MOTT MACDONALD

Gravesend Sludge Treatment Centre Environmental Permit Application

Environmental Risk Assessment

December 2024

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Issue and Revision Record

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A	September 2021	Natalia Cunningham	Shannon Stone	Anita Manns	Draft
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Contents

Tables

1 Introduction

1.1 Background and scope

This document has been prepared to support the application for the substantial variation of a Medium Combustion Plant Directive (MCPD)/Specified Generator (SG) Environmental Permit to a bespoke Waste Installation Environmental Permit (hereafter referred to as 'the Permit'), reference EPR/QP3337QC, for the Gravesend Wastewater Treatment Works (WTW) and Sludge Treatment Centre (STC) ('the Site') on behalf of Southern Water Services Limited ('Southern Water') or ('the Operator').

As part of the application for an Environmental Permit, operators must assess the risk to the environment and potential harm to human health from the activities they propose to undertake. This document provides the environmental risk assessment (ERA) considered relevant to the Site in accordance with the Environment Agency's 'Risk assessment for your environmental permit'[1].

1.2 Assumptions and limitations

The assessment of effects has been based on information sourced from relevant and applicable legislation, guidance and websites. It is assumed that all guidance documents produced by the Environment Agency are up to date and correct at the time of writing.

[1] Environment Agency (2023) Risk assessments for your environmental permit. Available online at https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

2 Site setting

2.1 Location

Activity address: Dering Way, Gravesend, Kent, DA12 2QF

National grid reference: TQ 66711 73969

A plan showing the boundary of the scheme is provided in 790101_MSDS_SiteLayoutPlan_GRA December 2024.

2.2 Geology

The Site is underlain by superficial deposits of Alluvium, which is a general term for clay, silt, sand, and gravel. To the south of the Site superficial deposits are noted as being absent.

The bedrock geology of the site consists of Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). These chalk formations are composed of hard to very hard nodular chalks and hardgrounds with interbedded soft to medium hard chalks. The softer chalks become more abundant towards to the top.

There are three boreholes recorded within 100m of the Site area, made ground was encountered in the top two metres.

2.3 Hydrogeology

The superficial deposits of Alluvium have been designated as a Secondary (undifferentiated) aquifer by the Environment Agency.

The bedrock geology is designated as a Principal aquifer by the Environment Agency, they may support water supply and/or river base flow on a strategic scale.

The Site does not lie within any Source Protection Zones (SPZ).

2.4 Hydrology

The Envirocheck Report (281083627_1_1) and online mapping indicates the presence of surface waters local to the Site. A drain is noted passing from north to south in the eastern area of the Site, historic maps indicate that this drain passes between five surface water ponds likely associated with Gravesend WTW in the western areas of the Site, however recent mapping indicates that these areas are overgrown and may only periodically host surface waters.

The Thames and Medway canal runs east to west occurring approximately 30m north of the Site, the River Thames is located 280m north of the Site. This area is impacted by tidal action.

The Site is located within a Flood Zone 3 (less than 1 in 100 annual probability), the area is also registered as an area which is benefitting from flood defences. Flood defences are noted as being present on the banks of the River Thames.

2.5 Protected Areas

The European designated habitat sites located within 10km of the Site include:

- North Downs Woodlands Special Area of Conservation (SAC), located 8km from the Site
- Thames Estuary and Marshes Special Protection Areas (SPA) and Ramsar, located 1.2km and 0.4km from the Site.

The national statutory designated sites located within 2km of the site are as follows:

- South Thames Estuary and Marshes Sites of Special Scientific Interest (SSSIs), located 143m from the Site.
- Higham Canal Sites of Importance for Nature Conservation (SINC) located 262m from the Site.

The priority habitats within 2km of the Site are listed below along with their distances and a description of their extent:

- Coastal and floodplain grazing marsh on the Site.
- Coastal Saltmarsh 311m from the Site.
- Deciduous woodland 1.2km from the Site.
- Mudflats 267m and 1.8km from the Site.
- Reedbeds 1.3km from the Site.
- Traditional orchard 1.2km from the Site.
- Coastal saltmarsh 1.8km from the Site.

Further discussion on impacts to natural habitats and ecology is provided in section 3.2.10 and Appendix A.

2.6 Other notable features

As shown in Figure A.4 Appendix A, there are three sensitive human receptors within 250m of the Site, including industrial estates, a Traveller's site and a residential area.

3 Environmental risks

3.1 Methodology

The ERA has been undertaken by identifying hazards and source-pathway-receptors and assigning a probability of exposure and a severity of consequence. These are assigned as described in Table 3.1 and Table 3.2 and are based on the generic risk assessments used for standard rules “SR2012 No11 and No12”, “SR2009 No 4” and “SR2008 No 19”, applicable to anaerobic digestion operations including use of the resultant biogas.

The probability and severity scores are then combined within a matrix to give an overall magnitude of the risk. This matrix is shown in Table 3.3 and is intended to illustrate the general approach to scoring.

Risks are categorised as either low, medium or high; this ranges from being a nuisance in some instances to potential health risks in others.

Table 3.1: Severity Index

Severity of harm	Severity index
Impact to people or designated receptor	High
Impact to non-designated receptor	Medium
All other impacts	Low

Table 3.2: Probability Index

Likelihood of harm occurring	Probability index
Harm is near certain or very likely to occur	High
Harm is likely to occur	Medium
Harm is unlikely	Low

Table 3.3: Magnitude of risk

Magnitude of risk	Probability index		
Severity index	**Low**	**Medium**	**High**
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

3.2 Risk assessment

3.2.1 Introduction

This section of the report identifies the potentially sensitive receptors within the vicinity of the Site and assesses the environmental risks within the following categories:

- Point source and fugitive emissions to air;
- Point source and fugitive emissions to water and land;
- Noise and vibration;
- Odour;
- Litter, mud and debris;

- Vermin and insects (pests);
- Human health and environment safety (i.e. visual impacts, site security, flood risk); and
- Natural habitats and ecology.

The methodology used to assess and screen the environmental risks for each category is discussed in turn in the following subsections. The need for further detailed assessments and/or management plans, where applicable, is also elucidated upon.

An assessment of the overall and residual risk is provided in Appendix B. For each hazard there is the identification of the pathway and receptor and the mitigation proposed in order to reduce the residual risk.

3.2.2 Point source and fugitive emissions to air

3.2.2.1 Air quality

The CHP unit is currently permitted under the permit number EPR/QP3337QC which also allows for the operation of one Tranche B Specified Generator aggregated to <50MWth at a specified location.

The permit allows Southern Water to operate the following at Gravesend WTW and STC:

- One biogas fuelled CHP engine providing excess electricity for export to the National Grid and providing heat to the digesters on the Site. The engine has a rated thermal input of 1.23MWth.
- One diesel back-up generator which has a rated thermal input of 2.68MWth and operates for less than 50 hours per year.

The Site was assessed for air emissions and requirement for an ADM when the Tranche B Specified Generator permit was granted in 2019. The Gravesend STC includes two dual-fuel (biogas/gas oil) boilers, which operate as duty/standby. One of these boilers was replaced in December 2023 with a 0.88MWth input Rehema boiler. The remaining boiler is a Beeston boiler with a thermal input of 1.1MWth. The boilers operate as backup in the event of a CHP engine failure in order to maintain digester temperature when the CHP engine is offline. Therefore, the CHP and boilers do not operate concurrently.

The Air Quality Assessment which accompanied the environmental permit application for this site, dated 14 January 2019, included only the emissions from the CHP and did not include emissions from the boilers in the assessment. This assessment assumed that the CHP would be operating at 100% load for a full year because this is a more conservative approach than modelling a split in operational hours between the CHP and boilers. This conservative approach is still valid with the replacement of one of the digester boilers and no update to the Air Quality Assessment and H1 screening assessment is necessary.

The operation of the flare will be prioritised for during emergencies, such as during CHP maintenance or downtime. In any other scenarios the imports of the biogas to the CHP unit will be controlled to reduce the time of operation of the flare where possible. Maintenance of the flare is undertaken annually.

Southern Water acknowledges that the flare is appropriate for emergency use (such as breakdown and maintenance). Southern Water confirms that they plan to retain the existing CHP and flare at Gravesend, as they meet the Site's requirements for biogas combustion. The flare has been tested and the emissions are compliant.

Gas modelling shows the site is not expected to flare outside of maintenance or emergency scenarios.

Additional work is required to ensure all BAT requirements are met (e.g. access platforms for testing, the required testing is fully adopted into BAU and related processes, ensure all required signals for data collation and reporting are provided, all specific requirements are met for MCERTs and M1 & M2 guidance).

The detail of this is under review and any identified scope will be completed in AMP8.

The flare use data forms part of wider data collation and reporting (IT) system improvements planned to meet BAT 2c for inventory, BAT 11 energy and has an influence on BATs 15b, 16b and 21c for incident reporting (re. PVRVs and gas system management).

Further information is being collated in line with discussions with the SSD LIA (KS) on 3/12/24 and will be provided in due course (regarding asset replacement plans and timescales but will be provided for all sites even though no asset replacements are required here).

The existing approaches and relevant procedures presented in the Environmental Management System (EMS) and operational procedures are considered to adequately address the emissions that may present a risk, and, therefore, an Emissions Management Plan (EMP) is not considered to be required.

3.2.2.2 Bioaerosols

According to the Environment Agency guidance 'bioaerosol monitoring at regulated facilities (Jan 2018)', a bioaerosol risk assessment is required if a facility is within 250m of a sensitive receptor.

The sensitive receptors in relation to the Site are shown in Appendix A. The Site lies within 250m of three sensitive human receptors and, therefore, a bioaerosols risk assessment has been undertaken and is provided with the supporting documents of the permit application (Document 790101_ERA_BioaRA_GRA February 2024).

For new permits there is a requirement to monitor in accordance with Technical Guidance Note (TGN) M9 'environmental monitoring of bioaerosols at regulated facilities' if the Site is within 250m of a sensitive receptor. The TGN lists sources of bioaerosols and refers to ambient and point sources of emissions.

The bioaerosol risk assessment concluded that the Site poses an acceptable level of risk of bio-aerosol release and the STC activities do not endanger human health or the environment. This is primarily due to the control measures in place at Gravesend WTW which are considered to be effective at reducing and containing emissions from bio-aerosols, inhibiting the pathway between source and receptor. Subsequently, since the Site is found to be low to medium risk, a Bio-aerosol Management Plan is not required.

Best practice methods will be followed, during operation of the Site, to prevent the release of bioaerosols. These include methods and principles outlined in the Environment Agency's "Guidance on the evaluation of bioaerosol risk assessments for composting facilities"[2] and are described in Appendix B.

3.2.2.3 Abatement of other fugitive emissions to air

Environment Agency best practice guidance methods will be followed, during operation of the facility, to prevent the release of fugitive emissions. These are described in Appendix B.

[2] Drew, G.H., Deacon, L.J., Pankhurst, L., Pollard, S.J.T. and Tyrrel, S.F. (2009). Guidance on the evaluation of bioaerosol risk assessments for composting facilities. Environment Agency.

3.2.3 Point source and fugitive emissions to water and land

An assessment of the risks from the potential point source and fugitive emissions to water, sewers, land or groundwater is provided in Appendix B.

The Substantial Pollution Incident register in Landmark's Envirocheck report (Reference No: 281083627_1_1) has been used to provide details of the pollution incidents within the past five years. According to the report there has been no substantiated pollution incidents recorded within 250m of the Site within the last five year in relation to the STC.

3.2.3.1 Emissions to water (other than sewers)

No pollution incidents to water were reported in SWS' Site incident report in the last five years.

The Site lies within an area of groundwater flooding capability with potential flooding to property situated below ground level and at the surface. There are no groundwater source protection zones (SPZ) 250m of the Site. There are five groundwater abstractions within 250m of the Site, four of these licenses are operated by J Clubb Ltd and permits the use of water for mineral washing, these are located 98m and 125m northeast of the Site. The other is operated by Southern Water (abstraction licence 9/40/1/508G).

All drainage water including surface or foul water is captured by the drainage network which returns all water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters.

There will be no direct discharge of wastewater to controlled waters from the STC.

There are no direct potentially contaminated discharges to groundwaters. Condensate from the flare, CHP and the digester is returned to the head of the WTW. The condensate is clean, uncontaminated and discharges are small in volume.

Accidental releases of materials to the environment are controlled through adequate containment measures and working procedures.

The existing approaches and relevant procedures presented in the EMS and operational procedures are considered to adequately address the emissions that may present a risk, and, therefore, an EMP is not considered to be required.

3.2.3.2 Emissions to sewers, effluent treatment planets or other transfers off-site

There will be no point source emission or direct discharges to controlled waters, or public sewers, as part of the permit operation. Any liquid waste will either be reused or discharged to the drainage system of the adjacent Gravesend WTW and will undergo treatment through the works before being discharged under an existing water discharge permit. On-site WTW effluent will meet the requirements of the existing environmental permit for discharges to water. The water used at the Site will be contained in a closed circuit; all wastewater streams will either be recycled within the process or captured and rerouted to the adjacent WTW.

Discharges will be minimal, typically arising from periodic maintenance/cleaning operations. As such, there are no direct potentially contaminated discharges to controlled surface waters and no significant impacts. All drainage (surface water or foul water) will be captured by the on-site drainage system and returned to the WTW. A drainage plan of the Site is presented in document reference 790101_MSD_DrainagePlan_GRA November 2021.

The stormwater drainage of potentially contaminated areas from within the site boundary will be routed into the sewage treatment process with no discharge outside of the site. There will therefore be no risk of polluted runoff affecting off-site features.

Due to the anticipated very low levels of contamination of the water and the volumes involved, no monitoring of its composition is proposed prior to discharge to the WTW.

Any areas of the Site, where there is a risk of contamination of surface water, groundwater or discharge of process waters are located on impermeable concrete surface. All surface water from these areas drain to the WTW internal drainage system and are returned to the head of the works for treatment prior to discharge as final effluent.

3.2.3.3 Emissions to land

There will be no point source emissions to land as part of the activities carried out on-site.

The condensate from the gasbag, flare and digester is returned to the head of the works.

All raw materials are handled and stored within the confines of the buildings on-site, or in IBCs in bunded areas, with the exception of biogas which is contained within the gas handling system. Releases of raw materials to land are considered to be negligible, due to adequate containment of the materials within suitable storage vessels, the provision of bunding and the presence of a contained drainage system.

3.2.4 Noise and vibration

The Site has not received any noise complaints within the past five years (2019-2023). Initial screening has been carried out for the Site. Since the Site is not undergoing changes to equipment and vehicle movements prior to application submission, a Noise Impact Assessment (NIA) is not considered to be required. Appropriate mitigation for noise and vibration impacts are provided in Appendix B. The sensitive receptors located within 1km of the Site are shown in Figure A.4 of Appendix A.

Since noise and vibration impacts are considered to be appropriately mitigated in the ERA, a Noise and Vibration Management Plan is also not considered to be required.

3.2.5 Odour

A review of the nearest human receptors has been undertaken to establish the level of odour risk to the receptors before and after mitigation. Sensitive receptors to odour are users of the adjacent land, which may vary in their sensitivity to odour. As shown in Figure A.4 Appendix A, there are three sensitive human receptors within 250m of the Site, including industrial estates, a Traveller's site and a residential area.

Current odour mitigation measures to prevent and reduce odours from receipt of waste, transfer across the Site, treatment and storage of waste have been assessed and are detailed in Appendix B.

One odour complaint has been received between 2018 and 2023.

There are no proposed works to be undertaken on the Site in respect of this permit application, therefore, the activities on-Site are not anticipated to increase the off-site impact or result in adverse impact upon nearby sensitive receptors or the amenity of the area surrounding the Site.

The Site has an Odour Management Plan (OMP), amended in December 2024, which identifies potential odour emissions from site operations and procedures to manage, control and minimise odour impacts. It sets out the procedures for engaging with neighbours and how the Operator will manage complaints, and the actions to be taken in the case of pollution events. The OMP also describes the monitoring and maintenance procedures to maintain the control measures.

The OMP was written in accordance with the Environment Agency's H4 Odour Management guidance (2011). The level of odour risk from the Site is considered to be Low as shown in

Appendix B and the OMP provides sufficient mitigation. The Odour Management Plan can be found in document reference 790101_ERA_OdourMP_GRA December 2024.

3.2.6 Particulate matter, littler, mud and debris

Appendix B describes the aspects of the Site that generate litter, mud and debris within and outside the Site boundary and assesses their risk to the environment. Current waste management and site cleaning procedures (EMS308) have been assessed in the ERA table in Appendix B to justify whether additional measures could be required. Measures to prevent debris and dust leaving the Site have also been addressed, in addition to the sensitivity of nearby receptors and the effectiveness of existing measures to reduce the escape of dust.

The need for a dust management plan is triggered if the keeping and/or treating of biowaste in the open, including the finished material, is located:

- In, or within 2km of, an air quality management area for PM10;
- Within 500m of a sensitive receptor such as a home, school, hospital or nursing home, food preparation facility or similar; and
- Within 250m of a sensitive receptor when treating biowaste.

The key sludge and wastewater treatment processes of the Site are enclosed. Sludge cake is stored in open cake bays on the Site, but mitigation is in place to prevent dust emissions from presenting a risk (see Appendix B). Liming is also undertaken, occasionally, on indigenously produced cake within the cake bay.

Although the Site has been screened as being within 500 metres of sensitive receptors (see Appendix A), a Dust Management Plan is not considered to be required since operations and waste types used on-site cause minimal dust emissions and appropriate mitigation is in place.

3.2.7 Pests

Discussions with the Site operator during a site visit have addressed whether the Site activities are likely to attract pests, what measures are in place to deter pests and how effective these are. These are covered in Appendix B.

A pest contractor is used to manage any issues regarding pests at the Site, the frequency of the visits depend on the severity of the issue, ranging between monthly to 6 monthly. New flues have also been installed on the boilers to help control pigeon entry to the boiler house.

Pests are not considered to be an issue since the waste types handled on-site do not attract them, contractors regularly check the Site for pests and appropriate mitigation is in place. Since the residual risk is not deemed to be medium or higher, a Pest Management Plan is not considered to be necessary.

3.2.8 Human health and environment safety

3.2.8.1 Visual impacts

The Site is located in an area which is predominantly industrial and commercial usage, there is also a railway and canal located to the north of the Site. A Traveller's community is located to the south of the site, and there are two residential properties by the Site entry. The northern, western and eastern boundaries of the site are surrounded by mature trees. The ground is relatively flat and the Site contains no tall infrastructure other than the digester and the alternative storage tank.

Since no changes to the Site will occur prior to submission of this permit application, there will not be any changes in heights and configuration of the placement of equipment which could be

noticed by nearby receptors. Visual impacts from the Site to the two residential properties located by the site entry, and the Traveller's community located to the south of the Site are considered to be low.

3.2.8.2 Site security

Activities are managed and operated in accordance with the management system. The outer gate at the front of the Site is kept closed and has a removable pin to allow access by the residents of the two properties by the Site entry. There is a steel palisade inner front gate which is approximately 2.5m high. The inner gate has an Automatic Number Plate Recognition (AMPR) thermal and daytime camera facing it. Residents only have access through the outer gate to gain access to their properties, they cannot enter the inner site gate which is for Southern Water access only.

Palisade fencing (approximately 2.5m high) borders the whole of the operational Site except the area of the Site which is adjacent to the railway in the north, where there is chain link fencing with barbed wire (approximately 2m high) in place. There is a back gate which allows entry to the eastern undeveloped plot of land. There are a total of nine cameras on-site at the inlet, bulk storage tanks and back gate. Lighting is provided around the site to give good visibility at all times of the day and night. The Site is staffed 7 days a week, from 7am to 6pm Monday to Friday and 7am to 3pm on Saturday and Sundays.

Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to site. Repairs are undertaken in accordance with the EMS requirements.

Other risks relating to human health and the environment are presented in Appendix B.

3.2.8.3 Flood risk

Initial screening was undertaken to determine the flood risk for the Site. The data utilised for this study was published online by the Environment Agency and relates to the flood risk from surface water, rivers and the sea.

The Site is located within an area with potential for groundwater flooding to occur at the surface and with potential for groundwater flooding of property situated below ground level.

The Site is located within a Flood Zone 3, the area is also registered as an area which is benefitting from flood defences. Flood defences are noted as being present on the banks of the River Thames. The site is considered to be at medium risk of flooding from surface water, corresponding to a chance of flooding each year of between 1 in 100 (1%) and 1 in 30 (3.3%). The site is considered to be at low risk from flooding of rivers and the sea.

There are no direct potentially contaminated discharges to controlled surface waters.

Activities are managed and operated in accordance with a management system and management plans and procedures implemented, including (but not limited to) the removal and clean-up of spilled waste material, including sludge, cake etc. and other pollutants (this may also include removal of used spill kits and mobile bunds) before these could enter any flood waters if an event was to occur.

There have not been any reported flood events at the Site in the last five years.

Since no changes to the Site are planned prior to application submission, and no impacts to flood pathways or sensitive receptors are anticipated, a full flood risk assessment (FRA) (defined here as a detailed assessment involving bespoke hydraulic modelling work) is unlikely

to be required. When proposed changes do occur these are understood to be either of a relatively minor nature or are unlikely to significantly alter existing development footprints.

3.2.9 Natural habitats and ecology

Ecological features that are situated within set distances of the Site boundary have been identified and screened. For the following ecological features, the Study Area was defined as the following:

- Statutory designated European sites: Special Areas of Conservation (SAC), candidate Special Areas of Conservation (cSAC), Special Protection Areas (SPA), potential Special Protection Areas (pSPA), Sites of Community Importance (SCI) and Ramsar sites within 10km of the Site boundary;
- Statutory designated national sites: Sites of Special Scientific Interest (SSSIs), Marine Conservation Zones (MCZs), National Nature Reserves (NNRs), Local Nature Reserve (LNRs), Areas of Outstanding Natural Beauty (AONB) within 2km of the Site boundary;
- Non-statutory designated sites: Local Wildlife Sites (LWS), Ancient Woodlands, Country Parks, Sites of Importance for Nature Conservation (SINC), Kent Wildlife Trust Reserves within 2km of the Site boundary;
- Priority habitats: within 2km of the Site boundary. Priority habitats are those listed under Section 41 of the Natural Environment and Rural Communities Act (2006) and include deciduous woodland, grassland, heathland, reedbed, vegetated shingle, wood-pasture and parkland, marshes, mudflats and fens; and
- Granted European Protected Species (EPS) within 2km of the Site boundary. Licences available on Multi-Agency Geographic Information for the Countryside (MAGIC), data from Kent & Medway Biological Records Centre (KMBR). Accurate to within the nearest 100-200m depending on local council survey data accuracy.

No ecological field surveys have been completed to inform this screening. This screening identifies the likelihood of ecological features being present or further investigation being required.

Initial screening has been carried out for the Site, the high-level results of which are shown in Table 3.4. Where habitat sites are situated within the study area surrounding the Site, the relevant cells are highlighted in red and indicate the number of habitats sites located therein. Cells highlighted in green indicate that relevant habitat sites are not located within the specified study area. For cells highlighted in orange, there is potential for these protected species to be present within the study area.

Table 3.4: Results of initial screening of natural habitats and ecology for Gravesend STC

Natural habitats and ecology	Gravesend
Statutory designated European sites within 10km of the site boundaries	
Special Areas of Conservation (SAC)	1
Special Protection Areas (SPA)	1
Sites of Community Importance (SCI)	
Ramsar sites	1
Statutory designated national sites within 2km of the site boundaries	
Sites of Special Scientific Interest (SSSIs)	1
Marine Conservation Zones (MCZs)	
National Nature Reserves (NNRs)	
Local Nature Reserve (LNRs)	
Areas of Outstanding Natural Beauty (AONBs)	

Natural habitats and ecology	Gravesend
Non-statutory designated sites within 2km of the site boundaries	
Local Wildlife Sites (LWS)	
Ancient Woodlands	
Country Parks	
Sites of Importance for Nature Conservation (SINC)	1
Kent Wildlife Trust Reserves	
Priority habitats within 2km of the site boundaries	
Priority habitats	9
Protected species	
Common nesting birds, common reptiles, terrestrial and aquatic invertebrates, common amphibians: within a 10m buffer of the site boundaries	
Wintering birds: within a buffer of up to 500m of the site boundaries	
Species of nesting birds within a 200m buffer of the site boundaries	
Bats: within a 50m buffer of the site boundaries	
Badgers: within a 30m buffer of the site boundaries	
Hazel dormice: within a 20m buffer of the site boundaries	
Great crested newts - ponds within a 500m buffer of the site boundaries and terrestrial habitat within 10m	

One SAC, one SPA and one Ramsar site are located with 10km of the Site. However, it is considered unlikely that a Habitats Regulations Assessment (HRA) would be required for the Site because Environment Agency best practice methods will be followed, during the operation of the facility to prevent significant effects to designated habitats. These are described in Appendix B.

Any potential impacts to statutory designated European and national habitat sites have been considered in the ERA following review of the following site-specific information:

- Discharges to water and groundwater, emissions to air and land, and from dust, noise and vibration, from all activities on-site, particularly from the anaerobic digestion processes;
- Pollution prevention and mitigation measures, including for emissions and spills; and
- Site plans detailing storage arrangements and drainage plans.

South Thames Estuary and Marshes SSSI is located 143m from the Site. One SINC, Higham Canal is also located 262m from the Site, and nine priority habitats are located within 2km of the Site. Coastal and floodplain grazing marsh are located within the site boundary. It is considered unlikely that Site activities will impact these habitat sites. This is covered in Appendix B along with appropriate mitigation.

It is considered unlikely that Site activities would lead to the disturbance or removal of terrestrial habitats, and therefore protected species surveys are not considered to be required for the Site.

The proposal for a varied permit does not involve the removal of vegetation, or structural modification to built structures therefore, a Preliminary Ecological Appraisal is not considered to be required for the Site.

The application is to permit anaerobic digestion activities in order to meet the Industrial Emissions Directive (IED). The site has been operating in its current capacity for a number of years and mitigation measures already in place directly or indirectly prevent or limit harm to

existing habitats and species, as shown in Appendix B. No changes to operations are proposed and therefore the current risks posed to these habitats and species are likely to improve upon granting of the permit.

A. Environmental Constraints Maps

Figure A.1: Statutory designated habitat sites within 10km of the Site

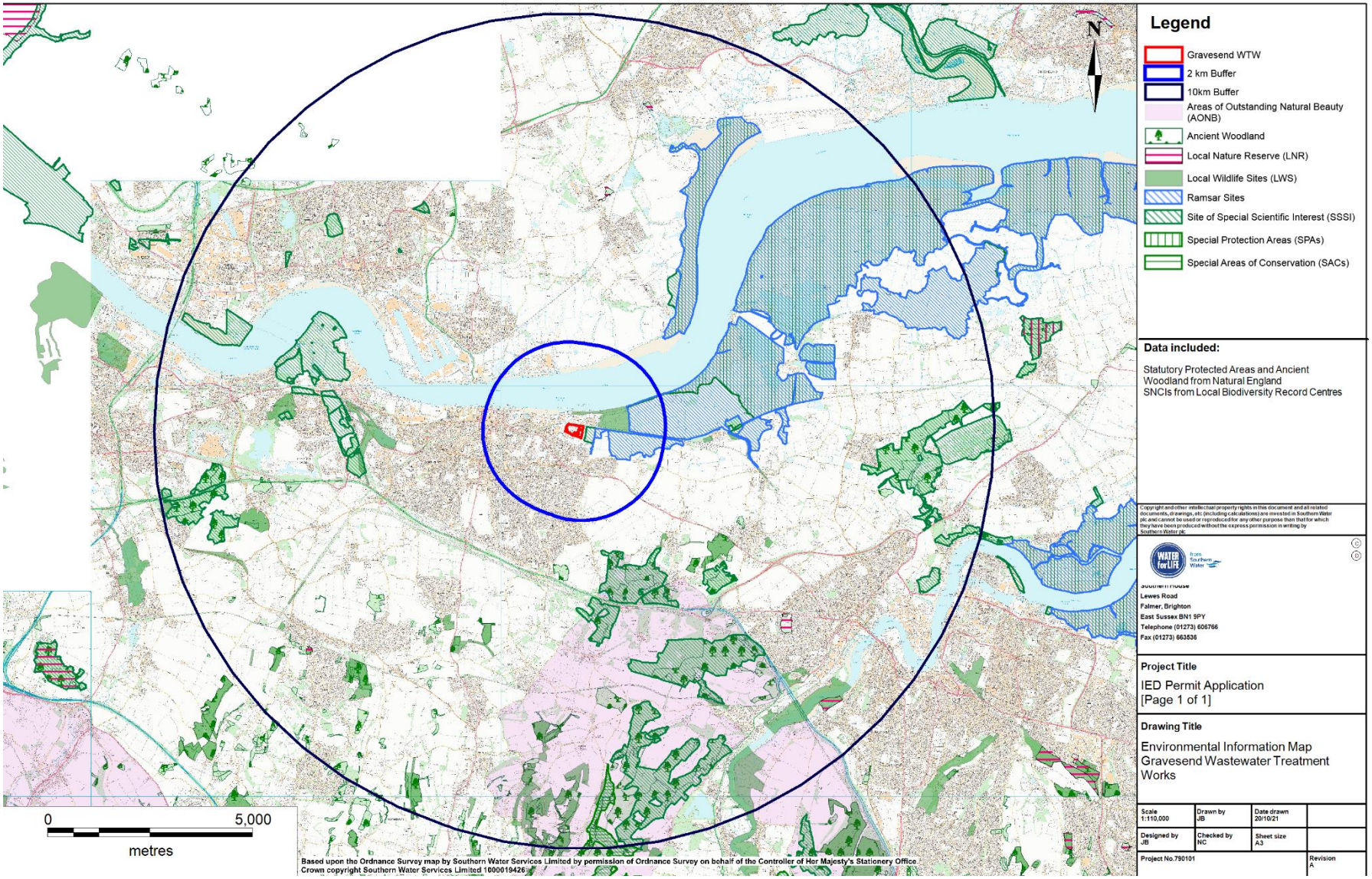


Figure A.2: Non-statutory designated habitat sites within 2km of the Site

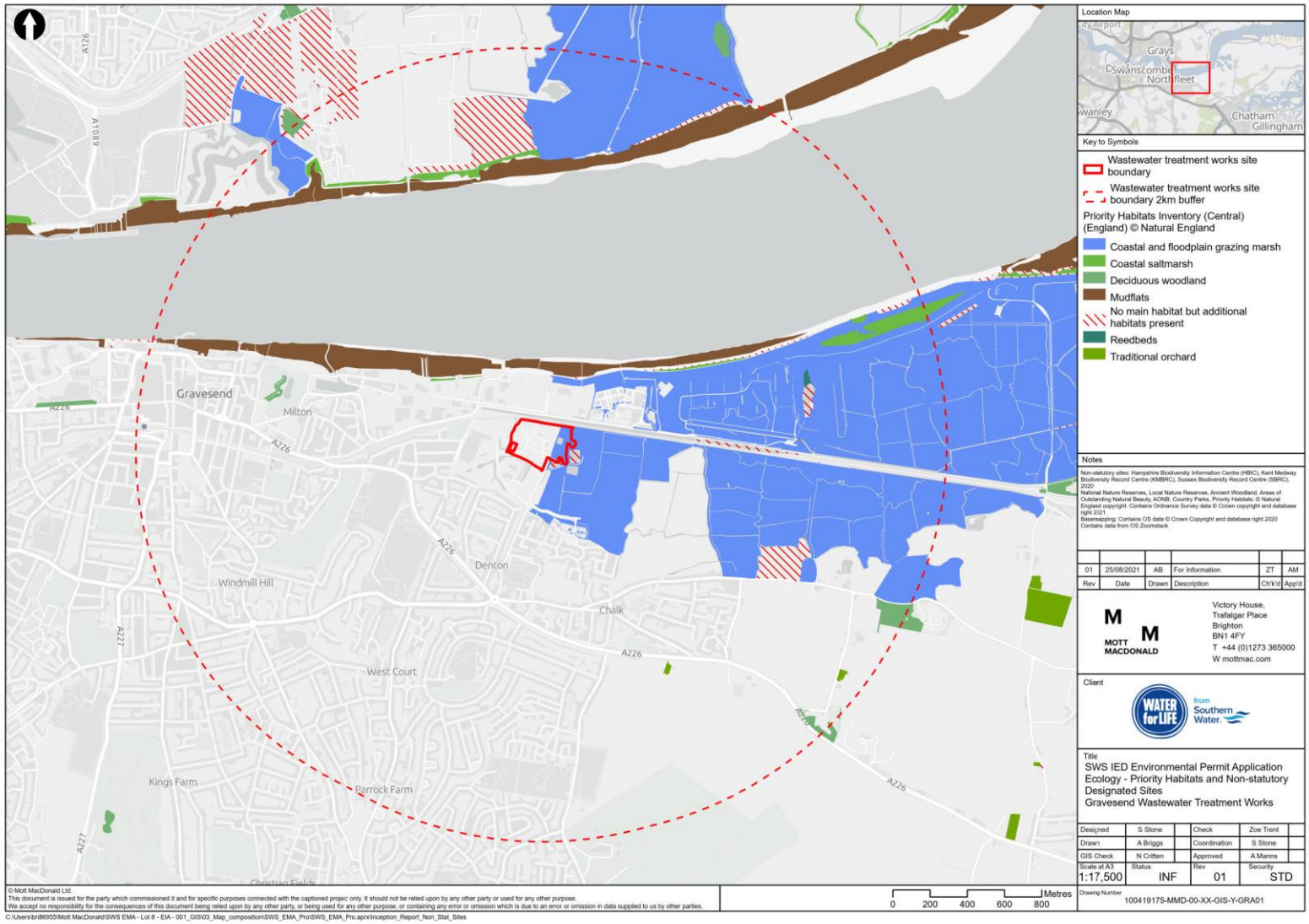


Figure A.3: Designated heritage sites within 1km of the Site

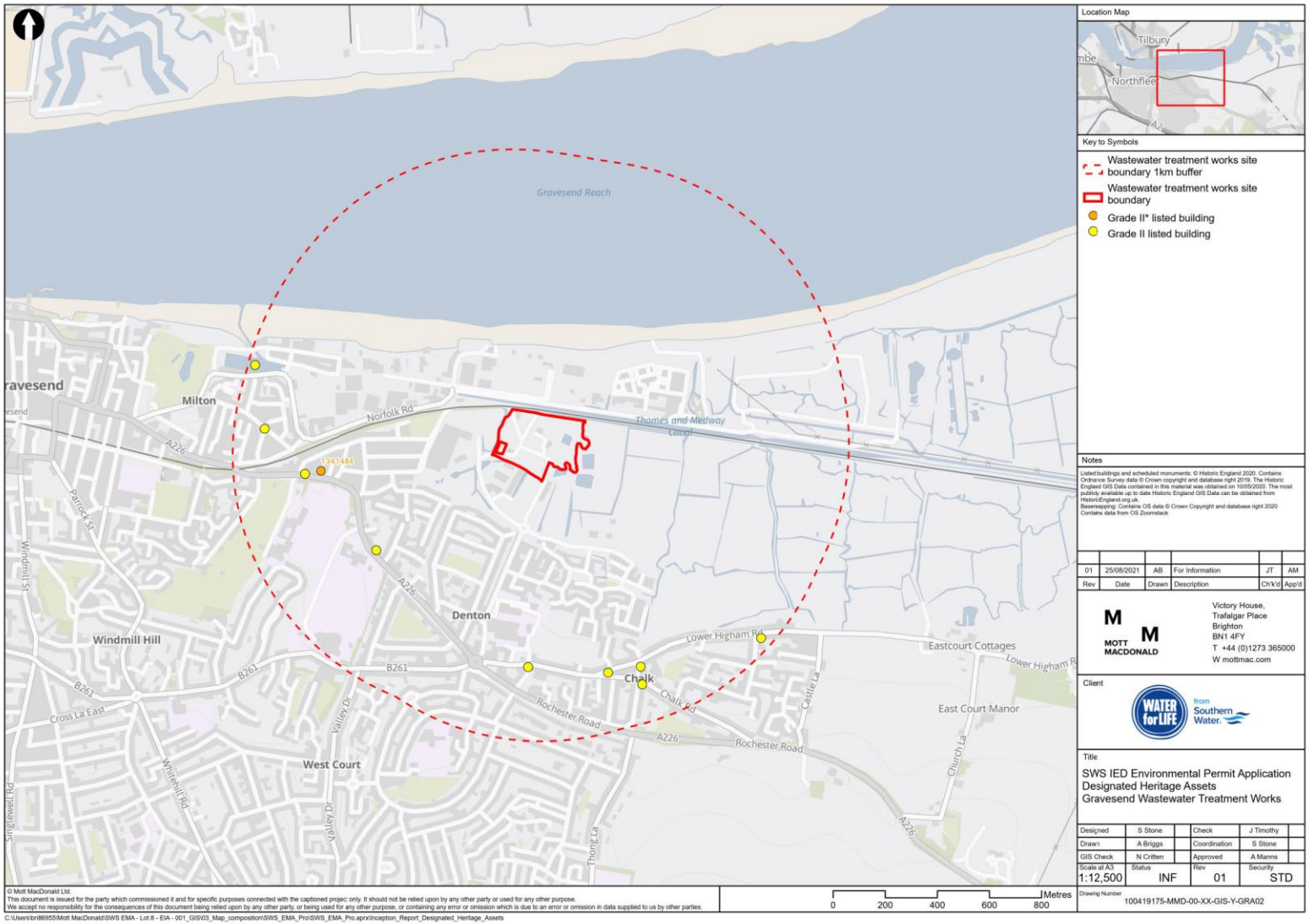
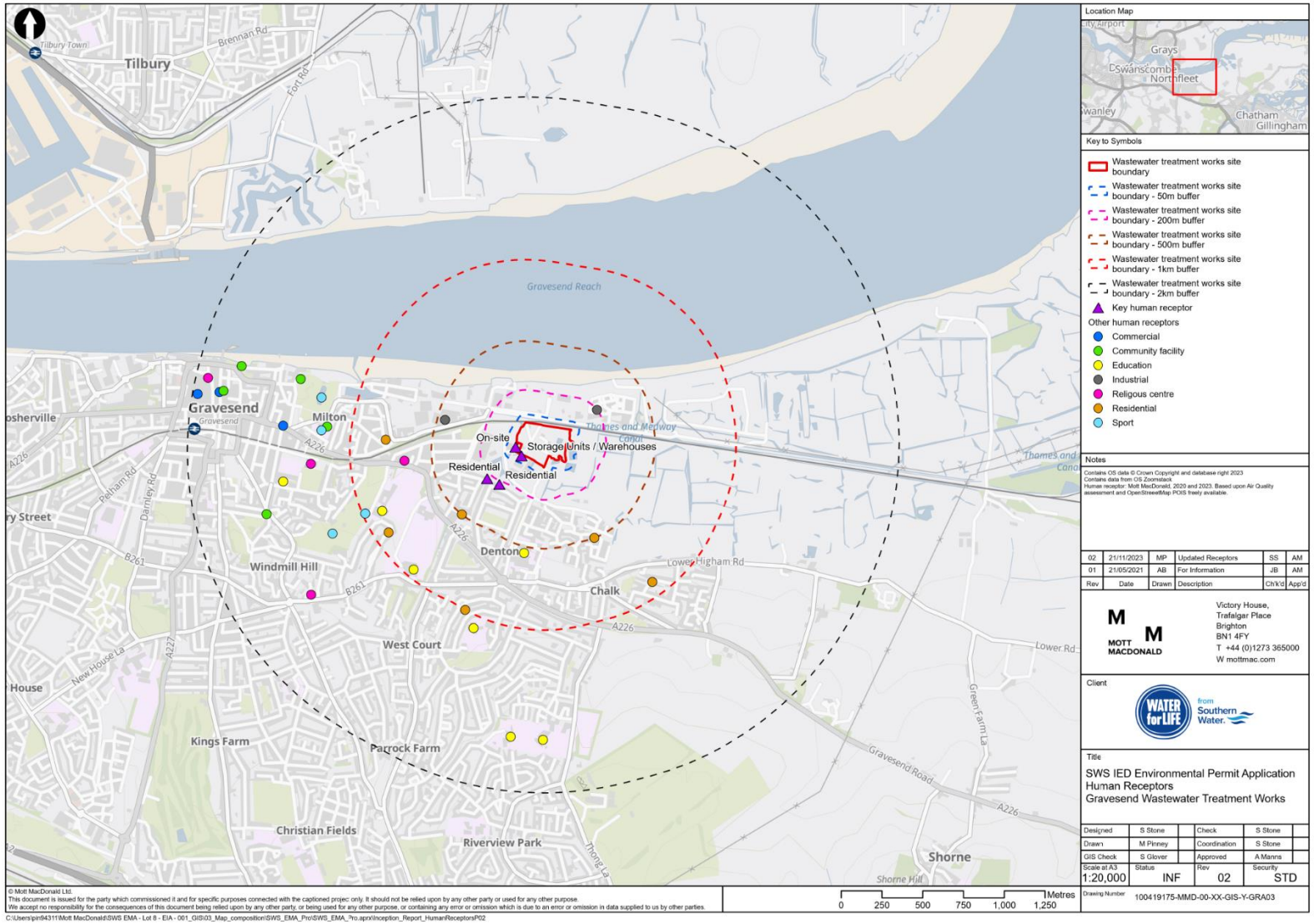


Figure A.4: Sensitive receptors within 2km of the Site



B. Environmental Risk Assessment Table

Emissions to air									
Data and information				**Judgment**				**Action (by permitting)**	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Local human population	Releases of NO2, SO2, CO, NH3 and other gases	Harm to human health – respiratory irritation and illness	Air transport then inhalation	Low	Medium	Low	There is potential for exposure to anyone living close to the Site or at locations where members of the public might be regularly exposed.	Activities will be managed and operated in accordance with the EMS. This will include regular inspection and maintenance of associated equipment. Point source emissions to air will be monitored in line with the permit requirements and any relevant TGNs including M2 and will meet Monitoring Certification Scheme (MCERTS) standards, where suitable and available. NOx and GHG emissions are controlled by emission limits. Storage of high ammonia bearing material will be covered at all times. Any emissions of substances harmful to human health not controlled by emission limits (excluding odour and noise) shall not cause pollution	Low
Local human population	Release of unburnt biogas	Harm to human health – respiratory irritation and illness. Release of potent climate change gases	Air transport	Low	High	Medium	There is potential for exposure to anyone living close to the Site or at locations where members of the public might be regularly exposed. There is one flare present on-site, which is understood to operate during emergencies only, such as during CHP maintenance or downtime.	Activities shall be managed and operated in accordance with the EMS and will include measures covering inspection and maintenance of equipment, including engine management systems. Point source emissions to air will be monitored to ensure emission limits for biogas are not exceeded, in accordance with permit requirements and any relevant TGN's including M2. There are pressure release valves on: 2 x per digester (2 total) 2 x gas holder (2 total) 2 x per PDST (2 total) Operational record including date, time duration of pressure relief events and calculated annual mass release. Linked to SCADA. The flare is appropriate for emergency use (such as breakdown and maintenance). There is no plan to replace the existing CHP and flare at Gravesend as they meets the Site's requirements for biogas combustion. However, work is likely to be required to be fully BAT compliant for access, ports and measuring/monitoring devices.	Low
Domestic properties, local human population, local amenity, site staff, visitors and offices. Haul roads, public highways.	Releases of particulate matter (dust) from cake and storage bays. Transport off-site	Nuisance, loss of amenity.	Air transport then deposition	Medium	Low	Low	Local residents and the surrounding environment are often sensitive to dust. Dust may be produced from dirt deposits from vehicles or other users of the haul road and treatment and storage of cake. The waste types used on-site are unlikely to cause dust emissions. Therefore, the magnitude of risk is considered to be low.	No wastes consisting solely of dusts are accepted. General operations at the Site do not create dust materials. There are seven cake storage bays on-site, each cake bay takes on average 4 weeks to fill. Cake is transferred from the centrifuge building by conveyor dropped into the distribution area. From there it is moved to the cake bays each day by a telehandler each day. Cake bays are in good condition including drainage, the walls are approximately 2.5m high. Vehicles, equipment and impermeable surfaces are swept and washed down when necessary. Internal	Low

								roads are swept, as required, to reduce the likelihood of any dust becoming airborne. Vehicles removing cake from site are kept covered, whilst in transport to prevent the escape of waste. Trucks removing cake from the Site and telehandler pass through a wheel wash system before exiting the area of the cake bays. The wheel wash is currently out of service but is due to be made operational again. There are water hoses available on-site to use while the wheel wash is out of service. A hosepipe is used to wash the road between bays when moving cake. A road sweeper is used once per year. There are no additional dust suppression techniques e.g. mist spray etc employed on-site as this is not considered necessary. Lime treatment for cake in bays south of the conveyor belt takes place at the Site only in adverse (wet) weather only. This activity is therefore not dusty by nature.	
Local human population.	Release of microorganisms (bioaerosols)	Harm to human-health – respiratory irritation and illness.	Air transport then inhalation	Low	Medium	Low	The permitted waste is non-hazardous sludge in liquid and cake form. The nature of waste and the 'wet' processes undertaken on-site are not likely to cause a release of bio-aerosols. Most of the key sludge treatment processes of the Site are enclosed. Emergency situations such as failure of the flare of CHP/boilers could result in uncontrolled emissions of bioaerosols.	Multiple control measures are in place at the Site which reduce and contain emissions of bioaerosols from the processes on-site by inhibiting the pathway between source and receptor. On average the Site accepts four tankers per day of liquid sludge imports. The liquid sludge is pumped from a tanker directly into the imported sludge storage tank. Most of the key sludge processes of the Site are enclosed, however the cake bays are uncovered. The conveyor which transports the cake from the centrifuge building to the distribution area is not in an enclosed building. Sludge reception is all enclosed, with material being imported into reception tank via hose. And sludge treatment and storage tanks are all sealed. Once in the bay cake is not turned, it is left to mature for approximately 2 months, a cake bay is emptied in approximately 2 days. Any emergency event would be temporary and infrequent due to the extensive monitoring and maintenance programmes undertaken at the Site as well as the emergency procedures and warning systems in place. Combustion of biogas occurs at very high temperatures in the CHP, boilers and flare, which would destroy bioaerosols. Stringent loading and unloading procedures are in place for receipt of sludge and liquor. Lorry and tanker drivers are required to hose down any spillage after each loading or unloading and clean contaminated wheels before leaving site. Liming only takes place on-site during adverse (wet) weather.	Low

								A Bio-aerosol Risk Assessment has been undertaken to assess the risks of bio-aerosols from the site. This identifies that bio-aerosol risks are low to medium.	
Emissions to water and land									
Data and information				**Judgement**				**Action (by permitting)**	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
All surface waters close to and downstream of the Site.	Tank failure, spillages of digestate and/or liquids including oil. Damage to drainage system. Spillage of raw materials of sludge/liquor during delivery/storage. Contaminated run off from cake storage e.g. containing suspended solids.	Aquatic or chronic effects to aquatic life, contamination, and water deterioration of water quality.	Direct run-off from the Site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer. Transport through soil/groundwater then extraction/ abstraction at borehole or intake.	Low	High	Medium	Potential for leaks from digestions tanks, storage vessels/bays and drainage system which may cause contamination or deterioration of surface water quality. The hardstanding and pavement across the site is in reasonable condition. There is no bunding around the tanks on-site and the ground is mostly permeable gravel. Areas of pavement and hardstanding have kerbs to force water to drains, all water flows to the drainage network which diverts all water to the head of works. Quantities of liquids stored are generally low. There are five surface water ponds in the western part of the Site, however recent mapping indicates that these are overgrown and may only periodically host surface water. The Thames and Medway canal runs east to west, occurring approximately 30m north of the Site, and the River Thames is located 280m north. No substantiated pollution incidents are recorded within 250m of the Site in the last five years, in relation to the STC.	The Site drainage plan is documented and all staff are trained in the event of emergency or accident. Drainage and cake bays are in good condition, there are drains running along the entrances to cake bays and at the end of the road through the centre of bays. Tanks are in good condition based on visual checks. In 2021, the digester was emptied and surveyed. In October 2021 refilling of the digester begun, and the digester is back in use currently. Impermeable surface and secondary containment, in the form of constructed bunds or portable bunds, is in place around storage areas of all wastes and raw materials surrounding the STC and WTW. Additional containment around digesters and other storage vessels is subject to a risk assessment and will be undertaken as part of the BAT requirements and in accordance with the Construction Industry Research and Information Association (CIRIA) standard 736. Hardstanding is planned to be constructed (based on the recommendations of the CIRIA risk assessment) around the digester. All transfer of digestate and material takes place under supervision and with flow rate control. All tanks undergo a delegated inspection regime and the process parameters are monitored and understood by Site operatives. Digestion tanks are built to appropriate standard and require appropriate bunding. There are seven cake storage bays on-site, all of which are in good condition and with walls approximately 2.5m high. The current cake storage on-site will be sufficient to store the quantity of cake being produced. Activities are managed and operated in accordance with the EMS. Spill procedures are in place under EMS363 and 364 as well as a pollution prevention procedure EMS360 All spillages are recorded in the site diary including actions taken. Trucks removing cake from the Site and telehandler also pass through a wheel wash system before exiting the area of the cake bays. The wheel wash is currently out of service but is due to be fixed made operational again. There are water hoses available on-site to use while the wheel wash is out of service. A hosepipe is used to wash the road between bays when moving cake.	Low
Abstraction from watercourse downstream of facility (for agricultural or potable use).	Spillage of liquids, contaminated rainwater run-off from waste e.g. containing suspended solids.	Acute effects, closure of abstraction intakes.	Direct run-off from site across ground surface, via surface water drains etc. then abstraction.	Low	Medium	Low	Watercourse must have medium / high flow for abstraction to be permitted, which will dilute contaminated run-off. No substantiated pollution incident to water, air or land has been recorded within 250m of the Site in the past ten years.		Low
Groundwater, land and surface water	Spillages of liquids, contaminated rainwater run-off from wate e.g. containing suspended solids. Sludge/liquid spillages as a result of loss of tank/pipe integrity carelessness during transfer or overfilling	Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole or closure of abstraction intakes. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.	Transport through soil/groundwater then extraction at borehole or intake.	Low	Medium	Low	Potential for leaks from digestion tanks and storage vessels. There is one groundwater abstraction present on-site, operated by Southern Water, under a permit for the use of water for general washing/process washing. The abstracted groundwater is used for poly make-up only. There another four groundwater abstraction licenses operated by J Clubb Ltd which permit the use of water for mineral washing, these are located 98m and 125m northeast of the Site. Site infrastructure, hardstanding and drainage is generally in good condition with few cracks present. The ground surrounding tanks and the digester is mostly permeable gravel. Storage tanks are in good condition based on visual checks, the digester was in poor condition and was out of		Low

				Low	Medium	Low	service during the Site visit. Quantities of liquids stored are generally low.	A road sweeper is used once per year. Site Manager ensures the programme of Planned Preventative Maintenance (PPM) is implemented effectively to minimise the probability of equipment malfunction. Control of substances hazardous to health (COSHH) assessment undertaken for all raw materials. All drainage, surface and foul water is captured by the on-site drainage systems and rerouted to the head of the works. Regular inspections of the Site drainage systems and other equipment are undertaken, with any repairs and maintenance carried out if necessary. All complaints and other incidents are recorded in the site diary including actions taken. The condensate is discharged to the head of the works for treatment through the adjacent WtW.	
Groundwater, land and surface water	Spillages of sludge/liquids during transfer of imported and indigenous/unknown sludge and liquids from tankers.	Acute or chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole or closure of abstraction intakes. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.	Transport through soil/groundwater then extraction/ abstraction at borehole or intake.	Low	Medium	Low	Potential for spillage during transfer of liquid/sludge from tankers. On average the Site accepts four tankers per day of liquid sludge imports. Sludge is imported in tankers, and is unloaded via hoses into the reception tank. Cake is stored on the ground and limited to be present around the conveyor and cake bays, a hosepipe is used to wash the road between the bays when moving the cake. There is one groundwater abstraction present on-site, operated by Southern Water, under a permit for the use of water for general washing/process washing. The abstracted groundwater is used for poly make-up only. There another four groundwater abstraction licenses operated by J Clubb Ltd which permit the use of water for mineral washing, these are located 98m and 125m northeast of the Site.	Impermeable surface required for storage of all waste. Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented to reduce spills when transferring liquids/sludges from tankers. Established procedures in place for the acceptance of tankered trade waste (EMS387), waste duty of care (EMS380), operational waste procedures (EMS381) and waste rejection (EMS488). Compliance with the waste duty of care requirements to ensure waste accepted meets the permit conditions and relevant legislation. All liquid run off will be captured in the drainage network and returned to head of works.	Low
Groundwater, land and surface water	Damage to drainage system	Acute or chronic effects: to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.	Transport through soil/groundwater then extraction/abstraction at borehole or intake.	Low	Medium	Low	There is no leak detection of underground pipework on the Site, other than SCADA balances.	Site Manager ensures the programme of PPM is implemented effectively and inspections are carried out frequently to minimise the probability of damage to the drainage system.	Low
Groundwater, land and surface water	Flooding of site	If waste is washed off-site it may contaminate natural habitats downstream.	Flood waters	Low	Medium	Low	Permitted waste types are sludges/bio-solids, which may contain pathogens, so any waste washed off-site will add to the volume of the local post-flood clean up and may be hazardous to human health. The entire Site area is located within Flood Zone 3 (less than 1 in 100 annual probability). The area is also registered as an area which is benefitting from flood defences, and flood defences are noted occurring on the banks of the River Thames, 280m north of the Site area. Area is not known to flood, and there have been no previous floods recorded on the Site.	The drainage network sends water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters. Activities to be managed and operated in accordance with a management system and management plans and procedures implemented, including the removal of spilled waste and other pollutants (such as use of spill kits and mobile bunds) before these could enter any flood waters if an event was to occur.	Low

Noise and vibration

Data and information				Judgement				Action (by permitting)	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Local human population	Noise and vibration from the following activities: Vehicles delivering/removing wastes and materials. Vehicles arriving/leaving the Site.	Nuisance, loss of amenity, loss of sleep	Noise through the air and vibration through the ground.	Low	Low	Low	Local residents and site staff are often sensitive to noise and vibration. There have been no noise complaints received in the last five years. There are three sensitive receptors within 250m of the Site, including storage unit warehouses, and two residential areas.	Site will only accept imports within existing operating hours established in current Environmental Permit (fully complying with site's planning conditions). Vehicles do not exceed the site speed limit of 10mph and will not generate a great amount of noise. The main truck movements are away from residential housing and other sensitive receptors. Noise and vibration shall be minimised and not cause nuisance. Noise kept to a minimum during operating hours. Exceptional noisy operations e.g. construction – inform residents. Noise complaints to be investigated and actioned and remedial measures will be undertaken. All complaints are recorded in the site diary including actions taken.	Low
Local human population	Noise and vibration from the following activities: Waste treatment processing. Plant boilers and engines.	Nuisance, loss of amenity, loss of sleep	Noise through the air and vibration through the ground.	Low	Low	Low	Local residents and site staff often sensitive to noise and vibration. Majority of site operations are fully enclosed. There have been no noise complaints received in the last five years. There are three sensitive receptors within 250m of the Site, including storage unit warehouses, and two residential areas.	Limitation of operating hours established in current Environmental Permit (fully complying with site's planning conditions). Fans and condensate traps will be checked for water and fans and extraction systems checked. Most equipment is enclosed. Flare usage is kept to a minimum to reduce noise impact. The design has been developed to minimise noise off-site. All equipment is maintained either in house or by a sub-contractor such that noise and vibration are maintained within the required limits and to manufacturers recommendations. Where equipment is to be replaced, preference will be given to procuring quiet plant and silencing equipment. Proper maintenance of plant and equipment. There is no equipment on-site that can cause vibration nuisance at the local receptors. Nonetheless, equipment is turned off when not in use, where appropriate. Any complaints received are investigated and actioned in line with the complaint's procedure. All complaints are recorded in the site diary including actions taken.	Low

Odour

Data and information				Judgement				Action (by permitting)	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Local human population.	Odour from site activities	Nuisance, loss of amenity, (e.g. disruption during outdoor activities)	Air transport then inhalation	Low	Medium	Low	Local residents often sensitive to odour. Wide range of waste may cause odour issues at reception from wastes,	Odours are likely to be generated and released due to the nature of the wastes. There is one odour control units (OCU) on Site.	Low

							release of biogas and from digestate hence control measures adopted. One odour complaint has been received between 2018 and 2023. Conveyor to transport cake from the centrifuge building to the distribution area is not in an enclosed building.	OCU is connected to the STC, specifically the drum thickeners, the two liquor balancing tanks, the sludge reception tank, the sludge storage tank, and the combined thickened storage tank. This unit comprises off a bio-filter only. Imported sludge is unloaded into the reception tank via hose. All sludge tanks are covered. Hatches on drum thickeners are kept closed. Drum thickeners and centrifuge are in enclosed building. Sniff tests are performed by ops whilst walking around the Site. The majority of the site infrastructure in STC is enclosed, except the cake bays. Odour is monitored to ensure emissions are free of odorous compounds. The Site's Odour Management Plan, amended in February 2024, identifies potential odour emissions from site operations and procedures to manage, control and minimise odour impacts. Using appropriate measures, non-point source emissions of biogas shall be minimised. All available measures and Best Available Techniques will be implemented. All abatement systems are designed, monitored and maintained to treat specified emissions and off gases. Any emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution. Cake is stored in one of seven open cake bays and is normally left in place for approximately 2 months. Each bay takes approximately 4 weeks to fill. All waste is imported and exported in covered lorries or contained in tankers. Any complaints received are investigated and actioned in line with the complaints procedure.	
Local human population, domestic properties, site offices.	Spillages of odorous materials including oils, fuels, chemicals. Failure to clean up spillages. Contaminated spill equipment not disposed of appropriately.	Nuisance, loss of amenity.	Air transport, then inhalation.	Low	Medium	Low	Local residents and staff often sensitive to odour.	Procedures for dealing with spillages are covered in the EMS under EMS363 and 364 for the Site. There is also a Field Event Co-ordinators (FEC) Manual which provides spillage procedures for EP sites (FEC322). The Site Manager shall ensure all relevant staff are appropriately trained to use the spill kits and that all spillages are cleaned up immediately. All areas of the Site are to be cleaned regularly; Site Manager to oversee regular cleaning schedule, all staff trained on importance of good housekeeping and site cleanliness. All spills are recorded in the site diary including actions taken.	Low

Local human population, domestic properties, site offices.	Fugitive release of H2S.	Nuisance, loss of amenity.	Air transport, then inhalation.	Low	Medium	Low	Local residents and staff often sensitive to odour. Fugitive release, not expected to occur under normal operating conditions.	Activities are managed and operated in accordance with the EMS (and include inspection and maintenance of equipment, including engine management systems). H2S point source emissions to air are controlled in accordance with emission limits. A specialist unit equipped with carbon filters is used for air treatment and abatement to reduce odours and the generation of other gaseous compounds.	Low

Litter, mud and debris

Data and information				**Judgement**				**Action (by permitting)**	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Local human population, livestock and wildlife, domestic properties and local amenity.	Waste and litter on local and internal roads. Vehicles entering and leaving site.	Nuisance, loss of amenity and road traffic accidents.	Air transport then deposition.	Low	Low	Low	Local residents, surrounding environmental and animals sensitive to litter. There is some potential for litter to be generated from general site activities, but limited potential for it to leave the Site boundary. Cake is delivered to and removed from the Site in covered trucks.	All vehicles leaving the site which are transporting waste are to be covered to prevent waste/materials escaping from them. All waste produced from general site activities is kept in enclosed containers, or inside a building, prior to removing from site. All waste is removed by an external contractor when required. Trucks leaving the Site and telehandler pass through a wheel wash system before exiting the area of the cake bays. The wheel wash is currently out of service but is due to be made operational again. There are water hoses available on-site to use while the wheel wash is out of service. A hosepipe is used to wash the road between the bays when moving the cake Daily housekeeping around the site is managed by site ops, such as litter picking and sweeping of hardstanding, as well as cleaning the offices twice weekly. Road sweeper is used once per year. Regular inspections for litter and debris are undertaken. Nuisance management measures are included in the EMS and the site specific management plant. Details of the procedures SWS follows with regards to the controls of mud and debris and potentially polluting leaks and spillages can be found in EMS 360 and EMS 381. A Residue Management Plan has been produced for the Site which identifies the waste types generated and appropriate storage arrangements on Site.	Low
Local human population	Vehicles depositing mud and debris arriving/ leaving the Site.	Nuisance, loss of amenity and road traffic accidents.	Vehicles entering/ leaving the Site.	Low	Low	Low	Road safety issues – local residents often sensitive to mud on the road. Limited potential for mud and debris.	Activities shall be managed and operated in accordance with a site-specific management plan with overarching procedures set out in the EMS. Details of the procedures SWS follows with regards to the control of mud and debris and potentially	Low

								polluting leaks and spillages can be found in EMS 360 and EMS 381. Any mud or sludge arising from activities on-site is cleared up promptly. Trucks leaving the Site and telehandler pass through a wheel wash system before exiting the area of the cake bays. The wheel wash is currently out of service but is due to be fixed made operational again. There are water hoses available on-site to use while the wheel wash is out of service. A road sweeper is also used once a year. Any emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution. Vehicle routes are to be inspected regularly and swept where necessary.	

Pests									
Data and information				**Judgement**				**Action (by permitting)**	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Local human population	Vermin, birds and insects	Harm to human health from wastes carried off-site and faeces. Nuisance and loss of amenity.	Air transport and over land	Low	Low	Low	Permitted wastes are unlikely to attract scavenging animals and birds but certain areas may become nesting / breeding sites. The waste types handled on-site do not attract pests and contractors regularly check the Site for pests. Therefore, the magnitude of risk is considered to be low	Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented. Pest control measures are implemented under EMS227. A pest contractor is used on site, with the frequency of visits depending on the severity of the issue. Typically, frequency of visits ranges between monthly and 6 monthly. New flues have been installed on boilers to help control pigeon entry to the boiler house. All reports of pests are sent to the contractor who will investigate and report findings and outcomes and detail any actions required. Ensure waste cannot be accessed by scavengers. All waste produced from general site activities are kept in enclosed containers, or inside a building, prior to removing from site. Doors of buildings are to remain closed at all times when not in use. Regular inspection and maintenance of boundary fencing and buildings is carried out to prevent access to the Site. Well established and proven operational controls and procedures are in place, including regular inspection and monitoring of the Site for pests by contractors.	Low

Human health and environmental safety									
Data and information				**Judgement**				**Action (by permitting)**	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**

Local human population and local environment.	Flooding of the site.	If waste is washed off-site it may contaminate buildings / gardens / natural habitats downstream.	Flood waters	Low	Medium	Low	Permitted waste types are sludges/bio-solids, which may contain pathogens, so any waste washed off-site will add to the volume of the local post-flood clean up and may be hazardous to human health. The entire Site area is located within Flood Zone 3 (less than 1 in 100 annual probability). The area is also registered as an area which is benefitting from flood defences, and flood defences are noted occurring on the banks of the River Thames, 280m north of the Site area. There have not been any reported flooding issued from the Site previously.	All drainage is captured by the on-site drainage network sends, which sends all water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters. Activities to be managed and operated in accordance with a management system and management plans and procedures implemented, including the removal of spilled waste and other pollutants (such as use of spill kits and mobile bunds) before these could enter any flood waters if an event was to occur.	Low
Local human population and / or livestock after gaining unauthorised access to the installation.	All on-site hazards: machinery, wastes and vehicles.	Bodily injury, death.	Direct physical contact.	Low	Medium	Low	Potential injury to on-site personnel as a result of vehicle movements or equipment malfunction or misuse. Direct physical contact is minimised by activity being carried out within enclosed digesters so a low magnitude risk is estimated. Contact with waste is minimal with exception of leaks or spills from unloading of tanker and transfer of filter cake. The eastern plot of land is owned by the Operator, but is not used for Site operations. There is a permanent Traveller's site to the south of this plot of land, and they often use this land for their horses.	Overall management of the site is overseen by an experienced member of staff holding an appropriate Certificate of Technical Competence (CoTC) or Competent Management System (CMS) awarded by the Waste Management Industry Training and Advisory Board. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours. All operational staff are fully trained in the site operating procedures and SWS' safety and environmental management procedures and are kept up to date on changes. Training includes awareness raising of the potential on-site hazards and health and safety measures to adhere to. Preventative measures will be under continuous review as part of the EMS procedures. Activities are managed and operated in accordance with the EMS – this includes site security measures to prevent unauthorised access. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. The outer gate at the front of the Site is kept closed using a removable pin for residents to gain access. There is a second inner front gate which is steel palisade 2.5m high. The inner gate has an AMPR thermal and daytime camera facing it. Residents only have access through the outer gate to gain access to their properties, they cannot enter the inner site gate which is for Southern Water access only. Palisade fencing (~2.5m high) borders the whole of the operational site except the area of the Site which is adjacent to the railway in north, where there is chain link fencing with barbed wire (~2m high) in place. The back gate allows entry to the eastern undeveloped plot of land. There are a total of nine cameras on-site at the inlet, bulk storage tanks and back gate. Lighting is	Low

				Low	High	Medium		provided around the site to give good visibility at all times of the day and night. The Site is staffed 7 days a week, from 7am to 6pm Monday to Friday and 7am to 3pm on Saturday and Sundays. Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to site. Repairs are undertaken in accordance with the EMS requirements. Key sludge treatment and wastewater treatment activities undertaken within enclosed systems. Vehicle movements around the Site vary depending on what activities are being undertaken. Cake is moved to cake bays once a trailer is full. A cake bay is emptied approximately every two months, taking around two days to empty. Waste is removed as required. Therefore, frequent vehicle movements are typically undertaken only by site staff and maintenance contractors. Operator has produced a hazard review and risk assessment documents relating to this and other types of potential incidents, within the EMS, H&S and O&M manuals.	
Local human population and local environment.	Explosion of biogas causing release of polluting materials to air (smoke or fumes), water or land	Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or arsonists/ vandals. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.	Air transport Direct run-off from site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.	Low	High	Medium	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff. An explosion could cause injury to local residents and site staff from flying debris. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings. Permitted waste types limited to sludges and liquids.	The key sludge treatment and WTW processes are undertaken within enclosed systems such as the AD and biogas systems. Sludge storage tanks are all enclosed. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals – this includes site security measures to prevent unauthorised access. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS includes procedures relating to maintenance and inspection of bunding of tanks. Site Manager shall ensure the programme PPM is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions. Emergency operating procedures are in place. Adequate firefighting measures are implemented on-site.	Low
Local human population and local environment.	Explosion of pressurised tanks due to equipment and/ or process failure.			Low	Medium	Low	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke, fumes and material released from tanks may cause irritation, illness or nuisance to local residents and site staff. Impact from the tank explosion may cause external damages to other equipment, buildings located close to the epicentre of the explosion.		Low

						The main site entrance is secured by two gates. The outer gate at the front of the Site is kept closed using a removable pin to allow access for residents. There is a second inner front gate which is steel palisade 2.5m high. Residents only have access through the outer gate to gain access to their properties, they cannot enter the inner site gate which is for Southern Water access only. The inner gate has an AMPR thermal and daytime camera facing it. Palisade fencing (~2.5m high) borders the whole of the operational site except the area of the Site which is adjacent to the railway in north, where there is chain link fencing with barbed wire (~2m high) in place. The back gate allows entry to the eastern undeveloped plot of land. Lighting is provided around the site to give good visibility at all times of the day and night. The Site is staffed 7 days a week, from 7am to 6pm Monday to Friday and 7am to 3pm on Saturday and Sundays. To prevent unauthorised access of pedestrians, the Site also benefits from a CCTV system. There are a total of nine cameras on-site at the inlet, bulk storage tanks and back gate. Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to the site. Repairs are undertaken in accordance with the EMS requirements. A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on-site is wet anaerobic digestion. However, fire prevention and environmental fire risk assessment procedures are provided in the EMS, H&S manual and Safety Instruction Book (SIB) (EMS362, H&S204, H&S440, and SIB603). There is also Safety zoning of areas under DSEAR/PEXA on site and Smoking is only permitted in designated areas.	
Local human population and local environment	Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land. Equipment failure.	Low	Medium	Low	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings. Risk of accidental combustion of waste is minimal. Permitted waste types limited to sludges and liquids.	The key sludge treatment and WTW processes are undertaken within enclosed systems Storage tanks are enclosed. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals including, fire and spill management. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on site is wet anaerobic digestion. However, fire prevention and	Low

Local human population and local environment.	Arson and/or vandalism causing the release of pollution materials to air (smoke and fumes), water or land.	Low	Medium	Low	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings. Risk of accidental combustion of waste is minimal. Permitted waste types limited to sludges and liquids	environmental fire risk assessment procedures are provided in the EMS, H&S manual and Safety Instruction Book (SIB) (EMS362, H&S204, H&S440, and SIB603). There is also Safety zoning of areas under DSEAR/PEXA on site and Smoking is only permitted in designated areas. Firewater within a newly bunded area will be contained by the bund and allow for appropriate disposal. There will be no gravity hydraulic connection from the bund to the drainage system/return to head of works. Manual intervention by an operator will be required to start the pumps and remains subject to the pre-acceptance (sample/test) procedure to ensure the water is appropriate for discharge to head of works. In the event of an incident, depending on the nature of the contamination (firewater in this context) the product will be held within the bund and be subject to alternative disposal methods. Depending on the scale and nature of the incident this may include temporary holding in road tankers to facilitate safe recovery activities. The detail regarding this procedure remains subject to further evaluation as solutions are designed and implemented. Firewater use on other process/equipment areas (which either have existing, or will be provided with new, impermeable surfaces) will drain to site drainage systems. A robust means of isolating the site drainage from returning to the head of works is required. Where sites have pumped return to head of works stopping the pump and ensuring no hydraulic link (syphoning) is required. Where return to head of works is (or could be) gravity returned, a new isolation valve is required which is to be shut in the event of an incident. Implementation of these measures will ensure no firewater returns to the WtW without appropriate controls including sampling/testing. Further design development is underway to determine the most appropriate solution to address this requirement and ensure compliance. There is also safety zoning of areas under the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)/ Potentially Explosive Atmospheres (PEXA) on-site and smoking is only permitted in designated areas. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS and Safety Instruction Book (SIB) includes procedures relating to maintenance and inspection of bunding of tanks, spills and environmental incidents. Site Manager shall ensure the programme of PPM is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions. Emergency operating procedures are in place. Adequate firefighting measures are implemented on-site.	Low

								The gate at the front of the Site is kept closed using a removable pin for residents to access. There is a second inner front gate which is steel palisade 2.5m high. The inner gate has an AMPR thermal and daytime camera facing it. Residents only have access through the outer gate to gain access to their properties, they cannot enter the inner site gate which is for Southern Water access only Palisade fencing (~2.5m high) borders the whole of the operational site except the area of the Site which is adjacent to the railway in north, where there is chain link fencing with barbed wire (~2m high) in place. The back gate allows entry to the eastern undeveloped plot of land. There are a total of nine cameras on-site at the inlet, bulk storage tanks and back gate. Lighting is provided around the site to give good visibility at all times of the day and night. The Site is staffed 7 days a week, from 7am to 6pm Monday to Friday and 7am to 3pm on Saturday and Sundays. Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to the Site. Repairs are undertaken in accordance with the EMS requirements.	
Local human population and local environment.	Operator Error.	Pollution to air, land, surface water and groundwater and human health	Air transport, direct run-off from site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer. Transport through soil/ groundwater then abstraction.	Low	Medium	Low	Possible contamination to air, land, groundwater and surface water. Given the level of operator controls which are in place and management plans, it is considered the probability and magnitude will be low.	Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented. All equipment is checked under preventative maintenance plans and is checked and calibrated as per the manufacturer's instructions. Overall management of the Site is overseen by an experienced member of staff holding an appropriate Certificate of Technical Competence (CoTC) or Competent Management System (CMS) awarded by the Waste Management Industry Training and Advisory Board. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours. All operational staff are fully trained in the Site operating procedures and Southern Water's safety and environmental management procedures and are kept up-to-date on changes. Training includes awareness raising of the potential implications of failure to control operations and the potential impact on the environment. Preventative measures will be under continuous review as part of the EMS procedures. Emergency operating procedures are in place and detailed in the Site's Operational Contingency Plan Senior site-based management have direct responsibility for implementing risk management measures.	Low

Natural habitats and ecology									
Data and information				**Judgement**				**Action (by permitting)**	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Protected nature conservation sites – European and national designated sites. One SAC, one SPA, and one Ramsar site are located within 10km of the Site. One SSSI's, and one SINC are located within 2km of the Site, South Thames Estuary and Marshes SSSI is located only 143m from the Site, Higham Canal SINC is located 262m from the Site.	Any, but principally NOx.	Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc.	Air transport. Direct run-off from site across ground surface water drains, ditches etc. Indirect run-off via the soil layer. Transport through soil/ groundwater then abstraction.	Low	Medium	Low	Physical disturbance and emission to air, water or land may cause harm to and deterioration of nature conservation sites. However, impacts to these sites are considered to be unlikely.	Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented. Emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution. Storage of high ammonia bearing material will be covered at all times. Emission limits for stack gases are specified. BAT and appropriate additional mitigation measures set out in the EMS (EMS323, EMS223, EMS228 and EMS220), have been taken to prevent or where that is not practicable, to minimise, those emissions. As required by the Southern Water EMS various housekeeping and waste management practices are in place to monitor waste emissions. These include segregation of wastes according to their classification and nature, labelling waste and using designated storage containers.	Low
Protected species, including nesting birds, wintering birds, common reptiles, terrestrial and aquatic invertebrates, common amphibians, bats, badgers, hazel dormice and great crested newts.	Any, but principally NOx.	Harm to protected species through disturbance or removal of habitats.		Low	Medium	Low	Physical disturbance and emissions to air may cause harm to protected species. Great Crested Newts are also present on-site. The proposal for the Permit does not involve the removal of vegetation, or structural modification to built structures. It is considered unlikely, therefore, that Site activities would lead to the disturbance or removal of terrestrial habitats.		Low

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