MOTT MACDONALD

# Environmental Risk Assessment

Queensferry Sludge Treatment Centre

April 2022

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# Environmental Risk Assessment

## Queensferry Sludge Treatment Centre

April 2022

# Issue and Revision Record

| Revision | Date | Originator | Checker | Approver | Description |
|---|---|---|---|---|---|
| A | Jan 21 | J Simmonds | A Manns | A Manns | First draft |
| B | March 21 | J Simmonds | A Manns | A Manns | For draft submission |
| C | May 21 | J Simmonds | R Green | A Manns | Final submission |
| D | April 2022 | J Simmonds | R Green | A Manns | Amended for NDM |
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# 1 Introduction

## 1.1 Background and scope

This document has been prepared to support the application for a new bespoke Industrial Emissions Directive (IED) Installation environmental permit for the Queensferry Wastewater Treatment Works (WwTW) and Sludge Treatment Centre (STC) ('the Site') on behalf of Dwr Cymru Welsh Water (DCWW).

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 facility in accordance with the Environment Agency's 'Risk assessments for your environmental permit' Guidance.

Operations on-site include the recovery of sludge (non-hazardous waste) using biological treatment and the utilisation and flaring of resultant biogas, currently operating under a T21 exception at the site.

## 1.2 Assumptions and limitations

The risk assessment sets the requirements for the management of the permitted operations at the site including emission control measures. All control measures within the rules must be adhered to in order to obtain the permit.

# 2 Site Setting

## 2.1 Location

Activity address: Queensferry WWTW, Queensferry, Deeside, CH5 2DU.

National grid reference: SJ 322682

The boundary of the site is shown in red in **Error! Reference source not found.** and provided as document reference XX

**Figure 2.1: IED Permit Boundary (green)**

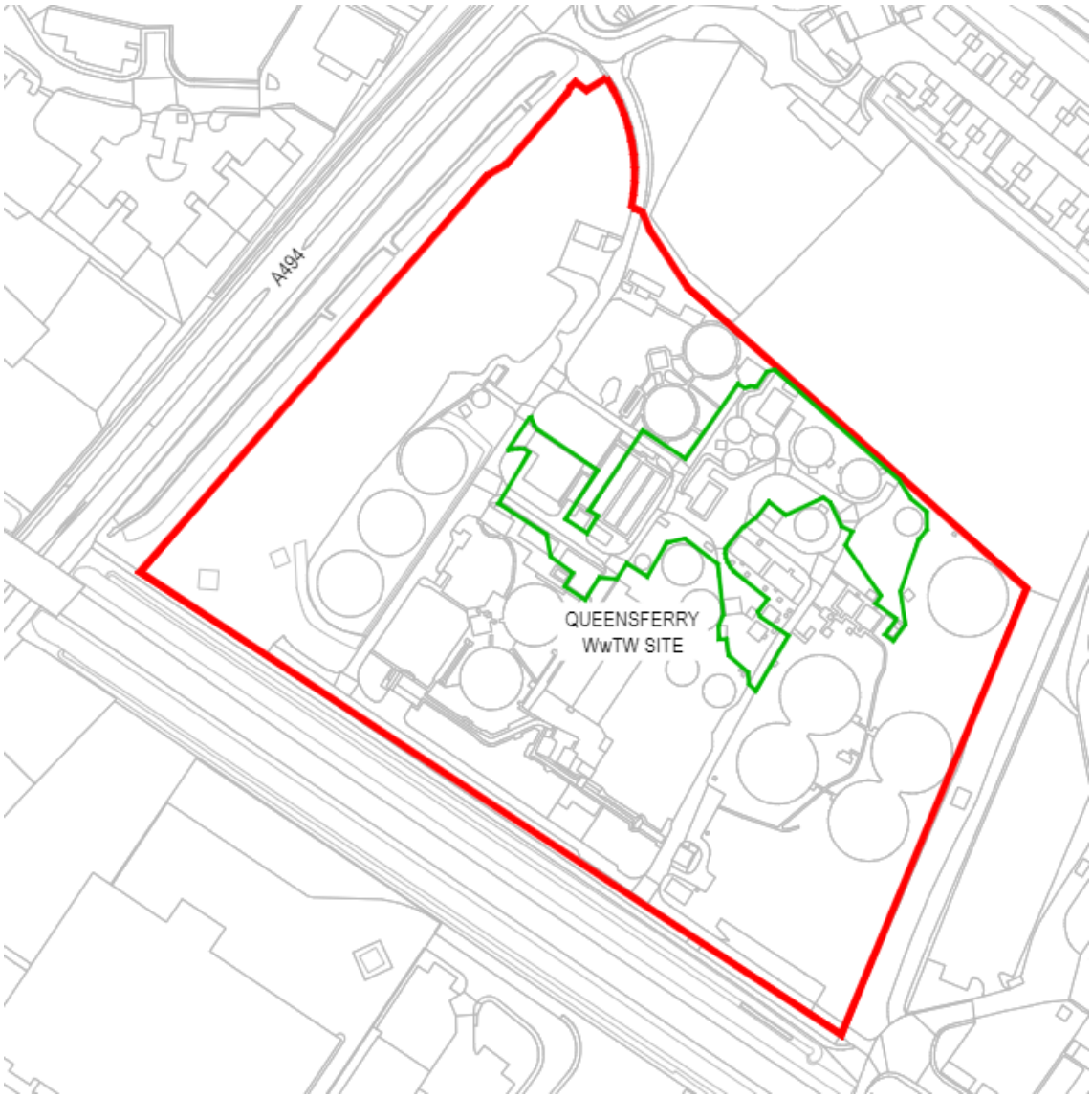
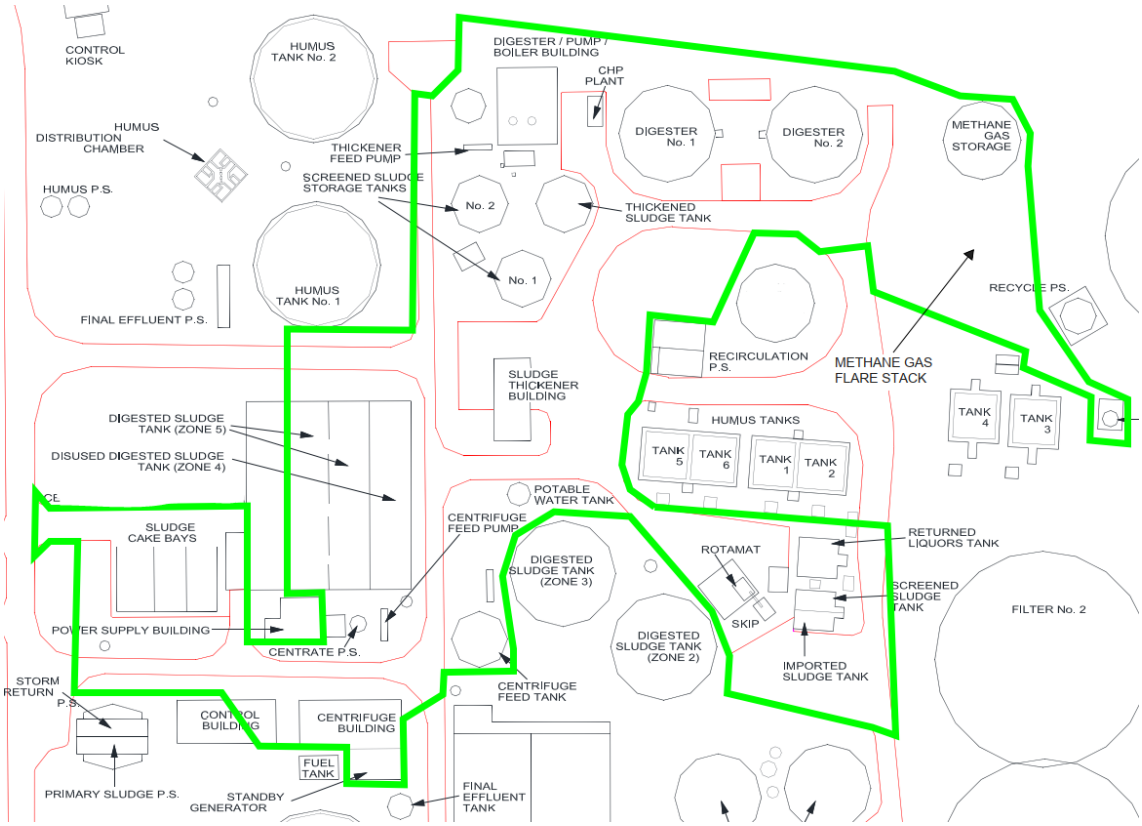


**Figure 2.2: Site Layout Plan (Assets labelled)**




## 2.2 Geology

Published geological mapping[1] shows the site to be underlain by the following descending sequence of geology:

**Table 2-1: Expected Underlying Geology**

| Strata | Description |
|---|---|
| Made Ground | Artificial deposits of variable composition. |
| Tidal Flat Deposits | *Normally a consolidated soft silty clay, with layers of sand, gravel and peat.* |
| Glacial Till | *Heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape.* |
| Pennine Middle Coal Measures Formation | *Interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams.* |

## 2.3 Hydrogeology

The Environment Agency classes the underlying Tidal Flat Deposits and Glacial Till as secondary undifferentiated aquifers and the Pennine Middle Coal Measures Formation as a secondary A aquifer.

Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value.

[1] British Geological Survey GeoIndex Onshore via: https://mapapps2.bgs.ac.uk/geoindex/home.html accessed December 2020.

Secondary A aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers.

The site is not located within a Source Protection Zone (SPZ).

## 2.4 Hydrology

The River Dee flows approximately from east to west 210m north of the site boundary. Sandycroft Drain (a drainage ditch) flows along the western boundary of the site into the River Dee.

A search of National Resource Wales' Public Register has been conducted. The records include a single water discharge activity permit relating to the site issued in 1996 (permit number: CG0367201) which is expected to related to the final effluent produced on-site. Gas condensate collected from the on-site digesters is discharged to an internal site drain which returns flows to the head of the works.

## 2.5 Protected Areas

Protected areas within 2km of the site boundary include:

- The River Dee Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) is located approximately 200m north of the site boundary; and,
- The Dee Estuary Ramsar site and Special Protection Area (SPA) is located approximately 1100m north-west of the site boundary.

Protected areas around the Site are shown in the environmental constraints maps included in Appendix A.

## 2.6 Other Notable Features

The Site is situated in a generally industrial area. It is bounded to the east by industrial units of Factory Road; to the south by the Chester & Holyhead railway line; to the west by the A494 (dual carriageway) and by a derelict site to the north.

The nearest residential properties to the Site are located approximately 90m south-west of the boundary. A caravan community has occupied an area approximately 110m north of the Site. These are identified in Figure A-4 in Appendix A.

# 3 Environmental Risk Assessment

## 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 **Error! Reference source not found.** and **Error! Reference source not found.** 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. The magnitude of risk uses professional judgement and site-specific knowledge and, as such, the general pattern in **Error! Reference source not found.** is not necessarily applicable to all risks.

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 Introduction

This section of the ERA identifies potentially sensitive receptors within the vicinity of the Site processes 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);

- Emissions to water and land;
- 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.

### 3.2.1 Point source and fugitive emissions risk

#### 3.2.1.1 Air quality

A high-level initial review of combustion activities on the Site has been carried out, using readily available information provided by Welsh Water. The Environment Agency's 'Risk assessments for your environmental permit' methodology was used, and has informed the risk assessment presented in Appendix B.

For potential human health effects, the pollutant of key concern is $NO_2$, although emissions of $SO_2$ and $CO_2$ have also been considered. Effects of atmospheric concentrations of NOx and $SO_2$ have also been assessed with respect to sensitive ecological sites. The method of the assessment has taken a conservative approach by assuming worst case conditions for a number of aspects including emissions characteristics, operating scenarios and metrological conditions.

As combustion activities are not being changed on site as a result of permitting the AD plant and associated processes, it is not anticipated that Air Quality Dispersion Modelling is required for this permit application. This is because the CHP engine and boilers do not require permitting under the Medium Combustion Plant Directive (MCPD) since they fall outside the scope of Medium Combustion Plant (MCP) and Specified Generator requirements under EPR 2018.

The flare will only operate during emergencies and when the CHP is on downtime for maintenance. Maintenance of the flare is undertaken annually. Overall impacts of all air pollutants are considered to be low.

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 Emissions Management Plan (EMP) is not considered be required.

#### 3.2.1.2 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 two sensitive receptors and, therefore, a bioaerosols risk assessment has been undertaken and is provided with the supporting documents of the permit application (Doc reference: B14411-123532-ZZ-XX-AS-NA-EI1041 - IED Queensferry - Bioaerosol Assessment).

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 bioaerosols risk assessment concluded that the Site poses an acceptable level of risk of bioaerosol release and the STC activities do not endanger human health or the environment. This is primarily due to the control measures in place at the Site, which are considered to be effective at reducing and containing emissions of bioaerosols, inhibiting the pathway between source and receptor. Subsequently, since the Site is found to be low risk, a Bioaerosol 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.

#### 3.2.1.3 Abatement of other fugitive emissions to air

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

### 3.2.2 Point source and fugitive emissions to water and land

An assessment of the risks from 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: 271638395_1_1) has been used to provide details of pollution incidents within the past five years. According to the report, there have been two recorded pollution incidents within 250m of the site (although not within the proposed permitted installation boundary). In 2002, a release of inorganic chemicals was recorded 73m north-west of the Site. This incident had no impact on waste, a significant impact on air (category 2) and a minor impact on land (category 3). In May 2018, there was a release of atmospheric pollutants and effects (smoke) 35m north-west of the site. There was no impact to land or water (category 4), but a significant impact to air (category 2).

#### 3.2.2.1 Emissions to water (other than sewers)

The water used at the Site will be contained in a closed circuit and all wastewater streams will be recycled within the process. The only emissions not returned to the process is uncontaminated surface water runoff. A drainage plan has been submitted with the application (Document reference: B14411-123532-XX-XX-DR-CC-CI8606 - IED Queensferry - Drainage Plan).

There have been no pollution incidents to water within 250m of the Site.

The site, including the proposed permitted installation, is not located within 250m of a Source Protection Zone (SPZ).

There are no known discharges to groundwater (historical/current) within 250m of the site, including the proposed permitted installation.

All drainage (surface water or foul water), including gas condensate collected within digesters will be captured by the onsite drainage system and returned to the WwTW via a return pumping station at the northwest of the Site.

There will be no point sources emissions from the Site. There are no direct potentially contaminated discharges to controlled surface waters.

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[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.

The majority of the wider WWTW site (except the eastern site boundary), including the proposed permitted installation boundary has the potential for groundwater flooding at surface level.

The site is located within Flood Zone 3 for flooding from rivers or sea without defences, due to its proximity to the River Dee.

Accidental releases of materials (i.e. spillages) to the environment are controlled through adequate containment measures and working procedures to minimise the risk of a significant impact from accidental spillages.

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.

#### 3.2.2.2 Emissions to sewers, effluent treatment plants or other transfers off-site

There will be no point source emissions or direct discharges to controlled waters or public sewers, as part of the permit operation. Drainage from the Site sends water to the head of the works for treatment.

Any liquid waste will either be reused or discharged to the drainage system of the adjacent Queensferry 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 discharge permit. 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 via a return pumping station. A drainage plan of the Site is presented in document reference B14411-123532-XX-XX-DR-CC-CI8606 - IED Queensferry - Drainage Plan.

#### 3.2.2.3 Emissions to land

There are no point source emissions or direct discharges to land. The condensate from the CHP exhaust, gas bag and digester is collected and returned to the head of the works. Discharges will be minimal, typically arising from periodic maintenance/cleaning operations, and is captured in spill trays.

All raw materials are handled and stored within the confines of the buildings on-site, or in intermediate bulk containers (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.

## 3.3 Noise and Vibration

The Site has not received any substantiated noise complaints in the last five years. Initial screening has been carried out for the Site. Potentially sensitive human receptors have been identified in residential housing as close as 90m from the site boundary. However, the site is situated in a largely industrial area adjacent to a dual-carriageway and railway. A noise measurement survey was undertaken in October 2017 by Environmental Compliance Ltd (ECL). The results of which are shown in document ST21-INC-000005 – Queensferry Noise Measurement Survey. Since the Site is not undergoing changes to equipment or 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 **Error! Reference source not found.** 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.

## 3.4 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 within 250m of the site are residents to the south-west and residents of the caravan park to the north

Following an odanet survey and dispersion modelling, it would be reasonable to state a figure of 5x odour complaints that have been associated with Queensferry over the past 3 years.

Odour dispersion modelling conducted by DCWW indicates that, under current operational conditions, odours from Queensferry WwTW might impact residential areas to the north and east of the site up to a distance of 900m, and commercial premises up to 600m. Based on this modelling, and the $H_2S$ level dispersion rates over this distance, it is considered that the WwTW is unlikely to be the cause of the odour complaints received.

DCWW have scheduled in Olfasense to conduct a new odour impact assessment on all IED sites during the Spring/Summer of 2022, in line with when odours are more prevalent. DCWW will then update the odour management plan (OMP), based on the outcome of this assessment, in accordance with the H4 guidance. In the interim, DCWW will continue to follow the existing odour management plan and odour impact assessment that was completed 2020 submitted with the application. The management of the odour risks at the Site is also addressed in the November 2020 Odour Management Risk Assessment and OMP. The current OMP provides mitigation measures to be followed by all staff to ensure normal operation does not result in odours leaving the STC boundary.

The existing odour management plan is therefore currently considered adequate.

## 3.5 Particulate Matter

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; or
- Within 250m of a sensitive receptor when treating biowaste

Appendix B describes the aspects of the Site that generates particulate matter such as dust within and outside the site boundary and assesses their risk to the environment. Current waste management and site cleaning procedures have been assessed in Appendix B to justify whether additional measures would be required. Measures to prevent 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 sludge and wastewater treatment processes of the Site are enclosed. Sludge cake is understood to be stored in the open in minor quantities on the Site, but mitigation is in place to

prevent dust emissions from presenting a risk. 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 procedures are in place.

## 3.6 Litter, 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 have been assessed in the ERA table in Appendix B to justify whether additional measures would be required. Measures to prevent debris, litter and mud leaving the Site have also been addressed, in addition to the sensitivity of nearby receptors and the effectiveness of existing measures to reduce their escape.

The type of waste handled on site is unlikely to create litter, mud or debris, such materials are more likely to be sourced from support works and contractors on site. Existing waste management and site cleaning procedures are considered adequate the residual is considered very low.

## 3.7 Pests (including birds, vermin and insects)

Discussions with the site operator have considered 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.

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 considered to be very low, a Pest Management Plan is not considered to be necessary.

## 3.8 Human and Environment Safety

### 3.8.1 Visual impacts

A treatment works has been on the site since the 1910s and it is situated in a generally industrial area. 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 are, therefore, considered to be low.

### 3.8.2 Site security

Activities are managed and operated in accordance with an EMS. Access to the Site is restricted by a combination of fence lines including a 3m palisade fence and 3.9m and 2.4m weldmesh fence. The Site also benefits from a CCTV systems, and intruder detection alarms. Security rated doors are present protecting key buildings. 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.

### 3.8.3 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 NRW and relates to the flood risk from surface water, rivers and the sea.

The majority of the wider WWTW site (except the eastern site boundary), including the proposed permitted installation boundary has the potential for groundwater flooding at surface level.

The site is located within Flood Zone 3 (high flood risk) for flooding from rivers or sea without defences, due to its proximity to the River Dee, which has a 1:1000 chance of flooding the site. The banks of the river (extending north-west / south-east) are recorded to be underlain by made ground (undivided), indicating that flood defences are present.

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.

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 FRA (defined here as a detailed assessment involving bespoke hydraulic modelling work) is unlikely to be required. When proposed changes to the Site do occur these are understood to be either of a relatively minor nature or are unlikely to significantly alter existing development footprints.

### 3.8.4 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 screening 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), 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) licences available on Multi-Agency Geographic Information for the Countryside (MAGIC), within 2km of the site boundary. Geographic Information for the Countryside (MAGIC), data from Wildlife Trust Reserves. 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. The following ecological conservation areas are located within 2km of the site boundary which are shown in the constraints mapping included in Appendix A:

- The River Dee Site of Special Scientific Interest (SSSI and SAC) - approximately 200m north of the site boundary; and,
- The Dee Estuary (Ramsar and SPA) - approximately 1100m north-west of the site boundary.

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 Queensferry STC**

| Natural habitats and ecology | Queensferry STC |
|---|---|
| **Statutory designated European sites within 10km of the site boundaries** | |
| Special Areas of Conservation (SAC) | 4 |
| Special Protection Areas (SPA) | |
| Sites of Community Importance (SCI) | |
| Ramsar sites | 1 |
| **Statutory designated national sites within 2km of the Site boundary** | |
| Sites of Special Scientific Interest (SSSIs) | 5 |
| Marine Conservation Zones (MCZs) | |
| National Nature Reserves (NNRs) | |
| Local Nature Reserve (LNRs) | 3 |
| Areas of Outstanding Natural Beauty (AONBs) | |
| **Non-statutory designated sites within 2km of the Site boundary** | |
| Local Wildlife Sites (LWS) | |
| Ancient Woodlands | |
| Country Parks | |
| Sites of Importance for Nature Conservation (SINC) | |
| Sussex Wildlife Trust Reserves | |
| **Priority habitats within 2km of the Site boundary** | |
| Priority habitats | |
| **Protected species** | |
| Granted European Protected Species (EPS) licences: within 2km of the site boundaries | |
| 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 | |

There are no SPAs located within 10km of the Site. Therefore, Habitats Regulations Assessment (HRA) is not 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.

One SAC is located within 2km of the Site. This is covered in Appendix B along with appropriate mitigation.

It is considered very 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 application for the permit does not involve the removal of vegetation, or significant structural modifications 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 Mapping

**Figure A.1: Designated Heritage Assets within 1km**

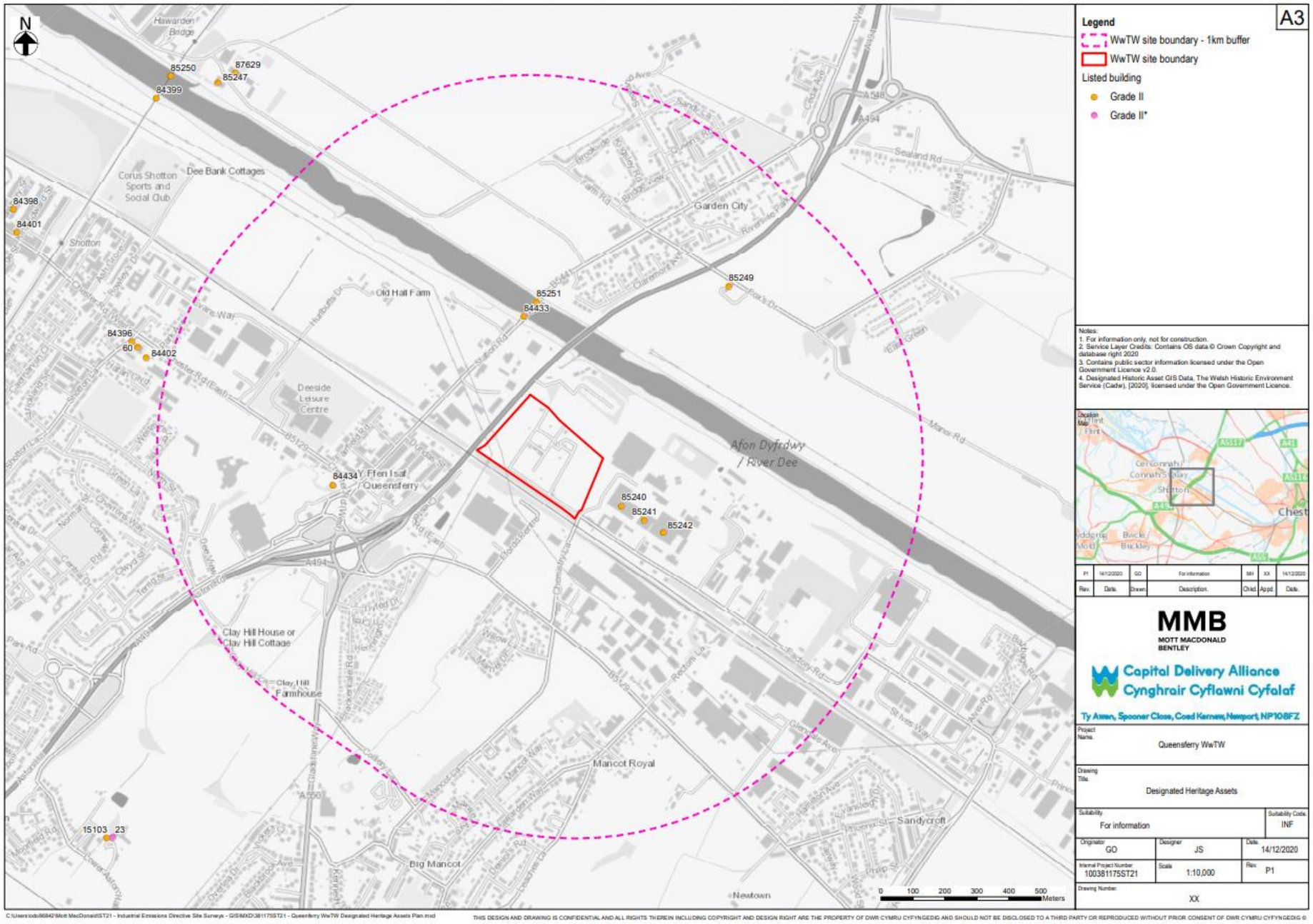


**Figure A.2: Designated Sites within 2km**

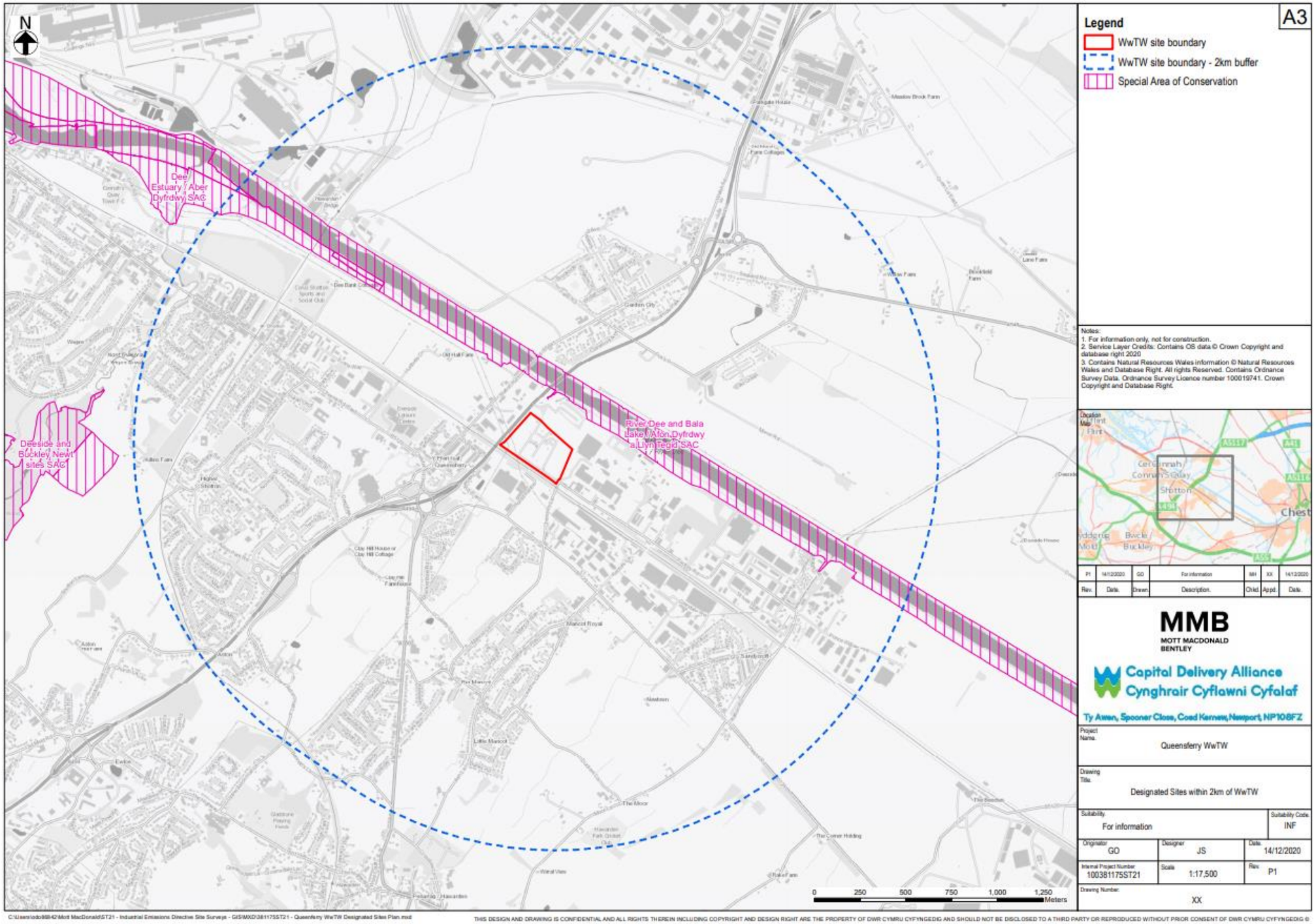


**Figure A.3: Designated Sites within 10km**

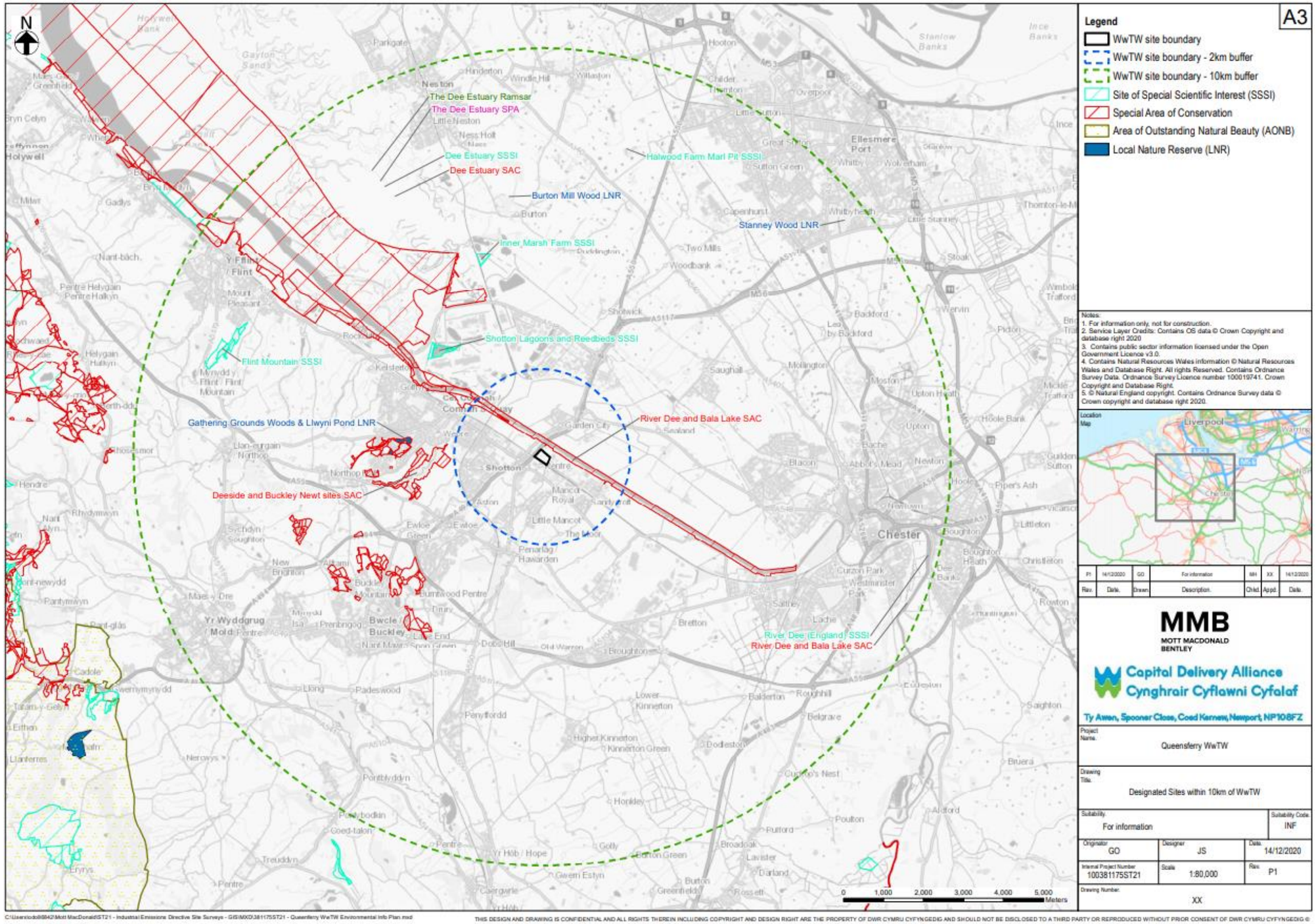
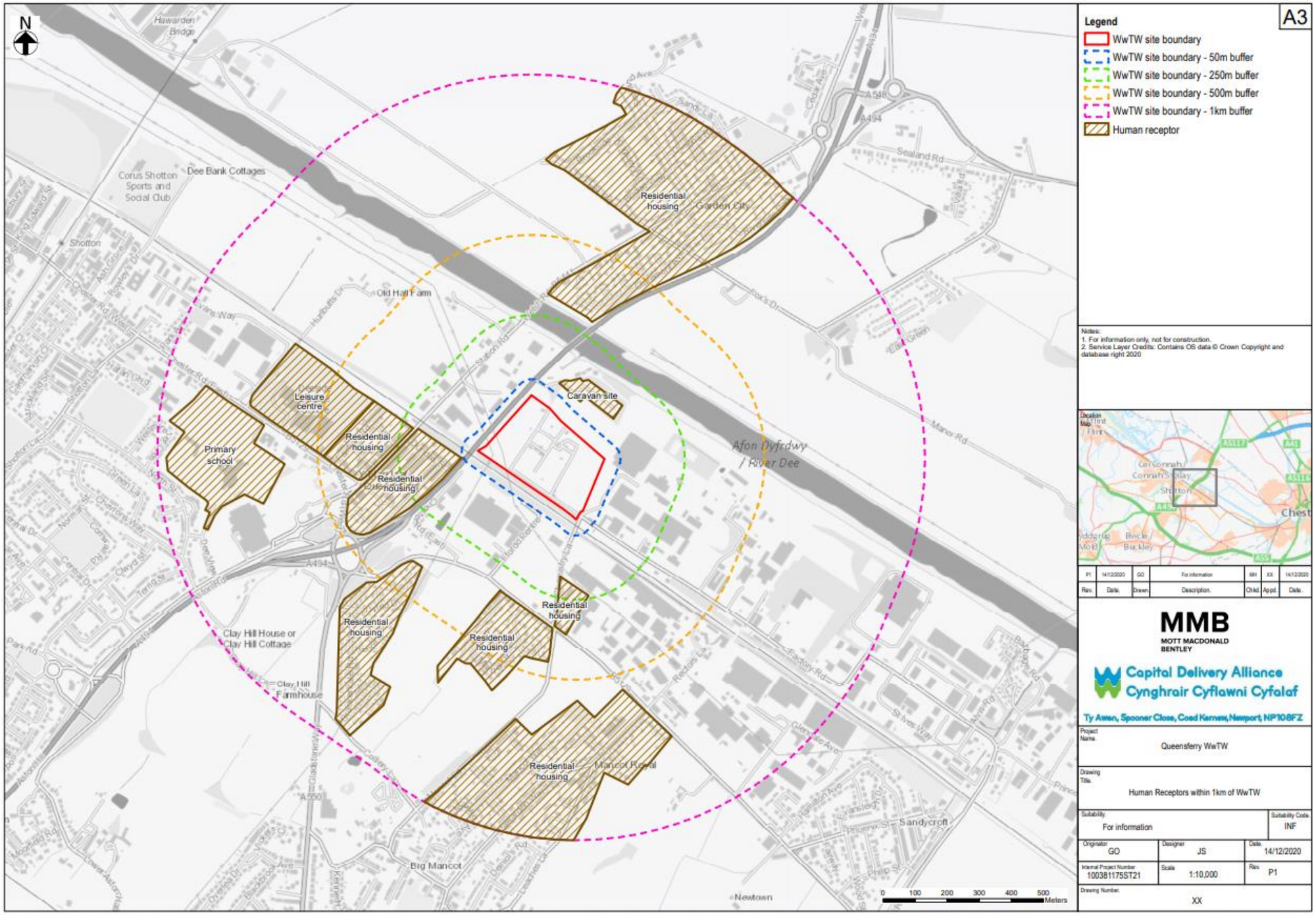


**Figure A.4: Human Receptors within 1km**



# B. Environmental Risk Assessment

| **Emissions to air** | | | | | | | | | |
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| **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. | Releases of $NO_2$, $SO_2$, CO, $H_2S$, $NH_3$ 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.<br><br>As combustion activities are not being changed on site as a result of the proposal, it is not anticipated that Air Quality Dispersion Modelling is required to address the emissions of the CHP units. This is because the units do not meet the scope of the Medium Combustion Plant Directive.<br><br>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 be required.<br><br>Overall the magnitude of risk is, therefore, considered to be low. | Activities will be managed and operated in accordance with the EMS. This will include regular inspection and maintenance of associated equipment (flare, mobile equipment and vehicles). 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.<br><br>NOx and GHG emissions are controlled by emission limits.<br><br>Storage of high ammonia bearing material will be covered at all times, where appropriate.<br><br>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.<br><br>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.<br><br>There is one flare present on site, which is used to burn excess biogas, during emergency use or when the CHP engine is down for maintenance. | Activities shall be managed and operated in accordance with the EMS and will include measures covering operation, inspection and maintenance of equipment, including engine management systems.<br><br>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 TGNs including M2. | Low |
| Domestic properties, local human population, local amenity, site staff, visitors and offices.<br><br>Haul roads, public highways. | Releases of particulate matter (dust) from cake storage bays<br><br>Transport of cake off-site | Nuisance, loss of amenity. | Air transport then deposition | Low | Low | Low | Local residents and 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.<br><br>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.<br><br>General operations at the site do not create dusty materials.<br><br>Cake is stored in the open prior to removal.<br><br>Vehicles, equipment and impermeable surfaces are swept and washed down when necessary. Internal roads are swept, as required, to reduce the likelihood of dust becoming airborne. | Low |

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| | | | | | | | | There are no additional dust suppression techniques e.g. mist spray etc employed on site as this is not considered necessary.<br><br>Vehicles removing cake from site are kept covered, whilst in transport to prevent the escape of waste.<br><br>All key sludge and wastewater treatment processes of the Site are enclosed, only the aeration lanes and final settlement tanks are open. | |
| 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.<br><br>The nature of waste and the 'wet' processes undertaken on-site are not likely to cause a release of bio-aerosols.<br>The aeration lanes and FSTs are uncovered.<br>Emergency situations such as a failure of the flare or CHP/boilers could result in uncontrolled emissions of bioaerosols.<br>There are sensitive receptors found within 250m of potential bioaerosol emission sources at the Site. Therefore, the magnitude of risk is considered to be 'low' to 'medium'. | Multiple control measures are in place at the Site which restrict the Source-Pathway-Receptor link by reducing and containing emissions of bioaerosols from these processes.<br><br>Key operations take place within a closed system, including covered tanks, pipework and machinery. The anaerobic digestion vessels are sealed and biogas is extracted from the vessels. This minimises the risk of bioaerosols affecting operational staff. Biofilters are regularly checked for efficiency. The nature of waste and the 'wet' processes undertaken on-site are not likely to cause a release of bio-aerosols.<br><br>Odour control unit is airtight and treats air released to remove bioaerosols. The process is monitored and regularly maintained.<br><br>Gas holder is air-tight to prevent uncontrolled release of bioaerosols. SCADA system in place to detect leaks.<br>Combustion of biogas occurs at very high temperatures in the CHP, boilers and flare, which would destroy bioaerosols. 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.<br>Stringent loading and unloading procedures are in place for receipt of sludge and liquor.<br>Lorry and tanker drivers are required to hose down any spillage after each loading or unloading and clean contaminated wheels before leaving site.<br><br>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. | Low |

| **Emissions to water and land** | | | | | | | | | |
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| **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 including the River Dee SSSI & SAC (200m) | Tank failure, spillages of digestate and/or liquids including oil | Acute or chronic effects to aquatic life, contamination and | Direct run-off from the Site across ground surface, via | Medium | High | High | The River Dee is located approximately 200m from the northern boundary of the site and is a designated SSSI and SAC. Further downstream, approximately | The site drainage plan is documented and all staff are trained in the event of emergency or accident. | Medium |

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| and the Dee Estuary Ramsar and SPA (1100m). | Damage to drainage system.<br><br>Spillage of raw materials or sludge/liquor during delivery/storage<br><br>Contaminated run off from cake storage e.g. containing suspended solids. | deterioration of water quality. | surface water drains, ditches etc.<br><br>Indirect run-off via the soil layer<br><br>Transport through soil/groundwater then extraction/ abstraction at borehole or intake. | | | 1100m from the site, the Dee Estuary is a designated Ramsar site and Special Protection Area (SPA). Although the river is considered an especially sensitive receptor, the potential for spillage from digestions tanks and storage vessels is considered low and processes on-site are generally contained.<br><br>Potential for leaks from digestion tanks, storage vessels/bays and drainage system which may cause contamination or deterioration of surface water quality.<br><br>Raw materials and liquids/chemicals are stored in suitable locations on-site and are appropriately bunded.<br><br>Permeable ground surfacing currently surrounds the digesters.<br><br>Site infrastructure and hardstanding are generally in a good condition.<br><br>Quantities of liquids and raw materials stored on site are generally low. | 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 and surrounding the STC and WTW.<br><br>Bunding will also be implemented for all raw material storage.<br><br>Additional containment around digestors 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.<br><br>Hardstanding is potentially planned to be constructed around the digesters, in line with the recommendations of the CIRIA risk assessment.<br><br>All transfer of digestate and material takes place under supervision and with flow rate control.<br><br>All tanks undergo a delegated inspection regime and the process parameters are monitored and understood by site operatives.<br><br>Digestion tanks are built to appropriate standard and require appropriate bunding.<br><br>Activities are managed and operated in accordance with the EMS. Spill procedures are in place. All spillages are recorded in the site diary including actions taken.<br><br>Site Manager ensures the programme of Planned Preventative Maintenance is implemented effectively to minimise the probability of equipment malfunction.<br><br>Control of substances hazardous to health (COSHH) assessment undertaken for all raw materials.<br><br>All condensate from the CHP, flare stacks and biogas system discharges into a sealed drainage system and are returned to the head of the works.<br><br>The condensate is clean, uncontaminated water and is small in quantity.<br><br>Both clean and contaminated surface water is directed to a pumping station which recirculates it back into the system.<br><br>The stormwater drainage of potentially contaminated areas from within the Site boundary is routed into the head of the works with no discharge outside of the site boundary.<br><br>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. | |

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| 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, ditches etc. then abstraction. | Low | Medium | Low | Watercourse must have medium / high flow for abstraction to be permitted, which will dilute contaminated run-off.<br><br>No identified groundwater abstraction is undertaken from nearby watercourses | The stream that runs through a culvert was recently bunded to reduce runoff. All liquid from site drains are pumped back to the inlet and the Site has no soakaways.<br><br>Activities are managed and operated in accordance with the EMS. Spill procedures are in place. All spillages are recorded in the site diary including actions taken.<br><br>No point source emissions to controlled water from the STC.<br><br>All biogas condensate from the CHP, flare stacks and biogas system discharges into a sealed drainage system to a centrate pumping station and returned to the head of the works. The condensate is clean, uncontaminated water and is small in quantity.<br><br>Impermeable surface provided for storage of waste and raw materials. | Low |
| Groundwater, land and surface water | Spillage of liquids, contaminated rainwater run-off from waste e.g. containing suspended solids.<br><br>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.<br><br>Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.<br><br>Pollution of water or land. | Transport through soil/groundwater then extraction/ abstraction at borehole or intake. | Low | Medium | Low | Potential for leaks from digestion tanks and storage vessels.<br><br>Site infrastructure and hardstanding is generally in a good condition. Quantities of liquids stored are generally low.<br><br>Underlying superficial Tidal Flat Deposits are designated a Secondary Undifferentiated Aquifer. The underlying Pennine Middle Coal Measure Formation is designated a Secondary A Aquifer. Contaminants sourced from on-site spillages are unlikely to significantly affect groundwater within the underlying aquifers.<br><br>Quantities of liquids stored are generally low. | The inlet works, raw sludge storage tanks, blended sludge tanks, digestor feed, buffer tanks activated sludge process and all sludge treatment processes are covered or enclosed.<br>Spill kits are available near some of the chemical storage. Improvements to waste and material storage are being made on site.<br><br>All transfer of digestate and material takes place under supervision and with flow rate control.<br><br>All primary tanks undergo a delegated inspection regime and the process parameters are monitored and understood by site operatives.<br><br>Site Manager shall ensure the programme of PPM is implemented effectively to minimise the probability of loss of tank/pipe integrity.<br><br>Activities to be managed and operated in accordance with the EMS. Spill procedures are in place. All spillages are recorded in the site diary including actions taken.<br><br>No point sources to controlled waters.<br><br>All condensate is discharged into a sealed drainage system and returned to the head of the 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.<br><br>Pollution of water or land. | Transport through soil/groundwater then extraction/ abstraction at borehole or intake. | Low | Medium | Low | Presence of SAS pipework below ground.<br><br>There is no leak detection of underground pipework on the site. | 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.<br><br>Activities to be managed and operated in accordance with the EMS | Low |

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| 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.<br><br>Area is not known to flood. | The drainage network sends water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters.<br><br>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. | 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:<br><br>Vehicles delivering/ removing wastes and materials<br><br>Vehicles arriving/ leaving the Site. | Nuisance, loss of amenity, loss of sleep. | Noise through the air and vibration through the ground. | Medium | Low | Low | Local residents and site staff are often sensitive to noise and vibration.<br><br>Nearest sensitive receptors located within 300m of the Site. | Limitation of operating hrs. Site is manned 8am-4pm only. The site will be operational 24/7<br><br>Site will only accept imports within existing operating hours (fully complying with site's planning conditions). Vehicles do not exceed the site speed limit of 15mph and will not generate a great amount of noise.<br><br>The main truck movements are away from residential housing and other sensitive receptors.<br><br>Noise and vibration shall be minimised and not cause nuisance.<br><br>Noise kept to a minimum during operating hours.<br><br>Exceptional noisy operations e.g. construction – inform residents.<br><br>Noise complaints to be investigated and actioned and remedial measures will be undertaken.<br><br>All complaints are recorded in the site diary including actions taken. | Low |
| Local human population. | Noise and vibration from the following activities:<br><br>Waste treatment, processing.<br><br>Plant boilers and engines. | Nuisance, loss of amenity, loss of sleep. | Noise through the air and vibration through the ground. | Medium | Low | Low | Local residents and site staff often sensitive to noise and vibration.<br><br>Nearest sensitive receptors located within 300m of the Site. No noise complaints received | Fans and condensate traps will be checked for water and fans and extraction systems checked.<br><br>Flare usage kept to a minimum to reduce noise impact. The design has been developed to minimise noise off-site. The operator will maintain all equipment either in house or by a sub-contract such that noise and vibration are maintained within the limits of the inputs to the sound model.<br><br>All other STC site operations are either covered or enclosed. | Low |

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| | | | | | | | | Where equipment is to be replaced choose quiet plant and the provision of silencing equipment.<br><br>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.<br><br>Any complaints received are investigated and actioned in line with the complaint's procedure.<br><br>All complaints are recorded in the site diary including actions taken. | |
| **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. | High | Medium | High | Local residents and staff sensitive to odour. The nature of the waste may cause odour issues during reception of wastes, from release of biogas and from digestate, hence control measures have been adopted.<br><br>Following an odanet survey and dispersion modelling, it would be reasonable to state a figure of 5x odour complaints that have been associated with Queensferry over the past 3 years.<br><br>Odour dispersion modelling conducted by DCWW indicates that, under current operational conditions, odours from Queensferry WwTW might impact residential areas to the north and east of the site up to a distance of 900m, and commercial premises up to 600m. Based on this modelling, and the $H_2S$ level dispersion rates over this distance, it is considered that the WwTW is unlikely to be the cause of the odour complaints received. | Odour management plan should continue to be implemented. Odour risk assessment to be undertaken.<br><br>Updated odour assessment and modelling to be undertaken by Olfasense in Spring/Summer 2022.<br><br>Emissions shall be free from odorous compounds. Non- point source emissions of biogas shall be minimised using appropriate measures.<br><br>Odours are likely to be generated and released due to nature of the wastes. Odours are controlled by an odour control unit at the inlet works.<br><br>All abatement systems are designed, monitored and maintained to treat specified emissions and off gases. Other odour mitigation measures implemented on-site include placing covers on containers and limiting the height of rising sludge.<br><br>A site-specific Odour Management Plan, reviewed and updated in November 2020, is followed and details the odour management measures.<br><br>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.<br><br>Any emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution.<br><br>All storage tanks are covered or enclosed. All sludge is processed as soon as it is discharged to the STC. | Medium |

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| | | | | | | | | No cake is stored on site<br><br>All waste is imported and exported in covered lorries or contained in tankers.<br><br>Any complaints received are investigated and actioned in line with the complaint's procedure. | |
| Local human population, domestic properties, site offices. | Spillage of odorous materials including oils, fuels, chemicals.<br><br>Failure to clean up spillages.<br><br>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.<br><br>Waste processes on-site are generally conducted within sealed units.<br><br>Accidental major spillages are unlikely to occur and cause an odour nuisance/ | Procedures for dealing with spillages are covered in the EMS.<br><br>The Site Manager shall ensure all relevant staff are appropriately trained to use the spill kits and that all spillages are cleaned up immediately.<br><br>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.<br><br>All spills are recorded in the site diary including actions taken. | Low |
| Local human population, domestic properties, site offices | Fugitive release of $H_2S$ | Nuisance, loss of amenity | Air transport then inhalation. | Low | Medium | Low | Local residents and staff often sensitive to odour.<br><br>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).<br><br>$H_2S$ point source emissions to air are controlled in accordance with emission limits.<br><br>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.<br><br>Vehicles entering and leaving Site. | Nuisance, loss of amenity and road traffic accidents. | Air transport then deposition. | Low | Low | Low | Local residents, surrounding environment and animals sensitive to litter.<br><br>There is some potential for litter to be generated from general site activities but limited potential for it to leave the site boundary.<br><br>Sludge that is delivered to the Site is transported in tankers. | All vehicles leaving the Site which are transporting waste are to be covered to prevent waste/materials being blown from them.<br><br>All waste produced from general site activities is kept in enclosed containers, or inside a building, prior to removing from site. Bins for general waste and recyclable waste are located outside the office, grit and screenings are stored in skips associated with relevant infrastructure. All waste is removed by an external contractor when required.<br><br>Regular inspections for litter and debris are undertaken.<br><br>Nuisance management measures are included in the EMS and the site-specific management plan. | Low |

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| Local human population. | Vehicles depositing mud and debris arriving/ leaving the Site. | Nuisance, loss of amenity, road traffic accidents. | Vehicles entering/ leaving the Site. | Low | Low | Low | Road safety issues – local residents often sensitive to mud on the road.<br><br>Limited potential for mud and debris.<br><br>Waste is either pumped onto site or transported in sealed tanks or containers. | Activities shall be managed and operated in accordance with a site-specific management plan with overarching procedures set out in the EMS.<br><br>Any mud or sludge arising from activities on-site is cleared up promptly.<br><br>There are no wheel washing facilities on the site, but vehicles can be washed down and equipment and impermeable surfaces are swept and washed down, when necessary.<br><br>Any emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution.<br><br>Vehicle routes are to be inspected regularly and swept when necessary.<br><br>All vehicles leaving the Site, transporting waste/ cake are to be covered to prevent waste/materials being blown from them. | Low |
| **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.<br>Nuisance and loss of amenity. | Air transport and over land. | Low | Low | Low | Permitted wastes are unlikely to attract scavenging animals and birds but may become nesting / breeding sites.<br><br>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.<br><br>Pest control measures are implemented. The site has 12 visits per year, by a contractor. Rat boxes are used around the Site, where appropriate.<br><br>All reports of pests are sent to the contractor who will investigate and report findings and outcomes and detail any actions required.<br><br>Ensure waste cannot be accessed by scavengers. All waste produced from general site activities is 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.<br><br>Regular inspection and maintenance of boundary fencing and buildings is carried out to prevent access to the Site.<br><br>Well established and proven operational controls and procedures in place, including regular inspection and monitoring of the Site for pests by contractors. | Low |

| **Human health and environmental safety** | | | | | | | | | |
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| **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 / or livestock after gaining unauthorised access to the installation. | All on-site hazards: machinery, tanks, wastes and vehicles. | Bodily injury<br><br>Risk of drowning | Direct physical contact. | Low | Medium | Low | Potential injury to on-site personnel as a result of vehicle movements or equipment malfunction or misuse.<br><br>Direct physical contact is minimised by activity being carried out within enclosed digesters so a low magnitude risk is estimated.<br><br>Access to storage tanks is probable with a risk of drowning.<br><br>Contact with waste is minimal with exception of leaks or spills from unloading of tanker and transfer of filter cake | Overall management of the site is overseen by an experienced member of staff having undergone appropriate training under DCWW's soon-to-be accredited Competency Management System (CMS). This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours.<br><br>All operational staff are fully trained in the site operating procedures and safety and environmental management procedures and are kept up to date on changes.<br><br>Training includes awareness raising of the potential on-site hazards and health and safety measures to adhere to.<br><br>Preventative measures will be under continuous review as part of the EMS procedures.<br><br>Activities are managed and operated in accordance with the EMS – this includes site security measures to prevent unauthorised access.<br><br>No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification.<br><br>Activities are managed and operated in accordance with the EMS. The site is secured by a combination of fence line of 3m palisade, 3.9m and 2.4m weldmesh, a gated entrance off Factory Road in the south-east and another disused entrance from the A494 in the north, a monitored CCTV system, intruder detection alarms and security rated doors protecting key buildings. Lighting is provided at all reception facilities to give good visibility at all times of the day and night. | Low |

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| | | | | | | | | The site is monitored 24/7, but only manned between 8am and 4pm with out of hours call out where required<br><br>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.<br><br>Key sludge treatment and wastewater treatment activities undertaken within enclosed systems.<br><br>Vehicle movements around the site vary depending on what activities are being undertaken. Cake movement is limited as cake is stored in silos.<br><br>Cake is removed from site frequently during specific land spreading windows, or taken to Five Fords for further processing.<br><br>Waste is removed as required. Therefore, frequent vehicle movements are typically undertaken only by site staff and maintenance contractors. | |
| Local human population and local environment. | Explosion of biogas and AD causing the 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.<br><br>Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land.<br><br>Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. | Air transport<br><br>Direct run-off from site across ground surface, via surface water drains, ditches etc.<br><br>Indirect run-off via the soil layer<br><br>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.<br><br>Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff.<br><br>An explosion could cause injury to local residents and site staff from flying debris.<br><br>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.<br><br>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. The post digestion tank is not covered but are not considered a fire risk.<br><br>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.<br><br>Fire detection equipment is installed in the CHP containers and the boiler building which activates 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.<br><br>Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency.<br><br>The EMS includes procedures relating to maintenance and inspection of bunding of tanks.<br><br>Site Manager shall ensure the programme of Planned Preventative Maintenance (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.<br><br>Emergency operating procedures are in place.<br><br>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. | Respiratory irritation, illness and nuisance to local population. Fatality/injury to staff, fire fighters.<br><br>Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land.<br><br>Acute or chronic effects to aquatic life, contamination and | | Low | High | Medium | Emissions to air, land or water may cause harm to and deterioration of air, land or water.<br><br>Smoke, fumes and material released from tanks may cause irritation, illness or nuisance to local residents and site staff.<br><br>Impact from the tank explosion may cause external damages to other equipment, buildings located close to the epicentre of the explosion. | | Low |

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| | | deterioration of land and water quality. | | | | 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.<br><br>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 and H&S manual<br><br>Firewater is diverted through the drainage system to the head of the works or to storm overflow allowing for contaminated fire water to be contained on site and treated through the wastewater treatment system.<br><br>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.<br><br>An accident management plan is part of the EMS and includes measures for security, fire and spill management.<br><br>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 tanks.<br><br>Site Manager shall ensure the programme of Planned Preventative Maintenance (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.<br><br>Emergency operating procedures are in place.<br><br>Smoking only permitted in designated areas. | |
| 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 | | 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.<br>The site is located within an area of groundwater flooding capability with potential flooding to property situated below ground level and at the surface. There is limited potential for groundwater flooding to occur, however there is the potential for groundwater flooding of property situated below ground level at the south west part of the Site.<br>The majority of the site is located within a very low risk flood extent area (less than 0.1% probability of flooding) with small areas within a low risk zone | Most of the site can be isolated by penstocks or isolation valves. The drainage for the Site goes to the head of the works for treatment.<br>There are no direct potentially contaminated discharges to controlled surface waters.<br>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. | |

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| | | | | | | | (0.1% - 1% chance of flooding) including the site entrance road. | | |
| Local human population and local environment | Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land.<br><br>Equipment failure | Respiratory irritation, illness and nuisance to local population. Injury to staff or fire fighters.<br><br>Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land.<br><br>Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. | Air transport<br><br>Direct run-off from site across ground surface, via surface water drains, ditches etc.<br><br>Indirect run-off via the soil layer<br><br>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.<br><br>Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff.<br><br>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.<br><br>Risk of accidental combustion of waste is minimal.<br><br>Permitted waste types limited to sludges and liquids. | The key sludge treatment and WwTW processes are undertaken within enclosed systems such as the AD and biogas systems.<br><br>Activities are managed and operated in accordance with the EMS, H&S and O&M manuals including, fire and spill management.<br><br>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.<br><br>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 and H&S manual There is also Safety zoning of areas under DSEAR/PEXA on site and Smoking is only permitted in designated areas.<br><br>Firewater is diverted through the drainage system to the head of the works or to storm overflow allowing for contaminated fire water to be contained on site and treated through the wastewater treatment system.<br><br>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, spills and environmental incidents.<br><br>Site Manager shall ensure the programme of Planned Preventative Maintenance (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.<br><br>Smoking only permitted in designated areas.<br><br>Emergency operating procedures are in place. | 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 | Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or vandals/arsonists.<br><br>Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. | Air transport<br><br>Spillages and contaminated firewater by direct run-off from site across ground surface, via surface water drains, ditches etc. | Low | High | Medium | Emissions to air, land or water may cause harm to and deterioration of air, land or water.<br><br>Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff.<br><br>Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the | The key sludge treatment and WTW processes are undertaken within enclosed systems such as the AD and biogas systems.<br><br>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, fire explosions and spill management. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification.<br><br>Fire detection equipment is installed in the CHP containers and the boiler building which activate an | Low |

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| | Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. | Indirect run-off via the soil layer<br><br>Transport through soil/ groundwater then abstraction. | | | | sludge treatment works and in containerised units or locked buildings.<br><br>Risk of accidental combustion of waste is minimal.<br><br>Permitted waste types limited to sludges and liquids. | 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.<br><br>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 and H&S manual . There is also Safety zoning of areas under DSEAR/PEXA on site and Smoking is only permitted in designated areas.<br><br>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, spills and environmental incidents.<br><br>Site Manager shall ensure the programme of Planned Preventative Maintenance (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.<br><br>Smoking only permitted in designated areas.<br><br>Emergency operating procedures are in place.<br><br>Adequate firefighting measures are implemented on-site.<br><br>Access to site and waste restricted by security fencing.<br><br>The site is secured by a combination of fence line of 3m palisade, 3.9m and 2.4m weldmesh, a gated entrance off Factory Road in the south-east and another disused entrance from the A494 in the north, a monitored CCTV system, intruder detection alarms and security rated doors protecting key buildings. Lighting is provided at all reception facilities to give good visibility at all times of the day and night.<br><br>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.<br><br>Firewater is diverted through the drainage system to the head of the works or to storm overflow allowing for contaminated fire water to be contained on site and treated through the wastewater treatment system. | |

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| Local human population and local environment. | Operator Error | Pollution to air, land, surface water and groundwater and human health | Air transport<br><br>Direct run-off from site across ground surface, via surface water drains, ditches etc.<br><br>Indirect run-off via the soil layer<br><br>Transport through soil/ groundwater then abstraction. | Low | Medium | Low | Possible contamination to air, land, groundwater and surface water. | Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented.<br><br>All equipment is checked under preventative maintenance plans and is checked and calibrated as per the manufacturer's instructions.<br><br>Overall management of the site is overseen by an experienced member of staff having undergone appropriate training recognised as part of the soon-to-be accredited CMS. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours.<br><br>All operational staff are fully trained in the site operating procedures and safety and environmental management procedures and are kept up to date on changes.<br><br>Training includes awareness raising of the potential implications of failure to control operations and the potential impact on the environment.<br><br>Preventative measures will be under continuous review as part of the EMS procedures.<br><br>Emergency operating procedures are in place.<br><br>Senior site-based management have direct responsibility for implementing risk management measures. | Low |

| **Natural habitats and ecology** | | | | | | | | | |
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| **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 | Any | Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc. | Air transport<br><br>Direct run-off from site across ground surface, via surface water drains, ditches etc.<br><br>Indirect run-off via the soil layer<br><br>Transport through soil/ groundwater then abstraction. | Low | Low | Low | Physical disturbance and emissions to air, water or land may cause harm to and deterioration of nature conservation sites.<br><br>There are a number of European designated sites, located within 10km of the Site, (identified in Appendix A3) so potential impacts on receptors are likely. | Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented.<br><br>Emissions of substances not controlled by emission limits (excluding odour and noise) shall not cause pollution.<br><br>Storage of high ammonia bearing material will be covered at all times.<br><br>Emission limits for stack gases are specified. | Low |
| Protected species, including nesting birds, wintering birds, common reptiles, terrestrial and aquatic invertebrates, common amphibians, bats, badgers, hazel | Any | Harm to protected species through the disturbance or removal of habitats | | Low | Low | Low | Physical disturbance and emissions to air may cause harm to protected species.<br><br>The proposal for the Permit does not involve the removal of vegetation, or structural modification to built structures. It is considered very unlikely, therefore, | BAT and appropriate additional mitigation measures set out in the EMS have been taken to prevent or where that is not practicable, to minimise, those emissions.<br><br>As required by the Southern Water EMS various housekeeping and waste management practices are in place to monitor waste emissions. These include segregation of | Low |

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| dormice and great crested newts | | | | | | | | that Site activities would lead to the disturbance or removal of terrestrial habitats. | wastes according to their classification and nature, labelling waste and using designated storage containers.<br><br>The potential hazards from the permitted activities pose a low risk to the broad sensitivity of species and habitats groups. | |
| Protected sites including the Dee River SSSI and SAC (200m) and the Dee Estuary Ramsar and SPA (1100m). | Any | Harm to protected site through toxic contamination, nutrient enrichment, smothering, disturbance, predation etc. | Any | Unlikely | Medium | Low | | Emissions to air, land or water may cause harm to and deterioration of nature conservation sites.<br><br>Operations may cause harm to and deterioration of nature conservation sites. | | |