EARTH FRIENDLY CONCRETE ENVIRONMENTAL PERMIT APPLICATION

Environmental Risk Assessment

Prepared for: EFC Green Concrete Technology UK Limited

Client Ref: 416.064010.00001

SLR Ref: 416.064010.00001
Version No: Final
October 2022

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1.0 INTRODUCTION

SLR Consulting Limited (SLR) has been instructed by EFC Green Concrete Technology UK Limited (EFC) to prepare an application for an Environmental Permit (EP) for the Fairlop site, for submission to the Environment agency (EA).

The EFC installation will be located within the existing Part B EP boundary of the concrete batching plant operated by Capital Concrete Limited. The EFC installation requires a permit under the Environmental Permitting (England & Wales) Regulation 2016 for Section 4.2 Part A(1)(a)(iv) producing inorganic chemical such as salt for the proposed geo-polymer manufacturing process.

This Environmental Risk Assessment (ERA) is a simple assessment of the risks to the environment and human health that may be associated with the operation of the proposed manufacturing process at the Installation.

1.1 Methodology

This ERA is an assessment of the risk to the environment and to human health that may be associated with the proposed manufacturing process.

The assessment has been completed in accordance with the Environment Agency (EA) Technical Guidance 'Risk Assessments for your Environmental Permit' dated August 2022. The aim of the assessment is to identify any significant risks and to demonstrate that the risk of pollution or harm will be acceptable by taking the appropriate measures to manage these risks.

This ERA uses the following approach for identifying and assessing the risks from the proposed manufacturing process:

Step 1 Identify and consider risks for your site and the sources of the risks.

Step 2 Identify the receptors at risk from your site.

Step 3 Identify the possible pathways from the sources of the risks to the receptors.

Step 4 Assess risks relevant to your specific activity and check they are acceptable and can be screened out.

Step 5 State what you will do to control the risks if they are too high.

Step 6 Submit your risk assessment as part of your EP application.

Section 2.0 of this document is a screening step to identify the receptors at risk as part of this assessment.

Section 3.0 identifies people or parts of the environment that could be harmed (at potentially significant risk) by the activity.

The guidance[1] requires all receptors that are near the Site and could reasonably be affected by the proposed activities to be identified and considered as part of the ERA. Therefore, for the purpose of this report:

- a 2km radius has been adopted in reviewing potentially sensitive receptors designated as RAMSAR, SAC, SPA and Marine Potential SPA;
- A 2km radius from the Site's EP boundary has been adopted in reviewing potentially SSSIs and sensitive receptors of ecological importance along with features such as Sites of cultural and natural heritage; and

[1] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit accessed July 2022

- A radius of 500m from the Site's proposed EP boundary has been adopted for all other potentially sensitive local receptors (for example, residential, commercial, industrial, agricultural and surface water receptors).

Section 4.0 of this document presents the assessment and demonstrates that any risks of pollution or harm will be mitigated to manage the risk.

This ERA should be read in conjunction with the following documents submitted with this EP application:

- Application Forms
  - Part A, B2, and F1
- Non-Technical Summary (SLR Ref. 416.064010.00001_NTS);
- Site Condition Report (SLR Ref. 416.064010.00001_SCR);
- Drawings
  - 001 Site Location (SLR Ref. 416.064010.00001 Drawing 001)
  - 002 Environmental Permit Boundary (SLR Ref. 416.064010.00001 Drawing 002)
  - 003 Site Layout Plan (SLR Ref. 416.064010.00001 Drawing 003)
  - 04A Local Receptors (SLR Ref. 416.064010.00001 Drawing 04A)
  - 04B Natural and Cultural Heritage (SLR Ref. 416.064010.00001 Drawing 04B)

2.0 IDENTIFYING THE RISKS

Step 1 is a screening step to identify potential risks to the environment from the Installation.

The proposed Installation will not release point source emissions to groundwater, surface water or land and the proposed manufacturing process will not attract pests or cause odour. Therefore, for the purpose of this ERA these elements have not been considered.

The risk considered with in the ERA from the proposed Installation are noise, odour, fugitive emissions (dust and litter), accident and air emissions.

3.0 SITE SETTING AND RECEPTORS

Step 2 identifies people or parts of the environment that could be harmed (at potentially significant risk) by the activity. This section identifies the Site setting and potentially sensitive receptors in the vicinity of the Site.

3.1 Site Setting

The Site is located at Capital Concrete Ltd, Hainault Toad, Little Heath, Romford, Essex, RM6 5SS approximately 2.1km southeast of Fairlop. The Site is centred on National Grid Reference TQ 46765 90878. The nearest residential properties are approximately 195m southwest of the proposed EP boundary.

The site location is illustrated on Drawing 001. The EP boundary is shown on Drawing 002, site layout is illustrated on Drawing 003, Drawing 04A illustrates the Local Receptors and Drawing 04B shows the Natural and Cultural Heritage.

A summary of the immediate surrounding land use is provided in Table 1.

Table 1
Immediate Land Uses Surrounding the Site

Direction	Land-Use
North	The wider Capital Concrete site, agricultural land and local transport network.
East	The wider Capital Concrete site, agricultural land and ditch.
South	The wider Capital Concrete site, pond, ditch and agricultural land.
West	The wider Capital Concrete site, commercial, residential, Hainault Road, landfill, ponds and agricultural land.

3.1.1 Residential Properties

The closest residential properties lie approximately 185m southwest of the proposed EP boundary along Hainault Road.

3.1.2 Industrial and Commercial

The wider Capital Concrete site lies adjacent to the proposed EP boundary in all directions.

Commercial premises lie approximately 25m to the west of the Site including Nuovo Food Romford, Euroglobe Distributors and Screwfix as part of the wider Hainault Works Industrial Estate.

3.1.3 Local Transport Network

Hainault Road lies approximately 105m west and Forest Road approximately 490m north.

3.1.4 Surface Water Features

A review of Multi Agency Geographical Information for the Countryside[2] (MAGIC) map reveals a pond lies approximately 205m south of the proposed EP boundary. A ditch lies approximately 200m east of the Site and beyond the pond approximately 285m south.

Ponds lie approximately 180m west of the proposed EP boundary.

3.1.5 Agricultural Land

Agricultural land lies adjacent to the northern and eastern boundaries. Additional areas of agricultural land lie approximately 130m west beyond Hainault Road and approximately 300m south of the proposed EP boundary.

3.1.6 Landfill

A landfill lies approximately 140m west of the proposed EP boundary.

[2] Multi-Agency Geographical Information for the Countryside Map, available at www.magic.defra.gov.uk, accessed in July 2022.

3.2 Geology, Hydrogeology and Hydrology

3.2.1 Geology

A search on the British Geological Survey (BGS)[3] Map identifies the Site as having the following strata:

- Superficial Boyn Hill Gravel Member comprising of sand and gravel, formed up to approximately 2 million years ago in the Quaternary Period in environments dominated by river; and
- Bedrock of London Clay Formation comprising clay, silt and sand, formed approximately 48 to 56 million years ago in the Palaeogene Period in an environment dominated by deep seas.

3.2.2 Hydrogeology

The MAGIC Map[4] identifies the bedrock at the Site is not identified as a bedrock aquifer.

The Superficial deposits are defined as a Secondary A Aquifer, which is defined as:

> "Permeable layer capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The Site does not lie in a Source Protection Zone.

3.2.3 Hydrology

The east of the Site lies in an unproductive groundwater vulnerability area and the west of the Site lies within in an area of low groundwater vulnerability.

Flood Zone

The Flood Map for Planning[5] identifies that the Site lies across Flood Zone 1 (an area with a low probability of flooding (Figure 1).

[3] British Geological Survey, available at http://www.bgs.ac.uk, accessed July 2022.
[4] Magic Map, available at https://magic.defra.gov.uk/magicmap.aspx, accessed July 2022
[5] Flood Map for Planning, available at https://flood-map-for-planning.service.gov.uk, accessed July 2022

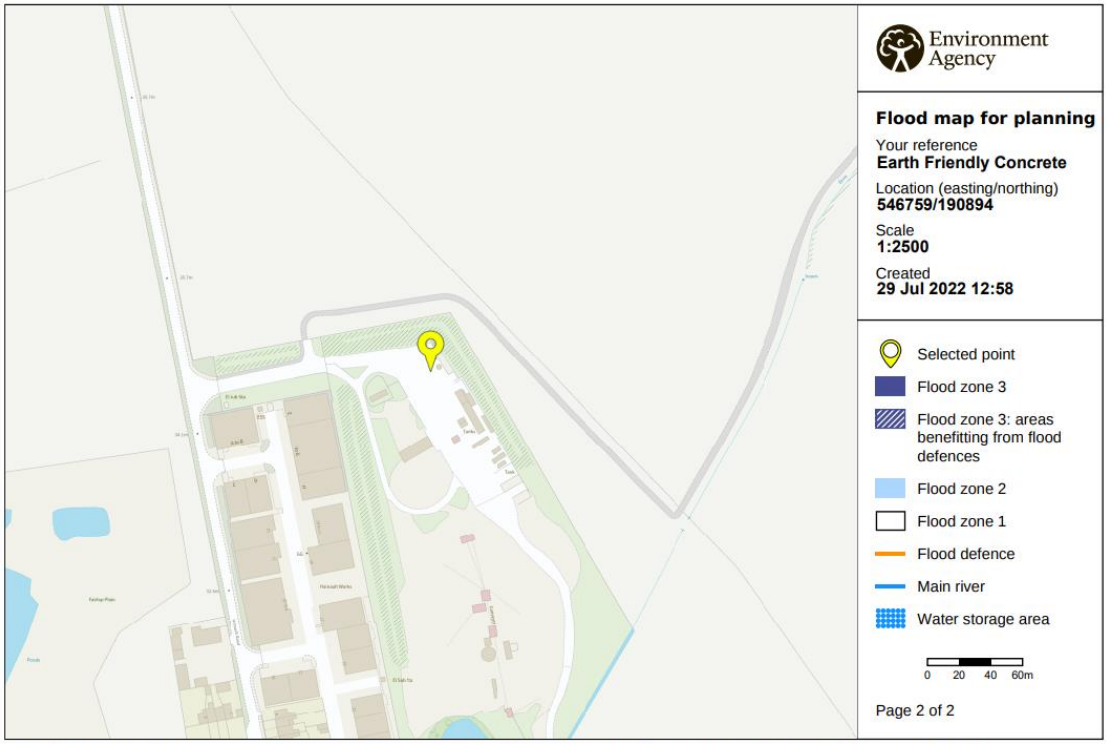

Figure 1 Flood Zones within the Site boundary

3.3 Ecology

3.3.1 Internationally Designated Sites

Site of Special Scientific Interest (SSSI)

A review of MAGIC Map identified Hainault Forest lies approximately 1.9km northeast the Site boundary.

Other Receptors

A Review of MAGIC Map confirms none of the following are within 2km of the Site boundary.

- Special Areas of Conservation (SAC);
- Special Protection Areas (SPA);
- RAMSAR; and
- Marine SPA.

3.3.2 Nationally/Locally Designated Sites

Ancient Woodland

A review of the MAGIC Map confirms Chigwell Row Wood lies approximately 1.86km north and Hainault Forest lies approximately 1.9km northeast of the Site boundary.

Local Nature Reserves (LNR)

A review of MAGIC Map identified three LNR within a 2km radius of the Site boundary, as follows:

- Hainault Lodge lies approximately 1.1km northeast.
- Chigwell Row Wood lies approximately 1.86km north; and

- Hainault Forest lies approximately 1.9km northeast.

Other Receptors

A review of the MAGIC Map confirms that none of the following are situated within a 2km radius of the Site boundary:

- Areas of Outstanding Natural Beauty (AONB);
- National Nature Reserves (NNR);
- National Parks;
- Biosphere Reserves; or
- RSPB Reserves.

3.4 Cultural Heritage

Listed Buildings

A review of the MAGIC Map confirmed three Grade II listed buildings within a 2km radius of the Site boundary. The buildings are located to the southeast and southwest of the Site boundary as follows:

- Furze House Farm lies approximately 1.6km southeast;
- The White House lies approximately 1.86km southeast; and
- Church of St Peter lies approximately 1.9kn southwest.

Other Receptors

A review of the MAGIC Map confirmed that none of the following are situated within a 2km radius of the Site boundary:

- Scheduled Monuments;
- Registered Parks and Gardens;
- World Heritage Sites; and
- Registered Battlefields.

3.5 Identified Receptors

Table 2 and Drawing 04A identified receptors which are considered to be potentially sensitive and could reasonably be affected by activities at the Site.

Table 2 Identified Receptors

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary at closest point (in metres)
Local receptors located within 500m of the EP boundary as shown on Drawing 04A			
Agricultural Land	Agricultural Land	North	Adjacent
Agricultural Land	Agricultural Land	East	Adjacent
Nuovo Food Romford	Commercial	West	25
Screwfix	Commercial	West	75

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary at closest point (in metres)
Euroglobe Distributors	Commercial	West	80
Hainault Road	Local Transport Network	West	105
Agricultural Land	Agricultural Land	West	130
Residential Properties	Residential	Southwest	185
Ditch	Surface Water Feature	East	200
Pond	Surface Water Feature	South	205
Ditch	Surface Water Feature	South	285
Agricultural Land	Agricultural Land	South	300
Forest Road	Local Transport Network	North	490
Internationally Designated receptors within 2km and Nationally/Locally Designated Ecological Receptors located within 2km of the EP boundary as shown on Drawing 04B			
Hainault Lodge	Local Nature Reserve	Northeast	1100
Furze House Farm	Listed Buildings (Grade II)	Southeast	1600
Chigwell Row Wood	Ancient Woodland	North	1860
Chigwell Row Wood	Local Nature Reserve	North	1860
The White House	Listed Building (Grade II)	Southeast	1860
Hainault Forest	Local Nature Reserve	Northeast	1900
Hainault Forest	Sites of Special Scientific Interest	Northeast	1900
Hainault Forest	Ancient Woodland	Northeast	1900
Church of St Peter	Listed Building (Grade II)	Southwest	1900

3.6 Windrose

Figure 2 shows the wind patterns between 2018-2022 as identified by London City Meteorological Station. The most prominent wind directions are from the southwest and east. Winds from the north, north-east, and south are relatively infrequent by comparison.

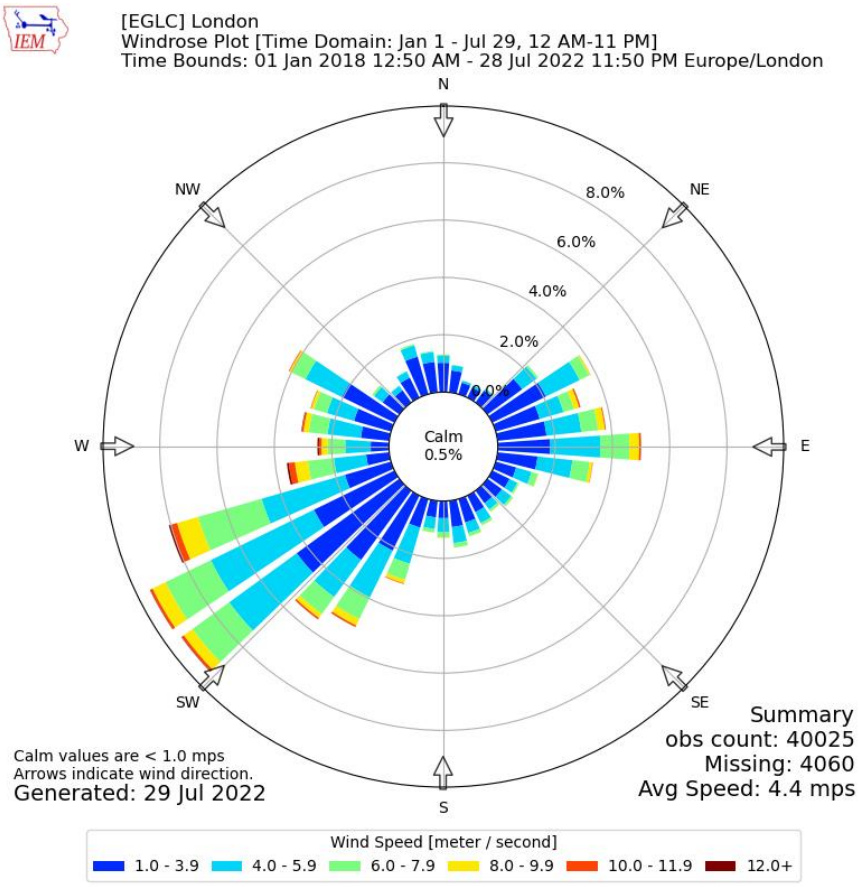

Figure 2
London City Meteorological Station Windrose (2018-2022)

4.0 ENVIRONMENTAL RISK ASSESSMENT

The following table sets out the potential hazards posed by the proposed new manufacturing process, receptors and pathways, along with management and assessment of the identified risks. As defined in Section 2, this assessment only considers risks to amenity (discharge, uncontrolled or unintended emissions (fugitive) and noise and vibration) and as a consequence of accidents.

The probability of exposure is the likelihood of the receptors being exposed to the hazard, and is defined as low, medium or high. These terms are qualified as follows:

- Low: exposure is unlikely, barriers in place to mitigate against exposure.
- Medium: exposure is fairly probable, barriers to exposure less controllable.
- High: exposure is probable, direct exposure likely with few barriers.

The methodology outlined in Section 1.1 of this report is the basis on which it is determined whether the proposed operations will lead to significant impacts on the surrounding environment. Where a conclusion of 'not significant' has been reached, it is proposed that the mitigation and management measures that will be in place at the Site will be sufficient to ensure that there will be no impact at the surrounding environment.

Table 3 Fugitive Emissions Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	***What is at risk what do I wish to protect?***	***How can the hazard get to the receptor?***	***What measures will you take to reduce the risk? – Who is responsible for what?***	***How likely is this contact?***	***What is the harm that can be caused?***	***What is the risk that still remains? The balance of probability and consequence***
To Air:						
Dust	Sensitive receptors listed in Table 2 including the road network, controlled water, agricultural land, residential and commercial properties as part of the Hainault Works Industrial Estate.	Air	Materials will be added from sealed bulk bags through screw conveyors on loadcells into nozzles. The mixing tank will be fully enclosed preventing dust emissions.	Low	Human health and ecological impacts.	**Not Significant**

	Drawing 04A					
To Water:						
Runoff from site surfaces	Sensitive receptors listed in Table 2 including the road network, controlled water, agricultural land, residential and commercial properties as part of the Hainault Works Industrial Estate. Drawing 04A	Land, surface and ground water	All liquid handling and storage areas are bunded to contain any spill that may occur while loading. Raw and waste materials associated with the proposed process will be stored in suitable containers and where required provided with adequate secondary containment. These will be stored inside the designated storage areas. Any surface water runoff from the hard-surfaced area of the site will be collected by the Site sealed drainage system.	Low – with mitigation measures in place.	Nuisance, pollution of controlled water and soil.	**Not significant**
Percolation of contaminated liquid into groundwater	Ground water	Ground water	The EFC process area will incorporate an impermeable surface and containment measures to prevent emissions to groundwater. All liquid handling and storage areas are bunded to contain any spill that may occur while loading.	Low – with the impermeable surfaces installed.	Contamination, nuisance, pollution of soil and controlled water.	**Not significant**

			Materials suitable for absorbing and containing minor spillages will be maintained on site. Minor spillages will be cleaned up immediately, using sand or proprietary absorbent to clean up liquids and placed in alternative containers. In the event of a major spillage immediate action will be taken to contain the spillage and prevent liquid from entering surface water drains and the unsurfaced ground. The spillage will be cleared immediately and placed in containers for off-site disposal and the EA will be notified. The Operations Manager will be responsible for implementing risk management measures in conjunction with the Best Available Techniques and Operating Techniques (Ref: 410.064010.00001_BATOT).			
Litter						
Litter	Sensitive receptors listed in Table 2 including the road network, controlled water, agricultural land,	Air	The site will be kept clean and tidy by way of a daily housekeeping regime of operational areas/the site perimeter. Wastes generated are minimal and restricted to empty bulk bags.	Low – with the proposed mitigation measure implemented at site.	Nuisance human and environmental receptors	**Not significant**

	residential and commercial properties.		The limited waste (empty bulk bags) will be stored in suitable containers, and therefore are unlikely to generate litter. Waste produced during scheduled maintenance will be kept to a minimum and stored in dedicated containers and disposed of correctly off site. The waste hierarchy will be adhered to at all times. Perimeter fencing of the Site reduces the chances of litter blowing off site. The Operations Manager will be responsible for implementing risk management measures in accordance with operational and management procedures.			

Table 4 Accidents Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	***What is at risk what do I wish to protect?***	***How can the hazard get to the receptor?***	***What measures will you take to reduce the risk? – Who is responsible for what?***	***How likely is this contact?***	***What is the harm that can be caused?***	***What is the risk that still remains? The balance of probability and consequence***
Spillage or leakage from site equipment	Local agricultural land quality, surface water and groundwater (aquifer).	Runoff and percolation through ground	The EFC process area will incorporate an impermeable surface and containment measures to prevent emissions to ground. All liquid handling and storage areas, including the fuel tank are bunded to contain any spill that may occur while loading. Raw materials will be added from sealed bulk bags to the vessel via a screw conveyor on loadcells into nozzles, this ensures that the volume cannot exceed capacity of the vessel, preventing spillage. Liquid processes will be contained in vessels and sealed pipework. The risk of corrosion is minimal due to the	Low – with the mitigation implemented on site.	Contamination of land, groundwater and surface water. Nuisance	**Not significant**

			materials of manufacture of all equipment and the preventative maintenance program. Containment engineering will prevent the release of potential polluting liquids and will be subject to routine inspections, with any remedial work undertaken and recorded. Operation of the boiler and vessels will be controlled and monitored by site personal and any leaks that may occur will be readily identified and action taken to rectify the issue. Additionally, the boiler and vessels will be subject to regular visual inspection by site staff to ensure the continued integrity of the plants and the requirement for any remedial action. Piping between the steam control valve and digester will be keep short as technically possible. Low level alarms will be installed on the vessels and discharge product storage tanks to alarm site operators to potential leaks. The digester vessel will be sealed, rated and certified. Pressure relief valves will be installed, to prevent over pressure.			

			The additive powder conveyor will be fitted with a trip system to cease the filling and therefore preventing the mixing vessel from overfilling. The boiler is inspected to BS and EN requirements. The digester agitator mechanical seal will be routinely maintained, and quality assured to ensure sufficient water to the digester to prevent the leakage of oil. Pipe work and joints will be constructed to appropriate standards. Materials suitable for absorbing and containing minor spillages will be maintained on site. Minor spillages will be cleaned up immediately, using sand or proprietary absorbent to clean up liquids and placed in alternative containers. In the event of a major spillage immediate action will be taken to contain the spillage and prevent liquid from entering surface water drains and the unsurfaced ground. The spillage will be cleared immediately and placed in containers for off-site disposal and the EA will be notified. The Operations Manager will be responsible for implementing risk			

			management measures in conjunction with the Best Available Techniques and Operating Techniques (Ref: 410.064010.00001_BATOT).			
Fire	Sensitive receptors listed in Table 2 including the road network (Hainault Road), controlled water, agricultural land, residential and commercial properties as part of the Hainault Works Industrial Estate. See Drawing 04A	Air Land, surface water and groundwater.	The site has the following in place which seeks to reduce the impacts as the result of a fire: • Fire and site evacuation procedures; • A fire alarm system; and • Local firefighting equipment. Operation of the proposed boiler, tanks and vessels will be controlled and monitored by site personnel and the PLC system; any fires that may occur will be readily identified and the necessary action taken. Additionally, the proposed boiler, tanks and vessels will be subject to regular visual inspection by Site staff and regular maintenance and servicing.	Low - due to the inspection and maintenance processes which will be implemented and the fire prevention measures in place.	Harm to human health and ecology. Nuisance. Contamination of land, groundwater and surface water	**Not significant**
Vandalism and Security	Sensitive receptors listed in Table 2 including the road network (Hainault Road), controlled water, agricultural land, residential and commercial properties as part of	Land, surface water, groundwater, air.	In order to prevent unauthorised access, a number of security measures are in place at the site including: • Perimeter CCTV which covers the site and is monitored 24/7 by the site's security function; • Visitor Sign in/Sign out book; and	Low – with the measures implemented on site.	Theft, plant failure, harm to human health, environmental harm.	**Low**

	the Hainault Works Industrial Estate. Drawing 04A.		• Perimeter 3m high fencing, with lockable gates at the site entrance; The Operations Manager will be responsible for implementing risk management measures in conjunction with the Operating Techniques (Ref: 410.064010.00001_BATOT).			
Flooding	Surface water, soils and groundwater. Receptors as identified in Table 2.	Flood waters over land	The Site lies within an area with a "low probability of flooding".	Low – due to the geographical location of the site.	Contaminated flood waters impacting water, land, residential, ecological and commercial areas.	**Not Significant**
Vehicle collisions	Harm to human receptors		The site will implement strict vehicle movement protocols to prevent collisions.	Low	Harm to human health	**Low**
Plant Failure	Sensitive receptors listed in Table 2 including the road network (Hainault Road), controlled water, agricultural land, residential and commercial properties as part of the Hainault Works Industrial Estate.	Air, surface water, ground water	All equipment will be subject to routine preventative maintenance checks and maintained in accordance with manufacturer's recommendations. Should any problems, malfunctions or breakdowns occur, which affects the ability to safely function, the proposed boiler, tanks and vessels will stop until the problem is rectified.	Low – due to the inspection and maintenance processes which will be implemented to prevent plant failure.	Nuisance Contaminated flood waters impacting water, land, residential, ecological and commercial areas.	**Not significant**

	Drawing 04A		The Operations Manager will be responsible for implementing risk management measures in conjunction with the Best Available Techniques and Operating Techniques (Ref: 416.064010.00001_BATOT).			
Explosion / over pressurisation	Sensitive receptors listed in Table 2 including the road network (Hainault Road), controlled water, agricultural land, residential, commercial properties as part of the Hainault Works Industrial Estate and ecological receptors. Drawing 04A	Air	The digester vessel is a rated pressure vessel with a design pressure greater than the boiler maximum pressure, therefore an over pressurisation event of the digester is not possible. The boiler will have pressure relief systems. Routine preventative maintenance program will be established. All electrical equipment will be subject to inspections and marked appropriately to conform with applicable regulations and legislation. 'Flammable Fuel Oil' and 'No Smoking' signs will be erected, as appropriate. The site will operate a permit to work system and any 'hot works' will only be permitted if the atmosphere is free from explosive gases.	Low – due to the control measures implemented.	Contaminated land, air pollution and harm to human health.	**Not significant**

Table 5 Noise and Vibration Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	***What is at risk what do I wish to protect?***	***How can the hazard get to the receptor?***	***What measures will you take to reduce the risk? – Who is responsible for what?***	***How likely is this contact?***	***What is the harm that can be caused?***	***What is the risk that still remains? The balance of probability and consequence***
Noise and vibration from site equipment including the boiler, tanks, vessels and associated equipment	Sensitive receptors listed in Table 2 including the road network (Hainault Road), controlled water, agricultural land, residential, commercial properties as part of the Hainault Works Industrial Estate and ecological receptors.	Air	The boiler the equipment has been designed to have a low noise level and will be in an enclosure. Plant options with lower noise levels will be used wherever possible to ensure noise is kept to a minimum. Opening of doors of the building housing the equipment will be kept to a minimum. Variable speed drivers will be used for pump motors to deliver low noise levels. All the equipment will be designed in accordance with European noise standards; the plant and equipment will be maintained regularly to minimise noise resulting from deterioration and inefficient	Low – with the mitigation implemented on site.	Nuisance and health risk to human receptors	**Not significant**

			operation. Maintenance will be in accordance with the manufacturer's requirements. Auditory inspections will be carried out in response to complaints, should theses occur. All site personnel will be trained in the need to minimise site noise and are responsible for monitoring and reporting excessive noise when carrying out their everyday roles. The Operations Manager will be responsible for implementing risk management measures in conjunction with the Best Available Techniques and Operating Techniques (Ref: 410.064010.00001_BATOT).			

5.0 Conclusion

This qualitative ERA has been undertaken in accordance with EA guidance. The assessment concludes that with the implementation of the risk management measures described above, potential hazards from the proposed Installation are not likely to be significant or pose a significant risk of harm to sensitive receptors in the vicinity of the Site and therefore, no further assessment is required.

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