RAMBOLL

ENVIRONMENT
& HEALTH

Outline Environmental Management System

Project name	**Thorpe Marsh Landfill (EPR/CP3091SC/V002)**
Project no.	**1620016237-012**
Client	**Thorpe Marsh Green Energy Hub Limited**
Memo no.	**01**
Version	**1.0**
To	**Thorpe Marsh Green Energy Hub Ltd**
From	**Ramboll UK Ltd**

Prepared by	**RMOAKE**
Checked by	**JEUDALL**
Approved by	**RMOAKE**

Date 2024/06/20

1 Background

Ramboll UK Limited ("Ramboll") have produced this Outline Environmental Management System ("EMS") report for Thorpe Marsh Landfill (the "site") as part of our ongoing support to Thorpe Marsh Green Energy Hub Limited ("TMGEHL" or herein "the "Client"). The landfill is to be redeveloped into a Battery Energy Storage System ("BESS"), and the design works are ongoing.

Thorpe Marsh Landfill is a regulated waste disposal site covered by an Environmental Permit ("EP") (WML number WD20D53, originally granted in 1977, now EPR/CP3091SC/V002). The permit allowed the disposal of PFA as well as domestic, commercial, and industrial wastes from the adjacent Thorpe Marsh Power Station. The landfill was operated prior to the implementation of the 2001 Landfill Directive ("LfD") and was designed as a 'dilute and disperse' land-raise landfill. The waste disposal cell was formed by the construction of a three sided, 'U' shaped ("horseshoe") bund using PFA. Within the cell, limited or no PFA deposition took place, due to the closure of the Power Station in 1994 when the landfill was put into closure. In a discrete area at the southern end of the site PFA waste was co-disposed with other permitted waste types. These discrete waste areas are identified in Section 6 and will not be disturbed by the proposed development work.

Despite closure of the Power Station in 1994 the landfill's environmental permit was not surrendered.

The current permit holder is HJ Banks and Company Ltd. A permit transfer application has been submitted (ref. EPR/CP3091SC/T002) to transfer the permit to Thorpe Marsh Green Energy Hub Limited. This transfer application is to be decided alongside the proposed permit variation application.

The proposed redevelopment of the landfill into a BESS will involve submission of a permit variation application for re-opening of the landfill to facilitate the

Ramboll
Arkwright House
Parsonage Gardens
Manchester M3 2LF
United Kingdom

T +44 161 827 1890
https://uk.ramboll.com

Ramboll UK Limited
Registered in England & Wales
Company No: 03659970
Registered office:
240 Blackfriars Road
London
SE1 8NW

creation of a development platform by re-profiling PFA from both the eastern and western arms of the 'U' shaped bund.

The environmental permit requires a written management system and that a summary of the management system forms part of the application. The full EMS is currently being prepared and will be completed prior to the works commencing.

1.1 Further Information

Reference should be made to the following documents as part of the permit variation application:

- Ramboll UK Ltd. Thorpe Marsh Landfill (EPR/CP3091SC/V002) Conceptual Site Model Report. Dated May 2024. Ref. 1620016237-012-RAM-SS-RP-00001.
- Ramboll UK Ltd. Thorpe Marsh Landfill (EPR/CP3091SC/V002) Hydrogeological Risk Assessment Report. Dated May 2024. Ref. 1620016237-012-RAM-SS-RP-00003.
- Ramboll UK Ltd. Thorpe Marsh Landfill (EPR/CP3091SC/V002) Environmental Setting and Installation Design Report. Dated May 2024. Ref. 1620016237-012-RAM-SS-RP-00004.
- Ramboll UK Ltd. Thorpe Marsh Landfill (EPR/CP3091SC/V002) Slope Stability Report. Dated June 2024. Ref. 1620016237-012-RAM-SS-RP-00006.
- Ramboll UK Ltd. Thorpe Marsh Landfill (EPR/CP3091SC/V002) Environmental Monitoring Plan. Dated June 2024. Ref. 1620016237-012-RAM-SS-RP-00007.

2 Current EMS

As part of the name transfer application referenced above, an EMS was produced detailing how TMGEHL will comply with the terms and conditions of the EP and the facility's current status as a closed landfill. Reference should be made to the following document:

- Egniol Consulting Ltd. Environmental Management System. Thorpe Marsh Industrial Waste Landfill (Factory Curtilage) – Close Landfill. Dated November 2023. Ref. ECL.1234.Z99.01.

3 Outline EMS (for New Landfill Cell)

3.1 Site Operator

On completion of the name transfer application ref: EPR/CP3091SC/T002, submitted to the Environment Agency in December 2023, Thorpe Marsh Green Energy Hub Ltd will be the site operator.

3.2 Location and Access

The site is located to the west of the former Thorpe Marsh Power Station (which was active between 1963 and 1994), approximately 6 km north of Doncaster town centre. The approximate centre of the site is at National Grid Reference 459480, 409490. A site location plan is presented as Figure 1, Appendix 1.

Access to the new landfill cell is through Ash Field Road towards the northeastern edge of the cell (as shown on Figure 2, Appendix 1).

3.3 Site Operations

The proposed installation and movement of PFA will create a new landfill cell within the area of the existing landfill. This is to allow for the construction of the BESS. It is estimated that approximately 600,000 m^3 of PFA will be excavated and used to form the new landfill cell which will form the development platform for the planned BESS scheme. A key consideration for design and construction of the new landfill cell is minimising the import of off-site material. This will greatly reduce the potential impact of increased traffic on nearby receptors.

After removal of vegetation and limited topsoil in the proposed new landfill area, PFA from the eastern and western U-shaped bund will be deposited in 225 mm thick layers and compacted to reduce future settlement/infiltration. Stability and settlement risk assessments indicate that the design of the landfill is sufficient to form the development platform for the BESS and PFA slopes will be stable. Final landfill elevations will vary between approximately 7.0 metres Above Ordnance Datum (m AOD) and 15.1 m AOD, with the development platform having a general sloping surface towards the south-west to aid surface water run-off.

The compacted cut and fill thickness will range from 0.00m to maximum of approximately 9.9m. This will create a low-permeability material throughout the thickness of the new landfill cell. A surface drainage system consisting of rock-filled trenches, ditches, piping and attenuation basins will collect rainfall towards the discharge point. Primary drains with a length of approximately 2,200m and secondary drains with a length of approximately 13,000m total will be installed to transport rainwater to the attenuation basins.

Infrastructure related to the BESS development will be installed inside and on top of the engineering layer such as roads, cable conduits, BESS battery unit foundations and other infrastructure elements. A switchyard / substation and welfare area are constructed on top of the landfill. Given the likely loadings of the switchyard / substation, the foundations may need to be piled. A piling risk assessment will form part of the detailed design and construction quality assurance (CQA) works following permit issue and prior to any works commencing. Management of pile arisings (as required) will also be addressed in the detailed design works.

3.4 Site and equipment maintenance

The operator will maintain a detailed Maintenance Record for all equipment utilised on site.

3.5 Contingency plans

Contingency plans will be implemented to minimise the impact on the environment of any, breakdowns, shutdowns or changes to normal operations.

3.6 Accident prevention and management

In the event of a near miss, accident or environmental incident the relevant accident and incident record will be completed. Emergency response procedures will be in place and fully implemented and recorded as required.

3.7 Contact information for the public

A notice board will be displayed at key entrance ways to include the following:

- The permit holders name

- Emergency contact name and telephone number
- Statement confirming the site is permitted by the Environment Agency
- Environmental Permit number
- Environment Agency Contact details (incl. incident hotline)

3.8 Climate change adaptation

The impacts of climate change have been considered within the CSM and HRA modelling (see Section 1.1, above). Within the outline drainage strategy referenced within the ESID report (see Section 1.1, above) for the new landfill cell, the attenuation storage volume required has been calculated including a 40% climate change to rainfall applied as per Environment Agency guidance for the area.

The nearest climate station at Robin Hood Doncaster Sheffield Airport indicates that between 1991 and 2020 annual rainfall was 582 mm. According to the EA's fluvial and tidal flood map for planning the west of the site (the area of the PFA mound) is Flood Zone 2 (Medium Probability). However, the Environment Agency mapping is based on historic flood extent through this area prior to the placement of the mound that occurred in 1947 as a result of a flood defenses failure and the development platform/PFA mound at a post construction level of ~10-11m AOD sits well above the climate change (20%) adjusted 1 in 1000-year flood extent of 7.37m AOD.

3.9 Complaints procedure

Complaints from the general public, local residents neighbouring businesses, site staff or regulatory bodies will be handled by the Site Manager or other technically competent persons responsible for site management. The complaints procedure shall be full enacted, documented and resolved as required, including undertaking any additional mitigation measures.

3.10 Managing staff competence and training records

Site staff will be trained and instructed in the procedures required to operate the site and will be made aware of the requirements of the EP and EMS. Training records will be kept, and a training matrix will be regularly updated.

3.11 Keeping records

A daily record of site operations and activities will be maintained and made available for inspection as required.

3.12 Waste Management

Waste types that were permitted under the WML are listed in Table 3.1.

Table 3-1 - Permitted Waste Types

Waste Type		Permitted Quantity
i	Pulverised Fuel Ash (PFA)	1,250 tonnes / day
ii	Untreated Domestic and Commercial Waste. Demolition Waste (plastic packing sections from cooling towers).	50 tonnes / day
Waste in categories (i) and (ii) above will not exceed 9,678 tonnes per annum in total.		

As noted earlier in this document the proposal comprises the relocation and re-deposition of ~600,00m^3 of PFA to form a development platform, this would exceed both criteria (i) and (ii). However, no new waste is being brought on to the site.

The landfill will accept PFA only, as waste code 10-01-02, coal fly ash, and potentially some component of 10-01-01, furnace bottom ash, if encountered locally or as inclusions. Unsuitable waste types, if encountered, will be removed and disposed to an appropriate licensed facility off-site.

3.13 Compliance

The EMS will be regularly reviewed and updated when:

- Changes are made to the site, operations or equipment that affect the activities covered by the permit.
- Whenever there is a requirement to change ('vary') the permit.
- After any accident, complaint or breach of the permit.
- Should a new environmental problem or issue be encountered and there is a requirement to implement new control measures.

Any changes to the management system will be clearly documented and the Environment Agency notified.

3.13.1 Environmental Monitoring

Reference should be made to the Environmental Monitoring Plan (see Section 1.1, above) for details of the planned monitoring programme.

In addition, the CEMP will be fully implemented during the construction stage and in line with all regulatory requirements under the planning system.

3.14 Restoration / Aftercare

The waste activity will ultimately lead to the creation of a development platform for the planned BESS scheme. Landfill restoration is not included as part of this variation but is likely to include placement of gravel on the landfill surface (BESS development platform), with seeded topsoil on PFA slopes to allow for landfill restoration activities to occur in future (detail not included in this application, but that will form part of a wider scheme include meeting the Client's ambitious biodiversity net gain targets).

3.15 Closure

It is a requirement of the Landfill Directive that a closure and aftercare management plan is maintained throughout the life of the landfill.

Closure is an ongoing process between the time when the Site is 'closed', i.e., has ceased accepting waste for disposal and 'definite closure', i.e., when the EA agree that the Site may enter the aftercare phase.

Monitoring plays a vital part in determining the performance of the landfill against any assumptions made. It is necessary to consider the following factors:

- Generation of landfill gas;
- Potential for leachate or gas to be generated in future;

- Physical stability of the waste and associated structures; and
- Surface water and groundwater monitoring.

The non-hazardous waste (i.e., PFA) permitted to be landfilled at the Site will not generate landfill gas or leachate and management infrastructure will not be required.

The Site will be monitored for evidence of instability when topographical surveys are carried out to assess the settlement of the waste mass. The landfill surface and waste slopes will be assessed during each monitoring round.

Monitoring of the post closure surface will be carried out on regular occasions (at least quarterly). On these occasions observations will be made and the results will be recorded on a Site check sheet. Should it be identified that settlement of the waste has occurred to affect the surface, the details of any rectification works necessary will be passed to the Site operator.

Once landfilling is complete a notification that the Site has ceased accepting waste will be sent to the EA. Following this notification, the operator shall submit an application for Definite Closure.

A post closure monitoring schedule for landfill gas and groundwater will be proposed based on the results of monitoring during the operational phase. Monitoring will be carried out for at least two years after the Site has ceased to accept wastes for landfill or such other period as agreed with the Environment Agency. The Site closure requirements will be reviewed periodically during the operational phase. Closure requirements will be in accordance with the guidance that is current at the time.