

Witcham Meadlands Landfill Site

784-B070447

Environmental Setting & Installation Design

Environmental Permit Variation Application

Mick George Limited

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MGL/B070447/REC/01A – Environmental Receptor Plan

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MGL/B070447/LOC/02 – Close up of Phase 9 Extension area

MGL/B070447/LOC/03 – Engineering Section Through Phase 9 Extension area

M34-7-24-03 – Restoration Plan

1.0 Introduction

- 1.1.1 This section of the Environmental Permit application corresponds to Question 1, Appendix 4 of Part C4 of the application forms, which requires the provision of an Environmental Setting and Site Design (ESSD) report.
- 1.1.2 The aim of this report is to describe the regulated facility in relation to the environmental setting, identifying the source terms, pathways and receptors that will be used as the basis for the risk assessments, including:-
- Hydrogeological Risk Assessment (HRA); and
 - Environmental Risk Assessment (ERA).
- 1.1.3 These risk assessments will include more specific conceptual models.
- 1.1.4 This Environmental Permit application has been prepared on behalf of the operator; Mick George Limited (Mick George) by Tetra Tech Limited as part of the environmental permit variation application.
- 1.1.5 The Witcham Meadlands Landfill site is currently regulated under a bespoke Environmental Permit (EPR/LP3996ND) to allow the importation of non-hazardous waste and stable non-reactive hazardous wastes including gypsum and asbestos within an engineered cell (Phase 9). The Environmental Permit also allowed for the importation of inert waste within separate areas to the engineered cell (Phases 1-8).
- 1.1.6 Mick George are now seeking to vary the environmental permit to apply a number of changes which are summarised in the Non-Technical Summary.
- 1.1.7 The aim of this report is to describe the regulated facility in relation to the environmental setting, identifying the source terms, pathways and receptors that will be used as the basis for the risk assessments, including:-
- Hydrogeological Risk Assessment (HRA);
 - Landfill Gas Risk Assessment; and
 - Environmental Risk Assessment.

1.2 Regulated Facility Details

Site Location

- 1.2.1 The site is located at Mepal Landfill Site, Mepal, Chatteris, Cambridgeshire (as shown overleaf) and operates under Environmental Permit ERP/LP3996ND.



- 1.2.2 Mepal Landfill Site (formerly South Witcham Quarry) is located approximately 5km to the southeast of Chatteris in Cambridgeshire. The site is located in the Block Fen area of Mepal, Witcham, Mepal, Meadlands CB6 2AY, at approximate National Grid Reference TL 4400 8396. The site location and permit boundary are presented on Drawing Number MGL/B070447/PER/01A.
- 1.2.3 The site is accessed via Block Fen Drove from the A142 and has good access to the connecting highways.
- 1.2.4 Within a 2km radius of Mepal Landfill Site lies the Ouse Washes, which at its nearest point is located approximately 900m to the east of the site. The Ouse Washes stretch approximately 33km in a southwest to northeast direction from Earith, Bexley to the area south east of Downham Market and have a varying width from approximately 1km at the widest parts to 500m at the narrowest.
- 1.2.5 The Ouse Washes has a statutory designation as a Site of Special Scientific Interest (SSSI), a Special Protection Area (SPA) and a RAMSAR Site. The Ouse Washes comprises the stretch of land between the Old Bedford River and associated counter drain and the New Bedford River and associated counter drain which run parallel in a southwest – northeast direction. In addition to these designations, 332ha of the Old Bedford River/Counter Drain and the Old Bedford River/River Delph have been designated as a Special Area of Conservation (SAC).

- 1.2.6 The nearest residential properties to the site comprise farms, farmhouses and isolated unoccupied rural cottages. Drawing Number MGL/B070447/ERA/01A – Environmental Receptor Plan shows the site location in relation to the surrounding features.

Site Classification

- 1.2.7 The regulated facility is a landfill that allows the importation of non-hazardous waste, stable non-reactive hazardous wastes including gypsum and asbestos within an engineered cell (Phase 9). The landfill also allowed for the importation of inert waste for the remaining phases (Phases 1-8).

Application Boundary and Site Security

- 1.2.8 The boundary of the current landfill is shown on Drawing Number MGL/A075924/PER/01A including the haul road, weighbridge, wheel bath and site office.
- 1.2.9 The permit boundary is an irregular in shape and has a site area of approximately 55 hectares.
- 1.2.10 As part of the mineral extraction and restoration operations, security fencing will be established around areas of the site that will be close to public access areas to prevent unauthorised access. Site gates and any perimeter fencing will be inspected on a daily basis. Any identified damage to the fence or gates that could compromise the site security will be recorded and temporarily repaired as necessary before the end of that working day. Permanent repair or replacement will be undertaken as soon as practicable.
- 1.2.11 All vehicles delivered to the site will be required to report to the site office. Upon request, drivers may be required to provide evidence to show that they are licensed waste carriers. All other visitors will be required to sign the Site Diary before proceeding onto the site and upon departure.
- 1.2.12 Signs may be erected on peripheral fences giving warnings of the operations being undertaken at the site.
- 1.2.13 A notice board will be maintained at the waste reception area, which will display a copy of the Environmental Permit along with any other relevant notices and site procedures. A copy of all of the documents provided in this application will be kept at the site office.

Former Waste Management Activity Boundaries

- 1.2.14 With reference to Groundsure's 'Enviro Data Viewer', there are no historic landfill sites within 1km of the site. However, there are two active landfills within 1km of the site. The

first site is the Mepal Landfill Extension which is an inert landfill that is located to the east of the site and the second site is the Mepal Southern Extension landfill which is an inert landfill to the south of the site. Both landfills are operated by Mick George under environmental permits EPR/DB3637RS and EPR/EB3306CB respectively.

2.0 Source Term Characterisation

2.1 Site History

- 2.1.1 Since 2000, mineral extraction activities have been undertaken at the site. Prior to this period the land was used for agricultural purposes.
- 2.1.2 In June 2001 planning permission was granted by Cambridgeshire County Council to import and deposit inert waste within the completed mineral extraction areas of the current Mepal Landfill site in order to backfill the quarry and restore the land (Planning Permission F/0480/00/CM and E/0507/00/CM). In December 2005, an environmental permit was issued by the Environment Agency to allow the operation of an inert landfill at the site.
- 2.1.3 In August 2008 Cambridgeshire County Council amended Condition 14 of this planning permission to allow Mick George Limited to import limited types of non-hazardous waste into the existing landfill. Mick George Ltd applied to vary Condition 1 of the current planning permission to allow stable non-reactive hazardous waste (SNRHW) and a limited number of asbestos wastes from construction and demolition sources and from other waste management facilities to be deposited in a designated cell within the landfill site. This was granted on 15th April 2014.
- 2.1.4 In 2024 CC granted planning permission (CCC/24/065/FUL) for continued disposal of SNRHW with the revised final contours and restoration. This planning permission is given in Appendix L of this application.
- 2.1.5 From a permitting perspective, a variation notice (reference EPR/LP396ND/V002) was issued in November 2009 to allow the importation of non-hazardous waste in to Phase 9. The importation of SNRHW and asbestos waste was authorised under a further variation (reference EPR/LP396ND/V003) which was issued in December 2014.
- 2.1.6 Since then, the following changes have been made to the environmental permit:-
- Application Reference EPR/LP3996ND/V006 – Variation to increase the depth of asbestos and SNRHW cells, variation of the annual throughput for the asbestos, SNRHW and inert waste cells and addition of waste codes for the SNRHW cell. This variation was issued in September 2016.
 - Application Reference EPR/LP3996ND/V006 – Variation for the input of gypsum waste to the SNRHW cell. This variation was issued in June 2017.

2.2 Current Activities

2.2.1 According to Table S1.1 of the environmental permit (EPR/LP3996ND), Mick George are permitted to undertake a number of waste activities which are summarised in Table 1 below.

Table 1: Permitted Activities

Schedule 1 Listed Activities			
Activity Reference	Activity Listed in Schedule 1 of the Environmental Permitting Regulations	WFD Annex I and II operations (where applicable)	Description of Specified Activity
A1	Section 5.2 Part A(1)(a)	D5 – Specially engineered landfill R10 – Land treatment resulting in benefit to agriculture or ecology	Landfill for non-hazardous waste and landfill restoration
A2	Section 5.2 Part A(1)(a)	D5 – Specially engineered landfill	Landfill for hazardous waste
Directly Associated Activities			
Activity Reference	Description of Specified Activity		
A3	D6 – Release to water body except seas/oceans	-	Discharge of site drainage from the landfill
A4	N/A	-	Temporary storage of leachate
Waste Operations			
Activity Reference	Description of activities for waste operation	Limits of activities	
A5	The deposit of inert waste into or onto land	Receipt, handling, storage and disposal of wastes, consisting of the types and quantities specified in Condition 2.6 as an integral part of landfilling in Phases 1 to 8 only.	

2.2.2 Following the completion of landfilling operations the land will be restored to an agricultural after use.

2.3 Proposed Changes

2.3.1 Mick George now seeks to vary the Environmental Permit for the Witcham Meadlands Landfill Site to apply the following changes:-

- Change the annual throughput to the following:-

Table 2: Proposed Changes in Throughput

Category	Current Limit Tonnes/Year	Proposed Limit Tonnes/Year
Non-hazardous waste / inert waste (Phase 9 only)	50,000	200,000

Stable Non-Reactive Hazardous Waste (Phase 9 only)	200,000 including a maximum of 20,000 tonnes of gypsum waste	200,000 including a maximum of 30,000 tonnes of gypsum waste
Asbestos waste and construction material containing asbestos (Phase 9 only)		
Gypsum waste (Phase 9 only)		
Inert Waste	50,000	0

- Update the location of the leachate monitoring points as they are not where the original permit application said they would be. This has also been raised by the local area officer in a Compliance Assessment Report (CAR Form) and Mick George have been advised to vary the environmental permit to ensure that the correct locations are referenced. As shown on Drawing Number MGL/B070447/LOC/01.
- Extend Phase 9 southwards as shown on Drawing Numbers MGL/B070447/LOC/01, MGL/B070447/LOC/02 and MGL/B070447/LOC/03 and include a new restoration drawing M34-7-24-03 Restoration Plan.
- Amend the sulphate compliance levels that are currently set in Table S3.3 of the environmental permit.
- Allow the continued importation of Air Pollution Control (APC) wastes into the SNRHW cell.

Table 3: Proposed Waste Codes for APC Waste

EWC Code	Description
10 01 16*	Fly ash from co-incineration containing hazardous substances
10 01 18*	Wastes from gas cleaning containing dangerous substances
10 01 04*	Oil fly ash and boiler dust
10 01 13*	Fly ash from emulsified hydrocarbons used as fuel
19 01 07*	Solid wastes from gas treatment
19 01 15*	Boiler dust containing hazardous substances
19 01 17*	Pyrolysis wastes containing hazardous substances

- Add the following waste codes to the environmental permit:-

Table 4: Proposed Waste Codes

EWC Code	Description
19 13 04	Sludges from soil remediation other than those mentioned in 19 13 03
19 12 11*	Other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances ¹
19 13 03*	Sludges from soil remediation containing hazardous substances ¹

12 01 16*	Waste blasting material containing hazardous substances
17 02 04*	Glass, plastic and wood containing or contaminated with hazardous substances
17 04 09*	Metal waste contaminated with hazardous substances
15 01 11*	Metallic packaging containing a hazardous solid porous matrix (for example asbestos), including empty pressure containers

Note 1 *Wastes codes for the asbestos list*

2.4 Phasing

- 2.4.1 There are no proposed changes to the phasing of the site as a result of the proposed changes.

2.5 Restoration and Aftercare

- 2.5.1 There are no proposed changes to the restoration or aftercare arrangements as a result of the proposed changes. However, details are provided in the following sections for ease of reference. Full details can be found within the Revised Aftercare Scheme submitted with Planning Permission F/02017/08/CM.

Restoration

- 2.5.2 Upon completion of the landfilling activities the site will be restored to wet grassland incorporating a network of wet furrows with the current hedgerows and ditches being reinstated as per Drawing Number M34-7-24-03. The restoration proposal of the main site includes the proposed reservoirs being recharged and a surface water flow attenuation pond to aid in the irrigation and upkeep of the wet grasslands.

Aftercare

- 2.5.3 Following restoration of the site the soils will be cultivated and sown with a mix of grass seed designed to provide optimum cover. The restored site will be planted in accordance with a detailed planting scheme to create a mix of habitats to enable an agricultural afteruse whilst enhancing biodiversity on site.

3.0 Pathway and Receptor

3.1 Geology

Regional Geology

- 3.1.1 Based on the British Geological Survey (BGS) 1:50,000 Sheet 173 Ely (Bedrock and Superficial Deposits) published in 1980, the regional geology comprises Jurassic deposits overlain in places by Pleistocene and Recent superficial deposits. The solid geology regionally consists of the Jurassic Ampthill Clay/West Walton Formation and the Kimmeridge Clay, dipping gently to the southeast.

Local Geological Setting

- 3.1.2 Locally, the youngest solid stratum is the Upper Jurassic Ampthill Clay Formation. The Fenland area is covered by extensive superficial deposits that include unconsolidated peats, clays, silts, sands and gravels. The most extensive superficial deposits local to the site are the Pleistocene First and Second River Terrace Deposits which have been removed from the site as a result of the extraction works. The River Terrace Deposits are thickest along the northwestern boundary of the site and range from between 6.3m to 4.1m. The deposits are generally thinner to the southeast where the deposits are typically less than 2m in thickness.

3.2 Hydrology

Surface Watercourses

- 3.2.1 The closest main watercourse to the site is the Old Bedford River/Counter Drain located approximately 900m to the southeast/east of the permit boundary. With reference to the Environment Agency website Mepal Landfill Site lies within an area likely to flood. The Welches Dam pumping station, located approximately 2km to the northeast of the site, is operated in order to protect the area from flooding. The pumping station operates by discharging water from the Old Bedford River / Counter Drain into the Ouse Washes via the Middle Level Barrier Bank.
- 3.2.2 The most recent available results for the River Bedford are for 2009. This monitoring point recorded ammonia as Grade A and dissolved oxygen as Grade B which are considered to be good, with nitrates and phosphates Grade 5 (equivalent to high levels). The biology of the water was recorded as Grade C.

- 3.2.3 The Environment Agency has monitoring points on the river both upstream and downstream of the Mepal Site and the recorded data has been awarded the same grading at each location, this indicates that the site does not have a negative impact on the river quality.

3.3 Surface Water Abstractions

- 3.3.1 There are 12 surface water abstractions registered with the Environment Agency operating within 2km of the site. The closest of which is located 20m from the site which is a Drain at Byall Farm. Further details are provided in the Hydrogeology Risk Assessment report submitted with this application.

3.4 Hydrogeology

Regional Hydrogeology

Aquifer Properties and Status

- 3.4.1 The main body of groundwater is provided by the localised superficial deposits (River Terrace Deposits). The Environment Agency's aquifer designation map for the area shows the majority of the site lies on a 'Secondary A' aquifer (formerly classified as a minor aquifer).
- 3.4.2 In-situ head tests undertaken by Mick George in 2003 and SLR Consulting in 2008 provide information on the local hydraulic conductivity for the River Terrace Deposits Secondary Aquifer. These tests show that the hydraulic conductivity ranges from 2×10^{-5} m/s to 6×10^{-4} m/s with a mean value of 3×10^{-4} m/s.
- 3.4.3 The River Terrace Deposits Secondary aquifer is underlain by the Ampthill Clay Formation which, characterised by its low permeability, can be considered to form an aquiclude.

Groundwater Abstractions

Table 4: Groundwater Abstractions within 2km

Licence no.	Distance	Location	Use	NGR
6/33/52/*G/0214	1.3km	Gravel Pit 1 at Chatteris	General Agriculture - Spray Irrigation	TL 4323 8421
6/33/52/*G/0214	1.6km	Gravel Pit 2 at Chatteris	General Agriculture - Spray Irrigation	TL 4295 8438
6/33/52/*G/0027	1.4km	Pit 1 Mepal	General Agriculture - Spray Irrigation	TL 4319 8352
6/33/52/*G/0006	1.5km	Gravel Pit at Block Fen	Industrial Mineral Washing	TL 4303 8376

6/33/52/*G/0213	1.6km	Gravel Pit at Block Fen	Industrial Mineral Washing	TL 4300 8340
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3.5 Local Hydrogeology

- 3.5.1 Under the current permit, groundwater is monitored at a number of locations around the site. It is considered that there is no significant direct pathway between the groundwater beneath the site in the superficial River Terrace Deposits (Secondary aquifer) and surface water in the Old Bedford River/Counter Drain.
- 3.5.2 The River Terrace Deposits have been demonstrated to thin out towards the Old Bedford River with site investigation works showing them to be approximately 0.1m thick.
- 3.5.3 Furthermore, it is understood that the strict management of water levels within the Old Bedford River/Counter Drain ensures that there is no hydraulic gradient towards the River. It is understood that the minimum retention level in the Counter Drain is 0.75mAOD and the target cessation level is 0.91mAOD (Halcrow 2002).
- 3.5.4 Those levels are higher than the groundwater levels recorded within the perimeter boreholes around the site, thus even if the River Terrace Deposits were laterally extensive, there would be no hydraulic gradient in that direction.

3.6 Groundwater Quality

- 3.6.1 The principal receptor considered within the original HRA is the groundwater within the River Terrace Deposits. Analysis of data by MWS in 2009 shows that groundwater quality in the area local to the site is poor. It was also observed that historical data taken prior to the landfilling of wastes at the site also showed poor groundwater quality with several substances including calcium, chromium, copper, iron, lead, sulphate, zinc, vanadium, arsenic and ammonia exceeding the Environmental Quality Standard and/or Drinking Water Standard for each parameter. The report also suggests that local landfilling activities, not related to the Mepal Site, could be the source of the poor water quality.
- 3.6.2 The updated HRA and the Environmental Monitoring Plan discuss the requirements at the site for groundwater monitoring.

3.7 Landfill Gas

- 3.7.1 A Landfill Gas Risk Assessment (GRA) has been prepared to assess the potential risk of landfill gas as a result of the proposed changes. A copy of the GRA is provided as Appendix H of the Environmental Permit Application.

3.8 Amenity

- 3.8.1 Sensitive receptors located within 1km of the application site have been considered in the Environmental Risk Assessment which is provided as Appendix D of the Environmental Permit Application.

4.0 Pollution Control Measures

4.1 Site Engineering

Basal and Side Slope Engineering

- 4.1.1 There are no proposed changes to the engineering arrangements that are currently permitted at the facility. The southern extension to the Phase 9 area will have exactly the same engineering profile as above as detailed in the latest approved CQA plan for Phase 9. Drawings showing the extended Phase 9 and cross sections are attached to this report.

Capping

- 4.1.2 There are no proposed changes to the capping arrangements that are currently permitted at the facility.

4.2 Leachate Management and Monitoring

Leachate Generation

- 4.2.1 Leachate is currently managed and monitored in accordance with the requirements outlined in Schedule 3 of the Environmental Permit. Details of these requirements are provided in the updated Environmental Management & Monitoring Plan (Appendix I of the Environmental Permit Application) for completeness.
- 4.2.2 A HRA has been prepared to assess the potential risk of significant impacts from leachate as a result of the proposed changes. A copy of the updated HRA is provided as Appendix G of the Environmental Permit Application.
- 4.2.3 The updated HRA concludes that the changes suggested in this permit variation will not affect the environment surrounding the site.

4.3 Gas Management and Monitoring Infrastructure

- 4.3.1 Landfill gas is currently managed and monitored in accordance with the requirements outlined in Schedule 3 of the Environmental Permit. Details of these requirements are provided in the updated Environmental Management & Monitoring Plan (Appendix J of the Environmental Permit Application) for completeness.
- 4.3.2 A Gas Risk Assessment (GRA) has been prepared to assess the potential risk of landfill gas as a result of the proposed changes. A copy of the GRA is provided as Appendix H of the Environmental Permit Application.

- 4.3.3 The GRA concludes that the changes suggested in this permit variation will not affect the environment surrounding the site.

4.4 Groundwater Management and Monitoring

- 4.4.1 Groundwater is currently managed and monitored in accordance with the requirements outlined in Schedule 3 of the Environmental Permit. Details of these requirements are provided in the updated Environmental Management & Monitoring Plan (Appendix J of the Environmental Permit Application) for completeness.
- 4.4.2 A HRA has been prepared to assess the potential risk of significant impacts on groundwater quality as a result of the proposed changes. A copy of the updated HRA is provided as Appendix G of the Environmental Permit Application.
- 4.4.3 The updated HRA concludes that the changes suggested in this permit variation will not affect the environment surrounding the site.

4.5 Surface Water Management System

- 4.5.1 The Mepal Landfill Site uses a discharge consent controlled by Aggregate Industries to discharge trade effluent from the site drainage from both operational mineral extraction and restoration areas. This discharge will continue to be used for the management of surface water. Surface water quality monitoring requirements are detailed within the current permit, these will remain in place.

4.6 Post Closure Controls

- 4.6.1 The post closure controls will ensure long-term management and monitoring of the regulated facility. The Environmental Management and Monitoring Plan (Appendix J of the Environmental Permit Application) provides details regarding the monitoring schedule of the aftercare phase.

5.0 Monitoring

- 5.0.1 A revised Environmental Management & Monitoring Plan has been prepared to detail the environmental monitoring arrangements for the site. A copy of the Environmental Management & Monitoring Plan is provided as Appendix J of the Environmental Permit Application.

6.0 Site Closure

- 7.0.1 The Environment Agency's Guidance 'Landfill (EPR 5.02) and other permanent deposits of waste: how to surrender your environmental permit' details that where records demonstrate that a recovery site has accepted Landfill Directive compliance inert wastes during its lifetime, the site is applicable for a low-risk surrender based on records alone. As such no further monitoring or post closure monitoring is deemed necessary. As such, no further closure and aftercare plan has been prepared in support of this Environmental Permit Application.
- 7.0.2 However, as a function of the planning permission, a 5-year aftercare scheme will be implemented to manage and maintain the wider quarry site. This will ensure the successful establishment and continued thriving of the restoration proposals.

Drawings

MGL/B070447/PER/01A – Permit Boundary Plan

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