



Crimplesham Inert Landfill Site

Environmental Permit Application

Environmental Setting and Site Design

September 2020

Prepared on behalf of Mick George Limited





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1.0 Introduction

1.1 Report Context

1.1.1 This section of the Environmental Permit Application corresponds to Question 1, Appendix 4 of Part B4 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);
- Landfill Gas Screening Report; 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 WYG.

1.2 Regulated Facility Details

Site Location

1.2.1 The application site forms part of the Crimplesham Quarry site which is located approximately 855m east from the village of Crimplesham in Norfolk. The Crimplesham Quarry site comprises two areas of land that are separated by a road (Main Road) that runs through the middle. This application solely relates to the southern section of the quarry which is centred at approximate National Grid Reference (NGR) TF 66346 03464 and the environmental permit boundary is shown on Drawing Number P2734 D3, Rev F.

Site Classification

1.2.2 The regulated facility is an inert landfill.

Application Boundary and Site Security

1.2.3 The proposed application boundary is shown on Drawing Number P2734 D3, Rev F. Access to the application site will be achieved via an unnamed access road off Main Road which runs



along the northern boundary of the application site.

- 1.2.4 As part of the mineral extraction and restoration operations, security fencing is established around the perimeter of the site to prevent unauthorised. Site gates and 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.

Former Waste Management Activity Boundaries

- 1.2.5 According to Groundsure's 'Enviro Data Viewer', there is one historic landfill located within 1km of the application site. The landfill is located to the north of the application site and covers the same area of land as the northern Crimplesham Quarry site which owned and operated by Frimstone /Mick George Limited.

Site Context

- 1.2.6 The location of the application site is shown on Drawing Number P2734 D3, Rev F. The immediate surroundings of the site comprise agricultural land and the nearest residential dwelling is an isolated property off Mill Lane and is located approximately 455m north of the application site.

Compliance with Environment Agency Position Statement on Location of Landfills

- 1.2.7 The Environmental Risk Assessment (Appendix C of the Environmental Permit Application) that has been undertaken for the proposed application shows that the waste disposal activities at the site does not pose a potential hazard to groundwater quality.
- 1.2.8 According the Multi Agency Geographic Information for the Countryside's (MAGIC) website, the site is not located in a Groundwater Source Protection Zone and is considered by The Environment Agency's Approach to Groundwater Protection guidance as a potentially suitable site, subject to planning considerations.
- 1.2.9 The environmental risk assessments of the Environmental Permit Application demonstrate that long-term site management will not be required due to the environmental protection measures and waste acceptance protocols proposed for the development.



2.0 Source Term Characterisation

2.1 Development of the Installation

Historical Development

Northern Crimplesham Quarry Site

- 2.1.1 A number of planning consents, that go as far back as 1960, were granted to undertake mineral extraction at the current quarry site which is located to the north of the application site. These planning consents were consolidated into a single planning permission (reference C/2/1997/2002) that was issued by Norfolk County Council (NCC) in January 2002.
- 2.1.2 In addition to permission C/2/1997/2002, two additional planning consents were issued for the current quarry site. The first consent (reference C/2/1996/2029) was issued in May 1999 and allows the extraction of mineral and recycling of building materials on an area of land that adjoins the eastern boundary of the original consented quarry. The second consent (reference C/2/2001/2019) was issued in June 2002 allows the importation of materials to facilitate the restoration of the site back the agriculture.
- 2.1.3 Since June 2002, the planning conditions of these three consents have subsequently been varied under multiple planning consents.

Southern Crimplesham Quarry Site (Application Site)

- 2.1.4 With reference to historic maps dated from 1885 to 2009, the application site has largely comprised open agricultural land.
- 2.1.5 In May 2009, planning permission (reference C/2/2008/2006) was granted by Norfolk County Council (NCC) to allow the extraction and processing of sand and gravel to the south of the existing quarry site (i.e. the application site). Following mineral extraction, the planning permission allows the site to be restored back to agricultural land via landfilling of inert waste materials.
- 2.1.6 In December 2014, planning permission (reference C/2/2014/2018) was granted by NCC to vary two conditions of permission C/2/2008/2006. The first condition (Condition 3), relates to amendments to the previously approved Phasing Plans. The second condition (Condition 7) concern amendments to the approved Plant Site Layout Plan. The alterations include an additional lagoon for use in the processing of mineral and the siting of a wheel cleaning facility in a different position to the approved plan.



2.1.7 In January 2016, planning permission (reference C/2/2015/2038) was granted by NCC to vary two conditions (2 and 30) of permission C/2/2014/2018 which relate to the Plant Site Layout and the Phasing Plans.

Proposed Development

2.1.8 The proposed development entails the importation of inert waste to infill and restore the quarry void that will be created following mineral extraction activities. Works will be completed in accordance with the restoration scheme (Drawing Number P2734 D1, Rev G) which was originally approved under planning permission C/2/2008/2006 and has been incorporated in to the most recent planning permission (C/2/2015/2038).

Waste Types and Quantities

2.1.9 Permitted wastes accepted at the site will be strictly inert as classified under the Landfill Directive (1999/31/EC) and Council Decision (2003/33/EC) of 19 December 2002 'establishing criteria and procedures for the acceptance of waste landfills'.

2.1.10 Details regarding the proposed waste types including restrictions are provided in the Operating Techniques (Appendix B of the Environmental Permit Application).

2.1.11 In order to complete the proposed works at the Crimplesham Inert Landfill Site, approximately 735,000m³ of inert materials will be required in total. When using a bulk density conversion factor of 1.6 tonnes/m³ this equates to approximately 1,176,000 tonnes of imported material.

Proposed Operational Phasing

2.1.12 The proposed phasing plan is detailed in Drawing Number P2734 D3, Rev F as provided under planning application C/2/2015/2038 (detailed in Section 2.1.7 above). As detailed in these plans, the site will comprise four phases (Phases 1-4) and each phase comprises a number of sub phases.

2.1.13 As shown on the phasing plan (Drawing Number P2734 D3, Rev F), mineral extraction with subsequent infilling and restoration would commence in Phase 1 and would proceed in a south easterly direction towards Phase 4.

2.1.14 Prior to extraction at each phase, topsoils and subsoils will be stripped and used to form 2-3m high screening bunds. The location of these bunds are shown on the phasing plan (Drawing Number P2734 D3, Rev F). Once infilling is complete in each phase, the soils from these bunds will be used to facilitate the restoration of the site.



Final Landform and After Use

- 2.1.15 As detailed on the approved restoration scheme (Drawing Number P2734 D1, Rev G), the site will be restored back to agricultural land and will comprise additional features that will enhance the biodiversity of the site.



3.0 Pathway and Receptor

3.1 Climate

Rainfall

3.1.1 Rainfall data is available from a rain gauge at Marham, located approximately 9.4km north east of the site (NGR: TF 73880 09016) shown on the Met Office website (Met Office, 2020) from 1981 to 2010 with average monthly rainfall summarised in Table 1 below.

Table 1: Monthly Rainfall Data from Marham (1981 - 2010)

Month	Average Rainfall mm (1981 – 2010)
January	56.1
February	39.3
March	49.1
April	47.2
May	53.3
June	59.2
July	52.1
August	58.8
September	55.3
October	67.3
November	62.2
December	52.7
Annual (Average)	652.5

Wind Rose

3.1.2 The wind rose data, based on findings recorded at Marham located approximately 450m South east of the site (NGR: TF 70531 09900) taken from www.meteoblue.com, shows that the prevailing wind direction is from the south west (SW).

3.2 Geology

3.2.1 According to the British Geological Survey’s (BGS) ‘Geology of Britain Viewer’, the bedrock below the site comprises Chalk of the West Melbury Marly Chalk Formation and the Gault Clay. However as per the Hydrogeological Risk assessment it is actually thought that the site lies on the edge of the lithological boundary between the Chalk and underlying Gault Formation where the Chalk formation would be at its shallowest and there is no evidence of limestone bands which would characterise the Chalk member as reported in the logs.

3.2.2 The superficial deposits comprise Lowestoft Formation which will be removed as a result of the approved extraction works.



3.3 Man-made Subsurface Pathways

3.3.1 With reference to the Coal Authority's Interactive Map Viewer, the Environment Agency's 'What's in my Backyard' website and BGS' 'Geology of Britain Viewer', there are no man-made subsurface pathways located on site.

3.4 Hydrology

3.4.1 The nearest surface water feature to the site is an unnamed pond which is located approximately 415m south from the application site.

3.4.2 According to the Flood Map for Planning Service (FMPS), the application site is not situated in an area at risk of flooding.

3.5 Hydrogeology

3.5.1 With reference to the Multi-Agency Geographic Information for the Countryside's (MAGIC) website, the site is not situated within a Groundwater Source Protection Zone (GSPZ).

3.5.2 According to the MAGIC website, the application site overlies a Principal Aquifer which are defined as layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage.

3.6 Receptor and Compliance Points

Groundwater

3.6.1 The risk of impact on groundwater is further investigated within the Hydrogeological Risk Assessment (Appendix F of the Environmental Permit Application).

Surface Water

3.6.2 The risk of contaminated rainwater run-off as a result of the proposed development has been considered in the Environmental Risk Assessment (Appendix C of the Environmental Permit Application).

Landfill Gas Risk Assessment

3.6.3 A Landfill Gas Risk Assessment has not been prepared for Crimplesham Inert Landfill Site, as the Landfill Technical Guidance Note LFTGN03 indicates that new inert landfills do not pose a



landfill gas hazard. Nevertheless, a Landfill Gas Risk Assessment Screening exercise has been undertaken to assess the potential risks associated with Landfill Gas migration from the site and is provided within this Environmental Permit Application as Appendix G.

Amenity

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



4.0 Pollution Control Measures

4.1 Site Engineering

Basal Engineering

- 4.1.1 Prior to the commencement of landfilling, a geological barrier will be engineered using imported clay or the underlying Gault Clay. The geological barrier will be constructed in compliance with the Environmental Permitting Regulations: Inert Waste Guidance 2010 which specifies that a geological barrier shall have a hydraulic conductivity of less than 1m at 1×10^{-7} m/s or 0.5m at 5×10^{-8} m/s (MGL-A110260-HYD-01 – Engineering Details). See the Hydrogeological Risk Assessment (HRA) detailed in Appendix F of this permit application for further details.

Side Slope Lining

- 4.1.2 The quarry sides will be shaped using on site materials. Prior to the commencement of landfilling, a geological side slope barrier will be engineered using imported clay materials. The geological side slope barrier will be constructed in compliance with the Environmental Permitting Regulations: Inert Waste Guidance 2010 which specifies that a geological barrier shall have a hydraulic conductivity of less than 1m at 1×10^{-7} m/s or 0.5m at 5×10^{-8} m/s (See MGL-A110260-HYD-01 – Engineering Details and (see Hydrogeological Risk Assessment (HRA) for further details).

Capping

- 4.1.3 In accordance with the requirements of the Landfill Directive, an engineered cap (clay or plastic) is not required. On completion of filling to final levels, the site will be capped with 1m of restoration soils comprising not less than 0.3m of topsoil.

Restoration

- 4.1.4 The application site is presently in agricultural use and it is the intention of Mick George to restore the site back to agricultural land detailed in the approved restoration plan (Drawing Number P2734 D1, Rev G).
- 4.1.5 As mentioned in Sections 2.1.12 to 2.1.14, the restoration works will comprise the use of topsoil and subsoil material that will be stripped and retained on site to provide temporary screening bunds.
- 4.1.6 With reference to the Environment Agency's guidance notes for the Part B4 application form,



an agricultural and ecological benefit statement is only required if the proposed activity involves the deposit of waste to provide a growing medium and / or nutrients to support plant growth. This is characterised in the guidance notes as recovery code R10 'Land treatment resulting in benefit to agriculture or ecological improvement'.

- 4.1.7 In light of the above, the growing medium works will not comprise the use of waste and therefore will not comprise a waste recovery activity. As such, it is considered that an agricultural and ecological benefit statement will not be required to support this application.

4.2 Groundwater Management and Monitoring

- 4.2.1 As mentioned in Section 2.1.9, Mick George only intend to utilise inert wastes as classed under the Landfill Directive (1999/31/EC) and Council Decision (2003/33/EC) of 19 December 2002 'establishing criteria and procedures for the acceptance of waste landfills'.

- 4.2.2 Inert waste is defined in Article 2 of the Landfill Directive 1999/31/EC as follows:-

'Inert waste' means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. The total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water and/or groundwater. Given the definition provided above, it is considered that the risk to groundwater is low. To ensure that the risk remains low throughout the operational life of the site, strict waste acceptance procedures will be employed to minimise the risk of non-compliant wastes being accepted. Details of these procedures are provided in the Operating Techniques (Appendix B of the Environmental Permit Application).

- 4.2.4 In addition, a Hydrogeological Risk Assessment was undertaken as part of the Environmental Permit Application which concludes that the risk to groundwater to low and therefore no groundwater management system is required at the site.

- 4.2.5 With regards to monitoring, the Hydrogeological Risk Assessment provides recommendations for groundwater monitoring which are detailed in the Environmental Management and Monitoring Plan (Appendix H of the Environmental Permit Application).

4.3 Leachate Management and Monitoring

- 4.3.1 Leachate is generated by rainfall infiltrating through areas of open waste and also through



areas of capped and restored waste. Due to the inert nature of the waste, there will be no leachate generated at the site that presents a risk to groundwater, and therefore no leachate management or monitoring is proposed.

4.4 Landfill Gas Management and Monitoring

4.4.1 A Landfill Gas Risk Assessment (GRA) has not been prepared for the proposed inert landfill, as the Landfill Technical Guidance LFTGN03 indicates that new inert landfills do not pose a landfill gas hazard. Nevertheless, a landfill gas screening report has been prepared which has been submitted with the Environmental Permit Application as Appendix G.

4.4.2 As detailed in the Landfill Gas Screening Report, it is considered that no active gas management will be required.

4.4.3 The Landfill Gas Screening Report and the Environmental Management and Monitoring Plan (Appendix H of the Environmental Permit Application) details the perimeter gas monitoring requirements at the site.

4.5 Surface Water Management

4.5.1 Drainage from the site occurs to two local surface water catchments, the Wissey operational catchment to the north and South Level and Cut Off Channel operational catchment to the south. The surface water divide between the two catchments crosses the centre of the site from west to east and this will remain after site restoration.

4.6 Post Closure Controls

4.6.1 The post closure controls will ensure long-term management and monitoring of the regulated facility.

4.6.2 The Environmental Management and Monitoring Plan (Appendix H of the Environmental Permit Application) provides details regarding the monitoring schedule of the aftercare phase.

4.6.3 The Closure and Aftercare Plan (Appendix I of the Environmental Permit Application) provides details of the measures to be taken upon and after the closure of the landfill to avoid pollution risk.



5.0 Site Condition Report

- 5.0.1 The Environmental Permitting Regulations – Site Condition Report (H5) guidance states that a Site Condition Report (SCR) is 'not applicable to those parts of a permitted landfill that have permanent deposits of wastes'. However, in accordance with the EA's Regulatory Guidance Note RGN 9 – Surrender, a SCR is required for areas within a permitted facility that will not be used for the permanent deposit of waste.
- 5.0.2 As such, a SCR has been prepared in relation to these areas using the EA's H5 SCR Template. A copy of the SCR is provided as Appendix K of the main application.



Drawings

P2734 D3, Rev F – Working Plan and Environmental Permit Boundary

P2734 D1, Rev G – Restoration Plan

TM_001, Rev B – Plant Site Layout

MGL-A110260-HYD-01 – Site hydrogeological conceptual model and engineering details