



# **Passenham Quarry**

## **Environmental Permit Variation Application**

### **Environmental Setting and Site Design**

**October 2018**

Prepared on behalf of GRS (Roadstone) Limited

**GRS** Group



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- A091151/ENG.02 (Revision 2) – Proposed Monitoring Point Locations

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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 C4 of the application forms, which requires the provision of an Environmental Setting and Site Design (ESSD) report.
- 1.1.2 This Environmental Permit application has been prepared on behalf of the operator, GRS (Roadstone) Limited by WYG.

### 1.2 Regulated Facility Details

#### Site Location

- 1.2.1 Passenheim Quarry is located approximately 625m east from the village of Deanshanger in South Northamptonshire. The proposed extension area is located to the east of the existing permitted area as shown on Drawing Number GRS/A099801/LOC/01, approximately 250m south of the hamlet of Passenheim.

#### 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 GRS/A099801/LOC/01. The application site is located to the east of the existing Passenheim Quarry site.
- 1.2.4 As part of the existing mineral extraction operations, fencing is established around the perimeter of the site to prevent unauthorised access to the site. Access to the site will be achieved from the existing access road off the A422 located in the north west of the existing permit area. The site entrance via the access road is secured by lockable gates.
- 1.2.5 Site gates and perimeter fencing are inspected on a daily basis. Any identified damage to the fence or gates that could prejudice the site security is 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



- 1.2.6 With reference to the Environment Agency's mapping website 'What's in my Backyard', there are two historic landfill sites within 1km of the proposed extension area. The nearest site is the RMC Aggregates Passenham site which is located approximately 260m north west from the application site and comprises land that covers the western section of the existing Passenham Quarry site. The registered operator is RMC Aggregates (Greater London) Ltd and the site was regulated under licence number 70652. There is no record of when waste was first or last received.
- 1.2.7 The second site is Kingfisher Farm Meridan Quarry which is located approximately 500m west of the proposed extension area. There is no record of the operator or the licence number however the Environment Agency's records show that the site first received waste on 1<sup>st</sup> July 1991 and last received waste on 30<sup>th</sup> April 1994.

### Site Context

- 1.2.8 The application site is located to the east of the wider Passenham Quarry site as shown on Drawing Number GRS/A099801/LOC/01. This application is for an eastern extension to the current boundary of the permit. The immediate surroundings of the proposed extension area largely comprise agricultural land with the nearest residential area located approximately 240m north.

### Compliance with Environment Agency Position Statement on Location of Landfills

- 1.2.9 With reference to the EA's mapping website 'What's in my backyard', the site is not situated within a Groundwater Source Protection Zone (GSPZ). As such, in accordance with the EA's approach to groundwater protection guidance (published March 2017), the site is considered to meet the requirements of the landfill location criteria subject to planning considerations.
- 1.2.10 The Environmental Risk Assessment also demonstrates that long-term site management will not be required due to the environmental protection measures and waste acceptance procedures protocols proposed for the development.



## 2.0 Source Term Characterisation

### 2.1 Development of the Installation

#### Historical Development

- 2.1.1 With reference to historic maps dated from the 1881 to present, the proposed extension area has largely comprised undeveloped, agricultural land.
- 2.1.2 In May 2017, a planning application (reference 17/01267/MIN) was submitted to Milton Keynes Council (MKC) to extend mineral extraction activities in an area to the east of the existing quarry and restore the area back to agriculture. Planning Permission was subsequently granted by MKC in March 2018.

#### Proposed Development

- 2.1.3 The proposed development comprises the importation of inert waste to infill the quarry void at the extended quarry area as approved under planning permission 17/01267/MIN. The site will be restored back to agricultural land with the restoration scheme (Drawing Number P14/PL16/04 is attached to this report) as approved under the planning permission.

#### Waste Types and Quantities

- 2.1.4 In order to achieve the restoration profiles provided on the approved restoration scheme (Drawing Number P14/PL16/04) a volume of 90,000m<sup>3</sup> of additional material will be required in order to achieve the proposed restoration profiles which equates to approximately 150,000 tonnes.
- 2.1.5 It is proposed that the site will continue to use the waste types that are permitted under the current Environmental Permit (EPR/AB3503UZ) for the proposed restoration works. These waste types are 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'.

#### Proposed Operational Phasing

- 2.1.6 The proposed phasing plan within the application site is detailed in Drawing Number P14/PL6/03. As detailed in the phasing plan, the application site will comprise two phases (Phases 13 and 14) which follow from the 12 phases that are covered within the existing permitted area regulated under permit EPR/AB3503UZ



- 2.1.7 Works will commence in Phase 13 where soils will be stripped to create amenity bunds along the eastern boundary of Phase 13 (bund reference FT1) and to the south of Phase 14 (bund reference FT2). Subsoil will then be stripped and placed in Subsoil Store FS1 located to the south of Phase 13 and FS2 located to the south of Phase 14.
- 2.1.8 Overburden will then be stripped in Phase 13, commencing in the west of the phase and working in an easterly direction. If possible, this material will be transported to extraction areas that are present within the existing permitted area to facilitate the restoration of these areas or used to restore the void space that is generated within Phase 13 following mineral extraction.
- 2.1.9 Mineral extraction and subsequent infilling will then commence in Phase 13 which will advance in a west to east direction as shown on Drawing Number P14/PL6/03. It is the intention of GRS that the majority of Phase 13 will be restored using indigenous material to the site, with imported inert materials only used to supplement the operations in the east of the Phase.
- 2.1.10 Following the completion of extraction operations in Phase 13, stripping operations will commence in Phase 14. The topsoil and subsoil will be directly placed into Phase 13 to facilitate restoration. If this is not possible, it is proposed that the topsoil will be stored in bund FT3 and subsoil will be used to expand bund FS3.
- 2.1.11 Following stripping activities, mineral extraction will commence to the north of Phase 14 and proceed in a north east to south west direction as shown on Drawing Number P14/PL16/03 (see attached).
- 2.1.12 On completion of mineral extraction in Phase 14, infilling operations will commence and Phase 13 will be restored to achieve the approved restoration profiles. Once filled, Phase 14 will be restored using subsoil that is stored in FS1 and FS2 and topsoil from the amenity bunds. The soil storage areas will be restored back to the original level by the spreading of topsoil bund FT1.

### Final Landform and After Use

- 2.1.13 Details of the final landform are provided on the approved restoration scheme (Drawing Number P14/PL16/04) as approved under planning permission 17/01267/MIN. The site will be restored back to agriculture with some nature conservation habitats.



### 3.0 Pathway and Receptor

#### 3.1 Climate

##### Rainfall

3.1.1 Long term average rainfall data (1993 to 2015) was obtained from a rain gauge in Deanshanger (NGR SP76115 39710) and is presented in Table 1 below.

**Table 1: Monthly Rainfall Data from Deanshanger (1993 - 2015)**

Month	Average Rainfall mm (1993 – 2015)
January	68
February	51
March	48
April	54
May	66
June	61
July	52
August	60
September	53
October	78
November	74
December	67
Annual (total)	680

##### Wind Rose

3.1.2 The wind rose data, based on findings recorded at Milton Keynes (located approximately 10km south east of the site) taken from [www.windfinder.com](http://www.windfinder.com) shows that for the period February 2012 to January 2018, the prevailing wind direction is from the south west.

#### 3.2 Geology

3.2.1 The regional geology of the site has been taken from the British Geological Survey (BGS) 1:50,000 scale digital geological mapping of the area (BGS, 2015). Superficial deposits of alluvium and river terrace deposits are present along the River Great Ouse and beneath the site. Fluvial deposits of alluvium, comprising silt and clay, are confined to the north of the site in close proximity to the river. River terrace deposits of sand and gravel with local lenses of silt, clay or peat are mapped beneath the south of the site.

3.2.2 Superficial deposits of glacial till are mapped at surface to the east and west of the river. The geological cross section provided on the six-inch scale geological map shows the glacial till to





thicken sharply to the south east of Deanshanger and extend beneath the river terrace deposits. This is a pre-glacial basin which has been infilled with glacial till.

- 3.2.3 The regional bedrock geology is of the Jurassic period. The uppermost formation present in the region is the Oxford Clay Formation consisting of silicate mudstone, underlain by the mudstone of the Ancholme Group, and present to the east of the site. The Ancholme Group is underlain by the Great Oolite Group consisting of interbedded mudstones and fine grained, argillaceous limestones.
- 3.2.4 The Lias Group underlies the Great Oolite Group and is characterised by marine calcareous mudstones with thin beds of argillaceous limestone. The Lias Group is the uppermost formation present beneath most of the site. The overlying Great Oolite Group is present to the east and west of the Great River Ouse, including a strip along the east of the site.

### 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

#### Surface Water Features

- 3.4.1 The nearest surface water feature to the proposed extension area is a stream/drain that runs off the River Great Ouse to the north east of the site, runs through the north of the site and connects back to the River Great Ouse to the north west. The River Great Ouse is located approximately 75m north of the proposed extension area which runs in an east to west direction along the northern boundary before it runs in a north and south direction through the existing permitted area.
- 3.4.2 A full list of surface water features located within 1km of the proposed extension area are provided in Table 2 of the Environmental Risk Assessment (Appendix B of the Environmental Permit application).

#### Flood Risk

- 3.4.3 According to the Flood Map for Planning Service (FMPS), there is an area to the north and west of the proposed extension area which is classed as a Flood Zone 3. These areas are defined as



land assessed as having 1 in 100 or greater annual probability of river flooding, or in a 1 in 200 or greater annual probability of flooding from the sea. The flood maps show that there is also an area to the south east of the extension area which is classed as a Flood Zone 2. This is land assessed as having 1 in 100 and 1 in 1,000 annual probability of river flooding or land having between 1 in 200 and 1 in 1,000 annual probability of sea flooding. This relationship has been examined in detail as part of the FRA that accompanied the planning application and EIA.

Surface Water Abstractions

3.4.4 There are two licenced surface water abstractions within a 3km radius of the application site. Details of the licences are provided in Table 2 below.

**Table 2: Surface Water Abstraction Licences within 3km of Passenham Quarry**

Licence Number	Licence Holder	Description of Use	Max. Daily Volume (m3/d)
6/33/03/*S/0057	Anglian Water Services Limited	Potable Water Supply – Direct	12,000
6/33/03/*S/0051	Weston Farms	Spray Irrigation – Storage	273

### 3.5 Hydrogeology

Aquifer Characteristics

3.5.1 With reference to the Environment Agency’s mapping website ‘What’s in my backyard’, the site is not situated within a Groundwater Source Protection Zone (GSPZ).

3.5.2 The hydrogeological setting of the site comprise three main layers which are detailed below.

Superficial Aquifer

3.5.3 The superficial river terrace deposits are classified as a “Secondary A Aquifer”. Secondary A Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers.

3.5.4 The hydrogeological nature of the river terrace deposits is a relatively thin aquifer layer of unconsolidated sand and gravel. This superficial aquifer is unconfined and groundwater flow is intergranular. The porosity of these fluvial deposits varies depending on the level of sorting of the sediments and the amount of silt and clay present and is usually moderate to high.



3.5.5 There is likely to be some level of hydraulic connectivity between groundwater in the superficial aquifer and the River Great Ouse. The direction of flow will be controlled by the relative elevations of the river level and groundwater levels, with flow being to the river when river levels are lower and groundwater levels higher and vice versa. The extent of connectivity will be controlled by the alluvial deposits underlying the river.

### Superficial Glacial Deposits

3.5.6 The superficial aquifer is underlain by a layer of low permeability glacial deposits which hydraulically separate the superficial aquifer from the underlying bedrock in the vicinity of the Site.

### Bedrock Aquifers

3.5.7 The Great Oolite Group, which is present in a strip along the east of the site, is classified as a Primary aquifer which is defined as layers of rock or drift deposits that have high intergranular and/or fracture permeability, which may support water supply and/or river base flow on a strategic scale.

3.5.8 The underlying Lias Group bedrock is classified as a "Secondary B" aquifer which is defined as being predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons, and weathering.

3.5.9 In the vicinity of the site the bedrock aquifers are separated from surface water and the superficial aquifer by the intervening glacial deposits.

### Groundwater Flow

3.5.10 Boreholes GW06 to GW011, BH17, and BH18 are located on the east side of the River Great Ouse and of these boreholes four are located within or very close to the Site: GW07, GW11, BH17, and BH18. The general direction of groundwater flow follows the topographic gradient which slopes gently down towards the river in a south easterly direction. On the west of the river the groundwater level is highest at borehole GW01; and on the east, at GW08. There is also a northerly component of flow, downstream with the river.

3.5.11 To the west of the river, mean groundwater level ranges from 67.5 mAOD at GW01 to 65.4 mAOD at GW03. To the east of the river, mean groundwater level ranges from 66.5 mAOD at GW08 to 64.1 mAOD at BH18. The hydraulic gradient in the vicinity of the Site has been estimated by comparing groundwater elevation at BH17 and GW07 which are considered most



representative of the groundwater regime at the Site. Based on the mean groundwater levels at these boreholes the hydraulic gradient trends in a northerly direction. Of the four boreholes close to the Site, the deposit is only fully saturated at GW07. At BH18 the sands and gravels are above the mean water level and at boreholes GW11 and BH17 the deposit is partially saturated. The saturated thickness ranges from 1.4 to 1.9 m.

### Groundwater Abstractions

3.5.12 With reference to the Environment Agency's mapping website 'What's in my backyard', there are no groundwater water abstractions within a 3km radius of the application site.

## **3.6 Receptor and Compliance Points**

### Groundwater

3.6.1 It is proposed that the site will continue to use the waste types that are permitted under the current Environmental Permit (EPR/AB3503UZ) for the proposed restoration works. These waste types are inert in accordance with the Landfill Directive (1999/31/EC) and Council Decision (2003/33/EC) of 19<sup>th</sup> December 2002 'establishing criteria and procedures for the acceptance of waste landfills and are set out in Table 2'.

3.6.2 In addition, strict waste acceptance procedures are currently employed on site to minimise the risk of non-compliant wastes being accepted. This will continue to be undertaken as a result of the proposed extension to ensure that no discernible concentrations of hazardous substances will enter the groundwater.

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

### Surface Water

3.6.4 The nearest surface water feature to the proposed extension area is a stream that runs off the River Great Ouse to the north east of the site, runs through the north of the site and connects back to the River Great Ouse to the north west.

3.6.5 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 main application).

### Amenity



3.6.6 Sensitive receptors located within 1km of the application site have been considered in the Environmental Risk Assessment.



## 4.0 Pollution Control Measures

### 4.1 Site Engineering

#### Basal and Side Slope Engineering

- 4.1.1 The basal and side slope liner within the proposed extension area will be constructed in accordance with the approved lining system that's currently employed at Passenham Quarry. Details of the approved system are provided on Drawing Number A089224-ENG-01.

#### Capping

- 4.1.2 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 agricultural areas proposed in the restoration plan will be capped with 1m of restoration soils comprising not less than 0.3m of topsoil.

### 4.2 Restoration

- 4.2.1 The application site is presently in agricultural use and it is the intention of GRS to restore the site back to agricultural use with some selected nature conservation habitats as detailed in the restoration scheme (Drawing Number P14/PL16/04).
- 4.2.2 As mentioned in Sections 2.1.6 to 2.1.12, the restoration works will comprise the use of topsoil and subsoil material that will be stripped from the proposed extension area and retained on site to provide temporary screening bunds.
- 4.2.3 With reference to the Environment Agency's guidance notes for the Part C4 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'.
- 4.2.4 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.

### 4.3 Surface Water Management



- 4.3.1 GRS propose to manage water in the proposed extension area with the establishment of a sump to settle out any waters prior to discharge off site under the provisions of a transfer permit. It is also proposed to maintain the existing system at the plant site lagoons. From the lagoons, the water will either be abstracted for use in the onsite mineral washing plant or discharged off site in accordance with the conditions appended to the site's Environmental Permit.
- 4.3.2 Dewatering sumps will be established for each phase (13 & 14) that will collect all groundwater and surface water inputs that accumulate in the excavation void. From these sumps, 6 inch semi-submersible pumps will either discharge the water into the plant site lagoons, located to the north of Phase 10A, or off site via the drain located between the plant site and the southern extension. GRS (Roadstone) Limited have consent authorised from the Internal Drainage Boards (IDB) to discharge the water off site at the location WD1 and WD2 approved under the Environmental Permit, and similar approvals would be needed for the transfer activity in Phases 13 and 14.
- 4.3.3 The recent workings located to the east of the River Great Ouse were de-watered and the water discharged to the plant site lagoons, for settlement prior to discharge off site under the provisions of this permit.

### System Design

- 4.3.4 In the event of peak storm events, the proposed extension area will be subject to flooding and de-watered at 80 litres per second thereafter. This is consistent with the flood management plan agreed with the Environment Agency. The continuity with the River Great Ouse allied with the area open at any one time means that it is not viable to pump with a view to maintaining production.
- 4.3.5 The Surface Water Management scheme is based on supplementing the storage capacity in the IDB network to provide the post development attenuation plus 30% climate change. The site restoration is designed to return the area to flat open land which is consistent with pre-development contours. As such, the restoration of the site is not expected to generate significant volumes of surface water run-off. However, run off on site will be divided internally within the site and channelled towards the nearest IDB asset which is consistent with arrangements prior to development.



## 5.0 Monitoring

### 5.1 Weather

5.1.1 There are no proposed changes to meteorological monitoring as a result of this variation. As such, the site will continue to undertake meteorological monitoring in accordance with the previously approved documentation for the existing environmental permit, see the Environmental Management and Monitoring Plan (Appendix H of the main application).

### 5.2 Gas Monitoring

5.2.1 In waste gas monitoring infrastructure will be installed following the completion of each landfill cell in order to monitor the levels of gas produced by waste mass in accordance with the requirements of Environment Agency's Technical Guidance Note LFTGN03 and the Landfill Directive.

5.2.2 The boreholes will be monitored monthly throughout the operational phase of the landfill and every six months during the aftercare period.

5.2.3 Further details regarding the monitoring of landfill gas is provided in the Landfill Gas is provided in the Environmental Management and Monitoring Plan (Appendix H of the main application).

### 5.3 Groundwater and Surface Water Monitoring

5.3.1 A Hydrogeological Risk Assessment (HRA) has been prepared for the inert landfill application (Appendix F of the main application). The objective of the HRA is to assess the potential risk of significant impacts on groundwater and surface quality as a result of the proposed development, to derive control and compliance limits for groundwater and surface water and to provide recommendations for contingency actions on the event of exceedances of those levels.

5.3.2 The HRA does not propose any changes to the monitoring schedule as a result of this variation application. However, details regarding the monitoring of groundwater and surface water are provided in the Environmental Management and Monitoring Plan (Appendix H of the main application) for completeness.





## 6.0 Site Condition Report

- 6.0.1 A Site Condition Report (Appendix D of the main application) has been prepared which provides an assessment of the site's current condition using the Environment Agency's H5 SCR template including details of any past uses, historic pollution events and the environmental characteristics of the site.



### 7.0 Closure

- 7.0.1 Operations at the site are regulated under two principal planning consents one covering activities east of the Great River Ouse (regulated by Milton Keynes Council) and the other west of the river (regulated by Northamptonshire County Council).
- 7.0.2 To the east of the river the existing permitted area at Passenham Quarry currently benefits from an aftercare scheme that was submitted and approved by Milton Keynes Council as part of the original planning permission (reference 12/000786/MIN). The approved scheme extends over a period of five years following the completion of restoration in the given phase of extraction. Details of the aftercare scheme were incorporated in to the site's Closure and Aftercare Plan which was previously submitted and approved by the Environment Agency under the original Environmental Permit application.
- 7.0.3 To the west of the river there is an agricultural restoration scheme in place for phases 10-12 inclusive, with a Landscape Habitat Management Plan in place for the remainder of the permit area including the current plant site (phases 1-2 of the original permit).
- 7.0.4 With regards to the proposed extension area, GRS intend to extend the provisions of the approved aftercare scheme for the part of the site situated east of the river in to the extension area. As such, it is considered that a revised Closure and Aftercare Plan is not required in support of this application with the guidance notes of the Part C4 application form which states the following:-

*"You do not need to resend any information from your original permit application if it is not affected by your proposed changes."*



## Drawings

GRS/A099801/LOC/01 – Site Location

P14/PL16/04 – Restoration Scheme

P14/PL16/03 – Proposed Working Plan

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## Appendices



## **Appendix A – Borehole Logs**