

# Berkswell Quarry

## Environmental Permit Variation Application

### Environmental Management & Monitoring Plan (Version 2)

H.D Ricketts Limited

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Prepared on Behalf of Tetra Tech Environment Planning Transport Limited.  
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BER/B031730/BH/01 – Borehole Location Plan

## 1.0 INTRODUCTION

### 1.1 REPORT CONTEXT

- 1.1.1 This document has been prepared by Tetra Tech on behalf of the Operator, H.D Ricketts Limited (H.D Ricketts) to support an Environmental Permit Application for Berkswell Quarry (the site), Cornets End Lane, Meriden, Warwickshire, CV7 7LH.
- 1.1.2 The site is currently regulated under a bespoke Environmental Permit (reference EAWML 103211 and EPR/KB3230MT) that allows the importation of inert waste to infill the quarry void following mineral extraction and restore the site to create agricultural land and broadleaf woodland.
- 1.1.3 H.D Ricketts are now seeking to vary the environmental permit to extend the permit boundary and increase the maximum throughput from 1,576,500 tonnes to 3,376,500 tonnes which will accommodate the extension areas. In addition, H.D Ricketts are seeking to add the following waste codes to the environmental permit:-
- 19 12 09 – Minerals (for example sand, stones); and
  - 19 12 12 – Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11.
- 1.1.4 This document corresponds to Part C4 of the Environmental Permit application forms, specifically detailing the environmental management and monitoring plan for the site.

## 2.0 GROUNDWATER MANAGEMENT AND MONITORING

- 2.0.1 Adherence to the Waste Acceptance Criteria will ensure that the waste deposited at the site complies with the inert classification thereby mitigating any risk to groundwater.
- 2.0.2 A HRA has been prepared for the application (Appendix F of the Environmental Permit Application). The objective of the HRA is to assess the potential risk of significant impacts on groundwater quality as a result of the proposed changes, 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.

### 2.1 GROUNDWATER MONITORING SCHEDULE

- 2.1.1 The HRA recommends that groundwater should continue to be monitored at the existing monitoring points (GW03, GW08 and GW10) as well as boreholes that are situated within the extension areas. The location of all groundwater monitoring points is shown on Drawing Number BER/B031730/BH/01.
- 2.1.2 Details of the groundwater monitoring schedule for the site are provided in Table 1 below.

**Table 1: Proposed Groundwater Monitoring Determinands and Sampling Frequency**

Monitoring Location	Parameter	Frequency
<b>Upgradient</b> GW01, GW02, GW03  Replacement boreholes to be installed if removed.	Water Level, Electrical Conductivity, Chloride, Phenol, pH, Nickel, Sulphate, Lead	Quarterly
<b>Down gradient</b> GW04, GW05, GW06, GW08 and GW10	Water Level, Electrical Conductivity, Chloride, Phenol, pH, Nickel, Sulphate, Lead	Quarterly
<b>Upgradient and Downgradient</b> GW01, GW02 GW03, GW08 and GW10	Base of monitoring point (mAOD)	Annually

#### Compliance Limits (Groundwater Quality)

2.1.3 The HRA provides compliance levels for boreholes GW04, GW05, GW06, GW08 and GW10 for chloride, nickel, sulphate, phenol and lead. Details of the compliance limits are set out in Table 2 below.

**Table 2: Proposed Control and Compliance Limits**

<b>Compliance Location</b>	<b>Parameter</b>	<b>Compliance Level (mg/L)</b>
GW05, GW08 and GW10	Chloride	32.4
	Phenol	0.001
	Nickel	0.00775
	Sulphate	70.4
	Lead	0.006
	Ammoniacal Nitrogen	3.4

Contingency Plan (Groundwater Quality)

2.1.4 Once compliance limits have been agreed, should site monitoring identify an increase in the concentration of the selected determinands then a series of contingency actions will be required. Suggested contingency actions, which require agreement with the EA, are provided below.

2.1.5 In the event that any Control Level is exceeded in one sampling point on one occasion, the following action will be taken:

1. The Company database will be queried to identify the past 12 months results from the affected location. If less than two of the last four results have breached the Control Level, no further action will be taken, other than to note that a breach has occurred. However if two or more of the last four sampling results have breached the Control Level at this location, then the borehole will be re-sampled as soon as possible after receipt of the results.

2.1.6 If the repeat sample also exceeds the Control Level the following course of action will be taken:

1. Data from the monitoring point exceeding the Control Level and adjacent monitoring points will be reviewed by use of statistics and graphical presentation to establish the presence of any trends or patterns.
2. Groundwater levels will be reviewed to establish flow direction in order to determine whether the site is the most likely cause of any change in groundwater quality.

3. A preliminary inspection will be carried out to determine whether there has been:
  - a. Any unusual activity or occurrence on or around the site that could account for the increase in the parameter.
  - b. Any spillage of contaminants at the surface in the vicinity of the affected boreholes.
4. The Company will assess the results of all of the above information and specify its course of action on future monitoring.

2.1.7 In the event that any Trigger Level is exceeded in one sampling point on one occasion, the following action will be taken:

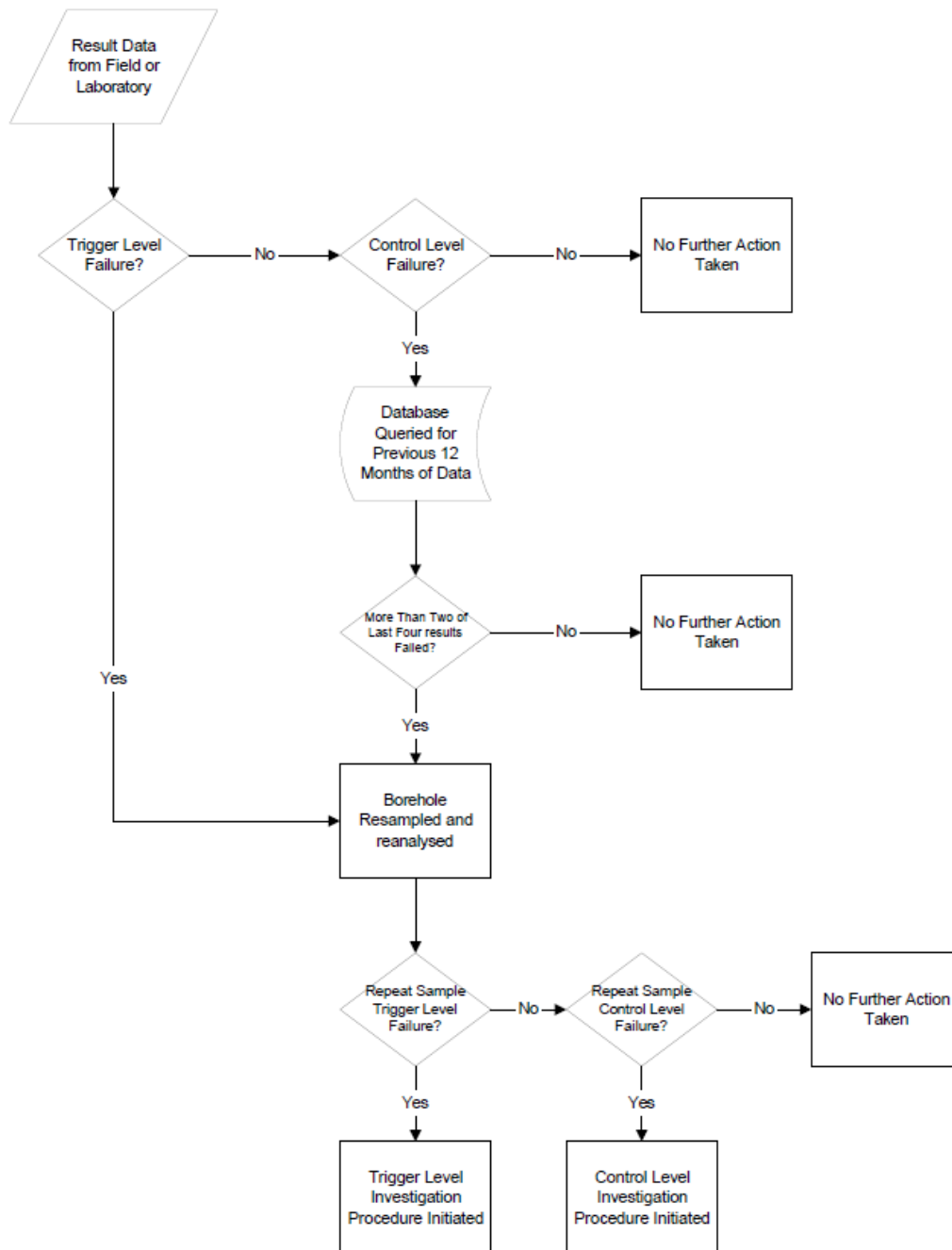
1. The monitoring point will be re-sampled as soon as possible after receipt of the results; whether the elevated determinand was derived from field or laboratory analysis the re-analysis will be carried out in the laboratory. This initial procedure will be used to eliminate errors that might be introduced during sampling, field analysis or laboratory analysis, before continuing. If this second sample does not exceed the Trigger Level then no further action will be taken unless it exceeds the Control Level in which case the procedures set out above will be followed.

2.1.8 If the additional repeat sample also exceeds the Trigger Level then:

1. The actions described in 2 to 4 above will be carried out; and
2. The monitoring frequency will be increased to monthly for an agreed set of monitoring determinands by laboratory analysis in the affected borehole and adjacent boreholes on a monthly frequency until the determinand concentration falls below the Trigger Level.
3. If the laboratory results from the monthly monitoring show no indication of decline over a four month period (or other period assessed appropriate with respect to the rate of flow of groundwater at the site), and the evidence indicates that the site is the most likely cause of the increase in concentrations, then a hydrological risk assessment will be carried out (see below).
4. The Company will conclude the risk assessment with an explanation of the effect of the groundwater quality changes on the groundwater and surface water resource with recommendations for any remedial action if it is considered necessary. A course of action will be agreed with the Environment Agency.

2.1.9 The control and trigger level procedure is summarised on the flow chart below.





## 2.2 QUALITY CONTROL PROCEDURES

### Monitoring Personnel

- 2.2.1 Monitoring will be undertaken by suitably trained person(s) appointed by the site management who are familiar with the monitoring procedures. The monitoring personnel will have access to the Environmental Permit and any relevant accompanying application documents to gain an understanding of the conditions applicable to groundwater monitoring (levels and quality).

#### Monitoring Procedures

- 2.2.2 The groundwater levels will be measured prior to sampling using an electronic dip tape/dip meter.
- 2.2.3 The groundwater samples will be collected using a portable electric submersible pump or other suitable sampling equipment. In order to obtain a sample of the groundwater, each monitoring borehole will be purged to at least three times the well volume (if possible) to prevent sampling non-representative, stagnant samples.
- 2.2.4 On-site analysis will include temperature, pH and electrical conductivity. All groundwater samples will be collected in 1 litre polyethylene or glass containers. Unless the containers already contain a preservative, they will be flushed three times with the sample prior to filling.
- 2.2.5 Filled sample bottles will be stored upright in cool boxes with ice packs. Sample bottles will be pre-labelled in accordance with laboratory requirements and will be submitted to a UKAS accredited laboratory within 24 hours of collection, together with the sample details, tests and suites required. If samples have to be kept overnight, they will be stored in a fridge/cool box and maintained at approximately 4°C.

#### Recording and Reporting

- 2.2.6 A copy of the sampling results will be stored on site for the duration of the site operations.
- 2.2.7 The site management will ensure that copies of the sampling results are sent to the EA in an agreed format and at quarterly frequencies.

## 3.0 SURFACE WATER MANAGEMENT AND MONITORING

### 3.1 SURFACE WATER MONITORING SCHEDULE

3.1.1 Surface water quality has been monitored regularly at one location (SW04). The location of this monitoring point is shown on Drawing Number BER/B031730/BH/01.

3.1.2 Surface water will continue to be monitored at this location in accordance with the schedule detailed in Table 3.

**Table 3: Proposed Surface Water Monitoring Determinands and Sampling Frequency**

Monitoring Location	Parameter	Frequency
SW04	Ammoniacal Nitrogen, Chloride Suspended Solids, Visual Oil and Grease, pH, Electrical Conductivity, Nickel, Sulphate and Cadmium	Quarterly

### 3.2 COMPLIANCE LIMITS

3.2.1 The HRA concludes that no control or compliance limits are required for surface water quality monitoring.

## 4.0 GAS MANAGEMENT AND MONITORING

- 4.0.1 A Gas Risk Assessment (GRA) has not been prepared for the site, as the Technical Guidance Note LFTGN03 indicates that sites that accept inert waste for disposal/recovery do not pose a gas hazard.
- 4.0.2 Nevertheless, a screening report has been prepared which has been submitted with the Environmental Permit application as Appendix G.

### 4.1 MANAGEMENT

- 4.1.1 The Gas Screening Report indicates that due to the inert nature of the proposed waste types, the site will not give rise to significant quantities of gas. The negligible quantities of gas generated are unlikely to be under significant pressure which will minimise the likelihood of gas migration. The risk to nearby sensitive receptors associated with the generation and migration of gas is low.
- 4.1.2 Due to this low risk, it is considered that no active gas management will be required for the site.

### 4.2 MONITORING

- 4.2.1 Gas is currently monitored on a monthly basis at 12 boreholes (as shown on Drawing Number BER/B031730/GAS/01).
- 4.2.2 The gas monitoring proposals including frequencies of monitoring for these particular boreholes are outlined in Table 4 below. Procedures for the monitoring of gas are provided as Appendix A to this report.

**Table 4: Gas Monitoring Programme**

Borehole Reference	Parameter	Monitoring Frequency
GW01, GW02, GW03, GW04, GW05, GW06, GW08, GW09Z1, GW09Z2, GW10, GW11 and GW16	Methane, carbon dioxide, oxygen, meteorological data, atmospheric pressure, differential pressure.	Monthly

- 4.2.3 Furthermore, in accordance with the EA's 'Waste recovery plans and deposit for recovery permits' guidance, in-waste gas monitoring infrastructure will be installed within each completed phase to monitor levels of gas produced by the waste mass.

## 4.3 COMPLIANCE LIMITS

4.3.1 Compliance limits and action levels have been set for each borehole, based on guidance set out in LFTGN03 and the Industry Code of Practice for Perimeter Soil Gas Emissions. These Compliance limits are detailed within Table 5.

**Table 5: Compliance Limits**

Monitoring Location	Parameter	Proposed Compliance Level (v/v%)	Monitoring Frequency	Proposed Action Level (v/v%)
GW01, GW02, GW03, GW04, GW05, GW06, GW08, GW09Z1, GW09Z2, GW10, GW11 and GW16	Methane	1.0	Monthly	0.5
GW01	Carbon Dioxide	None	Monthly	2.4
GW02				3.7
GW03				4.6
GW04				2.7
GW05				1.2
GW06				1.5
GW08				1.8
GW09Z1				1.6
GW09Z2				1.5
GW10				3.2
GW11				4.0
GW16				1.7

4.3.2 These compliance limits are based on concentrations of 1% above agreed background levels for methane.

4.3.3 The Gas Risk Screening Report has demonstrated that the potential for high concentrations of gas is low. However, an appropriate Action Plan is required in the unlikely event that action levels set for each borehole are exceeded. Action Levels have been set at a level which enables the site management to take timely and appropriate action, so that Compliance limits are not exceeded. Further actions are however documented, in the event that both Action Levels and Compliance limits are exceeded. The following sections set out the proposed Action Plan for the site.

## 4.4 ACTION PLAN

### Investigation Procedure

4.4.1 The procedures for the assessment of gas monitoring results in relation to trigger limits are as follows:

1. For methane and carbon dioxide concentrations below the Action Level - allow as normal variability.
2. If methane or carbon dioxide concentrations exceed the Action Level then check previous two readings from the gas database and:
  - i) If the previous readings do not exceed the Action Level then no further action is required other than to note that a breach has occurred.
  - ii) If the previous two readings do exceed the Action Level, then increase monitoring frequency to fortnightly of limits in affected and adjacent boreholes; and assess the possible cause of the increase in concentrations by problem solving described in Section 4.4.3.
3. If methane concentrations exceed the Compliance Level then check the previous reading from the gas database and:
  - i) If the previous reading in the affected borehole was below the Action Level then take no further action except to note that the compliance level has been breached.
  - ii) If the previous reading was above Action Level, then increase monitoring frequency to fortnightly in affected boreholes until concentrations reduce below Compliance Level %.
  - iii) Assess the possible cause of the increase in concentrations by problem solving described in Section 2.5.3, and review previous monitoring results to see if there is any indication of a trend.
  - iv) Monitor borehole pressure to determine likelihood of significant gas flow rates.

4.4.2 The procedures for the assessment of gas flow monitoring results in relation to compliance limits are as follows:

1. If significant flow rates are absent then continue monitoring fortnightly until gas concentrations reduce below Compliance Level.
2. If significant flow rates are absent but methane concentrations do not reduce below the Compliance Level within three months and the source of the gas has been identified as the permitted site, then consider the initiation of appropriate gas control measures in association with the Environment Agency.
3. If significant flow rates are present and readings persist above the Compliance Level % for more

than 6 weeks with no signs of decreasing levels then carry out a gas survey of street services (for methane and carbon dioxide). Dependent on the results of the street survey, consider carrying out a gas survey of potentially affected properties after discussion with the Environment Agency.

4. The Company will make immediate arrangements to install gas control measures after consultation with the Environment Agency.

#### Problem Solving

4.4.3 In the preceding section, the first course of action proposed following any breach of compliance limits is to “assess the possible cause of the increase in gas concentrations”. The routine to be followed to perform this instruction is set out below:

1. Check whether the barometric pressure was rising, falling or steady on the day and in the day(s) preceding the date of monitoring.
2. Check the results against those of other site monitoring boreholes to determine if the result is part of a general deterioration in the gas levels in the area, or a localised occurrence.
3. Check oxygen and carbon dioxide concentrations to determine if these correlate to a deterioration in methane concentrations.
4. Ensure that monitoring equipment is functioning effectively and in any case take a confirmatory sample for gas-chromatographic analysis.
5. Attempt to identify the most likely source of methane, in relationship to the history of the site, and previous monitoring results.
6. Investigate the surrounding area for signs of gas or leachate escape.

4.4.4 If a problem is identified, it will be rectified as soon as possible. The Site Manager or his nominee will be informed immediately, and he will co-ordinate any action required.

4.4.5 Record all actions in the Site Diary.

### Gas Control Procedure

- 4.4.6 Gas control measures may include one or more of the following:
- Cut-off barrier;
  - Passive vent trench;
  - Pumped wells.
- 4.4.7 The selection of the appropriate control measures will be discussed with the Agency prior to installation, and will take into account the nature and depth of the waste deposited. As this site contains only inert waste, it is highly unlikely that gas control procedures will be required, however if they were a passive vent trench or passive venting boreholes would probably be the most effective remedy.
- 4.4.8 Increased gas monitoring in the affected boreholes will continue throughout and after installation of the control measures and until values drop below the Action Level. Monthly monitoring will then resume unless the Action Level is exceeded again.

## **4.5 COMPLETION CRITERIA**

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- 4.5.1 Monitoring of gas will continue until the maximum concentration of methane in in-waste and external monitoring installations remains below 1.0% by volume and the concentration of carbon dioxide remains below 1.5% above the background level or the rate of gas flow remains below 15 litres/hr.
- 4.5.2 Monitoring will be carried out over a 24 month period on at least 4 occasions, including 2 occasions when the atmospheric pressure is falling and is greater than 1000 mb.



## 5.0 METEOROLOGICAL MONITORING

- 5.0.1 Due to the acceptance of inert waste at the site and with reference to the HRA, it is considered unnecessary to manage and monitor leachate. This negates the need to monitor meteorological conditions for the purpose of using water balance calculations as a tool for evaluating leachate production.
- 5.0.2 Atmospheric pressure and ground conditions will be monitored and recorded during all gas monitoring visits.
- 5.0.3 Weather conditions that may be unfavourable to infilling particularly dry loads will be used to determine the acceptability of such wastes on a particular day, for example strong winds given as severe weather warnings from the Meteorological Office.
- 5.0.4 Details on weather conditions will be recorded in the Site Diary on a daily basis.

## 6.0 AMENITY MANAGEMENT AND MONITORING

- 6.0.1 An Environmental Risk Assessment (ERA) has been prepared in accordance with the Environment Agency's Risk Assessment guidance. It specifically deals with the following: -
- Particulate Matter Management and Monitoring;
  - Noise Management and Monitoring;
  - Odour Management and Monitoring;
  - Mud Management and Monitoring;
  - Litter Management and Monitoring; and,
  - Birds, Vermin and Insect Management and Monitoring.
- 6.0.2 Due to the inert nature of the waste, the site will not produce odour or litter nor will it attract birds, vermin and insects.
- 6.0.3 The ERA concluded that the risk of particulate matter and noise annoyance was not significant and therefore it is not proposed to implement monitoring regimes for these potential hazards.
- 6.0.4 The ERA also considered the risk of mud being transferred to the local highways as not significant. A wheel washing facility will be employed on site which will be used by HGVs before they leave the site. Water sprays will also be employed to dampen the access road. However, in the unlikely event that mud is deposited on the road then a road sweeper will be utilised as necessary.

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## 7.0 HEALTH IMPACT MONITORING

- 7.0.1 Due to the inert nature of the waste, it is considered unnecessary to undertake health impact monitoring on the surrounding population.

## DRAWINGS

BER/B031730/BH/01 – Borehole Location Plan