

Birks Royd Stone Ltd

Ten Yards Lane Quarry Waste Recovery Facility

Bespoke Recovery Permit Application

Environmental Monitoring Plan

Document Reference: TYL-EMP-01

Issue 1

March 2026

Prepared by



1.0 Introduction

- 1.1 Silkstone Environmental Ltd. (SEL) on behalf of Birks Royd Stone Ltd has produced this Environmental Monitoring Plan (EMP) as part of a bespoke recovery permit application at Ten Yards lane Quarry.
- 1.2 Part of the quarry has been restored to date using available quarry backfill. The remainder of the quarry which is still being worked for sandstone but requires the importation of inert material to complete the quarry restoration, once mineral extraction is close to completion. The shortfall of material to achieve the planning permitted restoration profile is 58,800m³ (approximately 100,000 tonnes)
- 1.3 The current planning permission permits the importation of inert material to make up the final 2m depth of material shortfall for restoration.
- 1.4 Imported waste to be used for the final 2m depth of quarry restoration would comprise clean uncontaminated rock, subsoil, brick, concrete and ceramic waste.
- 1.5 Inert waste material would be sourced from demolition and excavation arisings in the West Yorkshire area.
- 1.6 Monthly groundwater and landfill gas monitoring was undertaken on a monthly basis between August 2025 and January 2026 at three boreholes (BH1, BH2 and BH3) on the following dates at the time of writing:
- 28th August 2025
 - 16th September 2025
 - 21st October 2025
 - 19th November 2025
 - 16th December 2025
 - 26th January 2026

2.0 Methodology

- 2.1 The area of quarry proposed for waste recovery activity is shown on drawing 26014/101 in Appendix A.
- 2.2 New borehole installations were agreed with the Environment Agency for the purposes of background gas and groundwater and these are detailed in Table 1 below.
- 2.3 The layout is based on the requirement for a minimum of one upgradient and two downgradient groundwater monitoring boreholes as per EA guidance (Ref.A). It is considered that borehole 1 is located hydraulically up gradient of the landfill site's groundwater regime and that boreholes 2 and 3 are considered down gradient positions.
- 2.3 The layout was based on the requirement for a minimum of one up-gradient and two down gradient groundwater monitoring boreholes as per EA guidance.
- 2.4 Each borehole was drilled using open-hole drilling techniques by ACE Drilling Services. Actual drilling depths were dependent on-site specific conditions as experienced at each drilling location and interpreted by the supervising engineer. The purpose of each borehole was taken

into consideration; groundwater monitoring boreholes are to target a specific horizon rather than specific depth. The depths to which the boreholes were installed is shown in Table 1 below.

Table 1. Water/gas monitoring boreholes installation depths

Borehole No.	Proposed Install Depth (m)	Depth of Installation (m)
BH1	39	45
BH2	32	34.5
BH3	32	32.5

3. Groundwater Monitoring Procedure

- 3.1 Groundwater monitoring is currently carried out at boreholes BH1 to BH3 for background purposes. The chemical components that are tested for in the groundwater samples are given in Table 2. In the event of any trigger level exceedance, post issue of the environmental permit. Table 3 details the appropriate actions to be carried out.
- 3.2 All monitoring boreholes will be inspected during the monitoring visits. Any damaged or non-functioning monitoring boreholes will be recorded on the monitoring record sheets and reported to the Site Management. Arrangements will then be made for the repairs or re-instatement of the installation with a month of the date of the incident being recorded. Damage to monitoring infrastructure will be avoided through clear marking out of monitoring locations (to avoid collision etc.) and a briefing given to all operations staff at the site as to the location of the monitoring infrastructure and the importance of preventing damage to the installations.

Table 2- Groundwater Monitoring Schedule

Type of Investigation	Sampling For:	Frequency, Location and Methodology	Guidance Followed
Groundwater Level Monitoring	Groundwater Level	Groundwater levels will be monitored MONTHLY for an initial period of 6 months and all subsequent years monitoring will take place at THREE monthly intervals until the licence is surrendered. Monitoring will take place at all operational groundwater monitoring boreholes (Refer to BH Plan ESID 6 in Appendix A)	LFTGN 02 - Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water
Groundwater Quality Sampling	The substances that will be sampled for are those given in Table 2	Groundwater levels will be monitored MONTHLY for an initial period of 6 months and all subsequent years monitoring will take place at THREE monthly intervals until the licence is surrendered. Monitoring will take place at all operational groundwater monitoring boreholes All laboratory testing will be carried out to the appropriate detection limits and compared to the site specific Control and Trigger Levels, as detailed in Table 3.	LFTGN 02 - Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water

Table 3- Groundwater Testing Contamination Suite

Analysis	MDL	Unit
pH	1	pH units
Conductivity at 20°C	90	uS/cm
Total Alkalinity	2	mg/l
TDS as mg/L	5	mg/l
Dissolved Organic Carbon	0.4	mg/l
Nitrite as N	0.01	mg/l
Ammoniacal Nitrogen as N	0.01	mg/l
Chloride as Cl	1	mg/l
Fluoride as F 0.1	0.1	mg/l
Arsenic as As	0.01	mg/l
Boron as B	0.01	mg/l
Cadmium as Cd	0.000002	mg/l
Calcium as Ca	1	ug/l
Total Chromium as Cr	0.001	mg/l
Copper as Cu	0.001	mg/l
Iron as Fe	0.01	mg/l
Lead as Pb	0.0002	mg/l
Magnesium as Mg	1	mg/l
Manganese as Mn	0.002	mg/l
Mercury as Hg	0.00003	mg/l
Nickel as Ni	0.001	mg/l
Potassium as K	1	mg/l
Selenium as Se	0.001	mg/l
Sodium as Na	1	mg/l
Total Sulphur as SO4	3	mg/l
Zinc as Zn	0.002	mg/l

Table 4. Groundwater & Gas Monitoring Action Plan

Breach of Control Level	Breach of Trigger Level	Contingency Action to be Taken
✓	✓	Advise site management
✓	✓	Confirm reading by repeat monitoring
✓	✓	Review existing monitoring information
✓	✓	Increase monitoring frequency to establish magnitude of problem
	✓	Advise Environment Agency and agree on corrective action based on the level of trigger level exceedance

4. Groundwater Sampling Procedure

- 4.1 Prior to groundwater monitoring commencing at the site, HDPE tubing and foot valves were installed at each groundwater monitoring point to enable groundwater to be pumped to surface. The length of HDPE tubing used was equivalent to the distance from borehole base to just below the gas bung seated on top of the borehole.

- 4.2 For each monitoring visit, a dip meter is used to determine the depth of groundwater inside each borehole. A record is made of groundwater depth and depth to borehole base. Based on the dip measurements, the volume of groundwater to be purged is calculated, based on a requirement to purge three times the well volume.
- 4.3 Groundwater is pumped from within the borehole to ground surface where it is collected and the volume measured in a suitable receptacle (usually a bucket). Groundwater is pumped from the borehole until sufficient purging has been achieved.
- 4.4 Plastic sample bottles which do not contain preserving agents/chemicals are rinsed a minimum of three times prior to collection of groundwater samples.
- 4.5 If groundwater recharge is very slow (and the borehole is dry) sometimes the borehole is revisited to collect a groundwater sample later in the day, or the next day.
- 4.6 In cases where groundwater recharge is insufficient to provide groundwater samples in a reasonable timeframe, we sometimes collect a grab sample (i.e. sample without purging).
- 4.7 Once groundwater purging is completed and the relevant sample bottles are rinsed, groundwater is pumped directly from the HDPE tubing into the sample bottles until there is no air left in the bottle. The bottle is then be sealed with a cap/lid.
- 4.8 Groundwater samples are not be collected from receptacles used for measuring purge volume to prevent cross contamination.
- 4.9 Each groundwater sample bottle is appropriately labelled with the following details (generally a pre-labelled sample bottle system is used);
- Date, Time of sampling, and Site Name.
 - Borehole identification.
 - Initials of person sampling.
 - Sample Number (If more than one sample is collected from same borehole).
 - Grid reference number (if appropriate)
 - Any additional site specific info that may be of relevance to a borehole (if appropriate)
- 4.10 The monitoring technician checks that the details of the sample bottles are accurate and correct, for each sample collected. Sample bottles should be in good condition, and free from contamination.
- 4.11 Should contaminated purge water be extracted from a borehole during sample collection, then the monitoring technician ensures it is collected stored in a suitable container (such as a five gallon drum) and handed over to site management who will arrange for its safe disposal/treatment. The site operator is responsible for ensuring any recovered contaminated purge water is disposed of or treated by suitably licensed means.
- 4.12 All collected groundwater samples are stored in suitable conditions prior to collection for laboratory analysis, i.e. samples are kept out of direct sunlight and stored in a cool dark place.
- 4.13 Groundwater samples are stored in a refrigerated system while collection and analysis by the laboratory is arranged. Groundwater samples are collected for analysis by the laboratory the

following day. This is to ensure that preserving agents and samples do not expire accredited shelf life periods.

4.14 Groundwater analysis is carried out by a UKAS accredited laboratory facility.

5. Landfill Gas Monitoring

5.1 Background landfill gas monitoring is currently carried out at the installation in accordance with Table 5, below. The results of all landfill gas monitoring will be compared with the control and trigger levels for parameters given in table 6, which are as yet to be set. Tables 7 and 8 gives details of the actions that will be carried out following any breach of a control and trigger level and any subsequent emergency action plan.

5.2 All monitoring boreholes are inspected during the monitoring visits as per Para 3.2.

5.3 The table below shows the full suite of landfill gas monitoring analysis carried out on all monitoring boreholes.

5.4 Background monitoring has taken place monthly for the first 6 months, then reverts to quarterly and will continue at this frequency when waste deposition commences.

Table 5 - Gas Monitoring Schedule

Type of Investigation	Sampling For:	Frequency, Location and Methodology	Guidance Followed
1) Routine Perimeter Boreholes	CH ₄ , CO ₂ , O ₂ , CO & H ₂ S	Landfill Gas will be monitored MONTHLY for an initial period of 6 months. QUARTERLY monitoring will then be carried out for all subsequent years monitoring until the licence is surrendered. Monitoring will take place at all operational groundwater monitoring boreholes	Environment Agency Guidance LFTGN 03 – Management of Landfill Gas
	Also Recording:		
	Atmospheric Pressure Differential Pressure Meteorological Data		

Table 6. Gas Monitoring Analysis

Parameter	Unit
Methane (CH ₄)	%
Carbon Dioxide (CO ₂)	%
Oxygen (O ₂)	%
Balance (Bal)	%
Hydrogen Sulphide (H ₂ S)	%
Carbon Monoxide (CO)	%
Relative Pressure	mbar
Atmospheric Pressure	mbar
Flow	l/h

5.5 To ensure a correct and valid reading, it is ensured that every gas bung and valve has been maintained in airtight and good condition at each borehole location. If any valves are damaged,

not airtight, or missing, then details are recorded on the appropriate data sheet and arrangements made for replacement or repairs as soon as is practical.

- 5.6 The borehole cover is opened first. A transparent pipe is attached to the gas bung valve and the other end to the “sample in” socket on the gas meter. Gas is then pumped from the borehole by the gas meter for two minutes. All gas concentrations listed in the landfill gas table above in Table 6 are then saved and noted once readings stabilise.
- 5.7 The gas valve is then closed and the transparent pipe is switched from the “sample in” socket to the “flow in” socket. The valve on the gas bung is then re-opened. The valve on the gas bung is then opened and the gas flow measured until readings become stable.
- 5.8 Once all readings are noted, the gas tap is closed and the transparent pipe is disconnected at both ends.

In Waste Gas Monitoring

- 5.10 The generation of landfill gas from the site will be monitored through both the operational and closed phases of the landfill’s lifecycle. It is not anticipated that in-waste boreholes would be required due to the minimal depth of the waste deposited but will be at the discretion of the EA.
- 5.11 This monitoring will act to further validate the modelling undertaken above and to warn of possible dangers to sensitive receptors.

Action Plan

- 5.12 It is not envisaged that any events or accidents on the site could result in the production of landfill gas. Any abnormal change in the monitoring results from the site will be recorded and reported to the Environment Agency appropriately in accordance with the ‘Contingency Actions for breaches in Control and Trigger Levels’ detailed in Table 7 below. As detailed in Table 7, any events requiring remedial action to be taken on the site will involve a specific action plan to be agreed between the operator, agent and the Environment Agency.

Table 7 - Contingency Actions for Exceeding Control and Trigger Levels

Following a breach of: Control Level	Trigger Level	Contingency Action Taken
√	√	Advise site management
√	√	Confirm reading by repeat monitoring following a complete purge of the gas analyser
√	√	Review existing monitoring information for both perimeter and in-waste mass monitoring boreholes
√	√	Review site management procedures/ waste acceptance/leachate management procedures to prevent further breach of level
√	√	Increase monitoring frequency at breach location and adjacent locations to establish magnitude and extent of problem
	√	Review existing Landfill Gas Risk Assessment and Gas Management Plan

	√	Advise Environment Agency and agree on corrective action based on the level of trigger level exceedance
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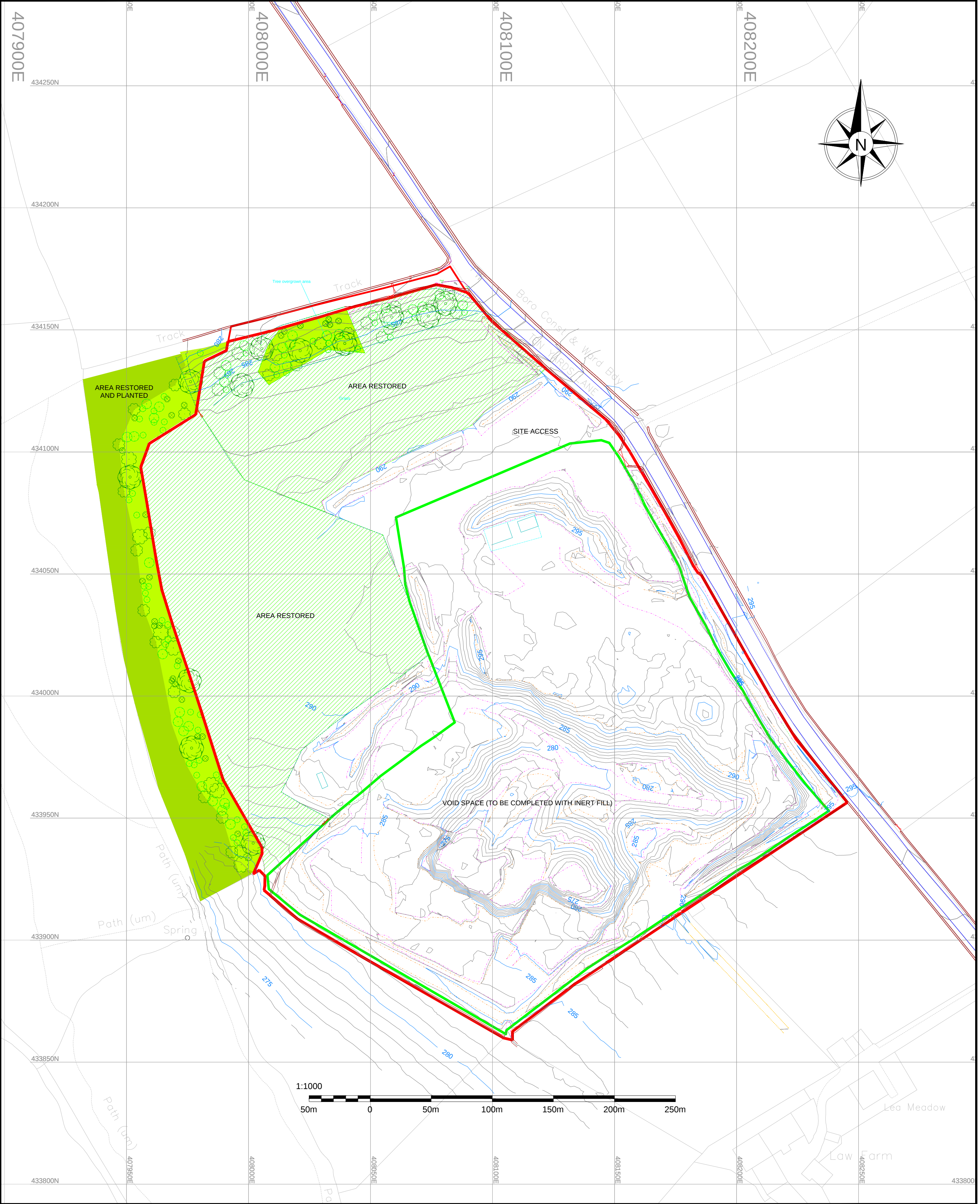
Table 8 – Emergency Action Plan

Action	Details
Person who is responsible for managing emergency actions	Site Manager (Technically Competent Person)
On discovery of problem contact Site Manager	07871573080
Site Manager to contact Emergency Services and advise Works Manager	Emergency Services on 999
Situation will be assessed against the following criteria: • Danger/Risk to Human Health • Danger/Risk to Site Equipment & Installation Infrastructure • Danger/Risk to Adjacent Equipment and Infrastructure	The Site Manager to assess the situation based on the given criteria. They will contact the Emergency Services where appropriate and will keep the Environment Agency informed of developments
Actions to be taken under direction of Site Manager	Assessment of situation • Evacuation of area concerned • Warning given to all personnel working in adjacent areas • Incident specific remediation plan implemented • Full written report, including initial situation assessment, personnel/ infrastructure affected, all actions taken and by whom, will be included in the Site Diary and a copy sent to the Environment Agency

APPENDIX A - PLANS

Waste Recovery Area

Monitoring Well Location Plan



LEGEND

- Bottom Of Bank
- Top Of Bank
- Fence
- Road
- Wall
- Normal Contour (1m AOD)
- Prominent Contour (5m AOD)

- Planning Permission Boundary
- Waste Recovery Area

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Rev	Description	Date

Client:

BIRKS ROYD STONE

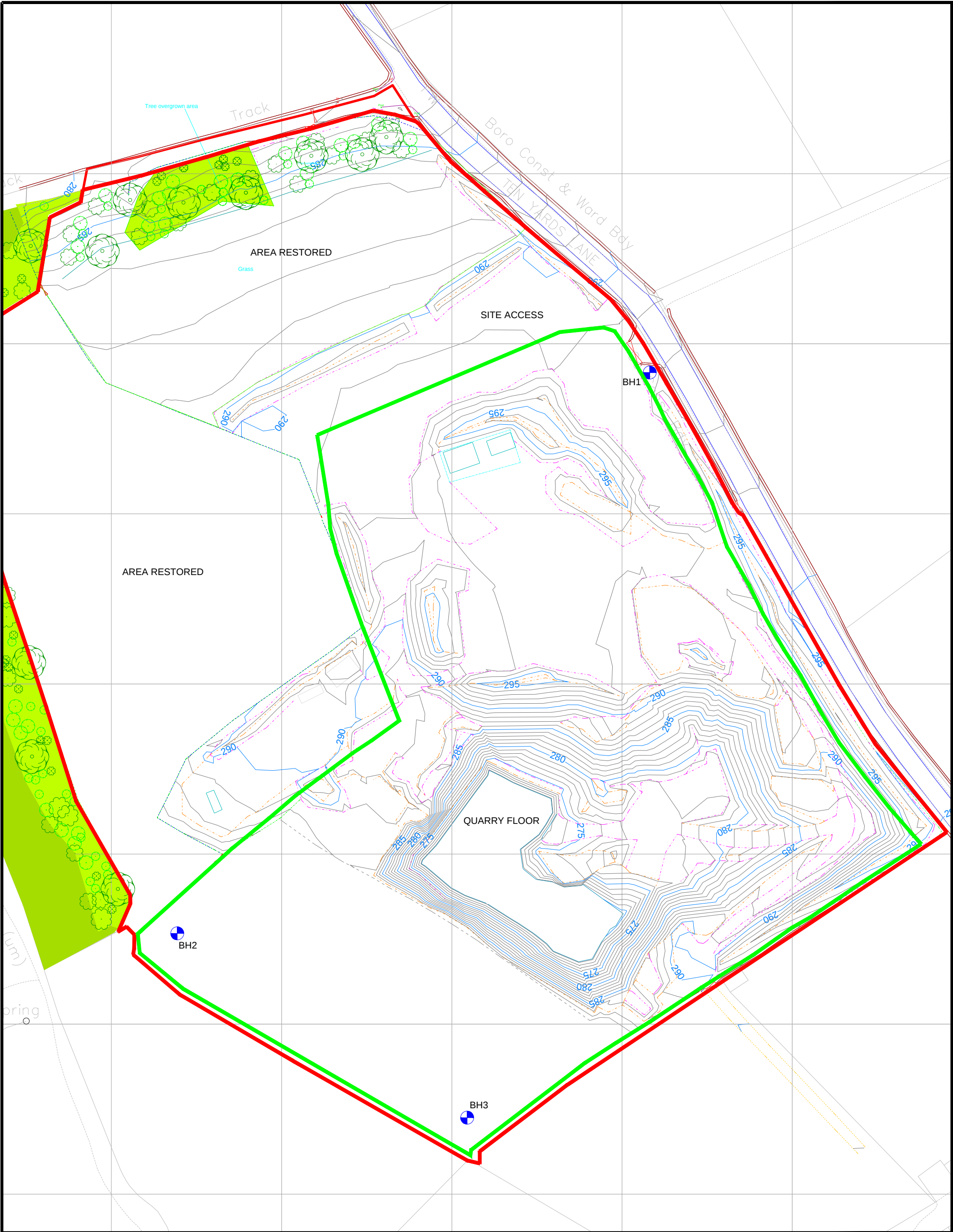
Project:

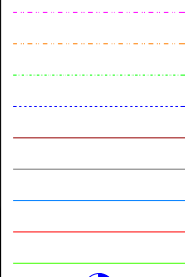
TEN YARDS LANE QUARRY
RECOVERY PERMIT APPLICATION

Plan Title:

EXISTING SITE PLAN

Project No. 26014	Dwg No. 26014/101	Rev
Date: Apr 26	Drawn: PS	Chkd: MB Scale: 1:1000 @ A2



 SILKSTONE ENVIRONMENTAL GEOTECHNICAL, PLANNING & SURVEYING CONSULTANTS A PHENNA GROUP COMPANY 7 Hall Annex, Thorncliffe Park, Chapeltown, Sheffield, S35 2PH Tel (0114) 2573487 www.silkstoneenvironmental.co.uk The copyright of this plan and its contents are the sole property of Silkstone Environmental Ltd and must not be copied or shown to third parties without prior consent of the Company or its clients. Crown Copyright. All rights reserved. Licence Number 100038464	 - Bottom Of Bank - Top Of Bank - Fence - Road - Wall - Normal Contour (1m AOD) - Prominent Contour (5m AOD) - Planning Permission Boundary - Waste Recovery Area - Borehole Location & ID	<table><tr><td>Client:</td><td>Birks Royd Stone</td><td>Drawing No.</td><td>ESID 6</td><td>Rev</td></tr><tr><td>Project:</td><td>Ten Yards Lane Quarry Bespoke Permit Application</td><td>Project No.</td><td>26014</td><td></td></tr><tr><td>Plan Title:</td><td>Borehole Location Plan</td><td>Date:</td><td>April 2026</td><td></td></tr><tr><td></td><td></td><td>Scale:</td><td>1:1000 @ A3</td><td></td></tr><tr><td></td><td></td><td>Drawn:</td><td>MS</td><td></td></tr><tr><td></td><td></td><td>Chkd:</td><td>DG</td><td></td></tr></table>	Client:	Birks Royd Stone	Drawing No.	ESID 6	Rev	Project:	Ten Yards Lane Quarry Bespoke Permit Application	Project No.	26014		Plan Title:	Borehole Location Plan	Date:	April 2026				Scale:	1:1000 @ A3				Drawn:	MS				Chkd:	DG	
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