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Fletcher Bank Quarry Landfill Site

Environmental Setting and Installation Design Addendum

Churchill Enviro Limited

Report No. K0047-ST-R006-01

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1 Introduction

1.1 Overview

Churchill Enviro Ltd is the Operator of Fletcher Bank Quarry Landfill Site (the Site) located near Ramsbottom in Lancashire. The site currently operates a non-hazardous landfill site accepting non-hazardous, non-biodegradable waste and inert waste in accordance with permit referenced EPR/GP3733FE/V002 issued in August 2020. This Environmental Settings and Installation Design (ESID) addendum supports a variation to the permit to increase the annual input of waste from 150,000 tonnes to 350,000 tonnes.

This variation will also be a means for the incorporation of submissions made in response to the improvement programme. Some of these submissions have been reviewed previously by the Environment Agency (Agency) to discharge planning conditions. These are:

- IC1: Revised landfill gas risk assessment
- IC2: Landfill gas report proposing assessment level and compliance limits for perimeter boreholes
- IC3: A Particulate Management and Monitoring Plan
- IC5: A revised Surface Water Management Plan

The priority for this application is to demonstrate an increase in waste inputs will not have an impact on human health or the environment. However, a number of the submission required to discharge the improvement programme are relevant to that assessment. Where that is the case and which elements of the ESID require updating as a result are detailed below. Other changes to the ESID associated with the improvement programme or Hydrogeological Rise Assessment Review (HRAR) are also detailed. The ESID Sections referenced in this document relate the template published previously by the Environment Agency which has now been withdrawn as guidance. However due to the age of the permit this has been maintained for consistency.

Table 1 below details each component of this variation, its purpose and potential associated risks, which section of the previous ESID template would relate and what supporting information has been appended or included in this ESID addendum to justify the change or submission.

Table 1. ESID Requirements

Variation Proposal	Purpose of component and Potential Risk (if relevant)	Relevant ESID Template Section	ESID Addendum Section and Supporting Reports
Increased Rate of Waste Inputs	<p>Increase in gas generation rate per year due to greater volume of material placed</p> <p>Increase in fugitive emissions associated with the site primarily relating to dust, noise and mud on the road from more frequent vehicle and plant movements</p>	<p>2.1.2 – Proposed Development</p> <p>2.4 - Gas Management</p> <p>3.7 – Receptors and compliance points</p>	<p>ESID Addendum Section 2.1</p> <p>K0047-ST-R001: Gas Risk Assessment (Appendix A)</p> <p>K0047-ST-R005: ERA (Appendix B)</p>
IC1 Gas Risk Assessment	Review the risk associated with source term detailed in Schedule 2 of the permit	2.4 – Gas Management	<p>ESID Addendum Section 2.1</p> <p>K0047-ST-R001: Gas Risk Assessment (Appendix A)</p>
IC2 Landfill Gas Report	Propose borehole-specific action and compliance levels	3.6 – Off-site Gas Monitoring	<p>ESID Addendum Section 2.2</p> <p>K0047-ST-R002: Gas Report (Appendix C)</p>
IC3 Particulate Monitoring and Management Plan	Provide measures to minimise risk of particulate matter leaving the site.	3.7 – Amenity Receptors	<p>ESID Addendum Section 2.3</p> <p>K0047-ST-R005: ERA (Appendix B)</p>
IC5 Surface Water Management Plan	Provide a revised surface water management and monitoring plan for the site.	2.5 – Surface Water Management System	ESID Addendum Section 2.4
Remove the compliance limit for Cadmium	HRAR recommends the removal of cadmium as a compliance point.	2.2.1 – Groundwater Management	ESID Addendum Section 2.5

2 Proposed Changes and Submissions

2.1 Increased Rate of Waste Inputs

The only change is the annual volume of material to be imported to the site which will increase from 150,000 tonnes to 350,000 tonnes. No changes are proposed to the previously agreed waste types to be imported to the site. This will not impact the waste acceptance procedures already in

place and no supplemental information is proposed. No changes are proposed to the engineered containment measures or leachate and gas controls. The increased rate of input of waste deposition may increase the rate at which landfill gas is generated from the site and this is considered further in the Landfill Gas Risk Assessment report referenced K0047-ST-R001 attached in Appendix A. This also addresses the requirements of Improvement Condition 1.

The increase in the rate of waste inputs will result in increased vehicle and plant movements associated with the site. This may result in an increased potential for dust and noise emissions and mud on the road. Since the original application in 2006 it is likely that the number and type of potentially sensitive receptors has changed. This means emissions which may not have been an issue previously may now be relevant. The Environmental Risk Assessment (ERA) report referenced K0047-ST-R005 includes an updated list of potentially sensitive receptors and assesses their vulnerability to an increased risk of amenity emissions resulting from the increased waste inputs. Appendix B of the ERA includes the emissions management and monitoring plan approved for the site by the planning Authority and addresses the requirements of Improvement Condition 3.

2.2 Landfill Gas Report

Report referenced K0047-ST-R002 has been prepared to address the requirements of Improvement Condition 2 and includes proposals to change the nominated perimeter gas monitoring boreholes associated with this permit and provide location-specific action and compliance limits. This also proposes the regime for monitoring in-waste gas borehole on completion of waste deposit in each area of site. The proposals within the Landfill Gas Report have been prepared with reference to the Gas Risk Assessment prepared in support of the permit variation above and response to Improvement Condition 1.

2.3 Particulate Management and Monitoring Plan

Report referenced K0047-ST-R005 has appended to it the particulate management and monitoring plan approved for the site by Lancashire County Council in order to discharge planning condition. For consistency it is proposed to use the same plan to discharge Improvement Condition 3.

2.4 Surface Water Management Plan

2.4.1 Overview

The site is situated within the catchment of the River Irwell, with the Irwell being located approximately 800m to the west of the site at an elevation of approximately 130 mOD.

The site is situated upon the watershed of two small brooks, Cross Bank Brook to the north and northeast of the site and Park Brook to the south. The watershed divide is formed by the topographical ridge of Harden Moor. Cross Bank Brook, indicated as 'Harden Brook' in its upper reach on 1:25,000 mapping, is located approximately 300m to the east of the Fletcher Bank

Quarry. Cross Bank Brook follows a north westerly valley coming within 100 m to the northern boundary of the Fletcher Bank site before being culverted under the A56 and M66 prior to discharging to the River Irwell.

A series of small reservoirs are indicated to be present along the valley of Cross Bank Brook from Ordnance Survey Mapping. However a recent walkover survey (October 2010) indicated that the retaining dams have been removed and the reservoirs are no longer present.

Park Brook appears to be primarily fed by a number of springs which issue to the south of the site; however, it will also receive surface water run off from land adjoining the southern boundary of the wider Fletcher Bank Quarry site before discharging to the River Irwell.

2.4.2 Site Rainfall Catchment

The site lies within MAFF Agroclimate Area 8, which indicates that the long term average rainfall is 1133mm, with a range of 770 mm to 2000 mm. The Flood Estimation Handbook (FEH) indicates that the quarry receives an average annual rainfall of around 1300 mm. The mean effective rainfall, reported by MAFF (as winter excess rain) is 600 mm per annum. This represents the amount of rainfall that is available for surface run-off, underdrainage and deep seepage. Environment Agency Flood Maps indicate the site to be located within Flood Zone 1, which represents an annual flood probability of less than 0.1% and is not considered further.

2.4.3 Proposed Management System

Drawing 1772/2/008: *Restoration Surface Water Management Plan-Concept* (Appendix D) provides details of the conceptual design for the surface water management system. Incident rain falling on the site currently will flow in an easterly direction following the current topographic profile. To regulate the surface water flow during the future waste deposit, a series of ditches will be constructed to direct surface water to the attenuation basin. As filling progresses, lateral surface water drains may be installed higher up the slope to mitigate erosion both upon the slope and within the drainage system. All drains are to flow to the proposed surface water attenuation basin, the approximate location of which is identified on drawing 1772/2/008 which will discharge to the existing site soakaway.

As filling progresses and the final restoration profile is achieved the permanent surface water management system will be installed. The drains along the lower slopes of the restoration profile have an indicative design based on a trapezoidal ditch profile to maximise conveyance and online storage. The break in the landform is at the eastern periphery, with water flowing anti-clockwise around the edge of the landform from north of this position and directly south toward the lagoon, south of this position. There is no direct flow from the site toward external surface water courses i.e. the Cross Bank Brook.

The basin has been conservatively sized with a basal area of 2000 m² and a maximum static volume of 6410 m³ to accommodate surface water volumes up to and including the critical 100 year (+ 40% allowance for climate change) storm event. The maximum discharge (1 in 100 years plus a 40% allowance for climate change) is 916 l/s. The primary outfall allows for discharge rate

of attenuated volumes at the mean annual greenfield runoff rate (Qbar Rural) of 44.08 l/s and an overflow weir with design discharge to accommodate the 100 year greenfield runoff rate of 91.5 l/s. It is proposed that the basin will discharge to the southern extent of the culvert drain and thus to the soakaway. The basin will furthermore allow for the settling of suspended solids, which along with regular system maintenance will prolong the life of the soakaway.

The basin has been designed to accommodate and attenuate potential flows and volumes to the nominal greenfield rates so as to provide a further contingency in the event that the soakaway ever fails, it will therefore be possible to redirect surface flows from the basin off-site without compromising downstream property and assets in accordance with NPPF Planning Practise Guidance. Specific design elements, e.g. ditch profiles, weirs, excavation volumes, outfall manholes will be incorporated into the detailed design prior to construction of each component.

Surface water monitoring points SW1 and SW2 are sampled on a monthly basis in accordance with the Permit. SW1 is located at Cross Bank Brook upstream of site and SW2 is located at Cross Bank Brook downstream of site. There are no direct discharges from the site to this water course.

2.4.4 Surface Water Monitoring

Although there is no direct connection between the on-site surface water system or external receptors i.e. the Cross-Bank Brook, water quality will continue to be monitored on a monthly basis at this water course in accordance with the permit as detailed in Table 2. Surface water monitoring points SW1 and SW2 are shown in drawing 1772/3/013 Rev D. Surface water monitoring point SW1 is located on Cross Bank Brook upstream of the site and SW2 downstream of the site. During the post-operational phase surface water monitoring will be on a quarterly basis in accordance with Table 2 below.

Table 2. Surface Water Monitoring Regime

Monitoring Points	Parameters	Frequency	
		Operational	Post-Operational
SW1 - Upstream of Cross Bank Brook SW2 - Downstream in Cross Bank Brook	pH, Electrical conductivity, Total suspended solids, Ammoniacal nitrogen, Chloride, Visual Oil and Grease	Monthly	Quarterly

2.5 Groundwater Monitoring

A HRAR has been submitted with this application and reviewed the groundwater quality data at the Site. A comparison of Permit Limits (as detailed in Permit Table S3.2) with the observed groundwater concentrations indicates there were only exceedances of the permit limits for cadmium between 2018 and 2021, namely in boreholes FB11-02A and SLR2. In addition, these exceedances are isolated one-off events, rather than sustained breaches of the permit limit as would be expected if there were leachate in the groundwater.

The low stable concentrations of typical leachate indicators ammoniacal-N, chloride and sulphate (especially in FB11-02A), coupled with the low concentrations of the priority metals indicates that leachate from the landfill is not impacting the groundwater at the site. In addition, there is no correlation between highest down-gradient cadmium concentrations (FB11-02A) and any trends within the chloride or sulphate concentrations. Therefore, the source of the cadmium within the groundwater down-gradient of the site is not considered to be from fugitive leachate from the landfill site.

In addition to the source of the cadmium down-gradient of the site not being linked to leachate due to the lack of other leachate indicators within the groundwater, cadmium concentrations in the upgradient borehole BH803 are above the down-gradient compliance limit, indicating cadmium is present upgradient of the landfill. Therefore, cadmium is not considered to be a suitable compliance limited substance to detect for failure of the engineered control system of the landfill site. The HRAR proposes the removal of cadmium from Permit Table S3.2.

Appendix A – K0047-ST-R001: Gas Risk Assessment

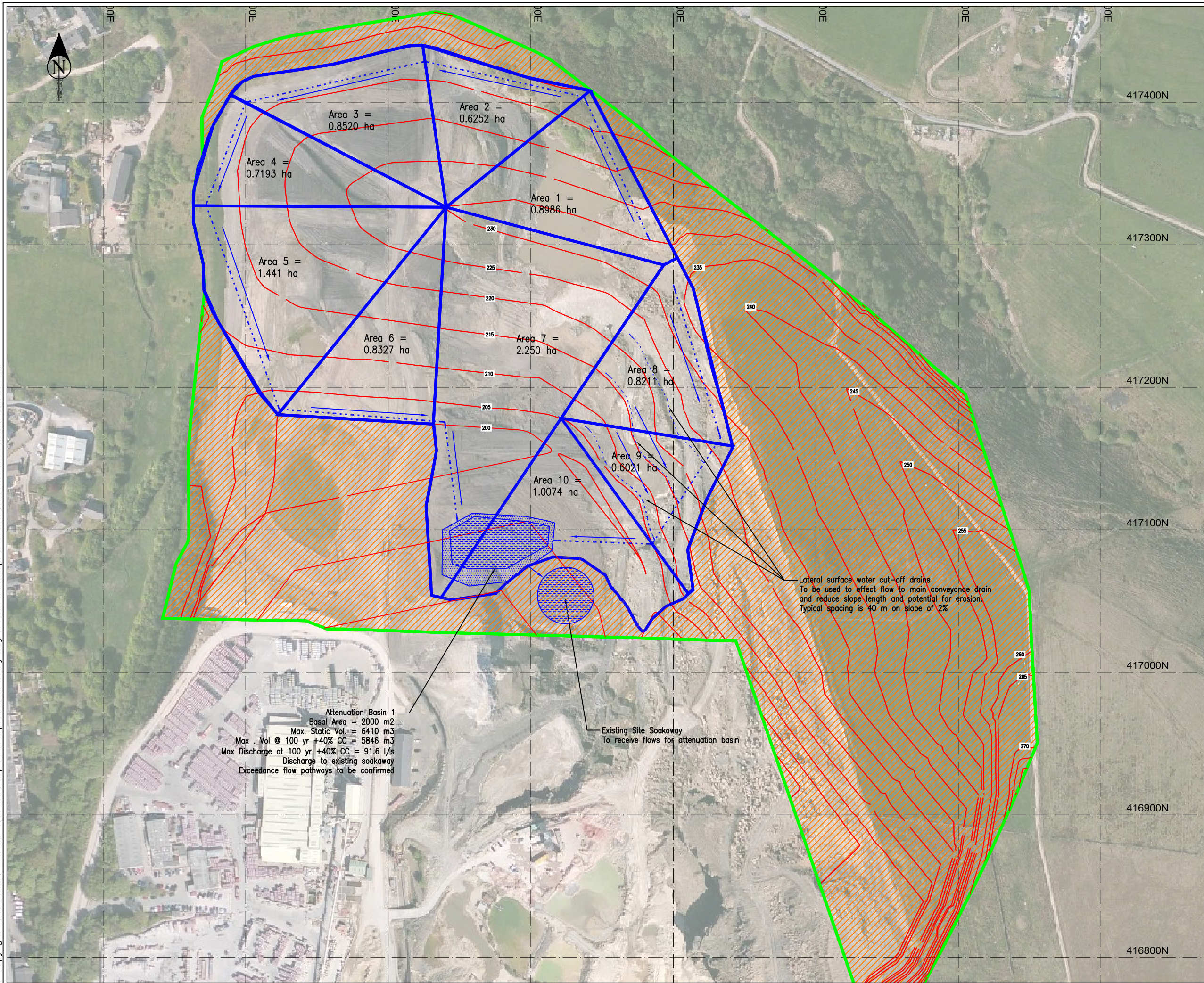
Appendix B – K0047-ST-R005: ERA

Appendix C – K0047-ST-R002: Gas Report

Appendix D – K0047-ST-R003: HRAR

Appendix E – Drawing Referenced 1772/2/008: Restoration Surface
Water Management Plan-Concept

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- Key**
- Planning Boundary
 - SWMP Boundary
 - SW Drains
 - SW Basin and Soakaway
 - Areas excluded from assessment
 - Major Restoration contours

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Sutton, St Helens WA9 4TX

Client
Churchill Enviro Ltd.

Site
Fletcher Bank

Title
Restoration Surface Water Management Plan - Concept

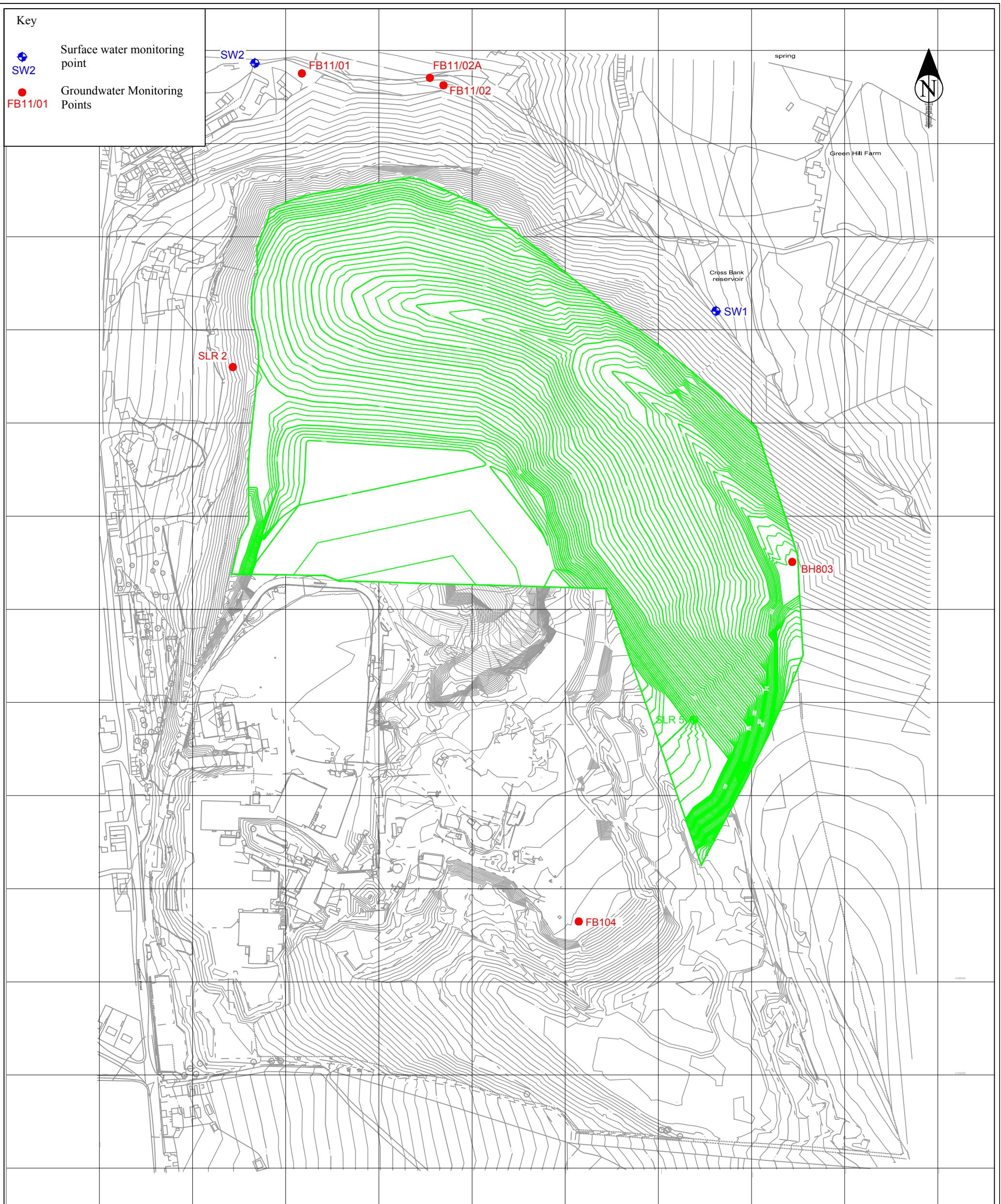
Scale		1:2,500	@ A3
Drawing No.		1772/2/008	
Rev	Date	Description	
File	17722008-SWMP-Concept.dwg		
Date	02/16	Engineer	TCL
Drawn	PP	Checked	JAG

Attenuation Basin 1
 Basal Area = 2000 m²
 Max. Static Vol. = 6410 m³
 Max. Vol @ 100 yr +40% CC = 5846 m³
 Max Discharge at 100 yr +40% CC = 91.6 l/s
 Discharge to existing soakaway
 Exceedance flow pathways to be confirmed

Existing Site Soakaway
 To receive flows for attenuation basin

Lateral surface water cut-off drains
 To be used to effect flow to main conveyance drain
 and reduce slope length and potential for erosion.
 Typical spacing is 40 m on slope of 2%

Appendix F – Drawing Referenced 1772/3/013 Rev D: Environmental
Monitoring Plan



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Client
Churchill Enviro Ltd.

Site
**Fletcher Bank
Landfill Site**

Title
**Environmental Monitoring
Plan**

Scale	1:4,000	@ A3
Drawing No.	1772/3/013	
Rev	Date	Description
A	25/04/16	Added Leachate points
B	23/08/16	Added Eastern BH Mon location
C	24/08/16	Added Western BH Mon location
D	30/09/16	Groundwater Monitoring Points Added
File	17723013envmonplan Rev D.dwg	
Date	09/16	Engineer RB
Drawn	PG	Checked RB



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