

## **D ATTACHMENTS Infrastructure and Operation**

### **ATTACHMENT D.1 Infrastructure**

- Attachment D.1(i)** Site Infrastructure Plan
- Attachment D.1(ii)** Surface Water Drainage Layout Plan
- Attachment D.1(iii)** Civic Amenity Layout Map

### **ATTACHMENT D.2 Facility Operation**

The landfill is restored therefore the only unit processes at the landfill are in relation to monitoring and abatement of emissions, the details of which are outlined in the attachments of Sections E, F and I. The details of facility operations at the Civic Amenity site are in relation to waste acceptance and handling procedures that are presented in Section H.

### **ATTACHMENT D.3 Liner System**

Ballymurtagh Landfill commenced acceptance of waste in 1989, ten years prior to the EU Landfill Directive 1999/31/EC, in 1999. The landfill was designed to operate under a 'disperse and dilute' method, under determined advice that this method would not result in harm to the Avoca River. The engineered landfill included a bottom liner in the form of low-permeability mine tailings whose function would reduce or limit the risk of pollution to groundwater. The embankment constructed to the front of the landfill was also partially lined to a height of 5m with butyl rubber.

### **ATTACHMENT D.4 Leachate Management**

Ballymurtagh Landfill was designed as a dilute and disperse facility with a base liner of consolidated tailings. It does not have a leachate collection system. However the capping of the landfill and the surface water drainage works assist in the prevention of the ingress of surface water with a consequential reduction in the generation of leachate. Levels of leachate and samples of leachate are monitored in accordance with the current Waste Licence for the facility.

The existing environment in terms of groundwater quality and the potential impacts of the landfill on surface and groundwater is the principal purpose of this Waste Licence Review Application. Water balance calculations, leachate generation and monitored leachate levels at the landfill are dealt with in detail in Sections 6 and 7 of the accompanying EIS.

### **ATTACHMENT D.5 Landfill Gas Management**

A gas extraction system has been installed at Ballymurtagh Landfill in accordance with the current Waste Licence of the facility. The system consists of a network of wells, connected to a flaring system. Included with this attachment are the following:

- Attachment D.5(i)** Gas Management System Plan
- Attachment D.5(ii)** Landfill Gas Generation
- Attachment D5(iii)** EPRTR for Releases to Air .
- Attachment D.5(iv)** Maintenance procedures for Flare Servicing
- Attachment D.5(v)** Maintenance procedures for Gas Field Balancing

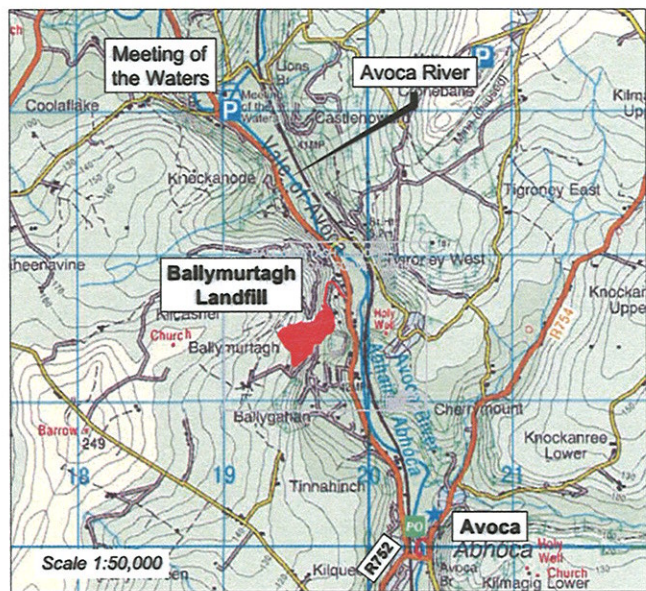
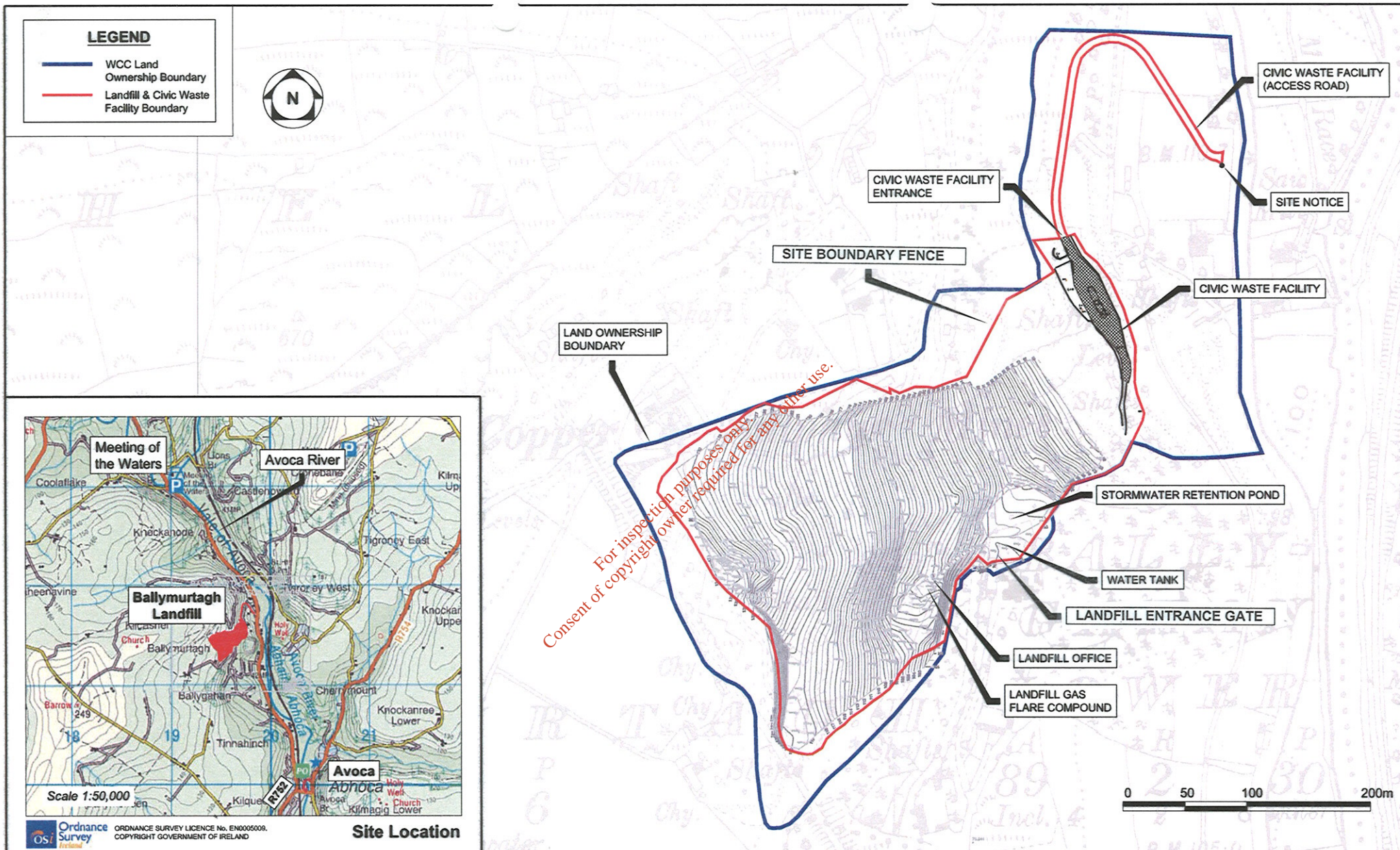
**ATTACHMENT D.6          Capping System**

The installation of capping at Ballymurtagh Landfill was completed in 2006. There is an annual slope stability assessment report carried out at the site. Included with this attachment are the following:

- Attachment D.6(i)**    Standard Capping Details as installed at the site
- Attachment D.6(ii)**   Landfill Stability Report January 2009

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Site Location


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NOTES

1. Verifying Dimensions.  
The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services.  
Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.
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No.	Date	By	App	Amendment / Issue
A03	Nov '09	RH	PL	Issue for Approval
A02	Nov '09	RH	PL	Issue for Approval
A01	Oct '09	RH	PL	Issue for Approval

Client



Wicklow County Council  
 County Buildings,  
 Wicklow,  
 Co. Wicklow

Drawn By: RH  
 Checked By: PL  
 Approved By: PL  
 Date: Oct. '09

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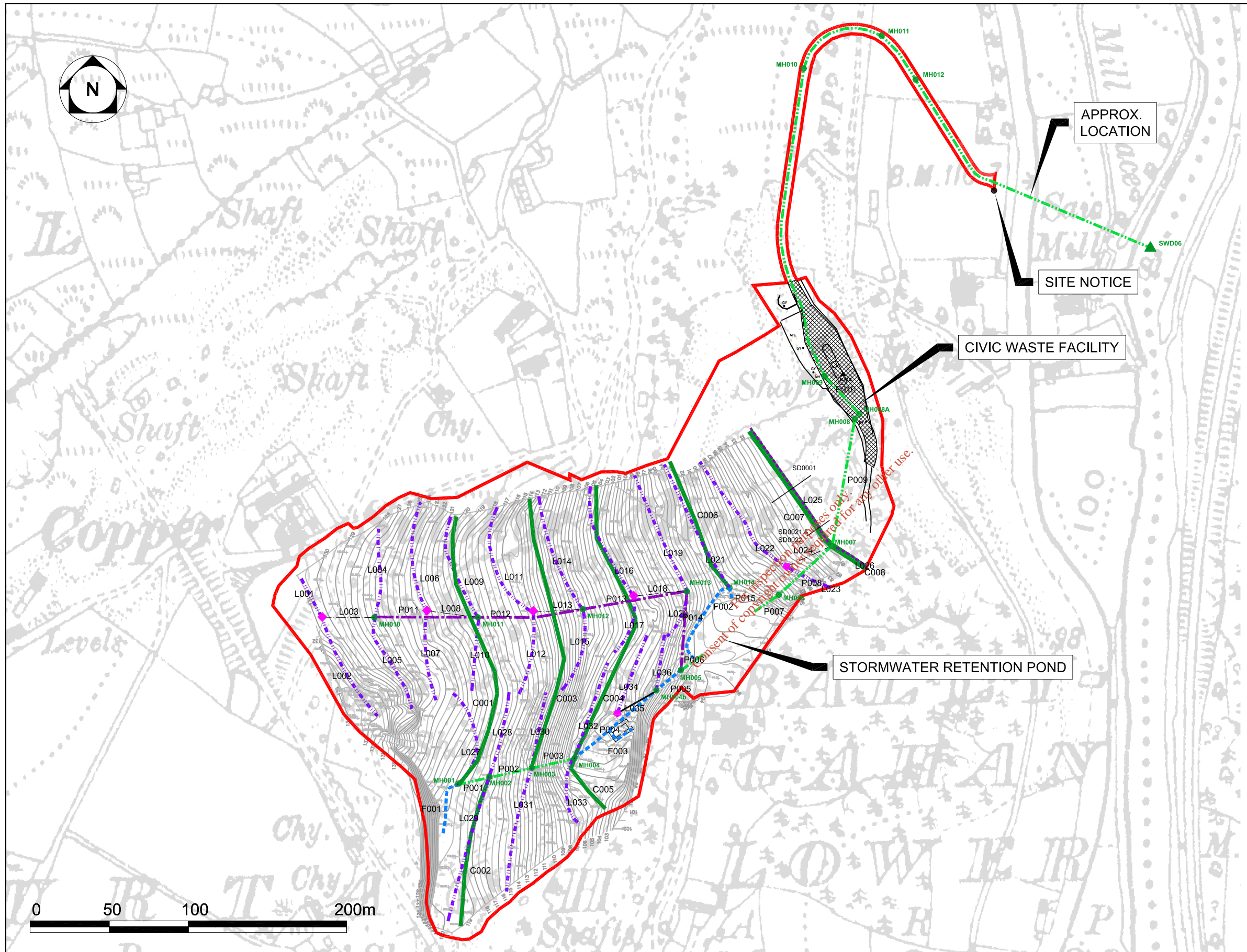
Project: **Ballymurtagh Landfill**

Drawing Status: Approval  
 Sheet Size: A4  
 Scale: NTS

Drawing Number	Rev

Title: **SITE LOCATION & LAYOUT PLAN**





### LEGEND

#### PROPOSED WORKS

**Surface Water :**

- 0.5m. Contour Drain
- 0.3m. Contour Drain
- - - - - French Drain
- · - · - Carrier Drain
- Manhole

**Subsurface Water :**

- ◆ Junction
- ◇ Reducer Unit
- · - · - Land Drain
- - - - - Land Drain Interceptor
- · - · - Carrier Drain
- - - - - Subsurface Interceptor Drain

**NOTES**

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Drawn By	Checked By	Approved By	Date
RH	PL	PL	Oct. '09

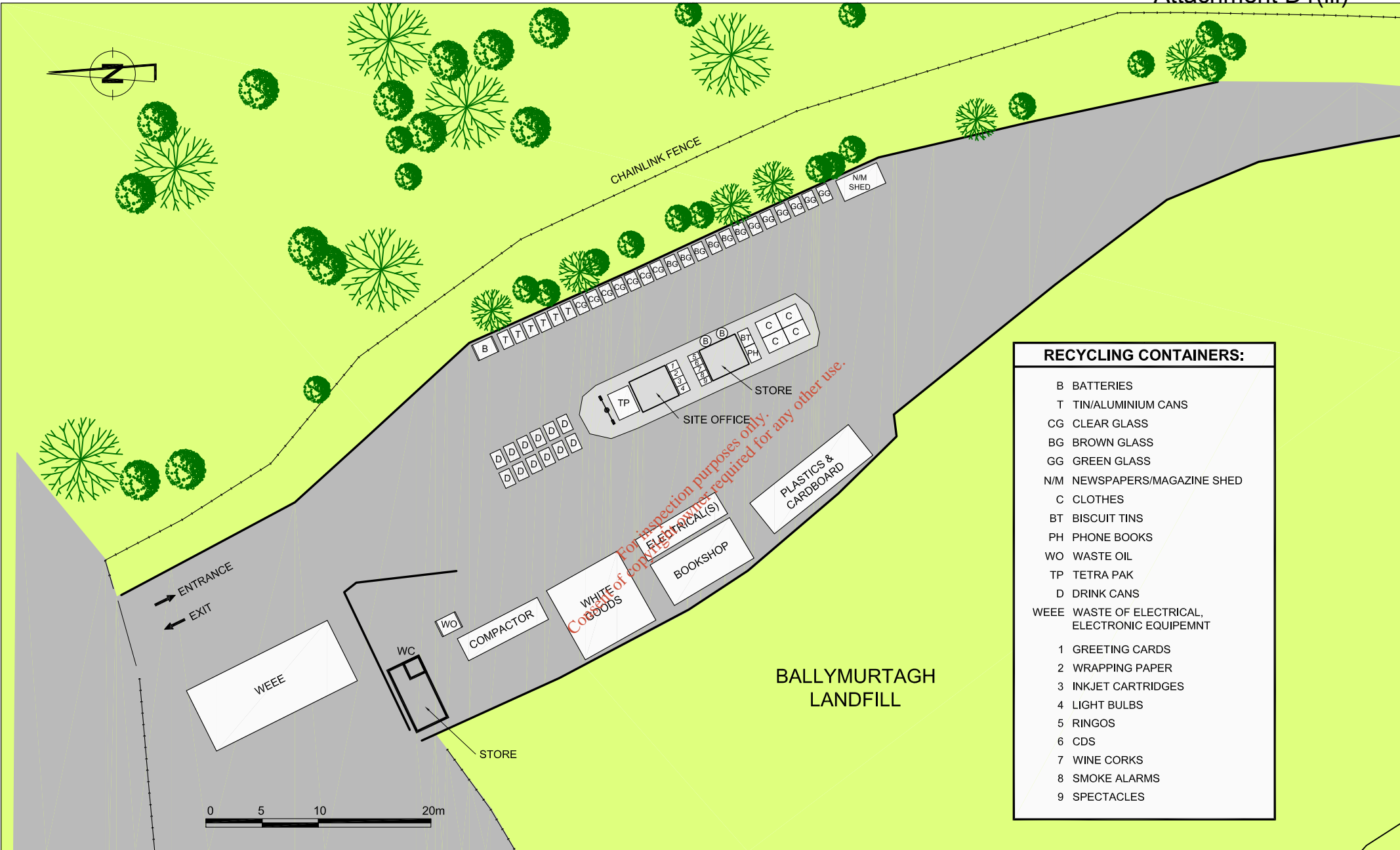
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Project **Ballymurtagh Landfill**

Drawing Status	Sheet Size	Scale
Approval	A3	NTS

Drawing Number	Rev
Title	
<b>DRAINAGE LAYOUT</b>	



RECYCLING CONTAINERS:	
B	BATTERIES
T	TIN/ALUMINIUM CANS
CG	CLEAR GLASS
BG	BROWN GLASS
GG	GREEN GLASS
N/M	NEWSPAPERS/MAGAZINE SHED
C	CLOTHES
BT	BISCUIT TINS
PH	PHONE BOOKS
WO	WASTE OIL
TP	TETRA PAK
D	DRINK CANS
WEEE	WASTE OF ELECTRICAL, ELECTRONIC EQUIPEMNT
1	GREETING CARDS
2	WRAPPING PAPER
3	INKJET CARTRIDGES
4	LIGHT BULBS
5	RINGOS
6	CDS
7	WINE CORKS
8	SMOKE ALARMS
9	SPECTACLES

**NOTES**

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Client



Wicklow County Council  
County Buildings,  
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Drawn By	Checked By	Approved By	Date
HF	PL	PL	Sept. '09



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Project  
**Ballymurtagh Landfill  
Environmental Management Plan**

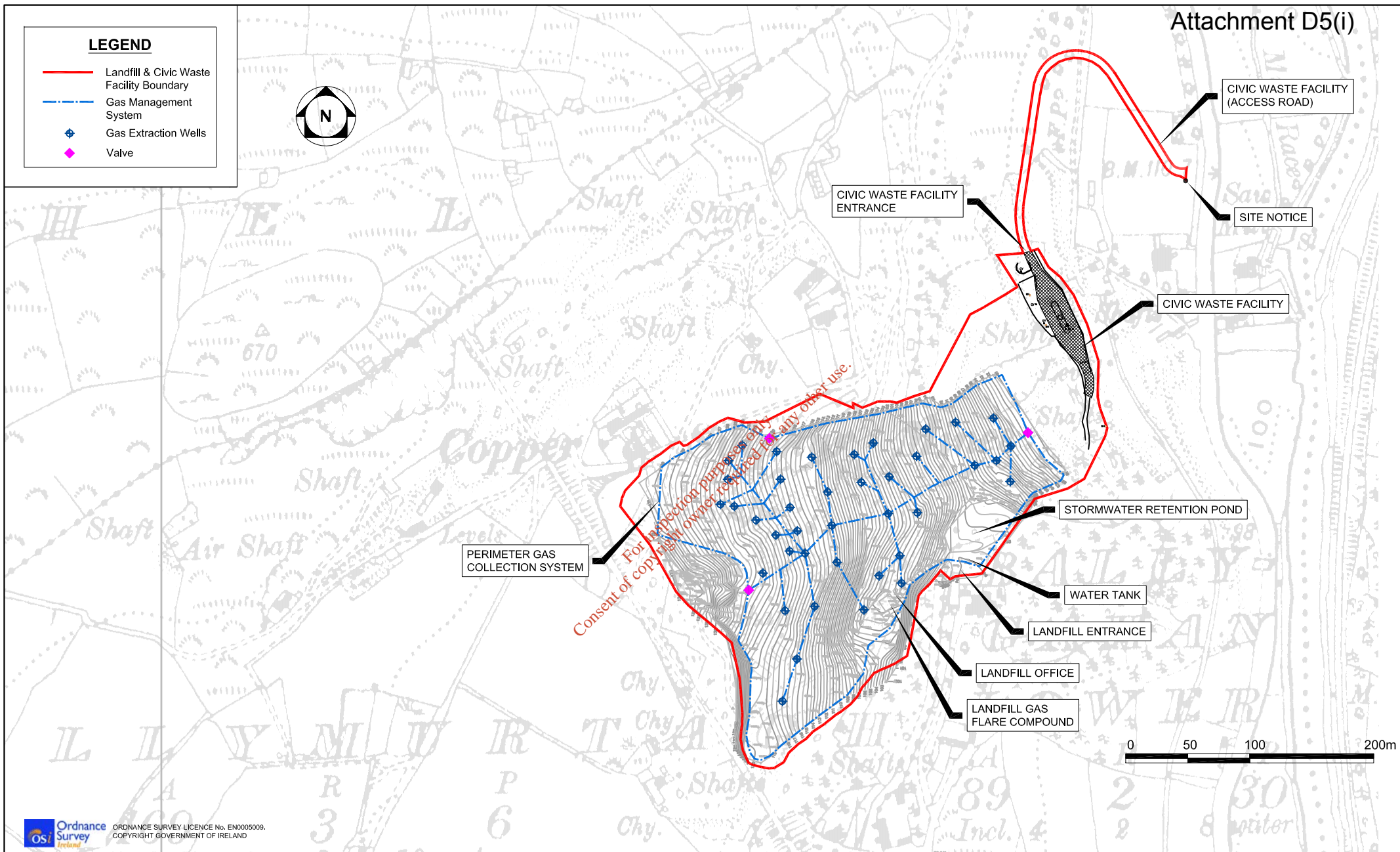
Drawing Status	Sheet Size	Scale
Preliminary	A4	NTS

Drawing Number	Rev
Title	



**LEGEND**

- Landfill & Civic Waste Facility Boundary
- Gas Management System
- ◆ Gas Extraction Wells
- ◆ Valve



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**NOTES**

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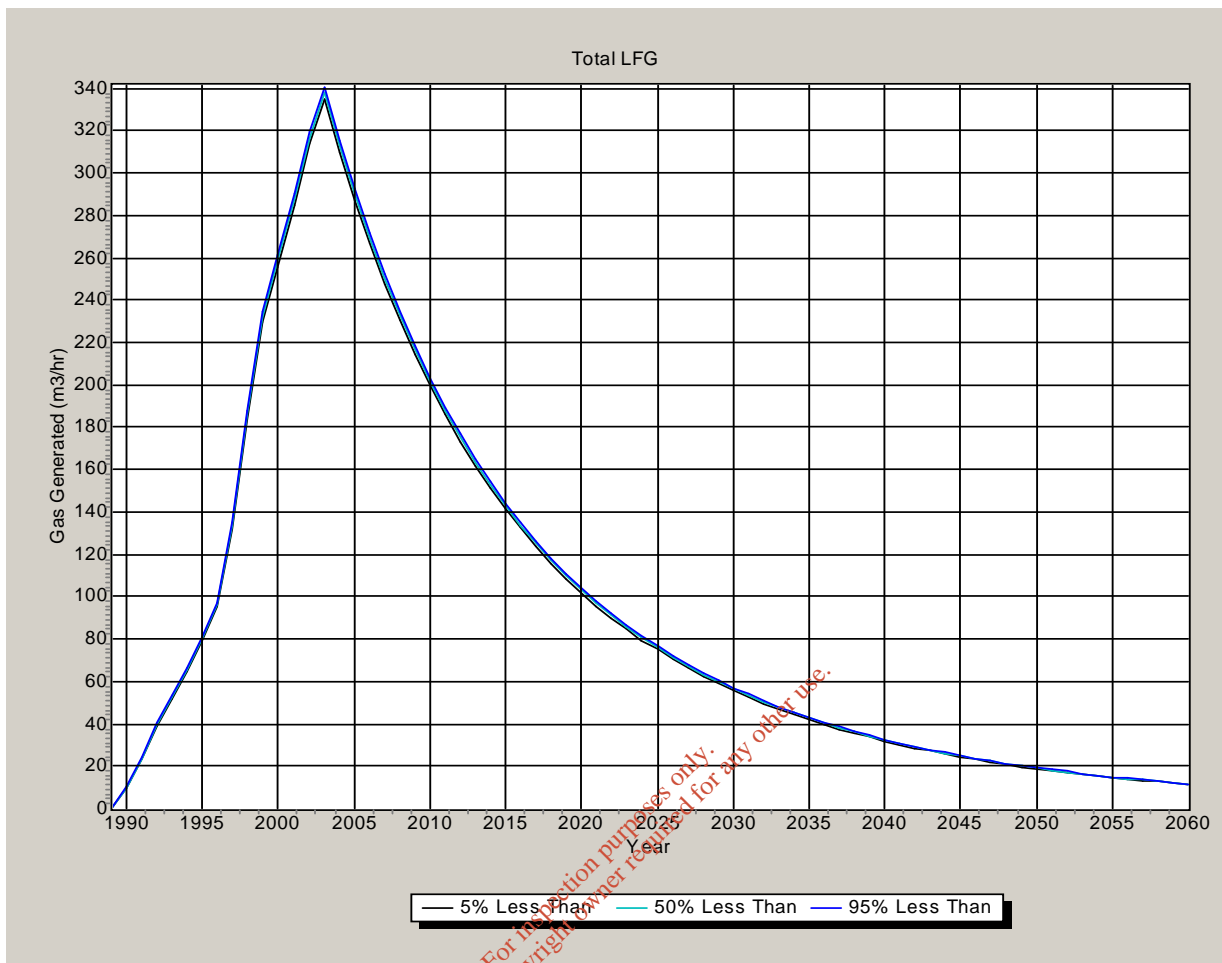
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A01	Oct '09	RH/PL	PL	Issue for Approval

<b>Wicklow County Council</b> County Buildings, Wicklow, Co. Wicklow			
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RH	PL	PL	Oct. '09

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	<b>Ballymurtagh Landfill</b>		
Drawing Status	Sheet Size	Scale	
Approval	A4	NTS	

Drawing Number	Rev
<b>GAS MANAGEMENT SYSTEM PLAN</b>	

**Figure 4.1:** Average hourly rate of landfill gas generated at the facility for each year 1995 to 2030.



The flare at Ballymurtagh has a capacity of 500m<sup>3</sup>/hr.

4.1 RELEASES TO AIR

| PRTR# : W0011 | Facility Name : Ballymurtagh Landfill Facility | Filename : W0011\_2008.xls | Return Year : 2008 |

18/06/2009 14:46

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR									
POLLUTANT		METHOD				QUANTITY			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
01 - Methane (CH4)	Methane	C	OTH	Gas Sim 2 & Calcs	7457.6	80400			72942.4
03 - Carbon dioxide (CO2)	Carbon Dioxide	C	OTH	Gas Sim 2 & Calcs	1843453.0	4107000.0	0.0		2263547.0
02 - Carbon monoxide (CO)	Carbon Monoxide (CO)	C	ssc	Gas Sim 2		3460			
08 - Nitrogen oxides (NOx/NO2)	Nitrogen oxides (Nox/NO2)	C	ssc	Gas Sim 2		1110.0	0.0		
11 - Sulphur oxides (SOx/SO2)	Sulphur oxides (Sox/SO2)	C	ssc	Gas Sim 2		2710.0			
86 - Particulate matter (PM10)	Particulate matter (PM10)	C	ssc	Gas Sim 2		66.9			

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR									
POLLUTANT		METHOD				QUANTITY			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
						0.0	0.0	0.0	0.0

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR									
POLLUTANT		METHOD				QUANTITY			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
						0.0	0.0	0.0	0.0

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Ballymurtagh Landfill Facility					
Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used		Facility Total Capacity m3 per hour
			Method Code	Designation or Description	
Total estimated methane generation (as per site model)	818704.7	C	OTH	Gas Sim 2 & Calcs	N/A
Methane flared	738304.7	C	OTH	Gas Sim 2 & Calcs	500.0 (Total Flaring Capacity)
Methane utilised in engine/s	0.0	C			0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	80400.0	C	OTH	Gas Sim 2 & Calcs	N/A

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**Bioverda Power Systems Work Instruction:**

**Title :           Landfill Gas Flare Maintenance**

**Client:           Wicklow County Council**

**Site:             Ballymurtagh Landfill, Ballygahan Upper,  
Ballygahan Lower, Tinnahinch, Co. Wicklow**

**Section 1: Document History**

Rev No.	By	Reason	Date	Approved
0	Donal O'Kinneide	Draft	29/10/09	

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## Section 2 – Contact Details

### 2.1. Contract Company

Company: Bioverda Power Systems.  
Address: Unit 543B  
Greenogue Business Park,  
Rathcoole,  
County Dublin  
Ireland

Primary Contact name: Tony Moore.  
Title: Electrical Control Manager  
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Mobile No. 087 2858191  
Email : [tony.moore@bioverdapowersystems.com](mailto:tony.moore@bioverdapowersystems.com)

Secondary Contact: Noel McDermott  
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Tel. No. 01 2572150  
Mobile No. 087 2858192  
Email : [noel.mcdermott@bioverdapowersystems.com](mailto:noel.mcdermott@bioverdapowersystems.com)

### Names of Personnel (possibly) on Site

Name	Title	Phone No.
Ambrose Noone	LFG Lead Technician	086 0433971
Adrian Farrell	Mechanical Technician	086 0433970
Matt Honan	Mechanical Technician	086 0433979
Michael Tighe	Electrical Technician	086 0433977
Tomas Sugrue	Electrical Technician	086 0433980
Alfie Sawyer	Mechanical Technician	086 0455699
Henry Vivash	Mechanical Technician	086 0433674
Seamus McHale	Mechanical Technician	086 0433975
Andrzej Majstrowicz	LFG Technician	086 0478712
David Dungan	LFG Technician	086 0478712

### 2.2 Client Company

Company: Wicklow County Council  
Address: Ballymurtagh Landfill, Ballygahan Upper,  
Ballygahan Lower, Tinnahinch,  
Co. Wicklow

Primary Contact: Seamus Breslin  
Title : Landfill Manager  
Mobile No. 087 230 1627  
Fax no. 0402 35472

### **Section 3 Job Description**

#### 3.1 Brief Description of Work

Regular service of Landfill gas Flaring Unit.

#### 3.2 Purpose of the work

The purpose of this work is to ensure the reliable operation of the landfill gas flaring unit at Ballymurtagh Landfill through regular maintenance inspections.

#### 3.3 Required Frequency:

Flare inspections will be carried out on a quarterly basis.

#### 3.4 Safety Requirements

BPS personnel will alert landfill manager of their presence on arrival.

BPS Personnel to adhere to all site rules

BPS personnel will wear High visibility jackets and Safety Shoes at all times.

All BPS personnel possess FAS Safe pass certification.

On completion of the inspection BPS personnel will inform Landfill manager that they have left site.

BPS will ensure that only suitably trained technicians will undertake the equipment service.

#### 3.5 Equipment Required

General Tools

Gas Analyser

Calibration equipment

Site keys

#### 3.6 Procedure

1. Undertake service as per BPS Flare service checksheet (see Appendix 1)
2. Record any additional work required in comments section of flare service checkheet..
3. Sign report
4. Forward report to Wicklow County Council including any recommended actions.

### **Appendix 1**

Bioverda Power Systems Flare inspection Report





Item	Description	Maintenance task	Frequency Interval	Performed	
220	centrifugal blower	exchange lube oil ( after commissioning )	400 OH	as required	
220	centrifugal blower	regular oil exchange	4000 OH or annually	as required	
220	centrifugal blower	check lube oil level	weekly	during engine lube oil check	
220	centrifugal blower	visual / aural inspection	weekly	during engine lube oil check	
360	flow rate measuring device	record values	weekly	during engine lube oil check	
130	motorised control vlv	check functioning, clean valve seat if necc	monthly	during engine lube oil check	
220	centrifugal blower	preservation device - check oil level	monthly	during engine lube oil check	
220	centrifugal blower		monthly	during engine lube oil check	
570	ribbed radiator	visual inspection, check functioning & settings	monthly	during engine lube oil check	
580	strip heater	visual inspection, check functioning	monthly	during engine lube oil check	
581	connection terminal strip heater	visual inspection, check functioning	monthly	during engine lube oil check	
590	remote measuring head DFK D7600	visual inspection, check functioning & settings. Change measuring head if necc	monthly	during engine lube oil check	
591	filter attachment FV 10 for FMK D7602	visual inspection, check charcoal filter. Change if necc.	monthly	during engine lube oil check	
620	plug in control unit ED 098 / model BQ	visual control, check function, exchange if necc	monthly	during engine lube oil check	
681	pneumatic compresor	check air supply	monthly	during engine lube oil check	
20	Manual Vlv, model ZO11-K1 DN 200	check functioning and smooth running	quarterly	dedicated flare check	
30	shut off vlv, model ZO11-K1 DN 250	check control well running and final position	quarterly	dedicated flare check	
90	ball vlv for gas DN 15 R 1/2"	check functioning and smooth running	quarterly	dedicated flare check	
110	manual cock for pressure gauge	check functioning and smooth running	quarterly	dedicated flare check	
130	motorised control vlv	visual inspection	quarterly	dedicated flare check	
150	check valve	check function, check for dirt & clean if ness	quarterly	dedicated flare check	
180	bellow expansion	visual inspection, check tolerance	quarterly	dedicated flare check	
182	bellows unit	visual inspection, check tolerance	quarterly	dedicated flare check	
220	centrifugal blower	visual inspection, check functioning.	quarterly	dedicated flare check	
220	centrifugal blower	check drive belt tension	quarterly	dedicated flare check	
220	centrifugal blower		quarterly	dedicated flare check	
220	centrifugal blower		quarterly	dedicated flare check	
300	pressure transducer	pressure measuring transducer	quarterly	dedicated flare check	
310	Press switch DG 450 80-450mbar	visual inspection, check functioning, adjust if necc	quarterly	dedicated flare check	
311	Press switch DG 500 100-500mbar	visual inspection, check functioning, adjust if necc	quarterly	dedicated flare check	
330	thermometer 0 - 100 deg C	visual inspection, check functioning.	quarterly	dedicated flare check	
340	temperature control. Model RAK 1120020	visual inspection, check functioning, adjust if necc	quarterly	dedicated flare check	
430	flow rate measuring device	visual inspection, check functioning, adjust if necc	quarterly	dedicated flare check	
431	analyzing system	per manuf instructions	quarterly	dedicated flare check	
500	control cabinet	visual inspection	quarterly	dedicated flare check	
510	lamp	check operation	quarterly	dedicated flare check	
511	lamp	check operation	quarterly	dedicated flare check	
512	moisture proof lamp	check operation	quarterly	dedicated flare check	
513	flourescent lights	check operation	quarterly	dedicated flare check	
514	safety illumination	visual inspection, check functioning	quarterly	dedicated flare check	
520	flashing red light	visual inspection, check functioning	quarterly	dedicated flare check	

## Attachment D5(iv)

530	signal horn	visual inspection, check functioning	quarterly	dedicated flare check	
540	emergency switches	visual inspection, check functioning	quarterly	dedicated flare check	
560	earthed plug & socket	visual inspection, check functioning	quarterly	dedicated flare check	
600	fan, model HQW 20/4 Helios	visual inspection, check functioning, measure power consumption	quarterly	dedicated flare check	
610	fan, model HQW 20/4 Helios	visual control, check function	quarterly	dedicated flare check	
630	wall box E 290	visual insp. Exchange control unit if necc	quarterly	dedicated flare check	
670	logo screen	visual control, check function	quarterly	dedicated flare check	
680	pneumatic compresor	visual control, check function & oil level	quarterly	dedicated flare check	
700	room thermostat AZT 5 - 35 deg C	visual control, check function & adjustment	quarterly	dedicated flare check	
710	weather protection for fan	vis insp, check for dirt & clean as necc	quarterly	dedicated flare check	
720	shutter AS 30 for fan	visual control, check function	quarterly	dedicated flare check	
780	oil tank for waste oil	visual control, repair defects in paint work	quarterly	dedicated flare check	
930	condensate rejector	vis insp, check for dirt & clean as necc	quarterly	dedicated flare check	
131	pressure reducer	visual inspection, check functioning, adjust if necc	half yearly	dedicated flare check	
350	capsule guage for low Pressure	visual inspection, check functioning, adjust if necc	half yearly	dedicated flare check	
351	capsule guage for low Pressure	visual inspection, check functioning, adjust if necc	half yearly	dedicated flare check	
501	control cabinet	tighten terminals	half yearly	dedicated flare check	
	Bolts, joints, flanges	vis insp, check for rust, tightness	half yearly	dedicated flare check	
130	motorised control vlv	check final position, chage worn parts if necc	yearly	dedicated flare check	
160	flame arrestor	visual inspection, check for dirt, clean if necc	yearly	dedicated flare check	
220	centrifugal blower	clean starting sieve	yearly	dedicated flare check	
682	pneumatic compresor	change oil	yearly	dedicated flare check	

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**Bioverda Power Systems Work Instruction:**

**Title :** Gas Field Well Balancing

**Client:** Wicklow County Council

**Site:** Ballymurtagh Landfill, Ballygahan Upper,  
Ballygahan Lower, Tinnahinch, Co. Wicklow

**Section 1 - Document History;**

Rev No.	By	Reason	Date	Approved
0	Donal O'Cinneide	Draft	29/10/09	



**Section 2 – Contact Details**

2.1. Contract Company

Company: Bioverda Power Systems.  
Address: Unit 543B  
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Rathcoole,  
County Dublin  
Ireland

Primary Contact name: Ambrose Noone.  
Title: Landfill Gas Lead Technician  
Tel. No. 01 2572150  
Mobile No. 086 0433971  
Email : [ambrose.noone@bioverdapowersystems.com](mailto:ambrose.noone@bioverdapowersystems.com)

Secondary Contact: Noel McDermott  
Title: Maintenance Manager  
Tel. No. 01 2572150  
Mobile No. 087 2858192  
Email : [noel.mcdermott@bioverdapowersystems.com](mailto:noel.mcdermott@bioverdapowersystems.com)

Names of Personnel (possibly) on Site

Name	Title	Phone No.
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Adrian Farrell	Mechanical Technician	086 0433970
Matt Honan	Mechanical Technician	086 0433979
Michael Tighe	Electrical Technician	086 0433977
Tomas Sugrue	Electrical Technician	086 0433980
Alfie Sawyer	Mechanical Technician	086 0455699
Henry Vivash	Mechanical Technician	086 0433674
Seamus McHale	Mechanical Technician	086 0433975
Andrzej Majstrowicz	LFG Technician	086 0478712
David Dungan	LFG Technician	086 0478712

2.2 Client Company

Company: Wicklow County Council

Address: Ballymurtagh Landfill, Ballygahan Upper,  
Ballygahan Lower, Tinnahinch, Co. Wicklow

Primary Contact: Seamus Breslin  
Title : Landfill Manager  
Mobile No. 087 230 1627  
Fax no. 0402 35472

### **Section 3 Job Description**

#### 3.1 Brief Description of Work

Inspect, monitor and adjust gas field wells to ensure even suction across the gas field

#### 3.2 Purpose of the work

The purpose of this work is to;

- optimize the suction across the entire gas field.
- improve the efficiency of the flare by maximizing the CH<sub>4</sub> and minimizing the O<sub>2</sub>
- increase the life of the wells by applying even suction across the field
- speed up the degradation of the landfill

#### 3.2 Required Frequency:

The balancing and monitoring of the gas field will be undertaken weekly.

#### 3.3 Safety Requirements

BPS personnel will alert landfill manager of their presence on arrival.

BPS Personnel to adhere to all site rules.

BPS personnel will wear High visibility jackets and Safety Shoes at all times.

All BPS personnel possess FAS safe pass certification.

On completion of the inspection BPS personnel will inform Landfill manager that they have left site.

#### 3.4 Equipment Required

General Tools

Gas Analyser

Site keys

#### 3.5 Procedure

1. Record value of gas quality (CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub>) at inlet to flare on sheet provided.
2. At each well monitor position of gas well valve and record on check sheet.
3. Use gas analyzer to measure gas quality (CH<sub>4</sub>, CO<sub>2</sub> and O<sub>2</sub>) produced by the well.
4. Adjust valve position to ensure minimum oxygen is produced by the well
5. Record the gas quality after adjustment of the well
6. Record final valve position
7. Repeat for all wells
8. Note any extra observances on gas field on site report sheet.
9. After attending to required wells, return to flare and ensure that that the O<sub>2</sub> level is below 2%.
10. Sign sheet and fax to Wicklow County Council.

Appendix 1

Ballymurtagh Landfil Gas Field Site Inspection Sheet

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Site	Ballymurtagh Landfill, Avoca Co. Wicklow		
Date		Gas Flow rate	
Hours Run		Temperature (deg C)	

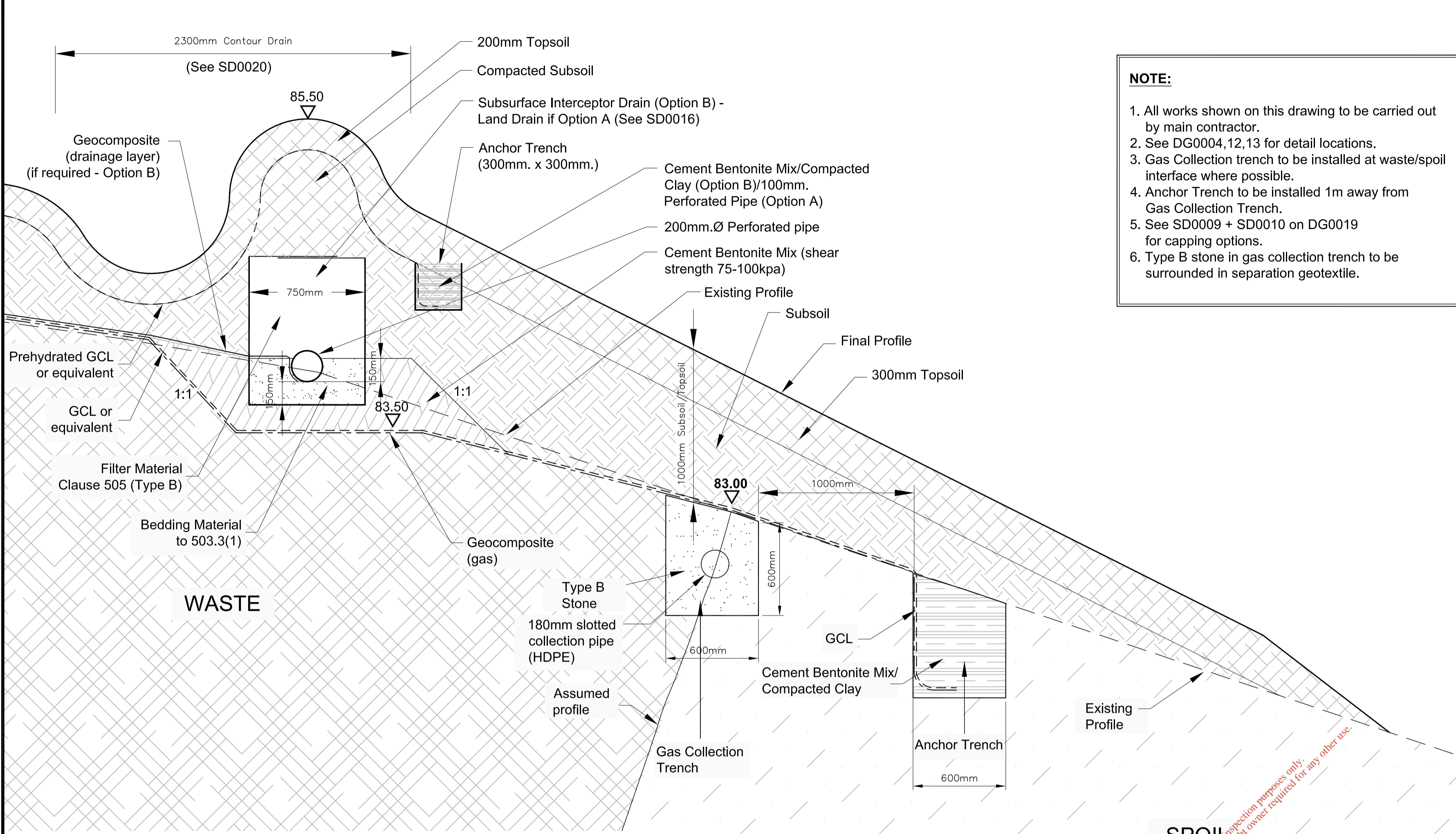
Well No.	CH4	CO2	O2	Valve Found	Valve Left
LO3/1					
LO3/2					
LO3/3					
GV2/1					
LO3/4					
LO3/5					
LO3/6					
LO3/8					
LO3/9					
SP1					
SP2					
SP3					
SP4					
SP5					
SP6					
SP7					
SP8					
SP9					
SP10					
SP11					
SP12					
LO5/1					
LO5/2					
LO5/3					
LO5/4					
LO5/5					
LO5/7					
LO5/8					
LO5/10					
LO5/12					
LO5/13					
LO5/14					
LO5/15					
LO5/16					
LO5/17					
GV4/1					
GV3					
GV2/2					
GV7					
GV5/1					
Notes:					
Signed:					

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Please Fax to Seamus Breslin, Wicklow County Council Fax No. 0402 35472

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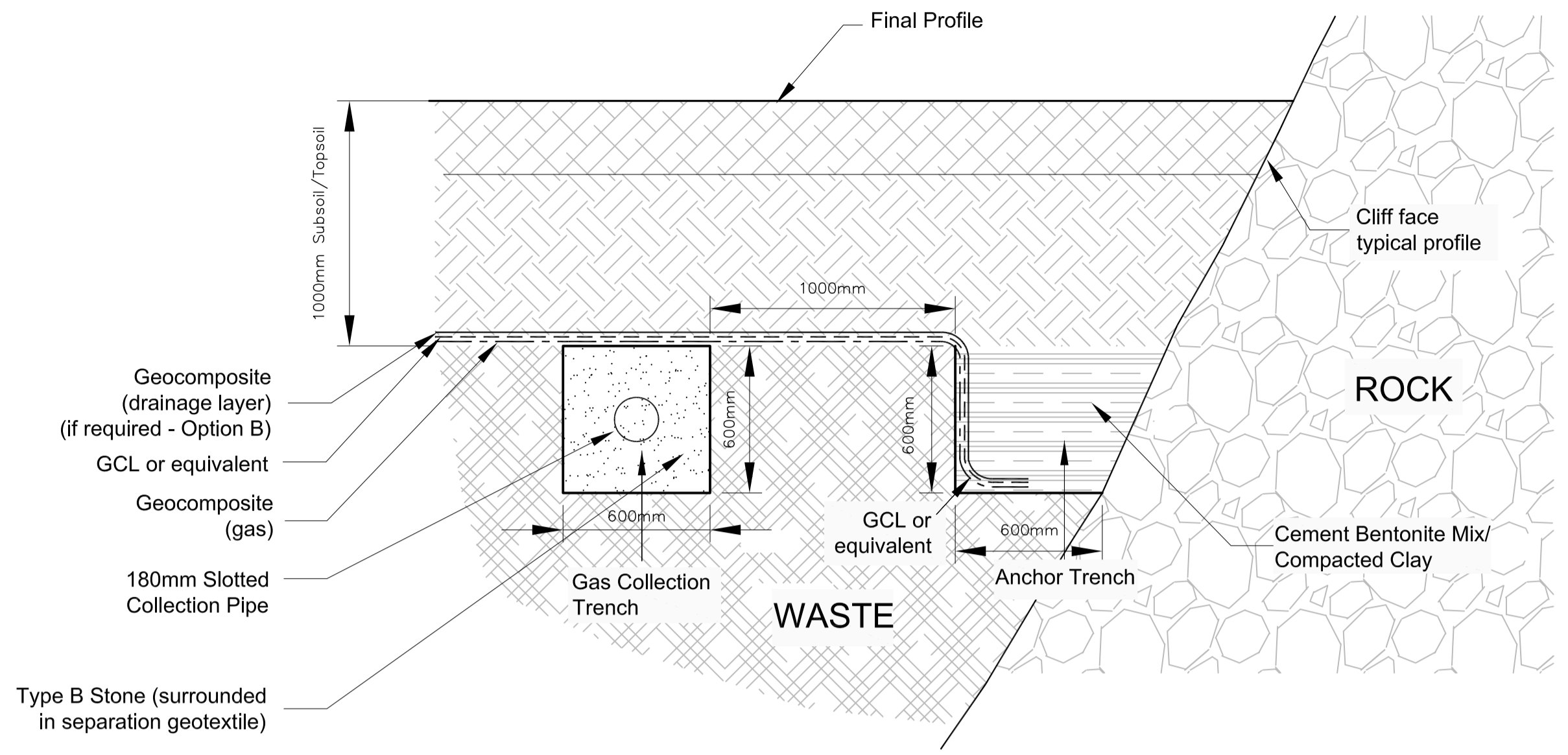




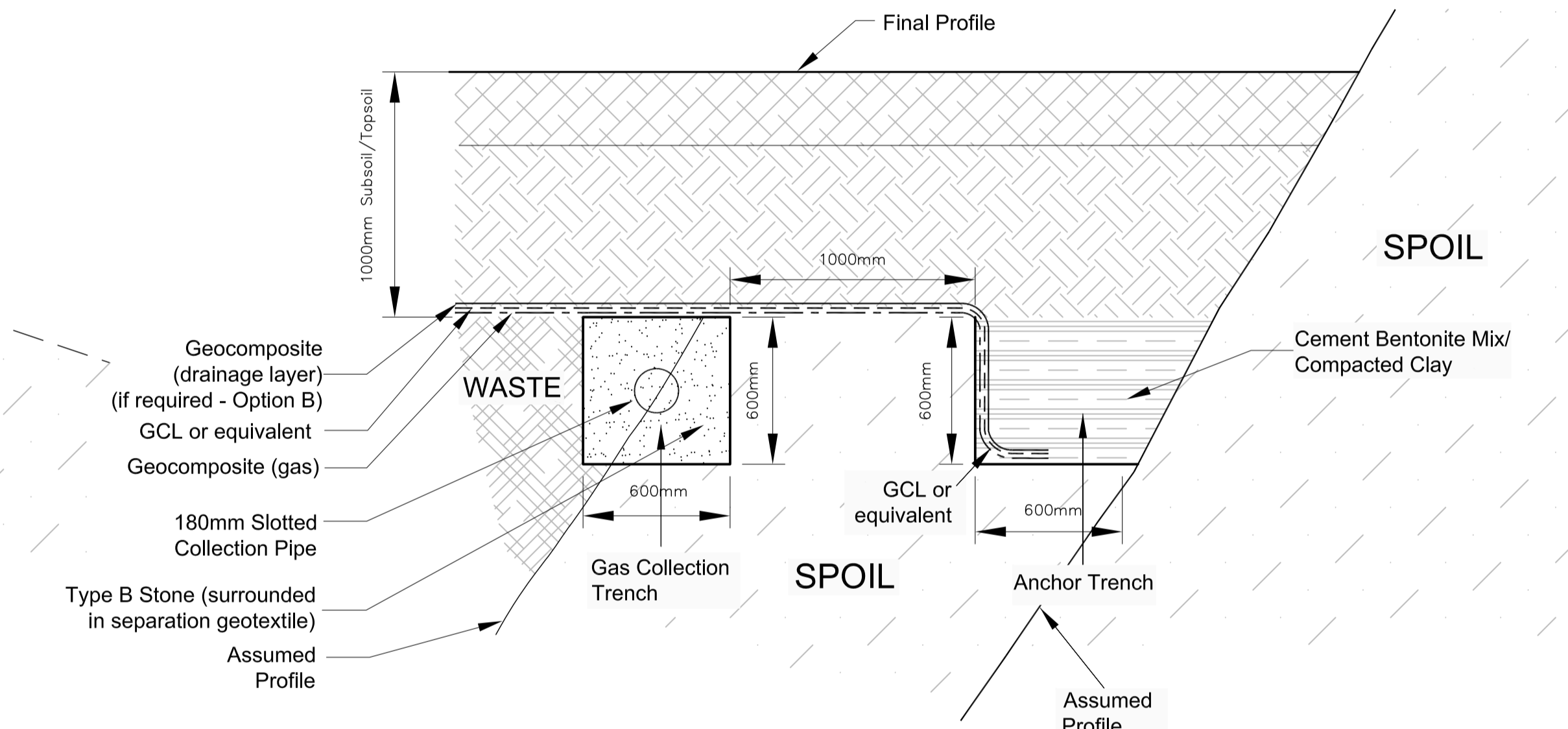
SD0001 East of landfill  
SCALE 1:20

**NOTE:**

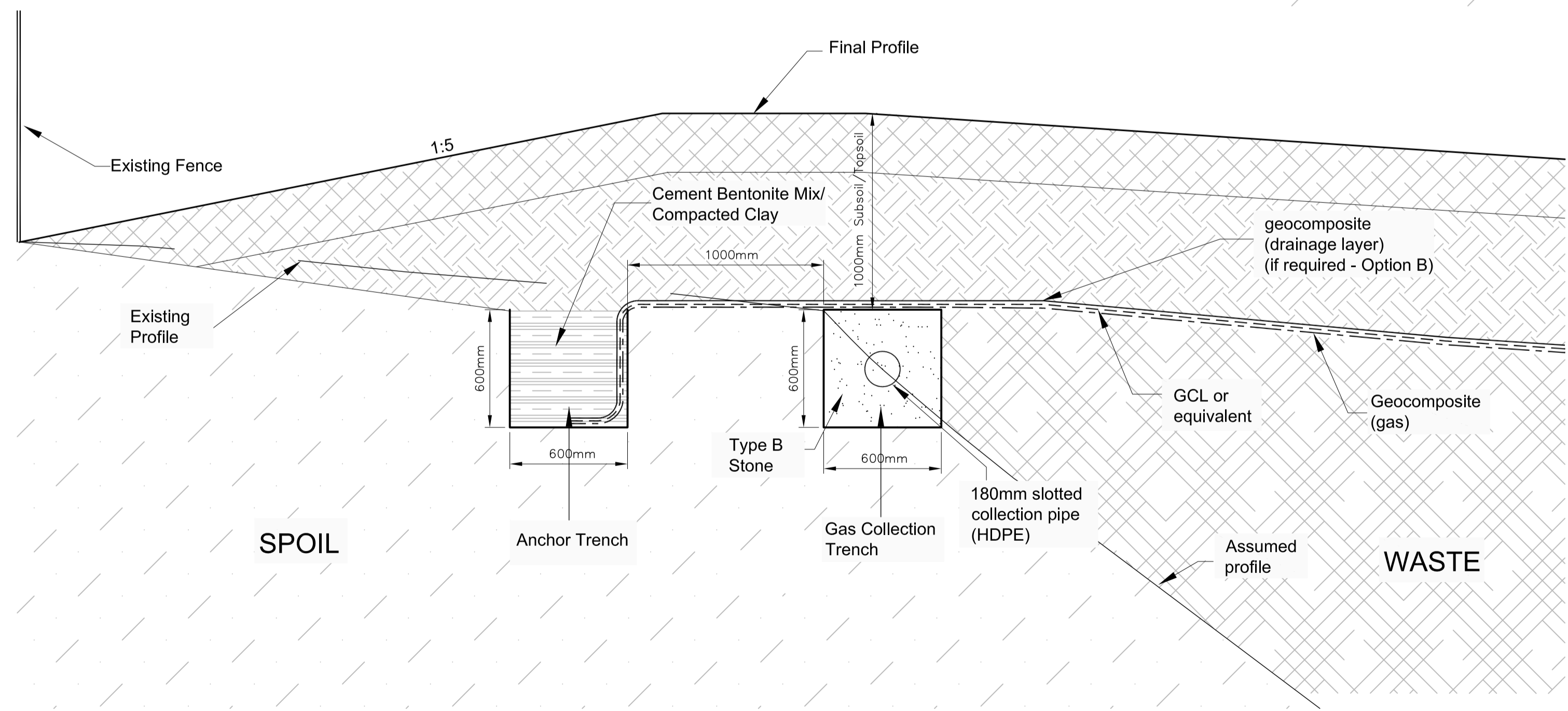
- All works shown on this drawing to be carried out by main contractor.
- See DG0004, 12, 13 for detail locations.
- Gas Collection trench to be installed at waste/spoil interface where possible.
- Anchor Trench to be installed 1m away from Gas Collection Trench.
- See SD0009 + SD0010 on DG0019 for capping options.
- Type B stone in gas collection trench to be surrounded in separation geotextile.



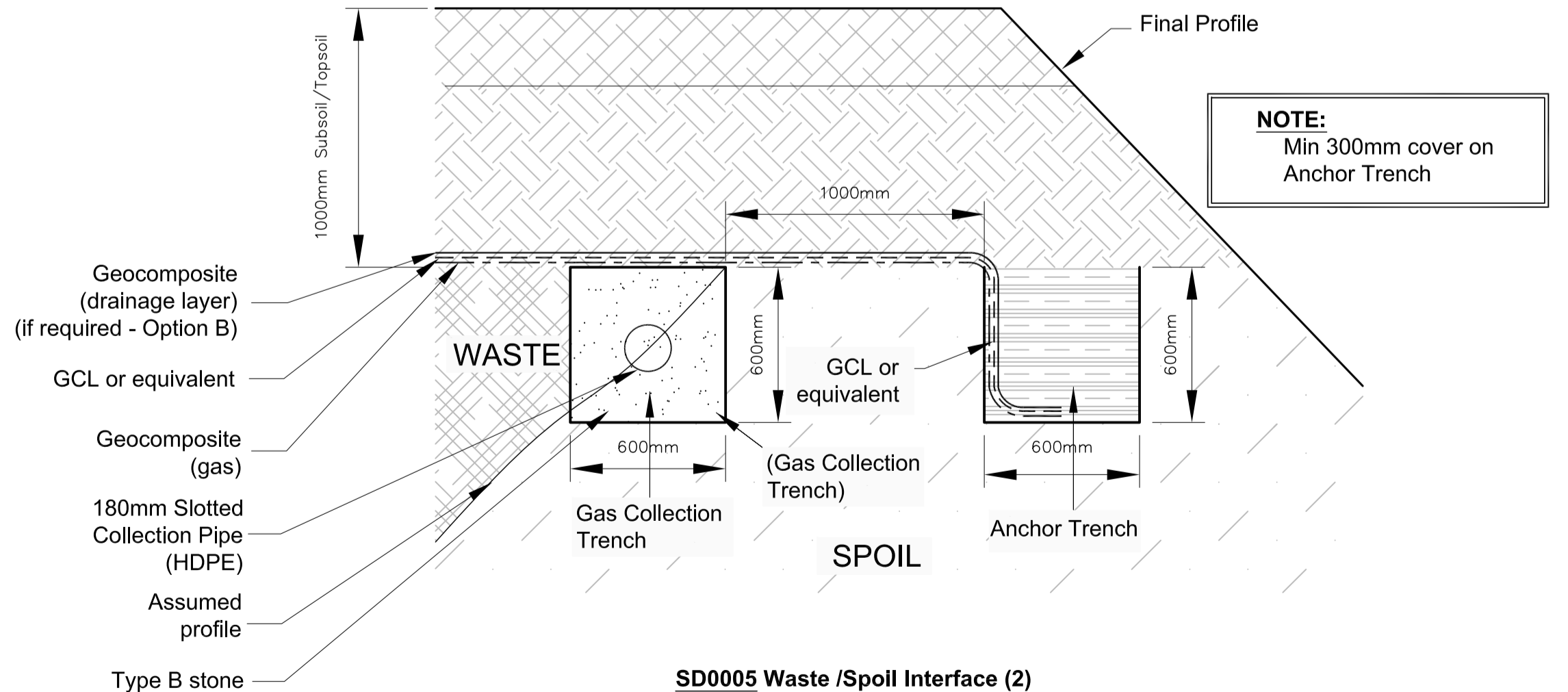
SD0003 Waste/Rock Interface  
SCALE 1:20



SD0004 Waste/Spoil Interface  
SCALE 1:20




SD0002 West of landfill  
SCALE 1:20



SD0005 Waste /Spoil Interface (2)  
SCALE 1:20

Client:



**Wicklow County Council**  
County Buildings,  
Wicklow,  
Co. Wicklow.



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**NOTES**

- This drawing is the property of RPS-MCOS Ltd., it is a confidential document and must not be copied, used, or its content divulged without prior written consent.
- All Levels refer to Local Datum (see Appendix 1/12).
- DO NOT SCALE, use figured dimensions only, if in doubt ask.

No.	Date	Rev.	App.	Amendment / Issue
C01	Sep'04	1/1	CC	Issue for Construction
B01	May'04	1/1	CC	Issue for Tender
A01	Apr'04	1/1	CC	Issue for Approval

Project:  
**Ballymurtagh Landfill  
Capping & Restoration Works**

Title:  
**STANDARD DETAILS  
(1 of 4)**

Drawn by:	MM	Job No:	mde0185
Checked by:	CC	File No:	mde0185DG0017
Approved by:	LOT	Drg. No:	DG0017
Scale:	1:20@A1	Rev:	C01
Date:	March '04		



12 January 2009

Mr. Seamus Breslin  
Wicklow County Council  
County Buildings  
Wicklow  
Co. Wicklow

Our Ref: 501.0147.00001

Dear Seamus

**RE: GEOTECHNICAL INSPECTION OF BALLYMURTAGH LANDFILL**

Further to my visit to Ballymurtagh Landfill site on Thursday 18<sup>th</sup> December last to undertake a geotechnical inspection of existing slope stability, I write to formally advise of my findings.

At the time of the inspection, the landfill capping and restoration works had been completed some 36 months previously and grass cover was well established across the entire site. Some localised bare patches of soil still remain immediately behind the crest of the lower slope. The healthy vegetation growth at the site serves to promote local stability of slopes and minimise soil erosion.

Surface water contour drains collecting run-off across the site were dry at the time of the inspection. They were generally observed to be

- (i) stable, with no little or no exposed soil and good vegetation cover on sides and base, and
- (ii) free of silt, suggesting little or no ongoing soil erosion.

**Lower Retention Berm**

At the present time, there are no indications of imminent large-scale (global) instability of the existing retention berm between 60mOD and 90mOD, immediately upslope of the recycling facility at Ballymurtagh. This assessment is primarily informed by the following observations made in the course of the geotechnical inspection :

- (i) there is no large-scale slip, back-scarp or toe bulging evident along the front (east face) of the retention berm;
- (ii) there are no tension cracks or fissures over the slope or along the level area behind the crest;
- (iii) vegetation is well established and there are little or no bare soil surfaces;
- (iv) the slope face is dry with no evidence of seepage apparent.

At the time of my visit, surface water run-off was observed to pond at the crest of the lower retention berm. Ponding at this location is most likely caused by a very low gradient along the interceptor drainage channel at the back of the crest or by excessive grass growth restricting flow along the floor of the channel.

As ponding of surface water at the crest could lead to a build of water pressure within the slope and thereby reduce the factor of safety against instability, it is recommended that the drainage channel be cleared and restored to its original condition.

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### **Mid-Slope**

No evidence of either localised or more deep-seated instability (tension cracking, back-scarp or toe bulging) was identified over the less steeply inclined mid-slope area, nor were any groundwater seepages or patches of bare or eroded soil observed. This suggests that the existing mid-slope remains stable.

### **Upper Slope**

As at mid-slope, no evidence of either localised or more deep-seated instability (tension cracking, back-scarp or toe bulging) was identified over the upper slope area, nor were any groundwater seepages or patches of bare or eroded soil observed. This suggests that the existing upper slope also remains stable.

### **Conclusion**

The existing slopes at Ballymurtagh are stable and are expected to remain so, provided existing collector drains and vegetation cover are maintained. As degradation of the landfilled waste continues, particularly across the mid-slope section, the annual topographic survey data should continue to be reviewed to ensure that differential settlement of the waste does not give rise to a reduction or reversal in gradients of existing drains, thereby hindering their effectiveness.

Should a reduction or reversal in the gradient of existing drains or channels be identified, as may be the case around the collector channel at the crest of the lower retention, they should be replaced, deepened or re-aligned as necessary in order to promote continued removal of surface water run-off from the side slopes.

Should you wish to discuss any of the issues raised herein, please contact the undersigned.

Yours sincerely

**SLR Consulting Limited**

**Derek Luby**  
Technical Director

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