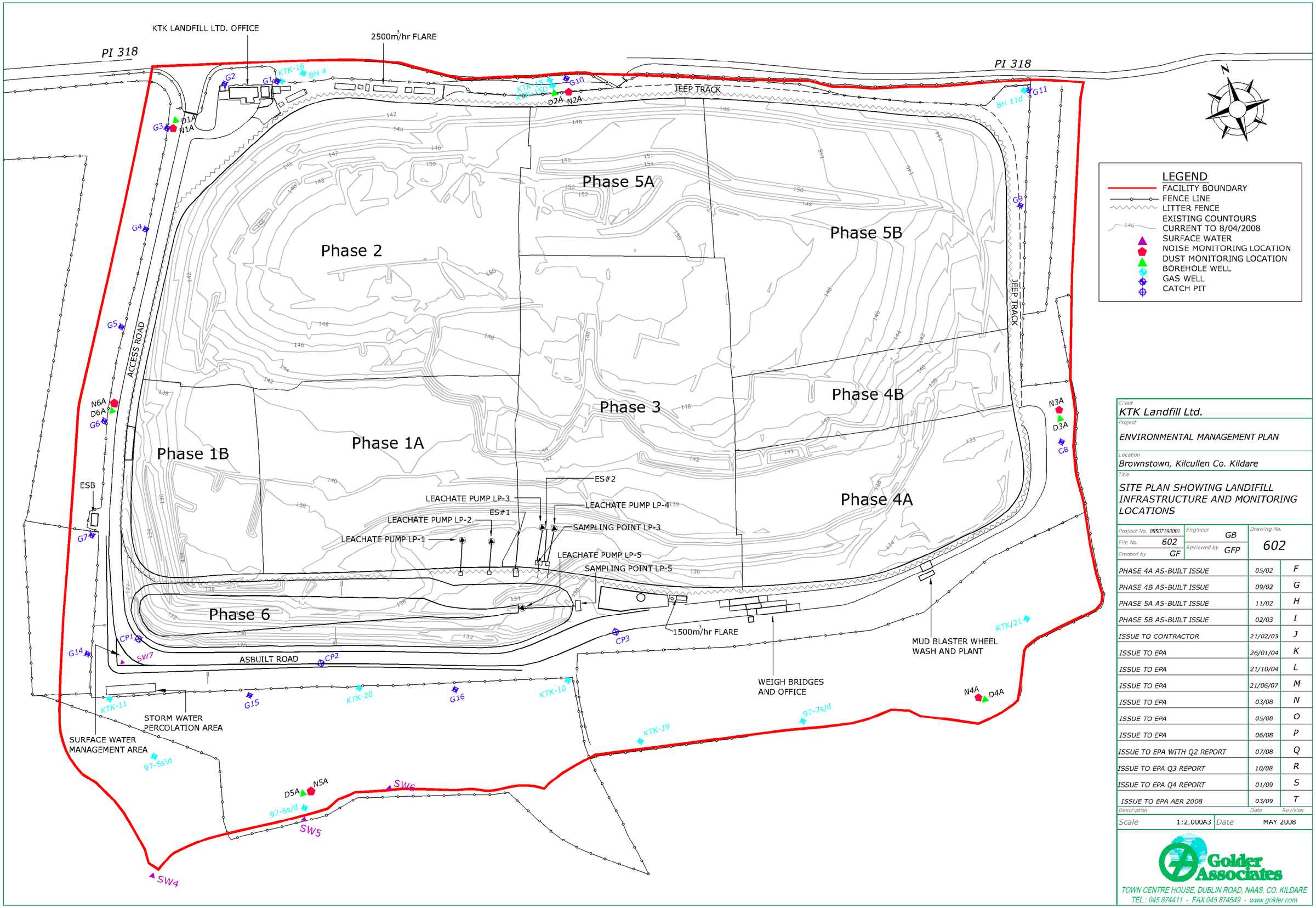

LEGEND

- FACILITY BOUNDARY
- FENCE LINE
- LITTER FENCE
- EXISTING COUNTOURS CURRENT TO 8/04/2008
- SURFACE WATER
- NOISE MONITORING LOCATION
- DUST MONITORING LOCATION
- BOREHOLE WELL
- GAS WELL
- CATCH PIT

Client: *KTK Landfill Ltd.*

Project: *ENVIRONMENTAL MANAGEMENT PLAN*

Location: *Brownstown, Kilcullen Co. Kildare*

Title: *SITE PLAN SHOWING LANDIFILL INFRASTRUCTURE AND MONITORING LOCATIONS*

Profect No. 08507190001	Engineer GB	Drawing No. 602
File No. 602	Reviewed by GFP	
Created by GF		

Description	Date	Revision
PHASE 4A AS-BUILT ISSUE	05/02	F
PHASE 4B AS-BUILT ISSUE	09/02	G
PHASE 5A AS-BUILT ISSUE	11/02	H
PHASE 5B AS-BUILT ISSUE	02/03	I
ISSUE TO CONTRACTOR	21/02/03	J
ISSUE TO EPA	26/01/04	K
ISSUE TO EPA	21/10/04	L
ISSUE TO EPA	21/06/07	M
ISSUE TO EPA	03/08	N
ISSUE TO EPA	05/08	O
ISSUE TO EPA	06/08	P
ISSUE TO EPA WITH Q2 REPORT	07/08	Q
ISSUE TO EPA Q3 REPORT	10/08	R
ISSUE TO EPA Q4 REPORT	01/09	S
ISSUE TO EPA AER 2008	03/09	T

Scale 1:2,000A3 Date MAY 2008

Golder Associates
TOWN CENTRE HOUSE, DUBLIN ROAD, NAAS, CO. KILDARE
TEL.: 045 874411 - FAX:045 874549 - www.golder.com

KTK LANDFILL LTD. OFFICE

2500m³/hr FLARE

500m³/hr FLARE

PI 318

PI 318

JEEP TRACK

JEEP TRACK

ACCESS ROAD

ACCESS ROAD

ESB

LEACHATE SHAFT

1500m³/hr FLARE

N

LEGEND

- FACILITY BOUNDARY
- WASTE CONTOUR (SURVEYED 02/01/08)
- FENCE LINE
- LITTER FENCE
- EXISTING GAS TRENCH
- GAS PIPE 225mmØ
- GAS PIPING ON LANDFILL SURFACE
- LANDFILL SIDE SLOPE RISER
- GYPSUM BAY
- ASBESTOS BAY
- WET SOIL/CLAY STOCKPILES
- EXISTING GAS EXTRACTION WELL
- DRIPLEG
- KNOCK OUT POT
- VALVE

ERM PROJECTS\KTK LANDFILL\REFUSE\734 REVF

Client: **KTK Landfill Ltd.**

Project: FACILITY MASTER PLAN

Location: BROWNSTOWN, KILCULLEN, CO.KILDARE.

Title: EXISTING GAS EXTRACTION WELLS

Project No. 05 719 149	Engineer CC	Figure No. KTK/734	
File No. KTK/734	Reviewed by GP		
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Scale 1:1,000A1 1:2000A3	Date MAR. 2008		

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Annual Environmental Report (AER)
(Period 1st January 2008 to 31st December 2008)

KTK Landfill Ltd.
Non Hazardous Waste Landfill,
Brownstown, Kilcullen,
Co. Kildare.
Waste Licence Register No. W0081-03.

Submitted to:
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Environmental Protection Agency
Johnstown Castle Estate
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1.0 INTRODUCTION

This Annual Environmental Report (AER) has been prepared in accordance with Condition 11.8 of Waste Licence Register No. W0081-03 and contains the information listed in Schedule F of the Licence.

2.0 SITE HISTORY

KTK Landfill Ltd. (KTK), a wholly owned subsidiary company of Greenstar Ltd., is currently developing and operating the KTK Landfill under Waste Licence Register Number W0081-03. KTK Landfill was granted a Waste Licence (W0081-01) by the Environmental Protection Agency (EPA) in April 1999. In July 2001, KTK Landfill submitted an application for a Review of Waste Licence W0081-01. An amended licence (Register No. W0081-02) was granted by The Agency on 8th April 2002. In November 2004 an application for Revision of Waste Licence W0081-02 was submitted. An amended Licence (Register No. W0081-03) was granted 16th February 2006.

3.0 REPORTING PERIOD

The reporting period for the Annual Environmental Report (AER) is from the 1st of January 2008 to the 31st December 2008. During this reporting period Waste Licence Register No. W0081-03 was in effect.

4.0 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

The KTK Landfill is a fully engineered facility with a composite lining system on the base and side walls of a large excavation. The licensed waste activities are as follows:

Licensed Waste Disposal Activities in Accordance with the Third Schedule of the Waste Management Act, 1996 to 2003

Class 1	Deposit on, in or under land (including landfill).
Class 5	Specially engineered landfill, including placement into lined discrete cells, which are capped and isolated from one another and the environment.
Class 11	Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
Class 13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

Licensed Waste Recovery Activities in Accordance with the Fourth Schedule of the Waste Management Act, 1996 to 2003

Class 3	Recycling or reclamation of metals and metal compounds.
Class 4	Recycling or reclamation of other inorganic materials
Class 13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

5.0 QUANTITIY AND COMPOSITION OF WASTE RECEIVED, DISPOSED OF AND RECOVERED DURING THE REPORTING PERIOD AND EACH PREVIOUS YEAR.

Waste Input Summary 2008

The quantity of wastes received on site for disposal and recovery during 2007 is shown in Table 5.1.1. The quantity of wastes accepted at the site and used for engineering and restoration purposes is depicted in Table 5.1.2.

Table 5.1: Wastes Received for the Purpose of Recovery and Disposal during 2008

Waste Type	Description	Total Accepted 2008 (tonnes)	Licence Limit (tonnes)
Commercial and Industrial	Mixed Commercial and Industrial	208,713	222,750
Industrial	Misc. Non-Haz Industrial solid wastes	10,612	24,750
Industrial	Industrial Non-Hazardous sludges and filtercakes	925	13,750
Asbestos	Construction materals containing Asbestos.	7,486	3,000
Construction and Demolition	Mixed Construction and Demolition Waste.	333	10,750
Total Waste Intake		**228,069**	**275,000**

Table 5.2: Materials used for Engineering and Restoration Purposes 2008

Description	Quantity (Tonnes)
Shredded Timber – Reused on site.	11,705
Compost – Reused on site.	22,397
Soil and Fines material – Reused on site for daily cover, intermediate cover, temporary capping, liner protection and Asbestos cover.	87,394
Total	**349,565**

6.0 CALCULATED REMAINING CAPACITY OF THE FACILITY

Based on topographical survey carried out on 24th of October 2008 the remaining void is 180,000m³. The maximum tonnage of wastes that must be deposited to produce the final restored landform indicated in the planning and waste licence applications is difficult to estimate as this quantity is dependent on a number of factors such as the nature and density of waste and the extent to which the wastes settle (i.e. consolidate, compress and become more dense over time).

7.0 METHODS OF DEPOSITION OF WASTE

The Site closed to acceptance of commercial and industrial wastes and asbestos wastes on the 21st of October 2008. The site is now only accepting soil material for regulating layer and stockpiling for the final restoration. Stage 1 of final restoration will commence in May 2009. The SEW has been submitted. However the process for waste deposition that has been in operation is listed below.

Waste was delivered to the site in heavy goods vehicles (HGV) with the appropriate covers to prevent loss of load. Each HGV passed through the weighbridge prior to proceeding to the active waste disposal/recovery areas. The weighbridge operator and/or the facility manager could at their own discretion request the load to be tipped in the Waste Inspection Area. Waste vehicles would then proceed to the active waste disposal/recovery areas where waste was deposited under the direction of waste inspection personnel.

Waste was deposited directly on a surface of waste close to and above the advancing tipping face. In accordance with Condition 6.19.2, the active working face was confined to a height of 3.5 metres after compaction and a width of 35 metres. Deposited waste was spread in shallow layers on the inclined surface and compacted. The steel-wheeled compactors operated on the gradient of the more shallow face, pushing thin layers of wastes and applying compaction pressure to them. Wastes were covered with heavier materials or covered with permeable soil

drawn from stockpiles of heavy inert waste or fine sand/silt located on the site. Alternative fabric cover systems were also utilised where appropriate.

Construction waste containing asbestos was deposited in dedicated bays to a minimum depth of 2m in accordance with the licence. Any materials containing asbestos were covered immediately after deposition with at least 250mm of suitable material. At the end of each working day the asbestos trenches are covered with a minimum of 500mm of suitable material.

In the event that difficult handling wastes (such as powders) were accepted at the facility, they were also deposited within the above bays to minimise any potential dust generation.

8.0 SUMMARY REPORT ON EMISSIONS

This summary report has been compiled in accordance with Emission Limit Values (ELV's) for the following media as detailed in Condition 6 and Schedule C of the current licence:

- Dust;
- Noise;
- Landfill Gas; and
- Leachate.

Environmental media for which no ELV's have been set under Waste Licence Register No. W0081-03 are discussed in Section 9.0.

8.1 Dust Deposition

Dust deposition emission limit values as established in Schedule B.1 of Waste Licence Register No. W0081-03 are detailed in Table 8.1 below.

Table 8.1: Dust Deposition ELV's

Level ($mg/m^2/day$) [Note 1]
350

Note 1: 30 day composite sample

Dust Monitoring was conducted at six locations on **three** occasions during the 2008 reporting period as specified in Schedule C.3 of the waste licence. Geotesting Ltd. conducted the analysis of dust deposition results from the KTK facility. Dust reports were included in the subsequent 1st, 2nd and 3rd Quarterly monitoring reports of 2008.

8.2 Noise Emissions

Noise ELVs as established in Waste Licence Register No. W0081-03 are detailed in Table 8.2 below:

Table 8.2: Noise ELV's (measured at the perimeter of the facility)

Day dB(A)L_{Aeq}(30 minutes)	Night dB(A)L_{Aeq}(30 minutes)
55	45

Noise monitoring was conducted by Golder Associates Ireland at six on-site locations and four sensitive receptors in June 2008. The complete noise monitoring report was included in the Quarter 2 submission to the Agency.

The survey revealed a number of sources on site and off site. Levels were detected that were above the specified licence limit of 55 dB(A). However, the levels detected by the sound level metre were a record of the ambient noise levels at the monitoring locations. This means that the levels were a combination of all the noise sources at the monitoring locations and were not as a direct result of operations at the facility. Indeed, the dominant noise sources recorded in the field notes show that road traffic noise was the overarching source.

8.3 Landfill Gas Emissions

Landfill Gas ELV's as established in Waste Licence Register No. W0081-03 are detailed in Table 8.3 below.

Table 8.3: Landfill Gas Concentration ELV's (measured in any building on or adjacent to the facility)

Methane	Carbon Dioxide
20% LEL (1% v/v)	1.5% v/v

Landfill Gas Monitoring was conducted at 14 monitoring well locations on a monthly basis during the 2008 reporting period. Golder Associates Ireland Ltd. conducted the sampling, analysis and reporting of Landfill Gas emissions from the facility. Landfill Gas emission reports were included in the subsequent Quarterly monitoring reports for 2008.

Landfill Gas monitoring was carried out at the facility offices and buildings on a weekly basis by trained facility staff. No measured landfill gas level in any of the facility buildings exceeded the above limits during 2008.

8.4 Emissions to Air monitoring

8.4.1 Locations and Methods

Waste Licence Register No. W0081-03 stipulates that Monitoring of Emissions to Air is carried out at the enclosed gas Flare No. 1 (HAASE 2500) and No. 2 (HAASE 1500) and at the gas Utilisation Plant Engines GE01, GE02 and GE03 at KTK Landfill. Odour Monitoring Ireland Ltd undertook this monitoring on the 25th of April 2008 with a second test carried out on the 4th of December 2008.

8.4.2 Results

The results reported by Odour Monitoring Ireland Ltd. are presented in Tables 8.4.1 to 8.4.6 below. Furthermore the complete reports are attached in Appendix 3.

Table 8.4.1. Emission value results from landfill gas flare No. 1 (2,500 HAASE) monitored at KTK Landfill.

Parameter	April 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
Nitrogen oxides (NO_X)	49.29	150	88.40	150
Sulphur Dioxide (SO_2)	1,694	-	3,038.85	-

Table 8.4.2. Emission value results from landfill gas flare No. 2 (1,500 HAASE) monitored at KTK Landfill.

Parameter	April 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
Nitrogen oxides (NO_X)	65.71	150	88.38	150
Sulphur Dioxide (SO_2)	5,571	-	7,492	-

Table 8.4.3 Emission value results from gas utilisation engine GE01 monitored at KTK Landfill.

Parameter	April 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
NO_X	355.27	500	396.68	500
CO	691.25	1,400	771.83	1,400
TNMVOCs	55.85	75	62.36	75
SO_2	1,357.14	-	1515.35	-
Particulates	64.15	-	71.63	-

Table 8.4.4. Emission value results from gas utilisation engine GE02 monitored at KTK Landfill.

Parameter	April 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
NO_X	388.13	500	426.48	500
CO	620	1,400	681.27	1,400
TNMVOCs	26.59	75	29.22	75
SO_2	1,694.29	-	1,861.72	-
Particulates	74.04	-	81.35	-

Table 8.4.5 Emission value results from gas utilisation engine GE03 monitored at KTK Landfill.

Parameter	April 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
NO_X	299.82	500	329.68	500
CO	592.50	1,400	651.50	1,400
TNMVOCs	39.89	75	43.86	75
SO_2	1,997.14	-	2,196.03	-
Particulates	-	-	-	-

Table 8.4.6. Emission value results from landfill gas flare No. 1 (2,500 HAASE) monitored at KTK Landfill.

Parameter	December 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
Nitrogen oxides (NO_X)	94.50	250	-	250
Sulphur Dioxide (SO_2)	6,052	-	-	-

Table 8.4.7: Emission value results from landfill gas flare No. 2 (1,500 HAASE) monitored at KTK Landfill.

Parameter	December 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
Nitrogen oxides (NO_X)	114	250	-	250
Sulphur Dioxide (SO_2)	9,654	-	-	-

Table 8.4.8: Emission value results from landfill gas flare No. 2 (750 Enclosed Flare Unit) monitored at KTK Landfill.

Parameter	December 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
Nitrogen oxides (NO_X)	37	250	-	250
Sulphur Dioxide (SO_2)	378	-	-	-

Table 8.4.9: Emission value results from gas utilisation engine GE01 monitored at KTK Landfill.

Parameter	December 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
NO_X	411.54	500	-	500
CO	1,017	1,400	-	1,400
TNMVOCs	41.49	75	-	75
SO_2	2,976	-	-	-
Particulates	-	-	-	-

Table 8.4.10. Emission value results from gas utilisation engine GE02 monitored at KTK Landfill.

Parameter	December 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
NO_X	388.48	500	-	500
CO	844	1,400	-	1,400
TNMVOCs	38.21	75	-	75
SO_2	2,548	-	-	-
Particulates	-	-	-	-

Table 8.4.11 Emission value results from gas utilisation engine GE03 monitored at KTK Landfill.

Parameter	December 2008			
	Normalised Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)	Oxygen Corrected Emission Conc. (mgN/m^3)	Emission Limit Value ($mg\ Nm^{-3}$)
NO_X	443.79	500	-	500
CO	601	1,400	-	1,400
TNMVOCs	32.75	75	-	75
SO_2	3,266	-	-	-
Particulates	-	-	-	-

9.0 SUMMARY OF ALL RESULTS AND INTERPRETATION OF ENVIRONMENTAL MONITORING, INCLUDING PLANS OF ALL MONITORING LOCATIONS INCLUDING 12-DIGIT GRID REFERENCES

9.1 Introduction

Monitoring was conducted at the KTK Landfill in accordance with Schedule D of Waste Licence Register No. W0081-03. However, in some case additional monitoring was carried out at the discretion of KTK, e.g. leachate quality etc. Details of monitoring and reporting frequencies of environmental data are presented in Table 9.1. The locations of all environmental monitoring points as well as current topographic conditions are illustrated on Drawings KTK/602, Rev T and KTK/734, Rev. G (Appendix 1).

Table 9.1: Environmental Monitoring and Reporting Frequency

Environmental Monitoring Data	Monitoring Frequency	Reporting Frequency
Groundwater Quality	Quarterly	Quarterly
Groundwater Levels	Monthly	Quarterly
Surface Water Quality	Quarterly	Quarterly
Surface Water Visual Inspection	Weekly	Quarterly
Leachate Quality	Monthly*	Quarterly
Leachate Levels	Weekly	Quarterly
Landfill Gas (Boreholes)	Monthly	Quarterly
Landfill Gas (Site Offices)	Weekly	Quarterly
Dust	Three times per year	Subsequent Quarterly
Noise	Annually	Annually
Meteorological Data	Daily	Annually
Asbestos Fibre Monitoring	Annually**	Annually

*Schedule C 2.1 of the licence (W0081-03) specifies annual monitoring of leachate quality for all parameters with the exception of BOD and COD which are monitored on a quarterly basis.

** Asbestos monitoring is carried out by the licensee three times per year

9.2 Dust Monitoring

9.2.1 Dust Monitoring Locations

Dust Monitoring was conducted on **three** occasions at six monitoring locations in 2008; 1st February to 29th of March 2008, 14th April to 12th of May 2008 and 21st of July to 19th August 2008 in accordance with Table C.3 of the Licence. Co-ordinates for all monitoring locations are detailed in Table 9.2.1 with locations illustrated on KTK/602, Rev T.

Table 9.2.1: Dust Monitoring Locations

Media	Location	Eastings	Northings
Dust Monitoring	D1A	285663	211440
	D2A	285883	211396
	D3A	286122	211102
	D4A	286032	210960
	D5A	285612	211021
	D6A	285550	211230

9.2.2 Dust Monitoring Methods

Total dust deposition was measured at the site using Bergerhoff gauges as specified in the Standard Method VDI 2119 (German Engineering Institute).

The dust gauges were set up such that the glass containers were approximately 2m above the ground surface. In order to inhibit the growth of algae in the dust jars 20ml of 5% 2-methoxyethanol was added to each jar. The glass jars containing the dust were submitted to GeoTesting Ltd. for analysis.

9.2.3 Dust Monitoring Results

The results of dust monitoring conducted at the KTK facility during 2008 are presented in Table 9.2.2 below. Dust concentrations and ELV's as detailed in Schedule B.1 of Waste Licence W0081-03 are discussed in Section 8.1 above.

The Dust ELV of 350mg/m^2/day was not exceeded at any of the six monitoring locations during the reporting period.

Table 9.2.2: Dust Monitoring Results 2008

Location	01/02/08 – 29/02/08	14/04/08 – 12/05/08	21/07/08 – 19/08/08
	mg/m^2/day		
D1A	344.5	172.3	188.50
D2A	114.8	68.9	232.80
D3A	189.5	143.5	122.00
D4A	97.6	51.7	33.30
D5A	57.4	80.4	11.1
D6A	223.9	189.5	188.50
Average	**171.28**	**117.71**	**117.70**

9.3 Groundwater Monitoring

9.3.1 Groundwater Monitoring Locations

Groundwater monitoring was conducted at thirteen locations during 2007 in accordance with Schedule C.3 of the current licence. Co-ordinates for all monitoring locations are detailed in Table 9.3 with locations illustrated on Drawing KTK/602, Rev T, Appendix 1.

Table 9.3: Groundwater Monitoring Locations

Media	Location	Eastings	Northings
Groundwater	BH4	285743	211444
	BH11d	286157	211305
	97-4	285441	211146
	97-5d	285534	211075
	97-6d	285612	211019
	97-7d	285916	210979
	KTK-10	285787	211045
	KTK-11	285518	211116
	KTK-15d	285884	211394
	KTK-16	285728	211444
	KTK-19	285819	210997
	KTK-20	285665	211078
	KTK-21	286065	210999

9.3.2 Groundwater Levels

Groundwater levels were monitored on a monthly basis in accordance with Schedule C of Waste Licence Register No. W0081-03. The results of water level monitoring were furnished to the Agency in the subsequent quarterly reports (Quarter 1 to Quarter 4, 2008).

9.3.2.1 Methods of Monitoring Groundwater Levels

Groundwater levels were measured using a standard dip-meter probe, which upon contact with water emits an audible signal. Measurements were made to the nearest centimetre relative to the top of the steel casing that protects each monitoring pipe.

9.3.2.2 Groundwater Level Results 2008

Figures 9.3.1 and 9.3.2 illustrate the annual water level data recorded from groundwater monitoring wells up-gradient and down-gradient of the facility during 2008.

9.3.3 Groundwater Quality

Analysis of groundwater quality at the facility was conducted on a quarterly basis in accordance with Schedule C.3 of the current licence (W0081-03).

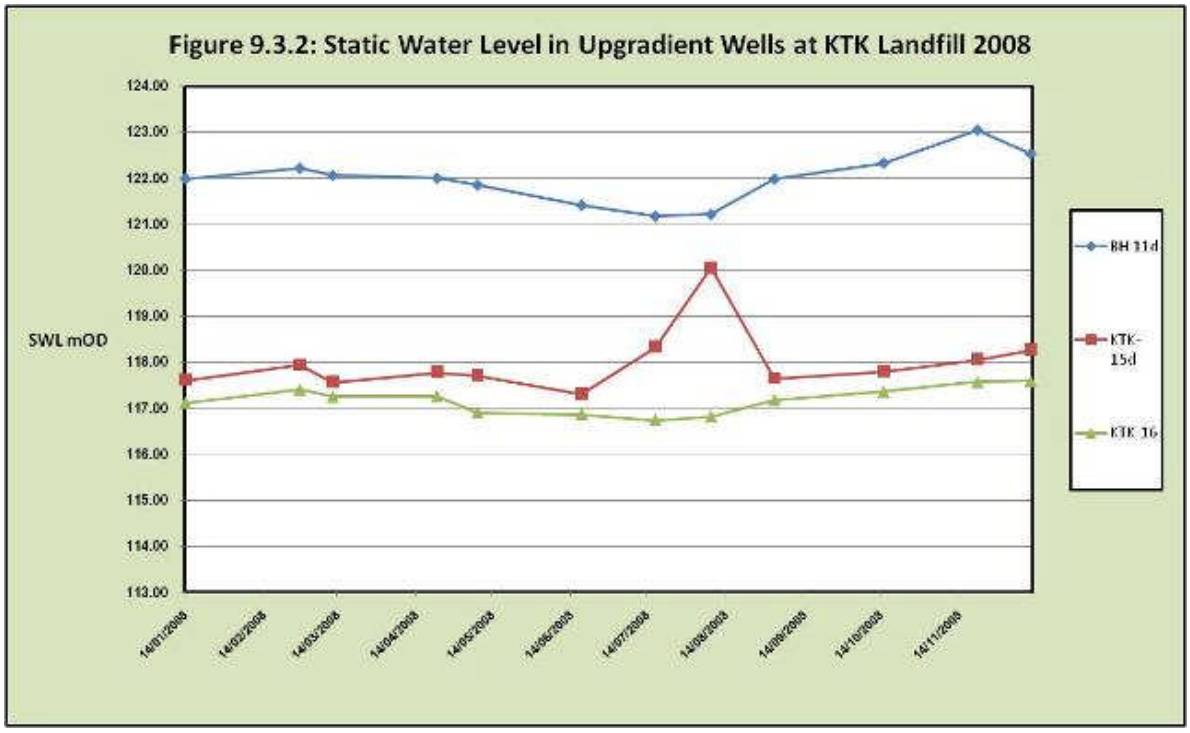


Figure 9.3.2: Static Water Level in Upgradient Wells at KTK Landfill 2008
SWL mOD
124.00
123.00
122.00
121.00
120.00
119.00
118.00
117.00
116.00
115.00
114.00
113.00
BH 11d
KTK-15d
KTK-16

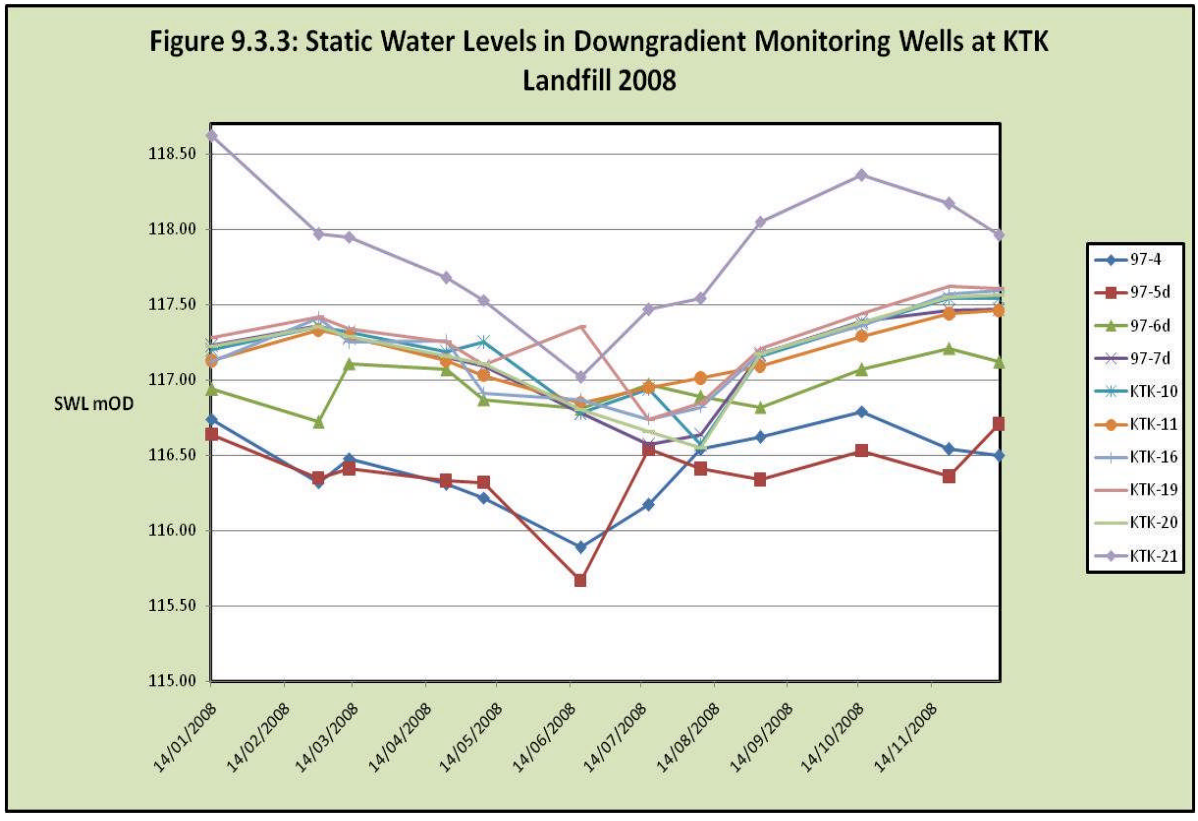


Figure 9.3.3: Static Water Levels in Downgradient Monitoring Wells at KTK Landfill 2008
SWL mOD
118.50
118.00
117.50
117.00
116.50
116.00
115.50
115.00
14/01/2008
14/02/2008
14/03/2008
14/04/2008
14/05/2008
14/06/2008
14/07/2008
14/08/2008
14/09/2008
14/10/2008
14/11/2008
97-4
97-5d
97-6d
97-7d
KTK-10
KTK-11
KTK-16
KTK-19
KTK-20
KTK-21

9.3.3.1 Methods of Monitoring Groundwater Quality

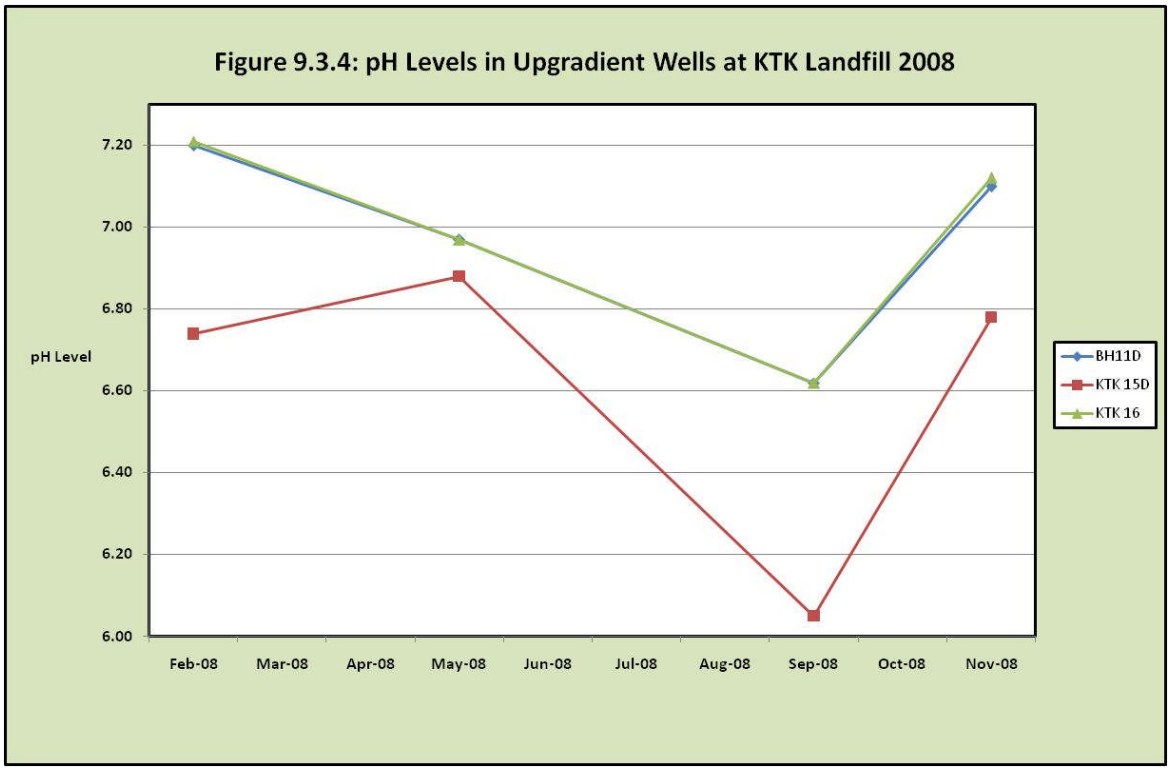
Groundwater samples were collected by purging a minimum 3 borehole volumes prior to sample collection. This allowed stagnant water to be removed and representative groundwater to be drawn into the hole. Dedicated sampling equipment was used to prevent cross contamination between sampling locations. Field measurements of temperature, pH and conductivity were recorded. Samples were decanted into laboratory designated containers and stored in cooler boxes to maintain sample temperature at approximately 4^0C. All samples were submitted to the laboratory within 24 hours of sampling.

9.3.3.2 Groundwater Quality Results 2008

Monitoring Boreholes

Groundwater quality has been monitored at thirteen locations during 2008 in accordance with Schedule C.3 of the current licence. The results of all quarterly monitoring have been presented to The Agency in reports Quarter 1 to Quarter 4 of 2008.

A summary of concentrations from a number of indicator parameters up-gradient and down-gradient of the facility recorded during the reporting period are presented in Figures 9.3.3 to 9.3.12.



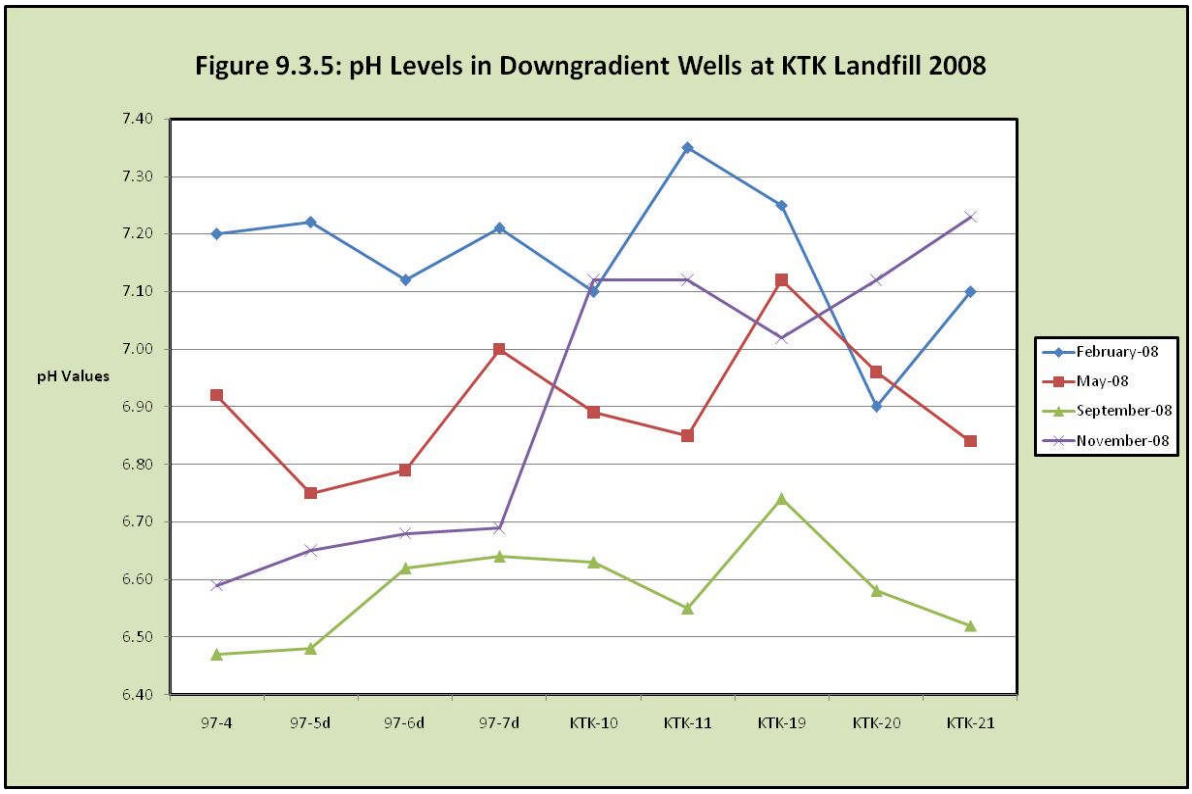


Figure 9.3.5: pH Levels in Downgradient Wells at KTK Landfill 2008
pH Values
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
6.60
6.50
6.40
97-4
97-5d
97-6d
97-7d
KTK-10
KTK-11
KTK-19
KTK-20
KTK-21
February-08
May-08
September-08
November-08

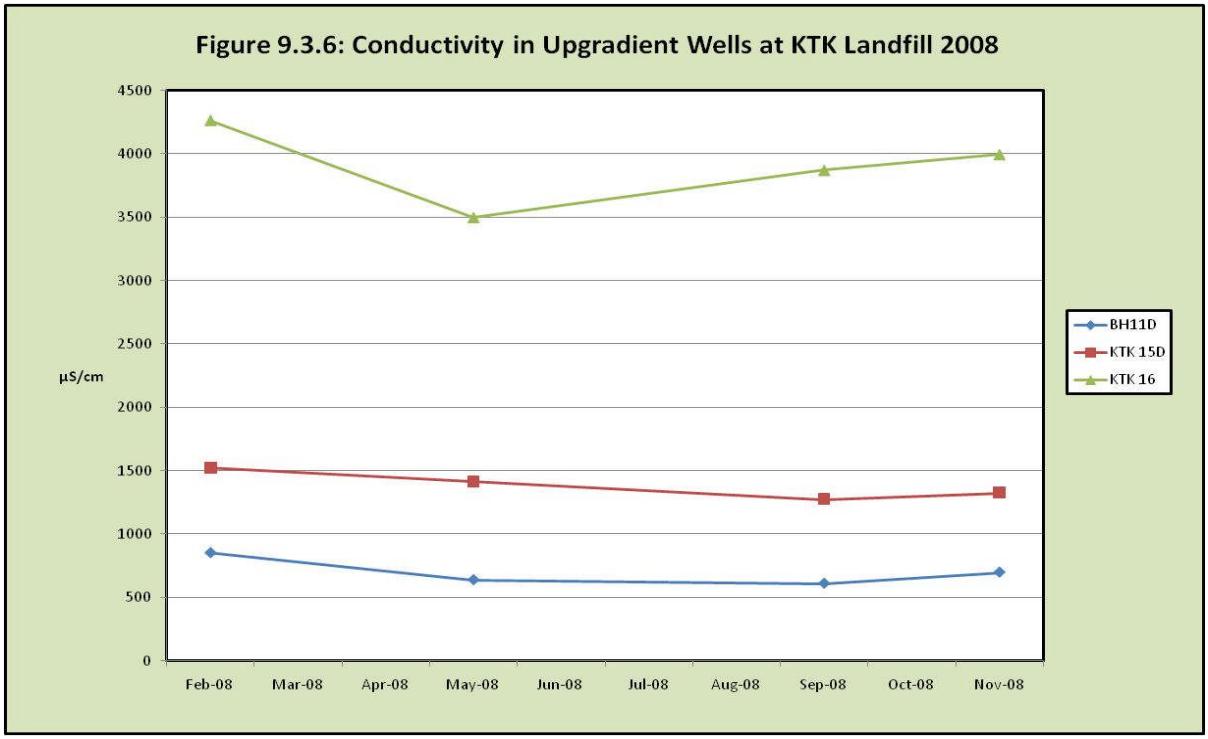


Figure 9.3.6: Conductivity in Upgradient Wells at KTK Landfill 2008
µS/cm
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
BH11D
KTK 15D
KTK 16

Figure 9.3.7: Conductivity in Downgradient Wells at KTK Landfill 2008

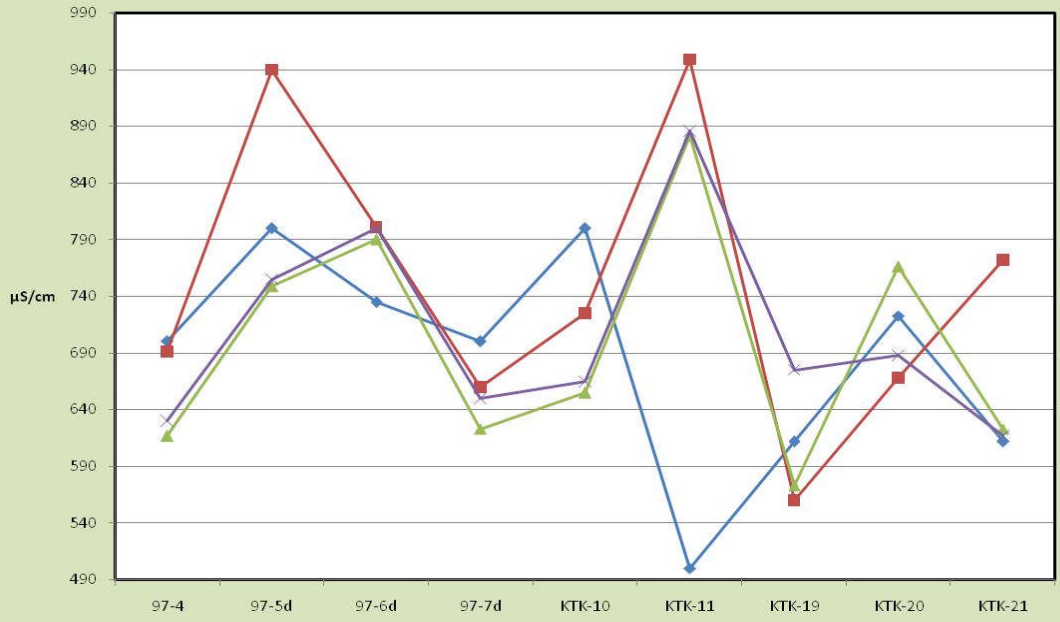


Fig 9.3.8: Cloride concentrations in upgradient wells at KTK Landfill 2008

Figure 9.3.9: Chloride concentrations in Downgradient Wells at KTK Landfill 2008

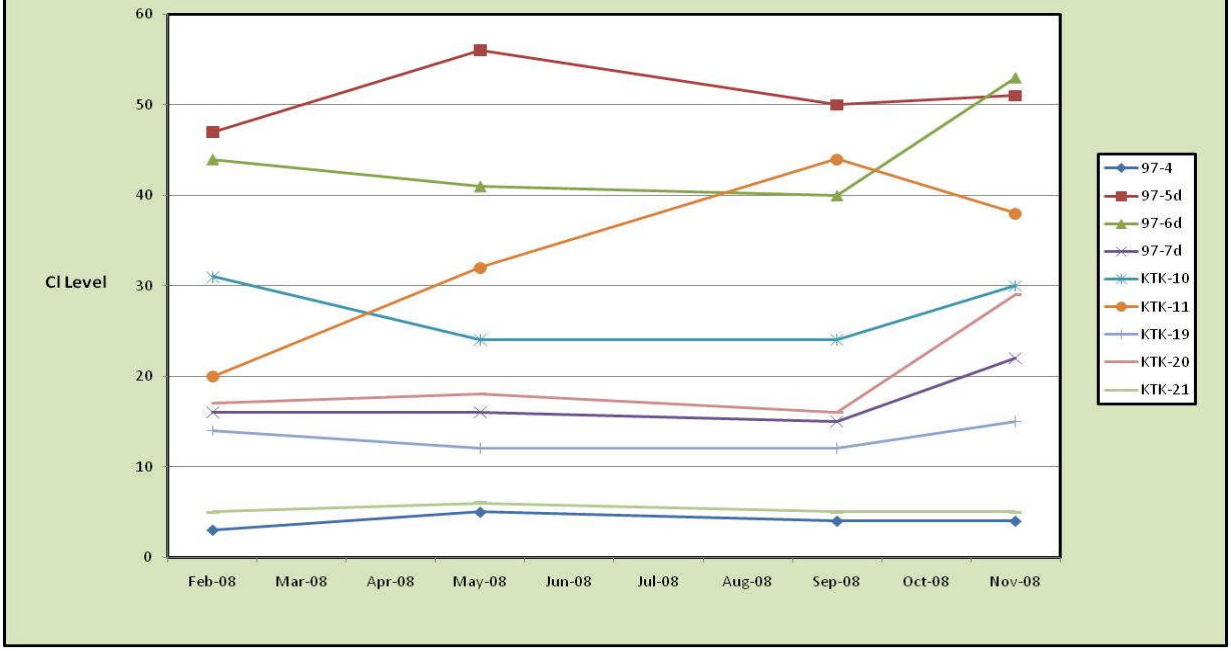
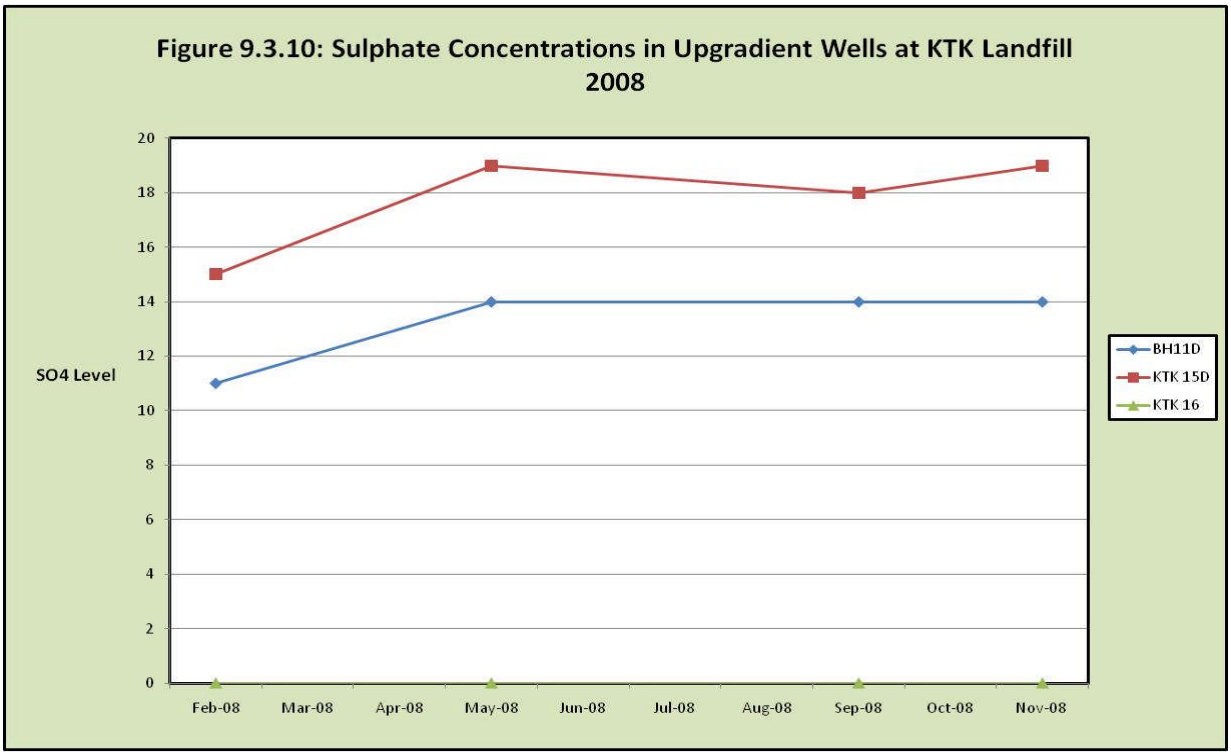


Figure 9.3.10: Sulphate Concentrations in Upgradient Wells at KTK Landfill 2008



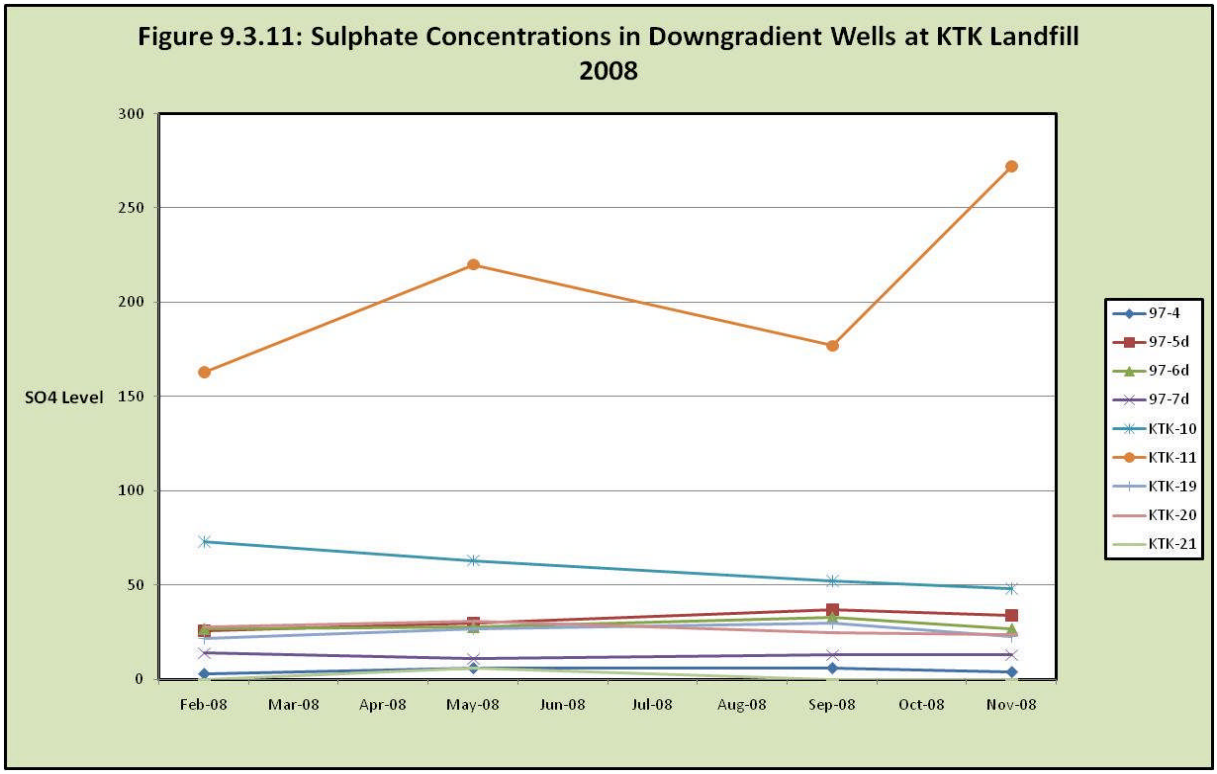


Figure 9.3.11: Sulphate Concentrations in Downgradient Wells at KTK Landfill 2008
SO4 Level
300
250
200
150
100
50
0
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
97-4
97-5d
97-6d
97-7d
KTK-10
KTK-11
KTK-19
KTK-20
KTK-21

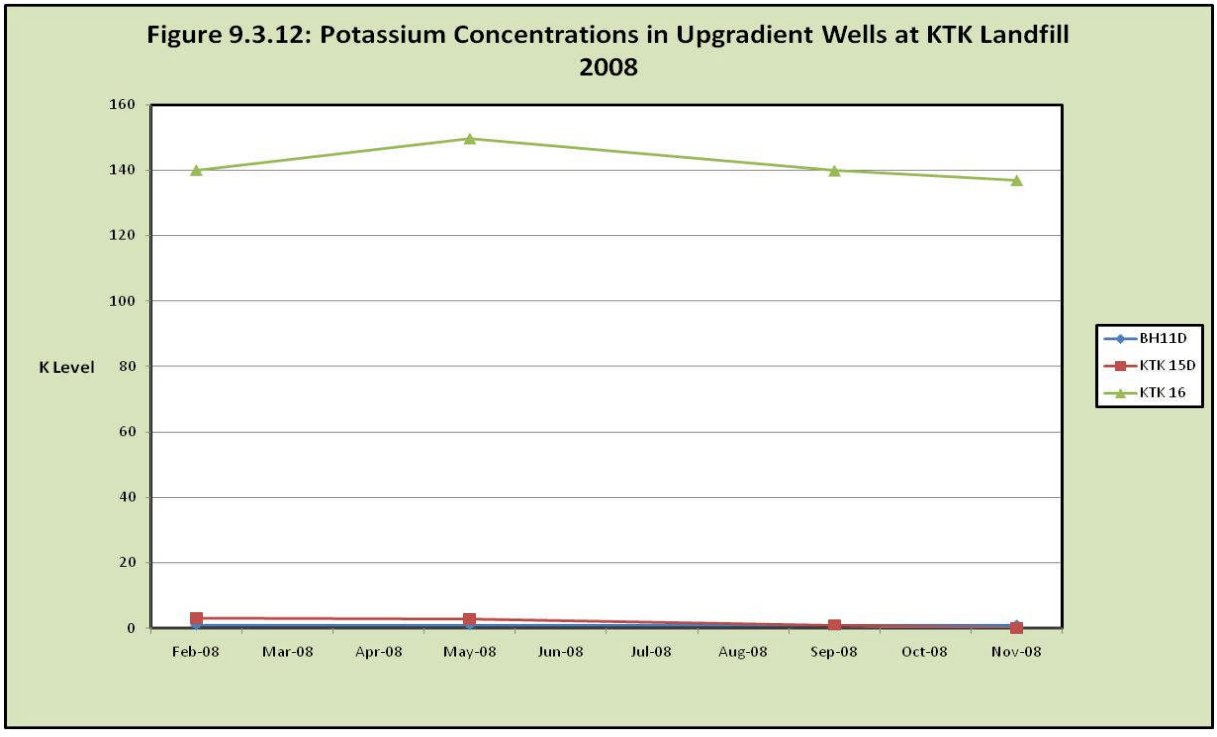
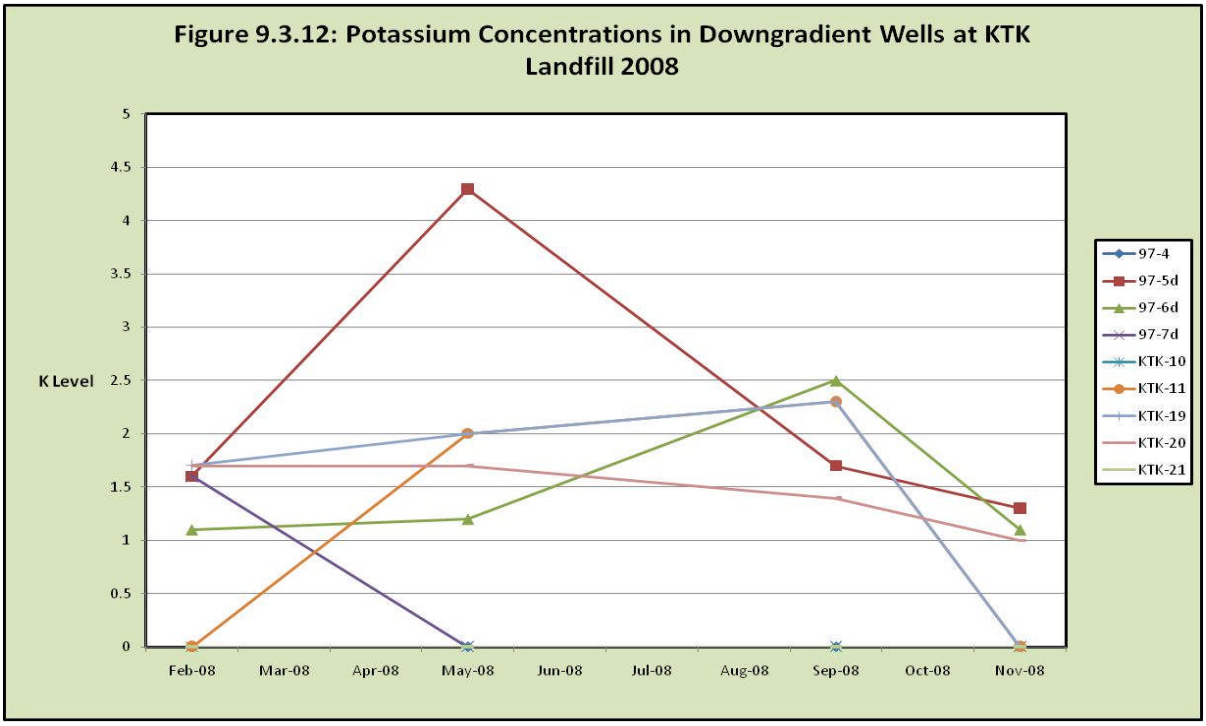


Figure 9.3.12: Potassium Concentrations in Upgradient Wells at KTK Landfill 2008
K Level
160
140
120
100
80
60
40
20
0
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
BH11D
KTK 15D
KTK 16

Domestic Wells



In accordance with Condition 6.10 of the current licence, a monitoring programme of private wells was conducted within 500m of the facility subject to the agreement of the well owners. The monitoring programme included the sampling of private wells – DW8 and DW10 during 2007. It is noted that neither of these wells are used for domestic drinking water abstraction. The results of the monitoring was reported to the land owners in each case.

9.4 Gas Monitoring

Gas Monitoring was conducted at the facility in accordance with Table C.1.3 of Schedule C of the current licence (W0081-03). Co-ordinates for all monitoring locations are detailed in Table 9.4.1 with locations illustrated on Drawing KTK/602, Rev T (Appendix 1).

9.4.1 Gas Monitoring Locations

Monthly gas monitoring was conducted at 14 no. gas monitoring wells. The general site offices are monitoring on a weekly basis via a fixed monitoring system. Details of gas monitoring from the mobile monthly monitoring and weekly fixed systems are discussed below.

Table 9.4.1: Gas Monitoring Locations

Media		Location	Eastings	Northings
Landfill Gas	Landfill Gas Monitoring Boreholes	G1	285726	211444
		G2	285695	211452
		G3	285653	211437
		G4	285623	211382
		G5	285591	211330
		G6	285565	211279
		G7	285537	211214
		G8	286116	211093
		G9	286135	211239
		G10	285894	211395
		G11	286160	211305
		G14	285513	211146
		G15	285600	211093
		G16	285720	211060
	Catch Pits	CP1	285623	211158
		CP2	285662	211133
		CP3	285729	211103

9.4.2 Gas Monitoring Methods

9.4.3 Gas Monitoring Boreholes

Landfill gas measurements were undertaken using a GA2000 Landfill Gas Analyser. The gas is analysed for its content by % volume of the following constituents:

- Methane CH_4;
- Carbon dioxide CO_2;
- Oxygen O_2; and
- Hydrogen sulphide H_2S.

The LEL (lower explosive limit of methane), atmospheric pressure (millibars) and temperature (^oC) were also recorded by the GA2000 Landfill Gas Analyser.

9.4.3.1 Catch Pits

Catch pits CP1, CP2 and CP3 were monitored as outlined in 9.4.2.1 above.

9.4.3.2 Site Buildings

The main site offices are monitored on a weekly basis by two fixed monitoring systems (GMI Landsurveyor II and Monicon MC4000). Gas monitoring results from the fixed systems have been submitted to the Agency in Quarterly Reports 1 to 4 of 2008.

9.4.3.3 Gas Monitoring Results

Gas monitoring results for the reporting periods were forwarded to the Agency in Quarter 1 to Quarter 4 2008 reports. A summary of carbon dioxide (CO_2) and methane (CH_4) monitoring results for 2008 is presented in Figures 9.4.1 and 9.4.2 respectively. The trigger level breaches were reported to the Agency as they occurred.

Moreover, as per the recommendations of The Agency inspectors during the audit of KTK Landfill Site on 23 November 2004, a full report on the assessment of landfill gas migration in the vicinity of KTK Landfill and Silliot Hill Landfill was submitted to The Agency on 7th April 2005.

This assessment concluded that the most likely source of elevated landfill gas levels in monitoring wells located outside the body of waste at KTK Landfill is from the historical uncontained landfilling operations at the Silliot Hill facility and are therefore not in any way connected with KTK Landfill. Full details of landfill gas trigger level breaches can be found in Table 22.1.1: Reported Incidents – 2008.

Historical monitoring at KTK Landfill has identified elevated gas levels at monitoring locations on the western and southern boundaries of the site, particularly at G3, G4 and G5. Significant works at Silliot Hill have been carried out during 2007 and 2008 including the installation of additional gas extraction wells. It is concluded that the methane levels recorded in KTK Landfill perimeter gas monitoring wells is attributed to these works. It is also understood that further gas extraction wells were installed at Silliot Hill during 2008. Reductions in gas levels measured in KTK perimeter monitoring wells are expected when this work is completed.

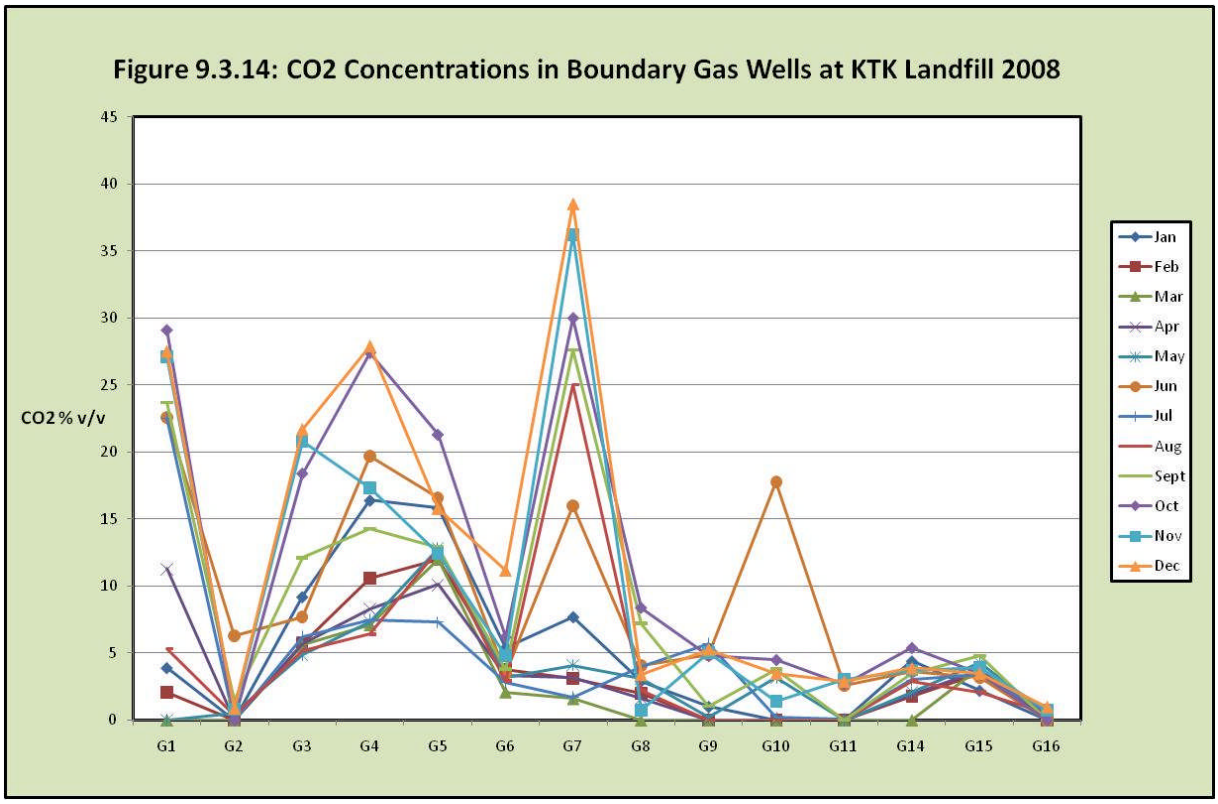


Figure 9.3.14: CO2 Concentrations in Boundary Gas Wells at KTK Landfill 2008
CO2 % v/v
45
40
35
30
25
20
15
10
5
0
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
G11
G14
G15
G16
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec

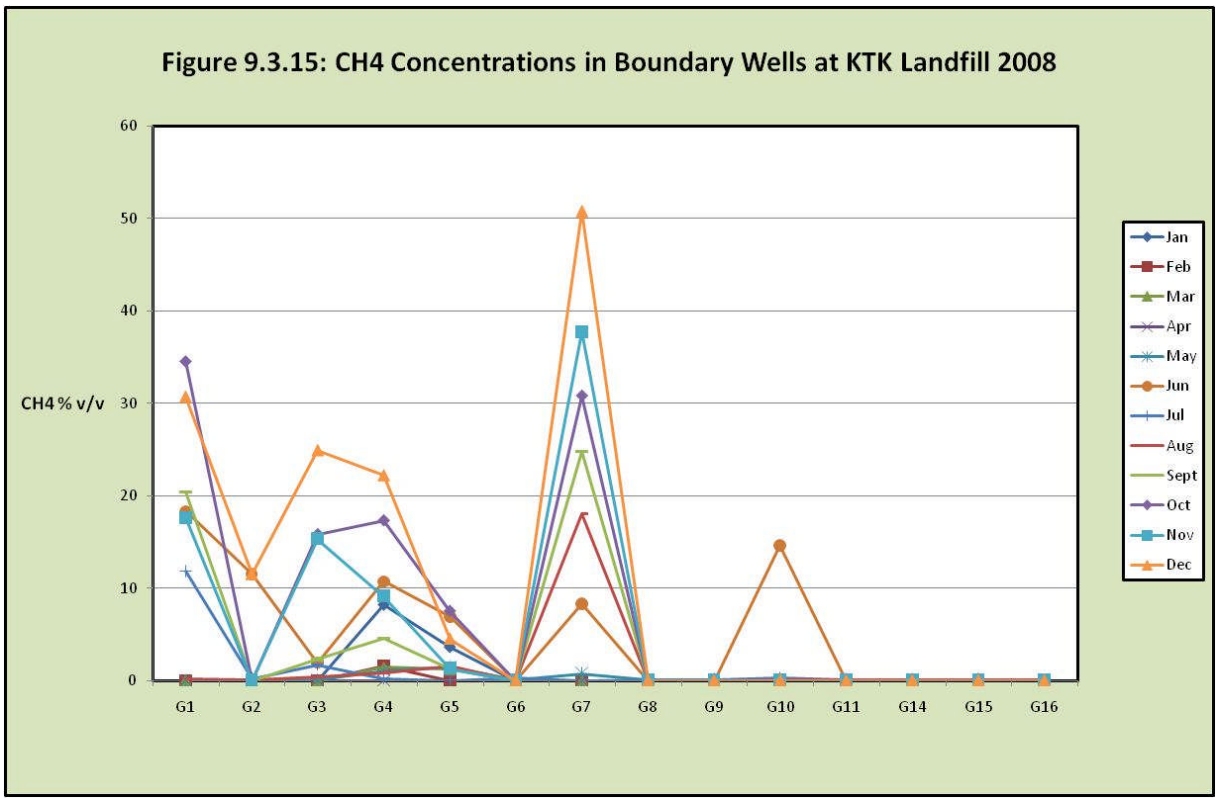


Figure 9.3.15: CH4 Concentrations in Boundary Wells at KTK Landfill 2008
CH4 % v/v
60
50
40
30
20
10
0
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
G11
G14
G15
G16
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec

9.5 Leachate Monitoring

9.5.1 Leachate Monitoring Locations

In accordance with Conditions 6.13.1 and 6.13.2 and Table C2.1 of Schedule C of the Waste Licence Register No. W0081-03, leachate composition and level monitoring are to be conducted at locations detailed in Table 9.5.1 below.

Table 9.5.1: Leachate Monitoring Locations

Media	Location	Eastings	Northings
Leachate Composition	LP1	285761	211123
	LP3	285783	211092
	LP6	285805	211086
Leachate Levels	VWP1	285724	211113
	VWP2	285767	211144
	VWP3	285751	211149
	VWP4	285746	211195
	VWP5	285760	211244
	VWP6	285799	211140
	VWP7	285881	211163
	VWP8	285990	211081

9.5.1.1 Leachate Levels

Methods of Monitoring Leachate Levels

Leachate levels have been recorded using the data collection method known as *DataTaker* since the 1st Quarter of 2004. The leachate management system involves one data logger and two pressure sensors. The pressure sensors measure the pressure of the leachate in two locations, Sump 1 (Phase 1 & 2) and Sump 2 (Phase 3, 4 & 5) . The *DataTaker* is a data logger, which takes measurements of a number of fundamental parameters from the pressure sensors, such as voltage, current, resistance and frequency; readings are taken every 20 minutes. It then converts the pressure readings into meaningful quantities such as metres of leachate. Data recorded from the data logger are sent to a PC, via a radio link where data is stored for later use.

9.5.1.2 Results

Leachate levels have been reported to the Agency in monitoring reports Quarter 1 to Quarter 4 of 2008. A summary of sump 1/2 and sump 3/4 leachate levels recorded during 2007 is presented in Table 9.5.2 below. It is noted that the Table 9.5.2 represents the leachate head over the base of the landfill.

Table 9.5.2: Average Leachate Levels for 2008.

Date	Sump 1 & 2 Average Level for Month (metres above liner)	Sump 3 & 4 Average Level for Month (metres above liner)	Sump 6 Average Level for Month (metres above liner)
January 2008	0.810	0.8924	0*
February 2008	0.7011	0.9365	0.1754
March 2008	0.4695	0.6363	0.6668
April 2008	0.3790	0.4540	0.9217
May 2008	0.4329	0.5344	0.6939
June 2008	0.3763	0.4756	0.7774
July 2008	0.3558	0.4235	0.6304
August 2008	0.3493	0.4675	0.4059
September 2008	0.3362	0.6806	0.2349
October 2008	0.2293	0.6352	0.4323
November 2008	0.1598	0.5352	0.3907
December 2008	0.2444	0.6466	0.4779

* - No result recorded due to leachate pumping from Phase 6 maintaining leachate levels below zero level during this period, i.e. leachate level was maintained below top/lip of sump.

9.5.2 Leachate Quality

9.5.2.1 Methods of Monitoring Leachate Quality

Monthly leachate monitoring includes sampling to be taken from three (LP1, LP3 and LP6) of the four leachate recirculation sumps (LP1, LP2, LP3 and LP4). LP1 and LP2 recirculate in Phase 1 and 2 and LP3 and LP4 recirculate in the later Phases 3, 4, and 5 respectively. Monthly monitoring of leachate quality in 2008 was conducted at LP1, LP3 and LP6. Leachate samples are analysed for parameters as stipulated in Table C 2.1 of Waste Licence Register No. W0081-03. All samples were filled directly into laboratory designated containers and transported to the laboratory.

9.5.2.2 Results of Leachate Quality 2008

Results from leachate monitoring conducted at the facility during the reporting period have been presented to the Agency in Quarter 1 to Quarter 4 (2008) reports.

9.6 Noise Monitoring

9.6.1 Noise Monitoring Locations

Annual noise monitoring was conducted at the facility on the 5th of June 2008 in accordance with Condition 6.11.1 and Schedule B.4 of Waste Licence Register No. W0081-03. Monitoring was conducted at six locations on the site; N1, N2, N3, N4, N5 and N6 and at four Noise Sensitive Locations; N8, N12, N14 and N16 as detailed in Table 9.6.1. The locations of all noise monitoring stations are detailed on Drawing KTK/602, Rev T (Appendix 1). The results and interpretations of the monitoring exercise were reported in the Quarter 4 submission to the EPA.

Table 9.6.1: Noise Monitoring Locations

Media	Location	Eastings	Northings
Noise Monitoring	N1A	285661	211438
	N2A	285878	211396
	N3A	286123	211106
	N4A	286029	210959
	N5A	285618	211022
	N6A	285550	211230
	N8A	285461	211459
	N12A	285710	210641
	N14A	286258	210888
	N16A	286389	211154

9.6.2 Noise Monitoring Methods

A Cirrus CR:831A sound level meter was used to take the noise measurements at the facility. This instrument is a Type 1 data logging integrated sound level meter and is in accordance with the requirements of IEC Publication 651. The meter was sent for annual calibration in October 2007 and re-calibrated in October 2008. However, prior to monitoring at each location a field calibration is carried out, to calibrate the meter at 93.7 dB, using the Cirrus CR:513A acoustic calibrator. This calibrating instrument was also calibrated in October 2007 and October 2008.

Prior to each measurement the instrument was mounted on a tripod at approximately 1.4 – 1.5 metres above ground level and 3.5m away from any sound reflecting objects as specified in ISO 1996: Acoustics – Description and Measurement of Environmental Noise (Part 1). The Time Weighting used was 'fast' and the Frequency Weighting was 'A' weighted.

In addition, a wind shield was used to reduce potential wind interference during measurements. The wind speed at each location during the monitoring period was less than 5m/s as required in ISO 1996: Acoustics – Description and Measurement of Environmental Noise (Part 2).

Cognisance was given to the following documents during preparation for the noise survey and writing of this report:

- Environmental Noise Survey Guidance Document, 2nd Edition. EPA 2006;
- Integrated Pollution Control Licensing – Guidance Note for Noise in Relation to Scheduled Activities, EPA 1995;
- Landfill Manuals – Landfill Monitoring, 2nd Edition, EPA 2003;
- Landfill Manuals – Manual on Site Selection, Draft for Consultation, December 2006; and
- ISO 1996: Acoustics – Description and Measurement of Environmental Noise (Part 1).

The following parameters were measured at the nine monitoring locations in compliance with Schedule 6.1.1 and Table B.4 of the waste licence.

- $L_{Aeq,\ 30\ min}$ - the equivalent continuous noise level in dB(A) over a specified measurement interval i.e. 30 minutes.

The following parameters were also measured during the environmental noise survey in order to grasp a more complete idea of the noise characteristics at the site.

- $L_{A10,\ 30\ min}$ - the noise level in dB(A) equalled or exceeded for 10% of the measurement interval i.e. 30 minutes;
- $L_{A90,\ 30\ min}$ – the noise level in dB(A) equalled or exceeded for 90% of the measurement interval i.e. 30 minutes; and
- Frequency Analysis i.e. $^1/_3$ octave band analysis.

9.6.3 Noise Monitoring Results

The results of noise monitoring conducted at the KTK Landfill facility in June 2008 are presented in Table 9.6.2 below. Interpretation of these results were included as part of the Quarter 3 2007 monitoring report submitted to The Agency. The report concluded that elevated noise levels were attributed to traffic noise on adjacent public roads and not activity within the site.

Table 9.6.2: Noise Monitoring Results – June 2008.

Location	Date & Time	Wind Speed	$L(A)_{eq}$ dB(A)	$L(A)_{10}$ dB(A)	$L(A)_{90}$ dB(A)
N1A	05/06/08 12:32 pm	1.1 – 2.2	63	61	51
N2A	05/06/08 13:27 pm	1.1 – 2.2	55	49	43
N3A	05/06/08 14:30 pm	0.0 – 0.8	53	53	39
N4A	05/06/08 15:29 pm	0.0	45	48	41
N5A	05/06/08 16:44 pm	0.0 – 0.8	45	47	37
N6A	05/06/08 17:38 pm	1.6 – 2.2	45	35	35
N8	05/06/08 08:25 am	0.0 – 0.7	68	66	45
N12	05/06/08 11:34 am	0.0 – 0.7	64	58	43
N14	05/06/08 10:36 am	0.0 – 0.8	59	54	43
N16	05/06/08 09:25 am	0.0 - 0.9	60	54	41

$L(A)_{eq}$ = Equivalent Continuous A-Weighted Sound Pressure Level
$L(A)_{10}$ = Sound Pressure Level exceeded 10% of the event duration
$L(A)_{90}$ = Sound Pressure Level exceeded 90% of the event duration
dB(A) = All levels expressed in A weighted Decibels
O/L denotes noise exceeding the limit of the meter.

9.7 Surface Water Monitoring

9.7.1 Surface Water Monitoring Locations

Surface water monitoring was conducted at the facility in accordance with Schedule C.3 of Waste Licence Register No. W0081-03.

Surface water monitoring stations SW4, SW5, SW6 and SW7 are detailed in Table 9.7.1 with monitoring locations illustrated on Drawing KTK/602 Rev T, (Appendix 1). Monitoring of surface water at the facility comprised weekly visual inspections and quarterly sampling and analyses, which are discussed in more detail below.

Table 9.7.1: Surface Water Monitoring Locations

Media	Location	Eastings	Northings
Surface Water	SW4	285512	211006
	SW5	285612	211014
	SW6	285664	211014
	SW7	285533	211140

9.7.1.1 Surface Water Quality

9.7.1.2 Methods of Monitoring Surface Water Quality

Surface water monitoring was conducted on a quarterly basis at the four locations detailed in Table 9.7.1. Surface water sampling involved the submergence of the designated sample container into the surface water body. During submergence every effort is made to keep the container steady so as to prevent sediment disturbance. Quarterly surface water samples were analysed for parameters stipulated in Table C.3 *Storm Water/Surface Water Monitoring* of Waste Licence Register No. W0081-03. Details and analyses of all surface water sampling was forwarded to the Agency in Quarterly reports 1 to 4 of 2008.

A summary of concentrations from a number of indicator parameters up-gradient and down-gradient of the facility recorded during the reporting period are presented in Figures 9.7.1 to 9.7.4.

Figure 9.7.1: pH Concentrations in Surface Water Monitoring Locations at KTK Landfill 2008

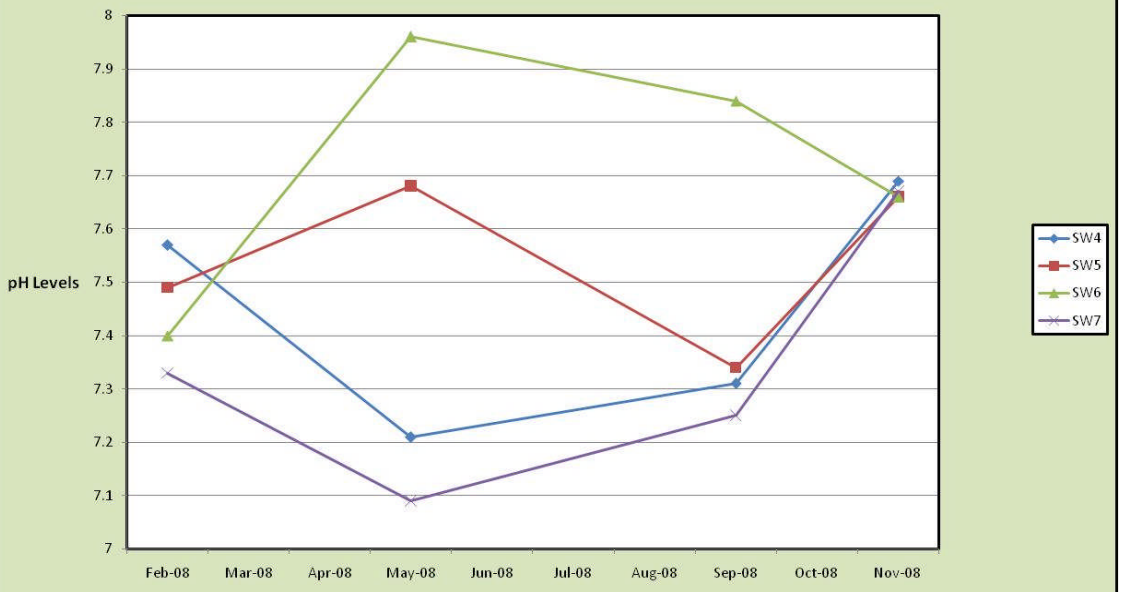


Figure 9.7.2: Conductivity Values in Surface Water Monitoring Locations at KTK Landfill 2008

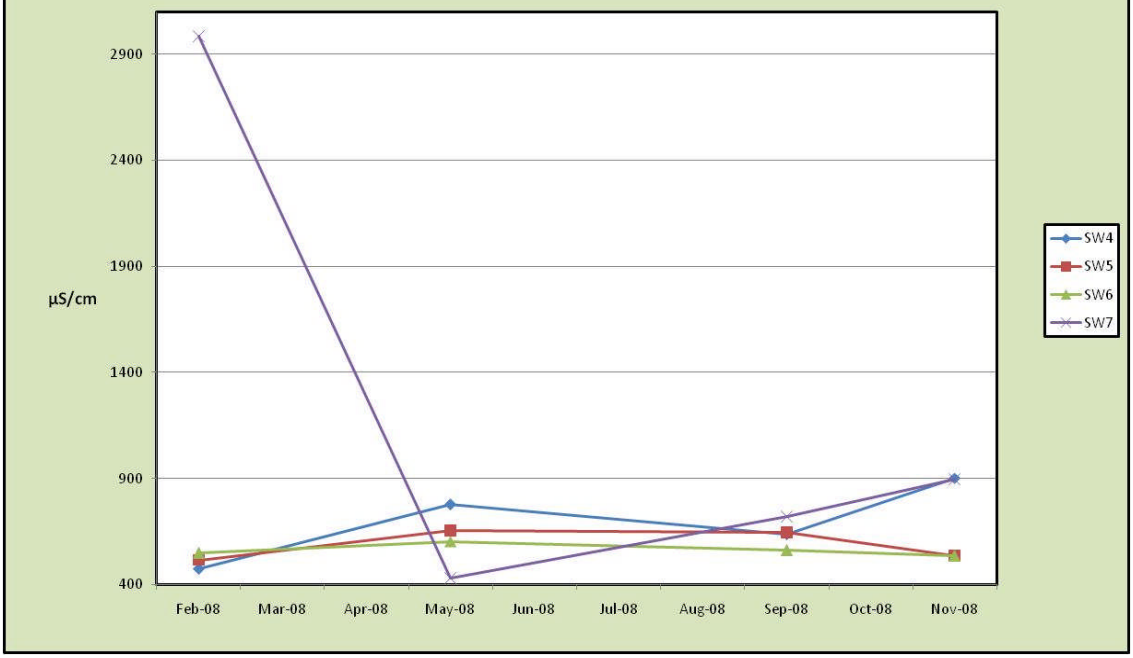


Figure 9.7.3: Chloride Concentrations in Surface Water Monitoring Locations at KTK Landfill 2008

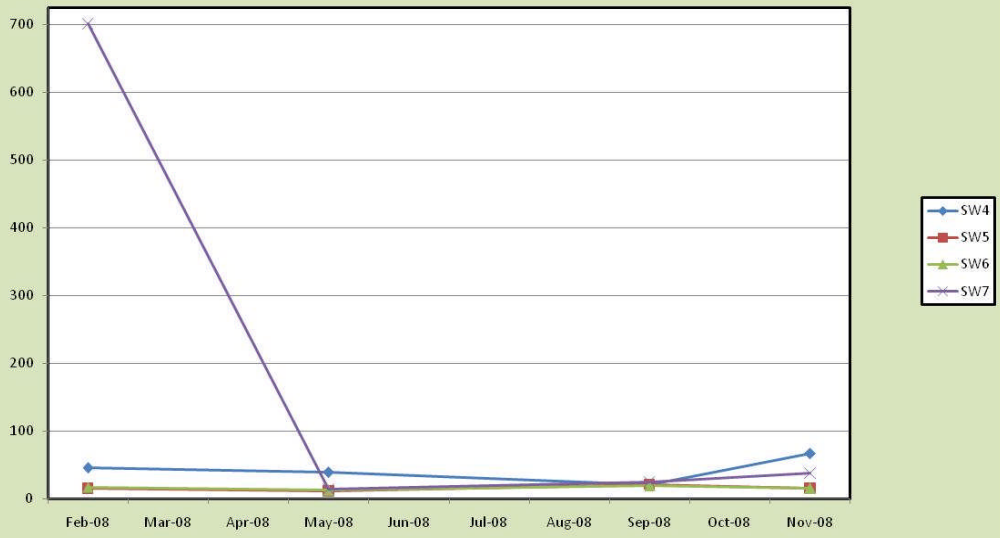
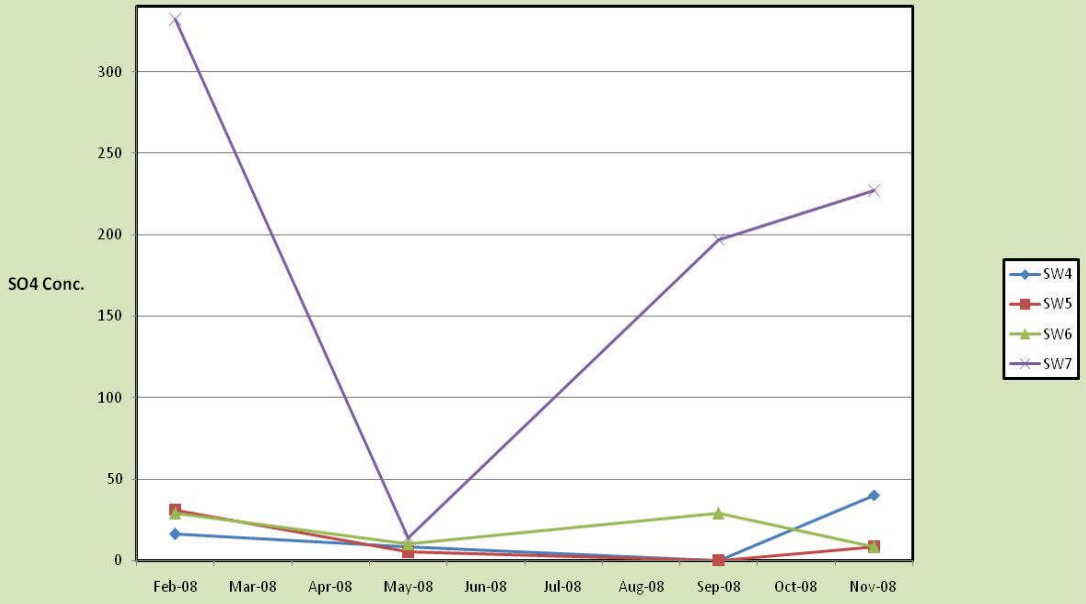


Figure 9.7.4: Sulphate Concentrations in Surface Water Monitoring Locations at KTK landfill 2008



9.7.2 Surface Water Visual Inspections

A visual inspection of surface water was carried out towards the southern end of the landfill. Surface water visual inspections comprise four locations down-gradient of the landfill (SW4, SW5, SW6 and SW7).

The inspection entailed walking along the stream banks and checking for any signs of potential pollution such as littering, iridescence or odour. To supplement these observations, measurements of pH, conductivity and temperature were taken. Details of all visual inspections have been furnished to the Agency in the subsequent quarterly reports.

9.8 Meteorological Monitoring

Details of meteorological monitoring conducted at the facility in 2007 are outlined in Section 19: "Meteorological Report".

9.9 Asbestos Fibre Monitoring

Schedule C.3 Asbestos Fibre Monitoring of the Waste Licence W0081-03, for KTK Landfill, specifies the asbestos fibre monitoring be completed annually. The monitoring was carried out on two separate occasions in 2008.

Table 9.9.1: Asbestos Fibre Monitoring Requirements

Parameter	Frequency	Analysis Method/Technique
Asbestos Fibre Concentration (fibres/ml)	Annual	Standard Method

9.9.1 Methods

Asbestos fibre monitoring was carried out on the 30th of September 2008 and on the 23rd of December 2008. The monitoring was carried out by ACS Ltd. Four air tests and one personal sample were taken in accordance with UK Health & Safety Executive procedure MDHS 39/4 (1995).

9.9.2 Results

The results of the asbestos monitoring for the reported period are in full compliance with licence conditions and no fibres were detected in any of the 4 no. samples. Copies of both reports are included in Appendix 2.

9.10 Pollution release transfer register (PRTR)

Under EU Regulation 166/2006, all licensed facilities are obliged to prepare a PRTR which details all releases of pollutants and off-site transfer of pollutants and waste. Figures for releases to air, releases top storm-water and wastes transferred off-site are included in figures 9.1, 9.2 and 9.3 below. The complete PRTR document was also uploaded to the dedicated EPA PRTR website.

Figure 9.1: PRTR Releases To Air 2008

4.1 RELEASES TO AIR #VALUE! 30/03/2009 14:11 40

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR													
POLLUTANT		METHOD									QUANTITY		
			Method Used		Haase Flare 2500	Haase Flare 1500	Engine GE 01	Engine GE 02	Engine GE 03				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
02	**Carbon monoxide (CO)**	M	EN ISO 10780		26.28	175.2	14541.0	13323.96	13227.0	41293.44	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	M	EN ISO 10780		1053.828	2102.4	7446.0	8339.52	6745.2	25686.948	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	EN ISO 10780		36225.228	179580.0	28557.6	36441.6	44676.0	325480.428	0.0	0.0
01	Methane (CH4)	E	EN ISO 10780	Gas Sim Estimate	0.0	0.0	0.0	0.0	0.0	1530000.0	0.0	1530000.0
07	Non-methane volatile organic compounds (NMVOC)	M	EN ISO 10780		0.0	0.0	1138.8	569.4	876.0	2584.2	0.0	0.0
86	Particulate matter (PM10)	M	EN ISO 10780		0.0	0.0	1314.0	1594.32	1752.0	4660.32	0.0	0.0
03	Carbon dioxide (CO2)	E	EN ISO 10780	Gas Sim Estimate	0.0	0.0	0.0	0.0	0.0	71400000.0	0.0	71400000.0

* 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			
			Method Used					
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			
			Method Used					
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: KTK Landfill Limited

Please enter summary data on the quantities of methane flared and / or utilised

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	71400000.0	E	Estimate	Gas Sim Estimate	0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

Figure 9.2: PRTR Releases to Wastewater or Sewer 2008

4.3 RELEASES TO WASTEWATER OR SEWER #VALUE! 30/03/2009 14:11

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used		LP6			
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
06	Ammonia (NH3)	M	EN ISO 17025		12412.0	12412.0	0.0	0.0
79	Chlorides (as Cl)	M	EN ISO 17025		14654.0	14654.0	0.0	0.0
83	Fluorides (as total F)	M	EN ISO 17025		33.7	33.7	0.0	0.0
13	Total phosphorus	M	EN ISO 17025		60.7	60.7	0.0	0.0
19	Chromium and compounds (as Cr)	M	EN ISO 17025		2.25	2.25	0.0	0.0
20	Copper and compounds (as Cu)	M	EN ISO 17025		4.41	4.41	0.0	0.0
22	Nickel and compounds (as Ni)	M	EN ISO 17025		2.06	2.06	0.0	0.0
23	Lead and compounds (as Pb)	M	EN ISO 17025		0.014	0.014	0.0	0.0
24	Zinc and compounds (as Zn)	M	EN ISO 17025		1.48	1.48	0.0	0.0

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

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
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
302	Biocides	M	EN ISO 17025		5238.0	5238.0	0.0	0.0
306	COD	M	EN ISO 17025		31418.5	31418.5	0.0	0.0
305	**Calcium**	M	EN ISO 17025		457.0	457.0	0.0	0.0
338	Potassium	M	EN ISO 17025		4811.0	4811.0	0.0	0.0
341	Sodium	M	EN ISO 17025		13225.0	13225.0	0.0	0.0
343	Sulphate	M	EN ISO 17025		3043.0	3043.0	0.0	0.0
332	Ortho-phosphate (as PO4)	M	EN ISO 17025		181.0	181.0	0.0	0.0
357	Iron	M	EN ISO 17025		4.88	4.88	0.0	0.0
320	Magnesium	M	EN ISO 17025		453.0	453.0	0.0	0.0
321	Manganese (as Mn)	M	EN ISO 17025		3.5	3.5	0.0	0.0

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

Figure 9.3: PRTR On-site Treatment & Off-Site Transfers of Waste 2008

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE #VALUE! 30/03/2009 14:11

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Transfer Destination	European Waste Code	Hazardous	Quantity T/Year	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Name and Licence / Permit No. of Recoverer / Disposer / Broker	Address of Recoverer / Disposer / Broker	Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)	Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	13 02 08	Yes	63.26	Engine Oil	R9	M	Weighed	Offsite in Ireland	Enva Oil W0184-01	Clonminam Industrial Estate, Portlaoise, Co. Laois	Enva Oil, Clonminam Industrial Estate, Poerlaoise, Co. Laois	W0184-01
Within the Country	**19 07 03**	**No**	6484.74	Landfill Leachate	R3	M	Weighed	Offsite in Ireland	Athy Waste Water Treatment Plant	Fortbarrington Road, Ardrew, Athy, Co. Kildare	Leixlip Waste Water Treatment Plant, St. Catherines Park, Leixlip	

* Select a row by double-clicking the Description of Waste then click the delete button

10.0 RESOURCE AND ENERGY CONSUMPTION SUMMARY

The main resources consumed at the facility during the reporting period were electricity, water for potable supply, vehicle wheel cleaning and dust suppression, diesel fuel and hydraulic oils. The details are listed in Table 10.1.1.

Table 10.1.1: Usage of Energy & Resources - 2008

Resource	Units	Consumption
Electricity	kWhr	376,281
Water, Potable Supply	Litres	162,850
Water, Dust suppression	Litres	2,500,000
Water, Wheel Cleaning Unit	Litres	5,231,700
Total Water	Litres	7,894,550
Diesel	Litres	347,478
Hydraulic Oils	Litres	1,211
Grease	kg	155
Biodegradable Plastic Film/ 'Raitex' fabric cover	m^2	0
Imported Aggregates	Tonnes	9,725
Soil materials from site stockpiles	Tonnes	15,000

10.1 Resource Recovery and Energy Production Summary

KTK Landfill Ltd. landfill gas utilisation plant exported **20,531,500 kWhr** of electricity to the national grid during 2008. This is up 19% on 2007 exported energy of 17,259,800 kWhr. It is anticipated that electricity export will be approximately 22,000,000 kWhr in 2009 as reduction in maintenance downtime is expected.

The main materials recovered at the facility during the reporting period were woodchip, soil and stones. The details are listed in Table 10.1.2 below:

Table 10.1.2: Material Recovery and Electricity Production 2008

Resource	Units	Recovered
Electricity Produced	kWhr	20,531,500
Woodchip recovered for roadway construction	Tonnes	11,705
Inert material recovered for internal engineering purposes (daily cover, intermediate cover, berms etc.)	Tonnes	109,791

11.0 VOLUME OF LEACHATE TRANSPORTED / DISCHARGED OFF SITE.

Table 11.1.1: Leachate Removed Off Site - 2008

Month	Volume (m^3)
January 2008	0
February 2008	181.94
March 2008	101.74
April 2008	0
May 2008	0
June 2008	51.42
July 2008	332.70
August 2008	436.54
September 2008	539.54
October 2008	1734.10
November 2008	1698.43
December 2008	2293.44
Total 2008	**7,369.85**

12.0 REPORT ON DEVELOPMENT WORKS UNDERTAKEN DURING THE REPORTING PERIOD, AND A TIMESCALE FOR THOSE PROPOSED DURING THE COMING YEAR.

12.1 Developments During 2008

The following development work was undertaken during 2008. The key works undertaken during the reporting period 1st January – 31st December 2008 are depicted in Table 12.1.1.

Table 12.1.1: Key Works undertaken during 2008

Date	Event
March 2008	Installation of 15 gas extraction wells (W123 to W137)
July 2008	Installation of 20 gas extraction wells (W138 to W157)
August 2008	Installation of 14 gas extraction wells (W158 to W171)
September 2008	Installation of 28 gas extraction wells (W172 to W199)
November 2008	Installation of 36 gas extraction wells (W200 to W235)
December 2008	Commenced decommissioning of site following closure on 21st October 2008

12.2 Proposed Developments During 2009

It is the policy of KTK Landfill to continuously improve the infrastructure and operating standards of the facility where possible. To this end a number of significant improvements are proposed to be undertaken during 2008, subject (where appropriate) to the Agency's approval.

12.3 Landfill Gas Management and Utilisation

Landfill Gas Management at KTK Landfill comprises collection, flaring and utilisation of gas. It started in 2003 as a joint venture company between G.A.S Energietechnologie GmbH and Greenstar Ltd to form Greenstar Gas Energy. Its aims are to supply, operate and maintain a Landfill Gas Utilisation Plant at the KTK Landfill Ltd. Site. The electricity produced is sold to a private utility company at pre-agreed rates and the plant burns 1,950 m3/hr of landfill gas at 50% methane and has a maximum electrical output of 3.6MW. Furthermore, the site has a total operational flaring capacity of 4,000 m3/hr and back up flaring capacity of 3,000m3/hr.

12.3.1 Restoration

A Closure, Restoration and Aftercare Plan (CRAMP) for the site was developed and submitted to the Agency in June 2006. The implementation of this plan commenced in 2007 following Agency approval of the plan with the commencement of regulating layer placement. This layer is designed to ensure an appropriate contour for placement of final cap and to ensure an effective gas seal.

Stage 1 of permanent final cap is scheduled to commence in May 2009. This will be approximately 70,000m2 of the 160,000m2 site. Stage 2 and 3 capping is scheduled to be completed during 2010 and 2011 respectively. SEW for stage 1 capping has been submitted to the Agency.

12.4 Proposed Developments During 2009

It is the policy of KTK Landfill to continuously improve the infrastructure and operating standards of the facility where possible. To this end, a number of significant improvements are proposed to be undertaken during 2009, subject (where appropriate) to the Agency's approval.

12.4.1 Landfill Gas Management and Utilisation

Landfill Gas Management at KTK Landfill comprises collection, flaring and utilisation of gas. It started in 2003, as a joint venture company between G.A.S Energietechnologie GmbH and Greenstar Ltd., to form Greenstar Gas Energy. Its aims are to supply, operate and maintain a Landfill Gas Utilisation Plant at the KTK Landfill Ltd. Site. The electricity produced is sold

to a private utility company at pre-agreed rates and the plant burns 1,950 m^3/hr of landfill gas at 50% methane and has a maximum electrical output of 3.6MW. Furthermore, the site has a total flaring capacity of 4,000 m^3/hr.

12.4.2 Restoration

A Closure, Restoration and Aftercare Plan (CRAMP) for the site was developed and submitted to the Agency in June 2006. The implementation of this plan commenced in 2007 following Agency approval of the plan.

12.4.3 Monitoring Infrastructure

There are no environmental monitoring infrastructure developments planned for 2009.

12.4.4 Waste Acceptance Control Infrastructure

There is no waste acceptance control infrastructure developments planned for 2009.

13.0 REPORT ON RESTORATION OF COMPLETED CELLS/PHASES.

The levels on the surface of the landfill are shown on Drawing No. KTK/734 Rev G, which is included in Appendix 1. The levels as shown were based on the survey carried out in October 2008.

In accordance with the approved CRAMP for the site, interim capping has been placed on completed areas of the site to a minimum depth of 500mm; this depth has been exceeded in many areas. This area has been seeded with a mix of natural wildflowers and grass. Daily cover is used in the operation areas with either 150mm of inert material or with an equivalent synthetic cover material.

14.0 SITE SURVEY SHOWING EXISTING LEVELS OF THE FACILITY AT THE END OF THE REPORTING PERIOD

Please refer to Drawing No. KTK/734 Rev G, (Appendix 1).

15.0 ESTIMATED AND ANNUAL CUMULATIVE QUANTITIES OF LANDFILL GAS EMITTED FROM THE FACILITY.

During 2008 landfill gas was extracted for utilisation and flaring throughout the year. Rates of extraction increased during the course of the year as additional gas management infrastructure was installed and commissioned in line with predicted increased gas generation. Details are given in Figure 15.1.1. below.

It is estimated that approximately 35,086,839 m^3 of landfill gas were extracted during 2008 for utilisation and flaring.

Table 15.1.1: Annual Cumulative Quantities of Landfill Gas Collected for Flaring/Utilization – 2008 Values

Month	Total Quantity of LFG Collected (m^3)	Quantity of CH4 Collected (kg CH_4)	Quantity of CO2 Collected (kg CO_2)	Gas Quality (% v/v) (Total figure is averaged)		
				CH_4	CO_2	O_2
January 2008	2,816,160	973,537	2,131,681	47.9	38.6	0.9
February 2008	2,575,640	889,647	1,956,075	48.1	38.8	0.9
March 2008	2,776,600	948,827	2,084,535	47.6	38.2	0.9
April 2008	2,557,440	846,904	1,834,080	46.5	36.0	1.0
May 2008	2,568,304	892,277	2,003,250	48.5	39.3	0.9
June 2008	2,434,660	833,838	1,894,188	47.7	39.4	1.1
July 2008	2,494,512	833,669	1,888,276	46.4	38.3	1.1
August 2008	2,771,368	922,501	2,166,109	46.4	39.9	1.0
September 2008	2,858,380	945,136	2,151,382	46.3	38.8	1.1
October 2008	3,027,000	997,279	2,230,507	46.4	38.0	1.1
November 2008	3,564,035	1,159,195	2,615,549	45.4	38.0	1.3
December 2008	4,642,740	1,527,227	3,426,436	46.3	38.1	1.5
Total Collected	**35,086,839**	**11,770,036**	**26,382,068**	**46.9**	**38.4**	**1.1**

16.0 ESTIMATED ANNUAL AND CUMULATIVE QUANTITY OF INDIRECT EMISSIONS TO GROUNDWATER.

The potential sources of indirect emissions into groundwater are:

Landfill Base

The landfill site has a composite base lining system comprising a HDPE geomembrane and one metre thick layer of compacted clay. A leak location survey of the HDPE geomembrane after placement of the drainage stone layer was completed and defects to the HDPE liner were repaired in accordance with industry standards.

Surface Water Collection & Treatment System

Surface water from the paved access road and service platform is collected and discharged into a surface water infiltration area. However, prior to final discharge into the ground, surface water is conveyed via a buried PVC sewer pipe to a concrete silt settlement tank and a Class 1 Klargester surface water bypass separator. The quality of the surface water discharge

downstream of the separator is measured quarterly at the monitoring manhole identified as SW7.

Treated Sewage Effluent

There are two BioCycle waste water treatment units on the site which treat the canteen and office waste water prior to discharge into a percolation area. In summary, as the landfill is fully contained there will be minimal to nil indirect emissions to ground water.

17.0 ANNUAL WATER BALANCE CALCULATION AND INTERPRETATION

The weather data, used for the purposes of the annual water balance calculations is derived from the weather station at KTK Landfill, Casement Aerodrome (Evapotranspiration) and Derrygreenagh weather station (Evaporation). The data is depicted in the following Table 17.1.1.

Table 17.1.1: Rainfall Data (mm) - 2008

Month	KTK Data (mm)	Evapotranspiration (Casement) (mm)	Evaporation (Casement) (mm)
January	129.8	15	4.6
February	22.0	26	11.1
March	115.5	43	21.6
April	31.5	56	46.7
May	16.6	89	79.6
June	70.8	83	61.6
July	100.4	81	71.6
August	153	63	70.0
September	91.2	43	30.1
October	110.6	27	17.7
November	74.8	11	3.2
December	46.2	13	5.6
Total	**962.4**	**550**	**423.4**

A water balance is used to calculate the difference between rainfall on landfilled areas and the various losses prior to leachate generation (See Table 17.1.2 for the water balance calculations).

Leachate that is not taken away by tanker or absorbed initially by the wastes, is re-circulated within the waste mass so as to increase the moisture content of the waste and accelerate biodegradation.

Operating Experience on the site has revealed that large quantities of the incident rainfall or leachate that is re-circulated from the sumps on the landfill base is and will be absorbed by the dry C&I wastes deposited in the KTK Landfill. Absorption rates are estimated to be in the range of 0.11 and 0.15 cubic metres per tonne of waste.

18.0 METEOROLOGICAL REPORT

The site is equipped with a Skyview meteorological station, which produces monthly climatological summaries comprising wind speed (km/hr), rain (mm) and temperature (^{o} C). Other data is collected from the Casement Aerodrome met station.

Monthly Rainfall, Evapotranspiration and Temperature data are depicted in Table 18.1.1.

Table 18.1.1: Monthly Rainfall, Evapotranspiration and Temperature data - 2008

Month	Rainfall (KTK) (mm)	Evapotranspiration (Casement) (mm)	Evaporation (Casement) (mm)	Average Monthly Temperature (KTK) (^{o}C)
January	129.8	15	4.6	6.55
February	22.0	26	11.1	6.80
March	115.5	43	21.6	6.68
April	31.5	56	46.7	9.30
May	16.6	89	79.6	13.42
June	70.8	83	61.6	13.47
July	100.4	81	71.6	15.64
August	153	63	70.0	15.51
September	91.2	43	30.1	13.03
October	110.6	27	17.7	9.59
November	74.8	11	3.2	7.25
December	46.2	13	5.6	5.35
Total	**962.4**	**550**	**423.4**	**10.21 (Tot. Av)**

19.0 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR THE FORTHCOMING YEAR

This Schedule of Objectives and Targets and Environmental Management Programme has been developed by Golder Associates Ireland, in conjunction with KTK Landfill Limited.

The Schedule of Objectives and Targets and the Environmental Management Programme,

has been developed in accordance with Conditions 2.2.2.2 and 2.2.2.3 of Waste Licence W0081-3 and Clause 4.3.3 of ISO 14001:2004 Environmental Management Systems –

Requirements with Guidance for Use, and with reference to KTK Landfill's Environmental Management System.

The aim of the Schedule of Objectives and Targets and the Environmental Management Programme, is to outline a set of achievable objectives and targets, aimed at meeting the commitments set out in the KTK Landfill Ltd Environmental Policy (see Appendix 1) and to mitigate the significant environmental aspects (see Appendix 2) associated with KTK Landfill Ltd. operations.

KTK Landfill Ltd is an ISO 14001: 2004 certified company (Certification No. SGR 05/66145). It is the policy KTK Landfill Ltd to continually seek to improve its environmental performance. This commitment is outlined in the Company's Environmental Policy. This Policy commits the organisation to setting targets and objectives, aimed at improving environmental performance and mitigating the potential impacts that the Facility may have on the environment.

KTK Landfill Ltd is licensed under the Waste Management Act 1996. Conditions 2.2.2.2 and 2.2.2.3 of Waste Licence W0081-3, require that KTK Landfill Ltd. maintain a Schedule of Objectives and Targets and an Environmental Management Programme.

The Schedule of Objectives and Targets and the Environmental Management Programme shall 'as a minimum provide for a review of all operations and processes, including an evaluation of practical options, for energy and resource efficiency, the use of cleaner technology cleaner production, and the prevention, reduction and minimisation of waste, and shall include waste reduction targets'. The Schedule of Objectives and Targets and the Environmental Management Programme 'shall consider a five year period as a minimum.'

19.1 Definitions

Condition 2.2.2.3 of Waste Licence W0081-3 sets out that an *Environmental Management Program* shall consist of a timed schedule for achieving the (Licensee's) Environmental Objectives and Targets. The EMP shall include; the designation of responsibility for targets, the means by which they will be achieved, the time within which they will be achieved.

An *Environmental Objective*; as defined by ISO 14001:2004 is an *'overall environmental goal, consistent with the* (Company's) *environmental policy, that an organisation sets itself to achieve.'*

An *Environmental Target*; as defined by ISO 14001:2004, is a *'detailed performance requirement, applicable to the organisation or part thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.'*

Table 19.1.1: Programme of Objective and Targets 2007 to 2012 – Progress Quarter 4 (December) 2008

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion	Progress as of 31st December 2008
O - 1	**Lower the environmental impacts associated with fugitive landfill gas emissions by continually developing the Facility's Gas Utilisation Infrastructure and landfill gas management techniques.**	T - 1.1	Undertake quarterly VOC surveys of the waste surface over the next 5 years, to establish the areas were fugitive emissions are most prevalent.	1,9	External Consultant (circa €1,800 per survey)	Site Manager	Ongoing	Surveys carried out on 3rd April 2008,1st August 2008, & 5th of December 2008.
		T - 1.2	Installation of gas extraction boreholes were fugitive emissions have been identified from the VOC surveys.	1,9	Circa €1,700 per borehole.	Site Manager	Ongoing	Leakage areas targeted by gas wells & additional cover. 15 gas wells installed in March 08, 20 wells in June 08, 14 wells in Aug 08, 28 wells in Sept and 36 wells in for Nov 08. 750 enclosed flare acquired in Nov 08 as site reaches peak gas production.

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion	Progress as of 31st December 2008
		T - 1.3	Achieve 70% utilisation of landfill gas extracted by 2012 by undertake landfill gas modelling of the waste body to establish the most the environmentally beneficial method for managing landfill gas. i.e. By maximising landfill gas utilisation and minimising flaring.	1,9	External Consultant (circa €2,500 per model)	Site Manager	2012	Methodology has been developed to calculate quantity of gas been utilised as opposed to flared. Methodology was based on trial of utilisation of gas only whereby the amount of gas to produce know MWhr was determined. 35% of gas was utilised during 2007. By Sept 08 38% of gas is utilised. However, due to additional flaring this has reduced to 34% by year end.

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion	Progress as of 31st December 2008
		T - 1.4	Support University College Dublin Research Project commissioned to investigate the most effective cover material for achieving maximum odour neutralisation.	1,9	UCD €10,000	GM Landfill Group	Dec 2012	Project ongoing. Site contribution to date includes set up of pilot scheme to determine absorptive capacities of various cover materials been investigated. UCD presented paper on findings to date at Sardinia Waste Symposium in Oct 2007.
		T - 1.5	Monitor and review the effectiveness of the perimeter odour neutralising infrastructure installed in 2005 and maintain record of performance.	1,9	Assistant Site Manager (80 man hours)	Site Manager	Ongoing	Following closure 21st October 2008 no longer in use.

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion	Progress as of 31st December 2008
O - 2	**Lower the potential environmental impacts (i.e. risk of spillage, CO2 emissions) associated with the off-site transport of leachate.**	T - 2.1	Divert leachate for tankering to direct discharge to sewer, by continuing discussions with Kildare County Council as to the possibility of discharging leachate directly to the municipal sewer. Achieve 50% diversion rate by 2008 and a 75% diversion rate by 2012.	2	External Consultant (€2,500)	Site Manager	Ongoing	Discussions with KCC ongoing. SEW connection established. Reviewing tenders for methane stripping plant. Currently in discussions with EPA and KCC regarding discharge consent. Meeting with KCC on 18th July. Problems with Osberstown STP are preventing discharge of leachate for 2008. Discussions to continue in 2009.

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion	Progress as of 31st December 2008
		T - 2.2	Design and commission on-site leachate treatment plant to reduce the dissolved methane levels in leachate to below the regulatory requirement of 0.2 mg/l.	2	Circa €100,000	Site Manager	December 2008	Leachate treatment trial scheduled Jan-Feb 2009. Design specification completed. Tenders for methane stripping plant have been reviewed and preferred supplier identified. Awaiting sewer discharge consent.
O - 3	**Lower the potential environmental nuisance**	T - 3.1	Install groundwater extraction well to aide dust suppression activities.	7	Circa €15,000	Site Manager	June 2007.	Well and holding tank installed. Pump installed in May 07 and system now operational.

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion	Progress as of 31st December 2008
	associated with dust by improving dust management techniques	T - 3.2	Investigate available technology options for dust suppression activities, that minimises water usage.	7	Assistant Site Manager (20 man hours)	Site Manager	December 2007	Hard stand surface water now diverted to holding tank for use in dust suppression thereby reducing potable water demand. New 2500 gallon water tanker purchased which utilises spray bar rather than splash plate thereby reducing water consumption. Water consumption continues to be monitored.

O - 4	**Lower the potential environmental impacts associated with litter by improving litter management techniques.**	T - 4.1	Investigate the erection of complete enclosure litter netting. Investigate potential for construction of wind breaker berms for operation in windy conditions.	3	Assistant Site Manager (20 man hours)	Site Manager	June 2008	This objective and target is now redundant as site has ceased accepting loose C&I wastes on 21st October 2008.
O - 5	**Minimise the amount of natural resources (water, power etc) consumed at the Facility.**	T - 5.1	Update the existing utilities report in light of the development of the Phase 6 cell and other capital expenditure works so as to identify resource required for	4	External Consultant (circa €3,000)	Site Manager	June 2007	Utilities report now complete
		T - 5.2	Carry out Energy Audit of Facility and identify opportunities for improved energy efficiency.	4	External Consultant (circa €5,000)	Site Manager	June 2007	Completed in February 2007. Recommendations to be implemented by June 2009.

		T – 5.3	Carry out assessment of the use of raw material at the Facility and identify opportunities for the improved efficiency in the use of raw materials.	4	Assistant Site Manager (40 man hours)	Site Manager	June 2007	Commenced usage of a recovered stone produced by Access waste and Greenstar thereby reducing requirement for natural resources.
		T - 5.4	Carry out assessment of water usage at the facility and identify opportunities for improved efficiency of water usage.	4	Assistant Site Manager (40 man hours)	Site Manager	On going	Water requirements on various sections of site been measured to identify potentials for reductions.
		T – 5.5	Use storm water for dust suppression activities when available.	4	Tanker Trailer and bowser	Site Supervisor	On going	Hard stand surface water now diverted to holding tank for use in dust suppression thereby reducing potable water demand.
O - 6	**Improve Health, Safety and Welfare**	T - 6.1	Review and amend site safety statement so that it is consistent with other sites within the Greenstar Landfill Group	8	Assistant Site Manager (40 man hours)	Site Manager GM Landfill Group	June 2007	Independent H&S audit carried out on 16th Sept 2008. Safety statement and risk assessments currently under review.

		T - 6.2	Reduce lost time injuries by 5% over the next five years	8		All site Personnel	On going	Ongoing. Data been recorded.
		T - 6.3	Develop Accident Prevention Plan	8	Assistant Site Manager (80 man hours)	Site Manager GM Landfill Group	June 2007	Completed in February 2007.
		T - 6.4	Achieve Certification to OHSAS 18001	8	Assistant Site Manager (160 man hours)	Site Manager GM Landfill Group	June 2010	Site manager completed IOSH certified 4 day H&S training in Jan 2008. Site supervisor completed IOSH certified 3 day training for supervisors in Nov 2007.
O-7	**Training**	T7 - 1	Continue to train staff on a regular basis in EMS system, waste licence and Emergency Response.		Assistant Site Manager	Site Manager	On going	
O-8	**Operations**	T8 - 1	Encourage all site hauliers to comply fully with the Waste Collection Permit Regulations		Site Manager	Site Manager	On going	

19.2 Environmental Management Program

19.2.1 Responsibility

Overall responsibility for implementing the EMP lies with Landfill Manager. While individual responsibilities, relating directly to specific targets, are outlined in Table 19.1.2 below.

19.2.2 Schedule of Objectives and Targets for 2009

The Schedule of Objectives and Targets for 2009 are listed in following Table 19.1.2.

19.2.3 Report on Schedule of Objectives and Targets for 2008.

A total of 8 no. new objectives and targets have been proposed for the forthcoming year 2008 and are presented in Table 19.1.2

Table 19.2.1 Schedule of Objectives and Targets for 2008 and Programme of Objective and Targets – 2008

Schedule of Objective and Targets for 2009 (2007 to 2012 Program)

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion
O - 1	**Lower the environmental impacts associated with fugitive landfill gas emissions by continually developing the Facility's Gas Utilisation Infrastructure and landfill gas management techniques.**	T - 1.1	Undertake quarterly VOC surveys of the waste surface over the next 5 years, to establish the areas were fugitive emissions are most prevalent.	1,9	External Consultant (circa €1,800 per survey)	Site Manager	Ongoing
		T - 1.2	Installation of gas extraction boreholes were fugitive emissions have been identified from the VOC surveys.	1,9	Circa €1,700 per borehole.	Site Manager	Ongoing
		T - 1.3	Achieve 70% utilisation of landfill gas extracted by 2012 by undertake landfill gas modelling of the waste body to establish the most the environmentally beneficial method for managing landfill gas. i.e. By maximising landfill gas utilisation and minimising flaring.	1,9	External Consultant (circa €2,500 per model)	Site Manager	2012

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion
		T - 1.4	Support University College Dublin Research Project commissioned to investigate the most effective cover material for achieving maximum odour neutralisation.	1,9	UCD €10,000	GM Landfill Group	Dec 2009
		T - 1.5	Monitor and review the effectiveness of the perimeter odour neutralising infrastructure installed in 2005 and maintain record of performance.	1,9	Assistant Site Manager (80 man hours)	Site Manager	Ongoing
O - 2	**Lower the potential environmental impacts (i.e. risk of spillage, CO2 emissions) associated with the off-site transport of leachate.**	T - 2.1	Divert leachate for tankering to direct discharge to sewer, by continuing discussions with Kildare County Council as to the possibility of discharging leachate directly to the municipal sewer. Achieve 50% diversion rate by 2010 and a 75% diversion rate by 2012	2	External Consultant (€2,500)	Site Manager	Ongoing

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion
		T - 2.2	Design and commission on-site leachate treatment plant to reduce the dissolved methane levels in leachate to below the regulatory requirement of 0.2 mg/l.	2	Circa €100,000	Site Manager	December 2009
O - 3	**Lower the potential environmental nuisance associated with dust by improving dust management techniques**	T - 3.1	Source road washing/sweeping plant for permanent operation on site	7	Circa €8,000 pa	Site Manager	April 2009.
		T - 3.2	Investigate available technology options for dust suppression activities, that minimises water usage.	7	Assistant Site Manager (20 man hours)	Site Manager	December 2009
O - 4	**Implement CRAMP**	T – 4.1	Complete design, contractor selection, and engineering works associated with stage 1 area of final permanent capping of approx 70,000m^2	1, 9	External consultants and contractors	Site Manager	December 2009
O - 5	**Minimise the amount of natural resources (water, power etc) consumed at the**	T - 5.1	Update the existing utilities report on an annual basis so as to identify operational resource consumption	4	External Consultant (circa €1,000 pa)	Site Manager	June 2009

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion
	Facility.	T - 5.2	Review Energy Audit of Facility and identify opportunities for improved energy efficiency.	4	Site Manager (20 man hours)	Site Manager	June 2009
		T – 5.3	Carry out assessment of the use of raw material at the Facility and identify opportunities for the improved efficiency in the use of raw materials.	4	Assistant Site Manager (40 man hours)	Site Manager	June 2009
		T - 5.4	Carry out assessment of water usage at the facility and identify opportunities for improved efficiency of water usage.	4	Assistant Site Manager (40 man hours)	Site Manager	Ongoing
		T – 5.5	Use storm water for dust suppression activities when available.	4	Tanker Trailer and bowser	Site Supervisor	Ongoing
O - 6	**Improve Health, Safety and Welfare**	T - 6.1	Review and amend site safety statement so that it is consistent with other sites within the Greenstar Landfill Group	8	Assistant Site Manager (40 man hours)	Site Manager GM Landfill Group	June 2007
		T - 6.2	Reduce lost time injuries by 5% over the next five years	8		All site Personnel	Ongoing

Ref. No.	Objective	Ref. No.	Target	ENV Aspect	Resources Required	Person Responsible	Time Frame for Completion
		T - 6.3	Develop Accident Prevention Plan	8	Assistant Site Manager (80 man hours)	Site Manager GM Landfill Group	June 2007
		T - 6.4	Achieve Certification to OHSAS 18001	8	Assistant Site Manager (160 man hours)	Site Manager GM Landfill Group	June 2010
O-7	**Training**	T7.1	Continue to train staff on a regular basis in EMS system, waste licence and Emergency Response.		Assistant Site Manager	Site Manager	Ongoing
O-8	**Operations**	T8.1	Encourage all site hauliers to comply fully with the Waste Collection Permit Regulations		Site Manager	Site Manager	Ongoing

20.0 FULL TITLE AND WRITTEN SUMMARY OF ANY PROCEDURES DEVELOPED BY THE LICENSE WHICH RELATES TO THE FACILITY OPERATION

KTK Landfill Ltd. achieved ISO 14001:2004 certification on 12th December 2005 (certificate number IE05/66145). The awarding body was SGS Ltd Systems and Service Certification in association with UKAS Environmental Management.

As part of KTK Landfill ISO14001 certification all procedures were reviewed and amended to comply with requirements of ISO 14001. A full list of all procedures is outlined below.

Table 20.1: Procedures Developed by the Licensee to Date which Relate to the Facility Operation

Ref.	Titles
KTKP 1	Environmental Aspects
KTKP 2	Legislation & Other Requirements
KTKP 3	Training & Awareness
KTKP 4	Communication
KTKP 5	Control of Documents
KTKP 6	Emergency Preparedness & Response
KTKP 7	Monitoring & Measurement
KTKP 8	Objectives, Targets & Programme
KTKP 9	Non-conformance, corrective & preventative action
KTKP 10	Control of Records
KTKP 11	Internal Audit
KTKP 12	Management Review
KTKP 13	Complaints
KTKP 14	Operating in Adverse Wind Conditions
KTKP 15	Control of Contractors & Visitors (Safe Systems of Work)
KTKP 16	Compaction of Waste on site.
KTKP 17	Litter prevention & Assembly/Disassembly of Litter Nets.
KTKP 18	Suppression of Dust
KTKP 19	Construction of Site Roads
KTKP 20	Fuel Storage & Distribution
KTKP 21	Vermin Control
KTKP 22	Handling Tipping Vehicles on site
KTKP 23	Asbestos Disposal
KTKP 24	Handling & Storage of Batteries & Gas Cylinders
KTKP 25	Completion of Daily Site Condition Reports
KTKP 26	Waste Acceptance Procedures
KTKP 27	Recyclable material leaving site
KTKP 28	Maintenance

Ref.	Titles
KTKP 29	Permit To Work Systems
KTKP 30	Record of Disposal Location
KTKP 31	Acceptance of non infectious healthcare waste
KTKP 32	Random Inspection of Waste
KTKP 33	Acceptance of Non-infectious and non risk healthcare waste.
KTKP 37	1500 Haase Flare Operation - Start-up
KTKP 38	1500 Haase Flare Operation - Shutdown
KTKP 39	1500 Haase Flare Operation – Startup Troubleshooting
KTKP 40	2500 Haase Flare Operation – Startup
KTKP 41	2500 Haase Flare Operation - Shutdown
KTKP 42	Deutz Gas Engine TGB 620 – Start Up Procedure
KTKP 43	Deutz Gas Engine TGB 620 – Shut Down Procedure
KTKP 44	Deutz Gas Engine TGB 620 – Start Up Procedure Following Common Fault Acknowledgement
KTKP 45	Blower Station Rosemount Analyser (CH4, CO2 & O2) Calibrations
KTKP 46	Drilling and Installation of a Landfill Gas Extraction Well.
KTKP 47	Gas Collection Pipework Fusion Welding
KTKP 100	Accident Prevention Policy/Procedure

21.0 TANK, PIPELINE AND BUND TESTING AND INSPECTION REPORT

A tank, pipeline and bund testing and inspection report was conducted in March 2004. In accordance with Condition 3.11.5 the subsequent testing and inspection reporting was carried out in 2008.

Integrity tests were carried out on a silt separation tank in May 2008 and in addition, a 110mm leachate line leading from inside the main facility gate to the main Kilcullen to Naas road was tested in May 2008. Copies of the finalised signed integrity conformity test sheets are presented in Appendix 4.

22.0 REPORTED INCIDENTS AND COMPLAINTS SUMMARIES

Reported Incidents and Complaints Summary

A record for reported incidents during the 2008 reporting period is presented in Table 22.1.1. A total of 14 incidents were recorded during the reporting period. Of the reported incidents for 2008, 12 related to elevated levels of landfill gas in perimeter monitoring wells. As per the recommendations of The Agency inspectors during audit of KTK Landfill Site on 23 November 2004, a full report on the assessment of landfill gas migration in the vicinity of KTK Landfill and Silliot Hill Landfill was submitted to The Agency on 7 April, 2005.

This assessment concluded that the most likely source of elevated landfill gas levels in monitoring wells located outside the body of waste at KTK Landfill is from the historical uncontained landfilling operations at the Silliot Hill facility and are therefore, not in any way, connected with KTK landfill.

Significant reductions in gas levels measured from April 2007, to June 2008, is attributed to ongoing works at Silliot Hill during 2007 and 2008, including the installation of additional gas extraction wells at that facility. However, the levels detected during the second half of 2008 are unexpectedly higher than gas levels recorded during 2007 and first half of 2008. In addition, elevated gas levels are being detected in monitoring wells that historically have not shown gas level breaches.

It is understood that works at Silliot Hill to install large diameter gas extraction wells are currently underway. It is expected that gas levels recorded since June 2008, are attributed to some form of interruption, caused by current works, to gas collection systems at Silliot Hill. It is also understood that the extraction wells installed at Silliot Hill located opposite to the Northern Boundary of KTK Landfill have not been activated. It is anticipated that the elevated gas levels being detected currently at KTK Landfill will decrease following on from the activation of these extraction wells.

One incident related to methane detected at >1% v/v within ESB substation which is located adjacent to KTK landfill gas perimeter monitoring location G7. This incident is attributed to migrating gas from Silliot Hill and has been reported to the Agency. An ATEX compliant fan has been installed in substation to prevent gas build up.

One other incident related to elevated noise levels at sensitive receptors but the predominant noise source in these areas was from traffic noise on adjacent public roads.

A register of complaints recorded during the reporting period is attached in Table 22.1.2. A total of 39 complaints were received from 11 complainants during the reporting period. The facility is located in proximity to Silliot Hill Integrated Waste Management Facility which includes a civic amenity area, an open air transfer station and a completed partially lined landfill site with a history of landfill gas migration: all of which have potential to generate odours. Any minor gas infrastructure malfunctions identified at the facility with the potential to generate odours were quickly identified and corrected as part of the site daily monitoring and inspections regime. All complaints were resolved to the satisfaction of complainants.

Reported Incidents and Complaints Summary

The list of Incidents at KTK Landfill for the reporting period 1st January 2008 to 31st December 2008, are outlined in Table 22.1.1 below.

Table 22.1.1. – List of Incidents

Number	Date	Description	Action
I 119	14/01/2008	Elevated CH4 levels at G4, G5 Elevated CO2 levels at G1, G3, G4, G5, G6, G7, G8, G14 & G15.	Incident Report Submitted.
I 120	28/02/2008	Elevated CH4 levels at G4. Elevated CO2 levels at G1, G3, G4, G5, G6, G7, G8, G14, & G15.	Incident Report Submitted.
I 121	12/03/2008	Elevated CH4 levels at G4 & G5 Elevated CO2 levels at G3, G4, G5, G6, G7, & G15.	Incident Report Submitted.
I 122	23/04/2008	No detectable CH4. Elevated CO2 levels at G1,G3, G4, G5, G6, G7, G8, G14, & G15.	Incident Report Submitted.
I 123	13/05/2008	Elevated CH4 levels at G4 & G5 Elevated CO2 levels at G3, G4, G5, G7, G8,G10,G14 & G15.	Incident Report Submitted.
I 124	05/06/2008	Elevated Noise levels at N1,N2,N8,N12,N14,&N16.	Incident Report Submitted.
I 125	18/06/2008	Elevated CH4 levels at G1, & G3. Elevated CO2 levels at G1,G2, G3, G4, G5, G6, G7, G8, G9, G10,G11, G14,& G15.	Incident Report Submitted.
I 126	17/07/2008	Elevated CH4 levels at G1 & G3.	Incident Report Submitted.

Number	Date	Description	Action
		Elevated CO2 levels atG1, G3, G4, G5,G6, G8,G9, G14, & G15.	
I 127	08/08/2008	Elevated CH4 levels at G5 & G7. Elevated CO2 levels at G1, G3, G4, G5, G6, G7, G8, G14 & G15.	Incident Report Submitted.
I 128	23/09/2008	Elevated CH4 Levels at G1,G3,G4,G5,&G7 Elevated CO2 levels at G1, G3, G4, G5, G6, G7, G8, G10, G14, & G15.	Incident Report Submitted.
I 129	15/10/2008	Elevated CH4 Levels at G1,G3,G4,G5,& G7. Elevated CO2 levels at G1, G3, G4, G5, G6, G7, G8, G9, G10,G11, G14, & G15.	Incident Report Submitted.
I 130	20/10/2008	Elevated CH4 Level within site ESB substation.	Incident Report Submitted.
I 131	13/11/2008	Elevated CH4 levels at G1,G3,G4, G5 & G7. Elevated CO2 levels at G1, G3, G4, G5, G6, G7, G14 & G15.	Incident Report Submitted.
1 132	11/12/2008	Elevated CH4 levels at G1,G3,G4,G5 & G7. Elevated CO2 levels at G1, G2, G3, G4, G5, G6, G7,G8,G9,G10,G11, G14 & G15.	Incident Report Submitted.

Complaints

KTK Landfill maintains a register of complaints received in compliance with Condition 10.4 of the waste licence. A total of 39 complaints were received in relation to the operation of the facility for the reporting period. Complaints in relation to the operation of the facility are summarised in Table 22.1.2

Table 22.1.2 - Recorded Complaints - 2008

Number	Date	Complainant	Description
2008/01	26/03/2008	Simon Durham	LFG Odour
2008/02	02/04/2008	Tracey Dunlop	LFG Odour
2008/03	02/04/2008	Pat Nowlan	LFG Odour
2008/04	02/04/2008	Simon Durham	LFG Odour
2008/05	10/06/2008	Pat Nowlan	LFG Odour
2008/06	03/07/2008	Pat Nowlan	LFG Odour
2008/07	15/07/2008	Bill Nowlan	LFG Odour
2008/08	16/07/2008	Pat Nowlan	LFG Odour
2008/09	20/07/2008	Simon Durham	LFG Odour
2008/10	13/08/2008	Simon Durham	LFG Odour
2008/11	07/08/2008	Helen Murphy	LFG Odour
2008/12	19/08/2008	Marie Gorman	LFG Odour
2008/13	20/08/2008	Mary Charlton	LFG Odour
2008/14	21/08/2008	Marie Gorman	LFG Odour
2008/15	22/08/2008	Bill Nowlan	LFG Odour
2008/16	22/08/2008	Tracey Dunlop	LFG Odour
2008/17	15/09/2008	Tracey Dunlop	LFG Odour
2008/18	16/09/2008	Helen Murphy	LFG Odour (via EPA)
2008/19	16/09/2008	Angela Tynan	LFG Odour
2008/20	17/09/2008	Gerry Tynan	LFG Odour
2008/21	22/09/2008	Ger Peacock	LFG Odour
2008/22	16/10/2008	Simon Durham	LFG Odour
2008/23	26/10/2008	Tracey Dunlop	LFG Odour
2008/24	03/11/2008	Ger Peacock	LFG Odour (via EPA)
2008/25	03/11/2008	Helen Murphy	LFG Odour (via EPA)
2008/26	03/11/2008	Angela Tynan	LFG Odour
2008/27	05/11/2008	Helen Nowlan	LFG Odour
2008/28	12/11/2008	Don Charlton	LFG Odour
2008/29	12/11/2008	Pat Nowlan	LFG Odour
2008/30	12/11/2008	Tracey Dunlop	LFG Odour
2008/31	12/11/2008	Simon Durham	LFG Odour
2008/32	15/11/2008	Simon Durham	LFG Odour

Number	Date	Complainant	Description
2008/33	18/11/2008	Sinead Phelan	LFG Odour
2008/34	19/11/2008	Pat Nowlan	LFG Odour
2008/35	19/11/2008	Tracey Dunlop	LFG Odour
2008/36	20/11/2008	Pat Nowlan	LFG Odour
2008/37	24/11/2008	Helen Murphy	LFG Odour
2008/38	25/11/2008	Mary Carter	LFG Odour (via EPA)
2008/39	25/11/2008	Angela Tynan	LFG Odour (via EPA)

23.0 REVIEW OF NUISANCE CONTROLS

KTK Landfill Ltd is committed to operating KTK landfill in the best possible manner using best available techniques to minimise impacts to the environment and local residential neighbours. KTK Landfill Ltd welcome communications from local residents and any interested parties and all reasonable and practical measures will be implemented to eliminate or minimise any issues or nuisances. The site closed to the acceptance of commercial and industrial and asbestos wastes on 21st October 2008. All nuisance control measures continue to be implemented so as to ensure licence compliance.

23.1 Bird Control

During the reporting period, KTK Landfill Ltd. employed the services of 'Falcon Bird Control Ireland,' to provide an integrated approach to bird control. This involved the use of gas cannons, kites, distress calls and various birds of prey including Falcons. This method is preferred as it is non destructive to the birds and by varying the site visit timing is a very effective method of bird control.

23.2 Vermin Control

Site personnel regularly checked for evidence of vermin on-site during regular routine inspections. Rentokil were employed throughout the duration of the reporting period in order to control potential nuisance caused by rodents. Continuous baiting was carried out by Rentokil and adjusted as necessary to prevent any infestation of vermin.

23.3 Mud Control

A new vehicle power wash system was installed in the southeast of the site, which is significantly more effective at reducing the amount of mud leaving the facility compared to the bath type wash. The 'Mud-Blaster' power wash system was installed in February 2004 and uses a series of pressure sprayers to power wash vehicles from the wheels up to the cab.

24.0 REPORTS ON FINANCIAL PROVISION MADE UNDER THIS LICENCE, MANAGEMENT AND STAFFING STRUCTURE OF THE FACILITY, AND A PROGRAMME FOR PUBLIC INFORMATION.

24.1 Financial Provision

Under condition 12.3.3 of the site licence KTK Landfill is required to maintain a financial provision to cover any liabilities incurred whilst carrying on the activities to which this licence relates. Detailed below are the financial provisions made for the facility:

24.1.1 Closure Restoration and Aftercare Costs (Known Environmental Liabilities)

A capital provision for closure, restoration and aftercare continued to be deducted from Gate Revenues during 2008. As of the end of this reporting period a total amount of **€7,001,326** has been accrued for closure, restoration and aftercare costs.

KTK landfill Ltd. is owned through its parent company Greenstar Ltd., by National Toll Roads plc. The company has a secure financial backing.

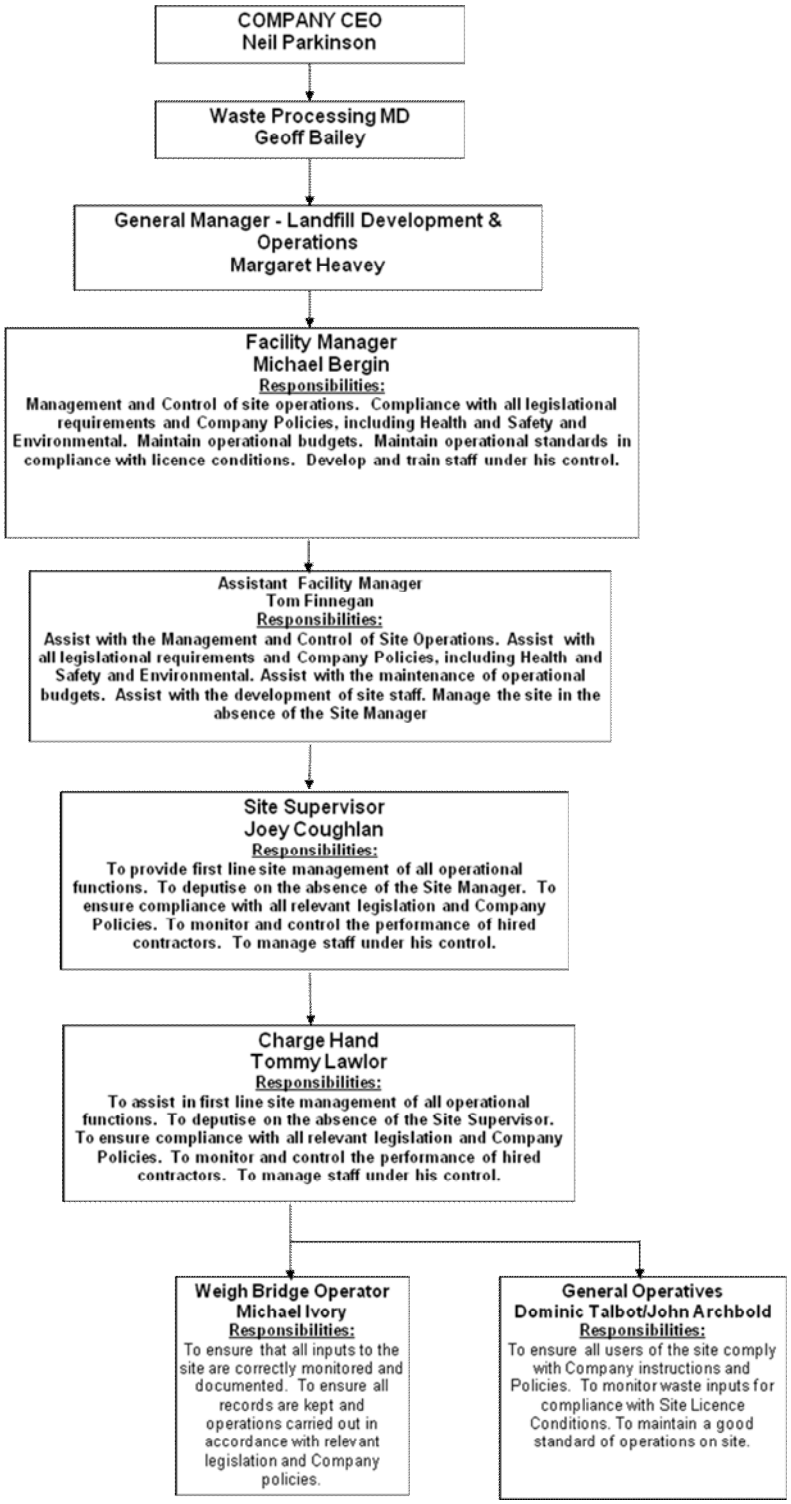
24.1.1.1 Financial provisions for Unknown Environmental Liabilities

As part of Condition 12.3.2, the Licensee has completed fully costed Environmental Liabilities Risk Assessment for the site. This document outlines the potential unknown environmental liabilities associated with the landfill and estimates the possible cost of these liabilities.

Greenstar Ltd. have accidental pollution liability insurance to the value of €6.5 million, which is well in excess of the of the cost that may arise from unknown liabilities.

Figure 24.1.1: KTK Management Structure and Responsibilities

KTK Management Structure and Responsibilities - Rev 3 March 2009



24.2 Programme for Public Information

KTK pursues an active programme of disseminating information on its operations to interested parties. This is undertaken through a variety of means including site tours, the company website, presentations and open days.

KTK's community development fund made significant donations to a number of local groups during the course of 2008, including local schools, scouts, community centre, bowling club, sports facilities and the Kilcullen Christmas lights. A comprehensive public information programme developed in April 2000 continues to be used.

The communications programme contains 8 specific objectives:

- To promote public awareness of the Company's activities and environmental policies;
- To maintain an ongoing dialogue with authorities that have direct involvement with waste disposal activities;
- To make available Environmental Performance Data relating to KTK Landfill Ltd.;
- To disseminate information relating to the operational and management of the site as appropriate;
- To encourage liaison between KTK Landfill Ltd, and local residents and those who may be affected by the sites operations;
- To provide general information on Waste Management Issues;
- To ensure all users and customers of the site are conversant with the requirements of the Site Licence; and
- To ensure that all objectives are, where possible, measurable and quantifiable.

The objectives of the programme are met through the following elements as appropriate:

- Personal Contact;
- Residents Meetings/Liaison Groups;
- Information Displays;
- Information Packs;
- Site Visits;
- Web Page;
- Educational Links; and
- Published Information

APPENDICES

APPENDIX 1

KTK/602, REV T: SITE LOCATION (SHOWING MONITORING LOCATIONS

KTK/734, REV G: EXISTING CONDITIONS SHOWING GAS INFRASTRUCTURE AND LEVELS.

APPENDIX 2

ASBESTOS MONITORING REPORTS

APPENDIX 3

AIR EMISSION TESTING REPORTS

APPENDIX 4

BUND TEST INTEGRITY REPORTS FOR 2008

Asbestos Consultancy Services Limited

A C S Limited

Project Supevision

Air Monitoring

Surveys

Sample Identification

CONFIDENTIAL REPORT

Client:
Golder Associates Ireland,
Town Centre House,
Dublin Road, Naas,
County Kildare.

Attention: Mr. Garrett Byrne

Title:
Asbestos Dust Reassurance Tests.

Report ref. ACS 8-505 **Order no:** 4028

Date recd: 15th December 2008 **Report by:** P. G. Byrne Peter G Byrne

Copies to: **Date:** 23rd December 2008

CONDITIONS

CLIENT WORK – TERMS AND CONDITIONS OF ACCEPTANCE

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6. The laws of Ireland shall apply.

ACS Report No. 8-505

SAMPLES RECEIVED

Five air tests, identified as in the table below, were taken on the 17th December 2008 for determination of asbestos fibre concentration. The tests were taken for reassurance purposes in a landfill licensed to store asbestos waste.

TEST PROCEDURE

The filters were tested in accordance with U.K. Health and Safety Executive procedure MDHS 39/4 (1995). In all cases 200 fields were counted. The pumps were set to sample at 10 litres/minute for the 72 minute sampling period. The microscope met the resolution and magnification criteria as laid down by the above method. The weather was dry with a southwesterly breeze for the duration of the sampling.

RESULTS

Site: KTK Landfill, Brownstown, Kilkullen, County Kildare

Filter Identification	Slide Ref.	No. of Fibres Counted	Air Volume (litres)	Fibre Concen. (fibres/ml)
Downwind at Northeast	08/mb/2090	0	720	<0.01
North side	08/mb/2091	0	720	<0.01
West side	08/mb/2092	0	720	<0.01
East side	08/mb/2093	0	720	<0.01
South side	08/mb/2094	0	720	<0.01

There was no evidence of asbestos dust in any of the samples taken and the areas tested are safe for normal use and occupancy.

Directors: Peter G Byrne - Claire Byrne
Registered Office: "Hampdale", Cedarwood Road, Glasnevin, Dublin 11.
Phone: 01 834 0152, Fax 01 8068475 - Mobile 086 8261784 Email byrnepg@indigo.ie
Company Registration Number: 327994

ACS Report No. 8-505

NOTES

1 This report refers only to the samples tested. The analytical technique does not distinguish asbestos from other fibres of similar dimensions and thus all are counted. A value of 0.5 is obtained when only one end of a fibre falls within the counting area.

2 The 0.01 fibre/ml. concentration (for a 720 litre sample this equates to 30 countable fibres) is the threshold below which an enclosure can be deemed fit for return to normal use and occupancy. It is also close to the limit of detection of the analytical technique and thus levels below this value are not reported. This is the clearance indicator as specified in the UK HSE Guideline EH 10.

3 Only the areas/enclosures specified above are covered by this report.

Directors: Peter G Byrne - Claire Byrne
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Asbestos Consultancy Services Limited

A C S Limited

Project Supevision

Air Monitoring

Surveys

Sample Identification

CONFIDENTIAL REPORT

Client:
Golder Associates Ireland,
Town Centre House,
Dublin Road, Naas,
County Kildare.

Attention: Mr. Garrett Byrne

Title:
Asbestos Dust Reassurance Tests.

Report ref. **ACS 8-389** **Order no: 4028**

Date recd: **12th September 2008** **Report by: P. G. Byrne**

Copies to: **Date: 19th September 2008**

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6. The laws of Ireland shall apply.

ACS Report No. 8-389

SAMPLES RECEIVED

Five air tests, identified as in the table below, were taken on the 17th September 2008 for determination of asbestos fibre concentration. The tests were taken for reassurance purposes in a landfill licensed to store asbestos waste.

TEST PROCEDURE

The filters were tested in accordance with U.K. Health and Safety Executive procedure MDHS 39/4 (1995). In all cases 200 fields were counted. The pumps were set to sample at 10 litres/minute for the 50 minute sampling period. The microscope met the resolution and magnification criteria as laid down by the above method. The weather was dry with a southerly breeze for the duration of the sampling.

RESULTS

Site: KTK Landfill, Brownstown, Kilkullen, County Kildare

Filter Identification	Slide Ref.	No. of Fibres Counted	Air Volume (litres)	Fibre Concen. (fibres/ml)
North Side	08/mb/1589	0	500	<0.01
East side	08/mb/1590	0	500	<0.01
West side	08/mb/1591	0	500	<0.01
South side - right	08/mb/1592	0	500	<0.01
South side - left	08/mb/1593	0	500	<0.01

There was no evidence of asbestos dust in any of the samples taken and the areas tested are safe for normal use and occupancy.

Directors: Peter G Byrne - Claire Byrne
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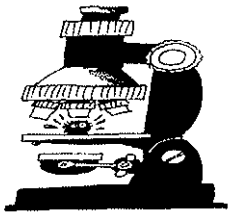

A C S Limited

ACS Report No. 8-389

NOTES

1 This report refers only to the samples tested. The analytical technique does not distinguish asbestos from other fibres of similar dimensions and thus all are counted. A value of 0.5 is obtained when only one end of a fibre falls within the counting area.

2 The 0.01 fibre/ml. concentration (for a 500 litre sample this equates to 20 countable fibres) is the threshold below which an enclosure can be deemed fit for return to normal use and occupancy. It is also close to the limit of detection of the analytical technique and thus levels below this value are not reported. This is the clearance indicator as specified in the UK HSE Guideline EH 10.

3 Only the areas/enclosures specified above are covered by this report.

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Company Registration Number: 327994

INTEGRITY TEST REPORT

CLIENT & PROJECT DETAILS

Client	*KTK Landfill Ltd.*	Project	KTK Phase 6 works	Project No.	*06 719 373*

INFRASTRUCTURE TESTED

Type	*Leachate line*	From	*Sump inside main gate*	To	*Main Road*
Diameter	*110mm diameter*	Length	*350m approx.*	Material	*Welded HDPE pipes*

Test Procedure:

The downstream end of the section of pipe to be tested was sealed using an inflatable bung in the manhole at the edge of the main road. The complete length of the pipe as far back as the sump inside the main access gate to KTK was tested after the upstream end was also sealed using an inflatable bung which also allowed air to be pumped into and hence pressure to be applied to the isolated leachate pipe system. A reading was taken at the start of the test from the level of water contained within the air pump. After a period of ten minutes was allowed to elapse, a second reading was taken with a third reading taken after a further ten minutes elapsed. These readings were then compared to determine if any loss in pressure was detected.

RESULT OF TEST

Date of start	*4 April 2008*	Time of start	*15:00 hrs*	Reading	*100mm water level*
Date of end	*4 April 2008*	Time of end	*15:20 hrs*	Reading	*100mm water level*

Statement of Integrity:

The 110m diameter leachate line running from the sump inside the main gate at KTK Landfill to the manhole located on the edge of the main Naas to Kilcullen road has been tested using air pressure and was found to be capable of withstanding a suitable level of pressure without incurring any discernable loss in pressure.

It is noted that this section of leachate line was previously tested in 1999 and found to be of sound integrity.

It is therefore concluded that this section of leachate line still remains in a state of sound integrity.

APPROVAL DETAILS

Approved by	*Peter Corrigan*	Signed	*Peter Corrigan*	Date	*10 May 2008*

INTEGRITY TEST REPORT

CLIENT & PROJECT DETAILS

Client	*KTK Landfill Ltd.*	Project	KTK Phase 6 works	Project No.	*06 719 373*

INFRASTRUCTURE TESTED

Type	*Silt Separation Tank*	From	*Base of tank*	To	*Inlet level*
Diameter	*See as-built drawing*	Length	*See as-built drawing*	Material	*Pre-cast concrete tank*

Test Procedure:

The outlet pipe from the silt separation tank was blocked using an extendable bung as was the inlet pipe. The complete tank on either side of the newly installed baffle wall was filled with water and a level taken from the water level to a marked location on the access lid. After 24 hours approximately was allowed to elapse, the depth to the water level from the same location on the access lid was again measured. These readings were then compared to determine if any loss of water was detected.

RESULT OF TEST

Date of start	*3 April 2008*	Time of start	*14:30 hrs*	Reading	*1601mm to water level*
Date of end	*4 April 2008*	Time of end	*15:30 hrs*	Reading	*1600mm to water level*

Statement of Integrity:

The silt separation tank located in the southwest corner at KTK Landfill has been tested using a monitored water level and was found to be capable of holding water for a period of 24 hours without incurring any discernable loss in water level outside that expected from normal reading errors.

It is noted that silt tank was previously tested in 2007 and found to be of sound integrity. The reason for this re-test was the installation of a baffle wall internally within the silt separation tank.

It is concluded that this silt separation tank still remains in a state of sound integrity after the construction works associated with the installation of the baffle wall.

APPROVAL DETAILS

Approved by	*Peter Corrigan*	Signed	*Peter Corrigan*	Date	*10 May 2008*