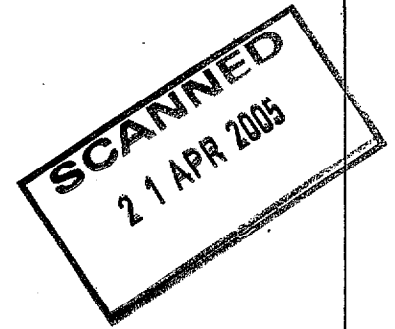


KTK LANDFILL LTD

**Brownstown/Carnalway
Kilcullen,
County Kildare**



**SPECIFIED ENGINEERING WORKS
Condition 3.2 and Schedule B
- Gas Utilisation Plant -**

Waste Licence Register No. 81-2

Prepared by:

**Environment & Resource Management Ltd.
No. 3 Tara Court,
Naas, Co. Kildare.**

April 2004

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**KTK Landfill Ltd
Brownstown/Carnalway
Kilcullen,
County Kildare**

**SPECIFIED ENGINEERING WORKS
Condition 3.2 and Schedule B
- Gas Utilisation Plant -**

Waste Licence Register No. 81-2

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Drawings

Drawing KTK/838 REV. B – Location of Proposed Gas Utilisation Plant Compound

Drawing KTK/839 REV. B – Proposed Gas Utilisation Plant Compound

Drawing KTK/840 REV. B – Sections through Gas Utilisation Plant Compound

1. INTRODUCTION

An updated Landfill Gas Management Plan was submitted to the Agency on the 8th July 2002. Section 4.4 of the submitted report described Stage 4 of the Gas Management Plan as follows:

"The licensee would prefer to extract and utilise this landfill gas to generate electricity. The commercial feasibility in terms of generating electricity, landfill gas cogeneration will need to be determined.

If landfill gas cannot be economically extracted and used a secondary option would be to flare the landfill gas."

To date the following proposals for Specified Engineering Works (SEW) relating to Gas Management at the KTK Landfill (Waste Licence 81-2) have been submitted to the Agency:

- Rev. 1.0 (29th May 2003): Initial SEW proposal for Gas Management Infrastructure;
- Rev. 2.0 (15th July 2003): Amended SEW proposal for Gas Management Infrastructure including Phases I and II;
- Rev. 3.0 (3rd February 2004): SEW proposal for the Phase III of the Gas Management Infrastructure.

KTK Landfill Ltd (a wholly owned subsidiary of *Greenstar*) intends to provide a landfill gas utilisation plant at the KTK Landfill site in Brownstown, Kilcullen, Co Kildare. The plant would generate an estimated 2.5 – 3.5MW of electricity, for input into the National Grid for a period of up to 25 years. The gas utilisation plant is an element of the Gas Management Plan submitted to the EPA during the most recent licence review in 2001/2002.

The plant will be constructed and managed through a joint venture between *Greenstar* and G.A.S. Energy Ltd of Germany. G.A.S. Energy Ltd – founded 1985 – is a leading company in the international market of clean power generation from renewable gases. G.A.S. Energy Ltd has installed over 500 plants throughout Europe to date.

KTK Landfill Ltd has retained Environment & Resource Management Ltd (ERML) and G.A.S. Energy Ltd of Germany to provide engineering design and construction supervision consultancy services for the work proposed. This report has been prepared by ERML on behalf of the licensee.

The following Specified Engineering Works are proposed at the site:

- Installation of a Landfill Gas Utilisation Plant at the site and integrating it to the facility's existing Gas Management Infrastructure.

This SEW report describes the works involved in the installation of a gas utilisation plant at the site. The proposed compound is outlined on attached *Drawing KTK/838 Rev. B*.

2. PROPOSED SPECIFIED ENGINEERING WORKS

The licensee envisages development of the proposed gas management system at the site as follows:

2.1 Gas Utilisation Plant

The plant will be located within the existing footprint of the landfill at a point furthest away from all of the facility's neighbours – refer to *Drawing KTK/838 Rev. B* for location. A state of the art, fully enclosed, high temperature landfill gas ground flare is currently located at this point.

The proposed development will include the following key components (refer to Drawings KTK/839 Rev. B and KTK/840 Rev. B):

- Three separate, purpose built and environmentally controlled, containers enclosing a landfill gas engine generating 1MW of power;
- Three separate, purpose built and environmentally controlled, containers enclosing a transformer;
- ESB Switch room;
- Screened site foot print (with vegetation and fencing);
- Ancillary ducting and services.

The plant will generate an estimated 2.5 – 3.5MW of electricity, for input into the National Grid for a period of up to 25 years.

The timing for the completion of works is July 2004.

2.2 Benefits of Proposed Plant

The key benefits of this proposed installation are:

- Compliance with current EU Directives including the Landfill Directive.
- Generation of electricity from alternative power sources, thus reducing reliance upon fossil fuels
- Implementation of current best practice guidance from both the EU and the EPA

- Mitigation of potential odour emissions from the facility by providing an effective management method for the landfill gases generated by the emplaced wastes.
- Reduction of emissions of gases contributing to global warming (CH₄ and CO₂)

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DRAWINGS

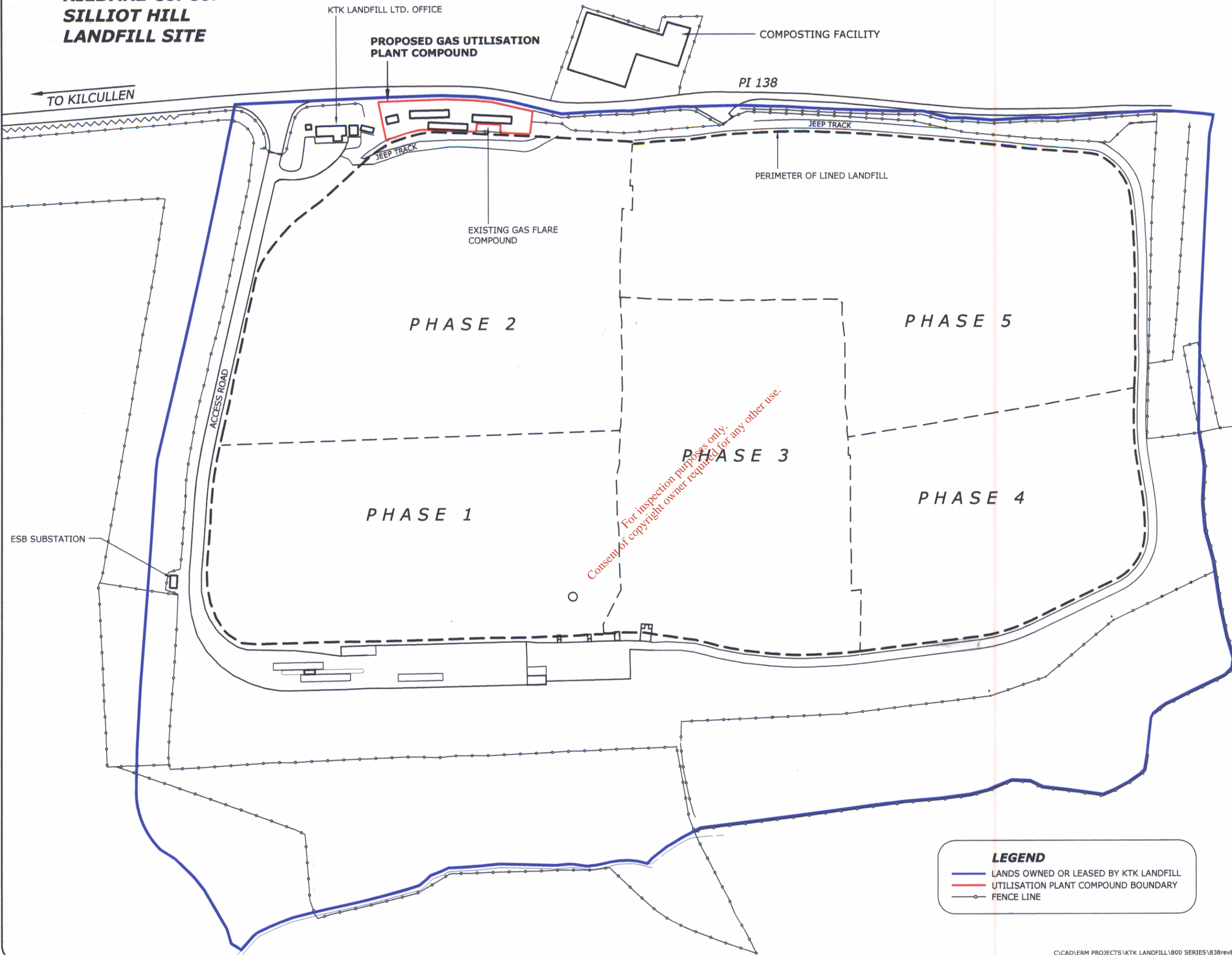
Drawing KTK/838 REV. B

Drawing KTK/839 REV. B

Drawing KTK/840 REV. B

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**KILDARE Co. Co.
SILLIOT HILL
LANDFILL SITE**



LEGEND

- LANDS OWNED OR LEASED BY KTK LANDFILL
- UTILISATION PLANT COMPOUND BOUNDARY
- FENCE LINE

Issue Date:		
No.	Date	Description
B	07/04/04	ISSUE TO EPA
A	31/03/04	ISSUE TO KILDARE Co. Co.

Surveyed by:
Environment & Resource Management Ltd.

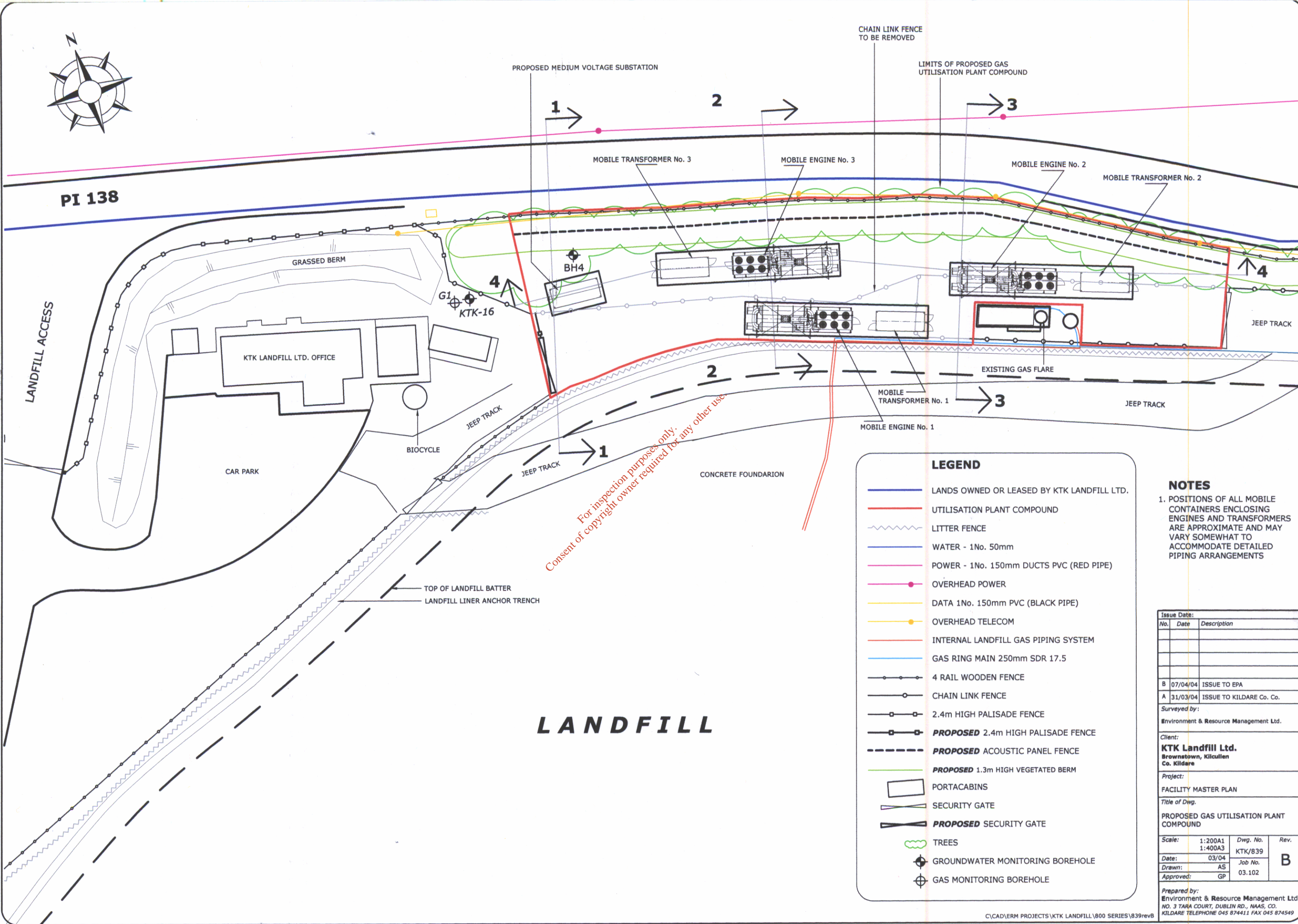
Client:
KTK Landfill Ltd.
Brownstown, Kilcullen
Co. Kildare

Project:
FACILITY MASTER PLAN

Title of Dwg.
LOCATION OF PROPOSED GAS UTILISATION PLANT COMPOUND

Scale:	1:1000A1 1:2000A3	Dwg. No.	KTK/838	Rev.	B
Date:	02/04	Job No.			
Drawn:	CC				
Approved:	GP				

Prepared by:
Environment & Resource Management Ltd.
NO. 3 TARA COURT, DUBLIN RD., NAAS, CO.
KILDARE TELEPHONE 045 874411 FAX 045 874549



PI 138

PROPOSED MEDIUM VOLTAGE SUBSTATION

CHAIN LINK FENCE TO BE REMOVED

LIMITS OF PROPOSED GAS UTILISATION PLANT COMPOUND

MOBILE TRANSFORMER No. 3

MOBILE ENGINE No. 3

MOBILE ENGINE No. 2

MOBILE TRANSFORMER No. 2

GRASSED BERM

BH4

G1

KTK-16

KTK LANDFILL LTD. OFFICE

EXISTING GAS FLARE

MOBILE TRANSFORMER No. 1

MOBILE ENGINE No. 1

LANDFILL ACCESS

CAR PARK

BIOCYCLE

JEEP TRACK

JEEP TRACK

CONCRETE FOUNDATION

JEEP TRACK

TOP OF LANDFILL BATTER

LANDFILL LINER ANCHOR TRENCH

LANDFILL

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LEGEND

- LANDS OWNED OR LEASED BY KTK LANDFILL LTD.
- UTILISATION PLANT COMPOUND
- ~ LITTER FENCE
- WATER - 1No. 50mm
- POWER - 1No. 150mm DUCTS PVC (RED PIPE)
- OVERHEAD POWER
- DATA 1No. 150mm PVC (BLACK PIPE)
- OVERHEAD TELECOM
- INTERNAL LANDFILL GAS PIPING SYSTEM
- GAS RING MAIN 250mm SDR 17.5
- 4 RAIL WOODEN FENCE
- CHAIN LINK FENCE
- 2.4m HIGH PALISADE FENCE
- **PROPOSED** 2.4m HIGH PALISADE FENCE
- - - **PROPOSED** ACOUSTIC PANEL FENCE
- **PROPOSED** 1.3m HIGH VEGETATED BERM
- PORTACABINS
- SECURITY GATE
- PROPOSED** SECURITY GATE
- ~ TREES
- ⊕ GROUNDWATER MONITORING BOREHOLE
- ⊕ GAS MONITORING BOREHOLE

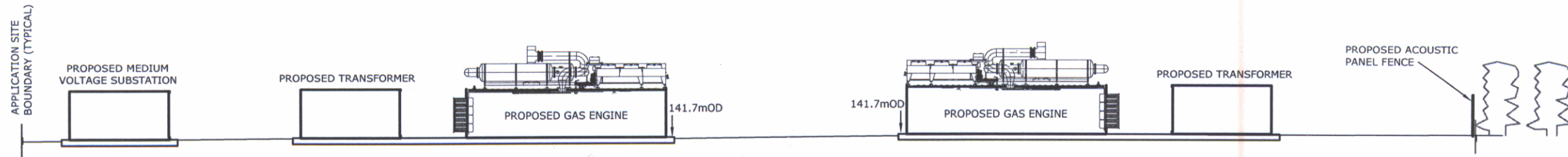
NOTES

1. POSITIONS OF ALL MOBILE CONTAINERS ENCLOSING ENGINES AND TRANSFORMERS ARE APPROXIMATE AND MAY VARY SOMEWHAT TO ACCOMMODATE DETAILED PIPING ARRANGEMENTS

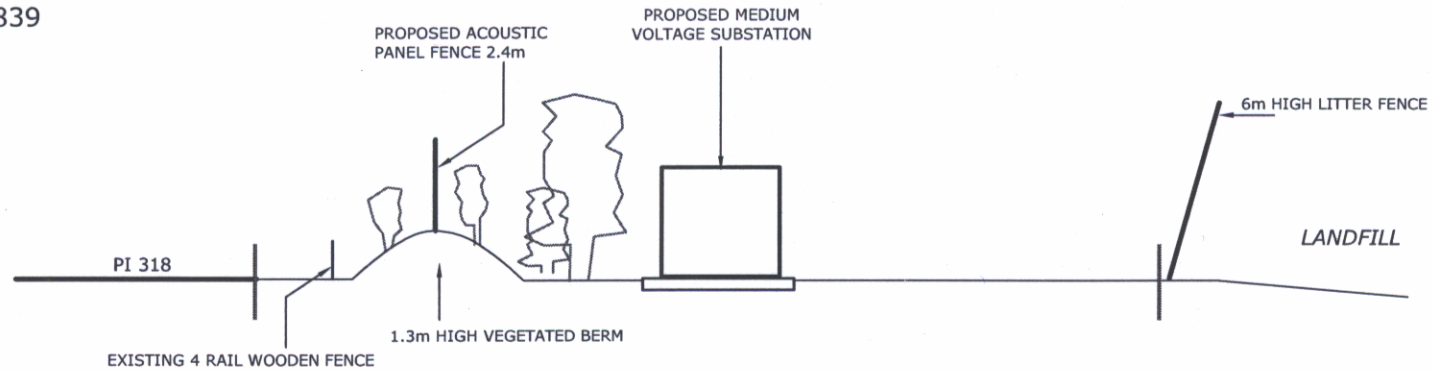
Issue Date:		
No.	Date	Description
B	07/04/04	ISSUE TO EPA
A	31/03/04	ISSUE TO KILDARE Co. Co.
Surveyed by:		
Environment & Resource Management Ltd.		
Client:		
KTK Landfill Ltd. Brownstown, Kilkullen Co. Kildare		
Project:		
FACILITY MASTER PLAN		
Title of Dwg.		
PROPOSED GAS UTILISATION PLANT COMPOUND		
Scale:	1:200A1 1:400A3	Dwg. No. KTK/839
Date:	03/04	Job No.
Drawn:	AS	03.102
Approved:	GP	

Prepared by:
Environment & Resource Management Ltd.
NO. 3 TARA COURT, DUBLIN RD., NAAS, CO.
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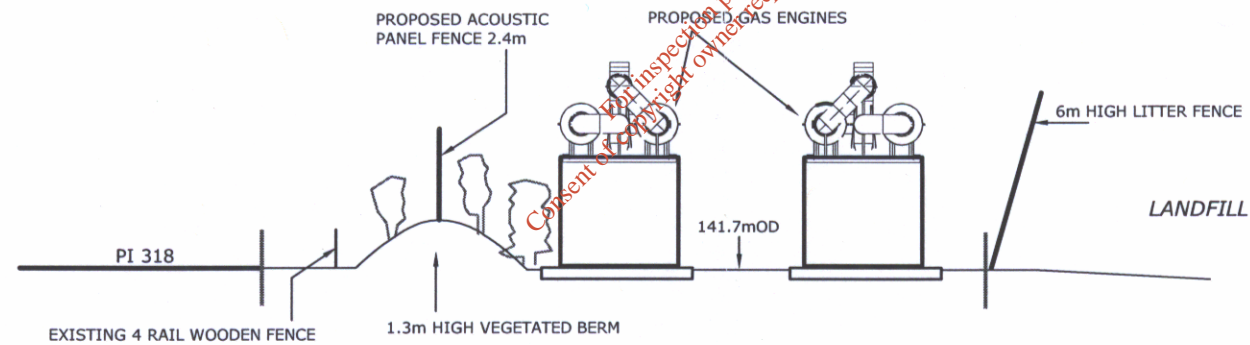
C:\CAD\ERM PROJECTS\KTK LANDFILL\800 SERIES\839rev8



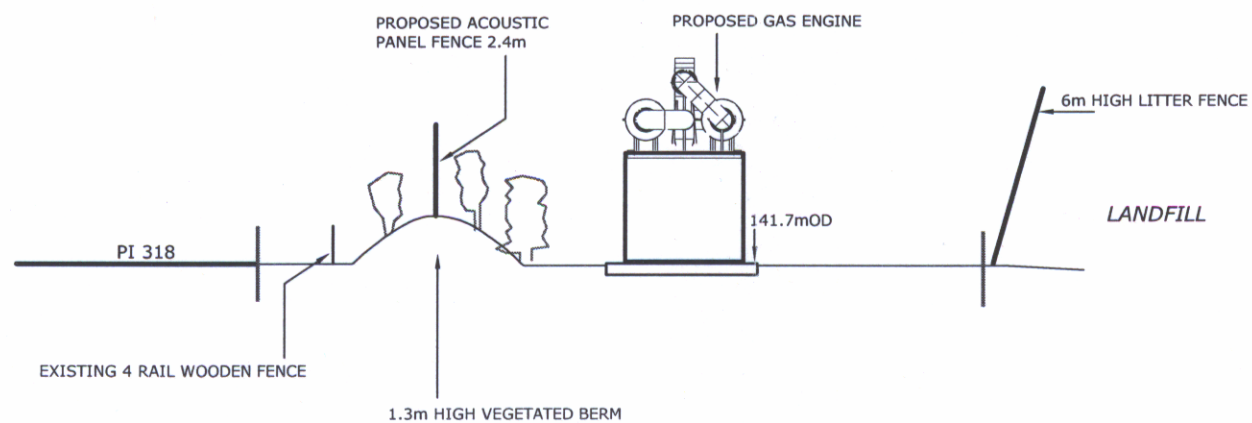
SECTION 4 (1:150 A1)
DRAWING REFERENCE KTK/839



SECTION 1 (1:100A1)
DRAWING REFERENCE KTK/839



SECTION 2 (1:100A1)
DRAWING REFERENCE KTK/839



SECTION 3 (1:100A1)
DRAWING REFERENCE KTK/839

Issue Date:		
No.	Date	Description
B	07/04/04	ISSUE TO EPA
A	31/03/04	KILDARE COUNTY COUNCIL
Surveyed by: Environment & Resource Management Ltd.		
Client: KTK Landfill Ltd. Brownstown, Kilcullen Co. Kildare		
Project: FACILITY MASTER PLAN		
Title of Dwg. SECTIONS THROUGH GAS UTILISATION PLANT COMPOUND		
Scale:	AS SHOWN	Dwg. No. KTK/840
Drawn:	CC	Job No. 03.102
Approved:	GP	Rev. B
Prepared by: Environment & Resource Management Ltd. NO. 3 TARA COURT, DUBLIN RD., NAAS, CO. KILDARE TELEPHONE 045 874411 FAX 045 874549		