Maeda Corporation

Upgrading of Ting Kok Road Pumping Station No. 5

Monthly EM&A Report No. 5

for May 2006

June 2006

Report no: 01284R0162

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Report no: EA01284R0162 **Date:** June 2006

Hyder Consulting

Certified by Landfill Gas Team Leader
Alexi Bhanja

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1 Executive Summary

Drainage Services Department (DSD) awarded the contract for the Upgrading of Ting Kok Road Pumping Station No. 5 to Maeda Corporation in September 2005. Maeda appointed Hyder Consulting Limited as the Contractor's Landfill Gas (LFG) Team during the construction period. The construction contract commenced in September 2005 and the total construction period is approximately 28 months.

This report recorded the results and findings of the required EM&A works undertaken during May 2006. All relevant mitigation measures and requirements were implemented. There have been no exceedances in Action/Limit (A/L) Levels at either fixed or variable monitoring locations, except for a carbon dioxide limit level exceedance (1.7%) recorded at the 11m-deep borehole M1 (it should be noted that Action Level exceedances have occurred at borehole M1 in previous months). The recorded level is within expected norms for a borehole and is not of concern because this is a fixed location, not part of the excavation works, and there are no safety-related issues. Borehole M1 is not affected by any ongoing Works and the exceedance is not due to the construction activities. Nor it is considered to be a non-compliance in terms of the EM&A programme and implementation of the Action/Event Plan, because these are based exclusively on worker safety in trenches – no actions are mandated in the event of an exceedance from a deep borehole and, indeed, none are practicable.

Environmental Protection Department (EPD) has not conducted any site visit in the reporting period.

Event and Action Levels

The baseline monitoring results documented in the baseline monitoring report for the Project (our report ref.: EA01284R0022) provided the A/L Levels for LFG impact monitoring and also the Action Plan. For methane, A/L Levels are 0.5%/1.0%; for carbon dioxide, A/L Levels are 0.5%/1.5%; and for oxygen, A/L Levels are 19.0%/18.0%.

Complaint Log

There were no non-compliances in terms of the EM&A programme during the reporting period and no complaints regarding LFG were received.

Reporting Changes

There have been no reporting changes during the reporting period.

Future Key Issues

Based on anticipated construction activities for next month, on the construction programme and on the review of relevant Contractor's method statements by the LGT, no significant future key issues in terms of LFG have been identified at this time, although it is likely that continuing A/L Level exceedances of carbon dioxide will occur at borehole M1 – this is not a cause for concern.

2 Introduction

2.1 Basic Project Information

Upgrading of Ting Kok Road Pumping Station No. 5 (TKRPS) under North District and Tolo Harbour Sewerage, Sewage Treatment and Disposal – High Priority Works is implemented based on the findings of the Study *Review of North District and Tolo Harbour Sewerage Master Plan*.

The purpose of the Project is to upgrade the existing TKRPS to cope with the sewerage needs of both existing and future developments along Ting Kok Road up to Tai Mei Tuk. The design pumping capacity of TKRPS has to be increased from 2,888m^3/day to 11,520m^3/day in order to serve the increasing sewage flow along Ting Kok Road. The Project is of high priority and needs to commence as soon as possible because full commissioning of the upstream sewerage facilities along Ting Kok Road is dependent on the completion of this Project.

The proposed scope of works includes construction of a new pumping station, laying of about 350m long twin 450mm diameter rising mains and 250m long 600mm diameter gravity sewer, and demolition of the existing pump pit. The main pumping station, transformer room, gravity sewers, manholes and boundary wall (except the twin rising mains) will be located outside the existing passive vent trench of Shuen Wan Landfill and the three existing Landfill Gas (LFG) monitoring probes within the Project site will not be affected by the works.

Six village houses are located about 60m away from the boundary of the proposed pumping station. The proposed pumping station upgrading works therefore constitute a Designated Project under type F.3(b)(i) in Schedule 2 of the Environmental Impact Assessment Ordinance. A Project Profile (PP) for direct application of the Environmental Permit (EP) (Application No.DIR-115/2005) was approved by the Environmental Protection Department (EPD) in March 2005 and an EP (EP-212/2005) was granted in April 2005, prior to the commencement of the upgrading works.

Drainage Services Department (DSD) awarded the contract for the upgrading of TKRPS to Maeda Corporation in September 2005. Maeda appointed Hyder Consulting Limited as the Contractor's Landfill Gas Team (LGT) during the construction period. CH2M HILL Hong Kong Limited is the Independent Checker (Landfill Gas) (IC(LG)) of the project. The construction contract commenced in September 2005 and the total construction period is approximately 28 months.

Close proximity of the Project to Shuen Wan Landfill (within the 250m Consultation Zone of Shuen Wan Landfill) may also suggest the possibility of landfill gas being released during excavation works for substructure of pumping station, transformer room and associated rising mains and gravity sewers. As such, a *Report on Landfill Gas Hazard Assessment* has been prepared previously (as Appendix E to the PP) in accordance with EPD's *Landfill Gas Hazard Assessment Guidance Note* and the *Practice Note for Professional Persons – Landfill Gas Hazard Assessment for Development Adjacent to Landfills*.

2.2 Management Structure and Project Organisation

The Engineer (DSD) is responsible for overseeing the construction works and ensuring that they are undertaken by the Contractor (Maeda) in accordance with the specification and contractual requirements. The Contractor shall report to the Engineer. The LGT is employed by the Contractor and responsible for conducting the EM&A programme. The IC(LG) shall advise the Engineer on LFG issues related to the Project.

The key personnel contact names and telephone number are summarised in Table 2-1. The project organisation is shown in Appendix 1.

Party	Position	Name:	Tel. No.:
Project Proponent and Engineer – DSD	Project Manager	Raymond LEE	2594 7457
	Engineer's Representative	Tim TSOI	2594 7460
Contractor – Maeda	Site Agent	George CHEUNG	9268 1918
LGT – Hyder Consulting	LGT Leader	Alexi BHANJA	2911 2916
IC(LG) – CH2M HILL	IC(LG)	Aldex LEE	2507 2203

Table 2-1 Contact Details for Key Project Personnel

2.3 Construction Programme

Construction programme of the Project is attached in Appendix 2. As can be seen, all works carried out during the reporting period have been carried out with the required LFG control measures in place (e.g. LFG monitoring for "hot works").

2.4 Works Undertaken during the Month

Works undertaken during the reporting period included:

- Sheet piling work and temporary work for trenchless method
- Working pit construction for rising mains
- Construction of gravity sewer
- Excavation

3 Environmental Status

3.1 Works Undertaken during the Month with Illustrations

Works undertaken during the reporting period are identified in Section 2.4. Illustrations of these works, such as location of works, are provided in Appendix 3.

3.2 Project Area and Monitoring Locations

The site is located at Ting Kok Road in Tai Po, and the major items to be constructed are located outside the existing passive vent trench of the adjacent Shuen Wan Landfill.

The impact monitoring locations specified in the *Report on Landfill Gas Hazard Assessment* comprise "utilities' manholes and chambers" (i.e. fixed locations for purposes of environmental protection) and at excavations of 1m depth or more (i.e. variable locations for purposes of worker safety), which vary from month to month.

In terms of fixed monitoring locations, the Baseline Report identified two existing manholes. A third location – a deep borehole – was installed by the Contractor, in addition to contract requirements, to provide further coverage and an early warning of any possible LFG problems that could affect nearby surface trenches.

The fixed monitoring locations are summarised in Table 3-2:

Monitoring Station ID	Description
M1	New Deep Borehole (11m deep)
M2	Existing Manhole (2m deep)
M3	Existing Manhole (2m deep)

Table 3-2 Monitoring Locations for LFG EM&A

Project area is shown in Appendix 3 and the fixed monitoring locations are shown in Appendix 4.

4 Brief Summary of EM&A Requirements

4.1 Monitoring Parameters

During the construction phase, impact monitoring of LFG is to be carried out in accordance with the *Report on Landfill Gas Hazard Assessment* at the selected locations. LFG parameters to be monitored comprise oxygen, methane and carbon dioxide. Temperature is also recorded but this is not a LFG parameter.

4.2 Monitoring Equipment

Table 4-3 shows the equipment list for LFG monitoring.

Equipment	Manufacturer / Serial Nos.
Gas Analyser GA 2000	Geotechnical Instruments / GA 08277

Table 4-3 Equipment List for LFG Monitoring

4.3 Event and Action Levels/Plans

The baseline monitoring results documented in the baseline monitoring report for the Project (our report ref.: EA01284R0022) provided the Action and Limit (A/L) Levels for LFG impact monitoring and also the Action Plan. As per the *Report on Landfill Gas Hazard Assessment*, and in keeping with the standard presentation of LFG EM&A in other projects, both the A/L Levels and Action Plan are shown in the same table.

Table 4-4 shows the combined A/L Level and Action Plan for the Project, to be triggered if the LFG criteria are exceeded:

Parameter	A/L Level	Action Plan
Oxygen	<19%	– Ventilate to restore oxygen to > 19%
	<18%	– Stop works – Evacuate personnel/prohibit entry – Increase ventilation to restore oxygen to >19%
Methane	>10% LEL (i.e. > 0.5 % by volume)	– Prohibit hot works – Ventilate to restore methane to < 10% LEL
	> 20% LEL (i.e. > 1% by volume)	– Stop works – Evacuate personnel/prohibit entry – Increase ventilation to restore methane to < 10% LEL
Carbon Dioxide	>0.5%	– Ventilate to restore carbon dioxide to <0.5%
	>1.5%	– Stop works – Evacuate personnel/prohibit entry – Increase ventilation to restore carbon dioxide to >0.5%

Table 4-4 Action and Limit Levels and Action Plan for Landfill Gas

4.4 Mitigation Measures and Requirements in Contract Documents

Measures for mitigating LFG hazards during the construction works have been stated clearly in the *Report on Landfill Gas Hazard Assessment*, which forms part of the contract documents Specification. Relevant excerpts could be referred to the Project Profile for Upgrading of Ting Kok Road Pumping Station No. 5.

Section 5 and Appendix 5 summarise the mitigation measures and requirements as well as the implementation status.

5 Implementation Status of Landfill Gas Hazard Control Measures

The status of the mitigation measures implemented by the Contractor is listed in Appendix 5. All LFG hazard control measures have been implemented as stipulated in the contract documents and in the *Report on Landfill Gas Hazard Assessment.*

6 Monitoring Results

Calibration records for the equipment used for LFG monitoring are provided in Appendix 6. *Original Field Measurement Recording Sheets* for both fixed locations and variable locations are provided in Appendix 7.

6.1 Fixed Locations

During the reporting period, LFG was monitored at three fixed locations (for purposes of environmental protection and for "early warning" of potential LFG problems). These are shown in Table 6-5, below (**bold** indicates an exceedance of Action Level and **bold** indicates exceedance of Limit Level):

Fixed Monitoring Station ID	Date	Gas Concentration (%)			Temperature (°C)	Remarks
		Methane	Carbon Dioxide	Oxygen		
M1	10 May 06	0	**1.7**	19.4	33.0	Nil
M2	10 May 06	0	0	20.4	37.6	
M3	10 May 06	0.1	0.3	20.0	41.7	

Table 6-5 Monitoring Results at Fixed Locations

Appendix 4 shows the position of each fixed monitoring station. The concentration of carbon dioxide exceeded the Limit Level of 1.5% at borehole M1 during the reporting period (Action Level exceedances have occurred at borehole M1 in previous months). M1 is an 11m-deep borehole and the carbon dioxide concentrations may reflect possible influence of LFG at depth below the site, although no methane was detected.

The recorded level is within expected norms for a borehole and is not of concern because this is a fixed location, not part of the excavation works, and there are no safety-related issues. Borehole M1 is not affected by any ongoing Works and the exceedance is not due to the construction activities. Nor it is considered to be a non-compliance in terms of the EM&A programme and implementation of the Action/Event Plan, because these are based exclusively on worker safety in trenches – no actions are mandated in the event of an exceedance from a deep borehole and, indeed, none are practicable. Notwithstanding, the Contractor has noted this exceedance and will take this into consideration when planning surface trench works in the vicinity – this was the original intention of monitoring at borehole M1 (see Section 3.2).

6.2 Variable Locations

During the reporting period, LFG was also monitored at variable locations (for purposes of worker safety). These locations were within Portions 4, 5 and 7 as shown in Appendix 3. A total of 224 readings, each including carbon dioxide, methane and oxygen, at variable locations were taken for safety-related reasons, including excavation and hot works. There were no exceedances for Action or Limit Level at any variable locations during the reporting period.

LFG monitoring results for variable locations are provided on the *Field Measurement Recording Sheets* in Appendix 7.

7 Report on Non-Compliance and Complaints

EPD has not conducted any site visit in the reporting period.

There were no non-compliances (in terms of the EM&A programme) during the reporting period and no complaints regarding LFG were received.

8 Others

8.1 Future Key Issues

Construction activities for next month are anticipated to include:

- Sheet piling work and temporary work for trenchless method
- Excavation
- Working pit construction for rising mains
- Construction of gravity sewer
- Installation of pile head steel plate
- Construction of sub-structure

Based on the above, on the construction programme (shown in Appendix 2) and on the review of relevant Contractor's method statements by the LGT, no significant future key issues in terms of LFG have been identified at this time, although it is likely that continuing A/L Level exceedances of carbon dioxide will occur at borehole M1 – this is not a cause for concern..

LFG monitoring will be continued and the tentative monitoring schedule at fixed locations for the next three months is shown below:

- 1 June 2006
- 3 July 2006
- 1 August 2006

8.2 Comments, Recommendations and Conclusions

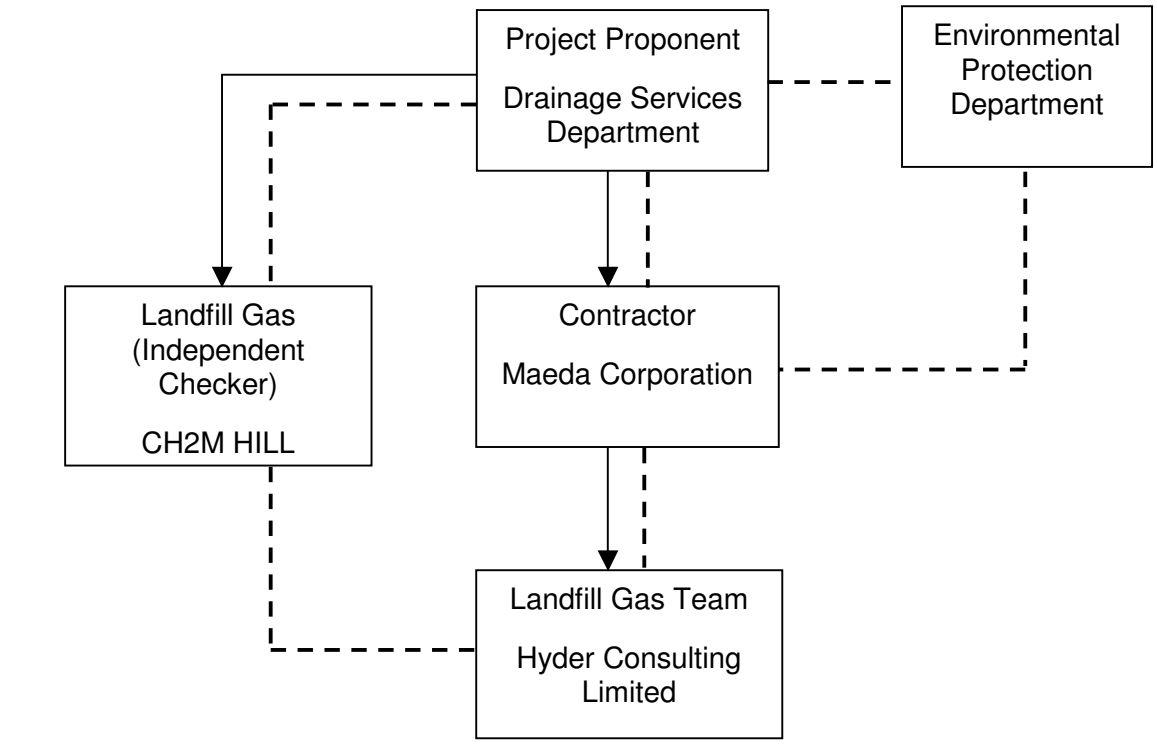
The LFG mitigation measures adopted by the Contractor during the reporting period are considered to have been implemented in a satisfactory manner and there have been no exceedances in A/L Levels at variable monitoring locations.

The EM&A programme is considered to be performed acceptably and there are no recommendations for improvements or modifications at this time.

In conclusion, there have been no significant issues relating to LFG hazard during the reporting period.

Appendix 1

Project Organisation


Project Proponent
Drainage Services Department
Environmental Protection Department
Landfill Gas (Independent Checker)
CH2M HILL
Contractor
Maeda Corporation
Landfill Gas Team
Hyder Consulting Limited
Line of communication
Line of Authority

Appendix 2

Construction Programme

Appendix 3

Location of Works and Project Area

Appendix 4

Fixed Monitoring Locations

Appendix 5

Updated Implementation Schedule

Appendix 6

Calibration Records

Appendix 7

Field Measurement Recording Sheets