

17 March 2015

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Dear Paul

New Chum Waste Disposal Facility Environmental Monitoring Annual Reporting Summary for January to December 2014

1 Introduction

GHD Pty Ltd (GHD) was commissioned by Transpacific Waste Management Pty Ltd (TPWM) to conduct groundwater, surface water, leachate, gas, dust monitoring and reporting for the January to December 2014 reporting period at the licensed waste disposal facility (WDF) at 100 Chum Street, New Chum (Lots 268 and 227 on SP 103913). A site plan identifying the monitoring locations included in this monitoring program are attached (Attachment 1 to 3).

The monitoring program has been established to assess compliance with the relevant conditions (Schedules) of the Environmental Authority (licence) EPPR00445713 (replacing ENRE00102604). This licence was issued by the Department of Environment and Heritage Protection (EHP) on 5 June 2013, under the provisions of the *Environmental Protection Act 1994*.

This report summarises the environmental monitoring conducted by GHD and provides a list of licence criteria exceedances measured at the New Chum WDF during the January to December 2014 reporting period. The following report is an amendment to the original issued on 28 January 2015.

2 Regulatory compliance

This annual reporting summary is in compliance with the requirements of Schedule H17 of the licence as outlined below:

• Any monitoring data compiled, collected or recorded as required by conditions of this environmental authority must be evaluated, summarised and reported to the administering authority on an annual basis with the annual return. Each annual monitoring report must be given to the administering authority with the annual report in a clear summarised format.

3 Environmental monitoring events

The environmental monitoring conducted at the New Chum WDF during the January to December 2014 reporting period is highlighted in Table 1.

Monitoring Date	Groundwater	Surface Water	Leachate	Landfill Gas	Dust
11 – 13 March 2014	\checkmark	\checkmark	\checkmark	\checkmark	
11 April – 13 May 2014					\checkmark
11 & 12 June 2014	\checkmark	\checkmark			
11 April to 12 August 2014					\checkmark
3 – 5 September 2014	\checkmark	\checkmark	\checkmark		
4 – 6 November 2014	\checkmark	\checkmark			
4/6 November 2014 - 3 December 2014					\checkmark
3 December 2014 – 2 January 2015					\checkmark

Table 1 Summary of monitoring events

4 Environmental monitoring summary

The field and analytical parameters measured for groundwater, surface water and landfill gas during the January to December 2014 reporting period were generally consistent with the respective datasets and as such typically complied with the licence criteria. Exceptions to these consistent results and a brief description of the respective monitoring events are outlined sections 4.1 to 4.3 below. In addition, dust deposition monitoring for non-consecutive events was also undertaken during the current reporting period. Non-conforming dust deposition results are outlined in sections 4.4.

4.1 Groundwater

The field and analytical results measured at the groundwater monitoring wells were generally consistent with the respective data sets for individual monitoring locations with the exception of those parameters and locations outlined in Table 2 below.

A statistical analysis of the quarterly groundwater monitoring results measured during the January to December 2014 reporting period indicates that observation greater than the Site Criteria (i.e. a statistically significant increase over historical concentrations) were measured for the locations and analytes detailed in Table 2.

Table 2	Statistically Significant Groundwater Results
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Monitoring Event	Monitoring Location	Parameter	Concentration (mg/L)	Exceedance
11 – 12 March 2014	BH05	Zinc	3.44	Site Criteria 2 & 3

Monitoring Event	Monitoring Location	Parameter	Concentration (mg/L)	Exceedance
	BH06	Zinc	0.254	Site Criteria 3
	BH07	Zinc	0.453	Site Criteria 3
11 – 12 June 2014	No statistically significant results were observed during this event			
3 – 5 September 2014	No statistically significant results were observed during this event			
	BH05	Sodium	475	Site Criteria 1
4 – 6 November 2014	BH05	Zinc	3.06	Site Criteria 3
	BH09	Zinc	0.671	Site Criteria 3

A review of the Site Criteria exceedances during the 2014 reporting period indicates that these measurements represent a continuation of the fluctuating range of results historically recorded.

The assumption is made in the context that the exceedances recorded did not occur consistently for parameters and monitoring locations over the course of consecutive monitoring events (i.e. elevated zinc concentrations observed in March 2014 were not observed during the June or September 2014 events). However this assumption will continue to be reassessed as part of the quarterly monitoring events in the 2015 reporting period.

On the basis of the limits of the current monitoring program, there does not appear to be any previously unidentified deterioration in groundwater quality or increasing trends in contaminant concentrations that require further investigation or management action at this point in time.

A review of the hydrogeology at the site was undertaken in the 2014 reporting period by GHD to assess the adequacy of the groundwater monitoring network. The review indicated that groundwater flows towards the east and then the north east, i.e. towards the Brisbane River. As such, monitoring well BH02 was found to be downgradient of Cell 5 and monitoring wells BH05 to BH10 were found to be upgradient of the landfill. Following the 2014 hydrogeological review, two additional inferred downgradient wells BH11 (adjacent to Cell 1) and BH12 (adjacent to Cell 2) were installed along the eastern property boundary. Whilst groundwater contours infer BH11 is downgradient of Cell 1, additional assessment of BH12 is required as this monitoring well (like BH03) may be hydraulically separated from the waste mass (refer to GHD document 41/27447/7240 Rev 0).

4.2 Surface water

Pumped discharges from the onsite sediment pond (NWH) occurred during the March and November 2014 events to reinstate the stormwater holding capacity at the site. No pumped discharged from the NWH occurred during the June or September 2014 monitoring events. As such, the field and analytical results measured at the discharge point (DIS) during the March and November 2014 monitoring events were assessed against the licence criteria outlined in Schedules D22 to D25. No licence criteria exceedances were measured during these pumped discharge events as indicated in Table 3 below.

Monitoring Event	Monitoring Location	Parameter	Concentration	Exceedance	Dates of Pumped Discharge
11 March 2014	No criteria exc	eedances wer	re observed during	this event	2-3 days per week since January 2014 and during the event
5 November 2014	No criteria exc	eedances wer	e observed during	this event	Daily during the two weeks preceding sampling and during the event

Table 3 Surface water licence criteria exceedances

During the January to December 2014 reporting period, pumped discharged only occurred during the March and November 2014 events and no licence criteria exceedances were recorded at the discharge point (DIS) during these events. During the previous reporting period (January to December 2013) licence criteria exceedances were typically recorded for dissolved oxygen and specific conductance during pumped discharge events.

It is noted that the dissolved oxygen concentrations measured at the onsite sediment pond (NWH) and the discharge point (DIS) have typically been recorded at levels greater than the lower licence criteria limit of <6 mg/L during the current reporting period. In addition, both the NWH and DIS locations have reported dissolved oxygen concentration greater than that recorded at the upstream Six Mile Creek (SMC) location (excluding the June 2014 event). During the previous reporting period specific conductance measurements at the DIS location were typically recorded at levels 10% greater than those measured at the SMC location, however this was typically not observed during the current reporting period.

Further to this, general water quality parameters recorded at the discharge point (DIS) and the up and downstream locations in Six Mile Creek (SMC and DWN) were generally within a similar range of each other during the November 2014 event. Six Mile Creek is likely to receive a proportion of its flows from groundwater based on its close proximity to Void 10 which is considered to be a window through the groundwater table as it is approximately 50 m in depth. Therefore the localised groundwater flows toward Six Mile Creek are likely to be an additional source of the similar water chemistry at the discharge point, the upstream and downstream at Six Mile Creek. In addition, the pumped discharge that occurred from the onsite sediment pond (NWH) prior to and during the March and November 2014 events may have contributed to these similar results between the DIS, SMC and DWN locations.

Further discussion of the surface water results measured at the discharge point (DIS) during the respective pumped discharge events are included in the relevant reports.

4.3 Landfill Gas

Annual landfill gas monitoring was conducted at the New Chum WDF on 13 March 2014 which included monitoring at the following locations:

- Ambient gas monitoring around, underneath (portable structures), and within any service pits associated with the site structures as well as within the Site Supervisor's office and the newly installed lunchroom and toilet block along the northern boundary of the Work Compound.
- Ambient surface monitoring conducted on a maximum grid spacing of 30 m across the surface of operational landfill Cell 5 and closed green waste cell (Cell 1).
- Ambient gas monitoring at 18 nominated locations evenly spaced around the site boundary (Boundary Monitoring).

No exceedances of the licence criteria outlined in Schedule B9 of the licence were measured during the March 2014 monitoring event. However, concentrations exceeding the adopted guideline value of 500 ppm were measured at three locations in and around Cell 5 and one location at the closed green waste cell (Cell 1). The adopted guideline value is outlined in the Queensland Department of Environment and Heritage Protection, (EHP) *Guideline, ERA 60 - Waste Disposal, Landfill siting, design, operation and rehabilitation* (EHP, 2012).

Noting the extent and limitations of the landfill gas monitoring, it was concluded that methane is generally not escaping the site via the final and intermediate cover layers of Cell 5 and the Green Waste Cell landfill units in significant concentrations (along the grid lines and at the heights monitored). Notable exceptions to this apparent trend were three measurements at Cell 5 (locations 4, 86 and 128) and a single measurement at the Green Waste Cell (location 155) where methane was detected at concentrations greater that the nominated assessment criteria of 500 ppm. The field observations recorded at the respective locations during the March 2014 monitoring event were conveyed to TPWM personnel and additional capping material was to be placed at these locations to mitigate these elevated gas measurements.

It should be noted that TPWM engaged Run Energy to install a landfill gas extraction system within Cell 5 and the Green Waste Cell (Cell 1) along with the installation of a landfill gas flare to manage the landfill gas generated at the operational Cell 5 and the closed green waste cell (Cell 1). Whilst the extraction system and the landfill gas flare have been installed (towards the north-western property boundary), the system was yet to be fully commissioned at the time this report was issued.

4.4 Dust monitoring

GHD installed six dust deposition stands (ND1 to ND6) and conduct monthly dust deposition monitoring at the New Chum WDF over a period of four months, between 11 April 2014 and 12 August 2014. Further to this, a seventh dust deposition stand (ND7) was installed to obtain baseline dust levels prior to the installation and operation of a concrete crushing facility, and undertake ongoing monthly dust monitoring of all seven locations as of November 2014 to compliment the Site's environmental monitoring program.

The collection and replacement of the dust deposition sample bottles was undertaken in accordance with the requirements of *Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air, Method 10.1: Determination of particulate matter – Deposited matter – Gravimetric method (2003).* The sample bottles were submitted to ALS Environmental (NATA accredited) for depositional dust analysis which included; total solids, soluble matter, total insoluble matter, combustible matter, ash content and

calculated rainfall/volume. Following this, monthly summaries of any exceedances were issued to TPWM. Two Dust Deposition Reports were issued to TPWM during the January to December 2014 reporting period.

In the absence of specified licence criteria, the results were compared to the guideline values outlined below:

- 4 g/m²/month as outlined in the NSW EPA, (1996) Environmental Guidelines: Solid Waste Landfills, which are derived from DECC NSW (2001) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales. This guideline is specific to landfill operations and allows for the direct comparison to the laboratory results.
- 120 mg/m² /day as outlined in the Queensland Department of Environment and Heritage Protection (EHP) *Guideline, Application requirements for activities with impacts to air, Version 2, April 2014* which incorporates trigger levels consistent with the environmental objectives of the QLD, Environmental Protection Policy (Air) 2008. This is a more generic trigger value for a wide range of dust generating activities and requires the laboratory results to be converted into mg/m² /day averaged over one month. The conversion factor of 33.3 outlined in Section 9.2 of AS 3580.10.1: 2003 was used to convert the laboratory results of g/m²/month to mg/m² /day.

Total insoluble solids results that exceeded the above adopted guideline criteria are summarised in Table 4 below:

Monitoring Event	Monitoring Location	Adopted Guideline Level	Result
	ND5	120 mg/m²/day²	123.3 mg/m²/day
11 April to 13 May 2014	ND6	4 g/m ² /month ¹	4.6 g/m ² /month
	ND6	120 mg/m ² /day ²	153.2 mg/m²/day
13 May to 12 June 2014	ND1	4 g/m ² /month ¹	5.1 g/m ² /month
	ND1	120 mg/m²/day²	169.8 mg/m²/day
	ND6	120 mg/m²/day²	123.2 mg/m ² /day
4/6 November to 3 December	ND1	4 g/m ² /month ¹	6.2 g/m ² /month
2014	ND1	120 mg/m²/day²	206.5 mg/m²/day
	ND2	4 g/m ² /month ¹	10.7 g/m ² /month
	ND2	120 mg/m ² /day ²	356.3 mg/m²/day
	ND4	4 g/m ² /month ¹	5.8 g/m ² /month
	ND4	120 mg/m²/day²	193.1 mg/m²/day

Table 4	Dust (as total insoluble solids) that e	exceeded adopted guideline levels
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Monitoring Event	Monitoring Location	Adopted Guideline Level	Result
	ND6	4 g/m ² /month ¹	7.1 g/m ² /month
	ND6	120 mg/m²/day²	236.4 mg/m ² /day
3 December to 2 January 2015	ND1	4 g/m ² /month ¹	6.3 g/m ² /month
	ND1	120 mg/m²/day²	209.8 mg/m ² /day
	ND4	120 mg/m²/day²	123.2 mg/m²/day
	ND6	120 mg/m ² /day ²	126.5 mg/m ² /day

Notes:

1 - NSW EPA, (1996) Environmental Guidelines

2 - QLD EHP, (2014) Guideline

An increase in total insoluble matter was observed at the site during the period from the 4/6 November to 3 December. Subsequent discussions with site personnel indicated the results were attributed to increased earthworks activity. In addition significant fire activity was also noted on the neighbouring properties east and south east that may also have influenced dust deposition results. No exceedances of the adopted guideline values were recorded during the June/July or July/August monitoring events at any of the locations. Dust (as total insoluble matter) appears to be present in concentrations that exceed both adopted guidelines at ND1 (located along the northern boundary) and ND6 (located along the western boundary).

5 Conclusion

The frequency of the environmental monitoring conducted at the New Chum WDF during the January to December 2014 reporting period was in accordance with the relevant Schedules of the Environmental Authority. This included quarterly groundwater and surface water monitoring and annual leachate and landfill gas monitoring. Additionally, dust deposition monitoring has also been included to complement the ongoing environmental monitoring program.

The field and analytical results measured during these environmental monitoring events were generally consistent with the respective datasets at individual monitoring locations and therefore typically complied with the licence criteria.

The only exceptions to the consistent results were the statistically significant groundwater results highlighted in Table 2. No exceedances of the surface water licence criteria occurred at the discharge point (DIS) during pumped discharge events as indicated in Table 3.

Groundwater

The available data tends to indicate that the groundwater Site Criteria exceedances appear to be a continuation of the fluctuating range of results measured at the respective wells included in the current monitoring program. The assumption is made in the context that the exceedances recorded did not occur consistently for any parameters and monitoring locations over several monitoring events.

Surface Water

No exceedances of the surface water licence criteria occurred at the discharge point (DIS) during pumped discharge events as highlighted in Table 3. Further to this, general water quality parameters recorded at the discharge point (DIS) and the up and downstream locations in Six Mile Creek (SMC and DWN) were generally within a similar range of each other during the November 2014 event. In addition, the pumped discharges that occurred from the onsite sediment pond (NWH) during the March and November 2014 events may have contributed to these similar results between the DIS, SMC and DWN locations.

Landfill Gas

Although the annual landfill gas measurements complied with the licence criteria, three measurements exceeding the adopted guideline criteria were measured in and around Cell 5 and one measurement exceeding the adopted guideline criteria was observed at the closed green waste cell (Cell 1). TPWM engaged Run Energy to install a landfill gas extraction system and associated gas flare to manage the landfill gas generated at the operational cell Cell 5 and the closed green waste cell (Cell 1). The gas extraction system and landfill gas flare have yet to be fully commissioned at the time this report was issued.

<u>Dust</u>

During the current reporting period, dust monitoring for total insoluble matter has been implemented at the site on a routine basis. Whilst data continues to be obtained on a monthly basis, an increase in total insoluble matter was detected during the period between the 4/6 November to 3 December 2014. Subsequent discussions with site personnel indicated the results were attributed to increased earthwork activity and may have been influenced by neighbouring fire activity to the east and south east of the site during this period. Dust (as total insoluble matter) appears to be present in concentrations that exceed both adopted guidelines at ND1 (located along the northern boundary) and ND6 (located along the western boundary).

On the basis of the nature, extent and frequency of the current monitoring program, there does not appear to be any previously unidentified deterioration in groundwater or surface water quality or increasing trends in contaminant, landfill gas concentrations or dust (as insoluble matter) that require further investigation or management action at this point in time.

Sincerely GHD Pty Ltd

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Mary Carter Environmental Scientist

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Alison Colella Principal Environmental Engineer

Attachment

- 1: Monitoring Locations (Figure 1)
- 2: Dust Deposition Monitoring Locations (Figure 1)
- 3: Groundwater Level Contours (Figure 2)



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