22 June 2018

Hugh Wright
Operations Manager Cleanaway Solid Waste Pty Ltd
100 Chum Street New Chum QLD 4303

Our ref: 41/29798/8039
Your ref:

Dear Hugh

New Chum Waste Disposal Facility Environmental Monitoring
New Chum Annual Letter Report 2017 – Rev 4

1 Introduction

GHD Pty Ltd (GHD) was commissioned by Cleanaway Solid Waste Pty Ltd to conduct groundwater, surface water, leachate and landfill gas monitoring and reporting for the January 2017 to December 2017 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 is provided as Attachment A.

The monitoring program has been established to assess compliance with the relevant conditions (Schedules) of the Environmental Authority (licence) EPPR00445713. This licence was issued by the Department of Environment (DES), formerly the Department of Environment and Heritage Protection (EHP) on 26 May 2016 and was amended on 17 December 2017, under the provisions of the *Environmental Protection Act 1994*.

This report summarises the environmental monitoring conducted by GHD (and others where relevant) and provides a list of licence criteria exceedances measured at the New Chum WDF during the January 2017 to December 2017 reporting period. It is noted that a discussion of the field and analytical results is provided in the relevant quarterly monitoring reports for this reporting period as shown in the report register Table 2).

2 Regulatory compliance

This annual reporting summary is in compliance with the requirements of Schedule H4 of the licence (dated 17 December 2017) 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 by GHD at the New Chum WDF during the January 2017 to December 2017 reporting period is highlighted in Table 1.

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Table 1 Summary of monitoring events

Monitoring Date	Groundwater	Surface Water	Leachate	Landfill Gas
28 to 29 March 2017	✓	✓	✓	
24 April 2017				✓
5 to 6 July 2017	✓	✓		
19 to 20 September 2017	✓	✓		
12 to 13 December 2017	✓	✓		

4 Reporting

A summary of the reports generated by GHD during the January 2017 to December 2017 reporting period are provided in Table 2.

Table 2 Report Register

Monitoring Event	Report Title	Document Reference
28 to 29 March 2017	New Chum Waste Disposal Facility Environmental Monitoring March 2017 Monitoring Event	41/29798/7958
	Exception Reporting Form	New Chum Exception Report – March 2017
24 April 2017	New Chum Waste Disposal Facility (WDF) – Landfill Gas Monitoring Gas Monitoring Report – April 2017 Rev 1	41/29798/7962
5 to 6 July 2017	New Chum Waste Disposal Facility Environmental Monitoring July 2017 Monitoring Event	41/29798/7988
	Exception Reporting Form	New Chum Exception Report – July 2017
19 to 20 September 2017	New Chum Waste Disposal Facility Environmental Monitoring September 2017 Monitoring Event	41/29798/8008
	Exception Reporting Form	New Chum Exception Report – September 2017
12 to 13 December 2017	New Chum Waste Disposal Facility Environmental Monitoring December 2017 Monitoring Event	41/29798/8031
	Exception Reporting Form	New Chum Exception Report – December 2017_Rev 1

4.1 Other Environmental Monitoring and Reporting by Other Parties

The environmental monitoring and reporting listed in Table 3 was also conducted during the January 2017 – December 2017 Reporting Period by Cleanaway and other consultants and is listed below to demonstrate reference to relevant conditions of licence EPPR00445713.

Table 3 Additional monitoring and reporting register

Monitoring Event/Report	Date/Reference	Relevant EA Condition
Dust Deposition Monitoring	Dust Deposition Monitoring Report (Report by The LZ Environmental Company Pty Limited. dated 30 January 2018)	1-H21 to 1-H23 From Dec 17 2017 onwards A2 to A5
Waste Composition Survey Report	Waste Composition Survey Report – October 2017 (Letter Report by Epic Environmental BE170088.01-CWM-NewChum Waste Composition Survey 9 October 2017 dated 26 October 2017)	-H18 to 1-H20 From Dec 17 2017 not specified
Waste Composition Survey Report	Waste Composition Survey Report – December 2017 (Letter Report by Epic Environmental BE170088.01-CWM-NewChum Waste Composition Survey-Dec_FINAL dated 18 December 2017)	-H18 to 1-H20 From Dec 17 2017 not specified
Waste Reporting	Incoming Waste stream volume is reported quarterly, and submitted to the Department of Environment and Science's "Queensland Waste Data System" (Site specific number W103083)	-
Gas Flare Emissions Monitoring Report	Compliance Monitoring Conducted on the Landfill Gas Flare Stack at the New Chum Landfill (Letter Report by AirLabs Environmental Pty Ltd AUG17161A.1 LG Flare Stack Report dated 11 August 2017	1-A18 to 1-A20 From Dec 17 2017 onwards A10 to A12

5 Environmental monitoring summary

The field and analytical parameters measured for groundwater, surface water and landfill gas during the January 2017 to December 2017 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 5.1 to 5.3 below.

5.1 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 4 below.

Table 4 Statistically Significant Groundwater Results

Monitoring Event	Monitoring Location	Parameter	Concentration	Exceedance
28 to 29 March 2017	BH05	Zinc	3.57 mg/L	Site Criteria 3
	BH06	Zinc	0.329 mg/L	Site Criteria 1, 2 and 3
	BH08	Zinc	0.408 mg/L	Site Criteria 2 and 3
	BH10	Zinc	0.617 mg/L	Site Criteria 2 and 3
5 to 6 July 2017	BH06	Zinc	0.275 mg/L	Site Criteria 1, 2 and 3
	BH08	Zinc	0.164 mg/L	Site Criteria 2 and 3
	BH10	Zinc	0.262 mg/L	Site Criteria 2
	BH11	TOC	10 mg/L	Site Criteria 3
19 to 20 September 2017	BH06	Zinc	0.183 mg/L	Site Criteria 1, 2 and 3
	BH08	Zinc	0.177 mg/L	Site Criteria 2 and 3
	BH11	TOC	8 mg/L	Site Criteria 2
12 to 13 December 2017	BH06	Zinc	0.151 mg/L	Site Criteria 1

The groundwater flow direction was reviewed on a quarterly basis in 2017, which indicates a shallow gradient at the site. In the northern portion of Lot 268 groundwater generally flows in an east to north-easterly direction and in a south-westerly and south-easterly direction across the southern portion of Lot 268. It is noted that the inferred groundwater contours in the southern portion of the Site show some variation from those historically prepared due to the absence of a well to verify the groundwater elevation on the southern boundary of the Site (BH09A was decommissioned as part of the new cell).There appears to be a groundwater ridge in the north eastern portion of the site (previously indicated to be related to fault lines under the site) that may direct groundwater in the vicinity of wells BH03 and BH11

A discussion of the statistically significant groundwater monitoring results measured during the respective quarterly groundwater monitoring events are included in the relevant report included in the report register in Table 2. Key trends are summarised as follows:

Zinc continues to display fluctuating trends at most groundwater monitoring locations across the site, including at upgradient wells BH05 and BH06, cross gradient well BH10 and downgradient wells BH08 and BH09A.

- The zinc results at upgradient BH05 were within the range of historical trends during the March 2017 monitoring event fluctuating to above Site Criteria 1, 2 and 3. It is noted that BH05 has not been sampled since the March 2017 monitoring round due to issues with the in situ pump.

- The zinc results at upgradient BH06 have been following a decreasing trend since September 2015, however remained above Site Criteria 1, 2 and 3 during the March, July and September 2017 reporting period and above Site Criteria 1 during the December 2017 reporting period.
- At BH08, zinc concentrations have continued the fluctuating trend apparent since June 2015, with results fluctuating above and below site criteria in consecutive monitoring events during 2017.
- At BH09A, zinc concentrations did not exceed site criteria for the March and July monitoring rounds however, it has not been sampled since the July 2017 monitoring round as it is understood to have been decommissioned during the adjacent cell construction works.
- At BH10, zinc concentrations have been fluctuating at levels above and below the site criteria since June 2015 with peaks in March 2016 (0.481 m/L) and again in March 2017 (0.617 m/L).

It is noted that zinc typically displays a great degree of variation in concentrations over the historical groundwater datasets and in consideration of the following multiple lines of evidence, zinc concentrations are likely to be attributed to geological conditions and not an indication of impact from the landfill:

- While results are statistically significant, the zinc concentration increases were typically less than an order of magnitude higher than historical results.
- The trend in zinc results was not reported for any other parameter.
- The fluctuating trend in zinc levels is observed in up gradient as well as cross and downgradient monitoring locations, with the highest zinc concentrations at the site typically detected in upgradient well BH05.

  Total organic carbon (TOC) concentrations at boundary well BH11 were statistically significant in July 2017 (10 mg/L) and September 2017 (8 mg/L), however a decreasing trend is observed from the peak in July 2017 to December 2017. . It is noted that the historical dataset on which the control lines are based are relatively low level concentrations (in this case less than 6 mg/L) and any fluctuation will likely be statistically significant. It is further noted that the TOC result for BH11 is of similar concentration of other upgradient, cross gradient and boundary wells (which are all relatively low level concentrations in the range of ten times the laboratory LOR and are not indicative of landfill impact) On this basis, the current TOC result for BH11 is not considered to be an indication of impact from the landfill, however will continue to be closely reviewed in future rounds to identify any trends.

Upon review of these key trends and on the basis of the scope of the current monitoring program, there does not appear to be a demonstrable deterioration in groundwater quality or increasing trends in contaminant concentrations that require further investigation or management action at this point in time.

5.2 Surface water

Scheduled pump discharges from onsite surface water bodies occurred prior to and during all monitoring events in 2017. The holding capacity of the onsite sediment pond identified as NWH is maintained by pumped discharges to the intermediate sediment pond (SED 1) which gravity feeds into Void 10 (DIS). Although these pumped discharges are rainfall dependant it is estimated that pumping occurs for approximately 12 hours per week. Monitoring location SED-1 represents the surface water discharge location from the landfill for the purposes of licence compliance (since September 2015).

It is noted that CHUM POND became a licenced discharge point on the 17th of December 2017 with the amended EA. There were no exceedances of EA condition noted for samples from this location in December 2017.

Table 5 Surface water licence criteria exceedances

Monitoring Event	Monitoring Location	Parameter	Concentration	Exceedance	Dates of Pumped Discharge
28-29 March 2017	SED-1	Specific Conductance	3,501 µS/cm	10% greater than upstream location (SMC)	12 hours per week
5-6 July 2017	SED-1	Specific Conductance	3,741 µS/cm	10% greater than upstream location (SMC)	12 hours per week
19-20 September 2017	SED-1	Specific Conductance	3,850 µS/cm	10% greater than upstream location (SMC)	12 hours per week
12-13 December 2017	SED-1	Specific Conductance	3,107 µS/cm)	10% greater than upstream location (SMC)	12 hours per week

There were variations in specific conductance (SC) throughout 2017, with all quarterly sampling results indicating a greater than 10% difference in SC between the discharge location (SED-1) and the upstream location (SMC) resulting in exceedances of the licence limits. A review of specific conductance results indicate that higher concentrations are typically recorded at the on-site pond (NWH) and the discharge location (SED-1) than at the upstream (SMC), downstream (DWN) and Void 10 (DIS).

While some variation in specific conductance was noted, general water quality characteristics recorded for discharge point (SED-1), upstream (SMC) and downstream location (DWN), did not suggest that discharge from the site had a significant impact on the water quality in the receiving environment. This consistency may also be a result of the likely hydraulic link between Void 10 (DIS) and the creek (SMC and DWN).

Further discussion of the surface water results measured at the discharge point (SED-1) during the 2017 reporting period is included in the relevant reports.

5.3 Landfill Gas

Annual landfill gas monitoring was conducted at the New Chum WMF by GHD on 24 April 2017 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 and around the perimeter of the Site Supervisor's office, weighbridge, 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 12 of the 18 nominated locations evenly spaced around the site boundary (Boundary Monitoring). Six boundary locations (locations 13-18) could not be accessed during this monitoring period.

No exceedances of the licence criteria outlined in Schedule 1-A9 of the licence were measured during the April 2017 monitoring event. However fugitive landfill gas emissions through the landfill intermediate cover layers exceeding the adopted ambient guideline value of 500 ppm were identified at three locations on the northern, western and southern batter of Cell 5 during ambient landfill gas monitoring (location 8, location 29 and location 118 respectively) and also at new location within the central portion of Cell 2. Cleanaway advised corrective actions were undertaken to mitigate the exceedances of the adopted guideline criteria. 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).

- Boundary landfill gas monitoring (approximately 50 mm above ground level at selected locations at the site's boundary) was used to assess whether the site is achieving the required assessment criteria in April 2017. GHD notes that this monitoring approach is not optimal for identifying the perimeter movement of landfill gas and understands that Cleanaway is currently considering the recommendation for installation of a network of perimeter landfill gas monitoring wells. A discussion of the guideline criteria exceedances are included in the Gas Monitoring Report shown in Table 2.

5.4 Dust monitoring

Cleanaway commissioned LZ Environmental Company Pty Ltd (LZ Environmental) to undertake dust deposition monitoring at the New Chum WDF during 2017. The following considers information and monitoring data presented in the LZ Environmental report dated 30 January 2018 titled "*Dust Deposition Monitoring Report".*

Six dust monitoring events of approximately 1 month duration each were conducted by LZ Environmental during the 2017 reporting period as follows:

- Three dust monitoring events between February 2017 and September 2017 at up to seven locations (ND1 to ND7)
  - Monitoring Event # 1 - 23.2.17-22.3.17 (4 locations)
  - Monitoring Event # 2 - 19.6.17-18.7.17 (7 locations)
  - Monitoring Event # 3 - 21.8.17-26.9.17 (7 locations)
- Three consecutive months of dust monitoring between 26 September 2017 and 3 January 2018 at 11-12 locations (ND1 to ND12). This monitoring was in response to communications from the Department of Environment and Science (DES) formerly Department of Environment and Heritage protection (DEHP) dated 25 August 2017 regarding dust complaints.
  - Monitoring Event # 4 – 26.9.17-26.10.17
  - Monitoring Event # 5 – 26.10.17-30.11.17

– Monitoring Event # 6 – 30.11.17-3.1.18

In addition to the previous seven locations and additional five points were chosen to obtain further understanding of the dust deposition rate when monitoring locations were located further from the current operating cell. Locations ND8, ND9 and ND10 were added closer to potential sensitive receptors located in Collingwood Park and locations ND11 and ND12 were added north-west, and south-west potentially downwind of operations. Figure 3, Attachment A shows the position of the Dust Deposition Monitoring Locations.

The six monitoring events were conducted in accordance with Schedules 1-H21 to 1-H23 of the Environmental Authority EPPR00445713 (amended 26 May 2016). It is considered that the locations chosen for dust deposition gauges and moreover the use of these gauges is suitable for nuisance dust monitoring.

The dust deposition sample methodology detailed by LZ Environmental was generally 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.

In the absence of specified licence criteria, the results were compared to a guideline value of 120 mg/m^2/day. This value is sourced from 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 has been adopted as a trigger value, which if exceeded may cause nuisance at a sensitive receptor such as a residence or sensitive commercial land use. The 120 mg/m^2 per day value has been converted into an equivalent monthly depositional rate for comparison the laboratory results using the conversion factor outlined in AS 3580.10.1: 2003.

Total insoluble solids results that exceeded the above adopted guideline criteria are summarised in Table 6 below:

Table 6 Dust (as total insoluble solids) that exceeded adopted guideline levels

Monitoring Event	Date	Number of Days	Unit	Boundary Adopted Guideline Level*	ND1	ND2	ND3	ND4	ND5	ND6	ND7	ND8	ND9	ND10	ND11	ND12
1	23.2.17-22.3.17	28	g/m^2/month	3.36	NA	**8.8**	1.9	1.9	NA	**4.9**	NA	NA	NA	NA	NA	NA
2	19.6.17-18.7.17	30	g/m^2/month	3.6	1.4	**8.2**	3.5	2.7	**4.9**	**4.0**	**8.0**	NA	NA	NA	NA	NA
3	21.8.17-26.9.17	36	g/m^2/month	4.32	0.9	**5.8**	1.1	1.0	2.7	4.0	1.3	NA	NA	NA	NA	NA
4	26.9.17-26.10.17	31	g/m^2/month	3.72	**12.5**	**25.3**	3.7	3.5	**7.7**	**10.5**	**132.0**	1.5	1.0	1.0	3.5	2.4
5	26.10.17-30.11.17	35	g/m^2/month	4.2	**8.9**	**6.2**	1.6	1.7	**5.4**	**8.1**	**25.4**	0.8	0.8	0.8	1.6	4.2
6	30.11.17-3.1.18	34	g/m^2/month	4.08	1.1	**12.4**	1.0	2.6	NA	**6.0**	3.6	**5.5**	0.9	0.9	1.0	4.0

Notes

- Results shaded as thus **BOLD** represent total insoluble matter results greater than adopted guideline level
- NA- No Result Available
- * Calculated Guideline Value [(120 mg/m2 per day / 1000) x monitoring duration in days]. This value is based upon the duration of the month that ends during the monitoring period.
- Event 1 - ND1 was not analysed due to broken funnel, ND5 and ND7 were not included due to their locations being not suitable due to construction activities associated with the construction of the new waste disposal cell 4b.
- Event 4 - The results provided by ALS for ND11 have been assigned to ND7 and the results for ND13 have been assigned to ND11 as per LZ Environmental Report (labelling inconsistency)
- Event 6 - The results provided by ALS did not include results for ND5 (reason unknown).
- Sample exposure period for Sample Events 3, 5 and 6 were outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1

Weather Conditions

The generation and migration of dust is dependent on a number of factors, in particular weather conditions, site activities and dust control practices.

The following observations are made with reference to the wind roses prepared (refer Table A1 in Attachment A):

- Average daily wind speeds for the monitoring events during the 2017 reporting period ranged between 9.06 km/hr – 13.83 km/hr in the morning (9 am) and 12.03 km/hr – 20.0 km/hr in the afternoon (3 pm). These are slightly higher than the long term averages for the region. [1]
- The strongest wind speeds were reported on the afternoons during dust monitoring event 5 (based on 3 pm wind direction data)
- Wind directions varied greatly over the reporting period confirming the need for a spatial distribution of gauges to assess potential dust nuisance.

Based on information presented in the LZ Environmental dust report, the following comments are provided in relation to the ambient particulate dust monitoring results for the 2017 reporting period:

- Cleanaway undertakes water sprays of stockpiled material and watering of haul roads to assist with dust suppression during periods of dry and windy weather.
- Dust monitoring location ND1 was originally located adjacent to the site entrance on Chum Street, prior to being moved closer to the operational disposal cell (Cell 5) from June 2017 onwards. This was reportedly with a view to assessing contributions to dust deposition close to the active cell.
- Dust monitoring location ND2 is located adjacent to the northern haul road within the site. ND2 results from late October 2017 may have also been influenced by the temporary stockpiling of drainage gravel for the new cell at this location.
- Dust monitoring location ND6 was influenced somewhat by external traffic along Chum Street and also from landfilling activities.
- Dust monitoring location ND7 is located adjacent to an active haulage road and also adjacent to an active tip face. Dust monitoring location ND7 had an isolated peak in ambient dust results during monitoring event 4 (26.9.17-26.10.17). Additional dust suppression was recommended by LZ Environmental which was implemented by Cleanaway. Subsequent monitoring results indicated that ambient dust was reduced by one to two orders of magnitude. Given the positioning of this monitoring location in close proximity to active areas of the site and particularly the tip face, it is not unexpected that higher results were recorded. However this is not necessarily reflective of dust nuisance at sensitive receptors beyond the site boundary. ND11 and ND12 are both receiving some insoluble matter from the landfill activities, nearby earthworks in the case of ND12 and also heavy vehicles traversing Chum Street. However results did not exceed the adopted criteria during the reporting period.

[1] Due to incomplete wind data in June/July for weather station 040004, wind speed data was also used from Archerfield Airport (Station 040211) for event 2

- The results of the dust monitoring locations positioned closer to the potential sensitive receptors or offsite downwind of operations (locations ND8, ND9, ND10 ND11 and ND12) typically did not exceed the adopted criteria during the reporting period.

6 Conclusion

The frequency of the environmental monitoring conducted at the New Chum WDF during the January 2017 to December 2017 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.

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 4 and specific conductance surface water results at the discharge location (SED-1) as indicated in Table 5.

Groundwater

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.

Fluctuating zinc results during 2017 are considered to be attributed to regional geological conditions and not a result of impacts from the landfill based on multiple lines of evidence outlined in this report.

Other statistically significant results this reporting period (TOC at BH11) are not currently considered to present a cause for concern.

Surface Water

Scheduled pump discharges from surface water bodies occurred prior to and during all monitoring events in 2017. Monitoring location SED-1 represents the surface water discharge location from the landfill for the purposes of licence compliance (since September 2015) with CHUMP POND being added as a discharge location as of the amended licence compliance (since December 2017).

Variations in specific conductance between the discharge location (DIS and SED-1) and the upstream location (SMC) occurred in all quarterly sampling events during the 2017 reporting monitoring period that exceeded the licence requirements. While some variation in specific conductance was noted, general water quality characteristics recorded for discharge point (SED-1), upstream (SMC) and downstream location (DWN), did not suggest that discharge from the site had a significant impact on the water quality in the receiving environment.

Landfill Gas

Annual landfill gas measurements complied with the licence criteria with the exception of four ambient surface monitoring points including three locations in Cell 5 (location 8 (52,500 ppm) on the north eastern batter, location 29 (520 ppm)) and one location in Cell 2 (1000 ppm). It has been noted that consideration should be given to the installation of a network of perimeter landfill gas monitoring wells to monitor landfill gas at depth, rather than continuing to undertake ambient boundary landfill gas monitoring in the future. This will provide an indication on the potential for sub-surface landfill gas migration.

Dust

Dust results (reported as insoluble matter) exceeding the adopted guideline levels were reported at a number of monitoring locations over the 2017 reporting period. However, in applying the guideline/trigger value, such exceedances do not necessarily indicate non compliance with the licence conditions as nuisance is measured at the receiver not at the point of generation. The results of the dust monitoring locations positioned closer to the potential sensitive receptors typically did not exceed the adopted criteria during the reporting period. LZ Environmental recommended increased dust suppression along haulage roads and at waste unloading points and this recommendation was implemented by Cleanaway. It is also recommended that the continuation of routine dust monitoring would also be beneficial to confirm if elevated dust generation continues at the Site.

GHD understands that Cleanaway intend to engage a suitably qualified consultant to review the dust monitoring program including the location of the dust monitoring locations for proposed cell upgrade works in 2018.

Other Environmental Monitoring

In addition to environmental monitoring undertaken by GHD and LZ Environmental during the 2017 reporting period, Cleanaway also commissioned waste composition surveys and monitoring of the landfill gas flare stack in accordance with EA conditions.

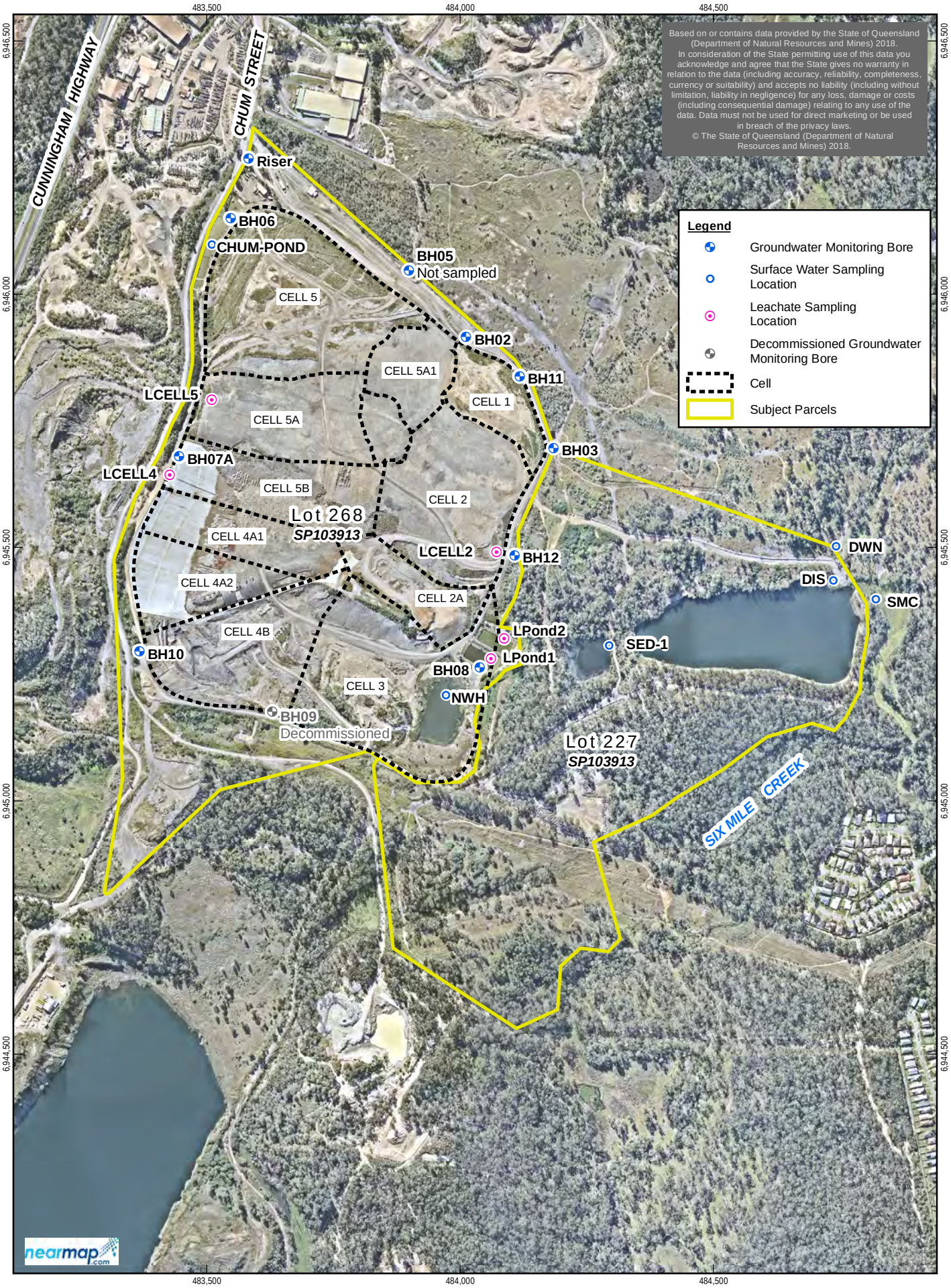
Overall Conclusion

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 that require further investigation or management action at this point in time other than the consideration to the installation of a network of perimeter landfill gas monitoring wells to monitor landfill gas at depth.

Regards
GHD Pty Ltd

Attachment A – Site Plans and Windrose

Attachment A – Site Plans and Wind Rose



1:10,000 (at A4)

0 100 200 300 400

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

GHD CLEANAWAY

Cleanaway Waste Management Limited
100 Chum Street, New Chum, 4303.

Job Number	41-29798
Revision	A
Date	19 Jan 2018

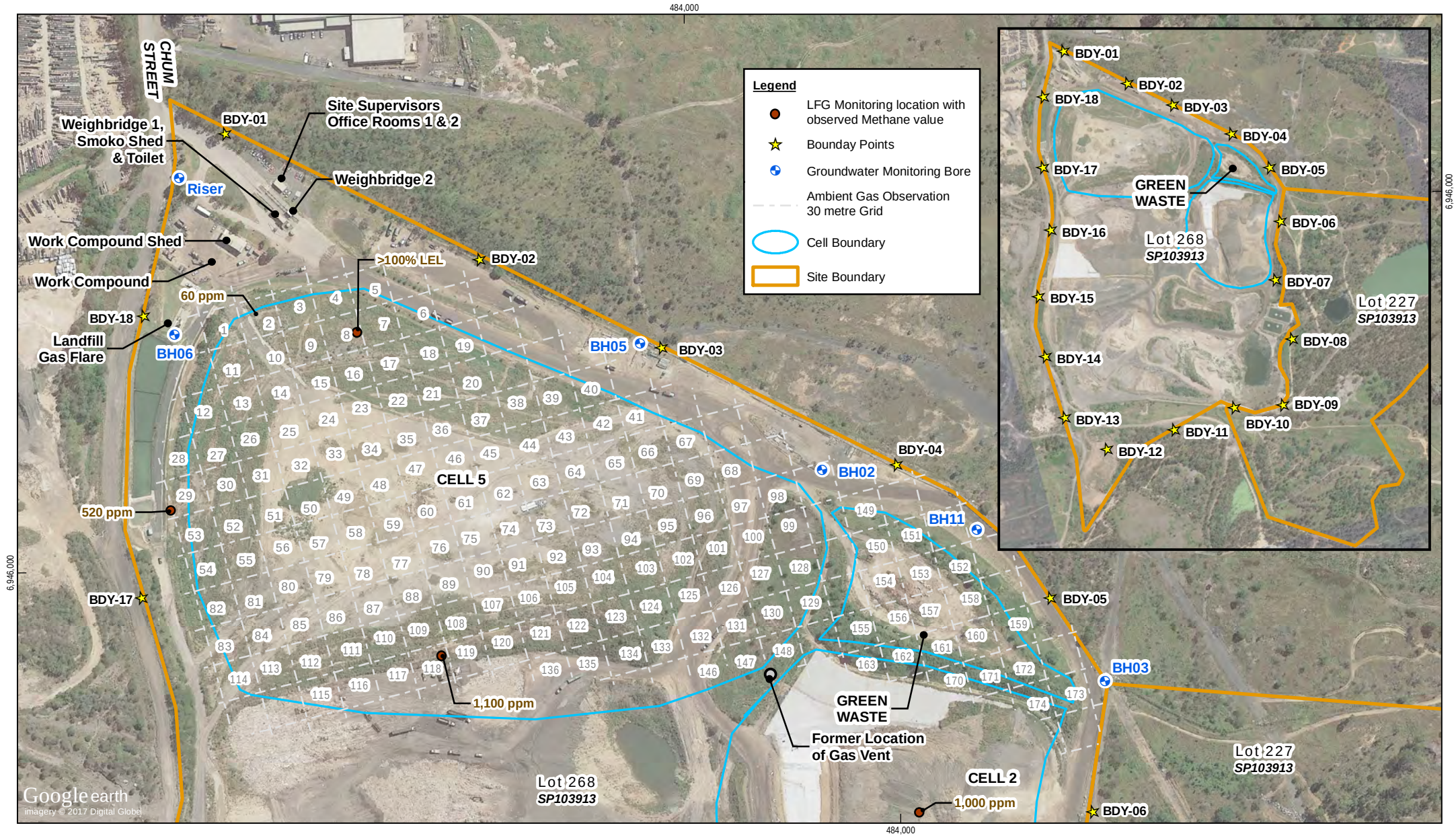
Monitoring Locations

Figure 1

N:\AU\Gold Coast\Projects\41\29798\GIS\Maps\MXD\41-29798-22_newChumGA_Dec2017.mxd

145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRM : Cadastre (May 2017), Nearmap : Imagery (Jul 2017, extracted Aug 2017), GHD : Monitoring Locations (2016/2017); Cleanaway: cell layout (Aug 2017). Created : jvc



1:4,000 (at A4)

0 50 100 150

metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 56

Cleanaway Waste Management Limited
Lot 268 & 227 on SP103913,
100 Chum Street, New Chum, 4303.

Job Number	41-29798
Revision	A
Date	08 May 2017

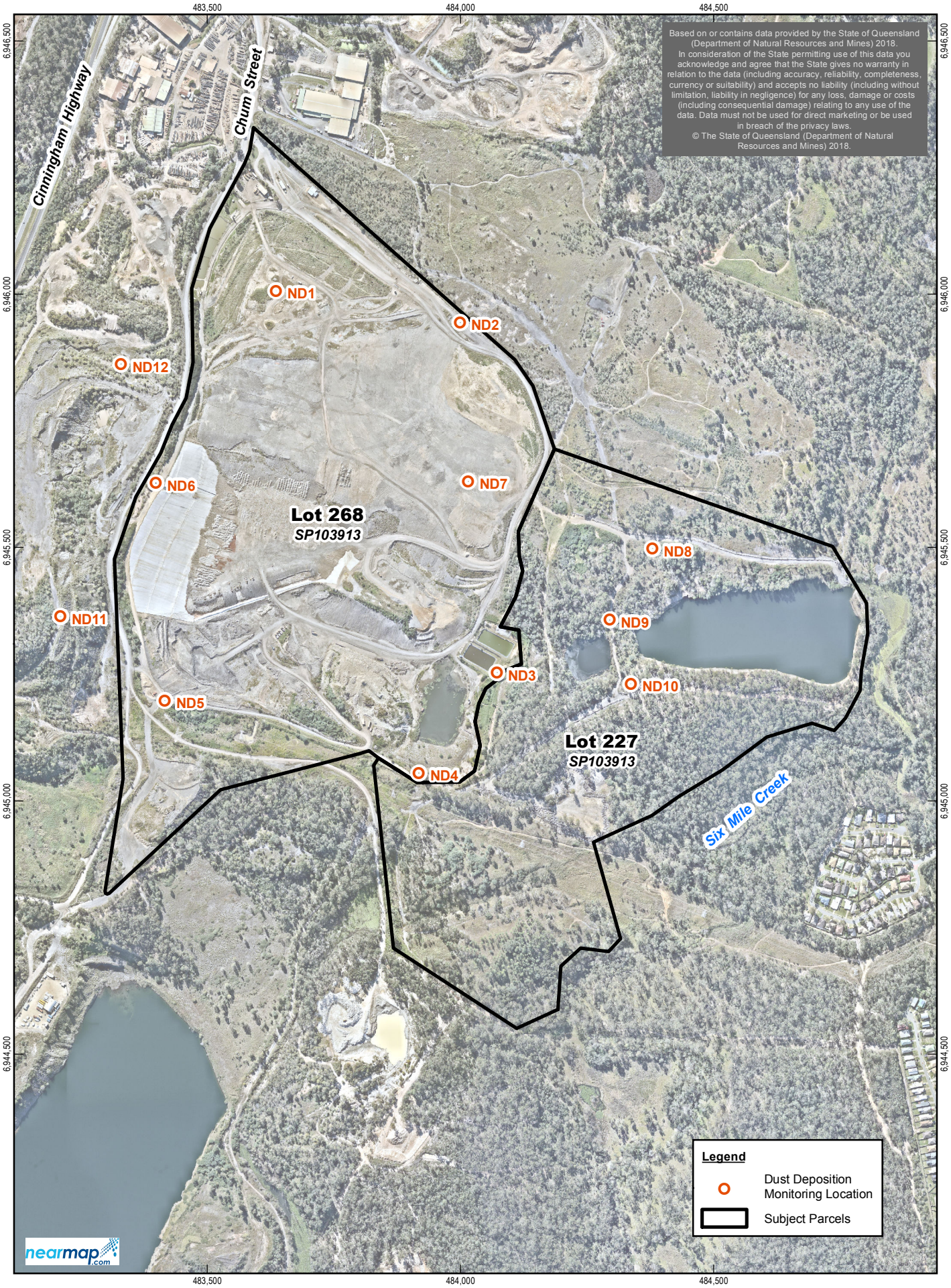
Ambient Gas Monitoring Locations and Structures Monitoring (April 2017)

Figure 2

N:\AU\Gold Coast\Projects\41\29798\GIS\Maps\MXD\41-29798-16_newChumAmbientGas_apr2017_revA.mxd

Level 4, 201 Charlotte St Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data source: DNRM: cadastre (2016), NearMap: aerial imagery (Feb, 2016, extracted May 2016). Created : jvc



1:10,000 (at A4)

0 100 200 300 400

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

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Cleanaway Waste Management Limited
100 Chum Street, New Chum, 4303.

Job Number 41-29798
Revision A
Date 24 Jan 2018

Dust Deposition Monitoring Locations

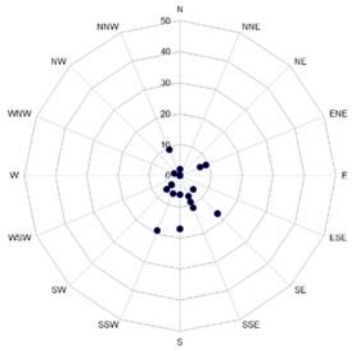
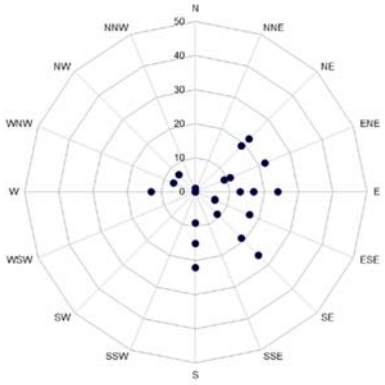
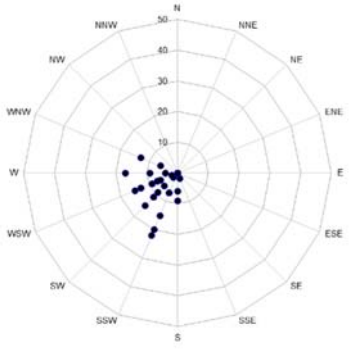
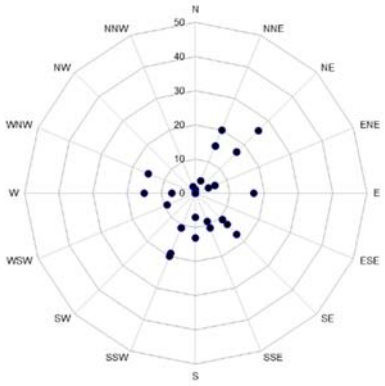
Figure 3

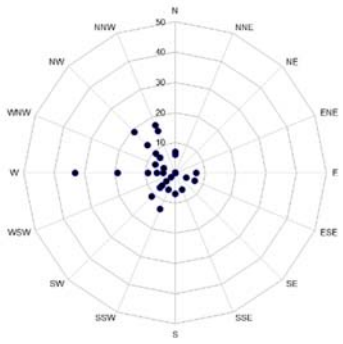
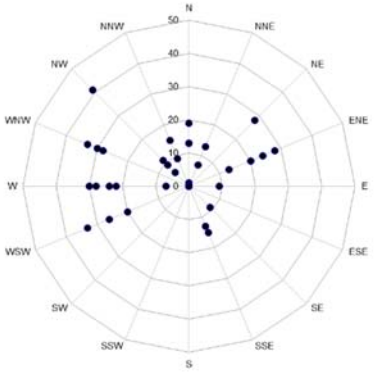
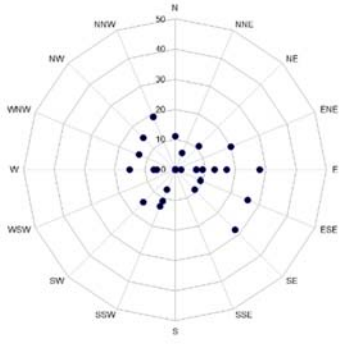
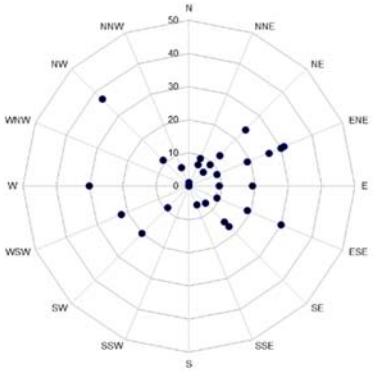
N:\AU\Gold Coast\Projects\41\29798\GIS\Maps\MXD\41-29798-24_newChumDust_jan2018_revA.mxd

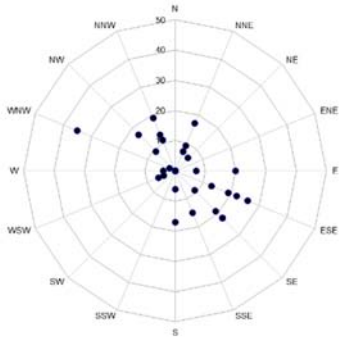
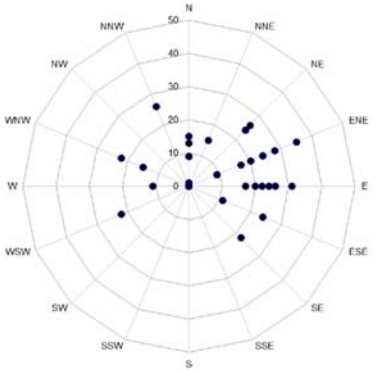
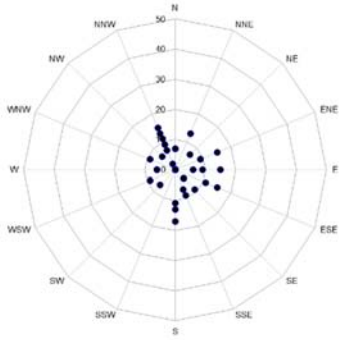
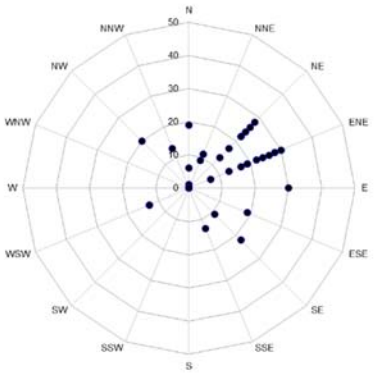
145 Ann Street Brisbane QLD 4000 T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

Data Source: DNRM : Cadastre (May 2017), Nearmap : Imagery (Jul 2017, extracted Aug 2017), GHD : Monitoring Locations (2016/2017); Cleanaway: cell layout (Aug 2017). Created : jvc

Table A1 Wind Roses

Dust Monitoring Event	9am	3pm
Event 1	 Average Wind Speed: 9.25 km/hr	 Average Wind Speed: 16.61 km/hr
Event 2	 Average Wind Speed: 9.71 km/hr	 Average Wind Speed: 12.03 km/hr

Dust Monitoring Event	9am	3pm
Event 3	 Average Wind Speed: 9.51 km/hr	 Average Wind Speed: 19.78 km/hr
Event 4	 Average Wind Speed: 13.17 km/hr	 Average Wind Speed: 16.81 km/hr

Dust Monitoring Event	9am	3pm
Event 5	 Average Wind Speed: 13.83 km/hr	 Average Wind Speed: 20.0 km/hr
Event 6	 Average Wind Speed: 9.06 km/hr	 Average Wind Speed: 18.34 km/hr