Holcim

Strength. Performance. Passion

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT
1 April 2019 – 31 March 2020

Northern Dune

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SITE DETAILS

Name of operation	Northern Dune
Name of operator	Holcim (Australia) Pty Ltd
Development consent / project approval #	Hunter Water (Special Areas) Regulations 1997 – Approval under Clause 13(1)
Name of holder of development consent / project approval	Holcim (Australia) Pty Ltd
Annual Review start date	April 1, 2019
Annual Review end date	March 31, 2020
I, Peter Radzievic certify that this audit report is a true and accurate record of the compliance status of Northern Dune Extension for the period of April 1, 2019- March 31, 2020 and that I am authorised to make this statement on behalf of Holcim (Australia) Pty Ltd. *Note.* *a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.* *b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).*	
Name of authorised reporting officer	Peter Radzievic
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Date	30 June 2020

1 STATEMENT OF COMPLIANCE

See **Table 1** for statement of commitments for the 2019/20 reporting period for Northern Dune Quarry.

Table 1: Statement of Commitments

Were all conditions of the relevant approval(s) complied with?	
Hunter Water (Special Areas) Regulations 1997 – Approval under Clause 13(1)	Yes

1.1 Name and Contact Details

Quarry Manager

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2 INTRODUCTION

Holcim Australia Pty Ltd (Holcim) acquired the Northern Dune site from Sibelco Australia Pty Ltd (Sibelco) on 31 March 2020, the final day of the reporting period.

On the 18th July 2002, Unimin Australia Limited (now trading as Sibelco Australia) was granted approval under Clause 13(1) of the *Hunter Water (Special Areas) Regulations 1997* to carry out extractive operations in the Tomago Sand Beds Catchment Area (Special Areas Approval). This relates to an area known as the Tanilba Northern Dune located near Oyster Cove in the Port Stephens Shire (the site). A copy of the Approval has been attached Appendix 1.

The Special Areas Approval requires that an Environmental Management Report be submitted on the anniversary of the Date of Issue for the term of the approval. Part 3, Clause 5, subsection 4 (a)) of the licence stipulates the requirements of the report:

*"The Approval Holder must submit a report to the Director-General on each anniversary of the Date of Issue for the term of this Approval (**Environmental Management Report**), addressing:*

- *(i) the performance of and compliance with the provisions of the **Groundwater Management** Plan by the Approval Holder;*
- *(ii) the performance of and compliance with the provisions of the **Rehabilitation Plans** by the Approval Holder;*
- *(iii) the performance of and compliance with the provisions of any **other requirements** of this Approval by the Approval Holder;*
- *(iv) any instances in which the Approval Holder has not satisfied the requirements of the Environmental Management Plan or this Approval, indicating any reason for that non-compliance and any action that is proposed to be introduced, or has already been implemented, to prevent or remedy the non-compliance;*
- *(v) identification of trends in monitoring data from the Groundwater Management Plan and Rehabilitation Plans over the life of the Extractive Operations; and*
- *(vi) environmental management targets and strategies for the subsequent year."*

This Annual Environmental Management Report (AEMR) has been prepared to report on mining activities undertaken during the past 12 month reporting period from 1st April 2019 to 31st of March 2020 at the Tanilba Northern Dune. This report addresses the site's present compliance obligations and status, activities of the past twelve-month reporting period and the proposed activities for the following 12 months.

This AEMR will be circulated to the Hunter Water Corporation (HWC), NSW Office of Water (DPI) and Port Stephens Shire Council.

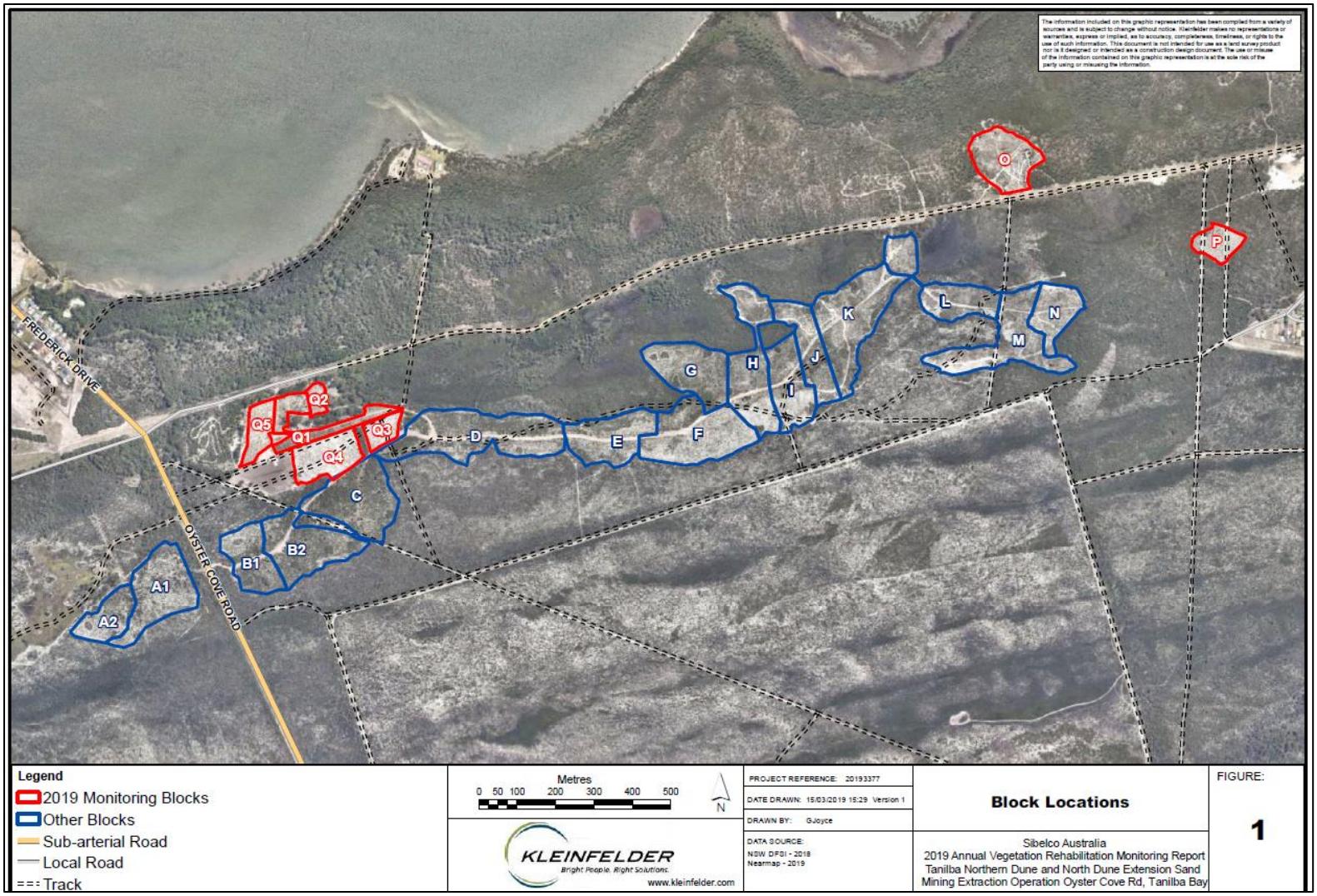

Figure 1: Northern Dune Site Boundary and Management Block Locality

2.1 Change of Ownership

The Northern Dune Operations were purchased by Holcim from Sibelco on the 31 March 2020, the final day of the 2019/20 Annual Review (AR) reporting period. As such, while Holcim are submitting this AR, much of the document refers to actions or correspondence regarding Sibelco.

2.2 Background Information and Mining History

The Tanilba Northern Dune is an elevated sand dune system located on the Tilligerry Peninsula adjacent to the township of Oyster Cove in the Port Stephens Shire, New South Wales.

White silica sand has been extracted from the Tanilba Northern Dune by several companies at different locations since 1991 - the approved extraction area in relation to the regional context can be seen in Figure 1.

Prior to 2003, the western parts of the northern dune were mined by ACI Operations Ltd. Sibelco commenced operations in 2004 and areas that have been mined by Sibelco since 2005 can be seen below in Figure 2.

The Tanilba Northern Dune site is comprised of a number of approval areas managed jurisdictionally by Crown Lands, Hunter Water and Department of Planning, Industry and Environment (DPIE) approvals as detailed in Table 3.

In 2013 approval was granted by the Minister for Planning and Infrastructure to extend the approval area for quarrying activities by 9 ha in an area to the north of the existing extraction operations at Zone 1. This part of the project, known as the Tanilba Northern Dune Extension Project, was declared a State Significant Development and operates under approvals issued by DPIE (Project Approval MP 09_0091 issued on 8 March 2013) and Hunter Water Corporation (HWC) (BN13/5769 issued on 25th of November 2013 under clause 10 (1) of the Hunter Water Regulation 2010). A separate Annual Report relating to operations in the Extension area only has been prepared and provided to DPIE and HWC. A summary of operating parameters at the Tanilba Northern Dune during the reporting period (reportable per the January 2015 Annual Environmental Management Report guidelines) is provided below.

Table 2: Summary of operations

Parameter	Site detail
Operating hours	Daylight hours from 7:00am to 6:00pm (light permitting) Monday to Friday.
Infrastructure	No permanent infrastructure has been constructed on-site at the Northern Dune as per approvals.
Construction activities	No construction took place at Northern Dune during the reporting period.
Equipment management	No chemicals or mobile plant are stored overnight at Northern Dune
Waste management	No bins or other waste management facilities are kept on site - any waste produced is removed at the end of each working day.
Lighting	Northern Dune does not operate outside of daylight hours and therefore does not have a lighting system installed.

Parameter	Site detail
Exploration	No exploration took place at the Northern Dune Extension during the reporting period.
Blasting	Blasting does not occur at the Northern Dune Extension Project site.
Land clearing	No land clearing occurred during the reporting period.
Extraction	Extraction ceased at the site on December 13 2018. No extraction occurred during the reporting period.

2.3 Activities in the Reporting Period

No extractive mining activities took place during this AEMR reporting period. Mining activities at the site ceased in 2016. Activities undertaken during the reporting period relate primarily to management of the rehabilitated areas and ongoing monitoring requirements as described in the Environmental Management Plan (EMP) and sub-plans.

Mined areas are required to be rehabilitated in accordance with the approved Rehabilitation Plans as defined in Clauses 11 and 12 of the Special Areas Approval. Once rehabilitation is complete, the rehabilitated areas will be returned to their respective owners. Other activities undertaken during the reporting period include ongoing groundwater monitoring undertaken in accordance with the approved GMP (clause 9) as well as regular inspections of the rehabilitated areas to determine any maintenance requirements.

3 APPROVALS

Operations in the Tanilba Northern Dune are undertaken in accordance with the various conditions outlined in the approval documents listed in Table 3 below.

Table 3: Approvals for Northern Dune Extension

Approval Authority	Approval Document
Hunter Water Corporation	Hunter Water (Special Areas) Regulations 1997 – Approval under Clause 13(1)
Crown Lands Licence	LI316308
Crown Lands Licence	LI190885
Port Stephens Council	DA 1139/94

4 OPERATIONS SUMMARY

4.1 Exploration

No exploration activities were completed during the reporting period.

4.2 Land Preparation

No clearing took place during the reporting period. All areas of the site were undergoing rehabilitation and covered by vegetation

4.3 Construction Activities

There was no construction undertaken during the Annual Review period.

4.4 Quarry Operations

No extraction occurred during the reporting period. Only rehabilitation activities were performed and are discussed in Section 7. No extractive material was transported from site.

4.5 Next Reporting Period

Extraction at the Northern Dunes site has ceased. Only rehabilitation activities are proposed during the next reporting period. These are discussed further in Section 7.3. Groundwater monitoring will also be performed as per the Groundwater Management Plan (GMP).

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 Actions from 2018/19 Annual Review

Following submission of the 2018/19 Northern Dune AEMR, as site visit was held with HWC which resulted in the comments presented in Table 4. The site visit incorporated discussion at the locations displayed in Figure 1**Error! Reference source not found.**

Table 4: Summary of action item correspondence timeline following 2018/19 Annual Review

Block	HWC Comment	Recommended Action	Action to be taken in 2020/21
A	Contains African Love and Red Natal grass and gravel, particularly at entrance and along old access road.	Access / Haul road requires rehabilitating. Gravel and grass should be removed before grasses spread. If the haul road is still required, then edges should be managed (sprayed).	Haul road gravel to be removed where possible (where access is not needed). Where removal occurs, rehabilitation will be commenced in line with the Landform and Vegetation Rehabilitation Plans.
B	Good rehab. Plants are seeding and flowering so are self-sustaining. East of access road has less canopy than west of access road. This is due to not as many trees being planted and the resultant presence of predominantly shrubs.	Potential for tree planting.	Assessment to be made investigating potential to plant trees.
C	Weeds (African Lovegrass and Natal Red Grass) are present along haul road edges and are infiltrating the block from there. Walking the pipeline easement reveals weeds (African Lovegrass) are spreading deeper into the block. Access road is acting as a source for weeds, while rest of block is the sink.	Easy access weeds (grasses) should be removed however those deeper in the block would require significant disturbance to perform good rehab due to access. These areas should be monitored and sprayed if required.	Weed mapping to be performed and recommendation to made for appropriate treatment. Recommended treatment to be performed.
D	RL depth marker survey point sighted. Presence of African Lovegrass and Red Natal Grass along access road. Grasses are growing in organic matter trapped by the gravel left on the access road.	Access / Haul road requires rehabilitating. Gravel and grass should be removed before grasses spread. If the haul road is still required, then edges should be managed (sprayed).	Haul road gravel to be removed where possible (where access is not needed). Where removal occurs, rehabilitation will be commenced in line with the Landform and Vegetation Rehabilitation Plans.

Block	HWC Comment	Recommended Action	Action to be taken in 2020/21
E	Presence of African Lovegrass and Red Natal Grass along access road. Grasses are growing in organic matter trapped by the gravel left on the access road.	Access / Haul road requires rehabilitating. Gravel and grass should be removed before grasses spread. If Haul road is still required then edges should be managed (sprayed).	Haul road gravel to be removed where possible (where access is not needed). Where removal occurs, rehabilitation will be commenced in line with the Landform and Vegetation Rehabilitation Plans.
F	Block F has experienced a fire event at an age where it can not recover. As a result there is the presence of weed grasses throughout which are spreading rapidly, particularly along an old unrehabilitated secondary access road to the south.	Access road requires rehabilitating. Gravel and grass should be removed before grasses spread.	Haul road gravel to be removed where possible (where access is not needed). Where removal occurs, rehabilitation will be commenced in line with the Landform and Vegetation Rehabilitation Plans.
G	Block G has experienced a fire event at an age where it can not recover. As a result there is the presence of weed grasses throughout which are spreading rapidly	Block G requires significant weed control / removal following fire event.	Weed mapping to be performed and recommendation to made for appropriate treatment. Recommended treatment to be performed.
H	Block H requires significant work due to the effects of fire followed by drought conditions. This will include brush matting and seeding. At present it will not meet the criteria set out in the rehabilitations plans implemented by Kleinfelder due to the conditions experienced.	There are two seed islands present within the block that were left untouched by the fire. These are a good source of seed that can be utilised for ongoing rehabilitation. The presence of Casuarina is anomalous to the rehabilitation plans and this should be removed to stop succession and predominance of this species.	Casuarina to be removed.
I	Edges of haul road are significantly raised forming a bund.	Edges of haul / access road require spreading / smoothing to achieve the desired final landform.	Haul road gravel to be removed where possible (where access is not needed). Where removal occurs, rehabilitation will be commenced in line with the Landform and Vegetation Rehabilitation Plans.
J	Significant rubbish debris on side access road (car parts and building materials). The presence of Casuarina is anomalous to the rehabilitation	Rubbish to be removed. Large trees to be removed.	Casuarina to be removed. Rubbish to be removed.

Block	HWC Comment	Recommended Action	Action to be taken in 2020/21
	plans and this should be removed to stop succession and predominance of this species. Otherwise there is good succession, cover and density in Block J.		
K	Weed (grasses) problem on access road and along edges – this is again related to the presence of gravel which traps clay material and provides good growing opportunity for weeds to become established.	Both gravel and grass require removal. Could be mechanical or spraying.	Haul road gravel to be removed where possible (where access is not needed). Where removal occurs, rehabilitation will be commenced in line with the Landform and Vegetation Rehabilitation Plans.
L	Almost a total absence of weeds. Debris / Rubbish present (cans / wood burning stove) Evidence of a grass tree having been removed (stolen).	Rubbish requires removal.	Rubbish to be removed.
M	There is an old access road present which does not contain grasses. This is a good example of how gravel removal works to stop to growth of weed grass species and allows rehab to progress effectively.	Nil	Nil
N	Good rehab, progressing well.	Nil	Nil
O	The access road in proximity to Rutile road has fibro sheeting (potential for asbestos) and a lawnmower (potential for petroleum) dumped by the public.	Rubbish requires removal.	Rubbish to be removed.

6 WATER MANAGEMENT

A Groundwater Management Plan (GMP) was prepared for the project under Clause 9 of the Special Areas Approval. This section addresses compliance with the approved GMP as required by the following clauses under the Approval:

- Part 3, Clause 5, section 4 (a) (i): performance and compliance with the provisions of the GMP.
- Part 3, Clause 5, section 4 (a) (v): identification of trends in monitoring data from the GMP over the life of the Extractive Operations.

Surface water monitoring is not required, however during the reporting period, visual inspections were carried out throughout the operational and rehabilitated areas with no surface water or ponding being noted. No environmental incidents or implementations of the Emergency Response Plan (ERP) in relation to groundwater occurred.

The GMP was revised as per the project requirements and approved in March 2020.

6.1 Groundwater Management Measures

Groundwater Management issues are managed by the regulatory approved GMP. The GMP has been developed to maintain compliance with the conditions of consent and licensing requirements stipulated by the relevant regulatory authorities, during development and operation at Northern Dune. The GMP provides a formal framework for ongoing monitoring of groundwater at the site to manage the potential impact of sand extraction on groundwater level and quality.

Section 2.5.1 of the 2017 GMP states operational groundwater quality monitoring is undertaken six monthly once mining commences in a zone, and will continue at a lower frequency for four years after mining ceases or as otherwise determined by DPI-Water and HWC.

Section 4.4 of the GMP states that the GMP will be reviewed at the completion of sand extraction in a zone and / or prior to commencement of operations in each new zone. If this review indicates a need to change programs or procedures, then a submission outlining the proposed changes and the need for them will be made to DPI-Water and HWC.

A revised GMP was submitted and approved in March 2020 due to the cessation of extraction and progression of the project into a rehabilitation activity. The revised GMP includes monitoring at a reduced number of bores that removes monitoring related to areas where mining ceased at least four years previously. It was also revised to lower the frequency of groundwater quality monitoring and reporting for bores that are within the four-year transition period.

This resulted in the groundwater quality monitoring locations and frequencies listed in Table 5 remaining. The locations of these monitoring bores are shown in Figure 2.

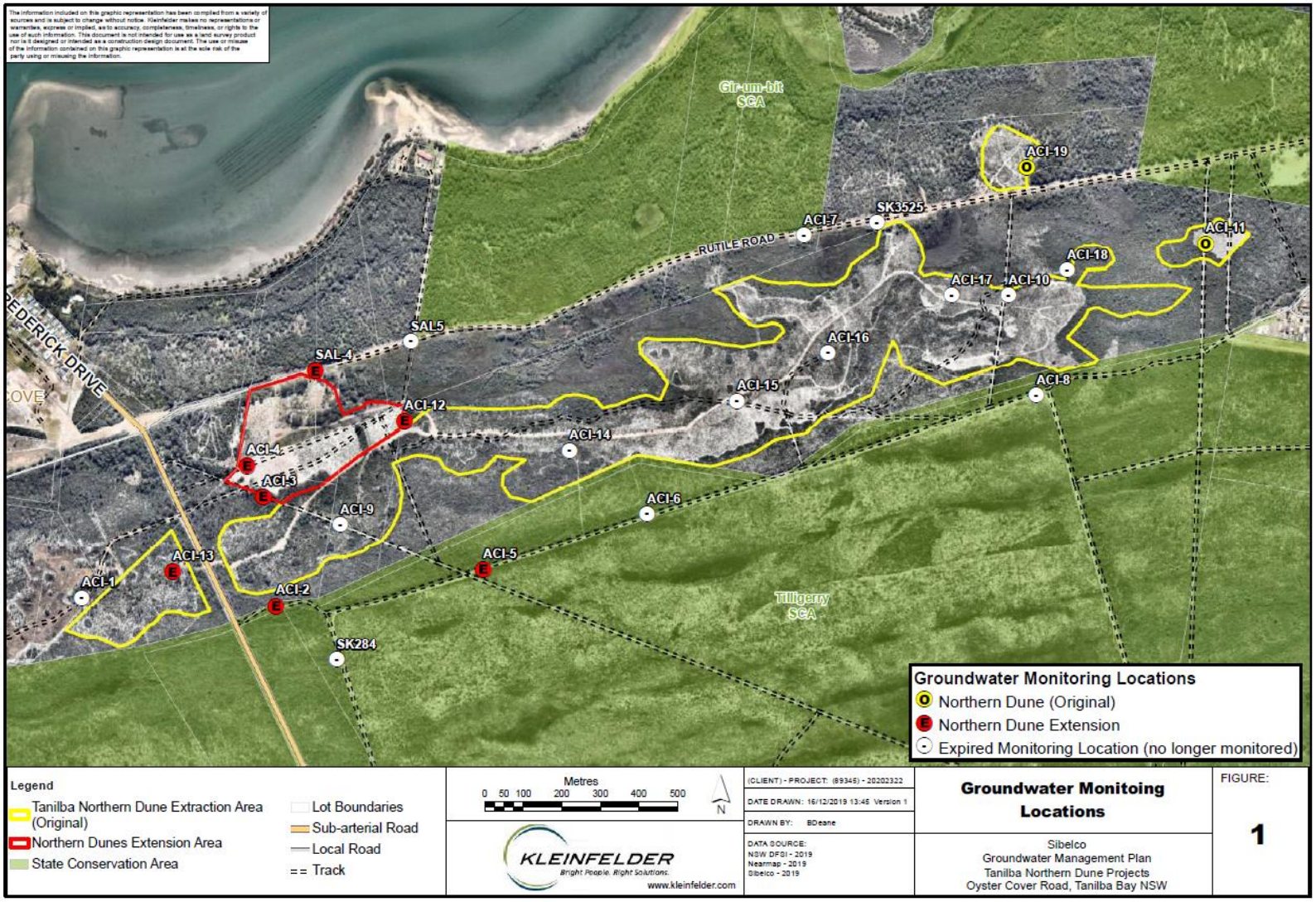

Figure 2: Location of the Tanilba Northern Dune Projects and Associated Current Groundwater Monitoring Locations

Table 5: Current Groundwater Quality Monitoring Locations

Project	Agency / Approval Jurisdiction	Monitoring Location Name	Easting	Northing	End of Mining Activity	Groundwater quality Monitoring Frequency	Groundwater Level Monitoring Frequency
Northern Dune	HWC	ACI-11	404951	6377742	Ceased Jan 2017	Annually	Monthly
	HWC	ACI-19	404487	6377941	Ceased Jul 2016	Annually	Monthly

Prior to the updated GMP, The previous revision described a groundwater monitoring network that consisted of 23 bores. This network covered both the Northern Dune Extension Area and the wider Northern Dune area which is subject to separate approvals and reporting. Historically, due to a lack of updates to the GMP, the AR for the Northern Dune area has considered a wider network, which was not necessarily relevant to activities on the site, or required by the approvals. As such the 2018/19 AR reported on the following monitoring locations (see Figure 2 for location):

- ACI-2;
- ACI-3;
- ACI-4;
- ACI-5;
- ACI-9;
- ACI-12;
- ACI-13;
- SAL-4;
- SAL-5.

This program was monitored until the reduced program was approved in March 2020. The results for this wider monitoring continued into this reporting period and were provided in the final biannual groundwater monitoring report produced in October 2019 and submitted to DPIE and HWC. This report is available in Appendix 2. The results of the reduced requirements of the current GMP, as per Table 5 are reported in this AEMR in the section that follows.

Groundwater quality is tested for the following parameters:

- Arsenic.
- Conductivity.
- Iron.
- Manganese.
- pH.
- Total Petroleum Hydrocarbons (TPH).

6.1.1 Groundwater Levels

Wider groundwater monitoring was initiated at Northern Dune in 2002, prior to the commencement of sand extraction in 2003. Baseline groundwater level and quality monitoring is undertaken within a planned zone prior to commencing sand extraction. Baseline groundwater level monitoring is used to create a Predicted Maximum Groundwater Elevation (PMGE) which is then used for determining depth of extraction and final landform.

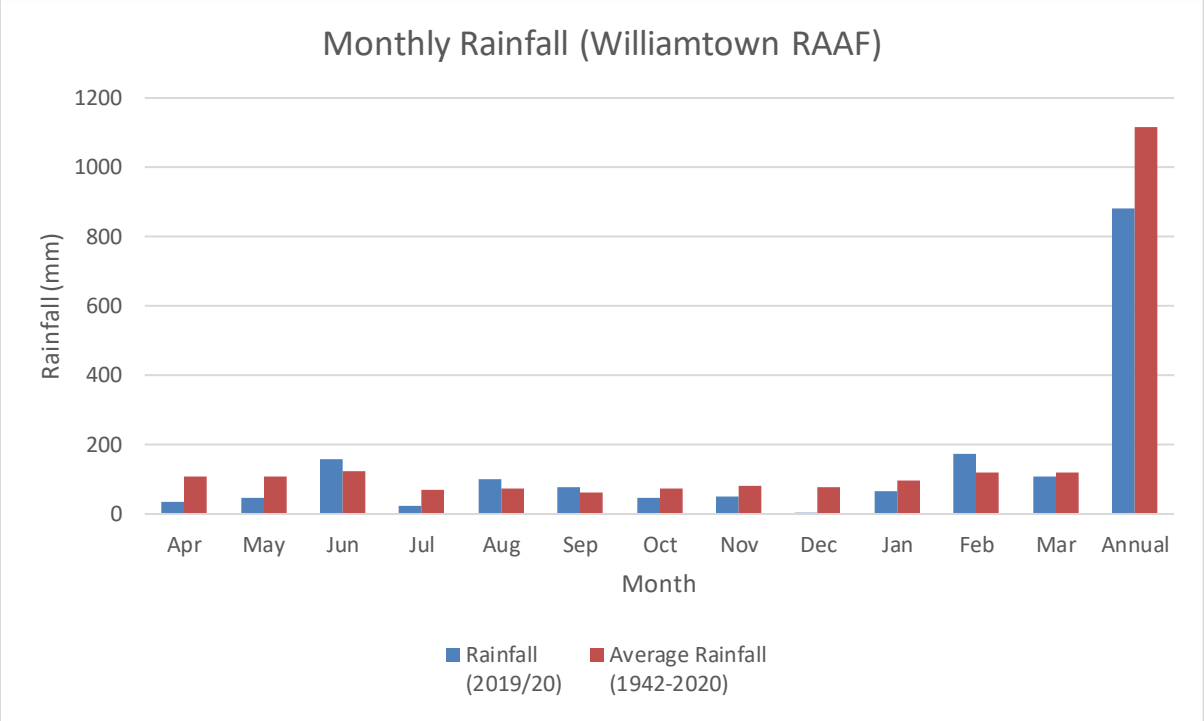

Chart 1: 2019/20 Monthly Rainfall at Williamtown RAAF

Historically groundwater level data is collected monthly across the entire wider monitoring network with reporting against the piezometers used to analyse PMGE surfaces for the extraction zones.

For the Northern Dune area, in the March 2020 revision to the GMP, the monitoring locations have been reduced to those that are considered most relevant to groundwater level observation as detailed in Table 5.

Other remaining locations within the wider monitoring network within the revised GMP are considered to be more applicable to the Northern Dune Extension area, and of less significance to the specific Northern Dune area (this report). The results for these locations are provided in tabulated form for this reporting period in (Table 6), along with the wider monitoring network for historical comparison should it be required.

The hydrographs in Appendix 3 demonstrate the groundwater trends throughout the life of the project, and Table 6 presents the monthly results for the current reporting period which demonstrate that all locations were monitored monthly (or weekly) during the current reporting period as per the requirements.

Annual rain monitoring data recorded at Williamtown throughout the reporting period has been included in Chart 1 for reference. During the reporting period, the highest recorded rainfall was in February 2020 with 171.6 mm being recorded. December 2019 was the lowest, with only 0.8 mm falling throughout the month. Figure 12 also presents the historical average monthly rainfall at Williamtown. The observations are that there is below average rainfall over the annual reporting period, and rainfall appears to show a trend of having less frequent but more significant rain events and longer drought periods when compared to the historical average. This is likely to influence the groundwater levels which respond to rainfall.

When rainfall levels exceeded more than 100mm in a seven-day period, bores are monitored weekly for a total of four weeks. This occurred once during the reporting period in February 2020 and subsequent weekly monitoring was performed, the results of which are presented in Table 6.

Groundwater level monitoring results (Table 6) demonstrate that there have been no exceedances of the PMGE during the reporting period.

Table 6: Groundwater Levels at Northern Dune Monitoring Locations

Date	ACI-1	ACI-2	ACI-3	ACI-4	ACI-5	ACI-6	ACI-7	ACI-8	ACI-9	ACI-10	ACI-11	ACI-12	ACI-13	ACI-14	ACI-15	ACI-16	ACI-17	ACI-18	ACI-19	SAL4	SAL5
8/04/2019	7.12	7.02	7.37	7.43	6.96	6.91	7.73	7.11	7.30	8.02	6.60	7.57	7.49	7.35	#N/A	6.84	7.19	6.39	8.18	7.20	6.73
1/05/2019	6.93	6.84	7.25	7.33	6.76	6.79	7.70	6.95	7.19	7.91	6.51	7.57	7.73	7.34	7.30	6.75	7.03	6.27	8.13	7.06	6.71
3/06/2019	6.91	6.82	7.21	7.09	6.71	6.78	7.83	6.94	7.12	7.88	6.47	7.57	7.73	7.34	7.29	6.72	6.61	6.25	8.12	7.10	6.93
3/07/2019	7.61	7.56	7.84	7.87	7.49	7.51	8.38	7.59	7.78	8.54	7.08	7.86	7.73	7.66	7.91	7.43	7.64	6.90	8.56	7.61	6.93
1/08/2019	7.45	7.33	7.68	7.73	7.28	7.29	8.36	7.40	7.65	8.80	6.95	7.72	7.33	7.46	7.75	7.21	7.45	6.21	8.63	7.49	7.02
29/08/2019	7.25	7.12	7.54	7.60	7.08	7.09	8.06	7.24	7.64	8.23	6.81	7.72	7.33	7.37	7.68	7.05	7.27	6.58	8.46	7.33	6.94
26/09/2019	7.72	7.56	7.91	7.93	7.41	7.49	8.34	7.56	7.86	8.53	7.12	7.72	7.76	7.67	8.02	7.37	7.57	6.93	8.71	7.62	7.07
30/10/2019	7.41	7.04	7.63	7.73	7.14	7.14	8.03	7.14	7.59	8.23	6.85	7.62	7.72	7.35	7.72	7.10	7.34	6.64	8.51	7.37	6.83
27/11/2019	7.30	6.92	7.48	7.63	6.86	7.02	7.74	8.01	7.31	9.03	6.67	7.61	7.71	7.29	7.39	6.99	7.07	6.47	8.14	7.11	6.58
30/12/2019	7.75	6.76	7.22	7.30	6.63	6.71	7.47	6.75	7.08	7.68	6.34	7.67	7.83	7.41	7.18	6.42	6.87	6.32	7.97	7.06	6.31
29/01/2020	7.75	6.44	7.09	7.14	6.53	6.53	7.51	6.76	6.93	7.88	6.44	7.62	7.73	7.41	6.98	6.52	6.87	5.82	7.94	6.95	6.61
10/02/2020	7.22	7.06	7.48	7.70	7.09	7.14	8.30	7.32	7.38	8.28	6.94	7.71	7.77	7.34	7.62	6.82	7.28	6.66	8.41	7.40	6.88
17/02/2020	7.22	7.02	7.57	7.75	7.11	6.99	8.01	7.28	7.45	8.21	6.99	7.62	7.72	7.41	7.52	7.02	7.00	6.64	8.52	7.46	6.96
27/02/2020	7.05	6.94	7.52	7.58	6.99	6.76	8.01	7.20	7.33	8.18	6.69	7.67	7.72	7.41	7.32	7.02	7.31	6.52	8.30	7.35	6.85
6/03/2020	7.05	6.72	7.24	7.26	5.98	6.69	8.00	7.16	7.42	8.27	6.61	7.67	7.78	7.41	7.41	7.02	7.29	6.55	8.24	7.30	6.90
26/03/2020	6.82	6.81	7.25	7.31	6.78	6.81	7.90	7.02	7.17	7.98	6.63	8.61	7.73	7.41	7.42	7.02	7.07	6.42	8.38	7.21	6.78
PMGE	**8.82**	**8.44**	**9.47**	**9.31**	**8.16**	**8.29**	**8.60**	**8.86**	**9.31**	**9.49**	**9.54**	**9.28**	**9.20**	**9.02**	**9.26**	**9.26**	**9.47**	**9.12**	**9.06**	**8.65**	**7.20**

Note: Highlighted cells are the location relevant to the Northern Dune. Historically all locations in the wider area have been provided. Going forwards only the location relevant to the Northern Dune will be continued, as per the revised GMP.

In accordance with the GMP, the results of groundwater level monitoring are analysed to determine whether they are anomalous and whether further sampling is required. If further sampling confirms anomalous results, then notification to the regulators is required.

During the reporting period there were no groundwater level exceedances or anomalous results at any of the monitoring points, as demonstrated by Table 6.

6.1.1.1 Groundwater Level Results Discussion and Trend Summary

During previous reporting periods, it was noted that the trend observed in groundwater levels is that they fluctuate naturally in response to rainfall. During this reporting period Table 6 demonstrates the same trend is observed; groundwater levels rise as there is increased monthly rainfall and fall during periods of reduced rainfall. This trend is highlighted by the elevated levels following the significant rain events in June 2019 and February 2020. The January 2020 rain event resulted in weekly monitoring being undertaken as required by the GMP. The annual trend shows that following rain significant rain events, groundwater levels return to the expected fluctuating trend over time.

The ongoing fluctuating trend over the life of the project is shown in the hydrographs provided in Appendix 3. As the groundwater in the area is rain fed, and this reporting period has seen an overall reduced trend in the rainfall received annually, groundwater levels have shown a slight trend of falling across the monitoring network when compared to previous years (see Appendix 3).

No significant change to the trends demonstrated in groundwater levels over the life of the project have been observed within this reporting period.

6.1.2 Groundwater Quality

Baseline groundwater quality samples were collected prior to extraction to create trigger values for comparison against sample concentrations during extraction operations and post-extraction operations to assist in detecting any changes in groundwater quality at the site.

The trigger values are then tested against at predetermined increments. Groundwater quality testing is undertaken biannually and reported to the relevant regulators in this AR.

Groundwater quality is sampled and tested biannually by an external third party with results sent to Holcim and reported to the relevant regulators. Historically this has been in the form of biannual reports. The updated GMP in March 2020 altered the frequency of reporting to annually and is now to be via the AEMR. As this change occurred throughout the reporting period, the final biannual report was provided in October 2019 (Appendix 2), and this AEMR presents the March 2020 monitoring results.

The groundwater quality monitoring results presented in Table 7 show that all results were within normal limits with no exceedences of trigger values (Trigger values are not available for AC-19, however monitoring does not suggest any elevated concentrations).

Table 7: Comparison of Groundwater quality results against trigger values for the 2019/20 reporting period.

Data	Date	Bore	pH	EC µS/cm	Iron mg/L		Arsenic mg/L		Manganese mg/L		TPH mg/L			
					Dissolved	*Total*	*Dissolved*	*Total*	*Dissolved*	*Total*	*C6- C9*	*C10-C14*	*C15-C28*	*C29-C40*
Trigger Value		**ACI-11**	N/A	N/A	4.344	5.116	0.002	0.002	0.028	0.030	0.02 (LOR)	0.05 (LOR)	1 (LOR)	1 (LOR)
Results	10/10/2019		4.99	100	1.72	2.14	<0.001	<0.001	0.005	0.005	<LOR	<LOR	<LOR	<LOR
Results	*25/03/2020*		5.62	92	1.00	1.63	<0.001	<0.001	0.004	0.005	<LOR	<LOR	<LOR	<LOR
Trigger Value		**ACI-19**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Results	10/10/2019		4.51	108	0.23	0.17	<0.001	<0.001	0.003	0.003	<LOR	<LOR	<LOR	<LOR
Results	*25/03/2020*		5.32	123	0.37	0.37	<0.001	<0.001	0.004	0.002	<LOR	<LOR	<LOR	<LOR

6.1.2.1 Groundwater Quality Results Discussion and Trend Summary

Observations of groundwater quality trends over time (see Appendix 4) show concentrations have fluctuated throughout the life of the project. This trend has been demonstrated by the results provided in previous annual reports provided as per the approval requirements, along with bi-annual groundwater monitoring reports. This observation was also made based upon analysis of data collected during operations at the Northern Dune site and presented in the trend predictions of the Environmental Assessment (EA) for the Northern Dune Extension Area.

The fluctuating trend previously identified has been continued in the current reporting period as demonstrated by the data presented in the hydrographs which demonstrate this trend over the life of the project in Appendix 4, and in the tabulated results for the current reporting period provided in Table 7.

Possible causes and influences of the trends observed in metal concentrations (based upon observations of the wider Northern Dune area) are:

- Peak total iron concentration seems to be attributed to the re-establishment of topsoil and regeneration which occurs after mining has ceased.
- The fluctuation of the water table (in response to rainfall) may cause enhanced mobilisation of iron from the coffee rock horizon, giving rise to potentially increased concentrations of iron.
- Localised variability of metal concentrations has been seen throughout monitoring of the wider northern dune area and appears to be impacted from well construction through localised coffee rock deposits.

Groundwater quality trends have continued as expected during the reporting period. Measured metal concentrations are consistent with data collected across the wider Tomago Sandbeds and have generally not exceeded the natural variation within metal concentrations recorded in the wider Tomago region. This is due to operations occurring above the deep grey sands and the groundwater table (by maintaining an exclusion zone from the PMGE), which are known to liberate metals in significant quantities if disturbed. The results presented in this report do not suggest any significant disturbance during the reporting period.

7 REHABILITATION AND LANDSCAPE MANAGEMENT

7.1 Rehabilitation Performance during the Reporting Period

The Rehabilitation Plans prepared for the project consist of the following:

- Landform Rehabilitation Plan (LRP) described in Part 3, Clause 11 of the Approval; and
- Vegetation Rehabilitation Plan (VRP) described in Part 3, Clause 12 of the Approval.

This section addresses compliance with the approved Rehabilitation Plans as required by the following clauses under the Special Areas Approval:

- Part 3, Clause 5, section 4 (a) (ii): performance and compliance with the provisions of the Rehabilitation Plans;
- Part 3, Clause 5, section 4 (a) (v): identification of trends in monitoring data from the Rehabilitation Plans over the life of the Extractive Operations.

7.2 Rehabilitation Management

Rehabilitation at the Tanilba Northern Dunes area is undertaken in areas mined as part of the approvals for the Tanilba Northern Dune Extension. For rehabilitation purposes, works have been subdivided into several blocks: within Tanilba Northern Dunes these are known as Blocks A to P.

Landform preparation and initial planting of all extraction areas within the former Tanilba Dunes extraction has been completed. Rehabilitation works undertaken within the Tanilba Northern Dunes during the reporting period were therefore composed predominantly of inspections to identify areas requiring weed management or maintenance. Inspection of revegetated areas forms part of monthly site inspections to identify any issues requiring management and the outcomes and observations of inspection are incorporated into the future works program together with any items or recommendations resulting from the annual performance monitoring program.

Sibelco has implemented a regime of weed control across the whole of the Tanilba Northern Dunes mining area and Holcim maintains a continued commitment to ongoing and progressive rehabilitation.

7.3 Rehabilitation Monitoring

The objective of the VRP is to progressively re-establish original vegetation community types, after extraction and landform rehabilitation has been completed, to as close as possible to that of the original vegetation. This recognises that the final landform will be lower in elevation than the original topography and provides performance measures to assess the success of the rehabilitation.

Monitoring of the progress of rehabilitation at the Tanilba Northern Dune project area was undertaken by Kleinfelder Australia Pty Ltd (Kleinfelder) in July 2019, October 2019 and January 2020.

As extraction and subsequent rehabilitation has been progressive across the licence area, for ease of data collection, the Tanilba Northern Dunes area has been subdivided into several blocks (Figure 1). Each of the blocks is at a different stage of rehabilitation:

- Rehabilitation blocks are prepared and, after 6 months of growth, surveyed biannually for a period of 3 years;
- After 3 years, blocks are monitored at a reduced frequency in accordance with the requirements of the agreed VRP.

Each of the blocks has been established at different time intervals. Block P located east of Oyster Cover Road is the last block to form part of the rehabilitation program under the Special Areas Approval and was monitored biannually as part of the Vegetation Rehabilitation program.

All other blocks forming the rehabilitation program at Northern Dunes (blocks A-N) are monitored and reported on as part of the post-3 year monitoring program. Frequency of monitoring occurs in accordance with the performance criteria outlined in the Northern Dune Environmental Management Plan (EMP) and occurs at Year 4 or 5 and again at Year 8 post rehabilitation for each respective block. This has been determined as a suitable requirement for the mine to monitor the growth and biodiversity trends up until the release stage.

- Blocks A, B1, B2 and C have been monitored for the Year 8 stage and these results have been reported by Kleinfelder (2014b);
- Blocks D, E, F, G and H have been monitored for the Year 8 stage and results have been reported by Kleinfelder (2018);
- Blocks I, J and K Year 4-5 stage results are detailed in the Post 3-year Monitoring Survey Report (Kleinfelder 2014a, 2015 and 2016). Blocks I and J have been monitored to the Year 8 stage in October 2019, with final Zone 3 Year 8 Monitoring and reporting to be conducted in October 2020.;
- Block L Year 4-5 stage survey was conducted in October 2016, with preliminary reported in 2017. Final Zone 4, 4-5 year reporting will be due in October 2021. Year 8 stage survey is due to be conducted in October 2020 with the Final Year stage report for Zone 4 due in October 2024;
- Block M has had the initial Year 4-5 stage survey conducted, with preliminary results reported in 2017. Final Zone 4, 4-5 year report is due to be reported in October 2021;
- Block N will have the initial Year 4-5 survey conducted in October 2019. Final Zone 4, 4-5 year report is due to be reported in October 2021.
- Block O had its final Biannual Monitoring conducted in January 2019. The initial 4-5- Year survey is due to be conducted in October 2020 with preliminary results reported.

Results reported in this AEMR are for Blocks P, I, J and N. Details of the surveyed blocks for the 2020 annual report are provided in **Table 8.**

Table 8: Block preparation and survey details for the North Dunes Extension Rehabilitation Blocks

Block	Prepared	First Biannual Survey Conducted	Last Biannual Survey	4-5 Year Stage Monitoring Conducted	8 Year Stage Monitoring Conducted
I	January 2011	July 2011	January 2014	October 2015	October 2019
J	August 2011	January 2012	July 2014	October 2015	October 2019
N	October 2014	January 2015	July 2177	October 2019	NA
P	July 2016	January 2017	January 2020	NA	NA

The monitoring plan has been designed in accordance with principles of the EMP and will facilitate the stated aim of the EMP (Section 7.1) to re-establish stable and sustainable native vegetation cover in-line with the original vegetation community types pre-extraction, including similar structural components and species composition at similar elevations.

A total of 38 plots and 5 quadrats were surveyed for the purpose of the current annual report consisting of:

- 38 plots on Block P,
- 2 quadrats for Block I,
- 2 quadrats for Blocks J, and
- 1 quadrat for Block N.

Results for Block P are discussed below and include survey results against rehabilitation and species composition targets established in the EMP.

7.3.1 Block P

This marks the sixth survey undertaken of Block P and represents 36 months of rehabilitation. This block has recorded excellent numbers as shown in **Table 9**. Average cover has continued to increase as the plants mature and is now at 63%. Average height has increased 43.13 cm. Plant density is still above target at 45.62 plants/4m^2. The density of Fire Tolerant Species (FTS) is still below target, but at 3.46 plants/4m^2, is one of the highest densities recorded on the Northern Dunes site. Average Species Richness has always been high on this block, starting at 12.31 species/4m^2 (on target) and has remained relatively stable at around 15 species/4m^2 (currently at 16.21 species/4m^2).

Vegetation structure has shown some minor variations with the increase in the shrub stratum in line with the increase in the number of species. The proportion of midstorey and overstorey has decreased slightly and is an artefact of the relative increase in the shrub stratum rather than a decrease in the actual number of species in these strata.

Table 9: Progression of average monitoring parameter data and target projections for Block P over the course of the rehabilitation

Parameter	Target	Rehab status Jan 2017	Rehab status Jul 2017	Rehab status Jan 2018	Rehab status Jul 2018	Rehab status Jan 2019	% Target Achieved Jan 2019
Average Cover (%)	**100**	13.03	19.10	53.08	51.03	56.15	56.15
Average height (cm)	**230**	16.42	25.41	33.59	36.16	35.68	15.51
Ave. No. of plants (plants/4 m^2)	**40**	24.38	35.87	48.79	44.26	47.28	118.20
Ave. No. Fire resistant species (plants/4 m^2)	**5 - 9**	3.51	2.95	3.00	2.87	3.08	61.60
Ave. Species Richness (species/4 m^2)	**12**	12.31	14.21	16.33	15.39	15.90	132.50
Ave. Ground stratum proportion (%)	**27**	7.53	7.71	7.69	8.53	7.68	28.46
Ave. Shrub stratum proportion (%)	**61**	64.47	72.95	73.80	73.82	74.30	121.80
Ave. Midstorey stratum proportion (%)	**7**	12.56	10.75	10.13	9.80	9.39	134.10
Ave. Overstorey stratum proportion (%)	**5**	12.88	8.59	8.39	7.84	8.63	172.60

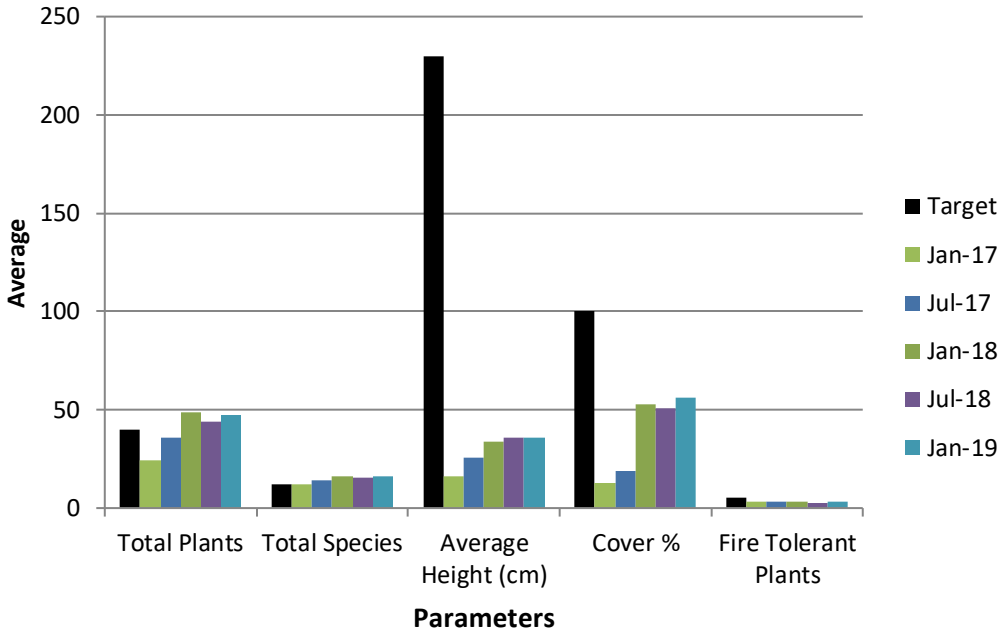

Chart 2: **The overall rehabilitation averages for Block P over the course of the biannual surveys.**

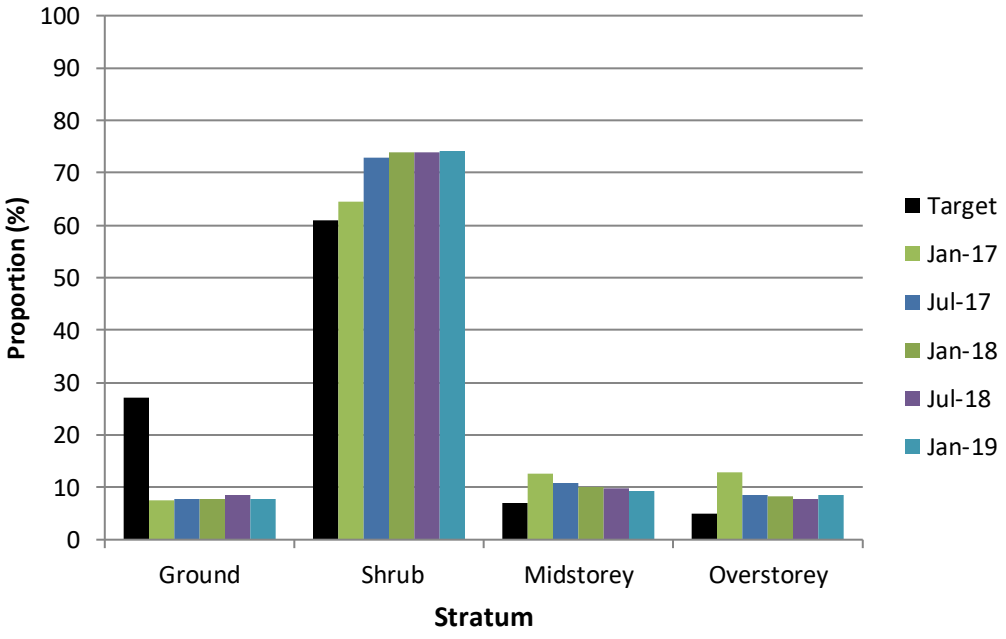

Chart 3: **The overall averages for stratum proportions for Block P over the course of the biannual surveys.**

7.3.1.1 Weeds

Holcim has an ongoing weed management program which acts partly on direction given in the annual and midyear monitoring reports and the post 3-year reporting program.

Block P is almost entirely weed free and is one of the best rehabilitation areas on the site.

7.3.1.2 Summary and Management Actions - Block P

This block is nearing the end of the initial 3-year monitoring program and the development parameters are looking very promising reflecting the success of the planting program. Where this is very evident is the proportion of midstorey and canopy species which is above average for both parameters. This may change, however, as the shrub species become established and hence increase their relative proportion as the early colonisers begin to die back.

The Total Fire-Resistant Species is the highest number recorded for any block, regardless of stage of rehabilitation. The average plant density and average number of species are also the highest for any block at this stage of rehabilitation with both being above target.

As a result of early and extensive planting in this block, five of the seven key species are above target densities with *M. nodosa* close to 82%. The only exception is *L. trinervium*, which usually comes up from the seed bank or is assisted through brush-matting (i.e. spreading of branches bearing seeds or seed capsules). The previous Annual Report (2019) recommended that further monitoring of this species occur to determine if action is required. This survey confirmed that this species will remain below target and recommended that remedial brush-matting or seeding occurs to increase numbers.

7.3.2 Block I

Block I was surveyed in early November 2019 as part of the Zone 3 Post 3 Year (8 Year Stage) of monitoring, consisting of two 20m x 20m quadrats (one per hectare of rehabilitation) as per the EMP. Monitoring results show that average cover is approaching target and average height is still progressing (**Table 10**). Average numbers of plants and average number of fire-resistant plants are both below target, but average species richness is above target and the strata proportions were consistent with monitoring across the North Dunes. Examples of monitoring photographs are provided in **Plate 2** and **Plate 3.**

Table 10: Results of the Year 8 monitoring of Block I

Parameter	Target	Nov 2019
Average Cover (%)	**100**	73
Average height (cm)	**230**	64
Ave. No. of plants (plants/4 m^2)	**40**	27
Ave. No. Fire resistant species (plants/4 m^2)	**5 - 9**	3
Ave. Species Richness (species/4 m^2)	**12**	13
Ave. Ground stratum proportion (%)	**27**	9
Ave. Shrub stratum proportion (%)	**61**	67
Ave. Midstorey stratum proportion (%)	**7**	16
Ave. Overstorey stratum proportion (%)	**5**	6

Average key species numbers for Block I are either at or above target for the majority of species (**Table 11**).

Table 11: Average Key species numbers for Block I

Species	Stratum	Average Numbers	Block Target
Banksia aemula	Midstorey	9349	5556
Corymbia gummifera	Overstorey	890	171
Eucalyptus piperita	Overstorey	1336	641
Leptospermum polygalifolium	Midstorey	1781	2564
Leptospermum trinervium	Midstorey	8904	2906
Melaleuca nodosa	Overstorey	4007	5984
Xanthorrhoea glauca	Shrub	890	No Target

7.3.3 Block J

Block J was surveyed in early November 2019 as part of the Zone 3 Post 3 Year (8 Year) stage of monitoring, consisting of two 20m x 20m quadrats (one per hectare of rehabilitation) as per the EMP. Monitoring results for Block J show a reduced average cover at 63%, and average height progressing well. The average number of plants and fire-resistant plants are well below target. Average species richness is right on target, and strata proportions are somewhat skewed towards the midstorey species, but the remaining three strata are consistent with results across the North Dunes rehabilitation. Examples of monitoring photographs are provided in **Plate 4** and **Plate 5**.

Table 12: Results of the Year 8 monitoring of Block J

Parameter	Target	Nov 2019
Average Cover (%)	**100**	63
Average height (cm)	**230**	76
Ave. No. of plants (plants/4 m^2)	**40**	19
Ave. No. Fire resistant species (plants/4 m^2)	**5 - 9**	2.25
Ave. Species Richness (species/4 m^2)	**12**	11.6
Ave. Ground stratum proportion (%)	**27**	9.7
Ave. Shrub stratum proportion (%)	**61**	65.4
Ave. Midstorey stratum proportion (%)	**7**	17
Ave. Overstorey stratum proportion (%)	**5**	6.8

Average key species for Block J recorded mixed results (**Table 13**), with the large numbers of *L. trinervium* resulting in the higher than target of midstorey species and plants.

Table 13: Average Key species numbers for Block J

Species	Stratum	Average Numbers	Block Target
Banksia aemula	Midstorey	7959	5228
Corymbia gummifera	Overstorey	0	161
Eucalyptus piperita	Overstorey	419	603
Leptospermum polygalifolium	Midstorey	1676	2413
Leptospermum trinervium	Midstorey	12567	2735

Species	Stratum	Average Numbers	Block Target
Melaleuca nodosa	Overstorey	3351	5630
Xanthorrhoea glauca	Shrub	419	No Target

7.3.3.1 Weeds

There were no weed species recorded for either Block I and J within the monitoring quadrats and in the bulk of the rehabilitation, a very good result. Weed species were observed along the haul road.

7.3.3.2 Summary and Management Actions

Blocks I and J will be discussed together.

These blocks were subjected to a large fire mid-2018 which burned through areas to the south of haul road and combined with the drought experienced over this time growth and regeneration have been hampered, resulting in lower average coverage, reduced average heights and the below target species richness. Management actions recommended included another monitoring event (of the total fire effected areas, not exclusively Blocks I and J) and seeding into the gaps left by fire. Additional planting and / or seeding of *Xanthorrhoea glauca* was also recommended.

7.3.4 Block N

Block N was surveyed in early November 2019 as part of the Zone 4 Post 3 Year (4-5 Year) stage of monitoring, consisting of one 20m x 20m quadrat (one per hectare of rehabilitation) as per the EMP. The monitoring results show that the rehabilitation of Block N is progressing well (**Table 14**). Average cover and height are excellent for this age of rehabilitation, with the species diversity and plant numbers also excellent. Strata proportions were consistent with monitoring across the North Dunes. Examples of monitoring photographs are provided in **Plate 6**.

Table 14: Results of the Year 4-5 monitoring of Block N

Parameter	Target	Nov 2019
Average Cover (%)	**100**	70
Average height (cm)	**230**	49.3
Ave. No. of plants (plants/4 m^2)	**40**	41.17
Ave. No. Fire resistant species (plants/4 m^2)	**5 - 9**	2.33
Ave. Species Richness (species/4 m^2)	**12**	16.8
Ave. Ground stratum proportion (%)	**27**	9.1
Ave. Shrub stratum proportion (%)	**61**	69.8
Ave. Midstorey stratum proportion (%)	**7**	15.4
Ave. Overstorey stratum proportion (%)	**5**	5.7

Average key species numbers for Block N are very good with the notable exception of *Corymbia gummifera* (**Table 15**). Otherwise the rehabilitation is progressing well.

Table 15: Average Key species numbers for Block N

Species	Stratum	Average Numbers	Block Target
Banksia aemula	Midstorey	5141	4010
Corymbia gummifera	Overstorey	0	123
Eucalyptus piperita	Overstorey	1285	463
Leptospermum polygalifolium	Midstorey	2570	1851
Leptospermum trinervium	Midstorey	9639	2097
Melaleuca nodosa	Overstorey	2570	4318
Xanthorrhoea glauca	Shrub	643	No Target

7.3.4.1 Weeds

There were no weed species identified in this block from the survey.

7.3.4.2 Summary and Management Actions

This block is progressing well, only requiring some additional planting *C. gummifera* to increase biodiversity. Overstorey species in general are adequate to provide the desired vegetation structure.

7.4 Other Management Actions Undertaken

No further planting of key species was undertaken on the North Dunes rehabilitation during the reporting period.

Weed control measures were undertaken by Sibelco in July 2019 with works conducted along the haul road in Blocks B, C, D, E and F.

Plate 1: View across Block P from NE looking SW, July 2019

Plate 2: Block I Q29 from NE corner

Plate 3: Block I Q30 from NE corner showing effects of fire on growth

Plate 4: Block J Q31 from NE corner

Plate 5: Block J Q32 from NE corner

Plate 6: Block N Q42 from SW corner (NE corner obscured by plants)

8 OTHER REQUIREMENTS

Clause 4 (a) (iii) of the approval granted under Clause 13(1) of the *Hunter Water (Special Areas) Regulation 1997* requires a report on the performance and compliance by Holcim with other requirements of the Special Areas Approval not associated with the GMP or Rehabilitation Plans.

8.1 Part 2: Clause 3, Section 1 – Extent of Extraction Operations

"The conduct of the Extractive Operations including the removal of vegetation and displacement of topsoil must not at any point:

> *(a) remove any material from beneath 0.7 metres above the level depicted by the Applicable Maximum Predicted Groundwater Level Plan (**Extraction Buffer**) for that point; or*
>
> *(b) extend beyond the Operational Area. "*

No extraction works occurred in the areas specific to this Approval during the reporting period: extraction works ceased in 2016 and all works in the area are focused on monitoring and management of the rehabilitated areas.

8.2 Part 2: Clause 4 – Method of Extraction

8.2.1 Laser level monitoring

"During Extractive Operations, the Approval Holder must monitor, to the reasonable satisfaction of the Director-General, the height of land from which sand is being extracted, including by taking regular measurements using a laser level in accordance with industry standard procedure by a person, whether a surveyor, geologist or other person, trained in surveying techniques."

No extractive operations took place during the reporting period. Laser level monitoring was therefore not required.

8.2.2 Machinery

"The Approval Holder must remove all machinery used in the Extractive Operations from the Tomago Sandbeds Catchment Area at the end of each day's operation"

Machinery was not utilised in the area during the reporting period.

8.2.3 Chemical storage

"The Approval Holder must not store fuel, oil, grease and any similar potential groundwater contaminant on the Tomago Sandbeds Catchment Area"

No chemicals were stored on the Lots exclusive to the Special Areas Approval during the reporting period.

8.3 Part 3: Clause 5, Section 3 (a) – Notification of Incident or Event

"The Approval Holder must notify the Director-General of any incident or event occurring in connection with the Extraction Operations that adversely affects or is likely to adversely affect the groundwater resource for use as potable supply, the groundwater ecosystem or the biophysical environment of the Tomago Sandbeds Catchment Area"

No incidents associated with Extractive Operations that are likely to affect groundwater were recorded during the reporting period.

8.4 Part 3: Clause 5, Section 4 (b) – Annual Inspection

"The Approval Holder must arrange an annual inspection of the Extraction Area to be attended by HWC and the Department."

A review of the previous AEMR was held at the Salt Ash office on the 25 October 2019, as required under Clause 4 (b) of Part 3 of the Special Areas Approval.

The meeting was attended by individuals shown in Table 8.

Table 16: Attendees to Northern Dune AEMR Inspection

Attendee	Representing	Presence
Liam O'Grady	Sibelco	Entire Meeting
Michael Lynch	Holcim	Entire Meeting
Rob Townsend	Kleinfelder	Entire Meeting
John Simpson	Hunter Water	Entire Meeting

8.5 Part 3, Clause 8, Section 5 – Environmental Audits

The Approval Holder must cause an Environmental Audit to be carried out at least once each six years for the duration of this Approval, such that the maximum period between any two consecutive Environmental Audits is six years

An Independent Environmental Audit of the lots exclusive to the Special Areas Approval was undertaken in December 2015, the next is due by December 2021.

8.6 Part 3, Clause 10 – Hydrocarbon Spill Procedure and Remediation of Land

The approval Holder must develop a procedure, to the satisfaction of HWC and the Department, to be followed by the Approval Holder in responding to the event of a hydrocarbon spill in the Extraction Area with the objective of prevention or minimisation to the extent possible of any unreasonable adverse impact on the quality of groundwater in the Tomago Sandbeds Catchment Area

A hydrocarbon spill procedure has been developed for the site and is contained within the EMP. This procedure is communicated through the Northern Dune Pollution Incident Response Management Plan and the Northern Dune induction as part of the emergency response plan.

There were no issues or incidents of hydrocarbon contamination at Northern Dune during the reporting period.

As required, no chemicals or mobile plant are stored overnight at Northern Dune which reduces the risk of any hydrocarbon contamination.

This is reflected in Section 5 which relates specifically to the GMP and the biannual reporting.

8.7 Hunter Water Regulation 2010 approval under Clause 10 (1)

On the 25th of November 2013, a variation to the Special Areas approval was granted to Sibelco Australia under clause 10 (1) of the *Hunter Water Regulation 2010* (BN 13/5769). The approval was granted under the *Hunter Water (Special Areas) Regulation 1997* and relates to an area known as the Tanilba Northern Dune Extension Project located adjacent to, and north of, Zone 1 of the Special Areas Approval.

This area is also subject to Project Approval MP09_0091, issued by the Department of Planning and Environment on 8 March 2013. A separate report has been prepared for activities in this area over the reporting period and a copy provided to HWC and OW in accordance with Part 3, Clause 9 of BN 13/5769.

9 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

Extraction at the site ceased in 2016. There will be no further extraction from the site and all future works will focus on implementation of the rehabilitation and monitoring requirements as described in the EMP and sub-plans as well as implementation of recommendations made throughout the reporting period as a result of inspections or monitoring activities.

The annual rehabilitation monitoring report prepared by Kleinfelder has determined that weed management should be continued into the next reporting period. Holcim will continue to manage rehabilitation commitments to address these actions. As progress reports are compiled throughout the reporting period any actions that arise will be managed accordingly to continue our commitment to the Rehabilitation Management Plan.

Activities proposed in the next AEMR period therefore include:

- Monitoring of groundwater in accordance with the requirement of the GMP.
- Monitoring of rehabilitated areas to assess performance against the requirements of the Rehabilitation Plans and implementation of any requirements to manage regrowth in accordance with the Plans.
- An ongoing weed management programme to reduce weed infestations.
- Action items as per Table 4.

Monitoring exceedances, if found to occur, will be reported per the approval requirements by phone and in writing within the defined approval time periods.

Any areas that are identified for improvement from the submission of this AEMR will also be a priority for Holcim into the next reporting period.

The action program for the coming reporting period is summarised in Table 17 below.

Table 17: Action Plan for 2020/2021 Reporting Period

Item	Requirement	2020-2021 program	Due Date
OPERATION/ADMINISTRATION			
1	Site condition	Inspection of site for identification of maintenance requirements including condition of roadside drainage and rehabilitated areas	Monthly
2	Annual Environmental Management Report	Prepare and submit AEMR to HWC and OW on activities undertaken in the 2019-2020 reporting period	18 July 2021
GROUNDWATER			
4	Groundwater Quality Monitoring	Third Party contractor to monitor bores referred to in Section 6 of this AEMR, or as determined by GMP review.	Annually
5	GMP Review	The GMP will be reviewed to ensure the monitoring and reporting is relevant to the activities being performed. The review will be performed in consultation with DPI-Water and HWC.	Following submission of AEMR (within 3 months)
6	Reporting	Reporting frequency will be reviewed during the review of the GMP following consultation with DPI-Water and HWC.	Annually
REHABILITATION PROGRAM			
7	Weed management	Site wide weed spraying	As required
8	Maintenance	Follow up inspections to identify and manage regrowth across all	As required

Item	Requirement	2020-2021 program	Due Date
		rehabilitated areas	
9	Performance monitoring	Implement recommendations in Annual Vegetation Rehabilitation Monitoring Report (Kleinfelder 2019)	As required
10		Monitoring of rehabilitated areas to assess performance against the requirements of the Rehabilitation Plans	Per schedule in VRP
11		Prepare report to summarise results of rehabilitation program, identify trends and any management measures required to achieve objectives of rehabilitation program	April 2021
12	Rehabilitation Plan Review	The Rehabilitation Plans will be reviewed to ensure the monitoring and reporting is relevant to the activities being performed. The review will be performed in consultation with DPI-Water and HWC	Following submission of AEMR

10 REFERENCES

Kleinfelder (2014a) *Post 3-year Monitoring of the Vegetation Rehabilitation at Tanilba Northern Dune 4-5 Year Surveys of Blocks G and H, Zone 2.* Report prepared for Sibelco Australia.

Kleinfelder (2014b) *8-year Monitoring of the Vegetation Rehabilitation at Tanilba Northern Dune 8 Year Survey of Zone 1.* Report prepared for Sibelco Australia.

Kleinfelder (2015) *Initial Year 8 Surveys for Zone 2 (Block D) and Initial 4 - 5 Year Survey for Zone 3 (Blocks I and J).* A report prepared for Sibelco Australia.

Kleinfelder (2016b) *4-5 Year Monitoring of the Vegetation at Tanilba Northern Dune, 4-5 Year Survey of Zone 3 (Blocks I, J and K)*. A report prepared for Sibelco Australia.

?? Kleinfelder (2017) *Recommended management actions for the Northern Dune Extraction Areas following the July 2017 biannual rehabilitation monitoring*. Report prepared for Sibelco Australia.

Kleinfelder (2018) *8-year Monitoring of the Vegetation Rehabilitation at Tanilba Northern Dune 8 Year Survey of Zone 2.* Report prepared for Sibelco Australia.

11 APPENDICES

APPENDIX 1
Project Approval

SCHEDULE 5

HUNTER WATER (SPECIAL AREAS) REGULATION 1997

Approval under Clause 13(1) of the
Hunter Water (Special Areas) Regulation 1997
for engaging in extractive industry
in the Tomago Sandbeds Catchment Area.

UNIMIN AUSTRALIA LIMITED

DEPARTMENT OF LAND AND WATER CONSERVATION

Approval under Clause 13(1) of the *Hunter Water (Special Areas) Regulation 1997* for engaging in extractive industry in the Tomago Sandbeds Catchment Area

TABLE OF PROVISIONS

APPROVAL UNDER
HUNTER WATER (SPECIAL AREAS) REGULATION 1997
CLAUSE 13(1).

DEFINITIONS:

Applicable Maximum Predicted Groundwater Level Plan means the Benchmark Maximum Predicted Groundwater Level Plan or, if amended under Clause 9(3)of the Schedule, the most recent amendment of that Plan.
Approval means this Approval in accordance with the Regulation as referred to in Clause B and the terms and conditions included in this document, incorporating any Schedule or Annexure in accordance with Clause G.
Approval Holder means Unimin Australia Limited (ABN 20 000 971 844) of Level 10, 80 George Street, Parramatta, NSW.
Benchmark Maximum Predicted Groundwater Level Plan means the plan referred to in Clause 2(1)(f) of the Schedule.
Biodiversity Reports means the reports referred to in Clause 2(1)(k) of the Schedule.
Deficiency means any deficiency referred to in Clause 6(1) of the Schedule.
Department means the Department of Land and Water Conservation of the State of New South Wales and where the context permits its servants employees and agents..
Director-General means the Director-General, Department of Land and Water Conservation and his or her authorised delegates.
Environmental Audit means any audit carried out under Clause 8 of the Schedule.
Environmental Audit Report means a report referred to in Clause 8(2)(a) of the Schedule.
Environmental Management Plan means the plan referred to in Clause 7 of the Schedule.
Environmental Management Report means any report prepared under Clause 5(4) of the Schedule.
Extraction Area means the area marked as Extraction Area shown on the map marked "A" annexed to this document.
Extraction Buffer means the depth of material to remain in situ after Extractive Operations under Clause 3(1)(a) of the Schedule.
Extractive Operations means the operations done under the Approval or works done as part of or associated with those operations, including without limitation the clearing of land, the stripping of topsoil, road-building, the extraction of sand, the stockpiling and storage of extracted sand, the loading of vehicles and transportation away of sand, and the rehabilitation of the landform and vegetation on the land.
Extraction Zone means any of the Extraction Zones 1, 2, 3 or 4 shown in the map marked "B" annexed to this document.
Final Landform Plan means the plan referred to in Clause 2(1)(e) of the Schedule.
Groundwater Management Plan means the plan referred to in Clause 9 of the Schedule.
HWC means the Hunter Water Corporation (ABN 46 228 513 446) of 426-432 King Street, NSW, established under Part 2 of the *Hunter Water Act 1991* (NSW).
Hydrocarbon Spill Procedure means the procedure referred to in Clause 10 of the Schedule.
Initial Bank Guarantee means the bank guarantee provided for in Clause 13(1) of the Schedule.
Investigation Event has the meaning given in the Groundwater Management Plan.
Land means that land designated as Lots 1 and 2, DP 408240 and Lots 407 and 408, DP 1041934.
Landform Rehabilitation Plan means the plan referred to in Clause 11(2) of the Schedule.
Operational Area has the meaning given in Clause 1(1) of the Schedule.
Operations Management Procedures means the procedures referred to in Clause 2(1)(g) of the Schedule.
Post-Extraction Landform Plan means the plan referred to in Clause 2(1)(d) of the Schedule.
Pre-Extraction Landform Plan means the plan referred to in Clause 2(1)(c) of the Schedule.
Rectification Notice means any notice referred to in Clause 6(1) of the Schedule.
Rectification Period means any period of time referred to in Clause 6(3) of the Schedule.
Rectification Works means any works referred to in Clause 6(2) of the Schedule.
Regulation means the *Hunter Water (Special Areas) Regulation 1997* (NSW).
Rehabilitation Plans means the Landform Rehabilitation Plan and the Vegetation Rehabilitation Plan.

Release Criteria includes the elements set out as Release Criteria for the purposes of this Approval in each of the Groundwater Management Plan, Landform Rehabilitation Plan and Vegetation Rehabilitation Plan.

Release Eligible refers to the classification of an Extraction Zone in accordance with Clause 8(3) of the Schedule.

Supplementary Environmental Audit means the audit referred to in Clause 8(2)(c) of the Schedule.

Supplementary Environmental Audit Report means any report prepared under Clause 8(2)(d) of the Schedule.

Supplementary Bank Guarantee means any bank guarantee referred to in Clause 13(2)(c) of the Schedule.

Tomago Sandbeds Catchment Area has the same meaning as in the Regulation.

Total Buffer Depth means the buffer referred to in Clause 11(5) of the Schedule.

Variation Date means any date as referred to in Clause 1(4)(e) of the Schedule.

Vegetation Rehabilitation Plan means the plan referred to in Clause 12(2) of the Schedule.

APPROVAL UNDER
HUNTER WATER (SPECIAL AREAS) REGULATION 1997
CLAUSE 13(1).

A. Date of Issue.

The 18 th day of July 2002.

B. Approval.

For the term of this Approval the Director General hereby permits the Approval Holder to undertake the extractive industry within part of the Tomago Sandbeds Catchment Area, described in this Approval, subject to the terms and conditions set out below.

C. Term of Approval.

This Approval shall commence on the Date of Issue and continue for a term not exceeding 20 years from the Date of Issue (*Maximum Term*) provided that the Director-General may at any time fix the term of the Approval for a shorter period (*Fixed Term*).

The Director-General's power to fix the term of the Approval does not limit any other power the Director-General may lawfully exercise.

D. Approval Holder.

Unimin Australia Limited (ABN 20 000 971 844) of Level 10, 80 George Street, Parramatta, NSW.

E. Extractive Industry.

Sand Extraction.

F. Extraction Area.

The Approval Holder is permitted to undertake the Extractive Industry in such parts of the Land shown as the "Extraction Area" on the plan annexed hereto and marked "A" as the Director-General may, in accordance with the terms of this Approval, approve from time to time (*Extraction Area*).

G. Terms and Conditions of Approval.

The Schedule and Annexures have effect and form part of this Approval.

H. Approval not Transferable.

This Approval may not be transferred or assigned (including, without limitation, assigned by way of security).

Director-General,
Department of Land and Water Conservation.

16/7/02

APPROVAL UNDER
HUNTER WATER (SPECIAL AREAS) REGULATION 1997
CLAUSE 13(1)

SCHEDULE

PART 1 OPERATIONAL AREA

1 OPERATIONAL AREA

(1) (a) [Operational Area] From the Date of Issue of this Approval, the Director-General approves the Approval Holder to commence and conduct the Extractive Operations in that area of land within the Extraction Area depicted as "Extraction Zone 1" on the plan marked "B" annexed to the Approval (***Operational Area***), subject to the prior performance of the obligations provided in Clause 2(1).

(b) [Limit on Extractive Operations] The Approval Holder may not undertake Extractive Operations outside of the boundary of the Operational Area as it exists from time to time, excepting that the Approval Holder may utilise any road outside the Operational Area for the purposes of access to the Operational Area and for associated purposes, including without limitation for the purpose of haulage of extracted sand away from the Operational Area, and the performance of any obligation under the Environmental Management Plan.

(2) (a) [Addition of land to Operational Area] The Approval Holder may apply in writing to the Director-General for variation of the Operational Area by the addition of one or more Extraction Zones.

(b) An application under subparagraph (2)(a) must relate only to land within the Extraction Area.

(c) An application under subparagraph (2)(a) must include:

(i) a map of the proposed Operational Area indicating the Extraction Zone or Extraction Zones that comprise the existing Operational Area, and the Extraction Zone or Extraction Zones proposed to be added to the Operational Area; and

(ii) costings for the rehabilitation of each Extraction Zone comprising the proposed Operational Area.

(3) (a) [Removal of land and release from obligations] The Approval Holder may apply in writing to the Director-General for variation of the Operational Area by the removal of one or more Extraction Zones and the release of the Approval Holder from all obligations in relation to such Extraction Zone or Extraction Zones.

(b) An application under subparagraph (3)(a) must include:

(i) a map of the proposed Operational Area indicating the Extraction Zone or Extraction Zones that comprise the existing Operational Area, and the Extraction Zone or Extraction Zones proposed to be removed from the Operational Area; and

(ii) an Environmental Audit Report and any Supplementary Environmental Audit Report for any Extraction Zone that is proposed to be removed from the Operational Area prepared in accordance with Clause 8.

(c) An application under subparagraph (3)(a) must relate only to an Extraction Zone that is designated Release Eligible in accordance with Clause 8(3).

(d) On the granting of an application by the Approval Holder pursuant to subparagraph (3)(a), the provisions of this Approval which permit the Extraction Operations on any Extraction Zone removed from the Operational Area cease to have effect.

(4) (a) **[Determination of application]** The Director-General must determine an application made under subparagraph (2)(a) or (3)(a) by granting or refusing that application within 28 days of the date of receipt of the application.

(b) In making a determination under subparagraph (4)(a), the Director-General must be reasonably satisfied, having regard, where relevant, to the Environmental Audit Report and any Supplementary Environmental Audit Report:

(i) that the Approval Holder has complied with limitations on the extent of Extractive Operations pursuant to Clause 3 in the existing Operational Area;

(ii) that the Approval Holder has complied with the requirements of the Groundwater Management Plan;

(iii) that the Approval Holder has complied with the requirements of the Rehabilitation Plans in the existing Operational Area;

(iv) that the rehabilitation work done by the Approval Holder has achieved or is achieving rehabilitation objectives in the existing Operational Area.

(c) **[Notice of determination]** The Director-General must give notice in writing to the Approval Holder of the determination of an application within 14 days of the determination.

(d) If the Director-General determines to refuse an application pursuant to subparagraph (4)(a), the notice given in accordance with subparagraph (4)(c) must include written reasons for that refusal.

(e) **[Content of notice]** If the Director-General determines to grant an application, the notice given in accordance with subparagraph (4)(c) must state:

(i) the date from which the variation of the Operational Area is effective (*Variation Date*);

(ii) the amount of security, if any, redetermined under Clause 13(2) required in relation to the Operational Area as varied; and

(iii) where the application was made under subparagraph (3)(a), that the Approval Holder is released from any further obligation or responsibility under this Approval in relation to the area the subject of the application.

(f) Any variation of the Operational Area pursuant to subparagraph (4)(a) has effect from the date set out in the notice under subparagraph (4)(c), subject to the prior lodgement of a Supplementary Bank Guarantee required in accordance with Clause 13.

(5) (a) **[Amendment of Extraction Zones]** The Approval Holder may apply in writing to the Director-General to amend the boundaries of one or more Extraction Zones, as indicated on the plan marked "B" annexed to this Approval.

(b) The Director-General must determine an application made under subparagraph (5)(a) by granting or refusing that application within 28 days of the date of receipt of the application.

(c) The Director-General must give notice in writing to the Approval Holder of the determination of an application pursuant to subparagraph (5)(b) within 14 days of the determination.

(d) If the Director-General determines to refuse an application pursuant to subparagraph (5)(b), the notice given in accordance with subparagraph (5)(c) must include written reasons for that refusal.

PART 2 EXTRACTIVE OPERATIONS

2 PRECONDITIONS TO EXTRACTIVE OPERATIONS

(1) [Material to be provided] Prior to the commencement of Extractive Operations, the Approval Holder must:

(a) lodge with the Department the Initial Bank Guarantee;

(b) lodge with HWC and the Department a copy of the report prepared under paragraph (2)(c) of the review of the Release Criteria ;

(c) lodge with HWC and the Department a map and associated data depicting the existing topographical contours of the Extraction Area to the reasonable satisfaction of HWC and the Department (*Pre-Extraction Landform Plan*);

(d) lodge with HWC and the Department a map and associated data depicting the landform to be achieved in the course of Extractive Operations subject to the limitations on the extent of Extractive Operations, including the Extraction Buffer limitation (*Post-Extraction Landform Plan*);

(e) lodge with HWC and the Department a map and associated data depicting the landform to be achieved through rehabilitation of the Extraction Area including the Total Buffer Depth (*Final Landform Plan*), which must be developed in consultation with HWC and the Department;

(f) lodge with HWC and the Department a map and associated data depicting the maximum predicted groundwater level for the Extraction Area (*Benchmark Maximum Predicted Groundwater Level Plan*) which must be developed in consultation with HWC and the Department;

(g) lodge with HWC and the Department a document describing the proposed methods of operation for the Extractive Operations including the management of plant, equipment and vehicles within the Operational Area and the manner of carrying out the Extractive Operations (*Operations Management Procedures*);

(h) lodge with HWC and the Department the Environmental Management Plan prepared in accordance with Clause 7;

(i) mark the limits of the site for the commencement of Extractive Operations within the Operational Area in the manner set out in the Environmental Management Plan;

(j) mark all monitoring bores within the Extraction Area in accordance with Clause 15(6); and

(k) lodge with HWC and the Department a report or reports on flora and fauna surveys of the Extraction Area completed by an independent consultant, nominated by the Approval Holder and approved in advance by HWC and the Department, (*Biodiversity Reports*) which must:

(i) describe the existing species and community types and distribution of flora and fauna in the Extraction Area for the purpose of providing a guide for rehabilitation of the Extraction Area; and

(ii) indicate floral and faunal communities in the Extraction Area that are threatened species, populations or ecological communities under the *Threatened Species Conservation Act 1995* (NSW).

(2) (a) [Review of Release Criteria] Prior to the commencement of Extractive Operations, the Approval Holder must retain an independent consultant, nominated by the Approval Holder and approved in advance by HWC and the Department, to review the Release Criteria set out in the Rehabilitation Plans.

(b) The review under subparagraph (a) must assess whether the Release Criteria are reasonable performance indicators in respect of the objectives of the Rehabilitation Plans.

(c) The Approval Holder must ensure that a comprehensive report of the review under subparagraph (a) is prepared by the independent consultant.

(d) The Director-General may require that a review of the Release Criteria be undertaken as part of any Environmental Audit performed under Clause 8.

3 EXTENT OF EXTRACTIVE OPERATIONS

(1) [Extraction Buffer] The conduct of the Extractive Operations including the removal of vegetation and displacement of topsoil must not at any point:

(a) remove any material from beneath 0.7 metres above the level depicted by the Applicable Maximum Predicted Groundwater Level Plan (**Extraction Buffer**) for that point; or

(b) extend beyond the Operational Area.

(2) [Review of Extraction Buffer] Prior to the commencement of Extractive Operations in an Extraction Zone other than Extraction Zone 1, as shown on the plan marked "B" annexed to this document, the Extraction Buffer and Total Buffer Depth may be reviewed by HWC and the Department in consultation with the Approval Holder, and may be reasonably amended by the Director-General on the basis of:

(a) any information produced by the Approval Holder in accordance with the Groundwater Management Plan;

(b) any further groundwater studies;

(c) the extent to which the rehabilitation work done by the Approval Holder in accordance with the Rehabilitation Plans has achieved or is achieving the rehabilitation objective; and

(d) any additional relevant information that has come to the attention of HWC or the Department during the course of Extractive Operations, including any Environmental Audit Report.

4 METHOD OF EXTRACTIVE OPERATIONS

(1) [Laser level monitoring] During Extractive Operations, the Approval Holder must monitor, to the reasonable satisfaction of the Director-General, the height of land from which sand is being extracted, including by taking regular measurements using a laser level in accordance with industry standard procedure by a person, whether a surveyor, geologist or other person, trained in surveying techniques.

(2) [Machinery] The Approval Holder must remove all machinery used in the Extractive Operations from the Tomago Sandbeds Catchment Area at the end of each day's operation.

(3) [No storage of contaminants] The Approval Holder must not store fuel, oil, grease and any similar potential groundwater contaminant on the Tomago Sandbeds Catchment Area.

PART 3 ENVIRONMENTAL CONTROLS

5 GENERAL

(1) [Manner of performing Extraction Operations] The Approval Holder must:

(a) operate and manage the Extractive Operations; and

(b) operate, manage and maintain all plant and works utilised as part of the Extractive Operations, including any equipment used for purposes of monitoring and rehabilitation,

in a manner that ensures that the Extractive Operations or works done as part of or in association with Extractive Operations do not have an unreasonably adverse impact on the supply or quality of groundwater located within the Operational Area and any adjoining land that forms part of the Tomago Sandbeds Catchment Area, having regard to:

(c) the terms and conditions of this Approval; and

(d) the importance of the groundwater (and its surrounding environment) for potable water supply purposes and groundwater dependent ecosystems.

(2) [Compliance with EMP] In carrying out the Extractive Operations the Approval Holder must comply with the Environmental Management Plan approved in accordance with Clause 7, including all rehabilitation requirements.

(3) (a) [Notification of incident or event] The Approval Holder must notify the Director-General of any incident or event occurring in connection with the Extraction Operations that adversely affects or is likely to adversely affect the groundwater resource for use as potable supply, the groundwater ecosystem or the biophysical environment of the Tomago Sandbeds Catchment Area.

(b) The notice referred to in subparagraph (3)(a) must be written, and include the following information:

(i) the nature, extent and location of the incident or event;

(ii) the likely effect of the incident or event; and

(iii) any measure taken or proposed to be taken to manage the effects of the incident or event in accordance with the Hydrocarbon Spill Procedure.

(c) [Stop work direction] If the Director-General is reasonably satisfied that the Approval Holder has not complied with the Hydrocarbon Spill Procedure in relation to any event or incident, the Director-General may direct the Approval Holder to stop the Extractive Operations.

(d) [Rectification Notice] If the Director-General makes a direction pursuant to subparagraph (3)(c), the Director-General must issue a Rectification Notice to the Approval Holder within 7 days of making the direction.

(e) [Revocation of stop work direction] If a direction is in force under subparagraph (3)(c), and the Director-General is reasonably satisfied that the Approval Holder is carrying out any Rectification Works set out in the Rectification Notice pursuant to subparagraph (3)(d), the Director-General must revoke the direction as soon as practicable to permit the Approval Holder to recommence Extractive Operations.

(4) (a) [Environmental Management Report] The Approval Holder must submit a report to the Director-General on each anniversary of the Date of Issue for the term of this Approval (*Environmental Management Report*), addressing:

(i) the performance of and compliance with the provisions of the Groundwater Management Plan by the Approval Holder;

(ii) the performance of and compliance with the provisions of the Rehabilitation Plans by the Approval Holder;

(iii) the performance of and compliance with the provisions of any other requirements of this Approval by the Approval Holder;

(iv) any instances in which the Approval Holder has not satisfied the requirements of the Environmental Management Plan or this Approval, indicating any reason for that non-compliance and any action that is proposed to be introduced, or has already been implemented, to prevent or remedy the non-compliance;

(v) identification of trends in monitoring data from the Groundwater Management Plan and Rehabilitation Plans over the life of the Extractive Operations; and

(vi) environmental management targets and strategies for the subsequent year.

(b) [Annual inspection] The Approval Holder must arrange an annual inspection of the Extraction Area to be attended by HWC and the Department.

(c) Other relevant agencies and authorities (for example, the Environment Protection Authority, National Parks and Wildlife Service and Port Stephens Council) should be notified by the Approval Holder of the date and time of the inspection and be given the opportunity to attend.

(d) The Environmental Management Report should be received by HWC and the Department at least one month prior to the annual inspection.

6 RECTIFICATION

(1) [Issue of Notice] If, in the reasonable opinion of the Director–General, the Approval Holder has conducted or is conducting the Extractive Operations in the Operational Area in a manner that was not or is not in accordance with the requirements of:

(a) the Groundwater Management Plan;

(b) the Rehabilitation Plans;

(c) the Hydrocarbon Spill Response Procedure; or

(d) any of the terms of this Approval;

the Director-General may issue a notice to the Approval Holder *(Rectification Notice)* in respect of any deficiency caused or likely to be caused (*Deficiency*):

(i) in the environmental condition of the Operational Area; and/or

(ii) in the performance of any obligation under the Plans, Procedure or Approval identified at (a) to (d) above.

(2) [Content of Notice] Any Rectification Notice issued by the Director-General to the Approval Holder pursuant to this Approval must:

(a) be in writing; and

(b) specify any Deficiency to which the Rectification Notice relates;

(c) specify any works or additional obligations reasonably required to amend or repair a Deficiency or to ensure that any area of the Operational Area will not be damaged or detrimentally affected (*Rectification Works*); and

(d) specify a reasonable time within which to commence and/or complete Rectification Works or any component of the Rectification Works (*Rectification Period*).

(3) (a) [Determination of Rectification Period] The Director-General must consult the Approval Holder in determining the Rectification Period in relation to the operational timeframes of the Approval Holder within which commencement and/or completion of the Rectification Works is reasonably achievable.

(b) The Director-General must determine the Rectification Period, having regard to the time in which the commencement and/or completion of the Rectification Works is reasonably achievable by the Approval Holder.

(4) [Compliance with Notice] The Approval Holder must comply with all the terms of a Rectification Notice.

(5) [Default under Notice] If the Approval Holder does not comply with a Rectification Notice the Director-General may:

(a) require, by notice in writing, that the Approval Holder stop the Extractive Operations until such time as the Rectification Works are completed; or

(b) authorise any other person to enter the land and carry out the Rectification Works and may fund those operations by draw down on the security lodged under Clause 13.

7 ENVIRONMENTAL MANAGEMENT PLAN

(1) [Preparation of EMP] Prior to the commencement of Extractive Operations, the Approval Holder must prepare and maintain a plan for the environmental management and rehabilitation of the Extraction Area (*Environmental Management Plan*) to the reasonable satisfaction of the Director-General.

(2) [Core components of EMP] The Environmental Management Plan must include, but is not limited to, the following core components (*Core Components*):
- (a) Groundwater Management Plan;
- (b) Vegetation Rehabilitation Plan;
- (c) Landform Rehabilitation Plan;
- (d) Hydrocarbon Spill Procedure; and
- (e) Operations Management Procedure.

(3) (a) [Core amendment of EMP] The Approval Holder must not amend the Environmental Management Plan in any respect that affects the Core Components unless with the consent of the Director-General in accordance with this paragraph.
- (b) The Approval Holder may apply in writing to the Director-General to amend the Environmental Management Plan in respect of any of the Core Components.
- (c) An application under subparagraph (3)(b) must include the following information:
  - (i) any provision of the existing plan to be omitted from the amended plan; and
  - (ii) any provision not in the existing plan to be included in the amended plan; and
  - (iii) reasons for any proposed amendment to the existing plan.
- (d) The Director-General must determine an application made under subparagraph (3)(b) by granting or refusing that application within 28 days of the date of receipt of the application.
- (e) The Director-General must give notice in writing to the Approval Holder of the determination of an application under subparagraph (3)(b) within 14 days of the determination.
- (f) If the Director-General determines to refuse an application pursuant to subparagraph (3)(d), the notice given in accordance with subparagraph (3)(e) must include written reasons for that refusal.

(4) (a) [Non-core amendment of EMP] The Approval Holder may amend the Environmental Management Plan in any respect that does not affect the Core Components without referring such amendment to the Director-General.
- (b) Any amendment under subparagraph (a) must not derogate from the requirements of the Core Components.

8 ENVIRONMENTAL AUDITS

(1) [Requirements for Environmental Audits] Any Environmental Audit undertaken for the purposes of this Approval must:
- (a) be carried out in accordance with *ISO 14010 – Guidelines and General Principles for Environmental Auditing* and *ISO 14011 – Procedures for Environmental Auditing*;
- (b) assess compliance with the requirements of this Approval;
- (c) assess compliance with the Groundwater Management Plan;
- (d) assess compliance with and progress of work under the Rehabilitation Plans;
- (e) assess whether the environmental objectives of the Groundwater Management Plan and the Rehabilitation Plans are being met;
- (f) assess the Operational Area in terms of the Release Criteria set out in the Environmental Management Plan;
- (g) be conducted by an independent consultant, nominated by the Approval Holder and approved in advance by HWC and the Department; and
- (h) be carried out at the cost of the Approval Holder.

(2) (a) **[Environmental Audit Report]** The results of an Environmental Audit must be presented in a comprehensive report (***Environmental Audit Report***).

(b) An Environmental Audit Report may include recommendations as to works that could be performed or additional obligations that could be imposed in order to rectify any of the matters assessed under paragraph (1).

(c) **[Supplementary Environmental Audit]** If the Approval Holder performs further works or satisfies additional obligations based on recommendations made in an Environmental Audit Report, the Approval Holder may cause a further audit to be carried out in relation to those further works or obligations (***Supplementary Environmental Audit***).

(d) The results of a Supplementary Environmental Audit must be presented in a comprehensive report (***Supplementary Environmental Audit Report***).

(3) (a) **[Application for removal of land from Operational Area]** Prior to an application under Clause 1(3)(a) for the removal of an Extraction Zone from the Operating Area, the Approval Holder must cause an Environmental Audit to be carried out to assess the compliance in that Extraction Zone with the requirements of the Approval, and in particular the Release Criteria.

(b) **[Eligibility for release]** If an audit under paragraph (a) determines that the Extraction Zone the subject of the application complies with the Release Criteria, the Environmental Audit Report may designate the Extraction Zone as being eligible for release (***Release Eligible***).

(4) **[Year four audit]** The Approval Holder must cause an Environmental Audit to be carried out four years after the commencement of the Extractive Operations.

(5) **[Maximum period for audits]** The Approval Holder must cause an Environmental Audit to be carried out at least once each six years for the duration of this Approval, such that the maximum period between any two consecutive Environmental Audits is six years.

9 GROUNDWATER

(1) **[Groundwater Management Plan]** Prior to the commencement of Extractive Operations, the Approval Holder must develop a program, to the satisfaction of HWC and the Department, to operate concurrently with the Extractive Operations in order to prevent or minimise to the extent possible any unreasonably adverse impact on the quality or stored quantity of the groundwater in the Tomago Sandbeds Catchment Area (**Groundwater Management Plan**).

(2) **[Requirements of GMP]** The Groundwater Management Plan must include, but is not limited to:

(a) the Release Criteria applicable to the objectives of the Groundwater Management Plan;

(b) locations of monitoring bores and piezometers distributed such that the monitoring program covers the Operational Area;

(c) pre-extraction and post-extraction monitoring across the Extraction Area of watertable levels and water quality;

(d) analytes to be monitored;

(e) procedures for sampling and testing;

(f) frequency of readings in relation to all specified parameters;

(g) levels of readings indicating contamination of the groundwater; and

(h) procedures for investigation of detected contamination.

(3) (a) **[Review of groundwater level plan]** The Benchmark Maximum Predicted Groundwater Level Plan, and any subsequent Applicable Maximum Predicted Groundwater Level Plan, may be reviewed by HWC, the Department, and the Approval Holder, taking into account:

(i) the monitoring results obtained under the Groundwater Management Plan; and

(ii) groundwater level monitoring by HWC in the performance of its functions.

(b) The Applicable Maximum Predicted Groundwater Level Plan may be amended from time to time by the agreement of the HWC, Department and the Approval Holder based on the review conducted in accordance with subparagraph (3)(a).

(c) If no agreement can be reached pursuant to subparagraph (3)(b), the Director-General may amend the Applicable Maximum Predicted Groundwater Level Plan if reasonably satisfied that such amendment is supported by the data available.

(d) On an amendment to the Applicable Maximum Predicted Groundwater Level Plan pursuant to subparagraphs (3)(b) or (3)(c), the Approval Holder must lodge with HWC and the Department a plan and associated data depicting that amended maximum predicted groundwater level for the Extraction Area (*Maximum Predicted Groundwater Level Plan Amendment No. [X]*, where "X" is the number of the amendment).

(4) [**Continued monitoring**] The Approval Holder must monitor the groundwater level and groundwater quality in accordance with the Groundwater Management Plan for four years after the extraction of sand has ceased in any particular Extraction Zone or such earlier time at which the Director-General is reasonably satisfied that the condition of the Extraction Zone satisfies the Release Criteria.

10 HYDROCARBON SPILL PROCEDURE AND REMEDIATION OF LAND

(1) [**Hydrocarbon Spill Procedure**] Prior to the commencement of Extractive Operations, the Approval Holder must develop a procedure, to the satisfaction of HWC and the Department, to be followed by the Approval Holder in responding to the event of a hydrocarbon spill in the Extraction Area, with the objective of the prevention or minimisation to the extent possible of any unreasonably adverse impact on the quality or stored quantity of the groundwater in the Tomago Sandbeds Catchment Area *(Hydrocarbon Spill Procedure)*.

(2) [**Remediation of land**] The Hydrocarbon Spill Procedure must include, but is not limited to, a provision for the development of a plan of remediation to be followed in the case of an Investigation Event or an incident or event that could have an adverse impact on the groundwater in the Tomago Sandbeds Catchment Area.

(3) [**Variation of Procedure**] The Director-General may require the Approval Holder to vary any part of the Hydrocarbon Spill Procedure as a result of any incident or event in relation to which the Hydrocarbon Spill Procedure was implemented.

11 REHABILITATION – LANDFORM

(1) [**Requirement to rehabilitate**] The Approval Holder must rehabilitate the landform of the Operational Area progressively from the commencement of Extractive Operations.

(2) [**Landform Rehabilitation Plan**] Prior to the commencement of Extractive Operations, the Approval Holder must develop a plan, to the satisfaction of HWC and the Department, to achieve the objective of rehabilitation of the landform of the Operational Area as depicted in the Post-Extraction Landform Plan (*Landform Rehabilitation Plan*).

(3) [**Parameters of Plan**] The Landform Rehabilitation Plan must provide for the progressive rehabilitation of the Operational Area, with reference to:

(a) the Extraction Buffer;

(b) the Applicable Maximum Predicted Groundwater Level Plan;

(c) timing and method of replacement of topsoil removed for the purposes of the Extractive Operations; and

(d) the objective of compliance with the Final Landform Plan.

(4) **[Content of Plan]** The Landform Rehabilitation Plan for the Operational Area must include, but is not limited to, provisions addressing:

(a) the Release Criteria applicable to the objectives of the Landform Rehabilitation Plan;

(b) methods for achieving the requirements of the Final Landform Plan; and

(c) costings for the rehabilitation of each Extraction Zone in the Operational Area.

(5) **[Total Buffer Depth]** For the purposes of rehabilitation in Extraction Zone 1, topsoil must be replaced on the Operational Area after the extraction of sand has occurred in order to provide a total buffer, incorporating the Extraction Buffer, of a minimum of one metre above the Applicable Maximum Predicted Groundwater Level Plan (*Total Buffer Depth*).

(6) **[Review of Total Buffer Depth]** The Total Buffer Depth or any sand or soil component of the Total Buffer Depth may be reviewed by the Director-General, in consultation with HWC and the Approval Holder, in relation to Extractive Operations in Extraction Zones 2, 3 or 4 based on the results of the Groundwater Management Plan, further groundwater studies and additional relevant information which may come to the attention of the Approval Holder, HWC or the Director-General during the term of the Approval.

(7) **[Amendment of Total Buffer Depth]** If no agreement can be reached through consultation under subparagraph (6), the Director-General may amend the Total Buffer Depth, or any sand or soil component of the Total Buffer Depth, if satisfied that such amendment is needed to prevent adverse impacts on the quality and stored quantity of groundwater in the Tomago Sandbeds Catchment Area.

12 REHABILITATION - VEGETATION

(1) **[Requirement to rehabilitate]** The Approval Holder must rehabilitate the Operational Area progressively from the commencement of Extractive Operations by revegetation .

(2) (a) **[Vegetation Rehabilitation Plan]** Prior to the commencement of Extractive Operations, the Approval Holder must develop a plan, to the satisfaction of the HWC and the Department, to achieve rehabilitation of the vegetation in the Operational Area as required by paragraph (1) (**Vegetation Rehabilitation Plan**).

(b) The Vegetation Rehabilitation Plan must have the objectives of re-establishing, based on the Biodiversity Reports:

(i) original vegetation community types;

(ii) structural components of the vegetation, comparable with the pre-extraction vegetation at similar elevations;

(iii) species composition and density comparable with pre-extraction vegetation at similar elevations;

having regard to the landform following the Extractive Operations.

(c) **[Content of Plan]** The Vegetation Rehabilitation Plan must include, but is not limited to, provisions addressing:

(i) the Release Criteria applicable to the objectives of the Vegetation Rehabilitation Plan;

(ii) procedures for clearing vegetation, topsoil management and sand extraction in order to minimise the environmental impact of those activities (eg percentage or description of the Operational Area to be under rehabilitation during Extractive Operations);

(iii) procedures for seed collection and propagation of adult vegetation;

(iv) procedures for revegetation;

(v) costings for the rehabilitation of each Extraction Zone in the Operational Area;

(vi) stages of the rehabilitation including progress to be followed throughout the Extractive Operations;

(vii) methods of monitoring and assessment of the progress of rehabilitation;

(viii) periodical and ongoing inspection and review of the rehabilitation by the HWC and the Department, including the annual inspection under Clause 5(4)(b);
(ix) procedures for reporting on the progress of rehabilitation;
(x) the framework for the flora component of the Environmental Audit under Clause 8; and
(xi) review of the Vegetation Rehabilitation Plan based on the results of monitoring and assessment activities.

(3) [Appointment of Rehabilitation Supervisor] The Approval Holder must appoint a Rehabilitation Supervisor with relevant qualifications approved by HWC and the Department, in order to supervise the rehabilitation work under the Vegetation Rehabilitation Plan.

13 BANK GUARANTEE

(1) (a) [Initial Bank Guarantee] The Approval Holder must provide to the Director-General a bank guarantee in the amount of $100,000 prior to the commencement of Extractive Operations in the Operational Area (*Initial Bank Guarantee*), to be maintained in that amount for the Term of this Approval, unless released at an earlier date by the Director-General.

(b) [Minimum amount of security] Notwithstanding any other provisions of this Approval, the sum total of security provided by the Approval Holder to the Director-General under all bank guarantees in force at any time must be a minimum amount of $100,000.

(2) (a) [Redetermination of amount of security] On granting an application for variation of the Operational Area, the Director-General must determine the quantum of security required from the Approval Holder in relation to the performance of the rehabilitation obligations by the Approval Holder on the Operational Area as varied, such that the amount of security required, in the reasonable opinion of the Director-General, equals the cost of carrying out those rehabilitation obligations on the Operational Area as varied.

(b) In making a redetermination under subparagraph (a), the Director-General must have regard to the costings on each Extraction Zone forming part of the Operational Area as varied, provided by the Approval Holder in accordance with Clause 1(2)(c)(ii).

(c) [Supplementary Bank Guarantee] If the Director-General determines a quantum of security pursuant to subparagraph (2)(a) that is greater than the amount of security in force under this Approval, the Approval-Holder must lodge a further bank guarantee (*Supplementary Bank Guarantee*), including where a Supplementary Bank Guarantee has already been provided in accordance with this subparagraph, in order to meet the amount of security so determined, within a reasonable time of receiving the Director-General's determination.

(d) The Approval Holder must maintain any security provided under this paragraph for the period that this Approval operates in relation to the Operational Area as varied, unless released at an earlier date by the Director-General.

(e) [Release of excess security] If the Director-General determines a quantum of security pursuant to subparagraph (2)(a) that is equal to or less than the amount of security provided under the Initial Bank Guarantee, and a Supplementary Bank Guarantee is in force under this Approval, the Director-General must release the full amount of the Supplementary Bank Guarantee to the Approval Holder as soon as practicable.

(f) If the Director-General determines a quantum of security pursuant to subparagraph (2)(a) that is greater than the amount of security provided under the Initial Bank Guarantee, but less than the amount of security provided under the sum of the Initial Bank Guarantee and any Supplementary Bank Guarantee that is in force under this Approval, the Director-General must release that part of the Supplementary Bank Guarantee that is in excess of the quantum determined pursuant to subparagraph (2)(a) as soon as practicable.

(3) (a) **[Form of security]** Any bank guarantee given in accordance with any provision of this Approval must be in a form approved by the Director-General and with a financial institution approved by the Director-General.

(b) The form of security annexed to this Approval and marked "C" is a form of security approved by the Director-General for the purposes of a bank guarantee under this Approval.

(4) (a) **[Demand on security]** The Director-General may make a demand on the Initial Bank Guarantee and/or any Supplementary Bank Guarantee for the purpose of applying the monies to the carrying out of any Rectification Works by the Department in accordance with Clause 6(5)(b) or Clause 14(6)(c).

(5) (a) **[Application for redetermination of security]** The Approval Holder may apply in writing to the Director-General to determine afresh the amount of security required for the performance of the rehabilitation obligations in relation to the Operational Area pursuant to subparagraph (2)(a).

(b) An application under subparagraph (5)(a) must include the following information:

(i) costings for the rehabilitation of each Extraction Zone comprising the Operational Area;

(ii) nomination of an amount of security that the Approval Holder considers is sufficient to perform all rehabilitation obligations in relation to the Operational Area with regard to the terms of this Approval; and

(iii) the date on which the Approval Holder seeks the variation to the bank guarantees to come into effect.

(c) The Director-General must, acting reasonably, determine an application made under subparagraph (5)(a) by granting or refusing that application within 28 days of the date of the application.

(e) The Director-General must give notice in writing to the Approval Holder of the determination of an application under subparagraph (5)(a) within 14 days of the determination.

PART 4 OBLIGATIONS AND RIGHTS

14 APPROVAL HOLDER'S RIGHTS AND OBLIGATIONS

(1) **[Compliance with Approval]**The Approval Holder must comply with any requirement expressed or implied under the terms and conditions of the Approval which includes this Schedule and any Annexures to this Schedule.

(2) **[Notification of breach]** The Approval Holder must notify the HWC and the Department of any act by the Approval Holder that in the reasonable opinion of the Approval Holder may be in breach of the terms and conditions of the Approval.

(3) **[Reimbursement of Department]** The Approval Holder is liable to reimburse the Department of its reasonable administrative expenses incurred for any inspection made by the Department on notification of a breach or potential breach by the Approval Holder of the terms and/or conditions of the Approval.

(4) (a) **[Compliance with laws]** The Approval Holder, by reason of this Approval, is not relieved of the obligation to obtain or comply with other authorities or permissions that may apply to the Extractive Operations.

(b) The Approval Holder must obtain and observe all statutory provisions and lawful orders made by any other government authority of competent jurisdiction in relation to the Extractive Operations that are in force from time to time.

(5) **[Investigation of performance under Approval]** The Director-General may require an investigation of the performance of any of the Approval Holder's obligations under this Approval during the conduct of the Extractive Operations and following the cessation of the Extractive Operations.

(6) (a) **[Obligations at conclusion of Extractive Operations]** The Approval Holder must give the Director-General 12 months notice in writing of the intended date of ceasing Extractive Operations permanently.

(b) On receipt of that notice the Director-General may require an Environmental Audit to be carried out in relation to the Operational Area in accordance with Clause 8, in particular for the assessment compliance with and the progress of work under the Rehabilitation Plans.

(c) Where the Director-General issues a Rectification Notice under Clause 6 after an Environmental Audit under subparagraph (6)(b) of this clause, if the Approval Holder defaults in performing the Rectification Works specified in that Rectification Notice:

(i) to the reasonable satisfaction of the Director-General, and/or

(ii) within the Rectification Period specified,

the Director-General may, without notice to the Approval Holder, make demand on the total amount of security in force under Clause 13 at that time.

15 OPERATION OF HWC

(1) [Entry onto Extraction Area] Employees and agents of HWC may enter the Extraction Area, for the purpose of ensuring:
   (a) the protection or proper maintenance of the groundwater; and
   (b) prevention of pollution or contamination of groundwater within the Extraction Area.

(2) [Notice of entry] Before entering the Extraction Area under paragraph (1), an employee and/or agent of HWC must use all reasonable endeavours to notify the Approval Holder of its intention to enter the Extraction Area.

(3) Where the Approval Holder is unable to be notified in compliance with paragraph (2) before HWC enters the Extraction Area in order to perform its statutory functions, HWC must notify the Approval Holder as soon as practicable after that entry onto the Extraction Area.

(4) [Interference with HWC functions] Nothing in this Approval allows the Approval Holder to interfere with or prevent the HWC from performing its statutory functions in relation to the Tomago Sandbeds Catchment Area.

(5) [HWC access and infrastructure] In carrying out Extractive Operations the Approval Holder must not, unless with written consent of HWC:
   (a) damage or interfere with any improvements, monitoring bores, water supply infrastructure or portable operating assets of the HWC situated in the Extraction Area;
   (b) limit or impede the HWC's access to any improvements, monitoring bores, water supply infrastructure or portable operating assets of the HWC situated in the Extraction Area;
   (c) limit or impede the manner or timing of the HWC in the performance of its statutory functions including installation and operation of any new improvements, monitoring bores, water supply infrastructure or portable operating assets of HWC within the Tomago Sandbeds Catchment Area.

(6) [Position of monitoring bores to be marked] Prior to the commencement of Extractive Operations, the Approval Holder must mark the position of all monitoring bores located within the Extraction Area in consultation with the HWC.

(7) [HWC to have key for access] The HWC must be given a key or other convenient means of access for any gate or fencing constructed and maintained for the purposes of the Extractive Operations on the Extraction Area that may be needed in order for the HWC to perform its functions in relation to the Tomago Sandbeds Catchment Area.

(8) [Interference with Extractive Operations] Prior to entering the Extraction Area in accordance with this clause to carry out activities that will interfere with the Extractive Operations, HWC must use all reasonable endeavours to give notice to and consult with the Approval Holder.

16 OPERATION OF THE DEPARTMENT

(1) [Entry onto Extraction Area] Employees and agents of the Department may enter the Extraction Area, in order to perform any of the Department's functions under legislation or this Approval.

(2) [Notice of entry] Before entering the Extraction Area under paragraph (1), employees and agents of the Department must use all reasonable endeavours to notify the Approval Holder of the intention to enter the Extraction Area.

(3) Where the Approval Holder is unable to be notified in compliance with paragraph (2) before the Department enters the Extraction Area in order to perform its statutory functions, the

Department must notify the Approval Holder as soon as practicable after that entry onto the Extraction Area.

(4) **[Powers exercisable on entry]** On entering the Operational Area, employees and agents of the Department have all the powers lawfully exercisable in the performance of the Department's functions, and may:

(a) conduct inspections of the equipment utilised for the purposes of monitoring under the Groundwater Management Plan and take samples and recordings as may be considered necessary;

(b) require the Approval Holder to produce records or documents relating to the monitoring under the Groundwater Management Plan; and

(c) require the Approval Holder to provide such assistance and facilities as may be requested for the purposes of paragraph (1).

(5) **[Power to vary or revoke]** If the Director-General is of the opinion that any provision or condition of the Approval does not prevent or is not consistent with the need to prevent adverse impacts in terms of quality or stored quantity of the groundwater in the Tomago Sandbeds Catchment Area from being polluted or contaminated, the Director-General may vary or revoke the provision or condition in whole or in part.

(6) **[Interference with Extractive Operations]** Prior to entering the Extraction Area in accordance with this clause to carry out activities that will interfere with the Extractive Operations, the Department must use all reasonable endeavours to give notice to and consult with the Approval Holder.

A

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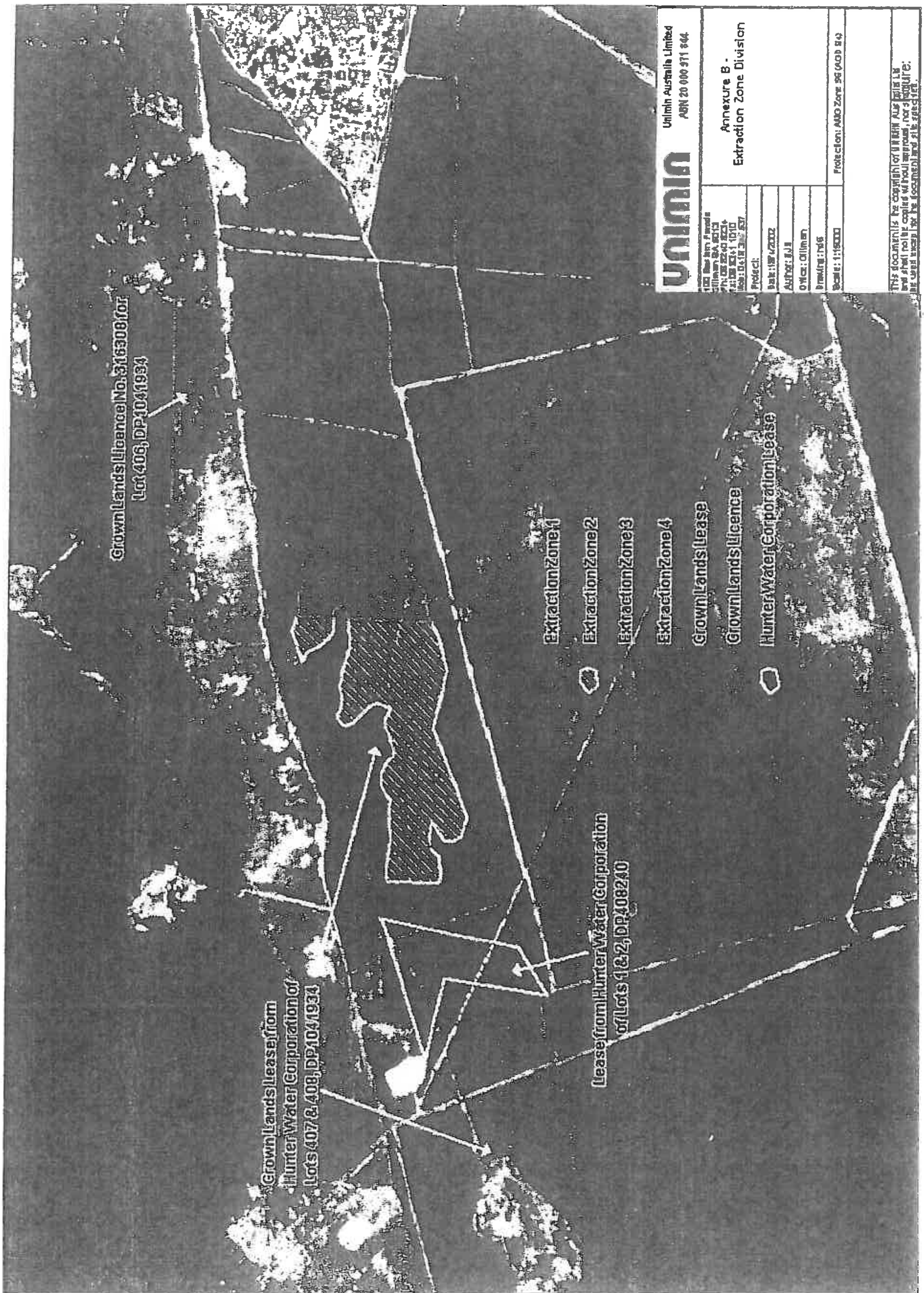
"B"


Grown Lands Licence No. 316308 for
Lot 406, DP1041934
Grown Lands lease from
Hunter Water Corporation of
Lots 407 & 408, DP1041934
Lease from Hunter Water Corporation
of Lots 1&2, DP408240
Extraction Zone 1
Extraction Zone 2
Extraction Zone 3
Extraction Zone 4
Grown Lands Lease
Grown Lands Licence
Hunter Water Corporation Lease
unimin
Unimin Australia Limited
ABN 20 000 971 844
Annexure B -
Extraction Zone Division
Project:
Office: Cillman
Scale: 1:15000
Projection: AMG Zone 56 (AGD 84)

"C"

BANK GUARANTEE

HUNTER WATER (SPECIAL AREAS) REGULATION 1997

TO: DIRECTOR-GENERAL, NSW DEPARTMENT OF LAND AND WATER CONSERVATION

WHEREAS the DIRECTOR-GENERAL, NSW DEPARTMENT OF LAND AND WATER CONSERVATION (hereinafter called "the Director-General") has granted the application for an approval under clause 13(1) of the Hunter Water (Special Areas) Regulation 1997 made by

Insert name and address of Approval Holder

UNIMIN AUSTRALIA LTD (ABN 20 000 971 844)

(hereinafter called "the Approval Holder") to undertake an extractive industry in the Tomago Sandbeds Catchment Area at Tanilba Bay comprising the extraction of sand and related materials in the area known as Extraction Zone 1 (hereinafter called "the Approval")

Insert details of work including Approval No.

AND WHEREAS pursuant to Clause 2(1)(a) of the Approval, as a pre-condition to the commencement of works as part of or in association with extraction operations in Extraction Zone 1, the Director-General has required the Approval Holder to give to the Director-General security for the due performance of the Approval Holder's obligations under and in connection with the Approval in respect of Extraction Zone 1 for the amount of

Insert sum in words

ONE HUNDRED THOUSAND DOLLARS ($100,000)

NOW THESE PRESENTS WITNESS that at the request of the Approval Holder and in consideration of the Director-General at the request of

Insert name of Surety

(hereinafter called "the Surety") which latter request is hereby testified, accepting this undertaking for the purpose of the said security the Surety unconditionally undertakes from the date of the commencement of works referred to herein to pay to the Director-General such sum or sums of money not exceeding

Insert sum in words

One Hundred Thousand Dollars ($100,000)

in the aggregate at any time upon demand or demands therefor being made by the Director-General.

The Surety undertakes to hold itself responsible for the said sum until a notification has been received from the Director-General that the said sum is no longer required by the Director-General or until payment is made by the Surety to the Director-General of the whole of the said sum in accordance with the provisions hereof.

Should the Director-General notify the Surety that it desires payment to be made to it of the whole or any part of the said sum the Surety unconditionally agrees that such payment or payments will be made to the Director-General forthwith without reference to the Approval Holder for instruction and notwithstanding the fact that notice may have been given by the Approval Holder to the Surety not to pay same.

The Surety reserves the right to terminate its liability hereunder at any time upon payment to the Director-General of the said

Insert sum in words

sum of
One Hundred Thousand Dollars ($100,000).
No variation or revocation of the said Approval or the conditions of the Approval or concession or indulgence granted by the Director-General to the Approval Holder in respect of its performance of the Approval Holder's obligation's under and in connection with the said Approval or any waiver of or exercise of any of the Director-General's rights under the Approval shall have the effect of altering the Surety's obligation hereunder notwithstanding the fact that such variation, revocation, concession, indulgence or waiver or exercise is not brought to the notice of the Surety.
Dated at the day of
2002

Signatories to be identified and their capacities shown. In the case of Power of Attorney, declaration of non-revocation is to be made.

_____ _____

APPENDIX 2
October 2019 Groundwater Monitoring Report

SIBELCO AUSTRALIA

October 2019 Biannual Groundwater Report

Tanilba Northern Dune Projects

Reporting Period Commencement	1st April 2018
Reporting Period Completion	31st March 2019
Name of Approval Holder	**SIBELCO AUSTRALIA LIMITED** PO Box 114 Tanilba Bay NSW 2319
Operations Manager	Peter Radzievic Operations Manager Sibelco Australia Limited **Sibelco Salt Ash** 8 Oakvale Road Salt Ash NSW 2318 **Mob:** +61 409 241 488 Shane.Pont@sibelco.com.au www.sibelco.com
Environmental Coordinator	Michael Lynch Quality, Safety and Environment Coordinator Sibelco Australia Limited **Sibelco Salt Ash** 8 Oakvale Road Salt Ash NSW 2318 **Tel** +61 2 4982 6399 **M** 0418 952 697 paul.bourne@sibelco.com.au www.sibelco.com

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Author:	Kleinfelder Australia Pty Ltd
Name of Site:	Tanilba Northern Dune Extension
Name of Project:	Annual Environmental Management Report
Document Version:	1

DISTRIBUTION OF COPIES

Version	Copy	Quantity	Issued to
1	pdf (email) / hard copy	1	Peter Dunn, Sibelco Australia Ltd
1	pdf (email)	1	Liam O'Grady, Sibelco Australia
1	pdf (email)	1	Hunter Water Corporation (HWC)
1	pdf (email)	1	NSW Department of Planning Industry and Environment (DPIE)

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Appendix 2: Monitoring Locations
Appendix 3: PGME Surface and Piezometer PMGE
Appendix 4: Monitoring Location Trigger Values and PMGE

1. INTRODUCTION

Sibelco Australia Limited (Sibelco) manage a white silica sand extraction operation at Tanilba Northern Dune on the Tilligerry Peninsula, NSW. Sand is extracted as a rolling west to east cycle in approved zones of clearing native vegetation, extracting sand, reforming a new surface and planting of native vegetation.

Biannual groundwater reports (this report) are a requirement of the Groundwater Management Plan which states:

The results of the groundwater level and quality monitoring will be compiled in a summary report which will be submitted to DPI-Water and HWC on a six-monthly basis

The aim of this report is to present the results of groundwater quality against the pre-determined trigger values for the 6 month biannual reporting period April 2019 – October 2019 and to assess groundwater elevations against the pre-determined maximum predicted groundwater levels for this reporting period.

The previous bi-annual report for the reporting period October 2018 to April 2019 was provided as part of the 2019 Annual Environmental Report, submitted six months prior to this report in July 2019, available at: https://www.sibelco.com/aus-nz-reporting-nsw/

2. REGULATORY REQUIREMENTS

Environmental Management issues at the site are managed by a court approved Environmental Management Plan (EMP) supplemented by an Environmental Assessment for extraction in extension areas. Groundwater Management issues are managed by the regulatory approved Groundwater Management Plan (GMP), as stipulated in the EMP. The GMP has been developed to ensure compliance with the conditions of consent and licensing requirements stipulated by the relevant regulatory authorities, during development and operation at Northern Dune. The GMP provides a formal framework for ongoing monitoring of groundwater at the site to manage the potential impact of sand extraction on groundwater level and quality. The EMP stipulates that:

- No excavation is to be carried out to a depth greater than 0.7m above the maximum predicted elevation of the water table;
- The land surface is to be restored, following mining, to a level at least 1m above the maximum predicted elevation of the water table; and
- If concentrations of any analyte are found to exceed the provisional trigger levels given in the GMP, that monitoring point will be re-sampled within fourteen days, with investigatory monitoring implemented should re-sampling also be in exceedance of the trigger values.
- The relevant Regulatory Authorities will be contacted if any recorded water level exceeds the benchmark maximum predicted groundwater levels.

3. GROUNDWATER MONITORING METHODOLGY

3.1 GROUNDWATER MONITORING NETWORK

The monitoring network consists of 21 Sibelco installed piezometers and 3 Government bores. Groundwater level data is routinely collected from 23 piezometers with reporting against the 22 piezometers used to create PMGE surfaces for the extraction zones. Groundwater quality is routinely collected from 10 piezometers with reporting against operational trigger levels in extraction areas.

The entire network covers both the Northern Dune and the Northern Dune Extension approved project areas. As such not all monitoring locations are considered to provide accurate reflection of conditions at each site due to the distance from each operational boundary. Monitoring locations can be viewed in Appendix 2. Groundwater monitoring wells ACI-3, ACI-4, ACI-12 and SAL-4 are monitored to assess potential impacts from the Northern Dune Extension Project Approval area. All other monitoring wells depicted in Appendix 2 are used to assess potential impacts from activities within the Northern Dune project area.

3.2 GROUNDWATER LEVEL MONITORING

3.2.1 Baseline Groundwater Level Monitoring and Predicted Maximum Groundwater Elevation

Baseline groundwater level monitoring is undertaken within a planned zone prior to commencing sand extraction. Planned sand extraction is based on a predicted maximum groundwater elevation (PMGE) surface created from the PMGE of baseline groundwater levels in monitored piezometers.

3.2.2 Operational Groundwater Level Monitoring

Operational groundwater level monitoring is undertaken to ensure compliance with the PMGE. Groundwater levels in monitoring wells are routinely measured monthly, increasing in frequency to weekly for a period of four weeks following any period when rainfall at Williamtown equals or exceeds 100 millimetres over a seven day rolling period, or when water levels are

within 100 millimetres of the maximum predicted groundwater levels. Monitoring will continue for the duration of mining, and until the release of the obligation by the NOW and HWC. General (visual) observation of currently mined and progressively rehabilitated areas will be carried out regularly to check for the occurrence of surface water ponding or the presence of groundwater windows.

3.2.3 Exceedence Investigation

If analysis of groundwater level monitoring sample shows anomalous levels above the PMGE then groundwater in the effected monitoring well will be retested again as soon as possible and in any case within fourteen days to confirm the results. If retesting confirms the anomaly, NOW and HWC will be notified immediately, by telephone and in writing, and within fourteen days of confirmation and an investigation will be initiated.

3.3 GROUNDWATER QUALITY MONITORING

3.3.1 Baseline Groundwater Quality Monitoring and Setting of Trigger Values

Baseline groundwater quality samples are collected for establishing baseline hydro-geochemical conditions and to create Trigger Values for comparison against sample concentrations during and post extraction operations to assist in detecting any changes in groundwater quality at the site. Baseline groundwater quality monitoring ceases when sand extraction commences and the Operational Monitoring Plan is initiated. Trigger Values have been determined for the water quality parameters of EC, Arsenic, Manganese, Iron and TPH.

3.3.2 Operational Groundwater Quality Monitoring

Operational groundwater quality monitoring will be carried out six monthly once mining commences in a zone, and will continue at a lower frequency for four years after mining ceases or as otherwise determined by the NOW and HWC. The monitoring frequency is subject to review in consultation with the NOW and HWC.

3.3.3 Exceedance Investigation

If analysis of water quality monitoring sample shows anomalous concentrations of any analyte above Trigger Values, then groundwater in the effected monitoring well will be resampled and tested again as soon as possible and in any case within fourteen days to confirm the results. If resampling confirms the anomaly, NOW and HWC will be notified immediately, by telephone and in writing, and a Groundwater Assessment Plan will be prepared within twenty eight days of confirmation. The Groundwater Assessment Plan will identify the specific groundwater quality parameters; establish the spatial and temporal variability of the water quality parameters; determine whether the anomaly is natural variability (background) or potentially related to a site activity and provide an assessment of the potential impact upon the groundwater resource. If the exceedance is determined to be potentially related to a site activity then the Groundwater Assessment Plan will outline a proposed sampling plan to obtain sufficient information to prepare a Groundwater Contamination Remediation Plan if and as required.

4. PERFORMANCE AGAINST REQULATORY REQUIREMENTS

Groundwater monitoring at Northern Dune has been conducted by AECOM for Sibelco since March 2008. AECOM continues to undertake this monitoring in accordance with their QA/QC and Sibelco's Groundwater Monitoring Guidelines.

4.1 GROUNDWATER LEVEL ASSESSMENT

There were no exceedances of groundwater level thresholds during the monitoring period.

4.2 GROUNDWATER QUALITY ASSESSMENT

Groundwater quality at Northern Dune is driven by the nature of rainfall and properties of the unsaturated zone. Rainfall entering the soil zone undergoes significant changes in chemical composition and pH by processes such as root respiration and decomposition of organic matter via chemical reactions such as sorption and redox. The chemical constituency of infiltrating water in turn modifies groundwater chemistry by processes such as leaching, dilution but not concentration (which is protected against by licence conditions limiting depth to groundwater) as well as dissolution/precipitation. The effect of multiple processes on groundwater quality parameters and therefore setting Trigger Values is that water quality data is often multiple-modal (non-normal distribution) and so simple statistical analysis using mean and standard deviation may not adequately represent processes leading to water quality change. Water quality is dependent upon the nature of rainfall (ie. timing, intensity, duration...etc) which determines whether infiltration provides a diluting effect and/or a leaching effect on ions and/or metals. Water quality can improve or deteriorate with rainfall and therefore timing of a small limited sample set strongly influences the calculated Trigger Value.

Groundwater quality trigger value exceedances may be attributed to a number of reasons including:

1. Aquifer compromised by sand extraction: measurable change in groundwater quality due to the removal of vegetation and the reduction in thickness of the unsaturated zone
2. Trigger Value set too low because of insufficient benchmark monitoring: Benchmarking should be untaken at a frequency which would allow the likely detection of water quality

maxima and minima if also required. Trigger levels for piezometers ACI-2, ACI-5, ACI-11, ACI-13, ACI-14 and ACI-16 almost certainly underestimate actual background water quality parameter levels and therefore water quality trigger level breaches will occur, particularly if sampling follows a major rainfall event

3. Trigger Value set too low because of poor Trigger Value determination methodology: The best method for determining trigger levels is simply observed pre-mining maxima based from targeted sampling in wet and dry conditions. Statistical methods introduce uncertainty on calculated trigger values.
4. Loss of bore integrity: Loss of bore integrity can be due to construction related issue and/or vandalism
5. Incorrect data: Administrative error

Exceedances of the groundwater quality trigger values were experienced at two monitoring locations during the reporting period, these being ACI-2 and ACI-16. Exceedances relate to Total Iron, Dissolved Iron, Total Manganese and Dissolved Manganese as detailed in

Table 1.

The two monitoring locations relating to the exceedances have exhibited exceedances for the same parameters in previous reporting periods as detailed in reports previously provided. These groundwater wells are used to monitor potential impacts from the Northern Dune project area, not the Northern Dune extension area. These exceedances are not related to the extension area and, consequently, have not been reported to the DPIE under Project Approval MP09_0091.

It is noted that extraction activities within proximity to these monitoring wells ceased in 2005 and therefore the elevated iron and manganese levels observed are unlikely to be the result of Sibelco activities.

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Table 1: Groundwater Quality Exceedances During Reporting Period

Monitoring Location	Exceedence No.	Monitoring Parameter	Monitoring Result	Trigger Value (Threshold)	Date of Exceedence	Date of Resample	Note
ACI-2	1	Dissolved Iron	3.92 (3.55 resample)	3.058	10/10/2019	1/11/2019	Resampled and still exceeded
	2	Total Iron	4.75 (3.51 resample)	3.623	10/10/2019	1/11/2019	Resampled and compliant
	3	Dissolved Manganese	0.016 (0.018 resample)	0.015	10/10/2019	1/11/2019	Resampled and still exceeded
	4	Total Manganese	0.017 (0.018 resample)	0.014	10/10/2019	1/11/2019	Resampled and still exceeded
ACI-16	6	Dissolved Iron	13.00 (6.40 resample)	0.188	10/10/2019	1/11/2019	Resampled and still exceeded
	7	Total Iron	13.40 (6.95 resample)	11.419	10/10/2019	1/11/2019	Resampled and compliant
	8	Dissolved Manganese	0.181 (0.251 resample)	0.061	10/10/2019	1/11/2019	Resampled and still exceeded
	9	Total Manganese	0.189 (0.242 resample)	0.104	10/10/2019	1/11/2019	Resampled and still exceeded

4.2.1 ACI-2

ACI-2 is located in Zone 1, mining Block B1 which was rehabilitated in May 2005.

Iron results are on a rising trend and have exceeded the assigned triggers (3.058mg/L dissolved Fe and 3.62mg/L Total Fe) in the September monitoring events Sept 2017. Results have been below trigger values during the March/April monitoring events.

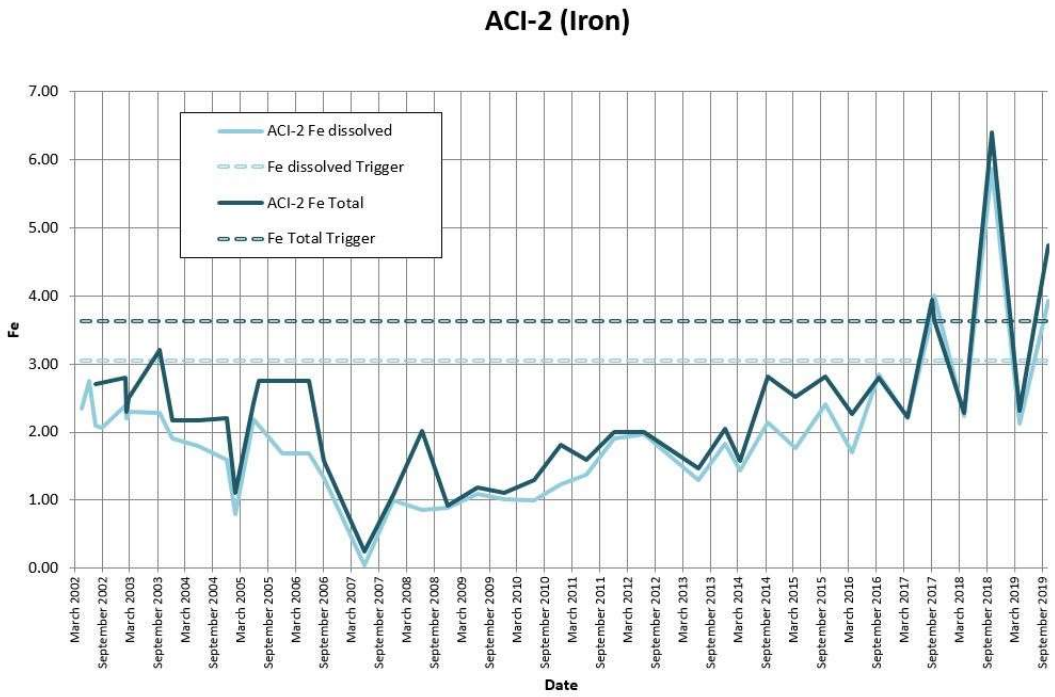

Figure 1 : ACI-2 Iron Results Trend

Demonstrating a similar trend to Iron, Manganese results are on a rising trend and have exceeded the assigned triggers in the September monitoring events Sept 2017. Results have been below trigger values during the March/April monitoring events.

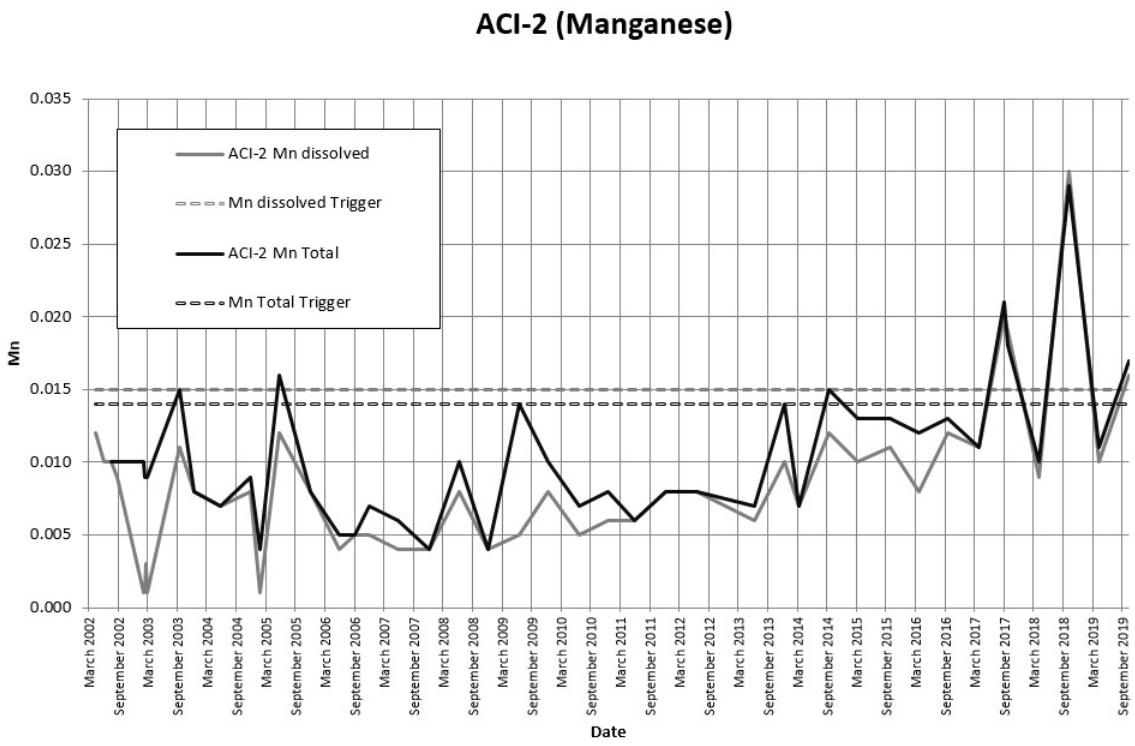

Figure 2 : ACI-2 Manganese Results Trend

4.2.2 ACI-16

ACI-16 is in an area from which sand was extracted in 2010-12 and has since undergone rehabilitation.

Iron results have declined in recent years but the latest sampling has shown higher levels returned for both dissolved and total iron since March 2018. The Fe dissolved trigger level for ACI-16 has been set too low at 0.188mg/L compared to the Fe total trigger of 11.419mg/L

Following an anomalous spike in both total and dissolved results in 2018, manganese results have returned a lower reading more in line with trends observed throughout the ongoing monitoring at ACI-16, however they remain in slight exceedance of the trigger values. A purging exercise of the bore should be undertaken prior to the next sampling round performed at ACI-16.

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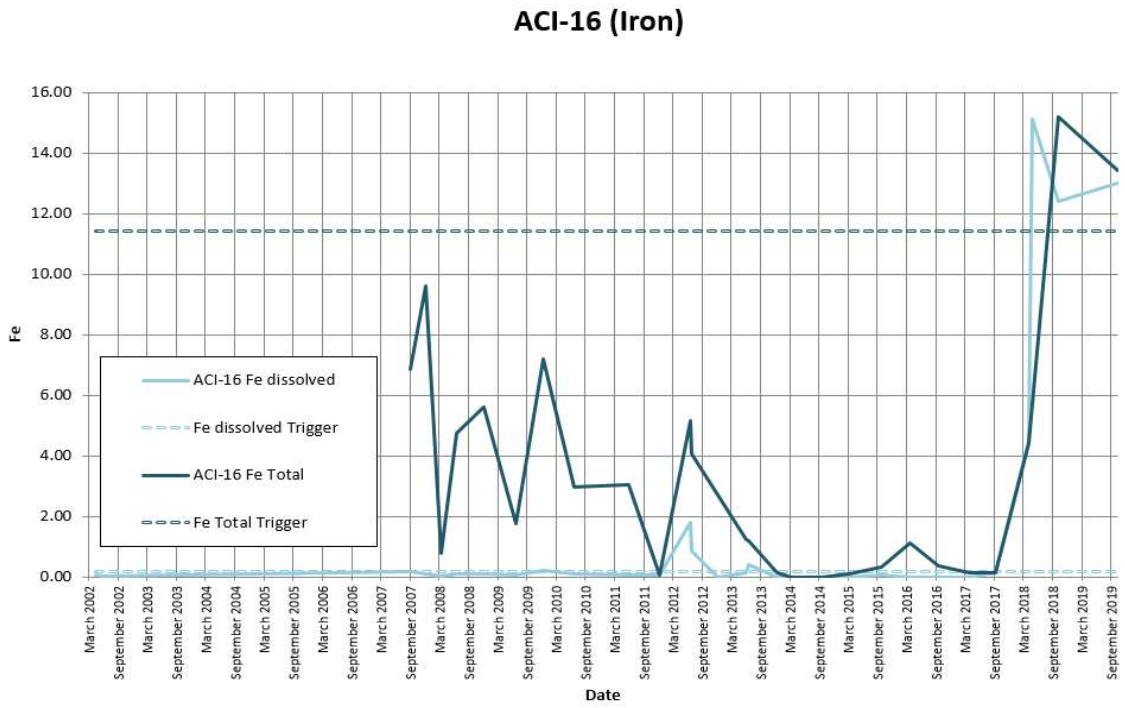


Figure 3 : ACI-16 Iron Results Trend

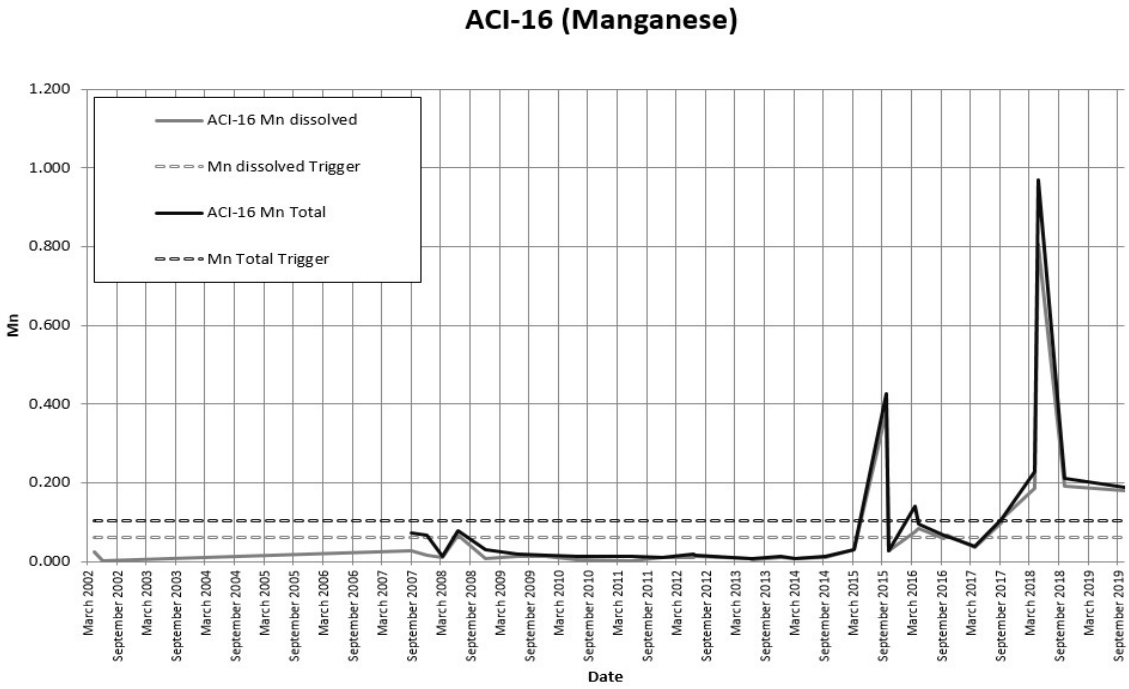
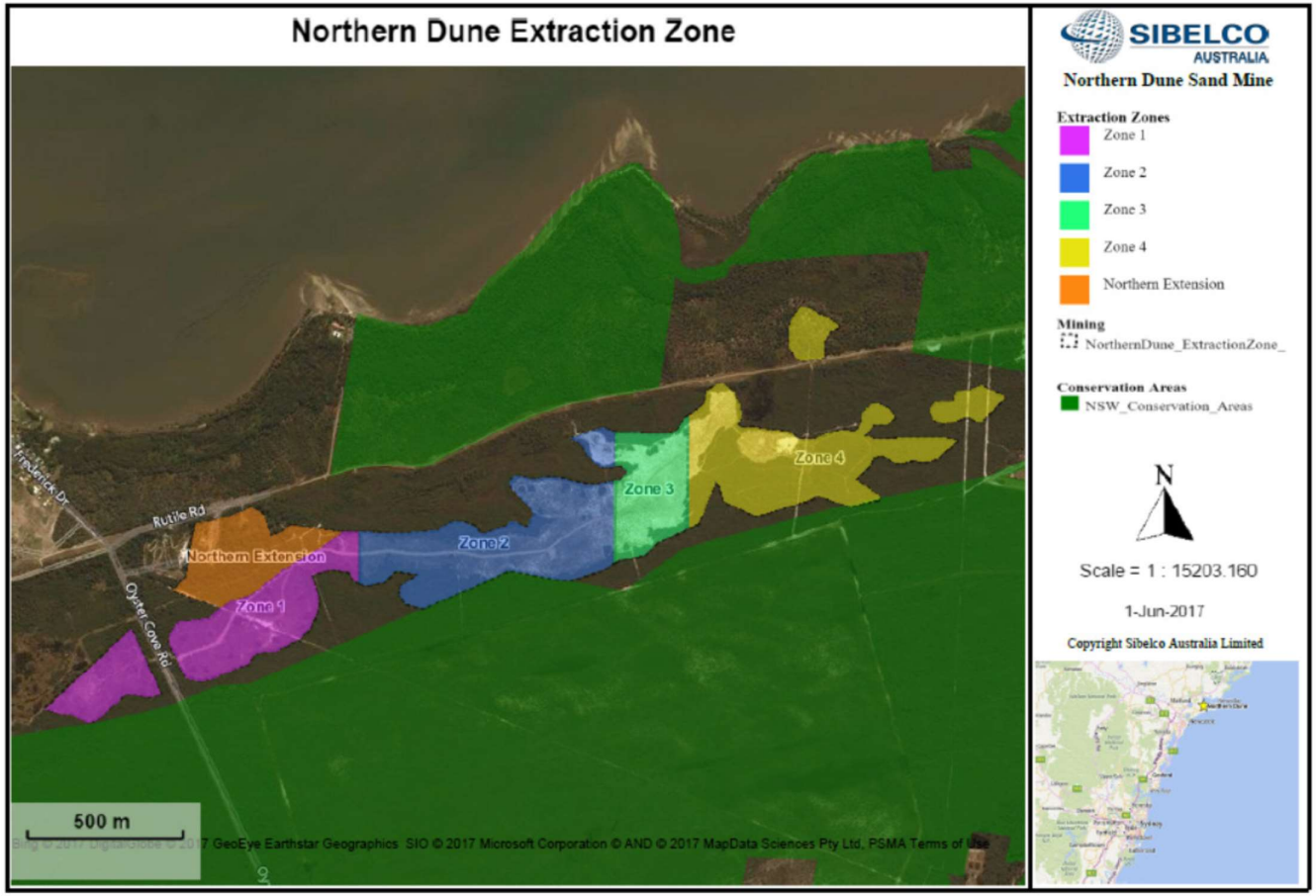
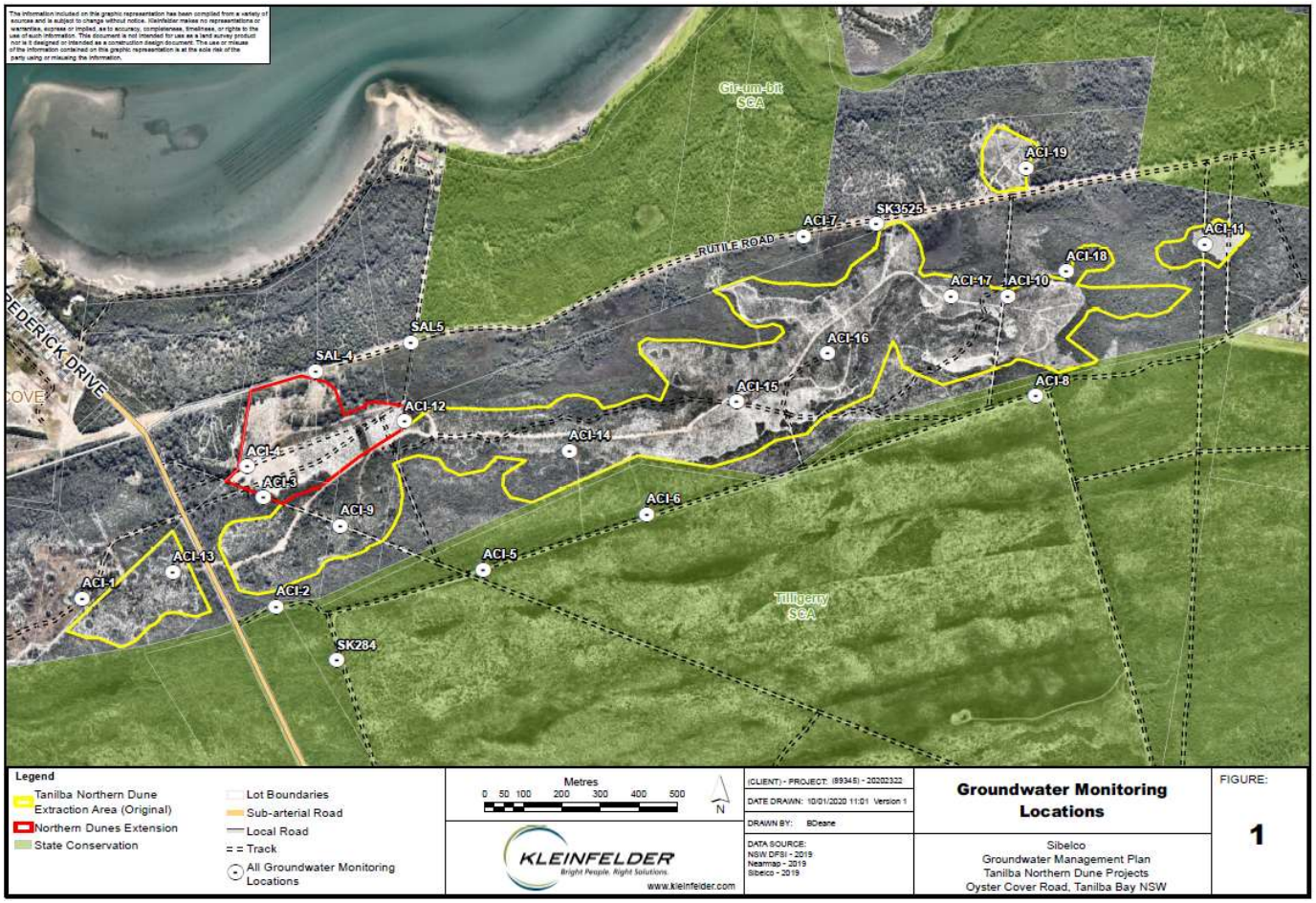


Figure 4 : ACI-16 Manganese Results Trend

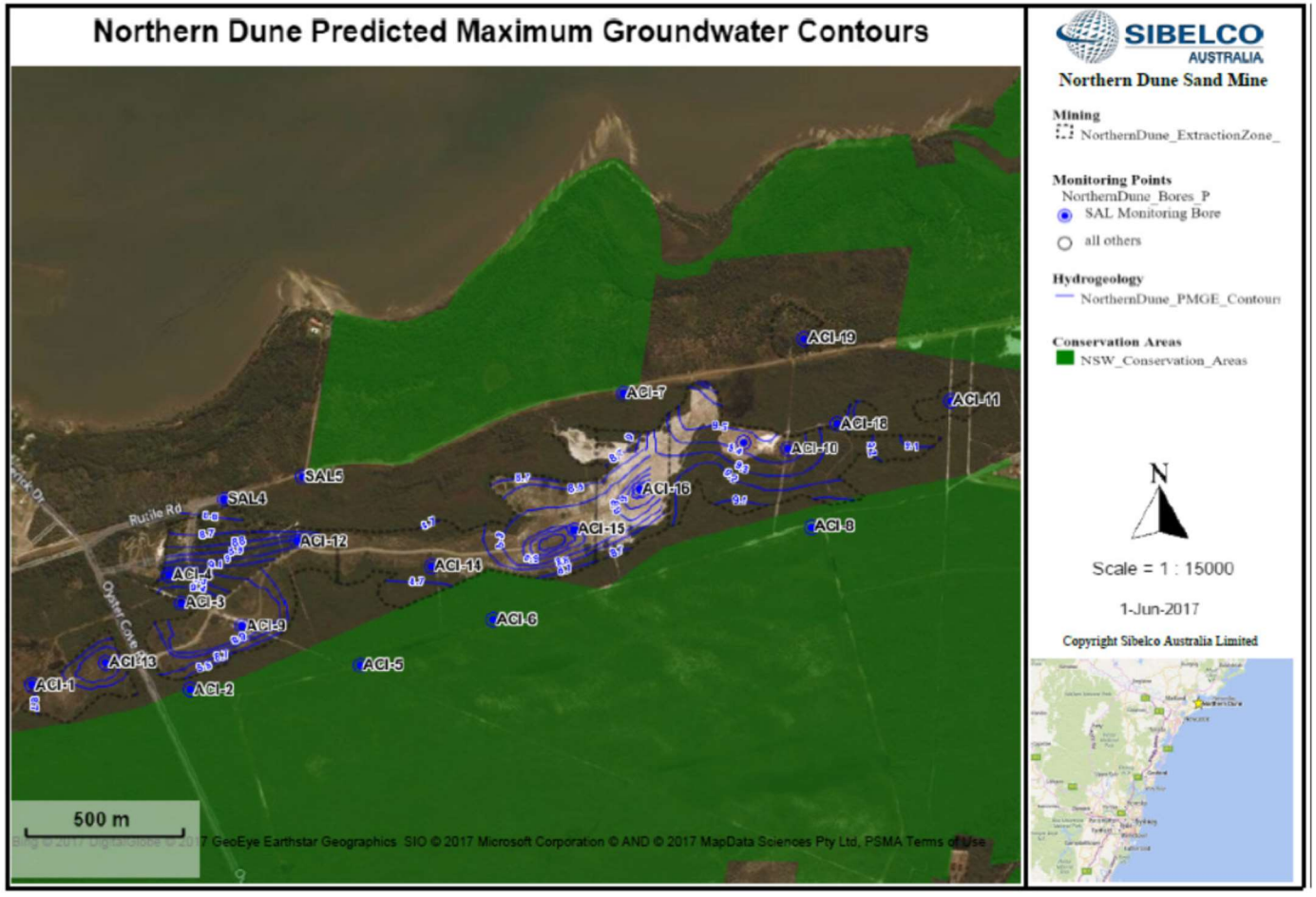
Appendix 1: Extraction Zones



Appendix 2: Monitoring Locations



Appendix 3: PGME Surface and Piezometer PMGE



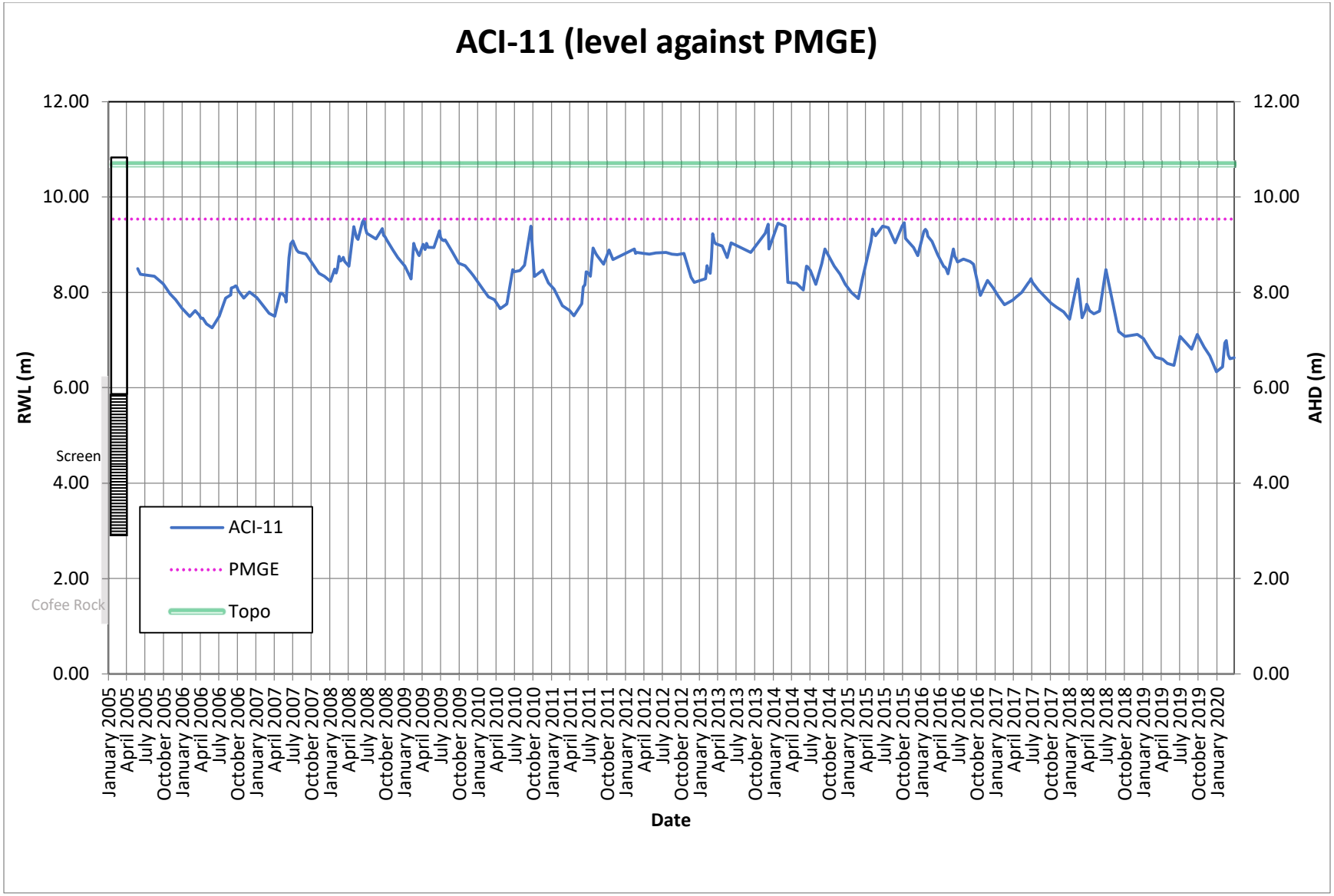
Appendix 4: Monitoring Location Trigger Values and PMGE

Extraction Zone	Bore	PMGE	GROUNDWATER QUALITY TRIGGER VALUES											
			pH	EC	Iron mg/L		Arsenic mg/L		Manganese mg/L		TPH mg/L			
					Dissolved	*Total*	*Dissolved*	*Total*	*Dissolved*	*Total*	*C6-C9*	*C10-C14*	*C15-C28*	*C29-C40*
1	ACI-1	8.82	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-12	9.28	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-13	**9.20**	x	x	1.547	6.428	0.001	0.012	0.061	0.056	0.02	0.05	1.00	1.00
	ACI-2	**8.44**	x	x	3.058	3.623	0.001	0.010	0.015	0.014	0.02	0.05	1.00	1.00
	ACI-3	9.47	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-4	9.31	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-5	**8.16**	x	x	2.048	3.286	0.001	0.015	0.014	0.036	0.02	0.05	1.00	1.00
	ACI-9	9.31	x	x	x	x	x	x	x	x	x	x	x	x
2	**ACI-14**	**9.02**	x	x	1.532	2.262	0.001	0.008	0.070	0.082	0.02	0.05	1.00	1.00
	ACI-15	9.26	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-6	**8.29**	x	x	0.493	0.935	0.001	0.001	0.006	0.006	0.02	0.05	1.00	1.00
3	**ACI-16**	**9.26**	x	x	0.188	11.419	0.001	0.002	0.061	0.104	0.02	0.05	1.00	1.00
	ACI-7	8.92	x	x	x	x	x	x	x	x	x	x	x	x
4	ACI-10	9.49	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-17	9.47	x	x	x	x	x	x	x	x	x	x	x	x
	ACI-8	**8.86**	x	x	1.108	1.410	0.002	0.002	0.006	0.006	0.02	0.05	1.00	1.00
	ACI-18	**9.12**	x	x	7.590	10.870	0.002	0.003	0.262	0.378	0.02	0.05	1.00	1.00
n/a	**ACI-11**	**9.54**	x	x	4.344	5.116	0.002	0.002	0.028	0.030	0.02	0.05	1.00	1.00
Lots 11-13	**SAL4**	**8.65**	4.44-6.63	213	3.210	3.640	0.001	0.002	0.093	0.116	0.02	0.05	1.00	1.00
-	ACI-19	9.06	x	x	x	x	x	x	x	x	x	x	x	x
	SAL5	x	x	x	x	x	x	x	x	x	x	x	x	x
	SK284	8.49	x	x	x	x	x	x	x	x	x	x	x	x
	SK3525	9.55	x	x	x	x	x	x	x	x	x	x	x	x
	SK3530	9.25	x	x	x	x	x	x	x	x	x	x	x	x

Trigger levels for Extraction Zones 1-4 calculated by AECOM have been retained which includes spurious data eg. ACI-13 Total Mn > Dissolved Mn and is based on a methodology. Lots 11-13 baseline data is simply maxiumum observed.

APPENDIX 3

Graphical Trends of Groundwater Level Monitoring


ACI-11 (level against PMGE)
RWL (m)
AHD (m)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Screen
Cofee Rock
ACI-11
PMGE
Topo
January 2005
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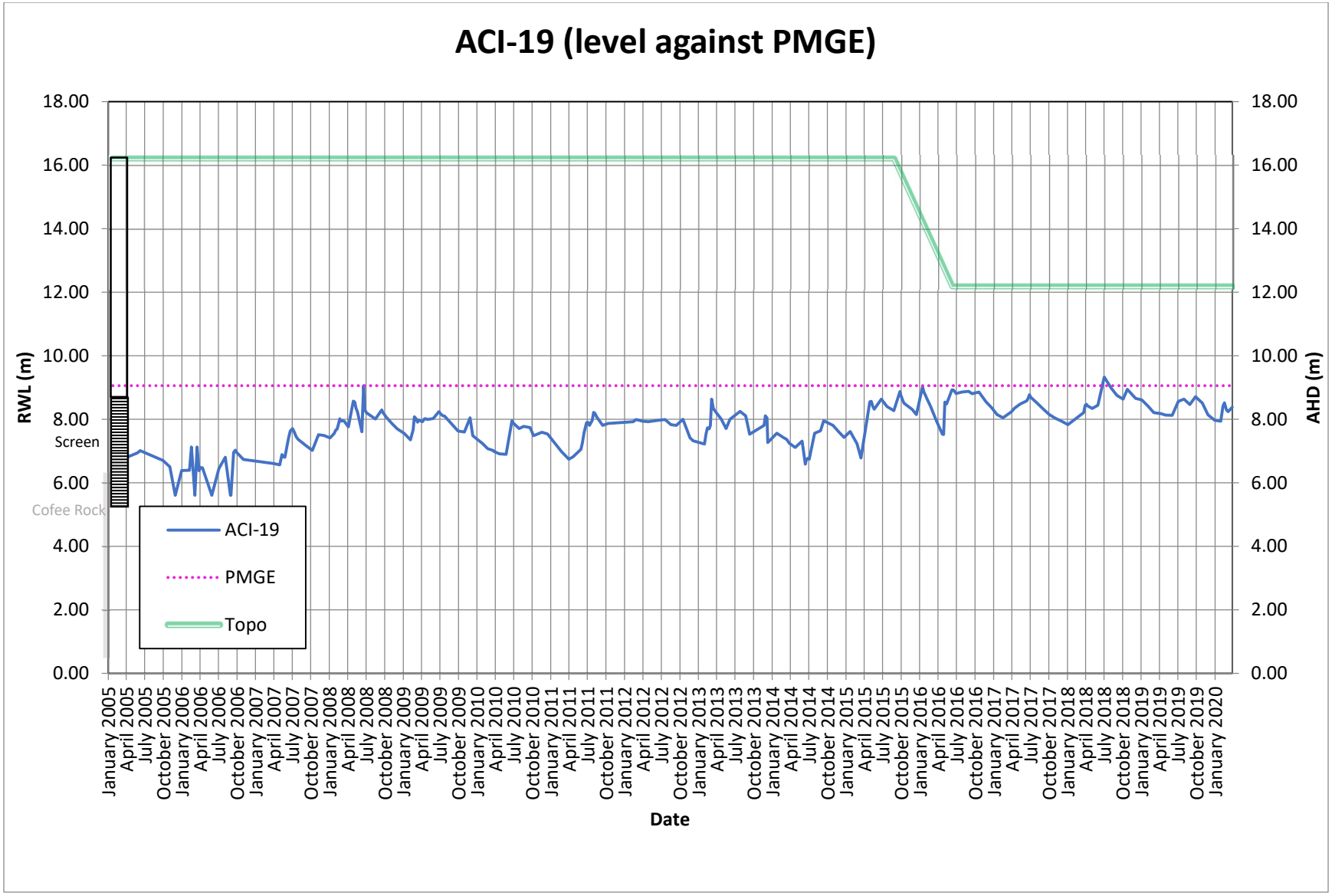
ACI-19 (level against PMGE)
RWL (m)
AHD (m)
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Screen
Cofee Rock
ACI-19
PMGE
Topo
January 2005
April 2005
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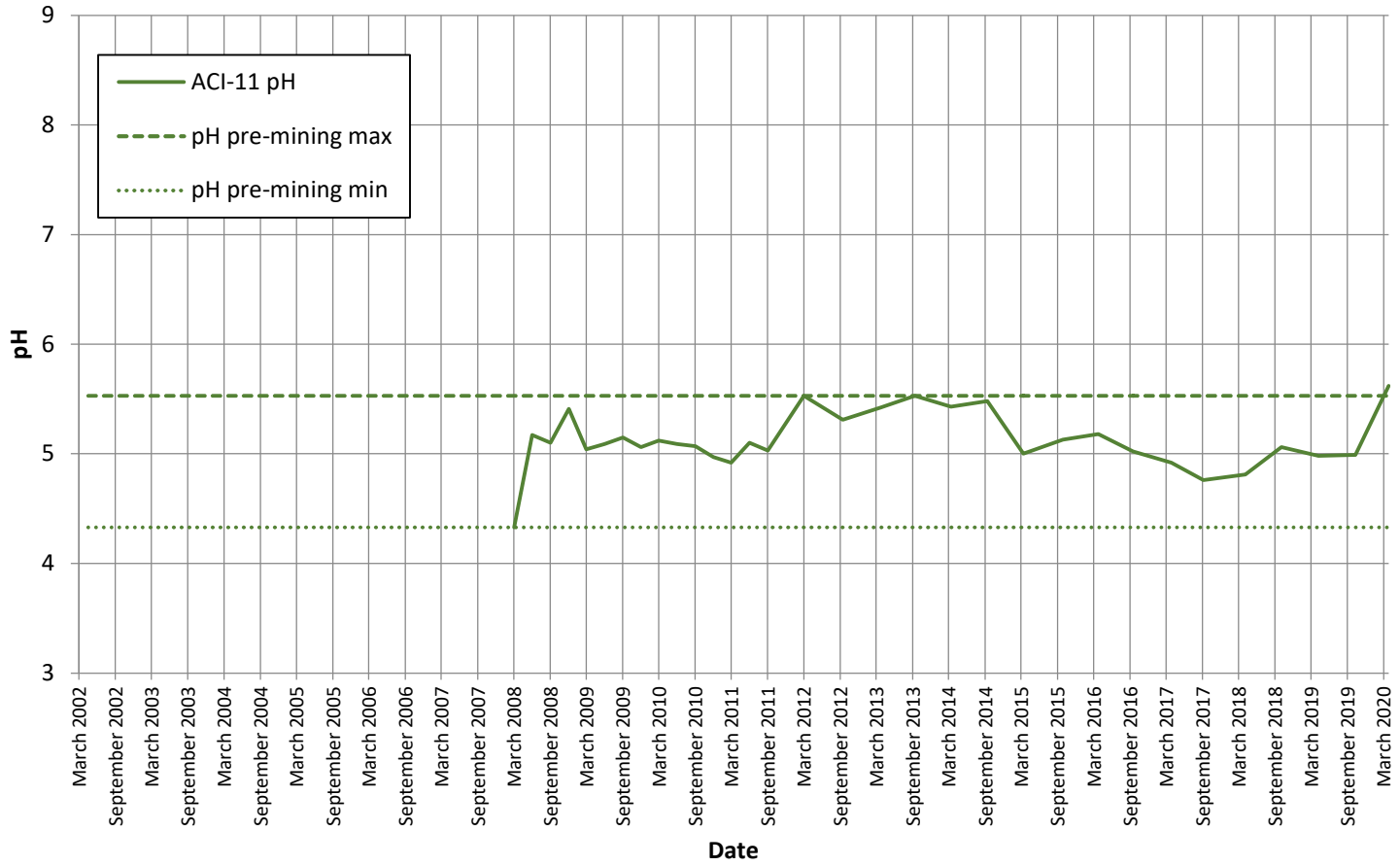
January 2020
Date

APPENDIX 4

Graphical Trends of Groundwater Quality Monitoring

ACI-11 (pH)


ACI-11 pH
pH pre-mining max
pH pre-mining min
pH
9
8
7
6
5
4
3
March 2002
September 2002
March 2003
September 2003
March 2004
September 2004
March 2005
September 2005
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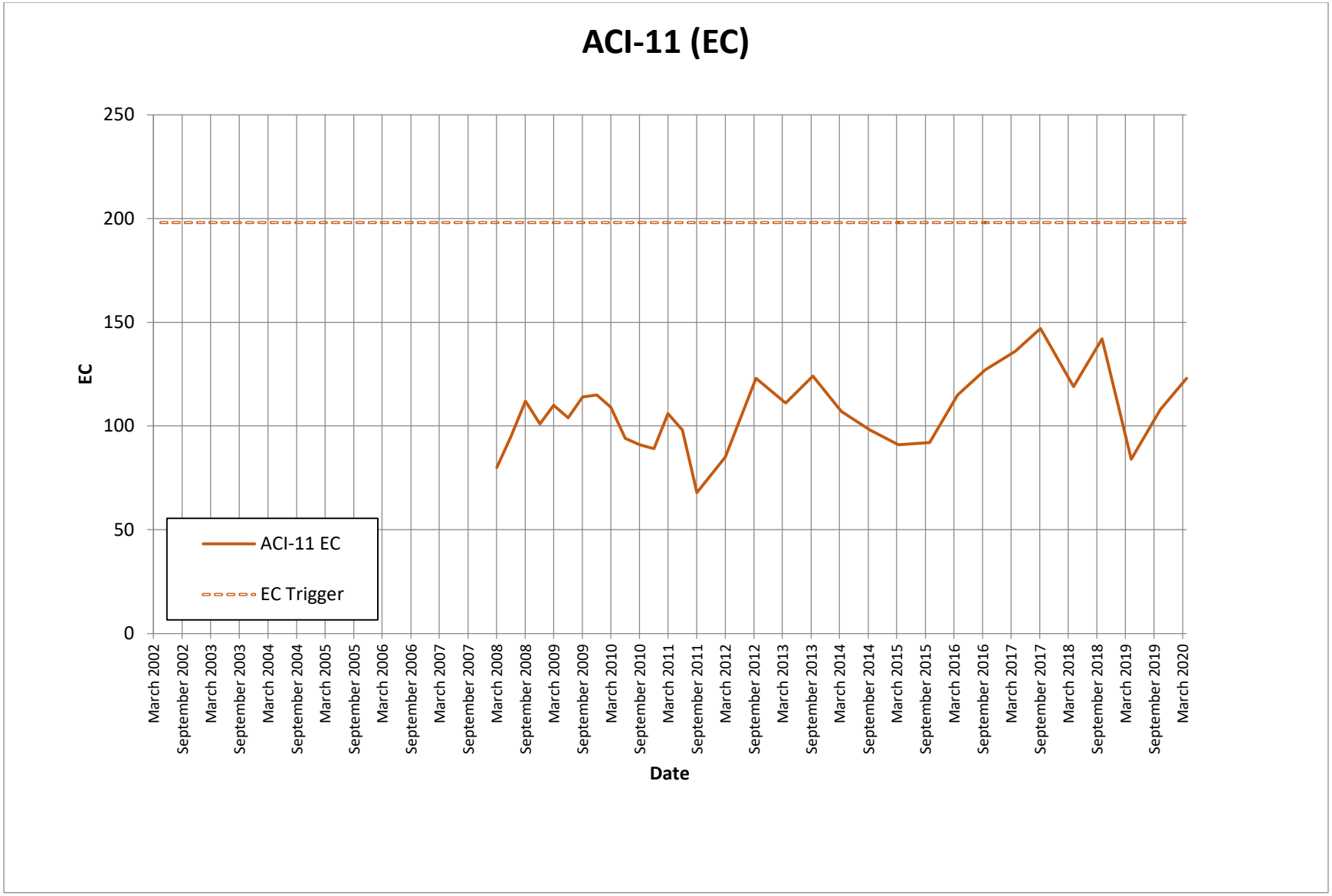
September 2019
March 2020
Date


ACI-11 (EC)
250
200
150
100
50
0
EC
ACI-11 EC
EC Trigger
March 2002
September 2002
March 2003
September 2003
March 2004
September 2004
March 2005
September 2005
March 2006
September 2006
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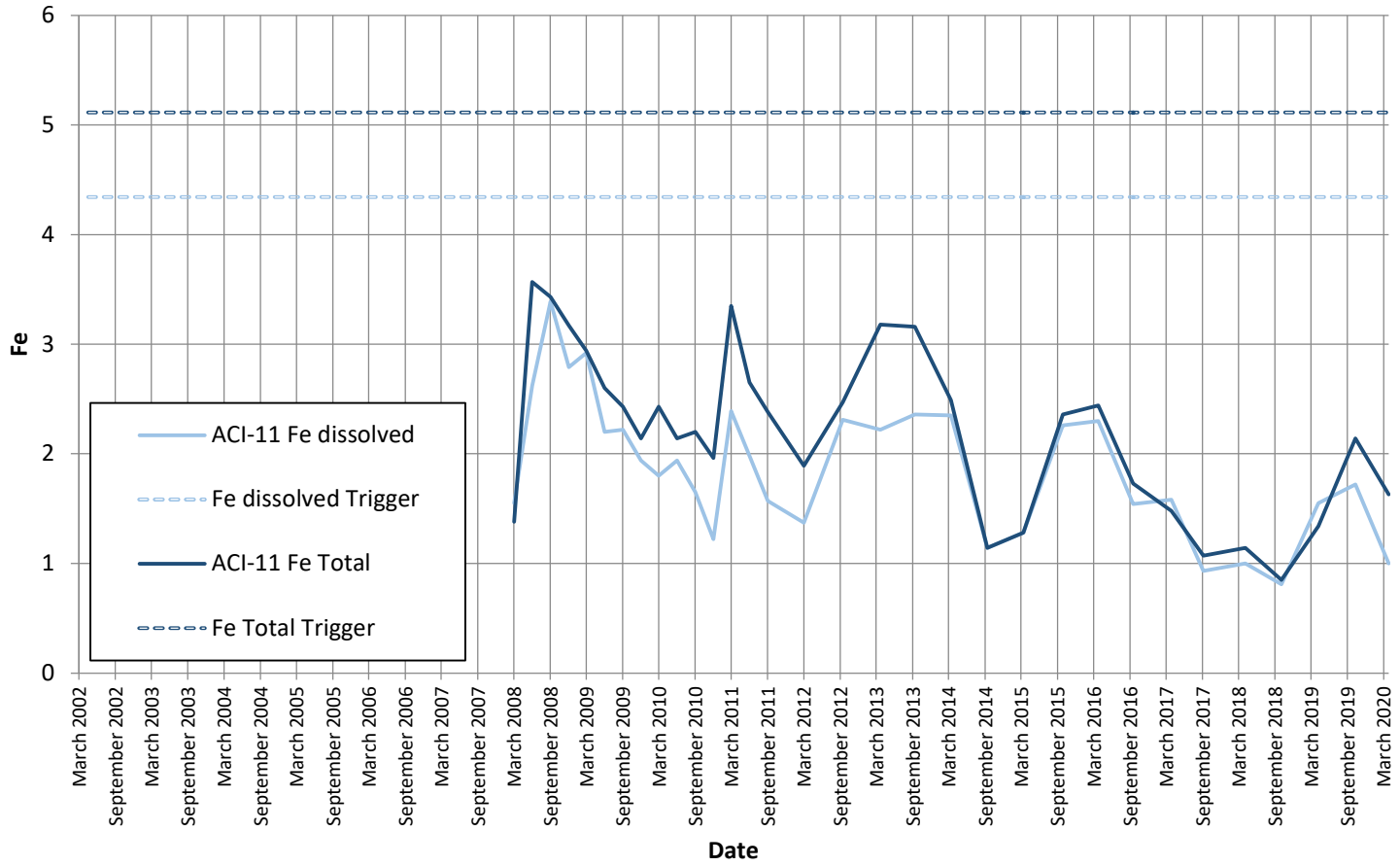
March 2020
Date

ACI-11 (Iron)


Fe
Date
ACI-11 Fe dissolved
Fe dissolved Trigger
ACI-11 Fe Total
Fe Total Trigger
0
1
2
3
4
5
6
March 2002
September 2002
March 2003
September 2003
March 2004
September 2004
March 2005
September 2005
March 2006
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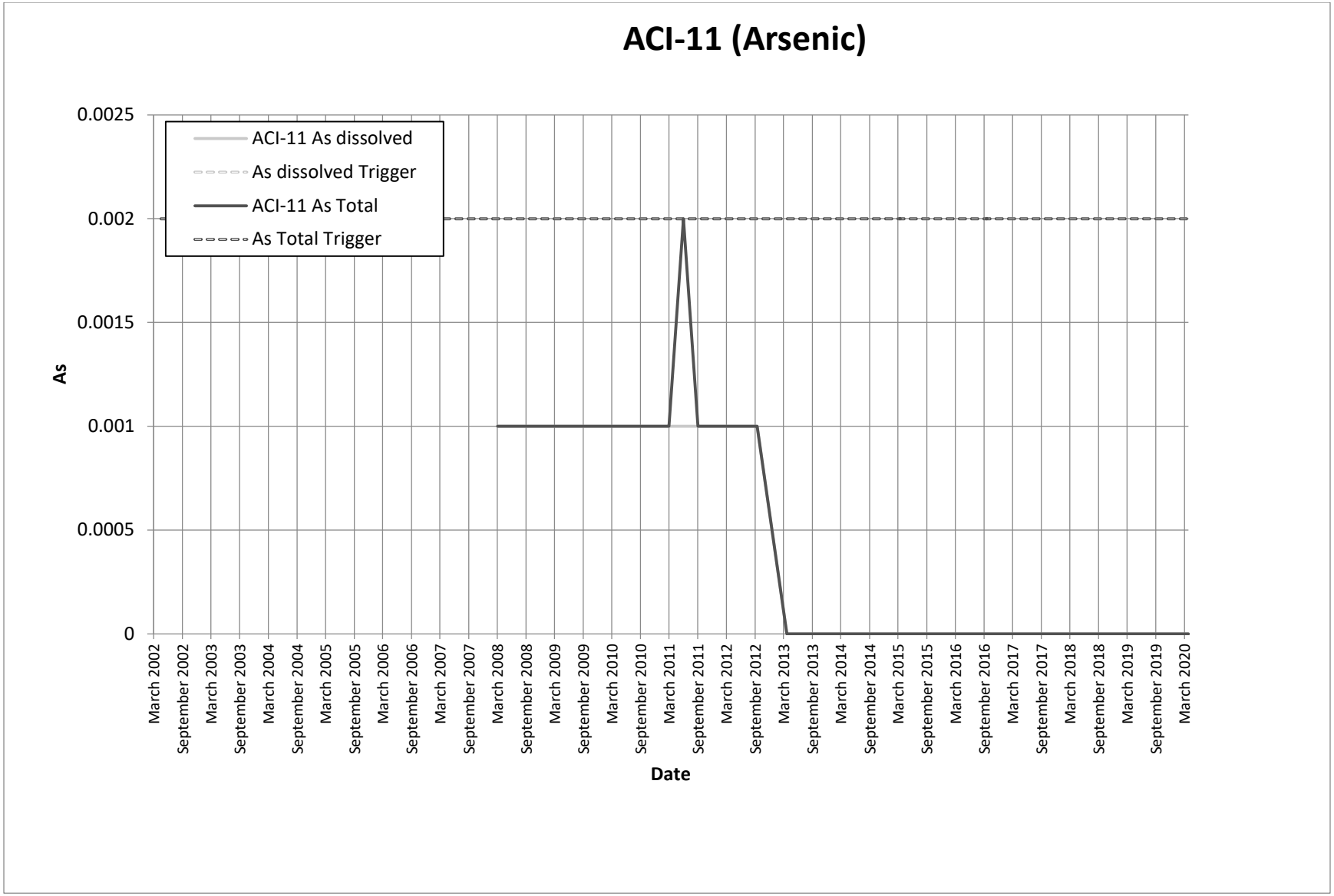
September 2019
March 2020


ACI-11 (Arsenic)
ACI-11 As dissolved
As dissolved Trigger
ACI-11 As Total
As Total Trigger
0.0025
0.002
0.0015
0.001
0.0005
0
As
March 2002
September 2002
March 2003
September 2003
March 2004
September 2004
March 2005
September 2005
March 2006
September 2006
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September 2007
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March 2020
Date

ACI-11 (Manganese)