Holcim Dunloe Sand Quarry Quarterly Environmental Report

January to March 2018

1. Introduction

Dunloe Sand Quarry is located on Mooball Rd, Pottsville. The development application number 06-0030 was approved by the NSW Minister for Planning in November 2008, subject to the conditions listed in the project approval document. Schedule 5, condition number 11 states:

> *During the project, the Proponent shall:*
> *(a) make a summary of monitoring results required under this approval publicly available at the Proponent's regional office; and*
> *(b) update these results regularly (at least every 3 months),*
> *to the satisfaction of the Director-General.*

This report is available on the proponent's website in satisfaction of this clause.

2. Water Quality

2.1. Surface Water – Dredge Pond

The following tables contain the monthly and quarterly results for the Dredge Pond, along with the Water Quality Objectives (WQO) documented in Schedule 3, condition 9.

Table 1. Monthly Surface Water Results

Reference	Site	Date	pH	Electrical Conductivity	Dissolved Oxygen	Turbidity	Oil & Grease
Units			pH Units	µS/cm	mg/L	NTU	mg/L
WQO			*6.5 - 8.5*	*3000*	*>6*	*5 - 20*	*10*
5305/1	SW1	24/01/2018	4.0	361	8.3	2.1	<5
5432/1	SW1	21/02/2018	4.0	367	8.7	2.1	<5
5552/1	SW1	21/03/2018	4.1	395	8.6	2.4	<5

Table 2. Monthly Surface Water Algae Tests

Reference	Site	Date	Blue Green Algae Cyanophytes	Total Algae Count
Units			cells/ml	cells/ml
WQO			*<50,000*	
5305/1	SW1	24/01/2018	<5	350
5432/1	SW1	21/02/2018	<5	100
5552/1	SW1	21/03/2018	<5	3,960

Table 3. Quarterly Surface Water Results

	Units	*WQO*	SW1
Reference			5552/1
Date			21/03/18
Aluminium	mg/L	*0.5*	0.88
Arsenic	mg/L		<0.001
Dissolved Iron	mg/L	*20*	0.088
Dissolved Manganese	mg/L		0.25
Chloride	mg/L	*1000*	21
Sulphate	mg/L	*800*	99
Total Alkalinity as $CaCO_3$	mg/L	*400*	<5
Magnesium	mg/L	*100*	5
Sodium	mg/L	*500*	14
Potassium	mg/L	*40*	3.6
Ammonia	mg/L	*20*	<0.005
Total Nitrogen	mg/L		<0.1
Total Phosphorus	mg/L		<0.05
Chlorophyll a	mg/m3	*2 - 10*	<1
Faecal Coliforms	CFU/100mL	*<1000*	<1
Enterococci	CFU/100mL	*<230*	~1

2.2. Surface Water – Local Creeks

The following table contains the quarterly results for the creeks from the surrounding environment.

Table 4. Waters from the Surrounding Environment – Quarterly Results

Description	Units	South Creek	North Creek
Reference		5553/1	5553/2
Date		21/03/2018	21/03/2018
pH	pH Units	6.4	6.8
Electrical Conductivity	µS/cm	4,060	18,500
Dissolved Oxygen	mg/L	6.1	7.3
Total Suspended Solids	mg/L	31	16
Total Nitrogen	mg/L	1.1	0.4
Total Phosphorus	mg/L	0.08	<0.05

2.3. Groundwaters

The following tables contain the monthly and quarterly results for the monitoring bores, along with the Water Quality Objectives (WQO) documented in Schedule 3, condition 9.

Table 5. Groundwater Monthly Results

Reference	Site	Date	Depth to Water from top of cap	pH	Electrical Conductivity
Units			m	pH Units	µS/cm
WQO				*6.5 - 8.5*	*3000*
5304/1	DLP1	24/01/2018	2.03	4.5	138
5431/1	DLP1	21/02/2018	1.94	4.5	121
5551/1	DLP1	21/03/2018	1.68	4.4	159
5304/2	DLP3	24/01/2018	1.70	5.9	7640
5431/2	DLP3	21/02/2018	1.52	5.9	7240
5551/2	DLP3	21/03/2018	1.38	5.9	8230
5304/3	DLP5	24/01/2018	1.77	4.4	2470
5431/3	DLP5	21/02/2018	1.62	4.5	1392
5551/3	DLP5	21/03/2018	1.49	4.6	1461
5304/4	DLP6	24/01/2018	1.88	3.9	866
5431/4	DLP6	21/02/2018	1.87	3.8	822
5551/4	DLP6	21/03/2018	1.62	3.9	655
5304/5	DLP7	24/01/2018	1.90	6.8	3450
5431/5	DLP7	21/02/2018	1.89	6.8	3310
5551/5	DLP7	21/03/2018	1.40	6.8	3650

Table 6. Groundwater Quarterly Results

Site	Units	*WQO*	DLP1	DLP3	DLP5	DLP6	DLP7
Reference			5551/1	5551/2	5551/3	5551/4	5551/5
Date			21/03/2018	21/03/2018	21/03/2018	21/03/2018	21/03/2018
Oil & Grease	mg/L	*10*	<5	<5	<5	<5	<5
Aluminium	mg/L	*0.5*	0.76	0.09	1.2	8.2	0.37
Arsenic	mg/L		<0.001	<0.001	<0.001	0.001	<0.001
Dissolved Iron	mg/L	*20*	5.5	9.9	4.2	120	1.3
Dissolved Manganese	mg/L		0.028	0.64	0.066	0.45	0.065
Chloride	mg/L	*1000*	21	2500	370	20	710
Sulphate	mg/L	*800*	44	200	59	410	250
Total Alkalinity as $CaCO_3$	mg/L	*400*	<5	140	11	<5	400
Magnesium	mg/L	*100*	0.8	150	25	7.1	41
Sodium	mg/L	*500*	13	1400	230	11	750
Potassium	mg/L	*40*	1.5	53	5.1	7.3	30
Ammonia	mg/L	*20*	0.062	2.9	0.14	0.3	2.3
Total Nitrogen	mg/L		0.2	3.7	0.4	1.3	3.7
Total Phosphorus	mg/L		0.06	<0.05	<0.05	0.2	0.2

3. Ambient Air Monitoring

3.1. Dust Depositional Gauges

The following table contains the results of the monthly dust deposition results, along with the Long Term Impact Assessment Criteria for Particulate Matter, as documented in Schedule 3, condition 6, table 5. It should be noted that this criteria is relevant to the annual average and not the monthly results.

Reference	Description	Date On	Date Off	Insoluble Solids	Ash	Combustible Matter
Units				g/m^2/mth	g/m^2/mth	g/m^2/mth
Criteria				*4*		
5303/1 *	D1 Sugar Shed	28/12/2017	24/01/2018	0.1	0.1	<0.1
5429/1	D1 Sugar Shed	24/01/2018	21/02/2018	2.7	2.4	0.3
5549/1	D1 Sugar Shed	21/02/2018	21/03/2018	0.4	0.1	0.3
	Annual Average			0.5		
5303/2 *	D2 Black Rocks	28/12/2017	24/01/2018	<0.1	<0.1	<0.1
5429/2	D2 Black Rocks	24/01/2018	21/02/2018	0.7	0.4	0.3
5549/2	D2 Black Rocks	21/02/2018	21/03/2018	4.9	0.3	4.6
	Annual Average			0.7		
5303/3 *	D3 Windmill	28/12/2017	24/01/2018	0.1	<0.1	0.1
5429/3	D3 Windmill	24/01/2018	21/02/2018	1.6	0.9	0.7
5549/3	D3 Windmill	21/02/2018	21/03/2018	11.8 #	0.5	11.3
	Annual Average			1.6		
5303/4 *	D4 Haul Rd	28/12/2017	24/01/2018	<0.1	<0.1	<0.1
5429/4	D4 Haul Rd	24/01/2018	21/02/2018	0.6	0.4	0.2
5549/4	D4 Haul Rd	21/02/2018	21/03/2018	7.1 #	0.4	6.7
	Annual Average			0.9		

* Note that this was a 27 day sampling period due to the Christmas shut-down period.
# High results due to insects and vegetation

3.1. Particulate Matter

The following table contains the results of Particulate Matter less than 10 µm (PM_{10}) as measured by high volume air sampler (HVAS) located near the Dunloe Site Office, along with the Short and Long Term Impact Assessment Criteria for Particulate Matter, as documented in Schedule 3, condition 6, tables 3 and 4. In accordance with the Air Quality Management Plan, Total suspended particulate matter (TSP) is calculated from the PM_{10} results multiplied by 2.5.

The HVAS was installed on 1/11/2017 and therefore the Long Term Impact Assessment Criteria (annual average) is not yet reportable (due after October 2018).

Reference	Description	Date Sampled	Comments	Particulate Matter <10µm (PM_{10})	Calculated Total Suspended Particulates (TSP)
Units				µg/m^3	µg/m^3
Criteria	*24 hour average*			*50*	
	Annual average			*30*	*90*
5398/1	Office	1/01/2018		24	60
5398/2	Office	7/01/2018		4	10
5398/3	Office	13/01/2018	80-100 km/Hr winds	23	58
5398/4	Office	19/01/2018	80-100 km/Hr winds	125	313
5470/1	Office	25/01/2018		17	43
5470/2	Office	31/01/2018		22	55
5470/3	Office	6/02/2018		27	68
5470/4	Office	12/02/2018	Very windy conditions	79	198
5470/5	Office	18/02/2018		2	5
5645/1	Office	24/02/2018		14	35
5645/2	Office	2/03/2018		25	63
5645/3	Office	8/03/2018		67	168
5645/4	Office	14/03/2018		25	63
5645/5	Office	20/03/2018		31	78

4. Monitoring Locations

Plan of:	Holcim Dunloe Sands Quarry - Site Layout & Instruction	***Location:***	Pottsville - Mooball Road, Mooball, NSW	***Source:***	nearmap - Image Date 05/05/2016	***Our Ref:***	Dunloe_Monit_C002_V2_F2.cdr
Figure:	TWO	***Council:***	Tweed Shire Council	***Survey:***	N/A	***Plan By:***	LT/JD
Sheet:	1 of 1	***Tenures:***	N/A	***Projection:***	N/A	***Project Manager:***	LT
Version/Date:	V2 01/05/2018	***Client:***	Holcim Australia Pty Ltd	***Contour Interval:***	N/A	***Office:***	Thornton

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.

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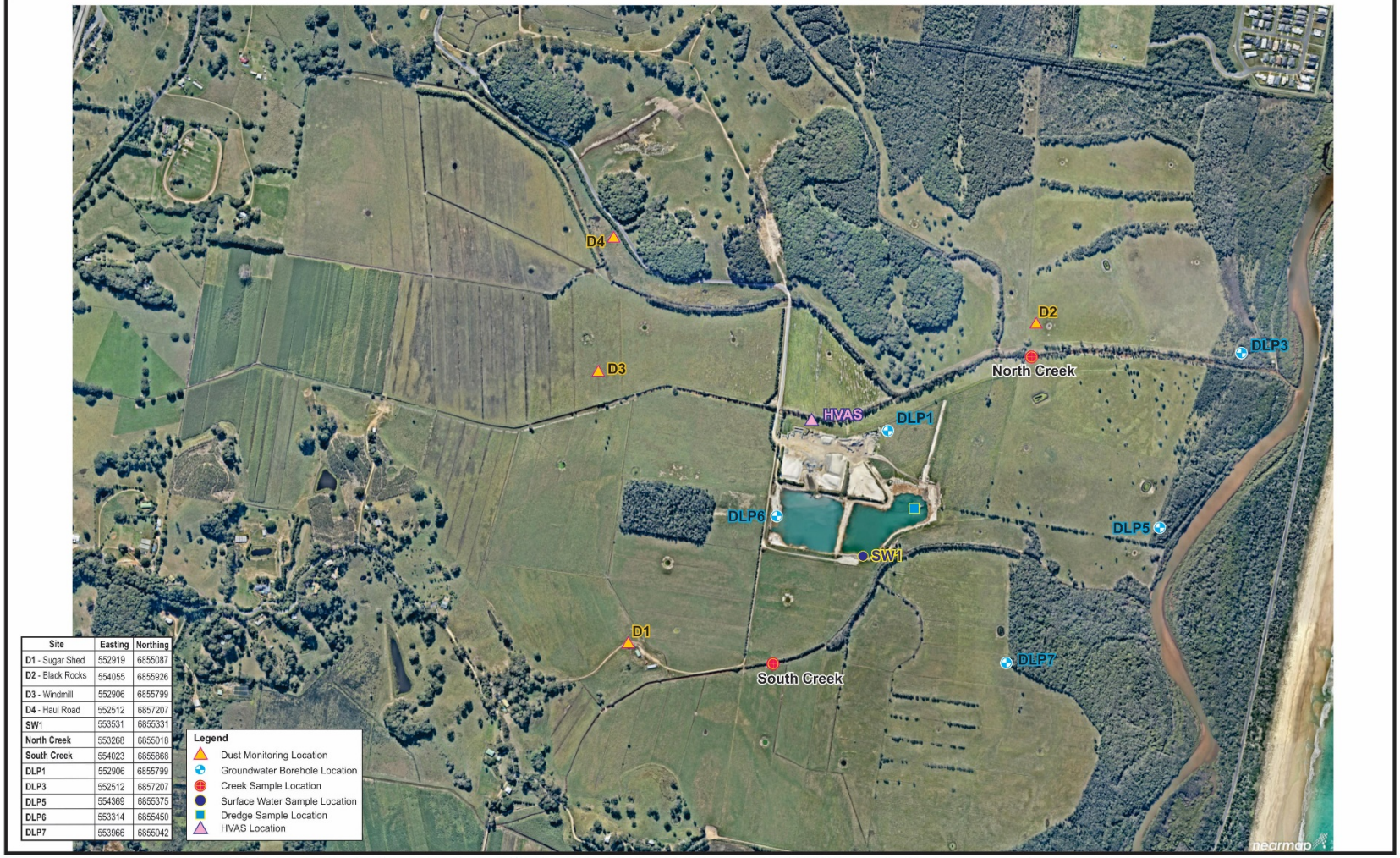

Site	Easting	Northing
D1 - Sugar Shed	552919	6855087
D2 - Black Rocks	554055	6855926
D3 - Windmill	552906	6855799
D4 - Haul Road	552512	6857207
SW1	553531	6855331
North Creek	553268	6855018
South Creek	554023	6855868
DLP1	552906	6855799
DLP3	552512	6857207
DLP5	554369	6855375
DLP6	553314	6855450
DLP7	553966	6855042

Legend

- Dust Monitoring Location
- Groundwater Borehole Location
- Creek Sample Location
- Surface Water Sample Location
- Dredge Sample Location
- HVAS Location

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