

# **2023 Annual Review**

**1 January 2023 – 31 December 2023**

**Rooty Hill Distribution Centre**

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Appendix 4: Independent Environmental Audit Action Plan



## Title Block

Name of operation	Rooty Hill Distribution Centre
Name of operator	Holcim (Australia) Pty Ltd
Development consent / project approval #	PA 05_0051
Name of holder of development consent / project approval	Holcim (Australia) Pty Ltd
Annual Review start date	1 January 2023
Annual Review end date	31 December 2023
<p><b>I, Michael Ensor, certify that this audit report is a true and accurate record of the compliance status of Rooty Hill Distribution Centre for the period of 1 January 2023 – 31 December 2023 and that I am authorised to make this statement on behalf of Holcim (Australia) Pty Ltd.</b></p> <p><i>Note.</i></p> <p>a) _ <i>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.</i></p> <p>b) _ <i>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).</i></p>	
Name of authorised reporting officer	Michael Ensor
Title of authorised reporting officer	Site Supervisor
Signature of authorised reporting officer	
Date	21/03/2024

# 1 Statement of Compliance

See **Table 1** for the statement of commitments for the 1 January 2023 to 31 December 2023 reporting period for the Rooty Hill Distribution Centre (RHDC). **Table 3** details the non-compliances of the relevant approvals identified within the reporting period. **Table 2** presents the compliance status key used for the summary of non-compliances shown in **Table 3**.

**Table 1: Statement of Commitments**

Relevant Approval	Were all conditions complied with?
Project Approval 05_0051	No – See <b>Table 3</b> for more details.

**Table 2: Compliance Status Key for Table 3**

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"><li>• potential for serious environmental consequences, but is unlikely to occur; or</li><li>• potential for moderate environmental consequences, but is likely to occur</li></ul>
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"><li>• potential for moderate environmental consequences, but is unlikely to occur; or</li><li>• potential for low environmental consequences, but is likely to occur</li></ul>
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Source: *Annual Review Guidelines* (NSW Government, 2015).

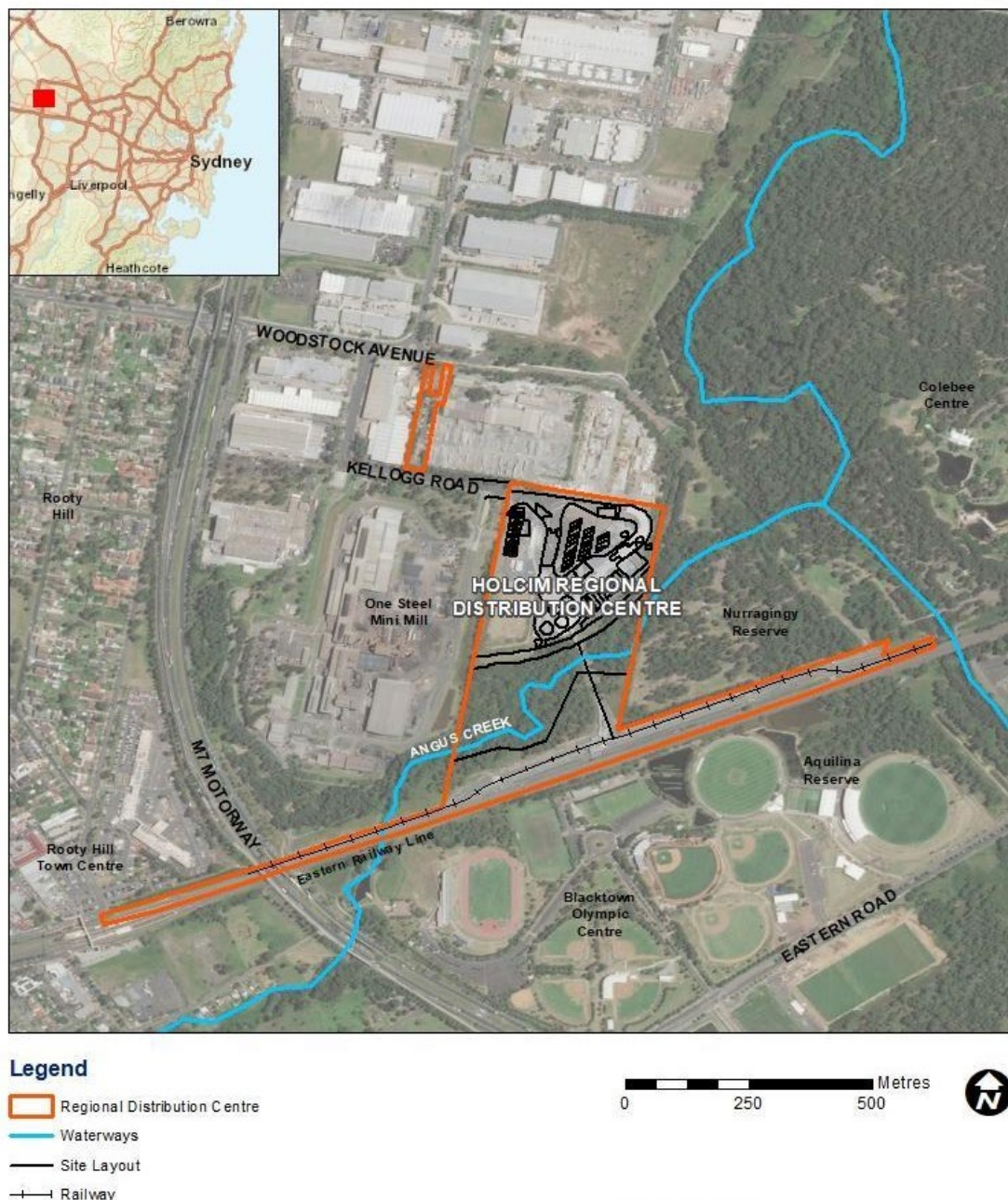
**Table 3: Summary of Non-Compliances in 2023**

Relevant approval	Condition	Condition Description	Compliance status	Relevant Section in this Annual Review and Comment
PA 05_0051 MOD 2	2.8A Air Quality	The Proponent must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 2 at any residence on privately-owned land.	Low Non-Compliance	<b>Section 6.3 Air Quality</b>
				HVAS 1 PM <sub>10</sub> Annual Average was exceeded, recording an average 33.2µg/m <sup>3</sup> which is above the allowed criteria of 25µg/m <sup>3</sup> .
				HVAS 1 PM <sub>10</sub> 24-hour exceedances occurred on:
				<ul style="list-style-type: none"><li>• 18 February 2023;</li><li>• 24 February 2023;</li><li>• 8 March 2023; and</li><li>• 25 May 2023</li></ul>
				HVAS 2 PM <sub>10</sub> 24-hour exceedances occurred on:
				<ul style="list-style-type: none"><li>• 18 February 2023; and</li><li>• 25 May 2023</li></ul>
				There were missed PM <sub>10</sub> sampling events between January and April due to the removal of the HVAS2 device from the Blacktown City Council property for redevelopment. The new PM10 location was commissioned in May 2023.
				The missed sampling events were reported to DPHI and EPA.
	Between 25 June – 5 July, HVAS 1 was offline due to errors likely associated with the installation of the weather station. On 1 October, both HVAS 1 and HVAS 2 were offline due to system configuration errors.			

Relevant approval	Condition	Condition Description	Compliance status	Relevant Section in this Annual Review and Comment
		<p>alone, with zero allowable exceedances of the criteria over the life of the development.</p> <p>c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.</p> <p>d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.</p>		
	5.5 e) Vegetation Management Plan	Vegetation Management Plan as described in condition 2.24 of this approval. The Proponent must implement the management plan as approved from time to time by the Secretary.	<b>Administrative Non-Compliance</b>	Holcim failed to undertake <i>Grevillea juniperina</i> subsp. <i>juniperina</i> monitoring as per the approved Vegetation Management Plan in the OEMP.
PA 05_0051 MOD 2	6.1 Incident Reporting	The Proponent must notify the EPA and the Secretary of any incident with actual or potential significant adverse off-site impacts on people or the biophysical environment as soon as practicable after the occurrence of the incident ("initial notification"). The Proponent must provide written details ("written report") of the incident to the EPA and the Secretary within seven days of the date on which the incident occurred.	<b>Administrative Non-Compliance</b>	<p>Holcim failed to notify the Secretary upon discovering that HVAS 1 was not operational during period 25/06 till 05/07.</p> <p>Holcim failed to notify the Secretary that both HVAS 1 and HVAS 2 were not operational on 01/10.</p>

## 2 Introduction

Holcim (Australia) Pty Ltd (Holcim) is the owner and operator of the Rooty Hill Distribution Centre (RHDC), an aggregate storage and distribution facility located on Lot 1 DP 1150066 at 21 Kellogg Road, Rooty Hill, as seen in **Figure 1**. A Development Consent was granted in 2006 by the Land and Environment (L&E) Court (Decision No. 10406 of 2006) to construct and operate a distribution centre to receive aggregates by rail from Holcim's Lynwood Quarry. The RHDC officially commenced operations on 1 October 2015. The RHDC facility is the primary unloading and distribution centre for construction materials extracted from Lynwood Quarry (located in Marulan, NSW) into the Greater Sydney market.



**Figure 1 – Rooty Hill Distribution Centre locality and primary features.**

In accordance with Condition 6.3 (Annual Performance Monitoring) of the modified Project Approval 05\_0051 the site is required to undertake an Annual Review of the site. These Annual Review requirements are presented in **Table 4** This Annual Review will cover a reporting period of 1 January 2023 to 31 December 2023.

**Table 4: Annual Review Requirements**

Condition	Section addressed in Annual Review
The Proponent must, throughout the life of the project, prepare and submit to the Secretary, an Annual Review. The Annual Review must review the performance of the project against the Operation Environmental Management Plan (refer to condition 5.4 and condition 5.5 of this approval), the conditions of this approval and other licences and approvals relating to the project. The Annual Review must include, but not necessarily be limited to:	
a) details of compliance with the conditions of this approval;	<b>Section 1 &amp; 6</b>
b) a copy of the Complaints Register (refer to condition 4.3 of this approval) for the preceding twelve-month period (exclusive of personal details), and details of how these complaints were addressed and resolved;	<b>Section 9</b>
c) a comparison of the environmental impacts and performance of the project against the environmental impacts and performance predicted in those documents listed under condition 1.1 of this approval;	<b>Section 6, 7.1, and 8.1</b>
d) results of all environmental monitoring required under this approval and other approvals, including interpretations and discussion by a suitably qualified person; and	<b>Section 6, 7, &amp; 8</b>
e) a list of all occasions in the preceding twelve-month period when environmental performance goals for the project have not been achieved, indicating the reason for failure to meet the goals and the action taken to prevent recurrence of that type of incident.	<b>Section 1, 6, &amp; 11</b>

This Annual Review has been prepared following the NSW Government's *Annual Review Guidelines: Post-approval requirements for State Significant Mining Developments* (October 2015).

## **2.1 Key Personnel**

### **RHDC Site Supervisor**

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### 3 Approvals

RHDC operates under the approvals listed in **Table 5**. The original Project Approval 05\_0051 was modified in 2011 (MOD 1) to approve alterations to site layout. In 2017, the Project Approval was modified (MOD 2) to secure a larger area for material storage and handling.

**Table 5: Approvals for RHDC Operations**

Approval	Regulatory Authority	Date of Approval
MOD 2 to PA 05_0051	Department of Planning, Industry & Environment (DPIE).	29 June 2017
MOD 1 to PA 05_0051	Department of Planning.	22 March 2011
L&E Court Decision No. 10406 of 2006.	Department of Planning, Housing, and Infrastructure	26 April 2006

On 18 June 2020, the EPA approved Holcim's application to surrender the Environment Protection Licence (EPL) 20672 for RHDC. EPL 20672 is no longer applicable to the RHDC.



## 4 Operations Summary

All operations undertaken at RHDC during the reporting period were undertaken in general accordance with the Project Approval. Fixed and mobile plant are serviced as required by their respective original equipment manufacturer's maintenance schedule and as required to ensure efficient and effective use. Maintenance of compliance based fixed and mobile plant is prioritised as required.

RHDC has approval to operate 24 hours a day, seven days a week. The site contained all construction activities within the hours specified in Condition 2.2 of the Project Approval during this report period. The time limits are as follows:

- a) 7:00am to 6:00pm, Mondays to Fridays,
- b) 8:00am to 1:00pm on Saturdays, and
- c) At no time on Sundays or public holidays.

**Table 6** includes a summary of the product distributed from RHDC in each calendar year which apply to this Annual Review reporting period. As outline in Condition 1.4, the production capacity of the concrete batching plant must not exceed 200,00m<sup>3</sup> per year.

**Table 6: Annual Production Summary**

Material	Approval Limit	2018	2019	2020	2021	2022	2023	2024 (Forecast)
Concrete Production (m <sup>3</sup> )	200,000	68,700	53,547	94,722	77,746	75,906	107,037	85,000

In accordance with the Operational Environmental Management Plan, road trucks are covered when leaving the site. Compliance against this condition is audited and training is provided to drivers through the induction process. Random or "spot" audits inspect the internal and external road conditions to ensure trucks are not carrying material out onto public roads.

### 4.1 Next Reporting Period

It is anticipated that RHDC will continue to operate within the current footprint and scope of the existing operations.

Development activities proposed to be carried out at RHDC in 2024 include:

- Stockpiling of product;
- Operation of the concrete batching plant; and
- Loading and unloading of product by truck and train.

## 5 Actions Required from Previous Annual Review

Holcim did not receive a letter from DPE following the submission of the 2022 Annual Review in March 2023.

### 5.1 Update on Proposed Actions from 2022 Annual Review

**Table 7** provides an update on the actions proposed by Holcim in the previous Annual Review.

**Table 7: Actions from Previous 2022 Annual Review**

Improvement Measure	Activities	Actions Taken in the Reporting Period
Air Quality Monitoring	Implement the air quality monitoring program as per the approved OEMP. This update includes updated air quality monitors and relocations of these monitors.	Installation of new Dust Sentry's was carried out on 2 June 2023. Monitoring Location of HVAS 2 has been relocated from the Blacktown Sports Centre to the Railway.
Independent Environmental Audit (IEA) Actions	Continue actions on the recommendations from the 2021 IEA Action Plan to close out improvement actions and non-compliances.	All recommendations from the 2021 IEA Action Plan have been closed out in 2023.

## 6 Environmental Performance

### 6.1 Meteorological Monitoring

A summary of monthly rainfall was retrieved from the Bureau of Meteorology (BOM) Station 067066 Erskine Park Reservoir till July 2023, with the onsite Dust Sentry providing data from August 2023 as presented in **Table 8**. Rooty Hill continued to review daily and forecast meteorological conditions to manage activities undertaken on site. The RHDC Dust Sentry was installed on 5 July 2023 with complete monthly meteorological data captured from August 2023.

**Table 8: Monthly Rainfall at Erskine Park Reservoir (BOM Station 067066) and RHDC Dust Sentry**

Month	Rainfall (mm)
January	123.0
February	46.0
March	64.0
April	76.0
May	29.0
June	11.0
July	6.0
August	41.9
September	15.5
October	18.4
November	58.3
December	63.5
Annual TOTAL	552.6mm

During 2023, a total of 552.6mm was recorded, this is down from 2022, where 1623mm was recorded. It should be noted that during 2020-2022, the East Coast of Australia was experiencing an active La Nina event, with above rainfall averages recorded. Since 2013, when Erskine Park Reservoir BOM Station became active, the average annual rainfall has been 830mm.

## 6.2 Noise

### 6.2.1 EIS Predictions

The Noise Impact Assessment of the 2005 Environmental Assessment Report (EAR) concluded that noise and vibration resulting from construction, traffic, and operations related to the project will comply with the project specific noise criteria for all periods. Furthermore, the maximum noise amenity levels at locations such as Blacktown Olympic Centre or Nurragingy Reserve would not be exceeded for all phases of the project.

The 2017 Environmental Assessment for MOD 2 found that the modification would cause a minor increase in the noise levels at the residential receivers, however this increase would not exceed the approved noise criteria levels. No further management measures beyond those already in place were recommended.

### 6.2.2 Approved Criteria

The project must comply with the noise criteria in Condition 2.3 of the Project Approval as well as the noise monitoring criteria outlined in the Noise Management Plan. These approved criteria are shown in **Table 9**.

**Table 9: Approved Noise Criteria (Project Approval 05\_0051)**

Location	Morning Shoulder (6am – 7am Monday to Saturday and 6am – 8am Sundays and Public Holidays)	Day 7am – 6pm Monday to Saturday and 8am – 6pm Sundays and Public Holidays	Evening 6pm – 10pm Monday to Sunday	Night 10pm – 7am Monday to Saturday and 10pm – 8am Sunday	
	L <sub>Aeq</sub> (15 minute) (dB(A))	L <sub>Aeq</sub> (15 minute) (dB(A))	L <sub>Aeq</sub> (15 minute) (dB(A))	L <sub>Aeq</sub> (15 minute) (dB(A))	L <sub>A1</sub> (1 minute) (dB(A))
Any residences in Station Street	39	44	44	39	53
Any Residences in Crawford Road	40	40	39	39	53
Any residences in Mavis Street	35	35	35	35	53
Nurragingy Reserve	When the Reserve is in use – L <sub>Aeq</sub> 50 dB(A)				
Colebee Centre	When the Centre is in use – L <sub>Aeq</sub> 50 dB(A)				
Blacktown Olympic Park (active recreation areas)	When active recreational areas of the Park are in use – L <sub>Aeq</sub> 55 dB(A)				

### 6.2.3 Key Environmental Performance

The results of noise monitoring and assessments must be reported in Annual Reviews. Ramboll Australia Pty Ltd (Ramboll) undertook noise monitoring for Holcim in this report period at monitoring locations as per the Project Approval.

It should be noted that the attended noise monitoring does not measure noise in the Morning Shoulder Period, as operational activities are not taking place during this period. Noise monitoring was undertaken at locations representative of the nearest noise sensitive receivers to RHDC.

**Table 10** summarises the noise monitoring results for this reporting period. Noise monitoring is carried out at the locations shown in **Figure 2**.



**Table 10: Noise Monitoring Results and Compliance Summary for 2023.**

Assessment Period	Receiver	Noise Criteria		Annual Noise Monitoring	Compliance
				9-10 February 2023	
Day <sup>1,2</sup>	N1	(LAeq (15 min))	44	<44	✓
	N2		40	<40	✓
	N3		50 (when Nurragingy Reserve is in use)	<46	✓
	N4		55 (when active recreational areas of the Blacktown Olympic Park are in use)	<55	✓
Evening <sup>1,</sup>	N1	(LAeq (15 min))	44	<44	✓
	N2		39	<39	✓
	N3		50 (when Nurragingy Reserve is in use)	n/a	✓
	N4		55 (when active recreational areas of the Blacktown Olympic Park are in use)	<55	✓
Night <sup>1,2</sup>	N1	(LAeq (15 min))	39	<39	✓
	N2		39	<39	✓
	N3		50 (when Nurragingy Reserve is in use)	n/a	✓
	N4		55 (when active recreational areas of the Blacktown Olympic Park are in use)	<40	✓

Note: Noise criteria adopted from Project Approval 05\_0051. Note 2: Morning shoulder 6am-7am Monday to Saturday and 6am-8am Sundays and public holidays; Day 7am-6pm Monday to Saturday and 8am-6pm Sundays and public holidays; Evening 6pm-10pm Monday to Sunday; Night 10pm-7am Monday to Saturday and 10pm-8am Sunday.

Night<sup>2</sup> Nurragingy Reserve closed during the evening and night monitoring periods. Opening hours for the reserve are 7am-6pm Monday to Friday

RHDC noise emissions were generally inaudible during the annual noise monitoring. All noise results were compliant with criteria.

Location N3 recorded contributions including industrial hum and RHDC alarms, with other contributions consisting of passing vehicles, aircraft, and birds.

RHDC was not audible at any other location, with other extraneous noise sources including birds, local traffic noise, insects, aircraft noise, the sports park alarm, trains, and nearby construction activities.

### **Long-term Trends**

Noise monitoring reports from 2015 until the end of this reporting period record no exceedances in noise criteria. Noise emissions from site have been inaudible at the receivers and negligible in comparison to other sources of noise. The noise monitoring results represented in this Annual Review support RHDC's continued compliance with the Project Approval noise criteria.

### **6.2.4 Management Measures**

The Operational Noise Management Protocol as well as the Operational Environmental Management Plan (OEMP) contain noise management measures including:

- During the morning shoulder and night-time periods, the storage bins are not loaded from an empty state, front end loader reversing alarms are replaced with visual warnings, and conveyor start-up warnings are visual.
- Plant and equipment are maintained, fitted wherever practical with mufflers or noise insulation, and operated efficiently.
- Noise barriers and enclosures are inspected regularly.

### **6.2.5 Proposed Improvements**

RHDC will continue to monitor wind direction, and make operational changes as necessary

There are no further improvements proposed for noise management at RHDC.

## 6.3 Air Quality

### 6.3.1 EIS Predictions

The 2005 EAR reported the level of impact from the project to air quality would be acceptable, with no reason for concern regarding the health and safety of those within or in the vicinity of the project area (Volume 2, Section F). The MOD 2 Environmental Assessment (2017) supported these findings in that no exceedances of the 24-hour criteria are predicted to occur in the operational phase of the project.

### 6.3.2 Approved Criteria

Air quality monitoring at RHDC is compared to the monitoring criteria stipulated in Condition 2.8A of the Project Approval to ensure compliance. There are no air quality criteria outlined in EPL 20672.

**Table 11: Air Quality Criteria from Project Approval 05\_0051, Condition 2.8A**

Pollutant	Averaging Period	Criterion
Particulate Matter < 10 µm (PM <sub>10</sub> )	Annual	a, d 25 µg/m <sup>3</sup>
Particulate Matter < 10 µm (PM <sub>10</sub> )	24 hours	b, d 50 µg/m <sup>3</sup>
Particulate Matter < 2.5 µm (PM <sub>2.5</sub> )	Annual	a, d 8 µg/m <sup>3</sup>
Particulate Matter < 2.5 µm (PM <sub>2.5</sub> )	24 hours	b, d 25 µg/m <sup>3</sup>
Total suspended particulates (TSP)	Annual	a, d 90 µg/m <sup>3</sup>

Note:

*“Reasonable and feasible avoidance measures” includes, but is not limited to, the operational requirements in conditions 2.8, 3.1(b) and 5.3(d) to develop and implement an air quality management system that ensures operational responses to the risks of exceedance of the criteria.*

*a Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).*

*b Incremental impact (ie increase in concentrations due to the development alone, with zero allowable exceedances of the criteria over the life of the development).*

*c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.*

*d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.*



### 6.3.3 Changes to Monitoring and Management in 2021 and 2022

The OEMP was revised in 2021 and was approved by DPE on 27 January 2022. Through the OEMP, Holcim proposed the following changes to the RHDC Ambient Dust Monitoring Program:

1. Monitor 1 will be a Dust Sentry instrument (particle counter) located near the site administration building and will monitor PM<sub>10</sub>, PM<sub>2.5</sub>, and meteorological data.
2. Monitor 2 will be a Dust Sentry instrument (particle counter) located near the Rail Loading Facility. Monitor 2 will monitor PM<sub>10</sub> and PM<sub>2.5</sub>.
3. Depositional dust monitoring will be removed from the dust monitoring program and depositional dust will no longer be recorded.

In 2022 following the approval of the OEMP, Holcim was unable to acquire the two Dust Sentry instruments required due to supply chain issues (availability) and a subsequent increase in device cost. As a result, RHDC was not able to transition to the approved Ambient Dust Monitoring Program successfully within the timeline outlined in the OEMP. On 2 June 2023, Holcim installed both the Dust Sentry instruments, with daily (24-hour) HVAS sampling being recorded.

Further information on the Ambient Dust Monitoring Program at RHDC can be found in Section 3.4.1 of the 2022 OEMP.

### 6.3.4 Key Environmental Performance

The available PM<sub>10</sub> results are summarised in **Table 12** and discussed in **Section 6.3.3**

**Table 12: 2023 PM<sub>10</sub> Monitoring Results**

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m <sup>3</sup> )	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m <sup>3</sup> )	Compliance Status
1-Jan-2023	16	Compliant	11.9	Compliant
7-Jan-2023	35.5	Compliant	20.3	Compliant
13-Jan-2023	44.4	Compliant	23	Compliant
19-Jan-2023	33.6	Compliant	22.3	Compliant
25-Jan-2023	34.9	Compliant	27.2	Compliant
31-Jan-2023	48.1	Compliant	15.9	Compliant
6-Feb-2023	37.7	Compliant	37.1	Compliant
12-Feb-2023	33.2	Compliant	25.7	Compliant
18-Feb-2023	<b>104</b>	<b>Non-Compliant</b>	<b>60.2</b>	<b>Non-Compliant</b>
24-Feb-2023	<b>60.2</b>	<b>Non-Compliant</b>	22.7	Compliant
8-Mar-2023	<b>65.8</b>	<b>Non-Compliant</b>	34.7	Compliant
14-Mar-2023	37.3	Compliant	18.8	Compliant
20-Mar-2023	45.7	Compliant	27	Compliant
26-Mar-2023	21.7	Compliant	15.9	Compliant
1-Apr-2023	34.7	Compliant	18	Compliant
7-Apr-2023	15.5	Compliant	14.4	Compliant
13-Apr-2023	38.8	Compliant	16.8	Compliant
19-Apr-2023	42.1	Compliant	27.2	Compliant
25-Apr-2023	20.6	Compliant	17.7	Compliant
1-May-2023	25.7	Compliant	16.2	Compliant
7-May-2023	25.3	Compliant	22.5	Compliant
13-May-2023	30.7	Compliant	16.8	Compliant
19-May-2023	39.9	Compliant	17.2	Compliant
25-May-2023	<b>51.8</b>	<b>Non-Compliant</b>	<b>51.7</b>	<b>Non-Compliant</b>

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
31-May-2023	44.1	Compliant	27.9	Compliant
2-Jun-2023	12.22	Compliant	10.04	Compliant
3-Jun-2023	18.93	Compliant	18.78	Compliant
4-Jun-2023	5.83	Compliant	5.3	Compliant
5-Jun-2023	7.62	Compliant	6.29	Compliant
6-Jun-2023	6.95	Compliant	7.42	Compliant
7-Jun-2023	8.1	Compliant	6.7	Compliant
8-Jun-2023	5.89	Compliant	6.09	Compliant
9-Jun-2023	12.18	Compliant	8.14	Compliant
10-Jun-2023	9.42	Compliant	7.96	Compliant
11-Jun-2023	9.84	Compliant	10.17	Compliant
12-Jun-2023	10.08	Compliant	9.62	Compliant
13-Jun-2023	5.97	Compliant	9.28	Compliant
14-Jun-2023	12.89	Compliant	5.06	Compliant
15-Jun-2023	8.73	Compliant	6.45	Compliant
16-Jun-2023	8.07	Compliant	8.39	Compliant
17-Jun-2023	3.26	Compliant	8.15	Compliant
18-Jun-2023	5.7	Compliant	6.84	Compliant
19-Jun-2023	6.07	Compliant	9.6	Compliant
20-Jun-2023	13.51	Compliant	8.29	Compliant
21-Jun-2023	6.57	Compliant	10.09	Compliant
22-Jun-2023	0	Compliant	11.1	Compliant
23-Jun-2023	2.72	Compliant	8.02	Compliant
24-Jun-2023	3.7	Compliant	4.83	Compliant
25-Jun-2023	NA	Non-Compliant	6.09	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
26-Jun-2023	NA	Non-Compliant	11.74	Compliant
27-Jun-2023	NA	Non-Compliant	7.45	Compliant
28-Jun-2023	NA	Non-Compliant	7.13	Compliant
29-Jun-2023	NA	Non-Compliant	3.98	Compliant
30-Jun-2023	NA	Non-Compliant	5.86	Compliant
1-Jul-2023	NA	Non-Compliant	4.14	Compliant
2-Jul-2023	NA	Non-Compliant	3.22	Compliant
3-Jul-2023	NA	Non-Compliant	8.81	Compliant
4-Jul-2023	NA	Non-Compliant	9.84	Compliant
5-Jul-2023	NA	Non-Compliant	6.85	Compliant
6-Jul-2023	2.84	Compliant	5.42	Compliant
7-Jul-2023	7.69	Compliant	11.7	Compliant
8-Jul-2023	6.56	Compliant	11	Compliant
9-Jul-2023	3.18	Compliant	6.46	Compliant
10-Jul-2023	25.02	Compliant	13.55	Compliant
11-Jul-2023	8.51	Compliant	9.29	Compliant
12-Jul-2023	10.93	Compliant	10.91	Compliant
13-Jul-2023	10.77	Compliant	12.02	Compliant
14-Jul-2023	12.27	Compliant	11.83	Compliant
15-Jul-2023	6.97	Compliant	18.36	Compliant
16-Jul-2023	7.27	Compliant	7.26	Compliant
17-Jul-2023	6.61	Compliant	6.58	Compliant
18-Jul-2023	7.88	Compliant	11.05	Compliant
19-Jul-2023	13	Compliant	7.51	Compliant
20-Jul-2023	8.72	Compliant	11.23	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
21-Jul-2023	12.61	Compliant	9.12	Compliant
22-Jul-2023	7.58	Compliant	6.59	Compliant
23-Jul-2023	7	Compliant	6.3	Compliant
24-Jul-2023	7.17	Compliant	5.88	Compliant
25-Jul-2023	7.87	Compliant	6.84	Compliant
26-Jul-2023	10.64	Compliant	8.01	Compliant
27-Jul-2023	9.12	Compliant	17.12	Compliant
28-Jul-2023	13.73	Compliant	9.19	Compliant
29-Jul-2023	6.54	Compliant	8.75	Compliant
30-Jul-2023	6.24	Compliant	7.81	Compliant
31-Jul-2023	11.57	Compliant	12.53	Compliant
1-Aug-2023	11.52	Compliant	9.47	Compliant
2-Aug-2023	11.89	Compliant	11.16	Compliant
3-Aug-2023	9.56	Compliant	19.06	Compliant
4-Aug-2023	11.95	Compliant	12.18	Compliant
5-Aug-2023	10.25	Compliant	9.5	Compliant
6-Aug-2023	5.79	Compliant	4.28	Compliant
7-Aug-2023	9.68	Compliant	5.64	Compliant
8-Aug-2023	8.46	Compliant	5.03	Compliant
9-Aug-2023	7.09	Compliant	6.47	Compliant
10-Aug-2023	10.83	Compliant	7.02	Compliant
11-Aug-2023	9.89	Compliant	8.13	Compliant
12-Aug-2023	10.29	Compliant	8.58	Compliant
13-Aug-2023	6	Compliant	6.03	Compliant
14-Aug-2023	4.72	Compliant	4.52	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
15-Aug-2023	5.57	Compliant	2.5	Compliant
16-Aug-2023	5.47	Compliant	3.31	Compliant
17-Aug-2023	7.92	Compliant	7.06	Compliant
18-Aug-2023	6.41	Compliant	8.39	Compliant
19-Aug-2023	7.71	Compliant	5.82	Compliant
20-Aug-2023	3.15	Compliant	3.62	Compliant
21-Aug-2023	7.53	Compliant	5.73	Compliant
22-Aug-2023	6.74	Compliant	6.58	Compliant
23-Aug-2023	8.87	Compliant	3.66	Compliant
24-Aug-2023	6.24	Compliant	3.98	Compliant
25-Aug-2023	13.46	Compliant	7.68	Compliant
26-Aug-2023	8.93	Compliant	5.35	Compliant
27-Aug-2023	4.48	Compliant	4.36	Compliant
28-Aug-2023	7.94	Compliant	5.01	Compliant
29-Aug-2023	8.92	Compliant	6.6	Compliant
30-Aug-2023	9.85	Compliant	7.03	Compliant
31-Aug-2023	7.39	Compliant	4.93	Compliant
1-Sep-2023	8.98	Compliant	5.13	Compliant
2-Sep-2023	7.03	Compliant	3.86	Compliant
3-Sep-2023	3.27	Compliant	3.15	Compliant
4-Sep-2023	8.67	Compliant	7.53	Compliant
5-Sep-2023	10.6	Compliant	7.4	Compliant
6-Sep-2023	22.57	Compliant	6.99	Compliant
7-Sep-2023	11.53	Compliant	11.14	Compliant
8-Sep-2023	3.55	Compliant	5.54	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
9-Sep-2023	6.52	Compliant	3.02	Compliant
10-Sep-2023	7.07	Compliant	3.62	Compliant
11-Sep-2023	13.48	Compliant	10.29	Compliant
12-Sep-2023	17.18	Compliant	14.36	Compliant
13-Sep-2023	16.69	Compliant	13.36	Compliant
14-Sep-2023	14.19	Compliant	12.71	Compliant
15-Sep-2023	18.49	Compliant	11.56	Compliant
16-Sep-2023	11.17	Compliant	15.18	Compliant
17-Sep-2023	7.49	Compliant	6.81	Compliant
18-Sep-2023	11.98	Compliant	13.55	Compliant
19-Sep-2023	12.47	Compliant	11.99	Compliant
20-Sep-2023	13.81	Compliant	15.47	Compliant
21-Sep-2023	17.4	Compliant	7.02	Compliant
22-Sep-2023	8.73	Compliant	4.84	Compliant
23-Sep-2023	4.41	Compliant	3.48	Compliant
24-Sep-2023	2.86	Compliant	3.01	Compliant
25-Sep-2023	8.38	Compliant	8.65	Compliant
26-Sep-2023	11.74	Compliant	8.03	Compliant
27-Sep-2023	8.97	Compliant	5.95	Compliant
28-Sep-2023	5.93	Compliant	8.23	Compliant
29-Sep-2023	10.46	Compliant	10.5	Compliant
30-Sep-2023	20.56	Compliant	10.13	Compliant
1-Oct-2023	NA	Non-Compliant	NA	Non-Compliant
2-Oct-2023	11.97	Compliant	11.74	Compliant
3-Oct-2023	10.51	Compliant	16.02	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
4-Oct-2023	6.3	Compliant	6.89	Compliant
5-Oct-2023	4.21	Compliant	3.12	Compliant
6-Oct-2023	9.87	Compliant	4.89	Compliant
7-Oct-2023	8.56	Compliant	4.09	Compliant
8-Oct-2023	3.34	Compliant	2.55	Compliant
9-Oct-2023	9.56	Compliant	6.34	Compliant
10-Oct-2023	11.37	Compliant	6.2	Compliant
11-Oct-2023	7.44	Compliant	5.82	Compliant
12-Oct-2023	13.49	Compliant	6.7	Compliant
13-Oct-2023	14.06	Compliant	3.79	Compliant
14-Oct-2023	4.3	Compliant	10.41	Compliant
15-Oct-2023	3.02	Compliant	2.66	Compliant
16-Oct-2023	12.48	Compliant	6.7	Compliant
17-Oct-2023	10.37	Compliant	3.19	Compliant
18-Oct-2023	6.81	Compliant	2.86	Compliant
19-Oct-2023	7.67	Compliant	4.74	Compliant
20-Oct-2023	10.38	Compliant	5.4	Compliant
21-Oct-2023	9.77	Compliant	7.71	Compliant
22-Oct-2023	8.97	Compliant	6.29	Compliant
23-Oct-2023	8.85	Compliant	4.72	Compliant
24-Oct-2023	12.46	Compliant	6.46	Compliant
25-Oct-2023	16.44	Compliant	11.28	Compliant
26-Oct-2023	9.45	Compliant	5.83	Compliant
27-Oct-2023	10.55	Compliant	3.07	Compliant
28-Oct-2023	5.12	Compliant	3.83	Compliant



Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
29-Oct-2023	3.34	Compliant	2.91	Compliant
30-Oct-2023	10.74	Compliant	11.29	Compliant
31-Oct-2023	14.73	Compliant	7.92	Compliant
1-Nov-2023	15.7	Compliant	6.44	Compliant
2-Nov-2023	9.32	Compliant	5.22	Compliant
3-Nov-2023	7	Compliant	4	Compliant
4-Nov-2023	3.89	Compliant	3.1	Compliant
5-Nov-2023	3.81	Compliant	3.05	Compliant
6-Nov-2023	4.86	Compliant	3.12	Compliant
7-Nov-2023	4.88	Compliant	3.65	Compliant
8-Nov-2023	7.49	Compliant	3.41	Compliant
9-Nov-2023	5.86	Compliant	3.83	Compliant
10-Nov-2023	5.69	Compliant	4.07	Compliant
11-Nov-2023	5.53	Compliant	4.9	Compliant
12-Nov-2023	9.92	Compliant	8.94	Compliant
13-Nov-2023	11.79	Compliant	7.4	Compliant
14-Nov-2023	8.95	Compliant	6.63	Compliant
15-Nov-2023	10.29	Compliant	5.54	Compliant
16-Nov-2023	11.73	Compliant	3.63	Compliant
17-Nov-2023	9.75	Compliant	4.09	Compliant
18-Nov-2023	7.03	Compliant	3.29	Compliant
19-Nov-2023	3.49	Compliant	3.61	Compliant
20-Nov-2023	10.83	Compliant	8.23	Compliant
21-Nov-2023	4.24	Compliant	2.33	Compliant
22-Nov-2023	9.72	Compliant	4.16	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
23-Nov-2023	9.97	Compliant	3.3	Compliant
24-Nov-2023	4.06	Compliant	2.39	Compliant
25-Nov-2023	2.37	Compliant	2.35	Compliant
26-Nov-2023	2.75	Compliant	3.24	Compliant
27-Nov-2023	11.89	Compliant	3.91	Compliant
28-Nov-2023	6.91	Compliant	3.7	Compliant
29-Nov-2023	4.95	Compliant	5.04	Compliant
30-Nov-2023	9.05	Compliant	6.94	Compliant
1-Dec-2023	9.19	Compliant	4.16	Compliant
2-Dec-2023	3.88	Compliant	2.54	Compliant
3-Dec-2023	2.9	Compliant	2.35	Compliant
4-Dec-2023	5.11	Compliant	3.63	Compliant
5-Dec-2023	6.95	Compliant	4.4	Compliant
6-Dec-2023	16.2	Compliant	7.32	Compliant
7-Dec-2023	15.54	Compliant	7.4	Compliant
8-Dec-2023	8.47	Compliant	9.83	Compliant
9-Dec-2023	5.26	Compliant	6.16	Compliant
10-Dec-2023	2.04	Compliant	2.98	Compliant
11-Dec-2023	11.24	Compliant	5.5	Compliant
12-Dec-2023	7.14	Compliant	3.94	Compliant
13-Dec-2023	7.28	Compliant	6.44	Compliant
14-Dec-2023	5.44	Compliant	6.57	Compliant
15-Dec-2023	9.21	Compliant	6.64	Compliant
16-Dec-2023	4.44	Compliant	5.07	Compliant
17-Dec-2023	3.06	Compliant	4.41	Compliant

Sample Date	HVAS 1 (Site Office) PM <sub>10</sub> (µg/m³)	Compliance Status	HVAS 2 (Rail) PM <sub>10</sub> (µg/m³)	Compliance Status
18-Dec-2023	9.59	Compliant	9.77	Compliant
19-Dec-2023	8.49	Compliant	11.83	Compliant
20-Dec-2023	1.97	Compliant	2.02	Compliant
21-Dec-2023	5.63	Compliant	3.68	Compliant
22-Dec-2023	5.74	Compliant	4.48	Compliant
23-Dec-2023	2.61	Compliant	2.6	Compliant
24-Dec-2023	1.84	Compliant	2.44	Compliant
25-Dec-2023	1.47	Compliant	2.3	Compliant
26-Dec-2023	2.32	Compliant	3.7	Compliant
27-Dec-2023	2.23	Compliant	3.37	Compliant
28-Dec-2023	2.24	Compliant	2.99	Compliant
29-Dec-2023	1.73	Compliant	2.88	Compliant
30-Dec-2023	1.6	Compliant	2.27	Compliant
31-Dec-2023	3.58	Compliant	5.55	Compliant
<b>Annual Average</b>	<b>11.1</b>	<b>Compliant</b>	<b>8.6</b>	<b>Compliant</b>
<b>Valid Sample Count</b>	226		237	
<b>Number of Sampling Events Attempted</b>	238		238	

Note: Results exceeding the short-term criteria are in **bold**. Results recorded with an asterisk note those impacted by contamination.

HVAS 1 (Site Office) PM<sub>10</sub> 24-hour criteria were exceeded on four occasions in 2023. These exceedances occurred on the following days:

- 18 Feb 2023;
- 24 Feb 2023;
- 8 March 2023; and
- 25 May 2023.

Holcim notified the Department of the 24-hour short term exceedances and have reported this a low non-compliance for section 2.8A of the development consent.

The period between 25 June till 5 July, it is believed the HVAS 1 was offline due to the installation of the weather station, and possible system configuration startup and errors associated with this. On 1 October, the HVAS was offline due to the unit being in a configuration mode. These offline errors were not reported to the Department and have been recorded as an administrative non-compliance for Condition 6.1 of the development consent (incident reporting).

HVAS 2 (Rail) PM<sub>10</sub> 24-hour criteria was exceeded twice in 2023. These exceedances occurred at HVAS 2 on the following days:

- 18 Feb 2023; and
- 25 May 2023.

Holcim notified the Department of the 24-hour short term exceedances and have reported this a low non-compliance for section 2.8A of the development consent.

On 1 October, the HVAS 2 was offline due to the unit being in a configuration mode. This offline error was not reported to the Department and have been recorded as an administrative non-compliance for Condition 6.1 of the development consent (incident reporting).

### **Incident Reporting**

Holcim noted that the exceedance that occurred on the 18 February was a Saturday, which only had a day shift operating (5am to 12:30pm), and with no afternoon train on that day either. Wind speed was reported up to 61km/hr from the SSW direction. All controls were in place on the day during the time, as such Holcim believe that due to the amount of time we were onsite and the direction of the wind that Holcim would have had minimal impact on this result.

On 24 February, wind was reported to be 28km/h from the ESE direction. The direction of the wind on this day was through the sales yard, and Holcim operations could have contributed to the result.

On 8 March, wind speed was reported at 43km/hr from the WSW direction. Holcim believe that due to the direction of the wind on this day, that operations would have caused minimal impact on this result, and that other non-Holcim factors contributed to this result.

On 25 May, wind data at Holcim at operating hours was a maximum 4km/hr at 9am and Calm at 3pm. (max wind speeds was 17km/hr at 22:30pm, site closed at 22:30pm on this day). All dust controls were in place on the day, water cart was used regularly throughout the day. Holcim cannot definitively say that operations contributed to this exceedance.

The annual average at HVAS 1 was 11.1 µg/m<sup>3</sup>, which is below the annual average criteria of 20 µg/m<sup>3</sup>. This is compliant with the limits of the Approval.

The annual average at HVAS 2 was 8.6 µg/m<sup>3</sup>, which is below the annual criteria value of 20 µg/m<sup>3</sup>. This is compliant with the limits of the Approval.

## Long-Term Trends

**Table 13** summarises the long-term PM<sub>10</sub> results at RHDC. Note, the location of monitors has changed between 2021 and 2022. HVAS 1 has increased since the 2015-2016 reporting period till 2022, and HVAS 2 results have generally been consistent across the project lifetime till 2022, with the exception of a small decrease in 2021.

With the installation of the Dust Sentry in June 2023, which provides 24-hours PM<sub>10</sub> monitoring data, annual average for HVAS1 and HVAS 2 have decreased, recording the lowest annual averages since the site became operational.

It is believed that due to the real time monitoring and wind data offered by the Dust Sentry's, Holcim can adjust operations to minimise dust exceedances.

Holcim will review the performance of the Dust Sentry units as part of the AQMP review required following production of this annual report.

**Table 13: Long-term PM<sub>10</sub> Results**

Monitor	PM <sub>10</sub> Annual Average (µg/m <sup>3</sup> ) <sup>1</sup>						
	October 2015 - September 2016	July 2017 - June 2018	2019	2020	2021	2022	2023
HVAS 1	9.5	30.2	35.2	36.1	32.4	33.2	11.1
HVAS 2	24.2	25.0	23.3	20.3	17.2 (January 2021 – September 2021)	21.7	8.6

*Note 1 – Contaminated samples removed*

### 6.3.5 Management Measures

The site undertook dust management measures throughout operations to ensure compliance with the Project Approval. The update to the OEMP introduced a new monitoring program for air quality at RHDC which improved the dust monitoring program at site. Consultation with air quality experts was undertaken in this update, with this being appended to the 2021 OEMP.

Dust management measures undertaken as per the approval and OEMP include:

- Provision and use of a permanent water cart onsite.
- Provision and use of a permanent street sweeper onsite.
- Installation and use of water cannons on all stockpiles.
- All heavy vehicles exiting the site leave via the wheel wash (located at the weighbridge).
- Trucks cover loads at all times, except for during loading and unloading;
- Water sprays and covering of all material conveyors.
- Stockpile spray maintenance.
- Internal roads are swept to minimise dust and sediment tracking.
- Staff training for dust control measures, including recognising dust as a hazard of high priority for resolution.

- Scope of works for monitoring contractors to include cleaning and general maintenance of samplers.
- Site speed limits are signed and enforceable at all times.

#### **6.3.6 Proposed Improvements**

Holcim will continue to operate and monitor the Dust Sentry's in accordance with the Ambient Dust Monitoring Program detailed in the OEMP.

## **6.4 Traffic Management**

### **6.4.1 EIS Predictions**

In Appendix D of Volume 3 of the 2005 EAR, a traffic assessment found that the existing road network around the project area would be sufficient for the performance of project-associated traffic. Furthermore, pedestrian safety was not found to be impacted as a result of the project. It was also noted that road upgrades may be necessary within the lifetime of the project. The 2010 and 2017 environmental assessments did not find any additional impacts to traffic volumes or routes as a result of RHDC operations.

### **6.4.2 Approved Criteria**

Traffic management is outlined in the RHDC Transport Code of Conduct and the 2021 OEMP. The Project Approval outlines requirements for traffic in Conditions 2.11 - 2.21A (Traffic and Transport).

### **6.4.3 Key Environmental Performance**

There were no traffic incidents or non-compliances at RHDC within this Annual Review period. Holcim continue to execute traffic management measures consistent with the Project Approval.

### **6.4.4 Management Measures**

Management measures for traffic are outlined in the OEMP. Some of these key controls include:

- The Transport Code of Conduct and site driver requirements must always be complied with.
- Vehicles must be maintained and serviced regularly.
- Site roads and access must be monitored and kept in good order including in terms of road condition and sediment tracking.
- Speeds are limited to 20km/hr and traffic routes are signed.

### **6.4.5 Proposed Improvements**

Holcim staff are responsible for regularly reviewing traffic management against the Transport Code of Conduct and OEMP. The site will continue to conduct traffic monitoring and management measures committed to within the approved OEMP in the next reporting period.

# 7 Water Management

## 7.1 EIS Predictions

### 7.1.1 Surface Water Quality

The Executive Summary from the 2005 EAR stated that *“the proposed RHDC would not materially change the drainage patterns on the site”* and there would be no negative impact on Angus Creek from the project. Furthermore, modelling that was presented in the 2005 EAR showed there would be minor changes to flood levels as a result of the project.

Section 6.4 of the 2017 Environmental Assessment for MOD 2 outlines the negligible impact to the site surface water management systems that the minor increase in runoff volume the RHDC Modification would create.

### 7.1.2 Aquatic Ecology

The Aquatic Ecology Impact Assessment (Volume 2, Section E) in the 2005 EAR found that there were no endangered ecological communities or threatened species within the riparian areas of the site. Angus Creek and Eastern Creek were categorised as disturbed lowland creeks.

### 7.1.3 Groundwater

The 2005 EAR found the RHDC would have minimal to no impact on the groundwater as a result of altered water flows due to increased impervious surfaces and not allowing potential sources of contamination to pass through such as spilled oils, fuels, or other chemicals stored on site.

## 7.2 Approved Criteria

The Project Approval requires surface water management at RHDC, including the expectation that Holcim follows best-practice guidelines for urban stormwater management. Holcim is expected to operate in accordance with:

- *Protection of the Environment Operations Act 1997.*
- *Draft Guidelines – Watercourse Crossing Design and Construction (DPI Water).*
- *Why do Fish Need to Cross the Road? – Fish Requirements for Waterway Crossings (2004, NSW Fisheries).*
- *Policy and Guidelines for Fish Friendly Waterway Crossings (2004, NSW Fisheries).*
- *Water Sensitive Urban Design and Integrated Water Cycle Management, Blacktown Development Control Plan (2015).*
- *Sensitive Urban design Technical Guidelines for Western Sydney (upper Parramatta River Catchment Trust, 2004).*
- *Managing Urban Stormwater Soils and Construction: Volume 1 (the ‘Blue Book’) by Landcom.*

As per Condition 2.28A (Aquatic Ecology) of the Project Approval as well as the Statement of Commitments, RHDC conduct a surface water and aquatic ecology monitoring program in Angus Creek and Eastern Creek which also includes monitoring locations in Nurragingy Reserve. Water quality monitoring and visual assessments for habitat and vegetation are required to occur as per the monitoring program.



**Table 14** shows the site-specific criteria for water quality parameters in dry weather from the OEMP and Soil and Water Management Plan.

**Table 14: ANZECC Guidelines (RHDC Soil and Water Management Plan).**

Parameter	Measure	Default Trigger Level
Electrical Conductivity (EC)	µS/cm	125-2200
Turbidity	NTU	6-50
pH	pH	6.5-8.0
Dissolved Oxygen	%	80-110
Total Phosphorous	(mg/L)	50
Total Nitrogen <sup>1</sup>	(mg/L)	500

*Note 1 – Total Nitrogen equals (TKN+NOx)*

Aquatic monitoring is undertaken at the locations shown in **Figure 3**.

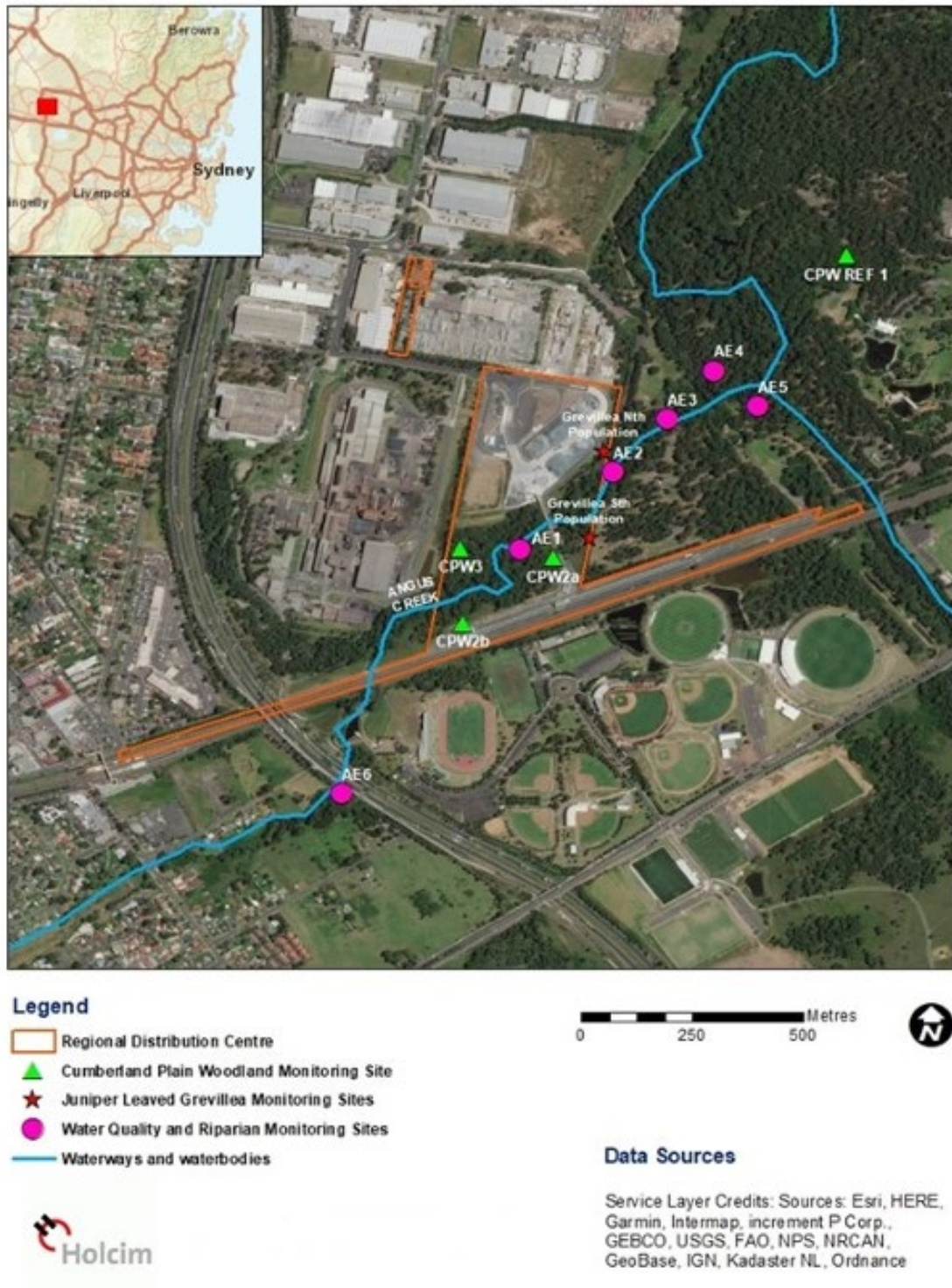


Figure 3 – RHDC Monitoring Locations for Aquatic Monitoring and Vegetation Monitoring

## 7.3 Key Environmental Performance

RHDC has conducted water monitoring as per the RHDC Operational Environmental Management Plan, the Soil and Water Management Plan, and Operational Monitoring Program. Water quality and aquatic ecology monitoring was undertaken by Niche Environment and Heritage in this reporting period. These reports can be found in **Appendix 2**. Monitoring sites AE1, AE2, AE3, and AE6 involved monitoring at Angus Creek, and AE4-AE5 involved monitoring along Eastern Creek

Monitoring occurred on the following dates:

- 16 February 2023 (Q1)
- 24 May 2023 (Q2)
- 2 August 2023 (Q3)
- 27 September 2023 (Q4)

### 7.3.1 Surface Water Quality

A summary of the 2023 water quality monitoring results is presented in **Table 15**.

AE6 monitoring location for surface water could not be undertaken during the Q1 2023 reporting period due to construction works being conducted at the Blacktown International Sports Park. The site was not accessible during this time. Holcim has not called this a non-compliance as this accessibility issues was out of Holcims control.

**Table 15: 2023 Water Quality Results Summary**

Sampling period	Sampling Site	Temperature (°C)	Turbidity	Dissolved Oxygen (% sat)	Electrical Conductivity (µS/cm)	pH	Total (TKN + Nitrogen NOx) (mg/L)	Total Phosphorous (mg/L)
ANZECC (2000) Default Trigger Levels for Lowland Streams			6 - 50	80 - 110	125 - 2200	6.5 - 8	0.5mg/L	0.05mg/L
Q1 2023	AE1	20.74	2.4	23.32	680	7.58	0.5	0.1
	AE2	20.81	1.6	22	675	7.45	0.5	0.11
	AE3	20.47	1.1	14.61	660	7.4	0.5	0.08
	AE4	21.09	114	59.15	353	7.24	2.6	0.72
	AE5	21.1	115	60.52	356	7.28	2.4	0.58
	AE6 <sup>1</sup>	NS	NS	NS	NS	NS	NS	NS
Q2 2023	AE1	9.99	7.5	61.9	2138	7.9	0.6	0.12
	AE2	9.91	58.9	55.3	1723	8.32	0.7	0.07
	AE3	9.9	21.5	54.6	1750	8.18	0.6	0.1
	AE4	9.25	43.6	80.2	699	7.96	1.0	0.6
	AE5	9.08	59.0	77.5	639	8.22	0.9	0.07
	AE6	10.02	4.0	83.6	2773	8.41	0.8	0.06
Q3 2023	AE1	10.68	2.3	27.1	1551	7.69	0.6	0.10
	AE2	10.38	3.3	50.4	1225	7.82	0.4	0.06
	AE3	10.53	4.8	34.3	1117	7.78	0.4	0.05
	AE4	10.01	17.6	77.3	529	8.71	0.4	0.04
	AE5	9.99	19.4	78.2	527	8.82	0.4	0.05
	AE6	10.36	3.9	61.3	2225	6.78	0.6	0.06
Q4 2023	AE1	14.81	27.1	5.4	723	7.51	1.7	0.78
	AE2 <sup>2</sup>	15.18	4.8	16.2	551	7.41	0.4	0.06
	AE3 <sup>2</sup>	14.81	20.3	24.8	668	7.72	0.4	0.07

Sampling period	Sampling Site	Temperature (°C)	Turbidity	Dissolved Oxygen (% sat)	Electrical Conductivity (µS/cm)	pH	Total (TKN + Nitrogen NOx) (mg/L)	Total Phosphorous (mg/L)
ANZECC (2000) Default Trigger Levels for Lowland Streams			6 - 50	80 - 110	125 - 2200	6.5 - 8	0.5mg/L	0.05mg/L
	AE4 <sup>2</sup>	15.22	<b>61.8</b>	<b>69.5</b>	533	7.26	<b>0.8</b>	<b>0.12</b>
	AE5	15.30	<b>61.8</b>	<b>76.1</b>	528	7.3	<b>0.9</b>	<b>0.12</b>
	AE6	14.60	20.3	<b>54.4</b>	<b>3750</b>	7.77	<b>0.8</b>	<b>0.11</b>

Note: NS stands for Not Sampled. Values outside of the ANZECC (2000) DTLs are in **bold**.

Note 1: AE6 unable to be sampled in February 2023 due to construction activities occurring.

Note 2: AE2, AE3, and AE4 had potential downstream impacts

Water quality monitoring was undertaken on four occasions in 2023, with the results summarised in **Table 15**. It should be noted that sampling site AE6 could not be accessed during the Q1 2023 reporting period due to construction works being conducted at the Blacktown International Sports Park.

Dissolved oxygen was below the ANZECC criteria of 80-110% for the majority of samples in all quarters. Low dissolved oxygen has been a consistent feature at the Angus Creek and Eastern Creek sites.

Turbidity was elevated in Eastern Creek in three of the monitoring events, which has been observed over previous years and is considered to be within background levels for the creek. Angus Creek was generally within ANZECC guidelines indicating that there has been no suspended solid runoff from the Holcim site.

EC was compliant across all sites with the exception of AE6, which recorded exceedances in all sampling events. The pH at all monitoring sites was above the ANZECC criteria levels in Q2, and both Eastern Creek locations in Q3.

Total Nitrogen was exceeded at all sites over the 2023 reporting period, with AE4 recording 2.6mg/L in Q1. Total Phosphorous was also above criteria limits at all sites, with AE1 recording the highest at 0.78mg/L in Q3.

### **Long-term Trends**

There were exceedances in turbidity and dissolved oxygen levels in 2023, which continued from results seen in 2022.

pH has continued to approach neutral since the beginning of 2017. The highest exceedance was at sampling location AE5 in Q3 with an exceedance of pH 8.82.

Comparisons between the control upstream location as well as sampling sites in downstream Angus Creek across multiple reporting periods have concluded that the RHDC site is unlikely to be the cause of these exceedances in the local water quality profile. Water quality or poor environmental conditions observed are the result of existing catchment disturbances unrelated to the site.

With this in mind, Holcim does not consider these water quality exceedances as a non-compliance against Condition 5.5 Operation Environmental Management Plan of the Project Approval.

### **7.3.2 Aquatic Ecology**

Aquatic ecology was monitored as per the bi-annual macroinvertebrate monitoring program. The same sampling sites were used for macroinvertebrate sampling. Across this Annual Review period the stream habitats exhibited a macroinvertebrate profile which indicates pollution, as supported by the SIGNAL2 assessments.

The number of taxa ranged from 4 to 8 in the 2023 monitoring events. The greatest number of taxa (8) were observed in Angus Creek (AE1) during the Autumn monitoring period, which also recorded 7 taxa in Spring.

In Autumn, sites AE3 and AE4 recorded a SIGNAL 6 sensitive macroinvertebrate family (*Acarina*), and in Spring another SIGNAL 6 macroinvertebrate family (*Leptoceridea*) was observed. Despite this, SIGNAL2 scores continued to indicate that the creek system has a dominance of pollution-tolerant taxa, possibly indicating moderate to severe pollution.

Throughout 2023, Eastern Creek AE4 had low SIGNAL2 scores below 3, with the other sites all ranging from a SIGNAL2 score of 2.4-3.78. This indicates that no sites have favourable habitat, and all locations are exhibiting some form of pollution or natural stress. No pollution sensitive macroinvertebrate families were found at the time of monitoring.

There is a variety of upstream impacts and land use activities that are likely to affect stream health conditions in these waterways and, as such, the low scores observed are likely the result of a combination of natural and anthropogenic catchment stressors, which is common in disturbed Western Sydney streams. During the Aquatic Ecology report, no endangered ecological communities or threatened species were identified within the riparian areas of the site.

In summary, the reports by Niche Environment and Heritage found that it was highly unlikely that RHDC affected the stream ecology of the Angus Creek and Eastern Creek waterways. Multiple activities occurring upstream to the site have a higher potential to impact creek health than RHDC operations.

### **Long-term Trends**

The health of aquatic ecology has not seen significant improvement nor decline from 2015 to 2023. Macro-invertebrate monitoring has consistently shown the aquatic ecology in the local waterways are in poor ecological condition. Monitoring reports have consistently reported there is no physiochemical or ecological evidence to suggest RHDC has affected the downstream environment.

## **7.4 Management Measures**

RHDC implement multiple management measures to maintain surface water quality and control storm water across the project area. The management measures for water on the site include:

- Storm water management measures (such as swales, detention basins, and gross pollutant traps) constructed to have minimal impacts to the flood regime and are regularly maintained.
- Silt traps and HumeCeptors in place to capture runoff.
- Maintenance of detention basins on the northern side of the project area.
- Maintenance of a truck wash facilities.
- Minimisation of freshwater demand by storing and recycling water collected on site.

## **7.5 Proposed Improvements**

There are no improvements suggested for water Management at RHDC for the next reporting period. Holcim will continue to collect surface water quality data to monitor and build the profile of the water quality at Angus Creek and Eastern Creek, and thus improve the site-specific monitoring parameters.

## 8 Rehabilitation and Landscape Management

### 8.1 EIS Predictions

The 2005 EAR stated that the project would require the removal of the Endangered Ecological Communities under the Threatened Species Conservation Act, including areas of Cumberland Plain Woodland and River-flat Eucalypt Forest. Threatened species, including *Grevillea juniperina* ssp. *juniperina* and the Cumberland Plain Land Snail (*Meridolum corneovirens*), were identified outside of the development area.

### 8.2 Approved Criteria

The RHDC *Vegetation Management Plan* is to be implemented as per Condition 2.24 (Flora and Fauna) of the Project Approval. Rehabilitation monitoring is required in accordance with Condition 2.25. MOD 1 of the Project Approval outlines the need to implement a post-construction rehabilitation program, which includes a weed control program and planting local native species.

### 8.3 Key Environmental Performance

As a result of the findings of the EAR (2005), a Compensatory Habitat Package was agreed upon between Holcim, the Office of Environment and Heritage, and the Sydney Western Parklands Trust in July 2011 satisfying Condition 2.27 of PA 05\_0051. Furthermore, RHDC's landscape management plans and procedures designed to control project impacts to surrounding threatened species.

The primary rehabilitation works undertaken in this reporting period was the maintenance of vegetated areas. Herbaceous weed activities such as mowing, herbicide spraying, slashing, and hand weeding were undertaken in the main planting bed adjacent to the front office, entrance gates, central sound wall and unloader parking, pathway, and surrounding workshop. Species treated include *Cenchrus setaceus* and *Juncus acutus*. Woody weed activity included trimming back overhanging branches. Species treated include *Celtis orientalis*, *Cestrum parqui*, *Lantana camara*, *Ligustrum lucidum*, *Ligustrum sinense*, *Solanum mauritianum* and *Ochna serrulate*. Vines were all hand weeded/stem treated throughout the North-Eastern section of the zone, to inhibit growth into canopy species and inhibit seeding/flowering potential. species treated include *Anredera cordifolia*, *Araujia sericifera*, *Passiflora caerulea*, and *Passiflora suberosa*. See **Appendix 3** for report detailing works undertaken.

*Grevillea juniperina* subsp. *juniperina* monitoring was not carried out in 2023, however was undertaken in September 2022. A summary of the 2022 *juniperina* monitoring results is presented in **Table 16**. As the monitoring was not carried out during the reporting period, this is an administrative non-compliance for condition 5.5 e) Vegetation Management Plan of the OEMP that states:

*"The integrity of the Juniper-leaved Grevillea on site must be monitored on a quarterly basis. Once the population size has remained stable, monitoring can be reduced to 6-monthly."*

**Table 16: *Grevillea juniperin* monitoring results (baseline comparison)**

Zone 1	Oct-17	Sep-22	Difference
South-East	60	98	+30
North-East	115	85	-30



October 2017 data was taken from the 2017 Annual Report. There were many emerging specimens pushing through the grassland, with many more small seedlings possibly uncoun-  
ted.

Reasoning for changes in numbers: Drought conditions seen in the past 5 years possibly caused some die off of juvenile and seedling plants and prevented germination. The North – East section of Zone 1 is less shaded than the South – East section, with full sun exposure in the area.

## 8.4 Management Measures

The actions committed to within the Vegetation Management Plan (VMP) must be undertaken to achieve its performance criteria. The key management controls include:

- The use of local native species for rehabilitation vegetation.
- Monitoring the performance of plantings.
- Weed management.
- General maintenance of riparian areas, rehabilitated areas, and Juniper-leaved Grevillea populations.

## 8.5 Proposed Improvements

Holcim to carry out *Grevillea juniperina subsp. juniperina* monitoring as per the approved Vegetation Management Plan within the OEMP.

There are no further improvements proposed for rehabilitation at RHDC for the next reporting period. At this operational stage of the project, Holcim will continue to identify areas for improvement in vegetation and landscape management for the site.

# 9 Summary of Environmental Performance

A summary of the performance of environmental management measures and sampling is detailed in **Table 17** below.

**Table 17: Summary of Environmental Performance at RHDC**

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / Key management implications	Implemented / Proposed management actions
Noise	EAR predictions are all below the Project Approval criteria.	All noise monitoring results were compliant with the Project Approval.	All noise monitoring results were compliant with criteria.	No further improvements proposed for noise management.
Air Quality	EAR (2005) and EA (2015) predictions are below the Project Approval criteria.	<p>HVAS 1 and HVAS 2 exceeded allowed 24-hour average performance criteria.</p> <p>HVAS 1 was offline between 25/06 till 05/07 and 01/10</p> <p>HVAS 2 was offline on 1/10</p> <p><b>See Section 1 and Section 6.3</b> for details</p>	Air quality monitoring results recorded lowest annual average since site operation. Installation of Dust Sentry believed to assist this this.	No further improvements proposed for air quality management.
Traffic	EAR predictions are consistent with the Project Approval conditions.	Met Project Approval criteria consistently.	Site consistently meets criteria.	No further improvements proposed for traffic management.
Water	EAR predictions are consistent with Project Approval conditions.	<p>Majority of water quality results consistent with the <i>Soil and Water Management Plan</i>.</p> <p>Sampling site AE6 surface water monitoring could not be accessed during the Q1 2023 reporting period due to construction works being conducted at the Blacktown International Sports Park. Ts.</p>	Exceedances in OEMP water quality criteria and ANZECC guidelines not attributed to RHDC. Therefore, this is not considered a non-compliance with the Project Approval.	Continue monitoring as per the OEMP. No further actions required.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / Key management implications	Implemented / Proposed management actions
<b>Biodiversity and Rehabilitation</b>	EAR predictions are consistent with Project Approval criteria.	<p>Consistent with Project Approval.</p> <p>Holcim failed to undertake vegetation monitoring as stated in the Vegetation Management Plan (VMP)</p>	All biodiversity and rehabilitation actions were done in accordance with the VMP, OEMP, and Project Approval in 2022.	<p>Vegetation monitoring as per the VMP to continue in 2024.</p> <p>No additional actions for 2024. Continue biodiversity and rehabilitation management as per the 2021 VMP appended to the 2023 OEMP.</p>

## 10 Community

Holcim has maintained community engagement measures during the reporting period by undertaking the following activities in accordance with Condition 4.1, 4.2 & 4.3 of the Project Approval:

- Maintenance of a website (containing publicly available documents).
- A telephone number, email, and postal address (on the website) for community complaints and feedback.
- A copy of the Complaints Register is maintained on the company website.
- All documents and items displayed on the website are regularly updated by Holcim staff.

Holcim has also communicated with the local community through periodic newsletters which provide information on the status of the project and its possible impacts. During previous reporting periods the RHDC Community Liaison Group was arranged to engage stakeholders. However, from 2017 and into this reporting period there has been no demand from community stakeholders for this group to be reassembled. RHDC staff continues to look for opportunities to engage with stakeholders.

In 2023, RHDC engaged with the neighbouring Nurragingy Reserve Miniature Railway Community project, where RHDC donated 35.16 t of 20mm aggregate. RHDC have supported the Nurragingy Reserve Miniature Railway for the past three years, with over 70t of materials being donated. RHDC continue to work with project representatives.

The Nurragingy Reserve Miniature Railway Community officially open on 16 April 2021

### 10.1 Complaints

All complaints received by RHDC are documented by Holcim and incorporated into RHDC's complaints register. An external complaints register is made available to the public on Holcim's website, via the link:

<https://www.holcim.com.au/community-complaint-register>

There were zero community complaints regarding RHDC in 2018, 2019, 2020, 2021, 2022 and this continued in 2023.

# **11 Independent Audit**

After the approval of MOD 2 of the Project Approval, Condition 3.5A (Independent Environmental Auditing) directs Holcim to commission an independent expert to conduct an Independent Environmental Audit (IEA) of the project within one year, and every three years hence.

Holcim engaged an independent auditor to satisfy Condition 3.5A of the Approval in 2021. The IEA site inspection occurred on 17 November 2021, with all actions being closed out.

The next IEA is due in November 2024.

## 12 Incidents and Non-Compliances

Incidents and non-compliances at RHDC in this Annual Review reporting period are summarised in **Table 18**.

**Table 18: Summary of Incidents and Non-Compliances**

Date	Incident/Non-Compliance	Action
Throughout the period	<p><b>Condition 2.8 (A) Air Quality</b></p> <p>HVAS 1 PM<sub>10</sub> Annual Average was exceeded, recording an average 33.2µg/m<sup>3</sup> which is above the allowed criteria of 25µg/m<sup>3</sup>.</p> <p>HVAS 1 PM<sub>10</sub> 24-hour exceedances occurred on:</p> <ul style="list-style-type: none"> <li>• 18 February 2023;</li> <li>• 24 February 2023;</li> <li>• 8 March 2023; and</li> <li>• 25 May 2023</li> </ul> <p>HVAS 2 PM<sub>10</sub> 24-hour exceedances occurred on:</p> <ul style="list-style-type: none"> <li>• 18 February 2023; and</li> <li>• 25 May 2023</li> </ul> <p>During the reporting period HVAS 1 did not operate between 25 June till 5 July and both HVAS 1 and HVAS 2 did not operate on 1 October.</p> <p>The missed sampling events were not reported to DPHI.</p>	<p>Continuous monitoring of ambient dust concentrations (PM<sub>10</sub>) will be undertaken at two locations at a minimum.</p> <p>RHDC will review Dust Sentry and adjust operations as required to minimise dust exceedances</p>
Throughout the period	<p><b>Condition 5.5 e) Vegetation Management Plan</b></p> <p>Holcim failed to undertake <i>Grevillea juniperina subsp. juniperina</i> monitoring as per the approved Vegetation Management Plan in the OEMP which states:</p> <p><i>“The integrity of the Juniper-leaved Grevillea on site must be monitored on a quarterly basis. Once the population size has remained stable, monitoring can be reduced to 6-monthly.”</i></p>	<p>Holcim will continue to implement the <i>Grevillea juniperina subsp. juniperina</i> monitoring program at RHDC.</p>

Date	Incident/Non-Compliance	Action
Throughout the period	<p><b>Condition 6.1 Incident Reporting</b></p> <p>Holcim failed to notify the Secretary of missed PM<sub>10</sub> sampling due to system errors during June, July, and October.</p>	<p>Holcim to review daily air quality samples and report any power outages or system errors that prevent sampling from occurring.</p>

# 13Activities to be completed in the next reporting period

The DPE Annual Review Guidelines require the Annual Review to outline actions proposed during the next reporting period. The next reporting period will cover 1 January 2024 to 31 December 2024. The activities to be completed in the next report period are detailed in **Table 19**.

**Table 19: Improvement Actions for 2024**

Improvement Measure	Activities
Air Quality Monitoring	Ensure that all monitoring is conducted and recorded as the OEMP.
Vegetation Monitoring	Ensure that all monitoring is conducted and recorded as the OEMP.
Independent Environmental Audit	Undertake Independent Environmental Audit by December 2024.



## **Appendix 1 – Noise Monitoring Reports**

Intended for  
**Holcim (Australia) Pty Ltd**

Document type  
**Report**

Date  
**February 2024**

Project number  
**318000911**

# **ANNUAL NOISE MONITORING ASSESSMENT 2023 ROOTY HILL DISTRIBUTION CENTRE, ROOTY HILL, NSW**

## ANNUAL NOISE MONITORING ASSESSMENT 2023 ROOTY HILL DISTRIBUTION CENTRE, ROOTY HILL, NSW

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Project name **Annual Noise Monitoring Assessment 2023 for Rooty Hill Distribution Centre**  
Project no. **318000911**  
Recipient **Michael Ensor**  
Document type **Report**  
Description **Data collected on 9 and 10 February 2023 for the annual noise monitoring program at Rooty Hill, NSW.**

Revision	Date	Prepared by	Checked by	Approved by	Description
1	12/05/2023	J. Bourke, M. Englert	P. Murray	G. Laing	Initial noise monitoring assessment.
2	13/02/2024	J. Bourke	A. Cho	B. Sinclair	Amended noise results/discussion and criteria for N3.

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## APPENDICES

### Appendix 1

Sound Exposure Level Calculations

## ABBREVIATIONS AND DEFINITIONS

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA1(1min)</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAmaz</b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
<b>NMA</b>	Noise Monitoring Assessment
<b>NMP</b>	Noise Management Plan
<b>SPL</b>	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.

Source: Noise Guide for Local Government (NSW EPA, 2023)

# 1. OVERVIEW

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the Holcim Rooty Hill Distribution Centre (RHDC) at Rooty Hill, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017);
- Noise Management Plan (NMP) within Rooty Hill Distribution Centre, Operational Environmental Management Plan (OEMP) (Holcim, 2022);
- Environment Protection Licence (EPL) number 20672 (NSW EPA, 2015).
- Development Consent 05\_0051 (June 2017 Modification) (Minister for Planning, 2017);
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018); and
- Australian Standard AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications (Standards Australia and Standards New Zealand, 2019).

This NMA is part of the annual monitoring requirement for the 2023 assessment period set out in the Development Consent and the NMP.

## 1.1 Site Location and Sensitive Receptors

The RHDC is located at 5 Kellogg Road, approximately 1 km to the northeast of the Rooty Hill railway station and town centre. Sensitive receptors in the locality surrounding the RHDC are primarily industrial, recreational, and urban residential. The RHDC is bounded by the railway line to the south, industry to the west and recreational areas to the east. The residential areas potentially affected by noise from the operation are to the east, beyond the Nurragingy Reserve in Doonside, NSW (Crawford Street and Knox Road); and to the west, beyond industrial zones and the M7 Motorway in Station Street, Rooty Hill, NSW. Road traffic from the M7 Motorway is a dominant noise source in the area along with urban hum and railway noise.

Monitoring locations were selected in accordance with the NMP and are representative of the nearest noise sensitive receivers to the RHDC. The monitoring locations with respect to the RHDC and assessed receivers are presented in the locality plan in **Figure 1**.

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**Figure 1: Noise monitoring locations**

## 2. NOISE CRITERIA

The applicable noise criteria for this NMA were adopted from the NMP and are shown in **Table 2-1**.

**Table 2-1: Monitoring locations and noise criteria**

Location	Monitoring Location	Morning Shoulder <sup>1</sup>	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4</sup>	
		LAeq (15min)	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)
		dB(A)				
Any residences in Station Street	N1	39	44	44	39	53
Any residences in Coughlan Crescent	N2	40	40	39	39	53
Any residences in Mavis Street	N1/N4	35	35	35	35	53
Nurragingy Reserve	N3	When the Reserve is in use – LAeq 50 dB(A)				
Colebee Centre	N3	When the Centre is in use – LAeq 50 dB(A)				
Blacktown Olympic Park (Active recreation areas)	N4	When active recreational areas of the Park are in use – LAeq 55 dB(A)				
<sup>1</sup> 6 am–7 am Monday to Saturday and 6 am–8 am Sunday and public holidays <sup>2</sup> 7 am–6 pm Monday to Saturday and 8 am–6 pm Sunday and public holidays <sup>3</sup> 6 pm–10 pm Monday to Sunday <sup>4</sup> 10 pm–7 am Monday to Saturday and 10 pm–8 am Sunday and public holidays						



### 3. METHODOLOGY

The monitoring program was designed in accordance with the procedures described in Australian Standard AS 1055:2018 and the Approval Documents referenced in Section 1. The measurements were carried out using a RION Sound Level Meter NL-52 on Thursday 9 and Friday 10 February 2023. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672-1:2013/2002 class 1. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with IEC 60942:2003. Drift in calibration did not exceed  $\pm 0.3$  dBA.

Attended noise monitoring was conducted for 15-minutes in duration during the day, evening, and night periods over two days. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source.

## 4. RESULTS AND DISCUSSION

### 4.1 Location N1

Noise monitoring at location N1 conducted on Thursday 9 February 2023 and Friday 10 February 2023 resulted in inaudible noise during the day, evening, and night. These results meet the established noise criteria and indicate that noise emissions from RHDC did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N1 are presented in **Table 4-1**. Measured ambient noise sources included birds and pedestrians. The dominant noise source was vehicles on the nearby motorway and residential street (Station Street).

**Table 4-1: Noise survey results and observations for Location N1**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Rooty Hill Distribution Centre Contribution LAeq(15min) (dBA)	LAeq(15min) Criteria (dBA)	Rooty Hill Distribution Centre LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
10-02-2023	8:21 (Day)	71.3	62.6	55.5	WD: 26° WS: 0.6 m/s Rain: Nil	Motorway 57-61 Passing cars on street 63-85 Birds 56-59 Pedestrians 63-65 Site inaudible	<46 <sup>1</sup>	44	n/a	n/a
09-02-2023	18:06 (Evening)	65.4	58.2	53.2	WD: 270° WS: 0.2 m/s Rain: Nil	Passing cars/motorway 52-68 Bird 56-58 Site inaudible	<43 <sup>1</sup>	44	n/a	n/a
10-02-2023	6:06 (Night)	68.8	60.5	56.5	WD: n/a WS: 0 Rain: Nil	Birds 57-58 Motorway 56-61 Cars 65-71 Site inaudible	<47 <sup>1</sup>	39	n/a <sup>2</sup>	53

<sup>1</sup> Measured LA90 values were predominantly affected by road traffic, so unable to estimate contribution for RHDC at the assessment location.

<sup>2</sup> Measured LA1 value of 69 dBA was predominantly affected by road traffic, so unable to estimate contribution for RHDC at the assessment location.

## 4.2 Location N2

Noise monitoring at location N2 conducted on Thursday 9 February 2023 and Friday 10 February 2023 resulted in inaudible noise during the day, evening, and night. These results meet the established noise criteria and indicate that noise emissions from RHDC did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N2 are presented in **Table 4-2**. Measured ambient noise sources included birds, passing cars on Crawford Road and Cross Street, passing train, barking dog and insects.

**Table 4-2 Noise survey results and observations for Location N2**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Rooty Hill Distribution Centre Contribution LAeq(15min) (dBA)	Laeq(15min) Criteria (dBA)	Rooty Hill Distribution Centre LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	Laeq	LA90						
09-02-2023	9:23 (Day)	63.6	51.2	41.2	WD: n/a WS: 0 Rain: Nil	Birds 44-60 Road 50-68 Train 44-49 Site inaudible	<31	40	n/a	n/a
09-02-2023	19:22 (Evening)	66.1	55.2	43.9	WD: 180° WS: 1.4 m/s Rain: Nil	Birds 41-54 Traffic nearby 42-59 Car exhaust 61-77 Passing car 58-64 Barking dog 51 Site inaudible	<34	39	n/a	n/a
10-02-2023	5:06 (Night)	63.8	51.9	44.6	WD: n/a WS: 0 Rain: Nil	Insects 45-46 Traffic 46-71 Site inaudible	<35	39	n/a <sup>1</sup>	53

<sup>1</sup> Measured LA1 value was predominantly affected by road traffic, so unable to estimate contribution for RHDC at the assessment location.

### 4.3 Location N3

Noise monitoring at location N3 conducted on Thursday 9 February 2023 and Friday 10 February 2023 resulted in audible noise measured during the day. During the day period a Holcim alarm was observed and measured for up to 10 seconds on one occasions, however, is below the 15min LAeq criteria using sound level exposure calculations included in **Appendix 1**. During the day period a hum was continuously observed and measured for the duration of the monitoring period but remained below the 15min LAeq criteria using sound level exposure calculations included in **Appendix 1**. No monitoring was completed during the evening and night due to Nurraringy Reserve being closed. These results meet the established noise criteria and indicate that noise emissions from RHDC did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N3 are presented in **Table 4-3**. Measured ambient noise sources included birds, passing vehicles, aircraft, and source fans from an adjacent site.

**Table 4-3 Noise survey results and observations for Location N3**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Rooty Hill Distribution Centre Contribution LAeq(15min) (dBA)	LAeq(15min) Criteria (dBA)	Rooty Hill Distribution Centre LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
10-02-2023	7:00 (Day)	58.3	52.1	48.4	WD: n/a WS: 0 Rain: Nil	RHDC hum 44-46 RHDC alarm 52-54 (once for 10 seconds) Passing vehicles 50-54 Aircraft 51-54 Birds 51-60 Site audible	<46	50	n/a	n/a
09-02-2023	18:06 (Evening)	-1	-1	-1	-1	-1	n/a <sup>1</sup>	n/a <sup>1</sup>	n/a	n/a
10-02-2023	6:33 (Night)	-1	-1	-1	-1	-1	n/a <sup>1</sup>	n/a <sup>1</sup>	n/a <sup>1</sup>	n/a <sup>1</sup>

<sup>1</sup> Nurraringy Reserve closed during the evening and night monitoring periods. Opening hours for the reserve are 7am-6pm Monday to Friday.

#### 4.4 Location N4

Noise monitoring at location N4 conducted on Thursday 9 February 2023 and Friday 10 February 2023 resulted in inaudible noise from RHDC. These results meet the established noise criteria and indicate that noise emissions from RHDC did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N4 are presented in **Table 4-4**. Measured ambient noise sources included nearby construction site, birds, passing cars, and a passing train.

**Table 4-4 Noise survey results and observations for Location N4**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Rooty Hill Distribution Centre Contribution LAeq(15min) (dBA)	LAeq(15min) Criteria (dBA)	Rooty Hill Distribution Centre LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
09-02-2023	8:55 (Day)	72.1	61.8	49.1	WD: n/a WS: 0 Rain: Nil	Construction site 50-65 Site inaudible	<39	55	n/a	n/a
09-02-2023	18:06 (Evening)	62.2	51.5	41.1	WD: 240° WS: 1.6 m/s Rain: Nil	Birds 45-67 Passing cars 54-59 Passing train 50-56 Aircraft 45-49 Site inaudible	<31	55	n/a	n/a
10-02-2023	5:35 (Night)	54.0	48.6	46.4	WD: n/a WS: 0 Rain: Nil	Train 49-55 Construction site 50-51 Birds 47-54 Site inaudible	<36	55	<54	55

## 5. CONCLUSION

This NMA was completed by Ramboll at the Holcim Rooty Hill Distribution Centre, Rooty Hill, NSW as an annual requirement of the NMP. Monitoring was carried out on Thursday 9 February 2023 and Friday 10 February 2023 at four locations selected as representative to the sensitive receptors at the surroundings the RHDC.

Audible noise identified as emitted from the RHDC was recorded during the day at location N3. RHDC was not audible at any other location or period during the monitoring campaign.

The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Rooty Hill Distribution Centre, Rooty Hill, NSW.

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## **APPENDIX 1**

### **SOUND EXPOSURE LEVEL CALCULATIONS**



## **Appendix 2 – Water Quality and Aquatic Ecology Reports by Niche Environment and Heritage**

## **Holcim Regional Distribution Centre Rooty Hill NSW**

**Aquatic Ecology Monitoring**

**Prepared for Holcim 15 February 2024**





## Document control

Project number	Client	Project manager	LGA
7273	Holcim	David Wilkinson	Hills Shire

Version	Author	Review	Status	Date
D1	David Wilkinson	Luke Stone	Draft	22/02/2023
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## 1. Introduction

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### 1.1 Background

This document reports on results of the visual and stream health assessment of Angus Creek and Eastern Creek as part of the Holcim Regional Distribution Centre (RDC) (the Project) aquatic ecology monitoring program (hereafter referred to as the monitoring program). The monitoring program, including quarterly visual monitoring, bi-annual aquatic survey, and reporting, is required under condition 2.28 of the Project approval.

The aim of the monitoring program is to compare sites downstream of the RDC to upstream sites and determine whether the RDC is affecting stream health in receiving waterways, adjacent to or downstream of the Project.

This report presents the results of quarterly monitoring undertaken on 16 February 2023 in Summer 2023. Water quality monitoring and visual monitoring of stream condition was conducted at five sites: three sites on Angus Creek and two sites on Eastern Creek.

## 2. Methods

### 2.1 Location of sampling sites

A total of five sites were sampled on Angus Creek and Eastern Creek (Figure 1, Table 1). Three sites were located on Angus Creek (one upstream and two downstream of the Project) and two sites were located on Eastern Creek (one upstream and one downstream of the Project). At the time of Summer 2023 monitoring (16 February 2023) AE6 could not be accessed due to construction works being conducted at the Blacktown International Sports Park.

**Table 1: Survey sites**

Site name	Location		Latitude	Longitude
AE1	Angus Creek upstream near property boundary	Control	-33.76798576	150.8516665
AE2	Angus Creek downstream –near property boundary in Nurragingy Reserve.	Potential impact	-33.76563506	150.854665
AE3	Angus Creek upstream of Eastern Creek confluence in Nurragingy Reserve.	Potential impact	-33.76496807	150.8554235
AE4	Eastern Creek downstream of Angus Creek in Nurragingy Reserve	Potential impact	-33.76419362	150.8576059
AE5	Eastern Creek upstream of Angus Creek in Nurragingy Reserve	Control	-33.76411307	150.8570044
AE6	Angus Creek upstream above railway.	Control	-33.77017801	150.8499068





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## 2.2 Field methods

The field survey was undertaken on 16 February 2023 by Ecology Assistant Lily Cains. The field methods were consistent with standardised techniques for field sampling.

### 2.2.1 Visual assessment

A description of aquatic habitat was also produced using the AUSRIVAS proforma. The survey is a rapid visual assessment used to describe the habitat based on the following parameters:

- Geomorphology
- Channel diversity
- Bank stability
- Riparian vegetation and adjacent land use
- Water quality
- Macrophytes
- Local impacts and land use practices.

### 2.2.2 Water quality

#### ***Physio-chemical field measurements***

Surface water quality was measured in situ using a Yeokal 618 water quality probe at each site. The following variables were recorded:

- Temperature (°C)
- Conductivity (µS/cm)
- pH
- Dissolved oxygen (DO % saturation and mg/L)
- Turbidity (NTU).

Alkalinity (mg CaCO<sub>3</sub>/L) was measured with a standard titration kit. Water quality data were compared with the ANZG (2018) default trigger values (DTVs) of physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia.

#### ***Water sampling***

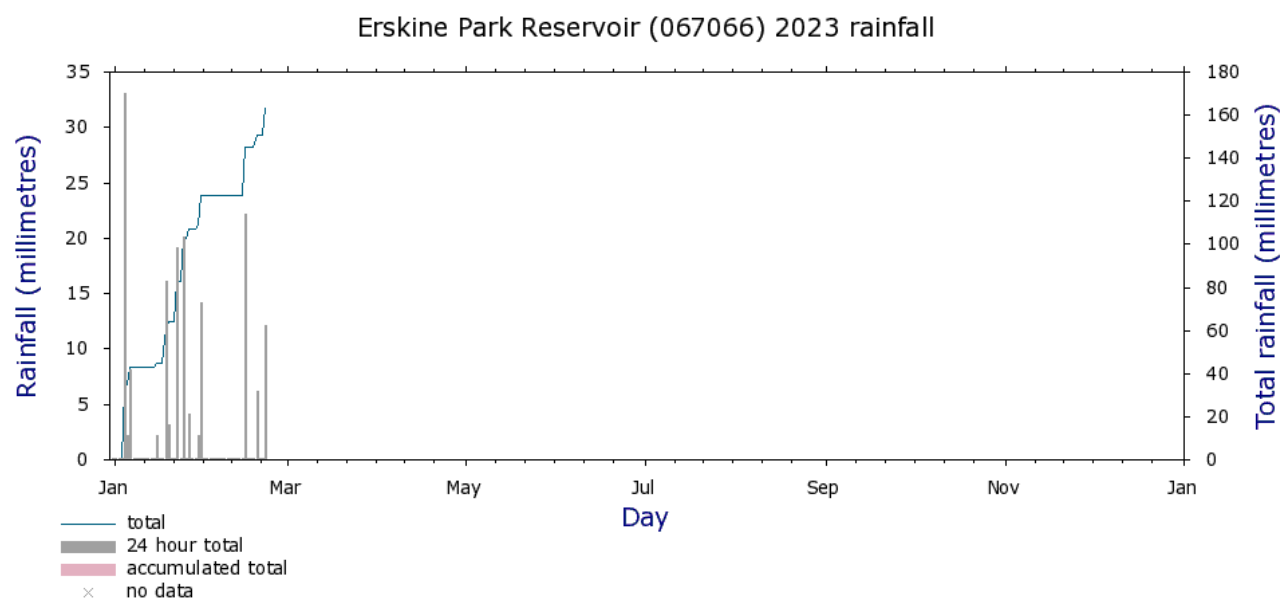
Water samples were taken at each location and sent to ALS laboratories to test for Total Phosphorus (TP), Total Nitrogen (TN) (Nitrogen Oxides (NO<sub>x</sub>) + Total Kjeldahl Nitrogen (TKN)). The results were compared with ANZG (2018) DTVs for TP, TN and NO<sub>x</sub>.



### 3. Results

#### 3.1 Rainfall

Sampling was conducted on 16 February 2023. Antecedent rainfall since the start of the month was 22 millimetres (mm) (Figure 2: Rainfall January to February). There was no rain in the weeks leading up to the sampling, with all rain falling on the day before. There was no rain on the day of sampling. The water level at the time of sampling was low to moderate with no visible flow besides sites AE1 and AE2.



Note: Data may not have completed quality control.

**Figure 2: Rainfall January to February 2023.**

#### 3.2 Visual observations

Results of the visual survey including photographs of each site are provided in Annex 1. Overall, the streams were visibly in reasonable condition for urban waterways. The upper banks of Angus Creek remain heavily vegetated with riparian ground cover. The lower steep banks above the water level are showing continued levels of erosion due to heavy flows from rainfall events. Some sections of site AE1 have areas of undercutting of the bank. Angus Creek AE1 and both Eastern Creek sites (AE4 and AE5) continue to have very little organic matter on the edges of the pools which has been previously observed (Niche 2022). At the time of monitoring, Eastern Creeks water level was low to moderate with no visible flow. However, the upper banks were unstable and were showing signs of erosion from flows coming from the park land. The riparian ground cover that had previously been growing on the lower bank of site AE4 was beginning to recover from being previously stripped by flood waters. All sites continue to have large amounts of plastic-based rubbish present in the systems, observed within the water and on the banks. The water was observed to be clear in upstream Angus Creek site AE1 and downstream sites AE2. Site AE3 appeared to have a slight opaqueness in water clarity which has been observed in previous monitoring rounds, while both Eastern Creek sites appeared turbid (Annex 1).

#### 3.3 Water quality

##### 3.3.1 Physio-chemical

Field physio-chemical water quality results are shown in Table 2. Electrical conductivity (EC) was within ANZG DTVs for all Angus Creek sites and both Eastern Creek sites. Sites within Angus Creek had higher EC than Eastern Creek with EC ranging from 660-680  $\mu\text{S}/\text{cm}$  with AE1 having the highest. Sites within Eastern

Creek had consistent EC ranging 353-356  $\mu\text{S}/\text{cm}$  with AE5 having the highest. Turbidity was within ANZG DTVs at all sites, except for the Eastern Creek sites AE4 and AE5 which had readings of 114 and 115 NTU respectively. Dissolved oxygen was below DTVs for all sites; however, this is common for small Western Sydney streams. The pH was within the DTVs at all Angus Creek sites and Eastern Creek sites. Alkalinity was higher in Angus Creek than Eastern Creek. Angus Creek alkalinity was relatively consistent ranging from 80-120  $\text{CaCO}_3/\text{L}$  with AE1 having the highest. Eastern Creek was also consistent, with both sites having a reading of 40  $\text{CaCO}_3/\text{L}$ .

**Table 2: Field physio chemical water quality results**

Site	Stream	Temp (C°)	Conductivity ( $\mu\text{S}/\text{cm}$ )	Turbidity (NTU)	Dissolved Oxygen (% sat)	pH*	Alkalinity (mg $\text{CaCO}_3/\text{L}$ )
AE1	Angus Creek	20.74	680	2.4	<b>23.32</b>	7.58	120
AE2	Angus Creek	20.81	675	1.6	<b>22</b>	7.45	100
AE3	Angus Creek	20.47	660	1.1	<b>14.61</b>	7.4	80
AE4	Eastern Creek	21.09	353	<b>114</b>	<b>59.15</b>	7.24	40
AE5	Eastern Creek	21.1	356	<b>115</b>	<b>60.52</b>	7.28	40
AE6*	Angus Creek	*	*	*	*	*	*

ANZG default trigger values (DTV) for lowland streams: Electrical conductivity (125-2200  $\mu\text{S}/\text{cm}$ ), Turbidity (6-50 NTU), pH (6.5-8), Dissolved Oxygen (80-110%). Text in bold indicate those variables that exceed the default trigger values.

\*Site was inaccessible due to construction activities in the area.

### 3.3.2 Nutrients

Total Nitrogen, Total Phosphorus and Nitrogen Oxides were above ANZG DTVs for lowland streams for all Angus Creek and Eastern Creek sites, with the exception of Total Nitrogen in Angus Creek which was on the upper limit for DTVs (Table 3).

**Table 3: Nutrients - laboratory results**

Site	Stream	Total Phosphorous (TP) (mg/L)	Total Nitrogen TN (TKN + NOx) (mg/L)	Nitrogen Oxides (NOx) (mg/L)	Total Kjeldahl Nitrogen (TKN) (mg/L)
AE1	Angus Creek	<b>0.1</b>	0.5	<b>0.14</b>	0.4
AE2	Angus Creek	<b>0.11</b>	0.5	<b>0.14</b>	0.4
AE3	Angus Creek	<b>0.08</b>	0.5	<b>0.13</b>	0.4
AE4	Eastern Creek	<b>0.72</b>	<b>2.6</b>	<b>0.45</b>	2.1
AE5	Eastern Creek	<b>0.58</b>	<b>2.4</b>	<b>0.46</b>	1.9
AE6*	Angus Creek	*	*	*	*

ANZG default trigger values (DTV) for lowland streams: TP (0.05 mg/L), TN (0.5 mg/L), NOx (0.02 mg/L). Text in bold indicate those variables that exceed the default trigger values.

\*Site was inaccessible due to construction activities in the area.

## 4. Discussion and conclusion

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All sites showed a decrease in electrical conductivity in Summer 2023 in comparison to the previous monitoring (Spring 2022) with all Angus Creek and Eastern Creek sites being within the ANZG DTVs. Despite some discolouration observed in Site AE3, turbidity in Angus Creek was low. Eastern Creek sites AE4 and AE5 however had elevated turbidity which has been observed on most monitoring occasions. All sites showed dissolved oxygen levels that are to be expected of disturbed urban streams. All sites in Angus Creek and Eastern Creek had a pH reading within the ANZG DTVs. Additionally, all nutrients' analytes were above the ANZG DTVs for all five sites surveyed this monitoring period, with the exception of Total Nitrogen (TN) in Angus Creek which on the upper limit for DTVs. The exceedance in nutrient parameters have been routinely observed over the monitoring program in both upstream and downstream sites in Angus and Eastern creeks (Niche 2022 Winter). The data indicates that Holcim RDC is not affecting the receiving environment and any exceedance in water quality or poor environmental conditions observed are the result of existing catchment disturbances unrelated to the site.

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## Annex 1- Visual observations – February 2023

### AE1: Angus Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE1 UPSTREAM
Riparian	Vegetation	The dominant tree species comprised Swamp Oak ( <i>Casuarina glauca</i> ) and Broad-leaf Privet ( <i>Ligustrum lucidum</i> ). Groundcover was dominated by <i>Tradescantia fluminensis</i> .
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	3 m
	Bank condition	Slightly vegetated banks and stable. Slight erosion of lower bank.
	Substrate	Fine sediment; silt. Hardened clay bottom.
	Flow/depth	Moderate flow/ ~1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Clear water
Comments		Weeds and rubbish present. Lack of organic material in channel.



## AE2: Angus Creek



A: Upstream



B: Downstream

	Attribute	AE2 DOWNSTREAM
Riparian	Vegetation	Dominant tree species included ( <i>C. glauca</i> ). Dominant groundcover was <i>T. fluminensis</i> and mixture of exotic and native grasses and herbs.
	Stream shading	Moderate shading
	Exotic vegetation	<i>T. fluminensis</i> and other groundcover species.
Stream characteristics	Modal width	2 m
	Bank Condition	Slightly unstable and heavily vegetated by groundcover
	Substrate	Silt and bedrock
	Flow/depth	Moderate flow/<1 m
	Macrophytes/algae	Emergent macrophytes present – Bulrush ( <i>Typha</i> sp.), <i>Cyprus</i> sp. <i>Potamogeton crispus</i>
	Water quality observations	Clear water
Comments		Weeds and rubbish. Metallic rubbish in system. Concrete rubble in system.

## AE3: Angus Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE3 DOWNSTREAM
Riparian	Vegetation	Dominant tree species was <i>C. glauca</i> ). Dominant grass/herb species was Wandering Jew ( <i>T. fluminensis</i> )
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. Lucidum</i> , <i>T. fluminensis</i>
Stream characteristics	Modal width	4 m
	Bank Condition	Stable, steep, exposed in sections, slight visible erosion.
	Substrate	Fine sediment, organic matter on banks
	Flow/depth	Low flow/~1 metre
	Macrophytes/algae	Ribbon Weed ( <i>Vallisneria</i> sp.)
	Water quality observations	Visually water appeared slightly opaque (but within DTVs)
Comments		Significant amount of plastic based rubbish in stream



## AE4: Eastern Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE4 DOWNSTREAM
Riparian	Vegetation	Dominant canopy species included <i>C. glauca</i> ) and Prickly-leaved Tea Tree ( <i>Melaleuca styphelioides</i> ). Dominant mid-storey species were <i>C. glauca</i> <i>L. lucidum</i> ). Dominant groundcover was the exotic <i>T. fluminensis</i>
	Stream shading	Moderate
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	8 m
	Bank condition	Unstable banks
	Substrate	Fine sediment
	Flow/depth	Moderate flow/>1m
	Macrophytes/algae	Macrophytes not present
	Water quality observations	Visually very turbid (above DTVs)
Comments		



AE 5: Eastern Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was Lomandra ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	12 m
	Bank condition	Unstable
	Substrate	Fine sediment and large woody debris.
	Flow/depth	Moderate flow/ >1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Visually very turbid (Above DTVs)
Comments		Lots of large woody debris and plastic based rubbish

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Biodiversity Stewardship Site Agreements (NSW)  
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Advanced Offset establishment (QLD)



## **Holcim Regional Distribution Centre Rooty Hill NSW**

**Aquatic Ecology Monitoring: Autumn 2023**

**Prepared for Holcim | 31 May 2023**





## Document control

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## 1. Introduction

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### 1.1 Background

This document presents the results of the visual and stream health assessment of Angus Creek and Eastern Creek, undertaken as part of the Holcim Regional Distribution Centre (RDC) (the Project) aquatic ecology monitoring program (hereafter referred to as the monitoring program). The monitoring program, including quarterly visual monitoring, bi-annual aquatic survey, and reporting, is required under condition 2.28 of the Project approval.

The aim of the monitoring program is to compare sites downstream of the RDC to upstream sites and determine whether the RDC is affecting stream health in receiving waterways, adjacent to or downstream of the Project.

This report presents the results of bi-annual aquatic macroinvertebrate monitoring undertaken on 24 May 2023 in autumn 2023. Aquatic ecology monitoring and visual monitoring of stream conditions was conducted at six sites: four sites on Angus Creek and two sites on Eastern Creek.

## 2. Methods

### 1.1 Location of sampling sites

A total of six sites were sampled on Angus Creek and Eastern Creek (Figure 1, Table 1). Four sites were located on Angus Creek (two upstream and two downstream of the Project) and two sites were located on Eastern Creek (one upstream and one downstream of the Project). At the time of autumn 2023 monitoring (24 May 2023), access to AE6 had been restored after previous construction works in the area had been completed.

**Table 1: Survey sites**

Site name	Location	Site status	Latitude	Longitude
AE1	Angus Creek upstream near property boundary	Upstream control site	-33.76798576	150.8516665
AE2	Angus Creek downstream –near property boundary in Nurragingy Reserve.	Potential downstream impact site	-33.76563506	150.854665
AE3	Angus Creek upstream of Eastern Creek confluence in Nurragingy Reserve.	Potential downstream impact site	-33.76496807	150.8554235
AE4	Eastern Creek downstream of Angus Creek in Nurragingy Reserve	Potential downstream impact site	-33.76419362	150.8576059
AE5	Eastern Creek upstream of Angus Creek in Nurragingy Reserve	Upstream control site	-33.76411307	150.8570044
AE6	Angus Creek upstream above railway.	Upstream control site	-33.77017801	150.8499068

**Figure 1: Location of sites**





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## 1.2 Field methods

The field survey was undertaken on 24 May 2023 by Aquatic Ecologist David Wilkinson. The field methods were consistent with standardised techniques for field sampling as prescribed by AUSRIVAS (Turak *et al.* 2000). The AUSRIVAS method of sampling both pools and riffles were modified for this program, as no suitable in-stream riffle features were present.

### 2.1.1 Visual assessment

A description of aquatic habitat was also produced using the NSW AUSRIVAS proforma field recording form. The survey is a rapid visual assessment used to describe the habitat based on the following parameters:

- Geomorphology
- Channel diversity
- Bank stability
- Riparian vegetation and adjacent land use
- Water quality
- Macrophytes
- Local impacts and land use practices.

### 2.1.2 Water quality

#### ***Physico-chemical field measurements***

Surface water quality was measured in situ using a Yeokal 618 water quality probe at each site. The following variables were recorded:

- Temperature (°C)
- Conductivity (µS/cm)
- pH
- Dissolved oxygen (DO % saturation and mg/L)
- Turbidity (NTU).

Alkalinity (mg CaCO<sub>3</sub>/L) was measured with a standard field titration kit.

Water quality data were compared with the ANZG (2018) default trigger values (DTVs) of physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia.

#### ***Water sampling***

Water samples were taken at each location and sent to the NATA accredited ALS laboratories to test for Total Phosphorus (TP), Total Nitrogen (TN), Nitrogen Oxides (NO<sub>x</sub>), and Total Kjeldahl Nitrogen (TKN). The results were compared with ANZG (2018) DTVs for TP, TN and NO<sub>x</sub>.

Physicochemical water quality results are provided in the reports associated with each round of monitoring. A collated list of all physicochemical water quality results recorded as part of the program at the time of reporting can be found in the Winter 2022 Visual Monitoring Report, dated 28 July 2022 (Niche 2022).

### 2.1.3 Macroinvertebrates

Samples were collected from pool edges for a length of 10 metres, either as a continuous line or in disconnected segments. Sampling in segments was undertaken to ensure the sub-habitats such as macrophyte beds, bank overhangs, submerged branches and root mats were appropriately sampled.

Segmented sampling was also employed where pool length was short, and it was logistically difficult to sample in a continuous line (e.g. in-stream logs). A 250 µm dip net was drawn through the water with short sweeps towards the bank to dislodge benthic fauna while scraping submerged rocks and debris, sides of the stream bank and the bed substrate. Further sweeps in the water column targeted suspended fauna. Each sample was rinsed from the net onto a white sorting tray from which animals were picked using forceps, pipettes and or paint brushes. Each tray was picked for a minimum period of 40 minutes, after which they were picked at 10-minute intervals for either a total of one hour or until no new specimens had been found. Care was taken to collect cryptic and fast-moving animals, in addition to those that were conspicuous or slow. The macroinvertebrates collected at each site were placed into a labelled jar containing 70% ethanol.

### **Laboratory methods-invertebrate identification**

Macroinvertebrate samples were identified to family level with the exception of Oligochaeta (to class), Polychaeta (to class), Ostracoda (to subclass), Nematoda (to phylum), Nemertea (to phylum), Acarina (to order) and Chironomidae (to subfamily). Keys used to identify fauna included:

- Dean, J., Rosalind, M., St Clair, M., and Cartwright, D. (2004) Identification keys to Australian families and genera of caddis-fly larvae (Trichoptera). Cooperative Research Centre for Freshwater Ecology.
- Gooderham, J. and Tsyrlin, E. (2002) The Waterbug Book: A guide to the Freshwater Macroinvertebrates of Temperate Australia. CSIRO Publishing.
- Hawking and Theischinger (1999) A guide to the identification of larvae of Australian families and to the identification of ecology of larvae from NSW. Cooperative Research Centre for Freshwater Ecology. Albury NSW.
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- Madden, C. (2011) Draft identification key to families of Diptera larvae of Australian inland waters. La Trobe University.
- Smith, B. (1996) Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters. Murray Darling Freshwater Research Centre.
- Online resource - <http://www.mdfrc.org.au/bugguide/>.

## **2.2 Data analysis**

### **2.2.1 SIGNAL2 (Stream Invertebrate Grade Number Average Level) scores**

The revised SIGNAL2 biotic index developed by Chessman (2003a, 2003b) was used to determine the “environmental quality” of sites. This method assigns grade numbers to each macroinvertebrate family or taxa found, based largely on their response to a range of environmental conditions (Table 2). The sum of all grade numbers for that habitat is then divided by the total number of families recorded in each habitat to calculate the SIGNAL2 index. A weighted SIGNAL2 score was also calculated (see Chessman 2003b). The SIGNAL2 index therefore uses the average sensitivity of macroinvertebrate families to present a snapshot of biotic integrity at a site. Table 3 provides a broad guide for interpreting the health of the site according to the SIGNAL2 score of the site.

**Table 2: SIGNAL 2 grade and the level of pollution tolerance**

SIGNAL2 grade (individual taxa)	Pollution tolerance
10-8	Indicates a greater sensitivity to pollution
7-5	Indicates a sensitivity to pollution
4-3	Indicates a tolerance to pollution

SIGNAL2 grade (individual taxa)	Pollution tolerance
2-1	Indicates a greater tolerance to pollution

**Table 3: Guide to interpreting the SIGNAL2 scores**

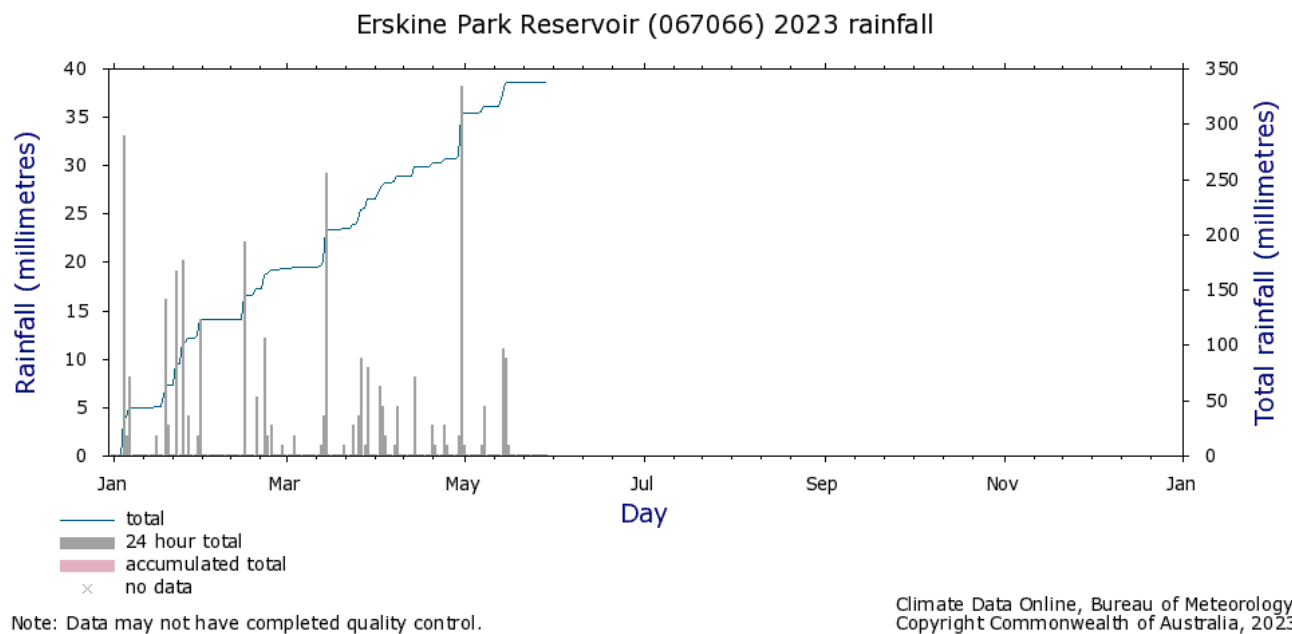
SIGNAL2 score	Habitat quality
Greater than 6	Healthy habitat
Between 5 and 6	Mild pollution
Between 4 and 5	Moderate pollution
Less than 4	Severe pollution

\*Note that SIGNAL2 scores are indicative only and that pollution does not refer to just anthropogenic pollution. Environmental stress may result in poor water quality occurring naturally in waterways. Low family richness and the occurrence of pollution tolerant invertebrates can give a low SIGNAL2 score even when they are in natural condition.

### 3. Results

#### 1.1 Rainfall

Sampling was conducted on 24 May 2023. Antecedent rainfall since the start of the month was 28 millimetres (mm) (Figure 2). There was 0 millimetres of rain in the 5 days prior to sampling, and no rain fell on the day of sampling. The water level at the time of sampling was low to moderate with no visible flow besides sites AE1, AE2 and AE6 which slow flows were observed. The water level in Eastern Creek was lower than in recent surveys.



**Figure 2: Rainfall January to May 2023.**

#### 3.1 Visual observations

Results of the visual survey including photographs of each site are provided in Annex 1. Overall, the streams were visibly in moderate condition for urban waterways within the locality. The upper banks of Angus Creek remain heavily vegetated with dense ground cover vegetation, including native riparian species. The lower steep banks above the water level are continuing to suffer from erosion events. Some sections of site AE1 and AE2 have the beginning of undercutting of the bank (both upper and lower bank). Angus Creek AE1 and both Eastern Creek sites (AE4 and AE5) continue to have very little organic matter on the edges of the pools which has been previously observed (Niche 2022). The upper banks of AE4 and AE5 have regained some stability after drying with lower rainfall events since spring 2022. However, the lower banks that are now exposed due to the reduced water levels are suffering from instability and erosion. The riparian ground cover of sites AE4 and AE5 has begun to regrow. All sites continue to have large amounts of plastic-based litter present in the systems, observed within the water and on the banks.

The water was observed to be clear in upstream Angus Creek sites AE1 and AE6. Angus Creek sites AE2 and AE3 appeared to have an opaqueness to them that has been observed by Niche in previous years (Niche 2019). Both Eastern Creek sites appeared visually turbid (Annex 1).

## 3.2 Water quality

### 3.2.1 Physio-chemical

Field collected physicochemical water quality results are shown in Table 4. Electrical conductivity (EC) readings were elevated at all sites, however they were within ANZG DTVs for all sites except for AE6 which exceeded DTVs. Sites within Angus Creek had higher EC than Eastern Creek with EC levels ranging from 1723-2773  $\mu\text{S}/\text{cm}$  with AE6 recording the highest reading. Sites within Eastern Creek had consistent EC levels ranging 639-699  $\mu\text{S}/\text{cm}$  with AE4 having the highest. Turbidity levels were within ANZG DTVs at all sites, except for the Eastern Creek site AE5, which had a reading of 59.0 NTU and Angus Creek site AE2 which had a reading of 58.9 NTU. Dissolved oxygen levels were below DTVs for all sites except for site AE4; however, this is common for small streams in Western Sydney. The pH readings were within the DTVs at all Angus Creek sites and Eastern Creek sites, with the exceptions being site AE1 (Angus Creek) and site AE4 (Eastern Creek). Alkalinity was higher at the Angus Creek sites than Eastern Creek sites. Angus Creek alkalinity was elevated upstream, and lowering downstream, ranging between 280-460  $\text{CaCO}_3/\text{L}$ , with AE6 recording the highest reading. Eastern Creek sites also recorded elevated, but relatively consistent alkalinity levels, ranging from 240-260  $\text{CaCO}_3/\text{L}$ , with AE4 having the highest.

**Table 4: Field physio chemical water quality results**

Site	Stream	Temp (C°)	Electrical conductivity ( $\mu\text{S}/\text{cm}$ )	Turbidity (NTU)	Dissolved Oxygen (% sat)	pH*	Alkalinity (mg $\text{CaCO}_3/\text{L}$ )
AE1	Angus Creek	9.99	2138	7.5	<b>61.9</b>	7.9	340
AE2	Angus Creek	9.91	1723	<b>58.9</b>	<b>55.3</b>	<b>8.32</b>	280
AE3	Angus Creek	9.9	1750	21.5	<b>54.6</b>	<b>8.18</b>	280
AE4	Eastern Creek	9.25	699	43.6	80.2	7.96	260
AE5	Eastern Creek	9.08	639	<b>59.0</b>	<b>77.5</b>	<b>8.22</b>	240
AE6	Angus Creek	10.02	<b>2773</b>	4.0	<b>83.6</b>	<b>8.41</b>	460

ANZG default trigger values (DTV) for lowland streams: Electrical conductivity (125-2200  $\mu\text{S}/\text{cm}$ ), Turbidity (6-50 NTU), pH (6.5-8), Dissolved Oxygen (80-110%). Text in bold indicate those variables that exceed the default trigger values.

### 3.2.2 Nutrients

Total Phosphorus, Total Nitrogen and Nitrogen Oxides levels were above ANZG DTVs for lowland streams for all Angus Creek and Eastern Creek sites. (Table 5).

**Table 5: Nutrients - laboratory results**

Site	Stream	Total Phosphorous (TP) (mg/L)	Total Nitrogen TN (TKN + NOx) (mg/L)	Nitrogen Oxides (NOx) (mg/L)	Total Kjeldahl Nitrogen (TKN) (mg/L)
AE1	Angus Creek	<b>0.12</b>	<b>0.6</b>	<b>0.23</b>	0.4
AE2	Angus Creek	<b>0.07</b>	<b>0.7</b>	<b>0.30</b>	0.4
AE3	Angus Creek	<b>0.10</b>	<b>0.6</b>	<b>0.24</b>	0.4
AE4	Eastern Creek	<b>0.09</b>	<b>1.0</b>	<b>0.39</b>	0.6
AE5	Eastern Creek	<b>0.07</b>	<b>0.9</b>	<b>0.40</b>	0.5
AE6	Angus Creek	<b>0.06</b>	<b>0.8</b>	<b>0.45</b>	0.4

ANZG default trigger values (DTVs) for lowland streams: TP (0.05 mg/L), TN (0.5 mg/L), NOx (0.02 mg/L). Text in bold indicate those variables that exceed the default trigger values.

### 3.3 Macroinvertebrates and SIGNAL2 scores

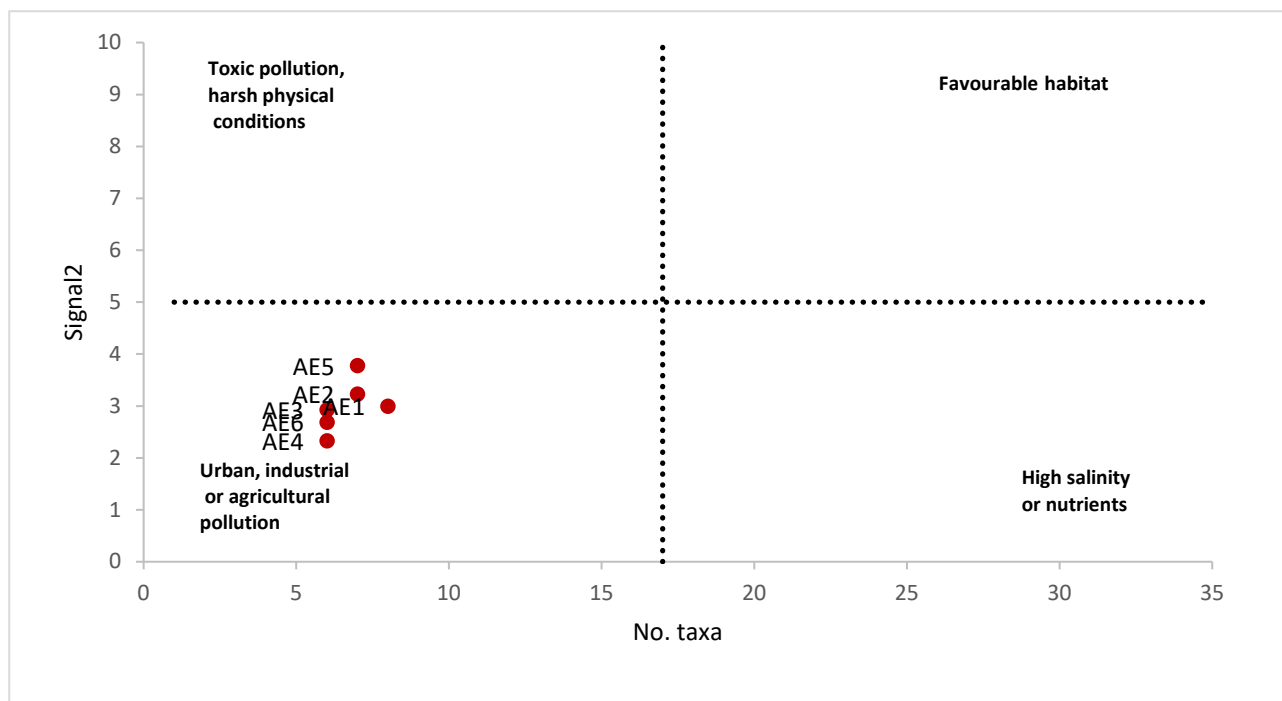
SIGNAL2 results for the five sampled sites are provided in Table 6. Raw data is provided in Annex 2.

The number of taxa was low, ranging between 6-8, with the most taxa (8) observed in Angus Creek site AE1. The least taxa (6) observed was in Eastern Creek site AE4 and Angus Creek sites AE3 and AE6. The SIGNAL2 scores indicate that all monitoring sites had a dominance of pollution-tolerant taxa, possibly indicating moderate to severe levels of pollution (Table 3). Eastern Creek site AE5 was the only site to have sensitive macroinvertebrate families observed during this round of monitoring (*Leptoceridae* – SIGNAL6). All sites, except for AE3, had a higher SIGNAL2 scores than the previous macroinvertebrate sampling round in November 2022 (Niche 2022). Site AE4 had the same score as the previous round of monitoring.

The SIGNAL2 bi-plot (Figure 3), indicates that no sites have favourable habitat and all locations are exhibiting some form of pollution or natural stress. Upstream Eastern Creek site AE5 had the highest SIGNAL2 score of any site from both creeks, but is still considered low. (Table 6). The results are observed to cluster together, suggesting relatively consistent conditions across the sites.

**Table 6: Number of taxa and weighted SIGNAL2 scores: autumn 2023**

Site	Number of taxa	SIGNAL2 weighted scores
AE1	8	3.00
AE2	7	3.23
AE3	6	2.93
AE4	6	2.33
AE5	7	3.78
AE6	6	2.69



**Figure 3: SIGNAL2 score and number of taxa bi-plot.**



## 4. Discussion and conclusion

All sites showed an increase in electrical conductivity levels in autumn 2023 in comparison to the previous monitoring (summer 2023), although the levels recorded at all Angus Creek and Eastern Creek sites were within the ANZG DTVs (with the exception of Angus Creek upstream site AE6). This trend likely reflects the change from consistently high rainfall levels (and associated freshwater inputs) through 2022 to more nominal conditions in autumn 2023. Turbidity in Angus Creek was low while Eastern Creek sites AE4 and AE5 had elevated turbidity levels, which has been observed on most monitoring occasions. Although, only site AE5 exceeded DTVs during this round of monitoring. All sites showed dissolved oxygen levels below ANZG DTVs (with the exception of site AE4), however that is to be expected of disturbed urban streams in the locality. All sites (with the exception of sites AE1 and AE4) in Angus Creek and Eastern Creek had a pH reading exceeding the ANZG DTVs. Additionally, all nutrients' analytes were above the ANZG DTVs for all six sites surveyed this monitoring period. The exceedance in nutrient parameters have been routinely observed over the monitoring program in both upstream and downstream sites in Angus and Eastern creeks. The data indicates that Holcim RDC is not affecting the receiving environment and any exceedance in water quality or poor environmental conditions observed are the result of existing catchment disturbances unrelated to the site.

Low numbers of taxa were observed in autumn 2023, across downstream and upstream sites. This pattern was also observed in the previous monitoring period (spring and autumn 2022) (Niche 2022). Low SIGNAL2 scores (<4) were recorded at all sites and only one pollution sensitive macroinvertebrate taxa were found at the time of monitoring (*Leptoceridae* – Signal 6 at AE5). Considering the SIGNAL2 scores and the water quality results both upstream and downstream were similar, it is unlikely that the RDC is affecting stream ecology. Furthermore, there is a variety of upstream impacts and land use activities that are likely to affect stream health conditions in these waterways and, as such, the low scores observed are likely the result of a combination of natural and anthropogenic catchment stressors, which is common in disturbed Western Sydney streams. Overall, the two streams appear to be in reasonable health for urban waterways. The physicochemical and ecological results do not suggest that the RDC is affecting the downstream aquatic environment.

Visual observations identified an opaque discolouration at sites AE2 and AE3 downstream of the RDC, that is not observed at the upstream sites (Annex 1). Similar discolouration has been observed on one previous occasion (Niche 2019). This discolouration does not appear to have any apparent acute impact on stream health or water quality on the basis of these monitoring results. It is recommended that Holcim investigate and determine whether water is inadvertently leaving the RDC and entering into Angus Creek.

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Online resources:

<http://ausrivas.ewater.com.au/>

<http://www.mdfrc.org.au/bugguide/>

## Annex 1- Visual observations – May 2023

### AE1: Angus Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE1 UPSTREAM
Riparian	Vegetation	The dominant tree species comprised Swamp Oak ( <i>Casuarina glauca</i> ) and Broad-leaf Privet ( <i>Ligustrum lucidum</i> ). Groundcover was dominated by <i>T. fluminensis</i> .
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	3 m
	Bank condition	Slightly vegetated banks and stable. Slight erosion and undercutting of lower bank.
	Substrate	Fine sediment; silt. Hardened clay bottom.
	Flow/depth	Moderate flow/ <1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Clear water
Comments		Weeds and rubbish present. Lack of organic material in channel.



## AE2: Angus Creek



A: Upstream



B: Downstream

	Attribute	AE2 DOWNSTREAM
<b>Riparian</b>	Vegetation	Dominant tree species included ( <i>C. glauca</i> ). Dominant groundcover was <i>T. fluminensis</i> and mixture of exotic and native grasses and herbs.
	Stream shading	Moderate shading
	Exotic vegetation	<i>T. fluminensis</i> and other groundcover species.
<b>Stream characteristics</b>	Modal width	2 m
	Bank Condition	Slightly unstable and heavily vegetated by groundcover
	Substrate	Silt and bedrock / concrete
	Flow/depth	Moderate flow/<1 m
	Macrophytes/algae	Emergent macrophytes present – Bulrush ( <i>Typha</i> sp.), <i>Cyprus</i> sp. <i>Potamogeton crispus</i>
	Water quality observations	Water was cloudy and opaque
<b>Comments</b>		Weeds and rubbish. Metallic rubbish in system. Concrete rubble in system.

## AE3: Angus Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE3 DOWNSTREAM
<b>Riparian</b>	Vegetation	Dominant tree species was <i>C. glauca</i> ). Dominant grass/herb species was <i>T. fluminensis</i>
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. Lucidum</i> , <i>T. fluminensis</i>
<b>Stream characteristics</b>	Modal width	4 m
	Bank Condition	Stable, steep, exposed in sections, slight visible erosion.
	Substrate	Fine sediment, organic matter on banks
	Flow/depth	Low flow/<1 metre
	Macrophytes/algae	Ribbon Weed ( <i>Vallisneria</i> sp.)
	Water quality observations	Visually water appeared slightly opaque (but within DTVs)
<b>Comments</b>		Dense organic matter in middle of pool.



## AE4: Eastern Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE4 DOWNSTREAM
Riparian	Vegetation	Dominant canopy species included <i>C. glauca</i> ) and Prickly-leaved Tea Tree ( <i>Melaleuca styphelioides</i> ). Dominant mid-storey species were <i>C. glauca</i> <i>L. lucidum</i> ). Dominant groundcover was the exotic <i>T. fluminensis</i>
	Stream shading	Moderate
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	8 m
	Bank condition	Unstable banks
	Substrate	Fine sediment
	Flow/depth	Moderate flow/<1m
	Macrophytes/algae	Macrophytes not present
	Water quality observations	Visually very turbid
Comments		

## AE 5: Eastern Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was <i>Lomandra</i> ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	12 m
	Bank condition	Unstable
	Substrate	Fine sediment and large woody debris.
	Flow/depth	Moderate flow/ <1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Visually very turbid
Comments		Lots of large woody debris and plastic based rubbish



## AE 6: Angus Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was <i>Lomandra</i> ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	4 m
	Bank condition	Stable (Artificial)
	Substrate	Fine sediment and cobble
	Flow/depth	Moderate flow/ <1 m
	Macrophytes/algae	Macrophytes and algae
	Water quality observations	Clear
Comments		

## Annex 2 Macroinvertebrate data – May 2023

SITE	AE1	AE2	AE3	AE4	AE5	AE6
Chironominae	3	0	15	18	27	0
Coenagrionidae	0	0	0	3	2	0
Conchostraca	3	1	1	0	0	0
Corixidae	0	0	0	4	9	1
Ecnomidae	0	0	0	0	7	0
Glossophionidae	2	0	0	0	0	1
Hydrobiidae	23	38	19	1	0	13
Leptoceridae	0	0	0	0	14	0
Libellulidae	3	2	2	0	1	1
Megapodagrionidae	8	3	0	1	2	0
Nematoda	0	1	1	0	0	27
Oligochaeta	1	4	6	0	0	2
Physidae	7	1	0	2	0	0

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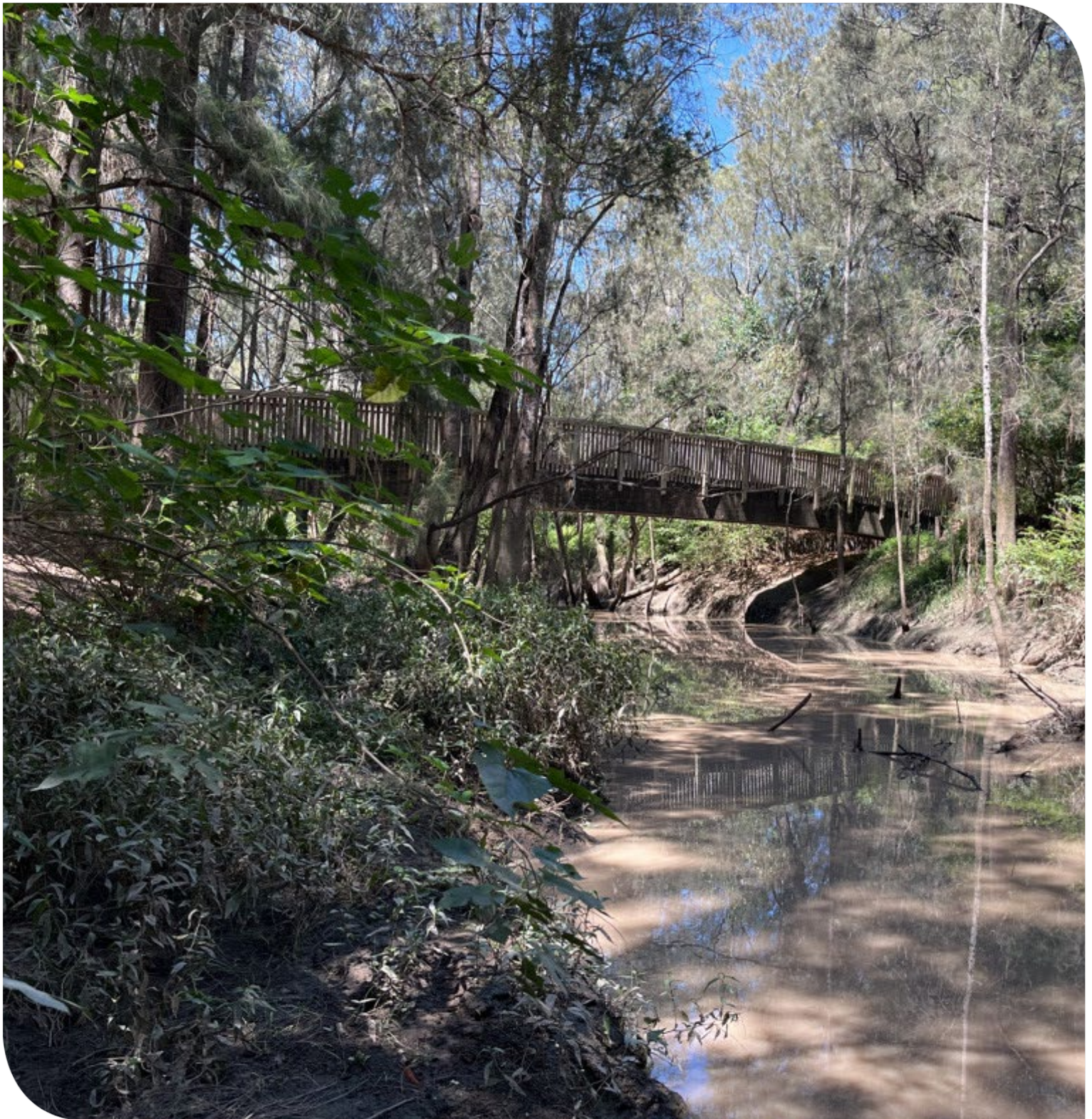
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Offset brokerage  
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## **Holcim Regional Distribution Centre Rooty Hill NSW**

**Aquatic Ecology Monitoring**

**Prepared for Holcim 8 September 2023**





## Document control

Project number	Client	Project manager	LGA
7273	Holcim	David Wilkinson	Hills Shire

Version	Author	Review	Status	Date
D0	Alan Davies	Luke Stone/David Wilkinson	Draft	08/09/2023
R0			Final	

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## 1. Introduction

---

### 1.1 Background

This document reports on results of the visual and stream health assessment of Angus Creek and Eastern Creek as part of the Holcim Regional Distribution Centre (RDC) (the Project) aquatic ecology monitoring program (hereafter referred to as the monitoring program). The monitoring program, including quarterly visual monitoring, bi-annual aquatic survey, and reporting, is required under condition 2.28 of the Project approval.

The aim of the monitoring program is to compare sites downstream of the RDC to upstream sites and determine whether the RDC is affecting stream health in receiving waterways, adjacent to or downstream of the Project.

This report presents the results of quarterly monitoring undertaken on the 2<sup>nd</sup> of August 2023 in Winter 2023. Water quality monitoring and visual monitoring of stream condition was conducted at six sites: three sites on Angus Creek and two sites on Eastern Creek.



## 2. Methods

### 2.1 Location of sampling sites

A total of five sites were sampled on Angus Creek and Eastern Creek (Figure 1, Table 1). Four sites were located on Angus Creek (two upstream and two downstream of the Project) and two sites were located on Eastern Creek (one upstream and one downstream of the Project).

**Table 1: Survey sites**

Site name	Location		Latitude	Longitude
AE1	Angus Creek upstream near property boundary	Control	-33.76798576	150.8516665
AE2	Angus Creek downstream –near property boundary in Nurragingy Reserve.	Potential impact	-33.76563506	150.854665
AE3	Angus Creek upstream of Eastern Creek confluence in Nurragingy Reserve.	Potential impact	-33.76496807	150.8554235
AE4	Eastern Creek downstream of Angus Creek in Nurragingy Reserve	Potential impact	-33.76419362	150.8576059
AE5	Eastern Creek upstream of Angus Creek in Nurragingy Reserve	Control	-33.76411307	150.8570044
AE6	Angus Creek upstream above railway.	Control	-33.77017801	150.8499068





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## 2.2 Field methods

The field survey was undertaken on the 2<sup>nd</sup> of August 2023 by Ecology Assistant Lily Cains. The field methods were consistent with standardised techniques for field sampling.

### 2.2.1 Visual assessment

A description of aquatic habitat was also produced using the AUSRIVAS proforma. The survey is a rapid visual assessment used to describe the habitat based on the following parameters:

- Geomorphology
- Channel diversity
- Bank stability
- Riparian vegetation and adjacent land use
- Water quality
- Macrophytes
- Local impacts and land use practices.

### 2.2.2 Water quality

#### ***Physio-chemical field measurements***

Surface water quality was measured in situ using a Yeokal 618 water quality probe at each site. The following variables were recorded:

- Temperature (°C)
- Conductivity (µS/cm)
- pH
- Dissolved oxygen (DO % saturation and mg/L)
- Turbidity (NTU).

Alkalinity (mg CaCO<sub>3</sub>/L) was measured with a standard titration kit. Water quality data were compared with the ANZG (2018) default trigger values (DTV) of physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia.

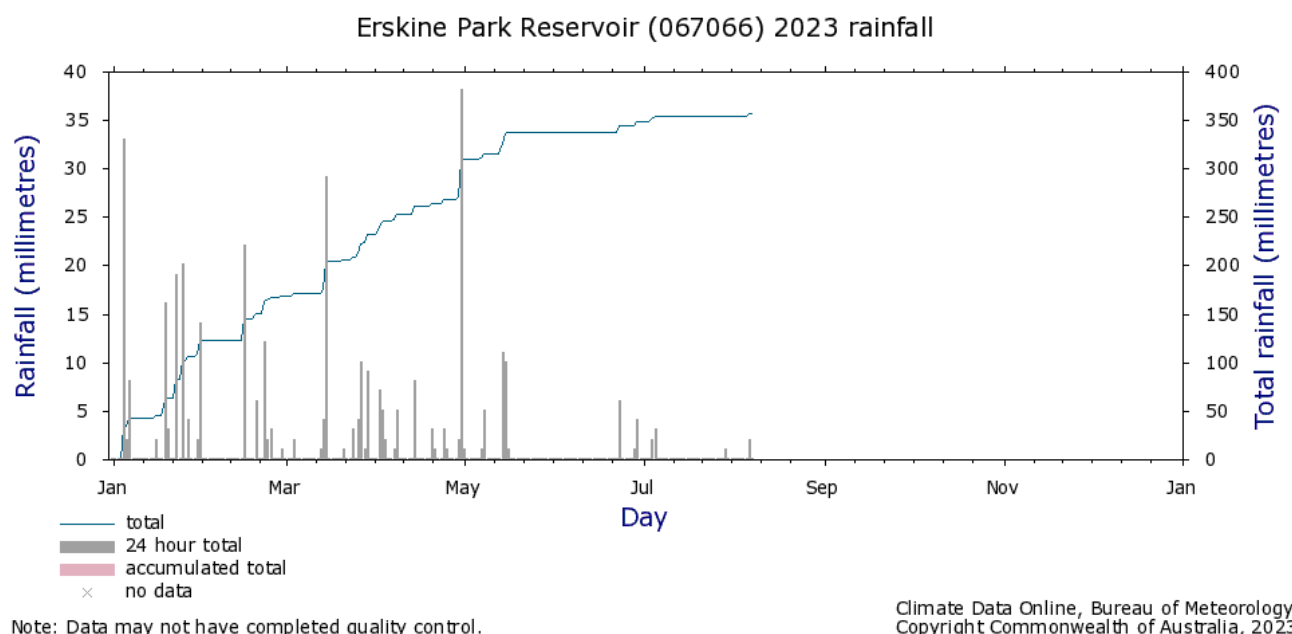
#### ***Water sampling***

Water samples were taken at each location and sent to ALS laboratories to test for Total Phosphorus (TP), Total Nitrogen (TN) (Nitrogen Oxides (NO<sub>x</sub>) + Total Kjeldahl Nitrogen (TKN)). The results were compared with ANZG (2018) DTVs for TP, TN and NO<sub>x</sub>.

### 3. Results

#### 3.1 Rainfall

Sampling was conducted on 2nd August 2023. Antecedent rainfall from the month preceding the winter monitoring totalled 6 millimetres (mm) (Figure 2: Rainfall January to August 2023). Only 1 millimetre of rain was recorded in the 2 weeks leading up to the sampling. There was no rain on the day of sampling. The water level at the time of sampling was low to moderate.



**Figure 2: Rainfall January to August 2023.**

#### 3.2 Visual observations

Results of the visual survey including photographs of each site are provided in Annex 1. Overall, the streams were visibly in reasonable condition for urban waterways. The upper banks of Angus Creek remain heavily vegetated with riparian ground cover. The lower steep banks above the water level are showing continued levels of erosion due to heavy flows from rainfall events. Some sections of site AE1 have areas of undercutting of the bank. Angus Creek AE1 and both Eastern Creek sites (AE4 and AE5) continue to have very little organic matter on the edges of the pools which has been previously observed (Niche 2022). At the time of monitoring, Eastern Creek's water level was low to moderate with no visible flow. However, the upper banks were unstable and were showing signs of erosion from flows coming from the park land. The riparian ground cover that had previously been growing on the lower bank of site AE4 was beginning to recover from being previously stripped by flood waters. All sites continue to have large amounts of plastic-based rubbish present in the systems, observed within the water and on the banks. The water was observed to be clear in upstream Angus Creek site AE1 and downstream sites AE2. Site AE3 appeared to have a slight opaqueness in water clarity which has been observed in previous monitoring rounds, while both Eastern Creek sites appeared turbid (Annex 1).

#### 3.3 Water quality

##### 3.3.1 Physio-chemical

Field physio-chemical water quality results are shown in Table 2. Electrical conductivity (EC) was within ANZG DTVs for both Eastern Creek sites and all Angus creek sites excluding AE6 which scored just marginally outside the DTV's. EC was much higher at the Angus creek sites (all > 1100  $\mu\text{S}/\text{cm}$ ) compared to

Eastern creek which did not exceed 600  $\mu\text{S}/\text{cm}$ . Sites within Eastern Creek had consistent EC ranging from 527-529  $\mu\text{S}/\text{cm}$ . Turbidity was low at all sites, Although Eastern creek sites showed higher readings in comparison to Angus creek. Dissolved oxygen was below DTVs for all sites; however, this is common for small Western Sydney streams. The pH was within the DTVs at both Eastern creek sites and all Angus creek sites excluding AE6. At Angus creek, alkalinity at 3 of the sites remained quite consistent (between 200-240  $\text{CaCO}_3/\text{L}$ ), site AE6 was a slight anomaly exceeding 300  $\text{CaCO}_3/\text{L}$ . Eastern creek had an alkalinity score of 90  $\text{CaCO}_3/\text{L}$  at both sites.

**Table 2: Field physio chemical water quality results**

Site	Stream	Temp (C°)	Conductivity ( $\mu\text{S}/\text{cm}$ )	Turbidity (NTU)	Dissolved Oxygen (% sat)	Dissolved Oxygen (mg/L)	pH*	Alkalinity (mg $\text{CaCO}_3/\text{L}$ )
AE1	Angus Creek	10.68	1551	2.3	<b>27.1</b>	2.89	7.69	220
AE2	Angus Creek	10.38	1225	3.3	<b>50.4</b>	5.48	7.82	240
AE3	Angus Creek	10.52	1177	1.8	<b>34.3</b>	3.62	7.78	200
AE4	Eastern Creek	10.01	529	17.6	<b>77.3</b>	8.71	7.84	90
AE5	Eastern Creek	9.99	527	19.4	<b>78.2</b>	8.82	7.7	90
AE6	Angus Creek	10.36	<b>2225</b>	3.9	<b>61.3</b>	6.78	<b>8.13</b>	340

ANZG default trigger values (DTV) for lowland streams: Electrical conductivity (125-2200  $\mu\text{S}/\text{cm}$ ), Turbidity (6-50 NTU), pH (6.5-8), Dissolved Oxygen (80-110%). Text in bold indicate those variables that exceed the default trigger values.

### 3.3.2 Nutrients

Total Phosphorus and Nitrogen Oxides were above ANZG DTVs for lowland streams for all Angus Creek and Eastern Creek sites. Total Nitrogen was below the DTV for the Eastern creek sites as well as for two of the four Angus creek sites. The two sites in exceedance of TN DTV's were only marginally above the accepted range.

**Table 3: Nutrients - laboratory results**

Site	Stream	Total Phosphorous (TP) (mg/L)	Total Nitrogen TN (TKN + NOx) (mg/L)	Nitrogen Oxides (NOx) (mg/L)	Total Kjeldahl Nitrogen (TKN) (mg/L)
AE1	Angus Creek	<b>0.10</b>	<b>0.6</b>	<b>0.10</b>	0.5
AE2	Angus Creek	<b>0.06</b>	0.4	<b>0.12</b>	0.3
AE3	Angus Creek	<b>0.05</b>	0.4	<b>0.09</b>	0.3
AE4	Eastern Creek	0.04	0.4	<b>0.12</b>	0.3
AE5	Eastern Creek	<b>0.05</b>	0.4	<b>0.12</b>	0.3
AE6*	Angus Creek	<b>0.06</b>	<b>0.6</b>	<b>0.07</b>	0.5

ANZG default trigger values (DTV) for lowland streams: TP (0.05 mg/L), TN (0.5 mg/L), NOx (0.02 mg/L). Text in bold indicate those variables that exceed the default trigger values.

## 4. Discussion and conclusion

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All sites showed an increase in Electro Conductivity between the summer and winter samples. Angus creek sites nearly doubling summer EC scores. Despite this, all but one site (AE6) remained within ANZG DTV's. Turbidity was overall very low in Angus creek, parallel to summer results. Although higher than Angus creek, Eastern creek showed significant improvements with Turbidity comfortably within ANZG DTV's. All sites exhibited relatively poor dissolved oxygen results although this is typical of disturbed urban sites. All sites excluding AE6 (Angus creek) had a pH reading within the ANZG DTVs. While Nutrients values still frequently exceeded DTV's the overall trend showed improvement. Total Nitrogen scores were more frequently within DTV's than outside. Exceedance in nutrient parameters have been routinely observed over the monitoring program. Although exceedance in both upstream and downstream sites in Angus and Eastern creeks (Niche 2022 Winter) indicates that Holcim RDC is not affecting the receiving environment. This is epitomised by site AE6 (Angus Ck upstream) which performed the worst of all sites. exceedance in water quality or poor environmental conditions observed are the result of existing catchment disturbances unrelated to the site.



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## Annex 1- Visual observations – August 2023

### AE1: Angus Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE1 UPSTREAM
Riparian	Vegetation	The dominant tree species comprised Swamp Oak ( <i>Casuarina glauca</i> ) and Broad-leaf Privet ( <i>Ligustrum lucidum</i> ). Groundcover was dominated by <i>Tradescantia fluminensis</i> .
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	3 m
	Bank condition	Slightly vegetated banks and stable. Slight erosion of lower bank.
	Substrate	Fine sediment; silt. Hardened clay bottom.
	Flow/depth	Moderate flow/ ~1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Clear water
Comments		Weeds and rubbish present. Lack of organic material in channel.

## AE2: Angus Creek



A: Upstream



B: Downstream

	Attribute	AE2 DOWNSTREAM
Riparian	Vegetation	Dominant tree species included ( <i>C. glauca</i> ). Dominant groundcover was <i>T. fluminensis</i> and mixture of exotic and native grasses and herbs.
	Stream shading	Moderate shading
	Exotic vegetation	<i>T. fluminensis</i> and other groundcover species.
Stream characteristics	Modal width	2 m
	Bank Condition	Slightly unstable and heavily vegetated by groundcover
	Substrate	Silt and bedrock
	Flow/depth	Moderate flow/<1 m
	Macrophytes/algae	Emergent macrophytes present – Bulrush ( <i>Typha</i> sp.), <i>Cyprus</i> sp. <i>Potamogeton crispus</i>
	Water quality observations	Clear water
Comments		Weeds and rubbish. Metallic rubbish in system. Concrete rubble in system.



## AE3: Angus Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE3 DOWNSTREAM
Riparian	Vegetation	Dominant tree species was <i>C. glauca</i> ). Dominant grass/herb species was Wandering Jew ( <i>T. fluminensis</i> )
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. Lucidum</i> , <i>T. fluminensis</i>
Stream characteristics	Modal width	4 m
	Bank Condition	Stable, steep, exposed in sections, slight visible erosion.
	Substrate	Fine sediment, organic matter on banks
	Flow/depth	Low flow/~1 metre
	Macrophytes/algae	Ribbon Weed ( <i>Vallisneria</i> sp.)
	Water quality observations	Visually water appeared slightly opaque (but within DTVs)
Comments		Significant amount of plastic based rubbish in stream

## AE4: Eastern Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE4 DOWNSTREAM
Riparian	Vegetation	Dominant canopy species included <i>C. glauca</i> ) and Prickly-leaved Tea Tree ( <i>Melaleuca styphelioides</i> ). Dominant mid-storey species were <i>C. glauca</i> <i>L. lucidum</i> ). Dominant groundcover was the exotic <i>T. fluminensis</i>
	Stream shading	Moderate
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	8 m
	Bank condition	Unstable banks
	Substrate	Fine sediment
	Flow/depth	Moderate flow/>1m
	Macrophytes/algae	Macrophytes not present
	Water quality observations	Visually Turbid (Although within DTV's)
Comments		



## AE 5: Eastern Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was <i>Lomandra</i> ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	12 m
	Bank condition	Unstable
	Substrate	Fine sediment and large woody debris.
	Flow/depth	Moderate flow/ >1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Visually turbid (although with DTV's)
Comments		Lots of large woody debris and plastic based rubbish



AE 6: Angus creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was Lomandra ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	12 m
	Bank condition	Unstable
	Substrate	Fine sediment and large woody debris.
	Flow/depth	Moderate flow/ >1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Clear
Comments		Lots of large woody debris and plastic based rubbish

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## Holcim Regional Distribution Centre Rooty Hill NSW

Aquatic Ecology Monitoring: Spring 2023

Prepared for Holcim Australia Pty Ltd | 21 November 2023





## Document control

Project number	Client	Project manager	LGA
7971	Holcim Australia Pty Ltd	David Wilkinson	Hills Shire

Version	Author	Review	Status	Date
D0	David Wilkinson	Luke Stone	Draft	21/11/2023
R0	David Wilkinson		Review	21/11/2023

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## 1. Introduction

---

### 1.1 Background

This document presents the results of the visual and stream health assessment of Angus Creek and Eastern Creek, undertaken as part of the Holcim Regional Distribution Centre (RDC) (the Project) aquatic ecology monitoring program (hereafter referred to as the monitoring program). The monitoring program, including quarterly visual monitoring, bi-annual aquatic survey, and reporting, is required under condition 2.28 of the Project approval.

The aim of the monitoring program is to compare sites downstream of the RDC to upstream sites and determine whether the RDC is affecting stream health in receiving waterways, adjacent to or downstream of the Project.

This report presents the results of bi-annual aquatic macroinvertebrate monitoring undertaken on 27th September in spring 2023. Aquatic ecology monitoring and visual monitoring of stream condition was conducted at six sites: four sites on Angus Creek and two sites on Eastern Creek.



## 2. Methods

### 1.1 Location of sampling sites

A total of six sites were sampled on Angus Creek and Eastern Creek (Figure 1, Table 1). Four sites were located on Angus Creek (two upstream and two downstream of the Project) and two sites were located on Eastern Creek (one upstream and one downstream of the Project).

**Table 1: Survey sites**

Site name	Location	Site status	Latitude	Longitude
AE1	Angus Creek upstream near property boundary	Upstream control site	-33.76798576	150.8516665
AE2	Angus Creek downstream –near property boundary in Nurragingy Reserve.	Potential downstream impact site	-33.76563506	150.854665
AE3	Angus Creek upstream of Eastern Creek confluence in Nurragingy Reserve.	Potential downstream impact site	-33.76496807	150.8554235
AE4	Eastern Creek downstream of Angus Creek in Nurragingy Reserve	Potential downstream impact site	-33.76419362	150.8576059
AE5	Eastern Creek upstream of Angus Creek in Nurragingy Reserve	Upstream control site	-33.76411307	150.8570044
AE6	Angus Creek upstream above railway	Upstream control site	-33.77017801	150.8499068

**Figure 1: Location of sites**

## 1.2 Field methods

The field survey was undertaken on 27<sup>th</sup> of September 2023 by Aquatic Ecologist David Wilkinson and Graduate Aquatic Ecologist Alan Davies of Niche Environment and Heritage. The field methods were consistent with standardised techniques for field sampling as prescribed by AUSRIVAS (Turak *et al.* 2000). The AUSRIVAS method of sampling both pools and riffles were modified for this program, as no suitable in-stream riffle features were present.

### 2.1.1 Visual assessment

A description of aquatic habitat was also produced using the NSW AUSRIVAS proforma field recording form. The survey is a rapid visual assessment used to describe the habitat based on the following parameters:

- Geomorphology
- Channel diversity
- Bank stability
- Riparian vegetation and adjacent land use
- Water quality
- Macrophytes
- Local impacts and land use practices.

### 2.1.2 Water quality

#### ***Physico-chemical field measurements***

Surface water quality was measured in situ using a Yeokal 618 water quality probe at each site. The following variables were recorded:

- Temperature (°C)
- Conductivity (µS/cm)
- pH
- Dissolved oxygen (DO % saturation and mg/L)
- Turbidity (NTU).

Alkalinity (mg CaCO<sub>3</sub>/L) was measured with a standard field titration kit.

Water quality data were compared with the ANZG (2018) default trigger values (DTVs) of physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia.

#### ***Water sampling***

Water samples were taken at each location and sent to the NATA accredited ALS laboratories to test for Total Phosphorus (TP), Total Nitrogen (TN), Nitrogen Oxides (NO<sub>x</sub>), and Total Kjeldahl Nitrogen (TKN). The results were compared with ANZG (2018) DTVs for TP, TN and NO<sub>x</sub>.

Physicochemical water quality results are provided in the reports associated with each round of monitoring. A collated list of all physicochemical water quality results recorded as part of the program at the time of reporting can be found in the Winter 2022 Visual Monitoring Report, dated 28 July 2022 (Niche 2022).

### 2.1.3 Macroinvertebrates

Samples were collected from pool edges for a length of 10 metres, either as a continuous line or in disconnected segments. Sampling in segments was undertaken to ensure the sub-habitats such as

macrophyte beds, bank overhangs, submerged branches and root mats were appropriately sampled. Segmented sampling was also employed where pool length was short, and it was logistically difficult to sample in a continuous line (e.g. in-stream logs). A 250 µm dip net was drawn through the water with short sweeps towards the bank to dislodge benthic fauna while scraping submerged rocks and debris, sides of the stream bank and the bed substrate. Further sweeps in the water column targeted suspended fauna. Each sample was rinsed from the net onto a white sorting tray from which animals were picked using forceps, pipettes and or paint brushes. Each tray was picked for a minimum period of 40 minutes, after which they were picked at 10-minute intervals for either a total of one hour or until no new specimens had been found. Care was taken to collect cryptic and fast-moving animals, in addition to those that were conspicuous or slow. The macroinvertebrates collected at each site were placed into a labelled jar containing 70% ethanol.

### **Laboratory methods-invertebrate identification**

Macroinvertebrate samples were identified to family level with the exception of Oligochaeta (to class), Polychaeta (to class), Ostracoda (to subclass), Nematoda (to phylum), Nemertea (to phylum), Acarina (to order) and Chironomidae (to subfamily). Keys used to identify fauna included:

- Dean, J., Rosalind, M., St Clair, M., and Cartwright, D. (2004) Identification keys to Australian families and genera of caddis-fly larvae (Trichoptera). Cooperative Research Centre for Freshwater Ecology.
- Gooderham, J. and Tsyrlin, E. (2002) The Waterbug Book: A guide to the Freshwater Macroinvertebrates of Temperate Australia. CSIRO Publishing.
- Hawking and Theischinger (1999) A guide to the identification of larvae of Australian families and to the identification of ecology of larvae from NSW. Cooperative Research Centre for Freshwater Ecology. Albury NSW.
- Madden, C. (2010) Key to genera of Australian Chironomidae. Museum Victoria Science Reports 12, 1-31.
- Madden, C. (2011) Draft identification key to families of Diptera larvae of Australian inland waters. La Trobe University.
- Smith, B. (1996) Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters. Murray Darling Freshwater Research Centre.
- Online resource - <http://www.mdfrc.org.au/bugguide/>.

## **2.2 Data analysis**

### **2.2.1 SIGNAL2 (Stream Invertebrate Grade Number Average Level) scores**

The revised SIGNAL2 biotic index developed by Chessman (2003a, 2003b) was used to determine the “environmental quality” of sites. This method assigns grade numbers to each macroinvertebrate family or taxa found, based largely on their response to a range of environmental conditions (Table 2). The sum of all grade numbers for that habitat is then divided by the total number of families recorded in each habitat to calculate the SIGNAL2 index. A weighted SIGNAL2 score was also calculated (see Chessman 2003b). The SIGNAL2 index therefore uses the average sensitivity of macroinvertebrate families to present a snapshot of biotic integrity at a site. Table 3 provides a broad guide for interpreting the health of the site according to the SIGNAL2 score of the site.

**Table 2: SIGNAL 2 grade and the level of pollution tolerance for individual taxa**

SIGNAL2 grade (individual taxa)	Pollution tolerance
10-8	Indicates a greater sensitivity to pollution
7-5	Indicates a sensitivity to pollution

SIGNAL2 grade (individual taxa)	Pollution tolerance
4-3	Indicates a tolerance to pollution
2-1	Indicates a greater tolerance to pollution

**Table 3: Guide to interpreting the SIGNAL2 scores for sites**

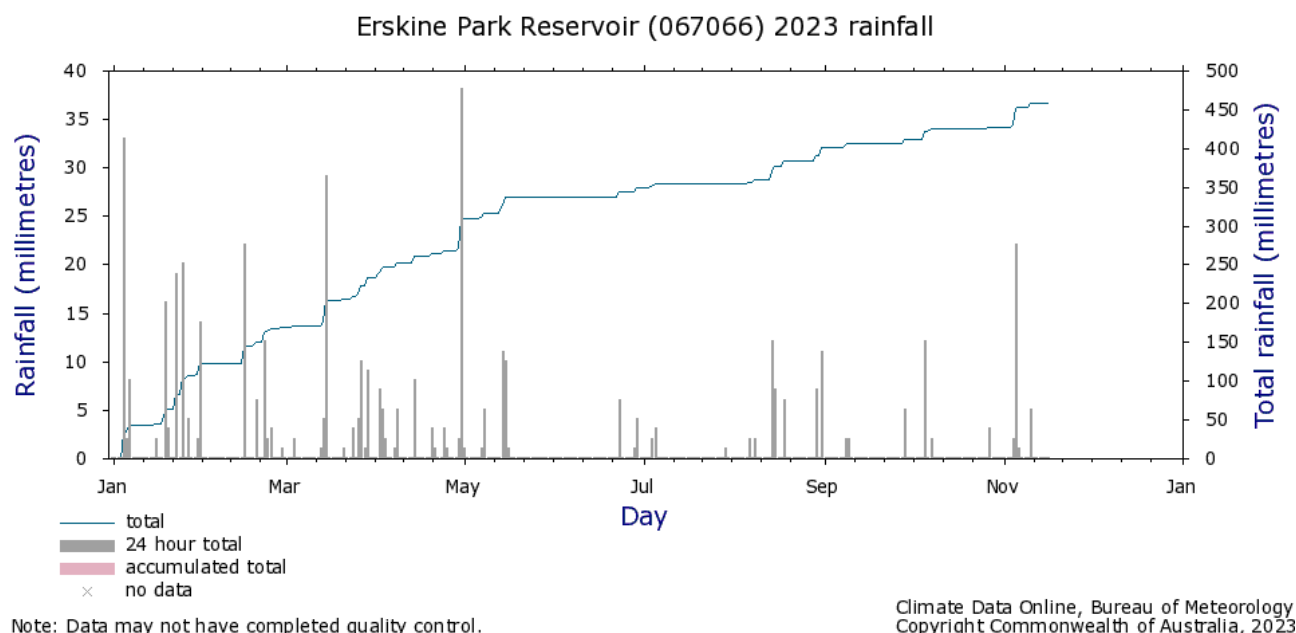
SIGNAL2 score	Habitat quality
Greater than 6	Healthy habitat
Between 5 and 6	Mild pollution
Between 4 and 5	Moderate pollution
Less than 4	Severe pollution

\*Note that SIGNAL2 scores are indicative only and that pollution does not refer to just anthropogenic pollution. Environmental stress may result in poor water quality occurring naturally in waterways. Low family richness and the occurrence of pollution tolerant invertebrates can give a low SIGNAL2 score even when they are in natural condition.

### 3. Results

#### 1.1 Rainfall

Sampling was conducted on 27<sup>th</sup> of September 2023. Antecedent rainfall since the start of the month was 4 millimetres (mm) (Figure 2). There was 0 millimetres of rainfall in the 10 days prior to sampling, and no rainfall on the day of sampling.



**Figure 2: Rainfall January to November 2023.**

#### 3.1 Visual observations

Results of the visual survey including photographs of each site are provided in Annex 1. The water level at the time of spring 2023 sampling was low with no visible flow, besides sites AE6 where slow flows were observed. The water level in Eastern Creek was lower than in recent (2022) surveys.

Overall, the streams were visibly in moderate condition for urban waterways within the locality. The upper banks of Angus Creek remain heavily vegetated with dense ground cover vegetation, including native riparian species. The lower steep banks above the water level are continuing to suffer from erosion events. Some sections of site AE1 and AE2 have the beginning of undercutting of the bank (both upper and lower bank). Eastern Creek sites AE4 and AE5 continue to have very little organic matter on the edges of the creek which has been previously observed (Niche 2022 and Niche 2023). The upper banks of AE4 and AE5 have regained some stability after drying with lower rainfall events during 2023. However, the lower banks that are now exposed due to the reduced water levels are suffering from instability and erosion. The riparian ground cover of sites AE4 and AE5 has begun to regrow. All sites continue to have large amounts of plastic-based litter present in the systems, observed within the water and on the banks.

The water was observed to be clear in all Angus Creek sites. The opaqueness that has been previously overserved (Niche 2019, Niche 2023) at some of these sites was not observed during this round of monitoring. Both Eastern Creek sites appeared visually turbid (Annex 1).



## 3.2 Water quality

### 3.2.1 Physico-chemical

Field collected physicochemical water quality results are shown in Table 4. The key findings include:

- Electrical conductivity (EC) readings were elevated at all sites, however they were within ANZG DTVs for all sites except for AE6 which exceeded DTVs. Sites within Angus Creek had higher EC than those along Eastern Creek, with EC levels ranging from 551-3750  $\mu\text{S}/\text{cm}$ .
  - Site AE6 (upstream control) recorded the highest EC levels (3750  $\mu\text{S}/\text{cm}$ ), which exceeded ANZG DTV's and is approximately five times the levels recorded at the other sites.
  - The potential downstream impact sites were all within ANZG DTV's for EC.
  - Sites within Eastern Creek had consistent EC levels ranging 528-533  $\mu\text{S}/\text{cm}$ . Suggesting no significant influence of Angus Creek on the EC levels at the confluence of Eastern Creek.
- Turbidity levels were within ANZG DTVs at all sites, except for the Eastern Creek site AE5 (upstream control), which recorded a reading of 61.8 NTU.
- Dissolved oxygen levels were below DTVs for all sites; however, this is common for small streams in Western Sydney.
  - The readings collected at the potential downstream impact sites were comparable to those at the upstream controls.
- The pH readings were within the DTVs at all Angus Creek sites and Eastern Creek sites. These readings were comparable between the potential downstream impact sites and the control sites.
- Alkalinity was higher at the Angus Creek sites than Eastern Creek sites, although alkalinity levels between the potential impact sites and the control sites were comparable.
  - Angus Creek alkalinity was elevated upstream, and lowering downstream, ranging between 180-300  $\text{CaCO}_3/\text{L}$ , with AE6 recording the highest reading. As has been previously recorded.
  - Eastern Creek sites also recorded elevated, but relatively consistent alkalinity levels when compared to previous years, ranging from 100-140  $\text{CaCO}_3/\text{L}$ , with AE5 having the highest.

**Table 4: Field physio chemical water quality results**

Site	Stream	Temp (C°)	Electrical conductivity ( $\mu\text{S}/\text{cm}$ )	Turbidity (NTU)	Dissolved Oxygen (% sat)	pH*	Alkalinity (mg $\text{CaCO}_3/\text{L}$ )
AE1	Angus Creek	14.81	723	27.1	<b>5.4</b>	7.51	180
AE2*	Angus Creek	15.18	551	4.8	<b>16.2</b>	7.41	200
AE3*	Angus Creek	14.81	668	20.3	<b>24.8</b>	7.72	240
AE4*	Eastern Creek	15.22	533	44.9	<b>69.5</b>	7.26	100
AE5	Eastern Creek	15.30	528	<b>61.8</b>	<b>76.1</b>	7.30	140
AE6	Angus Creek	16.40	<b>3750</b>	20.3	<b>54.4</b>	7.77	>300

ANZG default trigger values (DTV's) for lowland streams: Electrical conductivity (125-2200  $\mu\text{S}/\text{cm}$ ), Turbidity (6-50 NTU), pH (6.5-8), Dissolved Oxygen (80-110%).

Text in bold indicate those variables that exceed the default trigger values.

\*Potential downstream impact site

### 3.2.2 Nutrients

Total Phosphorus, Total Nitrogen and Nitrogen Oxides levels were above the ANZG DTVs for lowland streams for all Angus Creek and Eastern Creek sites (Table 5). The exceptions to this were Total Nitrogen at sites AE2 and AE3 (potential downstream impact sites), as well as Nitrogen Oxides at sites AE1 (upstream control) and AE2 (potential downstream impact).

The total Phosphorus and Nitrogen readings were lower (or comparable) at the potential downstream impact sites when compared to the upstream controls.

**Table 5: Nutrients - laboratory results**

Site	Stream	Total Phosphorous (TP) (mg/L)	Total Nitrogen TN (TKN + NOx) (mg/L)	Nitrogen Oxides (NOx) (mg/L)	Total Kjeldahl Nitrogen (TKN) (mg/L)
AE1	Angus Creek	<b>0.78</b>	<b>1.7</b>	<0.01	1.7
AE2*	Angus Creek	<b>0.06</b>	0.4	<0.01	0.4
AE3*	Angus Creek	<b>0.07</b>	0.4	<b>0.02</b>	0.4
AE4*	Eastern Creek	<b>0.12</b>	<b>0.8</b>	<b>0.10</b>	0.7
AE5	Eastern Creek	<b>0.12</b>	<b>0.9</b>	<b>0.11</b>	0.8
AE6	Angus Creek	<b>0.11</b>	<b>0.8</b>	<b>0.04</b>	0.8

ANZG default trigger values (DTV) for lowland streams: TP (0.05 mg/L), TN (0.5 mg/L), NOx (0.02 mg/L). Text in bold indicate those variables that exceed the default trigger values.

\*Potential downstream impact site

### 3.3 Macroinvertebrates and SIGNAL2 scores

Macroinvertebrate and SIGNAL2 stream health index results for the six sampled sites are provided in Table 6. Raw data is provided in Annex 2.

The number of taxa was low, ranging between 4-7, with the most taxa (7) observed in Angus Creek sites AE1 and AE3 and Eastern Creek site AE4. The least taxa (4) observed was in Eastern Creek site AE4 and Angus Creek site AE6. The SIGNAL2 scores indicate that all monitoring sites had a dominance of pollution-tolerant taxa, possibly indicating moderate to severe levels of pollution (Table 3). Angus Creek site AE3 and Eastern Creek site AE4 were the only sites to have sensitive macroinvertebrate families observed during this round of monitoring (*Acarina* – SIGNAL6). All sites, except for AE3 and AE5, had a higher SIGNAL2 scores than the previous macroinvertebrate sampling round in Autumn 2023 (Niche 2023). Site AE4 had the same score as the previous round of monitoring, and usually has lower overall scores than the other potential downstream impact sites. This is partly due to the limited habitat available at this site. Importantly, the stream health index results suggest that conditions at the potential downstream impact sites are comparable to those at the upstream controls.

**Table 6: Number of taxa and weighted SIGNAL2 scores: Spring 2023**

Site	Number of taxa	SIGNAL2 weighted scores
AE1	7	3.75
AE2*	6	3.08
AE3*	7	3.64
AE4*	7	2.33
AE5	4	2.40
AE6	4	3.22

\*Potential downstream impact site

The SIGNAL2 bi-plot (Figure 3), indicates that no sites have favourable habitat and all locations are exhibiting some form of pollution or natural stress. Control site AE1 (Angus Creek) recorded the highest SIGNAL2 score of any site from both creeks, but is still considered a low score. (Table 6). The results are observed to cluster together, suggesting relatively consistent conditions across the sites.

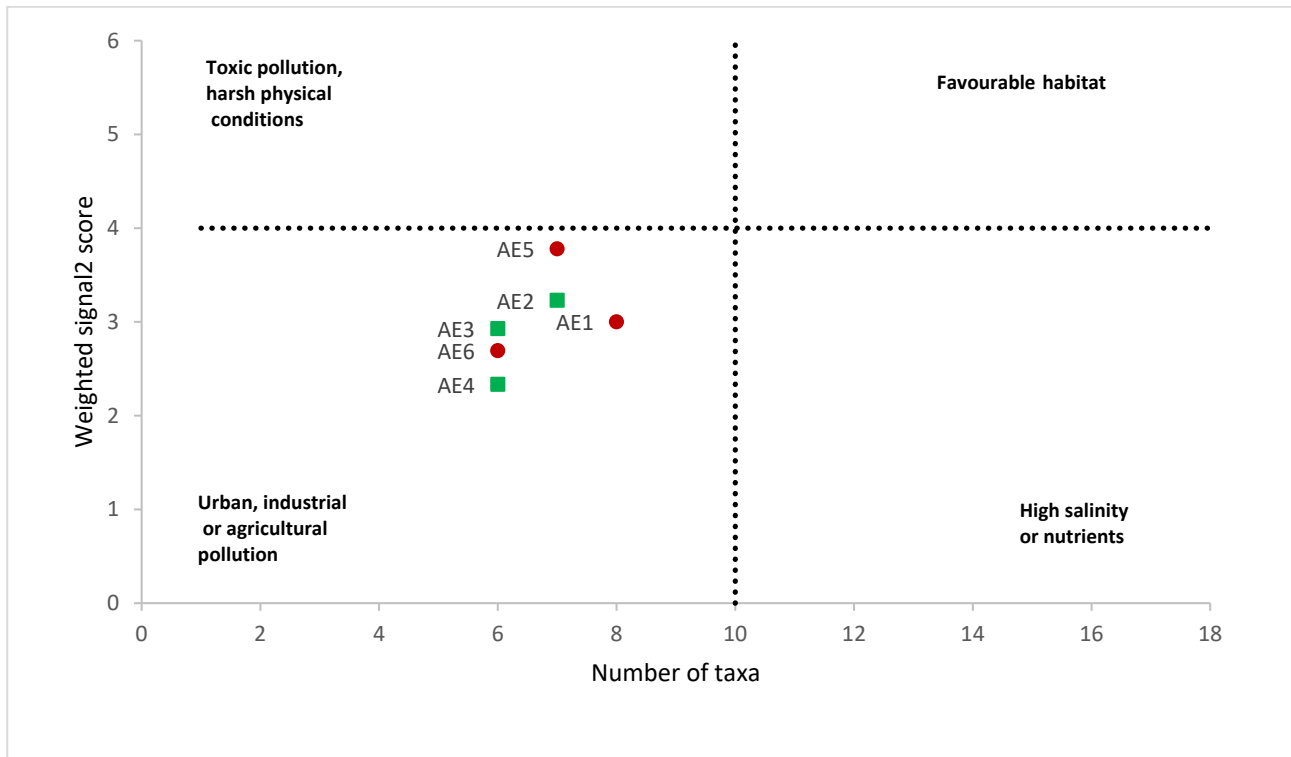


Figure 3: SIGNAL2 score and number of taxa bi-plot.

## 4. Discussion and conclusion

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All sites showed a decrease in electrical conductivity levels in Spring 2023 in comparison to the previous monitoring (winter 2023), with the exception of AE6 which recorded higher levels and both Eastern Creek sites which were comparable. AE6 was the only site to exceed electrical conductivity DTVs. Turbidity levels in Angus Creek were generally low, while Eastern Creek sites AE4 and AE5 had elevated turbidity levels, which has been observed on most monitoring occasions. Although, only site AE5 exceeded DTVs during this round of monitoring. All sites showed dissolved oxygen levels below ANZG DTVs, however that is to be expected of disturbed urban streams in the locality. All sites in Angus Creek and Eastern Creek had a pH reading within the ANZG DTVs. Additionally, all nutrients' analytes were above the ANZG DTVs for all six sites surveyed this monitoring period. The exceptions to this were for Total Nitrogen at sites AE2 and AE3, as well as Nitrogen Oxides at sites AE1 and AE2. The exceedance in nutrient parameters have been routinely observed over the monitoring program in both upstream and downstream sites in Angus and Eastern Creeks. Importantly, the water quality results as well as macroinvertebrate assemblages suggest that conditions at the potential downstream impact sites are comparable, or better, than those at the upstream controls in spring 2023. Therefore, the data indicates that Holcim RDC is not affecting the receiving environment and any exceedance in water quality or poor environmental conditions observed are the result of existing catchment disturbances unrelated to the site.

Low numbers of taxa were observed in spring 2023, across downstream and upstream sites. This pattern was also observed in the previous monitoring period (autumn 2023) (Niche 2023). Low SIGNAL2 scores (<4) were recorded at all sites and only one pollution sensitive macroinvertebrate taxa were found at the time of monitoring (*Acarina* – Signal 6 at AE3 and AE4). Considering the SIGNAL2 scores and the water quality results both upstream and downstream were similar, it is unlikely that the RDC is affecting stream ecology. Furthermore, there is a variety of upstream impacts and land use activities that are likely to affect stream health conditions in these waterways and, as such, the low scores observed are likely the result of a combination of natural and anthropogenic catchment stressors, which is common in disturbed Western Sydney streams.

Overall, the two streams appear to be in reasonable health for urban waterways. The physicochemical and ecological results do not suggest that the RDC is affecting the downstream aquatic environment.

## References

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- Turak E., Waddell N. and Johnstone G. (2000) NSW AUSRIVAS Sampling and Processing Manual. Department of Environment and Conservation.



Online resources:

<http://ausrivas.ewater.com.au/>

<http://www.mdfrc.org.au/bugguide/>

## Annex 1: Visual observations – September 2023

### AE1: Angus Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE1 UPSTREAM
Riparian	Vegetation	The dominant tree species comprised Swamp Oak ( <i>Casuarina glauca</i> ) and Broad-leaf Privet ( <i>Ligustrum lucidum</i> ). Groundcover was dominated by <i>T. fluminensis</i> .
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	3 m
	Bank condition	Slightly vegetated banks and stable. Slight erosion and undercutting of lower bank.
	Substrate	Fine sediment; silt. Hardened clay bottom.
	Flow/depth	Moderate flow/ <1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Clear water
Comments		Weeds and rubbish present.

## AE2: Angus Creek



A: Upstream



B: Downstream

	Attribute	AE2 DOWNSTREAM
Riparian	Vegetation	Dominant tree species included ( <i>C. glauca</i> ). Dominant groundcover was <i>T. fluminensis</i> and mixture of exotic and native grasses and herbs.
	Stream shading	Moderate shading
	Exotic vegetation	<i>T. fluminensis</i> and other groundcover species.
Stream characteristics	Modal width	2 m
	Bank Condition	Slightly unstable and heavily vegetated by groundcover
	Substrate	Silt and bedrock / concrete
	Flow/depth	Moderate flow/<1 m
	Macrophytes/algae	Emergent macrophytes present – Bulrush ( <i>Typha</i> sp.), <i>Cyprus</i> sp. <i>Potamogeton crispus</i>
	Water quality observations	Water was cloudy and opaque
Comments		Weeds and rubbish. Metallic rubbish in system. Concrete rubble in system.



## AE3: Angus Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE3 DOWNSTREAM
Riparian	Vegetation	Dominant tree species was <i>C. glauca</i> ). Dominant grass/herb species was <i>T. fluminensis</i>
	Stream shading	Moderate shading
	Exotic vegetation	<i>L. Lucidum</i> , <i>T. fluminensis</i>
Stream characteristics	Modal width	4 m
	Bank Condition	Stable, steep, exposed in sections, slight visible erosion.
	Substrate	Fine sediment, organic matter on banks
	Flow/depth	Low flow/<1 metre
	Macrophytes/algae	Ribbon Weed ( <i>Vallisneria</i> sp.)
	Water quality observations	
Comments		Dense organic matter in middle of pool.

## AE4: Eastern Creek Downstream



A: Upstream



B: Downstream

	Attribute	AE4 DOWNSTREAM
Riparian	Vegetation	Dominant canopy species included <i>C. glauca</i> ) and Prickly-leaved Tea Tree ( <i>Melaleuca styphelioides</i> ). Dominant mid-storey species were <i>C. glauca</i> <i>L. lucidum</i> ). Dominant groundcover was the exotic <i>T. fluminensis</i>
	Stream shading	Moderate
	Exotic vegetation	<i>L. lucidum</i> and <i>T. fluminensis</i>
Stream characteristics	Modal width	8 m
	Bank condition	Unstable banks
	Substrate	Fine sediment
	Flow/depth	Moderate flow/<1m
	Macrophytes/algae	Macrophytes not present
	Water quality observations	Visually very turbid
Comments		

## AE 5: Eastern Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was <i>Lomandra</i> ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	12 m
	Bank condition	Unstable
	Substrate	Fine sediment and large woody debris.
	Flow/depth	Moderate flow/ <1 m
	Macrophytes/algae	Macrophytes not present.
	Water quality observations	Visually very turbid
Comments		Lots of large woody debris and plastic based rubbish



## AE 6: Angus Creek Upstream



A: Upstream



B: Downstream

	Attribute	AE5 UPSTREAM
Riparian	Vegetation	Dominant overstorey species was <i>C. glauca</i> . Dominant grass/herb was <i>Lomandra</i> ( <i>Lomandra longifolia</i> ) and groundcover <i>T. fluminensis</i> .
	Stream shading	Moderate
	Exotic vegetation	<i>T. fluminensis</i>
Stream characteristics	Modal width	4 m
	Bank condition	Stable (Artificial)
	Substrate	Fine sediment and cobble
	Flow/depth	Moderate flow/ <1 m
	Macrophytes/algae	Macrophytes and algae
	Water quality observations	Clear
Comments		Major earthworks have been conducted at the upstream section of AE6. With large amounts of rock and a new footbridge having been built.

## Annex 2: Macroinvertebrate data – spring 2023

SITE	AE1	AE2	AE3	AE4	AE5	AE6
Glossophionidae		1	1	1		
Ancylidae			1			
Hydrobiidae	1	39	8	7		
Physidae	2	4	2			
Oligochaeta	1	4				1
Acarina			1	1		
Ostracoda	1			1		
Tanypodinae				1		
Orthoclaadiinae						1
Chironominae	1		16	9	7	52
Corixidae					5	
Coenagrionidae					1	
Isostictidae					1	
Megapodagrionidae	5	3				
Hemicorduliidae	2		8			
Ecnomidae						3
Sphaeriidae		1				
Tricladia				4		

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Community consultation  
Archaeological, built and landscape values

### Environmental management and approvals

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Development and activity approvals  
Rehabilitation  
Stakeholder consultation and facilitation  
Project management

### Environmental offsetting

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Accredited BAM assessors (NSW)  
Biodiversity Stewardship Site Agreements (NSW)  
Offset site establishment and management  
Offset brokerage  
Advanced Offset establishment (QLD)

## **Appendix 3 – Annual Works Report by Toolijooa Environmental Restoration**



# **Toolijooa Environmental Restoration**

## **Holcim Australia – Rooty Hill Distribution Centre**

Bushland Regeneration Report  
January 2023 – December 2023

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- 1. Summary of Works.....2
- 2. Works Mapping .....7
- 3. Recommendations .....8

## 1. Summary of Works

Zone	Type of Work	Weed Type	Work Description
<b>JANUARY 2023</b>			
<b>1a</b>	Maintenance	Vine	<ul style="list-style-type: none"> <li>Exotic vines were stem treated/skirted along the eastern fence line, to inhibit further establishment and fruiting potential in the area. Specimens targeted included <i>Anredera cordifolia</i>, <i>Araujia sericifera</i>, <i>Passiflora edulis</i>, and <i>Passiflora suberosa</i>.</li> </ul>
		Woody	<ul style="list-style-type: none"> <li>Isolated <i>Senna pendula</i> seedlings were removed along the eastern fence line to inhibit further establishment in the area.</li> </ul>
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Vegetation throughout the top section of the depot, including main planting bed (adjacent to the front office), snake alley pathway, central sound wall + loader parking and workshop have been mowed/slashed/sprayed (using 1.5% Roundup Biactive®) to control exotic weed growth and seeding potential throughout the landscaped sections of the depot, as well as improved visual aesthetics and controlled trip hazards to staff and visitors.</li> <li>Re-slashed and sprayed vegetation adjacent to the Sydney Trains gate to improve access for Holcim personnel.</li> <li>Vegetation through the planting bed at the top of the access road, adjacent to the sales yard, was slashed to maintain vegetation levels in the area.</li> <li>Vegetation along the eastern drainage line has been slashed to control heights, especially surrounding the gangway for train personnel access. <b>NB:</b> Vegetation to be sprayed during next visit.</li> </ul>
<b>FEBRUARY 2023</b>			
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Vegetation throughout the top section and</li> </ul>

Zone	Type of Work	Weed Type	Work Description
			lower sections of the depot, including main planting bed (adjacent to the front office), snake alley, central sound wall + loader parking, concrete plant pathway, M7 corner, opposite rail boom gates and planting bed at the top of the access road, have been mowed/slashed to control exotic weed growth and seeding potential throughout the landscaped sections of the depot, as well as improved visual aesthetics and controlled trip hazards to staff and visitors.
<b>MARCH 2023</b>			
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Vegetation throughout the top and lower sections of the depot, including road edges, loader parking and central soundwall, snake alley, concrete plant paths and buildings, electrical buildings, conveyer belt and M7 western corner, were all spot sprayed (using 2% Roundup Biactive®) to control weed growth and density.</li> </ul>
<b>APRIL 2023</b>			
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Vegetation throughout the top section of the depot, including road edges, snake alley, were mowed/slashed/spot sprayed (using 0.5% Starane Advance®) to control weed growth, density and seeding potential.</li> <li>Pockets of <i>Chloris gayana</i> were slashed to control seed development and will be treated in future visits.</li> </ul>
<b>1</b>	Maintenance	Vine	<ul style="list-style-type: none"> <li>Seeding vines were bagged. Vines not in seed were hung off the ground in trees and shrubs, cut/scrape &amp; painted, or manually removed. Target species: <i>Araujia sericifera</i>, <i>Asparagus asparagoides</i>, and <i>Passiflora suberosa</i>.</li> </ul>
		Woody	<ul style="list-style-type: none"> <li>Cut/scrape &amp; painted and hand weeded <i>Ligustrum lucidum</i>, <i>Ligustrum sinense</i>, and <i>Senna pendula</i> throughout.</li> </ul>

Zone	Type of Work	Weed Type	Work Description
<b>MAY 2023</b>			
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Grasses and herbaceous weeds were mown and brush cut around the front office, along snake alley, at the eastern end of the railway zone at the crossing and turning circle, and at the western end of the railway zone near the M7. The purpose of this was to control exotic weed growth and seeding potential, as well as improve visual aesthetics, control trip hazards and to reduce snake habitat.</li> </ul>
<b>JUNE 2023</b>			
<b>1</b>	Primary	Vine	<ul style="list-style-type: none"> <li>Cut/scrape and painted vines in the north eastern area of Zone 1, mainly <i>Araujia sericifera</i> and <i>Passiflora suberosa</i>.</li> </ul>
		Woody	<ul style="list-style-type: none"> <li>Woody weeds were cut/scrape and painted and piled onsite for habitat. Species targeted included: <i>Ligustrum lucidum</i>, <i>Ligustrum sinense</i>, and <i>Olea europaea</i> subsp. <i>cuspidata</i>.</li> </ul>
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Vegetation was brush cut next to the road heading towards the railway, along the western end of the road along the railway and around the eastern soundwall. The purpose of the brush cutting was to improve aesthetics and to reduce animal habitat around working areas.</li> </ul>
<b>JULY 2023</b>			
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Weeds were manually removed in the garden beds around the office. Species targeted included: <i>Conyza</i> sp., <i>Senecio madagascariensis</i>, and <i>Sonchus oleraceus</i>.</li> <li>All vegetation was sprayed around the office, car park, yard, sheds, road and path edges, sound wall, along the rails to the M7 and halfway to the end of the train line heading in the opposite direction. The purpose of the spraying was to improve</li> </ul>

Zone	Type of Work	Weed Type	Work Description
			aesthetics, mitigate fire hazards and reduce animal habitat in working areas. A solution of 2% Roundup Biactive was used.
AUGUST 2023			
Depot	Maintenance	Herbaceous	<ul style="list-style-type: none"><li>Part of the open grass area to the east of the office was brush cut.</li><li>Vegetation in the eastern and central areas of the rails was sprayed.</li><li>The sound wall to the east of the office was sprayed.</li><li>The area around the office block was sprayed.</li></ul>
		Woody	<ul style="list-style-type: none"><li><i>Casuarina</i> were cut and painted and brush cut in the open grass area between the office and the sound wall. All <i>Casuarina</i> were piled and left to decompose.</li></ul>
OCTOBER 2023			
Depot	Maintenance	Herbaceous	<ul style="list-style-type: none"><li>Slashing was undertaken at Snake Alley, the central soundwall, and the Graveyard.</li><li>The area around the office was mown and the plants growing over the footpath were pruned.</li><li>Weeds in the area around the office, stockpiles, concrete loading zone, snake alley and the top of the conveyor belt were sprayed with 20L of 2% Glyphosate with Pulse.</li><li>Weeds behind the stockpile were sprayed with 20L of 2% Glyphosate with Pulse and 1 gram of Associate.</li><li>The purpose of the spraying and slashing was to improve aesthetics, mitigate fire hazards and reduce animal habitat in working areas. Weeds targeted included: <i>Bidens pilosa</i>, <i>Cirsium vulgare</i>, <i>Conyza</i> sp., <i>Solanum sisymbriifolium</i>, and <i>Sonchus oleraceus</i></li></ul>

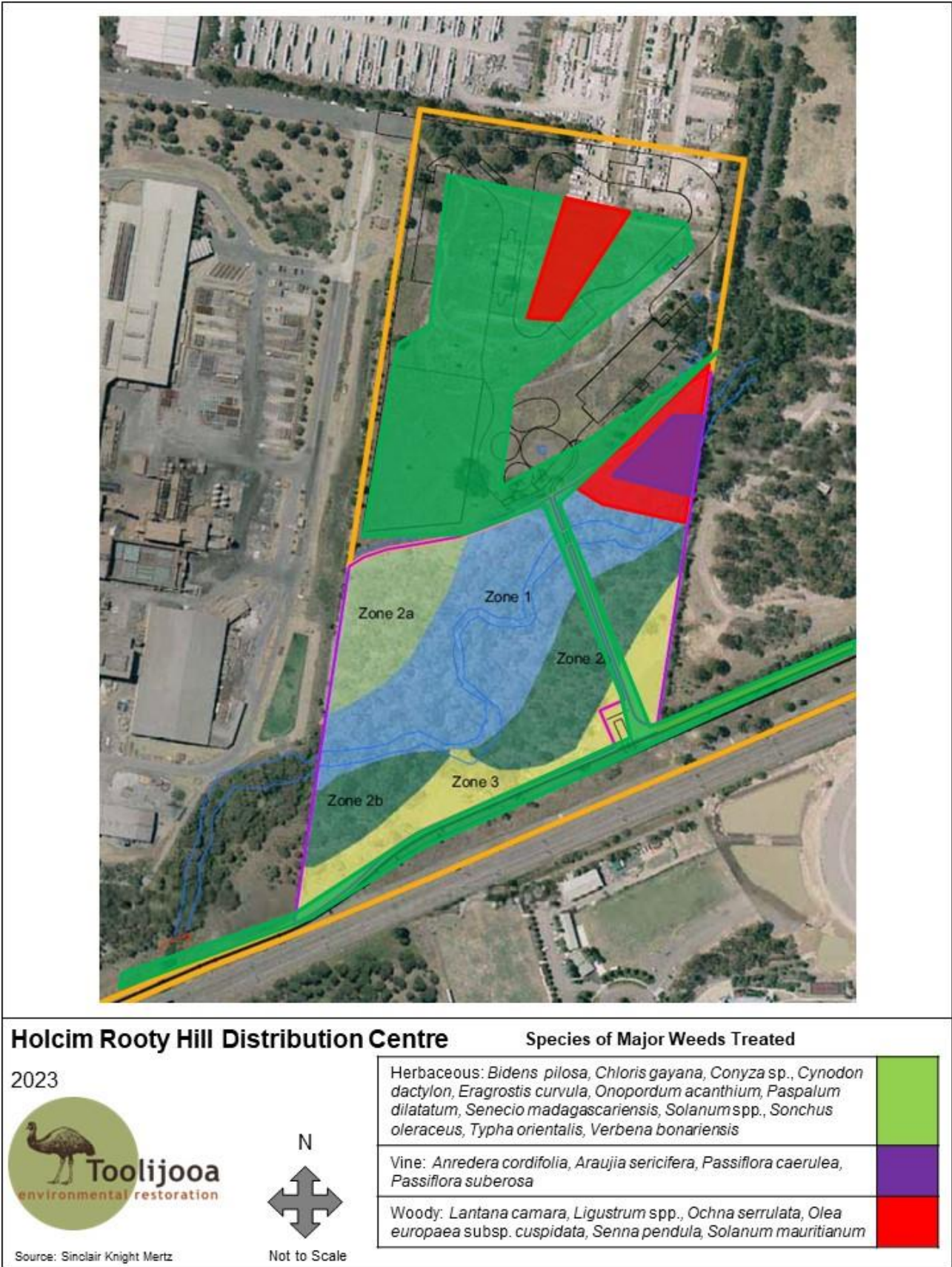
Zone	Type of Work	Weed Type	Work Description
		Woody	<ul style="list-style-type: none"> <li>Slashed and sprayed <i>Casuarina glauca</i>, <i>Lantana camara</i>, and <i>Morus alba</i>.</li> </ul>
<b>DECEMBER 2023</b>			
<b>Depot</b>	Maintenance	Herbaceous	<ul style="list-style-type: none"> <li>Slashing was undertaken at Snake Alley and the central soundwall to improve aesthetics, mitigate fire hazards, and reduce animal habitat in working areas.</li> <li>The area around the office was mown.</li> <li>Weeds in the area around the office, depot, loading zone, sound walls, beside the conveyor belt, snake alley and the road and path beside the rails heading east were sprayed with 90L of 2% Glyphosate.</li> <li>Weeds targeted included: <i>Bidens pilosa</i>, <i>Chloris gayana</i>, <i>Cirsium vulgare</i>, <i>Conyza</i> sp., <i>Solanum sisymbriifolium</i>, <i>Sonchus oleraceus</i>, and <i>Verbena bonariensis</i>.</li> </ul>

**Note:**

- All spraying utilised a 1% solution of 'Roundup Biactive®' unless stated otherwise.
- All cut/scrape and painting and drill and stem injecting was done using neat 'Roundup Biactive®'.



## 2. Works Mapping



### 3. Recommendations

#### Bushland

- Continue maintenance of previously revegetated areas and monitor for planting health.
- Push back vine and woody weeds throughout bushland zones.
- Continue to monitor health of *Grevillea juniperina* ssp. *juniperina* population

#### Landscape

- Continue maintenance as per current specification.
- Landscaping zones require constant brush cutting.

**Appendix 4:**  
**Independent Environmental Audit Action Plan - 2023**

Condition of consent	Requirement	Evidence collected	Independent audit findings and recommendations	Compliance status	Holcim's response
<b>DA 05_0051 as modified (March 2011 Modification and June 2017 Modification)</b>					
<b>1. ADMINISTRATIVE CONDITIONS</b>					
	<p>Terms of approval</p> <p>The Proponent must carry out the project generally in accordance with the:</p> <p>a) Project Application 05_0051;</p> <p>b) Environmental Assessment Report for the Proposed Regional Distribution Centre, Rooty Hill, volumes 1-3, prepared by National Environmental Consulting Services, dated October 2005;</p> <p>c) Response to Issues Raised in Submissions to EAR, prepared by National Environmental Consulting Services, dated February 2006;</p> <p>d) the final Statement of Commitments, submitted by the Proponent to the Department on 17 March 2006; and</p> <p>1.1 e) the Environmental Assessment Report - Proposed Minor Modification to Holcim Regional Distribution Centre (RDC), Rooty Hill, NSW prepared by Umwelt (Australia) Pty Limited, dated October 2010, including the Response to Submissions for Proposed Minor Modification to Holcim Regional Distribution Centre (RDC), Rooty Hill, NSW, dated 9 December 2010, and the March 2011 Modification Statement of Commitments shown in Attachment 2;</p> <p>f) the Environmental Assessment Report - Rooty Hill Regional Distribution Centre Minor Modification, prepared by Umwelt (Australia) Pty Limited and dated February 2017; including the Response to Submissions for Proposed Minor Modifications to Holcim Regional Distribution Centre (RDC), Rooty Hill, NSW, dated 16 May 2017; and</p> <p>f) the conditions of this approval.</p> <p>Note: The general layout of the project is shown in Attachment 3.</p>	<p>Major Projects Application DA 05_0051 (DA 05_0051), as modified, and associated assessments.</p> <p>Modification Application DA 05_0051 MOD1 and the accompanying environmental assessment (EA) (2011).</p> <p>Modification Application DA 05_0051 MOD2 and the accompanying EA (2017).</p> <p>Site inspection.</p> <p>Building Certificate for mobile CBP issued by Blacktown City Council on 8 November 2018.</p> <p>Construction Certificate C.C. No: 20190116 issued by Essential Certifiers on 08/11/2018 for the construction of the permanent CBP.</p> <p>DPIE correspondence regarding temporary and mobile, as well as permanent, CBP dated 25 June 2018, 16 July 2018, 4 September 2018, 1 November 2018 and Holcim's responses to each.</p> <p>RHDC IEA 2018.</p>	<p>RHDC IEA 2018 identified that the CBP and the aggregate storage areas are substantially different from the approved facilities.</p> <p>A key issue has been the construction and operation of a temporary mobile CBP, which was inconsistent with approval documentation (refer to Section 5.2.2). Since then, Holcim and DPIE have liaised regarding this matter and Holcim has attempted to rectify this issue.</p> <p>• Holcim obtained a Building Certificate for the operation of a mobile/temporary CBP issued by Blacktown City Council on 8 November 2018, as per DPIE's instructions.</p> <p>• Subsequently, a Construction Certificate was issued for the permanent CBP on 8 November 2018, after which the permanent CBP was constructed and commissioned.</p> <p>• The issue of a Construction Certificate is taken to have resolved the issue of the previously reported difference between the consent drawings and the proposed layout of the CBP, however, an Occupation Certificate has not been sighted during this audit.</p> <p>Aggregate storage areas remain unchanged from the last audit, and it is not clear whether this issue has been resolved.</p> <p>Recommendation:</p> <p>1. Actions are taken to ensure that material storage and handling facilities are constructed and operated as approved. This could be through:</p> <p>– amending existing site components and layout to comply with DA 05_0051 (as modified); and or</p> <p>– seeking advice from relevant regulatory agencies, including DPIE and EPA, on reconciling current operations and site infrastructure with Condition 1.1 of DA 05_0051 (as modified). The non-enclosure of the materials storage bins is the primary anomaly. This option may include the further modification of the Project Approval.</p> <p>2. Occupation Certificate must be obtained in order to operate the CBP and associated buildings.</p>	Non-compliant	<p>GIPA will need to be put in for document search for the Occupation Certificate.</p> <p>The recent modification for RHDC was approved under section 75 W of the E P and A Act 1979. The old section 3.3 A was repealed and replaced by section 4.55 and therefore cannot be replaced by section 75 W.</p>
	<p>The Proponent must comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:</p> <p>1.3 a) any reports, plans or correspondence that are submitted by the Proponent in accordance with this approval; and</p> <p>b) the implementation of any actions or measures contained in those reports, plans or correspondence submitted by the Proponent.</p>	<p>Discussion with Holcim's Environmental Representatives including Planning and Environment Coordinator NSW/ACT S. Shashi and Site Manager R. Flack (Holcim's audit team) during the audit period.</p> <p>DPIE correspondence regarding temporary/mobile and permanent CBPs dated 25 June 2018, 16 July 2018, 4 September 2018, 1 November 2018 and Holcim's responses to each.</p>	<p>Holcim's audit team confirmed that there were no site requirements relating to reports or plans from the Secretary's office that have been issued within the current audit period (29 November 2018 - 29 November 2021).</p> <p>Correspondence sighted between DPIE and Holcim regarding the temporary and mobile, as well as permanent, CBP noted requirements to obtain a Building Certificate from Blacktown City Council for the temporary and mobile CBP and a Construction and subsequent Occupation Certificate from a private certifier for the permanent CBP</p> <p>- A Building Certificate was issued for the mobile/temporary CBP by Blacktown City Council on 9 November 2018.</p> <p>- A Construction Certificate No. 20190116 was issued on 8 November 2018 by Essential Certifiers for the permanent CBP. However, no Occupation Certificate was sighted as noted in Condition 1.1.</p> <p>Recommendation: Refer to Condition 1.1.</p>	Non-compliant	<p>GIPA search to be conducted.</p>
	<p>Management Plans/Monitoring Programs</p> <p>With the approval of the Secretary, the Proponent may prepare and submit any management plan or monitoring program required by this approval on a progressive basis. Where a management plan or monitoring program is required before carrying out the project, or any stage of the project, the plans/ programs may be prepared and submitted in relation to either discrete components of the project or for a specified time period.</p> <p>1.8</p>	<p>RHDC Operational Environmental Management Plan 2015 (OEMP 2015).</p> <p>OEMP dated 2019 (OEMP 2019).</p> <p>RHDC OEMP dated October 2021 (OEMP 2021), which includes the following other management plans:</p> <ul style="list-style-type: none"><li>• General Site Management Plan;</li><li>• Noise Management Plan;</li><li>• Traffic Management Plan;</li><li>• Dust Management Plan;</li><li>• Soil and Water Management Plan;</li><li>• Energy Saving Management Plan;</li><li>•Vegetation Management Plan.</li></ul> <p>OEMP 2021 also includes the following Operational Monitoring Plan:</p> <ul style="list-style-type: none"><li>•Noise Monitoring Program;</li><li>•Transport Monitoring Program;</li><li>•Ambient Dust Monitoring Program;</li><li>•Aquatic Ecology and Water Quality Monitoring Program.</li></ul>	<p>See conditions relevant to management plans in regard to compliance relevant to preparation and submission of management plans.</p> <p>It is important to note that both OEMP 2019 and OEMP 2021 were provided during the audit period, however at different stages throughout the audit period, and therefore both have been considered for audit outcomes.</p> <p>It is our understanding that the latest OEMP 2021 was with DPIE for review/approval in accordance with conditions of consent, at the time of this audit. However, correspondence regarding this process has not been sighted during the audit and therefore cannot be verified.</p> <p>OEMP 2021 under the section 'Stakeholder Consultation' notes "During the review and revision of the 2015 OEMP, a draft OEMP was sent to DPIE for approval. Feedback on this Draft OEMP was received on 18 June 2021 and incorporated into this October 2021 OEMP as outlined in Appendix 9." Appendix 9 shows that DPIE comments were addressed. However, any correspondence regarding the OEMP submission or approval have not been verified.</p> <p>Recommendation: Refer to response for Condition 5.6.</p>	Non-compliant	<p>OEMP was approved in February 2022. All the correspondence with DPE was shared in the audit.</p>
	<p>Structural Adequacy</p> <p>The Proponent must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.</p> <p>Notes: Under Part 4A of the EP&amp;A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.</p> <p>Part 8 of the EP&amp;A Regulation sets out the requirements for the certification of the Project.</p> <p>1.13</p>	<p>Construction Certificate C.C. No: 20190116 issued by Essential Certifiers on 08/11/2018 for the construction of the concrete batching plant.</p> <p>Site observations.</p>	<p>Construction Certificate issued for the construction of a concrete batching plant, with the following architectural plans approved: 1) male-female ambulant toilet, 2) lunchroom plans, 3) control room floor plans, and 4) architectural plans.</p> <p>Site observations indicate that there is no reason to believe that the structural adequacy of the permanent CBP has not been constructed with the relevant requirements of the BCA.</p> <p>Occupational Certificate has not been sighted during the audit (refer to Condition 1.1).</p>	Non-compliant	<p>Please refer to comment above.</p>
<b>2. SPECIFIC ENVIRONMENTAL CONDITIONS</b>					
	<p>The Proponent must design, construct, commission, operate and maintain the project in a manner that minimises dust emissions from the site, as specified in paragraph of the final Statement of Commitments submitted by the Proponent to the Department on 17 March 2006, including:</p> <p>a) all dust control systems for transfer, load out and unloading points, as well as materials handling activities must be designed and operated to comply with a solid particles emission limit of 20 mgm-3 as required by Part 4 of the Protection of the Environment (Clean Air) Regulation 2002;</p> <p>b) all storage bins must be enclosed;</p> <p>c) water spray systems must be installed to service all stockpiles;</p> <p>d) all paved trafficable areas must be swept as required by a permanently stationed street sweeper to minimise dust.</p> <p>e) the application of Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA), where reasonable and practicable, to minimise dust impacts during construction and operation of the project.</p> <p>2.8</p>	<p>Site observations.</p>	<p>Site visit observations:</p> <p>(a) dust control systems in place, including rail unloading building and dust monitoring stations; (b) storage bins are not enclosed as identified and discussed in Condition 1.1;</p> <p>(c) water spray system operating over stockpiles;</p> <p>(d) street sweeper stationary during visit but trafficable areas generally free of loose material; and</p> <p>(e) regular operation of water cart for dust suppression and systems for 3% water addition to incoming raw materials observed.</p> <p>Recommendation: See Condition 1.1 (as relevant to bin enclosure).</p>	Non-compliant	<p>Bin enclosure review to be undertaken. Please see comment for section 1.1 (above)</p>



2.8A	The Proponent must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 2 at any residence on privately-owned land.	<p>INX register.</p> <p>No complaints.</p> <p>DPIE correspondence dated 28 August 2021 regarding RHDC (LEC No 10406 of 2006) .</p> <p>2020 Annual Review (prepared for 1 July 2018 - 31 December 2020).</p>	<p>Holcim operate two HVAS PM10 monitors for the site, which are shown in site photographs of the RHDC IEA 2021 report.</p> <p>The available monitoring reports did not cover the entire audit period (December 2017 - July 2018 and December 2020 to present). However, July 2018 - December 2020 were reported in the 2020 Annual Review.</p> <p>Air quality parameters were exceeded on a few occasions within the audit period:</p> <ul style="list-style-type: none"> <li>• 3 and 9 April 2018 as recorded in the INX register.</li> <li>• PM10 criteria was exceeded at HVAS 1 on six occasions in 2020, as per the correspondence with DPIE dated 23 August 2021.</li> <li>• DPIE noted that several air quality sampling events in 2019 were missed.</li> <li>• 2020 Annual Review notes that in 2019, the annual average PM10 at HVAS 1 was greater than the Project Approval criteria, and reported a non-compliance with this condition.</li> <li>• A few incidents of excessive dust were recorded in the INX register (6 September 2019, 17 October 2019), however no air quality or dust complaints were received during the audit period.</li> </ul> <p>Recommendations: Continue with best practice dust and air quality management on-site, and look into options to enclose product bin storage areas as conceptualised in the initial RHDC design. Refer to Condition 1.1 for further details.</p>	Non-compliant	New dust sentry device in place. All the missed sampling were informed to DPE due to covid closure. The site was not operational for a period of time. The location of one of the PM10 device was not correct. This was rectified via a proposal submission in 2019. OEMP got approved in February 2022. Last OEMP was in 2023
2.21A	<p>The number of on-site and truck parking spaces to be provided for the project must be in accordance with sections 5.4.3, 5.4.4 and 5.4.6 of the EAR as follows:</p> <p>a) truck parking: 50 spaces (truck and dog configuration);</p> <p>b) car parking: a total of 310 spaces on the project site and Humes site, as follows:</p> <p>i) project site: 121 spaces</p> <p>ii) Regional office and laboratory: 189 spaces, of which 84 are to be allocated to the project site staff and visitors and 105 are to be allocated to the staff and visitors to the existing Humes site;</p> <p>c) all car parking spaces must be marked/signposted in accordance with the above allocations. All visitor spaces must be located conveniently in relation to the various administrative offices on the site and must be clearly marked and signposted.</p> <p>d) all car and truck parking spaces must be sealed in a hardstanding material and drained in accordance with the approved stormwater management plan for the project;</p> <p>e) the design and dimensions of all truck and car parking spaces, together with all associated roads and maneuvering areas, must be in accordance with AS2890.2 (2002);</p> <p>f) a detailed car and truck parking plan, at a scale of 1:200, and incorporating the above requirements, must be submitted for the approval of the Secretary prior to the commencement of any works.</p>	Site observations.	<p>This condition has not been met at this stage, as construction of all approved components (eg laboratory) had not been completed on the date of the site audit on 17 November 2021. The status on the date of the site audit was:</p> <ul style="list-style-type: none"> <li>• there are approximately 14 delineated truck (and dog) parking spaces currently;</li> <li>• there are approximately 38 delineated car parking spaces provided adjacent the site office/administration (including 2 disabled);</li> <li>• all parking areas sealed and drained to the site stormwater system;</li> <li>• truck and vehicle turning and maneuvering areas appear to be constructed in accordance with the AS2890.2 (2002). Based on staff numbers and site observations, there are adequate light vehicles spaces on the site currently.</li> </ul> <p>It is understood that Holcim do not propose to develop the Regional office and laboratory site. Therefore the 189 spaces will not be required.</p> <p>Recommendation: The Project Approval should be modified to reflect the number of required parking sites in the absence of a laboratory facility being constructed on site.</p>	Non-compliant	Will consider this in new upcoming project for the site.
2.26	Immediately after completion of initial planting/seeding and every year thereafter for the duration of the maintenance period the Proponent must submit to the Department a monitoring report addressing the performance criteria as specified in the Vegetation Management Plan, and comment on the stability and condition of any stream works. With each monitoring report, the person responsible for implementing the Vegetation Management Plan must certify in writing that plantings (including follow-up plantings) have been carried out using stock propagated from seed or plant material collected only from native plants from the local botanical provenance.		There is no evidence that any of the monitoring reports were submitted to the DPIE as per the requirement of this condition.	Non-compliant	This was reviewed and shared during the Annual review for Rooty Hill (annually).
3.2	<p>The Proponent must review the Operational Monitoring Program referred to under condition 3.1 on a six-monthly basis, and may, with the agreement of the Secretary, alter the frequency and/ or scope of monitoring provided:</p> <p>a) pollutant/ parameter monitoring has been undertaken for a period of no less than six months (measured from the commencement of operation of the project);</p> <p>b) there has been no exceedance of any limit placed on the subject pollutant or parameter, through this consent or any Environment Protection Licence under the Protection of the Environment Operations Act 1997 within the preceding six-month period;</p> <p>c) there has been no reasonable complaint received from the public in relation to the subject pollutant/ parameter within the preceding six-month period (refer to condition 4.3 of this approval); and</p> <p>d) the EPA raises no objection to the proposed alteration to the frequency of pollutant/parameter monitoring.</p>		<p>There is no evidence that the Operational Monitoring Program has been reviewed on a six-monthly basis.</p> <p>Recommendation: The Operational Monitoring Program should be reviewed following finalisation of this audit and every six months thereafter.</p>	Non-compliant	The OEMP was reviewed and was approved in 2023 by DPE.
3.5A	<p>Within a year of the date of the approval of MOD 2, and every three years thereafter, unless the Secretary directs otherwise, the Proponent must commission and commence, and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <p>(a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;</p> <p>(b) include consultation with the relevant agencies;</p> <p>(c) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL or necessary water licences for the development (including any assessment, strategy, plan or program required under these approvals);</p> <p>(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals;</p> <p>(e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and</p> <p>(f) be conducted and reported to the satisfaction of the Secretary.</p>	<p>The previous audit period was completed on 12 December 2017.</p> <p>MOD2 was approved on 29 June 2017.</p> <p>EMM was commissioned to undertake this independent environmental audit on 19 May (purchase order issued 19 May 2021).</p> <p>RHDC – IEA Submission Extension Request – Service Level Agreement email dated 23 November 2021</p>	<p>(a) to (e) has been fulfilled.</p> <p>MOD2 was approved on 29 June 2017. The previous audit (undertaken for the period 31 March 2016 to 12 December 2017) notes "Given that the majority of the audit period was prior to the approval of MOD2, Condition 3.5 has been applied. However, it is noted that agencies were consulted as part of this audit."</p> <p>There is no evidence that an audit was undertaken within a year of the date of the approval of MOD2, and thus the current audit period is from 13 December 2017 - 17 November 2021. No evidence of the Secretary making available alternative arrangements.</p> <p>EMM Consulting was commissioned to undertake this independent environmental audit on 19 May 2021 (purchase order 4520690232), and activities officially commenced in the week of 16 August 2021. The site inspection was delayed due to State Government public health orders issued during the Covid-19 pandemic lockdown in the Greater Sydney Area.</p> <p>Holcim emailed DPIE on 23 November 2021 notifying DPIE about the delay and seeking an extension for the audit.</p> <p>Recommendation: The next audit should take place three years after this audit (ie November 2024).</p>	Non-compliant	Noted
3.5B	Within 12 weeks of commencing an audit under condition 3.5A, or as otherwise agreed by the Secretary, the Proponent must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Proponent must implement these recommendations, to the satisfaction of the Secretary.	RHDC – IEA Submission Extension Request – Service Level Agreement email dated 23 November 2021	<p>Site audit was delayed due to Covid-19 restrictions.</p> <p>Holcim emailed DPIE on 23 November 2021 notifying DPIE about the delay and seeking an extension for the audit.</p>	Non-compliant	Noted. - will aim to meet timelines. Disruptions due to Covid restrictions.
<b>4. COMMUNITY INFORMATION, CONSULTATION AND INVOLVEMENT</b>					
5.2	<p>Construction Environmental Management Plan</p> <p>The Proponent must prepare and implement a Construction Environmental Management Plan to outline environmental management practices and procedures to be followed during the site preparation and construction activities during each stage of the project. The Plan must be consistent with the Department's Guideline for the Preparation of Environmental Management Plans (DIPNR 2004) and must include, but not necessarily be limited to:</p> <p>a) the Management Plans listed under condition 5.3 of this approval;</p> <p>b) the environmental management and mitigation measures outlined in the documents referenced in condition 1.1; and</p> <p>c) complaints handling procedures during construction.</p>		<p>A Construction Environmental Management Plan (CEMP) for the construction of the CBP has not been provided during the audit.</p> <p>There is no evidence to suggest that a CEMP was prepared and implemented during the construction of the CBP.</p>	Non-compliant	GIPA search to be conducted.

5.2	The Plan must be approved by the Secretary prior to the commencement of any site preparation and construction works associated with the project subject to this approval, or within such period otherwise agreed by the Secretary. Construction works associated with any stage of the project subject to this approval must not commence until written approval has been received from the Secretary for that stage. The Proponent must implement the management plan as approved from time to time by the Secretary.		Refer to response to Condition 5.2.	Non-compliant	OEMP approved in February 2022. This was consulted. last OEMP approval was in October 2023
5.3	As part of the Construction Environmental Management Plan for the project, required under condition 5.2 of this approval, the Proponent must prepare and implement the following Management Plans: a) a Soil and Water Management Plan to detail measures to minimise dust, erosion and the discharge of sediment and other pollutants to lands and/or waters during construction works associated with the project. The Plan must be prepared in accordance with Landcom's Managing Urban Stormwater: Soils and Construction, 4th edition, March 2004.		Refer to response to Condition 5.2.	Non-compliant	Same as above
5.3	b) a Noise Management Plan to detail measures to minimise noise generated during construction activities associated with the project. The Plan must include, but not necessarily be limited to: i) identification of each work area, site compound and access route (both private and public), and the identification of the specific activities that will be carried out and associated noise sources at these sites; ii) identification of all potentially affected sensitive receivers, and the specification of the noise and vibration criteria for the proposed works (as identified in the documentation listed in condition 1.1); iii) demonstration that the construction methods (including construction traffic noise) will meet the objectives of the EA and noise criteria. This must include an analysis of feasible and reasonable noise mitigation measures that can be implemented to reduce construction noise impacts where the objectives are predicted to be exceeded; iv) a detailed description of what actions and measures would be implemented to ensure that these works would comply with the relevant noise and vibration criteria; v) procedures for notifying residents of construction activities that are likely to effect their noise and vibration amenity, as well as procedures for dealing and responding to noise complaints; vi) a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, how the results of this monitoring would be recorded; and vii) if any non-compliance is detected, with the criteria in condition 2.3 or the noise mitigation measures described in the Noise Management Plan, a description of what procedures would be followed to ensure compliance.		Refer to response to Condition 5.2.	Non-compliant	Same as above
5.3	d) a Dust Management Plan to outline measures to minimise and manage any impacts from the construction of the project on local air quality. The Plan must include, but not necessarily be limited to: i) identification of all major sources of dust that may occur as result of the construction of the project; ii) description of the procedures to manage the emission of dust from the sources identified; iii) identification of the locations where monitoring of dust emissions is to be undertaken; iv) procedures for the monitoring of dust emissions from the project, in accordance with any requirements of the EPA; v) protocols for regular maintenance of the construction plant and equipment to minimise the potential for dust emissions; vi) a principal requirement to satisfy the relevant goals specified under condition 2.8 and 2.8A of this approval at all times; vii) a system that allows for periodic assessment and reasonable implementation of Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) to minimise dust impacts during the construction of the project; viii) a system for regular auditing to ensure the effective implementation and maintenance of mitigation measures required to achieve the air quality goals specified under condition 2.8 and 2.8A of this approval; ix) pro-active and reactive management and response mechanisms for particulate emissions, with specific reference to measures to be implemented and actions to be taken in a timely manner to minimise and prevent reasonably foreseeable elevated air quality impacts on surrounding land uses as a consequence of meteorological conditions during construction of the project or the specific construction works being undertaken at any particular time; and x) description of procedures to be undertaken if any non-compliance is detected. The Proponent must implement the management plan as approved from time to time by the Secretary.		Refer to response to Condition 5.2.	Non-compliant	Same as above
5.6	Within 3 months of the submission of an: (a) incident report under condition 6.1 below; (b) Annual Review under condition 6.3 below; (c) Independent Environmental Audit under condition 3.5 or condition 3.5B above; and (d) any modifications to this consent, the Proponent must review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. The Proponent must notify the Department in writing of any such review being undertaken. Where this review leads to revisions in any such document, then within 6 weeks of the review the revised document must be submitted for the approval of the Secretary. Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.		OEMP 2021 is currently under review by DPIE and has not been endorsed yet.  This audit has identified that management plan(s) and Annual Review(s) are not being completed and submitted to DPIE within the timeframes specified in the conditions.  Recommendation: • Annual Reviews, management plans and monitoring programs need to be prepared and/or updated in accordance with the timeframes specified in conditions of consent. • Annual Reviews, management plans and monitoring programs need to be submitted to DPIE and other relevant government agencies, as specified in conditions of consent.	Non-compliant	Noted. Last review was done in June 2023 following the AEMR. Letter indicating the review was sent to DPE
5.7	Where consultation with any public authority is required by the conditions of this consent, the Proponent must: (a) consult with the relevant public authority prior to submitting the required document to the Secretary for approval; (b) submit evidence of this consultation as part of the relevant document; (c) describe how matters raised by the authority have been addressed and any matters not resolved; and (d) include details of any outstanding issues raised by the authority and an explanation of disagreement between any public authority and the Proponent.	PM10 Device relocation - RHDC emails with DPIE and EPA starting December 2019.	As per outcomes of Condition 5.6, consultation has not taken place in accordance with timelines specified in the consent.  However, consultation with DPIE and EPA regarding the relocation of PM10 device and EPL surrender, and updating this in the OEMP has been sighted.  There is no evidence of formal tracking system for matters raised by authorities.	Non-compliant	Emails were shared with the auditor. DPE and Holcim have records of this conversation. Also saved in the drive for future reference.  Closed.
<b>6. ENVIRONMENTAL REPORTING</b>					
6.3	Annual Performance Reporting The Proponent must, throughout the life of the project, prepare and submit to the Secretary, an Annual Review. The Annual Review must review the performance of the project against the Operation Environmental Management Plan (refer to condition 5.4 and condition 5.5 of Annual Review must include, but not necessarily be limited to: a) details of compliance with the conditions of this approval; b) a copy of the Complaints Register (refer to condition 4.3 of this approval) for the preceding twelve-month period (exclusive of personal details), and details of how theses complaints were address and resolved; c) a comparison of the environmental impacts and performance of the project against the environmental impacts and performance predicted in those documents listed under condition 1.1 of this approval; d) results of all environmental monitoring required under this approval and other approvals, including interpretations and discussion by a suitably qualified person; and e) a list of all occasions in the preceding twelve-month period when environmental performance goals for the project have not been achieved, indicating the reason for failure to meet the goals and the action taken to prevent recurrence of that type of incident.	DPIE letter dated 23 August 2021 regarding: RHDC (LEC No 10406 of 2006) Annual Review 1 July 2018 - 31 December 2020	DPIE noted that Holcim "failed to submit the Annual Review for the reporting periods from 1 July 2018 to 31 June 2019 and 1 July 2019 to 31 June 2020 in accordance with Condition 6.4 of the approval and advises that this non- compliance will be followed up separately by the Department."  Recommendation: As per DPIE's advice, the Annual Reviews on the calendar year basis with the 2012 Annual Review should be submitted in March 2022.	Non-compliant	Reviewed and the AEMR will be submitted in March 2022.



6.4	The Proponent must submit a copy of the Annual Review to the Secretary, EPA and Council every year, with: i) the first Annual Review to be submitted within twelve months after the commencement of operation of the project; and ii) the second and subsequent Annual Review to be submitted concurrently with the EPA's Annual Return.		Refer to response to Condition 6.3.	Non-compliant	Noted as above.
6.4	The Proponent must make the Annual Review available to the public for inspection upon request.		All Annual Review reports with the exception of Annual Review 2017 have been uploaded to the Holcim RHDC webpage.  Recommendation: Refer to Condition 4.1.	Non-compliant	Noted as above.
6.5	The Secretary may require the Proponent to address certain matters in relation to the environmental performance of the project in response to review of the Annual Environmental Report in relation to compliance with this approval and any comments received from the EPA and/or Council. Any reasonable action required to be undertaken must be completed within such period as the Secretary may agree.	DPIE letter dated 23 August 2021 regarding: RHDC (LEC No 10406 of 2006) Annual Review 1 July 2018 - 31 December 2020	DPIE notes the incidents regarding exceedance of air quality criteria, however no timelines are given for taking action.  As per DPIE correspondence, "onsite monitoring is required to be undertaken in accordance with the approval and any associated Management Plans, as approved by the Planning Secretary. Any amendments to the parameters required to be monitored, including monitoring frequencies and locations are to be included in the amended respective Management Plans and submitted to the Planning Secretary for approval, prior to implementation."  Recommendation: Air quality non-compliances noted in the Annual Review 2020 and in DPIE's Letter should be addressed.  Annual Reviews, management plans and monitoring programs need to be prepared and/or updated in accordance with the timeframes specified in conditions of consent.  Annual Reviews, management plans and monitoring programs need to be submitted to DPIE and other relevant government agencies, as specified in conditions of consent.	Non-compliant	OEMP addresses the Air Quality concerns. Dust Sentry device will provide real time data. PM10 relocation was flagged with DPE in 2019. OEMP approved in Feb 2022.
<b>Commitment</b>	<b>Condition of consent</b>	<b>Evidence collected</b>	<b>Independent audit findings and recommendations</b>	<b>Compliance</b>	<b>Holcim's response</b>
<b>Compliance with EA</b>		1 The original consent (DA 05_0051), Mod 1, Mod 2 documents.  Site observations.	See DA 05_0051 Condition 1.1.	Non-compliant	N/A
<b><u>EPL 20672</u></b>					
<b>5. Monitoring and Recording. M1.3</b>		"Annual Environmental Management Reviews (AEMRs).  Phone call with S. Shashi on 23.02.2022."□	"Sampe dates recorded Point of collection identified Time of collection and name of person not evident in AEMRs  S. Shashi explained that Holcim has a new online system that records each item within the system, and thus hardcopies of this data are not kept. However, evidence was not provided to verify this.  <b>Recommendation: Take screenshots and provide evidence for any future audits.</b>	Non-compliant	Noted. This is present in the COAs and lab reports. Additionally this is present in the portal for reference. This is not addressed in AEMR. Have the data available if requested.
6. Reporting Conditions  R 1.6		"Holcim website has Annual Returns (Annual Reviews) back to 2009, with 2017 report missing.  <a href="https://www.holcim.com.au/about-us/community-link/regional-distribution-centre-rtc-rooty-hill-nsw/environmental-monitoring-reports">https://www.holcim.com.au/about-us/community-link/regional-distribution-centre-rtc-rooty-hill-nsw/environmental-monitoring-reports</a> "□		Non-compliant	Missing AEMR is updated. DPE was informed about the gap in writing. 2020 AEMR was submitted in a timely manner.
6. Reporting Conditions		Reports prepared by Muller Acoustic Consulting for the period Q1 2019 to Q1 2021. S. Shashi phone call on 23.02.2022.	Reports prepared by Muller Acoustic Consulting for the noise reports	Non-compliant	Screeen shots will be taken when the data gets uploaded on DPE Major Project portal. This is also present on the website
<b><u>APPROVAL OF THE SURRENDER OF LICENCE NO. 20672 - Issued on 18 June 2020 (Notice Number 1594803)</u></b>					
1	The surrender of licence is approved.				
2	The approval of the surrender is subject to the following conditions:				
2(c)	The content and form of the Annual Return must be in accordance with the applicable reporting conditions in the licence before it was surrendered.	Not verified.		Non-compliant	Both EPA and DPE were present on site to finalise these steps. This Licence surrender was approved on 18 June 2020.
2(d)	The Annual Return must be signed in accordance with the applicable reporting conditions in the licence before it was surrendered.	Not verified.		Non-compliant	DPE was informed about the gap in annual review submission. A consolidated AEMR was provided in 2021. Holcim has submitted the AEMR for 2022.