Huntly Bauxite Mine – WQMS Data Review

February 2026

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1. Executive Summary

This report, prepared by RARE Environmental Pty Ltd and SciDev Pty Ltd for Alcoa, provides an analysis of turbidity data collected from Water Quality Monitoring Systems (WQMS) deployed at the Huntly bauxite mining operations during February 2026. The primary objective of this analysis was to evaluate the quality of the data, identify potential "true" turbidity exceedance events, and support Alcoa's compliance reporting obligations under Schedule 1, Division 2, Clause 6 of the **Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023**.

The analysis focused on identifying and classifying turbidity events where levels exceeded 25 nephelometric turbidity units (NTU) for at least one hour. Events were categorized as "true" or "false" based on Alcoa's **Turbidity Event Classification Guidelines**, which distinguish actual turbidity increases (true events) from false readings caused by environmental factors such as debris, air bubbles, or fluctuating water levels.

Key findings include:

- **Excluded Units**: Thirty WQMS units were excluded from the analysis due to invalid data caused by equipment faults or environmental interference.
- **False Events**: 62 'False' events were identified in total, primarily attributed to factors such as debris accumulation, sensor obstructions, and water turbulence.
- **Further Investigation**: 2 events were flagged for further investigation.
- **True Events**: Zero "True" turbidity exceedance events were identified.

The report also highlights periods of missing data, which occurred due to system logoffs, equipment faults, or unplanned shutdowns. These gaps are detailed in the report to ensure transparency in data handling.

2. Scope

RARE Environmental Pty Ltd and SciDev Pty Ltd were engaged by Alcoa to analyse turbidity data collected from the Huntly Water Quality Monitoring Systems (WQMSs). The primary objective of this engagement is to assess the quality of the collected data and identify potential "true" turbidity events. This analysis supports Alcoa's reporting obligations under *Schedule 1, Division 2, Clause 6 of the Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

3. Introduction

3.1. Background

Alcoa of Australia Ltd (Alcoa) operates two bauxite mines, Huntly and Willowdale, approximately 100 km southeast of Perth, Western Australia. These mining operations are subject to environmental controls mandated by the *Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

Under this Exemption Order, Alcoa is required to implement drainage control measures and monitor effectiveness in water bodies within and downstream of mining operations. Turbidity, a critical water quality parameter, is monitored using Water Quality Monitoring Systems (WQMSs), to detect deviations and identify high-turbidity events.

Alcoa is obligated to report monthly on-stream turbidity, including the identification and classification of any “true” high-turbidity exceedance events. (Refer to Appendix B for the site map showing WQMS locations.)

3.2. Monitoring requirements

Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023 specifies that a drainage incident occurs when:

> *a) runoff from a disturbance area enters the surrounding environment, resulting in surface water turbidity of at least 25 NTU for a duration of at least one hour; or*
>
> *b) a discharge from containment infrastructure includes, or February include, environmentally hazardous material.*

Trigger levels for drainage incidents are outlined in *Schedule 1* of the Exemption Order. To meet these requirements, Alcoa has developed "Turbidity Event Classification Guidelines" which define a true turbidity exceedance event as a WQMS recording turbidity levels of at least 25 NTU for a period exceeding one hour.

3.3. Water Quality Management Systems (WQMSs)

During the February 2026 monitoring period, forty-three WQMS units were deployed to monitor turbidity levels in streams subject to surface water runoff within and downstream of Huntly mining operations.

Each WQMS unit consists of the following components:

Aquas SMR10 Turbidity Probe

> Positioned at a 90-degree angle to water flow, each probe is equipped with an automatic lens wiper and a guard to protect against larger debris.

Data Taker DT82 Logger

> Records data locally every six seconds, with six-minute averages transmitted via IoT-enabled modems to a cloud-based platform.

Float Switch

Detects whether the sensor is submerged, or the stream is dry.

3.4. Purpose

This report aims to analyse turbidity data collected during February 2026, focusing on the identification and classification of "true" turbidity exceedance events based on Alcoa's Turbidity Event Classification Guidelines.

3.5. Exclusions

This report is not intended as:

- An assessment of the WQMS network or Alcoa's compliance with relevant legislation and requirements.
- An evaluation of the suitability of the trigger levels or event classification procedures adopted by Alcoa.

3.6. Abbreviations

	Term
IoT	Internet of Things
NTU	Nephelometric Turbidity Units
WQMS	Water Quality Management System

4. Methodology

4.1. WQMS Locations

A site map showing the WQMSs locations is provided in Appendix B.

4.2. Data Review

Data recorded by the WQMS Units was reviewed and potential events where turbidity levels exceeded 25 NTU for at least one hour. Each potential event was categorised as either 'true 'or 'false'.

4.2.1. True Turbidity Exceedance Events

These events are caused by an actual increase in stream turbidity. Per Alcoa's "Turbidity Event Classification Guidelines" true exceedance events typically exhibit:

- A sharp, sudden incline in turbidity levels.
- A return to baseline turbidity levels in a pattern resembling a normal (Gaussian) distribution.

Figure 1 Typical 'true' exceedance event showing the sharp incline and gradual return to background levels.

4.2.2. False Turbidity Exceedance Events

These events are caused by factors unrelated to actual turbidity increase, such as:

- Organic debris (e.g., leaves, sticks, algae) obstructing the sensor.
- Air bubbles or water turbulence near the sensor
- Fluctuating water levels intermittently covering and uncover the sensor lens.

False events typically exhibit sharp inclines and declines without the characteristic bell curve shape of true events.

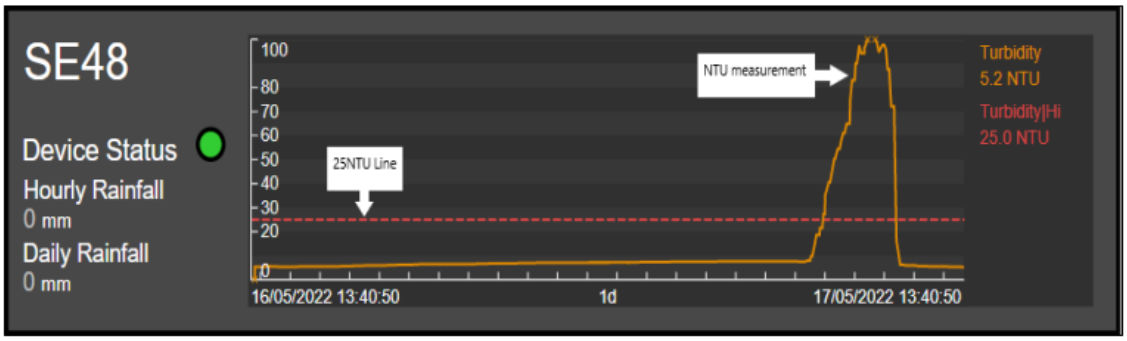

Figure 2 Typical 'false' exceedance event showing both a sharp incline and decline.

4.2.3. Missing Data

Missing data occurs when a WQMS unit fails to record information, this can occur from unexpected system logoffs, equipment faults, or unplanned shutdowns.

5. Results and Discussion

5.1. Events

Table 1 provides a summary of identified events. Table 2 offers detailed information about each event.

Table 1 Events Summary

Category	# of events
Flagged for further investigation	2
False	60

Table 2 Events Details

Event ID	WQMS ID	Event Category	Start	End	Duration	Average Turbidity (NTU)	Peak Turbidity (NTU)
HUN-2602-001	DB02T	'False'	03/02/2026 20:00	04/02/2026 05:36	9 hr, 42 min	250.448	402.303
HUN-2602-002	DB02T	'False'	04/02/2026 11:00	04/02/2026 12:36	1 hr, 42 min	237.594	474.913
HUN-2602-003	ND06T	'False'	01/02/2026 18:18	01/02/2026 22:24	4 hr, 12 min	146.638	591.478
HUN-2602-004	ND06T	'False'	09/02/2026 15:18	09/02/2026 16:24	1 hr, 12 min	58.593	93.757
HUN-2602-005	ND06T	'False'	09/02/2026 19:12	09/02/2026 20:18	1 hr, 12 min	45.074	69.528
HUN-2602-006	ND06T	'False'	17/02/2026 19:24	17/02/2026 21:06	1 hr, 48 min	41.402	58.607
HUN-2602-007	ND06T	'False'	18/02/2026 17:24	18/02/2026 18:18	1 hr	52.874	80.816
HUN-2602-008	ND06T	Additional Investigation Required	21/02/2026 17:42	21/02/2026 19:06	1 hr, 30 min	51.274	81.648
HUN-2602-009	ND06T	'False'	21/02/2026 21:06	21/02/2026 22:54	1 hr, 54 min	49.01	79.635
HUN-2602-010	ND06T	'False'	22/02/2026 17:18	22/02/2026 18:24	1 hr, 12 min	171.109	435.89
HUN-2602-011	ND06T	'False'	28/02/2026 19:54	28/02/2026 21:42	1 hr, 54 min	41.797	54.292
HUN-2602-012	ND07T	'False'	18/02/2026 18:54	18/02/2026 19:48	1 hr	35.137	40.266
HUN-2602-013	ND07T	'False'	18/02/2026 21:48	22/02/2026 14:46	3 d, 17 hr, 5 min	46.853	146.858
HUN-2602-014	SE02T	'False'	09/02/2026 14:36	09/02/2026 22:24	7 hr, 54 min	35.042	51.273
HUN-2602-015	SE02T	'False'	10/02/2026 01:18	10/02/2026 07:12	6 hr	33.746	44.264

Event ID	WQMS ID	Event Category	Start	End	Duration	Average Turbidity (NTU)	Peak Turbidity (NTU)
HUN-2602-016	SE02T	'False'	11/02/2026 10:36	11/02/2026 15:30	5 hr	42.941	86.357
HUN-2602-017	SE02T	'False'	11/02/2026 16:06	11/02/2026 19:30	3 hr, 30 min	44.841	59.895
HUN-2602-018	SE02T	'False'	11/02/2026 20:06	11/02/2026 21:30	1 hr, 30 min	58.084	83.746
HUN-2602-019	SE02T	'False'	11/02/2026 22:06	15/02/2026 04:06	3 d, 6 hr, 6 min	398.778	1134.134
HUN-2602-020	SE02T	'False'	16/02/2026 02:42	22/02/2026 14:00	6 d, 11 hr, 24 min	297.596	1981.357
HUN-2602-021	SE02T	'False'	25/02/2026 19:36	25/02/2026 21:30	2 hr	45.222	64.274
HUN-2602-022	SE02T	'False'	25/02/2026 23:42	26/02/2026 12:36	13 hr	235.003	473.949
HUN-2602-023	SE02T	'False'	27/02/2026 17:36	28/02/2026 23:54	1 d, 6 hr, 24 min	118.315	449.315
HUN-2602-024	SE03INV1	'False'	14/02/2026 20:12	19/02/2026 13:42	4 d, 18 hr, 36 min	257.576	490.913
HUN-2602-025	SE03INV1	'False'	28/02/2026 20:42	28/02/2026 23:54	3 hr, 18 min	57.273	60.115
HUN-2602-026	SE06T	'False'	02/02/2026 01:06	08/02/2026 14:18	6 d, 13 hr, 18 min	1065.422	2216.519
HUN-2602-027	SE06T	'False'	08/02/2026 22:12	16/02/2026 11:24	7 d, 13 hr, 18 min	689.248	1502.403
HUN-2602-028	SE06T	'False'	22/02/2026 06:00	22/02/2026 07:00	1 hr, 6 min	110.155	265.291
HUN-2602-029	SE06T	'False'	25/02/2026 22:06	26/02/2026 07:12	9 hr, 12 min	40.696	359.286
HUN-2602-030	SE06T	'False'	27/02/2026 19:36	27/02/2026 20:30	1 hr	58.795	62.381
HUN-2602-031	SE06T	'False'	27/02/2026 23:54	28/02/2026 03:06	3 hr, 18 min	52.294	83.430
HUN-2602-032	SE51T	'False'	12/02/2026 03:30	12/02/2026 05:24	2 hr	255.644	464.015
HUN-2602-033	SE52T	'False'	02/02/2026 09:48	03/02/2026 20:18	1 d, 10 hr, 35 min	330.200	2590.224
HUN-2602-034	SE52T	'False'	05/02/2026 16:36	07/02/2026 18:30	2 d, 2 hr	110.793	832.720
HUN-2602-035	SE52T	Additional Investigation Required	08/02/2026 03:00	08/02/2026 04:00	1 hr, 5 min	169.064	339.400
HUN-2602-036	SE52T	'False'	18/02/2026 14:42	18/02/2026 19:12	4 hr, 35 min	30.358	33.873
HUN-2602-037	SE52T	'False'	22/02/2026 14:36	22/02/2026 15:30	1 hr	78.036	131.222

Event ID	WQMS ID	Event Category	Start	End	Duration	Average Turbidity (NTU)	Peak Turbidity (NTU)
HUN-2602-038	SE52T	'False'	24/02/2026 11:36	24/02/2026 12:30	1 hr	48.800	63.943
HUN-2602-039	SE52T	'False'	24/02/2026 14:06	24/02/2026 15:30	1 hr, 29 min	71.431	136.796
HUN-2602-040	SE52T	'False'	24/02/2026 18:36	24/02/2026 19:30	1 hr	56.498	75.782
HUN-2602-041	SE52T	'False'	24/02/2026 20:36	24/02/2026 21:30	1 hr	69.633	103.966
HUN-2602-042	SE52T	'False'	25/02/2026 05:36	25/02/2026 06:30	1 hr	103.627	154.404
HUN-2602-043	SE52T	'False'	25/02/2026 08:36	25/02/2026 09:30	1 hr	52.222	62.558
HUN-2602-044	SE52T	'False'	25/02/2026 10:06	25/02/2026 11:00	1 hr	87.731	102.742
HUN-2602-045	SE52T	'False'	25/02/2026 12:54	25/02/2026 13:48	1 hr	138.037	186.199
HUN-2602-046	SE52T	'False'	25/02/2026 14:36	25/02/2026 17:00	2 hr, 29 min	1089.709	4000.000
HUN-2602-047	SE52T	'False'	25/02/2026 18:06	25/02/2026 19:30	1 hr, 29 min	91.174	207.564
HUN-2602-048	SE52T	'False'	25/02/2026 20:06	25/02/2026 21:30	1 hr, 29 min	69.174	157.650
HUN-2602-049	SE52T	'False'	25/02/2026 22:06	25/02/2026 23:00	1 hr	170.785	322.598
HUN-2602-050	SE52T	'False'	26/02/2026 00:06	26/02/2026 01:00	1 hr	179.530	338.705
HUN-2602-051	SE52T	'False'	26/02/2026 02:06	26/02/2026 03:00	1 hr	71.281	112.110
HUN-2602-052	SE52T	'False'	26/02/2026 03:36	26/02/2026 04:30	1 hr	159.246	279.745
HUN-2602-053	SE52T	'False'	26/02/2026 05:36	26/02/2026 06:30	1 hr	75.745	125.628
HUN-2602-054	SE52T	'False'	26/02/2026 10:18	26/02/2026 13:51	3 hr, 39 min	207.085	656.827
HUN-2602-055	SE52T	'False'	26/02/2026 16:11	26/02/2026 17:35	1 hr, 30 min	103.462	230.654
HUN-2602-056	SE52T	'False'	26/02/2026 19:06	27/02/2026 04:30	9 hr, 29 min	262.331	297.833
HUN-2602-057	SE53T	'False'	20/02/2026 04:05	20/02/2026 05:54	1 hr, 55 min	32.016	40.834
HUN-2602-058	SE53T	'False'	20/02/2026 06:06	20/02/2026 08:14	2 hr, 13 min	34.205	45.302
HUN-2602-059	SE53T	'False'	20/02/2026 09:08	20/02/2026 10:09	1 hr, 6 min	30.141	36.268
HUN-2602-060	SE53T	'False'	25/02/2026 08:08	25/02/2026 09:33	1 hr, 30 min	40.817	45.064

Event ID	WQMS ID	Event Category	Start	End	Duration	Average Turbidity (NTU)	Peak Turbidity (NTU)
HUN-2602-061	SE53T	'False'	26/02/2026 05:15	26/02/2026 07:59	2 hr, 49 min	167.370	342.556
HUN-2602-062	SE59T	'False'	02/02/2026 16:52	03/02/2026 00:45	7 hr, 58 min	217.428	313.765

5.2. Additional Investigation

Two events were flagged for additional investigation.

5.2.1. HUN-2602-008 Additional Investigation

The event, occurring between 17:42 and 19:06 on 21 February at ND06T, is characterised by a rise in turbidity to a peak of 81.6 NTU, followed by a gradual recession back toward baseline. Although the event is not fully consistent with the Alcoa true turbidity event guidelines, the Gaussian style response profile suggests a pattern that may be consistent with a runoff-driven turbidity event.

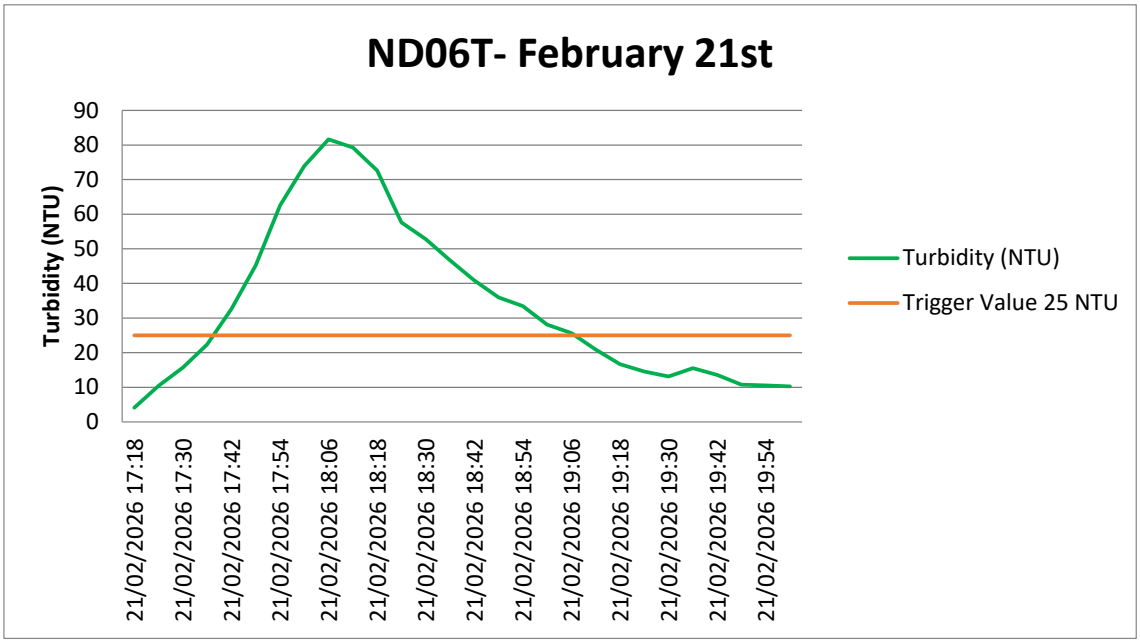

Figure 3 - HUN-2602-008

Site observations recorded on 23/02/2026 noted that the stream level was low, with visible sediment present on the stream bed, and that the sensor was positioned on the stream bed due to the low water level. Review of the broader turbidity record indicates the sensor may have been temporarily impacted by localised sediment disturbance under these shallow flow conditions. In addition, no rainfall was recorded in the preceding 24 hours. While the event exhibits a clear rise and fall profile, the available field evidence indicates that localised sediment interference at the sensor is the likely cause. Accordingly, the event has been considered as 'False'.

Alcoa's field notes have been provided below

"Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours."

5.2.2. HUN-2602-035 Additional Investigation

The event, occurring between 03:00 and 04:00 on 8 February at SE52T is characterised by a rise in turbidity to a peak of 339.4 NTU followed by a recession back toward baseline. Although the event is not fully consistent with the Alcoa true turbidity event guidelines, the broadly Gaussian response profile suggests a pattern that may be consistent with a runoff-driven turbidity event.

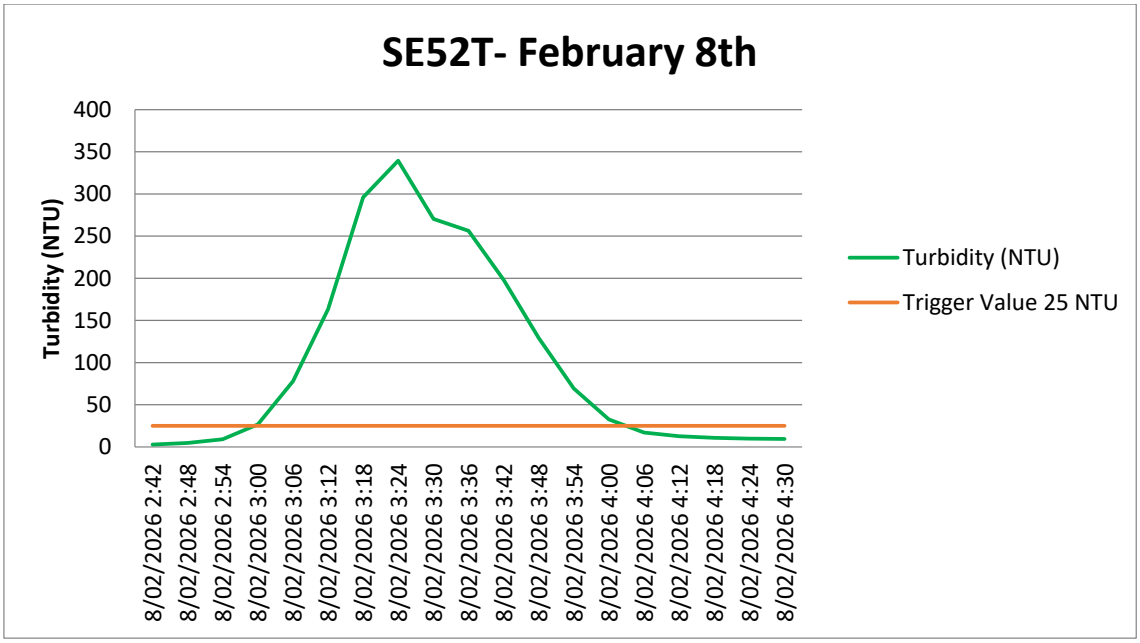

Figure 4 - HUN-2602-035

Site observations indicate that the stream level was very low and that water depth was insufficient to submerge the sensor, resulting in unreliable readings. The site notes also record that the stream bed was heavily impacted by organic debris and algae, and that water levels had been fluctuating between flow and dry conditions during the preceding weeks. These observations indicate the sensor was operating under unstable local conditions. The event has therefore been reclassified as False.

Alcoa field notes have been provided below

"The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. The level float has been fluctuating between 1(flow) and 0(dry) during the preceding weeks. The stream bed is heavily impacted by organic debris and algae."

5.3. True Event(s)

Zero 'True' turbidity events were identified during the period.

5.4. False Event(s)

In total 62 'False' events were identified during the reporting period. Rationale on potential causes is summarised below.

Table 3 False Events Rationale

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-001	DB02T	This event is characterised by a prolonged elevated response with a sustained plateau rather than a distinct bell-shaped pulse. This pattern is more consistent with stagnant low-flow conditions and localised sensor interference than a true runoff-driven turbidity event.	The site was inspected on 30/01/2026, the stream level was very low and the water was becoming stagnant. The site was inspected again on 12/02/2026 and the stream was dry. False events were triggered by drying stream conditions, with stagnant water / algae impacting the lens, and the sensor being partially out of water.
HUN-2602-002	DB02T	This event displays a sharp rise to a high peak followed by a rapid decline back to baseline. The abrupt response is more indicative of localised interference at the sensor than a natural turbidity event.	The site was inspected on 30/01/2026, the stream level was very low and the water was becoming stagnant. The site was inspected again on 12/02/2026 and the stream was dry. False events were triggered by drying stream conditions, with stagnant water / algae impacting the lens, and the sensor being partially out of water.
HUN-2602-003	ND06T	This event is characterised by an irregular multi-peaked response with abrupt rises and falls rather than a smooth rise and recession. The pattern is consistent with localised sediment interference at the sensor.	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-004	ND06T	This event presents as a short-duration elevated response with a gradual rise and fall. The event is considered false.	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-005	ND06T	This event displays a short pulse and rapid decline. The response is more consistent with unstable local conditions at the sensor than a true event.	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-006	ND06T	This event is characterised by a gradual rise followed by a rounded peak and relatively smooth recession. While the profile has some features of a genuine event, the response is also consistent with sediment interference under shallow low-flow conditions.	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-007	ND06T	Additional Investigation Required	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-008	ND06T	Additional Investigation Required	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-009	ND06T	This event displays a broad elevated response with a gradual rise and fall. The response is therefore more	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the

Event ID	Monitor ID	Rationale	Field Notes
		consistent with localised sediment effects than a true runoff-driven event.	turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-010	ND06T	This event is characterised by a very abrupt rise to a high peak followed by a rapid decline to baseline. The response is typical of localised disturbance at the sensor, likely associated with debris or sediment interference.	Site inspected on 01/03/2026. Stream is flowing, very shallow and clear. Organic debris observed beside the sensor and sensor also impacted by stream bed sediment due to shallow depth. Sensor cleaned.
HUN-2602-011	ND06T	This event displays a gradual rise and fall. The response is more consistent with localised sediment effects than a true runoff-driven event.	Site inspected on 23/02/2026. The stream level is low with visible sediment on the stream bed. The sensor is positioned on the stream bed due to low water level. Review of the turbidity trend indicates the sensor was likely temporarily impacted by sediment on the stream bed. No rainfall was received in the proceeding 24 hours.
HUN-2602-012	ND07T	This event displays a small pulse with a rounded peak and gradual recession. This type of response is consistent with temporary sediment interference at the sensor.	Site inspected 22/02/2026. The stream is ponding and the sensor is above the low stream level. The sensor was impacted by sediment which was cleaned, dropping the turbidity reading from 40.9 NTU, to 5.43 NTU.
HUN-2602-013	ND07T	This event is characterised by a prolonged elevated plateau with limited pulse structure and an abrupt drop at the end of the response. This pattern is typical of sensor fouling or persistent low-flow interference rather than a natural runoff-driven turbidity event.	Site inspected 22/02/2026. The stream is ponding and the sensor is above the low stream level. The sensor was impacted by sediment which was cleaned, dropping the turbidity reading from 40.9 NTU, to 5.43 NTU.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-014	SE02T	This event sustained elevated response with multiple irregular peaks and a gradual return toward threshold. This is consistent with unstable localised interference than a true runoff-driven event.	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.
HUN-2602-015	SE02T	This event displays a sharp rise to a high peak followed by a rapid decline back to baseline. The abrupt response is more indicative of localised interference at the sensor than a true runoff-driven event.	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.
HUN-2602-016	SE02T	This event is characterised by multiple irregular spikes and elevated prolonged periods rather than a smooth threshold exceedance. The response is more consistent with localised interference at the sensor.	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.
HUN-2602-017	SE02T	This event displays a prolonged elevated response with multiple irregular step changes and an abrupt return to baseline. The structure is more typical of localised interference than a natural turbidity event.	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.
HUN-2602-018	SE02T	This event does not present as a clean pulse and instead includes multiple irregular spikes and elevated threshold exceedance of limited duration. The	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.

Event ID	Monitor ID	Rationale	Field Notes
		response is more consistent with a false event caused by localised interference.	
HUN-2602-019	SE02T	This event is characterised by a very prolonged elevated response with sustained high turbidity, abrupt spikes, and no distinct rise-and-fall structure. The response is typical of persistent interference or altered probe conditions rather than a true event.	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.
HUN-2602-020	SE02T	This event displays a prolonged elevated plateau with major step changes and extended threshold exceedance over several days. The response lacks shape and is more consistent with persistent localised interference.	Site inspected on 22/02/2026. Stream is flowing, low and clear. The stream bed and sensor were heavily impacted with algae. Turbidity NTU pre clean 40.9 NTU, post clean 5.43 NTU. Data trend also supports false event due to algae impact.
HUN-2602-021	SE02T	This event presents as a short elevated plateau with abrupt start and end points. The response is more typical of probe interference than a natural runoff-driven event.	Site inspected on 01/03/2026. Stream is flowing, low and clear. The sensor was heavily impacted with red algae. Turbidity NTU pre clean was 362.48 NTU, post clean to 4.8 NTU. The data trend spikes also indicate false event due to impact from algae.
HUN-2602-022	SE02T	This event is characterised by a prolonged elevated response with sustained high turbidity and abrupt shifts rather than a distinct peak and recession. The response is more indicative of false event under unstable local conditions.	Site inspected on 01/03/2026. Stream is flowing, low and clear. The sensor was heavily impacted with red algae. Turbidity NTU pre clean was 362.48 NTU, post clean to 4.8 NTU. The data trend spikes also indicate false event due to impact from algae.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-023	SE02T	This event displays a gradual overall rise by step changes and sustained elevated conditions over an extended period. The plateau-type structure is more consistent with localised interference than a true discrete event.	Site inspected on 01/03/2026. Stream is flowing, low and clear. The sensor was heavily impacted with red algae. Turbidity NTU pre clean was 362.48 NTU, post clean to 4.8 NTU. The data trend spikes also indicate false event due to impact from algae.
HUN-2602-024	SE03INV1	This event is characterised by a prolonged elevated plateau with abrupt step changes and no distinct recession. The response is not typical of a natural turbidity pulse and is more consistent with persistent sensor interference.	Site inspected on 19/02/2026. Stream level is low with slow flow. Sensor was heavily impacted by algae. The sensor was cleaned which dropped the turbidity from 411.87 NTU to 2.12 NTU.
HUN-2602-025	SE03INV1	This event displays an abrupt rise to a flat elevated plateau. The response is more typical of altered probe conditions or localised interference than a true event.	The monitoring site was inspected on 1/03/2026. The stream level is very low and heavily impacted by organic debris, algae and tanins. The lens was impacted by algae, turbidity value on arrival was 25.93 NTU which dropped to 1.63 NTU after cleaning.
HUN-2602-026	SE06T	This event is characterised by a prolonged period of elevated and highly erratic turbidity with repeated spikes and sustained plateaus. The response is not representative of a natural event and is more consistent with severe localised sensor interference.	Site inspected due to exceedance notification 2/02/2026. The stream level is low, has minimum flow, thick sediment/algae built up on the stream bed and is heavily vegetated. On arrival the sensor was submerged in sediment and impacted by leaf litter. The sensor was cleaned a placed back into he stream, significantly declining the turbidity reading from 1397.41 NTU to 3.01 NTU. The turbidity trend on Pi rapidly inclines/declines indicating the sensor was likely impacted by debris and built up sediment/algae. No rain was received in the 24 hours proceeding this event.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-027	SE06T	This event displays a very long elevated response with, repeated spikes. The event is more indicative of persistent local interference than a true runoff-driven event.	Site inspected on 16/02/2026. Stream is flowing, narrow, very shallow and clear. Stream bed sediment is impacting the sensor. Sensor preclean, NTU 821.2355, and post clean NTU 1.5182. The erratic spike in data trend also indicates stream bed sediment impact.
HUN-2602-028	SE06T	This event presents as a short abrupt spike sequence followed by a rapid return to baseline. The response is highly irregular and more consistent with localised disturbance at the sensor than a genuine turbidity event.	Site inspected on 28/02/2026. Stream flowing, very shallow and clear. Observed leaf litter upstream and downstream of sensor. False event due to shallow depth, leaf litter and stream bed sediment impacting the sensor. Turbidity NTU pre clean 3.6595, post NTU 0.7866.
HUN-2602-029	SE06T	This event is characterised by a long-elevated period followed by a single abrupt high spike before rapidly returning to baseline. The response is more indicative of local sensor interference.	Site inspected on 28/02/2026. Stream flowing, very shallow and clear. Observed leaf litter upstream and downstream of sensor. False event due to shallow depth, leaf litter and stream bed sediment impacting the sensor. Turbidity NTU pre clean 3.6595, post NTU 0.7866.
HUN-2602-030	SE06T	This event displays a short flat elevated plateau with abrupt start and end points. The response is more consistent with probe interference or localised disturbance than a true turbidity event.	Site inspected on 28/02/2026. Stream flowing, very shallow and clear. Observed leaf litter upstream and downstream of sensor. False event due to shallow depth, leaf litter and stream bed sediment impacting the sensor. Turbidity NTU pre clean 3.6595, post NTU 0.7866.
HUN-2602-031	SE06T	This event is characterised by irregular elevated turbidity with multiple spikes and no distinct recession structure. The response is more typical of unstable local conditions at the sensor than a natural runoff-driven event.	Site inspected on 28/02/2026. Stream flowing, very shallow and clear. Observed leaf litter upstream and downstream of sensor. False event due to shallow depth, leaf litter and stream bed sediment impacting the sensor. Turbidity NTU pre clean 3.6595, post NTU 0.7866.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-032	SE51T	This event is characterised by a rapid rise to very high turbidity with multiple abrupt shifts followed by a sharp return to baseline. The response is more indicative of localised interference from debris impacting the sensor than a natural runoff-driven event.	Data analysis indicates false event, likely caused by organic debris impacting the sensor. Erratic trend with extreme peak, and a sharp decline. Turbidity values dropped from 136NTU to 6.26NTU within 6 minutes, consistent with debris being dislodged.
HUN-2602-033	SE52T	This event displays a prolonged elevated response with an early spike, extended recession, and later isolated spike. The overall structure is more consistent with unstable local conditions and insufficient sensor submergence.	The monitoring site was inspected on 3/02/2026, the stream level was very low and the depth was insufficient to submerge the sensor, causing false readings. The level float has been fluctuating between 1(flow) and 0(dry) during the preceding weeks.
HUN-2602-034	SE52T	This event is characterised by an elevated plateau with abrupt spikes. The response is more typical of unstable local conditions at the sensor than a discrete natural event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. The level float has been fluctuating between 1(flow) and 0(dry) during the preceding weeks. The stream bed is heavily impacted by organic debris and algae.
HUN-2602-035	SE52T	Additional Investigation Required	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. The level float has been fluctuating between 1(flow) and 0(dry) during the preceding weeks. The stream bed is heavily impacted by organic debris and algae.
HUN-2602-036	SE52T	This event displays an elevated plateau with an abrupt return to baseline. The response is more consistent with localised interference than a true event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. The level float has been fluctuating between 1(flow) and 0(dry) during the preceding weeks. The stream bed is heavily impacted by

Event ID	Monitor ID	Rationale	Field Notes
			organic debris and algae. A site inspection conducted on 20/02/2026 confirmed that the stream was ponded and stagnant, with no connecting flow.
HUN-2602-037	SE52T	This event is characterised by a stepped plateau response with abrupt start and end points and no distinct recession. The response is more indicative of sensor interference than a natural turbidity pulse.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. The level float has been fluctuating between 1(flow) and 0(dry) during the preceding weeks. The stream bed is heavily impacted by organic debris and algae. A site inspection conducted on 20/02/2026 confirmed that the stream was ponded and stagnant, with no connecting flow.
HUN-2602-038	SE52T	This event displays abrupt changes in turbidity before and after the exceedance. The response is more typical of localised probe interference than a true runoff-driven event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry/hot conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend, and intermittently dropping below calibration. The sensor is scheduled for replacement.
HUN-2602-039	SE52T	This event is characterised by a stepped rise to an elevated flat-line value followed by an abrupt fall to baseline. The flat-topped structure is more consistent with local sensor effects than a natural event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry/hot conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend, and intermittently dropping below calibration. The sensor is scheduled for replacement.
HUN-2602-040	SE52T	This event presents as a short plateau-type exceedance with multiple spikes. The response is more consistent with localised interference than a true event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry/hot conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend, and intermittently dropping below calibration. The sensor is scheduled for replacement.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-041	SE52T	This event displays a short elevated plateau with abrupt start and finish points. The response is more indicative of probe interference than a natural turbidity event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry/hot conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend, and intermittently dropping below calibration. The sensor is scheduled for replacement.
HUN-2602-042	SE52T	This event is characterised by a flat-topped elevated response with an abrupt rise and abrupt return to baseline. The structure is more typical of localised interference than a genuine event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-043	SE52T	his event displays a short stepped exceedance with abrupt changes in value. The response is more consistent with unstable local conditions at the sensor.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-044	SE52T	This event is characterised by a stepped elevated plateau followed by a sharp drop to near-baseline conditions. The response is indicative of probe interference.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-045	SE52T	This event presents as a short, elevated response followed by a rapid fall, with a separate larger rise occurring immediately after the event. The structure is consistent with localised interference.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-046	SE52T	This event displays an abrupt rise to a sustained high plateau approaching instrument limit of detection, followed by a rapid return. This response is indicative of severe localised sensor interference rather than a true turbidity event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-047	SE52T	This event is characterised by a short stepped plateau within a broader unstable period that includes very high preceding values. The response is more consistent with persistent probe interference than a standalone natural event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-048	SE52T	This event displays a short elevated plateau with abrupt level shifts and no clear recession. The response is more typical of localised interference than a true event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-049	SE52T	This event is characterised by a stepped rise to a high flat response followed by an abrupt drop to baseline. The flat-topped structure is more indicative of probe effects than a natural turbidity response.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-050	SE52T	This event presents as a short elevated plateau with abrupt start and finish points and repeated stepped behaviour.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction,

Event ID	Monitor ID	Rationale	Field Notes
		The response is more consistent with sensor interference than a true event.	characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-051	SE52T	This event displays a stepped exceedance with abrupt transitions. The response is more indicative of unstable localised interference at the sensor.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-052	SE52T	This event is characterised by a sharp rise to a flat elevated response followed by a rapid return to baseline. The response is more typical of localised interference than a natural event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-053	SE52T	This event presents as a short threshold exceedance within a broader period of repeated stepped behaviour. The response is more consistent with persistent local sensor effects than a true event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-054	SE52T	This event displays multiple erratic peaks; the event occurs within a broader unstable period characterised by repeated spikes. The response is therefore more consistent with sensor malfunction than a true event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-055	SE52T	This event is characterised by a stepped rise to an elevated plateau followed by a sharp drop below threshold. The	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction,

Event ID	Monitor ID	Rationale	Field Notes
		response is more consistent with localised interference than a true event.	characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-056	SE52T	This event displays a prolonged elevated plateau with minimal structure and an abrupt drop at the end. The pattern is more typical of persistent sensor interference than a natural runoff-driven event.	The stream level is very low and depth is insufficient to submerge the sensor, causing false readings. Recent dry conditions are causing the sensor to malfunction, characterised by repeated block spikes in the turbidity trend. The sensor is scheduled for replacement.
HUN-2602-057	SE53T	This event is characterised by a low-amplitude elevating response developing from an already rising baseline, with limited separation from the surrounding data set. The response is more consistent with stagnant low-flow conditions or localised algae interference than a discrete true event.	Site inspected 20/02/2026. Identified the stream is mostly stagnant with minimal flow and visible built up green algae that's impacting the sensor. Turbidity reading pre-clean read 31.98 NTU & post-clean 0.52 NTU. No rainfall was received in the 24 hours proceeding this event.
HUN-2602-058	SE53T	This event displays a low-amplitude exceedance with irregular peaks and limited event definition. The response is more indicative of localised algae impact at the sensor.	Site inspected 20/02/2026. Identified the stream is mostly stagnant with minimal flow and visible built up green algae that's impacting the sensor. Turbidity reading pre-clean read 31.98 NTU & post-clean 0.52 NTU. No rainfall was received in the 24 hours proceeding this event.
HUN-2602-059	SE53T	This event is characterised by a short low-amplitude exceedance with only weak pulse structure before dropping back below threshold. The response is more consistent with stagnant low-flow conditions than a genuine event.	Site inspected 20/02/2026. Identified the stream is mostly stagnant with minimal flow and visible built up green algae that's impacting the sensor. Turbidity reading pre-clean read 31.98 NTU & post-clean 0.52 NTU. No rainfall was received in the 24 hours proceeding this event.

Event ID	Monitor ID	Rationale	Field Notes
HUN-2602-060	SE53T	This event presents as a short, elevated plateau with an abrupt fall to baseline. The flat-topped structure is more typical of localised probe interference from algae and sediment than a natural runoff-driven event.	Site visited on 26/02/2026. Stream was low, clear and impacted by red algae on the stream bed. Sensor also impacted by algae and sediment creating a film across the sensor face. Turbidity NTU pre clean was 42.3160 and post clean reduced to 1.0037. False event due to algae and sediment impact.
HUN-2602-061	SE53T	This event displays a clear rise, sustained elevated period, and partial recession, however the abrupt spike and elevated plateau are consistent with localised algae interference rather than a true runoff-driven event.	Site vested on 26/02/2026. Stream was low, clear and impacted by red algae on the stream bed. Sensor also impacted by algae and sediment creating a film across the sensor face. Turbidity NTU pre clean was 42.3160 and post clean reduced to 1.0037. False event due to algae and sediment impact.
HUN-2602-062	SE59T	This event is characterised by a broad elevated response with a progressive rise, sustained high turbidity, and an extended recession back toward baseline. this event is likely consistent with false triggering associated with probe position above the water level.	Data analysis indicates false event. The monitoring site was inspected on 3/02/2026 and the sensor was positioned above the water level due to stream level drop. The sensor was cleaned and repositioned mid-depth.

5.5. Excluded WQMS Units

Thirty WQMS Units were excluded from analysis due to erroneous data. Alcoa confirmed the invalidity of data recorded from these units and provided commentary on the condition of each.

Table 4 Excluded WQMS Units

Unit	Dates/	Comments
DB01T	03/12/2025-28/02/2026	Stream dry on 3/12/2025
DB02T	12/02/2026-28/02/2026	Stream dry as of 12/02/2026
FPWR1	12/11/2025-28/02/2026	Stream dry as of 12/11/2025
ND04T	02/12/2025-28/02/2026	Stream dry as of 2/12/2025
ND12T	15/12/2025-28/02/2026	Stream dry as of 15/12/2025
ND13T	13/01/2026-28/02/2026	Stream dry as of 13/01/2026
PD02T	01/12/2025-28/02/2026	Awaiting Water Corp approval to access Pipe head catchment area
PD03T	01/12/2025-28/02/2026	Awaiting Water Corp approval to access Pipe head catchment area
SE01T	01/02/2026-28/02/2026	Equipment reinstated on 5/02/2026, the stream was dry at the time of installation.
SE03INV3	01/12/2025-28/02/2026	Stream dry as of 1/12/2025
SE04T	20/11/2025-28/02/2026	New monitoring site installed 20/11/2025, stream dry at time of installation.
SE07T	01/11/2025-30/11/2026	Unit removed from the field on 18/09/2025 due to DBCA prescribed burns. Awaiting DBCA approval to access for reinstatement once prescribed burns are completed.
SE08T	09/01/2026-28/02/2026	Stream dry as of 9/01/2026
SE09T	04/01/2026-28/02/2026	Site inspected on 04/01/2026 and stream is dry.
SE10T	01/01/2026-28/02/2026	Stream dry as of 1/01/2026
SE11T	01/12/2025-28/02/2026	Stream dry as of 3/11/2025 at 2:48 AM
SE12INV	12/11/2025-28/02/2026	Stream dry as of 12/11/2025
SE12T	03/12/2025-28/02/2026	Stream dry as of 3/12/2025
SE15T	01/12/2025-28/02/2026	Unit removed from the field on 18/09/2025 due to DBCA prescribed burns. Awaiting DBCA approval to access for reinstatement once prescribed burns are completed.
SE22T	01/12/2025-28/02/2026	Stream dry as of 1/12/2025
SE23T	3/10/2025 -28/02/2026	Stream dry as of 3/10/2025 at 1:42 PM
SE24T	12/11/2025-28/02/2026	Stream dry as of 12/11/2025
SE25T	12/11/2025-28/02/2026	Stream dry as of 12/11/2025
SE26T	28/09/2025-28/02/2026	Stream dry as of 28/09/2025 (dry stream false events omitted)
SE34T	15/12/2025-28/02/2026	Stream dry as of 15/12/2025
SE36T	19/12/2025-28/02/2026	Stream dry as of 19/12/2025
SE48T	21/12/2025-28/02/2026	Stream dry as of 21/12/2025

SE60T	01/02/2026-28/02/2026	Equipment reinstated on 5/02/2026, the stream was dry at the time of installation.
SE62T	17/12/2025-28/02/2026	Stream dry as of 17/12/2025
SN07T	28/02/2026-28/02/2026	Stream dry as of 28/02/2026

5.6. Missing Data

Periods of missing data are detailed in Table 5.

Table 5 Missing Data Summary

Missing Data ID	Unit	Start	End	Comments
MD-2602-001	ND07T	1/02/2026	12/06/2026	Sensor reading fault code from 1/02/2026 to 12/06/2026. Sensor replaced on 12/02/2026.
MD-2602-002	SE52T	20/02/2026	28/02/2026	Level float fluctuating between 1(flow) and 0(dry) due to very low water level. Dry conditions caused the sensor to malfunction from 20/02/2026 to 28/02/2026, causing consistent false data spikes, the sensor is scheduled for replacement.
MD-2602-003	SE53T	01/02/2026	05/02/2026	Equipment reinstated on 5/02/2026
MD-2602-004	SE61T	01/02/2026	12/02/2026	Equipment reinstated on 12/02/2026

6. Appendices

Appendix A. Huntly Raw WQMS Data

Date	Huntly WQMS Data – February 2026 - Events with turbidity > 25 NTU for an hour or more																
	DB01T	DB02T	FPWR1	ND04T	ND06T	ND07T	ND12T	ND13T	ND14T	PD01T	SE01T	SE02T	SE03T	SE05T	SE06T	SE07T	SE08T
1/02/2026					**1**												
2/02/2026															**1**		
3/02/2026		**1**															
4/02/2026		**1**															
5/02/2026																	
6/02/2026																	
7/02/2026																	
8/02/2026															**1**		
9/02/2026					**3**							**1**					
10/02/2026												**1**					
11/02/2026												**4**					
12/02/2026																	
13/02/2026																	
14/02/2026																	
15/02/2026																	
16/02/2026												**1**					
17/02/2026					**1**												
18/02/2026					**1**	**2**											
19/02/2026																	
20/02/2026																	
21/02/2026					**2**												
22/02/2026					**1**										**1**		
23/02/2026																	
24/02/2026																	
25/02/2026												**2**			**1**		
26/02/2026																	
27/02/2026												**1**			**2**		
28/02/2026					**1**												

Note: False events have been annotated by **black** bold text. True events are annotated by **red** bold text.

Date	Huntly WQMS Data -February 2026 - Events with turbidity > 25 NTU for an hour or more																
	SE09T	SE10T	SE11T	SE12T	SE12INV	SE15T	SE34T	SE36T	SE48T	SE51T	SE52T	SE53T	SE59T	SE60T	SE61T	SE62T	SN07T
1/02/2026																	
2/02/2026											**1**		**1**				
3/02/2026																	
4/02/2026																	
5/02/2026											**1**						
6/02/2026																	
7/02/2026																	
8/02/2026											**1**						
9/02/2026																	
10/02/2026																	
11/02/2026																	
12/02/2026										**1**							
13/02/2026																	
14/02/2026																	
15/02/2026																	
16/02/2026																	
17/02/2026																	
18/02/2026											**1**						
19/02/2026																	
20/02/2026												**3**					
21/02/2026																	
22/02/2026											**1**						
23/02/2026																	
24/02/2026											**4**						
25/02/2026											**8**	**1**					
26/02/2026											**7**	**1**					
27/02/2026																	
28/02/2026																	

Note: False events have been annotated by **black** bold text. True events are annotated by **red** bold text.

Date	Huntly WQMS Data – February 2026 - Events with turbidity > 25 NTU for an hour or more																
	SE22T	SE23T	SE24T	SE25T	SE26T	SE03INV1	SE03INV3										
1/02/2026																	
2/02/2026																	
3/02/2026																	
4/02/2026																	
5/02/2026																	
6/02/2026																	
7/02/2026																	
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9/02/2026																	
10/02/2026																	
11/02/2026																	
12/02/2026																	
13/02/2026																	
14/02/2026						**1**											
15/02/2026																	
16/02/2026																	
17/02/2026																	
18/02/2026																	
19/02/2026																	
20/02/2026																	
21/02/2026																	
22/02/2026																	
23/02/2026																	
24/02/2026																	
25/02/2026																	
26/02/2026																	
27/02/2026																	
28/02/2026						**1**											

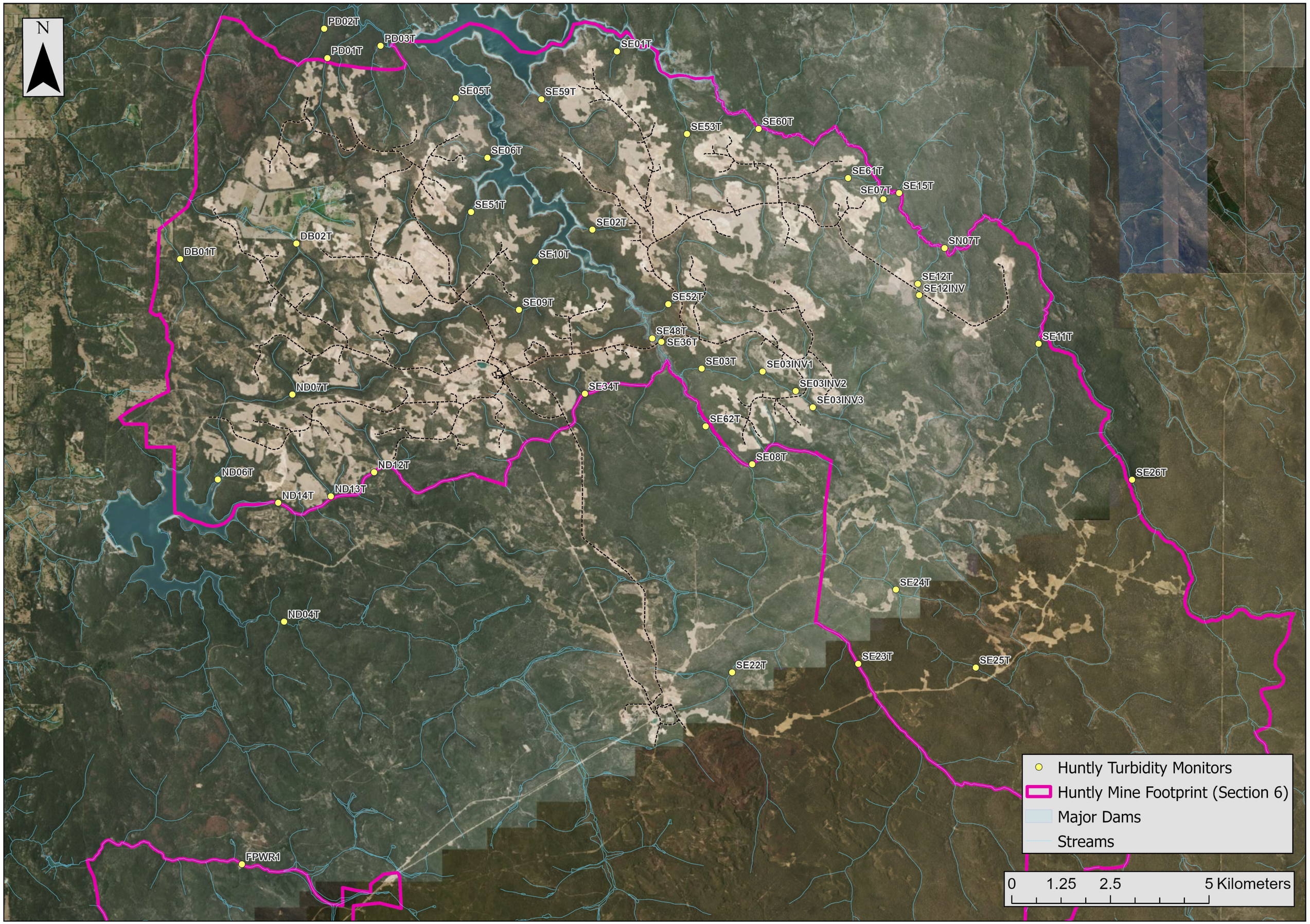
Note: False events have been annotated by **black** bold text. True events are annotated by **red** bold text.

Date	Huntly WQMS Data – February 2026 - Turbidity (Daily Average, NTU)																
	DB01T	DB02T	FPWR1	ND04T	ND06T	ND07T	ND12T	ND13T	ND14T	PD01T	SE01T	SE02T	SE03T	SE05T	SE06T	SE07T	SE08T
1/02/2026		1.46			27.88				1.24	3.87		4.08	5.81	13.07	0.82		
2/02/2026		1.51			4.11				0.84	3.84		4.31	7.49	11.40	924.68		
3/02/2026		41.20			6.02				0.92	3.41		4.53	7.37	11.45	1625.06		
4/02/2026		82.36			6.09				0.89	3.27		4.52	7.84	12.15	1493.13		
5/02/2026		5.84			5.05				0.89	3.63		4.76	7.52	12.18	880.57		
6/02/2026		6.00			8.10				0.97	3.08		5.27	8.23	12.02	810.53		
7/02/2026		6.12			4.96				0.95	3.06		5.76	7.88	11.59	725.26		
8/02/2026		6.66			5.33				0.94	3.53		8.25	8.71	11.48	531.82		
9/02/2026		5.95			11.10				0.99	2.46		21.81	9.73	11.60	472.53		
10/02/2026		5.99			1.79				0.99	0.90		20.60	3.92	11.84	743.59		
11/02/2026		6.34			1.71				1.01	1.25		30.10	1.81	11.81	1015.09		
12/02/2026		6.48			2.22	4.97			1.00	1.82		139.56	5.28	12.67	1212.27		
13/02/2026					2.55	3.67			1.03	1.13		262.25	5.58	12.43	718.82		
14/02/2026					6.10	3.27			1.03	1.00		729.68	5.94	12.52	464.09		
15/02/2026					1.79	4.74			1.03	1.08		180.26	6.47	12.24	355.22		
16/02/2026					1.80	3.26			1.08	1.23		31.95	4.63	11.95	219.53		
17/02/2026					5.34	2.91			1.09	1.33		246.26	4.93	11.81	1.01		
18/02/2026					5.95	8.33			1.14	0.97		165.54	6.14	11.87	1.60		
19/02/2026					3.59	38.13			1.16	1.08		360.24	8.09	11.97	4.94		
20/02/2026					5.14	52.98			1.47	1.19		437.00	10.15	11.89	3.67		
21/02/2026					11.57	50.36			1.28	1.12		462.02	10.46	12.21	11.77		
22/02/2026					10.99	31.92			1.32	1.26		228.85	8.46	12.34	10.77		
23/02/2026					5.91	5.73			1.29	1.45		5.40	8.87	12.17	2.00		
24/02/2026					4.91	5.59			1.35	1.48		6.17	10.28	11.80	3.68		
25/02/2026					12.66	5.44			1.24	1.12		12.71	10.20	11.73	14.35		
26/02/2026					30.77	5.67			0.92	5.74		132.47	15.33	12.36	15.63		
27/02/2026					3.71	5.89			0.83	1.15		22.07	5.81	11.97	11.99		
28/02/2026					9.69	6.04			0.87	1.00		139.37	12.01	12.32	10.44		

Date	Huntly WQMS Data – February 2026 - Turbidity (Daily Average, NTU)																
	SE09T	SE10T	SE11T	SE12T	SE12INV	SE15T	SE34T	SE36T	SE48T	SE51T	SE52T	SE53T	SE59T	SE60T	SE61T	SE62T	SN07T
1/02/2026	2.95									1.34	2.80		6.16				
2/02/2026	7.21									1.35	407.86		74.96				
3/02/2026	9.94									2.65	73.97		6.51				
4/02/2026	10.19									1.72	12.32		1.54				
5/02/2026										1.75	111.09	0.86	1.73				
6/02/2026										1.35	97.48	0.77	1.96				
7/02/2026										1.30	73.94	0.75	2.37				
8/02/2026										1.33	20.50	0.81	2.56				
9/02/2026										1.43	10.04	0.81	3.07				
10/02/2026										1.60	7.17	0.94	3.25				
11/02/2026										7.42	4.29	2.56	2.66				
12/02/2026										25.73	4.55	1.69	2.12		1.82		
13/02/2026										1.52	4.89	1.30	2.11		1.79		
14/02/2026										1.43	5.55	0.93	2.05		1.75		
15/02/2026										1.36	6.31	1.01	2.17		1.79		
16/02/2026										1.27	4.67	7.17	2.37		1.82		
17/02/2026										1.02	4.18	1.43	2.66		1.88		
18/02/2026										1.03	13.09	1.44	2.90		1.82		
19/02/2026										1.08	4.25	3.52	3.23		1.88		
20/02/2026										1.05	12.91	11.57	3.59		1.90		
21/02/2026										1.11	38.46	0.77	4.19		2.06		
22/02/2026										1.14	30.25	0.81	4.03		2.24		
23/02/2026										1.14	27.79	0.92	4.42		2.30		
24/02/2026										1.17	33.45	1.01	4.98		2.40		
25/02/2026										1.15	158.27	8.22	5.57		2.55		
26/02/2026										1.26	126.11	26.48	5.89		3.37		
27/02/2026										5.61	69.15	0.67	4.71		2.83		
28/02/2026										1.11	26.15	0.70	4.28		5.96		

Date	Huntly WQMS Data – February 2026 - Turbidity (Daily Average, NTU)																	
	SE22T	SE23T	SE24T	SE25T	SE26T	SE03INV1	SE03INV3											
1/02/2026						21.78												
2/02/2026						1.77												
3/02/2026						27.84												
4/02/2026						1.96												
5/02/2026						2.04												
6/02/2026						1.95												
7/02/2026						2.28												
8/02/2026						2.53												
9/02/2026						5.29												
10/02/2026						7.80												
11/02/2026						6.03												
12/02/2026						7.14												
13/02/2026						10.64												
14/02/2026						20.74												
15/02/2026						58.44												
16/02/2026						266.43												
17/02/2026						293.20												
18/02/2026						403.50												
19/02/2026						193.81												
20/02/2026						2.38												
21/02/2026						3.16												
22/02/2026						2.54												
23/02/2026						4.92												
24/02/2026						5.57												
25/02/2026						6.26												
26/02/2026						8.11												
27/02/2026						14.14												
28/02/2026						23.54												

Appendix B. Huntly WQMS Locations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SE02T
DB02T
DB01T
SN07T
SE10T
SE12T
SE12INV
SE52T
SE09T
SE48T
SE36T
SE11T
SE03T
SE03INV1
SE03INV2
SE03INV3
ND07T
SE34T
SE62T
SE08T
ND12T
ND06T
ND13T
ND14T
SE26T
SE24T
ND04T
SE23T
SE25T
SE22T
FPWR1
Huntly Turbidity Monitors
Huntly Mine Footprint (Section 6)
Major Dams
Streams
0
1.25
2.5
5 Kilometers

Appendix C. WQMS General Arrangement

ANTENNA

SOLAR PANEL

DATA TRANSMISSION TO IOT

DATA OUTLET

POWER INLET

40 X 60 MM CABLE DUCT

20 AMP MPPT
SOLAR CHARGER

40 X 60 MM CABLE DUCT

SIERRA WIRELESS FX30

40 X 60 MM CABLE DUCT

12 V, 120 AH LI-ION BATTERY

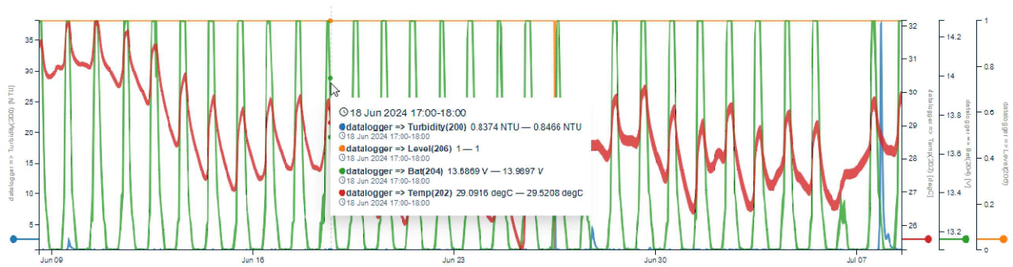
DATA INLET

SENSOR

STREAM DRY

SENSOR

STREAM FLOWING



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0	ISSUE FOR APPROVAL	05.07.2024	A.K.	S.A.	A.K.	A.K.	

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SCIDEV

TITLE
IOT TURBIDITY MONITORING STATION
SITE LAYOUT
GENERAL ARRANGEMENT

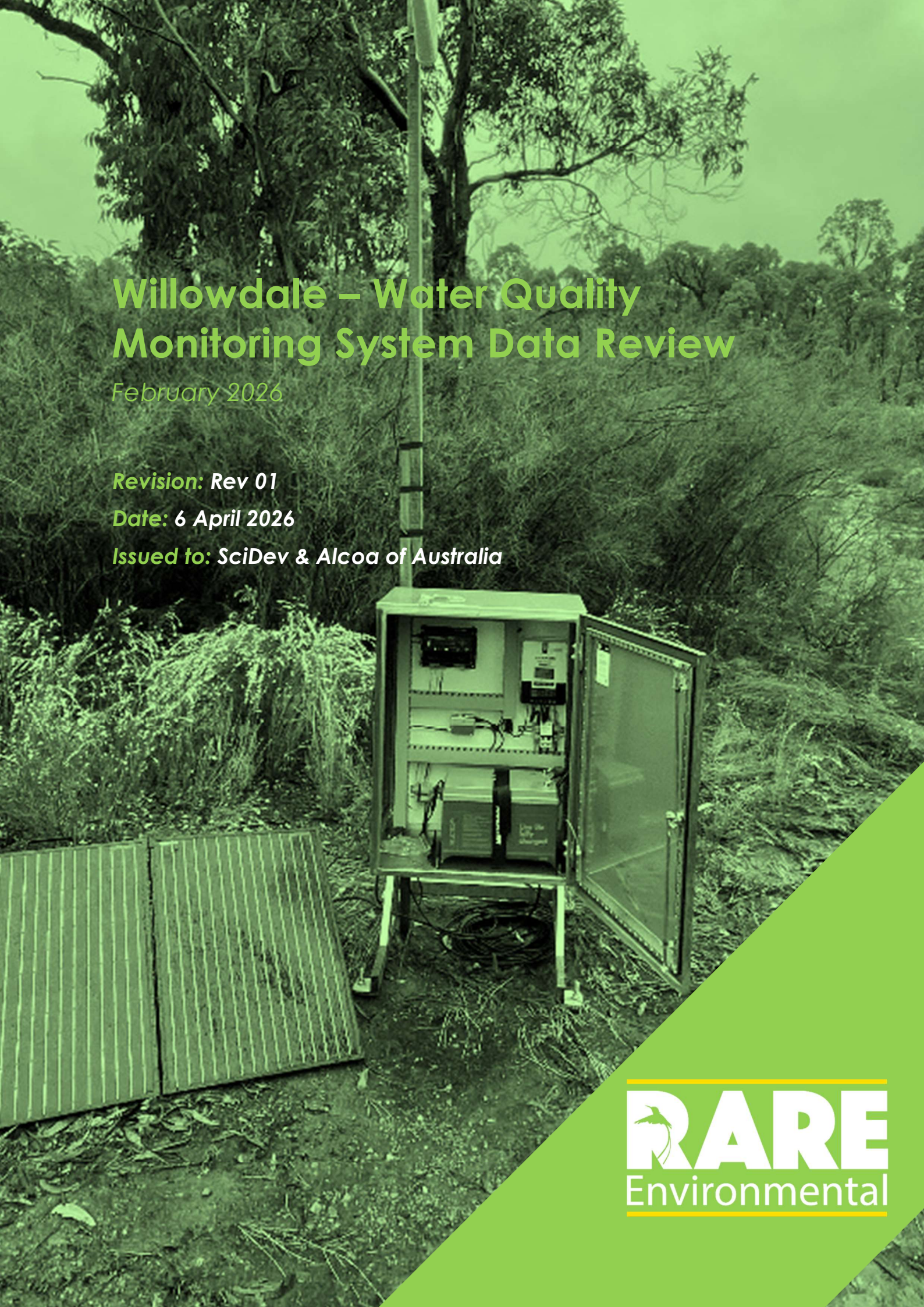
SHEET 1 OF 2

SCALE NTS OR AS SHOWN

DRAWING NO.
HI0090 - ALCOA WQMS

SHEET SIZE
A3

REV.
1



Willowdale – Water Quality Monitoring System Data Review

February 2026

Revision: ***Rev 01***

Date: ***6 April 2026***

Issued to: ***SciDev & Alcoa of Australia***

RARE Environmental

Document Control

Project Details	
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Document No	RP24050 WDL WQMS Data Review - February 2026
Project Name	WQ Data Processing
Project Number	RP24050
Client Reference	PO002447

Document History and Status						
Revision	Date	Description	Prepared	Reviewed	Approved	Issued to
01	06/04/2026	Issued to client	MM	GD	GD	Alcoa

Report Sign Off					
Report Version	01				
Prepared by		Technical Review		Approved for Issue	
Michael Minter		Georgia Duffy		Georgia Duffy	
Name	Michael Minter	Name	Georgia Duffy	Name	Georgia Duffy
Position	Env. Engineer	Position	Chemical Engineer	Position	Chemical Engineer
Date	06/04/2026	Date	06/04/2026	Date	06/04/2026

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Infrastructure Sustainability Council MEMBER

Contents

1. Executive Summary

This report, prepared by RARE Environmental Pty Ltd and SciDev Pty Ltd for Alcoa, provides an analysis of turbidity data collected from Water Quality Monitoring Systems (WQMS) deployed at the Willowdale bauxite mining operations during February 2026. The primary objective of this analysis was to evaluate the quality of the data, identify potential "true" turbidity exceedance events, and support Alcoa's compliance reporting obligations under Schedule 1, Division 2, Clause 6 of the **Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023**.

The analysis focused on identifying and classifying turbidity events where levels exceeded 25 nephelometric turbidity units (NTU) for at least one hour. Events were categorized as "true" or "false" based on Alcoa's **Turbidity Event Classification Guidelines**, which distinguish actual turbidity increases (true events) from false readings caused by environmental factors such as debris, air bubbles, or fluctuating water levels.

Key findings include

- **False Events**: One 'False' event was identified, primarily attributed to transient local interference.
- **Further Investigation**: Zero events were flagged for further investigation.
- **True Events**: Zero "True" turbidity exceedance event were identified.
- **Excluded Units**: Two WQMS unit were temporarily excluded from the analysis due to limited water in the stream.
- **Missing data**: Zero sustained periods of missing data were identified in this reporting period.

2. Scope

RARE Environmental Pty Ltd and SciDev Pty Ltd were engaged by Alcoa to analyse turbidity data collected from the Willowdale Water Quality Monitoring Systems (WQMSs). The primary objective of this engagement is to assess the quality of the collected data and identify potential "true" turbidity events. This analysis supports Alcoa's reporting obligations under *Schedule 1, Division 2, Clause 6 of the Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

3. Introduction

3.1. Background

Alcoa of Australia Ltd (Alcoa) operates two bauxite mines, Huntly and Willowdale, approximately 100 km southeast of Perth, Western Australia. These mining operations are subject to environmental controls mandated by the *Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

Under this Exemption Order, Alcoa is required to implement drainage control measures and monitor effectiveness in water bodies within and downstream of mining operations. Turbidity, a critical water quality parameter, is monitored using Water Quality Monitoring Systems (WQMSs), to detect deviations and identify high-turbidity events.

Alcoa is obligated to report monthly on-stream turbidity, including the identification and classification of any “true” high-turbidity exceedance events. (Refer to Appendix B for the site map showing WQMS locations.)

3.2. Monitoring requirements

Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023 specifies that a drainage incident occurs when:

> *a) runoff from a disturbance area enters the surrounding environment, resulting in surface water turbidity of at least 25 NTU for a duration of at least one hour; or*
>
> *b) a discharge from containment infrastructure includes, or February include, environmentally hazardous material.*

Trigger levels for drainage incidents are outlined in *Schedule 1* of the Exemption Order. To meet these requirements, Alcoa has developed "Turbidity Event Classification Guidelines" which define a true turbidity exceedance event as a WQMS recording turbidity levels of at least 25 NTU for a period exceeding one hour.

3.3. Water Quality Management Systems (WQMSs)

During the February 2026 monitoring period, four Turbidity units were deployed in section six areas to monitor turbidity levels in streams subject to surface water runoff within and downstream of Willowdale mining operations.

Each WQMS unit consists of the following components:

Aquas SMR10 Turbidity Probe

> Positioned at a 90-degree angle to water flow, each probe is equipped with an automatic lens wiper and a guard to protect against larger debris.

Data Taker DT82 Logger

> Records data locally every six seconds, with 6-minute averages transmitted via IoT-enabled modems to a cloud-based platform.

Float Switch

Detects whether the sensor is submerged, or the stream is dry.

3.4. Purpose

This report aims to analyse turbidity data collected during February 2026, focusing on the identification and classification of "true" turbidity exceedance events based on Alcoa's Turbidity Event Classification Guidelines.

3.5. Exclusions

This report is not intended as:

- An assessment of the WQMS network or Alcoa's compliance with relevant legislation and requirements.
- An evaluation of the suitability of the trigger levels or event classification procedures adopted by Alcoa.

3.6. Abbreviations

	Term
IoT	Internet of Things
NTU	Nephelometric Turbidity Units
WQMS	Water Quality Management System

4. Methodology

4.1. WQMS Locations

A site map showing the WQMSs locations is provided in Appendix B.

4.2. Data Review

Data recorded by the WQMS Units was reviewed and potential events where turbidity levels exceeded 25 NTU for at least one hour. Each potential event was categorised as either 'true 'or 'false'.

4.2.1. True Turbidity Exceedance Events

These events are caused by an actual increase in stream turbidity. Per Alcoa's "Turbidity Event Classification Guidelines" true exceedance events typically exhibit:

- A sharp, sudden incline in turbidity levels.
- A return to baseline turbidity levels in a pattern resembling a normal (Gaussian) distribution.

Figure 1 Typical 'true' exceedance event showing the sharp incline and gradual return to background levels.

4.2.2. False Turbidity Exceedance Events

These events are caused by factors unrelated to actual turbidity increase, such as:

- Organic debris (e.g., leaves, sticks, algae) obstructing the sensor
- Air bubbles or water turbulence near the sensor
- Fluctuating water levels intermittently covering and uncover the sensor lens.

False events typically exhibit sharp inclines and declines without the characteristic bell curve shape of true events.

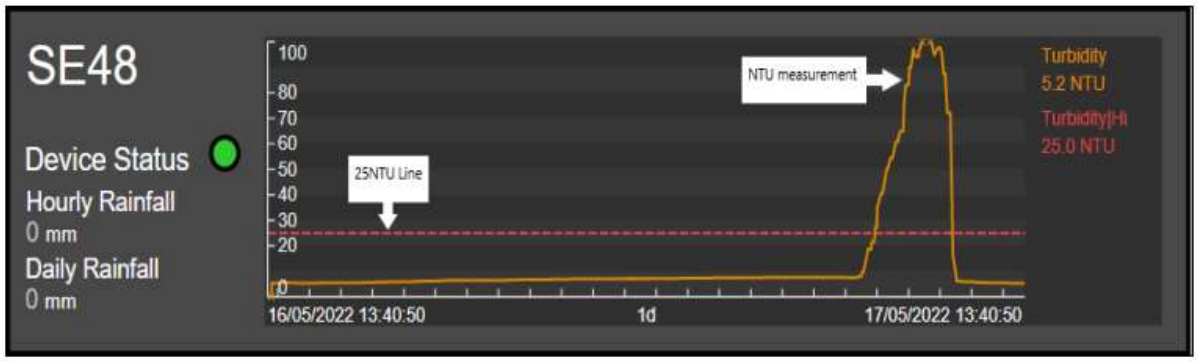


Figure 2 Typical 'false' exceedance event showing both a sharp incline and decline

4.2.3. Missing Data

Missing data occurs when a WQMS unit fails to record information, this can occur from unexpected system logoffs, equipment faults, or unplanned shutdowns.

5. Results and Discussion

5.1. Events

Table 1 provides a summary of identified events. Table 2 offers detailed information about each event.

Table 1 Events Summary

Category	# of events
Flagged for further investigation	0
False	1

Table 2 Events Details

Event ID	WQMS ID	Event Category	Start	End	Duration	Peak Turbidity (NTU)	Average Turbidity (NTU)
WDL-2602-001	RHB3	'False'	21/02/2026 19:23	21/02/2026 20:54	1 hr 31 min	1720.5	990.8

5.2. Additional Investigation

Zero events were flagged for additional investigation

5.3. False Event(s)

One false event was identified during the reporting period. A summary of the result is provided in Table 3.

Table 3 False Events Rationale

Event ID	Monitor ID	Rationale	Field Notes
WDL-2602-001	RHB3	The event shows an abrupt rise to very high turbidity with a sustained plateau and a rapid fall back toward baseline. This pattern is consistent with localised probe disturbance or sensor fouling, based on this the event is considered false.	Stream inspected on 02/03/2026 at 9:20am. Stream was flowing well at the time of the inspection and there were no signs of turbidity. Event not identified until more than one week later. The event consisted of a very sharp and very sudden increase in readings, high readings for the duration of the event and a very sharp and sudden decrease. This is indicative of a fault with the equipment rather than something environmental. Event classified as a false event.

5.4. Excluded WQMS Units

Two WQMS Unit was excluded from analysis due to erroneous data. Alcoa confirmed the invalidity of data recorded from these units and provided commentary on the condition of each.

Table 1 Excluded WQMS Units

Unit	Dates	Comments
HV07T	01/02/2026-28/02/2026	Stream dry. Probe installed in bucket of deionised water.
HV49T	01/02/2026-28/02/2026	Stream dry.

5.5. Missing Data

No periods of missing data were identified during the reporting period.

6. Appendices

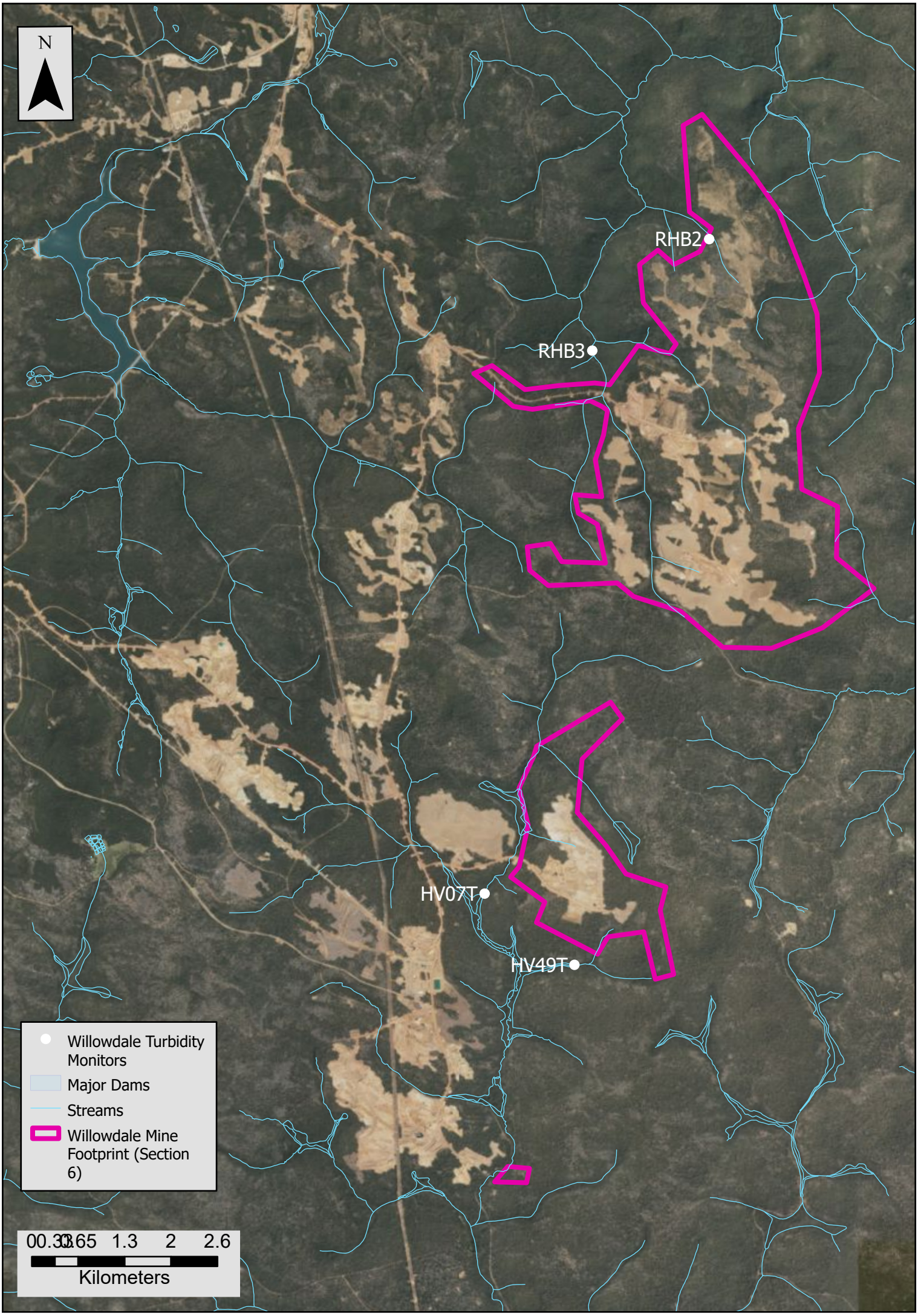
Appendix A. Willowdale Raw WQMS Data

Date	Willowdale WQMS Data - February 2026 - Events with turbidity > 25 NTU for an hour or more			
	HV07T	HV49T	RHB2	RHB3
1/02/2026				
2/02/2026				
3/02/2026				
4/02/2026				
5/02/2026				
6/02/2026				
7/02/2026				
8/02/2026				
9/02/2026				
10/02/2026				
11/02/2026				
12/02/2026				
13/02/2026				
14/02/2026				
15/02/2026				
16/02/2026				
17/02/2026				
18/02/2026				
19/02/2026				
20/02/2026				
21/02/2026				**1**
22/02/2026				
23/02/2026				
24/02/2026				
25/02/2026				
26/02/2026				
27/02/2026				
28/02/2026				

Date	Willowdale WQMS Data - February 2026 – Daily Average Turbidity (NTU)			
	HV07T	HV49T	RHB2	RHB3
1/02/2026			0.75	0.96
2/02/2026			0.60	0.88
3/02/2026			0.52	0.96
4/02/2026			0.63	0.99
5/02/2026			0.72	1.05
6/02/2026			0.51	1.67
7/02/2026			0.37	1.07
8/02/2026			0.34	0.84
9/02/2026			0.89	0.78
10/02/2026			0.53	0.82
11/02/2026			0.43	0.85
12/02/2026			0.43	0.87
13/02/2026			1.25	1.64
14/02/2026			0.42	30.46
15/02/2026			0.86	1.49
16/02/2026			0.50	0.78
17/02/2026			0.38	3.09
18/02/2026			0.37	7.27
19/02/2026			0.40	25.85
20/02/2026			0.39	5.97
21/02/2026			0.34	67.81
22/02/2026			0.36	1.52
23/02/2026			0.35	15.18
24/02/2026			0.36	0.79
25/02/2026			0.47	0.73
26/02/2026			0.40	0.71
27/02/2026			2.29	0.70
28/02/2026			0.35	0.77

* - Adjusted average with sensor fault data removed

Appendix B. Willowdale WQMS Locations


N
RHB2
RHB3
HV07T
HV49T
Willowdale Turbidity Monitors
Major Dams
Streams
Willowdale Mine Footprint (Section 6)
0 0.33 0.65 1.3 2 2.6
Kilometers

Appendix C. WQMS General Arrangement

ANTENNA

SOLAR PANEL

DATA TRANSMISSION TO IOT

DATA OUTLET

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40 X 60 MM CABLE DUCT

20 AMP MPPT
SOLAR CHARGER

40 X 60 MM CABLE DUCT

SIERRA WIRELESS FX30

40 X 60 MM CABLE DUCT

12 V, 120 AH LI-ION BATTERY

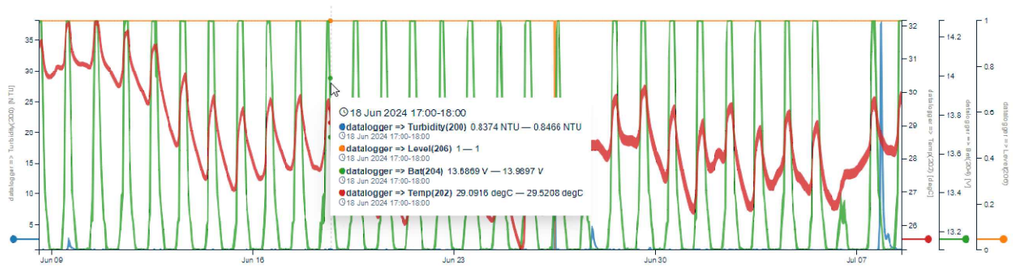
DATA INLET

SENSOR

STREAM DRY

SENSOR

STREAM FLOWING



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SCIDEV

TITLE
IOT TURBIDITY MONITORING STATION
SITE LAYOUT
GENERAL ARRANGEMENT

SHEET 1 OF 2

SCALE NTS OR AS SHOWN

DRAWING NO.
HI0090 - ALCOA WQMS

SHEET SIZE
A3

REV.
1