Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

March 2022

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Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environment and Community Advisor**	**Final**	**02/08/2022**

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mount Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1 March to 31 March 2022.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

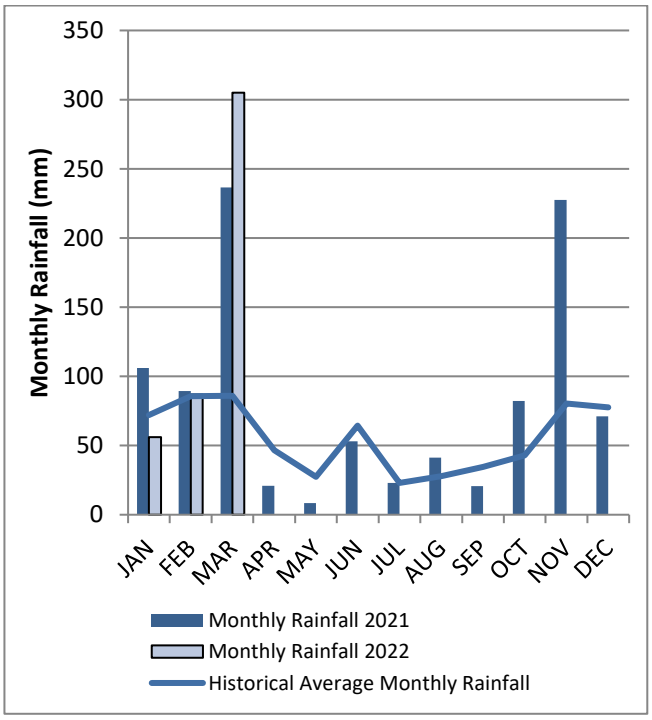
Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to **Figure 3**: Air Quality Monitoring Locations).

2.1.1 Rainfall

Rainfall for the period is summarised in **Table 1**, the year-to-date trend and historical trend are shown in **Figure 1**.

Table 1: Monthly Rainfall MTW

2022	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
March	305	447.8



Note: The historical average monthly rainfall is calculated from 2007 to 2022 monthly totals

2.1.2 Wind Speed and Direction

Winds from the south east were dominant throughout the reporting period as shown in

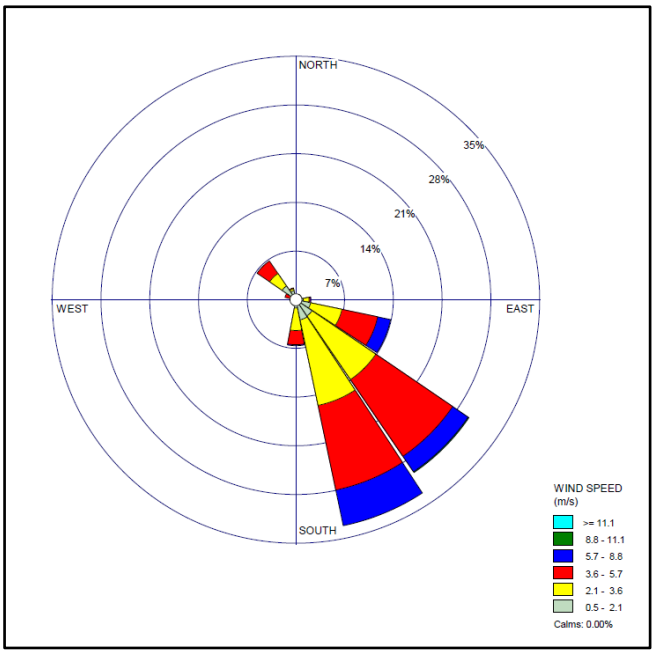


Figure 2.

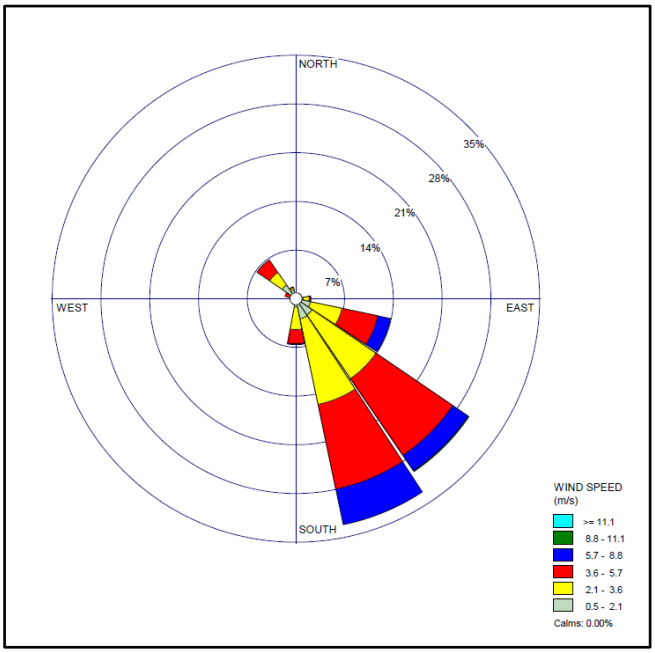


Figure 2: Charlton Ridge Wind Rose – March 2022

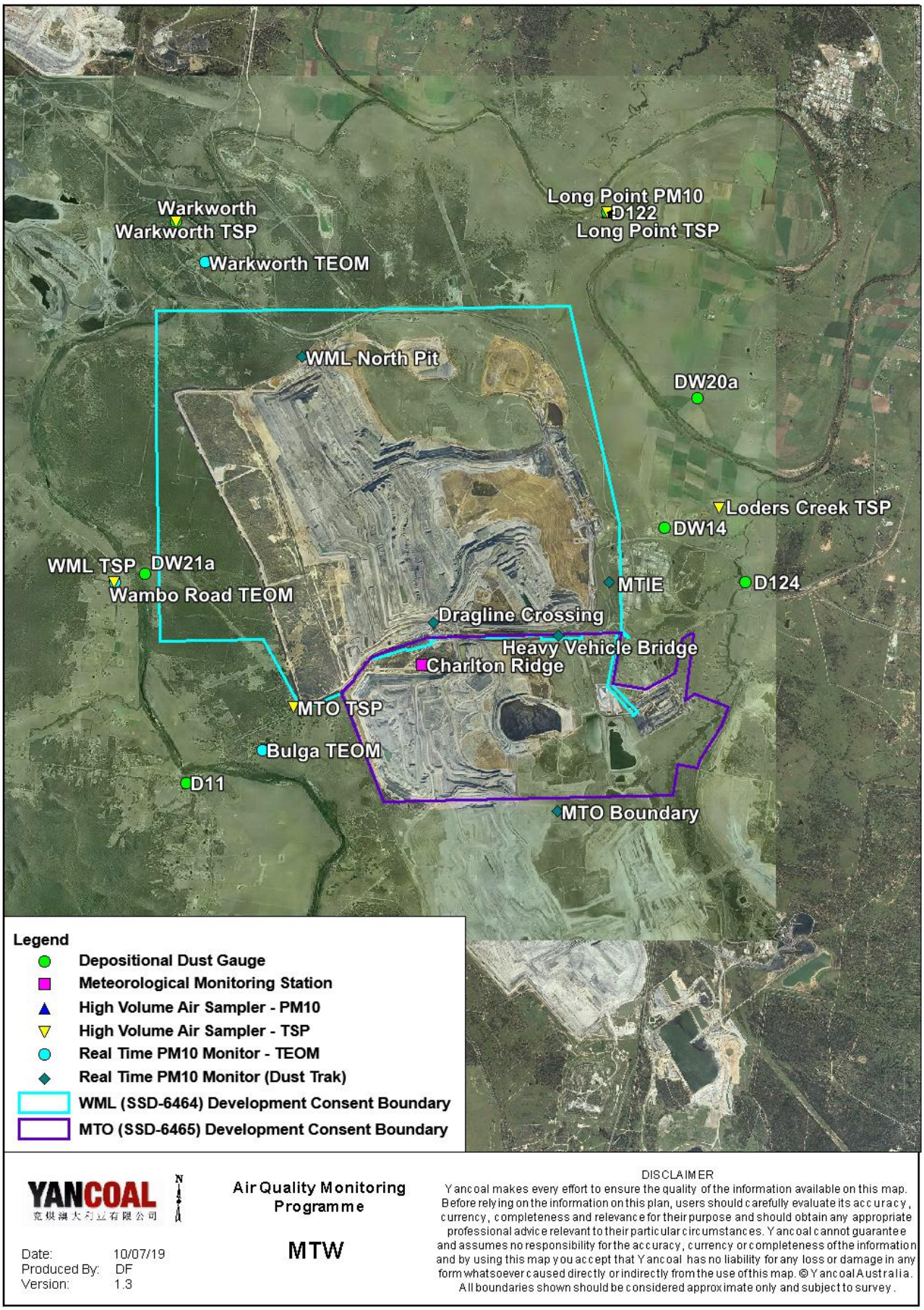


Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

To monitor regional air quality, MTW operates and maintains a network of seven depositional dust gauges, situated on private and mine owned land surrounding MTW.

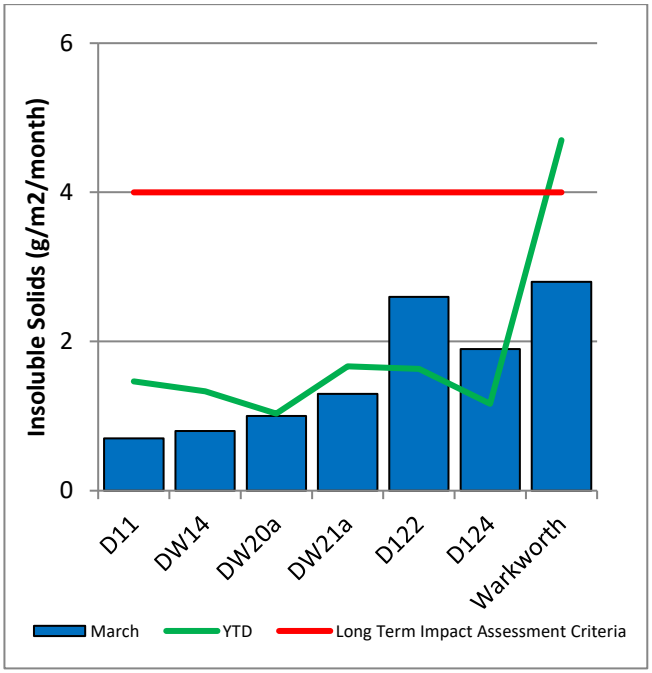


Figure 4 displays insoluble solids results from depositional dust gauges during the reporting period compared against the year-to-date average and the annual impact assessment criteria.

An annual assessment of MTW's compliance with the Long-Term Impact Assessment Criteria will be provided in the 2022 Annual Review Report.

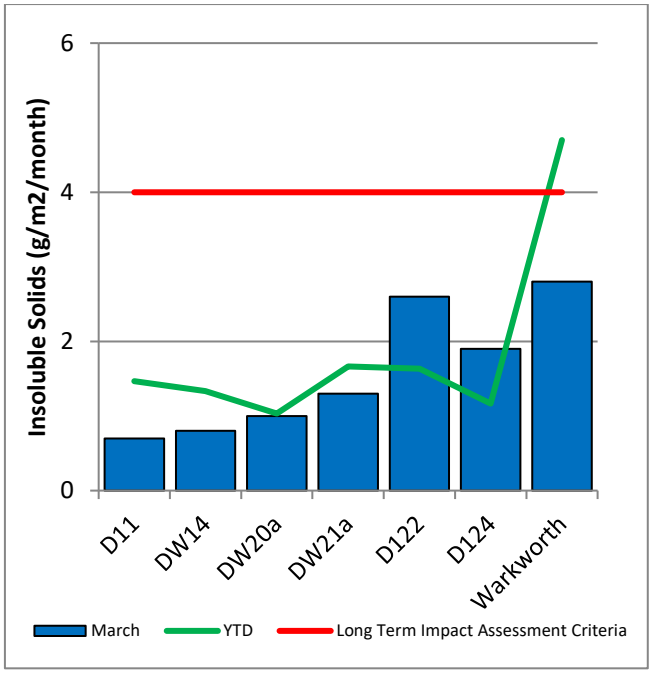


Figure 4: Depositional Dust – March 2022

2.3 Suspended Particulates

Suspended particulates are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM_{10}). The location of these monitors can be found in **Figure 3**. Each HVAS was run for 24 hours on a six-day cycle in accordance with EPA requirements.

2.3.1 HVAS PM_{10} Results

Figure 5 shows the individual PM_{10} results at the monitoring station against the short-term impact assessment criteria of 50µg/m³.

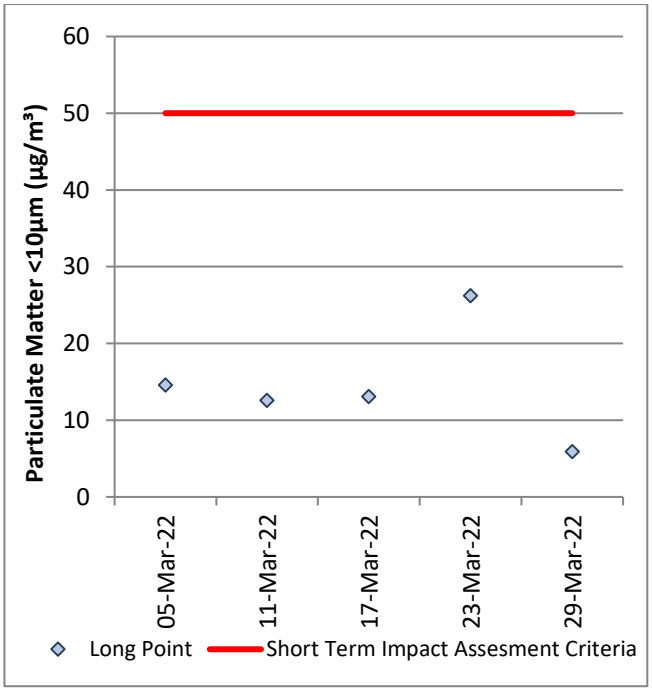


Figure 5: Individual PM_{10} Results – March 2022

Figure 6 shows the annual average PM_{10} results against the long-term impact assessment criteria.

An annual assessment of MTW's compliance with the Long-Term Impact Assessment Criteria will be provided in the 2022 Annual Review Report.

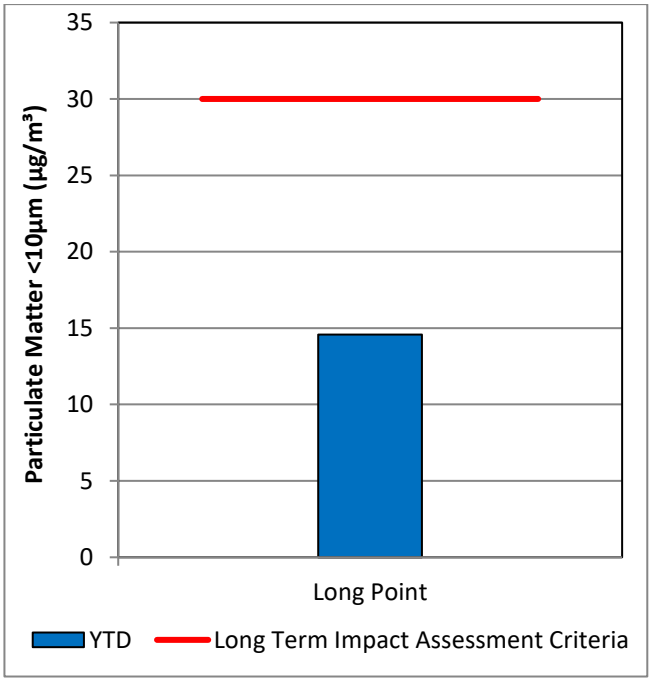


Figure 6: Annual Average PM_{10} – March 2022

2.3.2 TSP Results

Figure 7 shows the annual average TSP results compared against the long-term impact assessment criteria of 90µg/m³.

An annual assessment of MTW's compliance with the Long-Term Impact Assessment Criteria will be provided in the 2022 Annual Review Report.

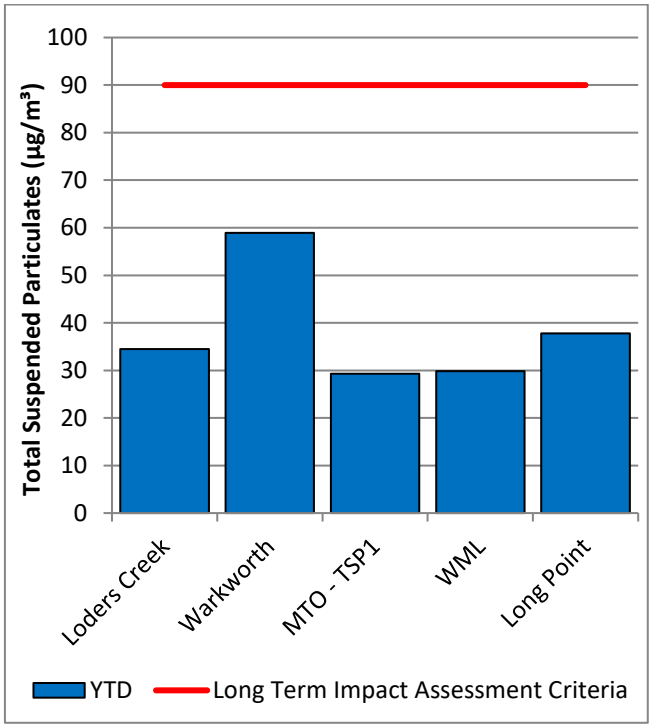


Figure 7: Annual Average Total Suspended Particulates – March 2022

2.3.3 Real Time PM_{10} Results

Mount Thorley Warkworth maintains a network of real time PM_{10} monitors. The real-time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger limits.

Results for real time dust sampling are shown in **Figure 8**, including the daily 24-hour average PM_{10} result and the annual PM_{10} average.

2.3.4 Real Time Alarms for Air Quality

During March, the real-time monitoring system generated 25 automated air quality related alerts, including 12 alerts for adverse meteorological conditions and 13 alerts for elevated PM_{10} levels.

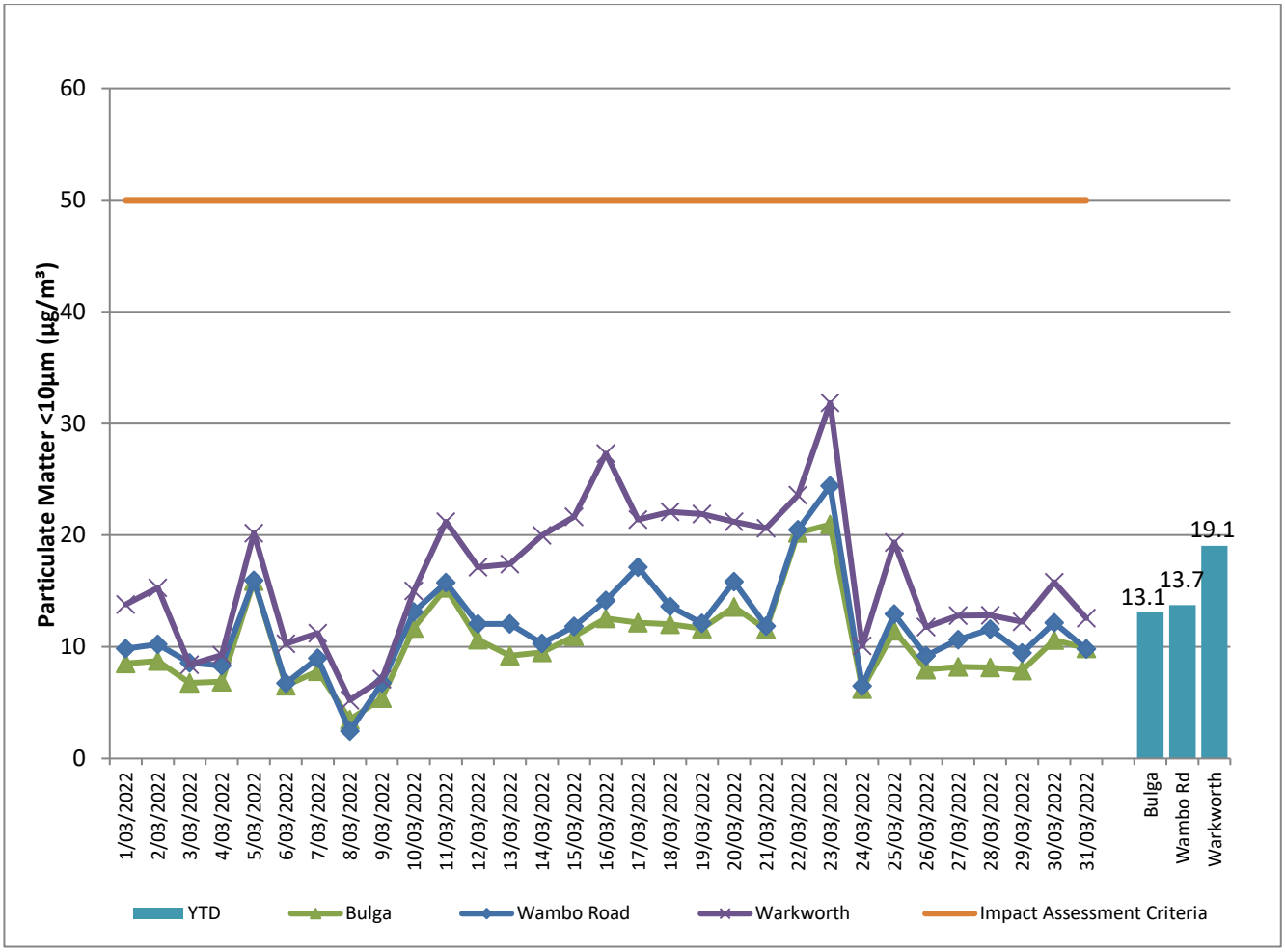


Figure 8: Real Time PM_{10} 24hr average and Year-to-date average – March 2022

3.0 WATER QUALITY

MTW maintains a network of surface water and groundwater monitoring sites.

3.1 Surface Water

Monitoring is conducted at mine site dams and surrounding natural watercourses. The surface water monitoring locations are outlined in **Figure 15**.

Surface water courses are sampled on a monthly or quarterly sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS). The Hunter River and the Wollombi Brook are sampled both upstream and downstream of mining operations, to monitor the potential impact of mining. Other Hunter River tributaries are also monitored.

3.1.1 Surface Water Monitoring Results

Figure 9 to **Figure 11** show the long-term surface water trend (2019 – current) within MTW mine dams. **Figure 12** to **Figure 14** show the long-term surface water trend (2018 - current) in surrounding watercourses.

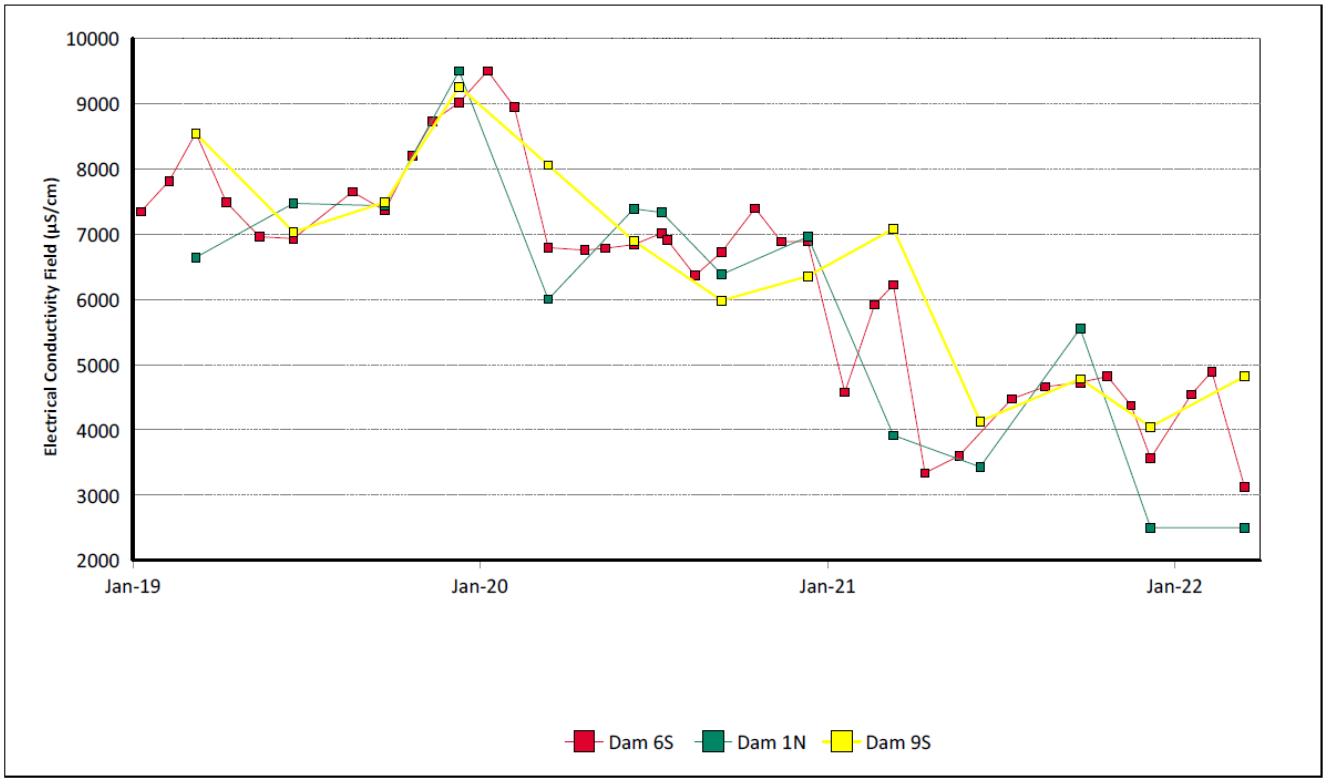


Figure 9: Site Dams Electrical Conductivity Trend – March 2022

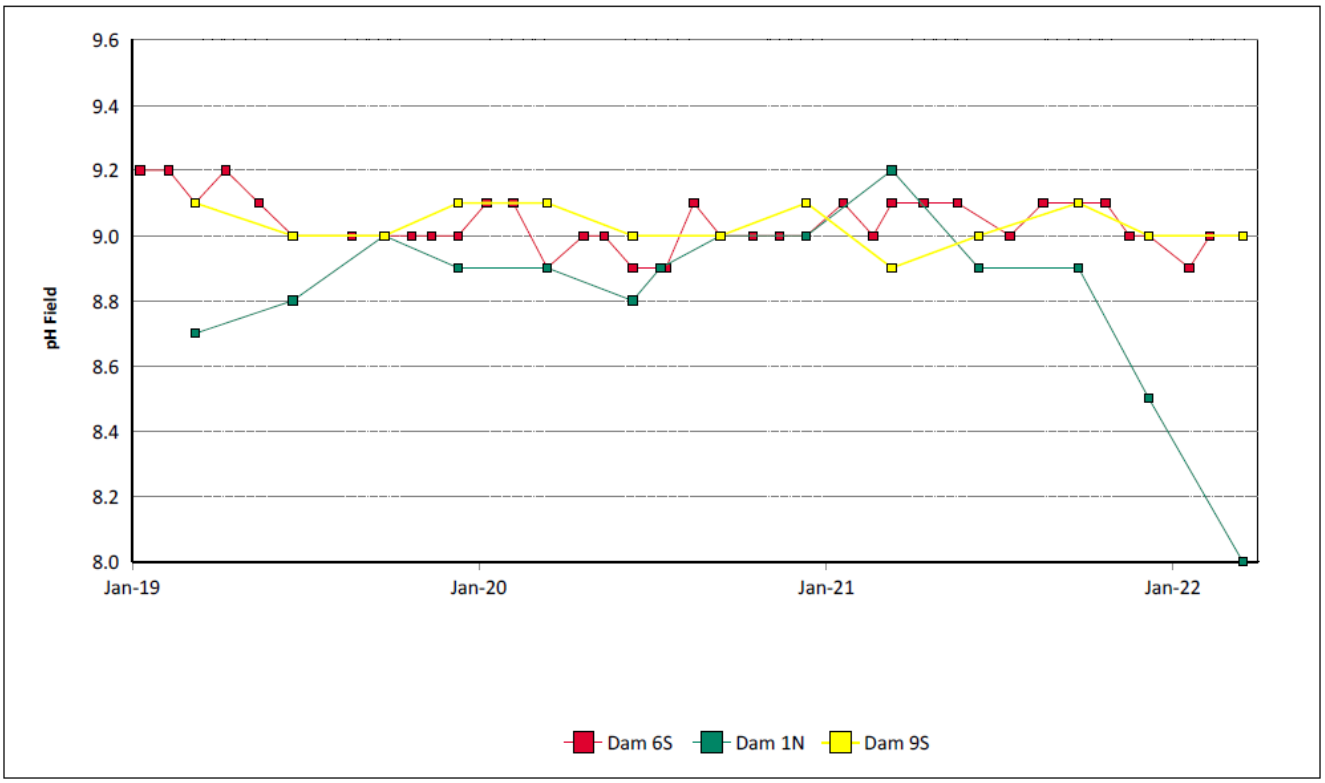


Figure 10: Site Dams pH Trend – March 2022

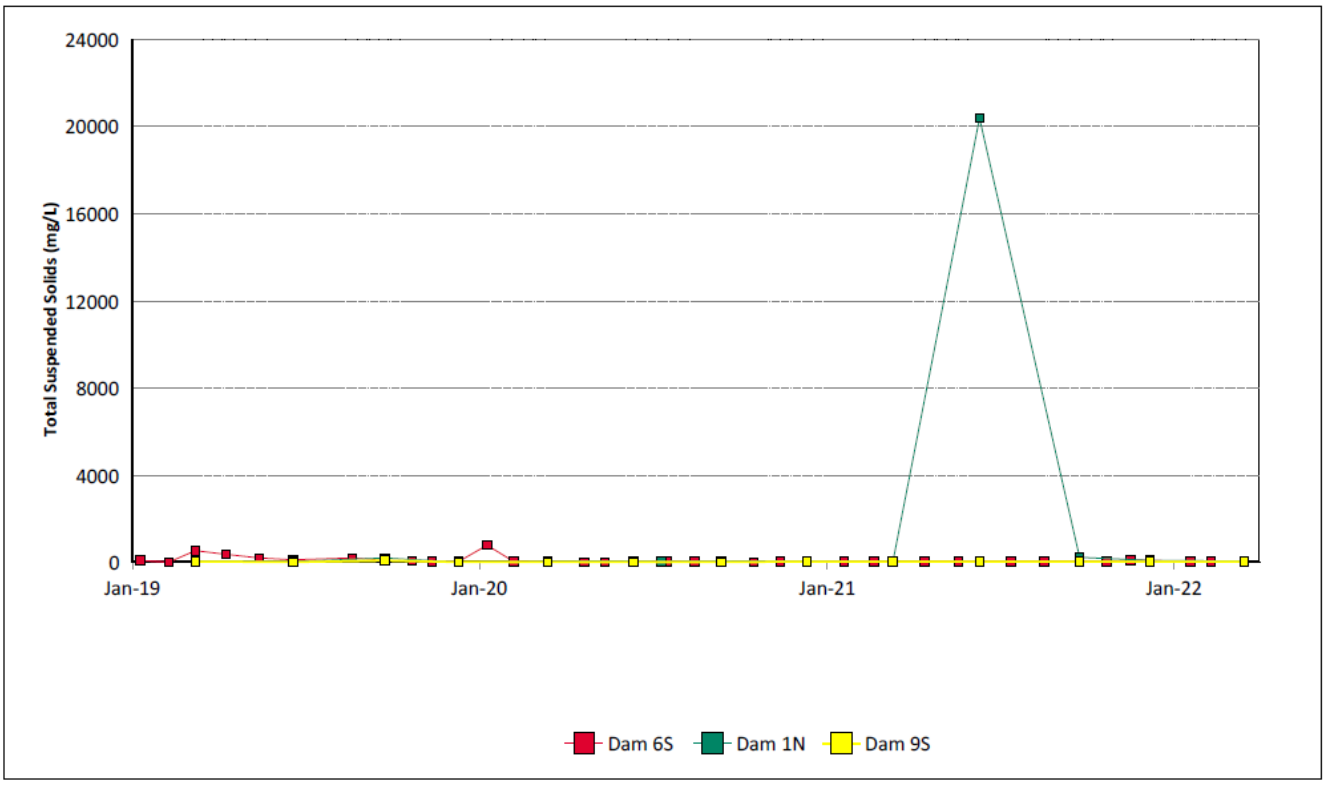
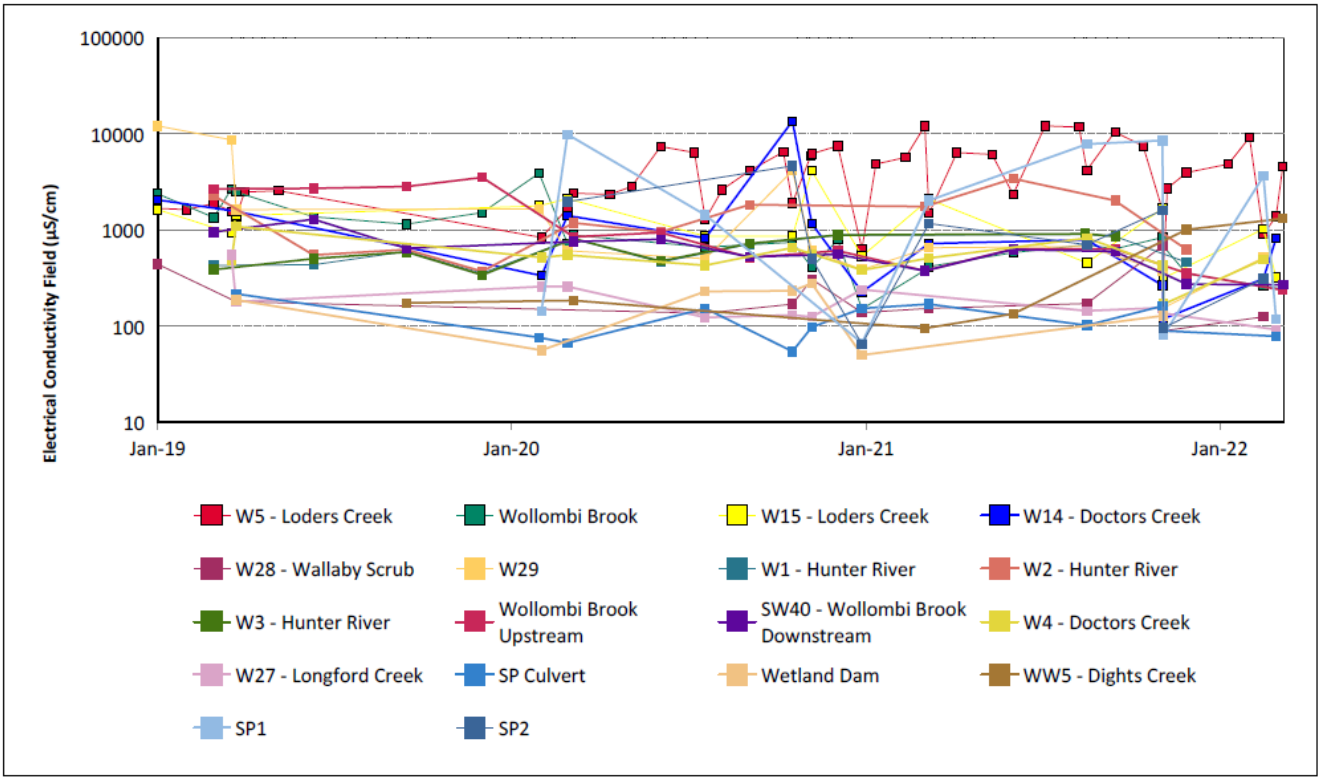
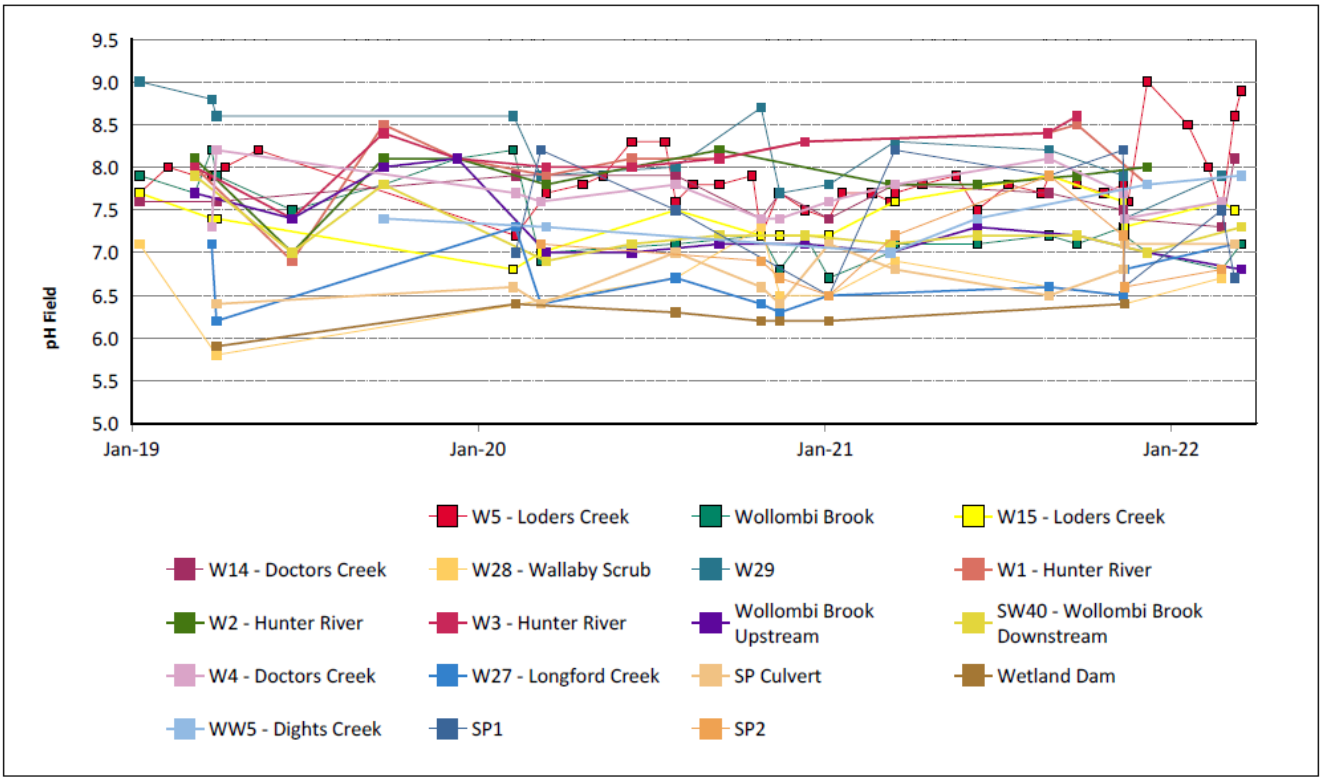


Figure 11: Site Dams Total Suspended Solids Trend – March 2022



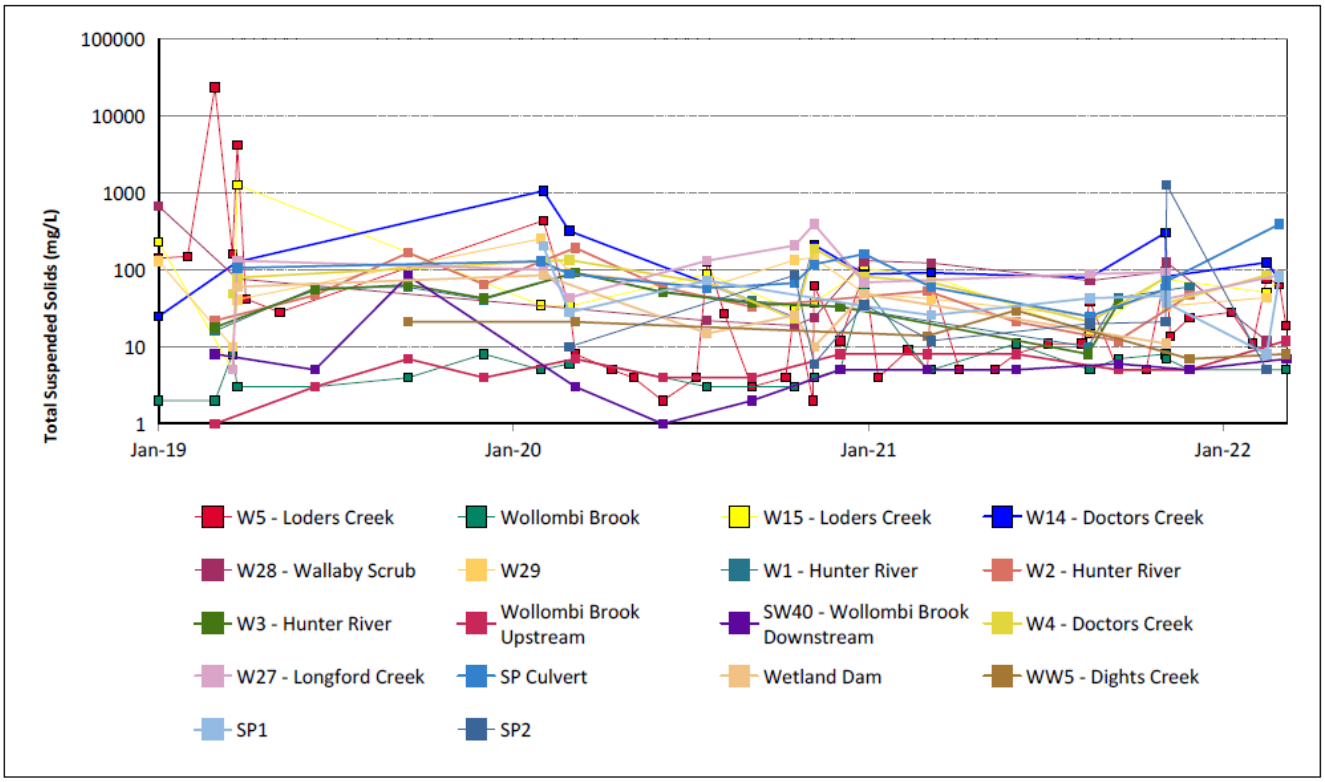
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 12: Watercourse Electrical Conductivity Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 13: Watercourse pH Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 14: Watercourse Total Suspended Solids Trend – March 2022

3.1.2 Surface Water Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis, and to highlight potentially adverse surface water impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses are outlined in the MTW Water Management Plan.

Current internal surface water trigger limit breaches are summarised in **Table 2**.

Table 2: Surface Water Trigger Tracking – March YTD 2022

Site	Date	Trigger Limit Breached	Action Taken in Response
WW5	15/03/2022	EC – 95th Percentile	Watching Brief*
W5	15/03/2022	pH – 95th Percentile	Watching Brief*
SP1	08/03/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (53.2mm on 7/03/2022 and 78.4mm on 8/03/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required.
W4	23/02/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (21.0mm on 22/02/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required.
W5	23/02/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (21.0mm on 22/02/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required.
W5	8/03/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (53.2mm on 7/03/2022 and 78.4mm on 8/03/2022), resulting in mobilisation of sediment. No follow up required.
W14	23/02/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (21.0mm on 22/02/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required. No follow up required.
W14	8/03/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (53.2mm on 7/03/2022 and 78.4mm on 8/03/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required.
W15	23/02/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (21.0mm on 22/02/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required. No follow up required.

Site	Date	Trigger Limit Breached	Action Taken in Response
W15	8/03/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (53.2mm on 7/03/2022 and 78.4mm on 8/03/2022), resulting in mobilisation of sediment. MTW were also discharging into Loders Creek from Dam 9S on this day, although TSS results from the discharge point were below the trigger limit. No follow up required.
W27	8/03/2022	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with high runoff due to rainfall event (53.2mm on 7/03/2022 and 78.4mm on 8/03/2022), resulting in mobilisation of sediment. No MTW site sources of sediment identified. No follow up required.
* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.			

* = Watching brief established pending outcomes of subsequent monitoring events.

3.2 HRSTS Discharge

MTW participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing discharge from licensed discharge points located at Dam 1N and Dam 9S. Discharges can only take place subject to HRSTS regulations.

During the reporting period licenced HRSTS discharge from Dam 9S (EPL 1976 Point 4) occurred from the 4 March to 29 March 2022 discharging a total of 1,298ML.

Note: Reported discharge volume data is based on HRSTS 24-hour discharge block totals, at the discharge point.

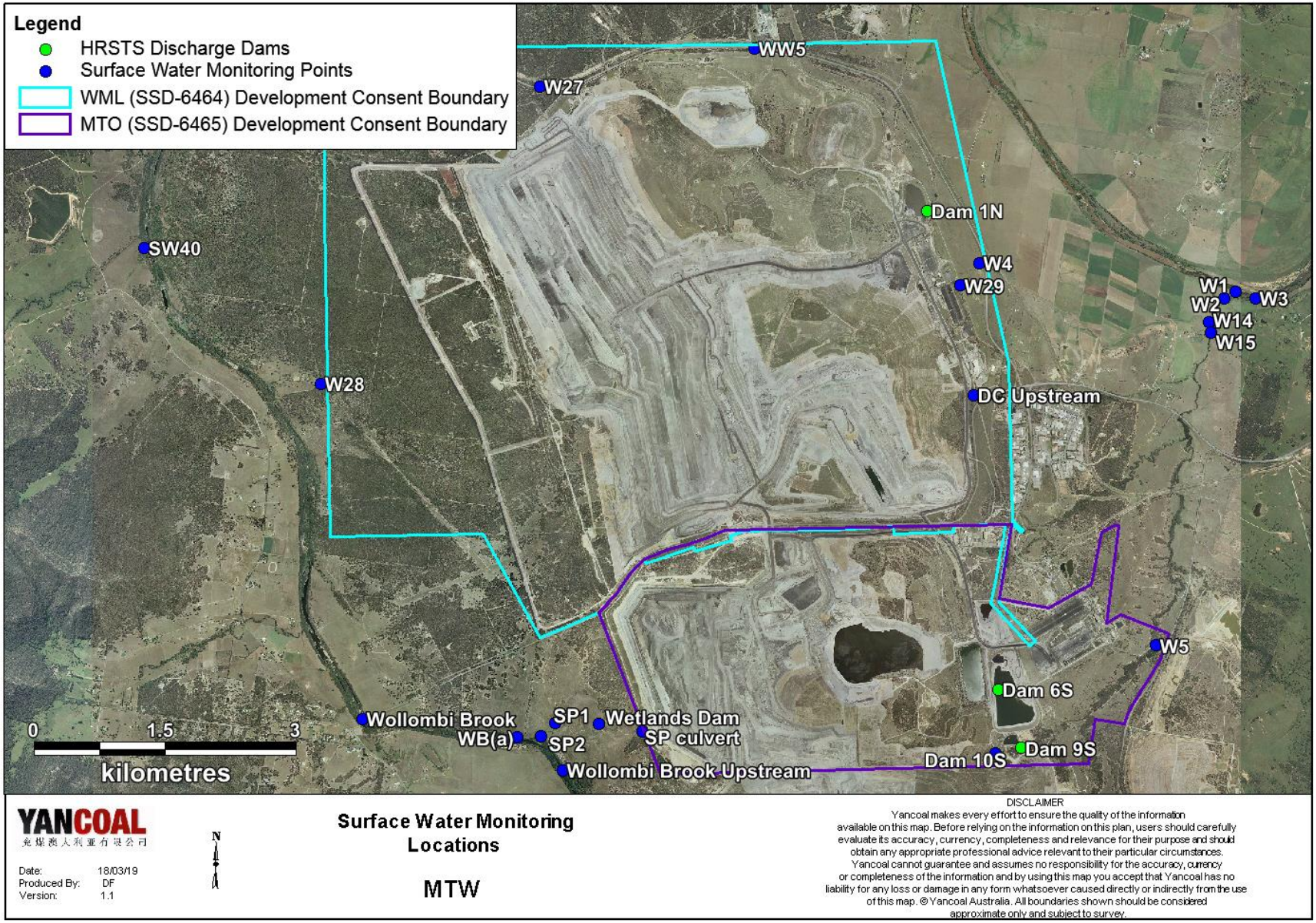


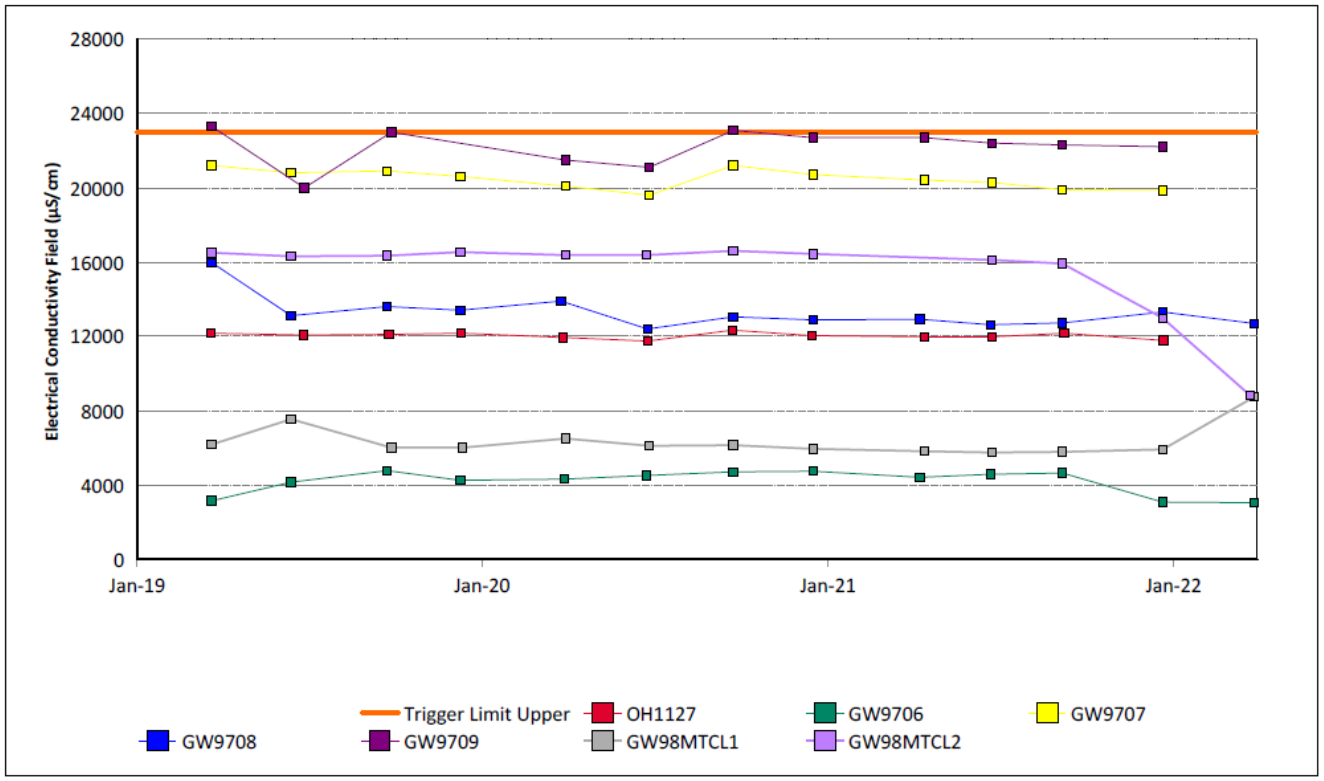
Figure 15: Surface Water Monitoring Location Plan

3.3 Groundwater Monitoring

Groundwater monitoring is undertaken on a quarterly basis in accordance with the MTW Groundwater Monitoring Programme.

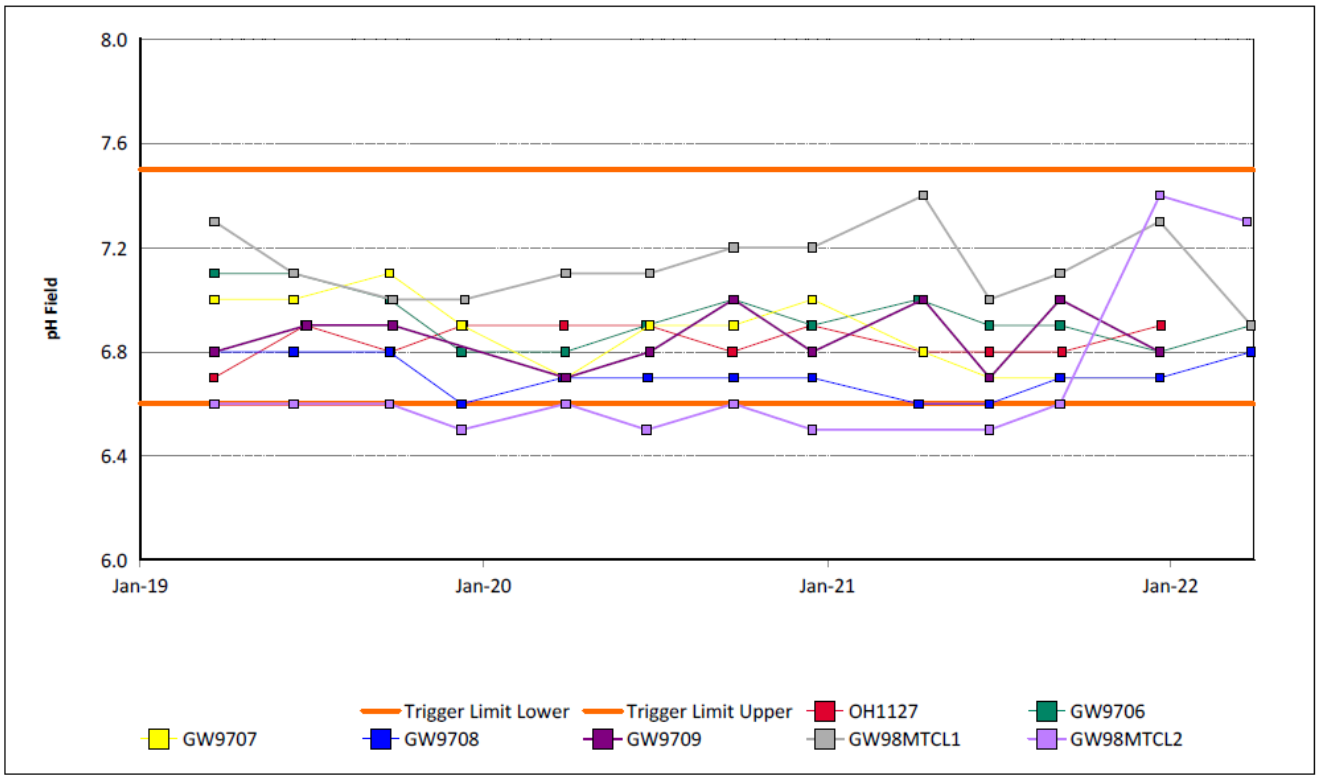
Figure 16 to **Note:** *Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.*

Figure 61**4** show the long-term water quality trends (2019 – current) for groundwater bores monitored at MTW. Note: The pH and EC trigger limits shown are based on the Water Management Plan V5.1, approved 15 November 2021.



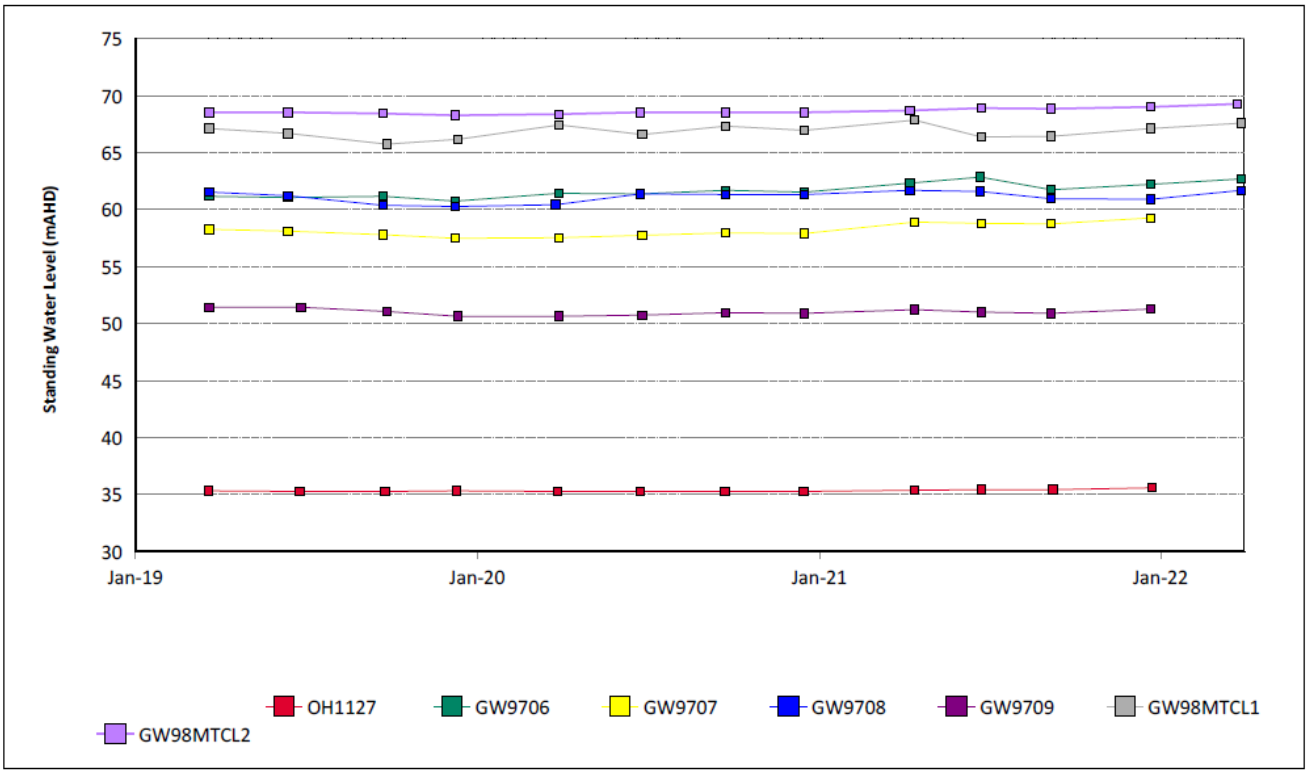
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 16: Bayswater Seam Electrical Conductivity Trend – March 2022



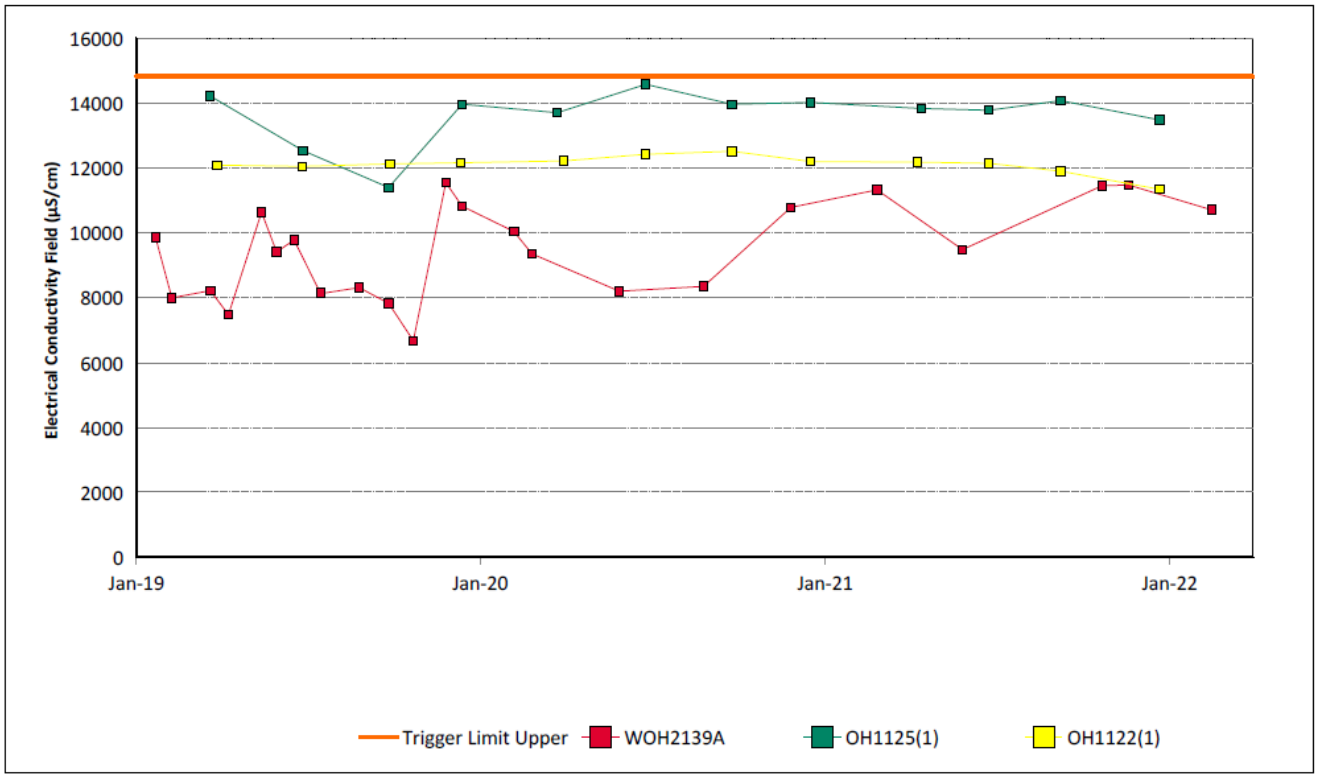
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 17: Bayswater Seam pH Trend – March 2022



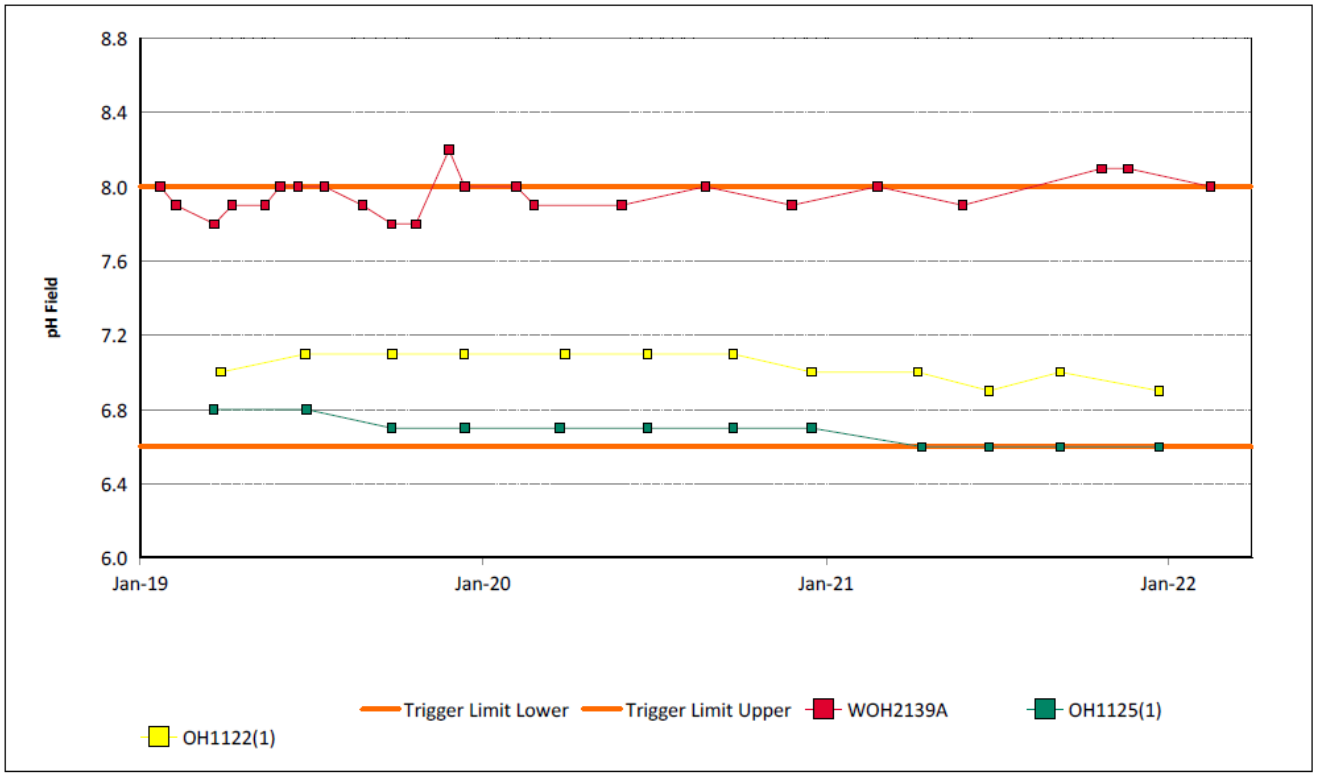
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 18: Bayswater Seam Standing Water Level Trend – March 2022



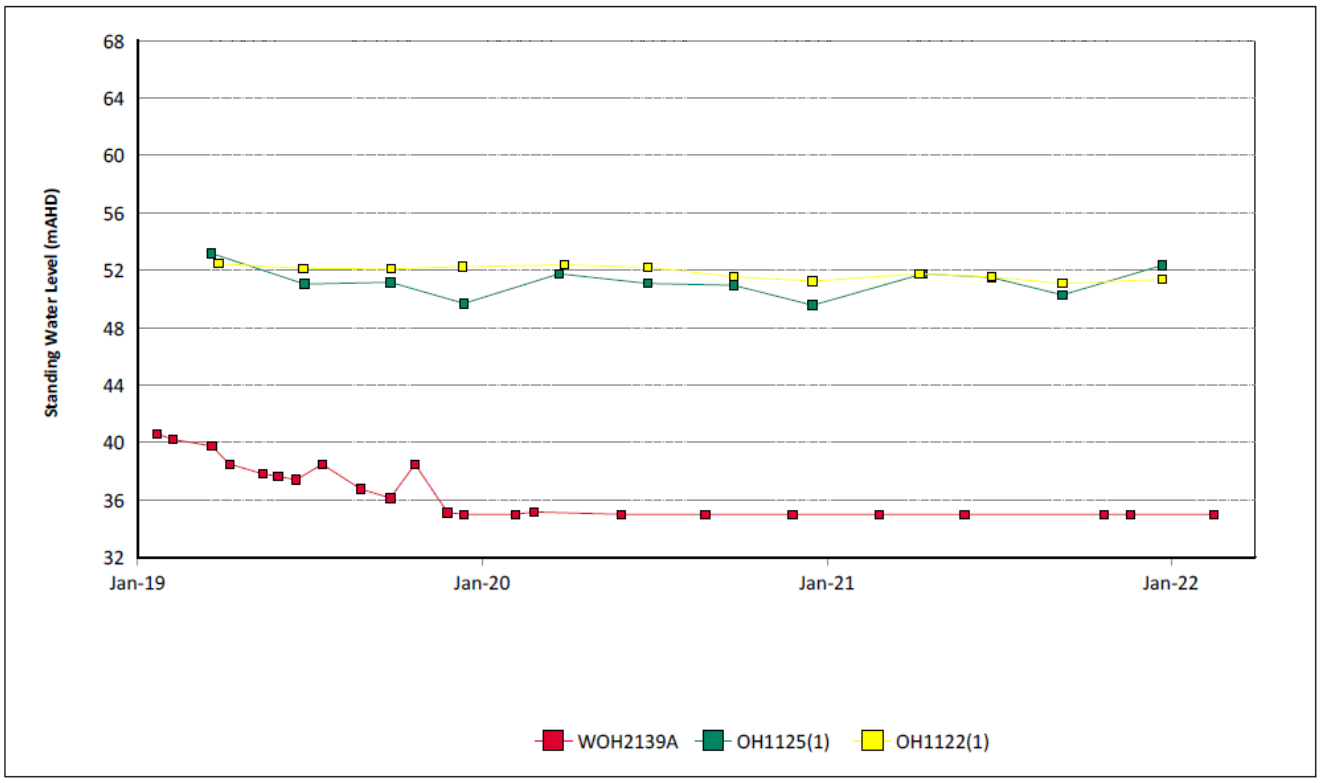
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 19: Blakefield Seam Electrical Conductivity Trend – March 2022



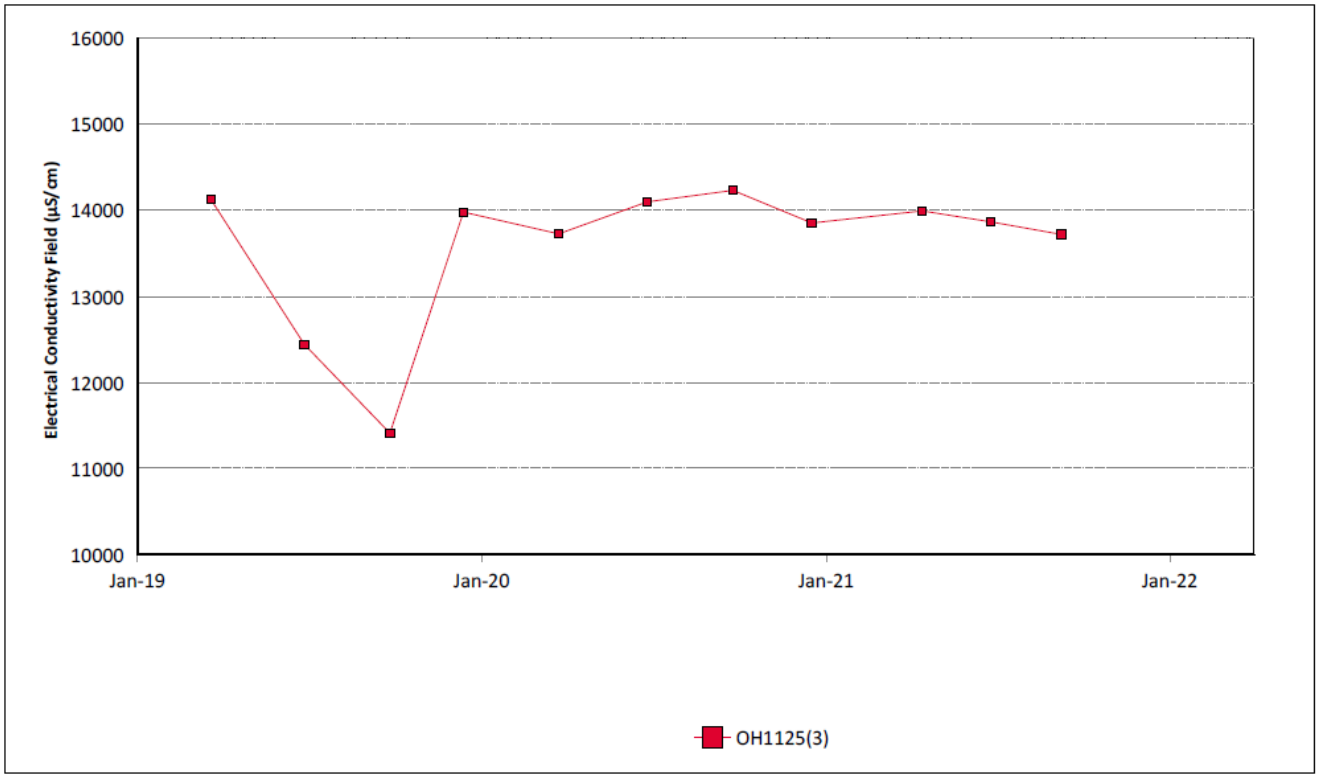
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 20: Blakefield Seam pH Trend – March 2022



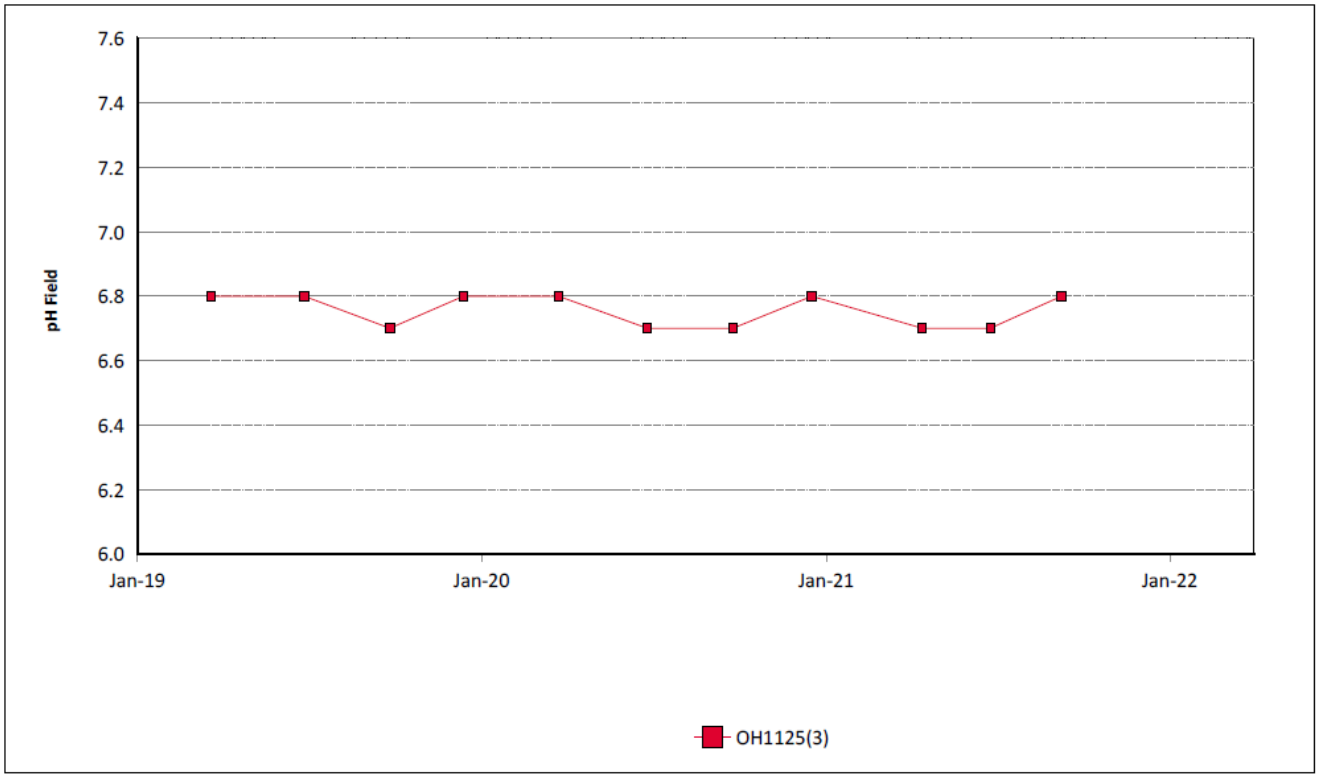
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 21: Blakefield Seam Standing Water Level Trend – March 2022



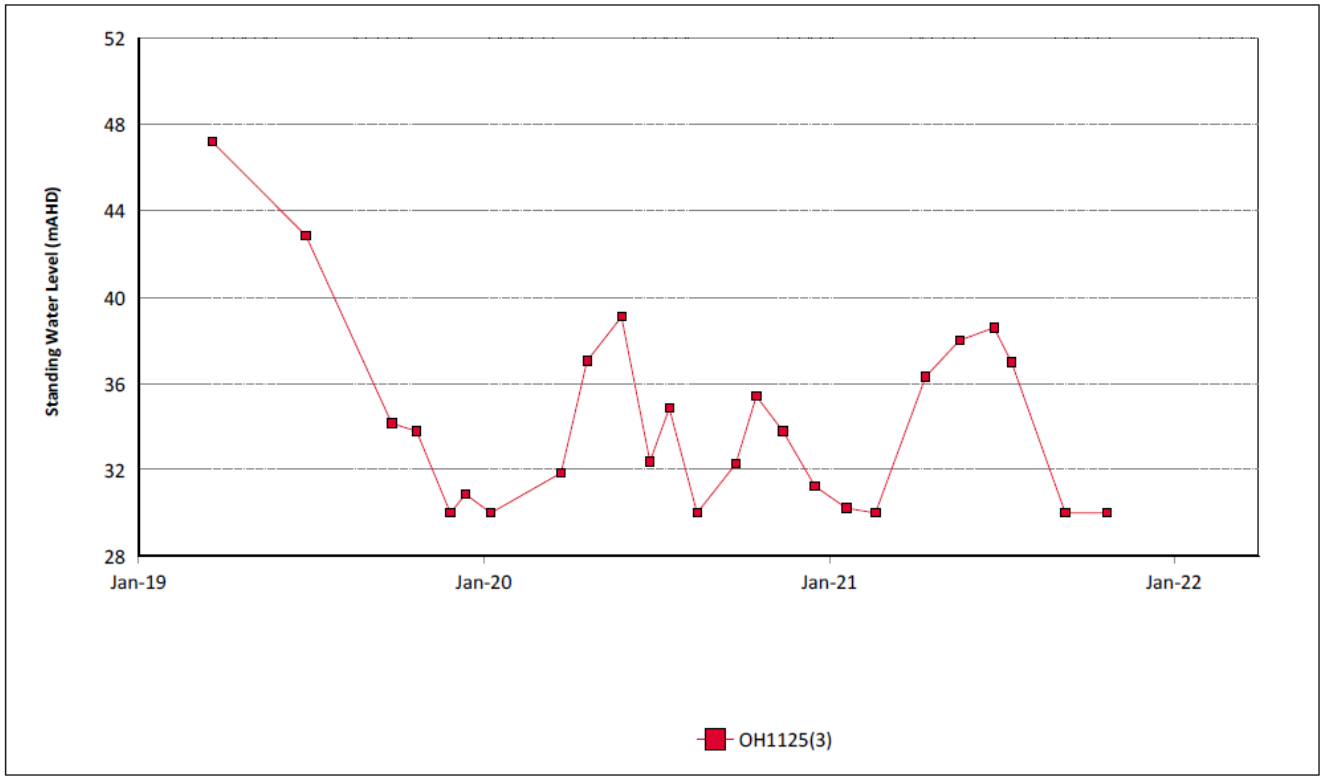
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 22: Bowfield Seam Electrical Conductivity Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 23: Bowfield Seam pH Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 24: Bowfield Seam Standing Water Level Trend – March 2022

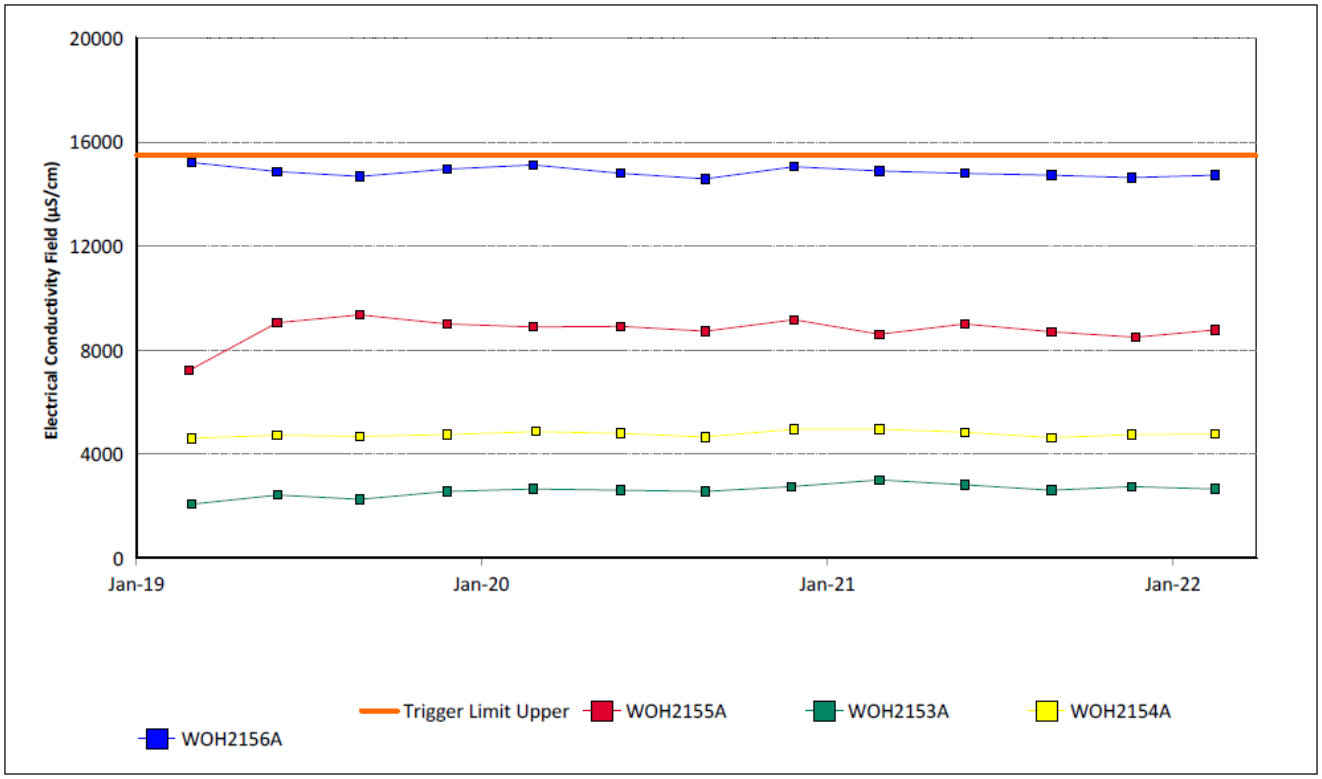


Figure 25: Redbank Seam Electrical Conductivity Trend – March 2022

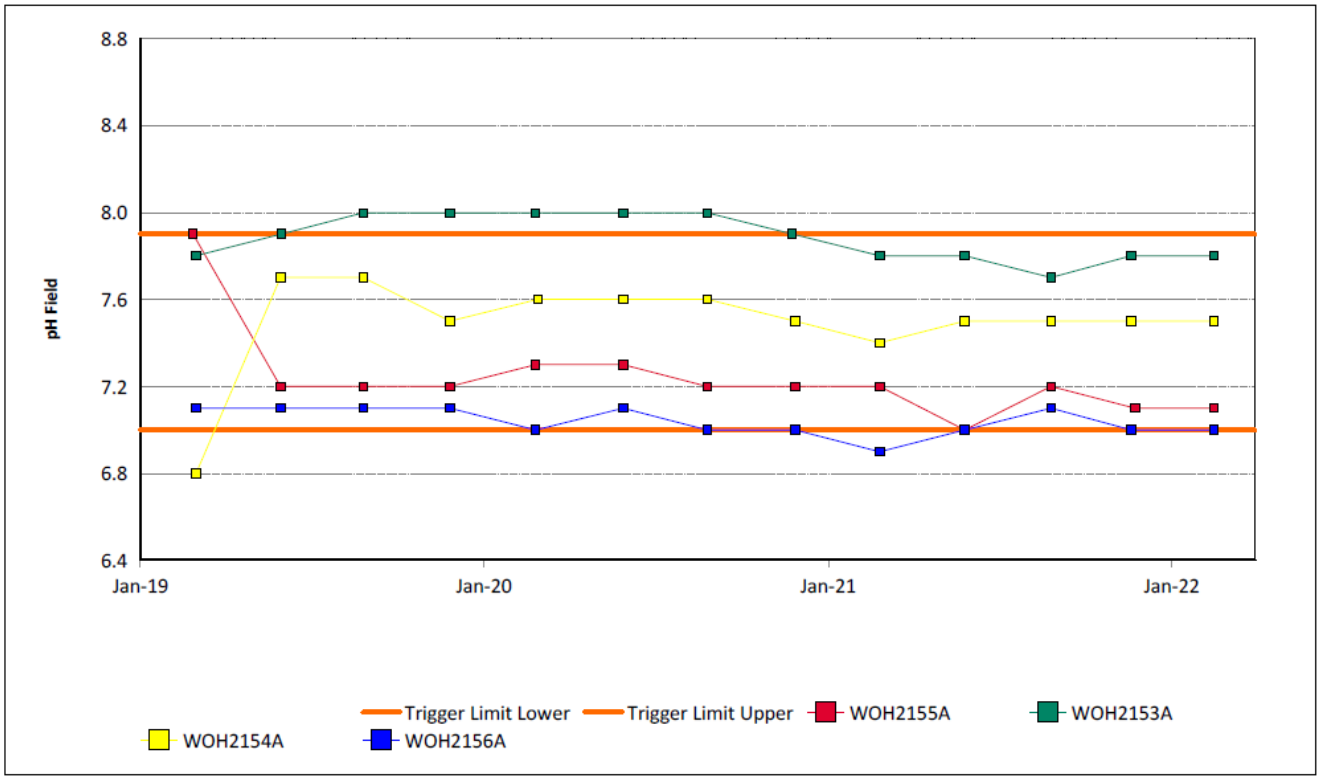


Figure 26: Redbank Seam pH Trend – March 2022

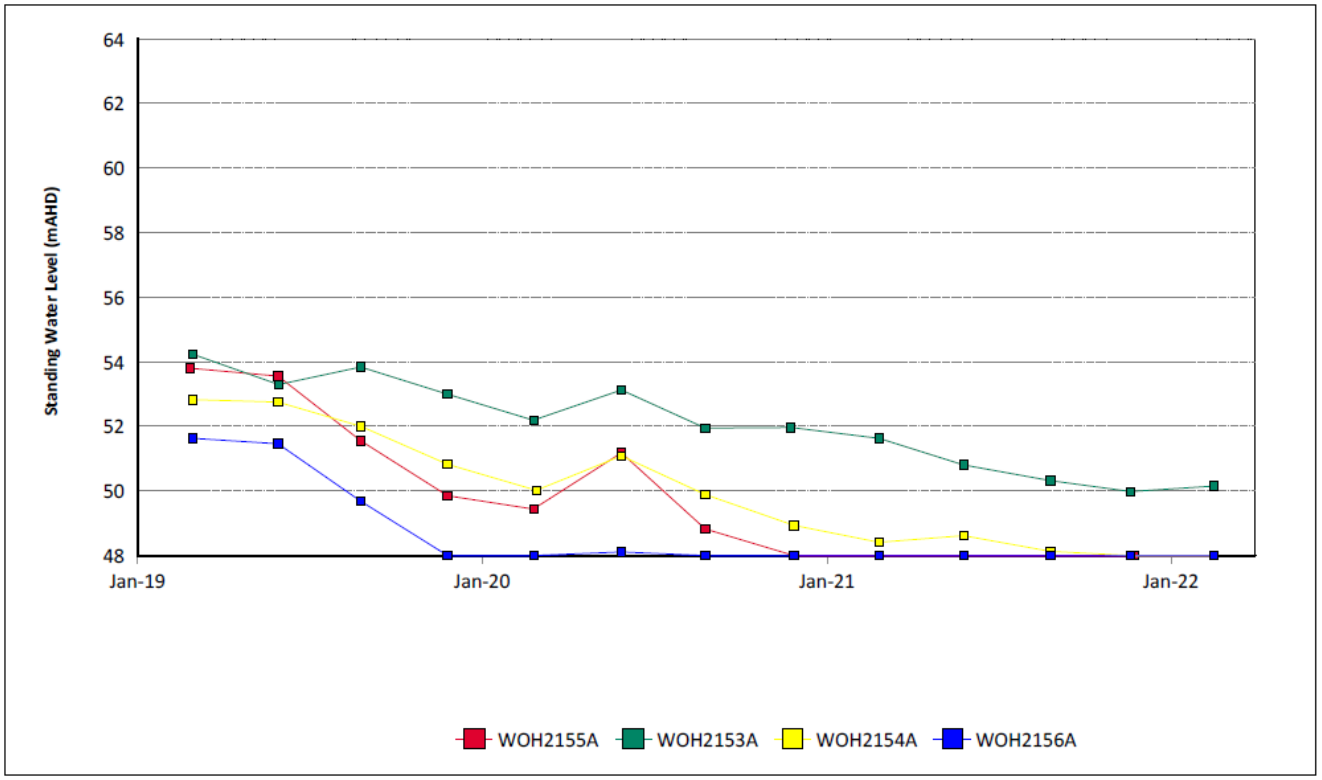
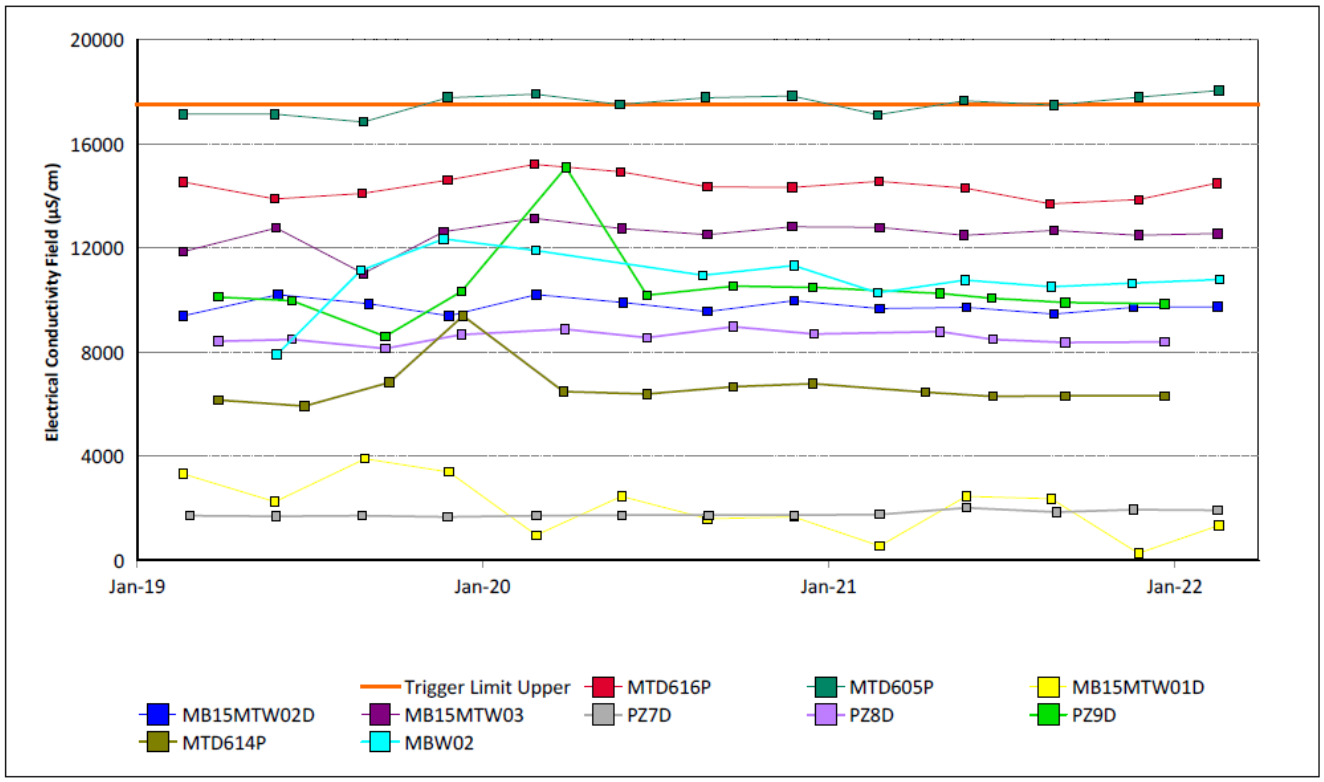
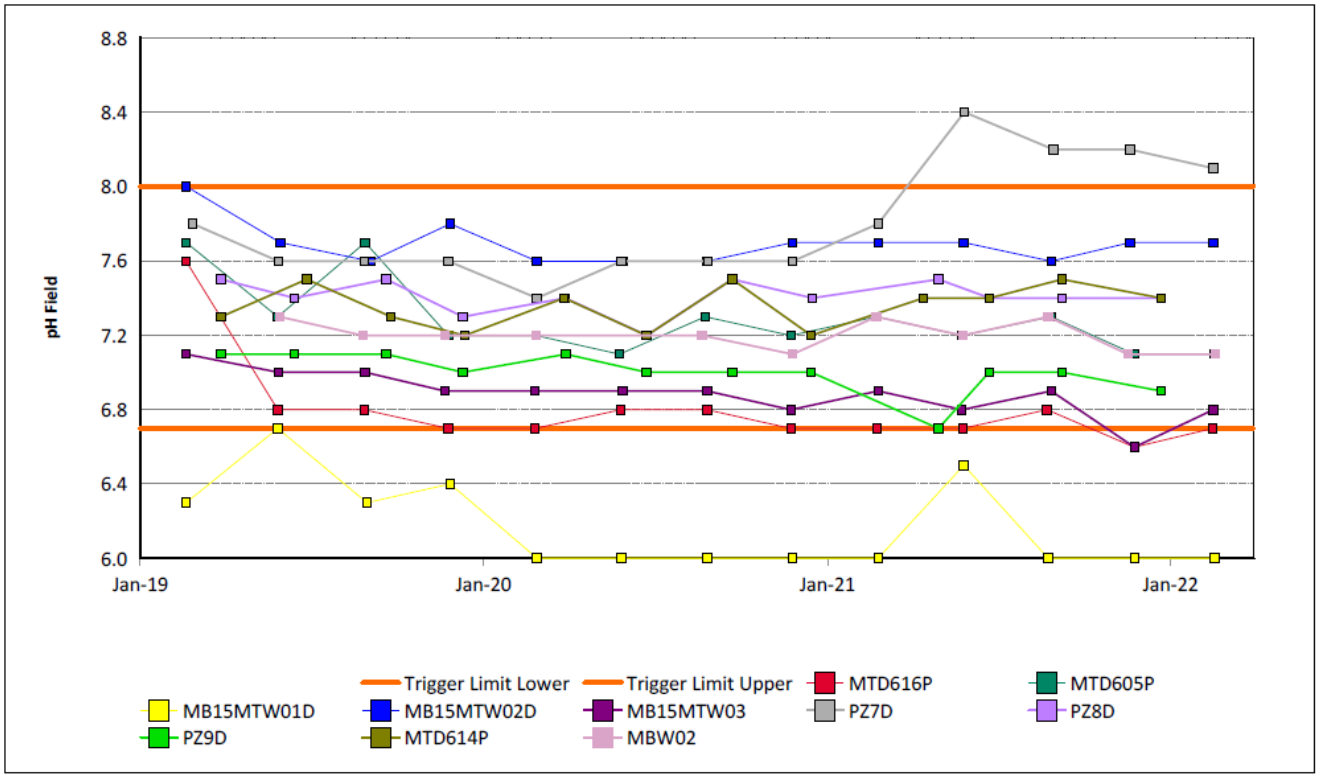


Figure 27: Redbank Seam Standing Water Level Trend – March 2022



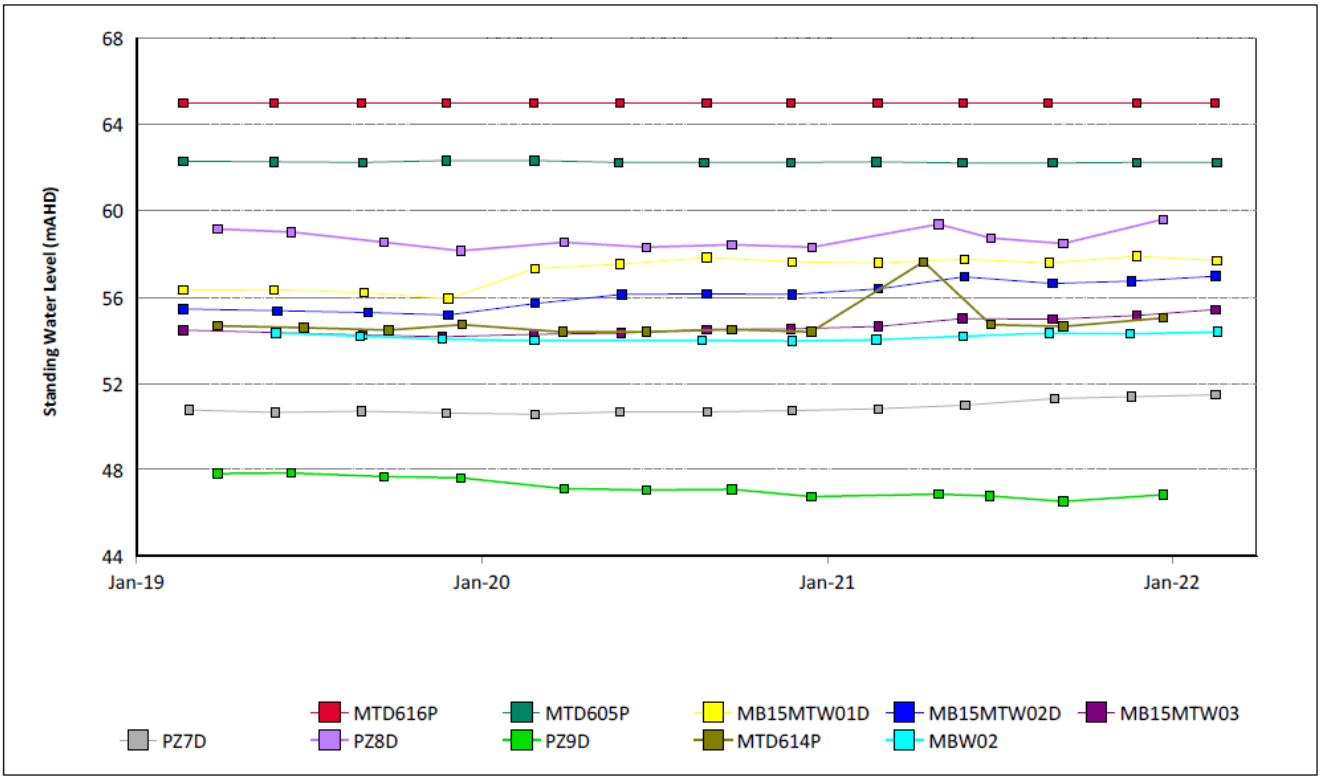
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 28: Shallow Overburden Electrical Conductivity Trend – March 2022



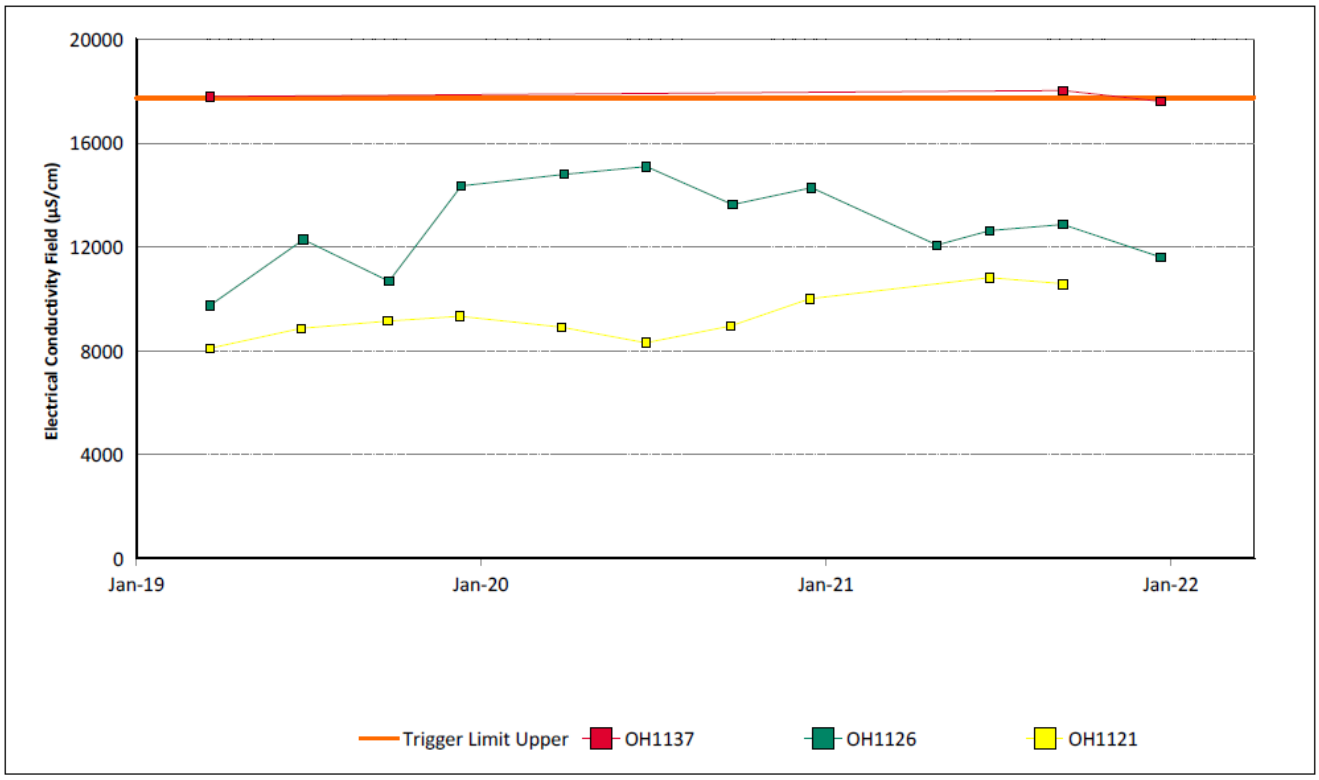
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 29: Shallow Overburden pH Trend – March 2022



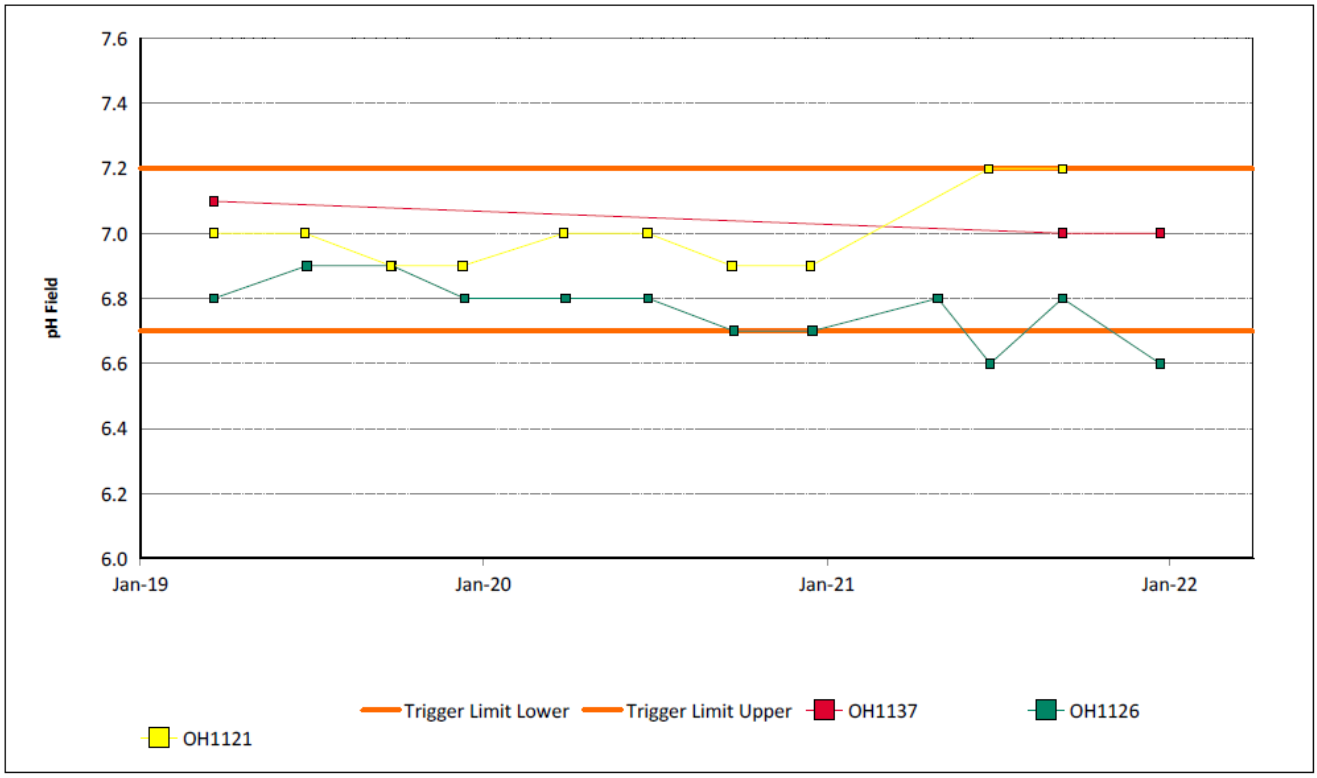
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 30: Shallow Overburden Standing Water Level Trend – March 2022



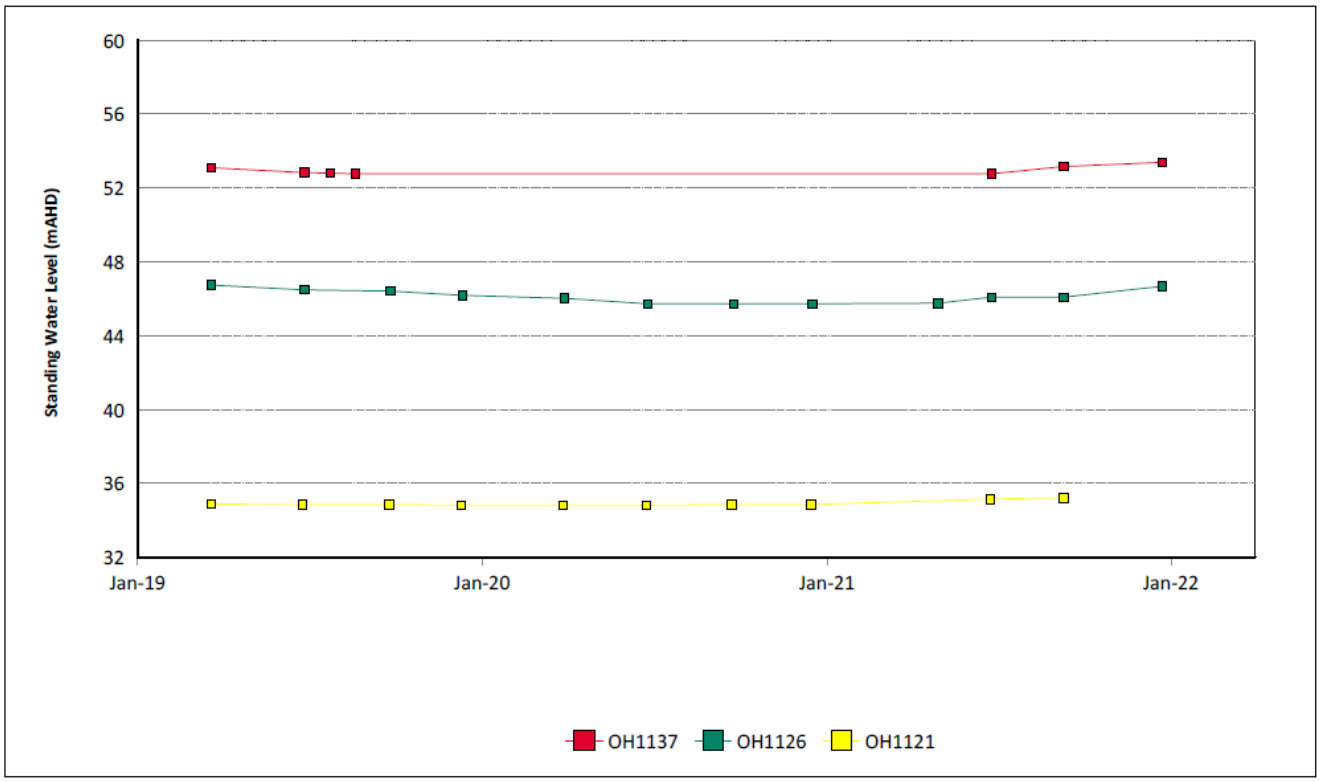
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 31: Vaux Seam Electrical Conductivity Trend – March 2022



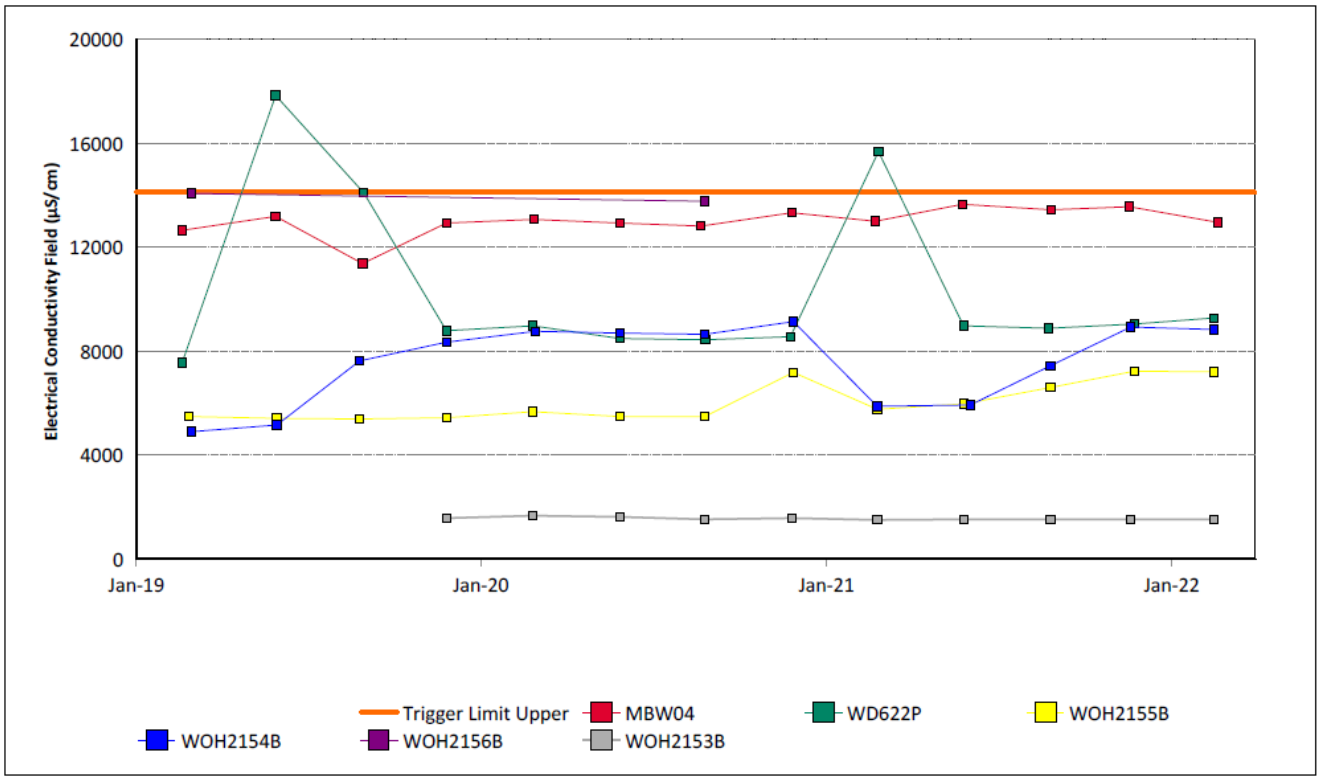
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 32: Vaux Seam pH Trend – March 2022



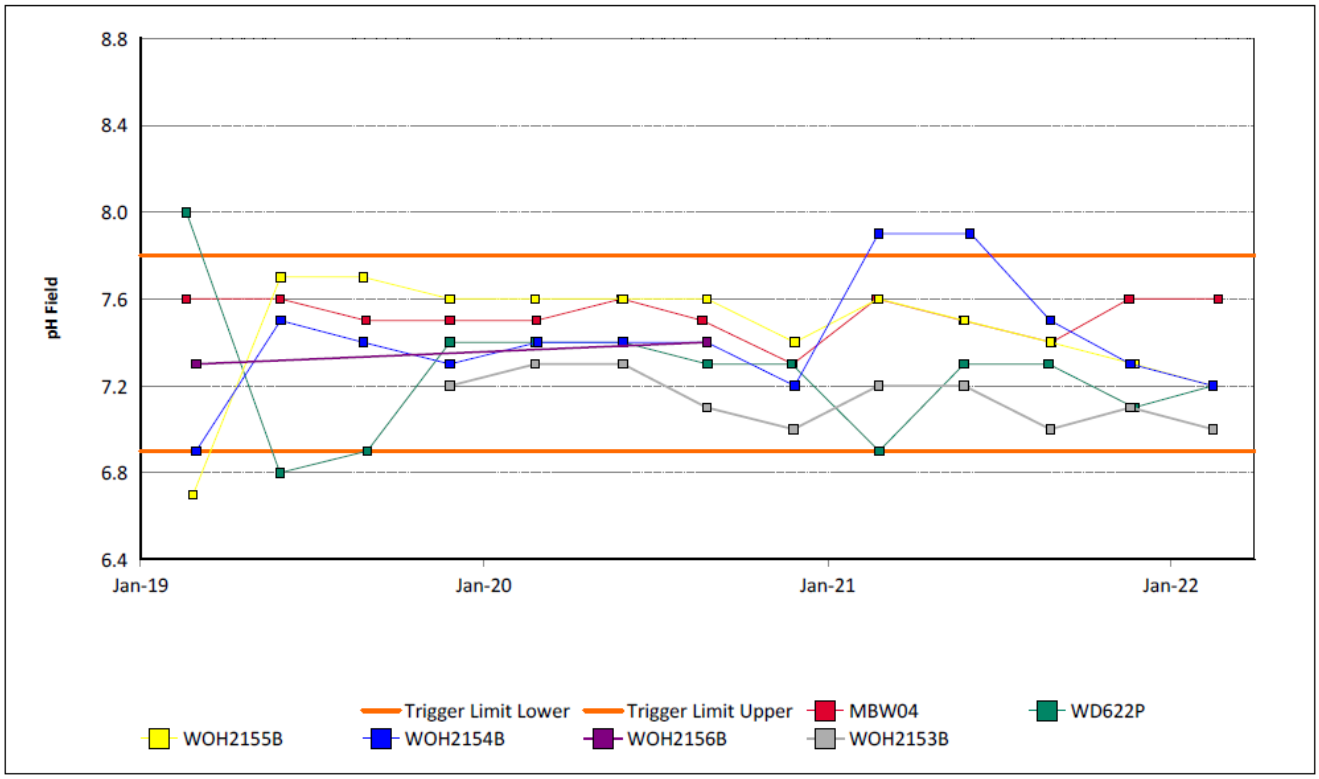
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 33: Vaux Seam Standing Water Level Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample.

Figure 34: Wambo Seam Electrical Conductivity Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample.

Figure 35: Wambo Seam pH Trend – March 2022

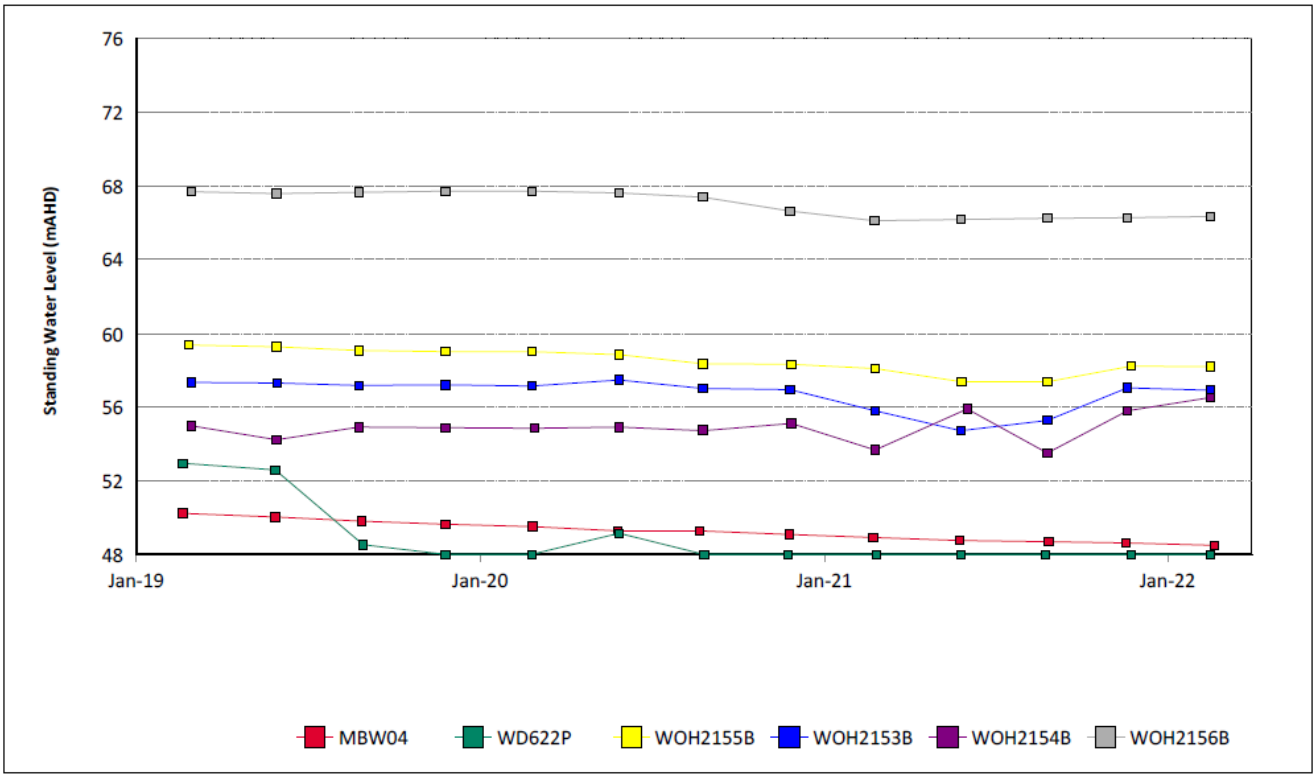


Figure 36: Wambo Seam Standing Water Level Trend – March 2022

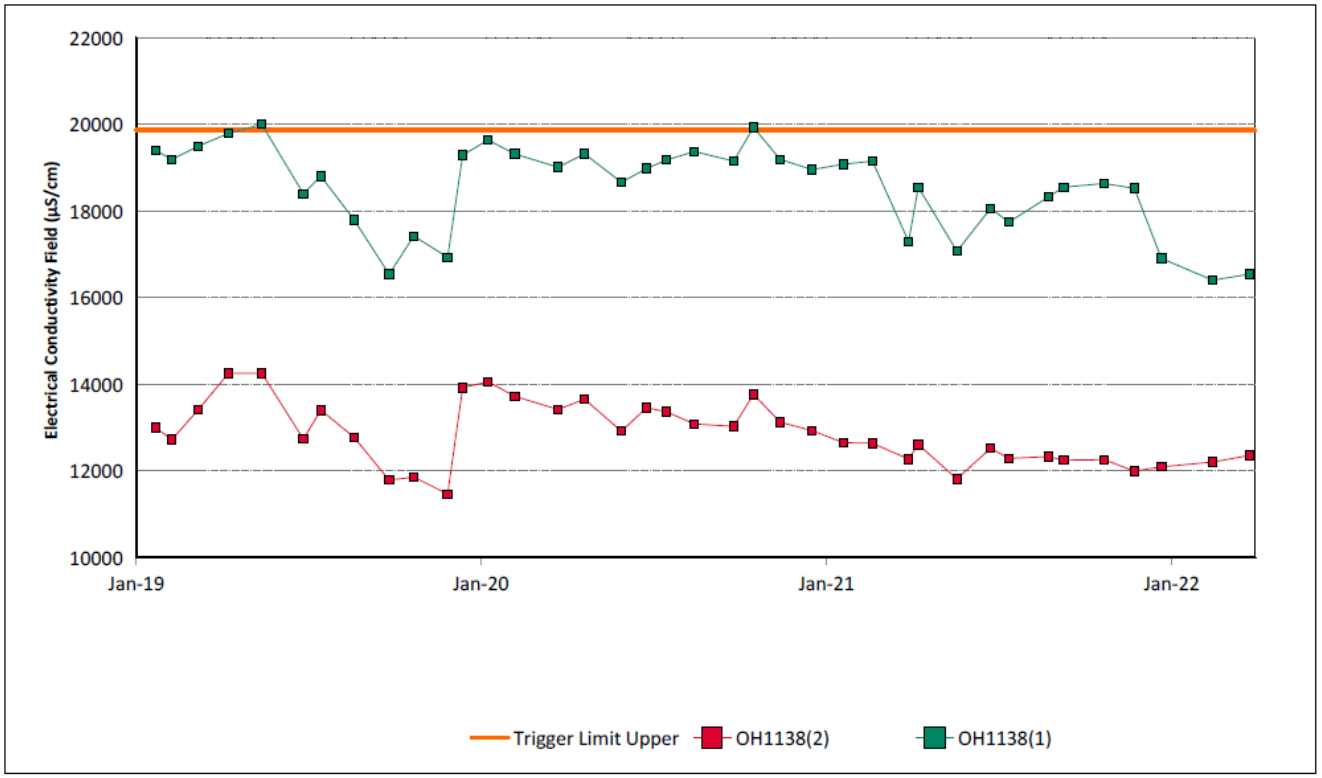


Figure 37: Warkworth Seam Electrical Conductivity Trend – March 2022

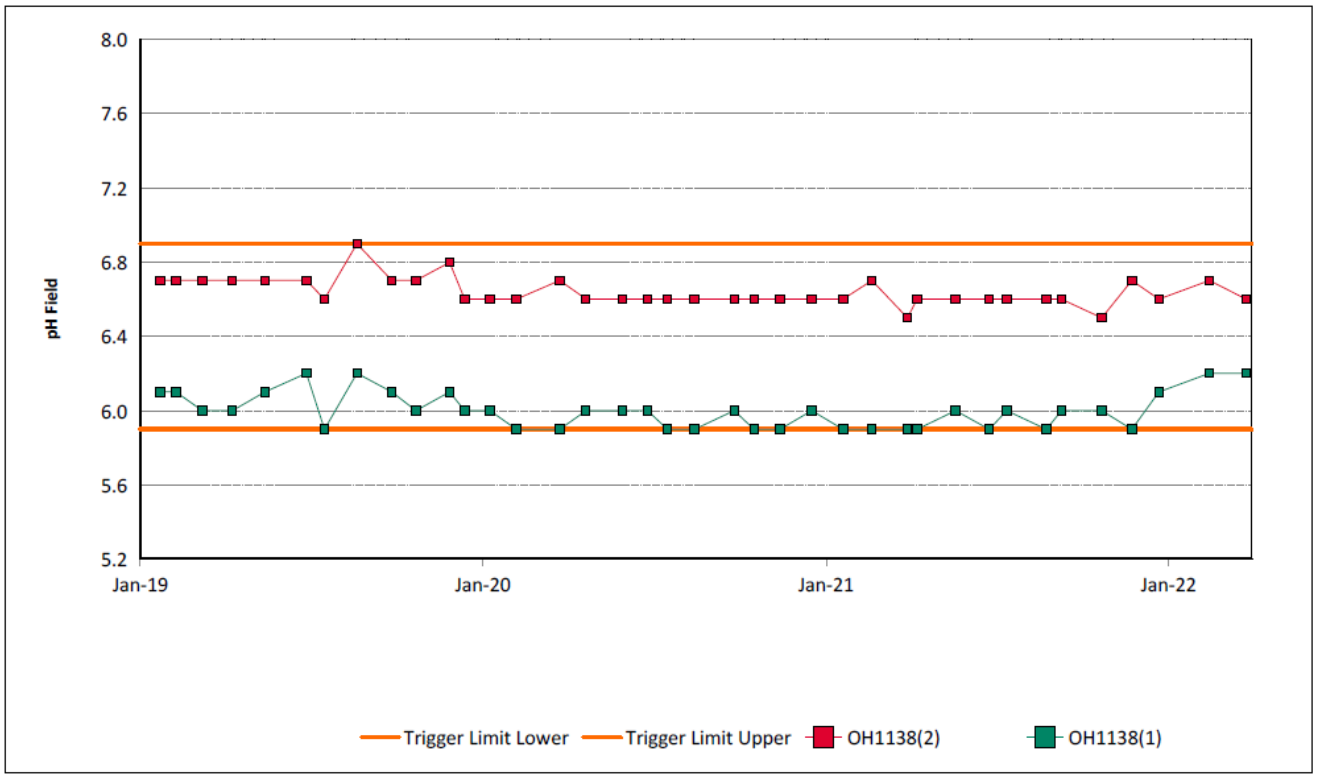


Figure 38: Warkworth Seam pH Trend – March 2022

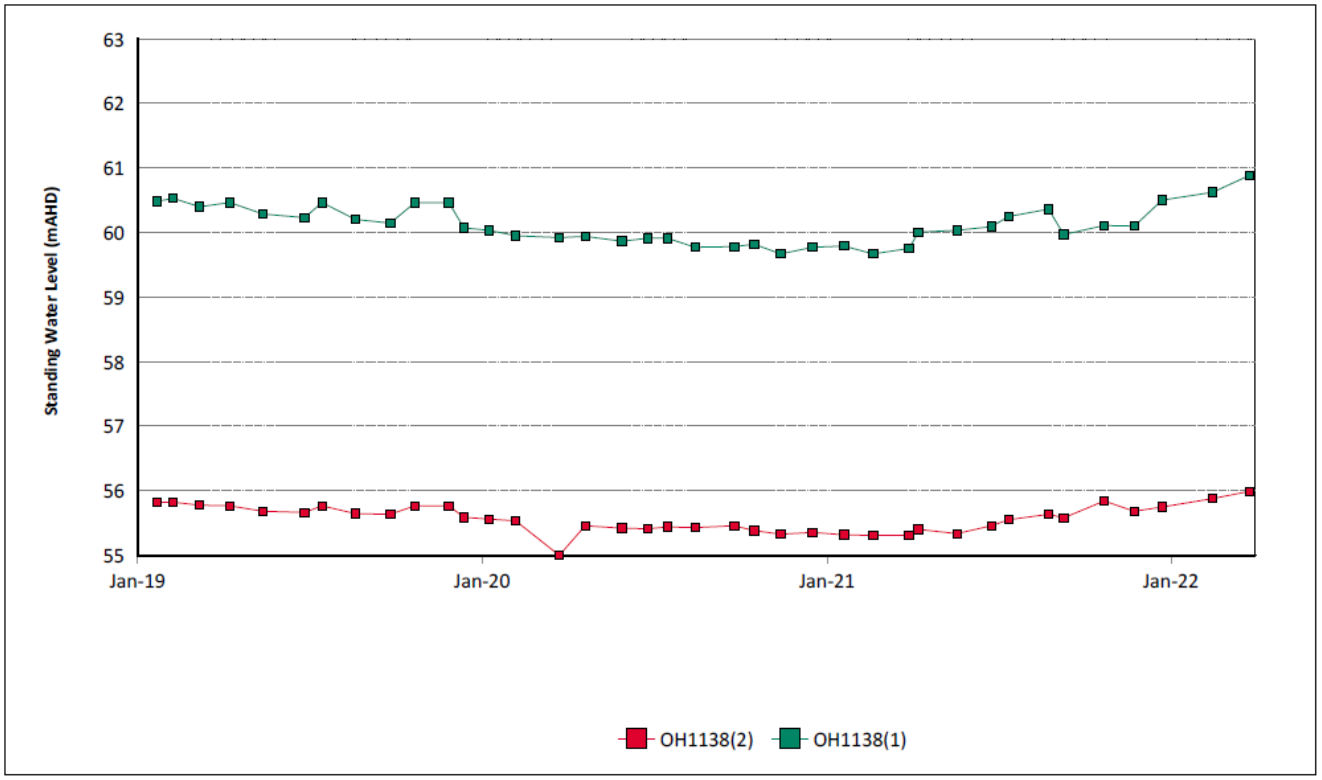
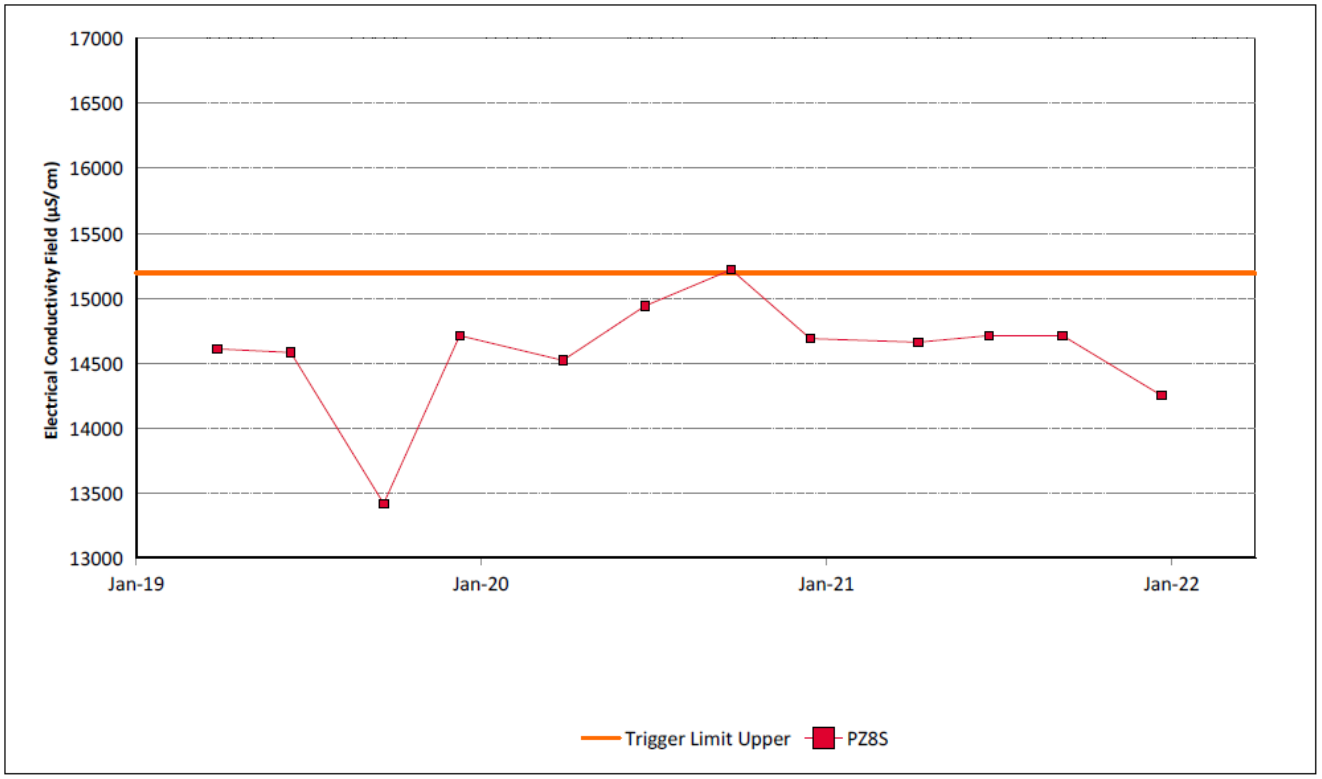


Figure 39: Warkworth Seam Standing Water Level Trend – March 2022

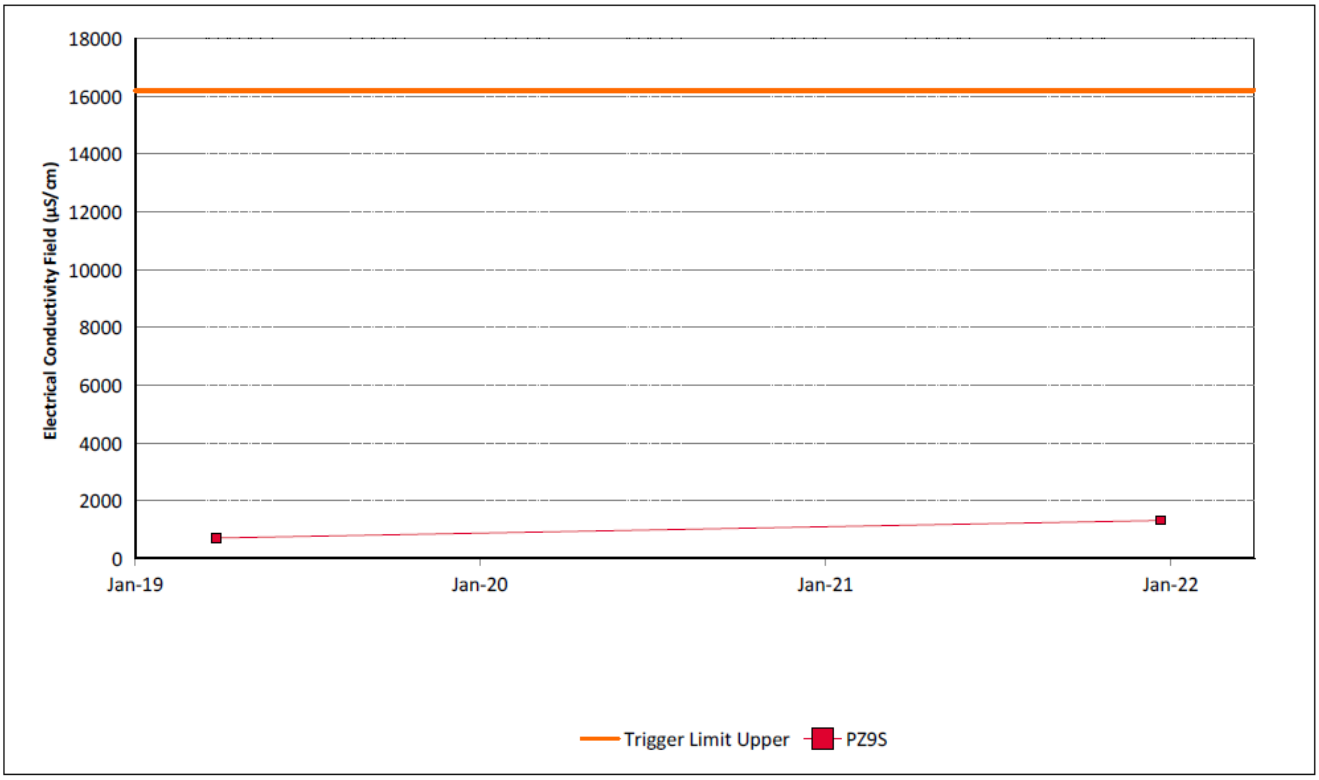


Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 40: Wollombi Alluvium Electrical Conductivity Trend – March 2022

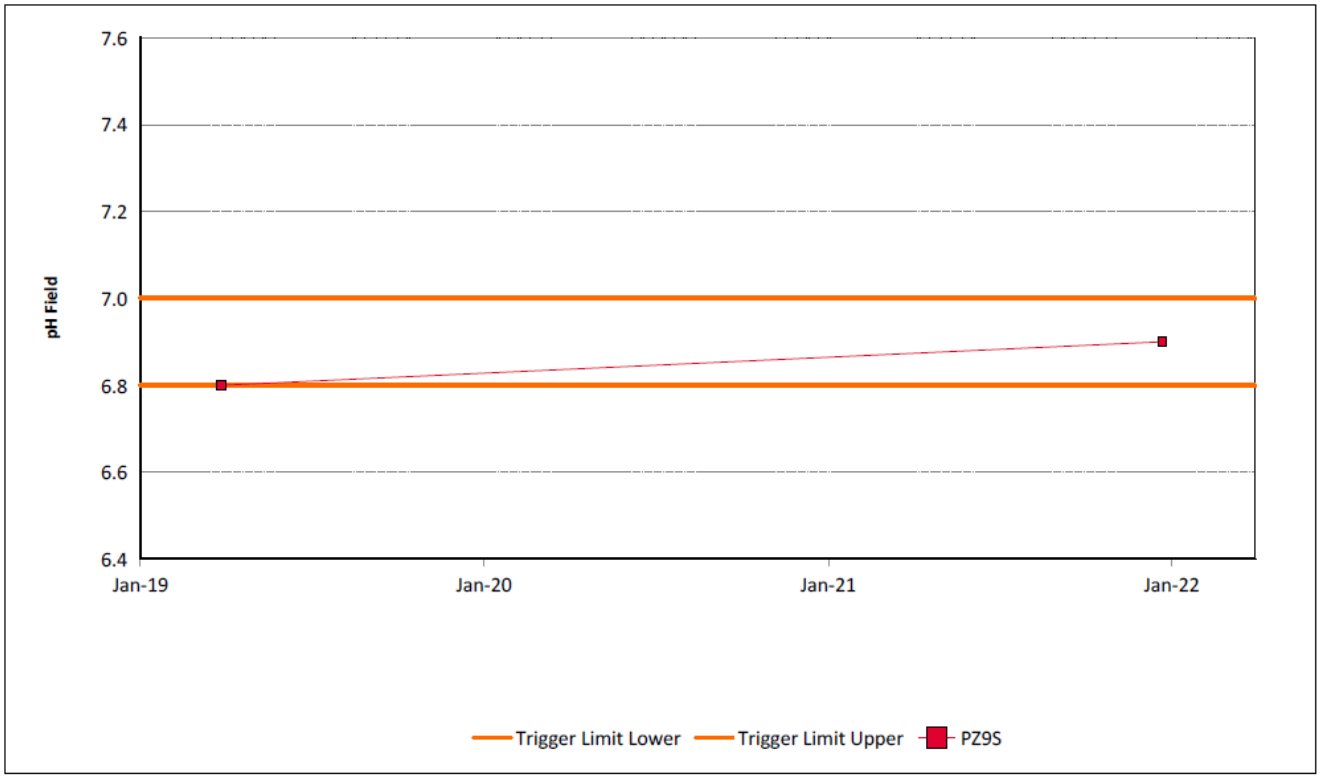
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 41: Wollombi Alluvium pH Trend – March 2022



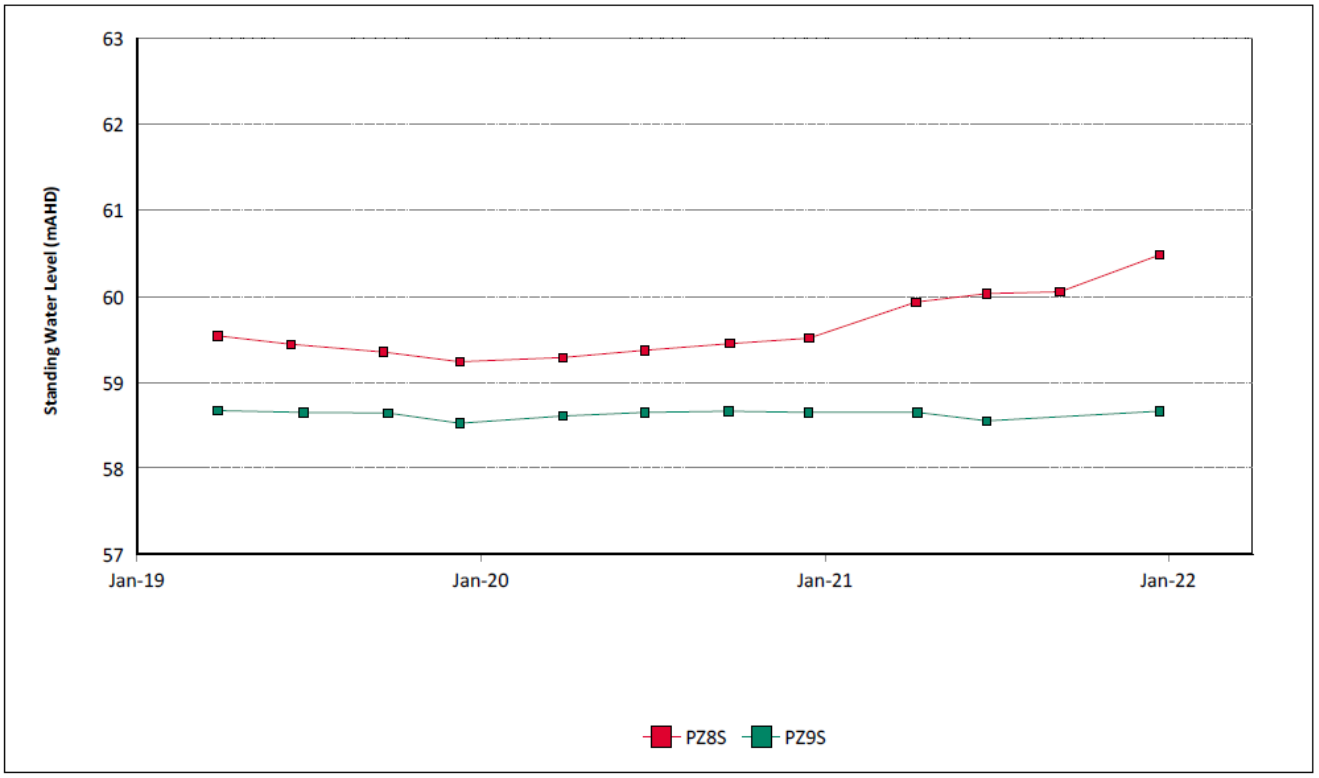
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 42: Wollombi Alluvium 2 Electrical Conductivity Trend – March 2022



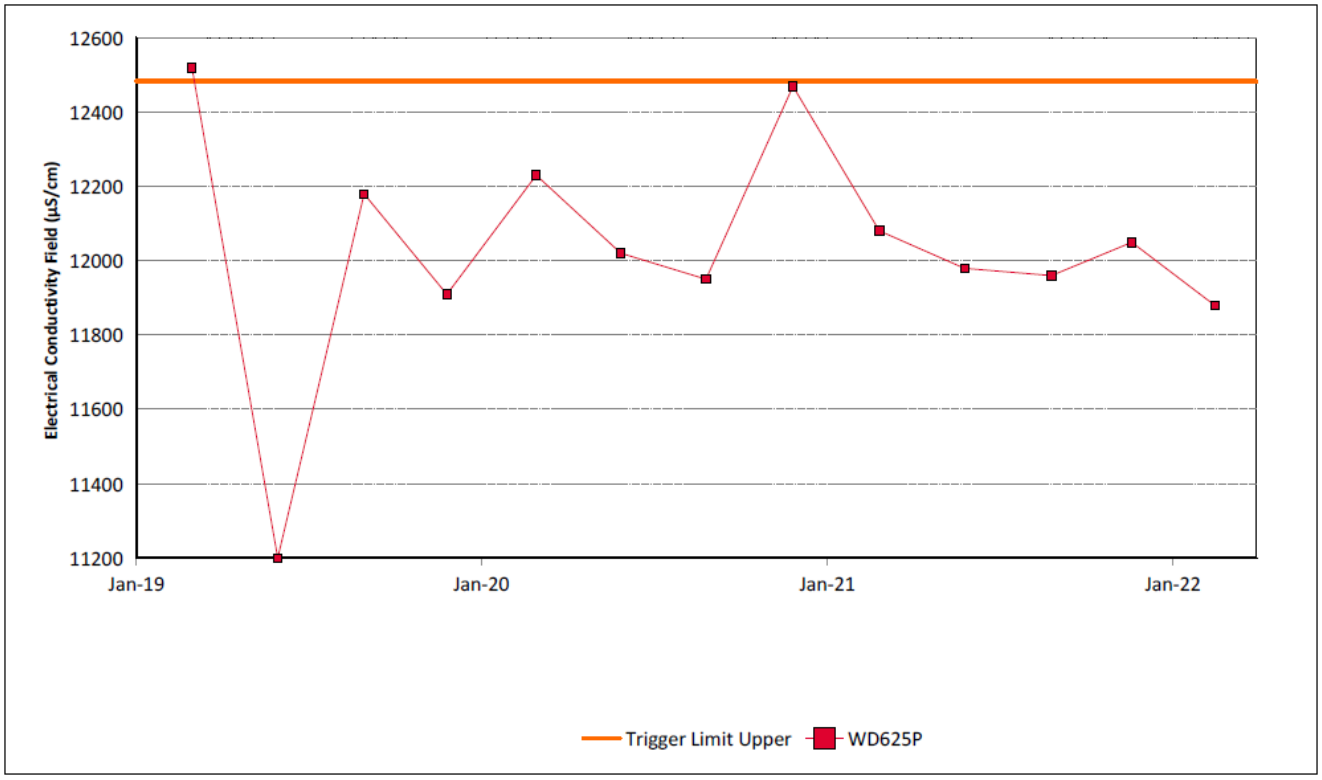
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 43: Wollombi Alluvium 2 pH Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 44: Wollombi Alluvium Standing Water Level Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 45: Woodlands Hill Seam Electrical Conductivity Trend - March 2022

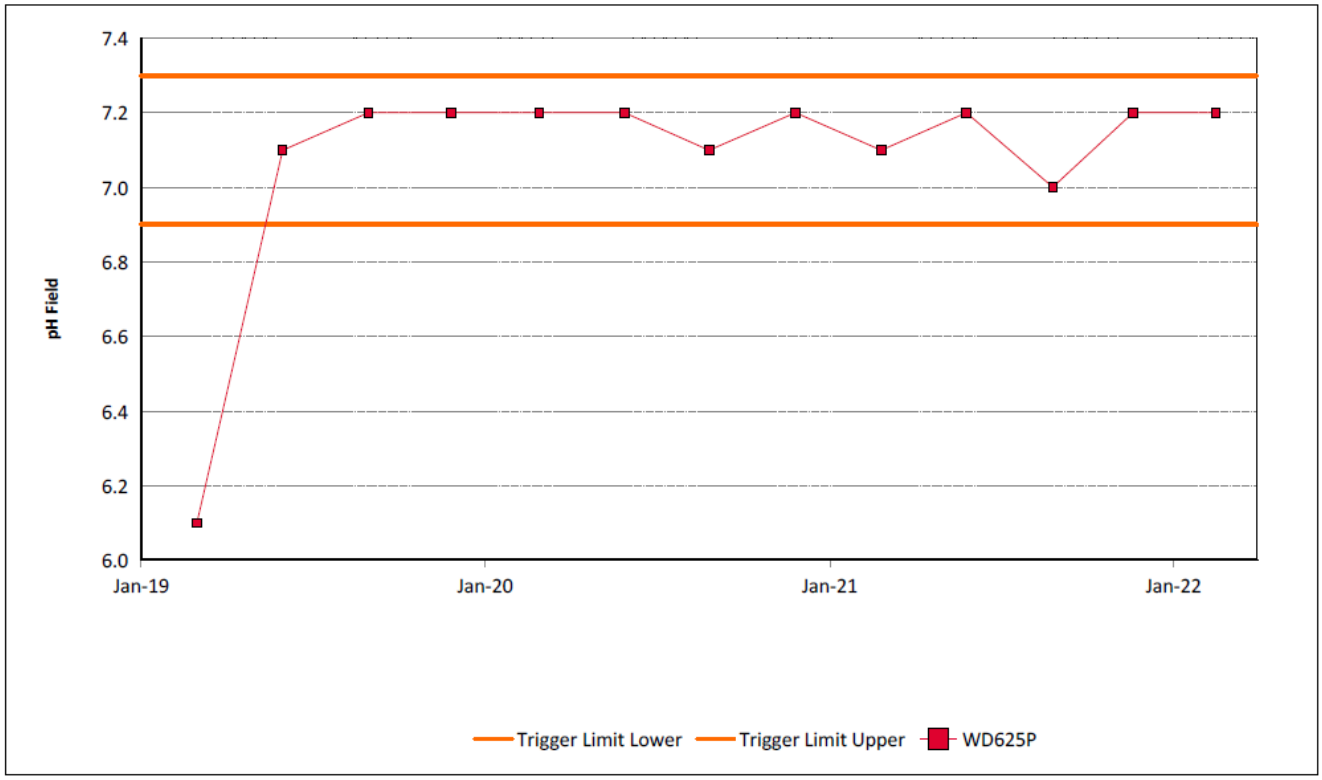


Figure 46: Woodlands Hill Seam pH Trend - March 2022

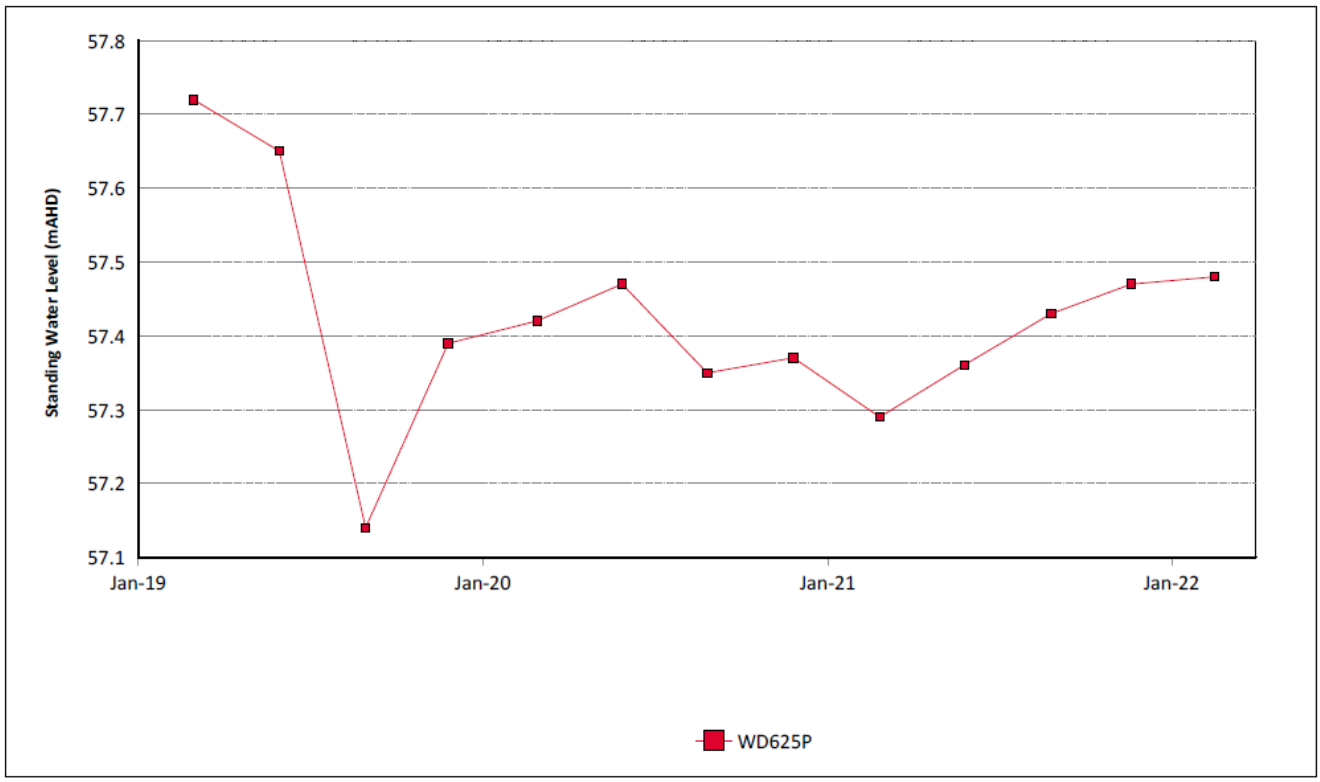


Figure 47: Woodlands Hill Seam Standing Water Level Trend - March 2022

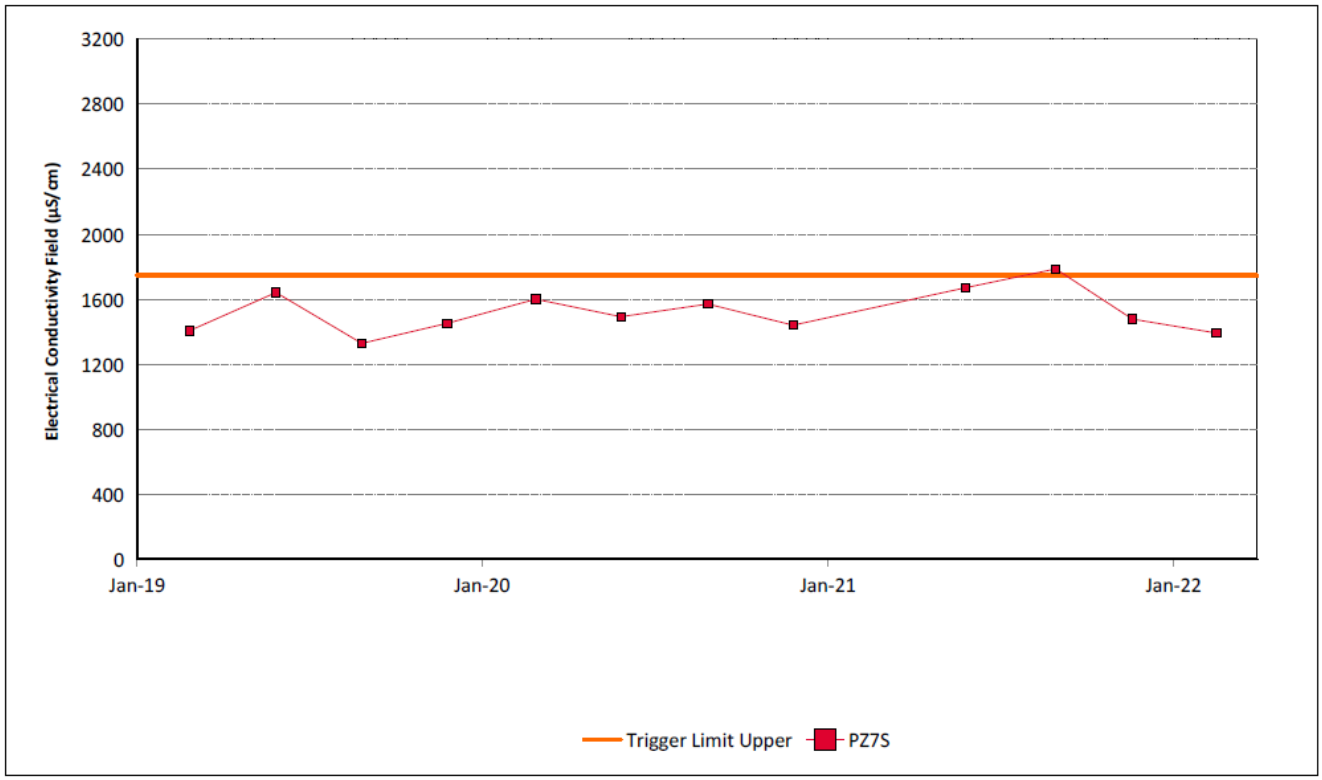


Figure 48: Aeolian Warkworth Sands Electrical Conductivity Trend – March 2022

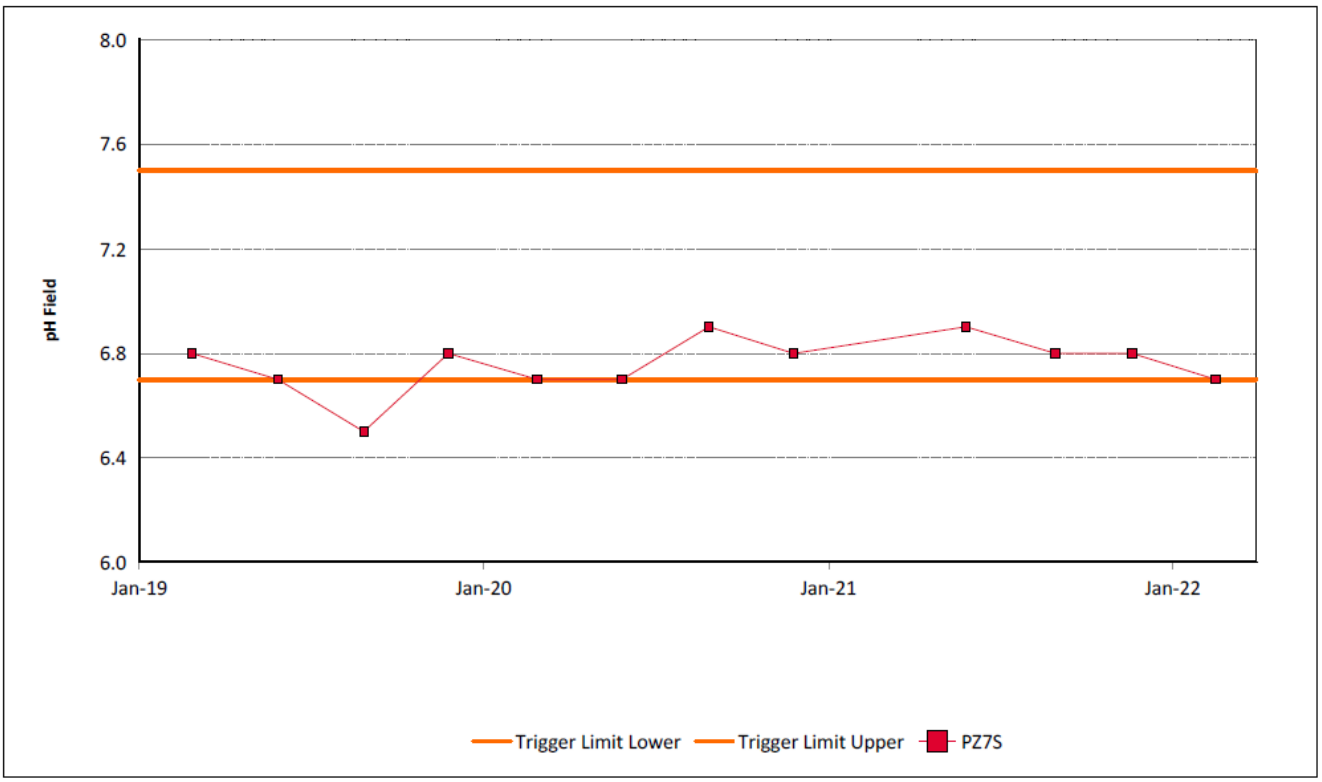


Figure 49: Aeolian Warkworth Sands pH Trend – March 2022

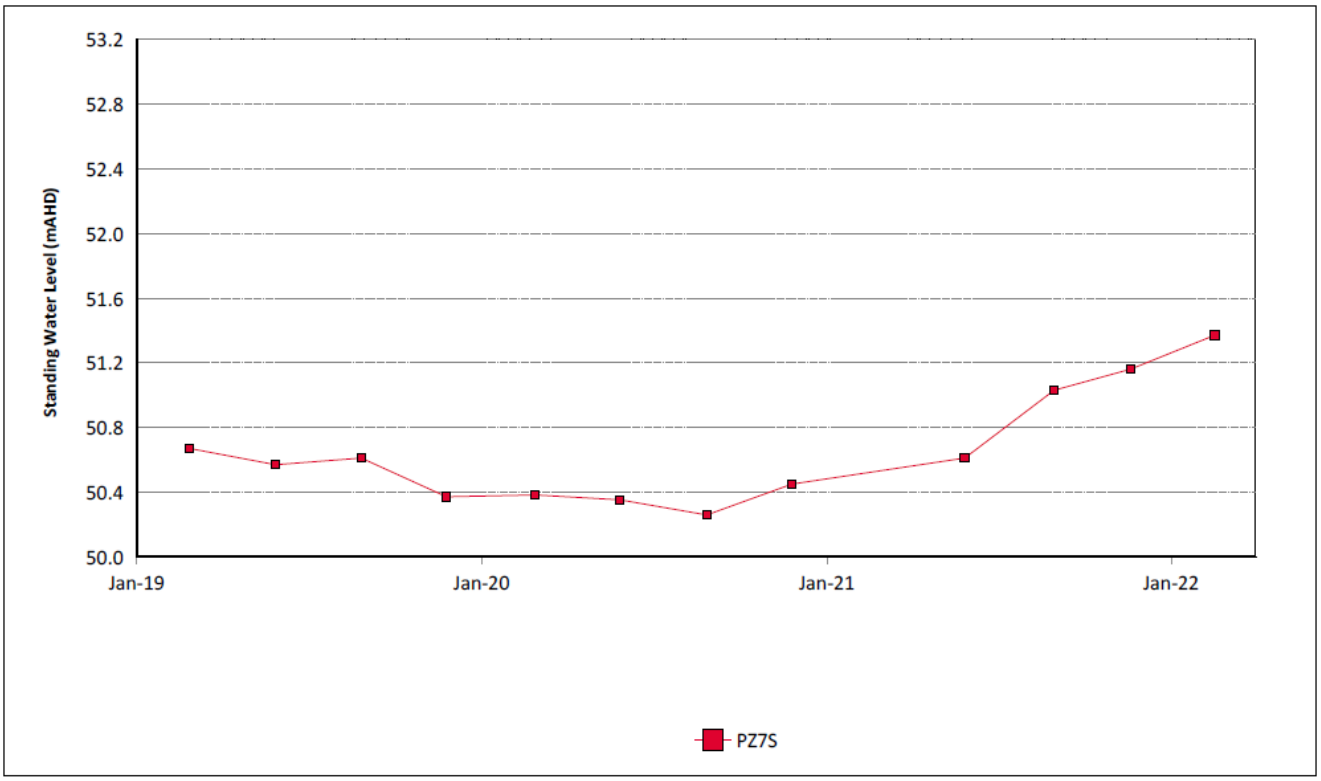
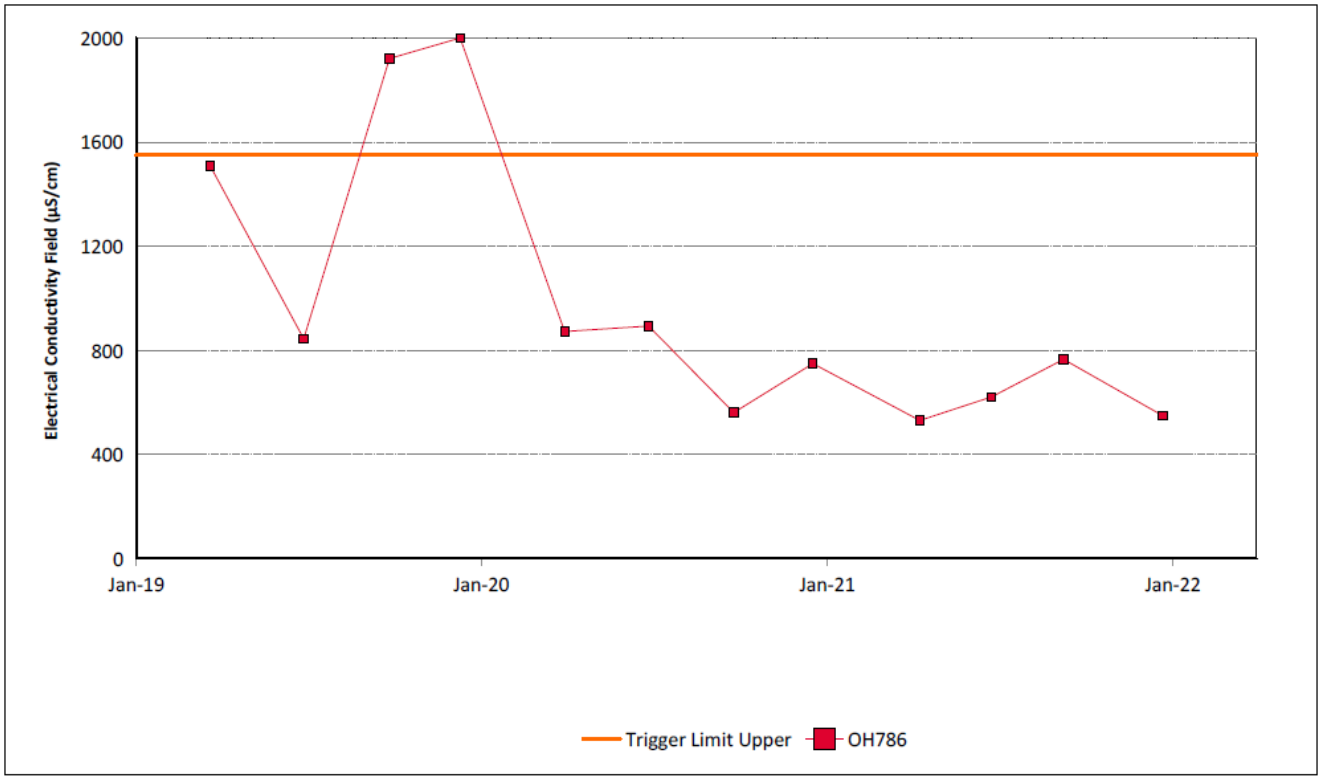
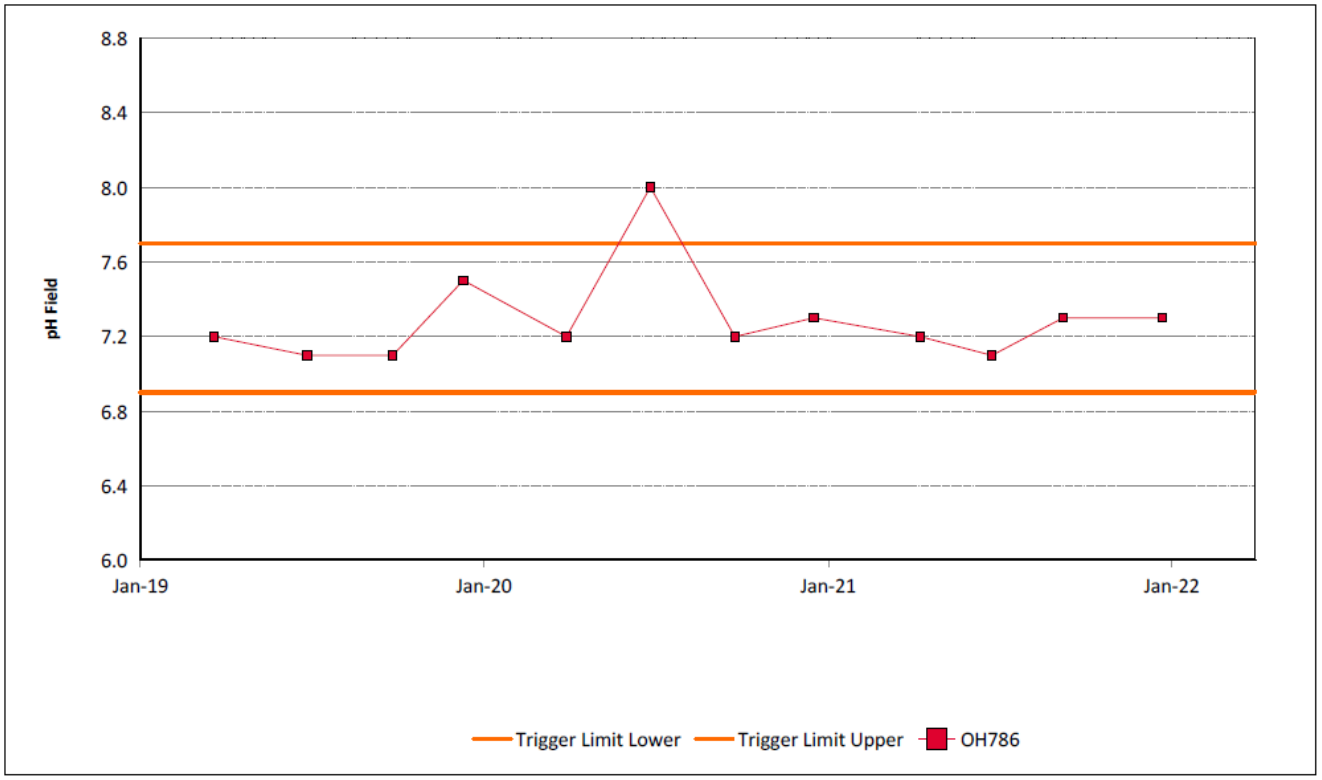


Figure 50: Aeolian Warkworth Sands Standing Water Level Trend – March 2022



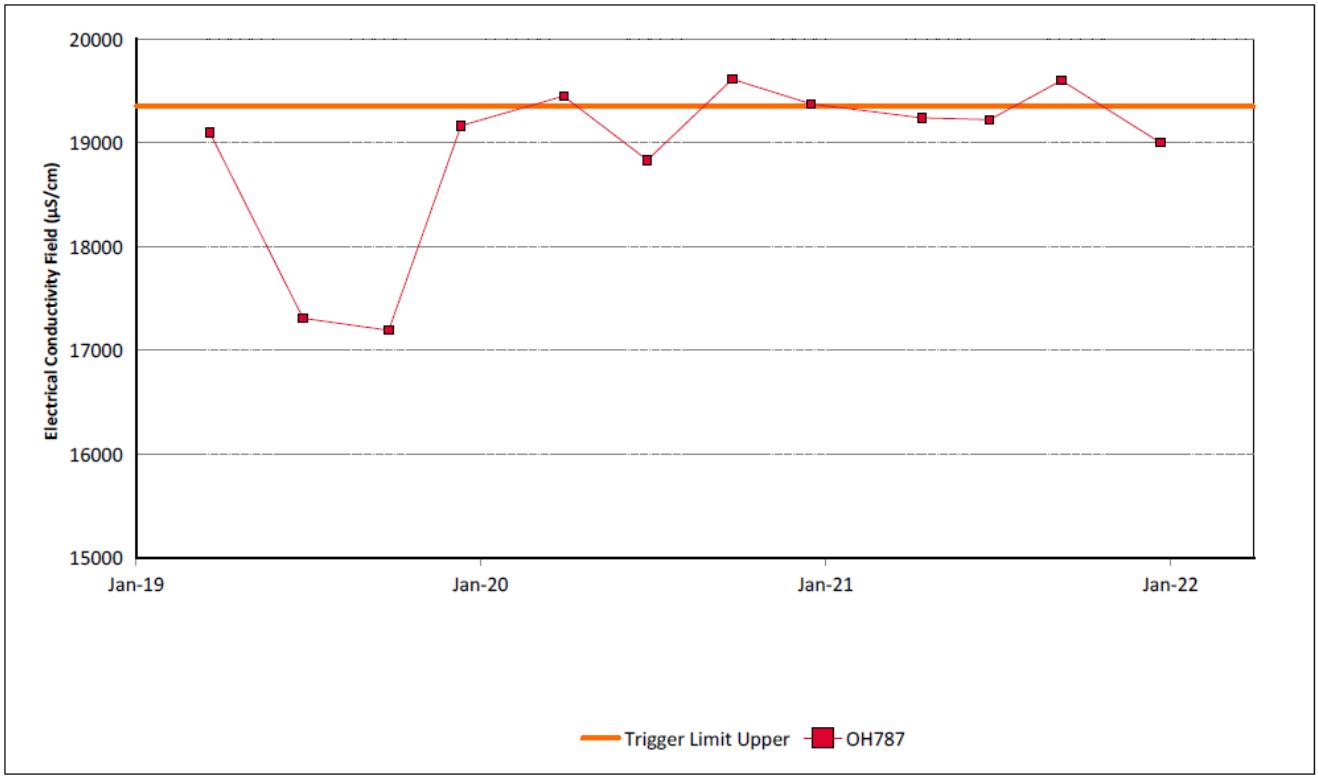
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 51: Hunter River Alluvium 1 Electrical Conductivity Trend – March 2022



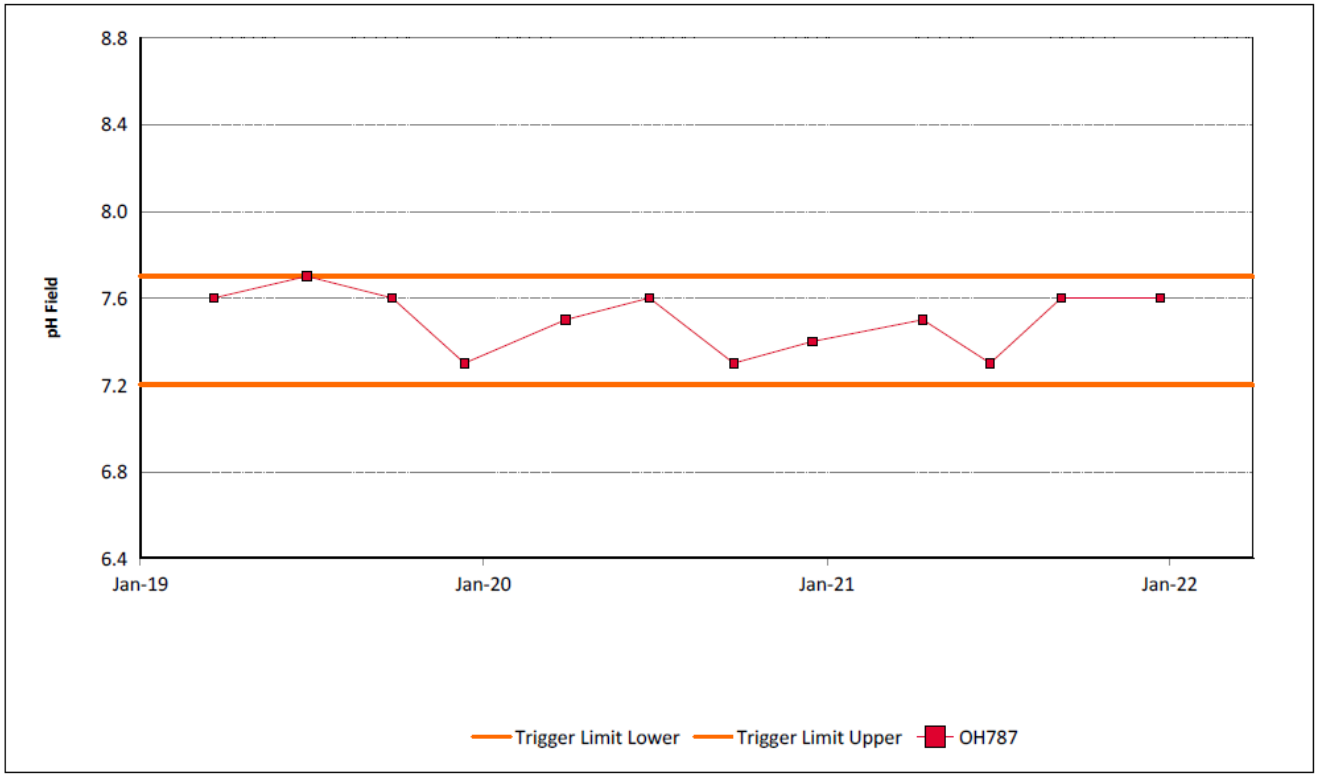
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 52: Hunter River Alluvium 1 pH Trend – March 2022



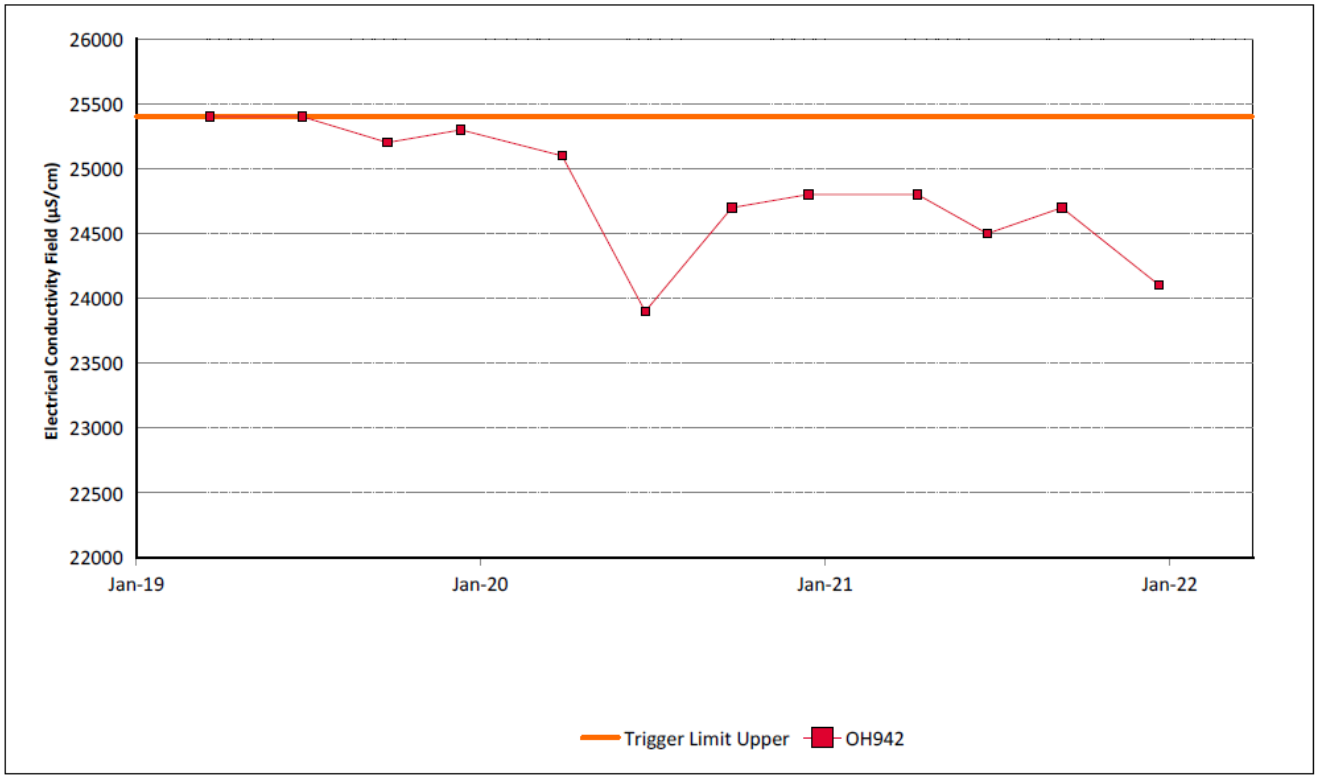
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 53: Hunter River Alluvium 2 Electrical Conductivity Trend – March 2022



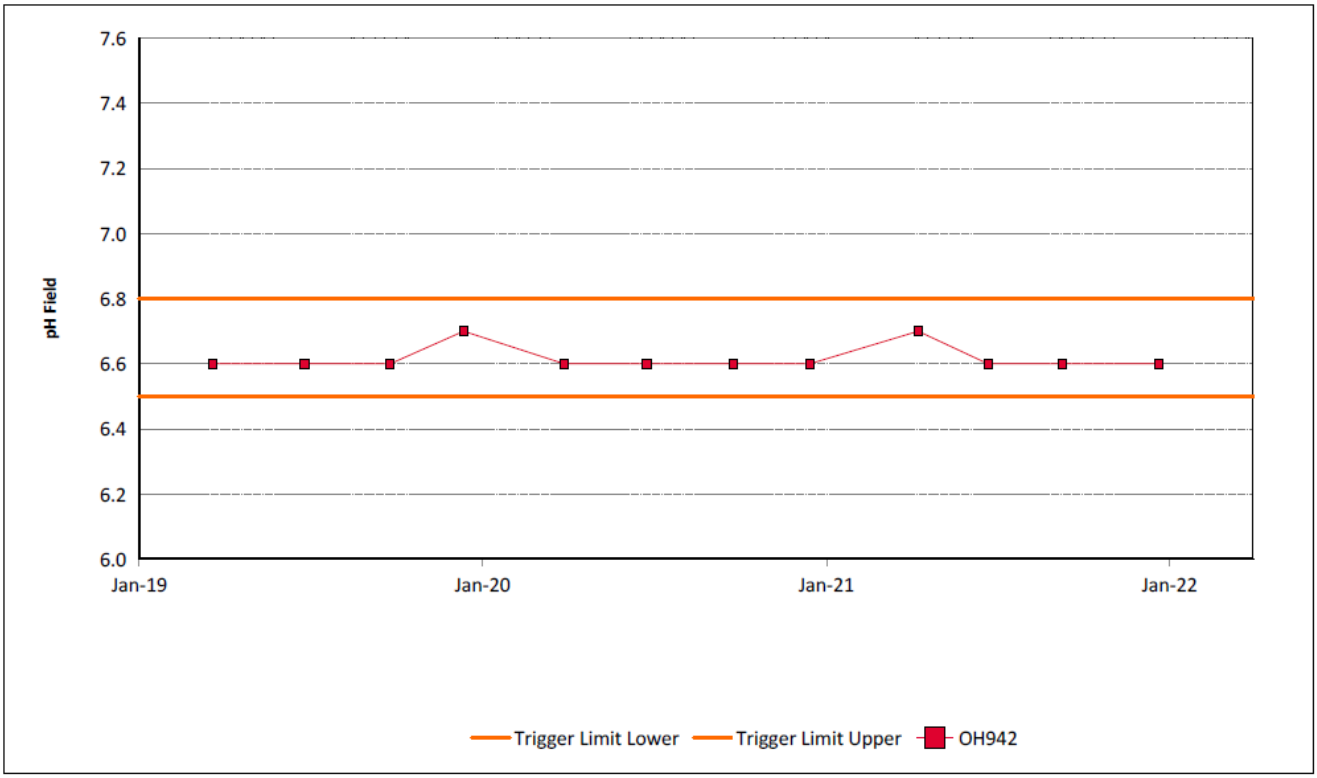
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 54: Hunter River Alluvium 2 pH Trend – March 2022



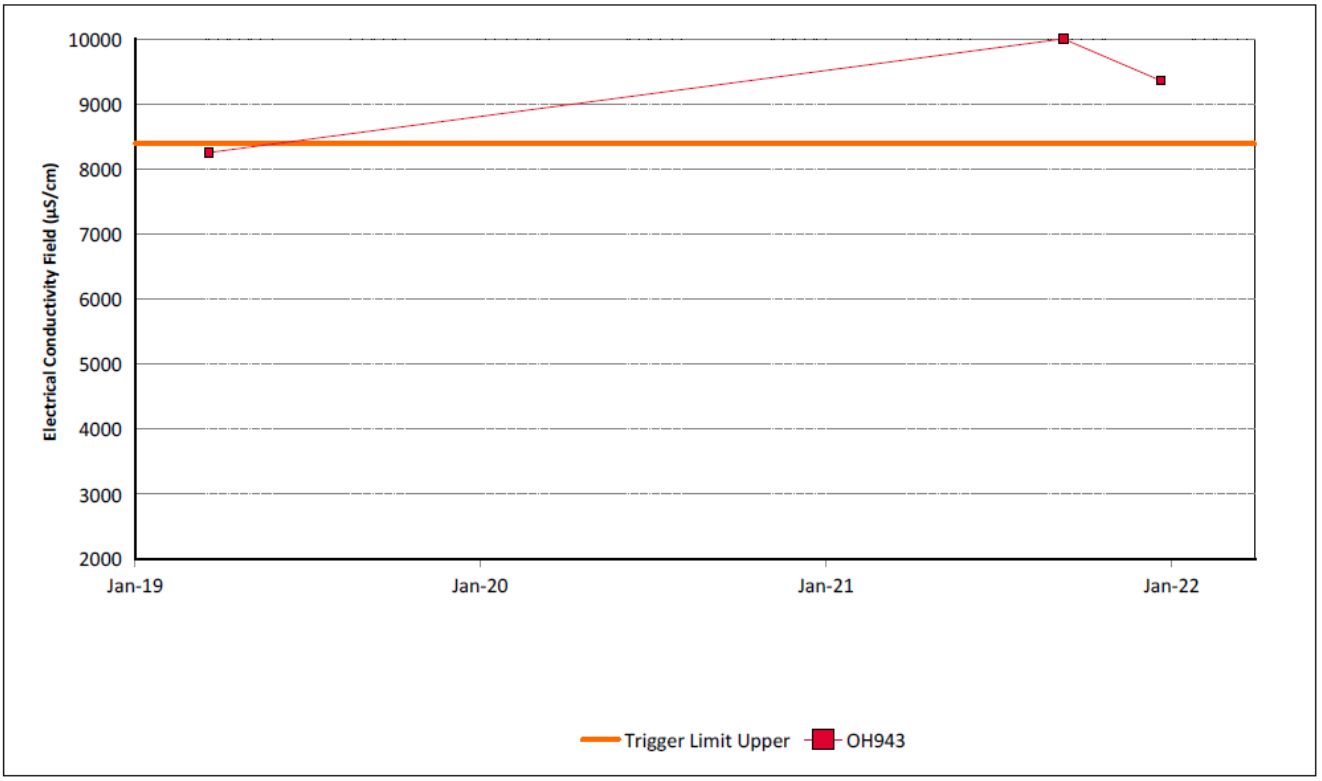
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 55: Hunter River Alluvium 3 Electrical Conductivity Trend – March 2022



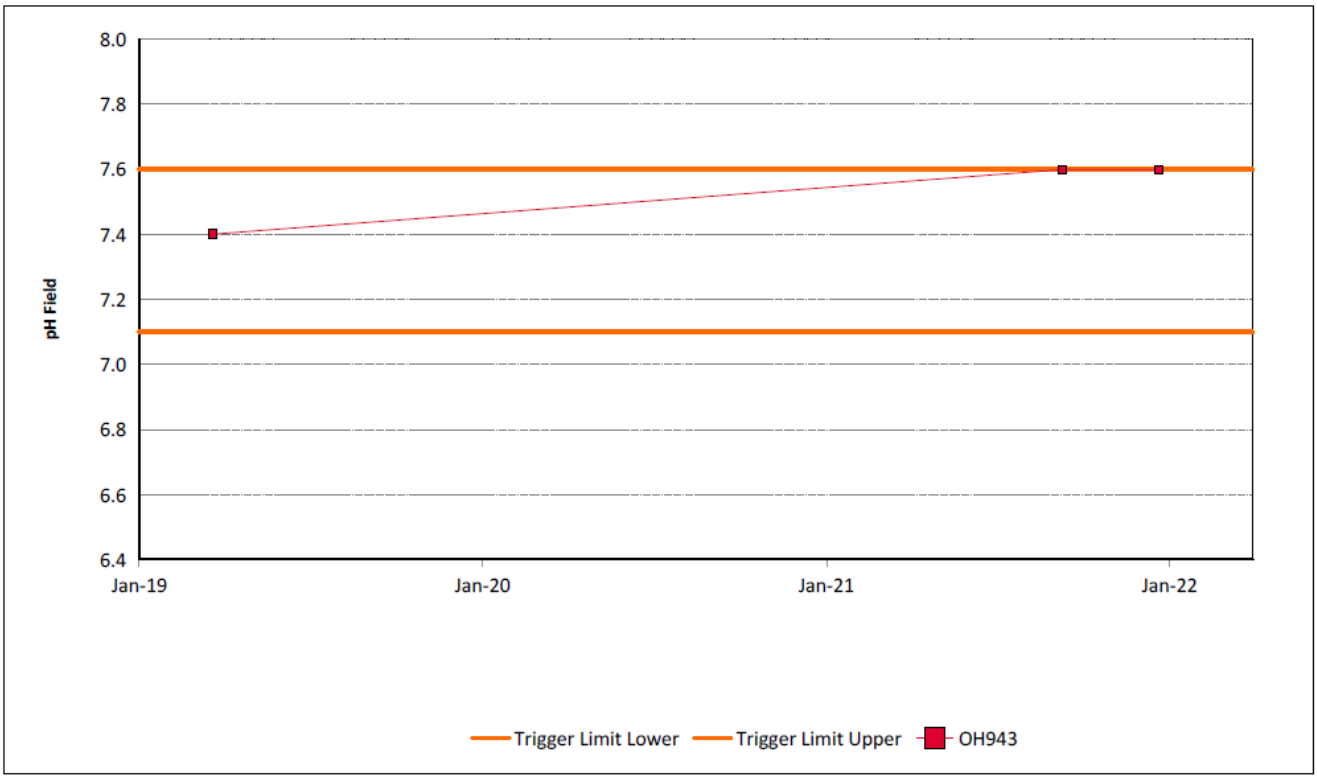
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 56: Hunter River Alluvium 3 pH Trend – March 2022



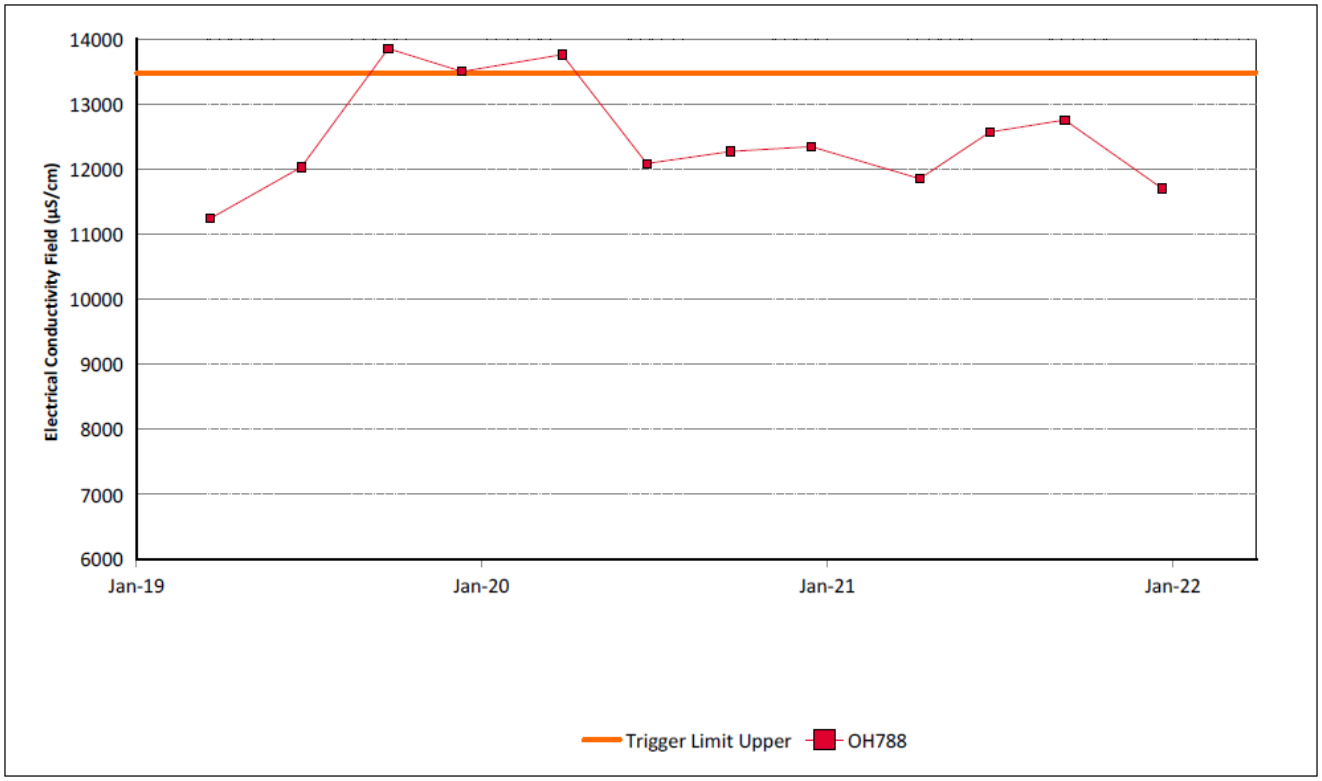
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 57: Hunter River Alluvium 4 Electrical Conductivity Trend – March 2022



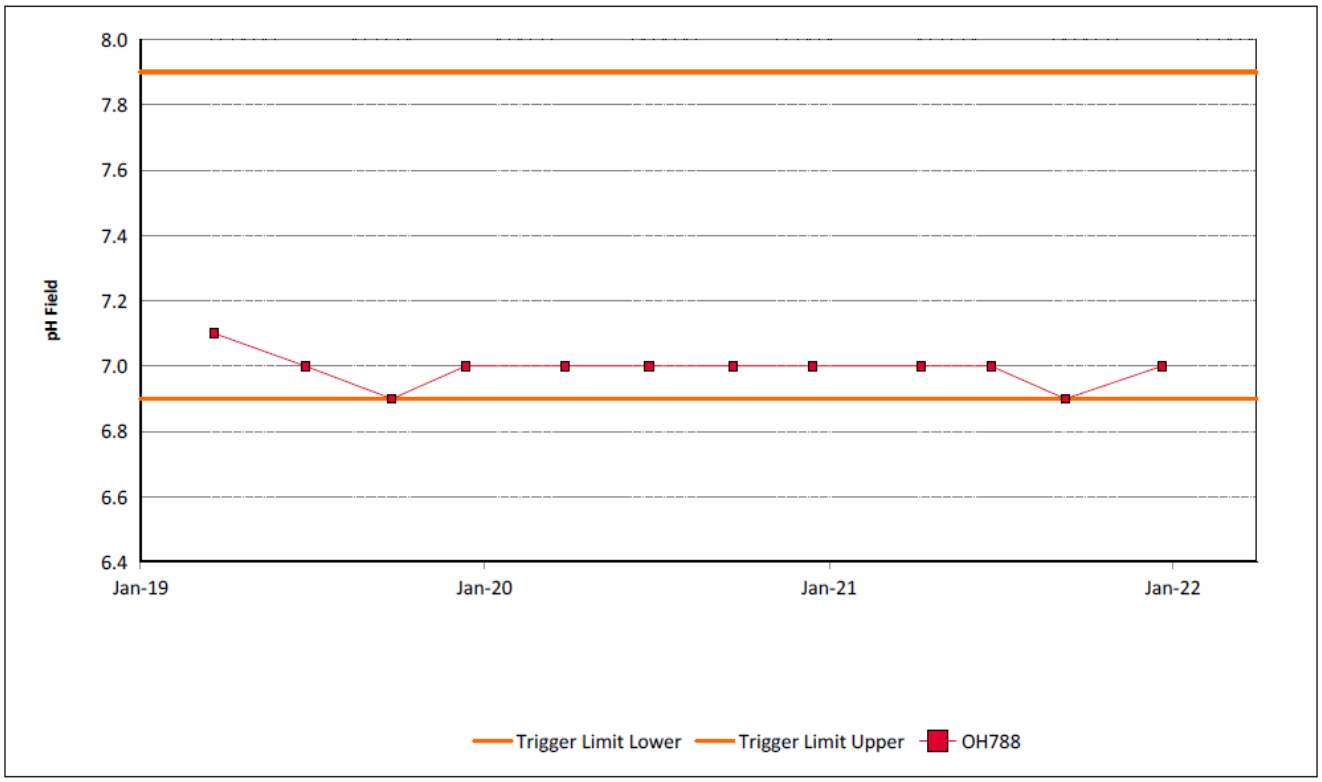
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 58: Hunter River Alluvium 4 pH Trend – March 2022



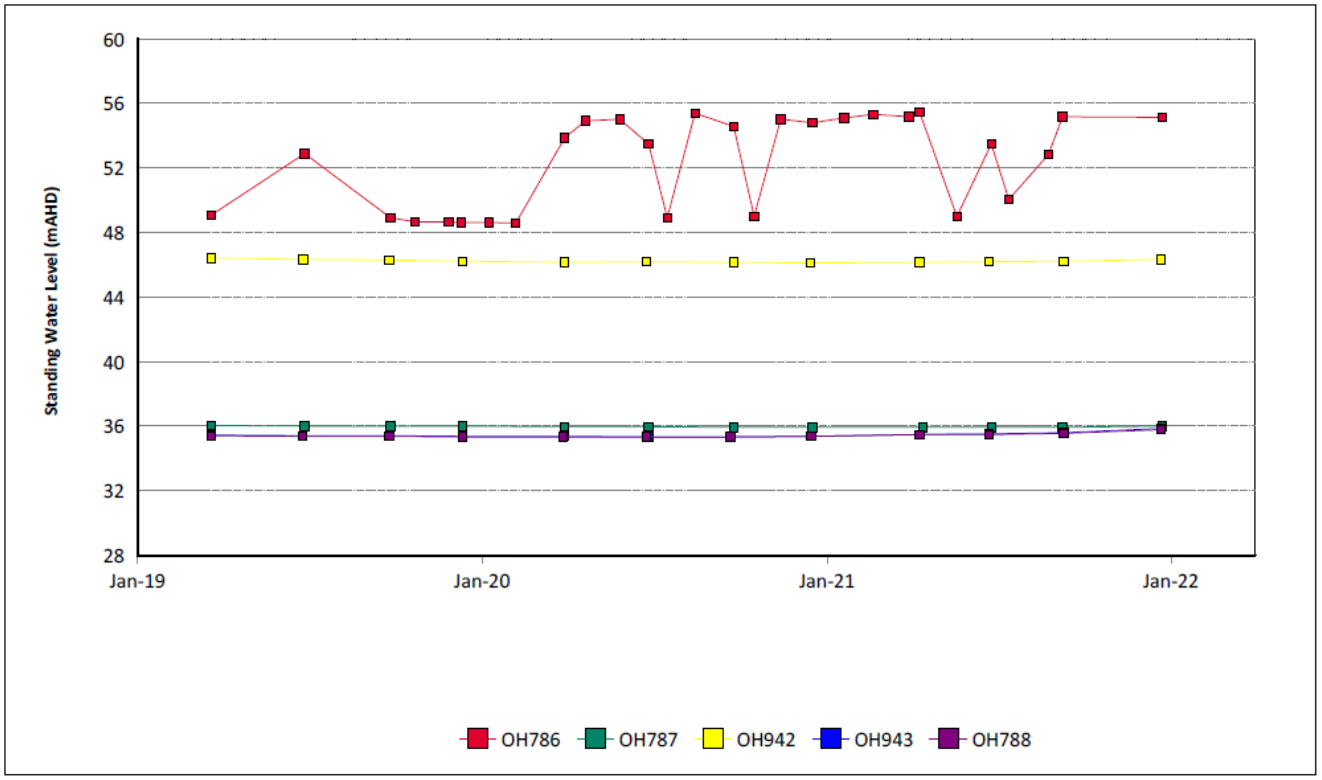
Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 59: Hunter River Alluvium 5 Electrical Conductivity – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 60: Hunter River Alluvium 5 pH Trend – March 2022



Note: Missing data indicates that there was insufficient water to take a sample, or that there was no safe access.

Figure 61: Hunter River Alluvium Standing Water Level Trend – March 2022

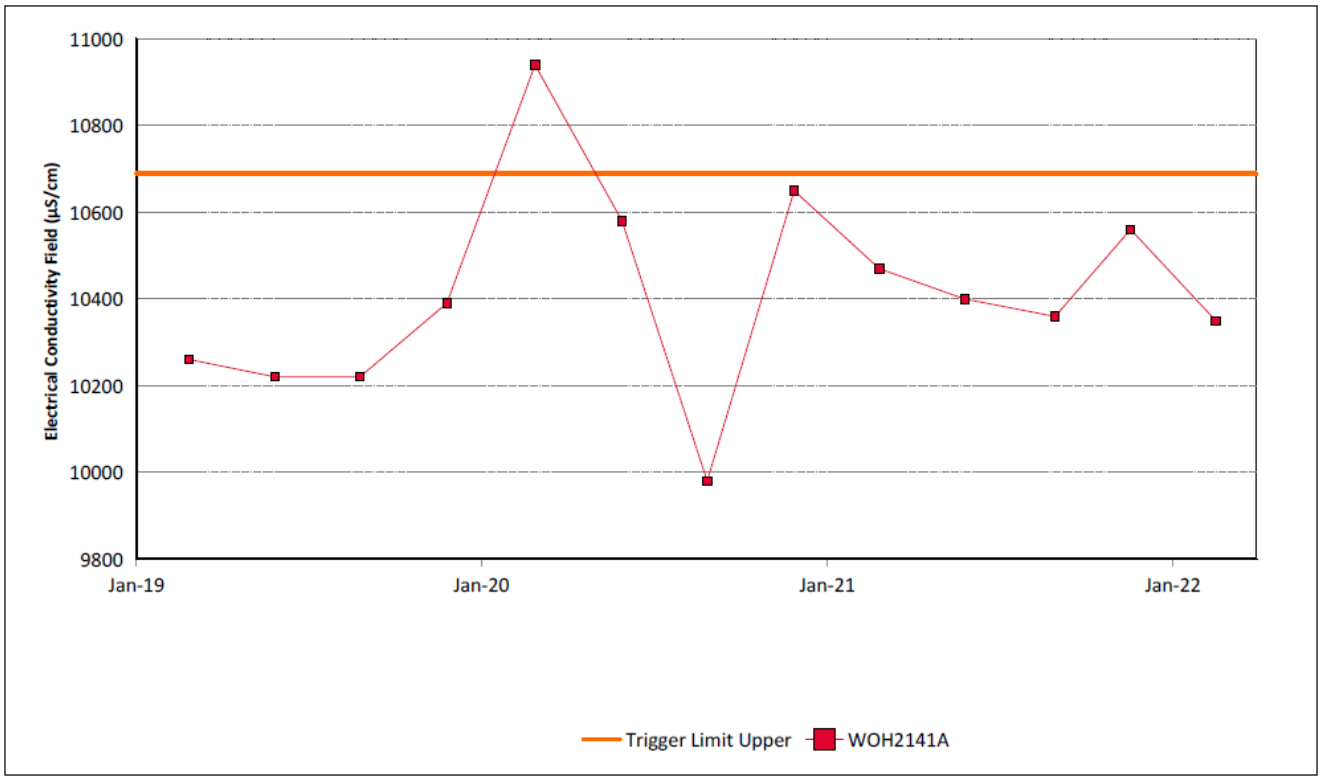


Figure 62: Whynot Seam Electrical Conductivity Field Trend - March 2022

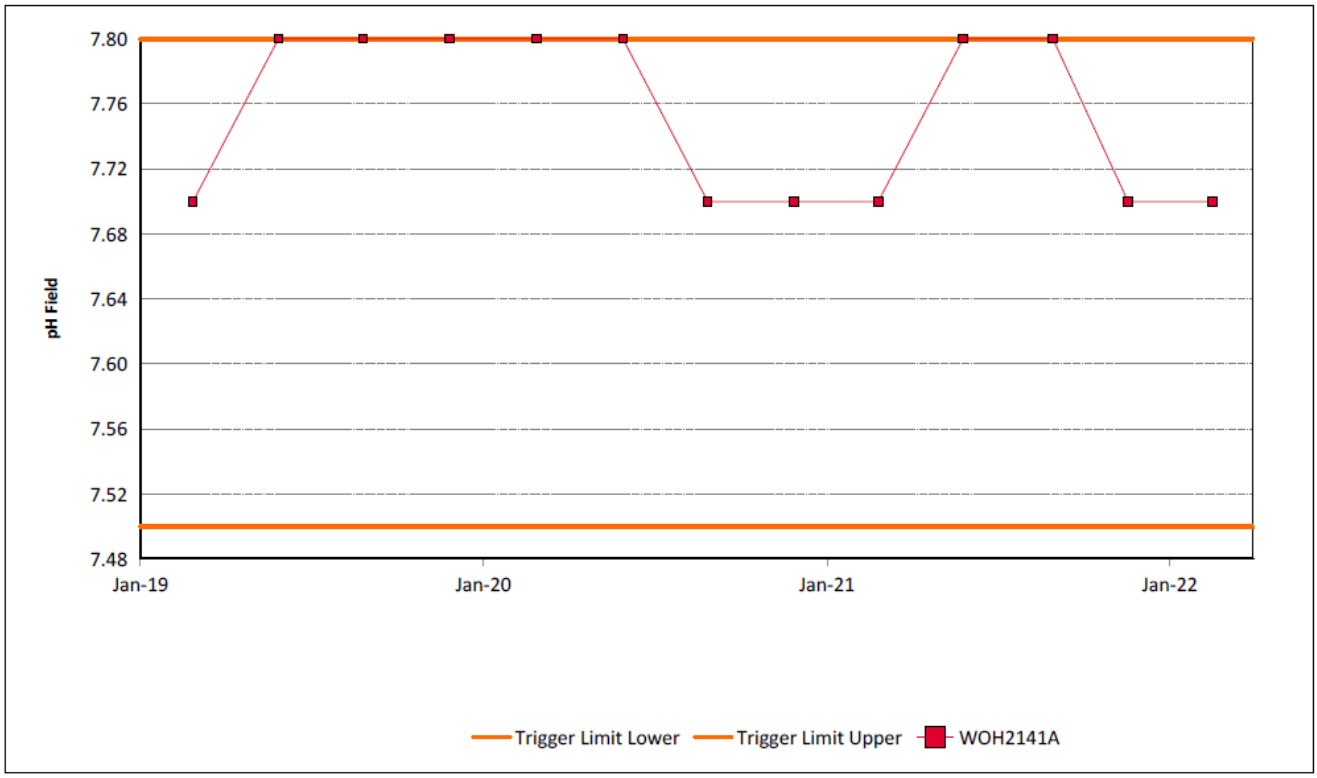


Figure 63: Whynot Seam pH Field Trend - March 2022

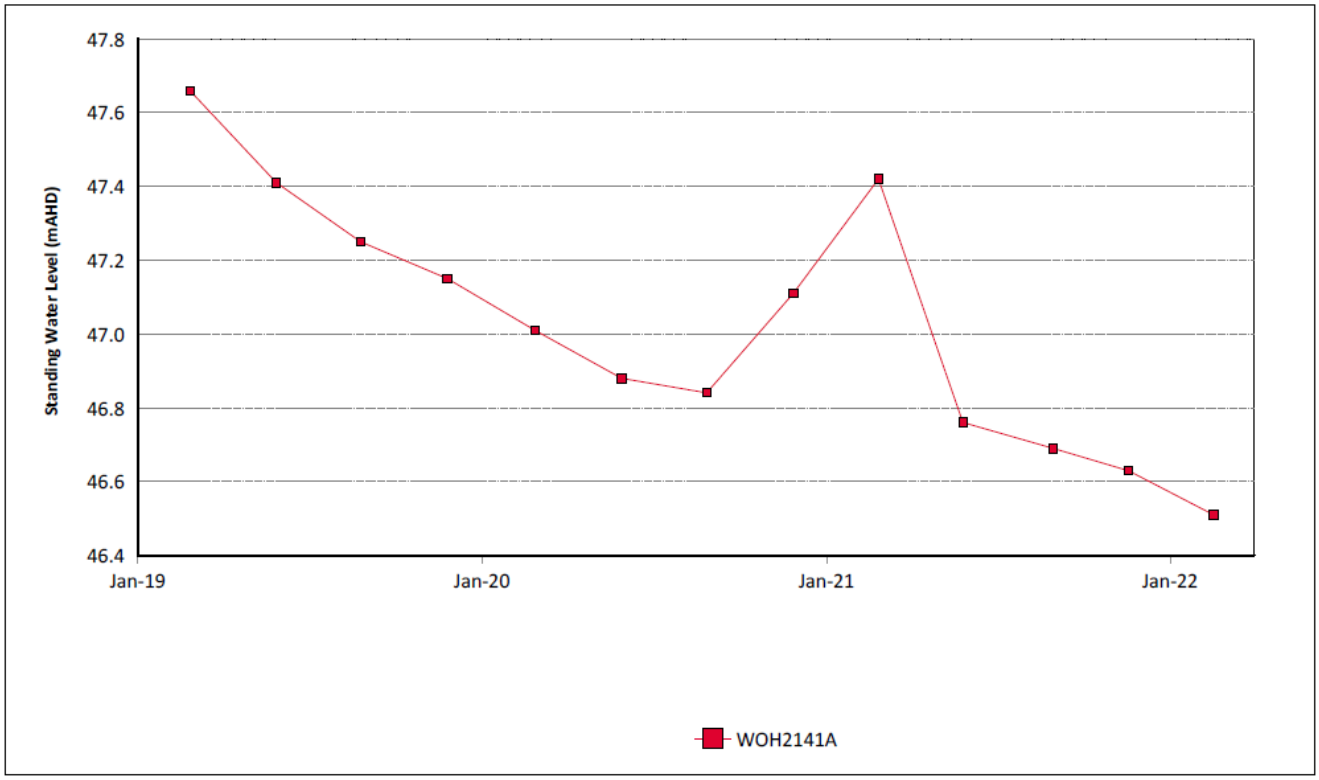


Figure 64: Whynot Seam Standing Water Level Trend - March 2022

3.3.1 Groundwater Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis, and to highlight potentially adverse groundwater impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses are outlined in the MTW Water Management Plan. Locations of groundwater bores are shown in **Figure 65**.

Current internal groundwater trigger limit breaches are summarised in **Table 3**.

Table 3: Groundwater Triggers – March 2022 YTD

Site	Date	Trigger Limit Breached	Action Taken in Response
OH788	22/06/2021	EC – 95th Percentile	Watching Brief*
OH788	9/09/2021	EC – 95th Percentile	Watching Brief*
OH943	9/09/2021	EC – 95th Percentile	Watching Brief*
OH943	21/12/2021	EC – 95th Percentile	Watching Brief*
MTD605P	24/11/2021	EC – 95th Percentile	Watching Brief*
MTD605P	17/02/2022	EC – 95th Percentile	Watching Brief*
WOH2139A	19/11/2021	pH – 95th Percentile	Watching Brief* Returned to below 95th percentile for 15/02/2022 sample result.
PZ7D	27/05/2021	pH – 95th Percentile	Watching Brief*
PZ7D	30/08/2021	pH – 95th Percentile	Watching Brief*
PZ7D	19/11/2021	pH – 95th Percentile	Investigation required.
PZ7D	16/02/2022	pH – 95th Percentile	Consultant engaged to complete investigation.
MB15MTW01D	25/02/2021	pH – 5th Percentile	Watching Brief* A change to the sampling methodology implemented in 2019 i.e. low flow pumping/purging prior to all sampling and analysis, is possibly considered the cause of the measured drop in pH results below 5th percentile trigger level since then.
MB15MTW01D	26/05/2021	pH – 5th Percentile	Watching Brief* A change to the sampling methodology implemented in 2019 i.e. low flow pumping/purging prior to all sampling and analysis, is possibly considered the cause of the measured drop in pH results below 5th percentile trigger level since then.
MB15MTW01D	24/8/2021	pH – 5th Percentile	Watching Brief* A change to the sampling methodology implemented in 2019 i.e. low flow pumping/purging prior to all sampling and analysis, is possibly considered the cause of the measured drop in pH results below 5th percentile trigger level since then.

Site	Date	Trigger Limit Breached	Action Taken in Response
MB15MTW01D	24/11/2021	pH – 5th Percentile	Investigation required.
MB15MTW01D	16/02/2022	pH – 95th Percentile	Consultant engaged to complete investigation.
MB15MTW03	24/11/2021	pH – 5th Percentile	Watching Brief* Returned to within trigger limit for 15/02/2022 sample.
MTD616P	24/11/2021	pH – 5th Percentile	Watching Brief* Returned to within trigger limit for 15/02/2022 sample.
* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.			

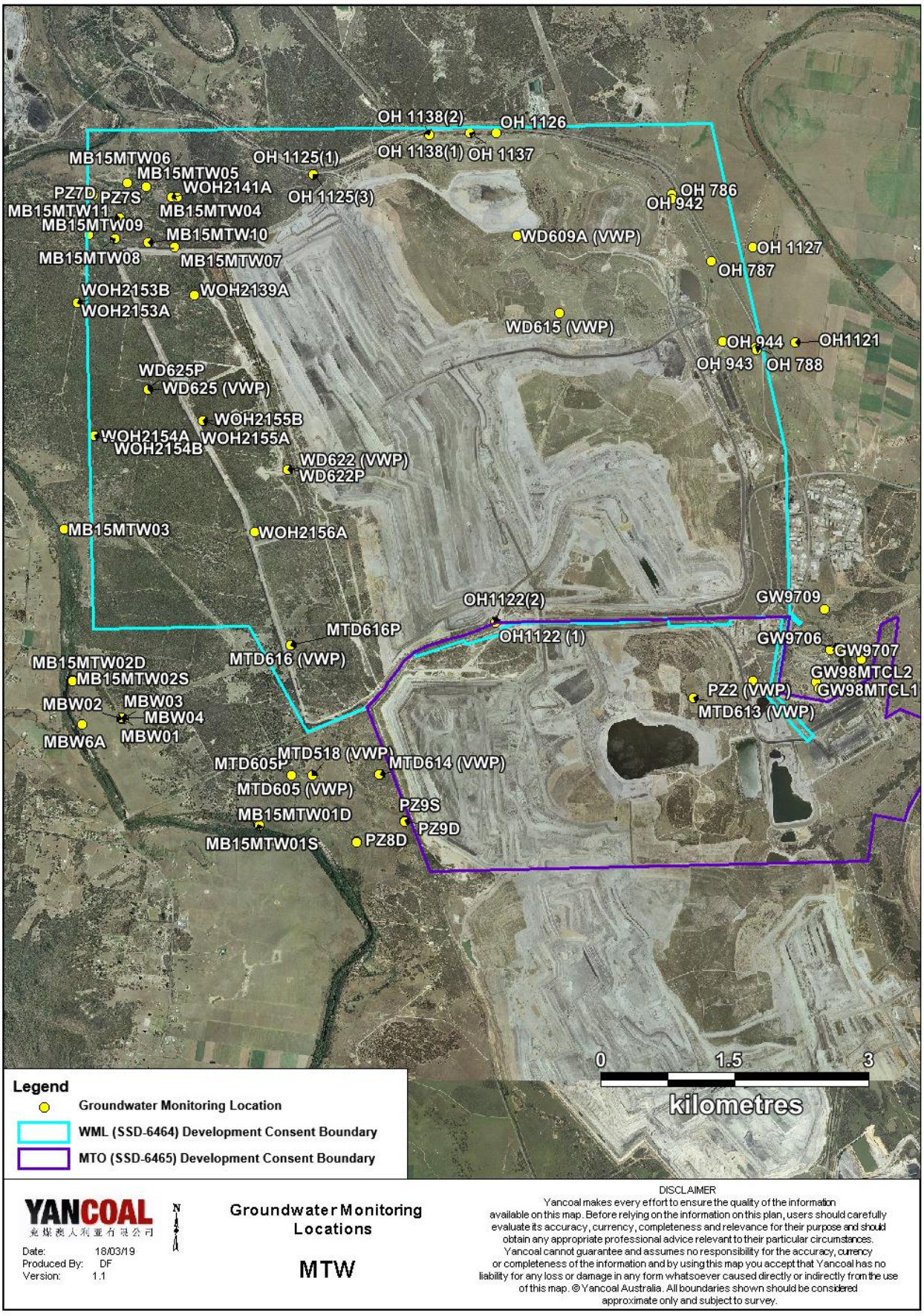


Figure 65: Groundwater Monitoring Location Plan

4.0 BLAST MONITORING

MTW have a network of six blast monitoring units. These are located at nearby privately-owned residences and function as regulatory compliance monitors.

The location of these monitors can be found in **Figure 72**.

4.1 Blast Monitoring Results

During March 2022, 11 blasts were initiated at MTW. Error! Reference source not found. to Error! Reference source not found. show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Error! Reference source not found..

Table 4: Blasting Limits

Airblast Overpressure (dB(L))	Comments
115	5% of the total number of blasts in a 12-month period
120	0%
Ground Vibration (mm/s)	**Comments**
5	5% of the total number of blasts in a 12-month period
10	0%

During the reporting period no blasts exceeded the 115 dB(L) 5% threshold for airblast overpressure or 5mm/s 5% threshold for ground vibration.

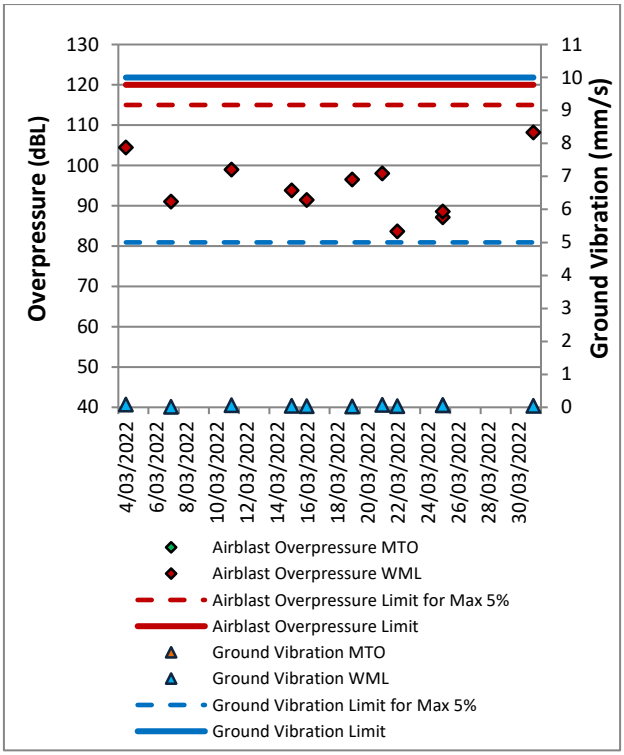


Figure 66: Abbey Green Blast Monitoring Results – March 2022

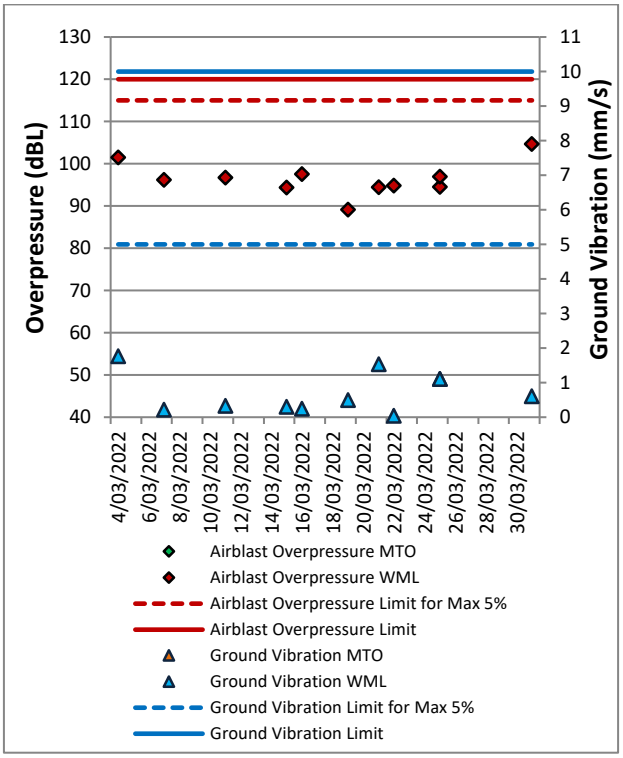


Figure 67: Bulga Village Blast Monitoring Results – March 2022

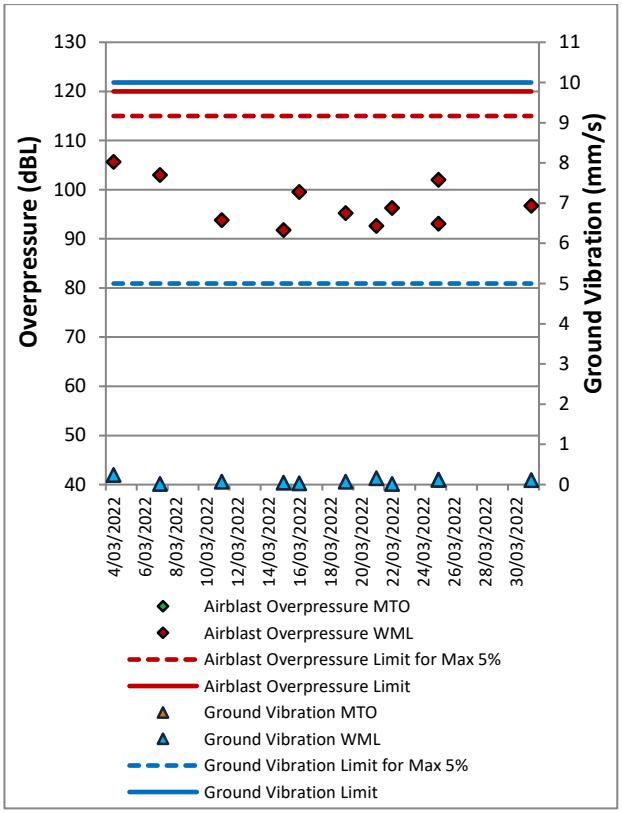


Figure 68: MTIE Blast Monitoring Results – March 2022

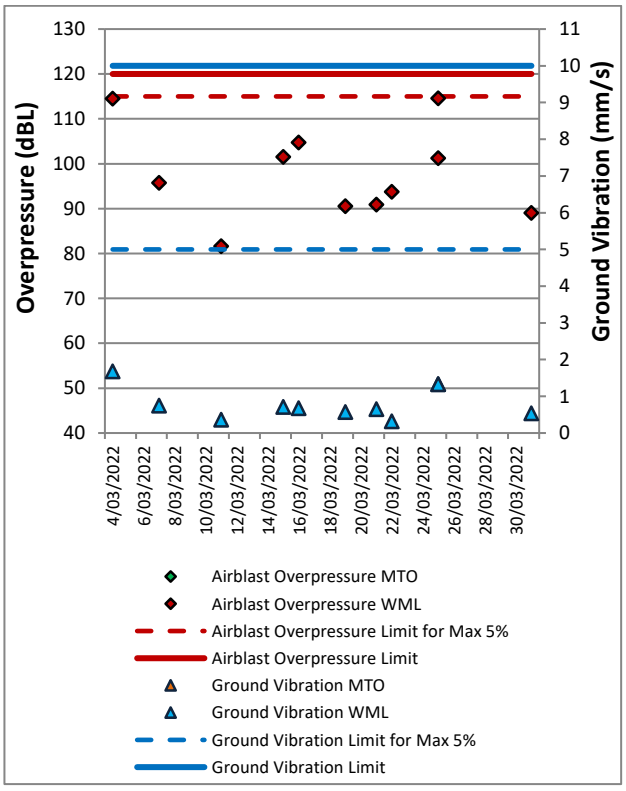


Figure 69: Warkworth Blast Monitoring Results - March 2022

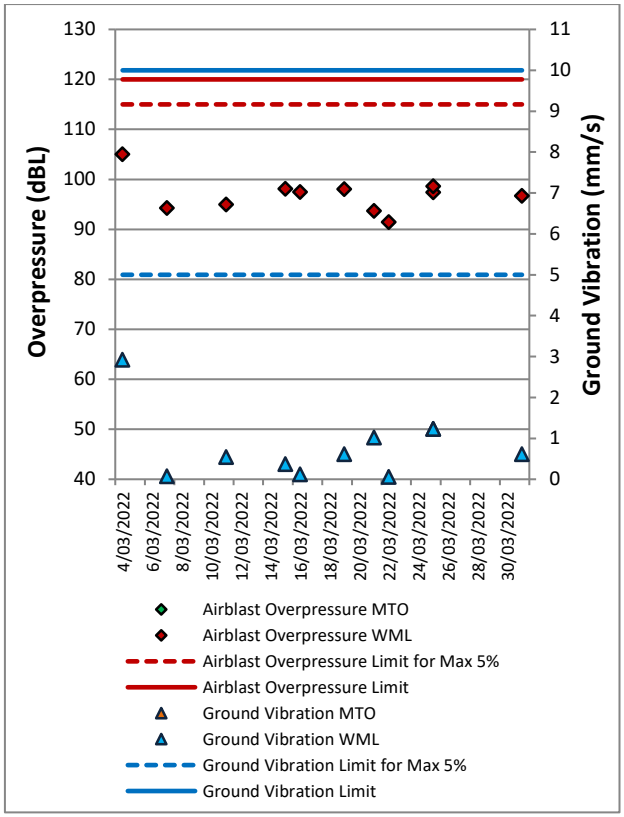


Figure 70: Wambo Road Blast Monitoring Results – March 2022

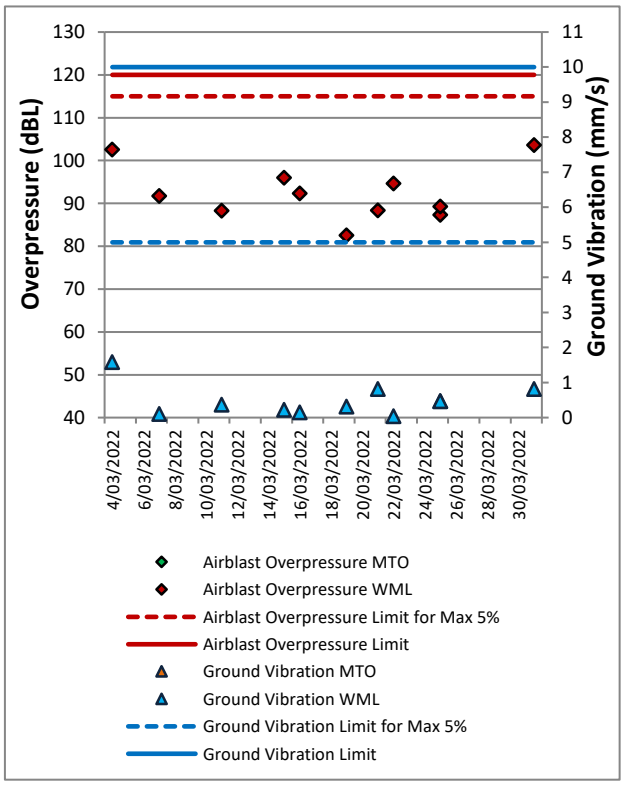


Figure 71: Wollemi Peak Road Blast Monitoring Results - March 2022

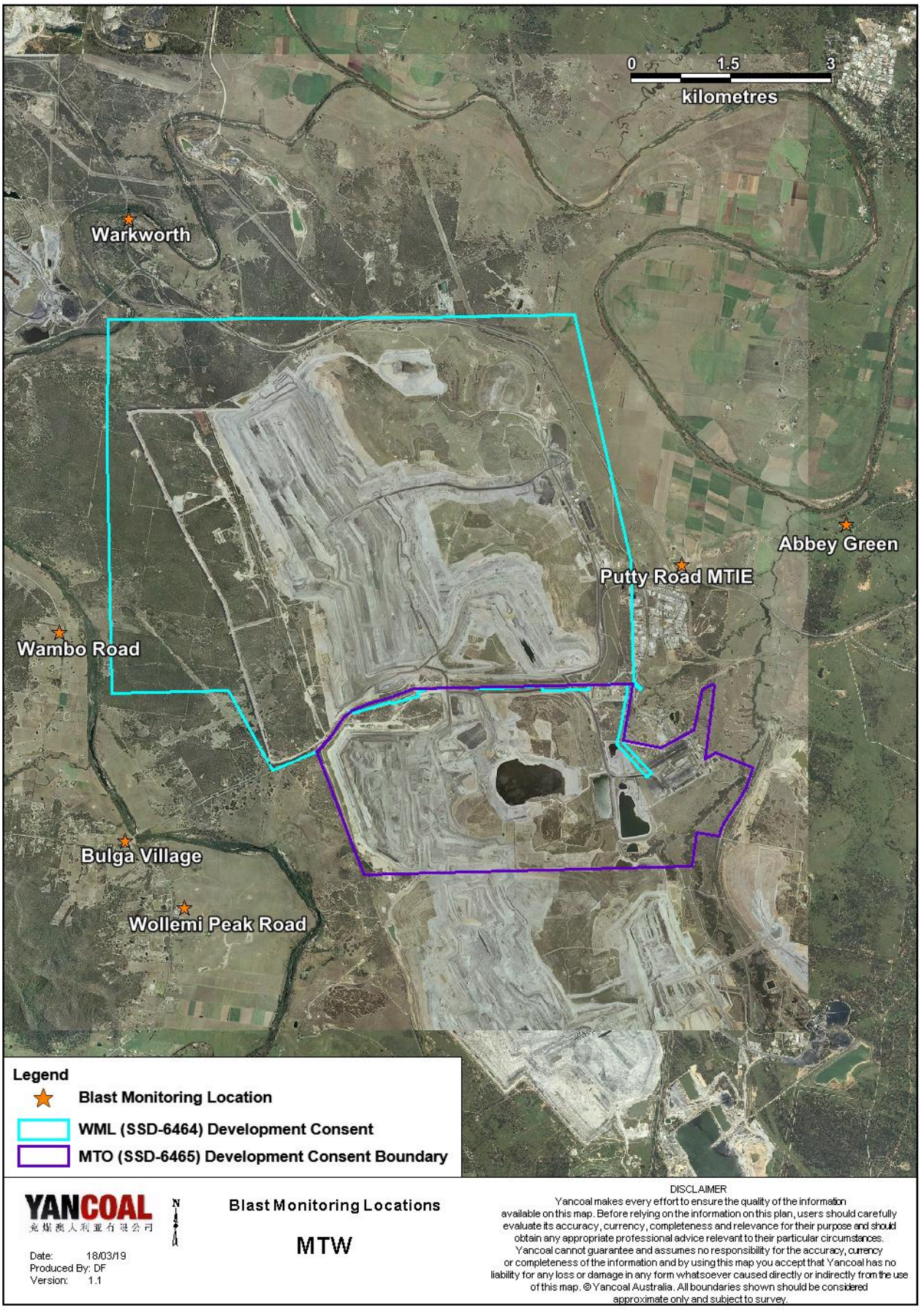


Figure 72: Blast and Vibration Monitoring Location Plan

5.0 NOISE

Routine attended noise monitoring is carried out in accordance with the MTW Noise Management Plan. A review against EIS predictions will be reported in the Annual Review Report. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Unattended monitoring (real time noise monitoring) also occurs at five sites surrounding MTW. The attended noise monitoring locations are displayed in **Figure 73.**

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 17 March 2022. All measurements complied with the relevant criteria. Results are detailed in **Table 5** to **Table 8**.

5.1.1 WML Noise Assessment

Compliance assessments undertaken against the WML noise criteria are presented in **Table 5** and **Table 6**.

Table 5: $L_{Aeq,\ 15\ minute}$ Warkworth Impact Assessment Criteria – March 2022

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion (dB(A))	Criterion Applies?[1]	WML L_{Aeq} dB[2,3,4]	Exceedance[3]
Bulga RFS	17/03/2022 23:44	2	F	37	Yes	IA	Nil
Bulga Village	17/03/2022 23:02	2.8	E	38	Yes	NM	Nil
Gouldsville	17/03/2022 21:25	2.3	F	38	No	IA	NA
Inlet Rd	17/03/2022 21:22	2.8	F	37	No	32	NA
Inlet Rd West	17/03/2022 21:00	2.9	E	35	Yes	29	Nil
Long Point	17/03/2022 21:00	2.9	E	35	Yes	IA	Nil
South Bulga	18/03/2022 0:07	2	E	35	Yes	IA	Nil
Wambo Road	17/03/2022 21:45	2.8	F	38	No	32	NA

Notes:

1. Noise criteria apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions. Criterion may or may not apply due to rounding of meteorological data values;

2. Site-only LAeq,15minute attributed to WML, including modifying factors if applicable;

3. Bold results in red indicate exceedance of relevant criterion; and

4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.

Table 6: $L_{A1,\ 1\ minute}$ Warkworth Impact Assessment Criteria – March 2022

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion (dB(A))	Criterion Applies?[1]	WML L_{Aeq} dB[2,3]	Exceedance[3,4]
Bulga RFS	17/03/2022 23:44	2	F	47	Yes	IA	NA
Bulga Village	17/03/2022 23:02	2.8	E	48	Yes	NM	NA
Gouldsville	17/03/2022 21:25	2.3	F	48	No	IA	NA
Inlet Rd	17/03/2022 21:22	2.8	F	47	No	34	NA
Inlet Rd West	17/03/2022 21:00	2.9	E	45	Yes	32	NA
Long Point	17/03/2022 21:00	2.9	E	45	Yes	IA	NA
South Bulga	18/03/2022 0:07	2	E	45	Yes	IA	NA
Wambo Road	17/03/2022 21:45	2.8	F	48	No	36	NA

Notes:
1. Noise criteria apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LA1,1minute attributed to WML;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.

5.1.2 MTO Noise Assessment

Compliance assessments undertaken against the MTO noise criteria are presented in **Table 7** and **Table 8**.

Table 7: $L_{Aeq,\ 15minute}$ Mount Thorley Operations - Impact Assessment Criteria – March 2022

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB	Criterion Applies?[1]	MTO L_{Aeq} dB[2,3]	Exceedance[3,4]
Bulga RFS	17/03/2022 23:44	2	F	37	Yes	31	Nil
Bulga Village	17/03/2022 23:02	2.8	E	38	Yes	IA	Nil
Gouldsville	17/03/2022 21:25	2.3	F	35	No	IA	NA
Inlet Rd	17/03/2022 21:22	2.8	F	37	No	IA	NA
Inlet Rd West	17/03/2022 21:00	2.9	E	35	Yes	IA	Nil
Long Point	17/03/2022 21:00	2.9	E	35	Yes	IA	Nil
South Bulga	18/03/2022 0:07	2	E	36	Yes	NM	Nil
Wambo Road	17/03/2022 21:45	2.8	F	38	No	IA	NA

Notes:
1. Noise criteria apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LAeq,15minute attributed to MTO, including modifying factors if applicable;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.

Table 8: $L_{A1, 1Minute}$ Mount Thorley Operations - Impact Assessment Criteria – March 2022

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB	Criterion Applies?[1]	MTO $L_{A1, 1min}$ dB[2,3]	Exceedance[3,4]
Bulga RFS	17/03/2022 23:44	2	F	47	Yes	42	Nil
Bulga Village	17/03/2022 23:02	2.8	E	48	Yes	IA	Nil
Gouldsville	17/03/2022 21:25	2.3	F	45	No	IA	NA
Inlet Rd	17/03/2022 21:22	2.8	F	47	No	IA	NA
Inlet Rd West	17/03/2022 21:00	2.9	E	45	Yes	IA	Nil
Long Point	17/03/2022 21:00	2.9	E	45	Yes	IA	Nil
South Bulga	18/03/2022 0:07	2	E	46	Yes	NM	Nil
Wambo Road	17/03/2022 21:45	2.8	F	48	No	IA	NA

Notes:
1. Noise criteria apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LA1,1minute attributed to MTO;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.

5.1.3 Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. No noise modifying factors were applicable during the March monitoring.

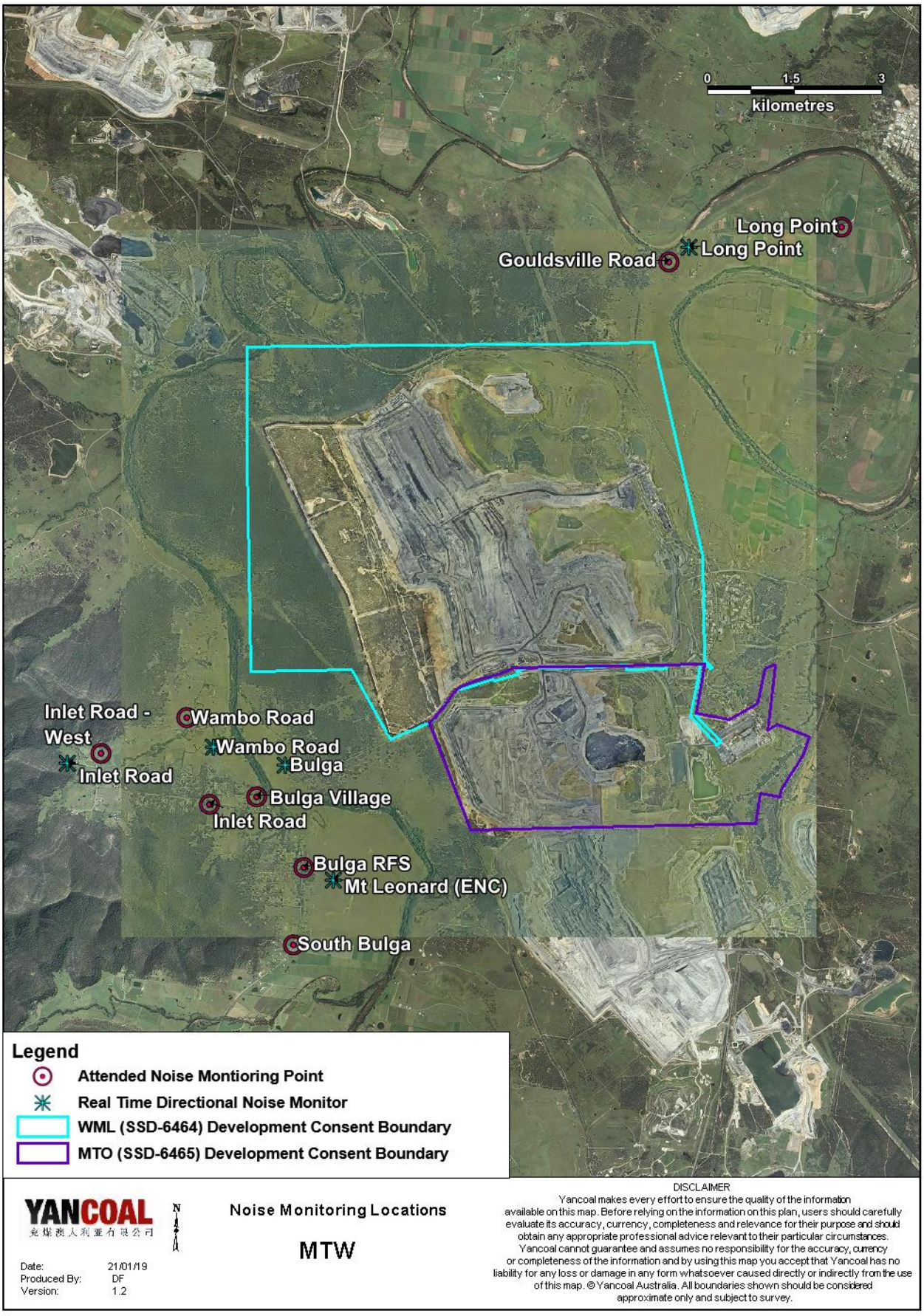


Figure 73: Noise Monitoring Location Plan

5.2 Noise Management Measures

A program of targeted supplementary attended noise monitoring is in place at MTW, supported by the real-time directional monitoring network and ensuring the highest level of noise management is maintained. The supplementary program is undertaken by MTW personnel and involves:

- Routine inspections from both inside and outside the mine boundary;
- Routine and as-required handheld noise assessments (undertaken in response to noise alarm and/or community complaint), comparing measured levels against consent noise limits; and
- Validation monitoring following operational modifications to assess the adequacy of the modifications.

Where a noise assessment identifies noise emissions which are exceeding the relevant noise limit(s) for any particular residence, modifications will be made so as to ensure that the noise event is resolved within 75 minutes of identification. The actions taken are commensurate with the nature and severity of the noise event, but can include:

- Changing the haul route to a less noise sensitive haul;
- Changing dump locations (in-pit or less exposed dump option)
- Reducing equipment numbers;
- Shut down of task; or
- Site shut down.

A summary of these assessments undertaken during March are provided in **Table 9**: Supplementary Attended Noise Monitoring Data – .

Table 9: Supplementary Attended Noise Monitoring Data – March 2022

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
540	4	3	0.74

: Measurements are taken under all meteorological conditions, including conditions under which the consent noise criteria do not apply.

6.0 OPERATIONAL DOWNTIME

During March a total of 18 hours of equipment downtime was logged in response to environmental events such as dust, noise and adverse meteorological conditions. Operational downtime by equipment type is shown in

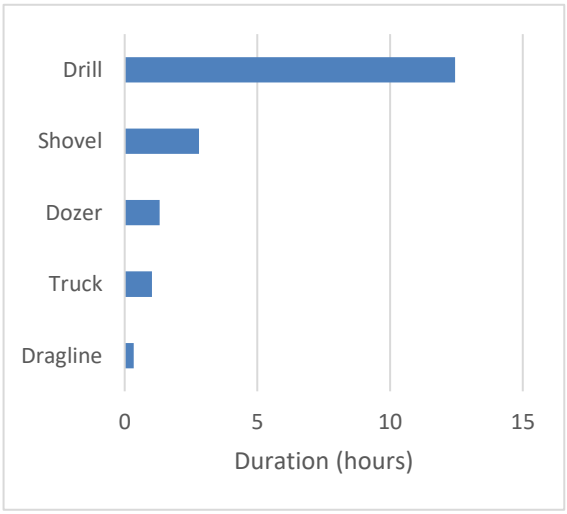


Figure 74.

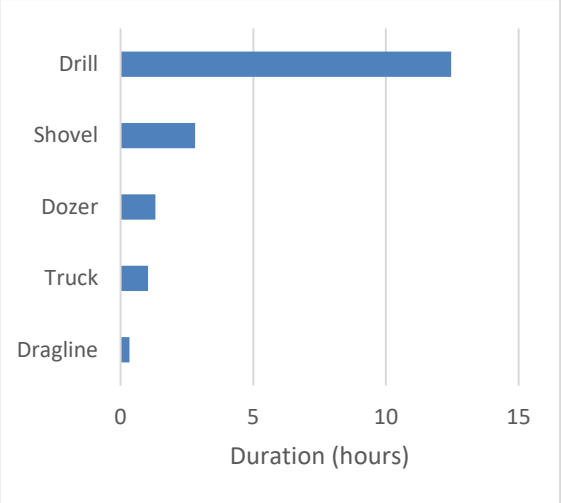


Figure 74: Operational Downtime by Equipment Type – March 2022

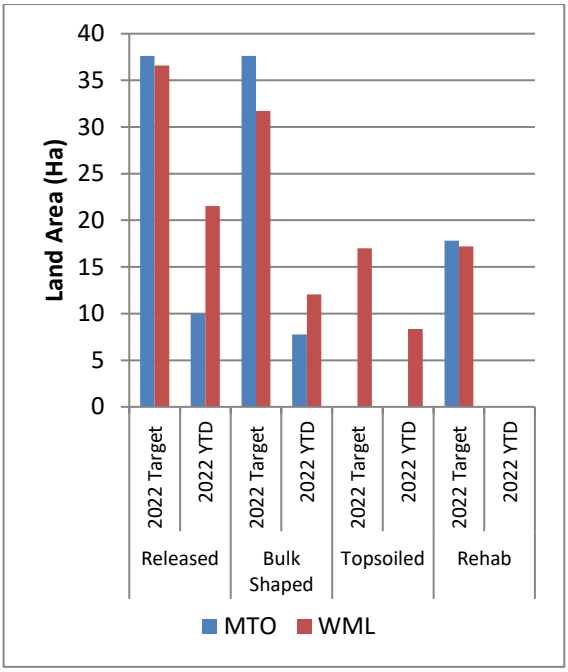


Figure 75: Rehabilitation YTD – March 2022

7.0 REHABILITATION

During March, 5.6 Ha of land was released for rehabilitation, and 1.5 Ha was bulk shaped. Year-to-date progress can be viewed in **Figure 75.**

8.0 ENVIRONMENTAL INCIDENTS

There were 2 reportable environmental incidents recorded during the reporting period.

On 7 March 2022, three sediment dams overtopped their spillway due to a significant rain event. Rainfall started at approximately 12:45am on Sunday 6 March 2022 and continued until approximately 8:45am on Wednesday 9 March 2022. A total of 153.2mm of rainfall was recorded during the period. Notifications to the relevant regulatory authorities was undertaken by the MTW Environment and Community Manager in accordance with the site's Pollution Incident Response Management Plan.

On 26 March 2022, one sediment dam overtopped its spillway due to a significant rain event. Rainfall started at approximately 4:49pm on Wednesday 23 March 2022 and continued until approximately 11:12am on Wednesday 30 March 2022. A total of 116.6mm of rainfall was recorded during the period. Notifications to the relevant regulatory authorities was undertaken by the MTW Environment and Community Manager in accordance with the site's Pollution Incident Response Management Plan.

Table 10: Complaints Summary - YTD

	Noise	Dust	Blast	Lighting	Other	Total
January	2	1	4	0	0	7
February	7	0	5	0	1	13
March	8	0	3	0	0	11
April						
May						
June						
July						
August						
September						
October						
November						
December						
Total	17	1	12	0	1	31

9.0 COMPLAINTS

During the reporting period 11 complaints were received, details of these complaints are displayed in Error! Reference source not found.below.

Appendix A: Meteorological Data

Table 11: Meteorological Data – Charlton Ridge Meteorological Station – March 2022

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/03/2022	26	15	99	65	152	3.1	2.8
2/03/2022	27	14	99	60	153	2.4	2.0
3/03/2022	24	15	99	78	177	3.3	21.8
4/03/2022	28	15	98	68	170	3.1	1.6
5/03/2022	29	14	99	53	165	1.1	0.2
6/03/2022	27	17	99	63	183	3.9	16.0
7/03/2022	27	16	99	69	157	2.5	53.2
8/03/2022	21	15	99	76	214	3.5	78.4
9/03/2022	25	12	99	52	201	2.9	6.2
10/03/2022	23	11	80	44	154	2.3	0.0
11/03/2022	26	12	88	45	154	2.0	0.0
12/03/2022	26	10	93	44	149	2.4	0.0
13/03/2022	26	9	91	45	154	2.0	0.0
14/03/2022	27	10	96	48	163	2.3	0.0
15/03/2022	26	13	95	46	150	3.0	2.2
16/03/2022	28	12	96	45	152	2.8	0.0
17/03/2022	29	13	97	47	147	2.2	0.0
18/03/2022	29	14	97	44	149	2.3	0.0
19/03/2022	22	13	98	66	176	3.0	2.0
20/03/2022	27	9	96	41	187	1.8	0.0
21/03/2022	26	11	97	40	168	2.3	0.0

22/03/2022	31	9	98	37	177	1.9	0.0
23/03/2022	31	14	100	38	145	3.0	7.6
24/03/2022	20	12	100	83	142	3.1	44.0
25/03/2022	23	10	100	68	146	2.9	0.2
26/03/2022	22	11	100	65	149	2.9	25.8
27/03/2022	21	12	100	81	165	2.8	2.6
28/03/2022	24	12	100	70	161	1.6	2.2
29/03/2022	21	13	100	94	170	2.5	31.6
30/03/2022	24	13	100	71	172	4.5	2.6
31/03/2022	22	10	100	63	174	6.0	1.0

"-" Indicates that data was not available due to technical issues.