Monthly Environmental Monitoring Report

Yancoal Mount Thorley Warkworth

June 2022

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Revision History

Version No.	Version Details	Document Status	Date
1.1	**Environment and Community Advisor**	**Final**	**10/11/2022**

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 June to 30 June 2022.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

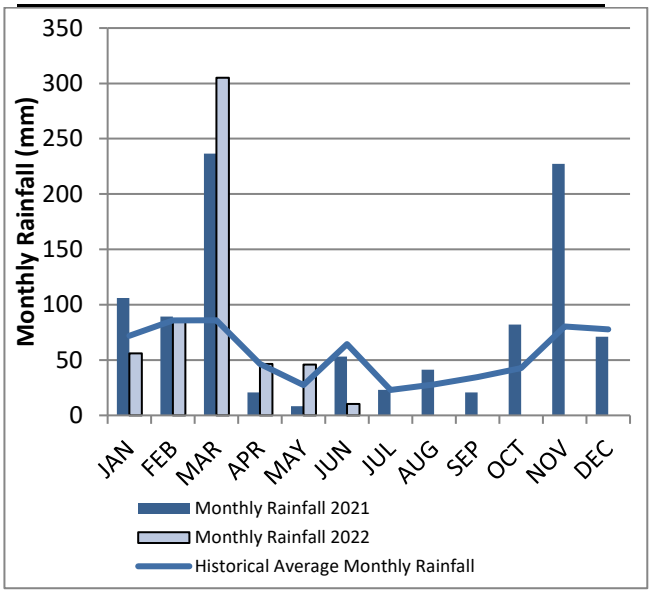
Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to **Figure 3**: Air Quality Monitoring Locations).

2.1.1 Rainfall

Rainfall for the reporting period is summarised in **Table 1**. The year-to-date monthly rainfall totals, 2022 monthly rainfall totals and historical average monthly rainfall trend are shown in **Figure 1**.

Table 1: Monthly Rainfall MTW

2022	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
June	10.2	550.4



Note: The historical average monthly rainfall is calculated from 2007 to 2021 monthly totals

Figure 1: Rainfall Trend YTD

2.1.2 Wind Speed and Direction

Winds from the north west were dominant during the reporting period as shown in **Figure 2.**

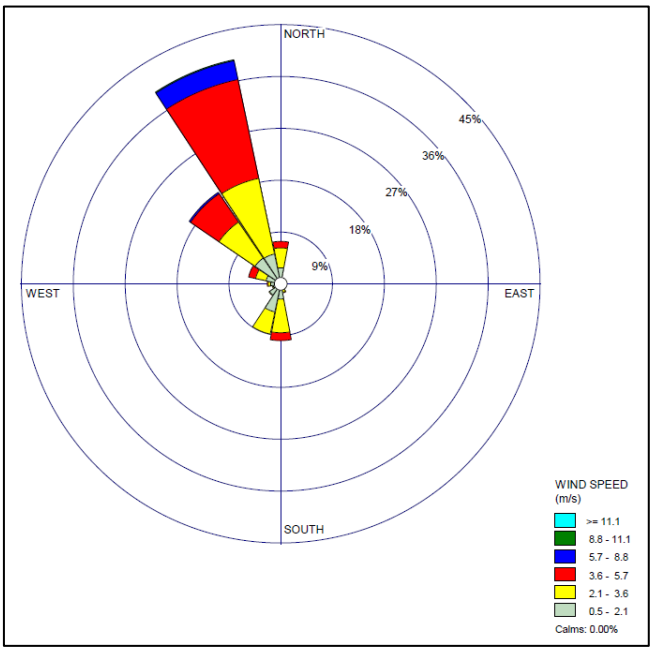


Figure 2: Charlton Ridge Wind Rose – June 2022

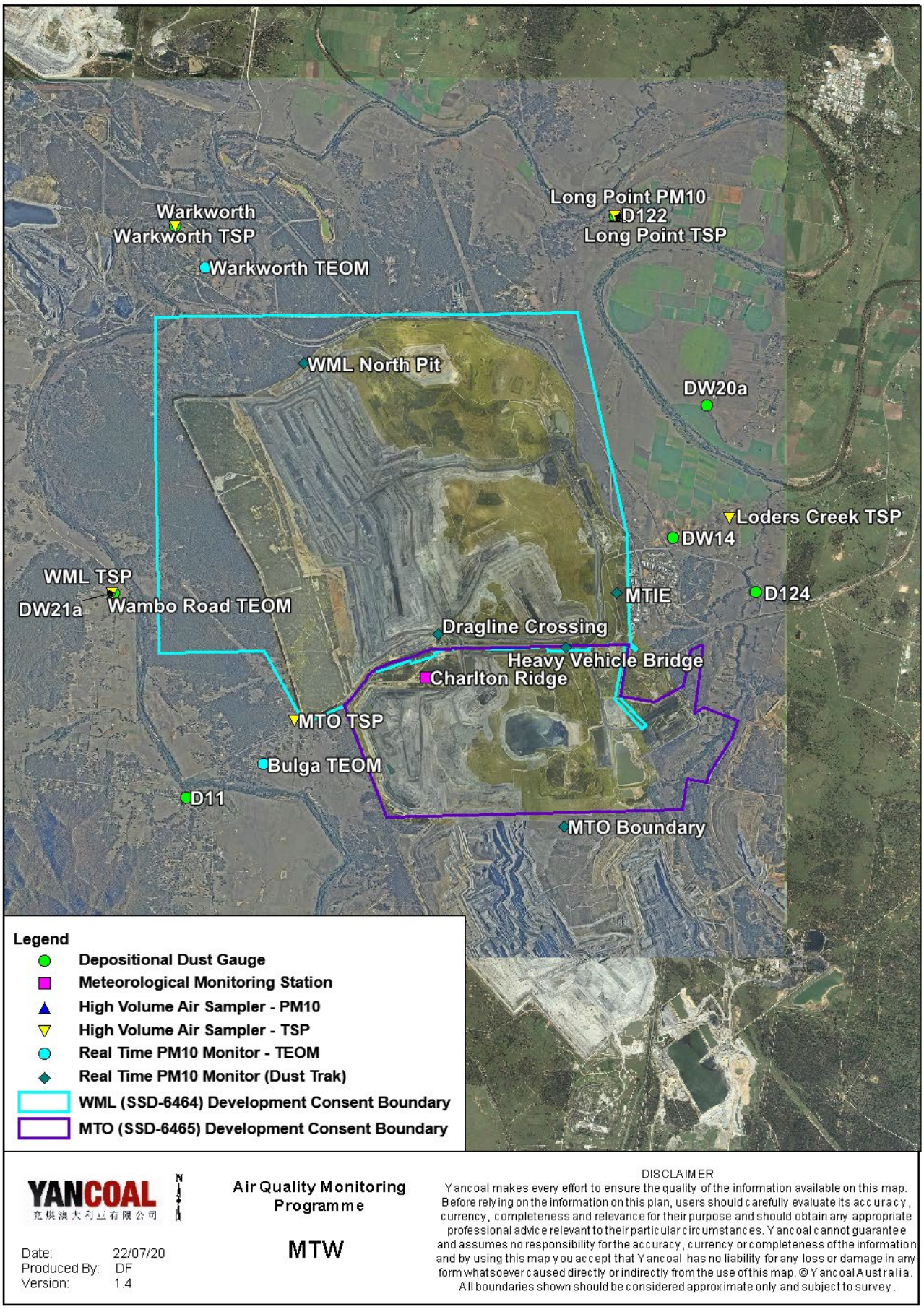


Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

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

During the reporting period the Warkworth monitor recorded a monthly result above the long-term impact assessment criteria of 4.0 g/m^2 per month. There is no evidence to suggest that the Warkworth result is contaminated. Accordingly, the result will be included in the annual average calculation.

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.

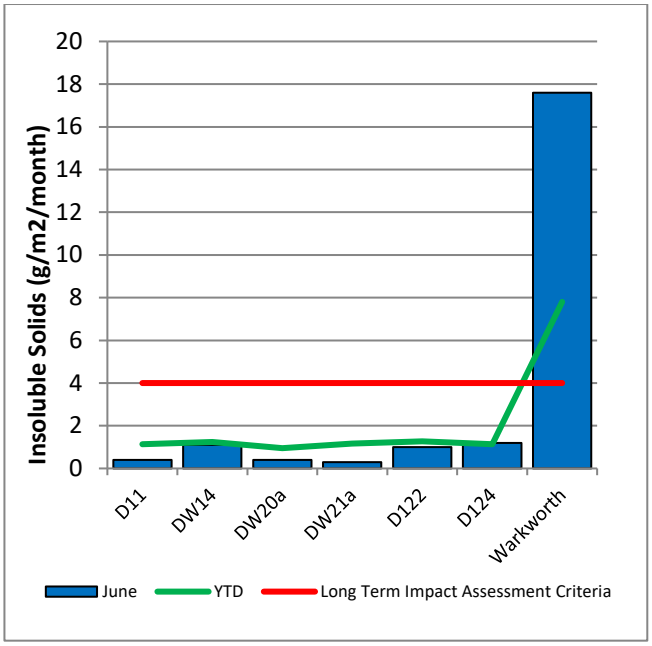


Figure 4: Depositional Dust – June 2022

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 each monitoring station against the short-term impact assessment criteria of 50µg/m^3.

Data was not available on 3/06/2022 at the Long Point HVAS due to a power outage.

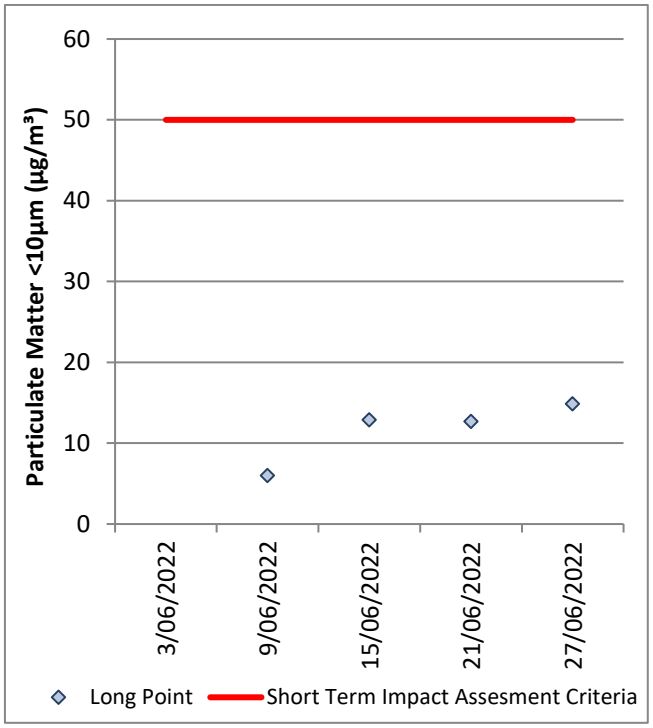


Figure 5: Individual PM10 Results – June 2022

Figure 6 shows the annual average PM10 result against the long term impact assessment criteria.

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

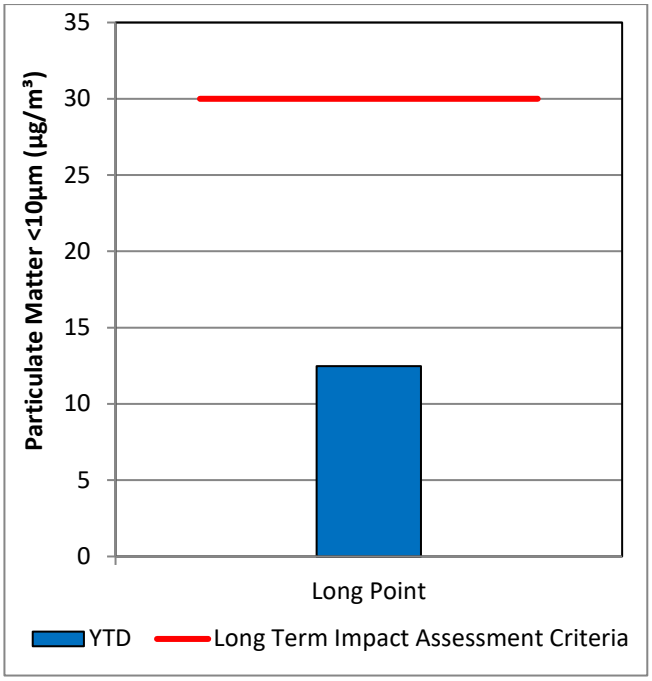


Figure 6: Annual Average PM_{10} – June 2022

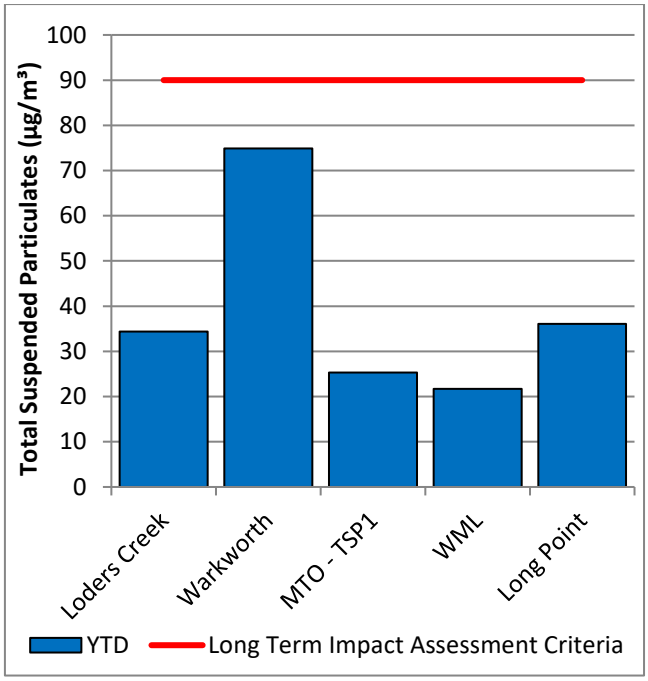


Figure 7: Annual Average Total Suspended Particulates – June 2022

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

2.3.3 Real Time PM_{10} Results

MTW 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 internal alerts 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.

Data was not available on 21 and 30 June from the Wambo Road monitor due to equipment issues.

2.3.4 Real Time Alarms for Air Quality

During June, the real time monitoring system generated 20 automated air quality related alerts, including 6 alerts for adverse meteorological conditions and 14 alerts for elevated PM_{10} levels

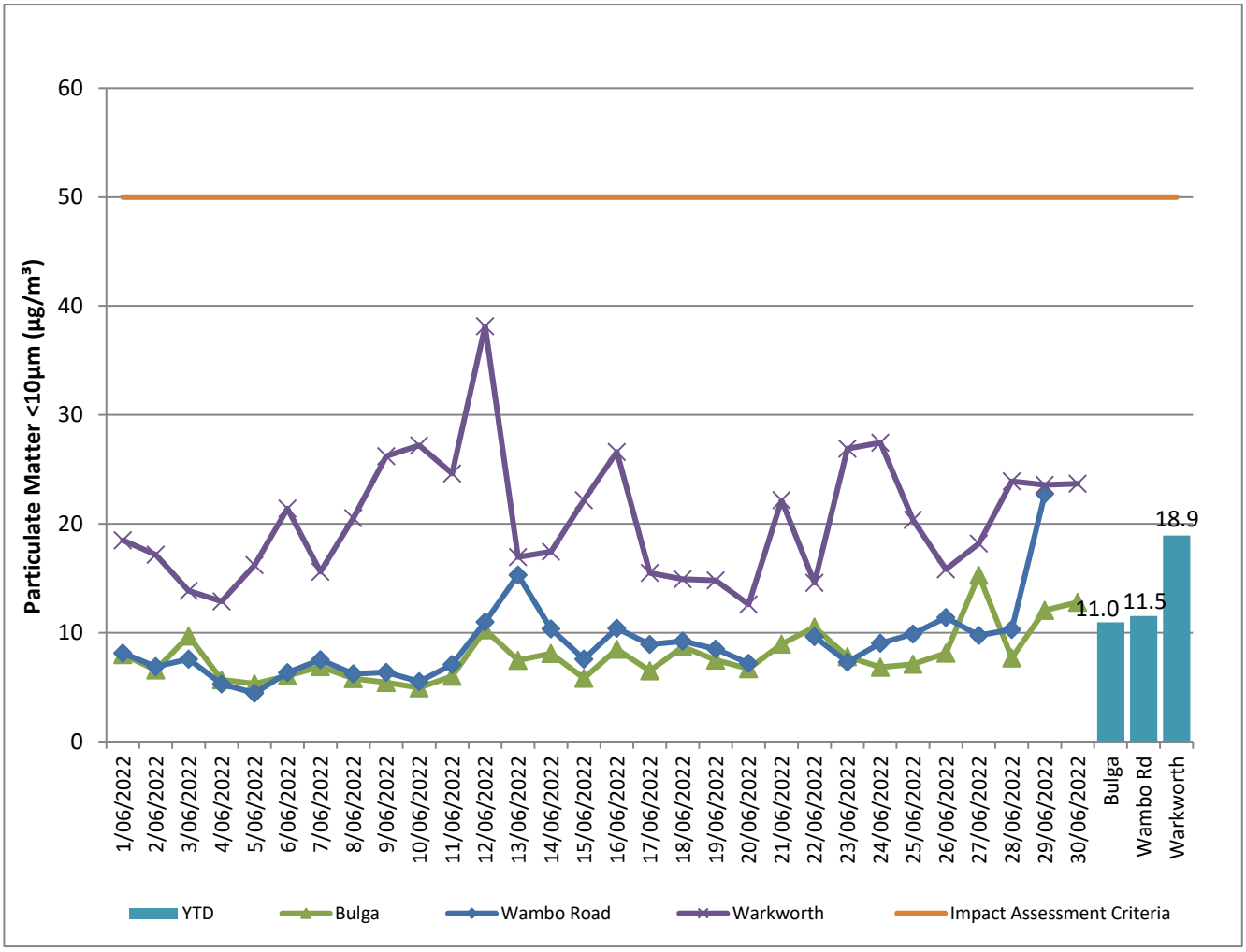


Figure 7: Real Time PM_{10} daily 24hr average (line graphs) and YTD annual average (column graphs) – June 2022

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 record background water quality and to monitor the potential impact of mining on the river system. Other Hunter River tributaries are also monitored.

3.1.1 Surface Water Monitoring results

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

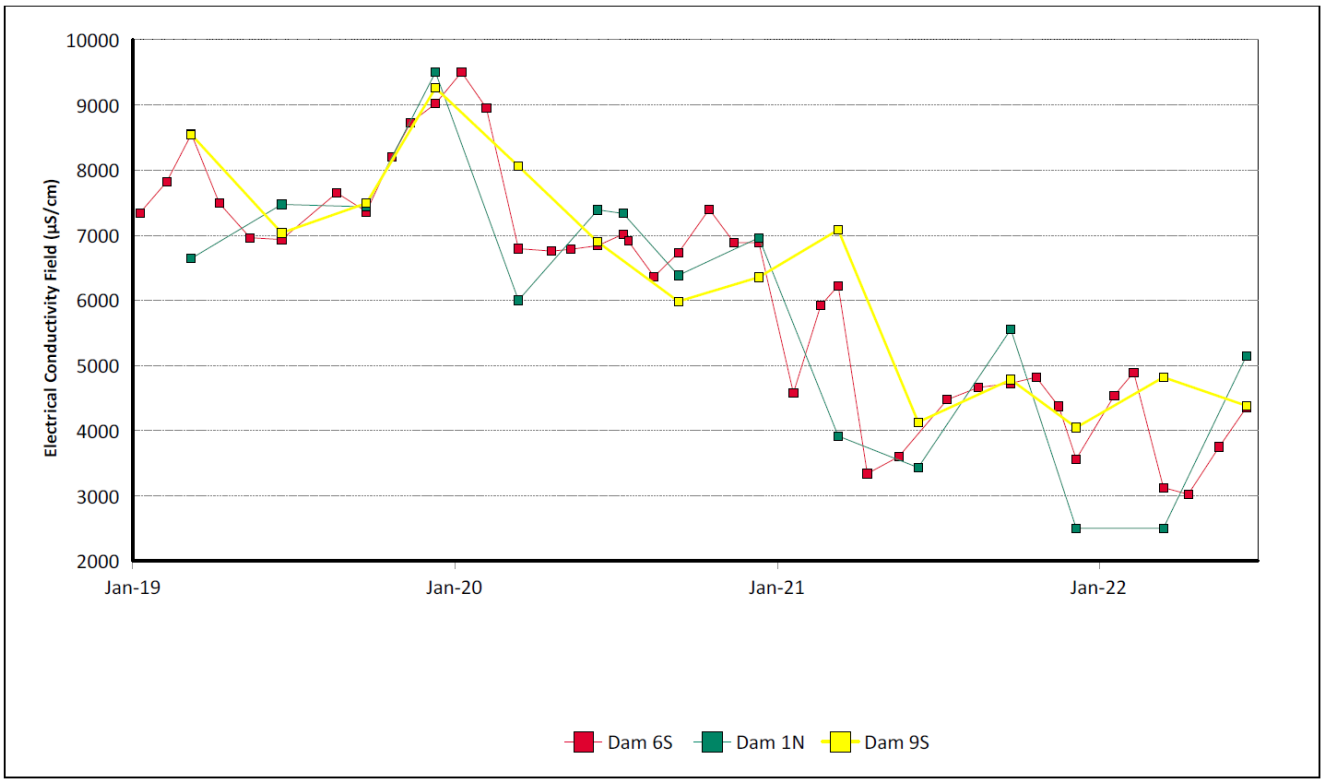


Figure 8: Site Dams Electrical Conductivity Field Trend - June 2022

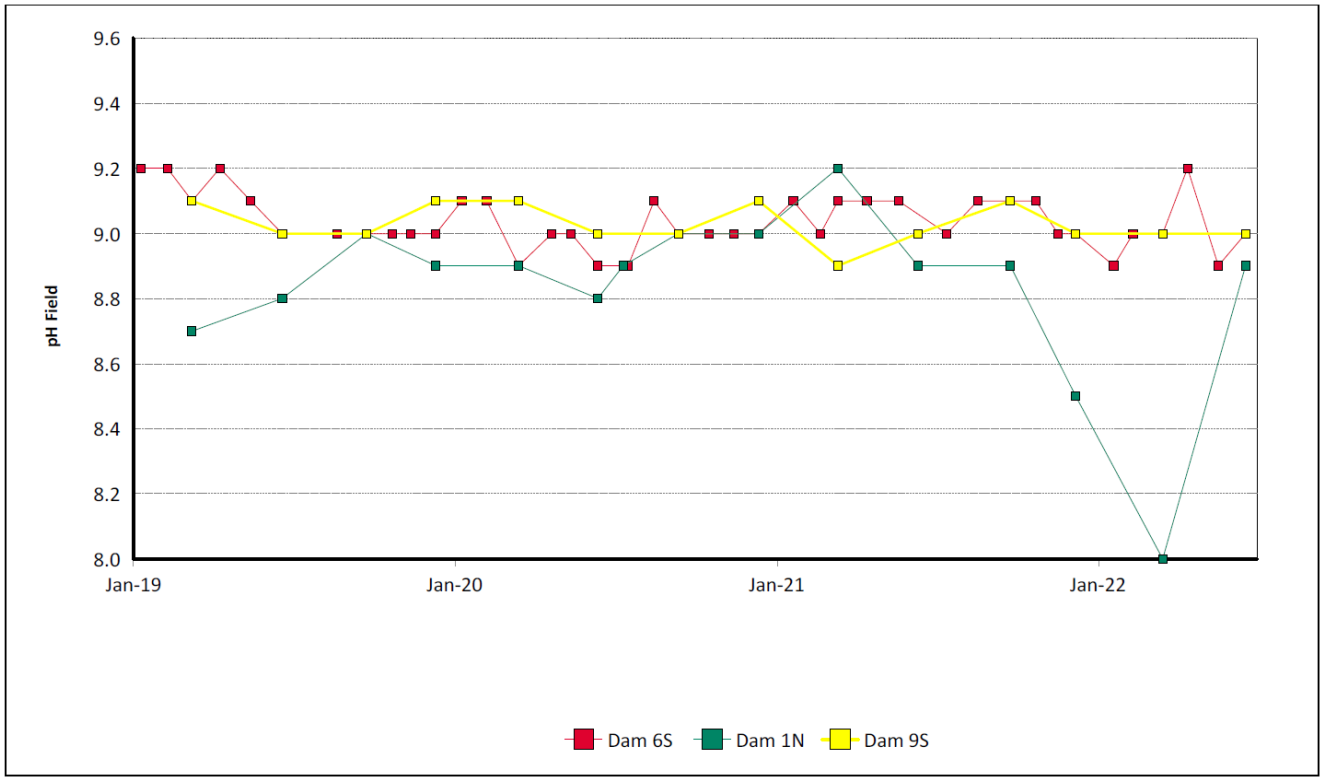


Figure 9: Site Dams pH Field Trend - June 2022

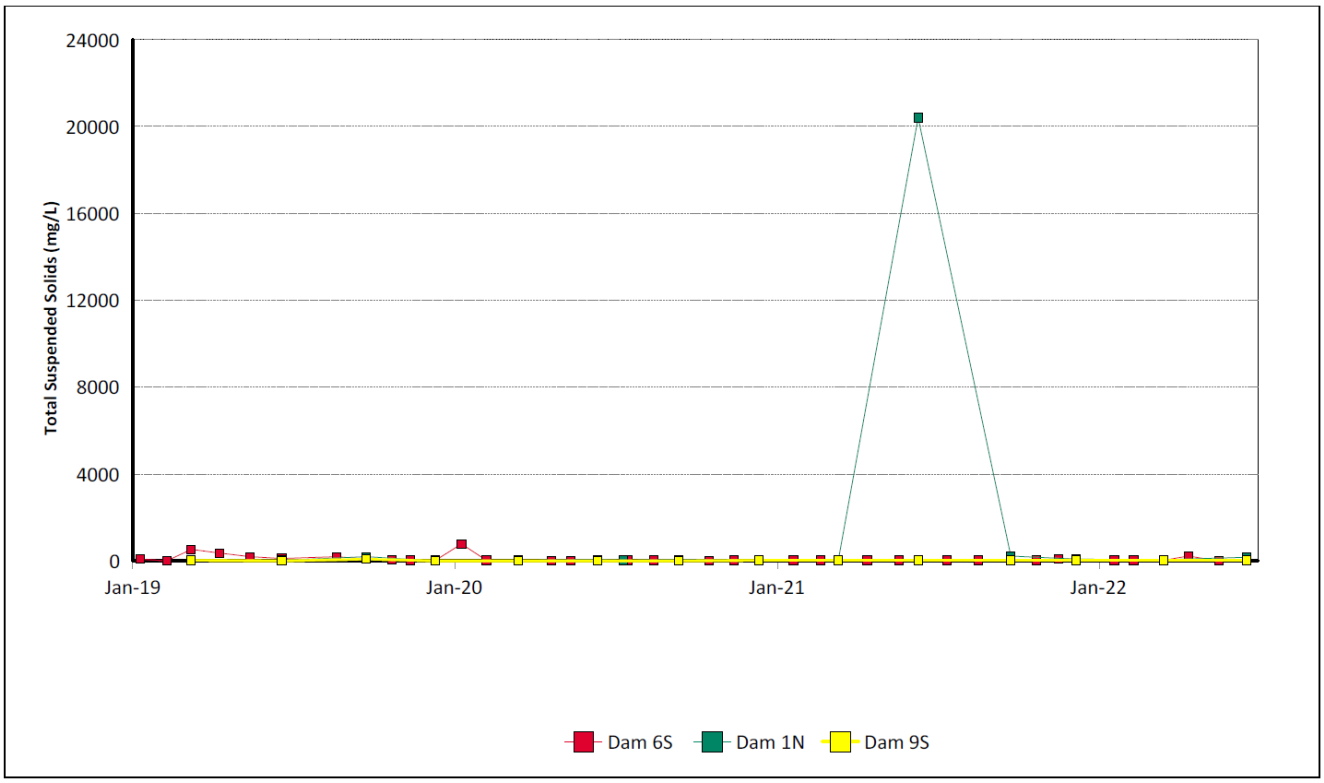


Figure 10: Site Dams Total Suspended Solids Trend - June 2022

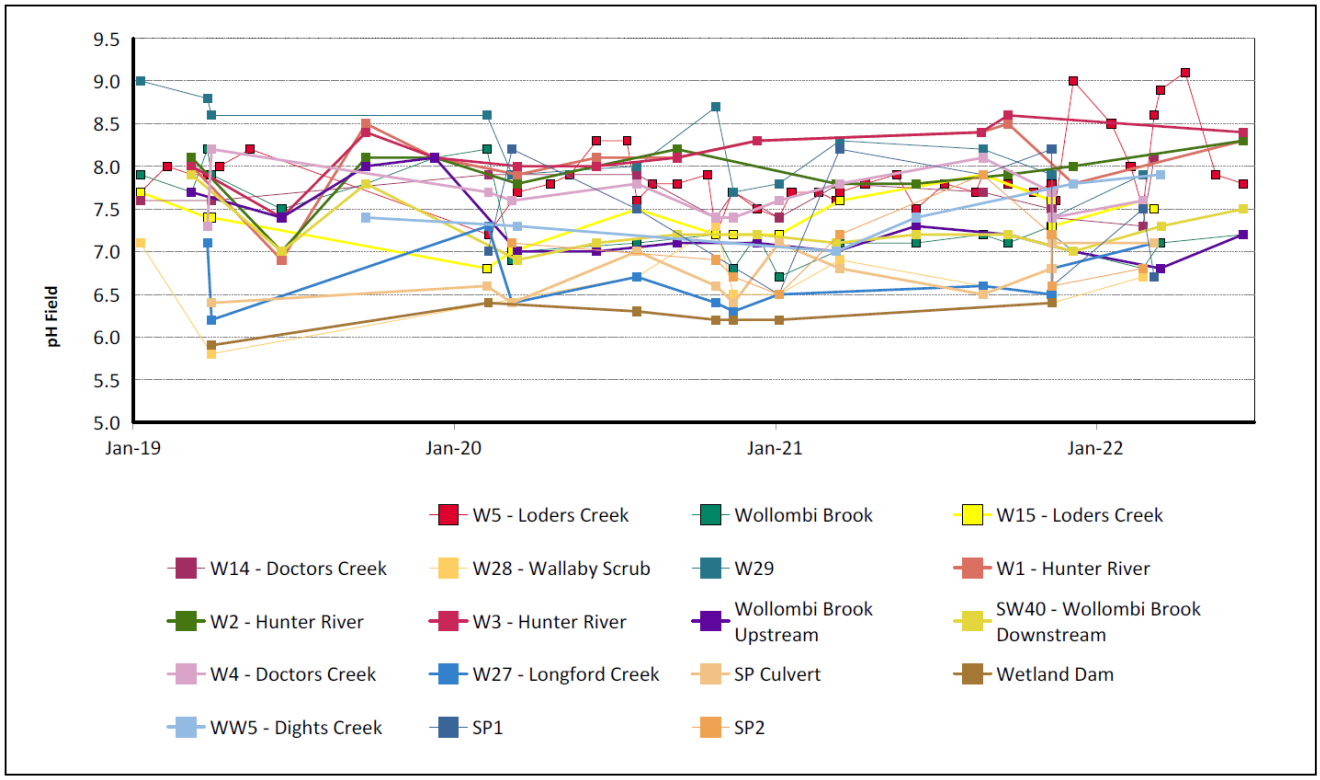


Figure 11: Watercourse pH Field Trend - June 2022

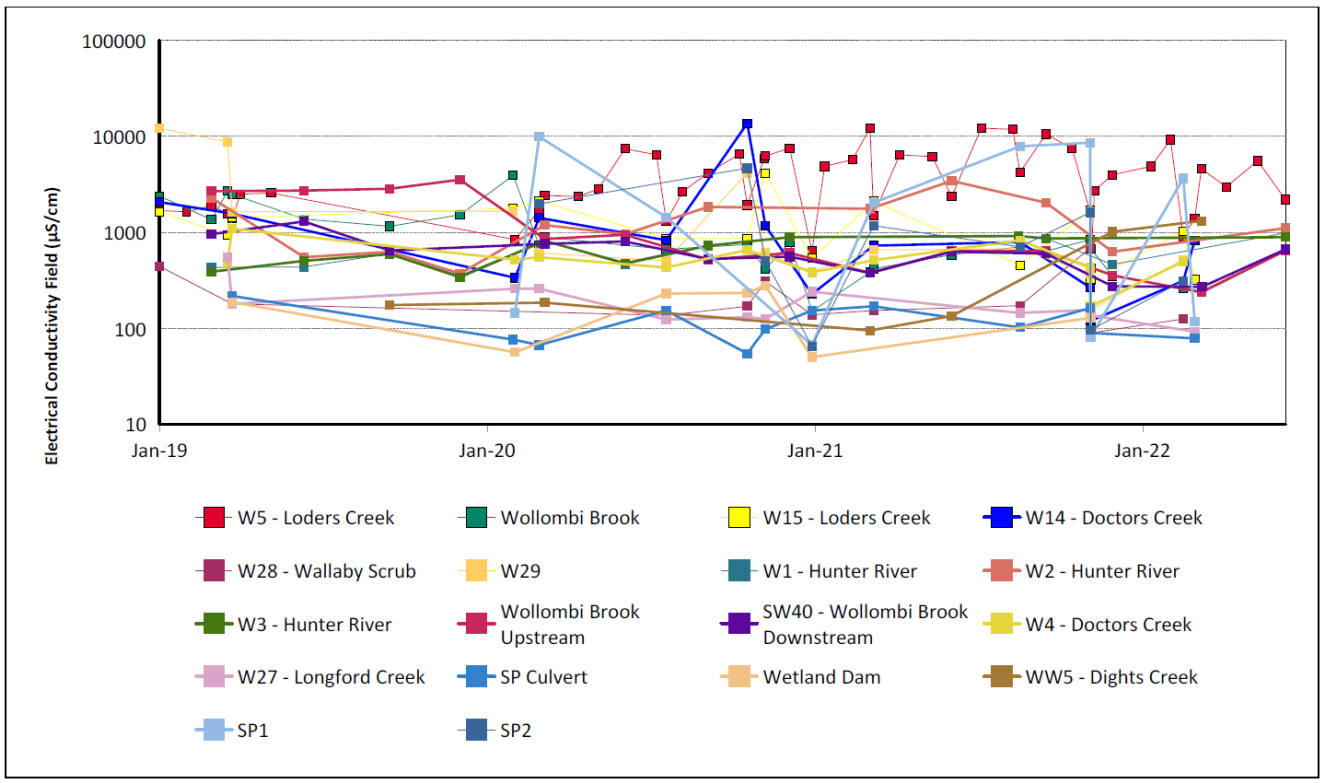


Figure 12: Watercourse Electrical Conductivity Field Trend - June 2022

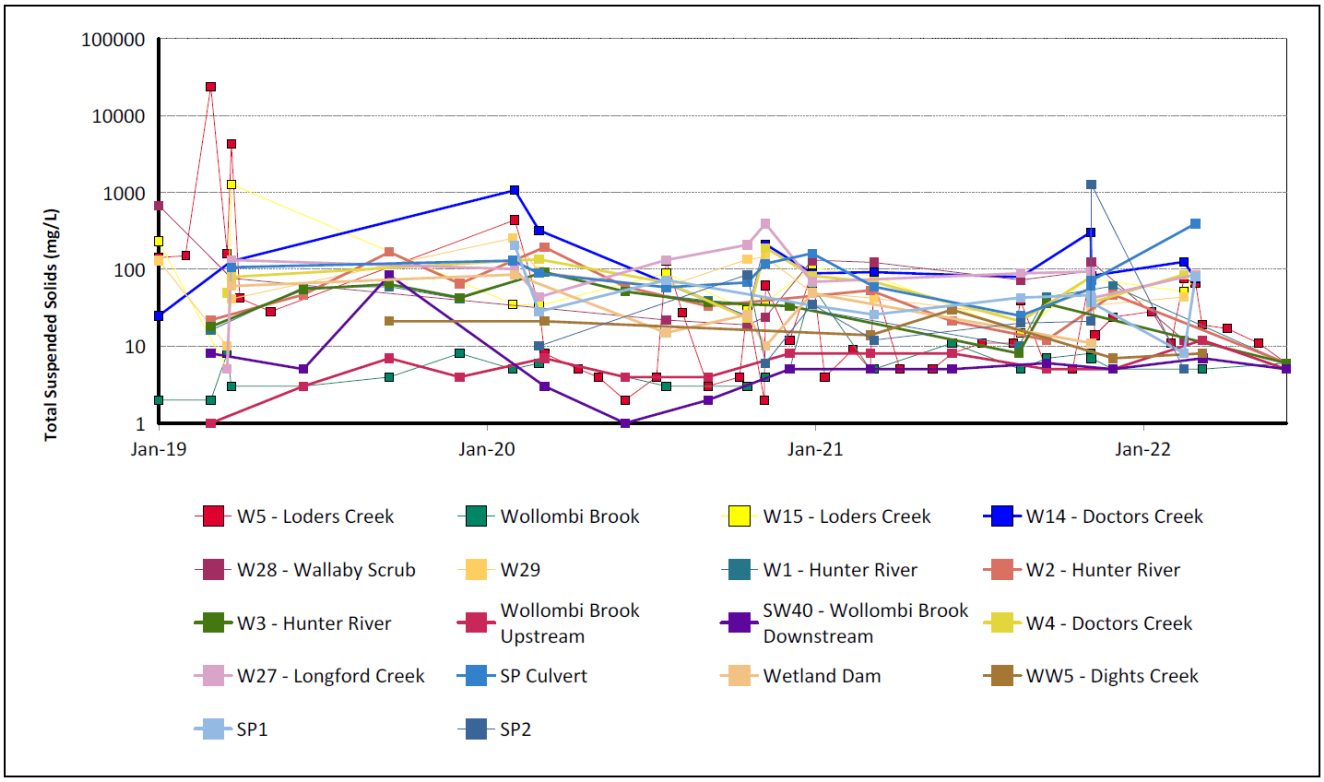


Figure 13: Watercourse Total Suspended Solids Trend - June 2022

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 – June 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*
W5	12/04/2022	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.
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

Site	Date	Trigger Limit Breached	Action Taken in Response
			sediment. No MTW site sources of sediment identified. No follow up required.
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.

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.

MTW did not undertake any HRSTS discharges in the reporting period.

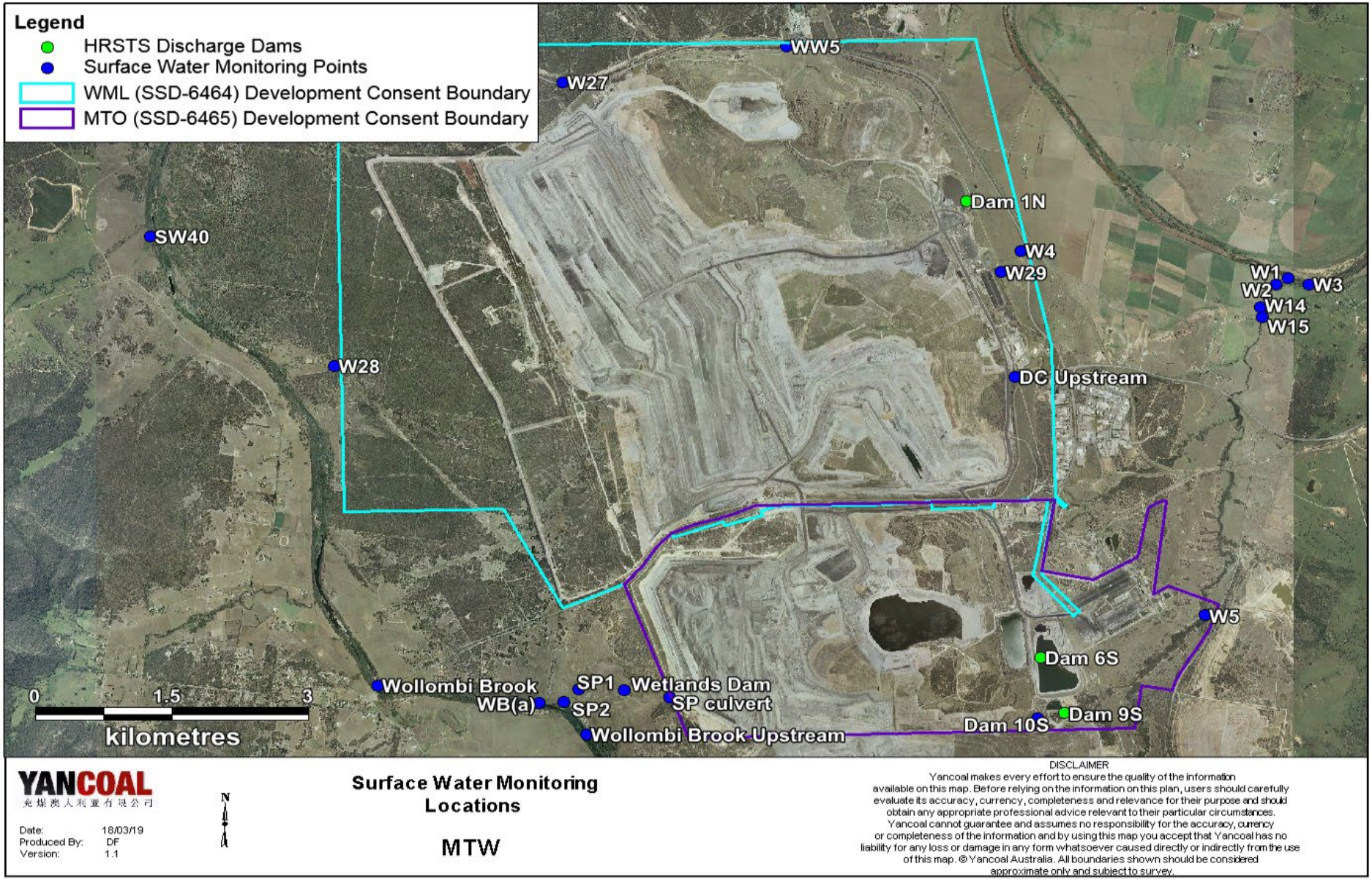


Figure 14: Surface Water Monitoring Location Plan

3.3 Groundwater Monitoring

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

Figure 16 to **Figure 65** show the long-term water quality trends (2019 - current) for groundwater bores monitored at MTW.

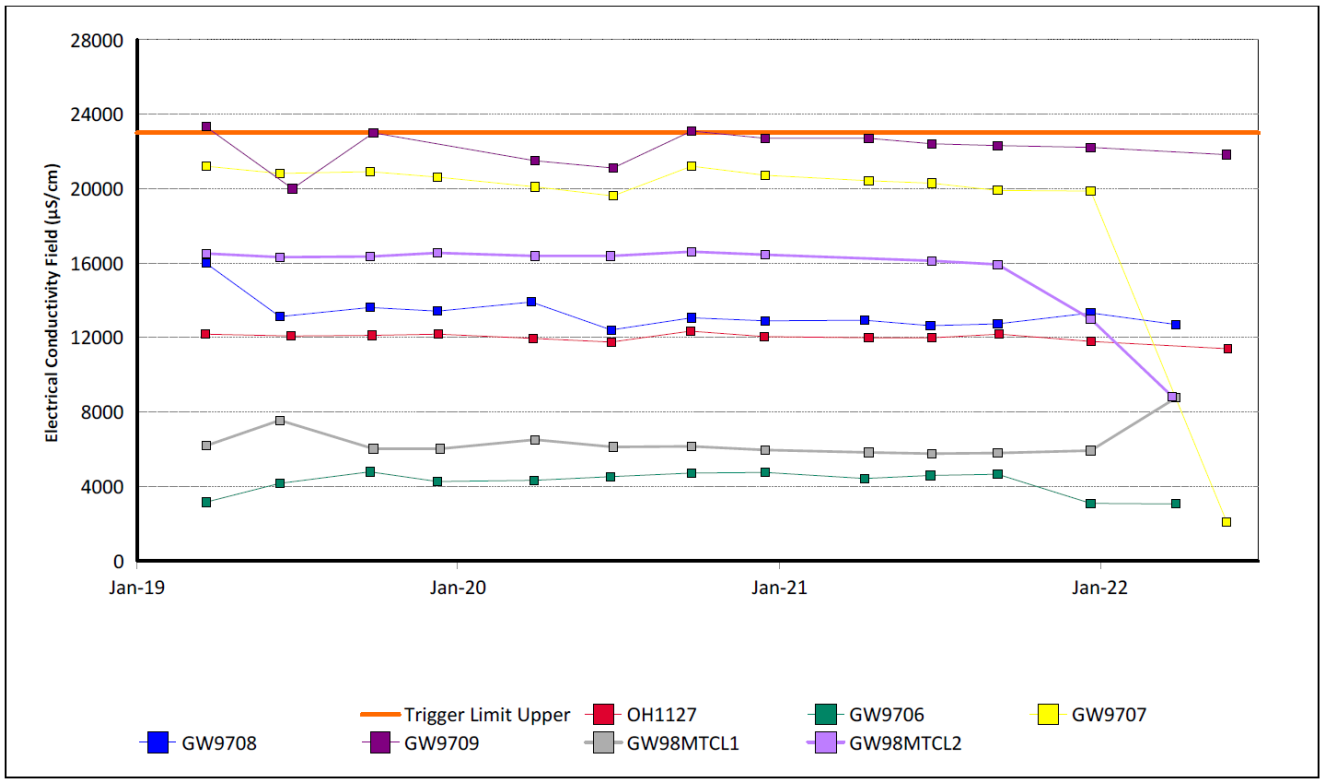


Figure 15: Bayswater Seam Electrical Conductivity Field Trend - June 2022

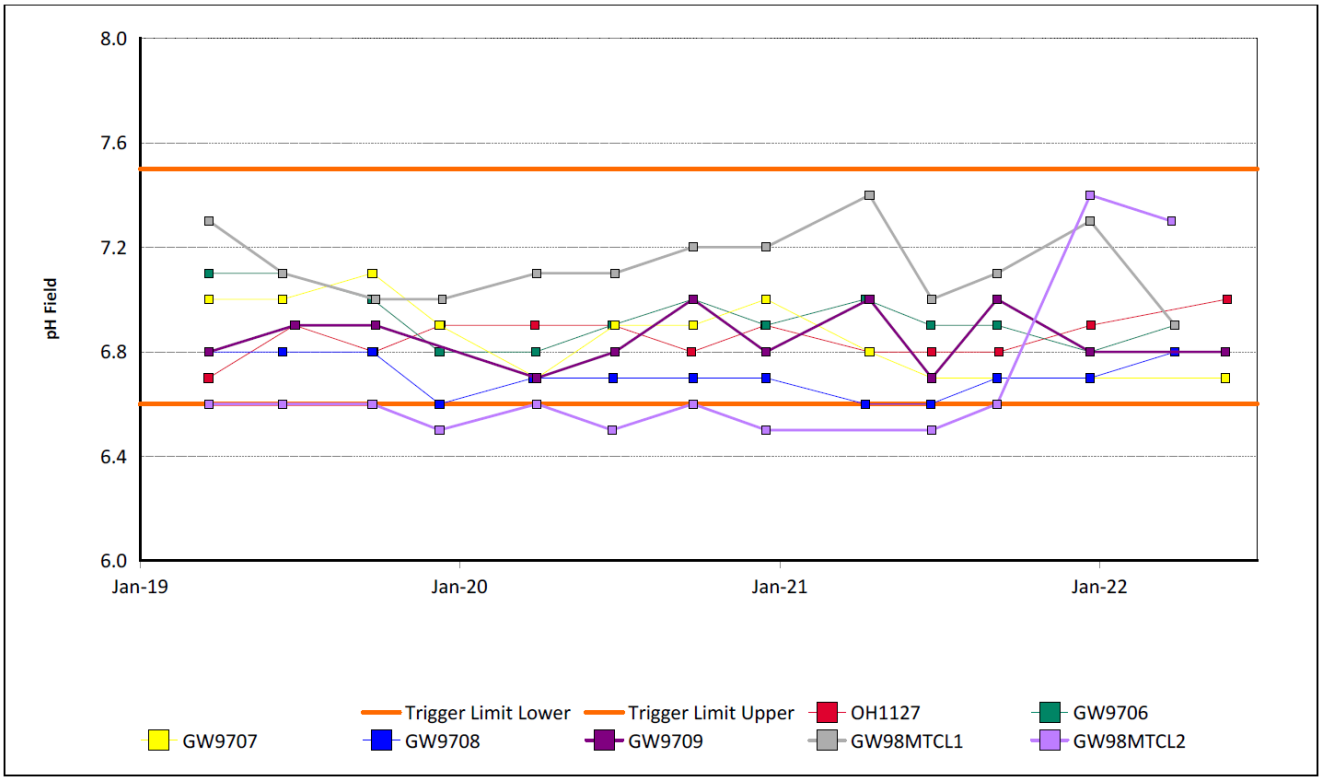


Figure 16: Bayswater Seam pH Field Trend - June 2022

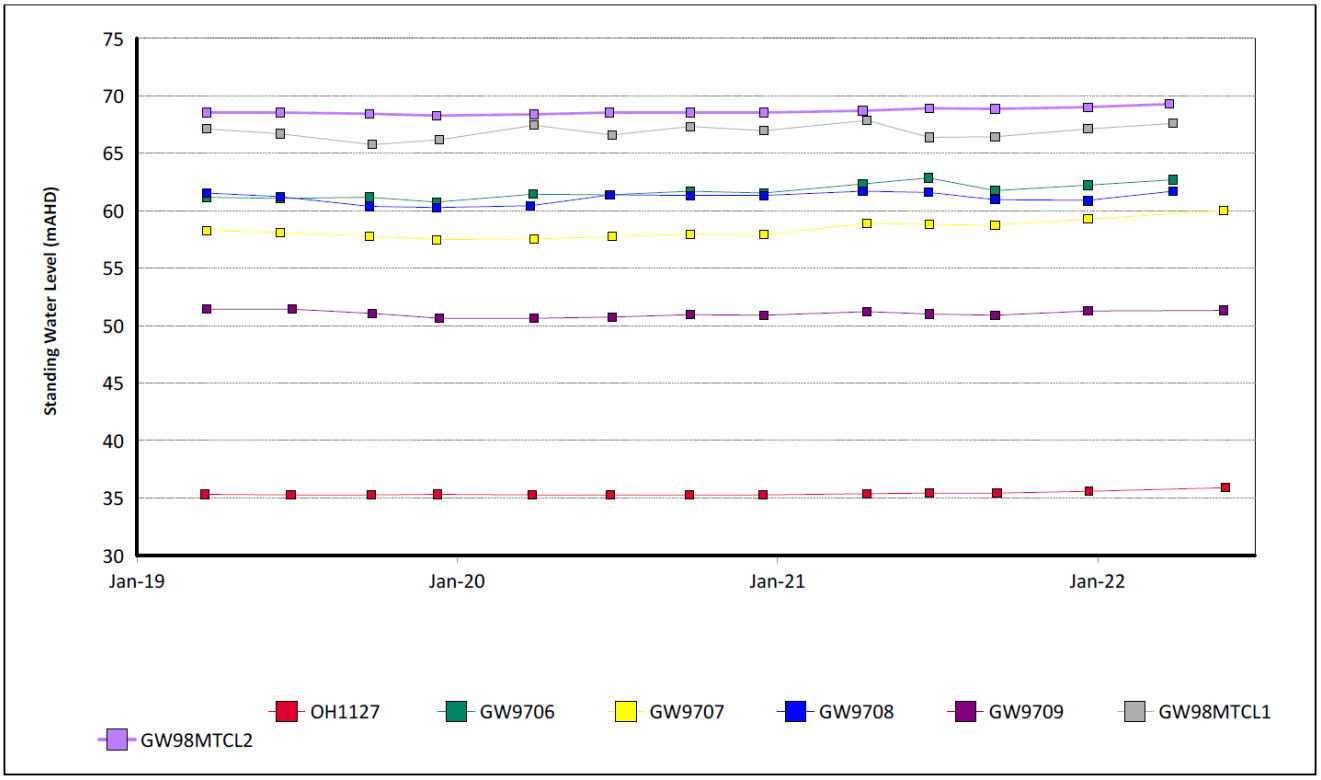


Figure 17: Bayswater Seam Standing Water Level Trend - June 2022

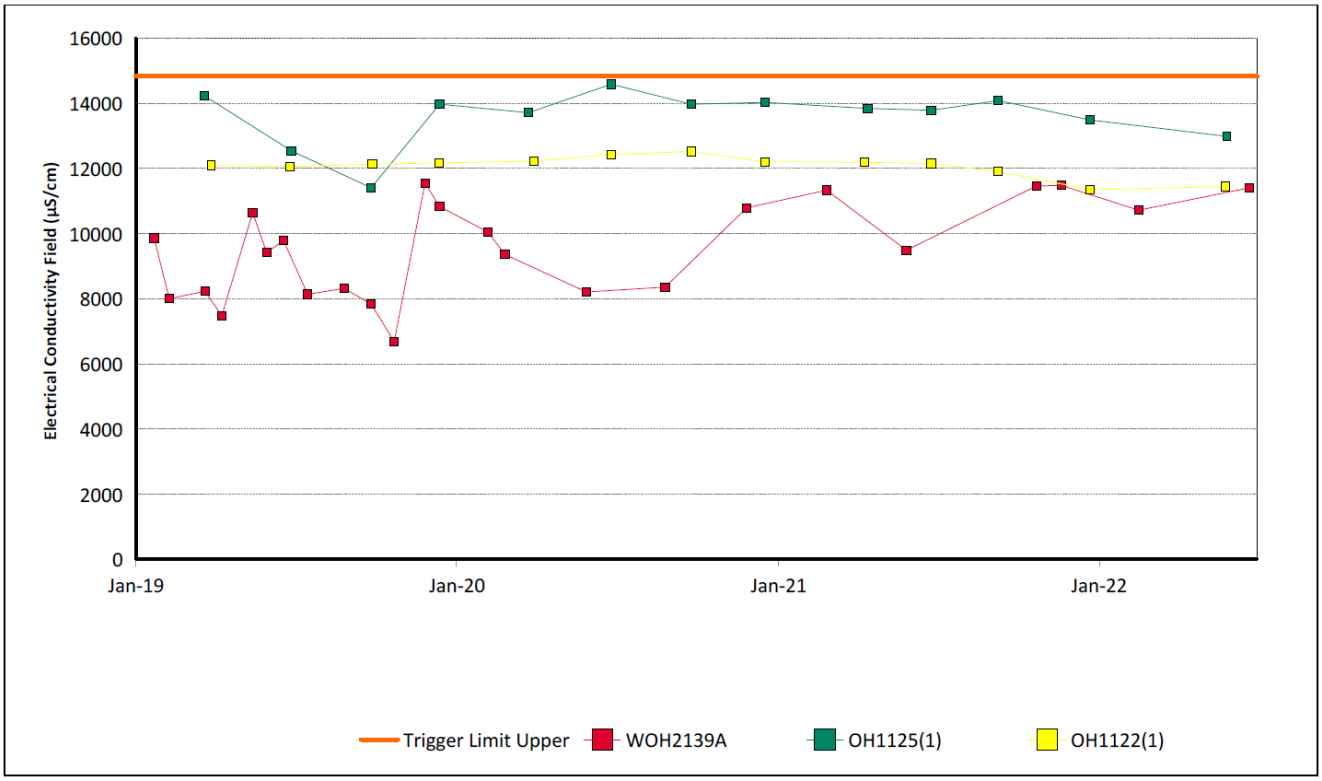


Figure 18: Blakefield Seam Electrical Conductivity Field Trend - June 2022

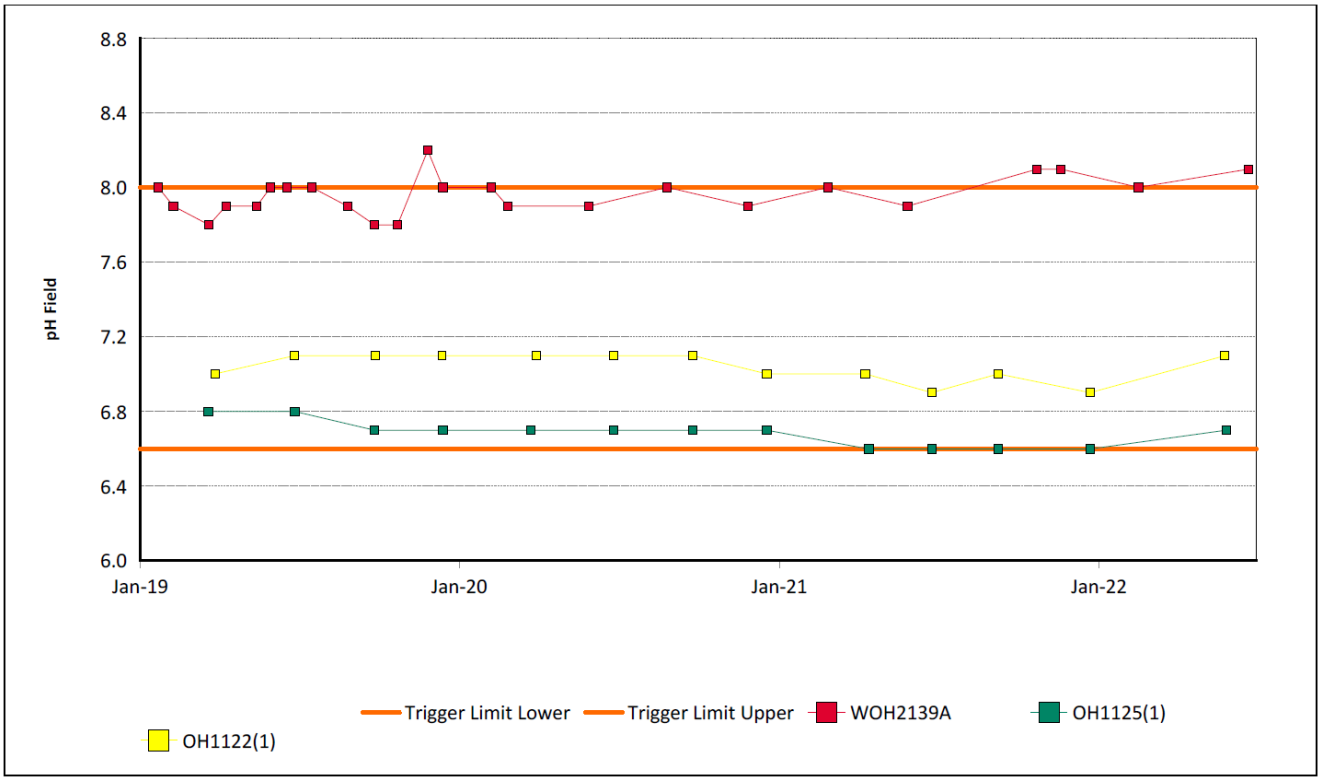


Figure 19: Blakefield Seam pH Field Trend - June 2022

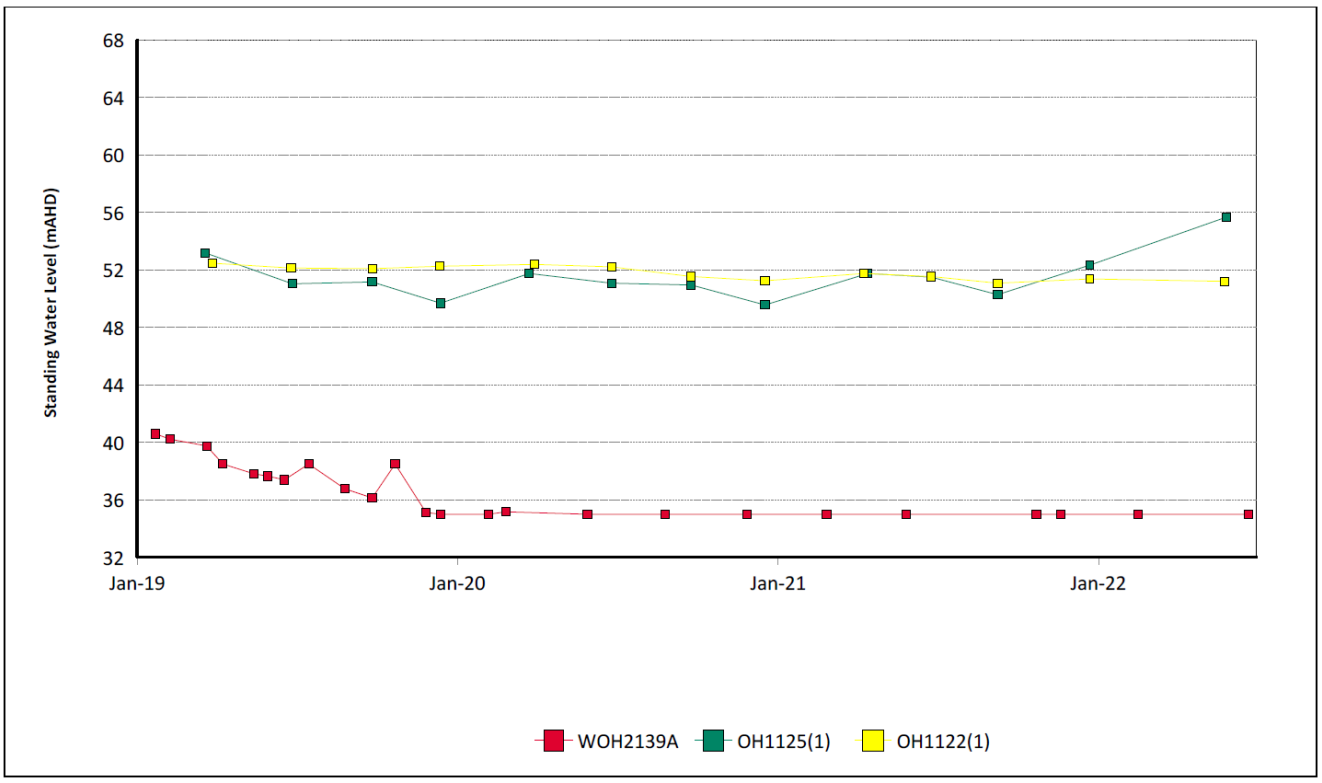


Figure 20: Blakefield Seam Standing Water Level Trend - June 2022

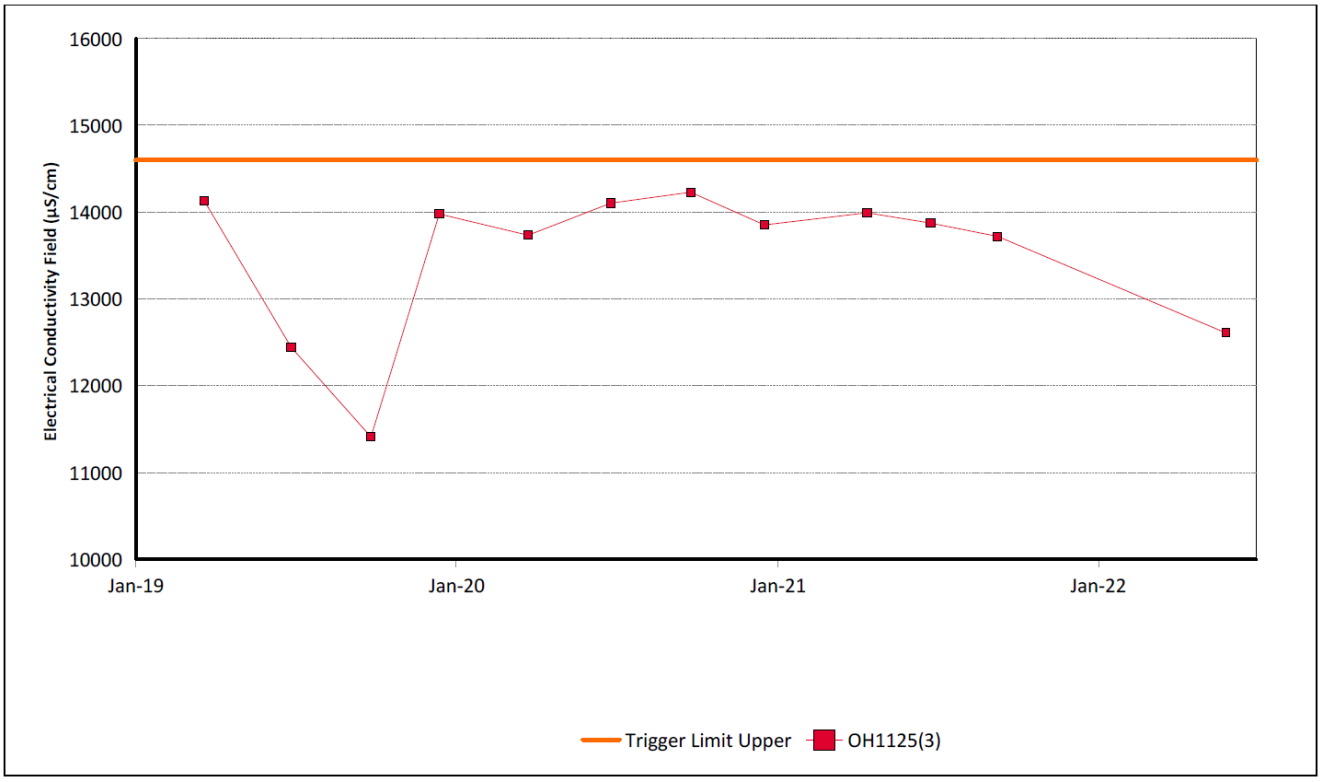


Figure 21: Bowfield Seam Electrical Conductivity Field Trend - June 2022

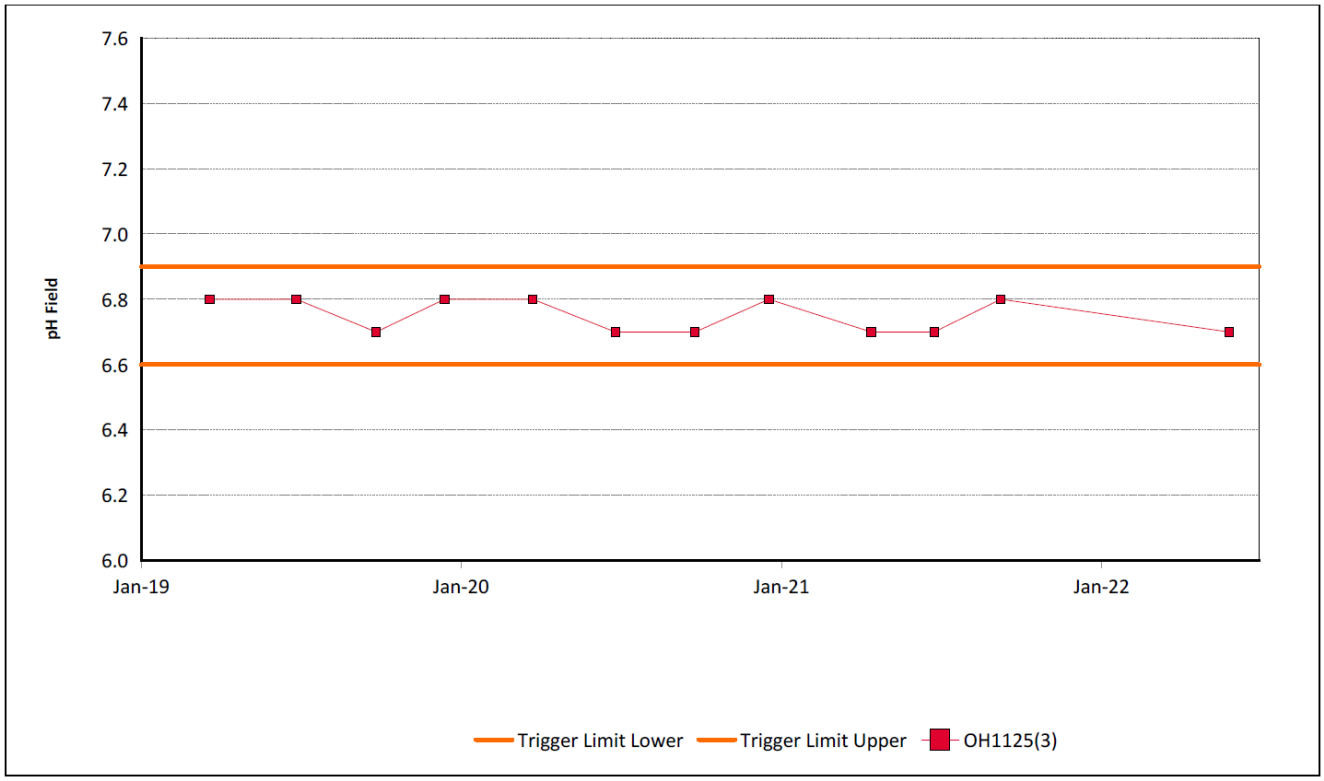


Figure 22: Bowfield Seam pH Field Trend - June 2022

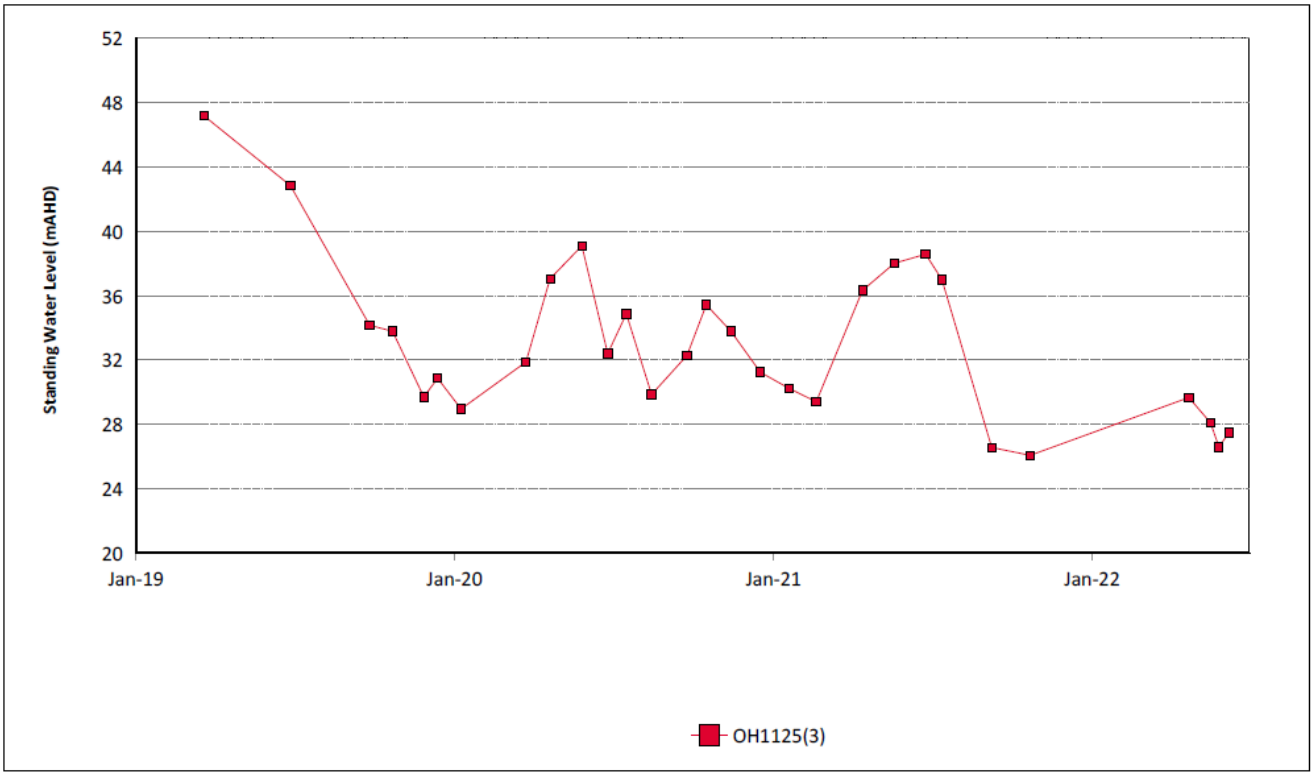


Figure 23: Bowfield Seam Standing Water Level Trend - June 2022

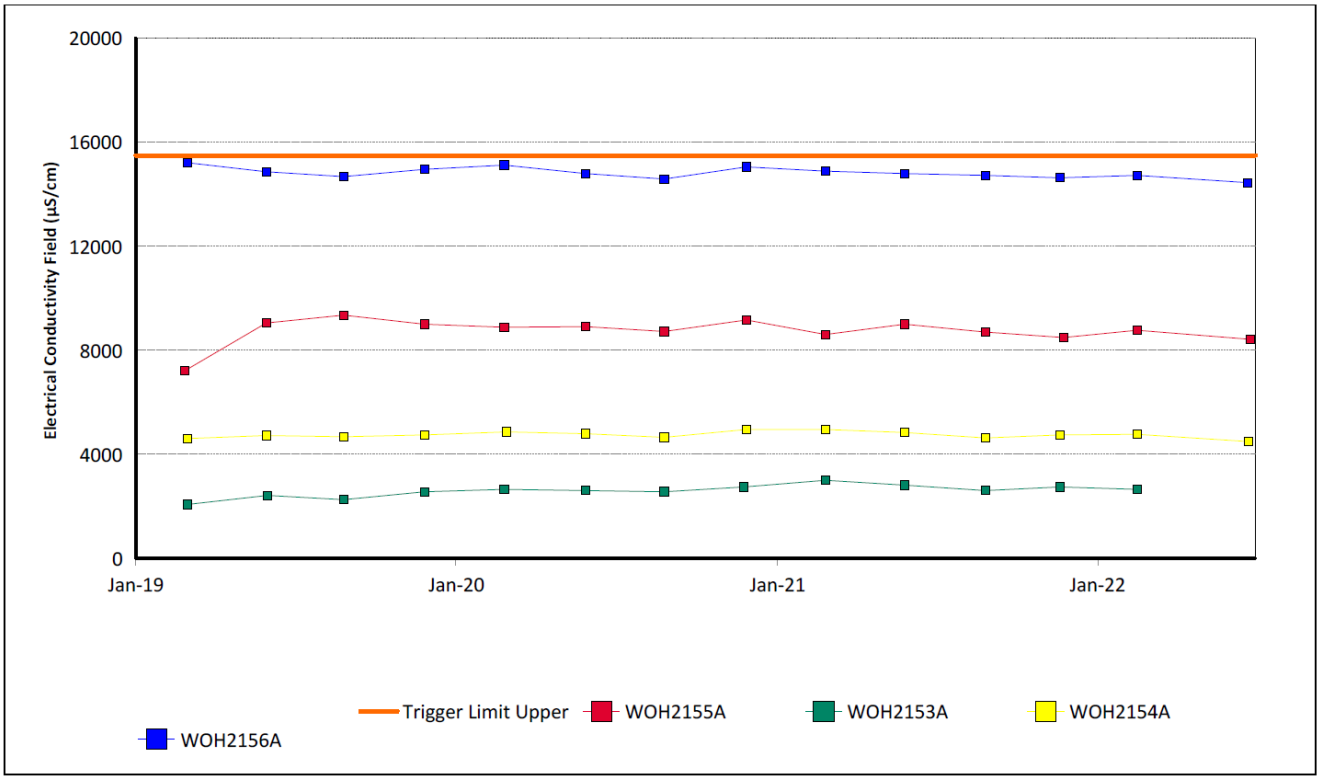


Figure 24: Redbank Seam Electrical Conductivity Field Trend - June 2022

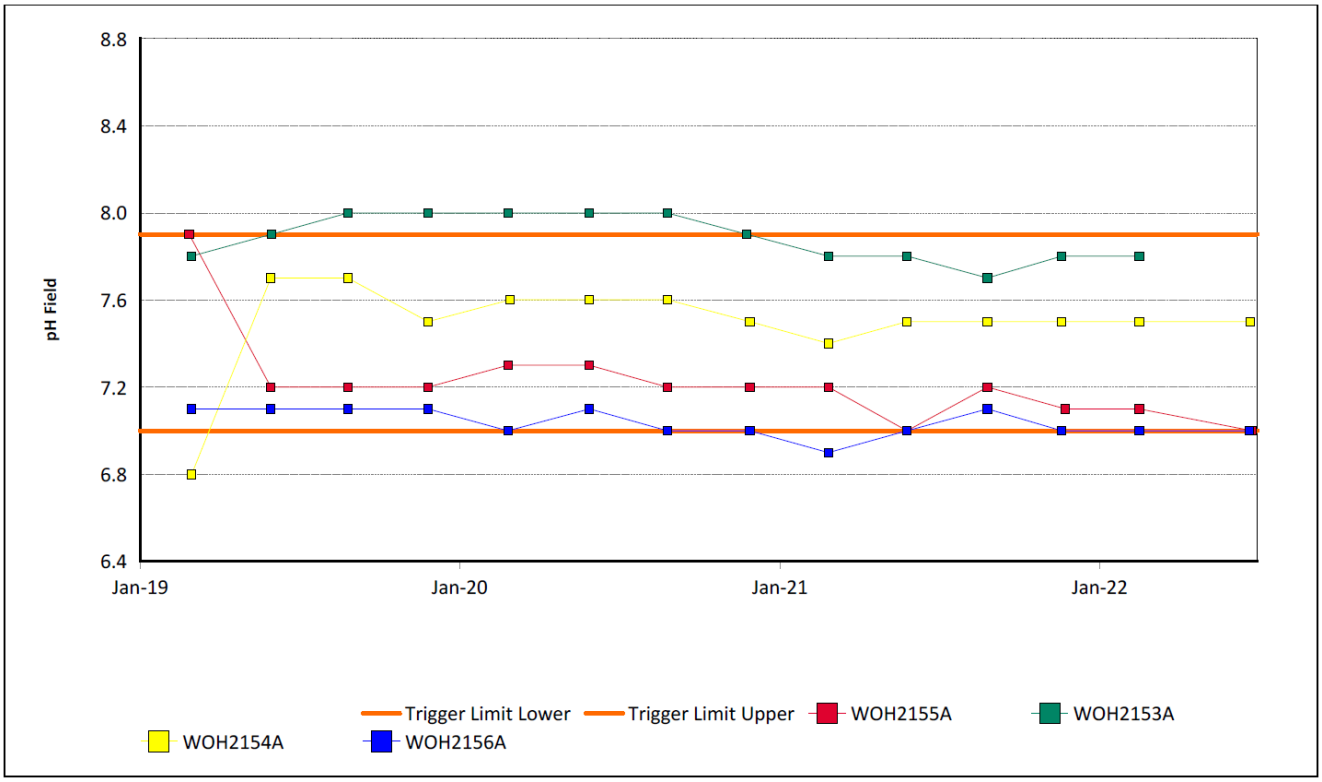


Figure 25: Redbank Seam pH Field Trend - June 2022

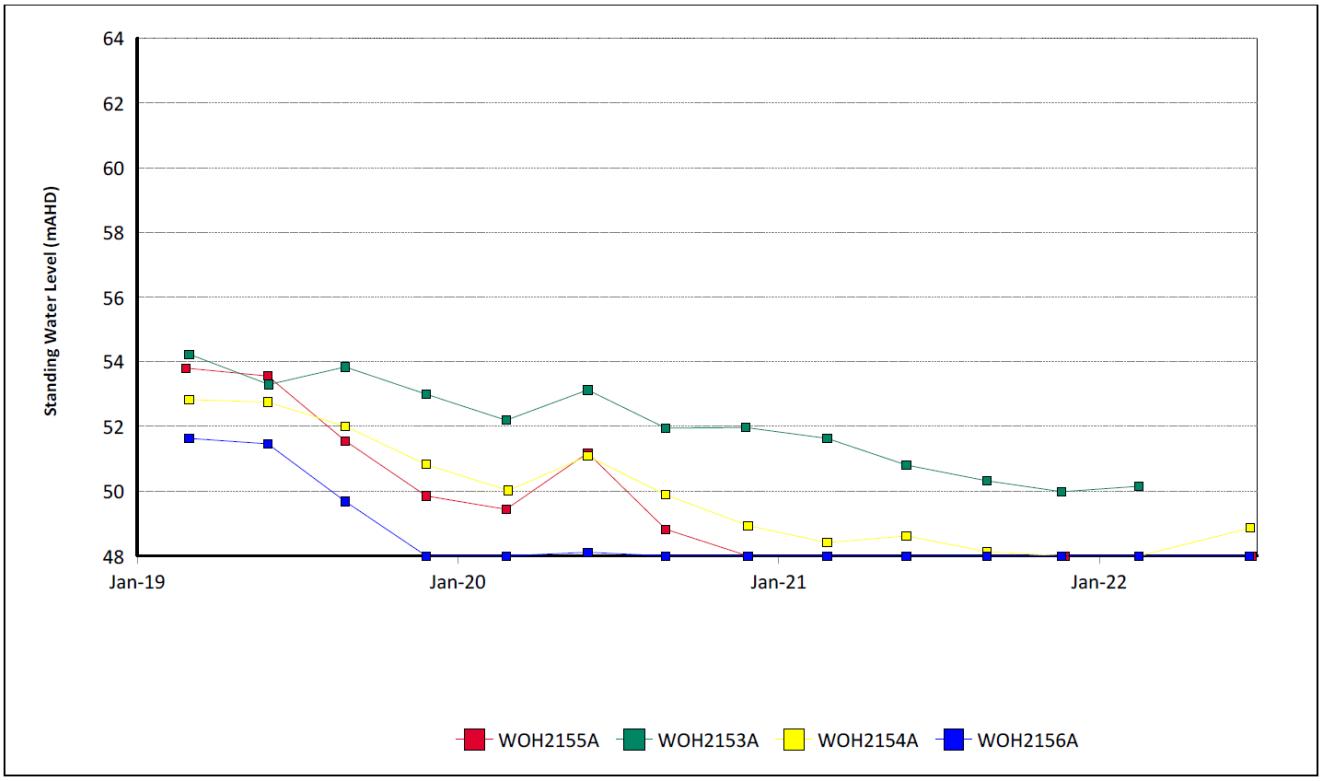


Figure 26: Redbank Seam Standing Water Level Trend - June 2022

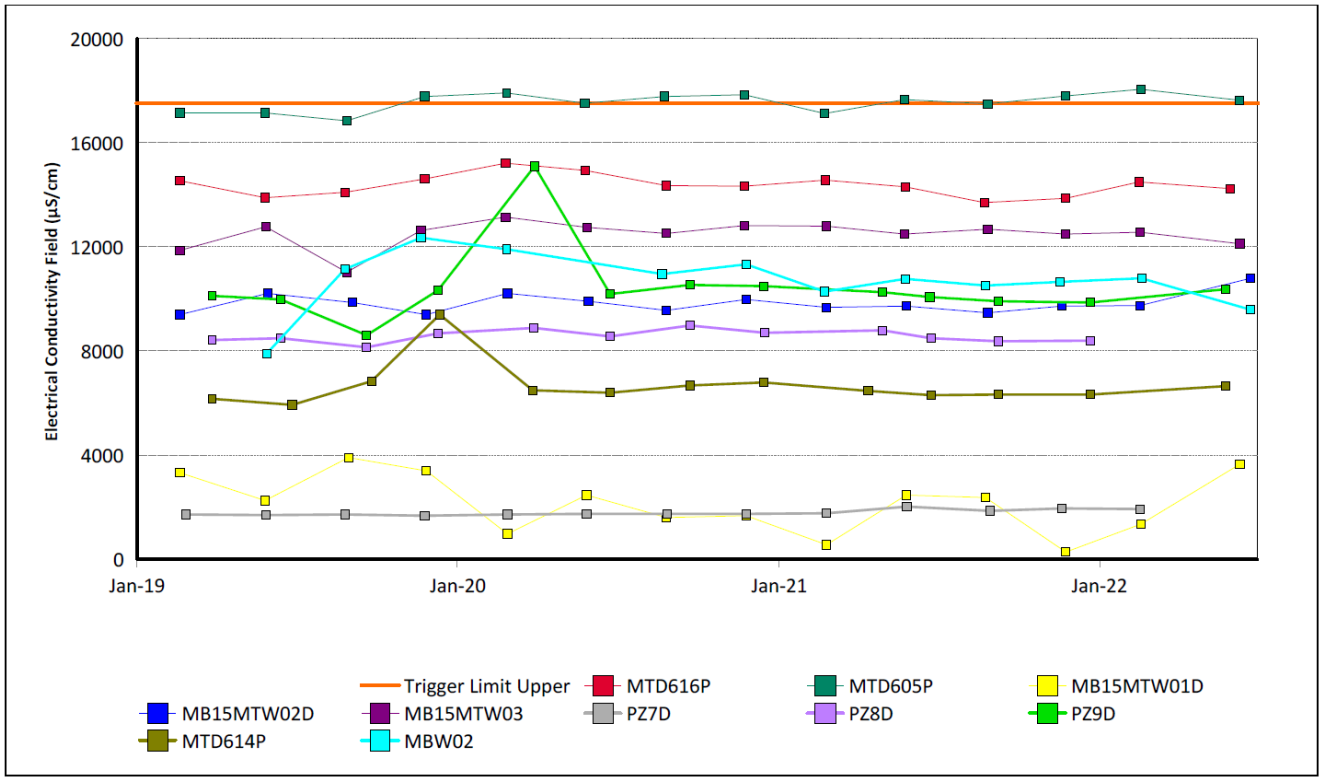


Figure 27: Shallow Overburden Electrical Conductivity Field Trend - June 2022

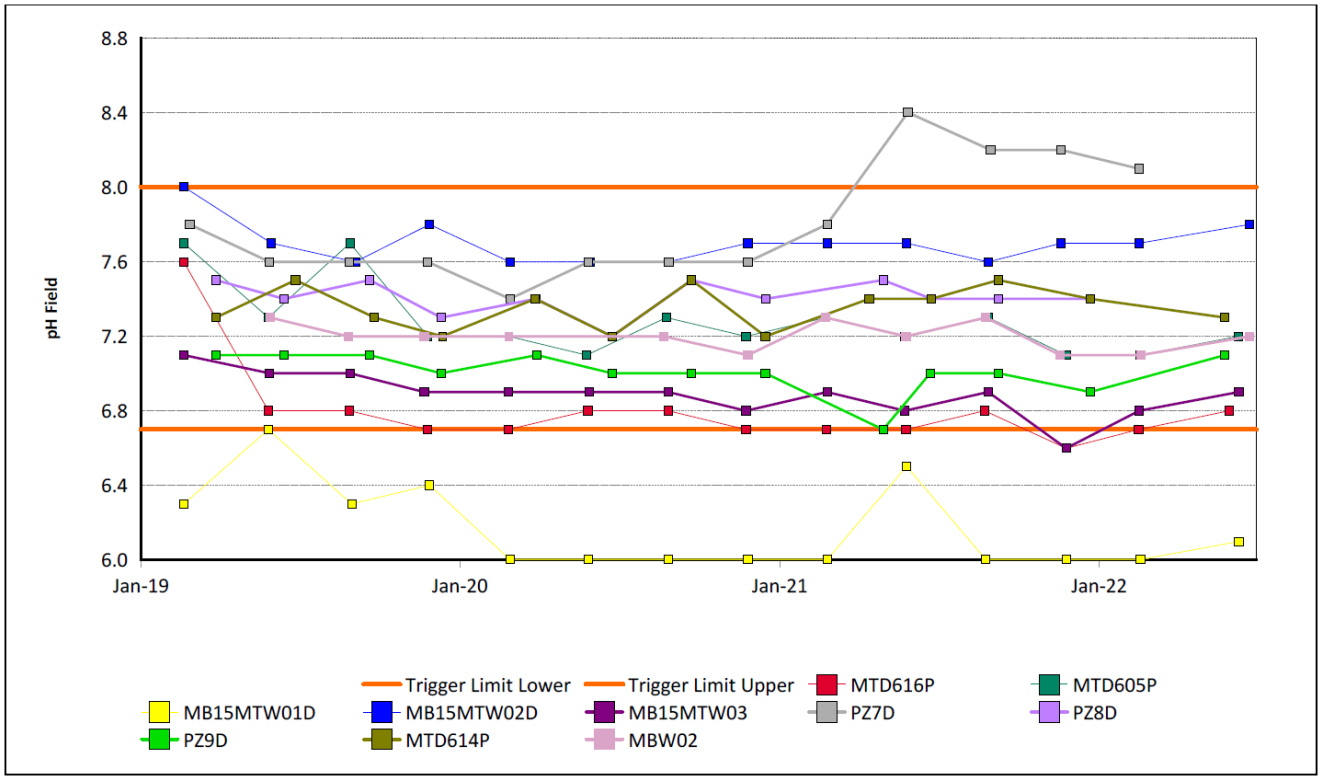


Figure 28: Shallow Overburden pH Field Trend - June 2022

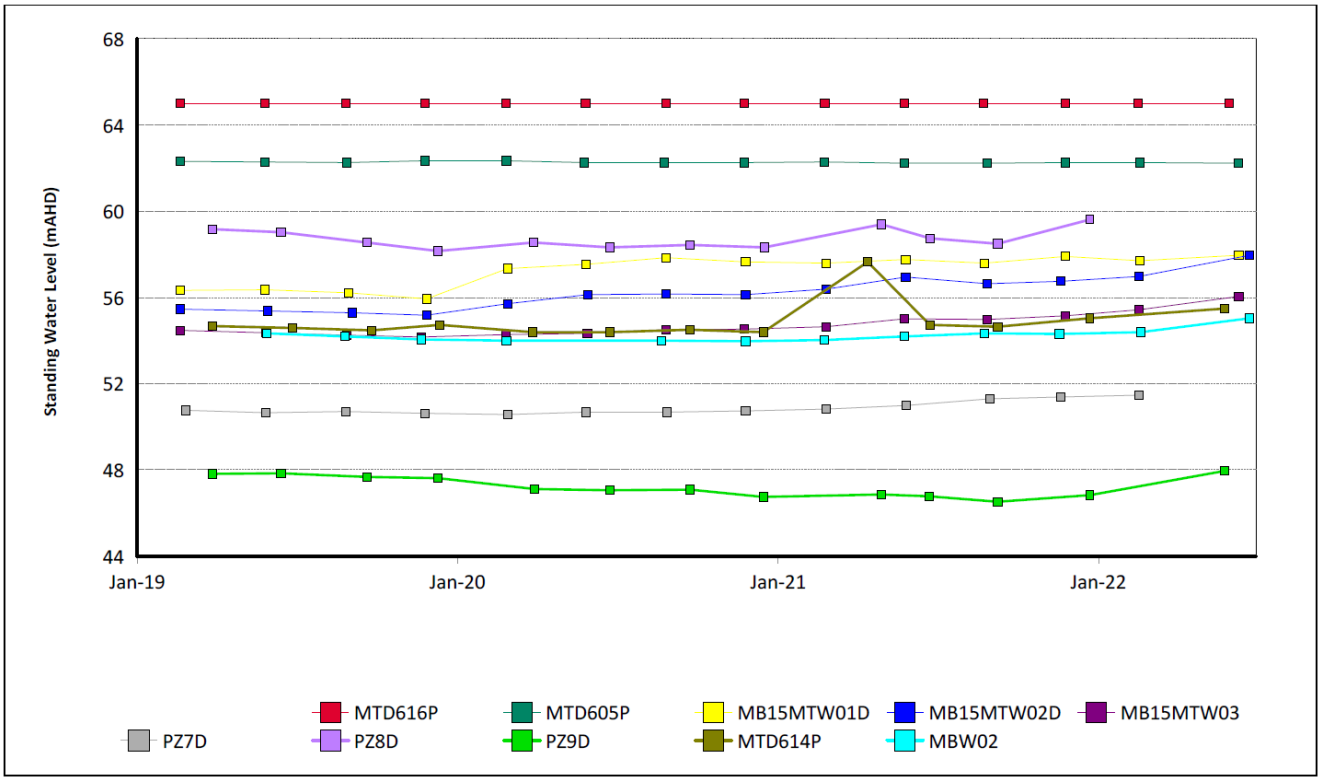


Figure 29: Shallow Overburden Standing Water Level Trend - June 2022

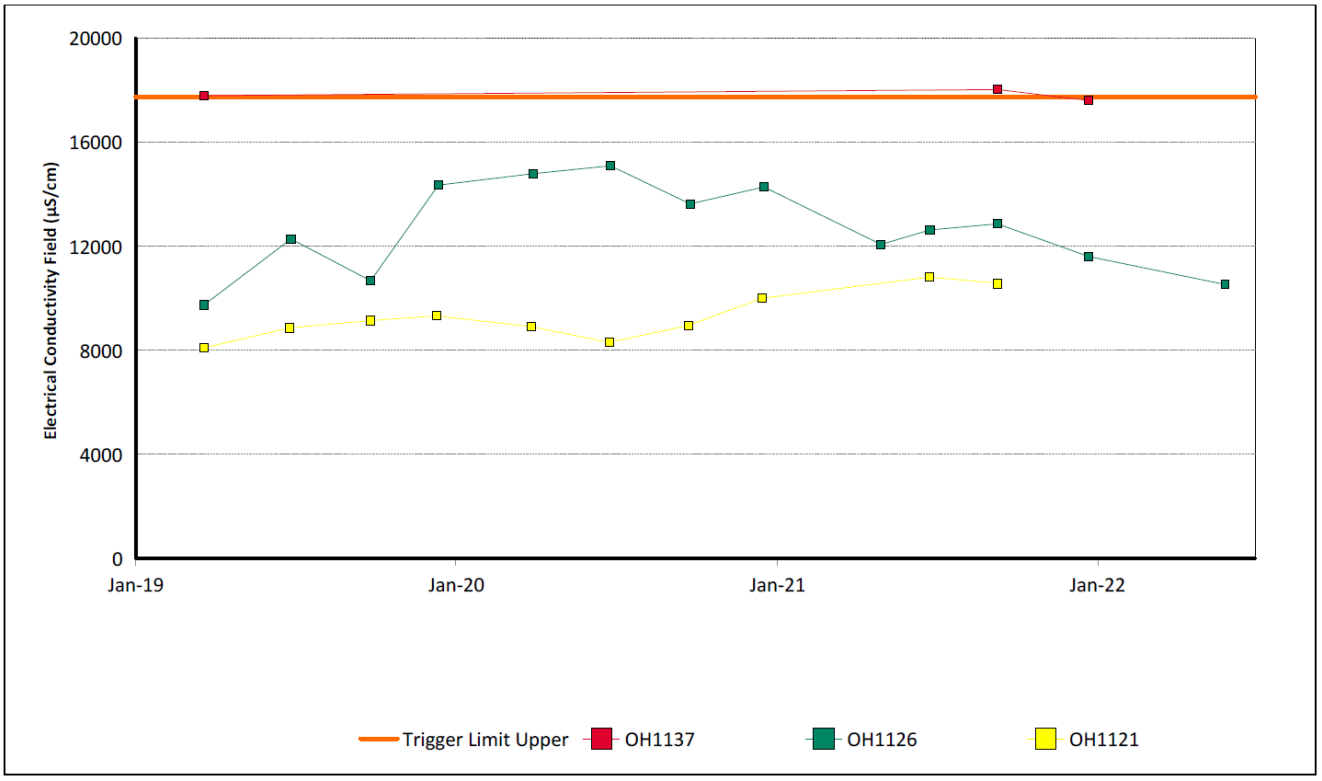


Figure 30: Vaux Seam Electrical Conductivity Field Trend - June 2022

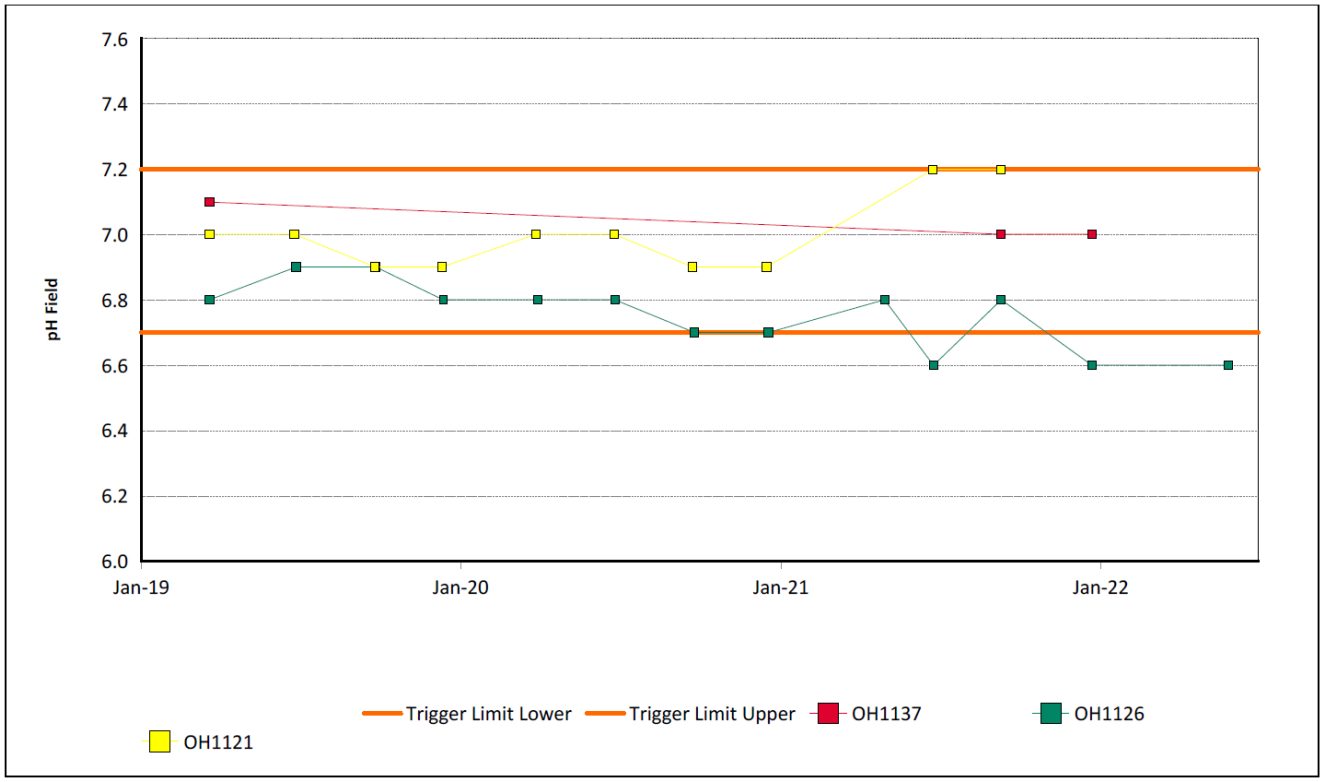


Figure 31: Vaux Seam pH Field Trend - June 2022

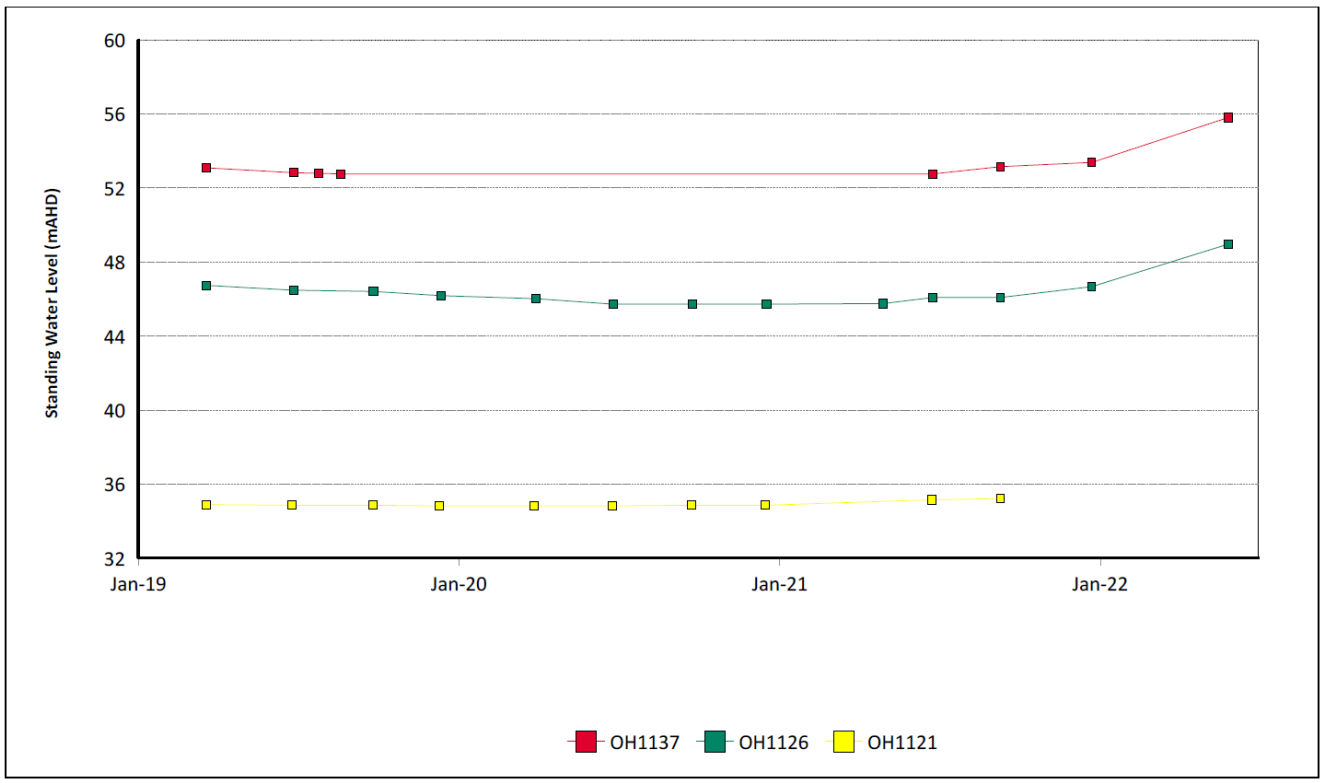


Figure 32: Vaux Seam Standing Water Level Trend - June 2022

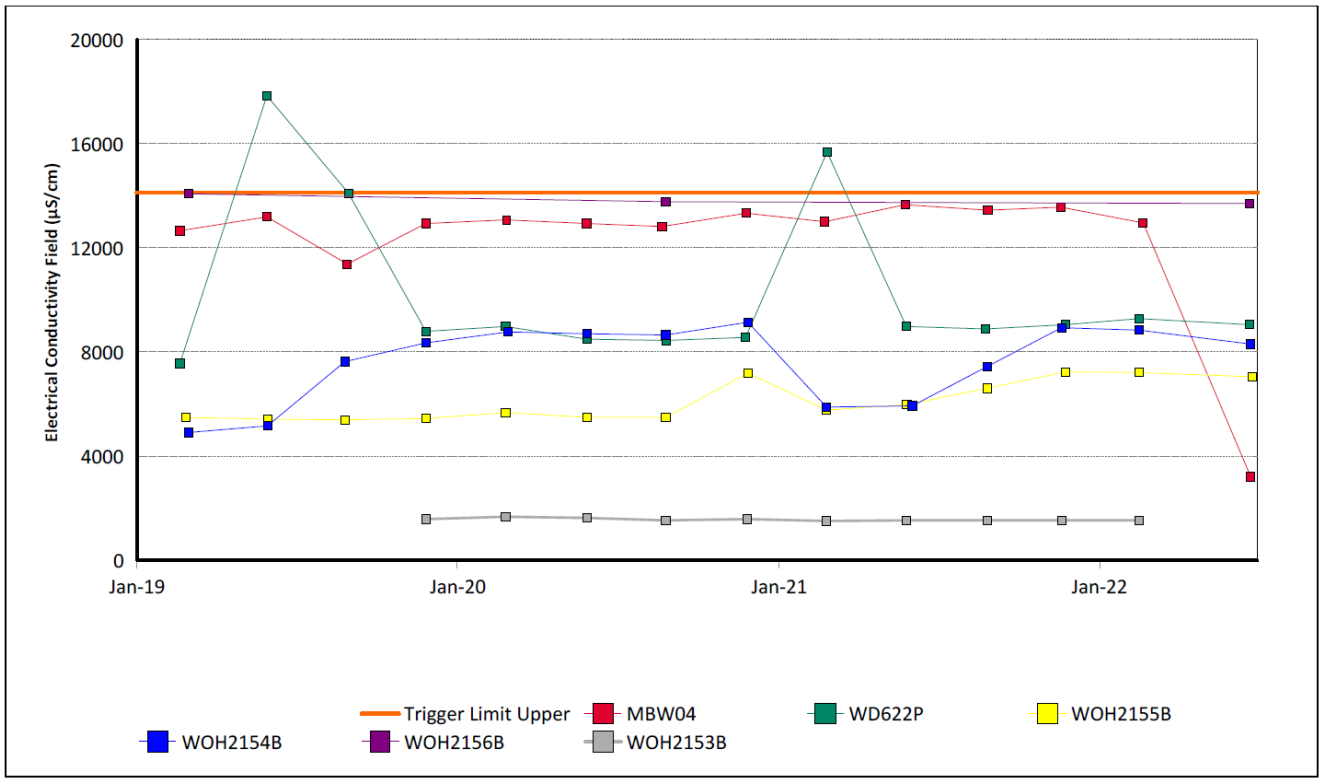


Figure 33: Wambo Seam Electrical Conductivity Field Trend - June 2022

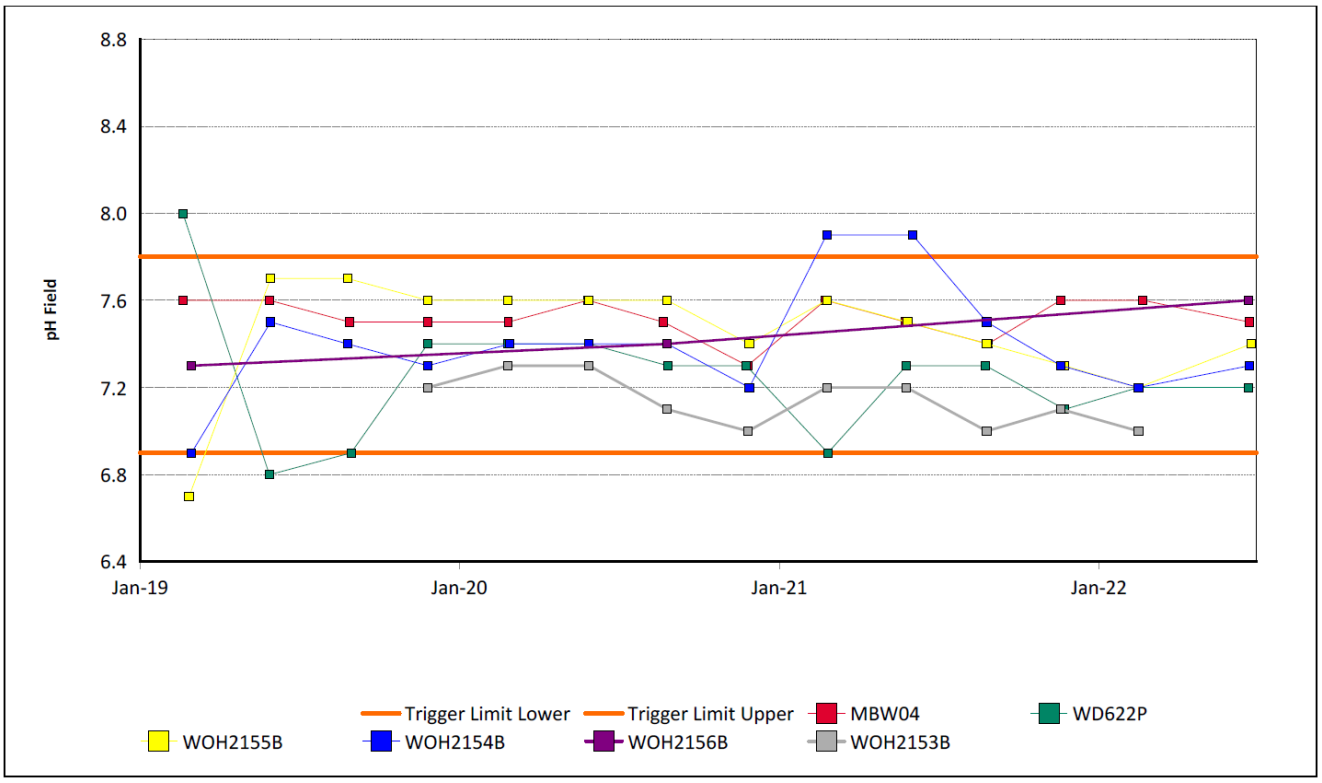


Figure 34: Wambo Seam pH Field Trend - June 2022

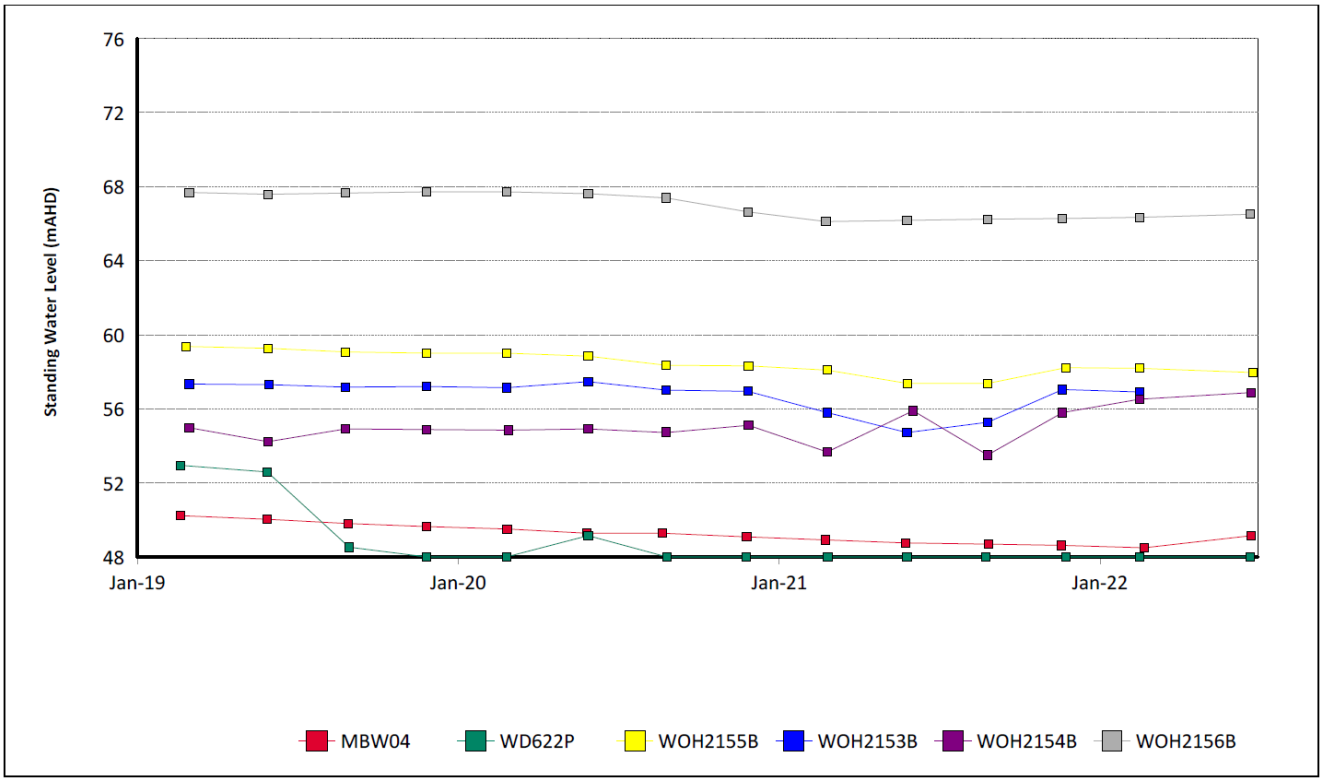


Figure 35: Wambo Seam Standing Water Level Trend - June 2022

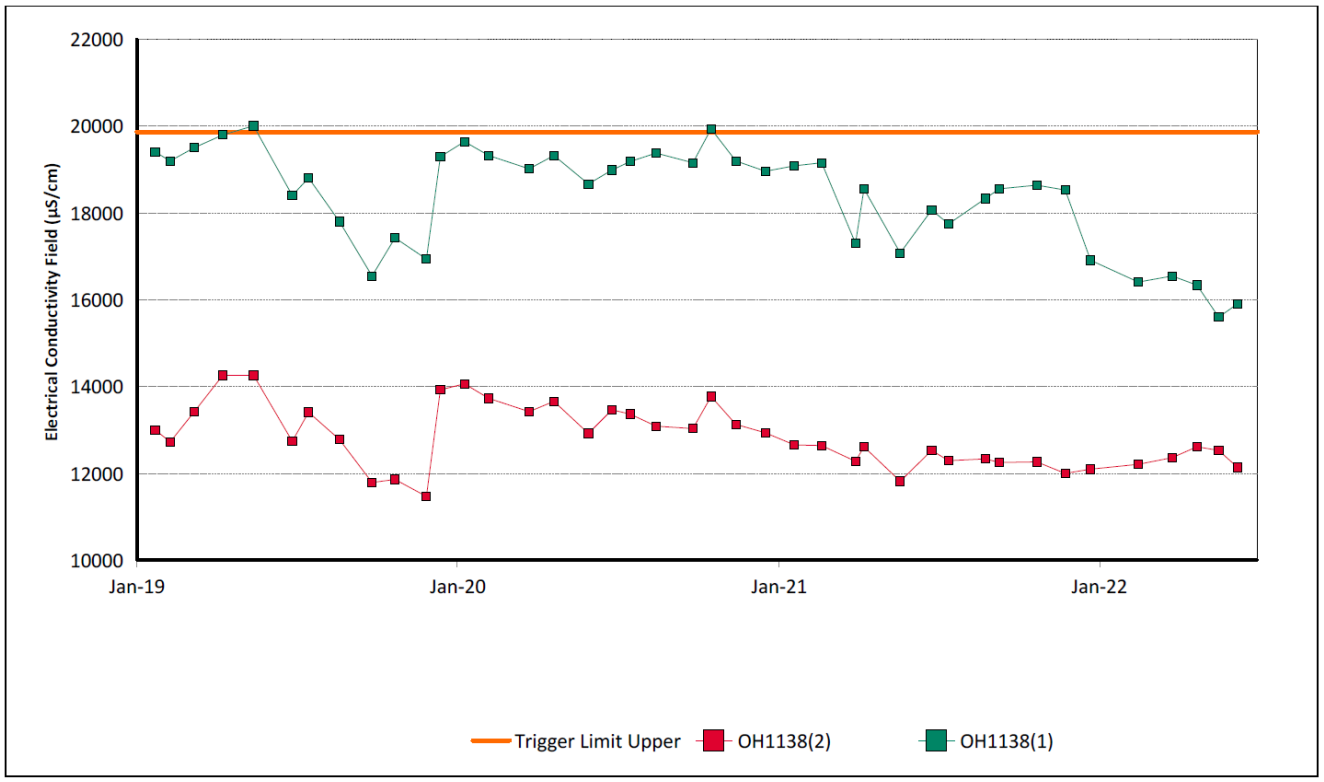


Figure 36: Warkworth Seam Electrical Conductivity Field Trend - June 2022

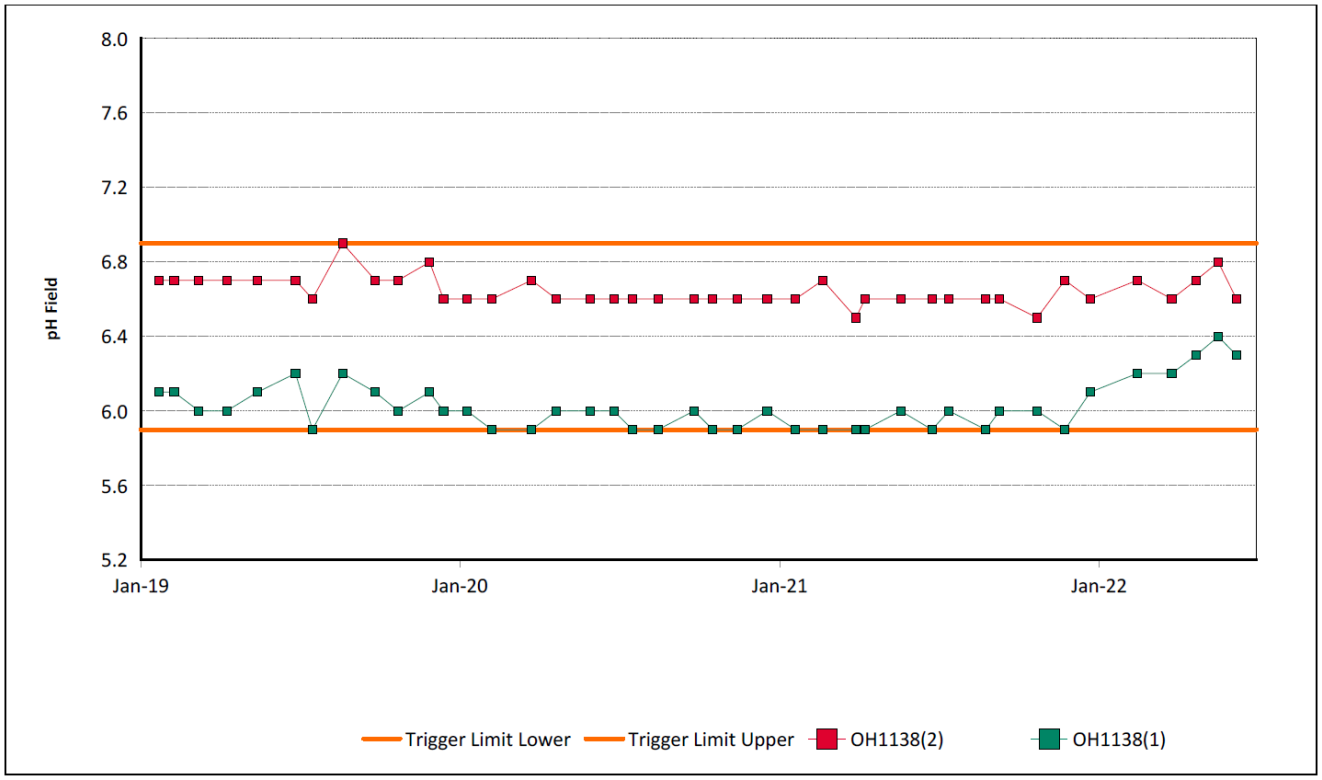


Figure 37: Warkworth Seam pH Field Trend - June 2022

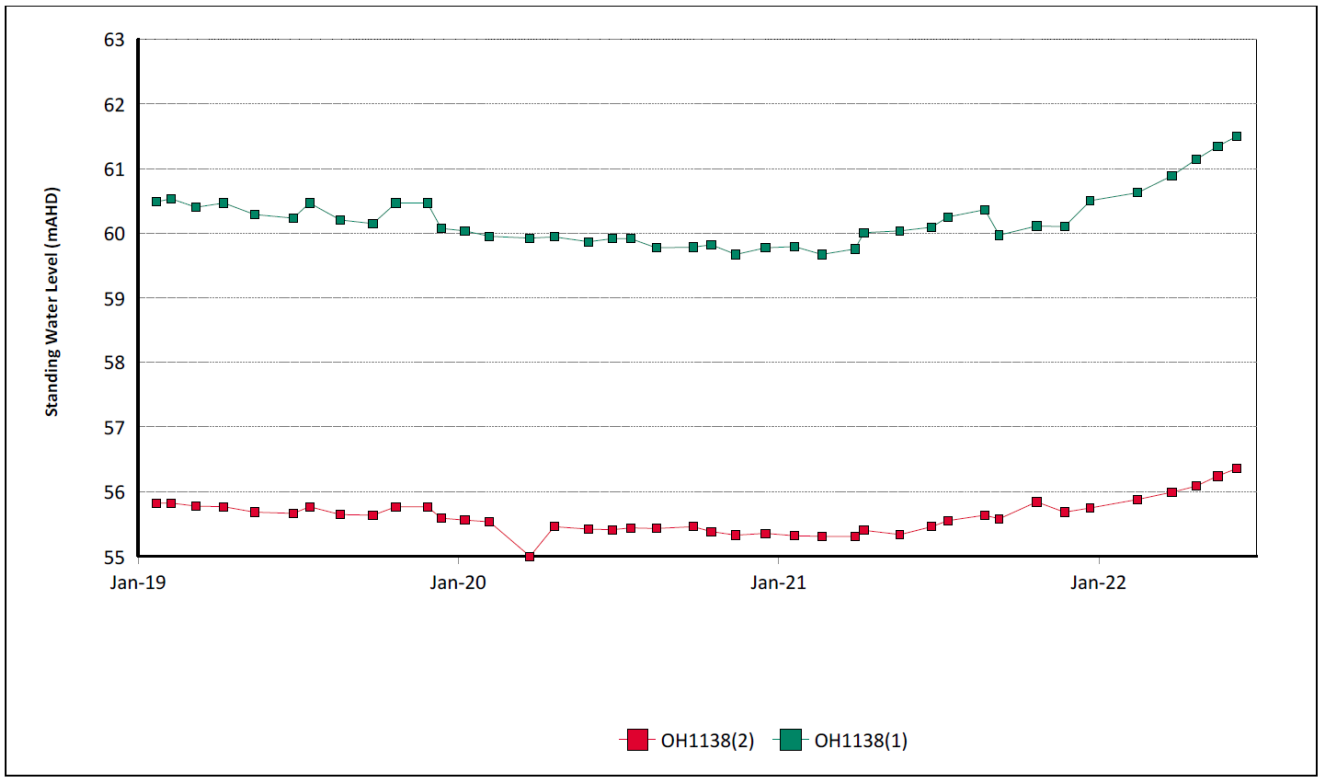


Figure 38: Warkworth Seam Standing Water Level Trend - June 2022

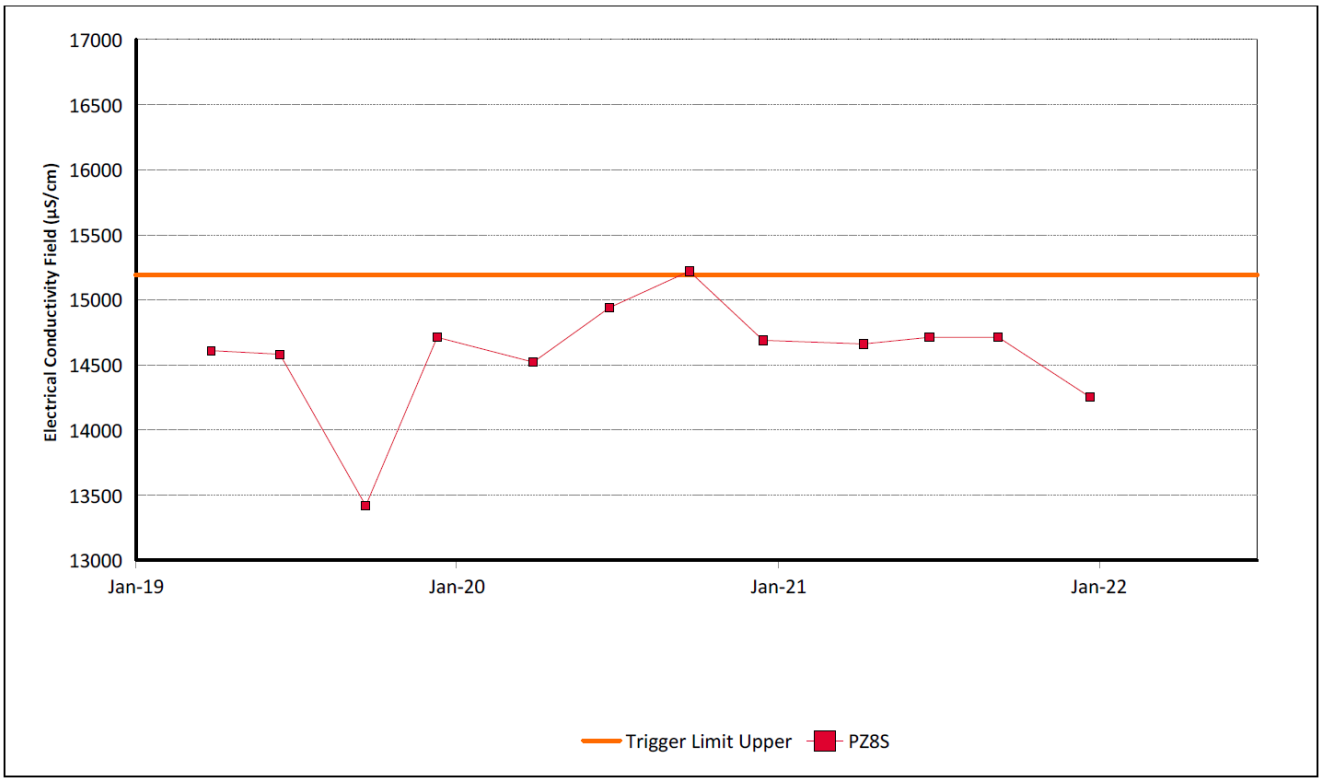


Figure 39: Wollombi Alluvium 1 Electrical Conductivity Field Trend - June 2022

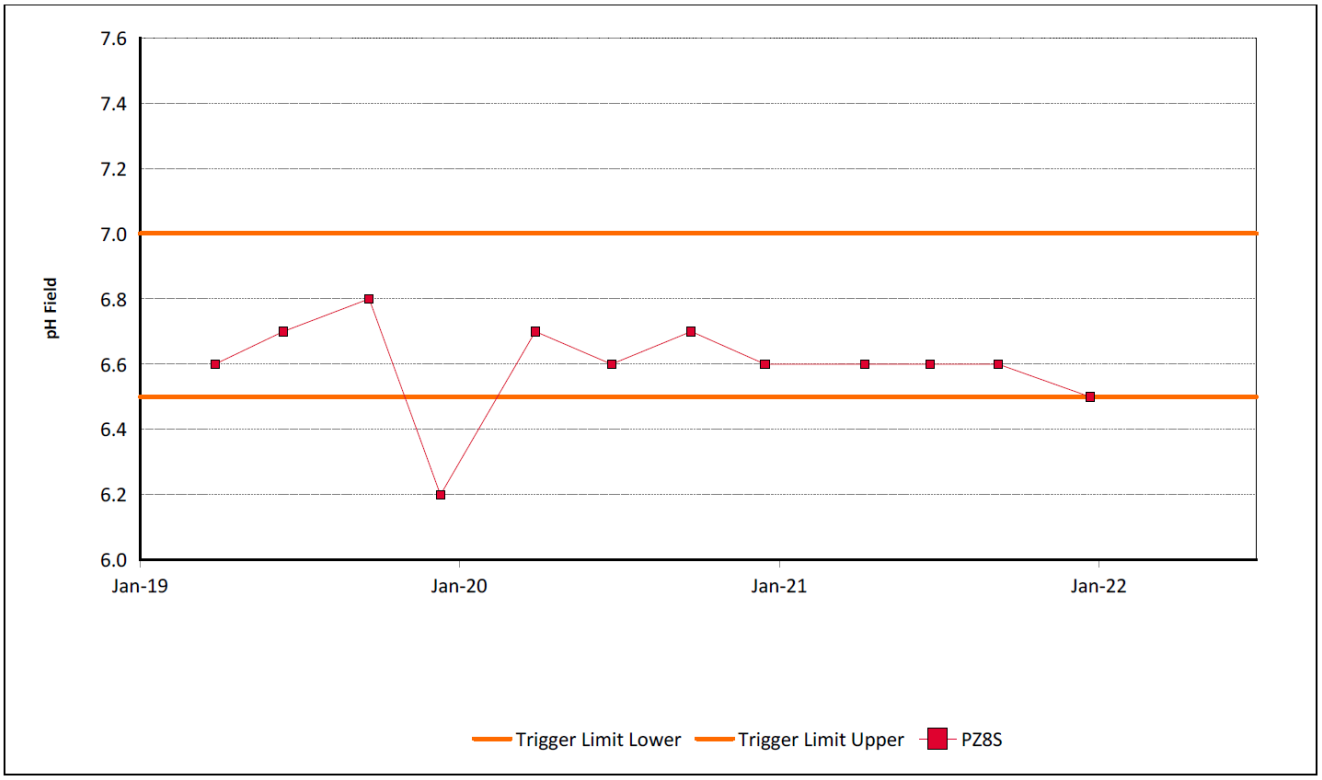


Figure 40: Wollombi Alluvium 1 pH Field Trend - June 2022

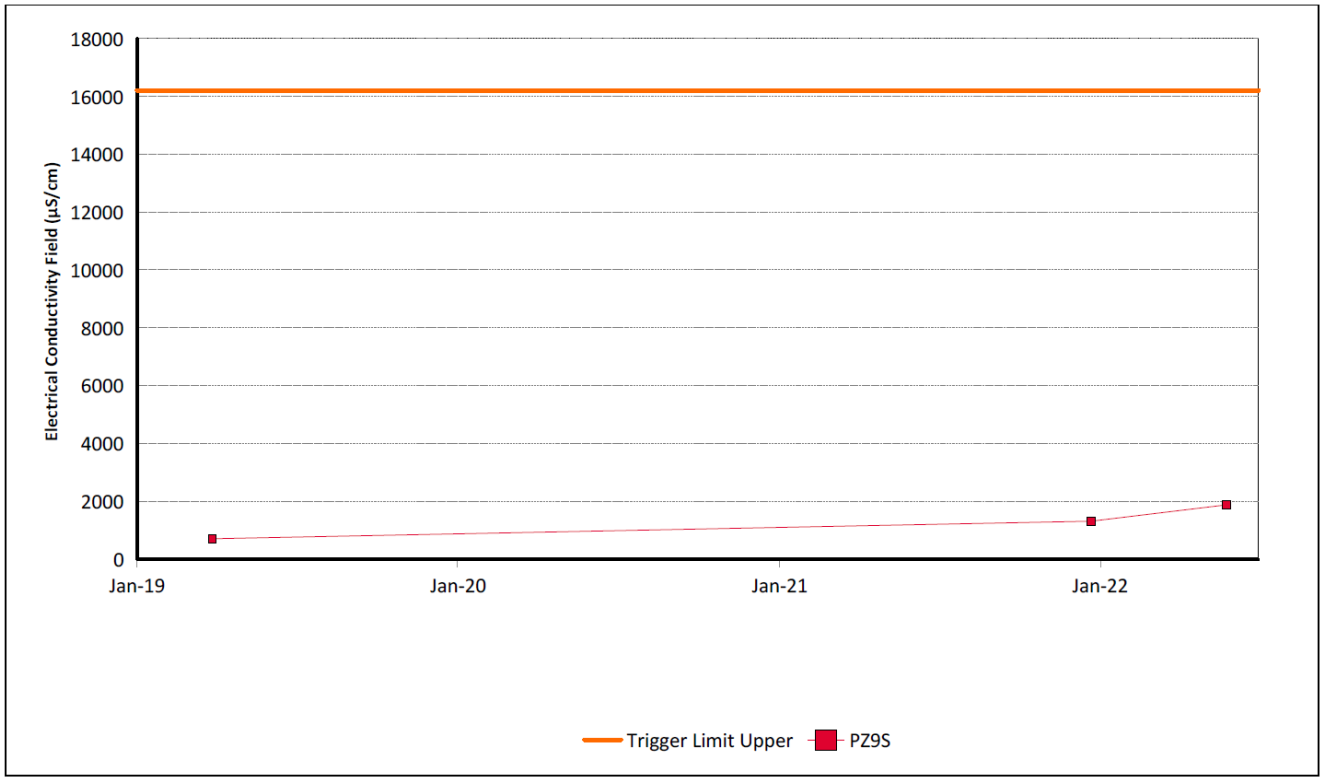


Figure 41: Wollombi Alluvium 2 Electrical Conductivity Field Trend - June 2022

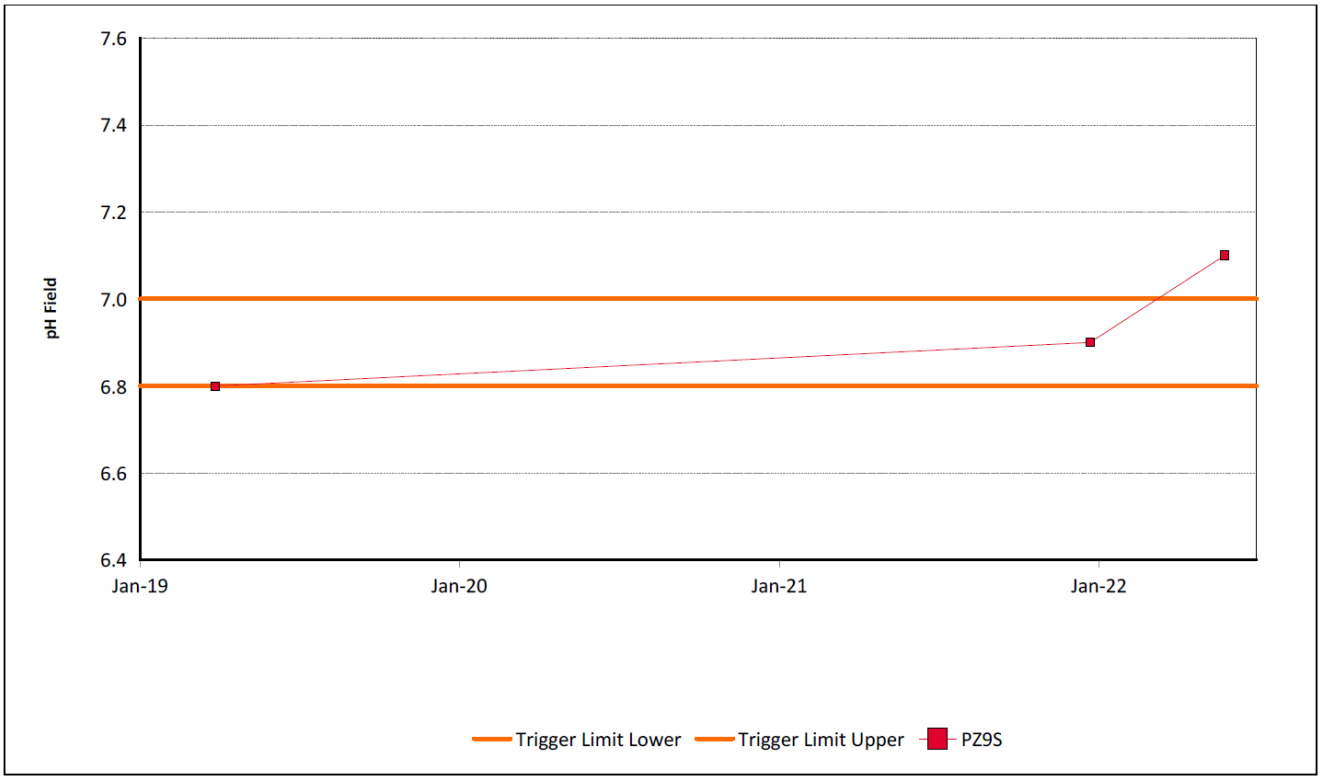


Figure 42: Wollombi Alluvium 2 pH Field Trend - June 2022

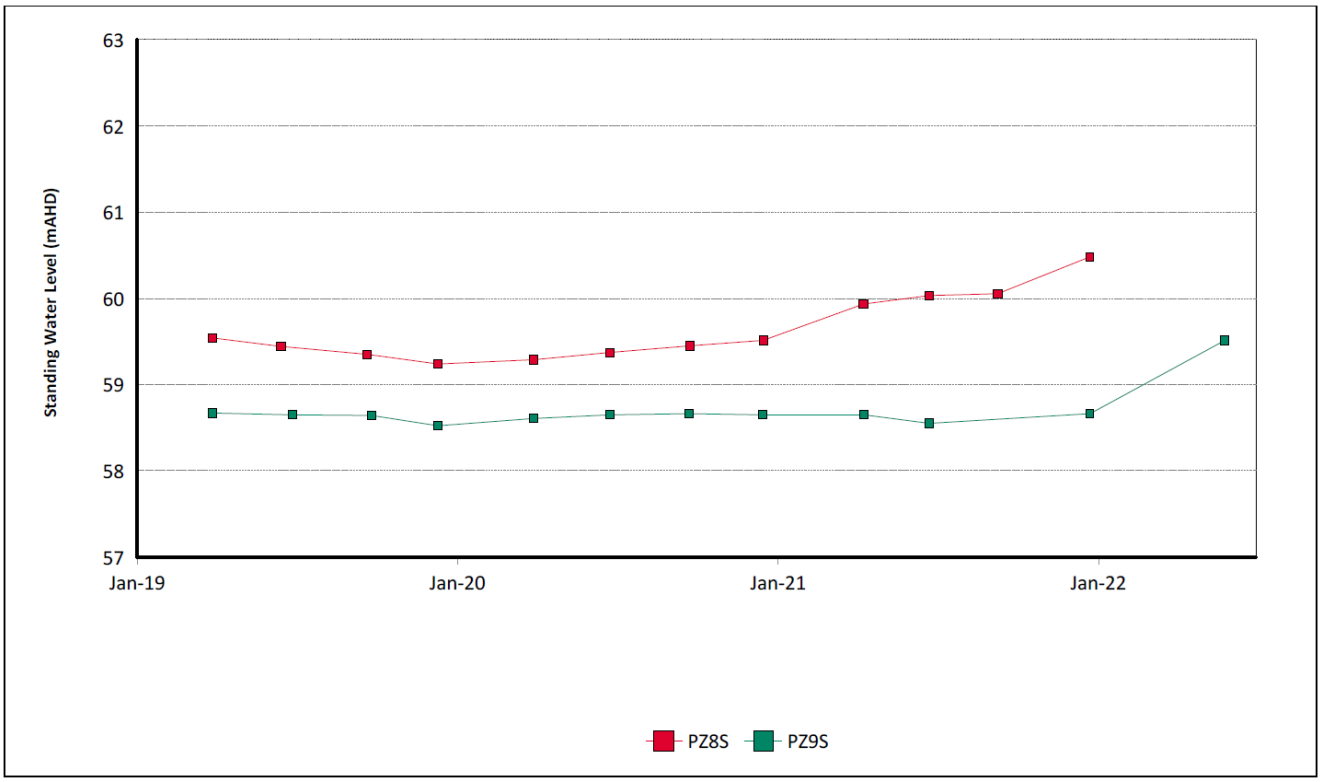


Figure 43: Wollombi Alluvium Standing Water Level Trend - June 2022

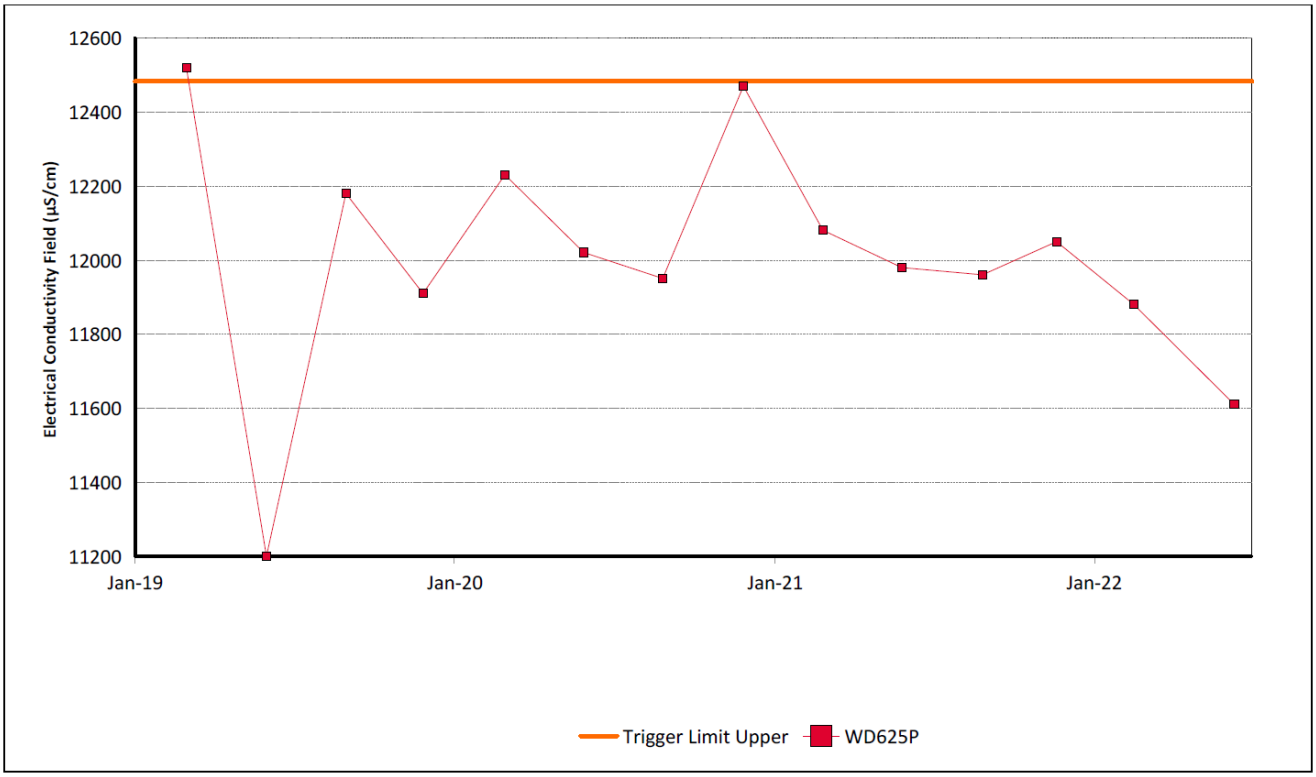


Figure 44: Woodlands Hill Seam Electrical Conductivity Field Trend - June 2022

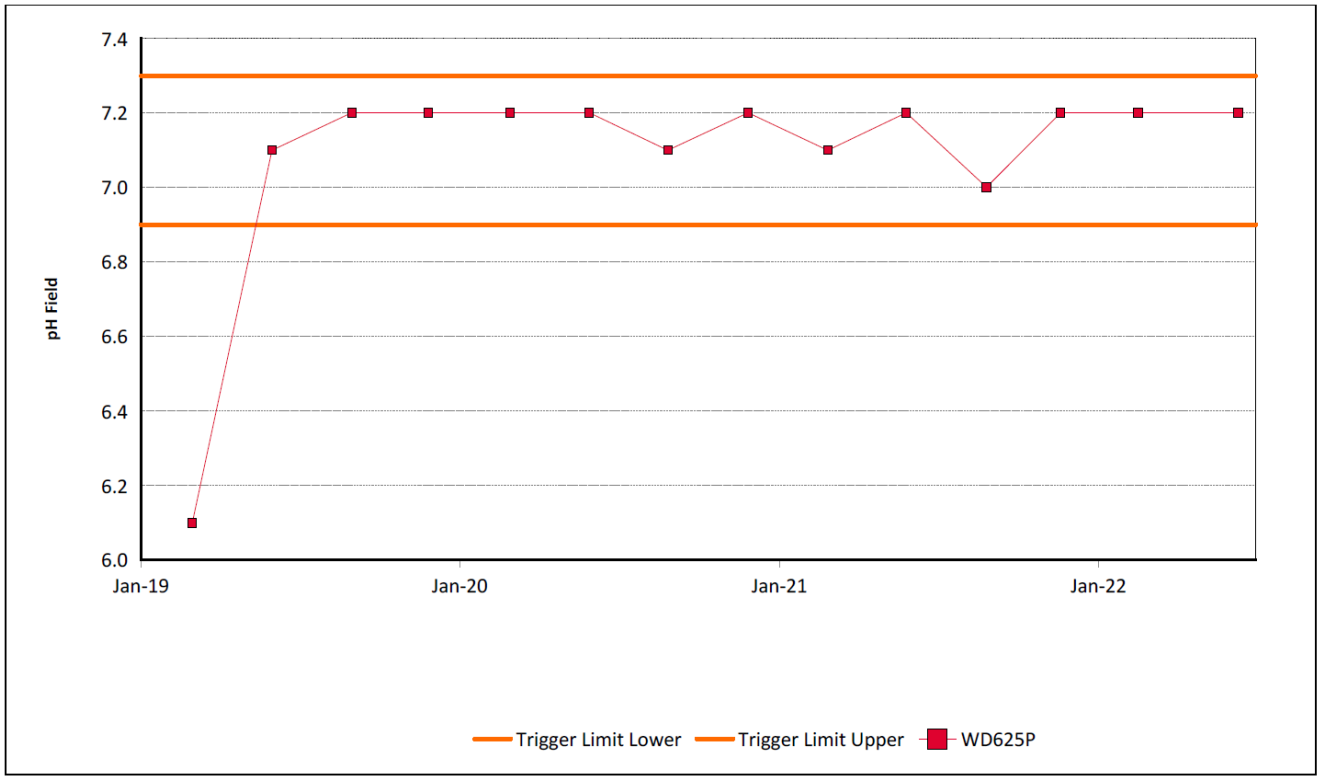


Figure 45: Woodlands Hill Seam pH Field Trend - June 2022

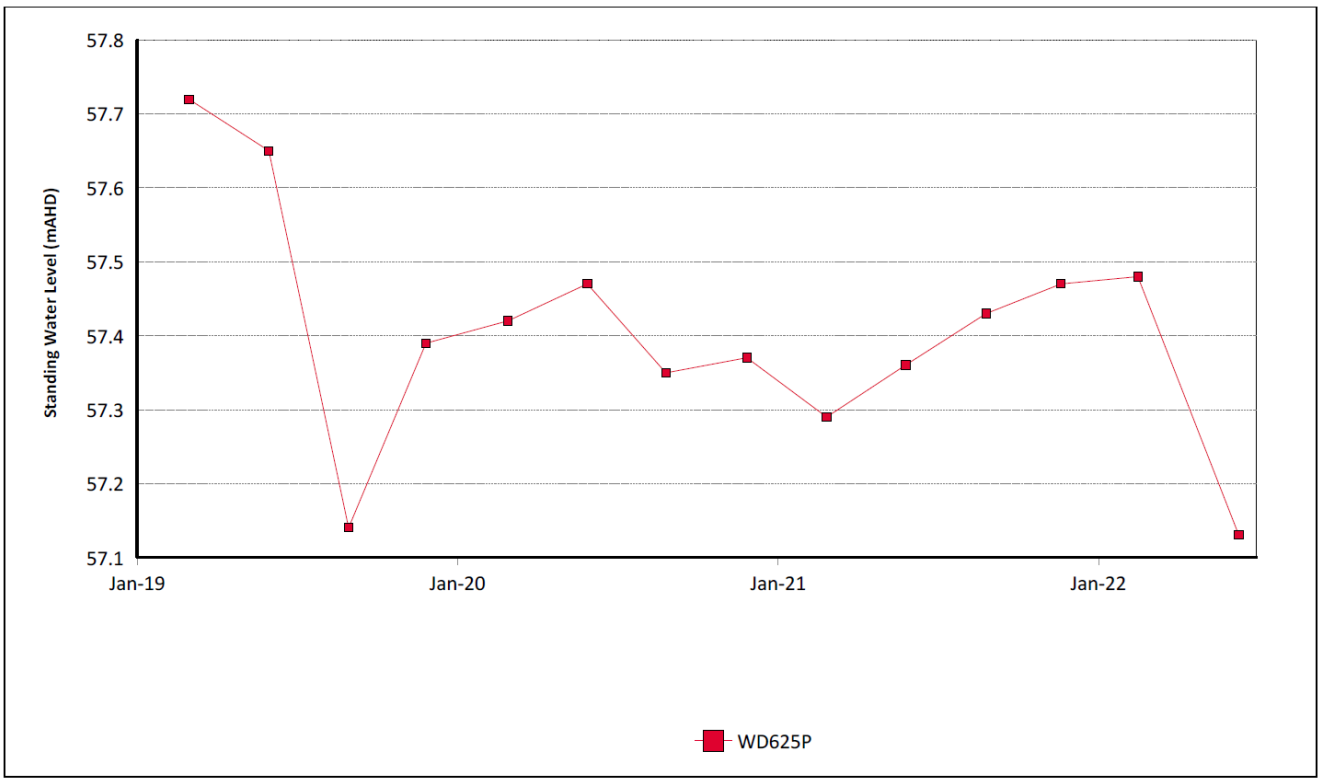


Figure 46: Woodlands Hill Seam Standing Water Level Trend - June 2022

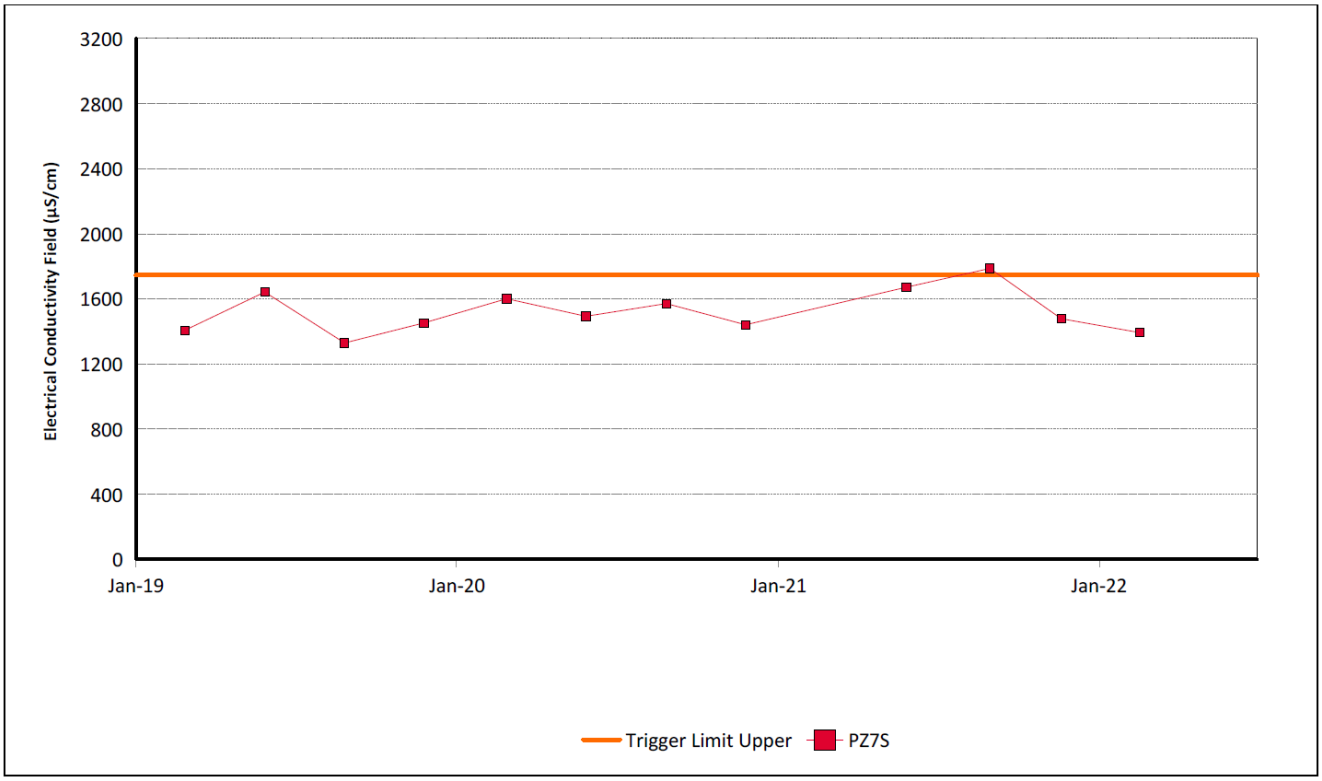


Figure 47: Aeolian Warkworth Sands Electrical Conductivity Field Trend - June 2022

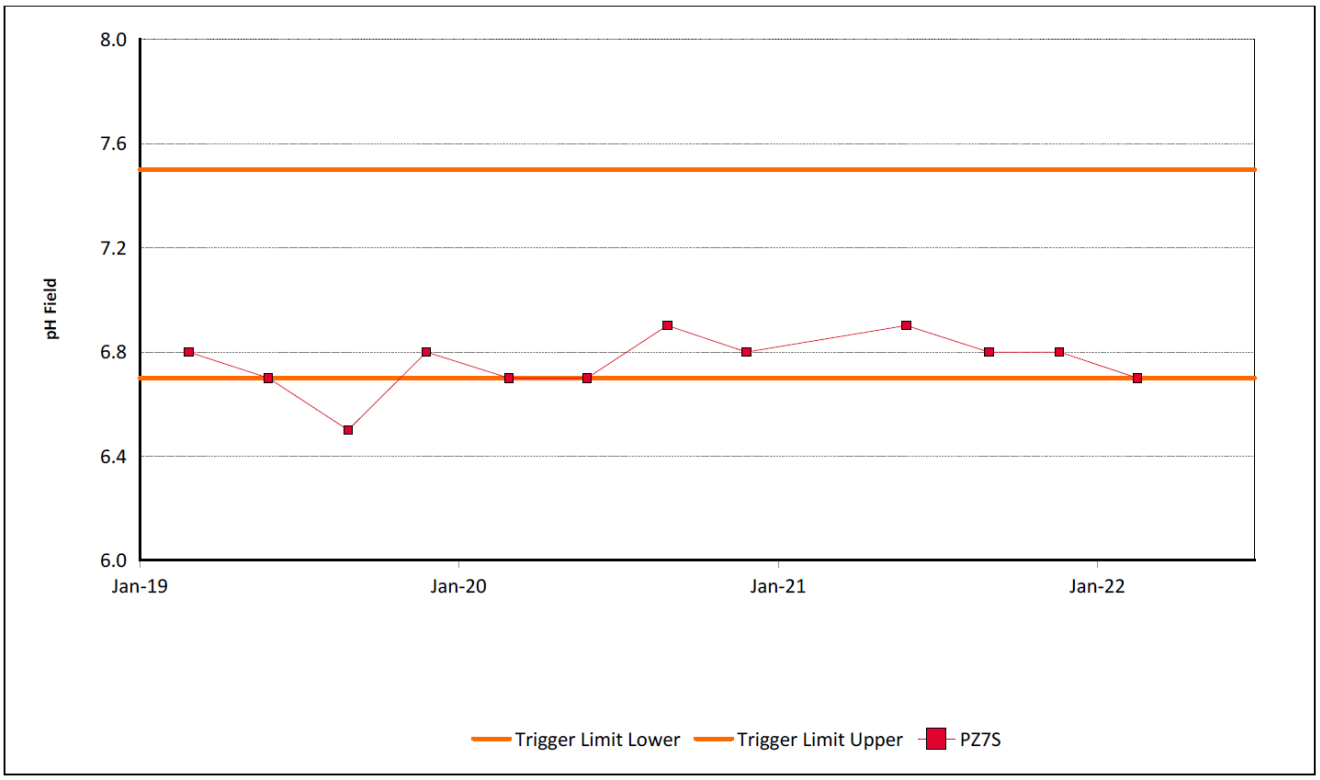


Figure 48: Aeolian Warkworth Sands pH Field Trend - June 2022

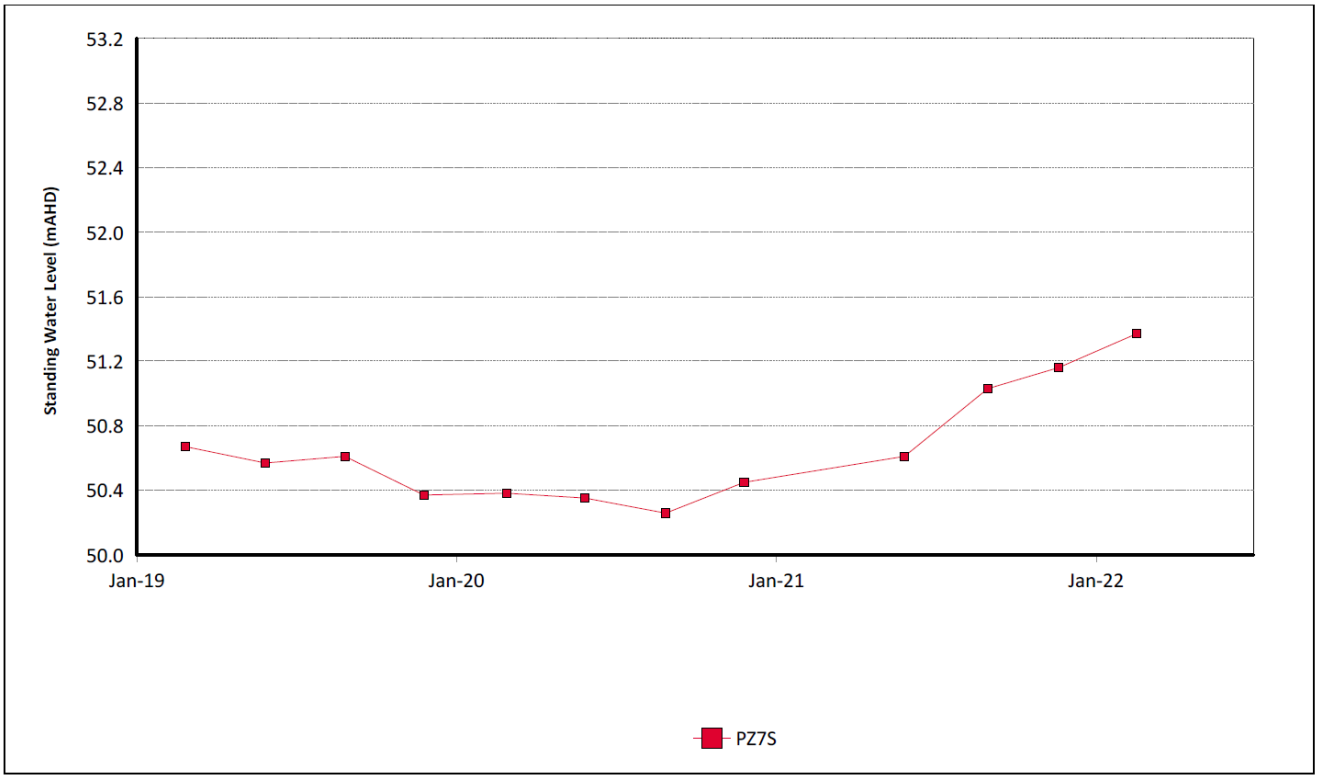


Figure 49: Aeolian Warkworth Sands Standing Water Level Trend - June 2022

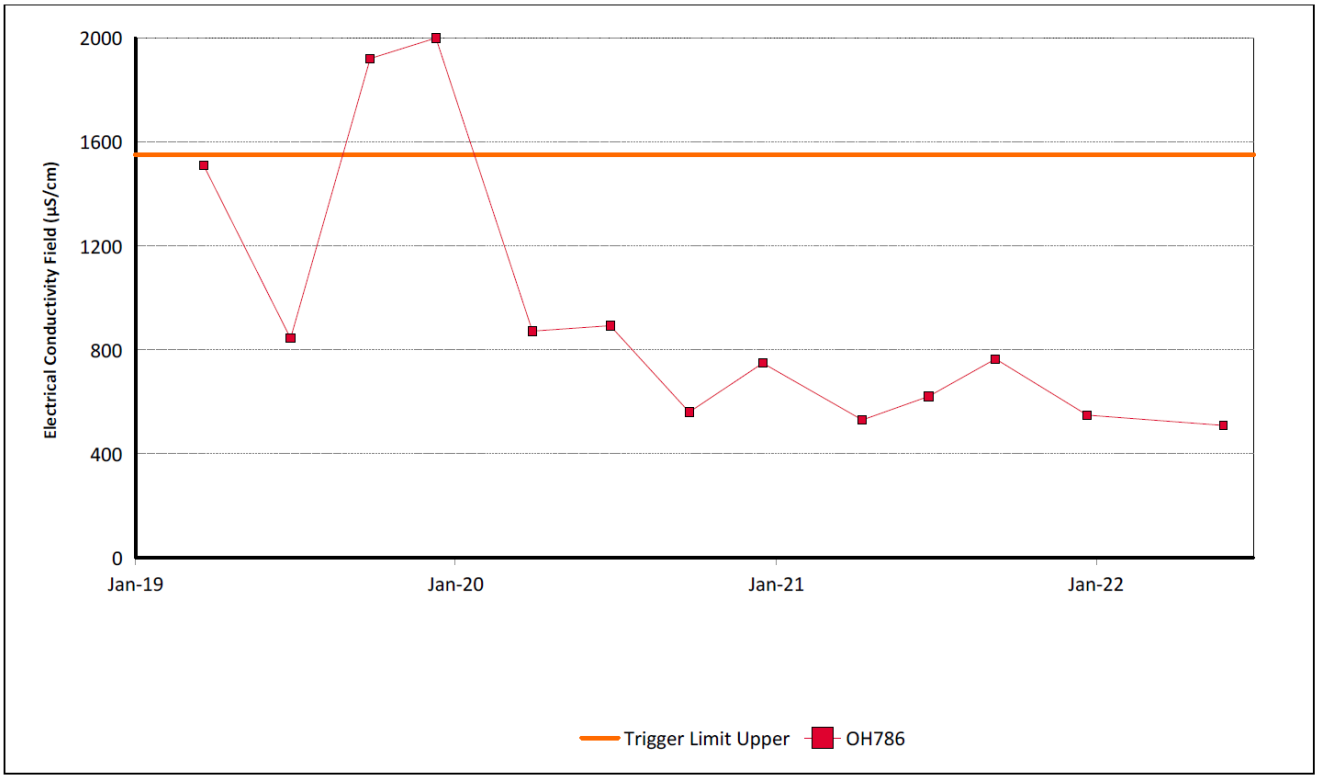


Figure 50: Hunter River Alluvium 1 Electrical Conductivity Field Trend - June 2022

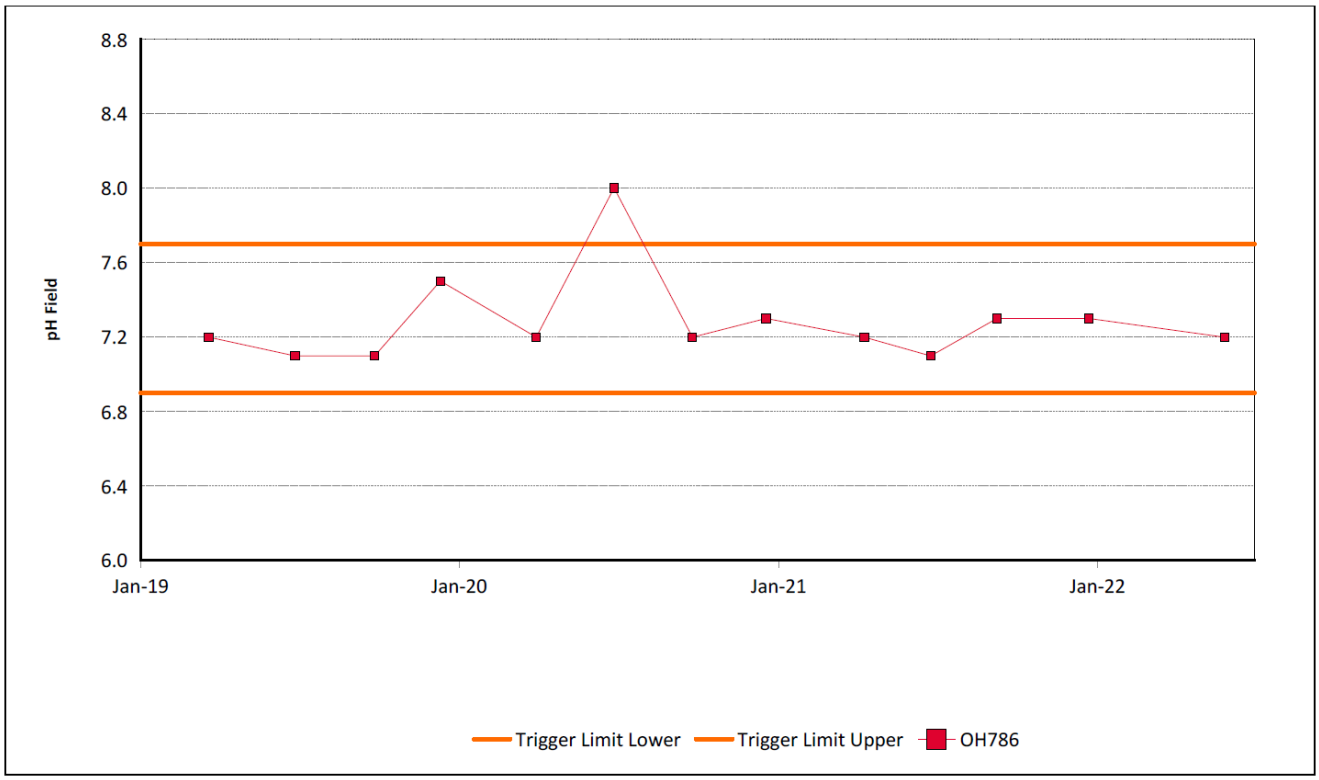


Figure 51: Hunter River Alluvium 1 pH Field Trend - June 2022

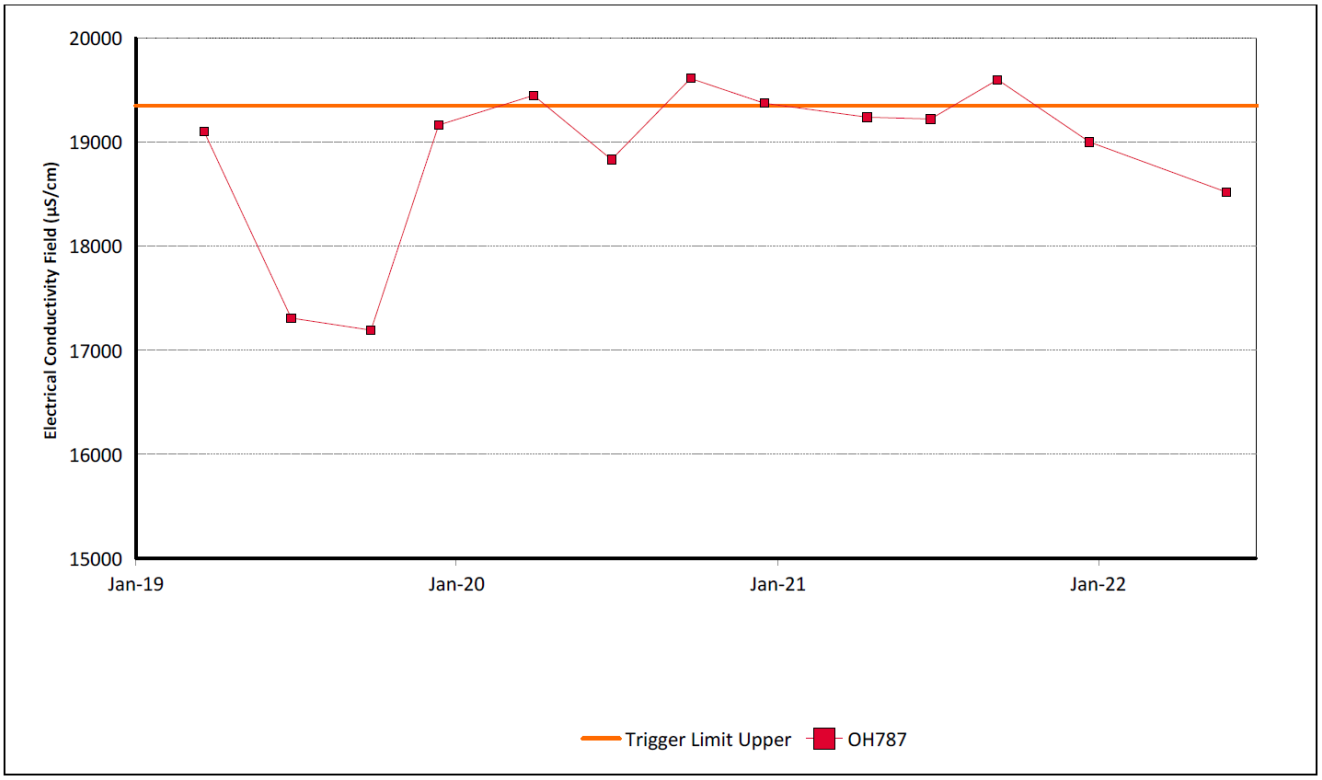


Figure 52: Hunter River Alluvium 2 Electrical Conductivity Field Trend - June 2022

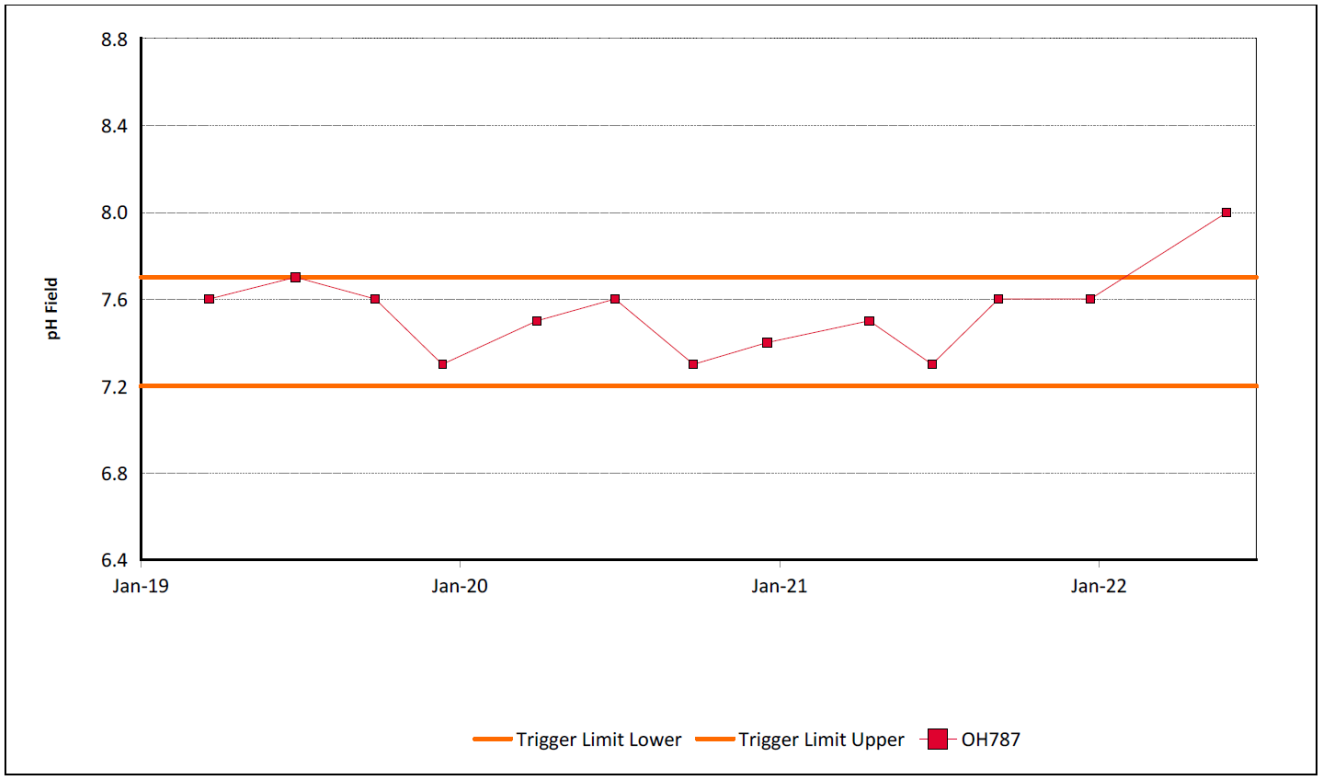


Figure 53: Hunter River Alluvium 2 pH Field Trend - June 2022

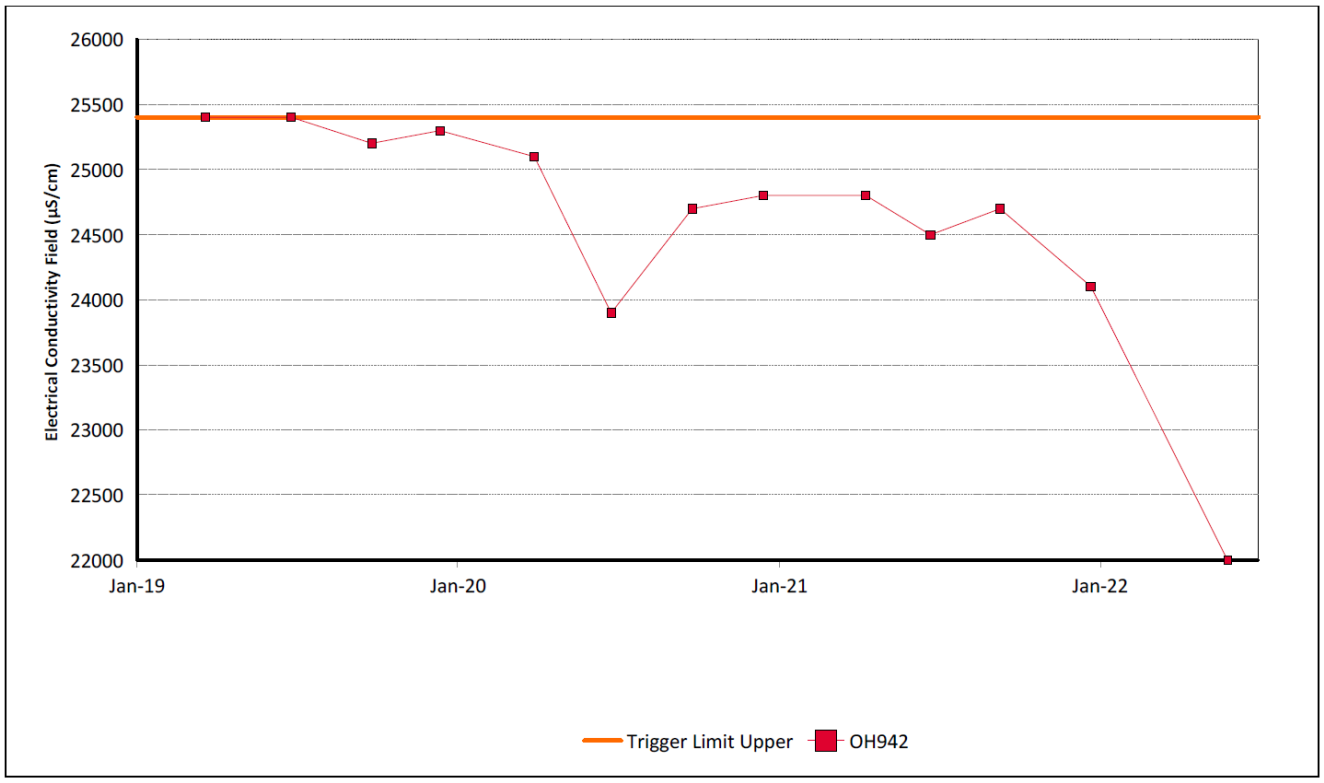


Figure 54: Hunter River Alluvium 3 Electrical Conductivity Field Trend - June 2022

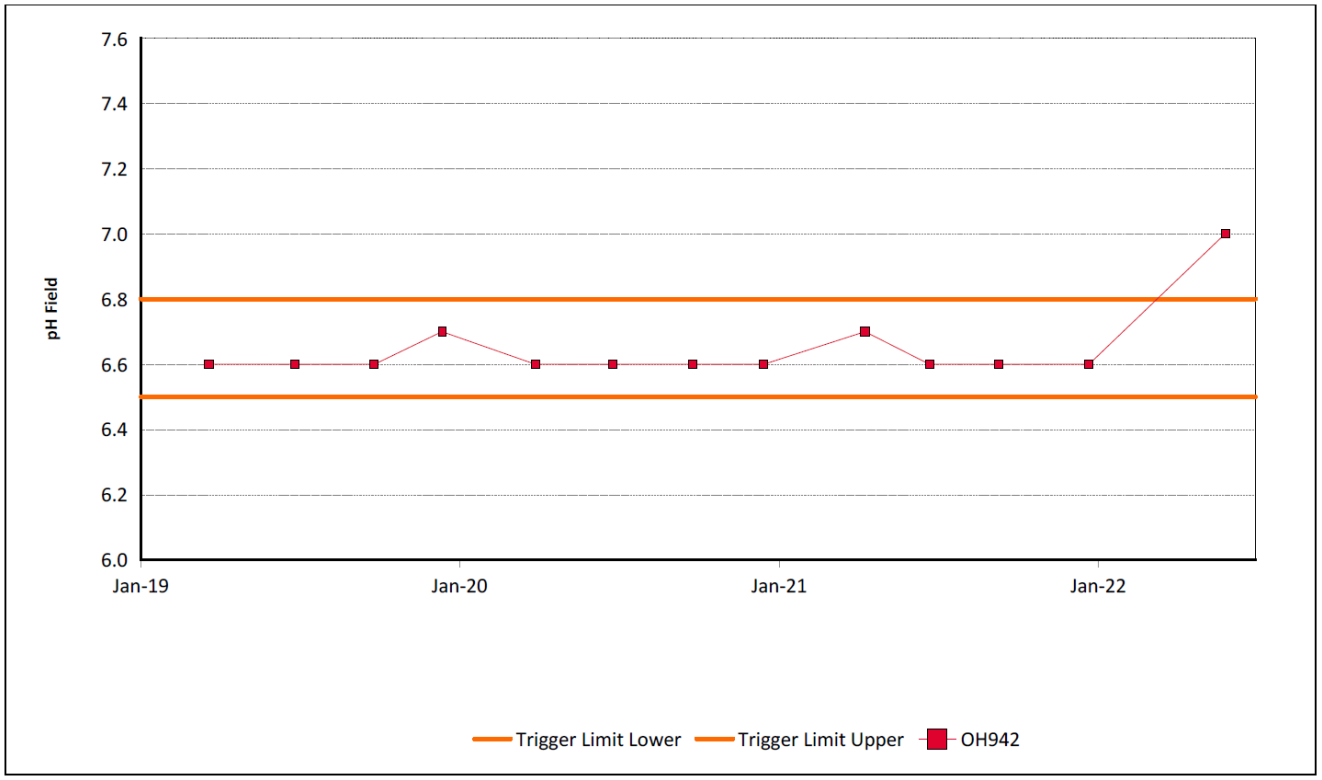


Figure 55: Hunter River Alluvium 3 pH Field Trend - June 2022

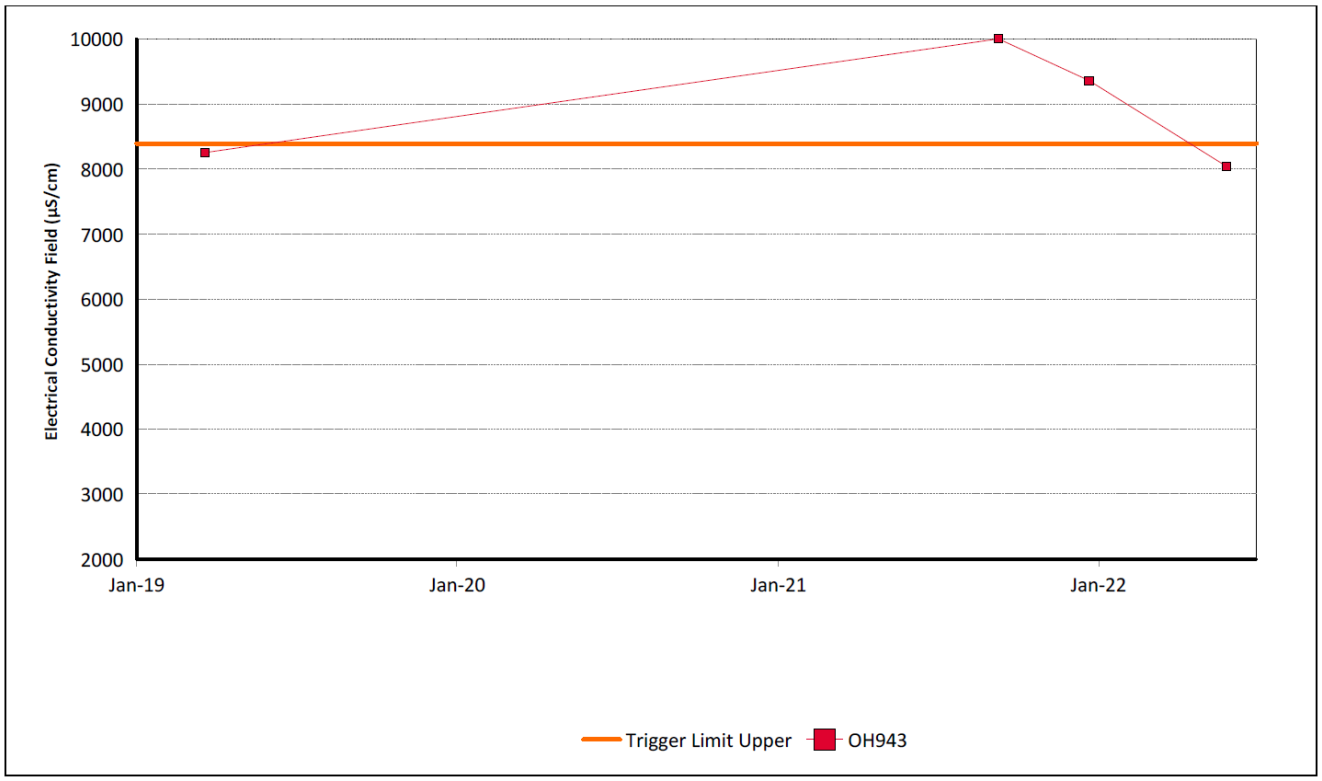


Figure 56: Hunter River Alluvium 4 Electrical Conductivity Field Trend - June 2022

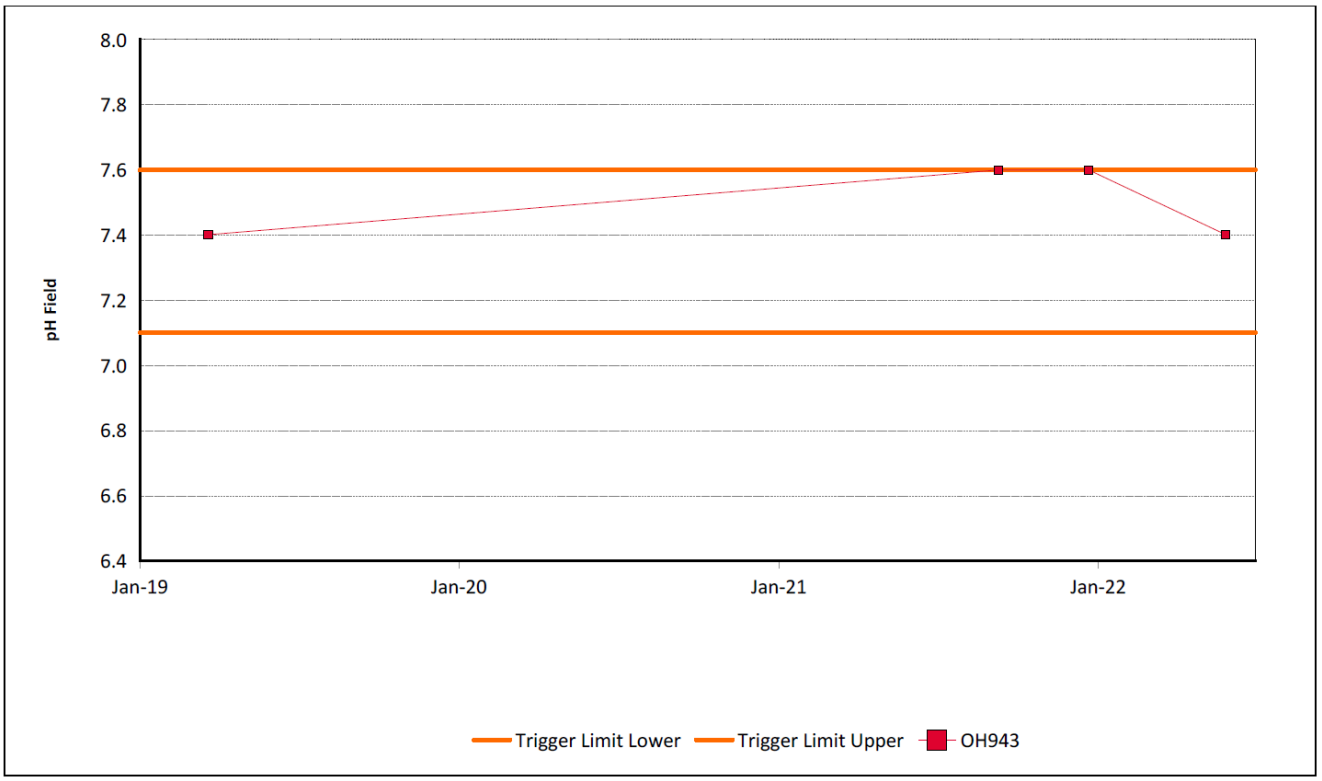


Figure 57: Hunter River Alluvium 4 pH Field Trend - June 2022Hunter River Alluvium 4 pH Field Trend - June 2022

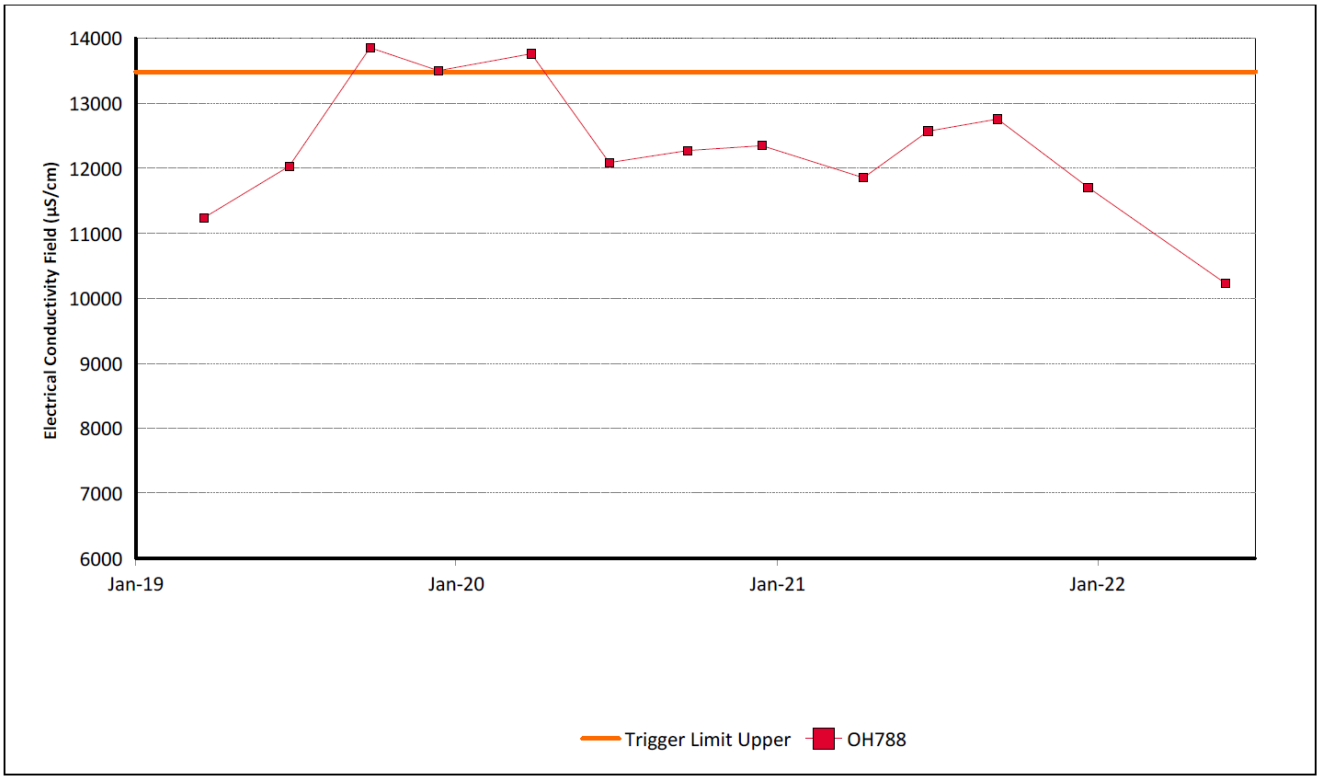


Figure 58: Hunter River Alluvium 5 Electrical Conductivity Field Trend - June 2022

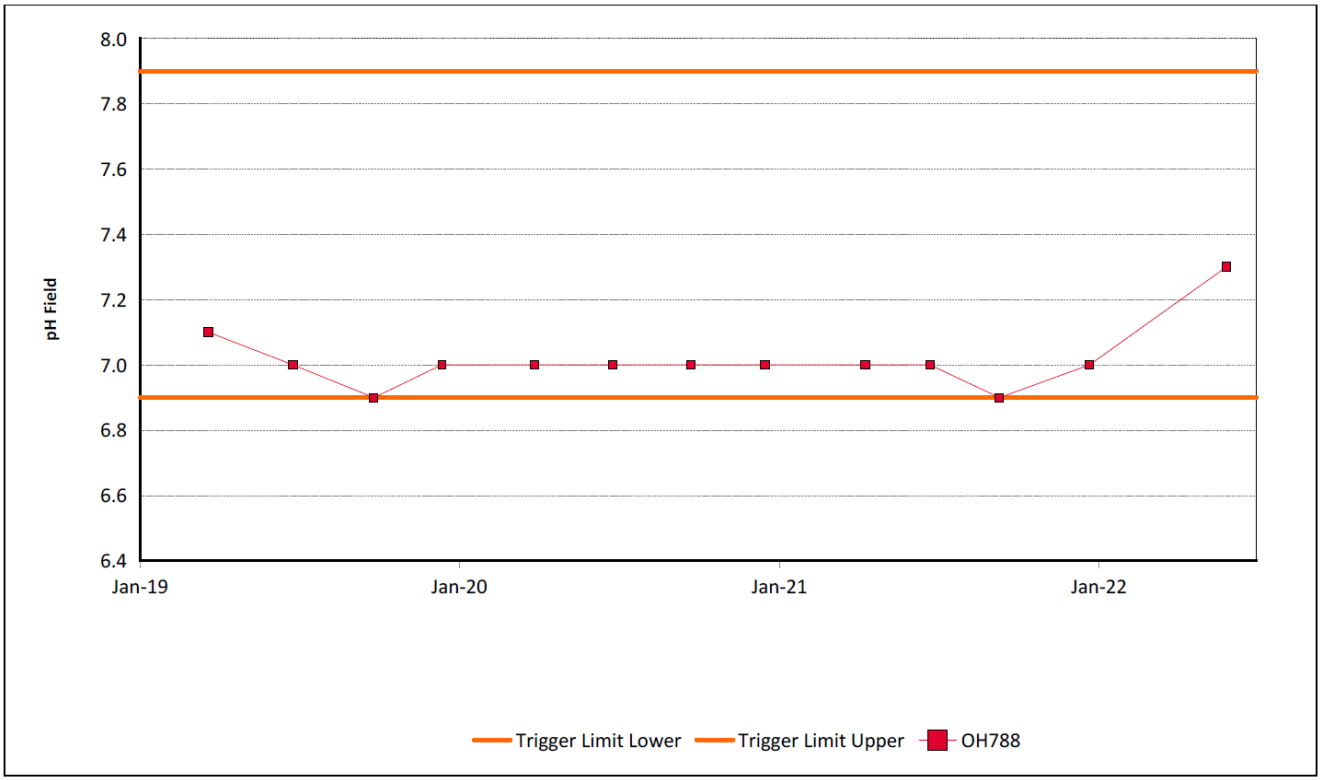


Figure 59: Hunter River Alluvium 5 pH Field Trend - June 2022

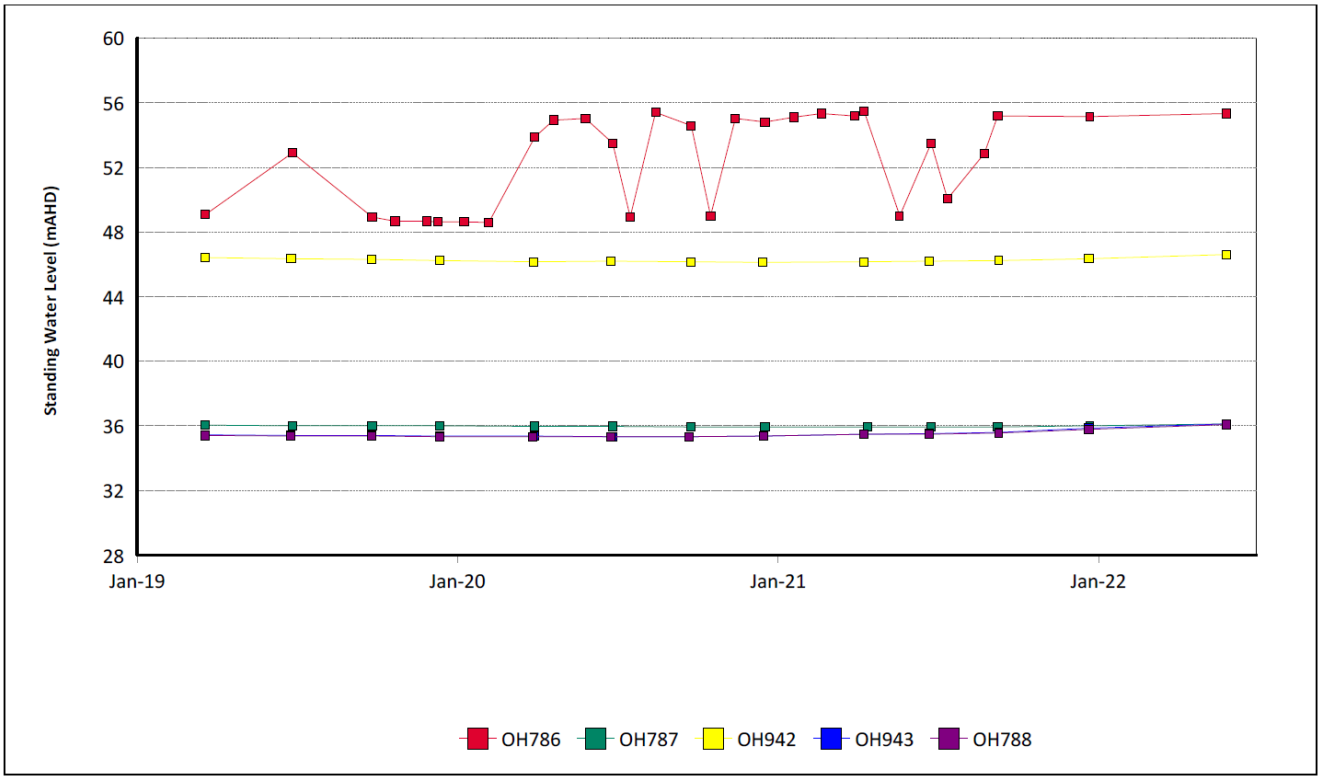


Figure 60: Hunter River Alluvium Standing Water Level Trend - June 2022

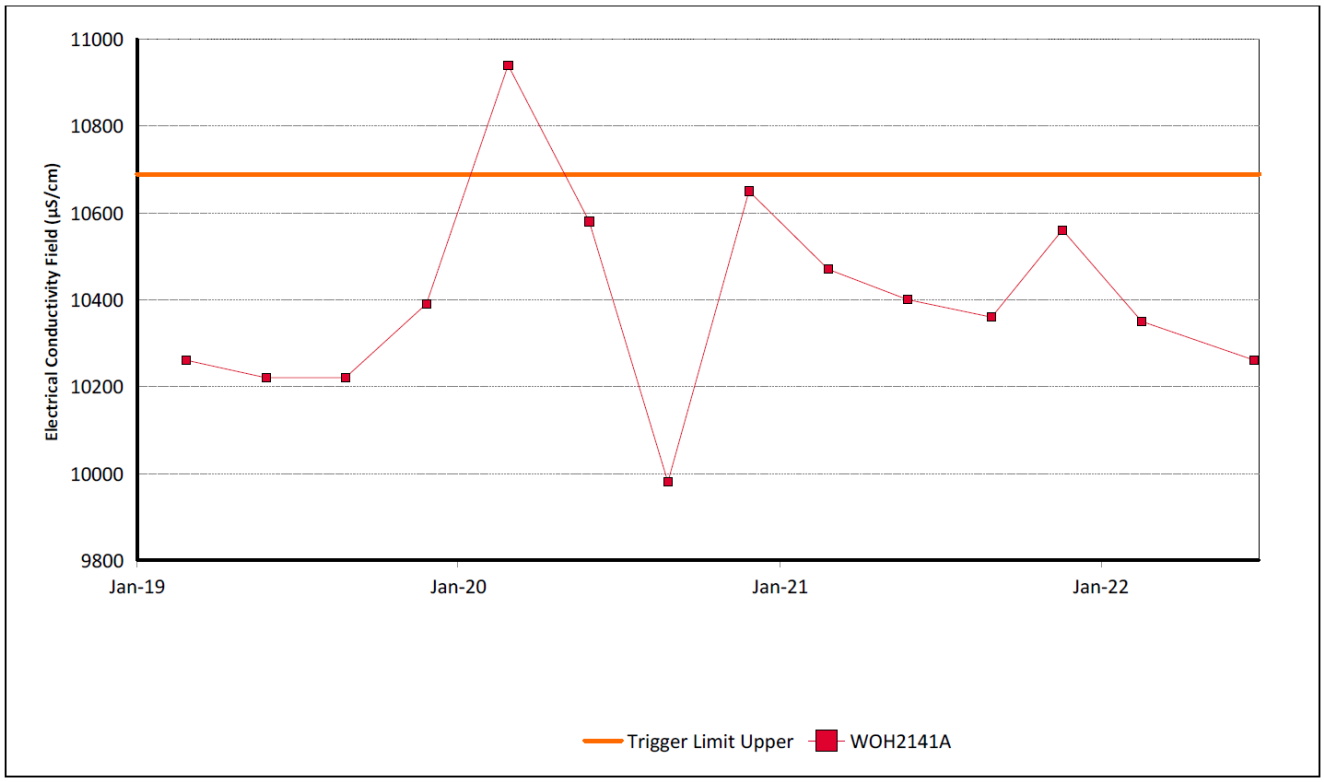


Figure 61: Whynot Seam Electrical Conductivity Field Trend - June 2022

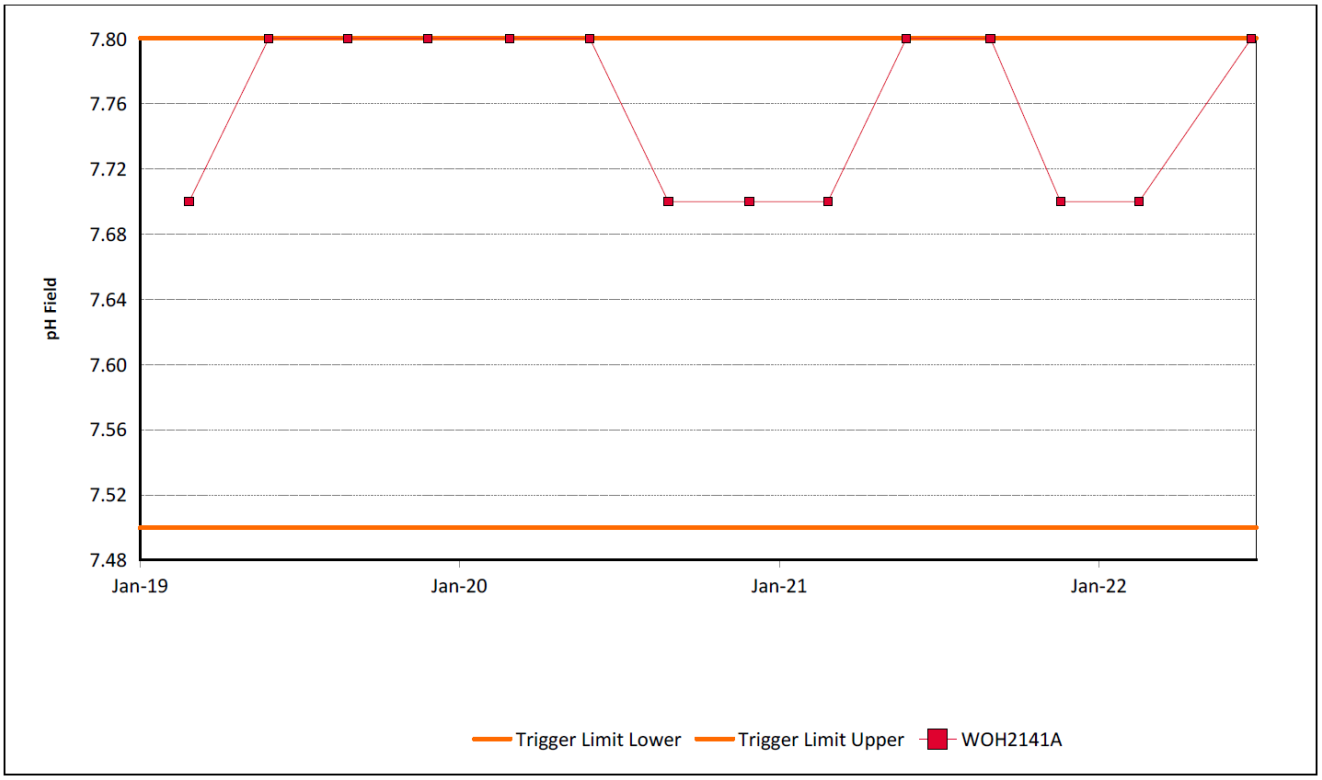


Figure 62: Whynot Seam pH Field Trend - June 2022

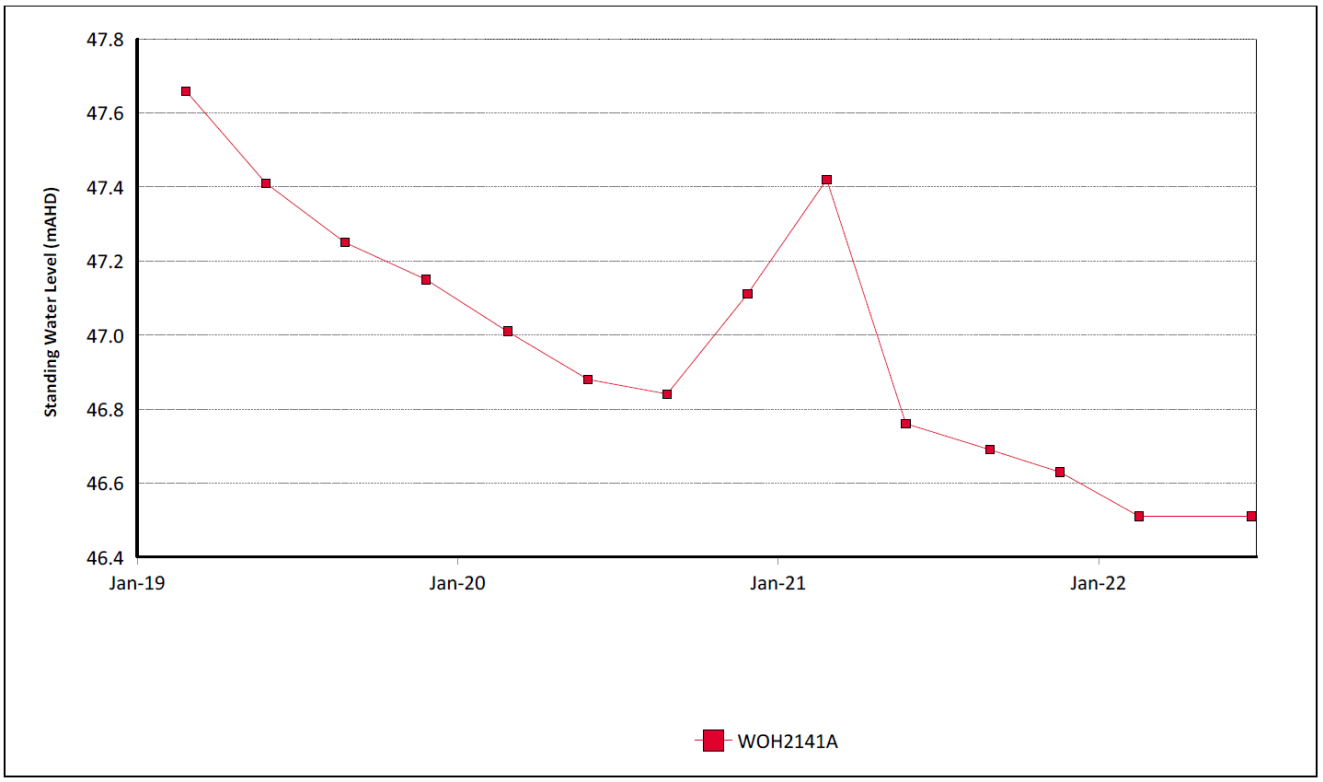


Figure 63: Whynot Seam Standing Water Level Trend - June 2022

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

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

Table 3: Groundwater Trigger Tracking – June 2022

Site	Date	Trigger Limit Breached	Action Taken in Response
MB15MTW01D	17/02/2022	pH –5th Percentile	Consultant engaged to complete investigation.
MB15MTW01D	10/06/2022	pH –5th Percentile	The consultant identified in their report that "it is likely the trigger values derived for shallow overburden bores do not accurately represent in-situ groundwater water quality for MB15MTW01D". MB15MTW01D is part of a larger dataset from the shallow overburden seam. The 5th percentile of the seam is currently 6.7 while the 5th percentile of MB15MTW01D is 5.4. The result is consistent with previous results and within sample location trigger levels. No further investigation required.
PZ7D	16/02/2022	pH –95th Percentile	Consultant engaged to complete investigation. The consultant identified in their report that the high pH could indicate that stagnant water is present within the bore. PZ7D displays a subdued response to rainfall recharge, with recorded groundwater levels remaining relatively stable since December 2011. The limited response to rainfall recharge indicates limited surface connectivity and/or overlying sediments with low hydraulic conductivity. PZ7D is part of a larger dataset from the shallow overburden seam. The 95th percentile of the seam is currently 8 while the 95th percentile of PZ7D is 8.2. The result is consistent with previous results and within sample location trigger levels. No further investigation required.
OH1126	26/05/2022	pH –5th Percentile	Watching Brief*
OH787	27/05/2022	pH –95th Percentile	Watching Brief*
OH942	26/05/2022	pH –95th Percentile	Watching Brief*
WOH2139A	21/06/2022	pH –95th Percentile	Watching Brief*
PZ9S	25/05/2022	pH –5th Percentile	Watching Brief*
MTD605P	17/02/2022	EC – 95th Percentile	Watching Brief*
MTD605P	9/06/2022	EC – 95th Percentile	MTD605P is part of a larger dataset from the shallow overburden seam. The 95th percentile of the seam is currently 17,516uS/cm while the 95th percentile of MTD605P is 17,933uS/cm. The result is consistent with previous results and within sample location trigger levels. No further investigation required. Watching Brief*

Site	Date	Trigger Limit Breached	Action Taken in Response
* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.			

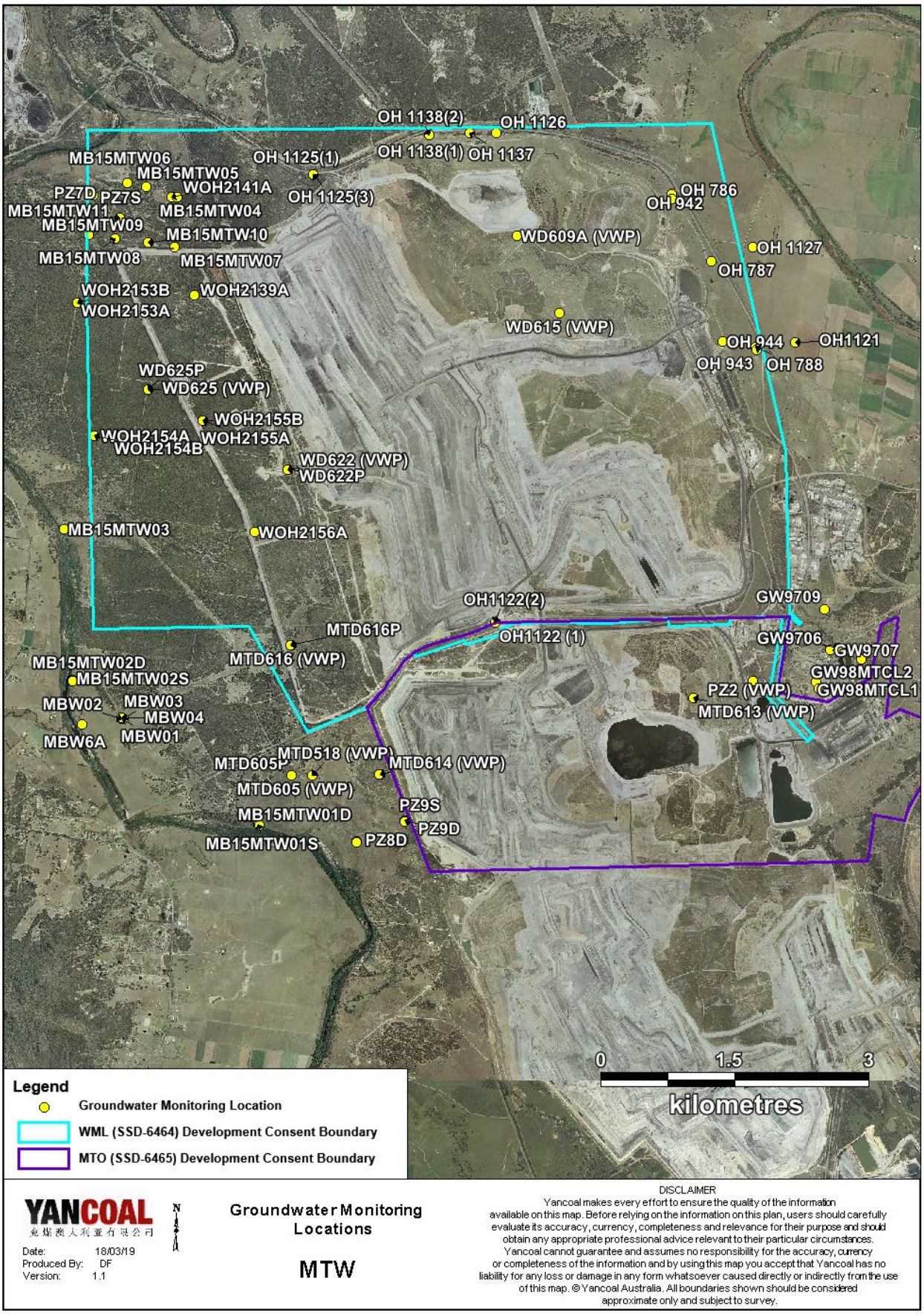


Figure 64: Groundwater Monitoring Location Plan

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 73**.

4.1 Blast Monitoring Results

During June 2022, 20 blasts were initiated at MTW. **Figure 67** to **Figure 72** show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in **Table 4**.

Table 4: Blasting Limits

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

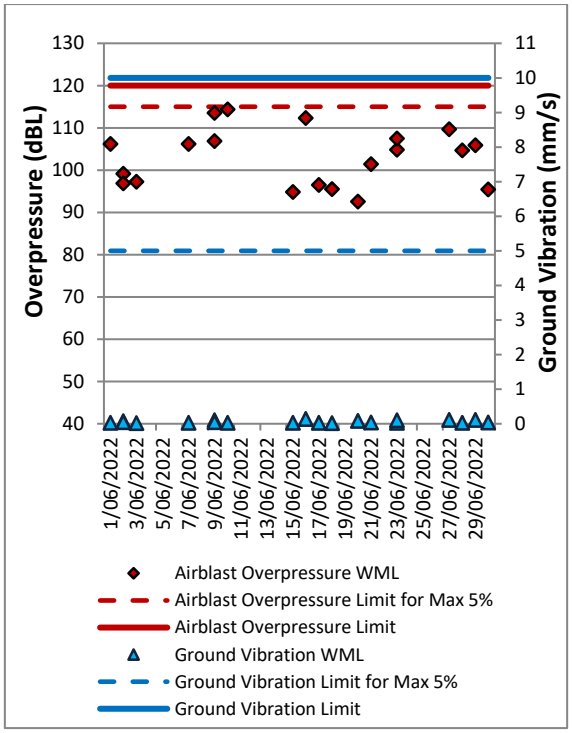


Figure 65: Abbey Green Blast Monitoring Results – June 2022

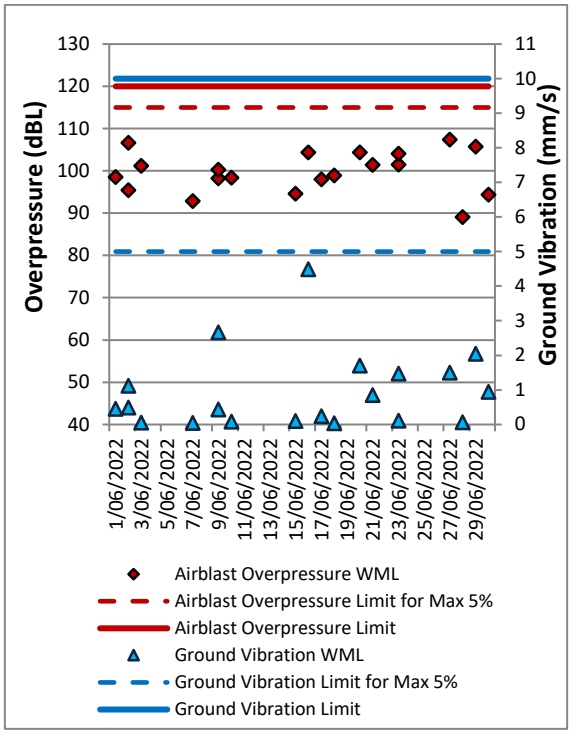


Figure 66: Bulga Village Blast Monitoring Results – June 2022

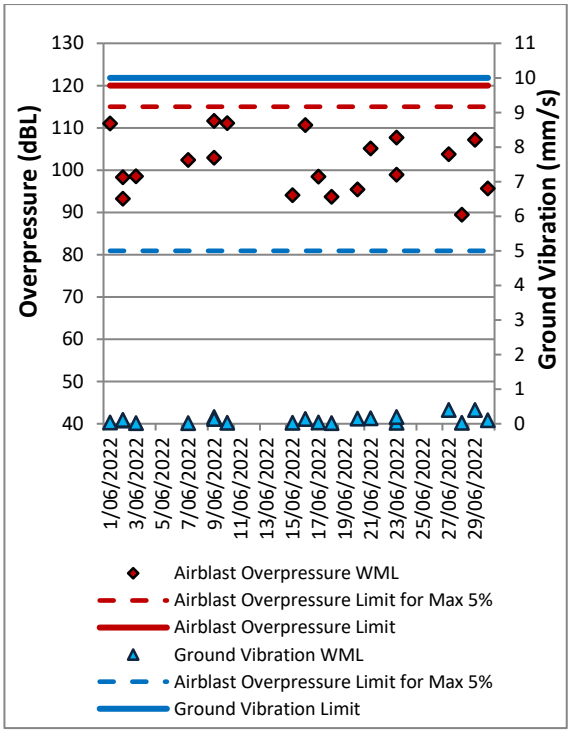


Figure 67: MTIE Blast Monitoring Results – June 2022

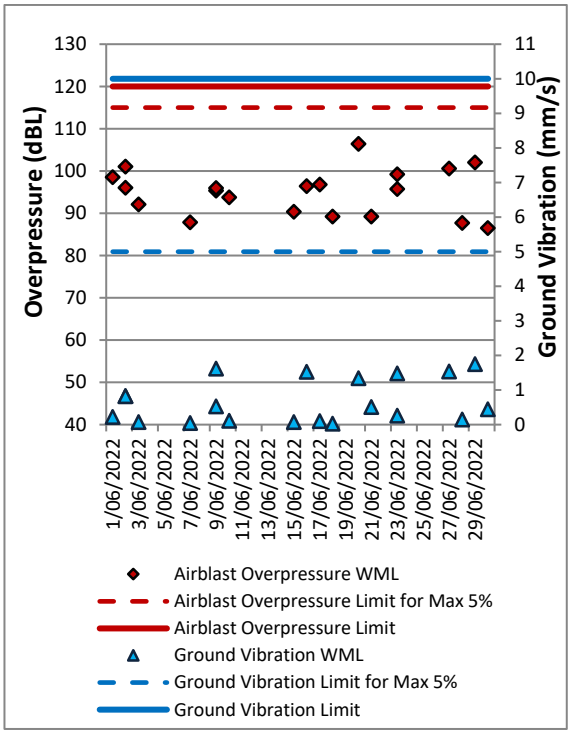


Figure 68: Wambo Road Blast Monitoring Results – June 2022

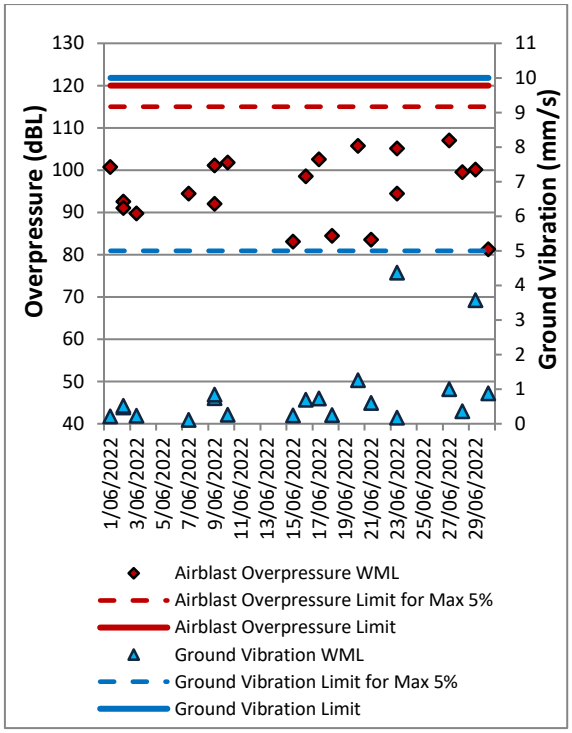


Figure 69: Warkworth Blast Monitoring Results – June 2022

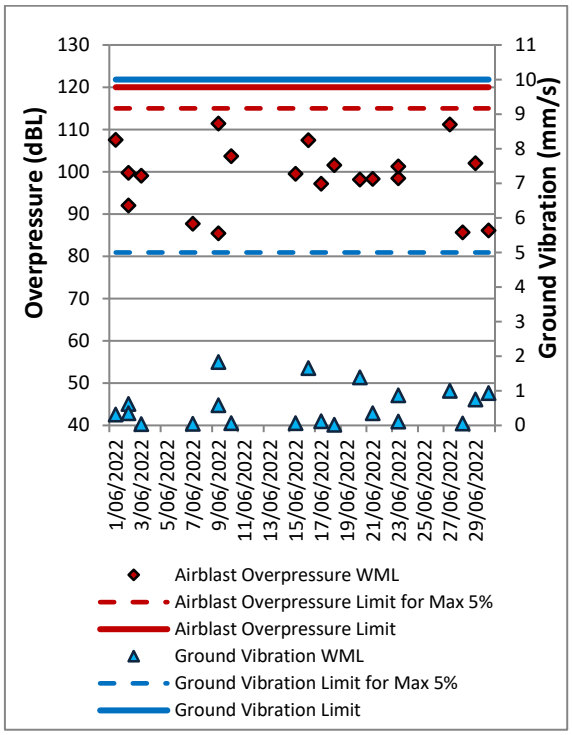


Figure 70: Wollemi Peak Road Blast Monitoring Results – June 2022

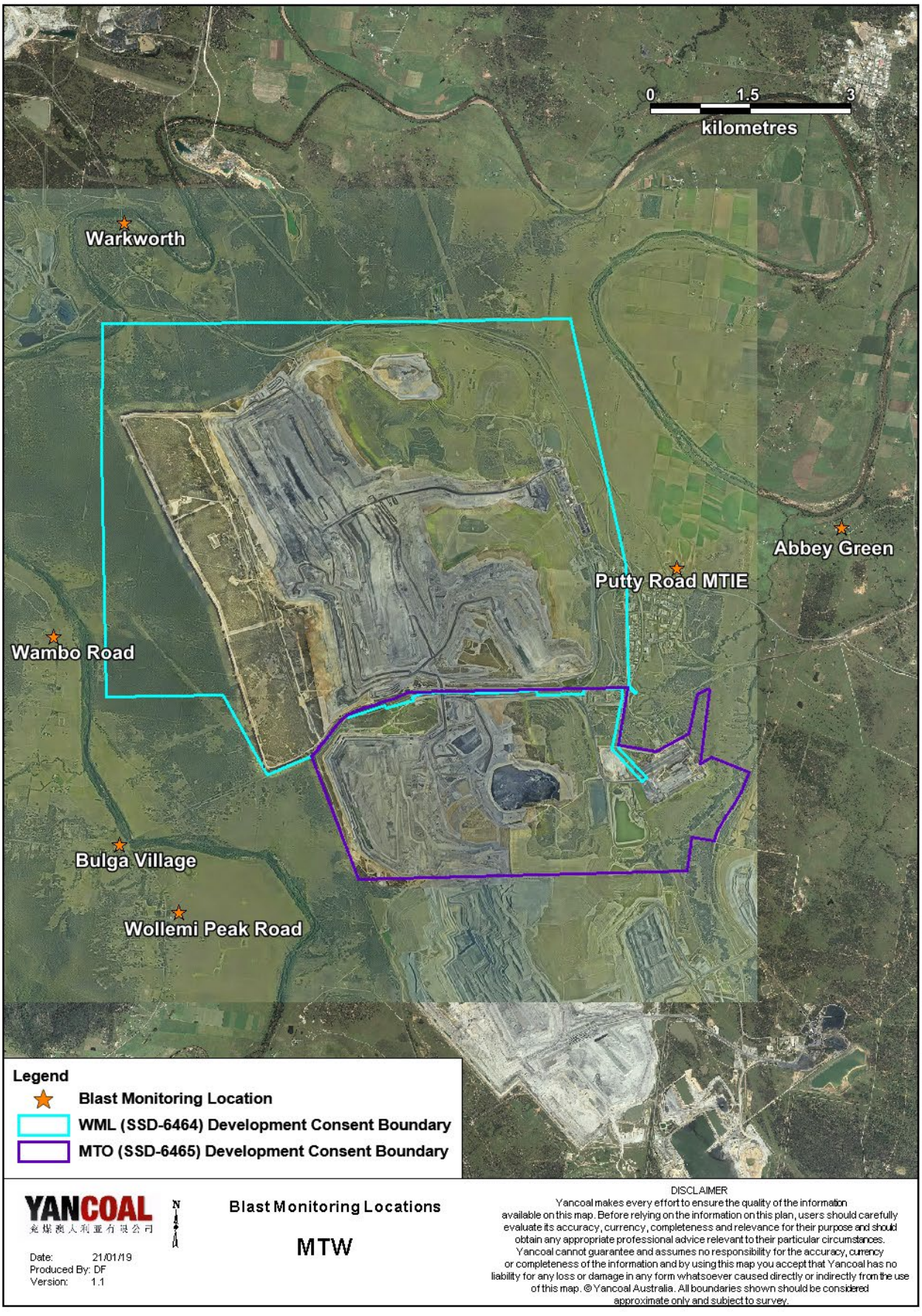


Figure 71: MTW Blast Monitoring Location Plan

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. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Real time noise monitoring also occurs at five sites surrounding MTW. Noise monitoring locations are displayed in **Figure 74**.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 20th June 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 **Tables 5** and **6**.

Table 5: $L_{Aeq,\ 15\ minute}$ Warkworth Impact Assessment Criteria – June 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[3,4]
Bulga RFS	20/06/2022 23:14	1.6	E	37	Yes	31	Nil
Bulga Village	20/06/2022 22:25	1.2	D	38	Yes	35	Nil
Gouldsville	20/06/2022 21:22	2.1	E	38	Yes	IA	Nil
Inlet Rd	20/06/2022 21:26	2.1	E	37	Yes	37	Nil
Inlet Rd West	20/06/2022 21:00	2.3	D	35	Yes	31	Nil
Long Point	20/06/2022 21:00	2.3	D	35	Yes	IA	Nil
South Bulga	21/06/2022 0:09	2.5	D	35	Yes	31	Nil
Wambo Road	20/06/2022 21:57	1.9	D	38	Yes	33	Nil

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 – June 2022

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB(A)	Criterion Applies?[1]	WML $L_{A1,\ 1min}$ dB[2,3,4]	Exceedance[3,4]
Bulga RFS	20/06/2022 23:14	1.6	E	47	Yes	33	Nil
Bulga Village	20/06/2022 22:25	1.2	D	48	Yes	38	Nil
Gouldsville	20/06/2022 21:22	2.1	E	48	Yes	IA	Nil
Inlet Rd	20/06/2022 21:26	2.1	E	47	Yes	37	Nil
Inlet Rd West	20/06/2022 21:00	2.3	D	45	Yes	34	Nil
Long Point	20/06/2022 21:00	2.3	D	45	Yes	IA	Nil
South Bulga	21/06/2022 0:09	2.5	D	45	Yes	34	Nil
Wambo Road	20/06/2022 21:57	1.9	D	48	Yes	37	Nil

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 **8**.

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

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB	Criterion Applies?[1]	MTO L_{Aeq} dB[2,3,4]	Exceedance[3,4]
Bulga RFS	20/06/2022 23:14	1.6	E	37	Yes	IA	Nil
Bulga Village	20/06/2022 22:25	1.2	D	38	Yes	IA	Nil
Gouldsville	20/06/2022 21:22	2.1	E	35	Yes	<25	Nil
Inlet Rd	20/06/2022 21:26	2.1	E	37	Yes	IA	Nil
Inlet Rd West	20/06/2022 21:00	2.3	D	35	Yes	IA	Nil
Long Point	20/06/2022 21:00	2.3	D	35	Yes	IA	Nil
South Bulga	21/06/2022 0:09	2.5	D	36	Yes	IA	Nil
Wambo Road	20/06/2022 21:57	1.9	D	38	Yes	IA	Nil

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 - Impact Assessment Criteria – June 2022

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB	Criterion Applies?[1]	MTO $L_{A1, 1min}$ dB[2,3,4]	Exceedance[3,4]
Bulga RFS	20/06/2022 23:14	1.6	E	47	Yes	IA	Nil
Bulga Village	20/06/2022 22:25	1.2	D	48	Yes	IA	Nil
Gouldsville	20/06/2022 21:22	2.1	E	45	Yes	<25	Nil
Inlet Rd	20/06/2022 21:26	2.1	E	47	Yes	IA	Nil
Inlet Rd West	20/06/2022 21:00	2.3	D	45	Yes	IA	Nil
Long Point	20/06/2022 21:00	2.3	D	45	Yes	IA	Nil
South Bulga	21/06/2022 0:09	2.5	D	46	Yes	IA	Nil
Wambo Road	20/06/2022 21:57	1.9	D	48	Yes	IA	Nil

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 NPfI Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification factor corrections has been assessed. There were no noise measurements taken during the reporting period which required the penalty to be applied. The WML assessment for low frequency noise is shown in **Table 9** and the MTO assessment for low frequency noise is shown in **Table 10.**

Table 9: Warkworth Low Frequency Noise Assessment – June 2022

Location	Date and Time	Measured WML LAeq dB	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality[1]	Low-frequency Modifying Factor?	Maximum Exceedance of Reference Spectrum [1,2]	Penalty dB[2]
Bulga RFS	20/06/2022 23:14	31	Yes	No	No	NA	No	NA	Nil
Bulga Village	20/06/2022 22:25	33	Yes	No	No	NA	Yes	**2 dB @ 80 Hz**	**+ 2**
Gouldsville	20/06/2022 21:22	IA	Yes	NA	NA	NA	No	NA	Nil
Inlet Rd	20/06/2022 21:26	35	Yes	No	No	NA	Yes	**2 dB @ 80 Hz**	**+ 2**
Inlet Rd West	20/06/2022 21:00	31	Yes	No	No	NA	No	NA	Nil
Long Point	20/06/2022 21:00	IA	Yes	NA	NA	NA	No	NA	Nil
South Bulga	21/06/2022 0:09	31	Yes	No	No	NA	No	NA	Nil
Wambo Road	20/06/2022 21:57	33	Yes	No	No	NA	No	NA	Nil

Notes:
1. NA denotes 'not applicable'; and
2. Bold results indicate that application of NPfI modifying factor/s is required.

Table 10: Mount Thorley Operations Low Frequency Noise Assessment – June 2022

Location	Date and Time	Measured WML LAeq dB	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality[1]	Low-frequency Modifying Factor?	Maximum Exceedance of Reference Spectrum [1,2]	Penalty dB[2]
Bulga RFS	20/06/2022 23:14	IA	Yes	No	No	NA	No	NA	NA
Bulga Village	20/06/2022 22:25	IA	Yes	No	No	NA	No	NA	NA
Gouldsville	20/06/2022 21:22	<25	Yes	No	No	NA	No	NA	Nil
Inlet Rd	20/06/2022 21:26	IA	Yes	No	No	NA	No	NA	NA
Inlet Rd West	20/06/2022 21:00	IA	Yes	No	No	NA	No	NA	NA
Long Point	20/06/2022 21:00	IA	Yes	No	No	NA	No	NA	NA
South Bulga	21/06/2022 0:09	IA	Yes	No	No	NA	No	NA	NA
Wambo Road	20/06/2022 21:57	IA	Yes	No	No	NA	No	NA	NA

Notes:
1. NA denotes 'not applicable'; and
2. Bold results indicate that application of NPfI modifying factor/s is required.

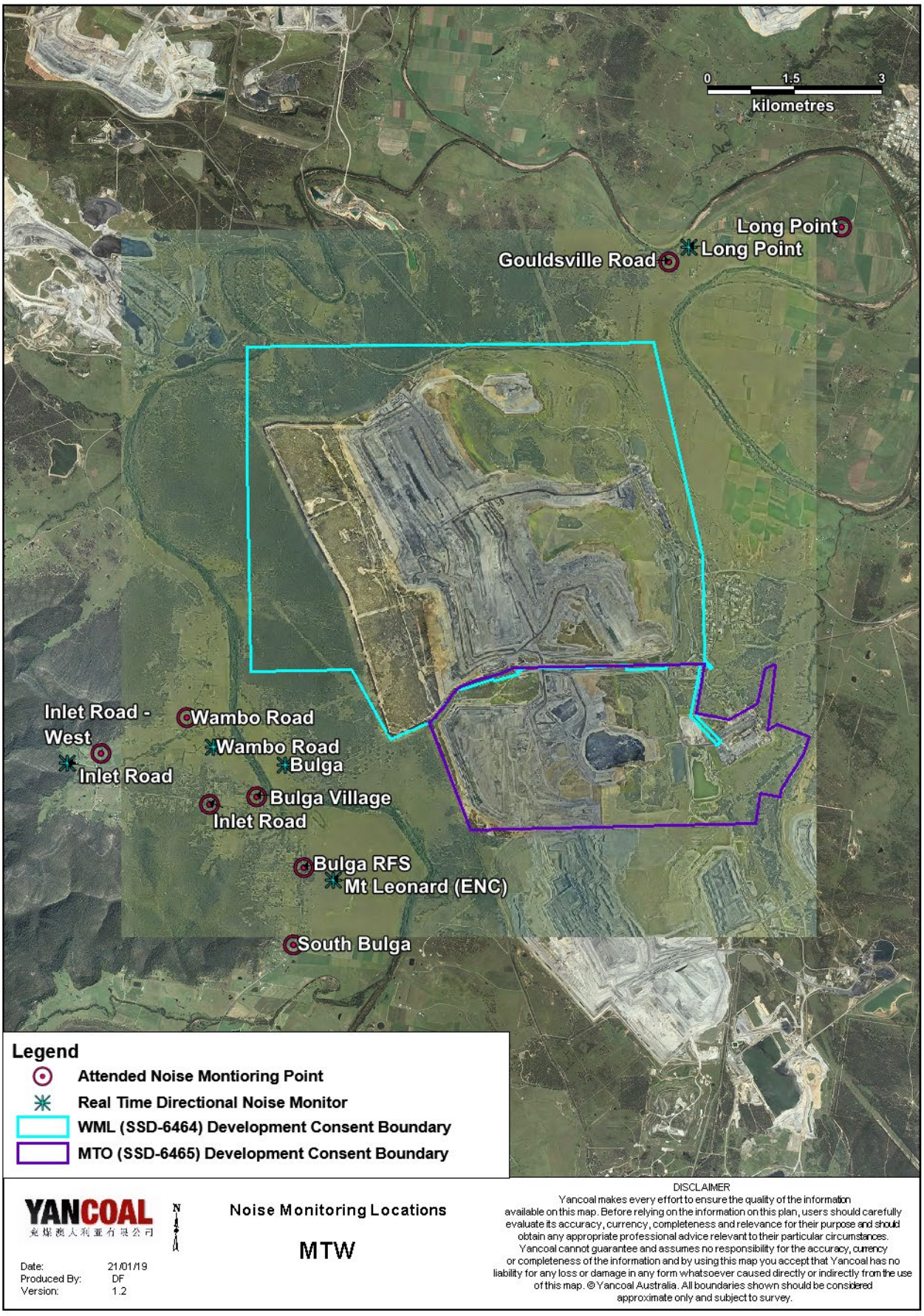


Figure 72: Noise Monitoring Location Plan

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 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 are provided in **Table 11**.

Table 11: Supplementary Attended Noise Monitoring Data – June 2022

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
607	4	3	0.65

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

6.0 OPERATIONAL DOWNTIME

During June, a total of 116 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 75**.

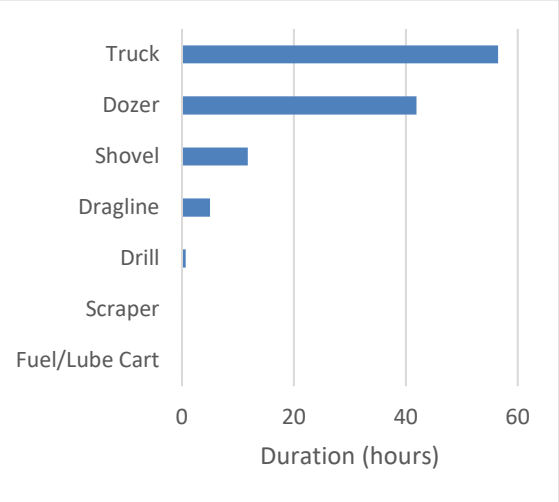


Figure 73: Operational Downtime by Equipment Type –June 2022

7.0 REHABILITATION

During June 2022, 4.4 Ha of land was released, 0.96 Ha was bulk shaped, 7.8 Ha was topsoiled, 4.15 Ha was composted and 6.66 Ha was rehabilitated.

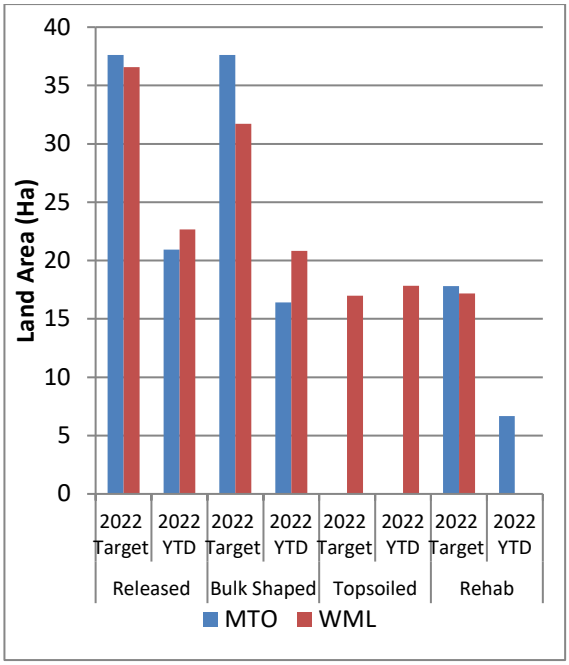


Figure 74: Rehabilitation YTD - June 2022

8.0 ENVIRONMENTAL INCIDENTS

There were no environmental incidents recorded during the reporting period.

9.0 COMPLAINTS

6 complaints were received during the reporting period. Details of these complaints are shown in **Table 12** below.

Table 12: Complaints Summary YTD

	Noise	Dust	Blast	Lighting	Other	Total
January	2	1	4	0	0	7
February	8	0	5	0	1	14
March	8	0	3	0	0	11
April	1	0	7	6	0	14
May	4	0	6	1	0	11
June	0	1	4	1	0	6
July						
August						
September						
October						
November						
December						
Total	23	2	29	8	1	63

Appendix A: Meteorological Data

Table 13: Meteorological Data – Charlton Ridge Meteorological Station – June 2022

Date	Air Temperature		Relative Humidity		Wind Direction	Wind Speed	Rainfall
	Maximum (°C)	Minimum (°C)	Maximum (%)	Minimum (%)	Average (°)	Average (m/sec)	total (mm)
1/06/2022	14	2	83	36	294	4.7	0.0
2/06/2022	15	-1	99	51	262	2.2	0.0
3/06/2022	14	-2	100	62	238	1.7	8.4
4/06/2022	15	1	100	56	293	4.0	0.4
5/06/2022	16	2	90	53	265	3.3	0.0
6/06/2022	15	3	94	46	286	5.4	0.4
7/06/2022	16	2	85	42	296	4.8	0.0
8/06/2022	14	0	91	48	294	4.0	0.0
9/06/2022	15	-1	82	40	304	3.9	0.0
10/06/2022	17	1	90	40	301	4.0	0.0
11/06/2022	17	-1	99	41	303	3.7	0.0
12/06/2022	17	1	79	40	297	4.7	0.0
13/06/2022	17	-3	100	41	220	1.8	0.0
14/06/2022	17	0	98	46	236	1.9	0.0
15/06/2022	19	-2	100	32	278	2.3	0.0
16/06/2022	20	2	92	40	285	2.8	0.0
17/06/2022	19	1	100	49	260	2.3	0.0
18/06/2022	18	2	99	54	232	2.2	0.0
19/06/2022	18	5	97	60	181	2.6	0.0
20/06/2022	18	3	100	51	195	2.2	1.0
21/06/2022	20	0	100	50	262	2.3	0.0
22/06/2022	18	2	96	36	242	1.9	0.0
23/06/2022	18	-1	97	49	302	2.7	0.0
24/06/2022	19	1	95	42	295	3.3	0.0
25/06/2022	20	2	91	40	287	3.1	0.0
26/06/2022	20	0	100	41	271	2.3	0.0
27/06/2022	16	2	86	43	223	2.6	0.0
28/06/2022	15	-1	96	55	182	2.8	0.0
29/06/2022	16	1	100	55	237	1.9	0.0
30/06/2022	18	2	97	51	222	1.4	0.0