



# Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

June 2018

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## Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	30/07/2018
1.1	Environmental Specialist	Final	31/07/2018

## 1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mt Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1<sup>st</sup> June to 30<sup>th</sup> June 2018.

## 2.0 AIR QUALITY

### 2.1 Meteorological Monitoring

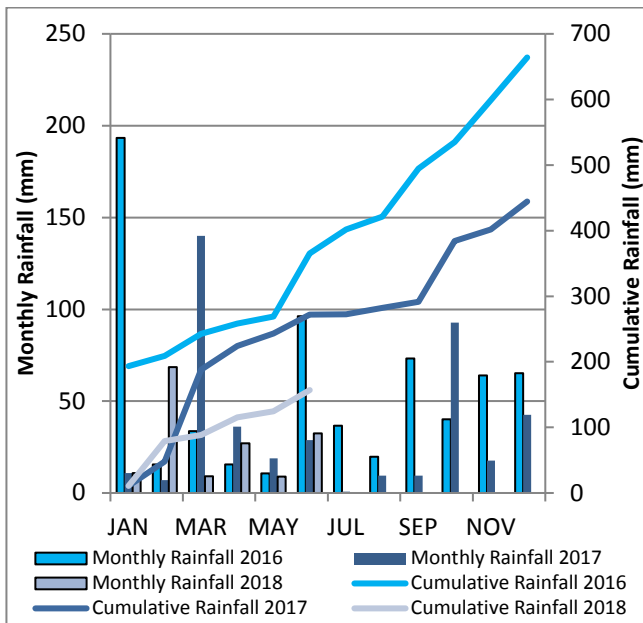
Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to **Figure 3: Air Quality Monitoring Locations**).

#### 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**

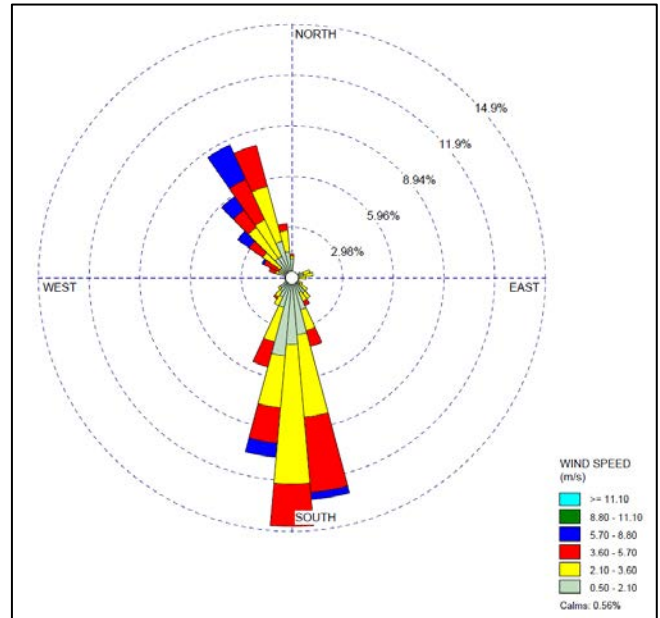
2018	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
June	32.4	156.9



**Figure 1: Rainfall Trends YTD**

### 2.1.2 Wind Speed and Direction

Winds from the South were dominant throughout the reporting period as shown in **Figure 2**.



**Figure 2: Charlton Ridge Wind Rose – June 2018**

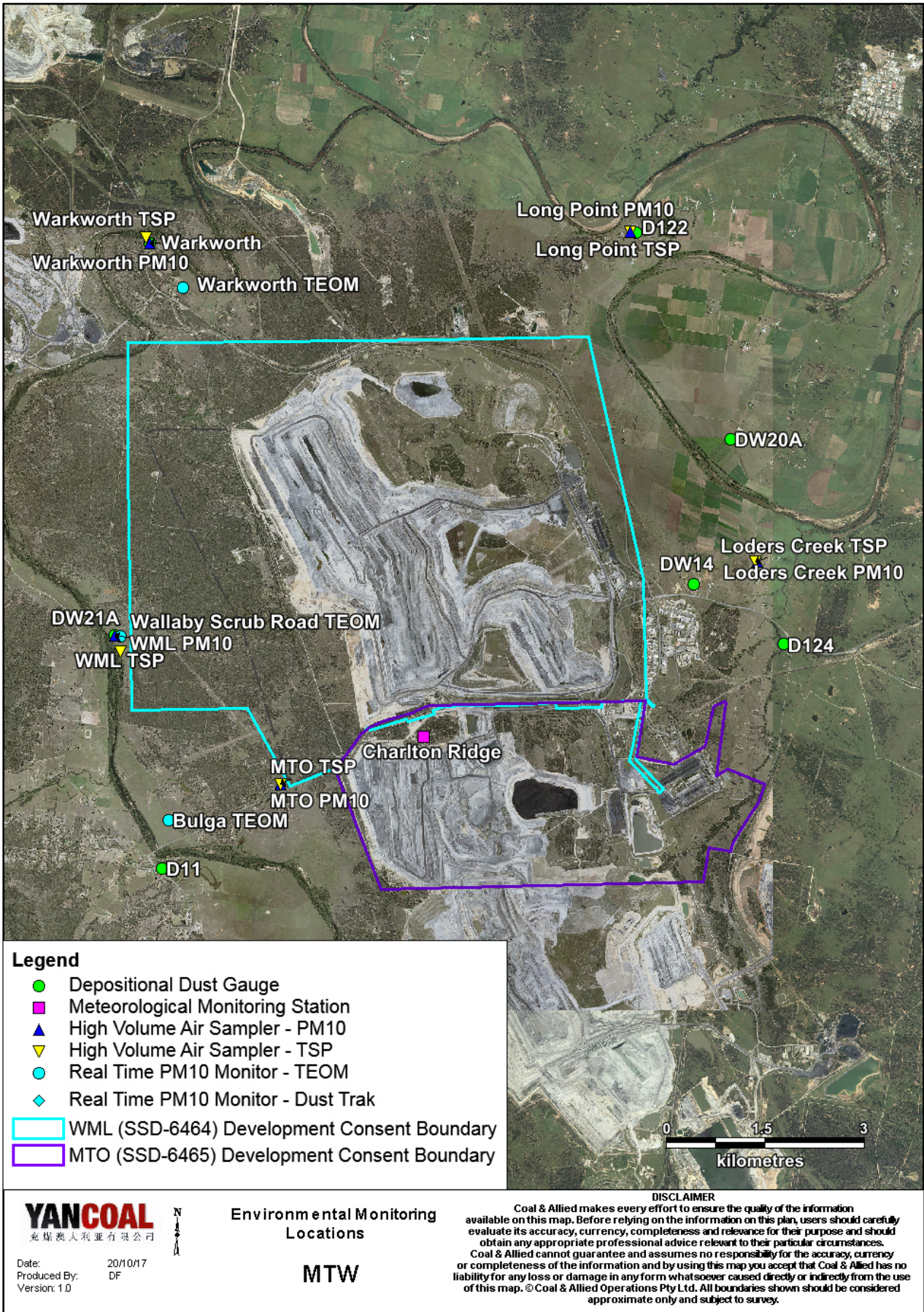


Figure 3: Air Quality Monitoring Locations

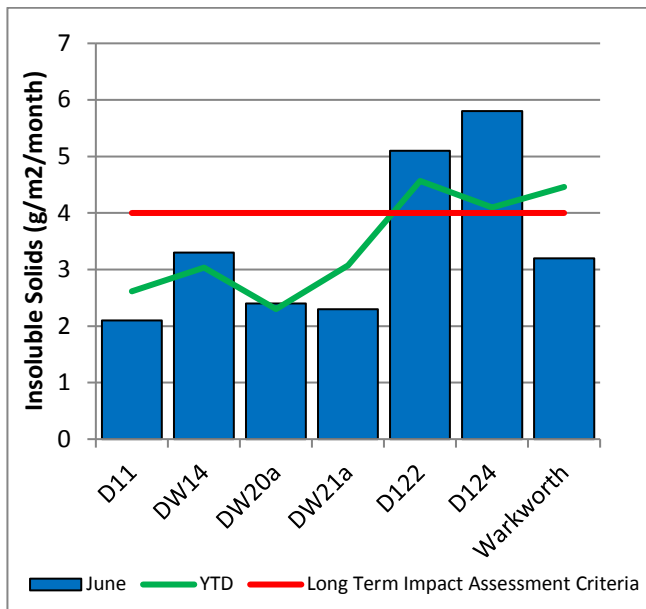
## 2.2 Depositional Dust

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.

During the reporting period the D122 and D124 monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m<sup>2</sup> per month. Field notes associated with monitor D124 result confirms the presence of insects and bird droppings. As such the result is considered contaminated and will be excluded from calculation of the annual average. There is no evidence to suggest that the D122 result is contaminated. Accordingly, the result will be included in the annual average calculation.

An assessment of MTW's contribution to the long term Impact assessment criteria will be provided in the 2018 Annual Review Report.



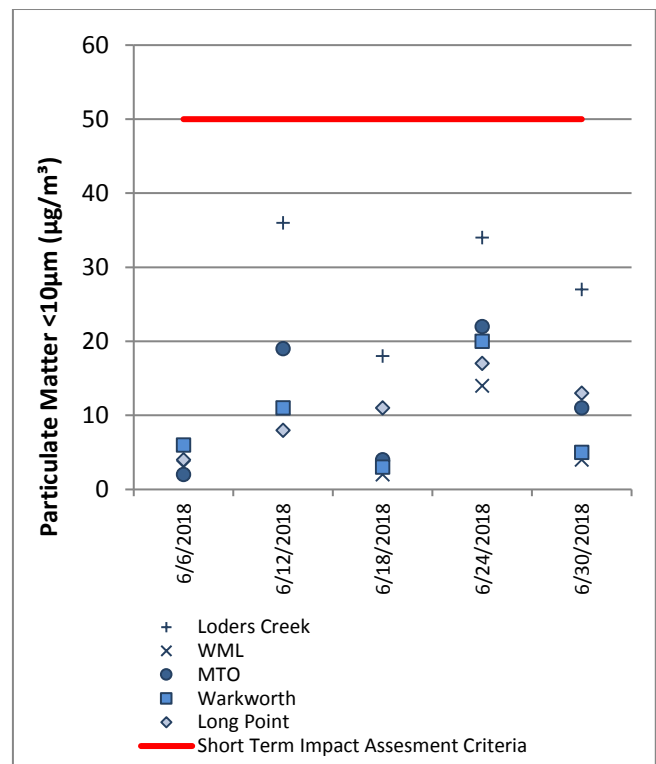
**Figure 4: Depositional Dust – June 2018**

## 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<sub>10</sub>). 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<sub>10</sub> Results

**Figure 5** shows the individual PM<sub>10</sub> results at each monitoring station against the short term impact assessment criteria of 50µg/m<sup>3</sup>.



**Figure 5: Individual PM<sub>10</sub> Results – June 2018**

**Figure 6** shows the annual average PM<sub>10</sub> results against the long term impact assessment criteria.

An assessment of MTW's contribution to the long term Impact assessment criteria will be provided in the 2018 Annual Review Report.

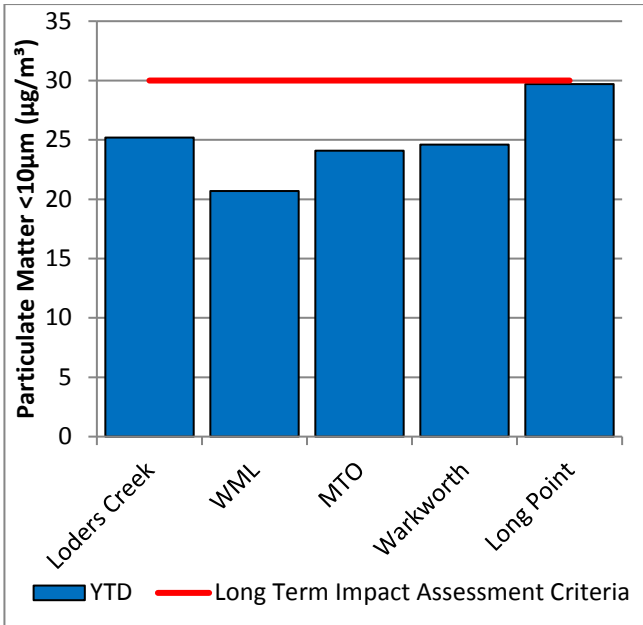


Figure 6: Annual Average PM<sub>10</sub> – June 2018

### 2.3.2 TSP Results

Figure 7 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m<sup>3</sup>.

An assessment of MTW’s contribution to the long-term assessment criteria will be reported in the 2018 Annual Review Report.

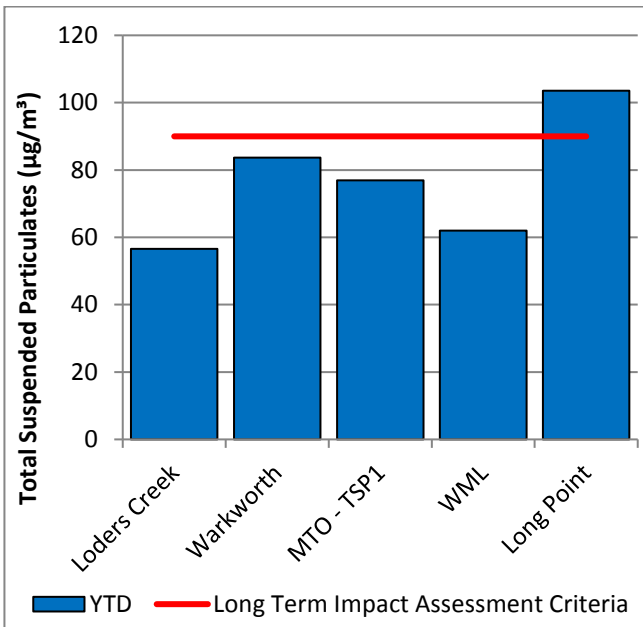


Figure 7: Annual Average Total Suspended Particulates – June 2018

### 2.3.3 Real Time PM<sub>10</sub> Results

Mt Thorley Warkworth maintains a network of real time PM<sub>10</sub> 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<sub>10</sub> result and the annual PM<sub>10</sub> average.

### 2.3.4 Real Time Alarms for Air Quality

During July, the real time monitoring system generated 52 automated air quality related alerts, including 12 alerts for adverse meteorological conditions and 40 alerts for elevated PM<sub>10</sub> levels.



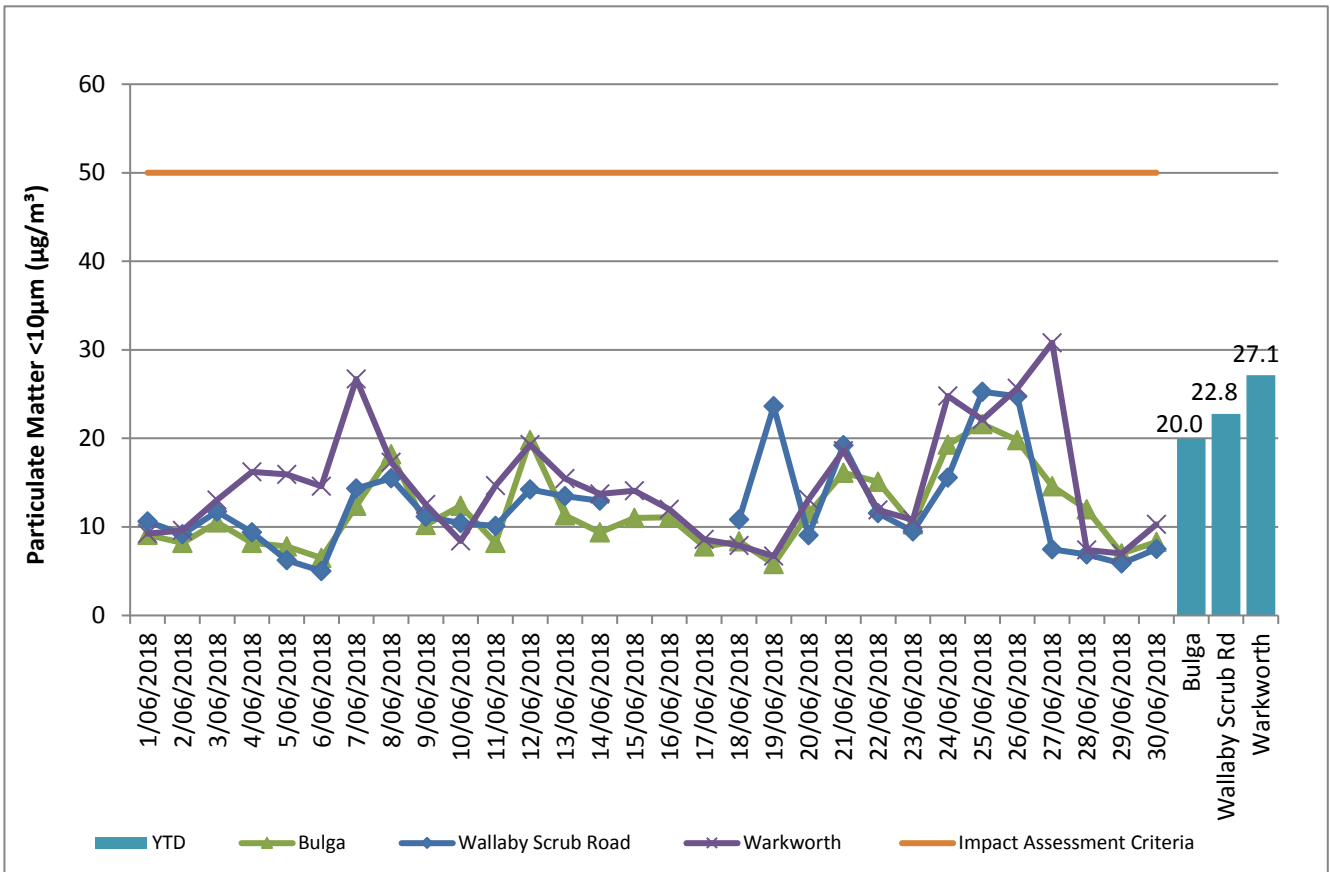


Figure 8: Real Time PM<sub>10</sub> 24hr average and Year-to-date average – June 2018

### 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 (2015 – current) within MTW mine dams. Figure 12 to Figure 14 show the long term surface water trend (2015 - current) in surrounding watercourses.

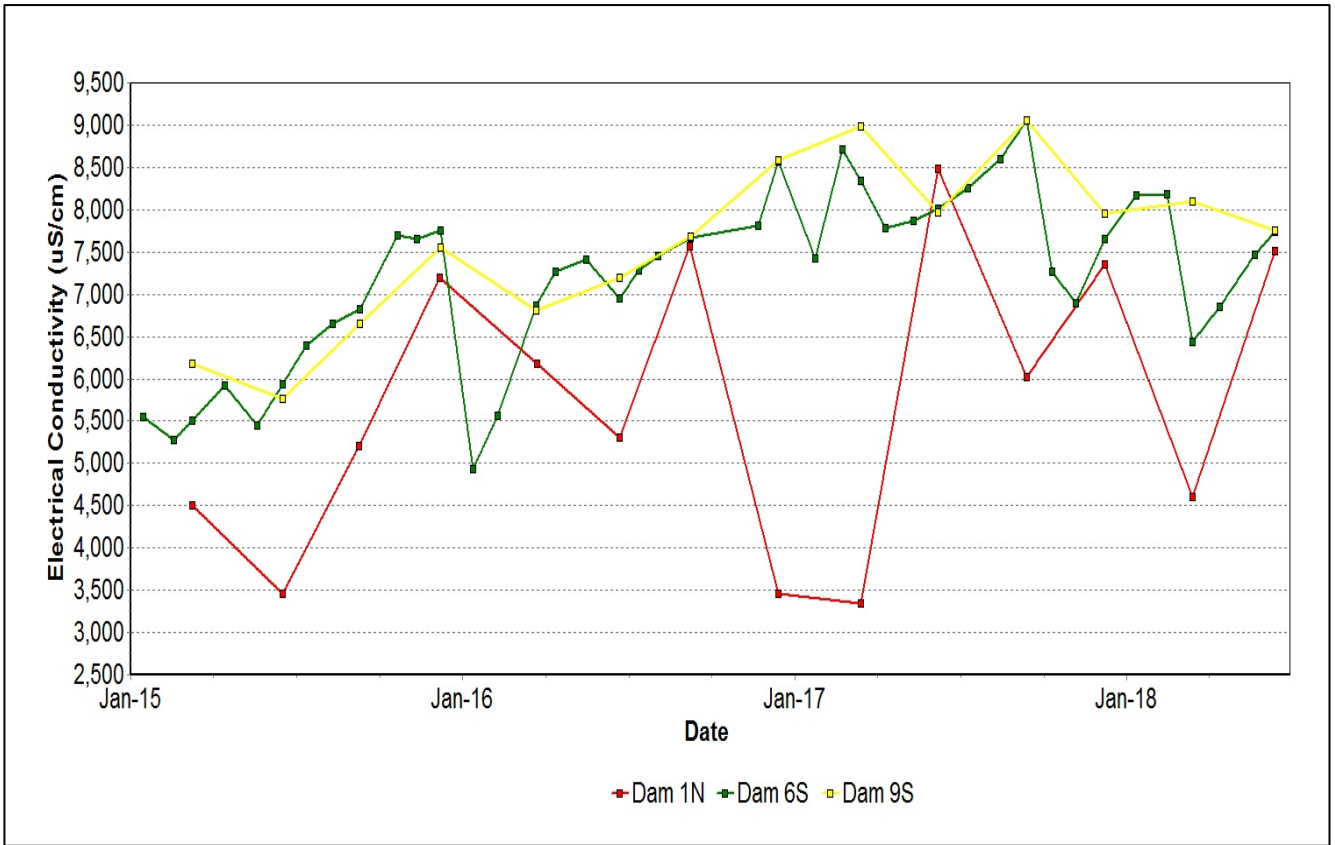


Figure 9: Site Dams Electrical Conductivity Trend – June 2018

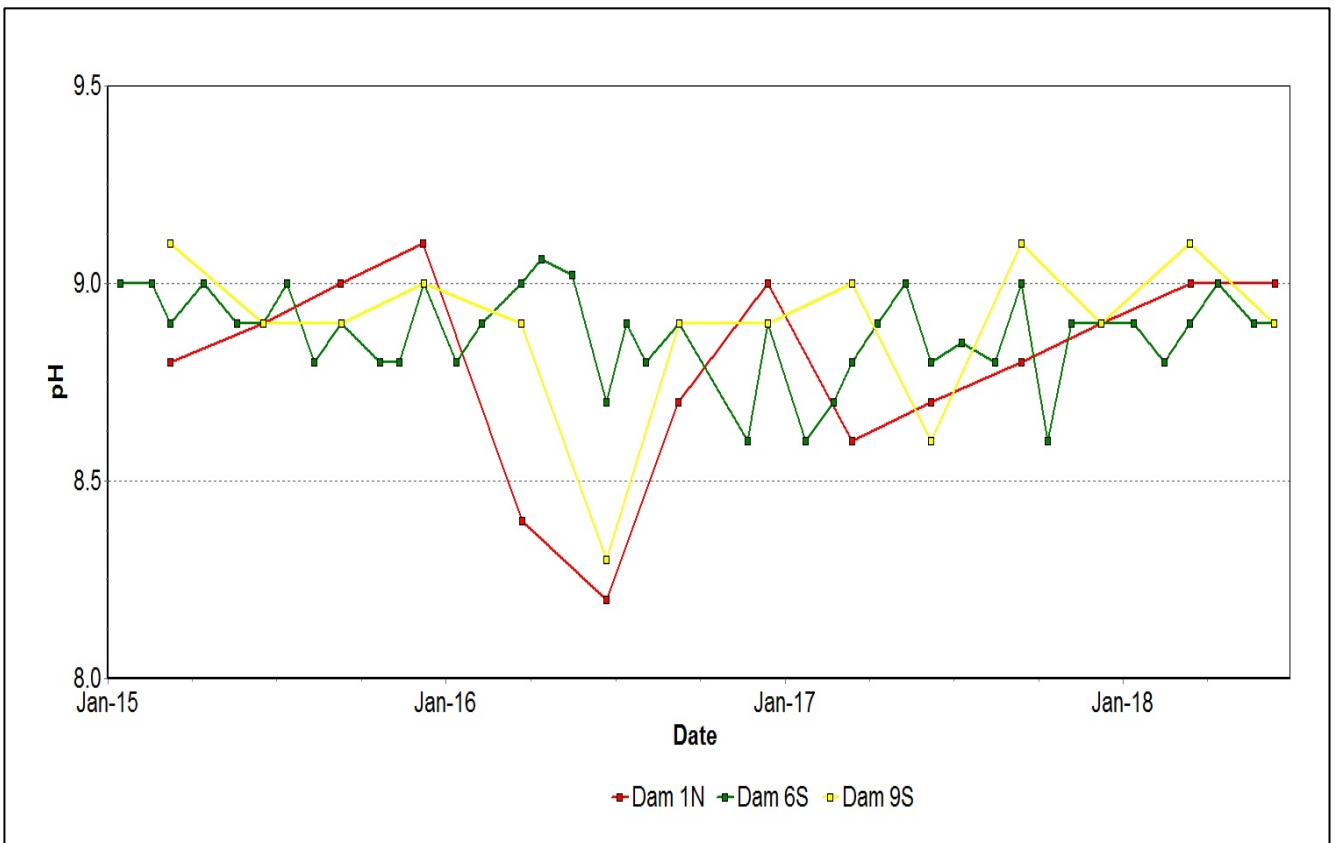


Figure 10: Site Dams pH Trend – June 2018

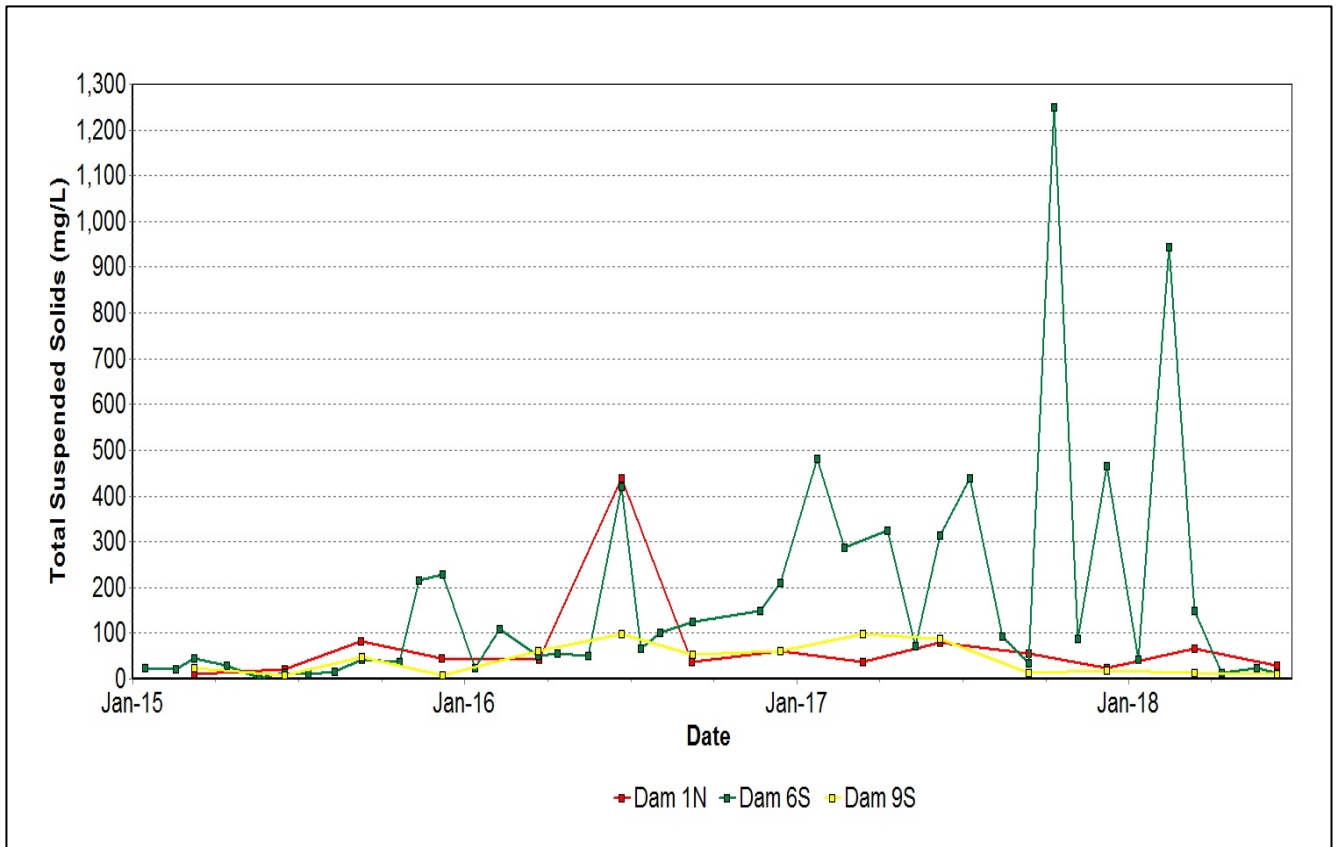


Figure 11: Site Dams Total Suspended Solids Trend – June 2018

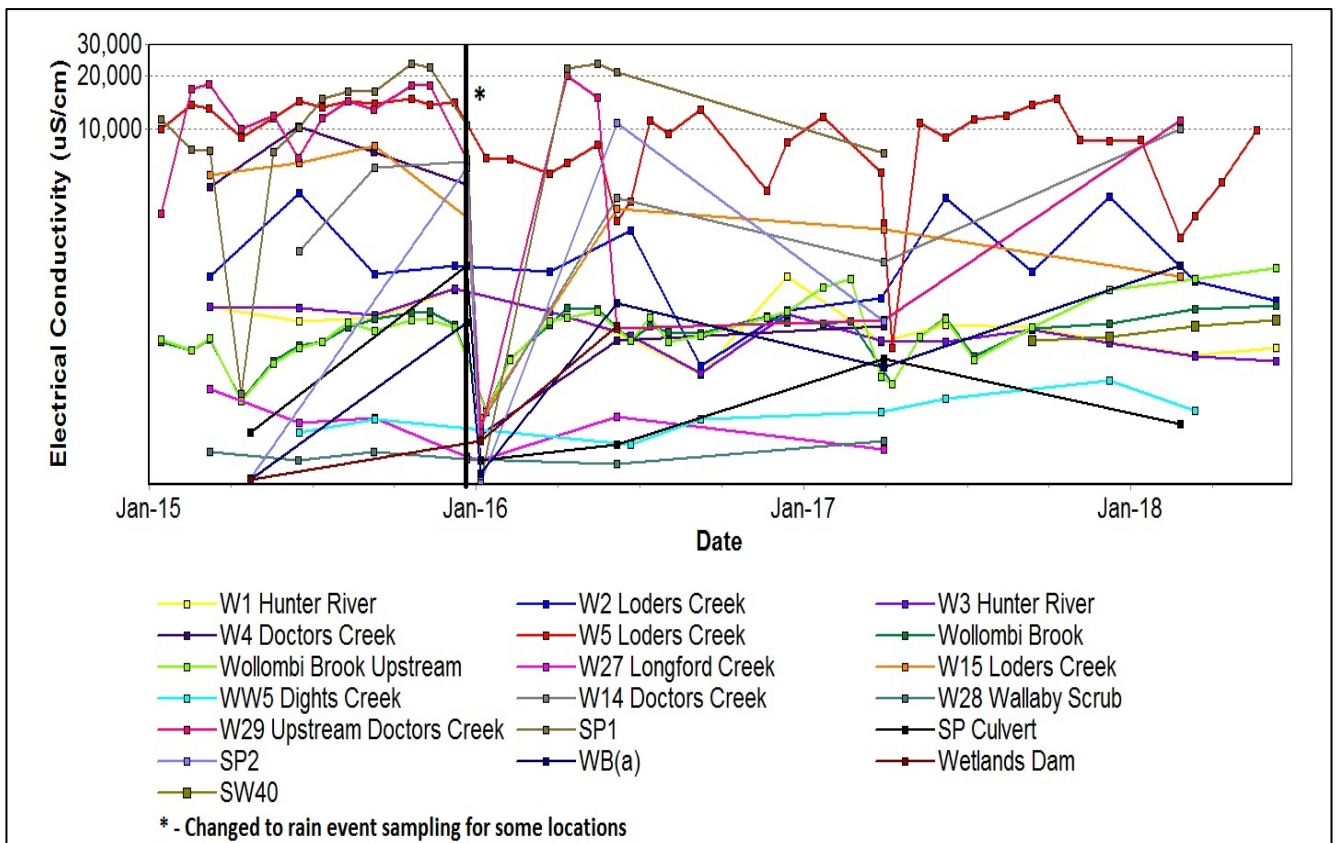


Figure 12: Watercourse Electrical Conductivity Trend – June 2018

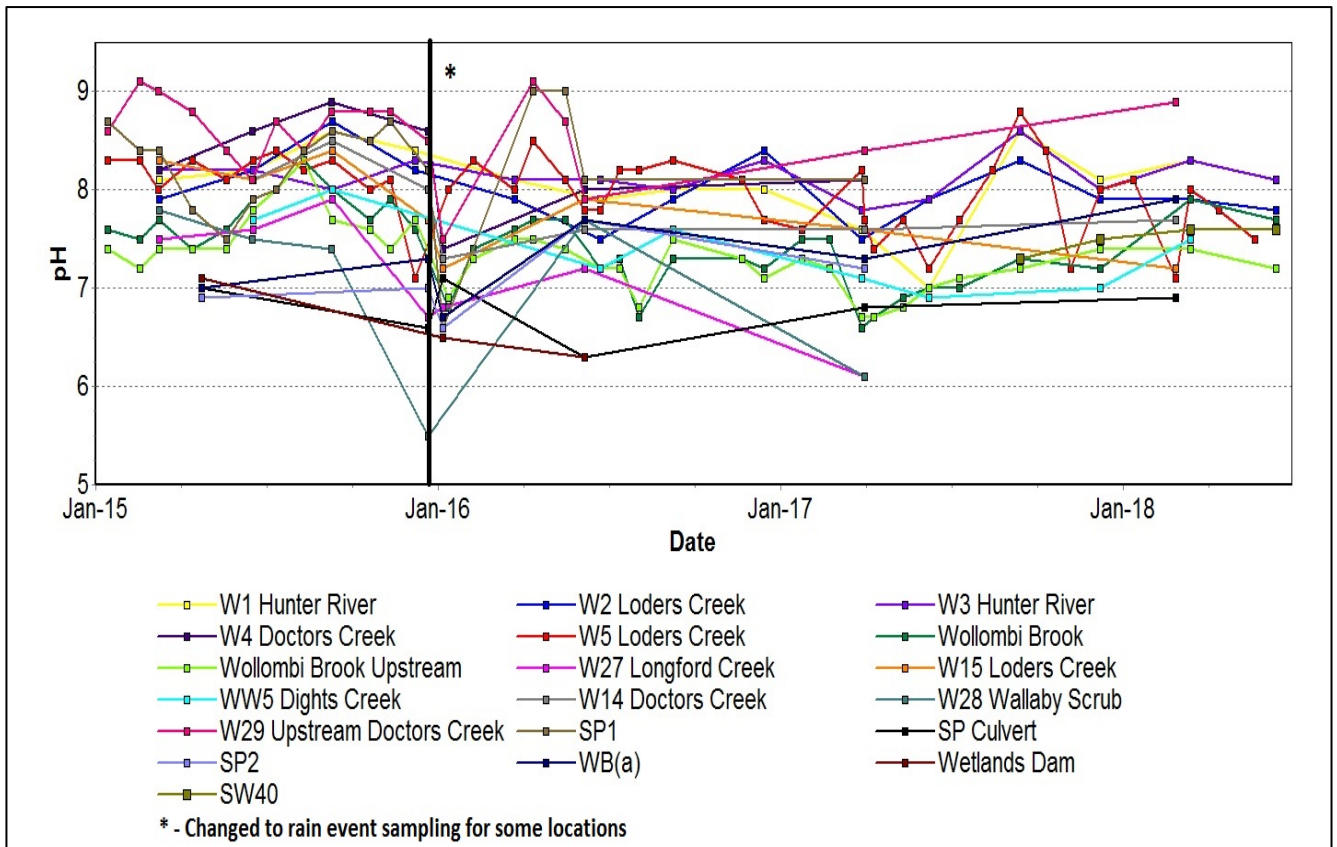


Figure 13: Watercourse pH Trend – June 2018

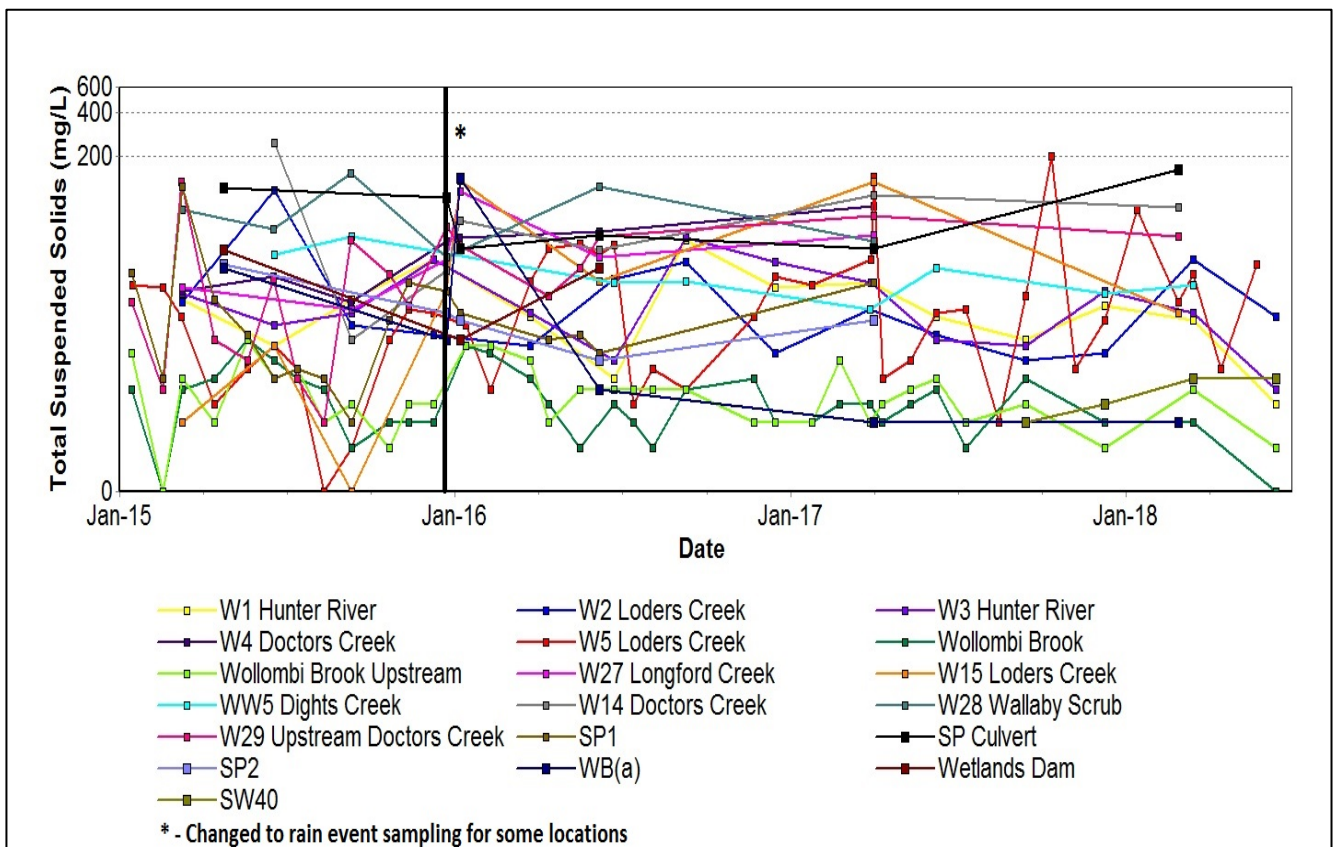


Figure 14: Watercourse Total Suspended Solids Trend – June 2018

### 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 3**.

**Table 2: Surface Water Trigger Tracking – June YTD 2018**

Site	Date	Trigger Limit Breached	Action Taken in Response
W14	26/02/2018	EC –95 <sup>th</sup> Percentile	Watching Brief*
Wollombi Brook	14/03/2018	EC –95 <sup>th</sup> Percentile	Watching Brief*
Wollombi Brook	13/06/2018	EC –95 <sup>th</sup> Percentile	Watching Brief*
Wollombi Brook Upstream	14/03/2018	EC –95 <sup>th</sup> Percentile	Watching Brief*
Wollombi Brook Upstream	13/06/2018	EC –95 <sup>th</sup> Percentile	Elevated EC is considered attributable to prolonged dry climatic conditions, and not related to mining related impacts. Continue to watch and monitor.
W5	14/02/2018	pH –5 <sup>th</sup> Percentile	Watching Brief*
W5	22/05/2018	pH –5 <sup>th</sup> Percentile	Watching Brief*
W15	26/02/2018	pH –5 <sup>th</sup> Percentile	Watching Brief*
W5	12/01/2018	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining related sources of sediment. Elevated TSS associated with high intensity rainfall event after prolonged dry period. No further action taken
W14	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining related sources of sediment. Elevated TSS associated with high intensity rainfall event after prolonged dry period. No further action taken
W29	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining related sources of sediment. Elevated TSS associated with high intensity rainfall event after prolonged dry period. No further action taken

\* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.

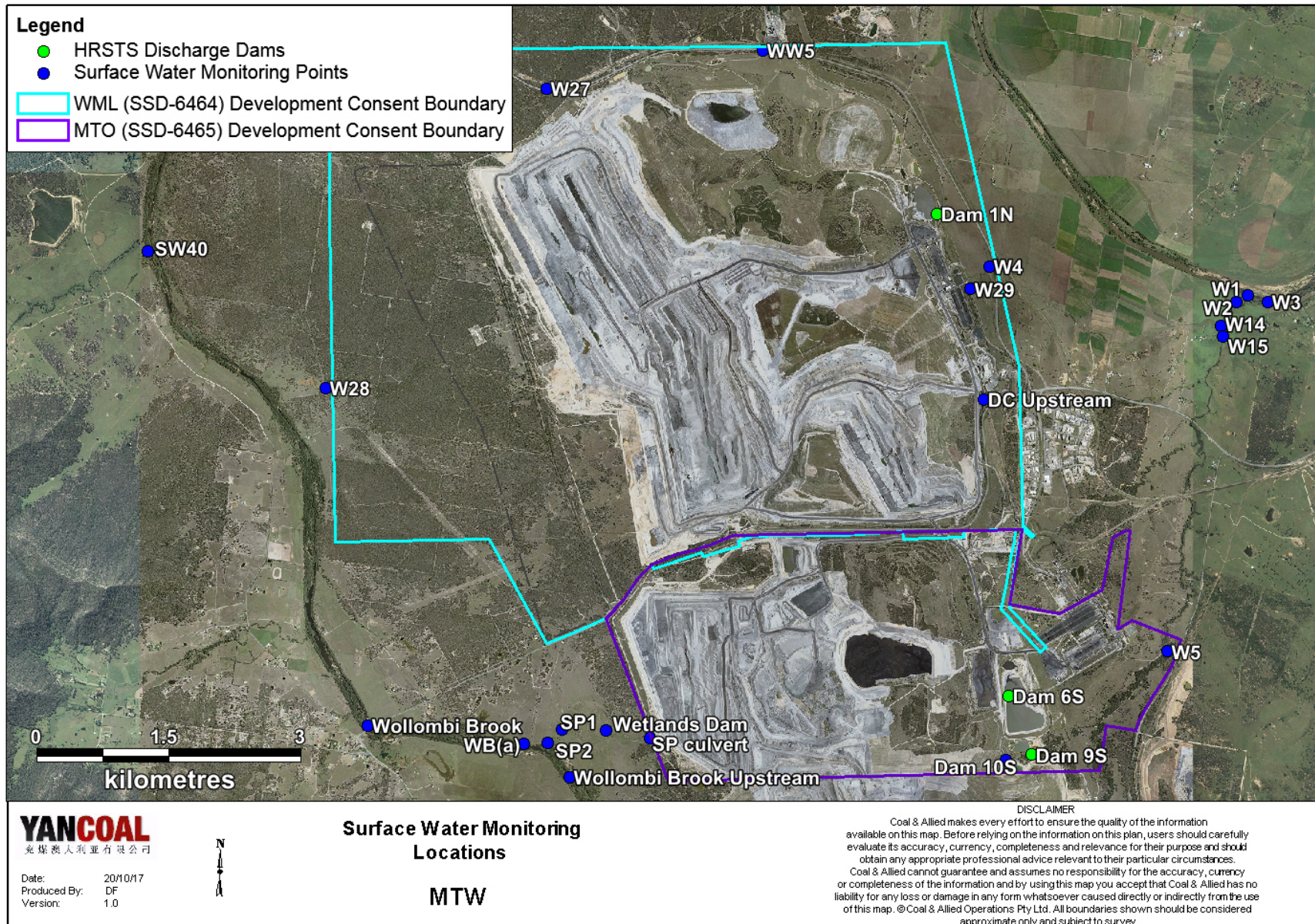


Figure 15: Surface Water Monitoring Location Plan

### 3.2 Groundwater Monitoring

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

Figure 16 to Figure 60 show the long term water quality trends (2015 – current) for groundwater bores monitored at MTW.

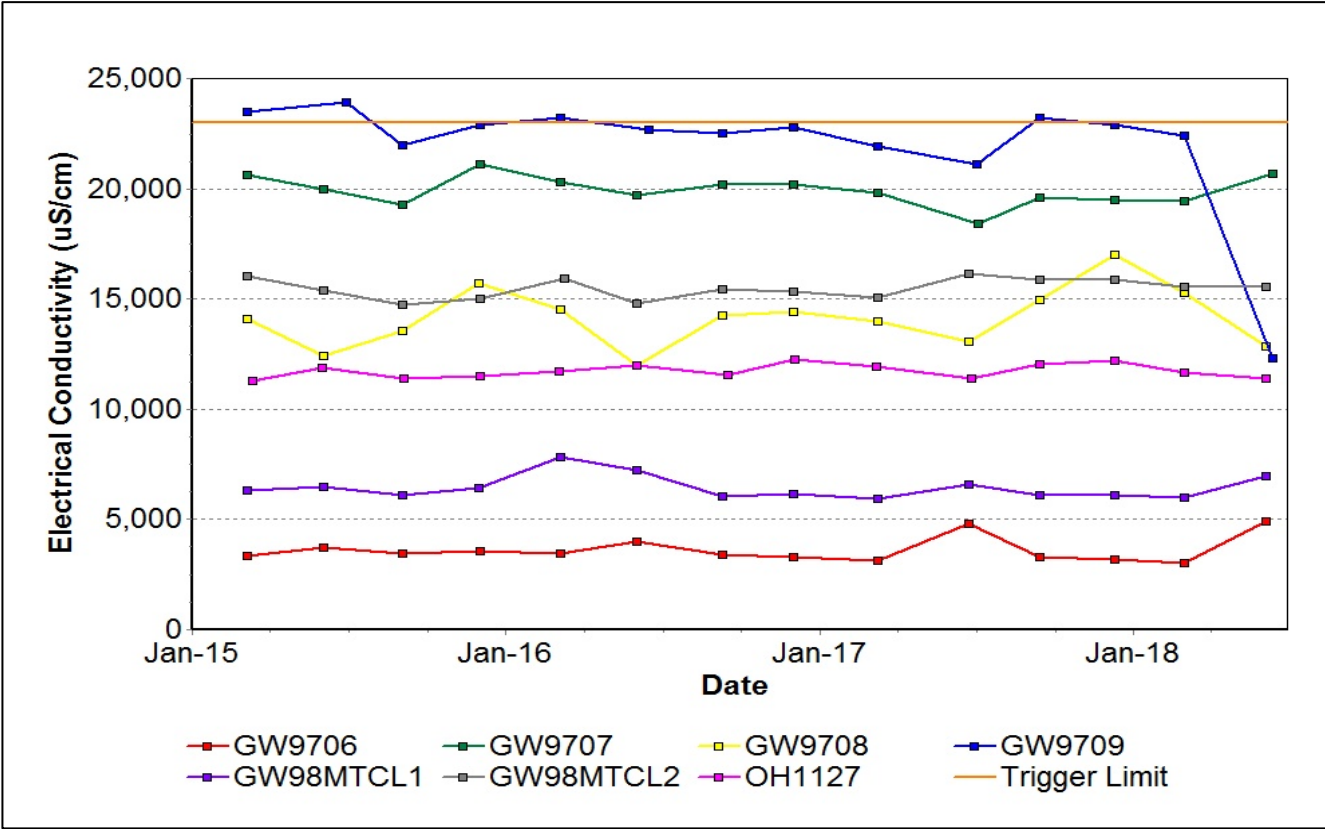


Figure 16: Bayswater Seam Electrical Conductivity Trend – June 2018

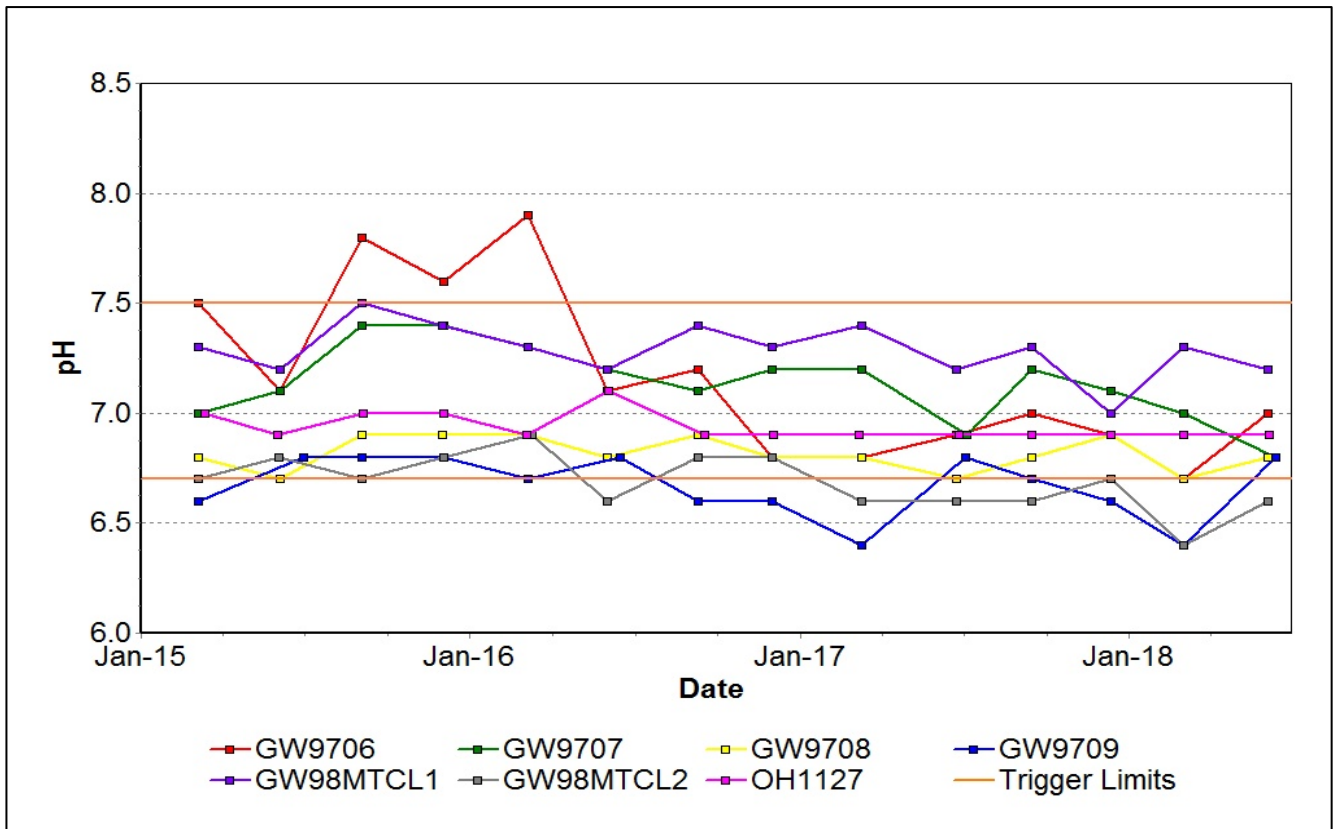


Figure 17: Bayswater Seam pH Trend – June 2018

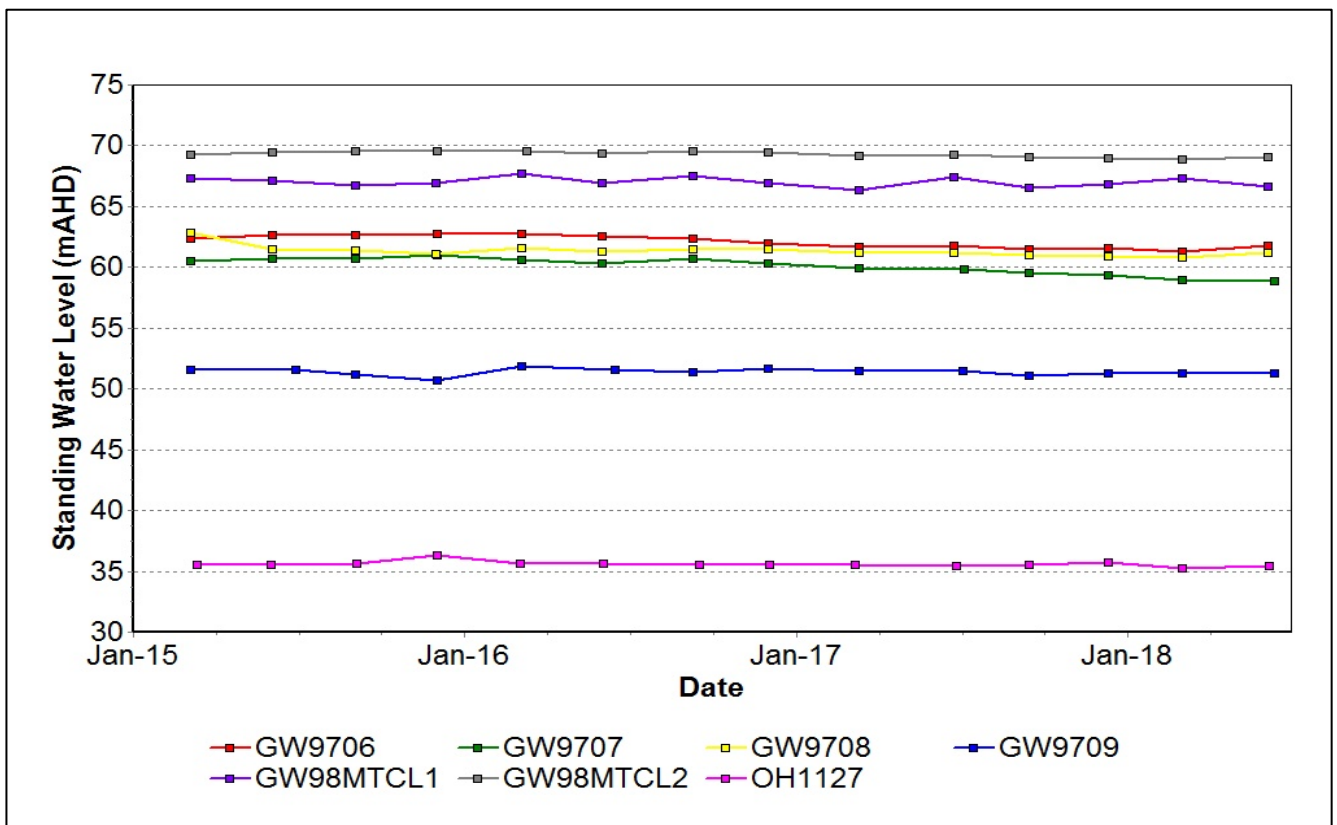


Figure 18: Bayswater Seam Standing Water Level Trend – June 2018



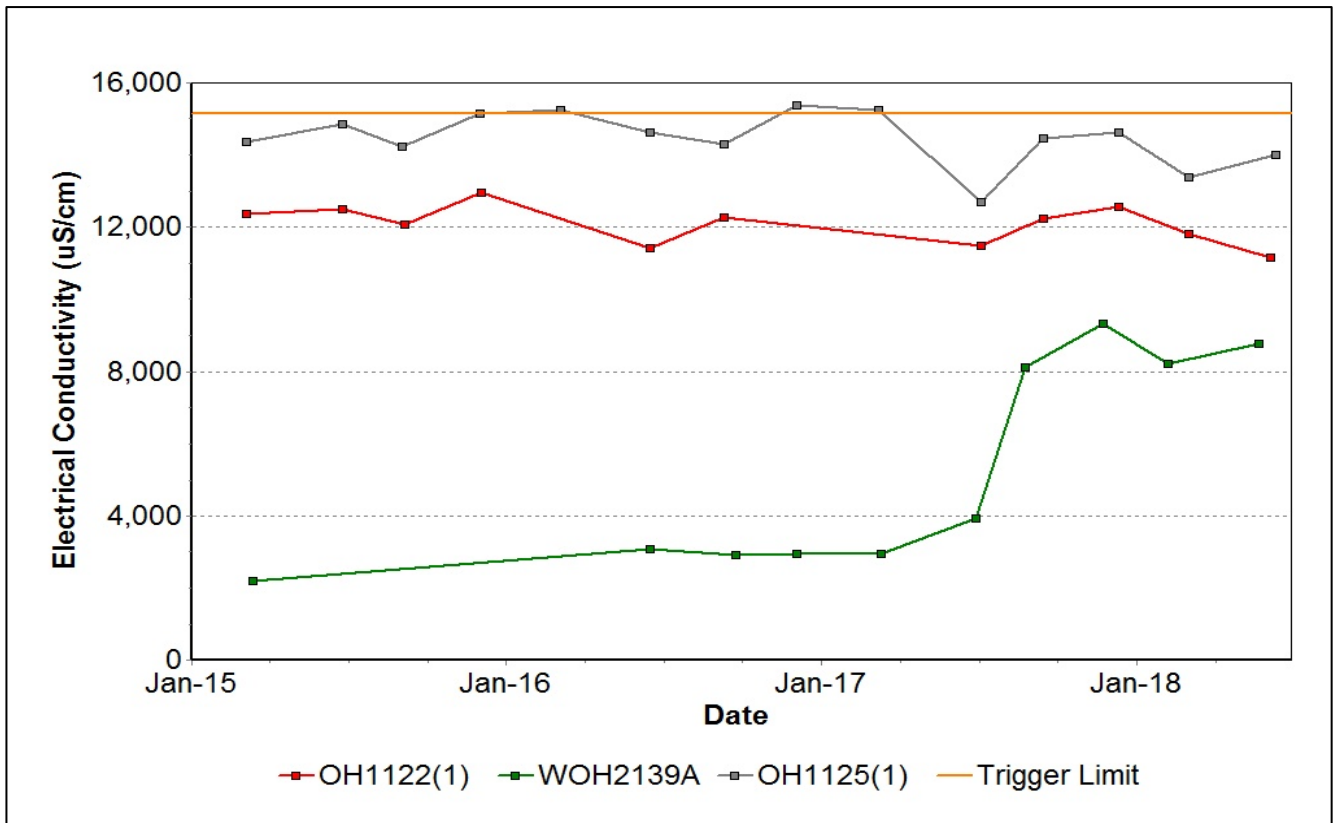


Figure 19: Blakefield Seam Electrical Conductivity Trend – June 2018

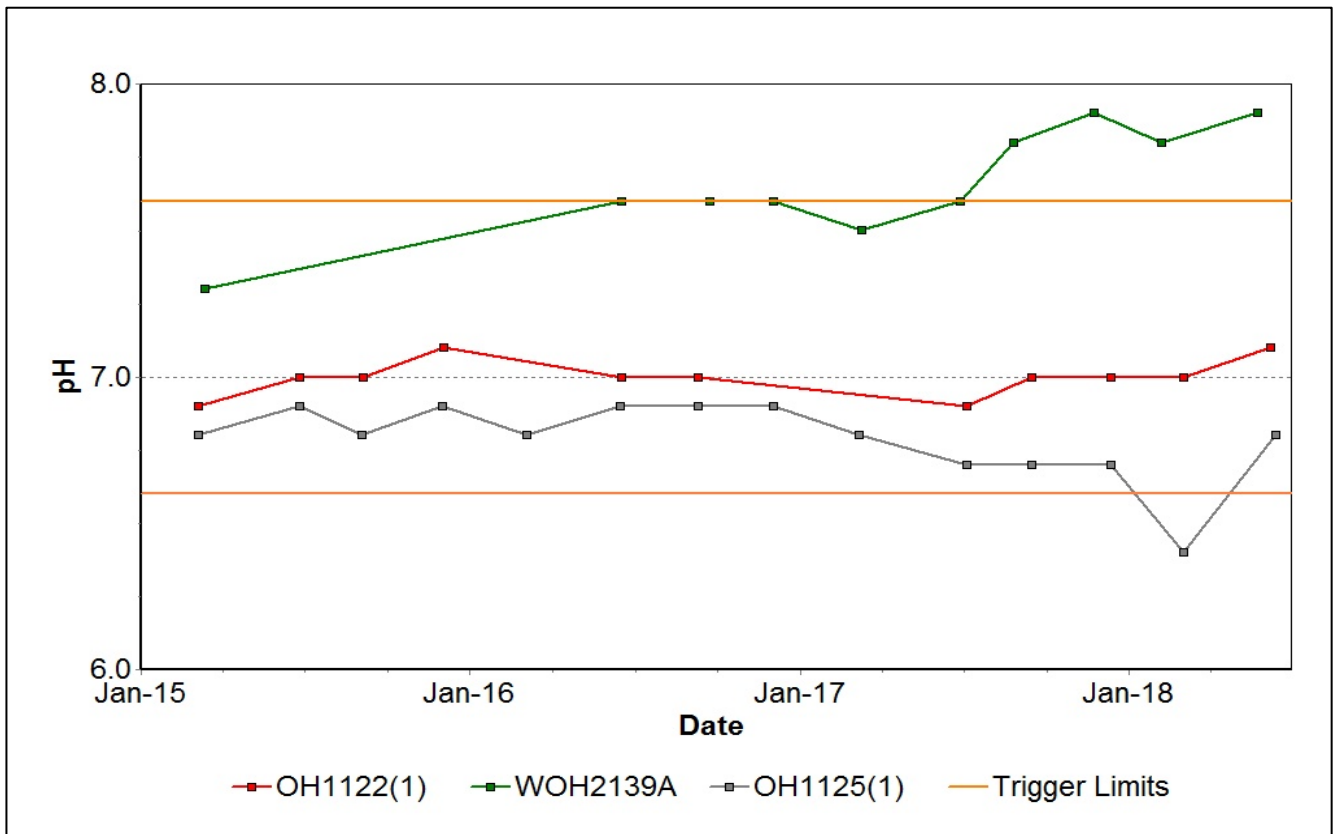


Figure 20: Blakefield Seam pH Trend – June 2018

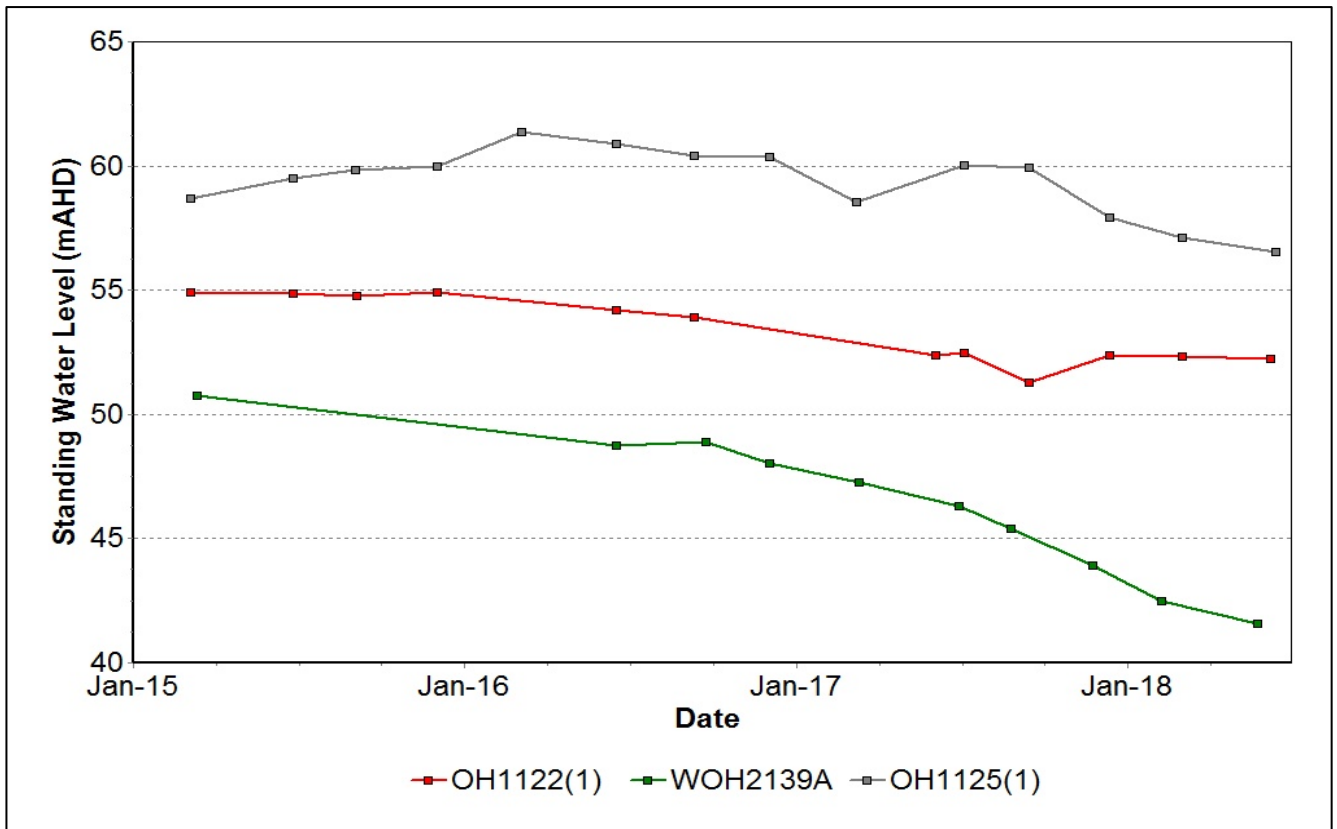


Figure 21: Blakefield Seam Standing Water Level Trend – June 2018

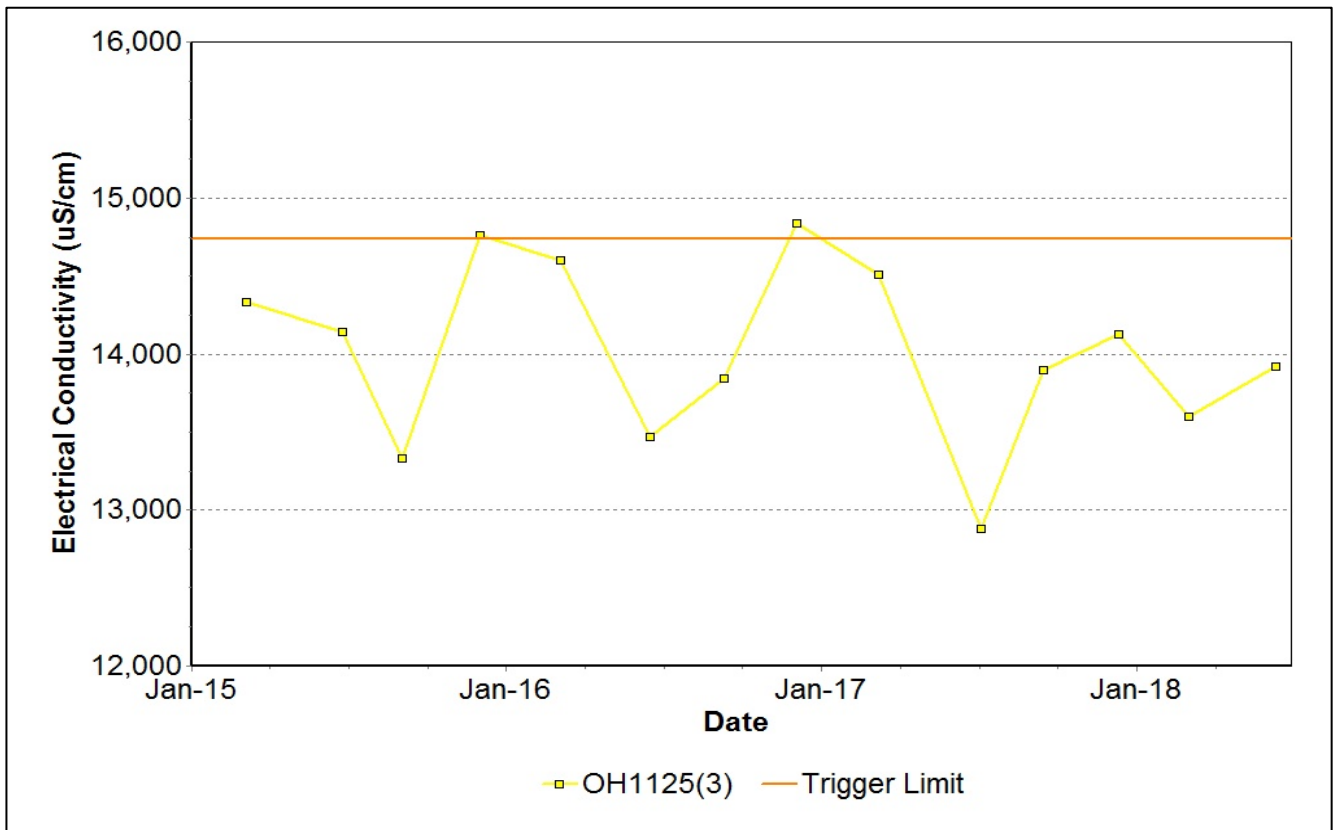


Figure 22: Bowfield Seam Electrical Conductivity Trend – June 2018

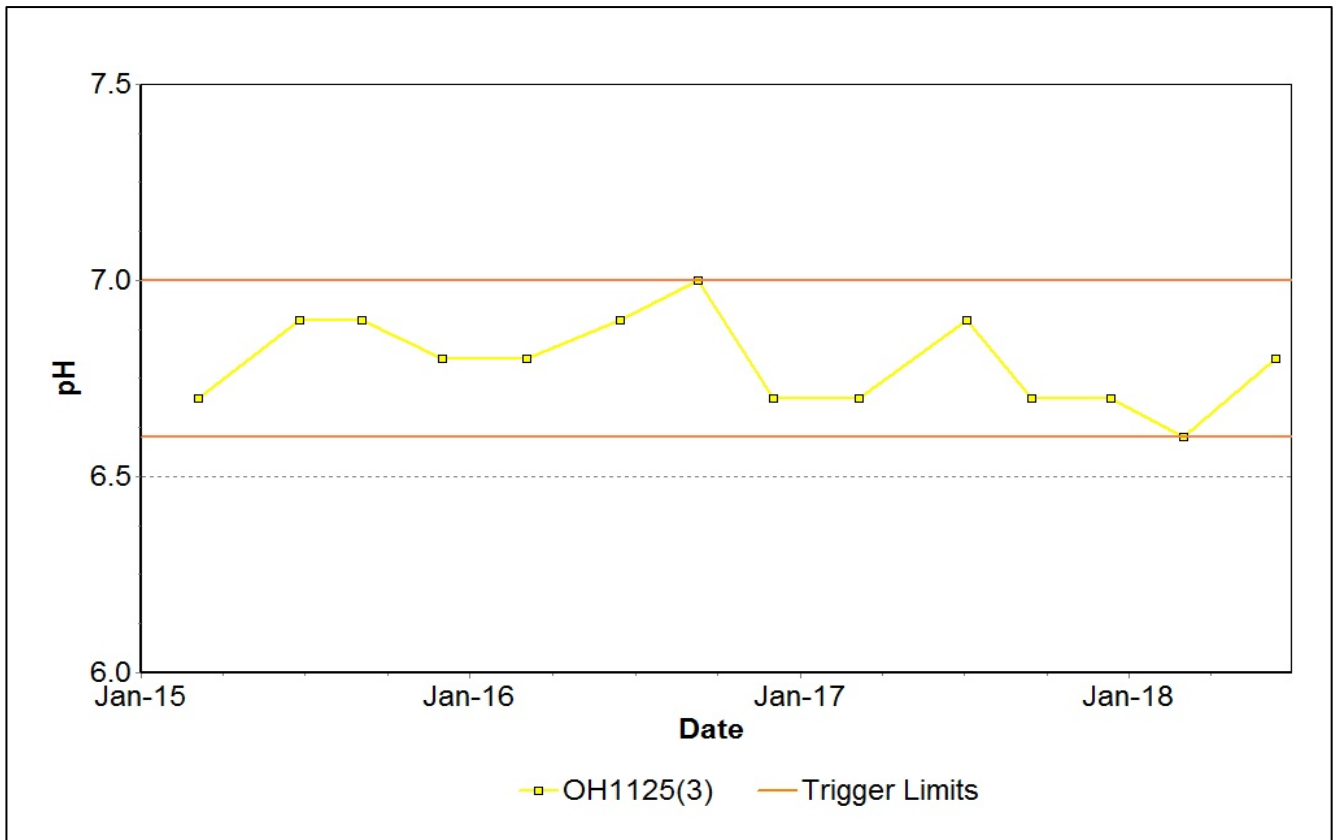


Figure 23: Bowfield Seam pH Trend – June 2018

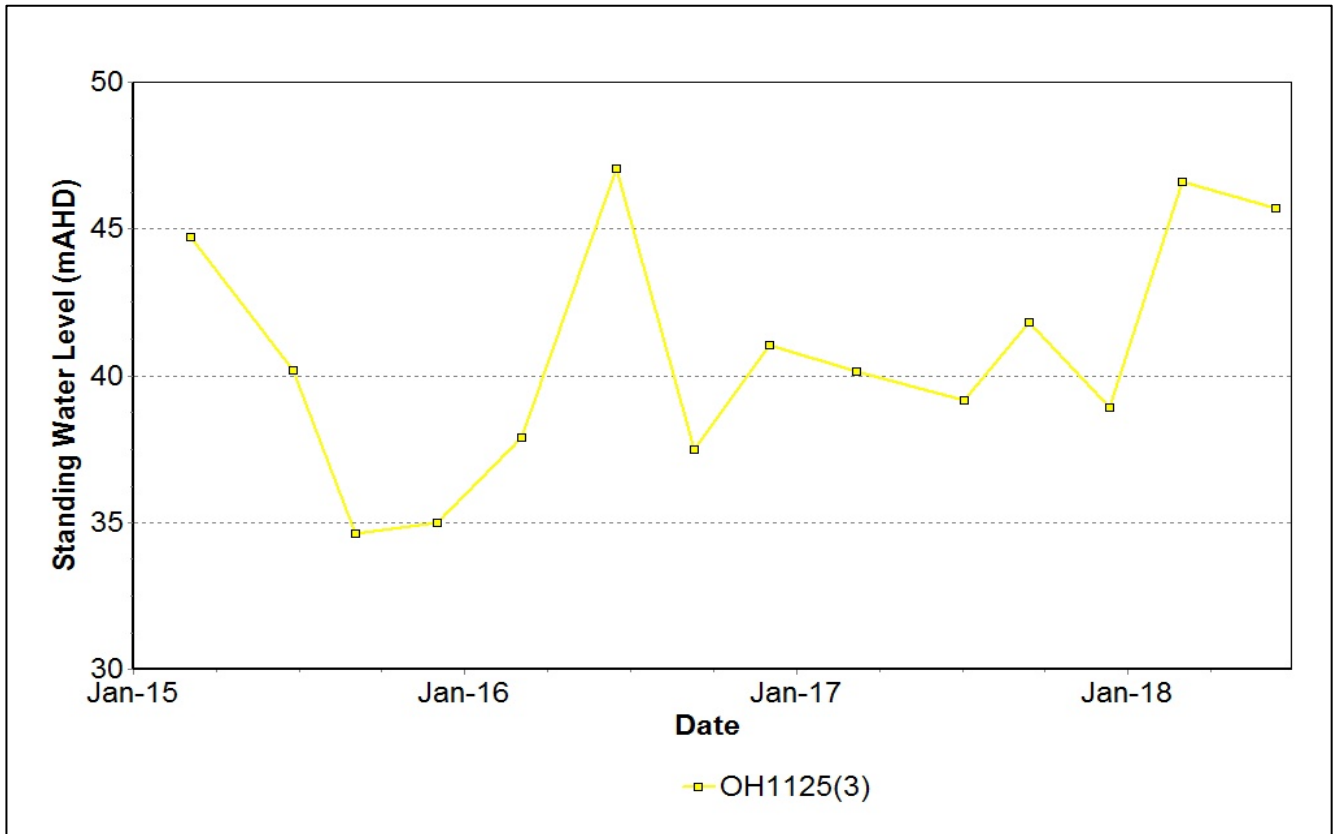


Figure 24: Bowfield Seam Standing Water Level Trend – June 2018

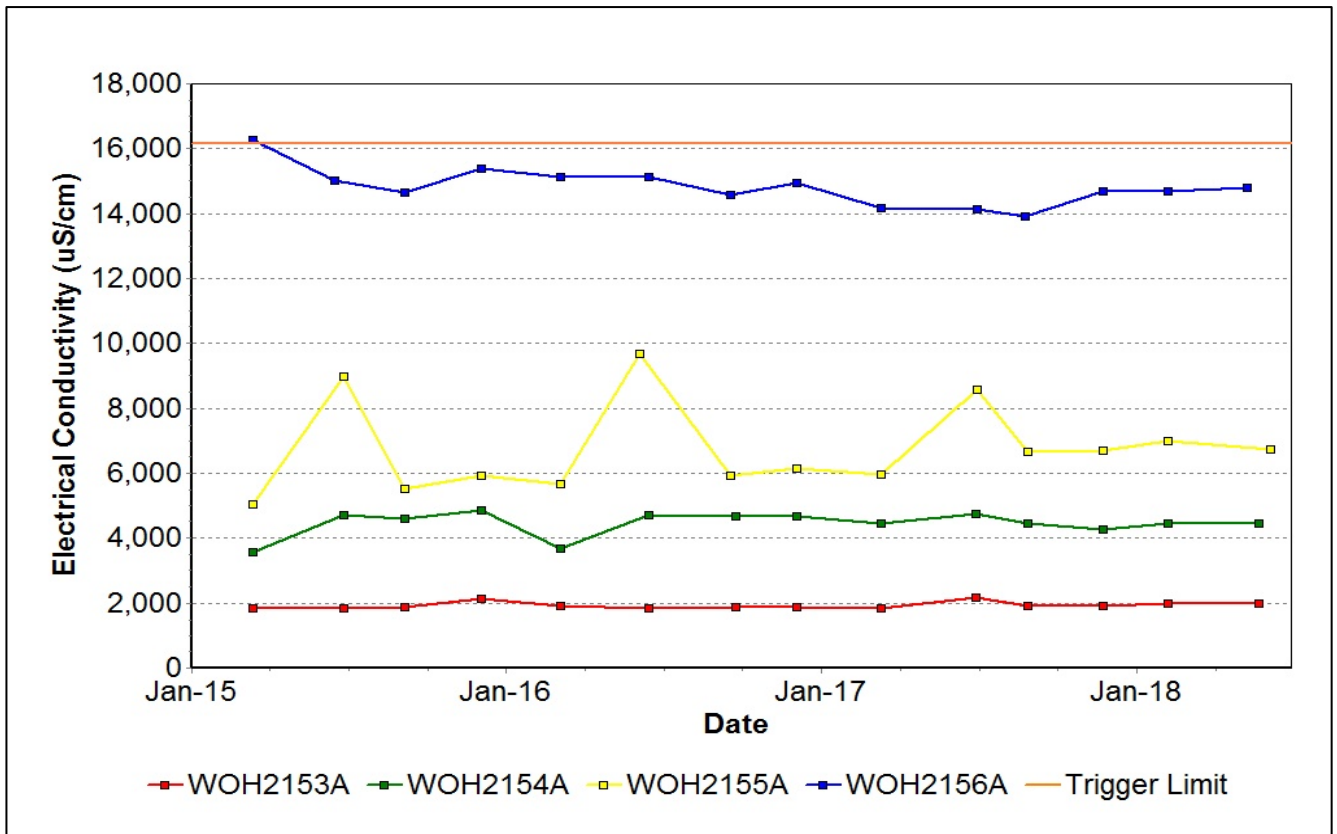


Figure 25: Redbank Seam Electrical Conductivity Trend – June 2018

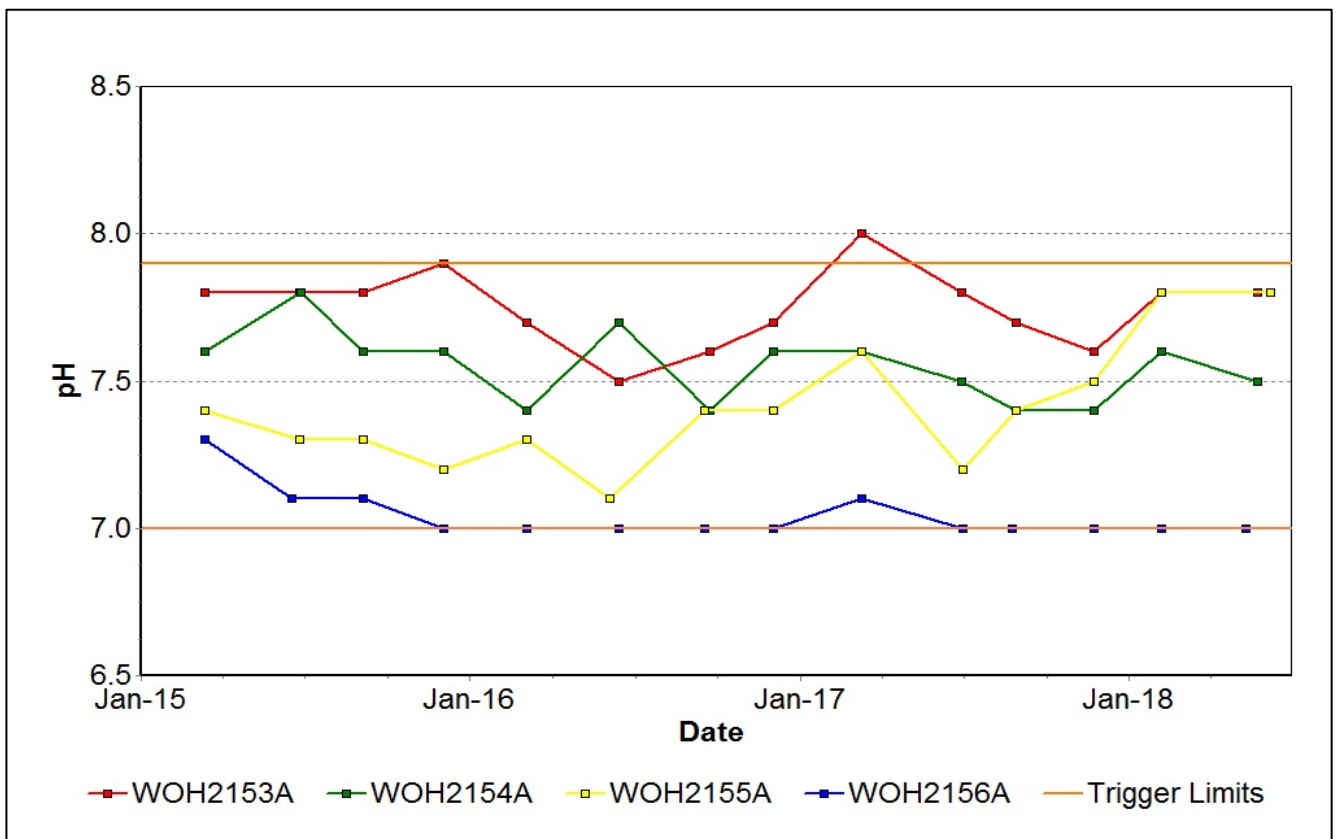


Figure 26: Redbank Seam pH Trend – June 2018

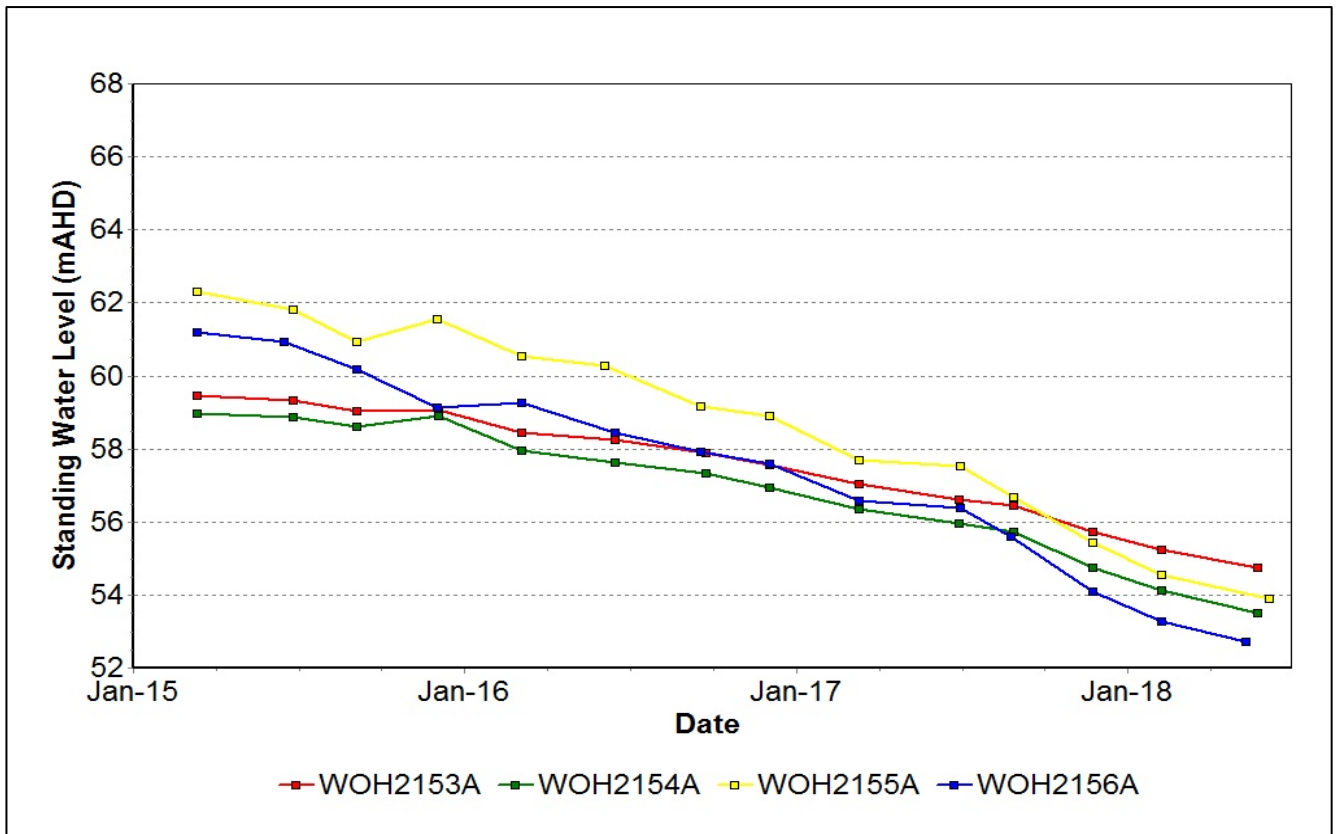


Figure 27: Redbank Seam Standing Water Level Trend – June 2018

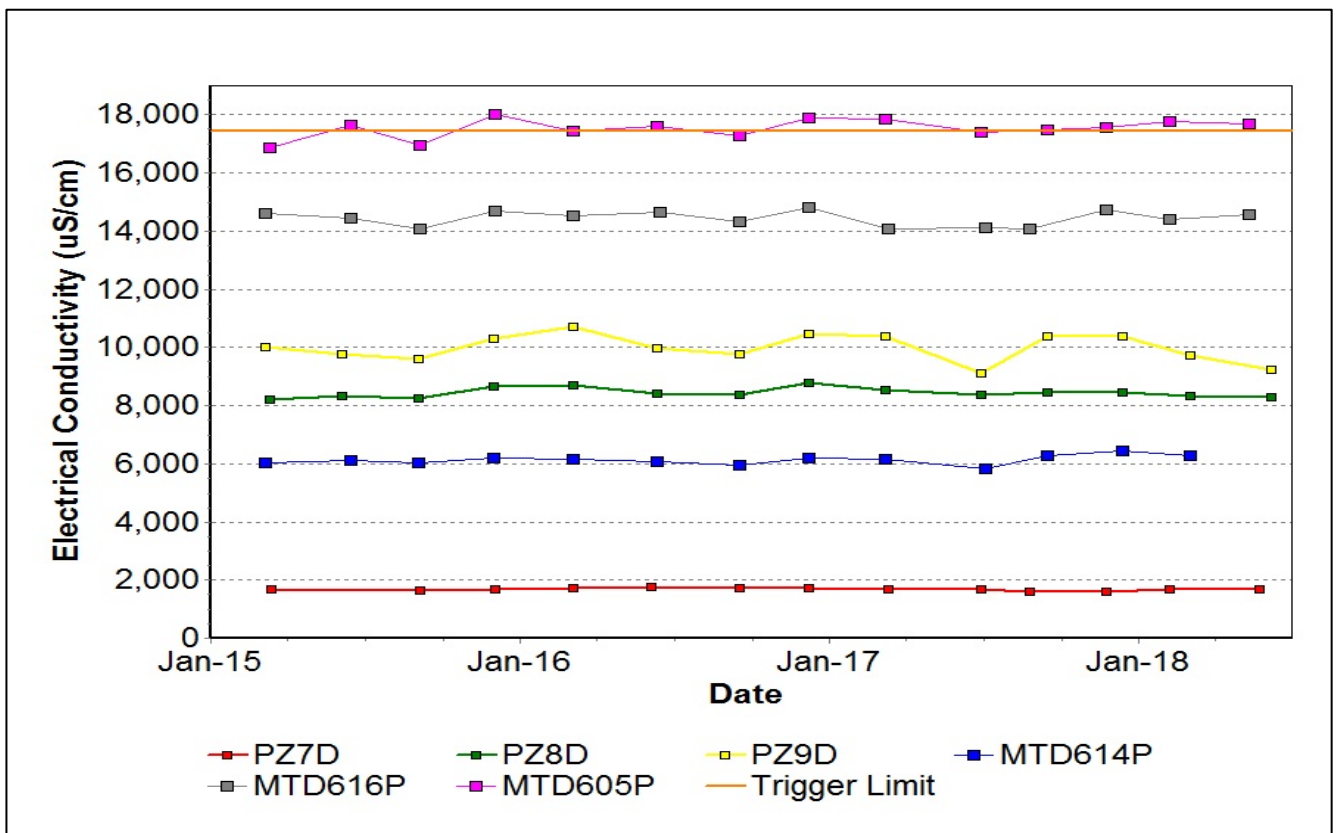


Figure 28: Shallow Overburden Seam Electrical Conductivity Trend – June 2018

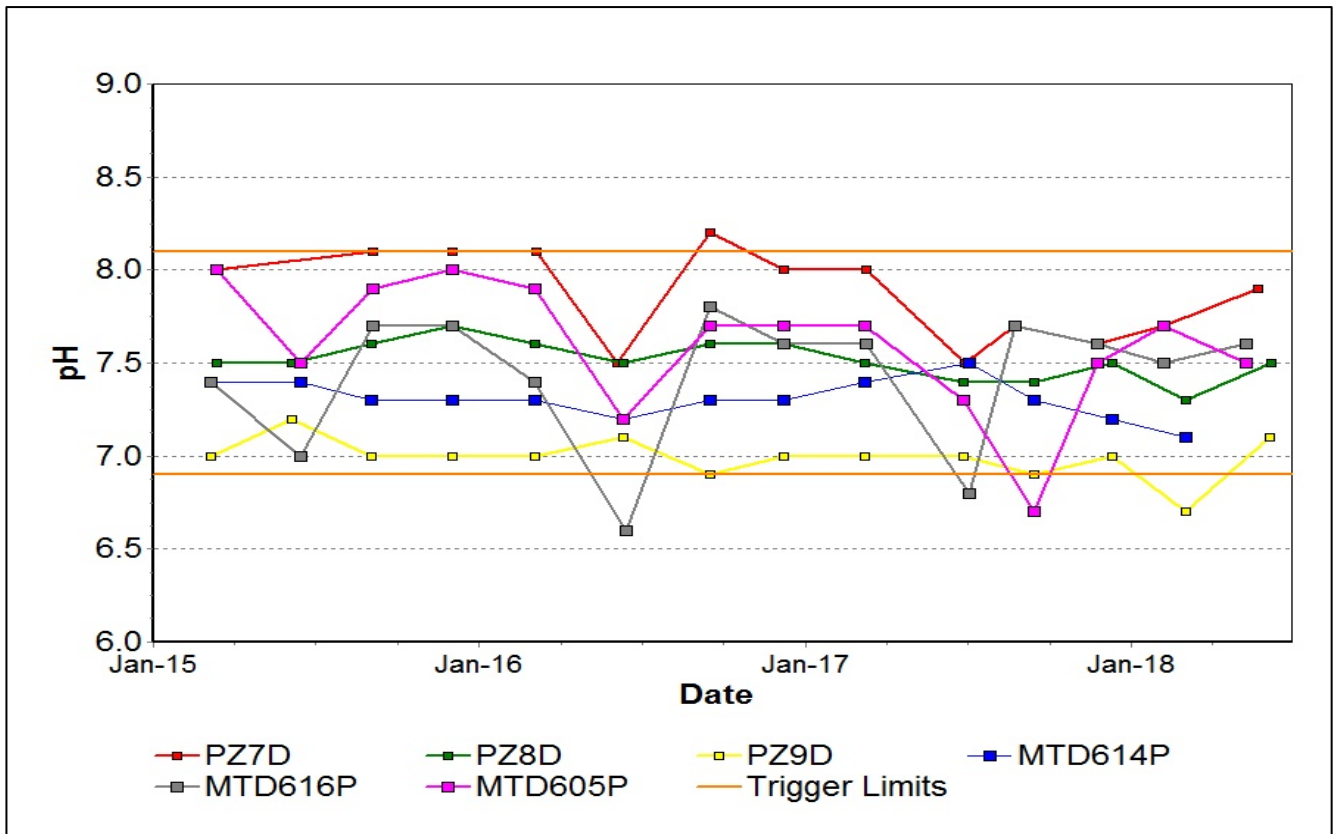


Figure 29: Shallow Overburden Seam pH Trend – June 2018

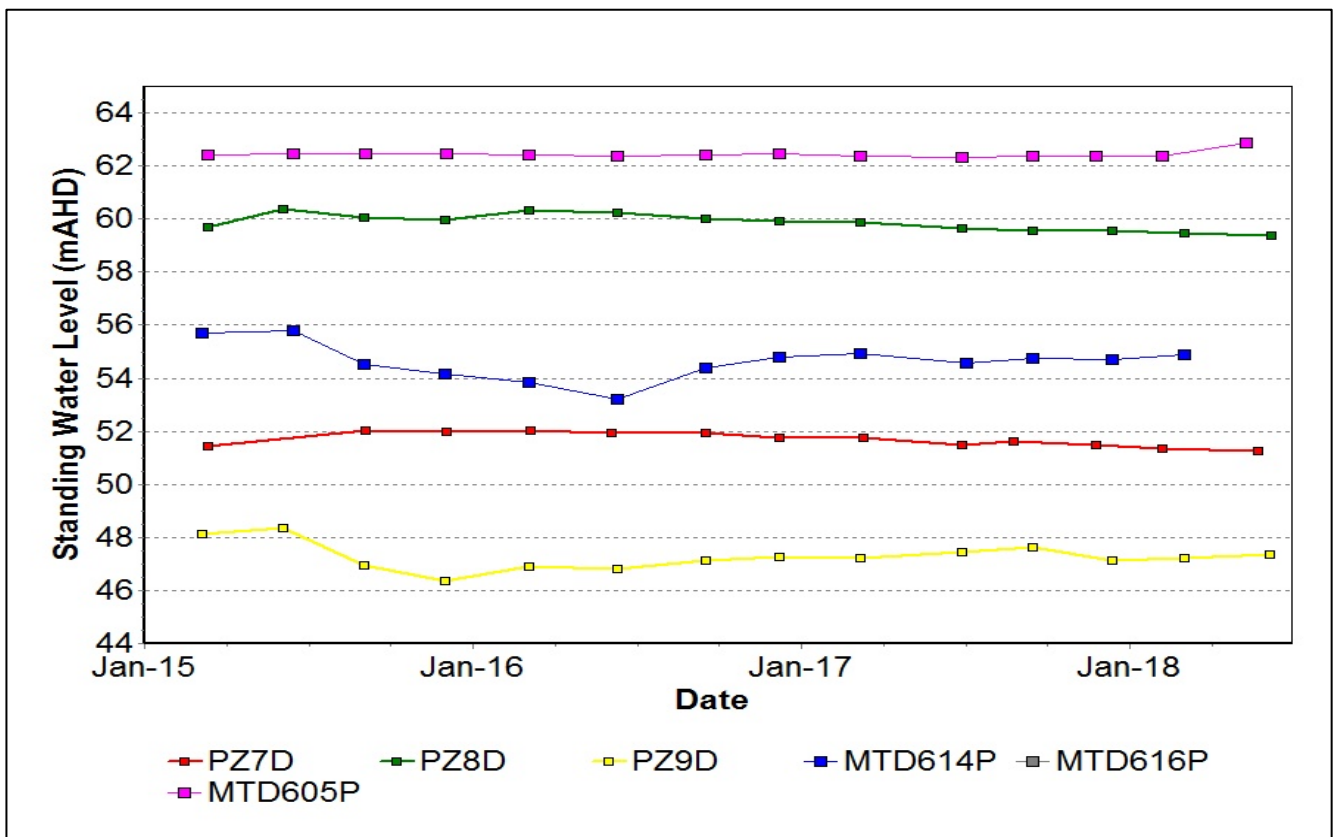


Figure 30: Shallow Overburden Seam Standing Water Level Trend – June 2018

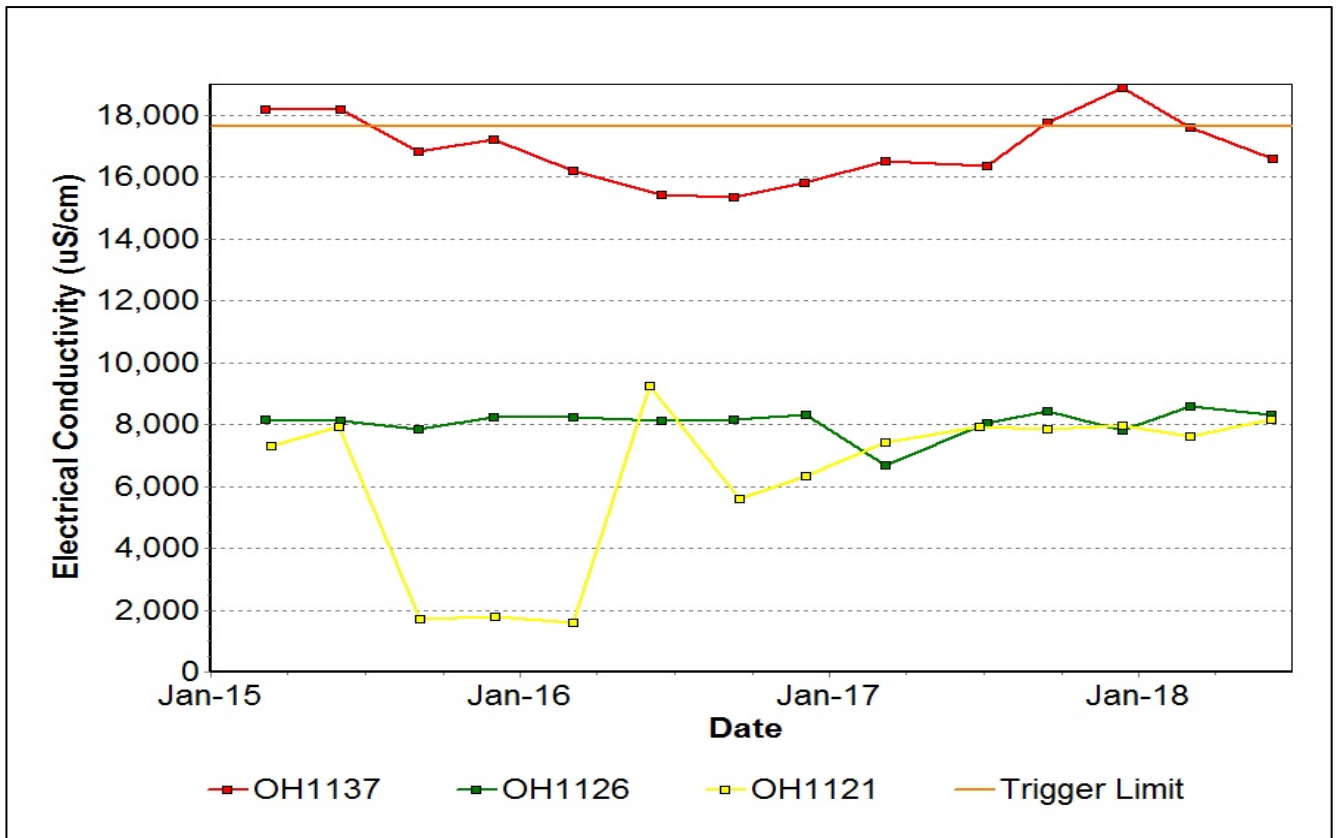


Figure 31: Vaux Seam Electrical Conductivity Trend – June 2018

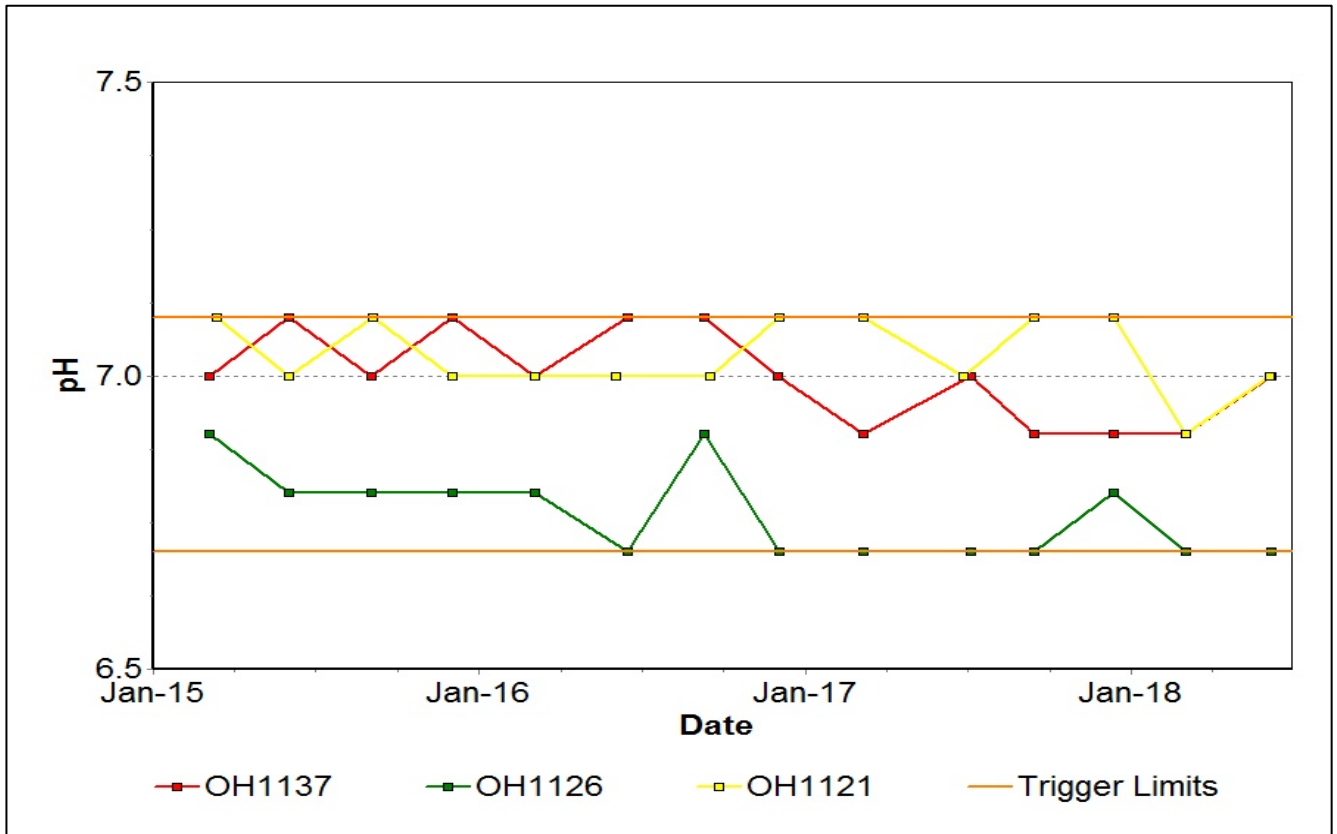


Figure 32: Vaux Seam pH Trend – June 2018

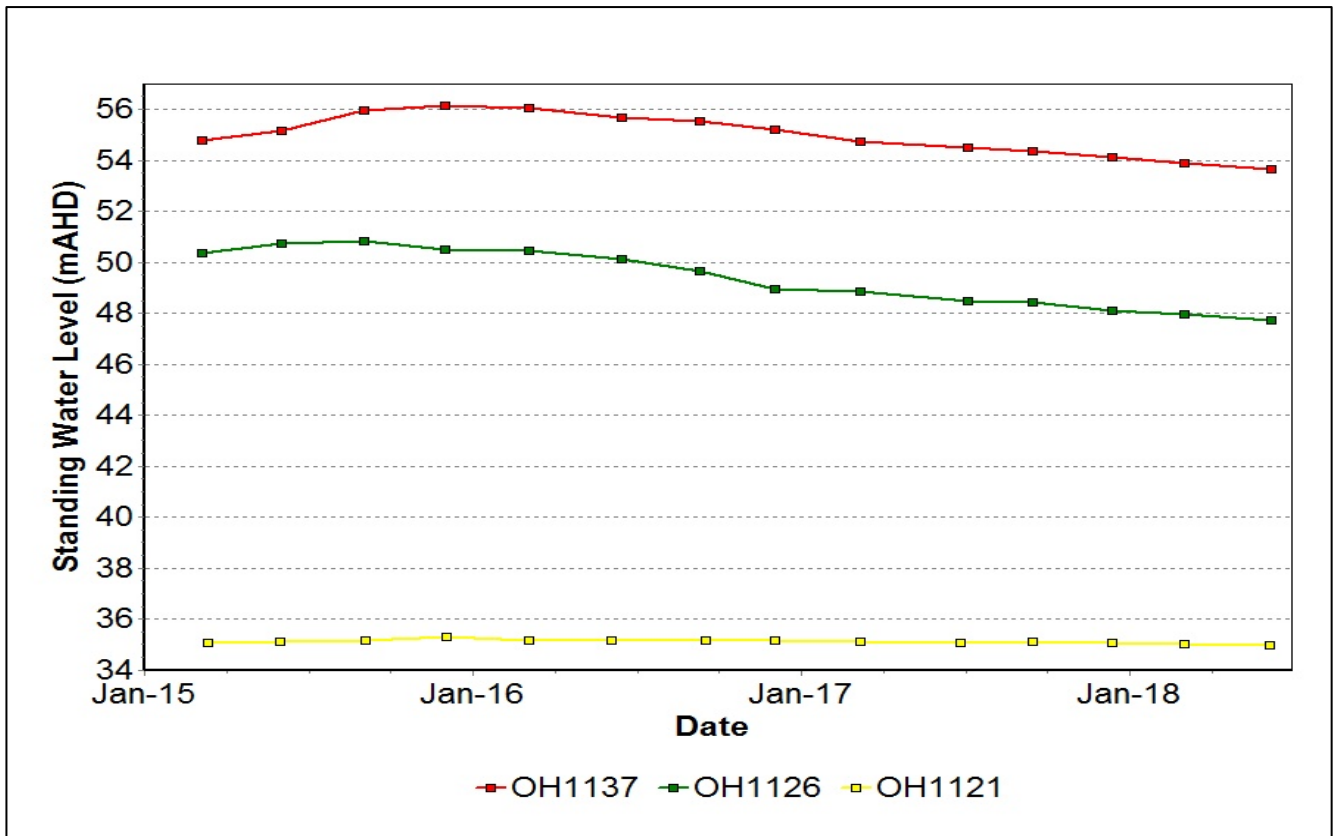


Figure 33: Vaux Seam Standing Water Level Trend – June 2018

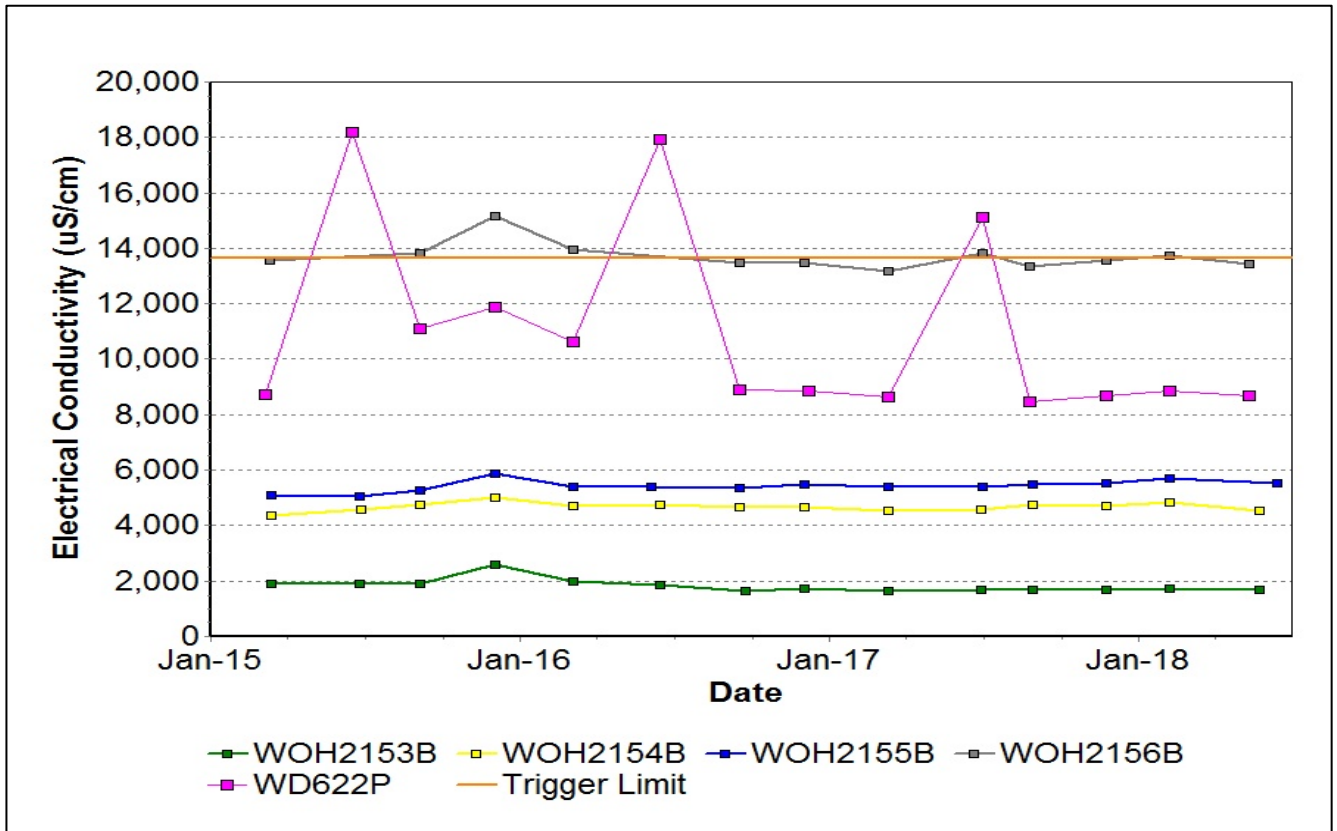


Figure 34: Wambo Seam Electrical Conductivity Trend – June 2018



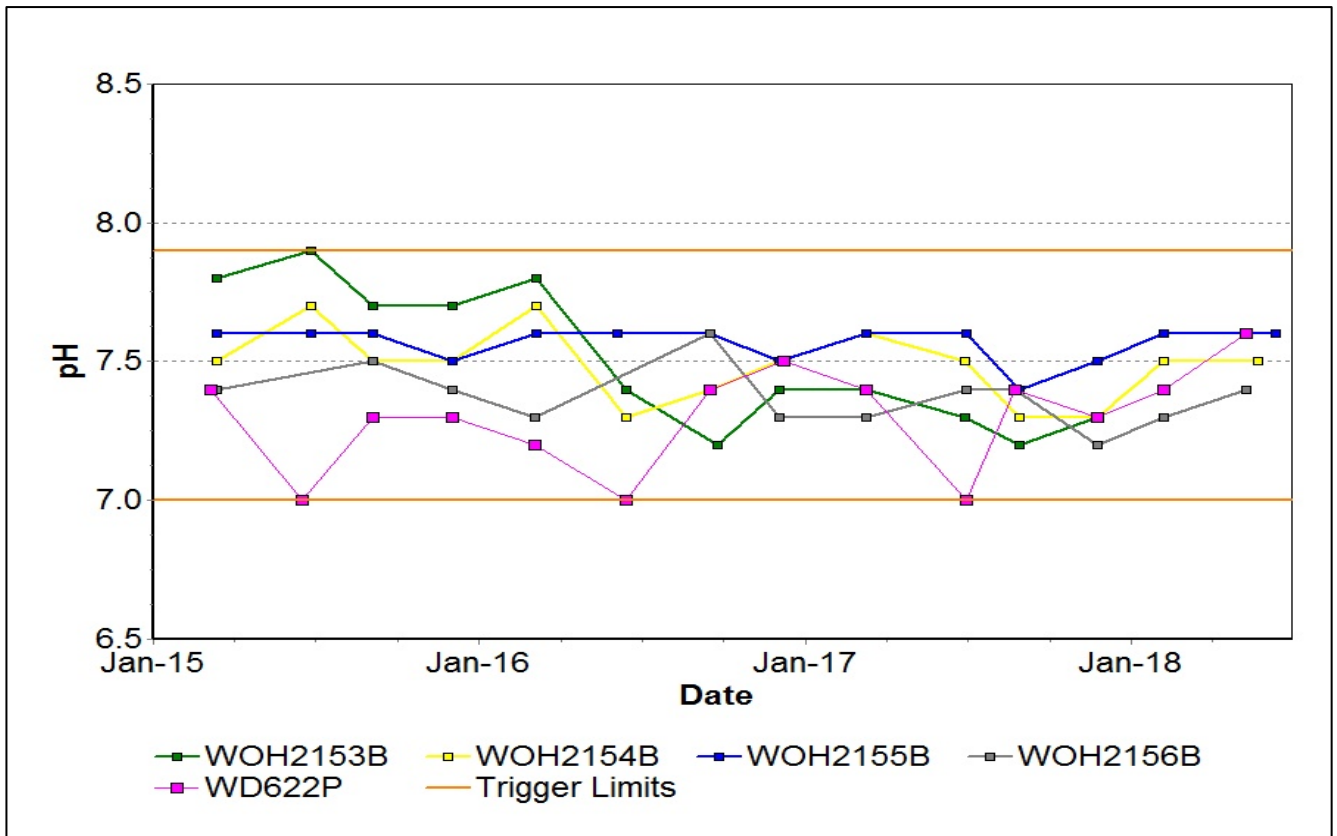


Figure 35: Wambo Seam pH Trend – June 2018

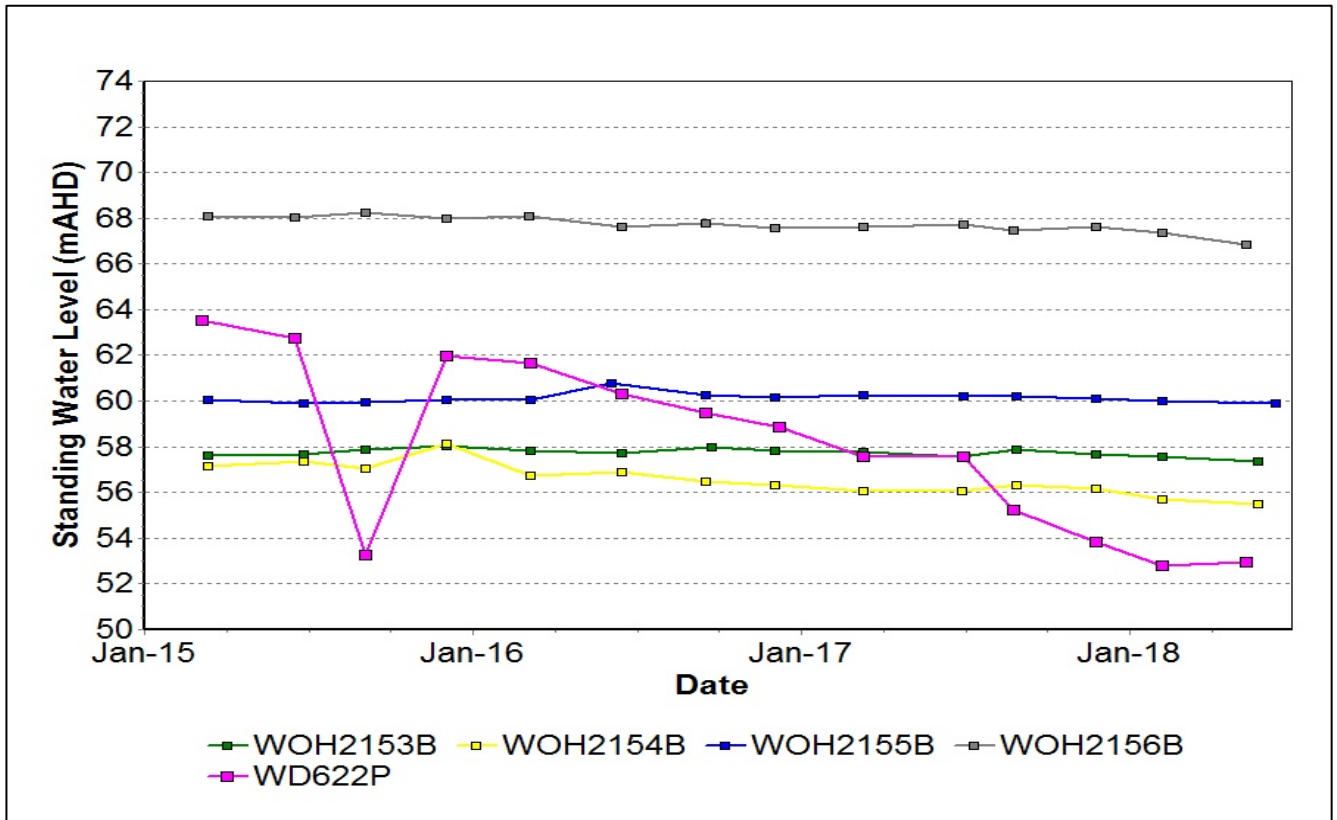


Figure 36: Wambo Seam Standing Water Level Trend – June 2018

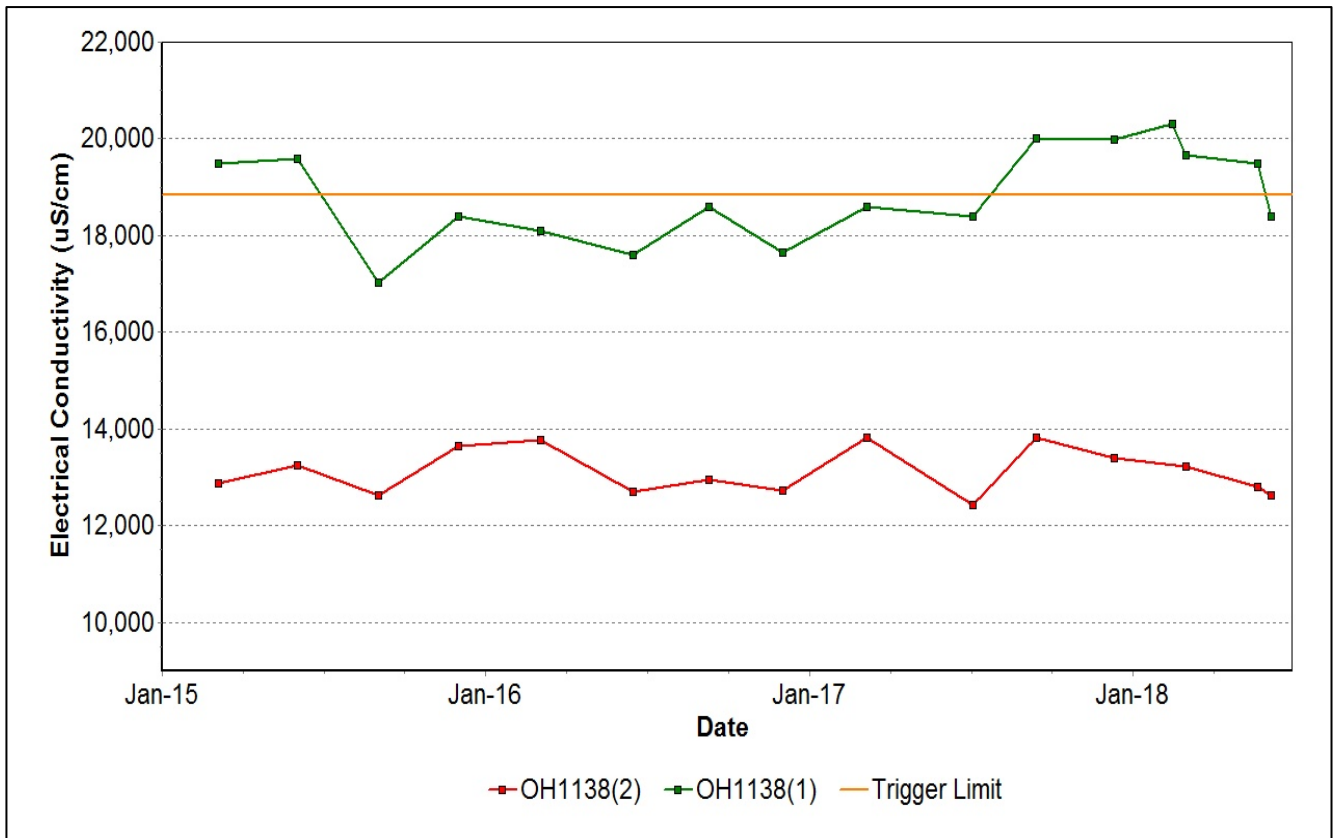


Figure 37: Warkworth Seam Electrical Conductivity Trend – June 2018

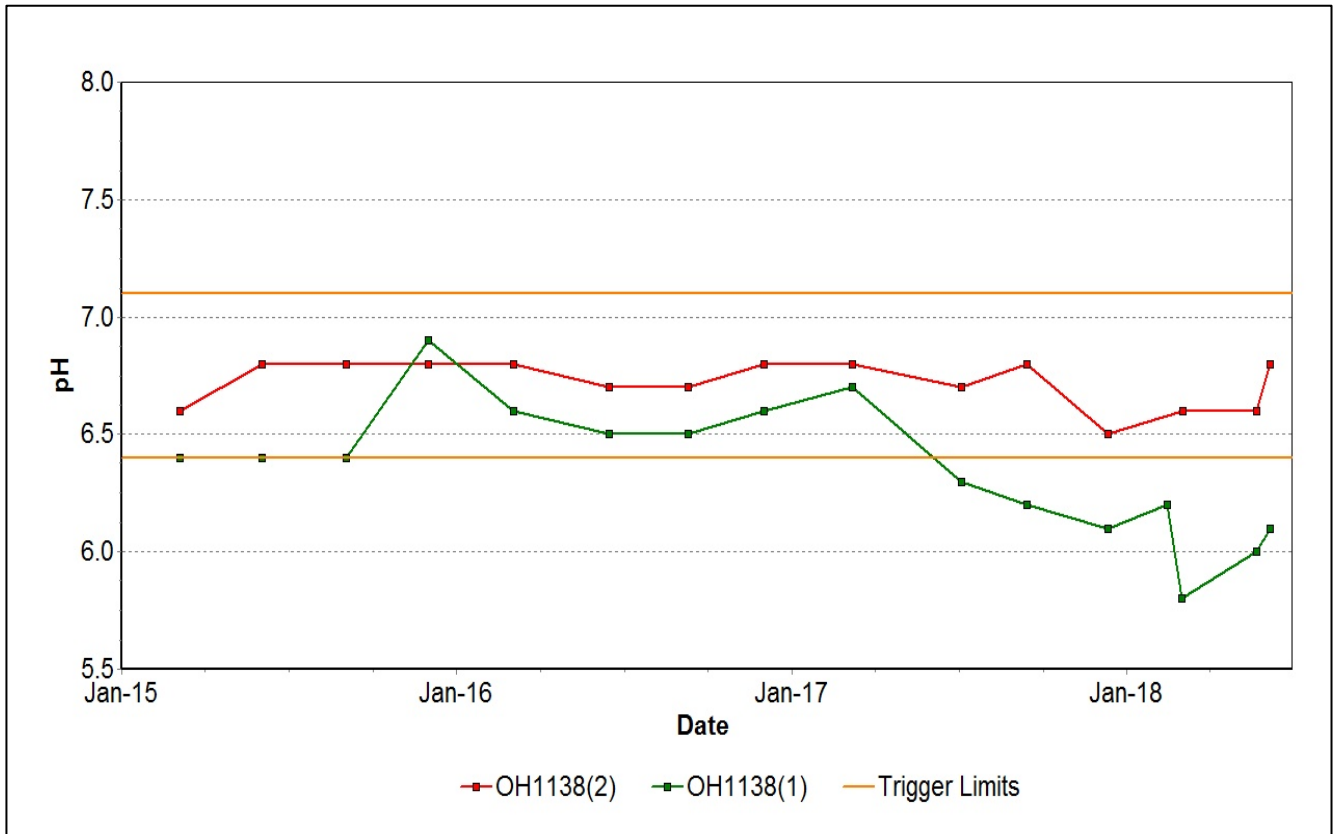


Figure 38: Warkworth Seam pH Trend – June 2018

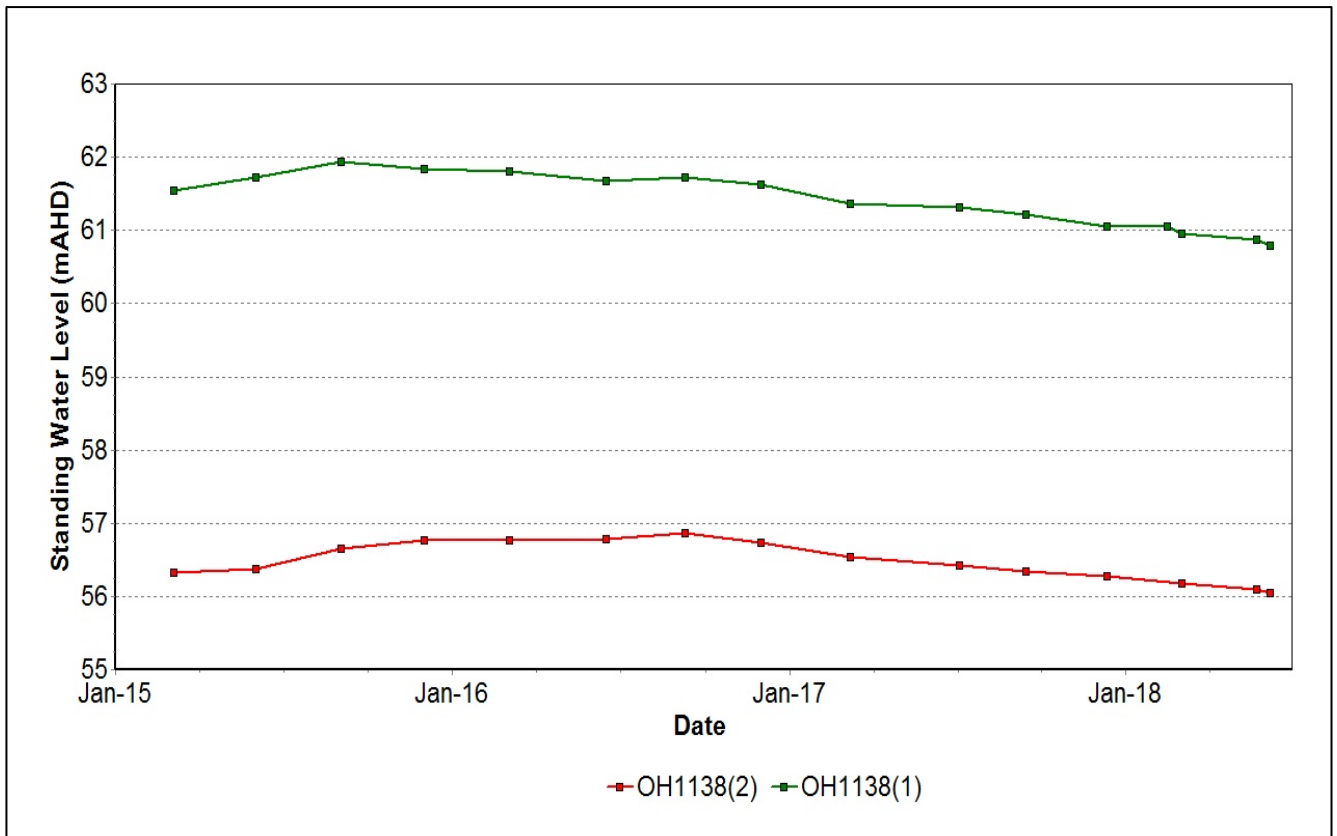


Figure 39: Warkworth Seam Standing Water Level Trend – June 2018

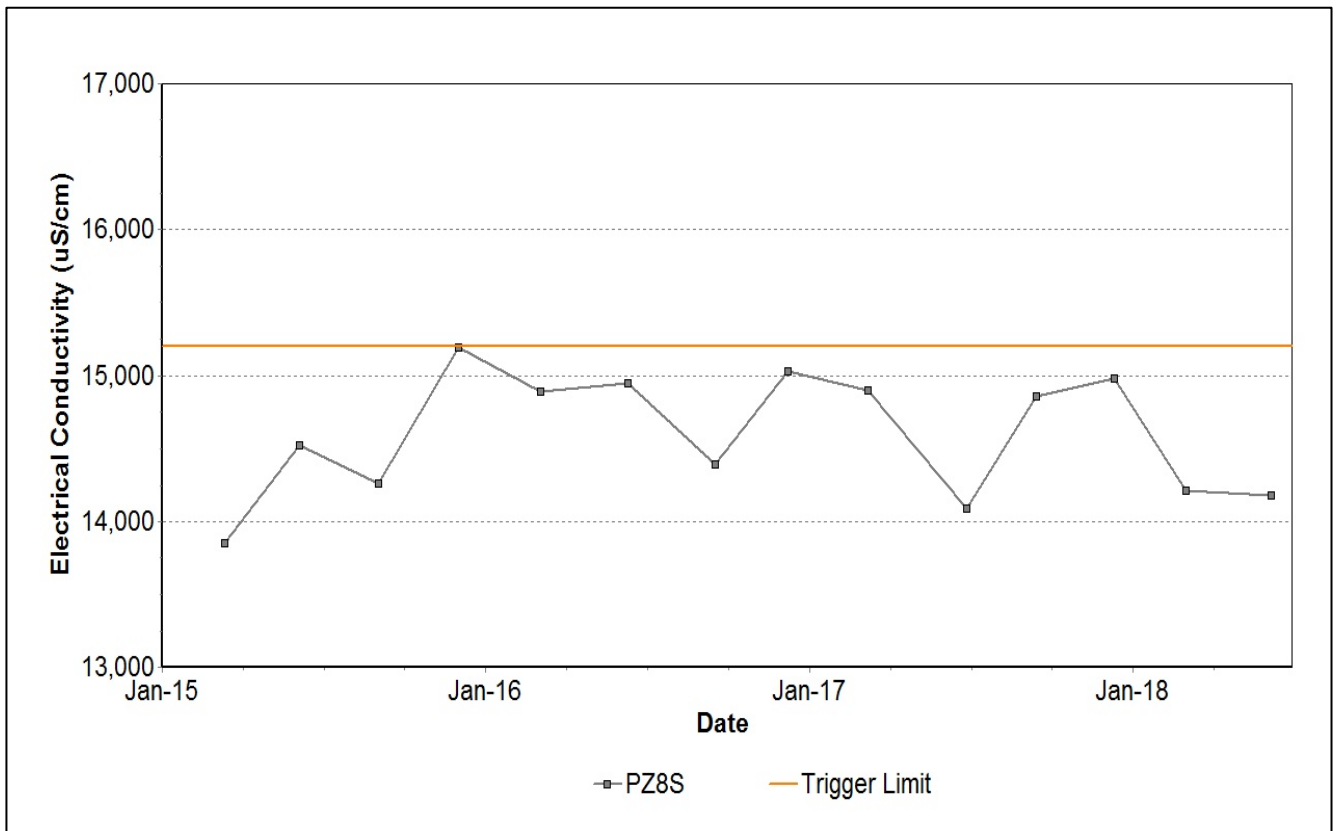


Figure 40: Wollombi Alluvium 1 Electrical Conductivity Trend – June 2018

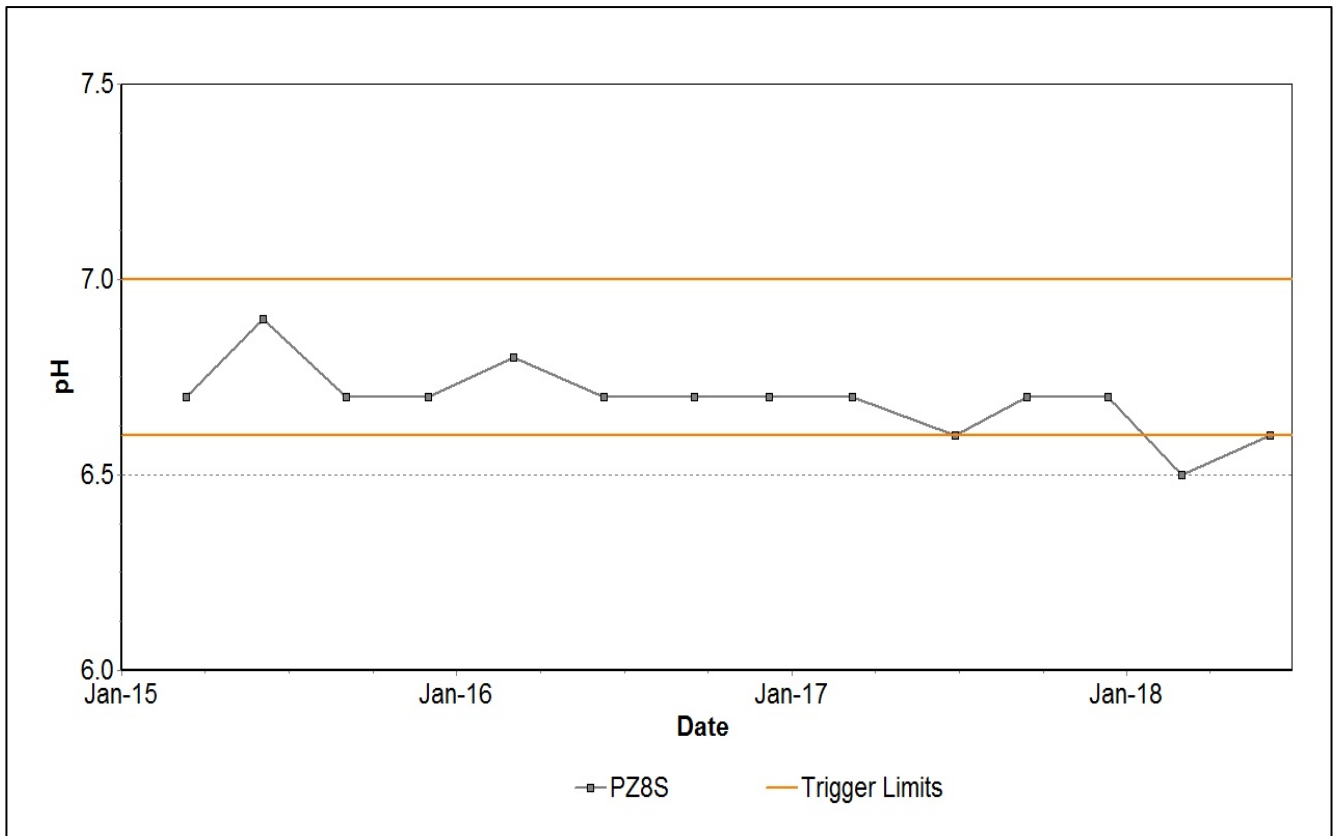


Figure 41: Wollombi Alluvium 1 pH Trend – June 2018

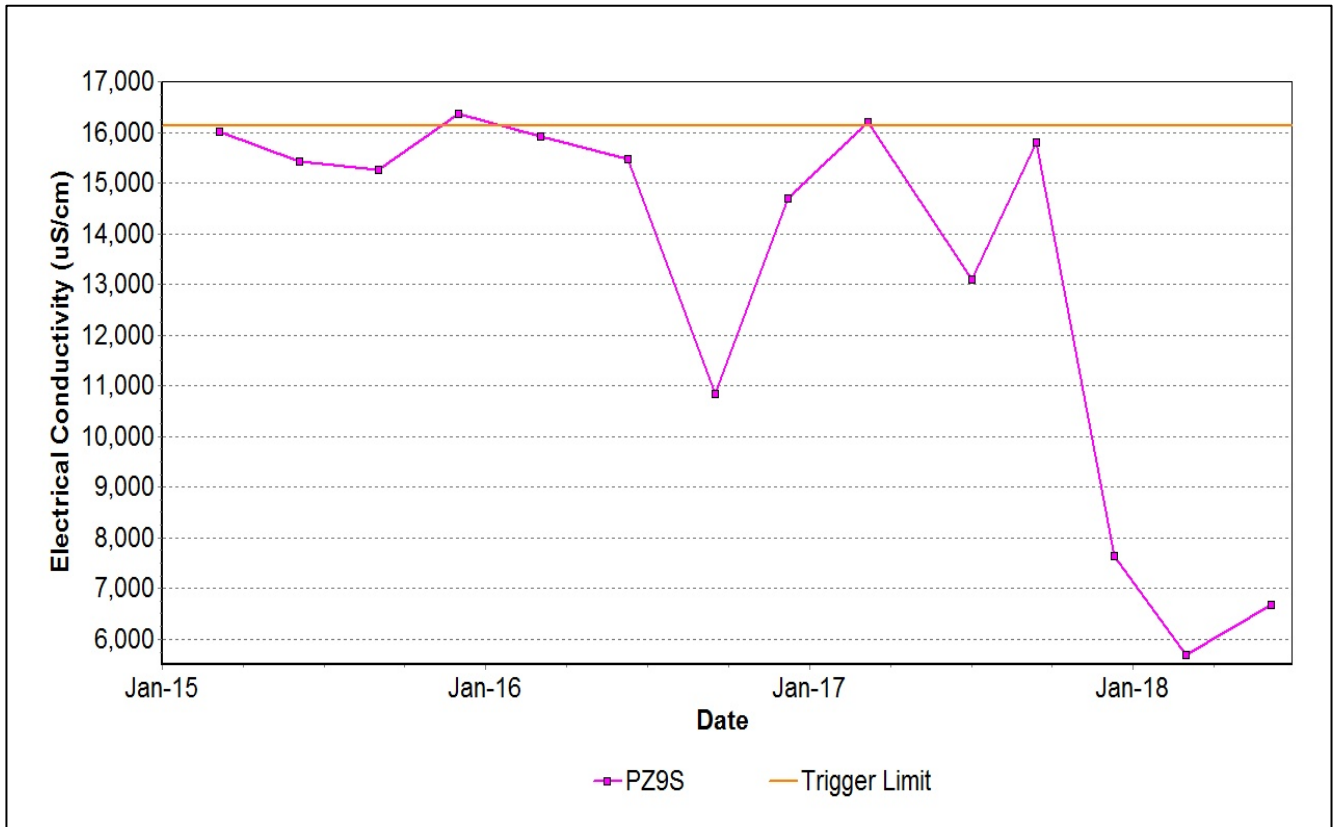


Figure 42: Wollombi Alluvium 2 Electrical Conductivity Trend – June 2018

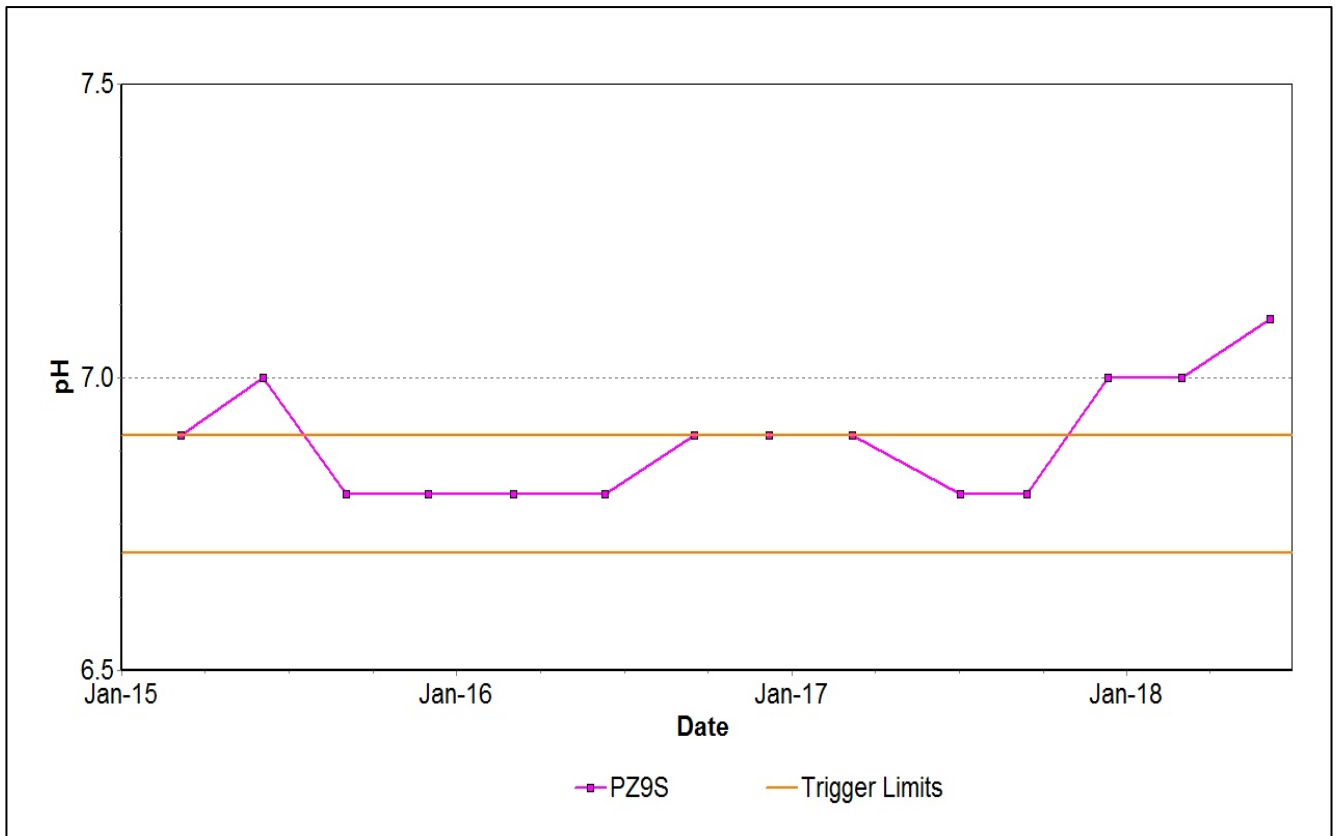


Figure 43: Wollombi Alluvium 2 pH Trend – June 2018

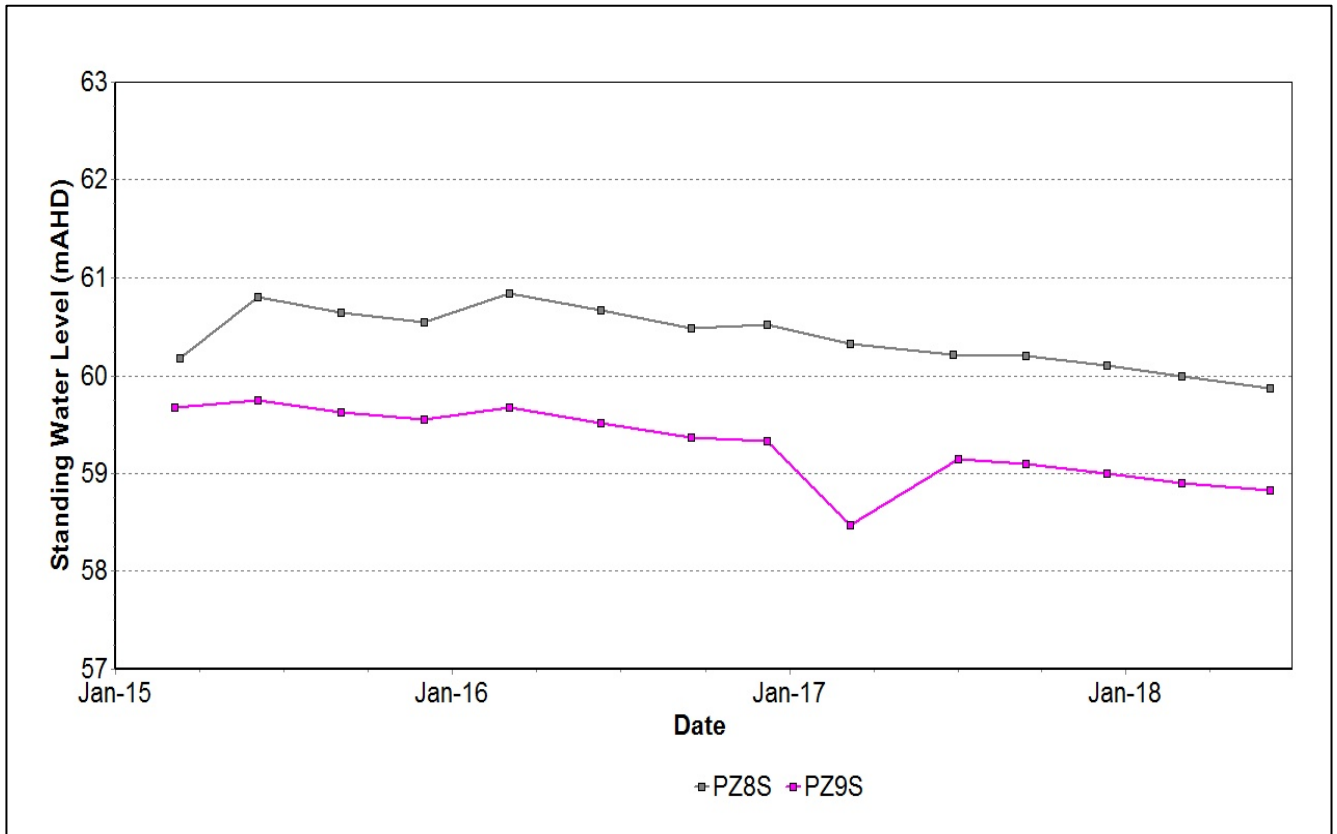


Figure 44: Wollombi Alluvium Standing Water Level Trend – June 2018

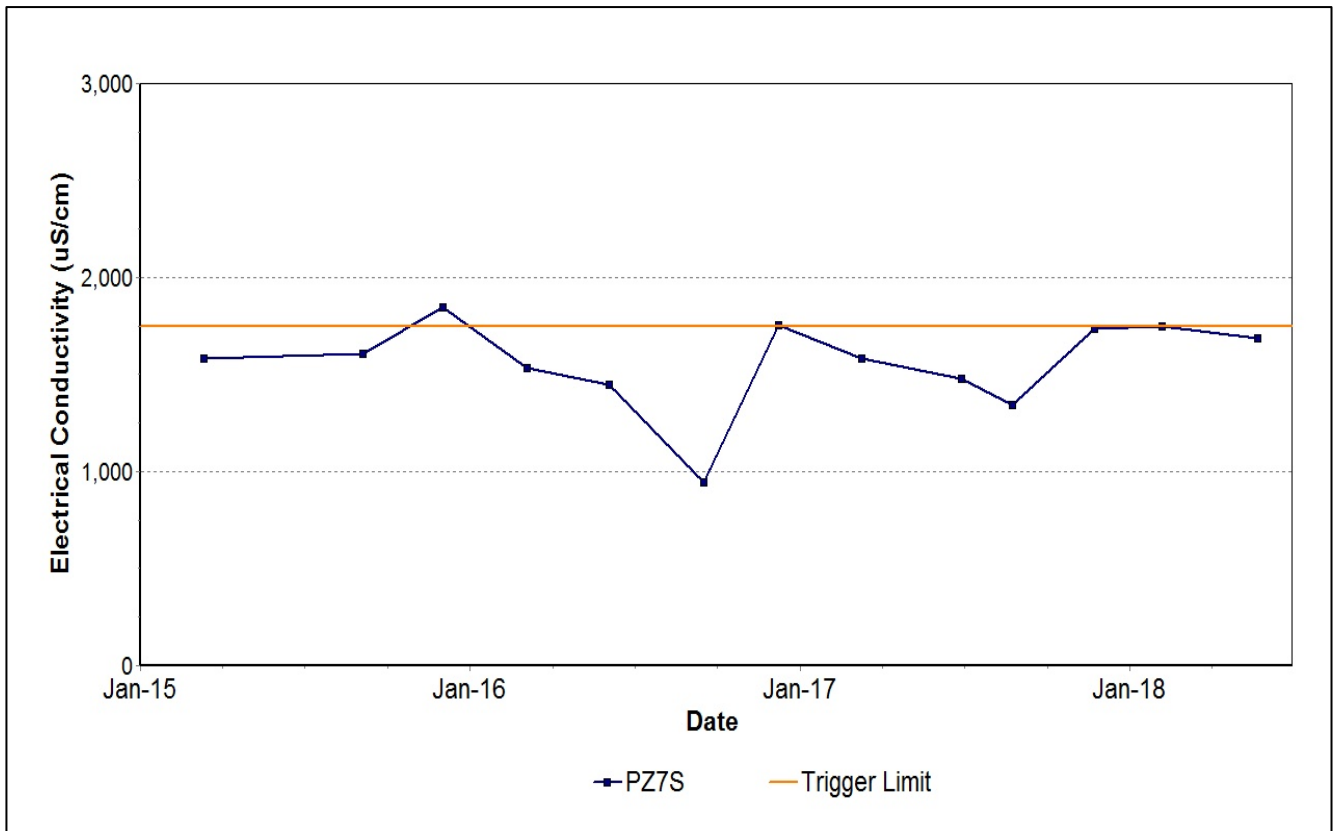


Figure 45: Aeolian Warkworth Sands Electrical Conductivity Trend – June 2018

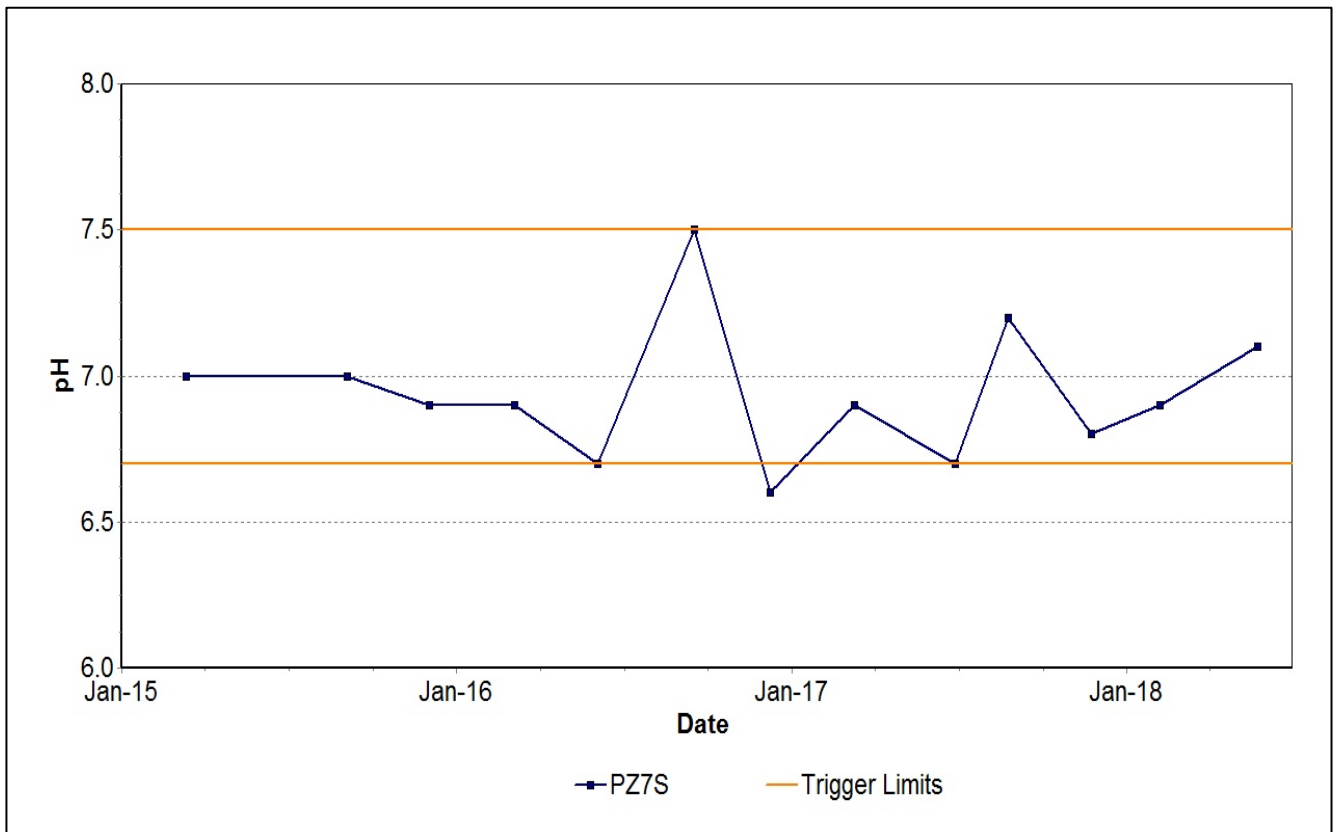


Figure 46: Aeolian Warkworth Sands pH Trend – June 2018

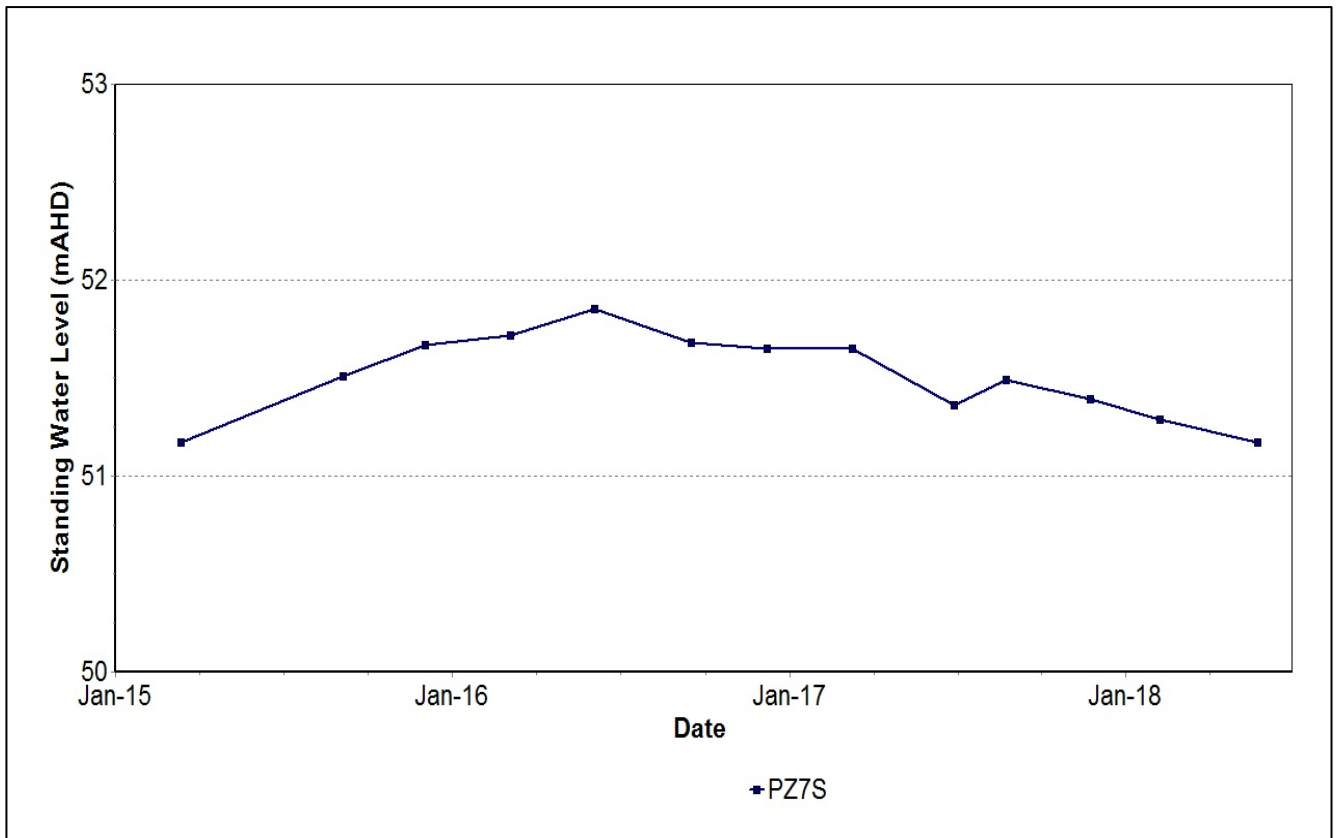


Figure 47: Aeolian Warkworth Sands Standing Water Level Trend – June 2018

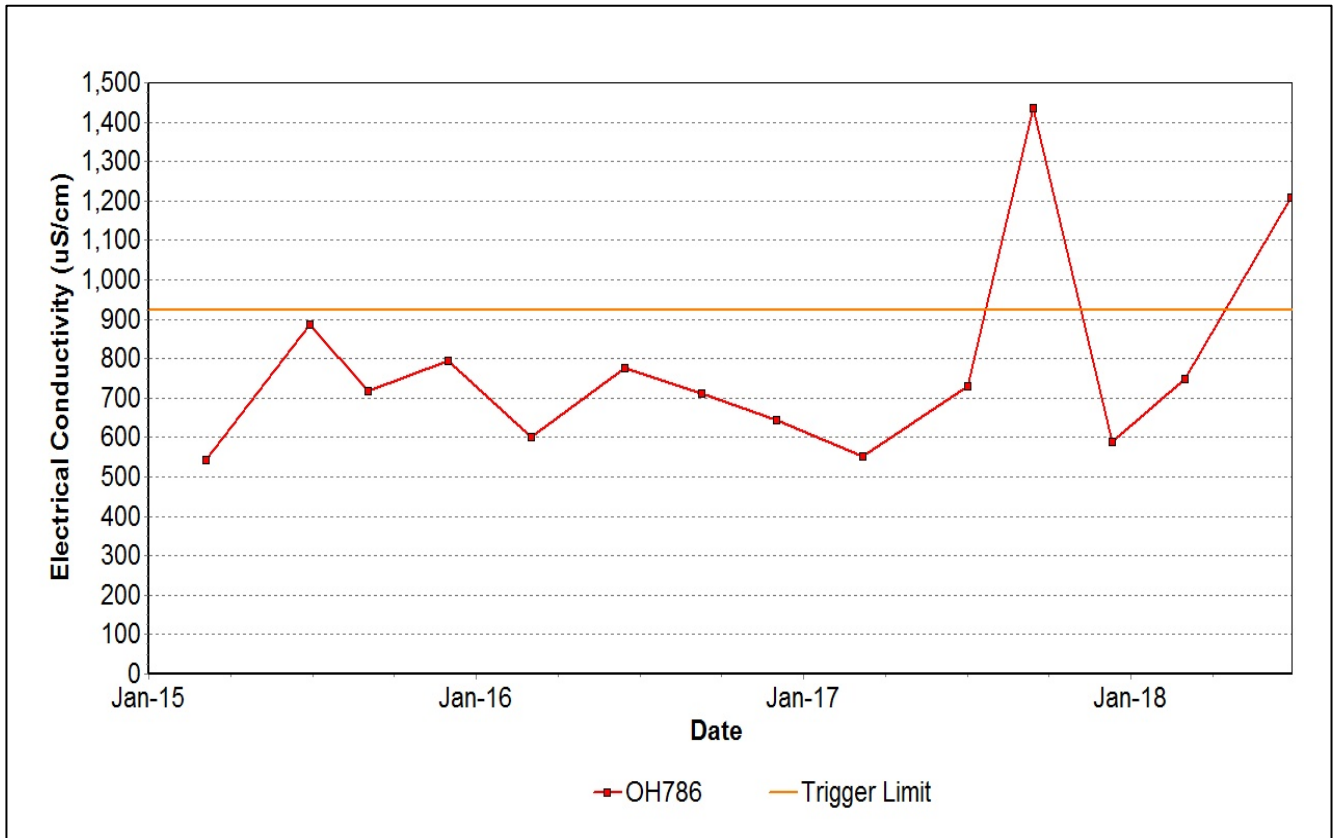


Figure 48: Hunter River Alluvium 1 Seam Electrical Conductivity Trend – June 2018

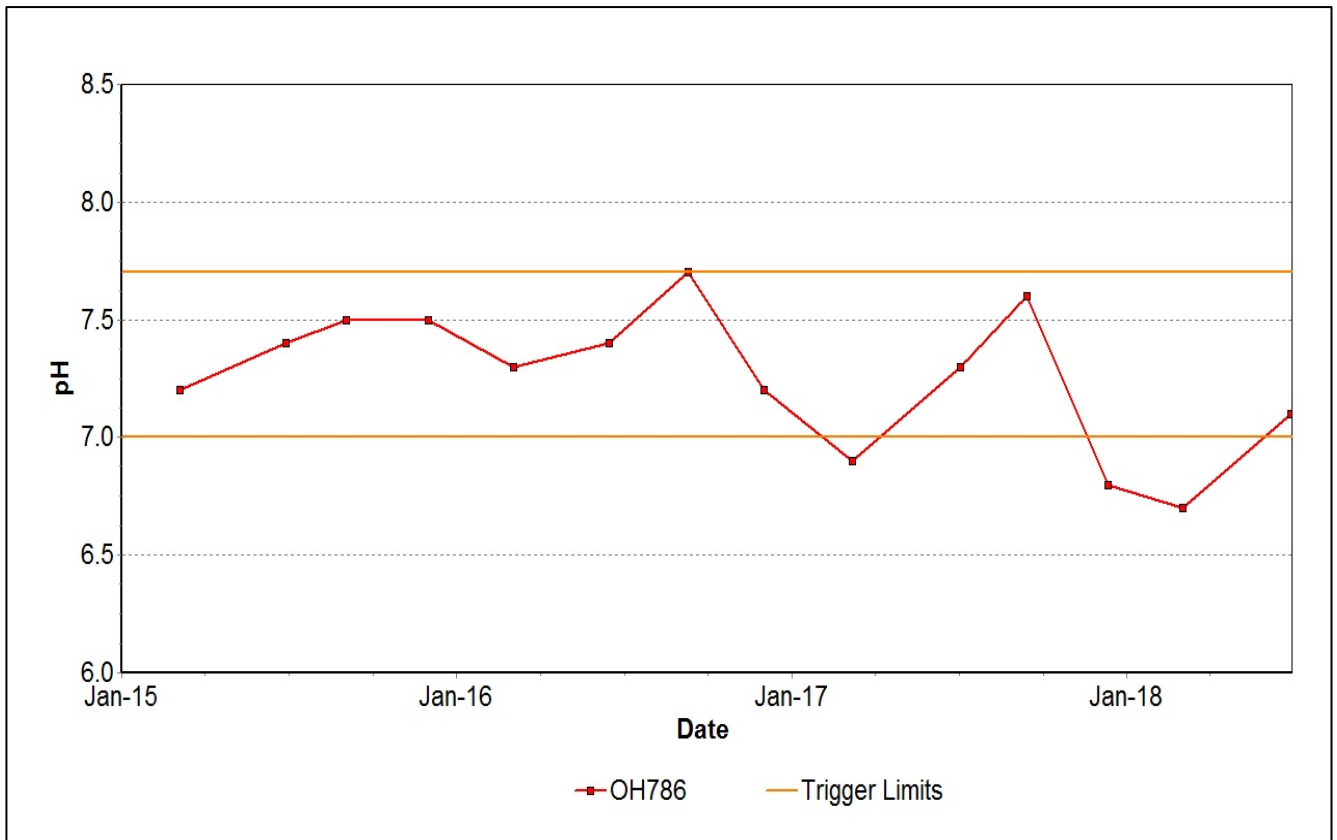


Figure 49: Hunter River Alluvium 1 Seam pH Trend – June 2018

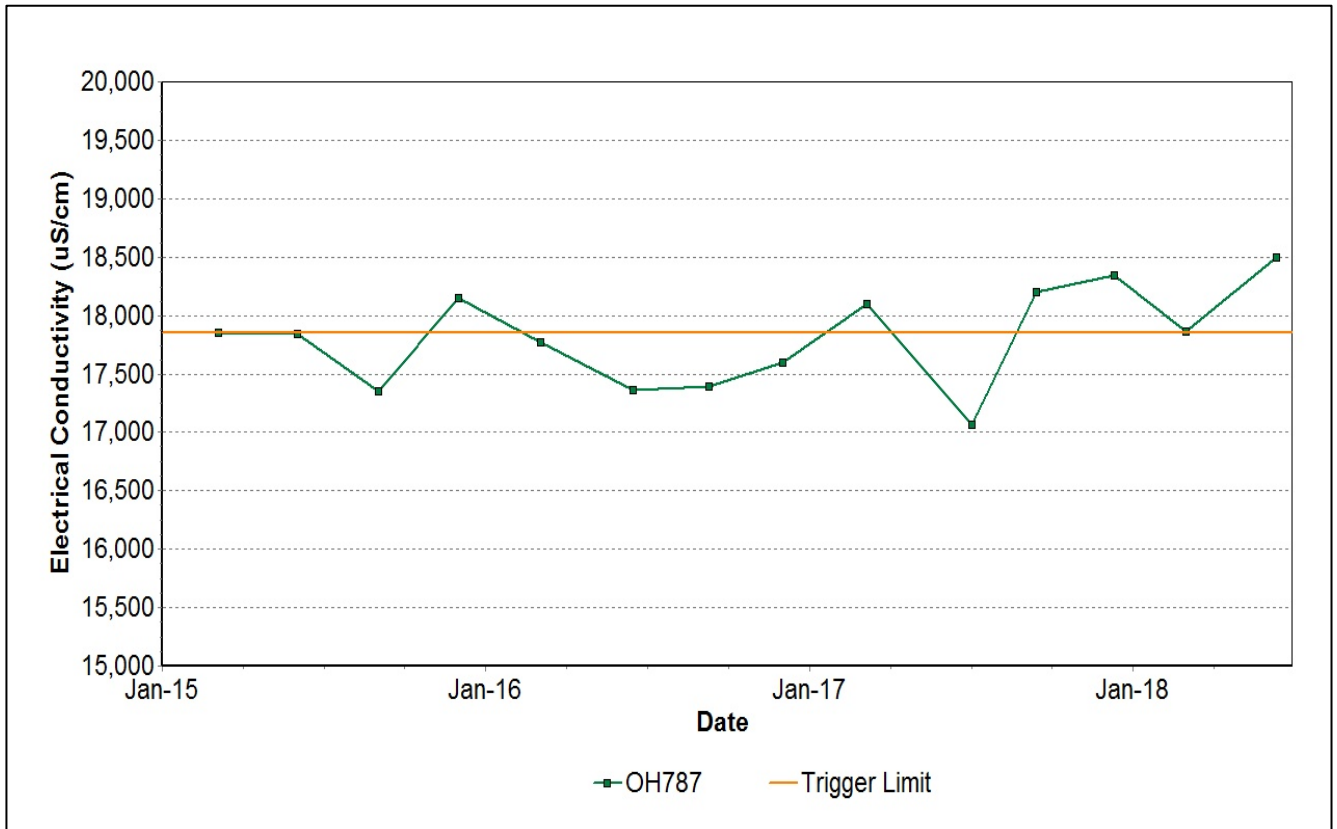


Figure 50: Hunter River Alluvium 2 Seam Electrical Conductivity Trend – June 2018



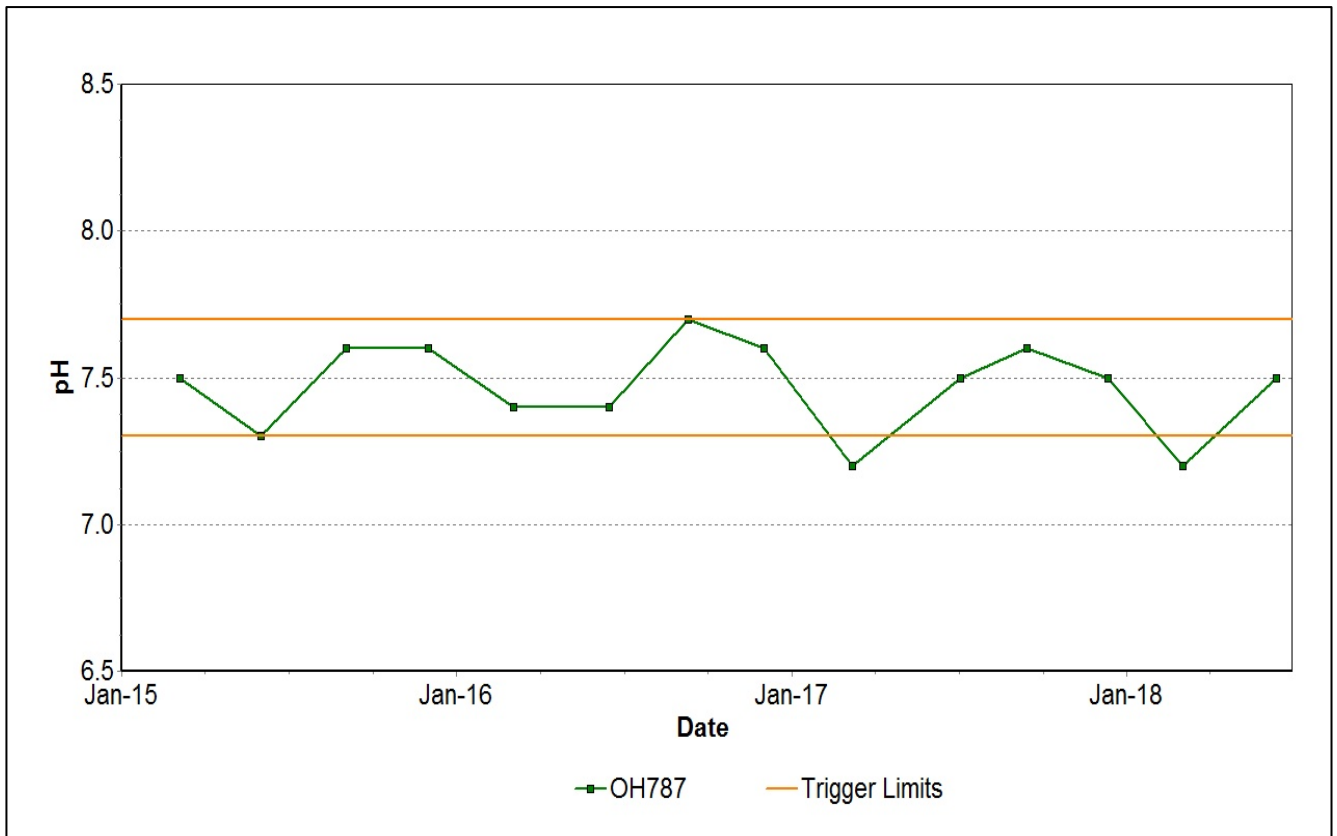


Figure 51: Hunter River Alluvium 2 Seam pH Trend – June 2018

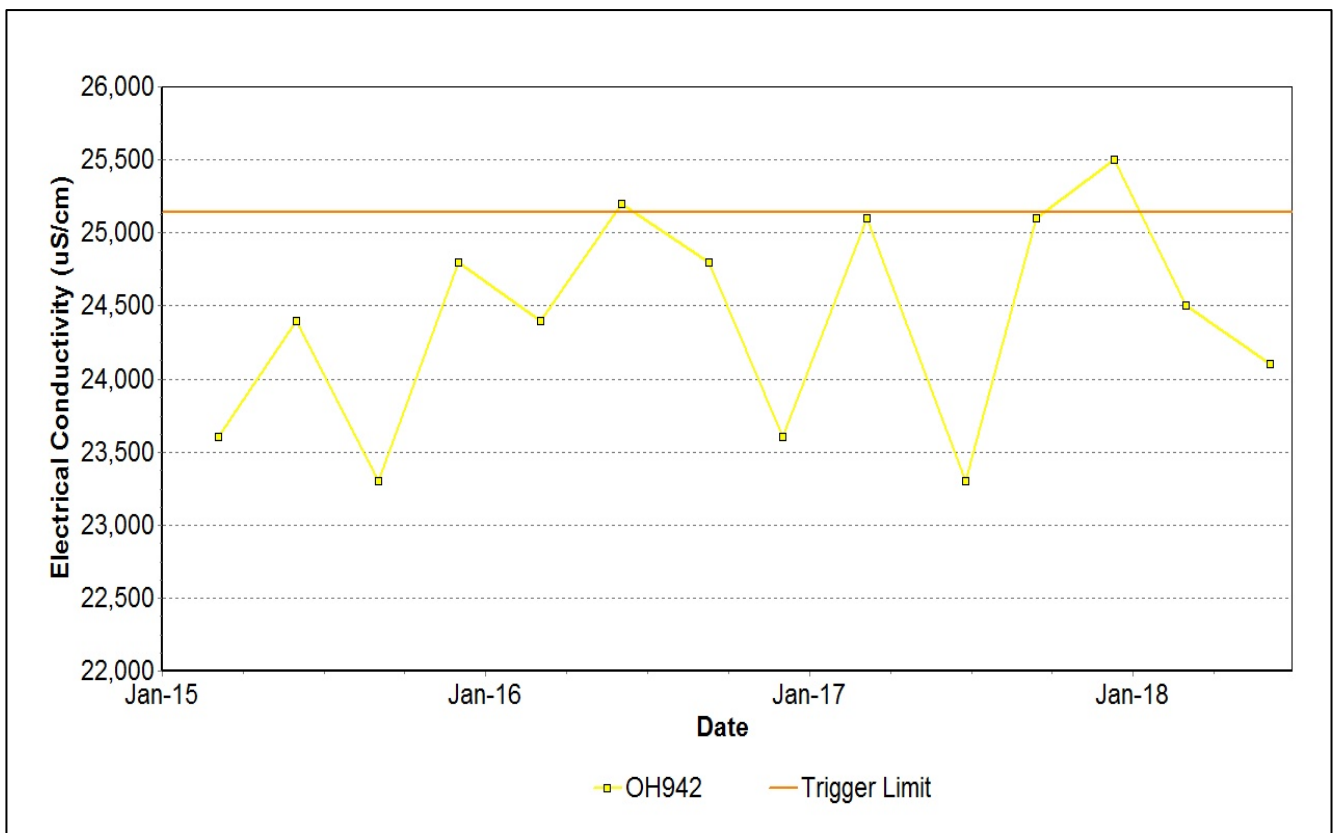


Figure 52: Hunter River Alluvium 3 Seam Electrical Conductivity Trend – June 2018

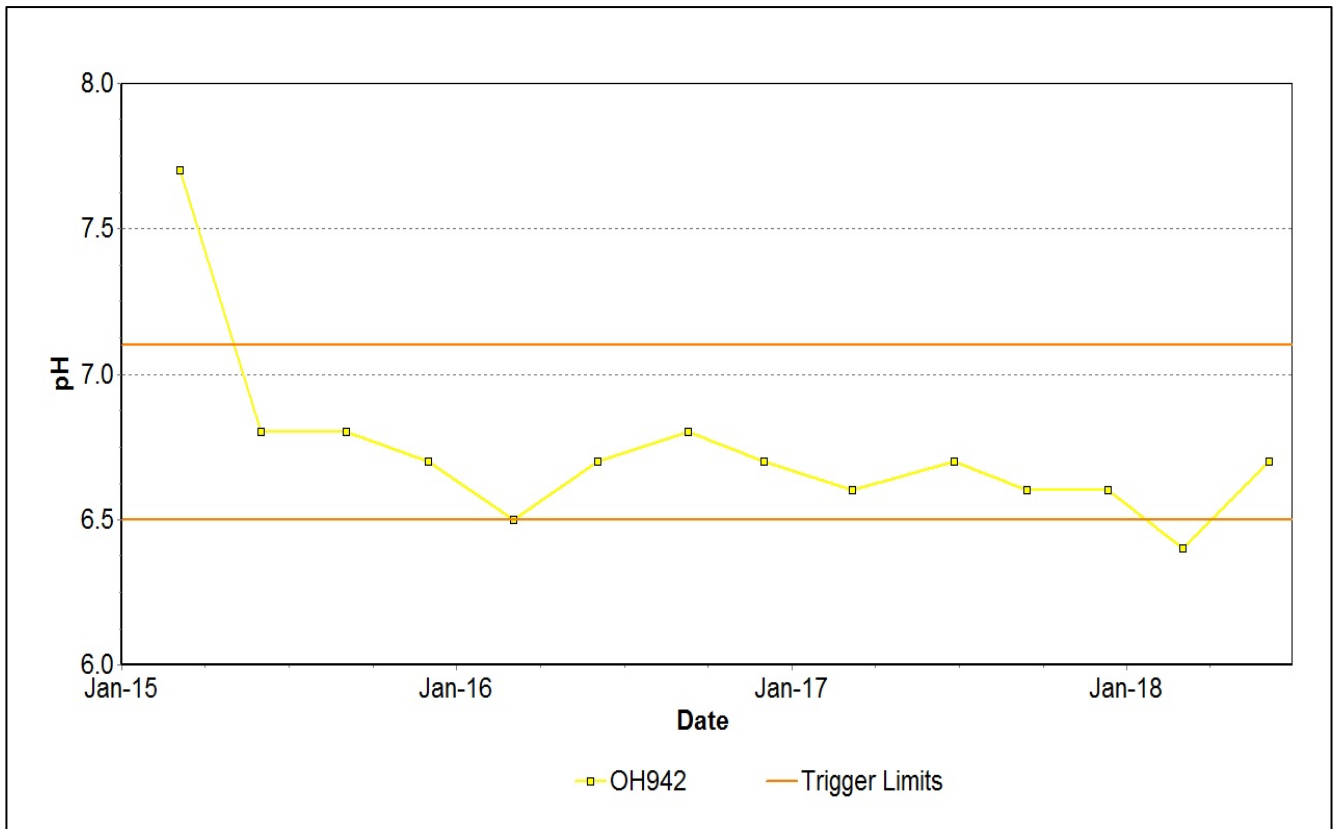


Figure 53: Hunter River Alluvium 3 Seam pH Trend – June 2018

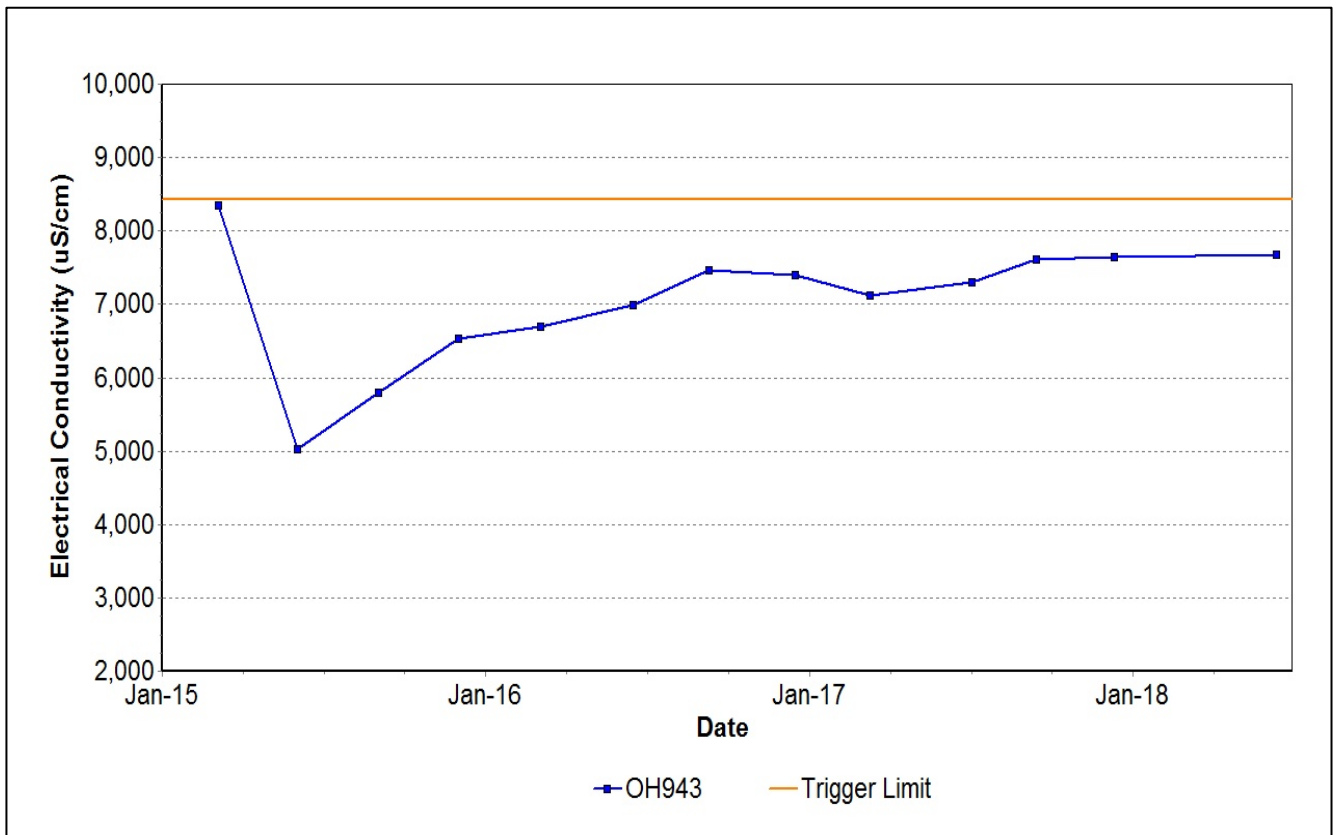


Figure 54: Hunter River Alluvium 4 Seam Electrical Conductivity Trend – June 2018

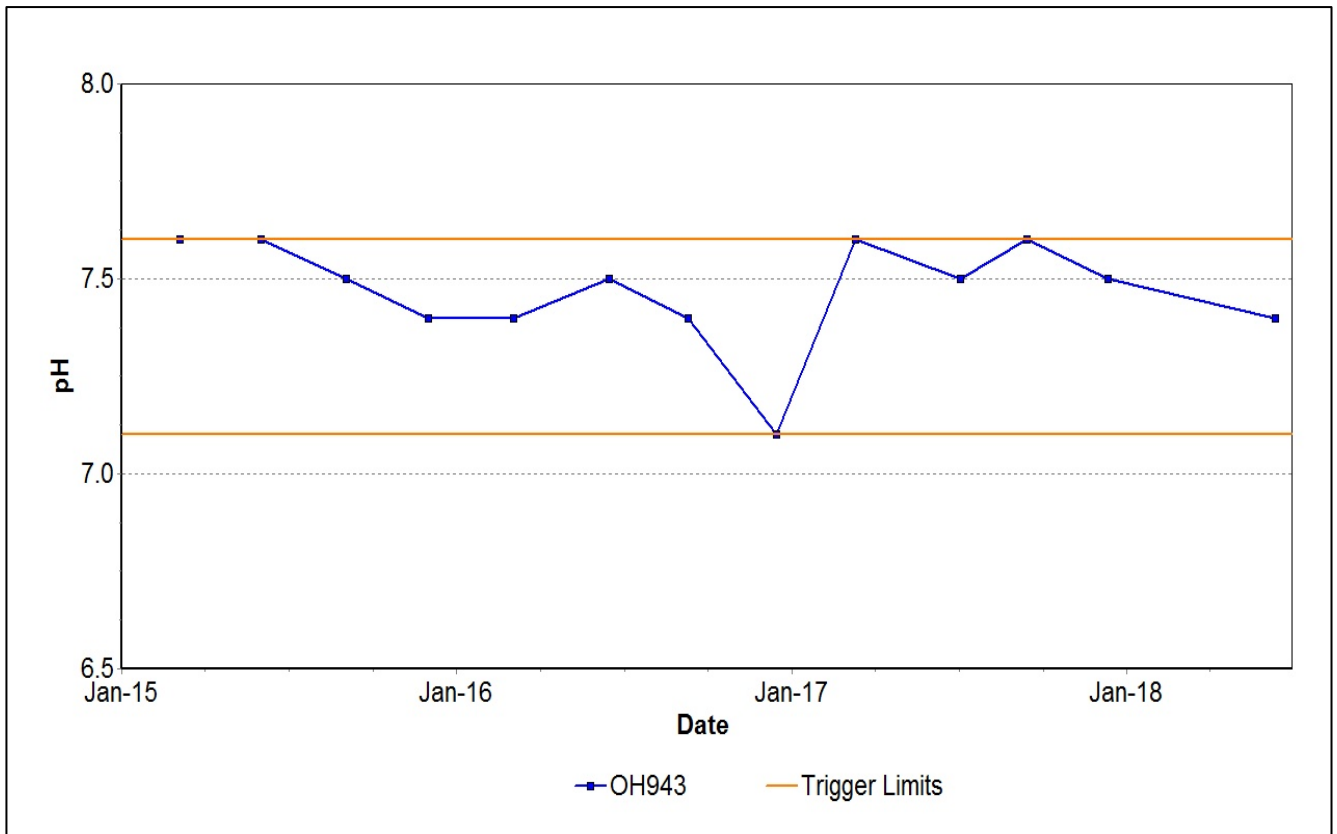
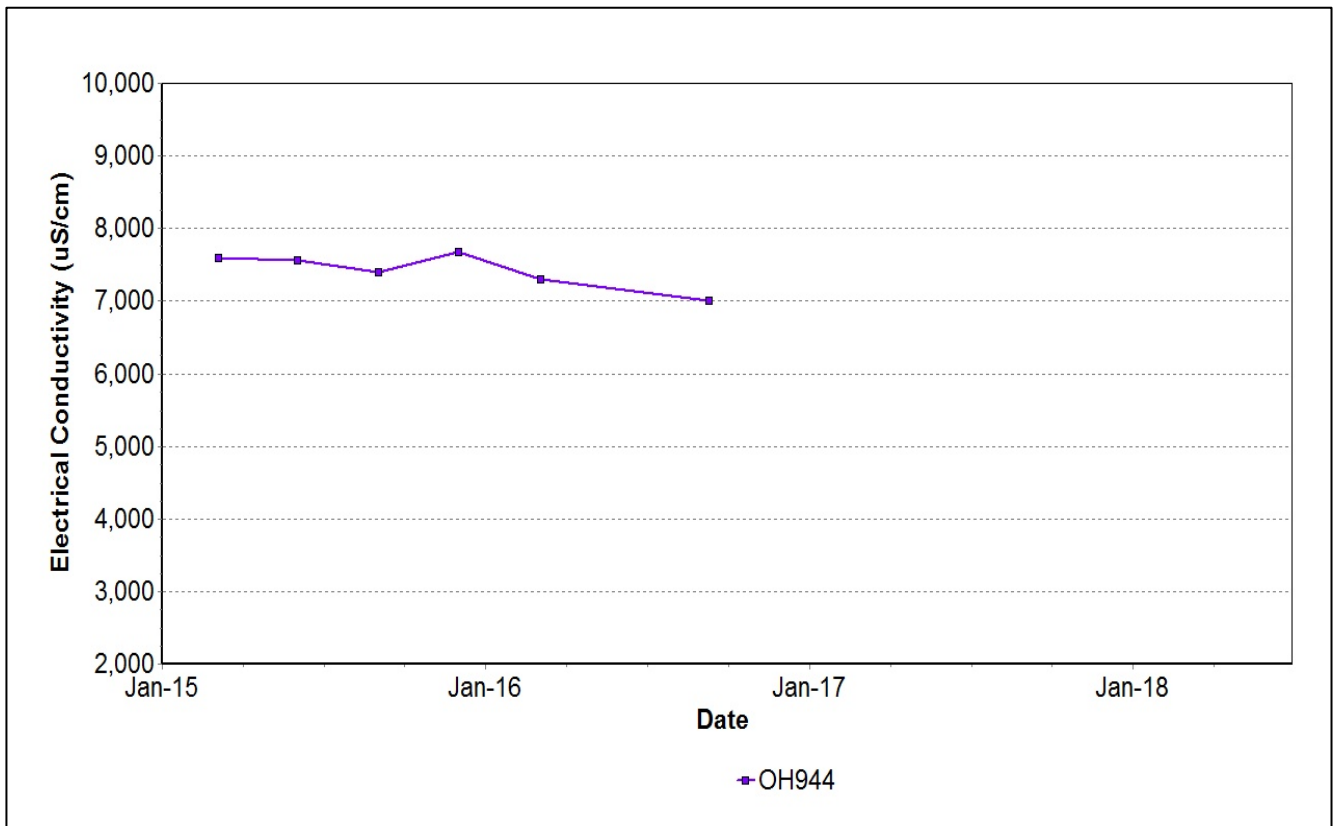
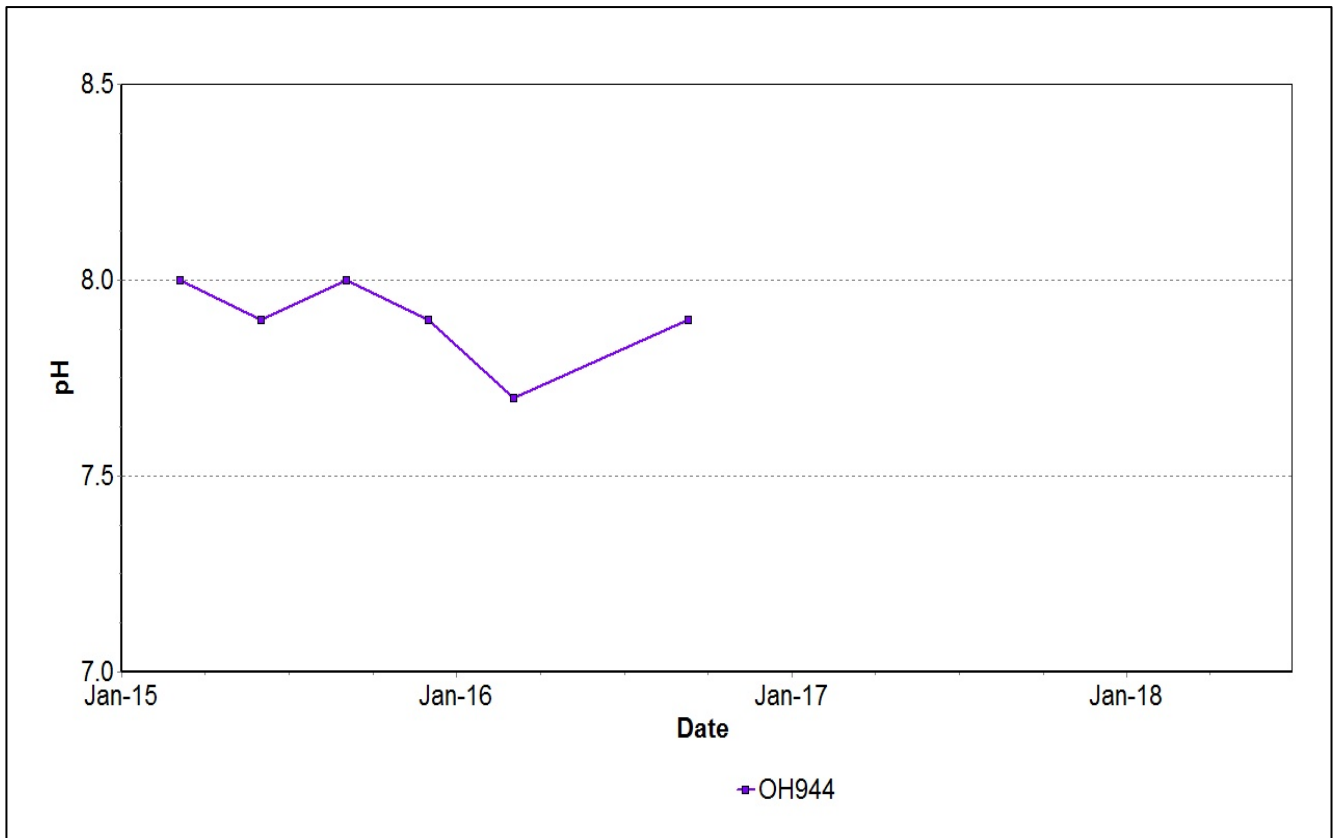


Figure 55: Hunter River Alluvium 4 Seam pH Trend – June 2018



Note: There has been insufficient water to sample since September 2016.

Figure 56: Hunter River Alluvium 5 Seam Electrical Conductivity Trend – June 2018



Note: There has been insufficient water to sample since September 2016.

Figure 57: Hunter River Alluvium 5 Seam pH Trend – June 2018

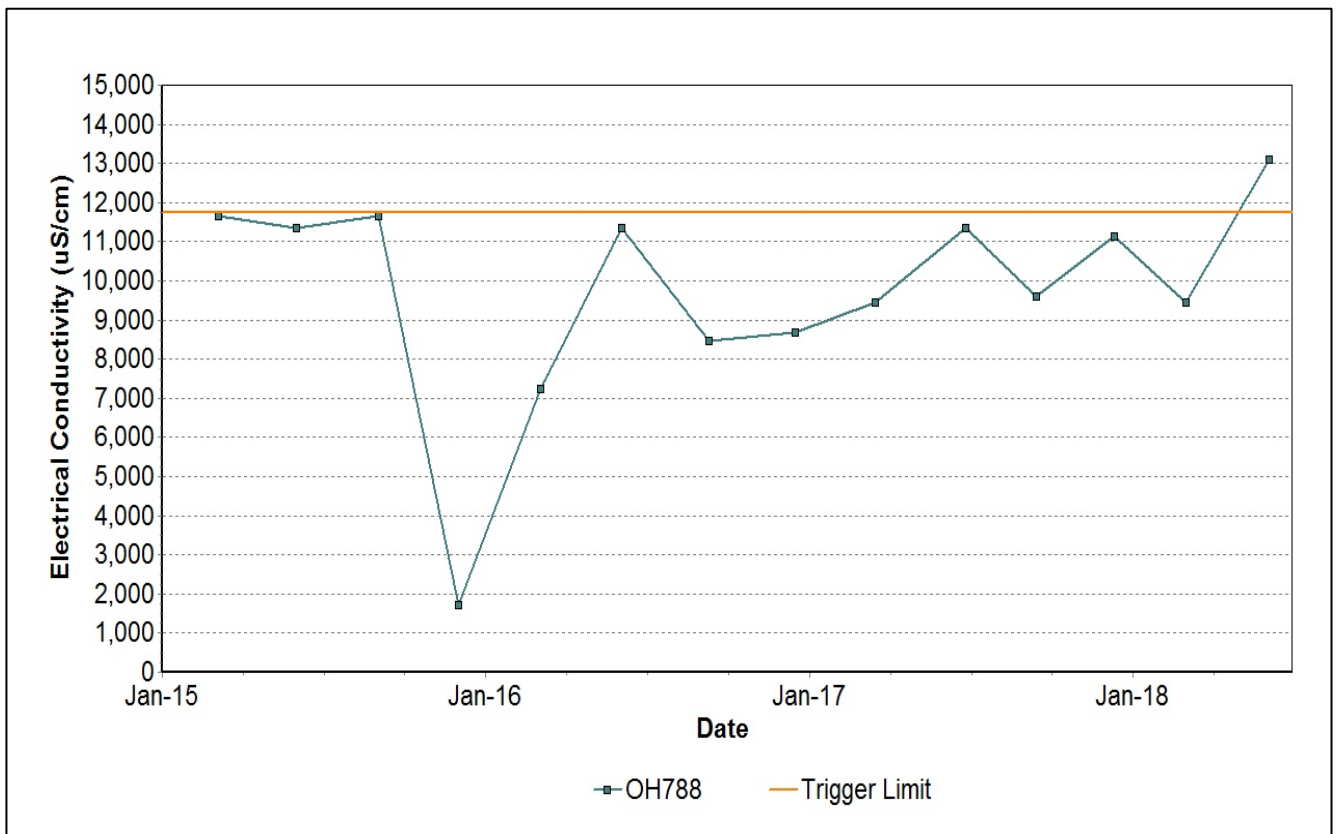


Figure 58: Hunter River Alluvium 6 Seam Electrical Conductivity – June 2018

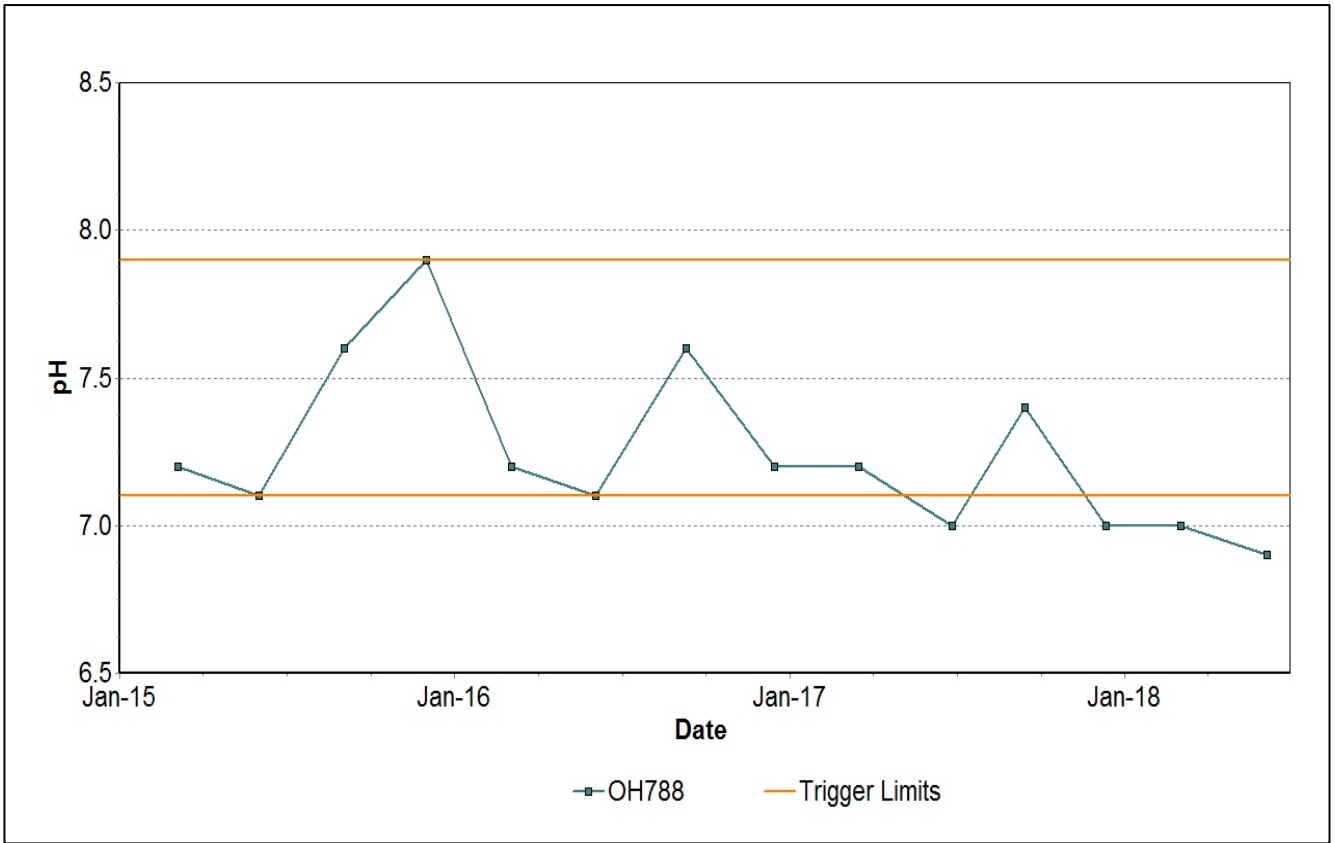


Figure 59: Hunter River Alluvium 6 Seam pH Trend – June 2018

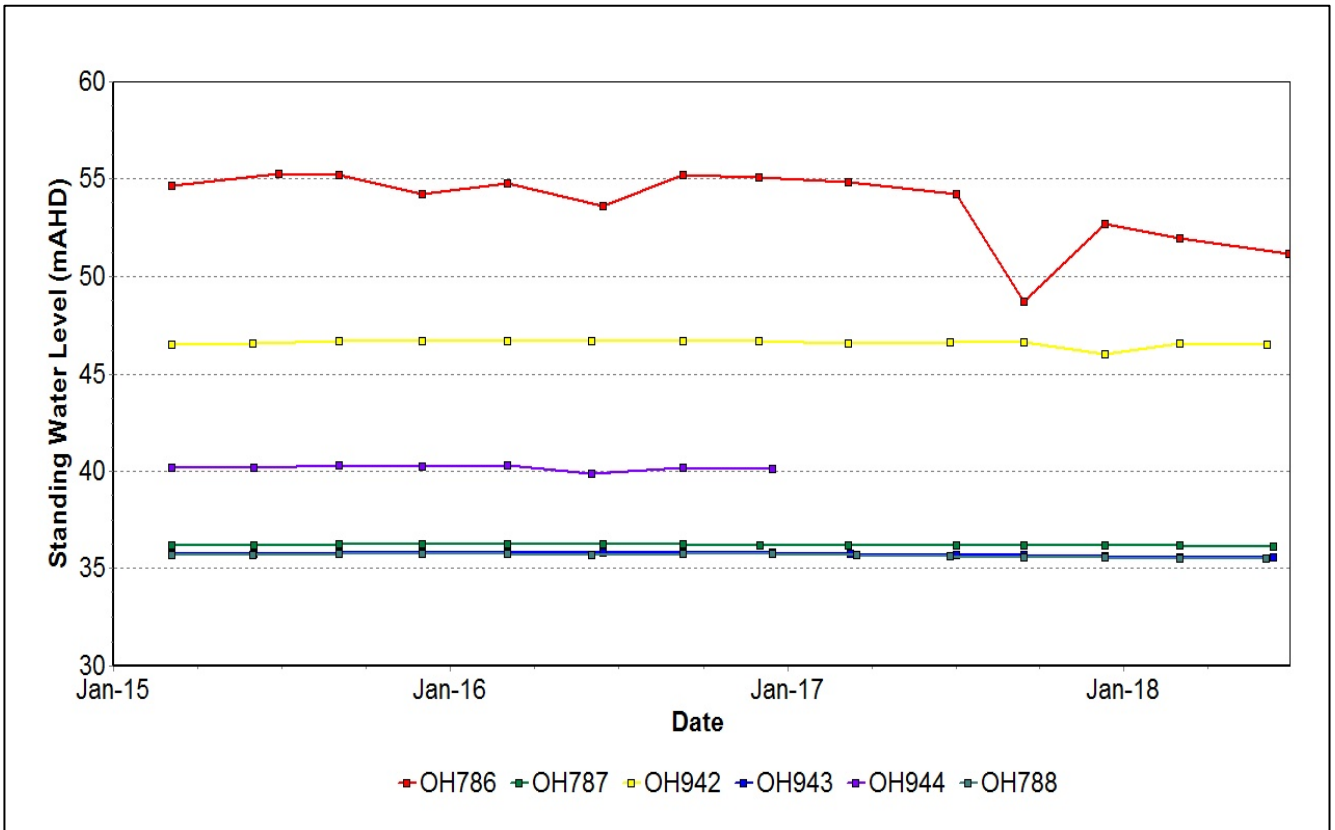


Figure 60: Hunter River Alluvium Standing Water Level Trend – June 2018

### 3.2.1 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 61**.

Current internal groundwater trigger limit breaches are summarised in **Table 4**.

**Table 3: Groundwater Triggers - 2018**

Site	Date	Trigger Limit Breached	Action Taken in Response
OH 786	June	EC – 95th Percentile	Watching Brief*
OH 787	02/03/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
OH 787	12/06/2018	EC – 95th Percentile	Elevated EC is considered attributable to prolonged dry climatic conditions, and not related to mining related impacts. Continue to watch and monitor
OH788	04/06/2018	EC – 95th Percentile	Watching Brief*
MTD605P	06/02/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
MTD605P	10/05/2018	EC – 95th Percentile	Data is stable and consistent with historical trend, other bores within the Shallow Overburden are stable; no further action required
WOH2156B	06/02/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
OH 1138(1)	02/03/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
OH 786	02/03/2018	pH –5th Percentile	Watching Brief*
OH 787	02/03/2018	pH –5th Percentile	Watching Brief*
OH 942	02/03/2018	pH –5th Percentile	Watching Brief*
OH 788	02/03/2018	pH –5th Percentile	Watching Brief*
OH 788	04/06/2018	pH –5th Percentile	Investigation commenced
PZ8S	02/03/2018	pH –5th Percentile	Watching Brief*
PZ9S	02/03/2018	pH – 95th Percentile	Watching Brief*
PZ9S	06/06/2018	pH – 95th Percentile	Investigation commenced
GW9709	02/03/2018	pH –5th Percentile	Watching Brief*
GW98MTCL2	02/03/2018	pH –5th Percentile	Watching Brief*
GW98MTCL2	04/06/2018	pH –5th Percentile	Watching Brief*
WOH2139A	06/02/2018	pH – 95th Percentile	Data is stable and consistent with historical trend; no further action

WOH2139A	23/05/2018	pH – 95th Percentile	Data is stable and consistent with historical trend. Other bores within the Blakefield seam are stable; no further action required
OH 1125(1)	02/03/2018	pH –5th Percentile	Watching Brief*
MB15MTW01D	06/02/2018	pH –5th Percentile	Watching Brief*
MB15MTW01D	10/05/2018	pH –5th Percentile	Data is stable and consistent with historical trend, other bores within the Shallow Overburden are stable; no further action required
PZ9D	02/03/2018	pH –5th Percentile	Watching Brief*
OH 1138(1)	06/02/2018	pH –5th Percentile	Investigation commenced.
OH 1138(1)	06/06/2018	pH –5th Percentile	pH beginning to recover to historic levels. Continue to monitor on increased frequency

\* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.



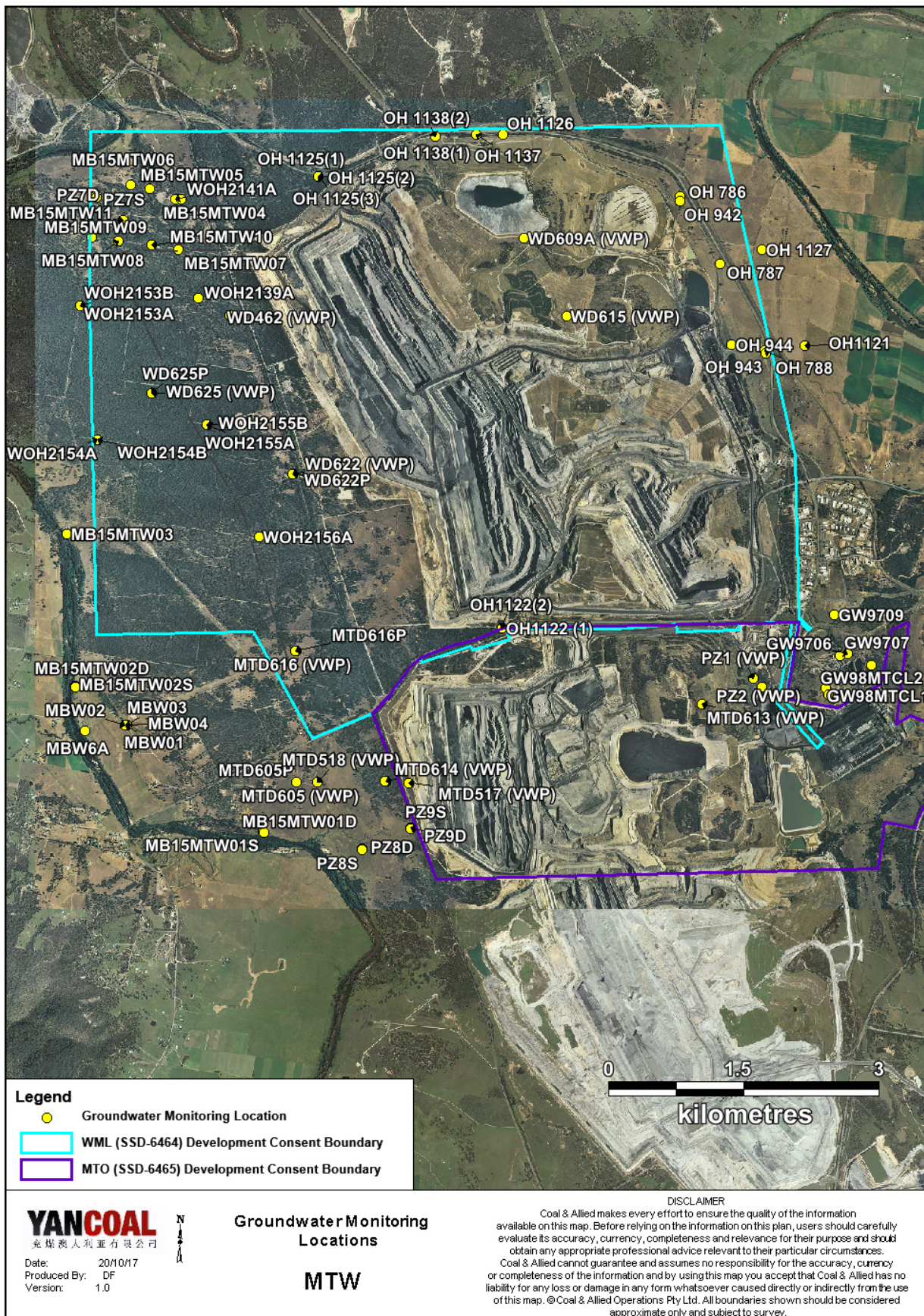


Figure 61: Groundwater Monitoring Location Plan

## 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 68**.

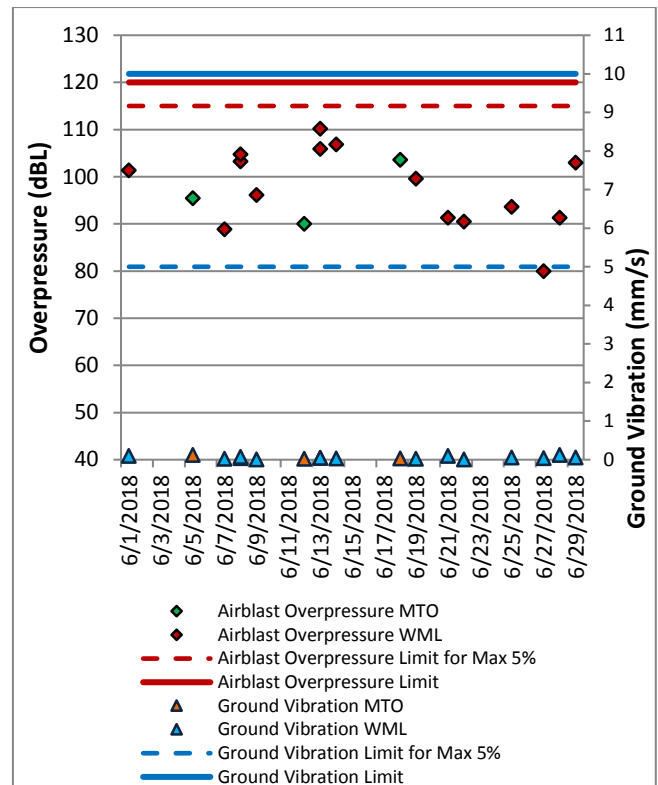
### 4.1 Blast Monitoring Results

During June 2018, 18 blasts were initiated at MTW. **Figure 62** to **Figure 67** show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in **Table 5**.

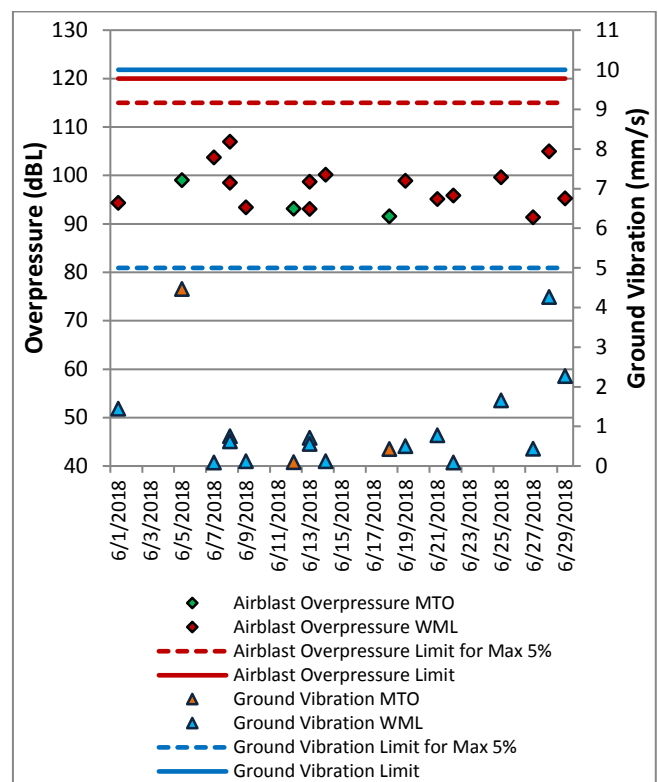
**Table 4: Blasting Limits**

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 62: Abbey Green Blast Monitoring Results – June 2018**



**Figure 63: Bulga Village Blast Monitoring Results – June 2018**

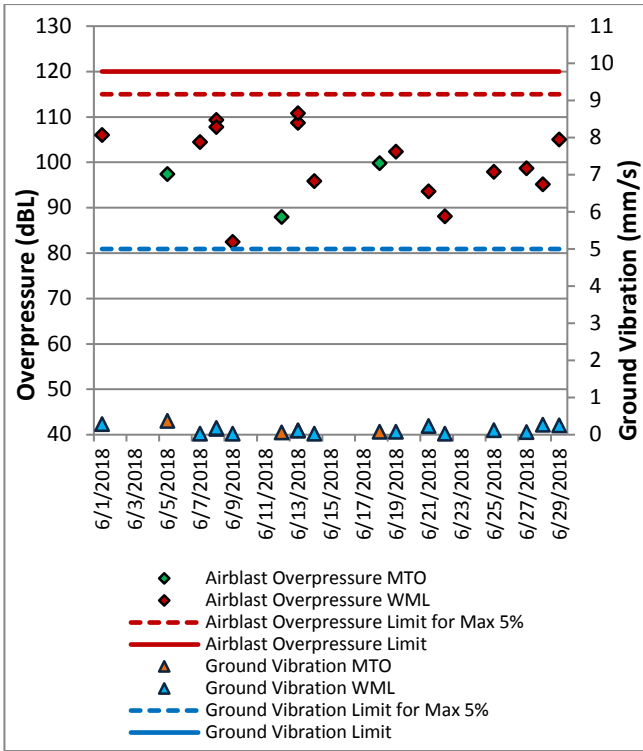


Figure 64: MTIE Blast Monitoring Results – June 2018

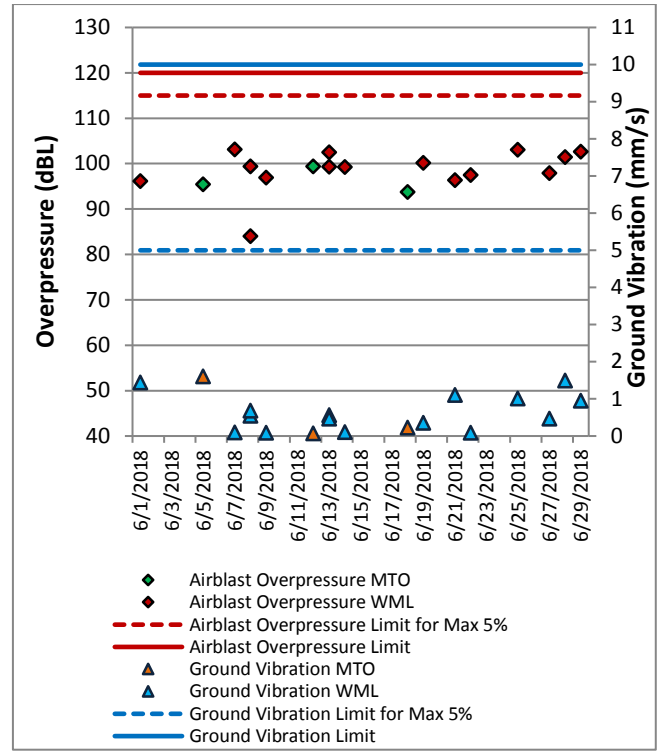


Figure 66: Wambo Road Blast Monitoring Results – June 2018

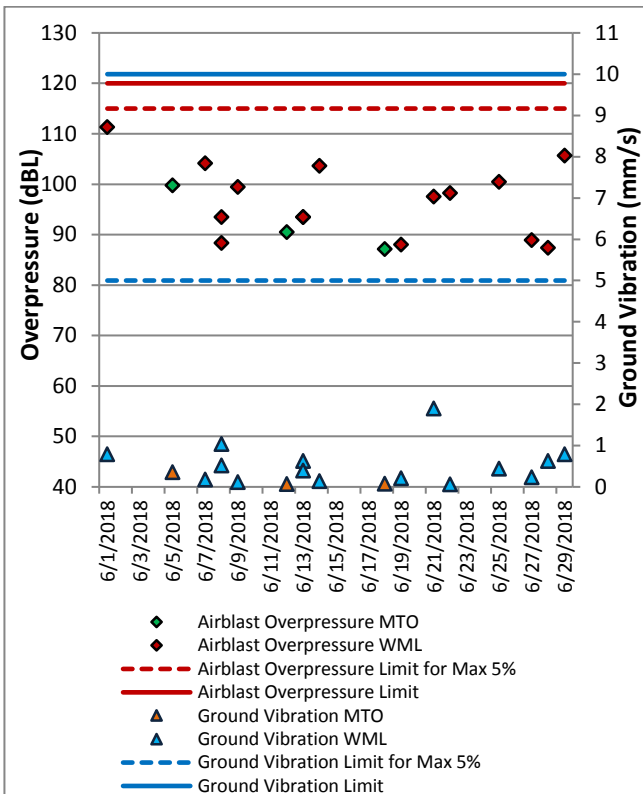


Figure 65: Warkworth Blast Monitoring Results - June 2018

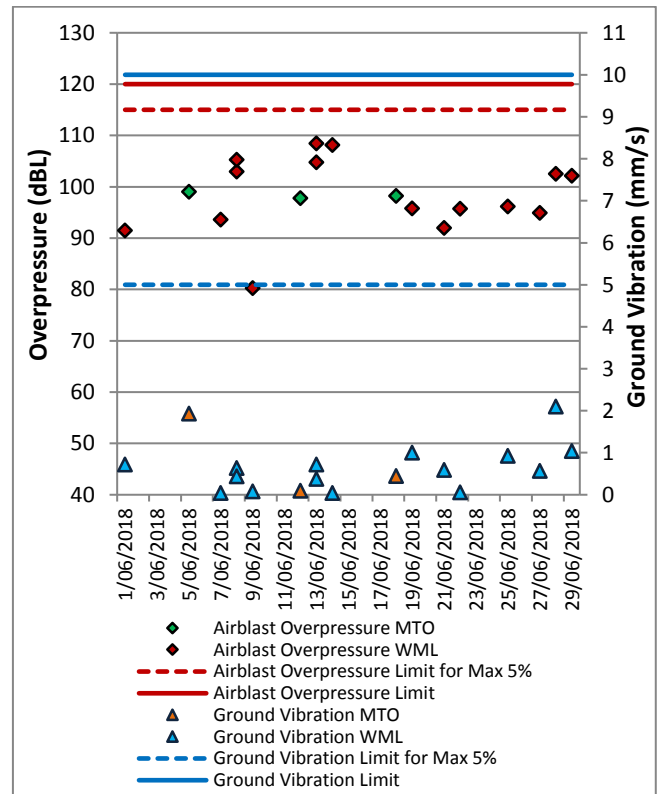


Figure 67: Wollemi Peak Road Blast Monitoring Results - June 2018

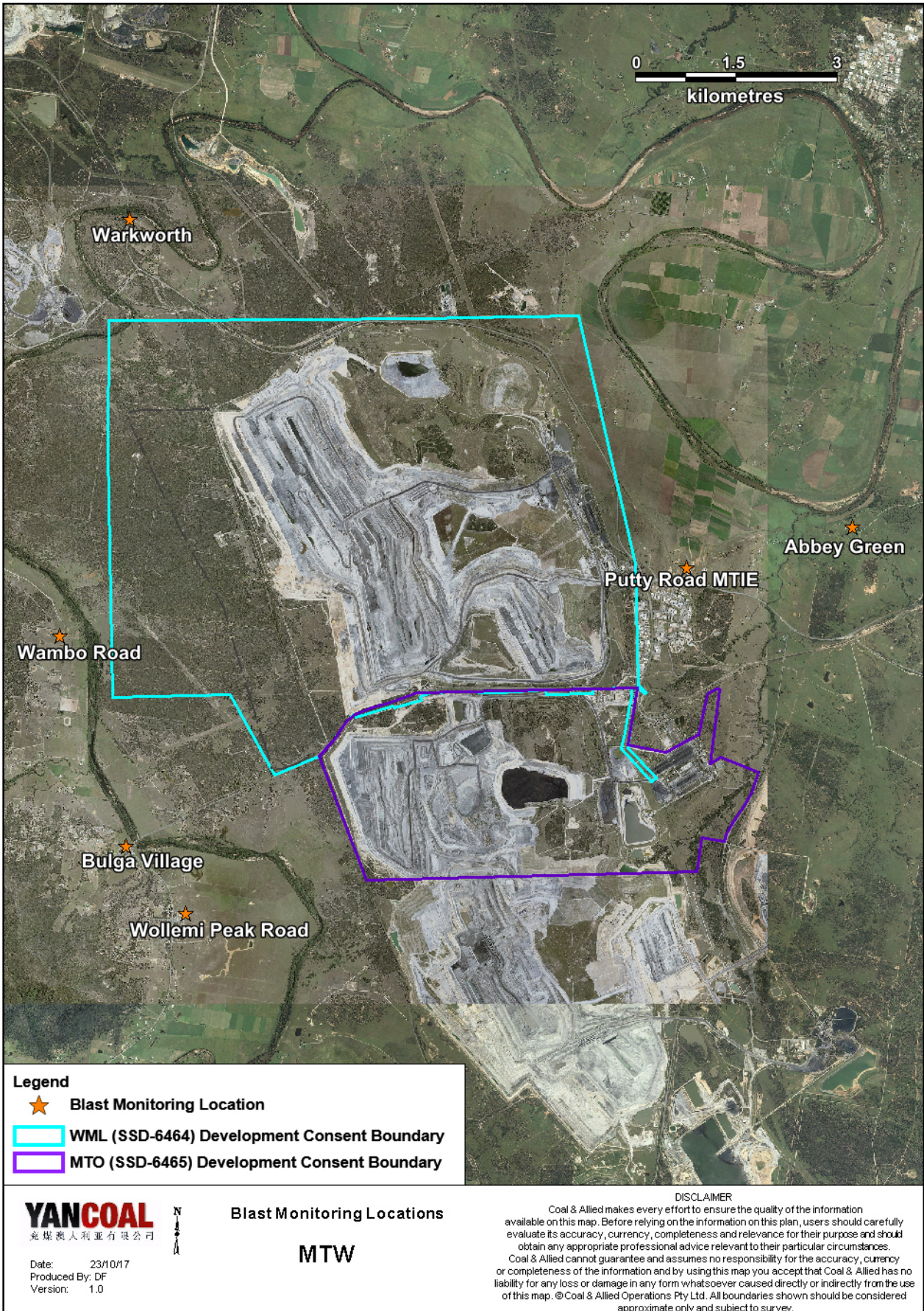


Figure 68: Blast and Vibration Monitoring Location Plan

## 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 69**.

## 5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 21 June 2018. All measurements complied with the relevant criteria. Results are detailed in **Table 6** to **Table 9**.

### 5.1.1 WML Noise Assessment

Compliance assessments undertaken against the WML noise criteria are presented in **Table 6** and **Table 7**.

**Table 5: L<sub>Aeq</sub>, 15 minute Warkworth Impact Assessment Criteria – June 2018**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion (dB(A))	Criterion Applies? <sup>1,5</sup>	WML L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	21/06/2018 21:00	1.5	D	37	Yes	<30	Nil
Bulga Village	21/06/2018 23:18	2.3	D	38	Yes	34	Nil
Gouldsville	21/06/2018 23:56	2.5	D	38	Yes	<30	Nil
Inlet Rd	21/06/2018 21:27	1.7	E	37	Yes	33	Nil
Inlet Rd West	21/06/2018 21:00	1.5	D	35	Yes	30	Nil
Long Point	22/06/2018 0:20	2.4	D	35	Yes	IA	Nil
South Bulga	21/06/2018 21:21	1.7	D	35	Yes	IA	Nil
Wambo Road	21/06/2018 21:56	1.9	E	38	Yes	32	Nil

**Notes:**

- Noise emission limits 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;
- Estimated or measured L<sub>Aeq</sub>,15minute attributed to WML;
- NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

**Table 6: L<sub>A1, 1 minute</sub> Warkworth Impact Assessment Criteria – June 2018**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion (dB(A))	Criterion Applies? <sup>1,5</sup>	WML L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	21/06/2018 21:00	1.5	D	47	Yes	<30	Nil
Bulga Village	21/06/2018 23:18	2.3	D	48	Yes	41	Nil
Gouldsville	21/06/2018 23:56	2.5	D	48	Yes	32	Nil
Inlet Rd	21/06/2018 21:27	1.7	E	47	Yes	43	Nil
Inlet Rd West	21/06/2018 21:00	1.5	D	45	Yes	41	Nil
Long Point	22/06/2018 0:20	2.4	D	45	Yes	IA	Nil
South Bulga	21/06/2018 21:21	1.7	D	45	Yes	IA	Nil
Wambo Road	21/06/2018 21:56	1.9	E	48	Yes	44	Nil

**Notes:**

- Noise emission limits 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;
- Estimated or measured L<sub>A1,1minute</sub> attributed to Warkworth mine (WML);
- NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable.
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

## 5.1.2 MTO Noise Assessment

Compliance assessments undertaken against the MTO noise criteria are presented in **Table 8** and **Table 9**.

**Table 7: L<sub>Aeq, 15minute</sub> Mount Thorley Operations - Impact Assessment Criteria – June 2018**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	21/06/2018 21:00	1.5	D	37	Yes	IA	Nil
Bulga Village	21/06/2018 23:18	2.3	D	38	Yes	IA	Nil
Gouldsville	21/06/2018 23:56	2.5	D	35	Yes	IA	Nil
Inlet Rd	21/06/2018 21:27	1.7	E	37	Yes	IA	Nil
Inlet Rd West	21/06/2018 21:00	1.5	D	35	Yes	IA	Nil
Long Point	22/06/2018 0:20	2.4	D	35	Yes	<25	Nil
South Bulga	21/06/2018 21:21	1.7	D	36	Yes	IA	Nil
Wambo Road	21/06/2018 21:56	1.9	E	38	Yes	IA	Nil

**Notes:**

- Noise emission limits 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;
- Estimated or measured L<sub>Aeq,15minute</sub> attributed to MTO;
- NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

**Table 8: L<sub>A1, 1Minute</sub> Mount Thorley Operations - Impact Assessment Criteria – June 2018**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO L <sub>A1, 1min</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	21/06/2018 21:00	1.5	D	47	Yes	IA	Nil
Bulga Village	21/06/2018 23:18	2.3	D	48	Yes	IA	Nil
Gouldsville	21/06/2018 23:56	2.5	D	45	Yes	IA	Nil
Inlet Rd	21/06/2018 21:27	1.7	E	47	Yes	IA	Nil
Inlet Rd West	21/06/2018 21:00	1.5	D	45	Yes	IA	Nil
Long Point	22/06/2018 0:20	2.4	D	45	Yes	<25	Nil
South Bulga	21/06/2018 21:21	1.7	D	46	Yes	IA	Nil
Wambo Road	21/06/2018 21:56	1.9	E	48	Yes	IA	Nil

**Notes**

- Noise emission limits 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;
- Estimated or measured L<sub>A1,1minute</sub> attributed to MTO;
- NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable.
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

### 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. There were no noise measurements taken during the reporting period which required the penalty to be applied. The assessment for low frequency noise is shown in **Table 10**.

**Table 9: Low Frequency Noise Assessment - June 2018**

Location	Date and Time	Measured Site Only LA <sub>eq</sub> dB (WML/MTO)	Site Only LC <sub>eq</sub> dB <sup>4</sup> (WML/MTO)	Site Only LC <sub>eq</sub> - LA <sub>eq</sub> dB <sup>1,4</sup> (WML/MTO)	Result Max exceedance of ref spectrum dB <sup>2,3,4</sup> (WML/MTO)	Penalty dB(A) (WML/MTO)	Exceedance
Bulga RFS	21/06/2018 21:00	<30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Bulga Village	21/06/2018 23:18	34/IA	53/NA	19/NA	0/NA	Nil/NA	NA
Gouldsville	21/06/2018 23:56	<30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd	21/06/2018 21:27	33/IA	52/NA	19/NA	0/NA	Nil/NA	NA
Inlet Rd West	21/06/2018 21:00	30/IA	47/NA	17/NA	0/NA	Nil/NA	NA
Long Point	22/06/2018 0:20	IA/<25	NA/NA	NA/NA	NA/NA	NA/NA	NA
South Bulga	21/06/2018 21:21	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Wambo Road	21/06/2018 21:56	32/IA	50/NA	18/NA	0/NA	Nil/NA	NA

**Notes:**

1. As per NPfI, if LC<sub>eq</sub> – LA<sub>eq</sub> >= 15 dB further assessment of low frequency noise required.
2. As per NPfI, compare measured spectrum against reference spectrum to determine if the low frequency modifying factor is triggered and application of penalty is required;
3. Bold results and penalties in red are where the relevant modifying factor trigger was exceeded; and
4. Where it is not possible to determine the site only result due to the presence of other low frequency noise sources occurring during the measurement, or where criteria were not applicable due to meteorological conditions, this is noted as NA (not available) and no further assessment has been undertaken.

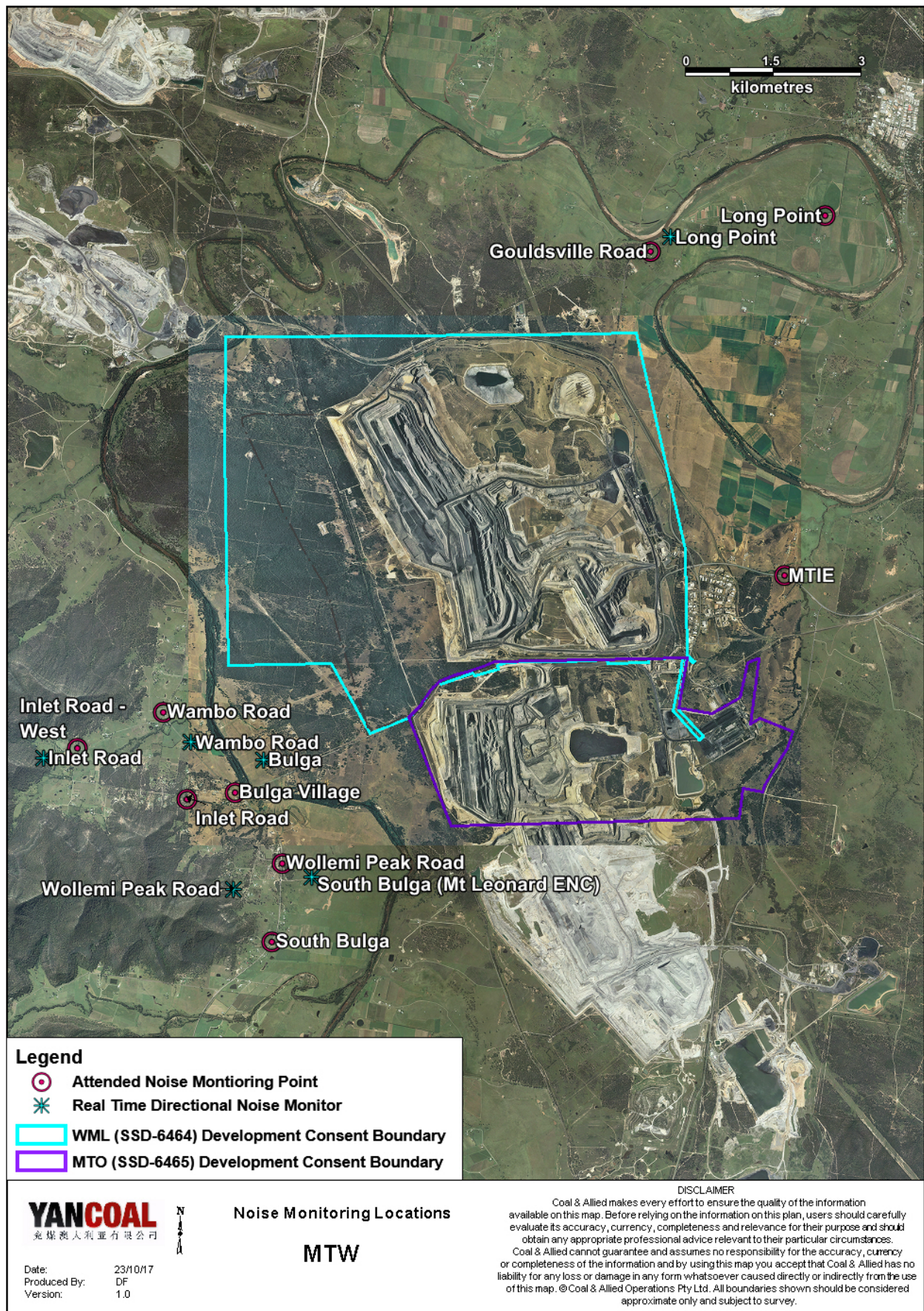


Figure 69: Noise Monitoring Location Plan



## 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 June are provided in **Table 11**.

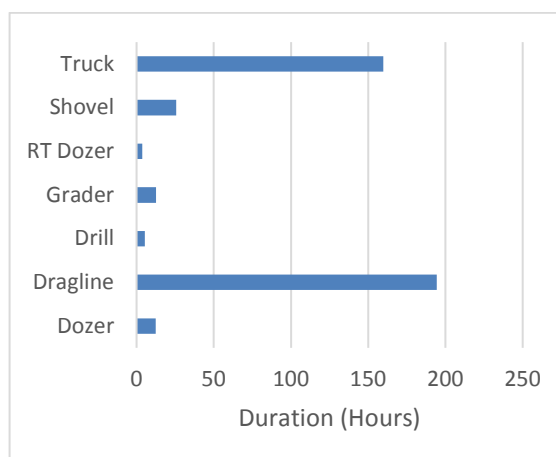
**Table 10: Supplementary Attended Noise Monitoring Data – June 2018**

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
582	3	1	0.5

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 413 hours of equipment downtime was logged in response to environmental events such as dust, noise and elevated wind impacts. Operational downtime by equipment type is shown in **Figure 70**.



**Figure 70: Operational Downtime by Equipment Type – June 2018**

## 7.0 REHABILITATION

During June, 2.3Ha of land was released, 4.0Ha was bulk shaped, 0.4 Ha was composted and 4.1Ha was rehabilitated. Year-to-date progress can be viewed in **Figure 71**

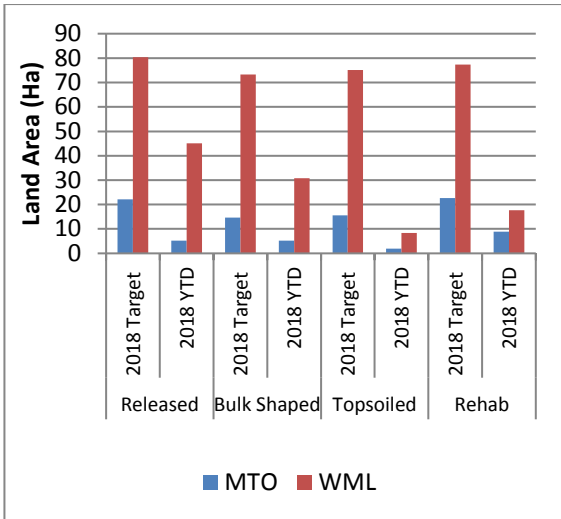


Figure 71: Rehabilitation YTD - June 2018

## 8.0 ENVIRONMENTAL INCIDENTS

There were no reportable environmental incidents during the reporting period.

## 9.0 COMPLAINTS

During the reporting period 22 complaints were received, details of these complaints are displayed in Figure 72 below.

	Noise	Dust	Blast	Lighting	Other	Total
January	9	6	14	0	1	30
February	8	5	2	3	1	19
March	21	0	0	2	0	23
April	8	3	9	3	2	25
May	10	11	3	1	0	25
June	12	2	8	0	0	22
July						
August						
September						
October						
November						
December						
<b>Total</b>	<b>68</b>	<b>27</b>	<b>36</b>	<b>9</b>	<b>4</b>	<b>144</b>

Figure 72: Complaints Summary - YTD June 2018

## **Appendix A: Meteorological Data**

**Table 11: Meteorological Data – Charlton Ridge Meteorological Station – June 2018**

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/06/2018	16	8	65	41	881	198	3.9	0.0
2/06/2018	16	8	78	47	782	200	3.6	0.2
3/06/2018	20	11	82	42	751	171	4.1	0.0
4/06/2018	19	8	84	45	777	173	2.5	0.0
5/06/2018	17	10	92	53	830	169	3.2	0.4
6/06/2018	14	9	95	80	332	170	2.6	3.2
7/06/2018	19	9	93	49	795	145	2.5	0.0
8/06/2018	16	6	96	54	310	206	1.4	0.6
9/06/2018	15	9	96	78	183	238	1.4	1.8
10/06/2018	14	8	97	77	712	176	2.6	1.2
11/06/2018	18	6	92	47	862	168	2.4	0.0
12/06/2018	17	4	98	52	751	203	1.7	0.2
13/06/2018	17	5	91	39	614	308	3.0	0.0
14/06/2018	18	4	82	32	567	295	2.9	0.0
15/06/2018	19	7	62	27	602	303	4.2	0.0
16/06/2018	17	7	69	27	591	310	5.2	0.0
17/06/2018	14	6	74	37	727	304	5.9	0.0
18/06/2018	16	7	83	37	621	246	3.8	0.4
19/06/2018	14	6	93	55	844	193	3.8	13.2
20/06/2018	17	9	93	56	868	173	3.3	1.2
21/06/2018	16	7	93	54	597	173	1.3	0.0
22/06/2018	16	4	99	66	676	199	1.6	0.2
23/06/2018	20	3	98	31	443	261	2.2	0.2
24/06/2018	17	3	86	36	429	186	1.4	0.0
25/06/2018	17	3	88	37	439	166	1.8	0.0
26/06/2018	18	3	90	41	437	164	1.8	0.0
27/06/2018	17	5	93	60	509	148	2.0	0.0
28/06/2018	17	7	97	55	620	200	1.4	9.4
29/06/2018	14	5	100	47	670	303	2.6	0.2
30/06/2018	19	4	88	33	583	296	3.1	0.0

“..” Indicates that data was not available due to technical issues.