HUNTER VALLEY OPERATIONS

Monthly Environmental Monitoring Report

Hunter Valley Operations

June 2019

CONTENTS

Figures

Tables

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environment & Community Officer**	**Draft**	**05/08/2019**
1.1	**Environment & Community Coordinator**	**Final**	**09/08/2019**

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Hunter Valley Operations (HVO). This report includes all monitoring data collected for the period 1st June to 30th June 2019.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

HVO maintains two meteorological stations; 'Corporate' and 'Cheshunt' (Refer to Figure 4: Air Quality Monitoring Location Plan).

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the 2019 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2019	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
June	8.6	264.8

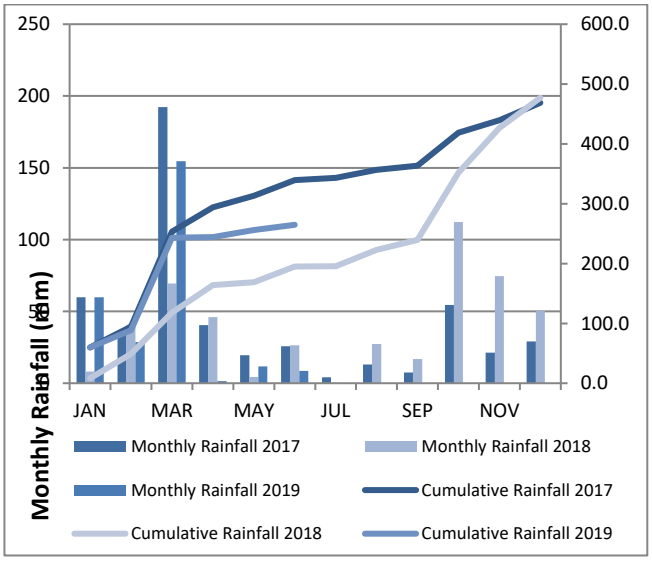

Figure 1: Rainfall Summary 2019

2.1.2 Wind Speed and Direction

North-westerly winds were dominant during June as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

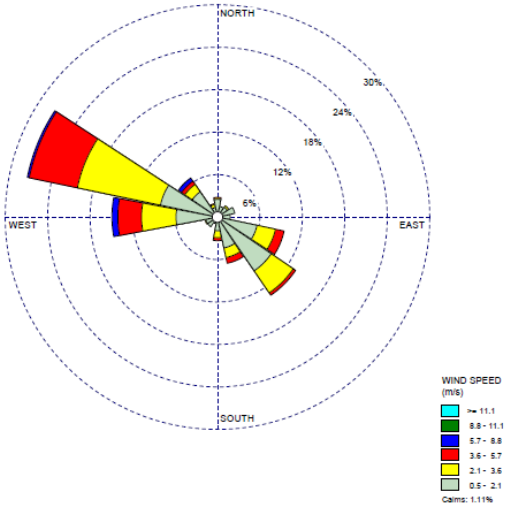

Figure 2: HVO Corporate Wind Rose – June 2019

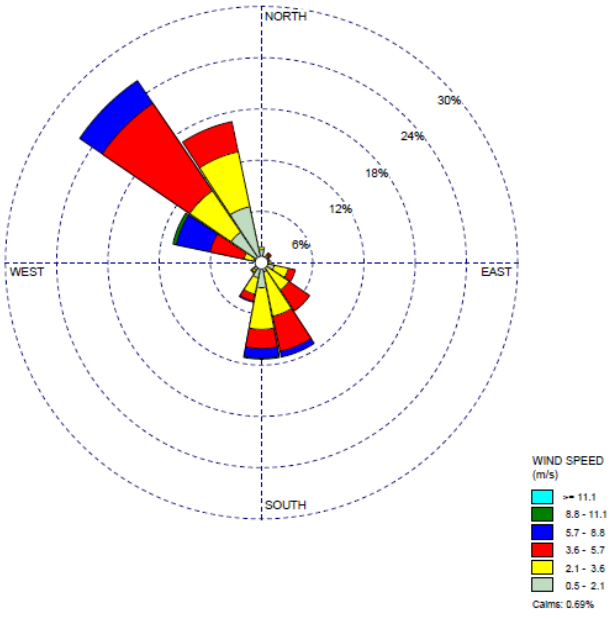

Figure 3: HVO Cheshunt Wind Rose – June 2019

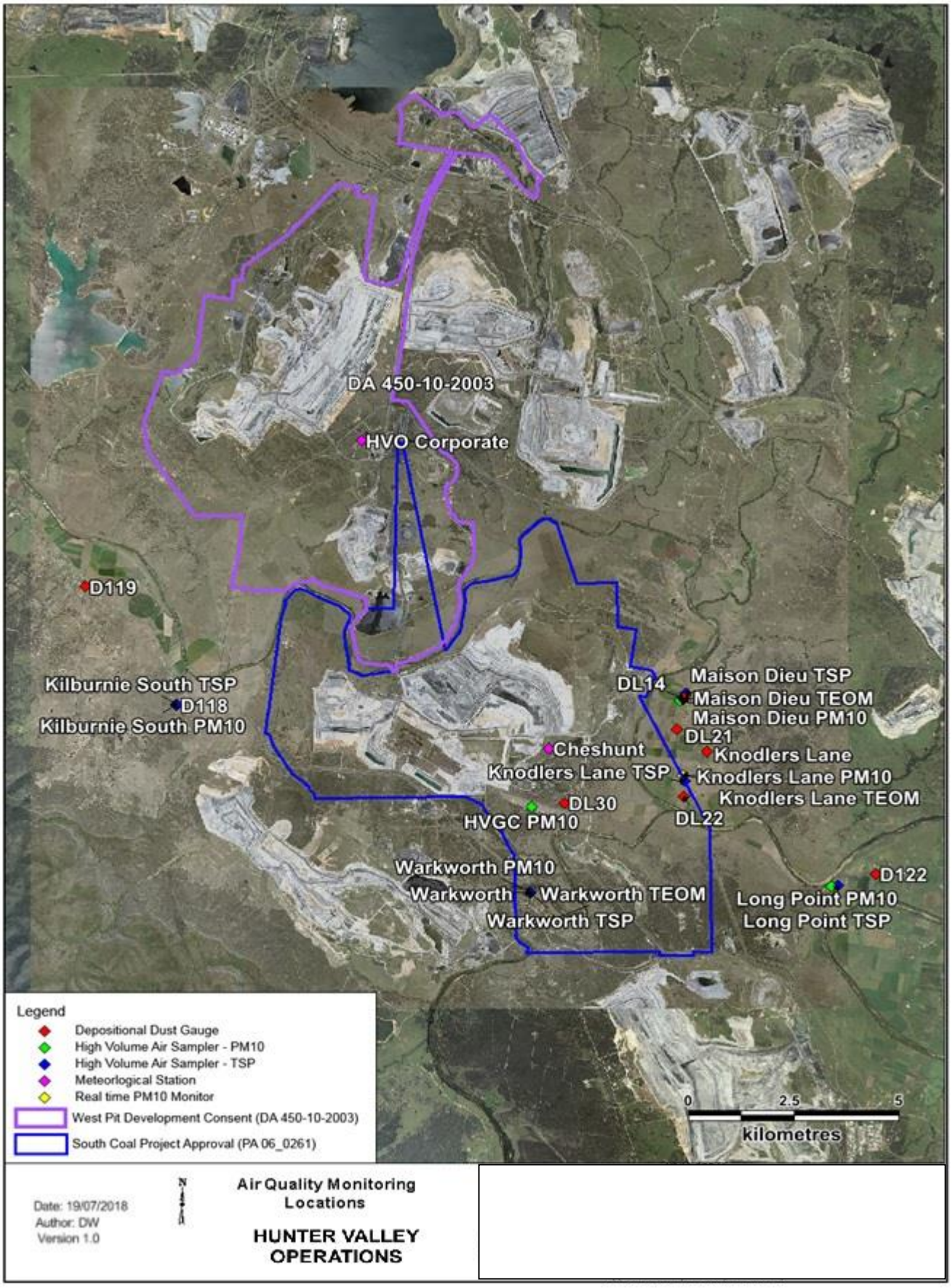

Figure 4: Air Quality Monitoring Location Plan

2.2 Depositional Dust

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

Figure 5 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, DL21 and DL30 monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m^2 per month.

The field notes associated with the DL21 and DL30 monitor results indicates no evidence to suggest that these results were contaminated and will be included in the annual average calculation.

Field notes for D122 state that the sample was contaminated with insects and was green and slightly turbid.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

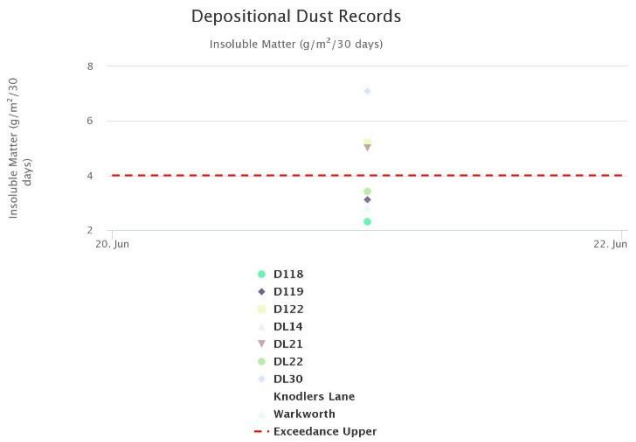

Figure 5: Depositional Dust Results – June 2019

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 4. Each HVAS was run for 24 hours on a six-day cycle.

2.3.1 HVAS PM_{10} Results

Figure 6 shows individual PM_{10} results at each monitoring station against the short term impact assessment criteria of 50 µg/m3.

On 1 June 2019, the Hunter Valley Gliding Club HVAS unit recorded an elevated 24 hour average of 72µg/m^3, with HVO's maximum contribution was calculated to be 45.3 µg/m^3 or 63% of the total measured result.

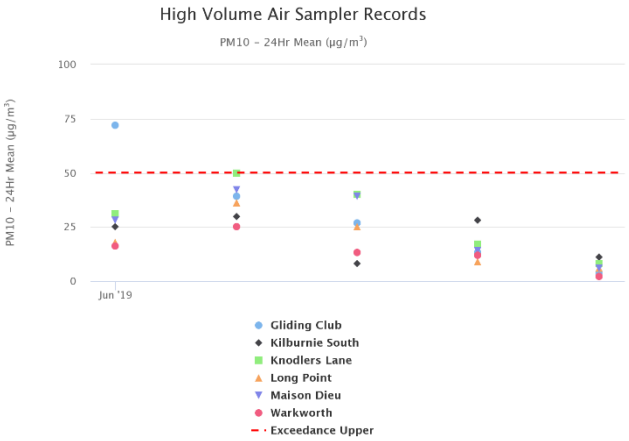

Figure 6: Individual PM_{10} Results – June 2019

Figure 7 shows the year to date annual average PM_{10} results. An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

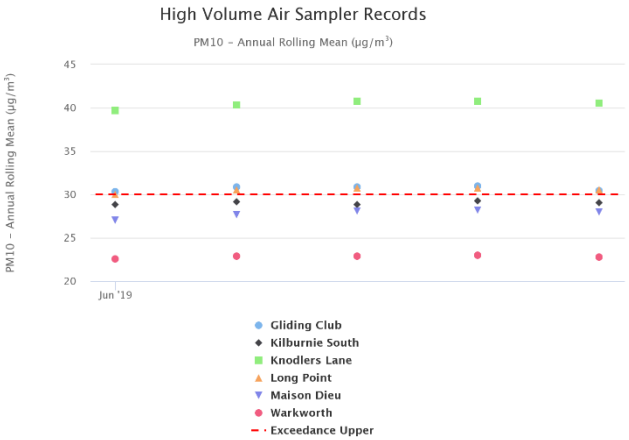

Figure 7: Year to Date Average PM_{10} – June 2019

2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2019 Annual Review.

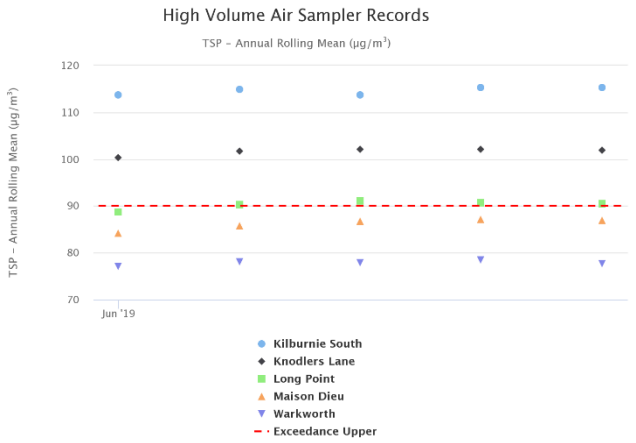

Figure 8: Year to Date Average Total Suspended Particulates – June 2019

2.3.3 Real Time PM_{10} Results

Hunter Valley Operations maintains a network of real time PM_{10} monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger limits. Results from real time PM_{10} monitoring are used as a reactive measure to guide mining operations to ensure compliance with the relevant conditions of the project approval.

Results for real time dust sampling is shown in Figure 9**,** including the daily 24 hour average PM_{10} result and the year to date 24 hour PM_{10} annual average.

Table 2 shows the exceedances for real time PM_{10} monitoring for June.

2.3.4 Real Time Alarms for Air Quality

During June the real time monitoring system generated 154 automated air quality related alarms. 10 were related to adverse weather conditions and 144 alarms relating to PM_{10}.

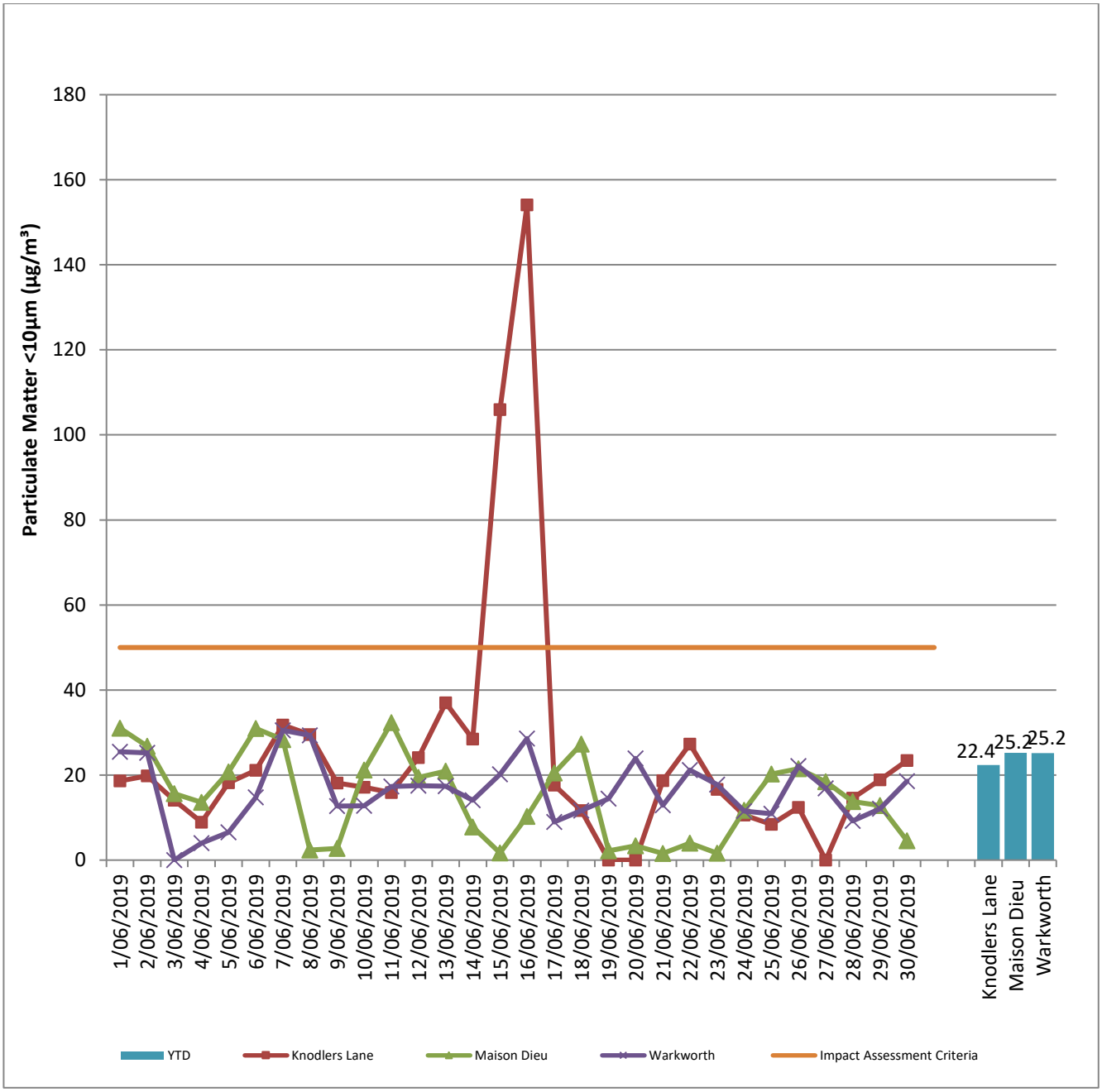

Figure 9: Real Time PM_{10} 24hr average and YTD average – June 2019

Table 2: Real-time PM10 Investigation Results

Date	Site	Total Measured Result (µg/m3)	Estimated contribution from HVO (µg/m3 / %)	Discussion
15/06/2019	Knodlers Lane TEOM	105.9	71.0µg/m3 Or 67%	An internal investigation determined HVO maximum potential contribution to be in the order of 71ug/m3 or 67% of the total measured based on prevailing wind conditions. However it was identified that a fault with the monitor caused flat line data at 399.
16/06/2019	Knodlers Lane TEOM	N/A	N/A	Insufficient amount of valid data to calculate a 24 hour average.

3.0 SURFACE WATER

3.1.1 Surface Water Monitoring

Surface water courses are sampled on a quarterly or rain event sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS).

In the absence of licence or applicable ANZECC criteria, the 5th / 95th percentile of the available validated data record for a monitoring station are adopted as the basis for a water quality management guideline trigger as outlined in the Water Management Plan for Electrical Conductivity and pH. The 50mg/L ANZECC criteria has been adopted for TSS. Exceedances of these triggers for Quarter 2 2019 are detailed in Table 3

The location of Surface Water monitoring locations is shown in Figure 22**.**

Figure 10 to Figure 12 show the long term surface water trend (2016- current) within HVO mine dams.

Figures 13 to 21 show the long term surface water trend (2016 – current) in surrounding watercourses

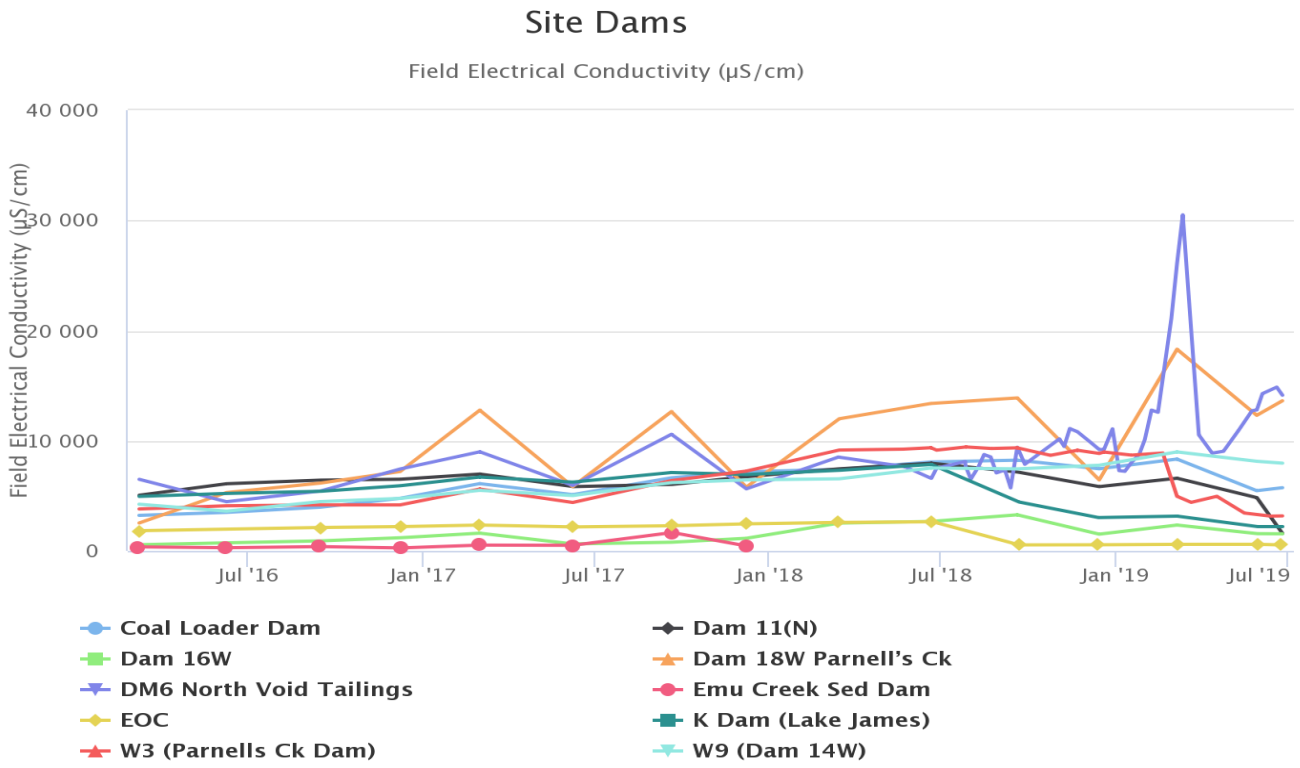

Figure 10: Site Dams Electrical Conductivity Trend – June 2019

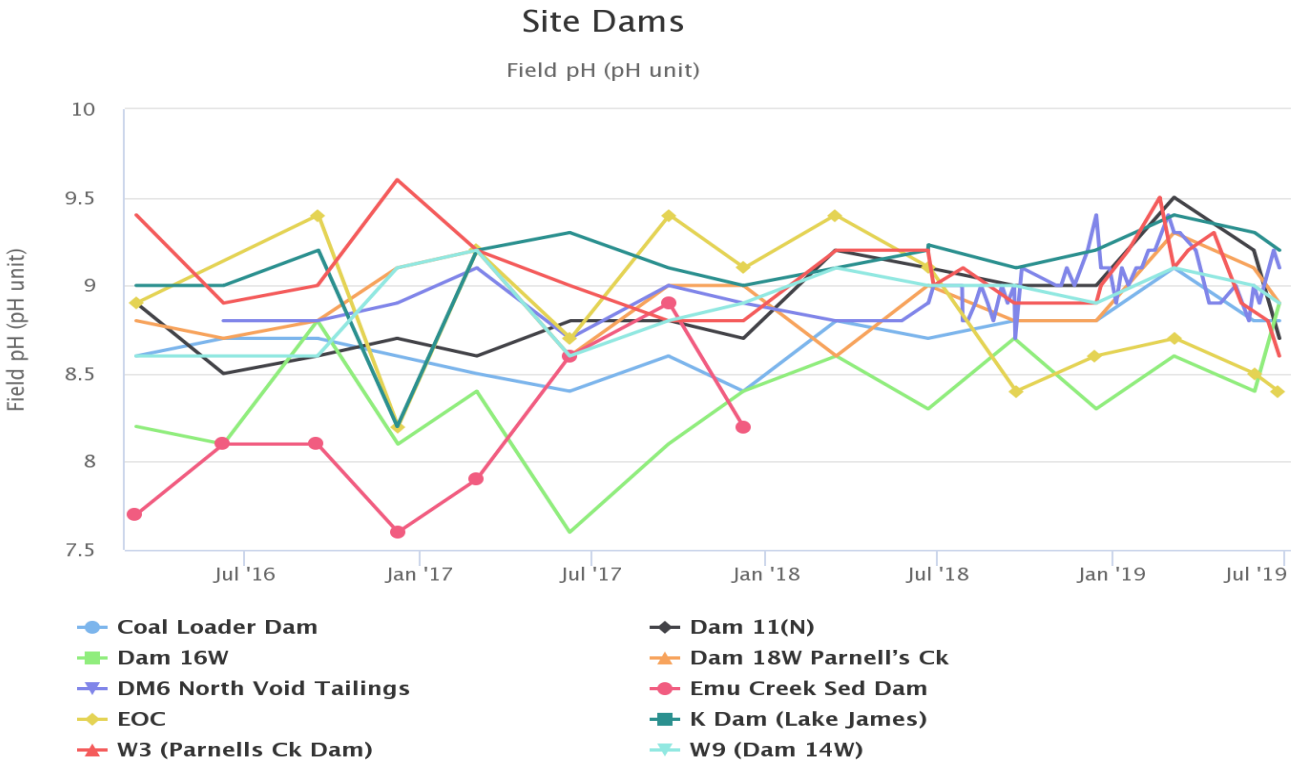

Figure 11: Site Dams pH Trend – June 2019

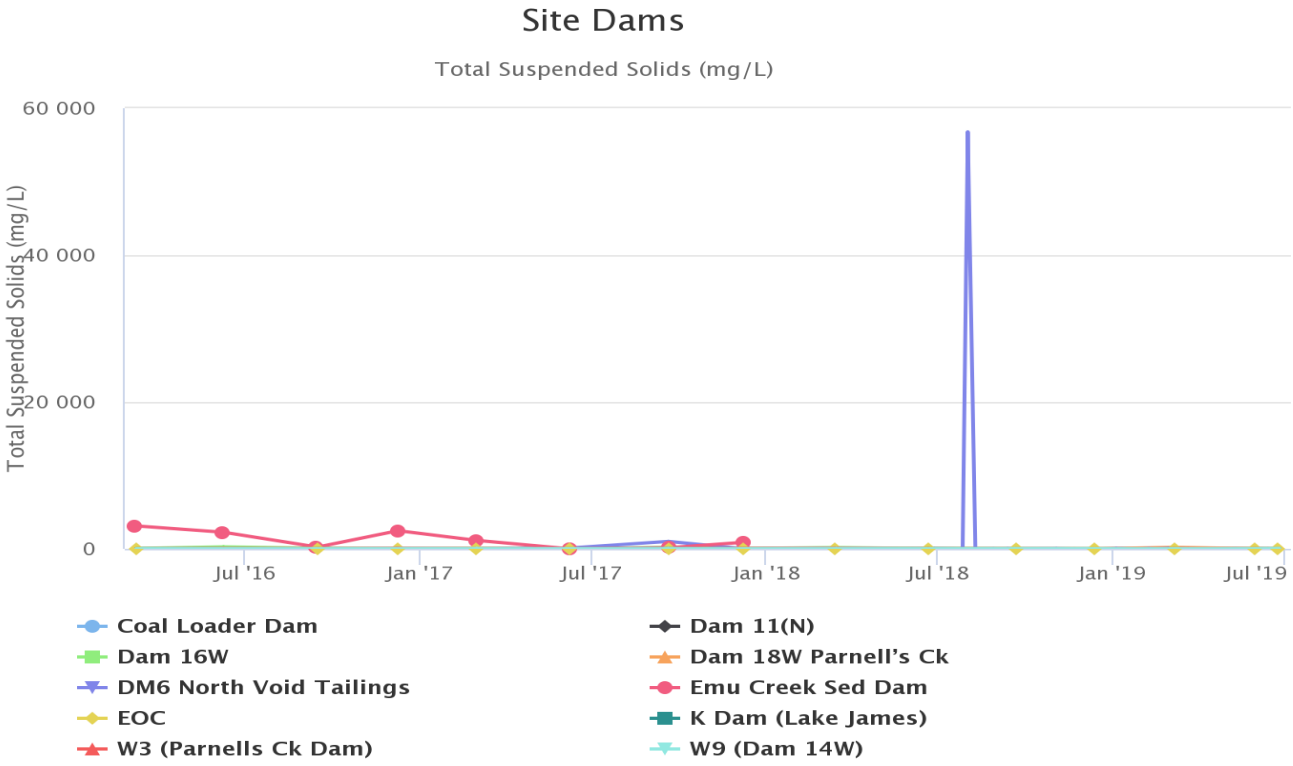

Figure 12: Site Dams Total Suspended Solids Trend – June 2019

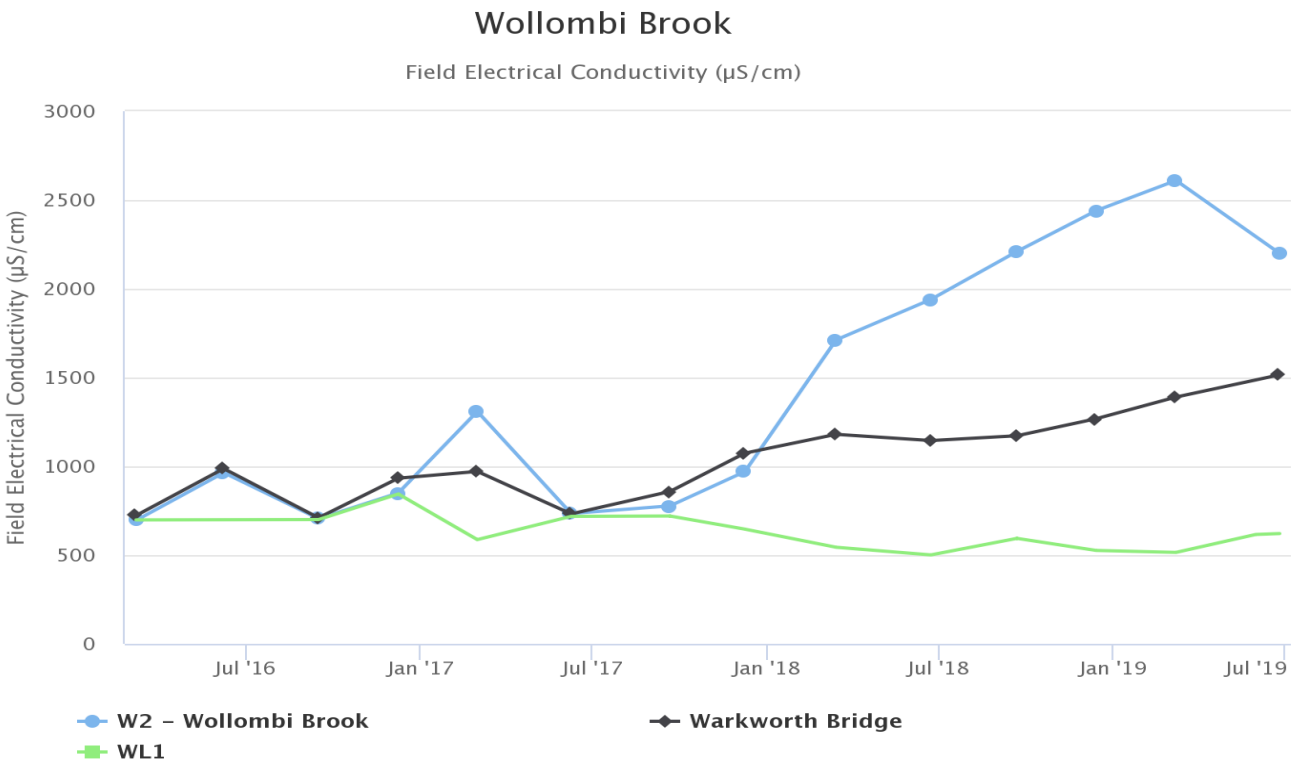

Figure 13: Wollombi Brook Electrical Conductivity Trend – June 2019

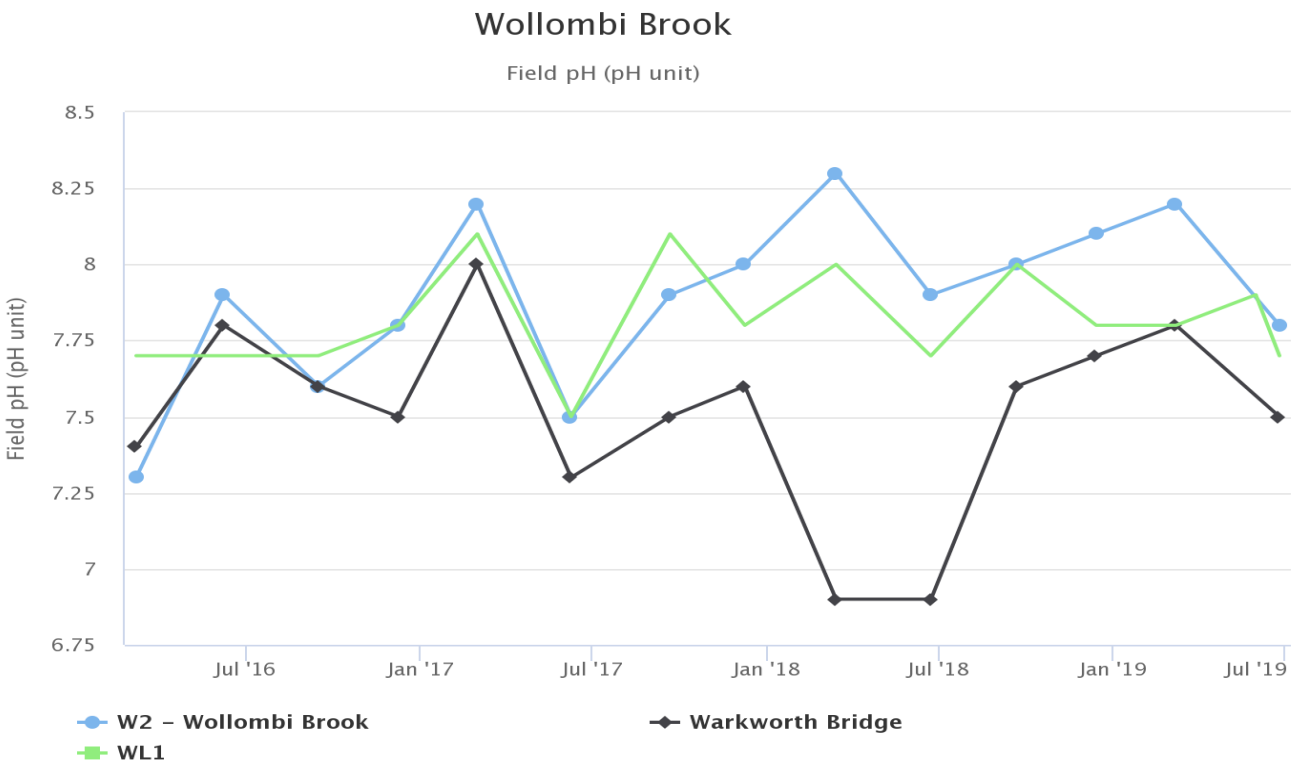

Figure 14: Wollombi Brook pH Trend – June 2019

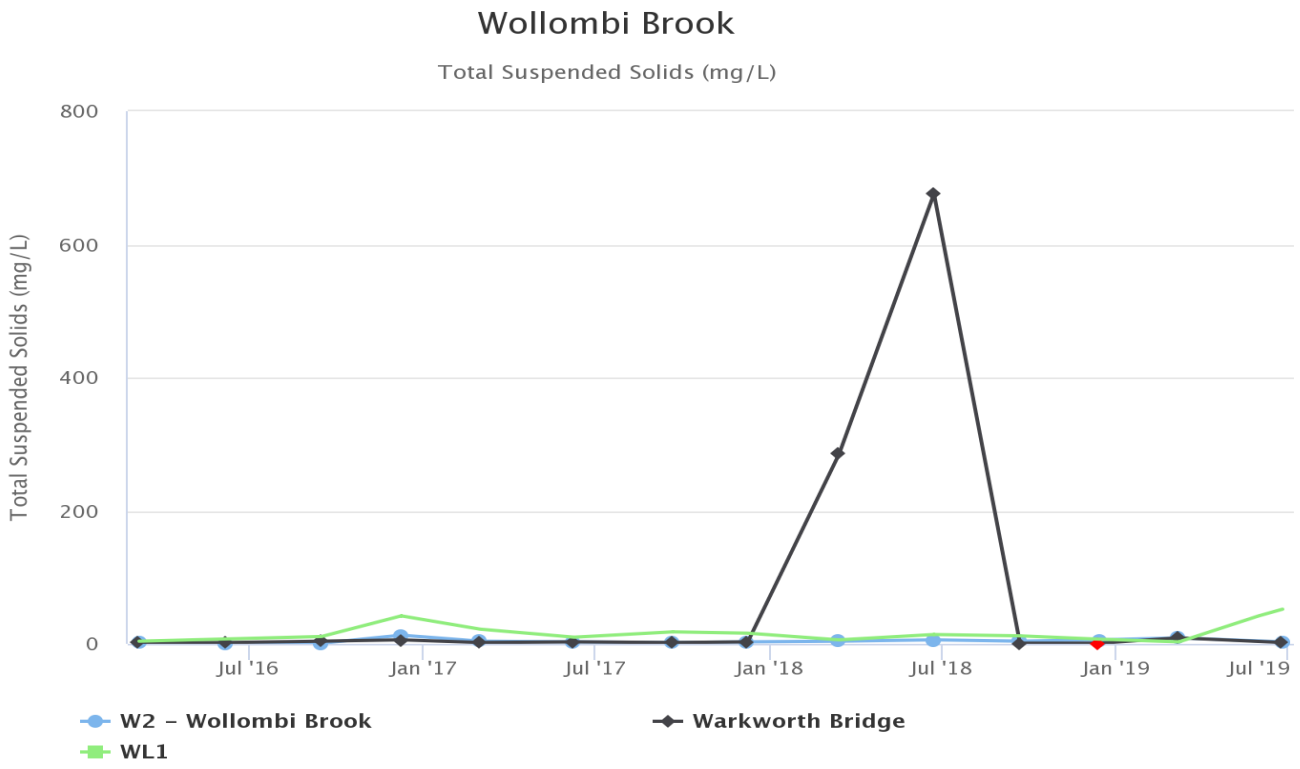

Figure 15: Wollombi Brook Total Suspended Solids Trend – June 2019

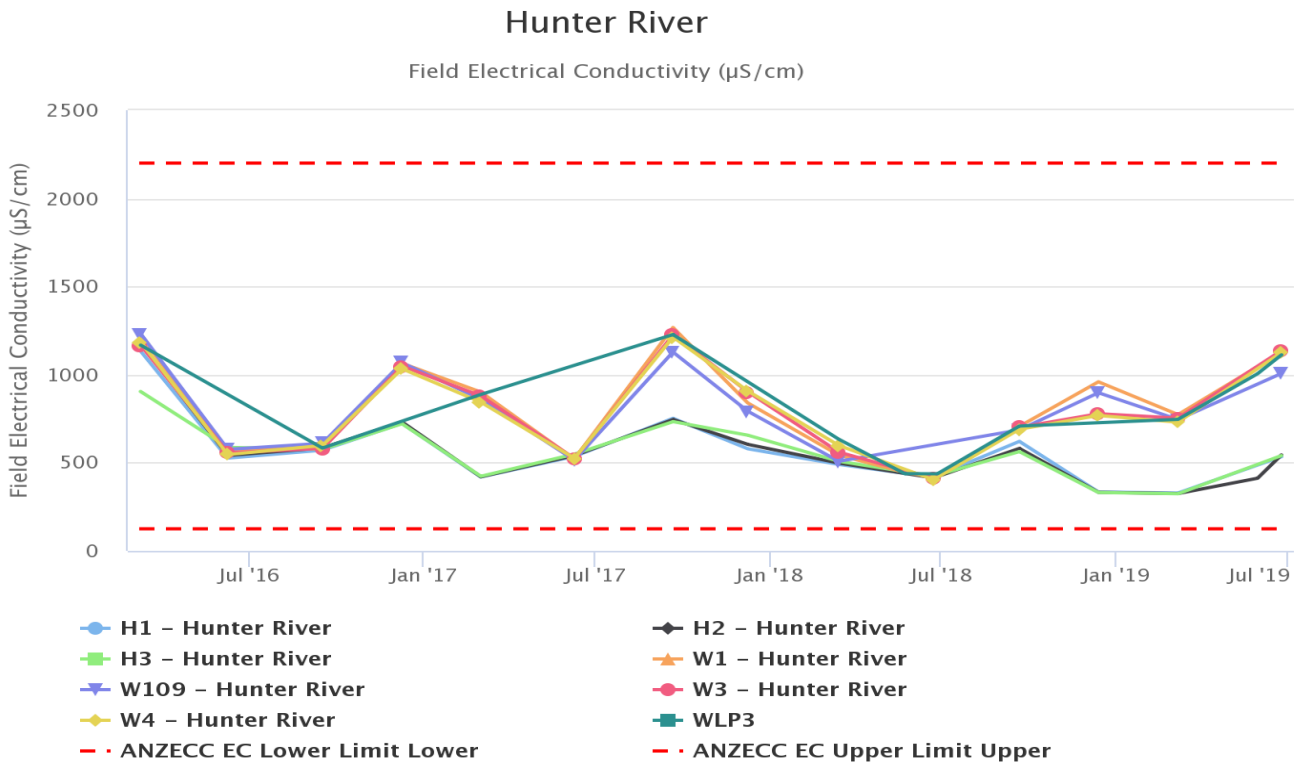

Figure 16: Hunter River Electrical Conductivity Trend – June 2019

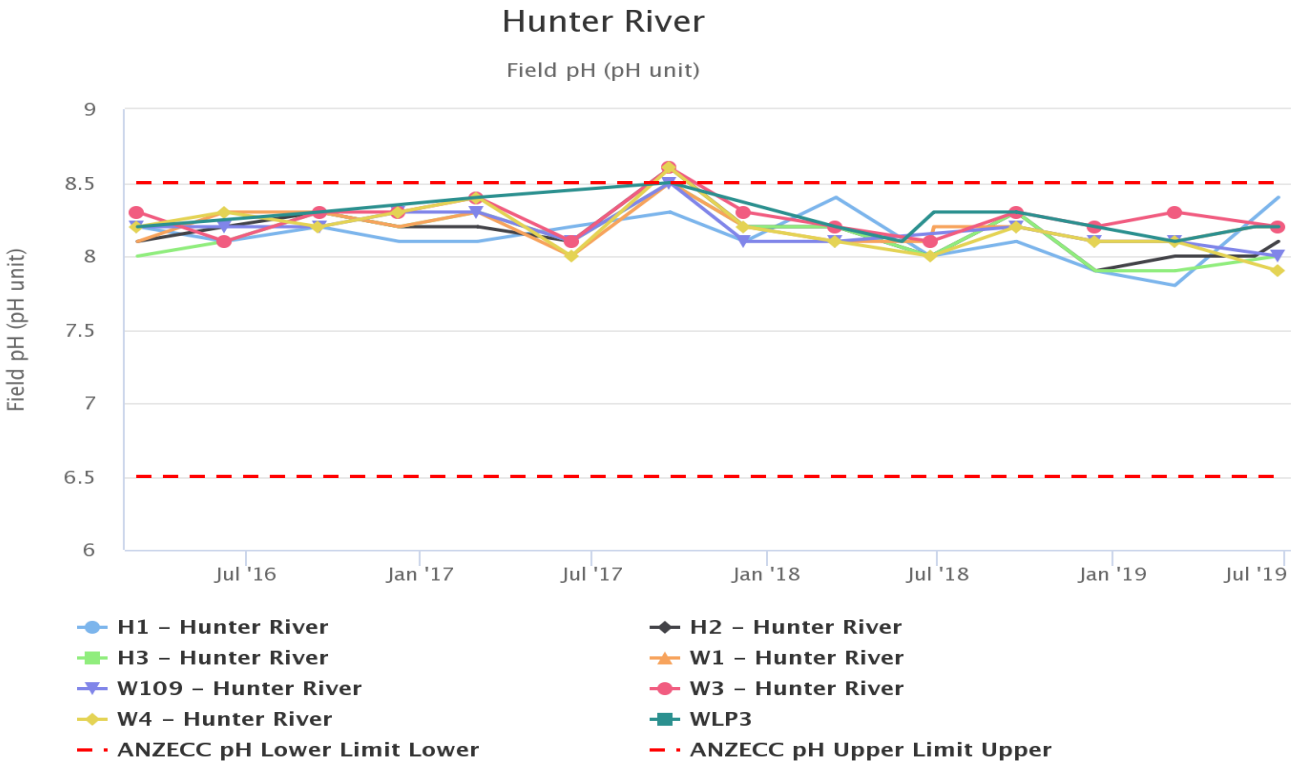

Figure 17: Hunter River pH Trend – June 2019

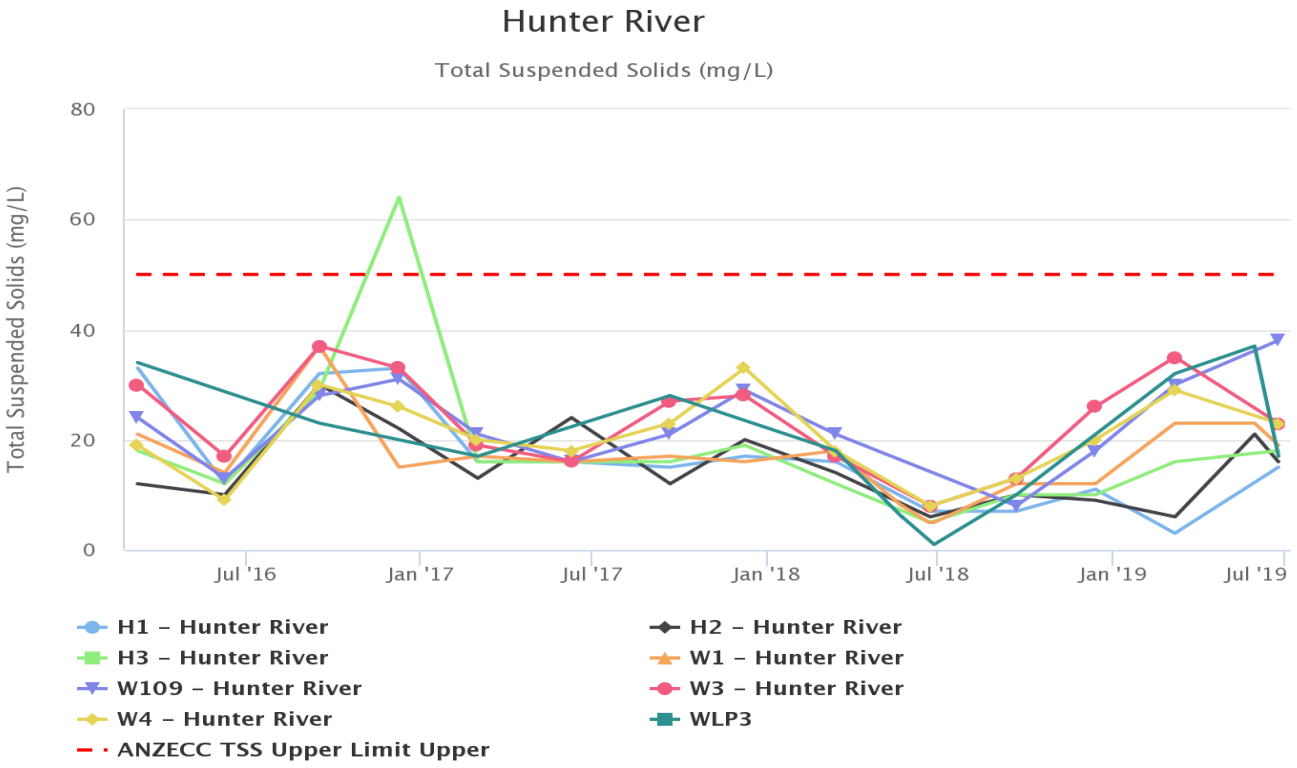

Figure 18: Hunter River Total Suspended Solids – June 2019

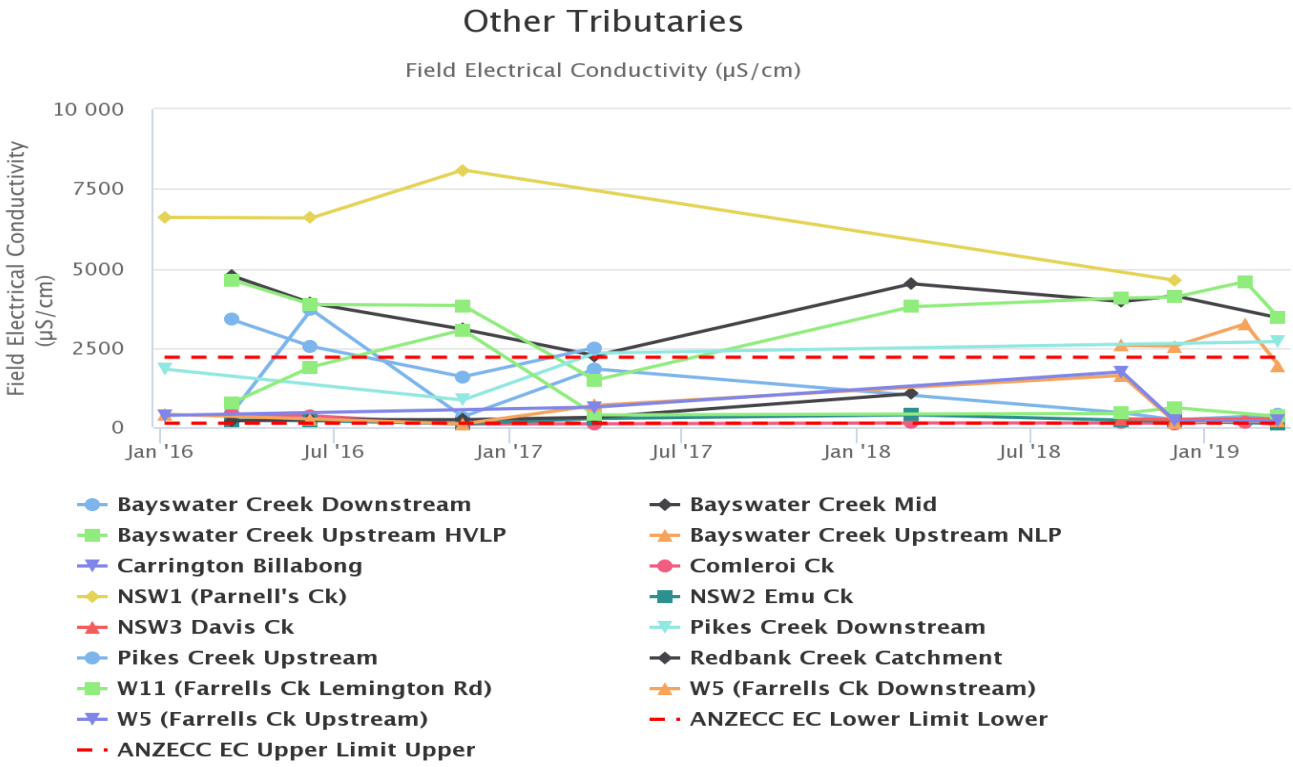

Figure 19: Other Tributaries Electrical Conductivity Trend – June 2019

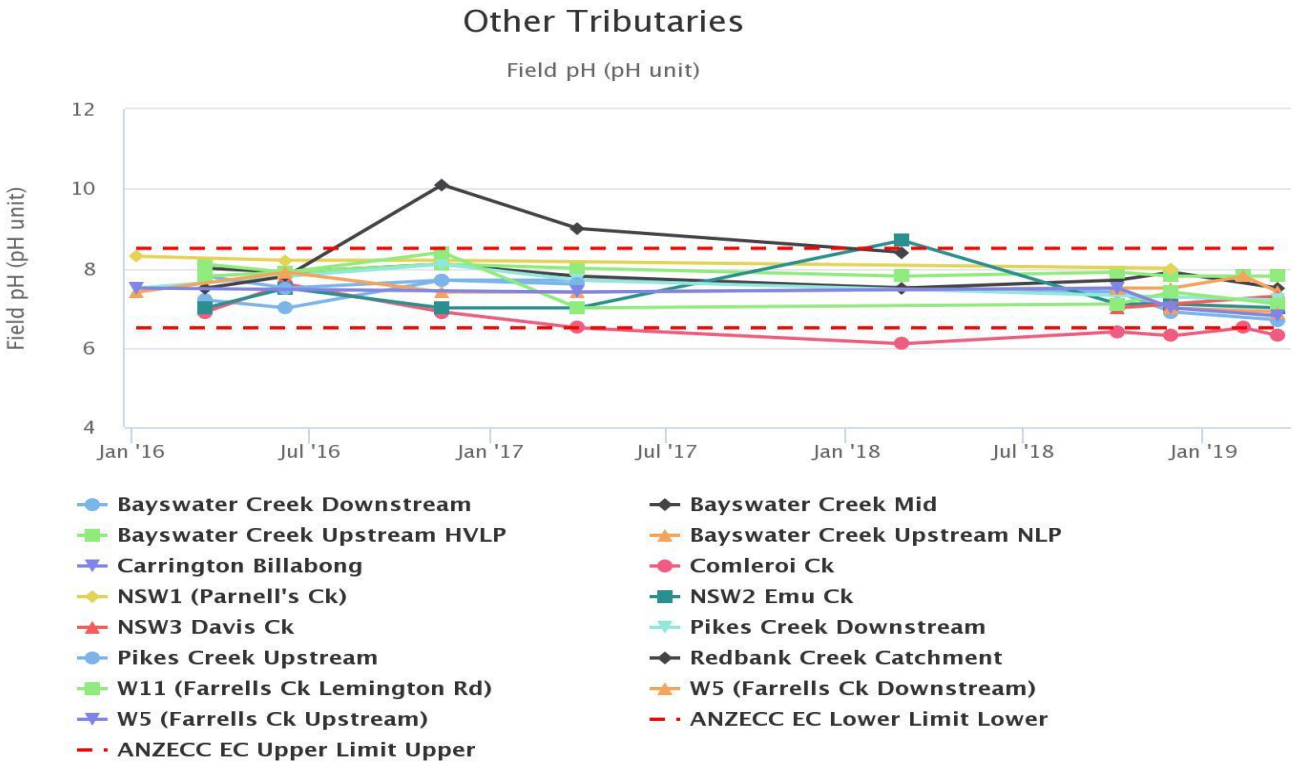

Figure 20: Other Tributaries pH Trend – June 2019

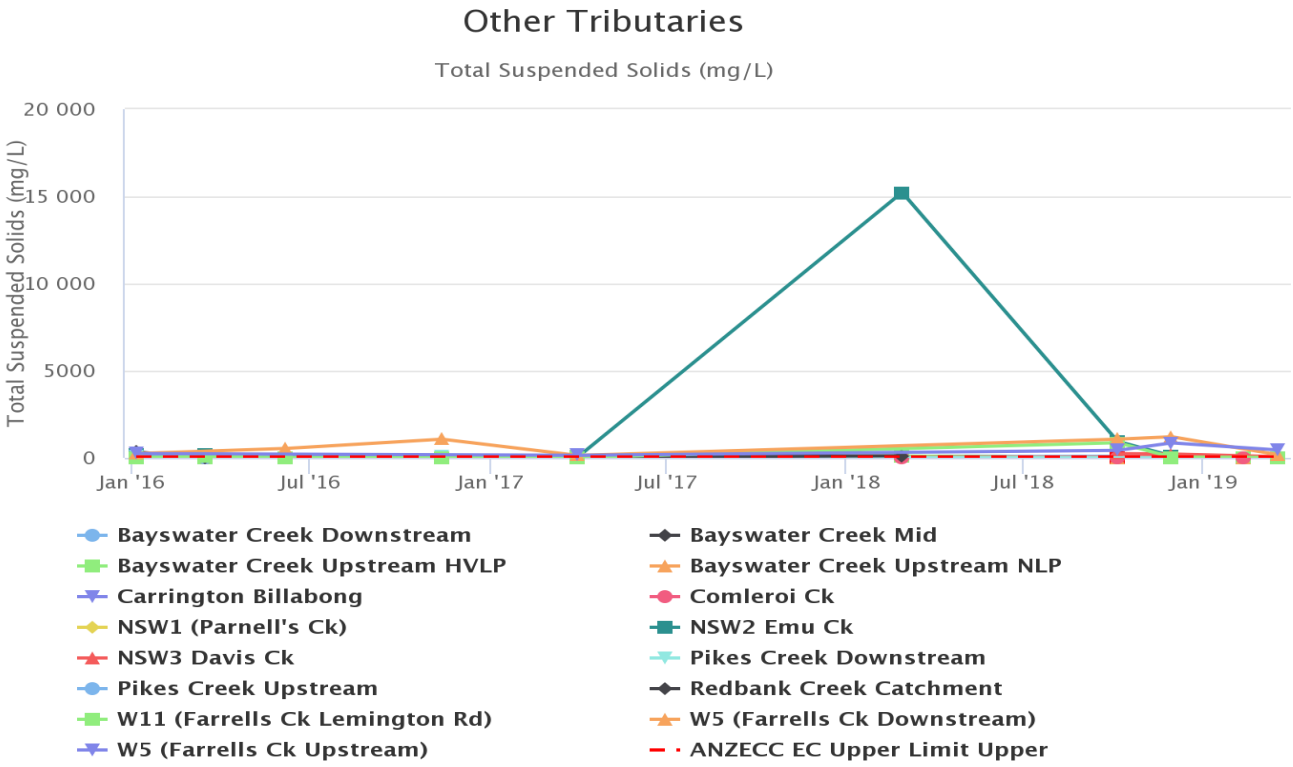

Figure 21: Other Tributaries Total Suspended Solids Trend – June 2019

3.1.2 Site Water Use

Under water allocation licences issued by the NSW Office of Water, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO extracted approximately 421.5ML of water from the Hunter River.

3.1.3 HRSTS Discharge

HVO participates in the HRSTS, allowing it to discharge from licensed discharge points Dam 11N (to Farrell's Creek), Lake James (to the Hunter River) and Parnell's Dam (to Parnell's Creek). Discharges can only take place subject to HRSTS regulations.

During the reporting period no water was discharged under the HRSTS.

3.1.4 Surface Water Trigger Limits

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 HVO Water Management Plan.

Current internal trigger limits that have been breached are summarised in Table 3.

Table 3: Surface Water Trigger Limit Summary

Site	Date	Trigger Limit Breached	Action taken in response
W4 Hunter River	24/06/2019	pH 5th Percentile	First Breach of pH 5th Percentile trigger. Watching Brief*.
Warkworth Bridge	24/06/2019	EC 95th Percentile	Seventh exceedance of EC 95th Percentile trigger (1515us/cm). Field observations indicate that sample was taken from a pool of water as there was no flow in the Brook. Downstream monitoring (WL1) indicated a moderate flow and lower EC level (621us/cm). Based on this it can be assumed that the sample taken is not representative of flows in the Brook and that there is no impact to suggest mining influence. Maintain watching Brief*.
W2 Wollombi Brook	24/06/2019	EC 95th Percentile	Sixth exceedance of EC 95th Percentile trigger (2200us/cm). Field observations indicate that sample was taken from a pool of water as there was no flow in the Brook. Downstream monitoring (WL1) indicated a moderate flow and lower EC level (621us/cm). Based on this it can be assumed that the sample taken is not representative of flows in the Brook and that there is no impact to suggest mining influence. Maintain watching Brief*.
WL1	24/06/2019	TSS	First Breach of TSS. Downstream results at monitoring location H3 in the Hunter indicate better water quality than that measured at WL1 indicating that the TSS results may be isolated to a local source to the sampling location and not from a broader impact. Watching Brief*

* = Watching Brief established pending outcomes of subsequent monitoring events. No further action required.

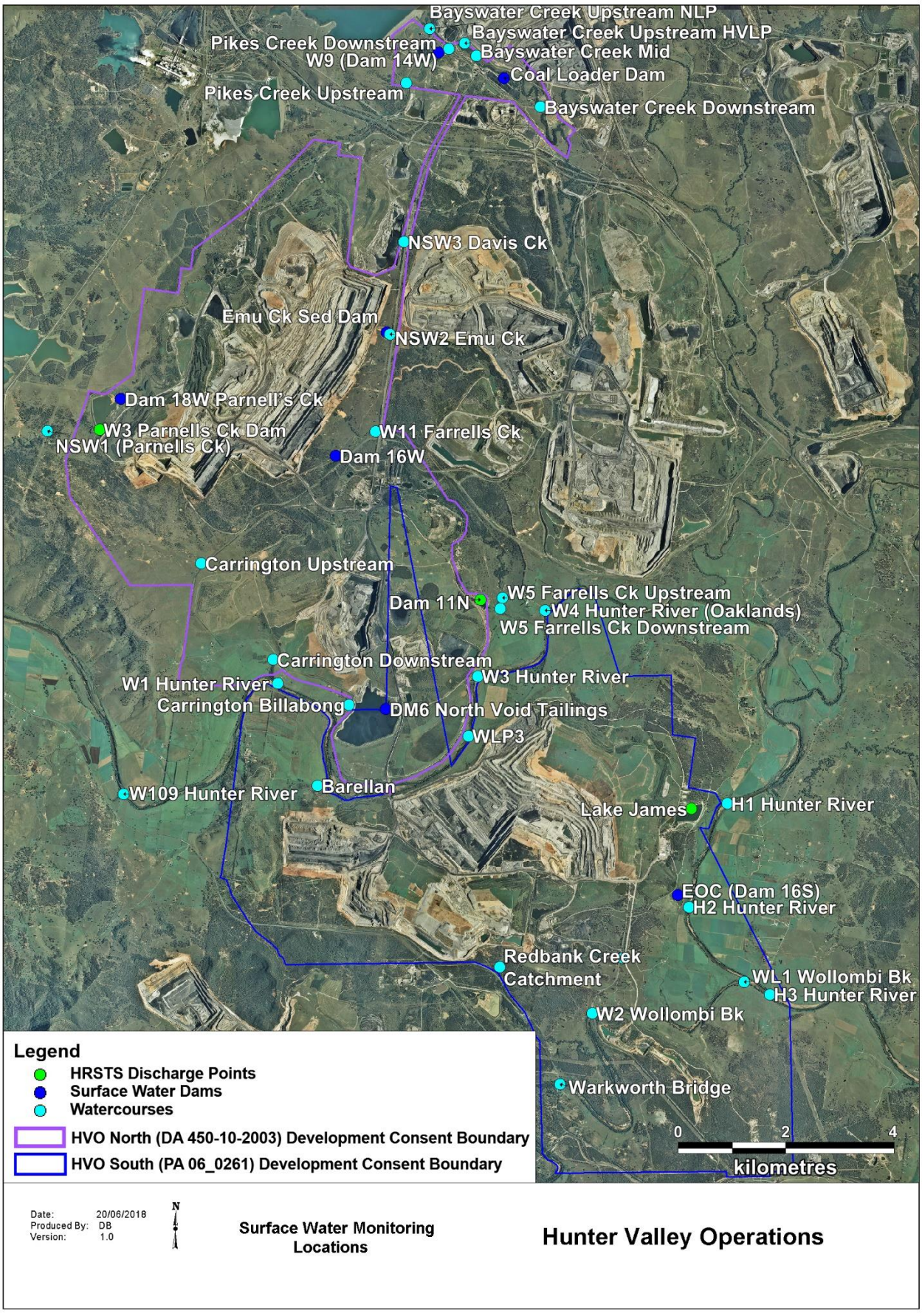

Figure 22: Surface Water Monitoring Location Plan

4.0 GROUNDWATER

4.1.1 Groundwater Monitoring

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Monitoring sites are shown in Figure 80.

Figure 23 to Figure 79 show the long term trends (2016 – current) for ground water bores monitored at HVO.

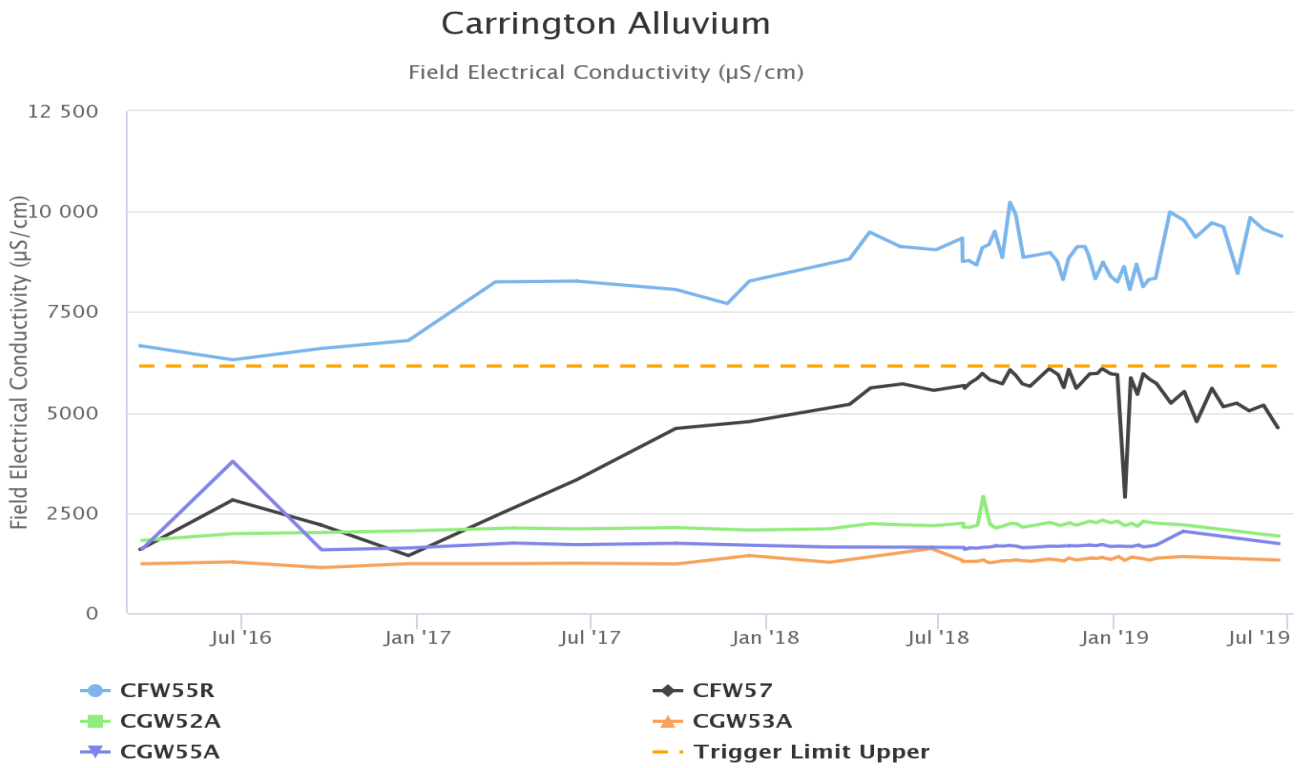

Figure 23: Carrington Alluvium Electrical Conductivity Trend – June 2019

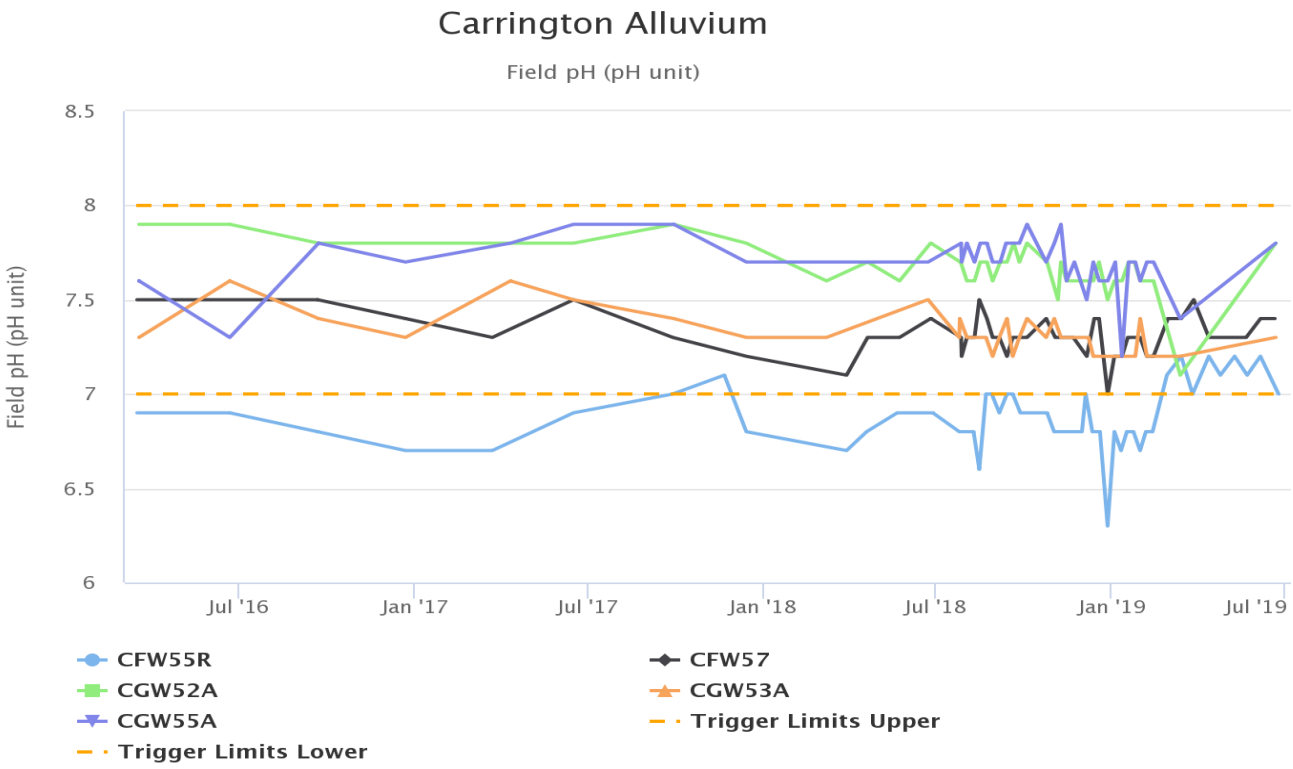

Figure 24: Carrington Alluvium pH Trend – June 2019

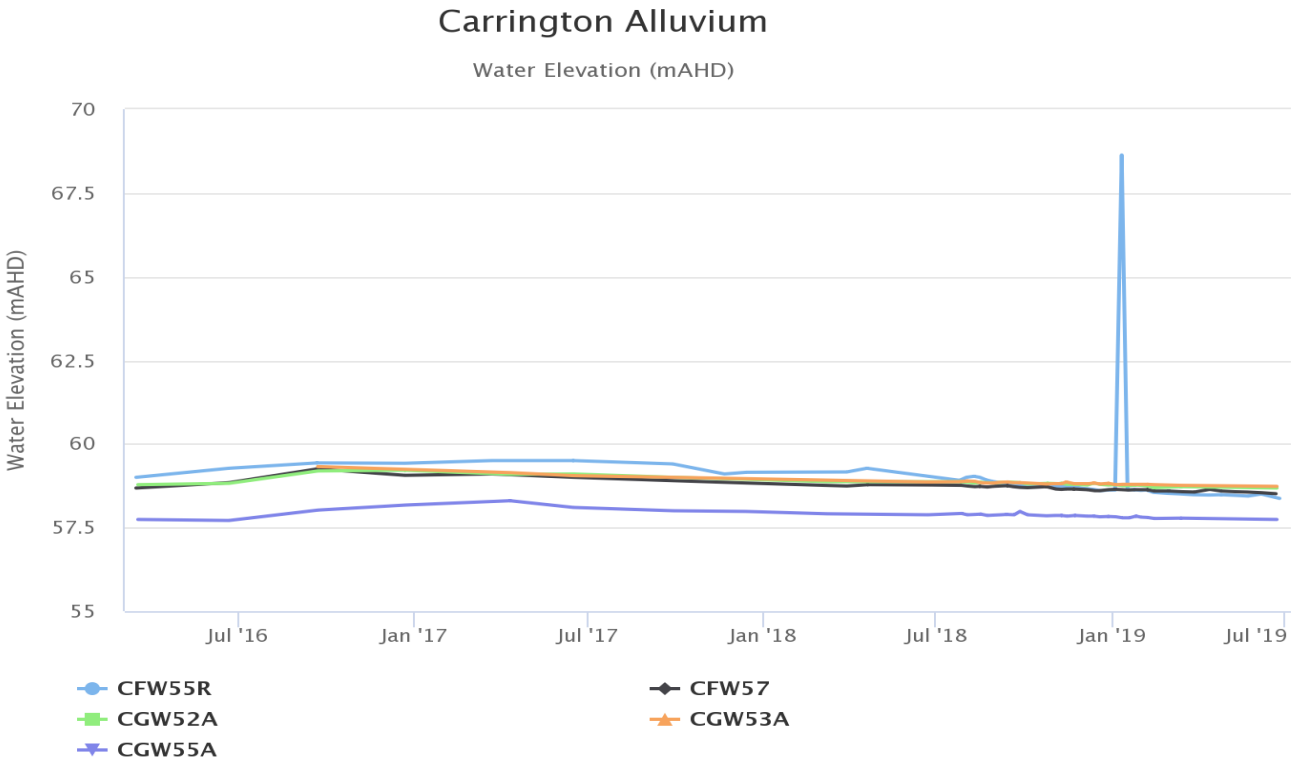

Figure 25: Carrington Alluvium Standing Water Level – June 2019

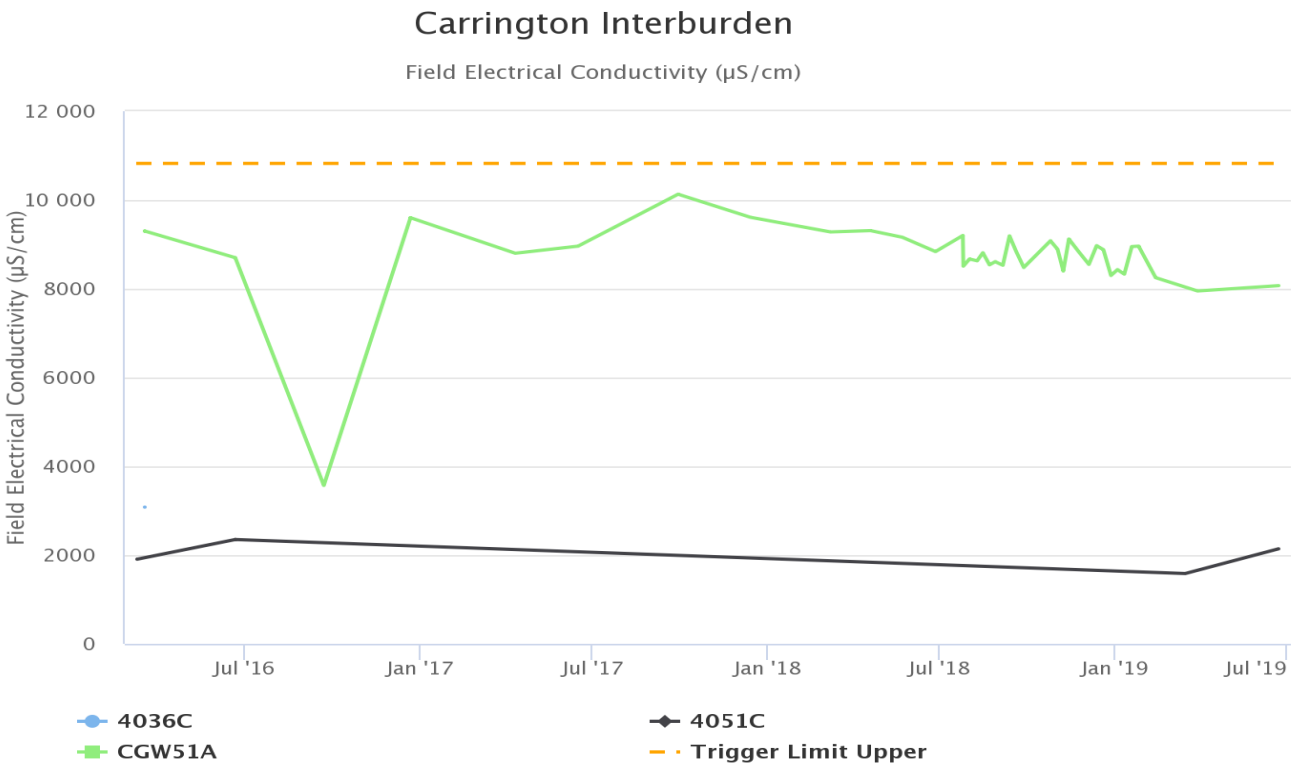

Figure 26: Carrington Interburden Electrical Conductivity Trend – June 2019

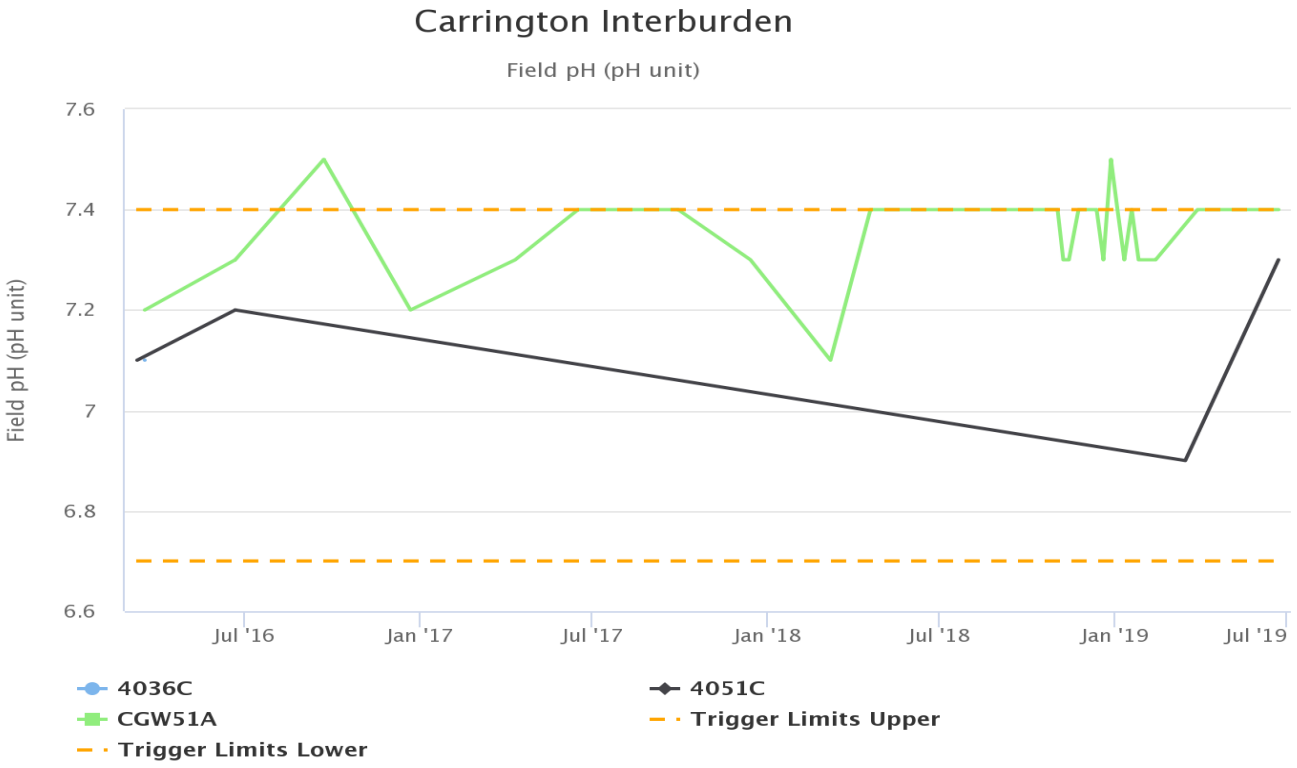

Figure 27: Carrington Interburden pH Trend – June 2019

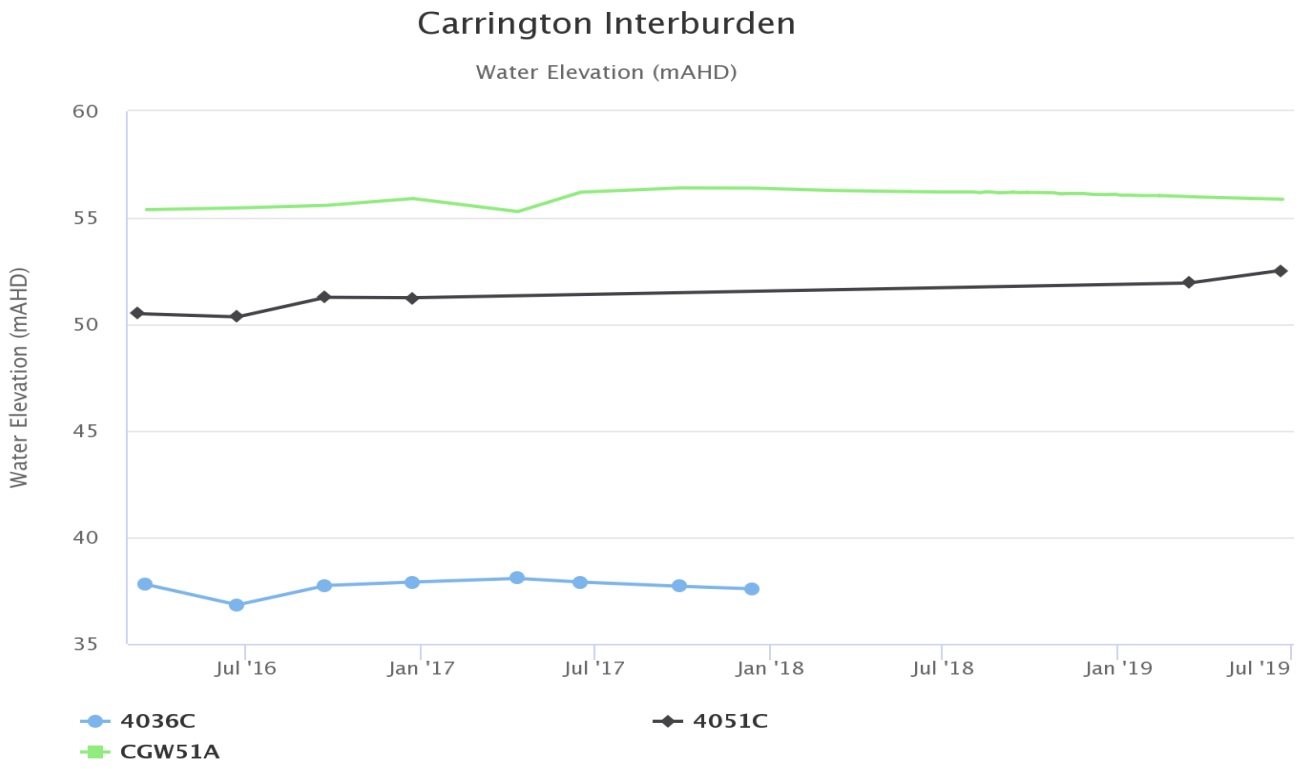

Figure 28: Carrington Interburden Standing Water Level – June 2019

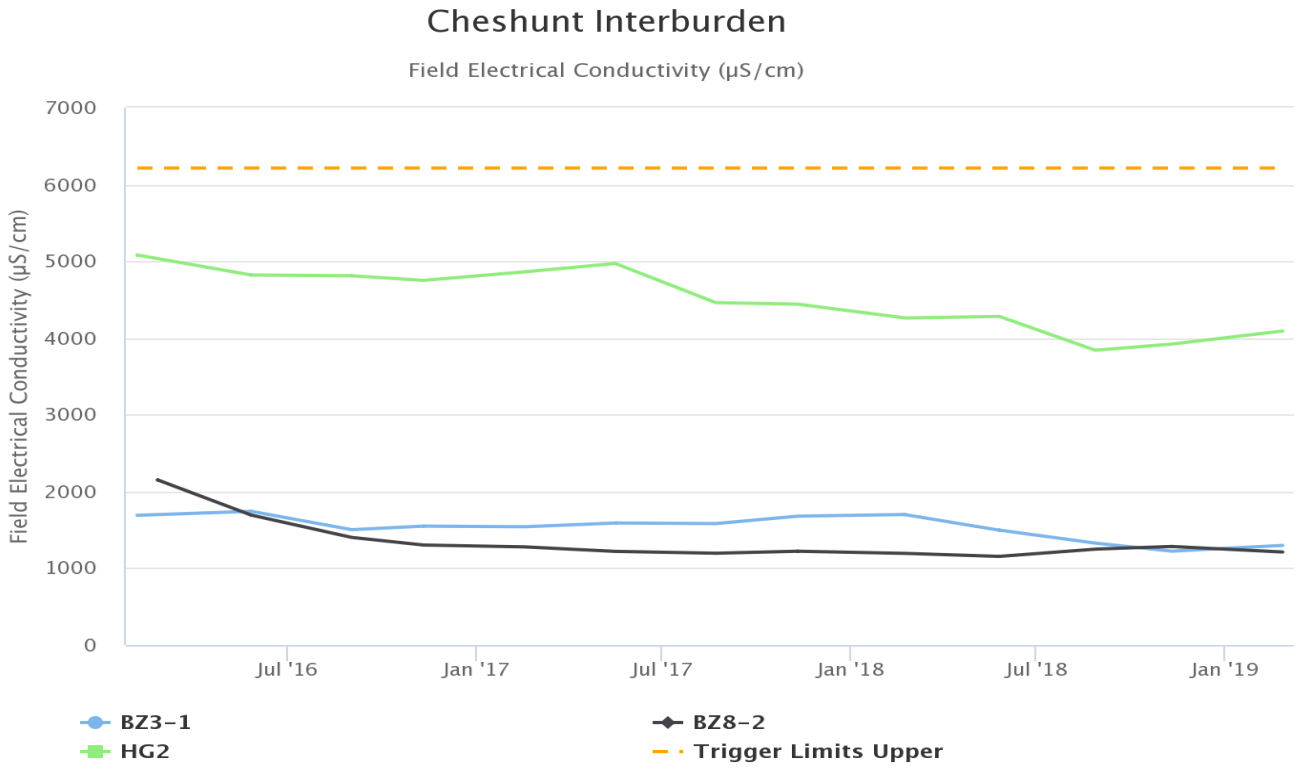

Figure 29: Cheshunt Interburden Electrical Conductivity Trend – June 2019

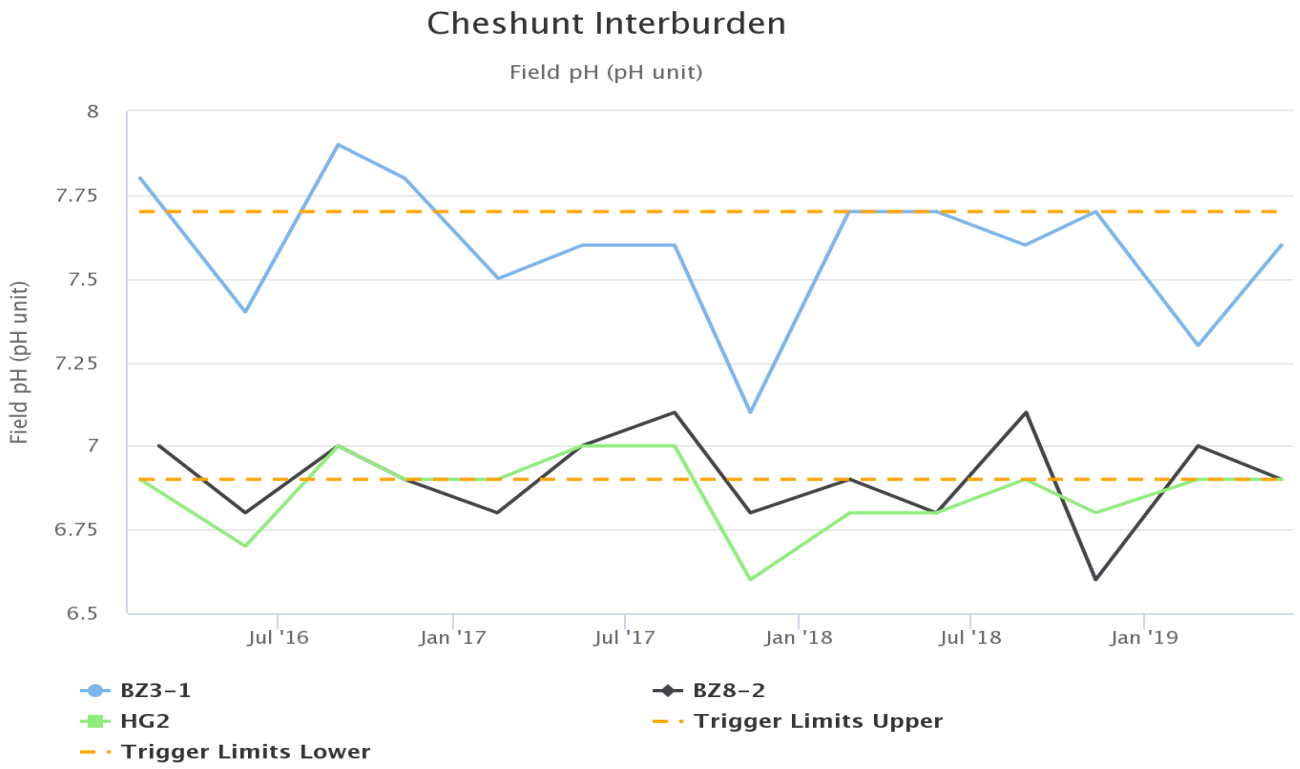

Figure 30: Cheshunt Interburden pH Trend – June 2019

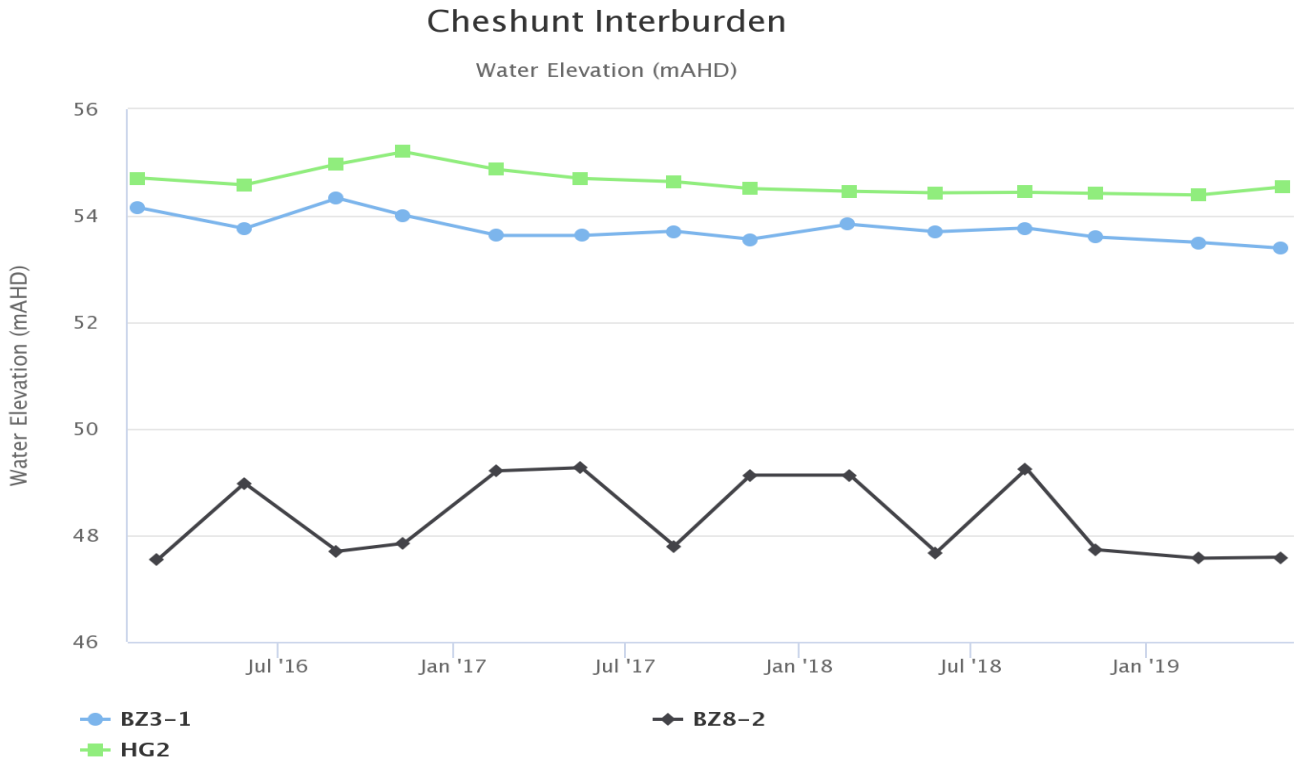

Figure 31: Cheshunt Interburden Standing Water Level – June 2019

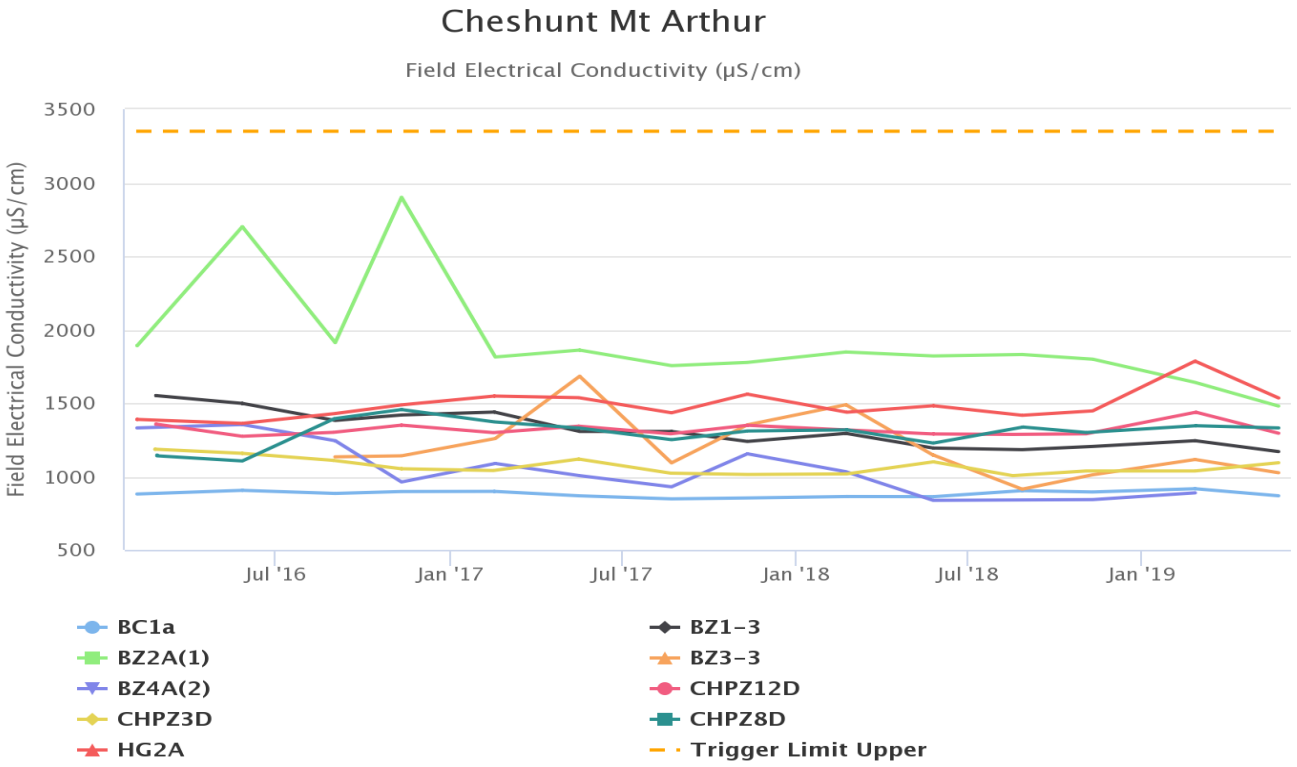

Figure 32: Cheshunt Mt Arthur Electrical Conductivity Trend – June 2019

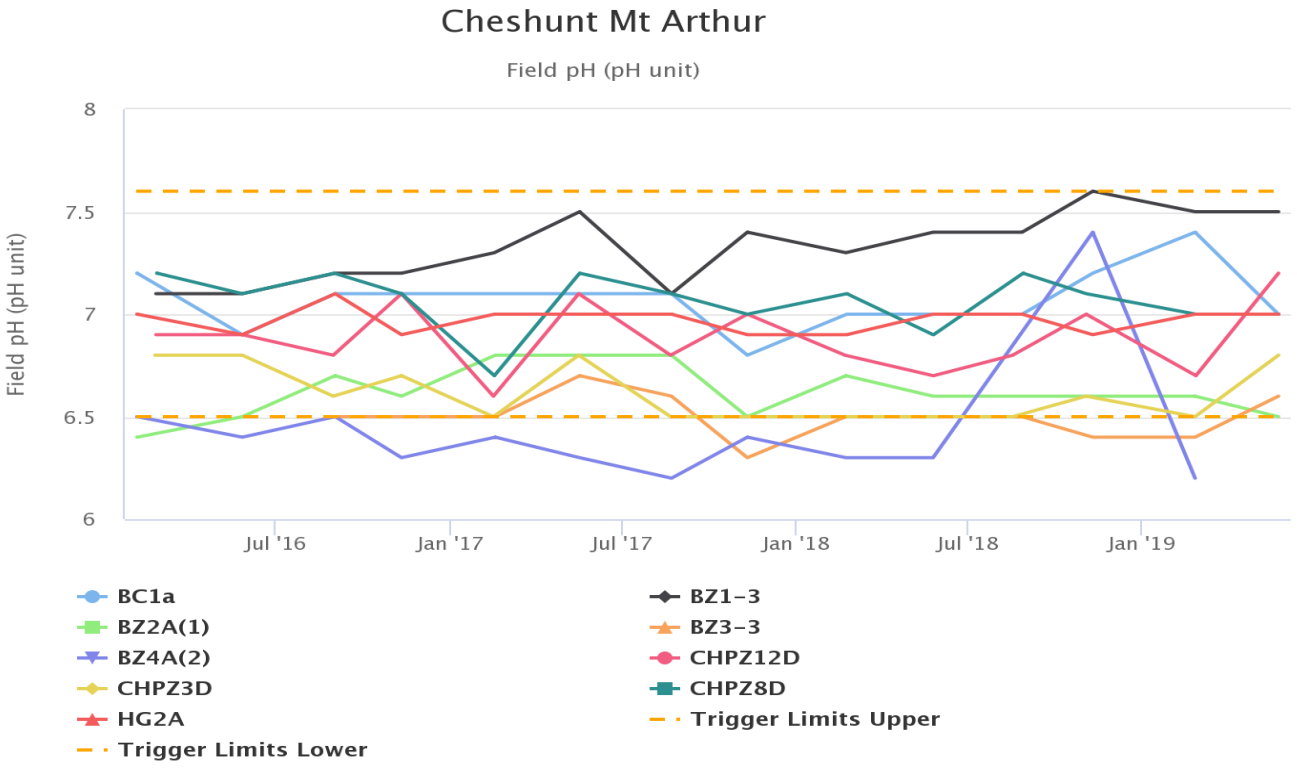

Figure 33: Cheshunt Mt Arthur pH Trend – June 2019

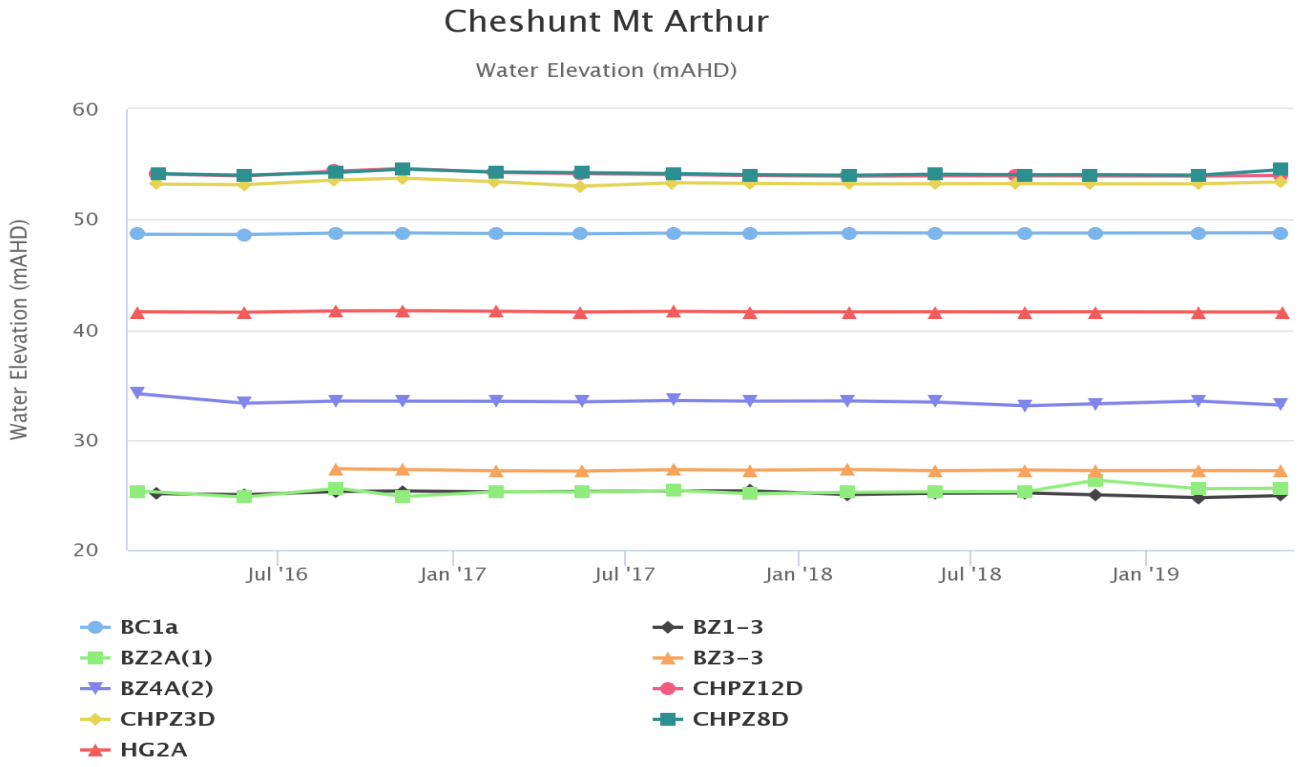

Figure 34: Cheshunt Mt Arthur Standing Water Level – June 2019

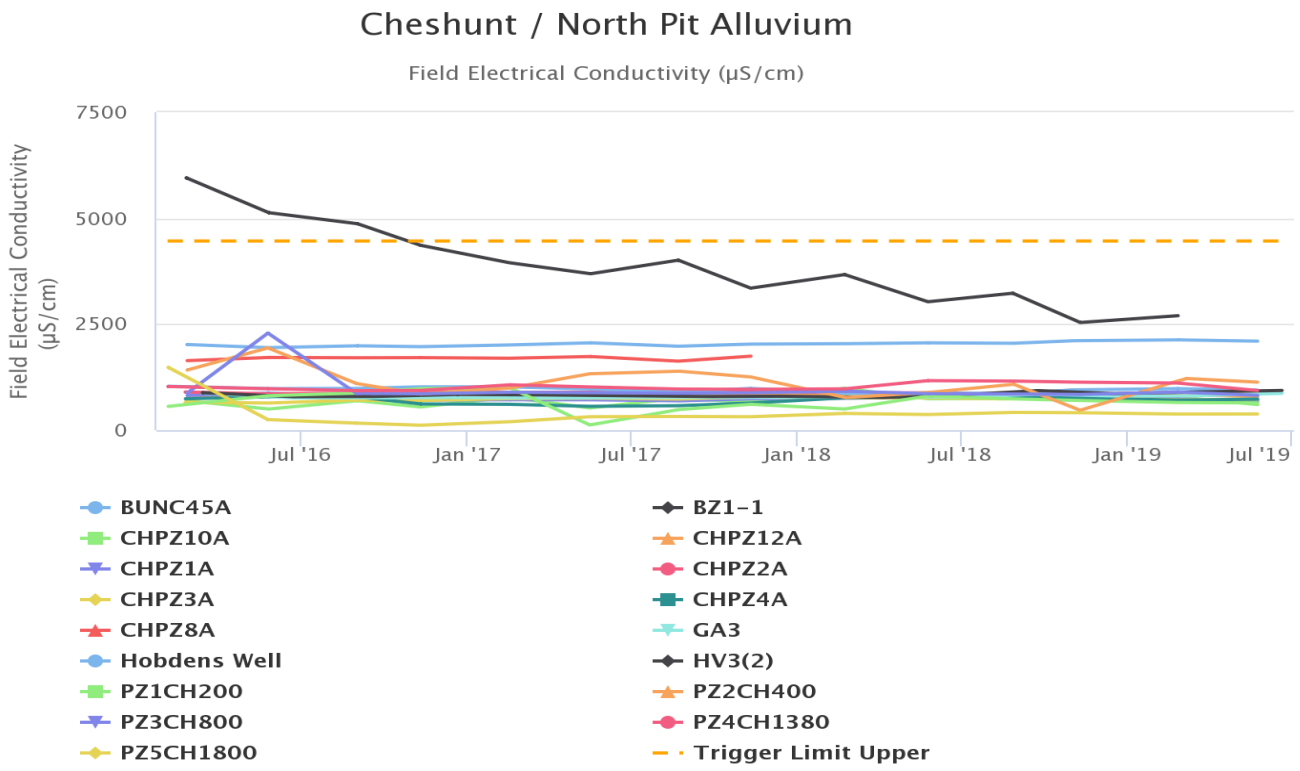

Figure 35: Cheshunt / North Pit Alluvium Electrical Conductivity Trend – June 2019

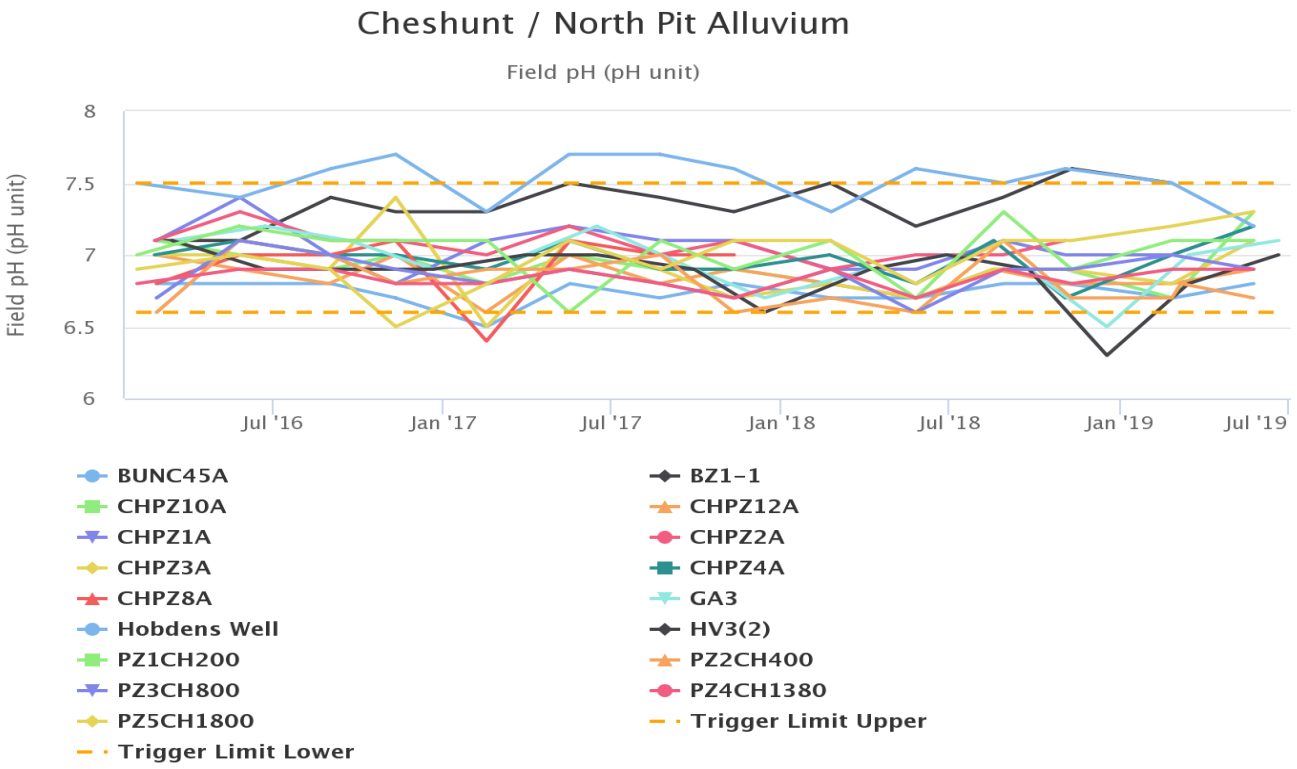

Figure 36: Cheshunt / North Pit Alluvium pH Trend – June 2019

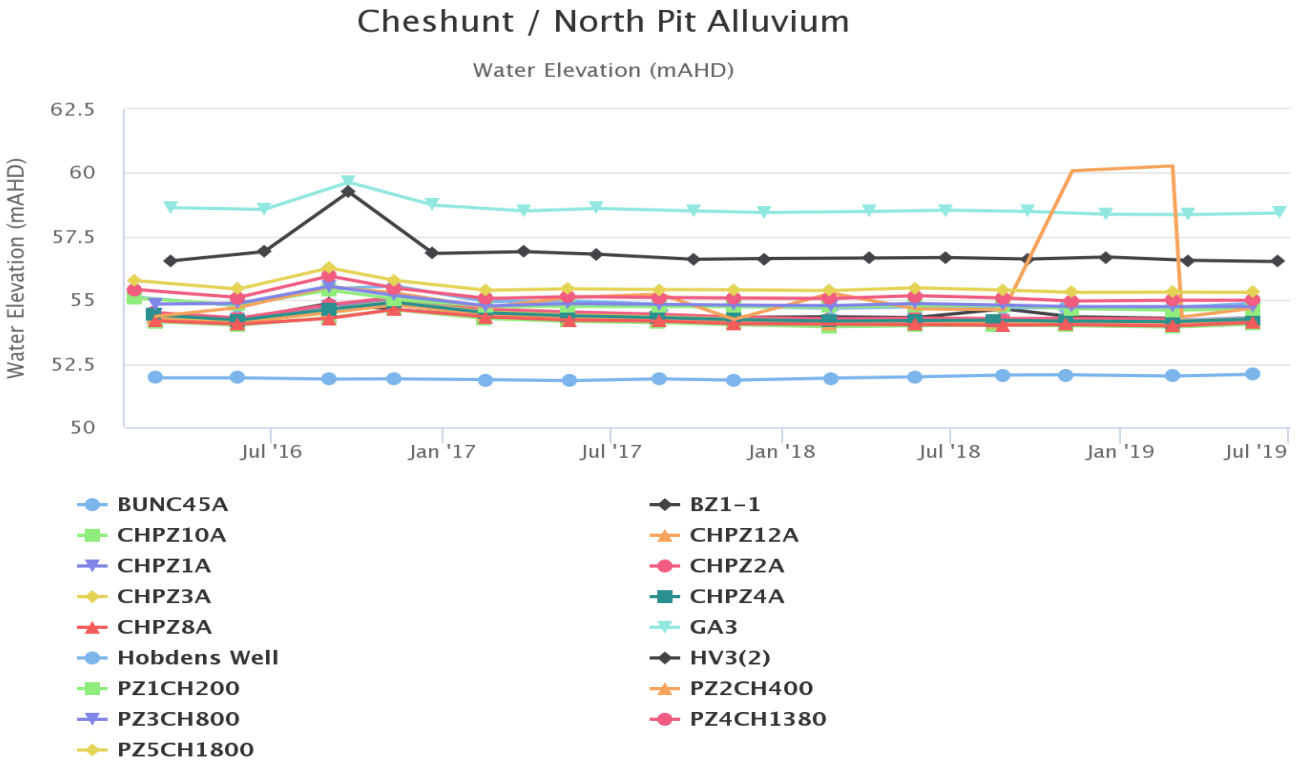

Figure 37: Cheshunt / North Pit Alluvium Standing Water Level – June 2019

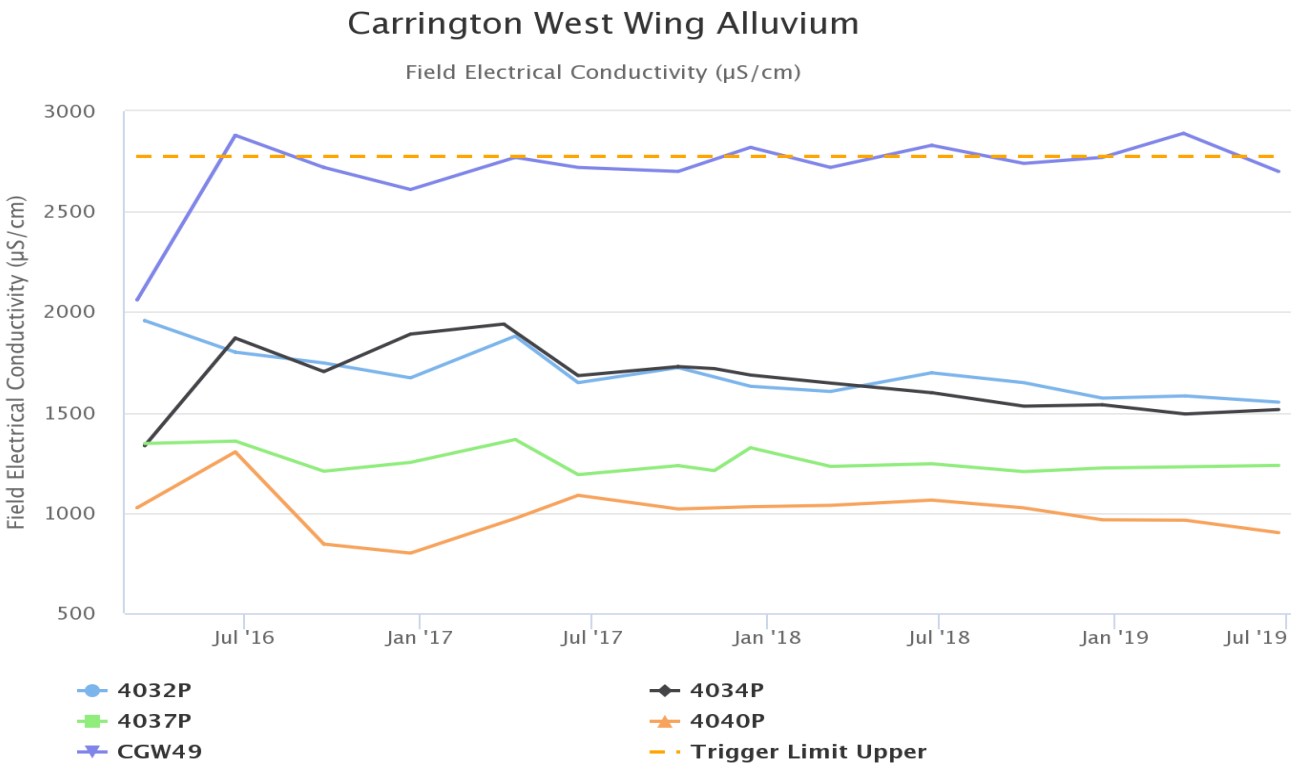

Figure 38: Carrington West Wing Alluvium Electrical Conductivity Trend – June 2019

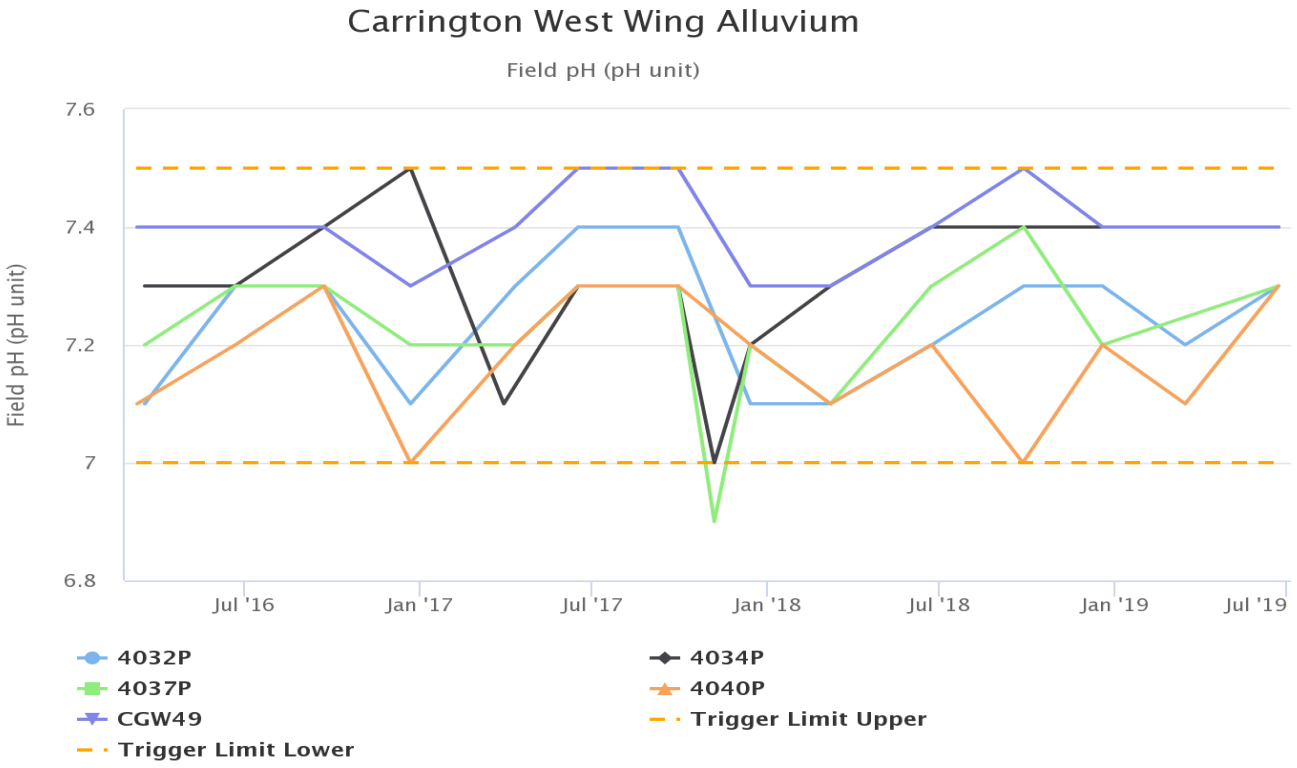

Figure 39: Carrington West Wing Alluvium pH Trend – June 2019

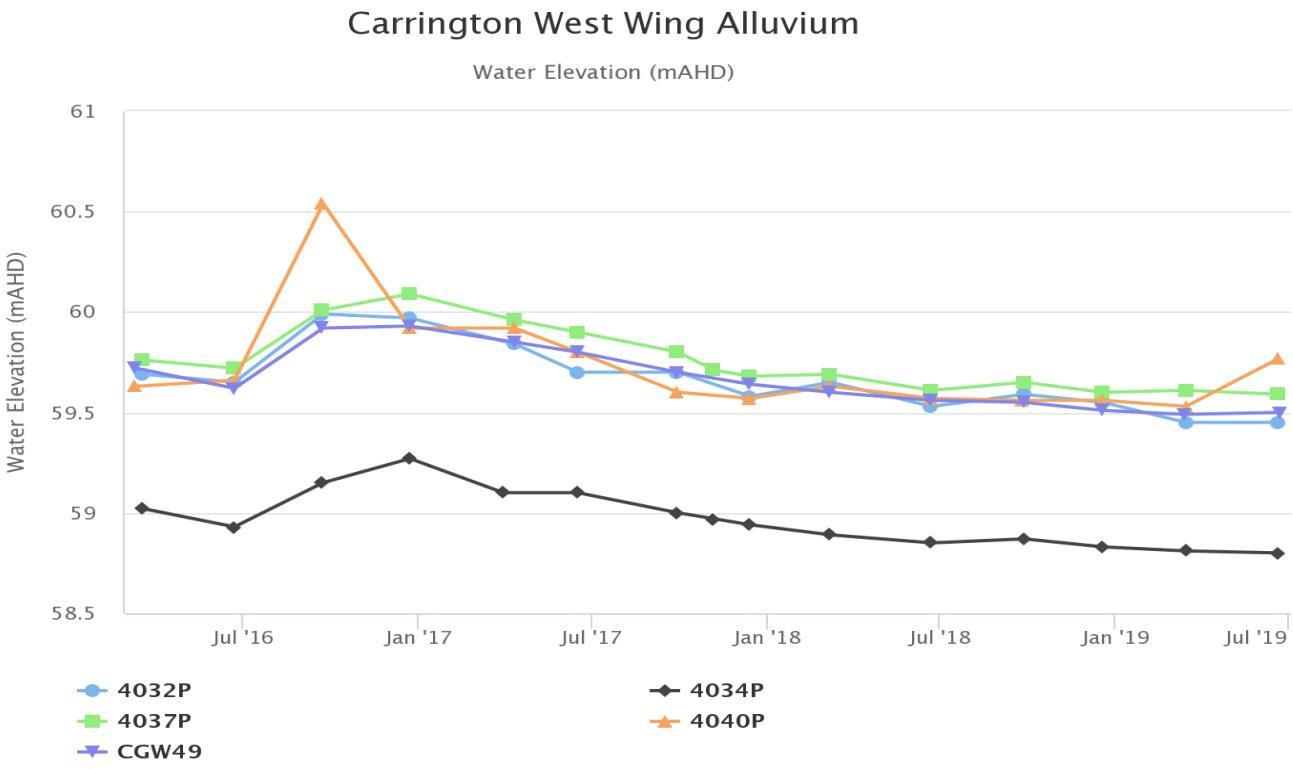

Figure 40: Carrington West Wing Alluvium Standing Water Level – June 2019

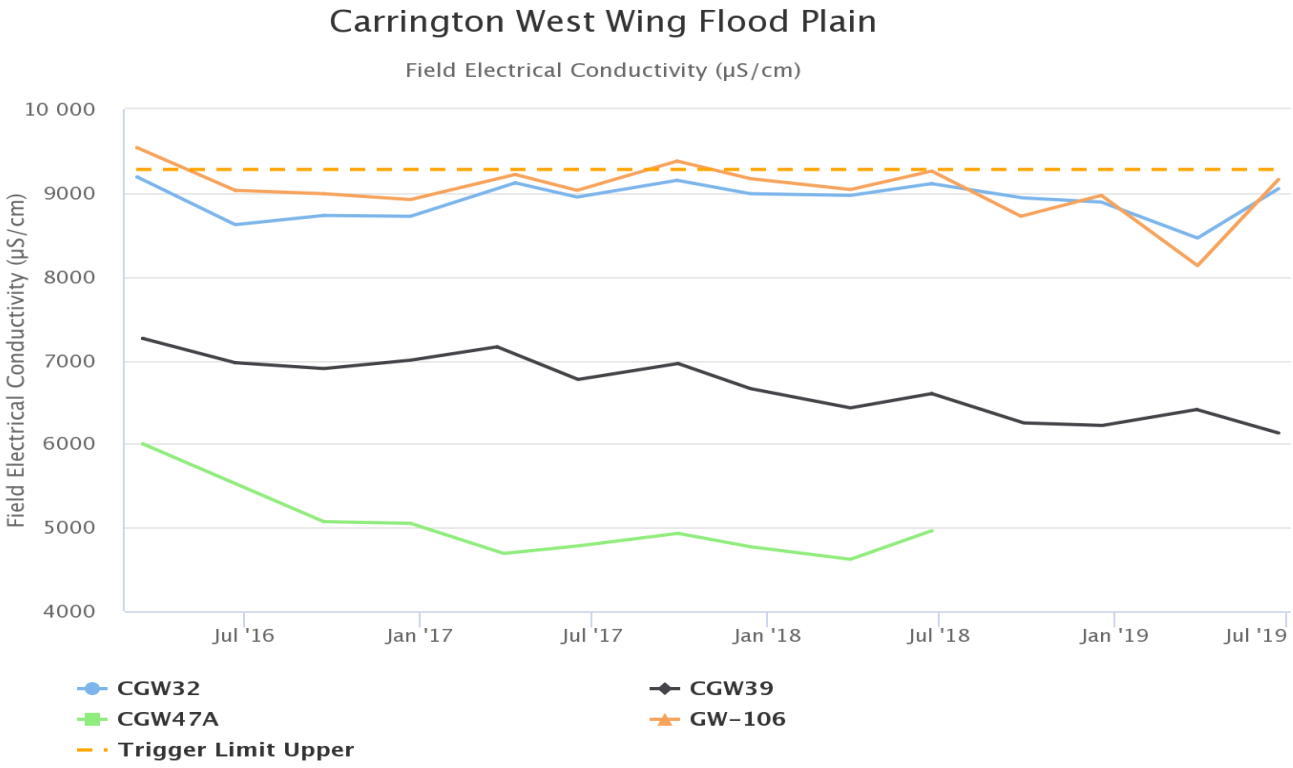

Figure 41: Carrington West Wing Flood Plain Electrical Conductivity Trend – June 2019

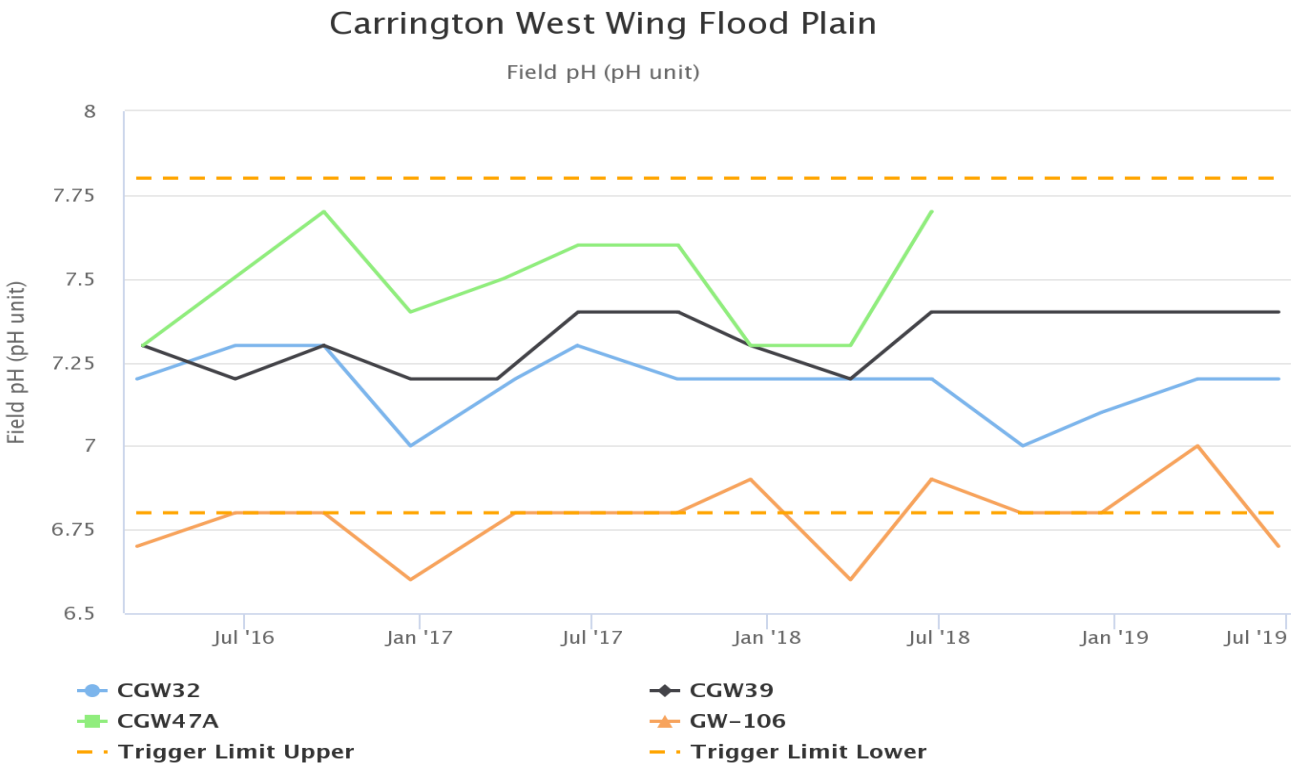

Figure 42: Carrington West Wing Flood Plain pH Trend – June 2019

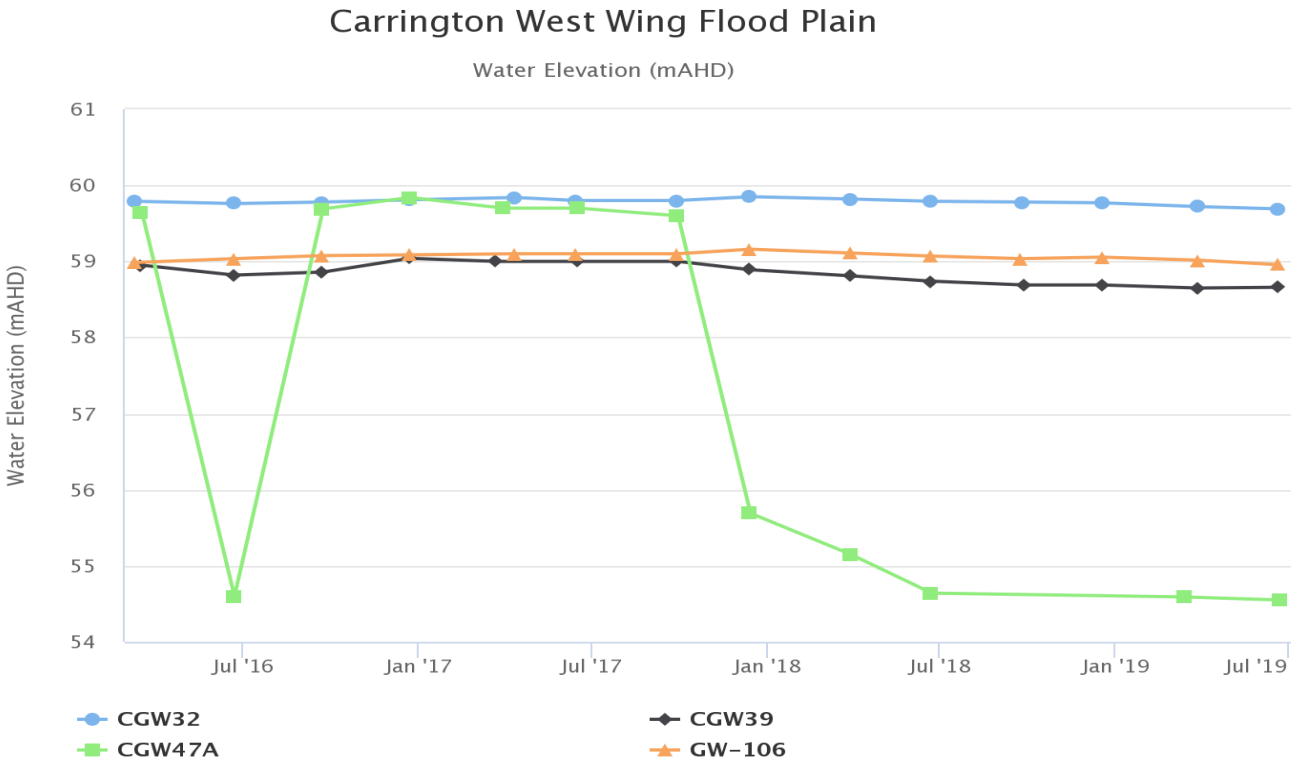

Figure 43: Carrington West Wing Flood Plain Standing Water Level – June 2019

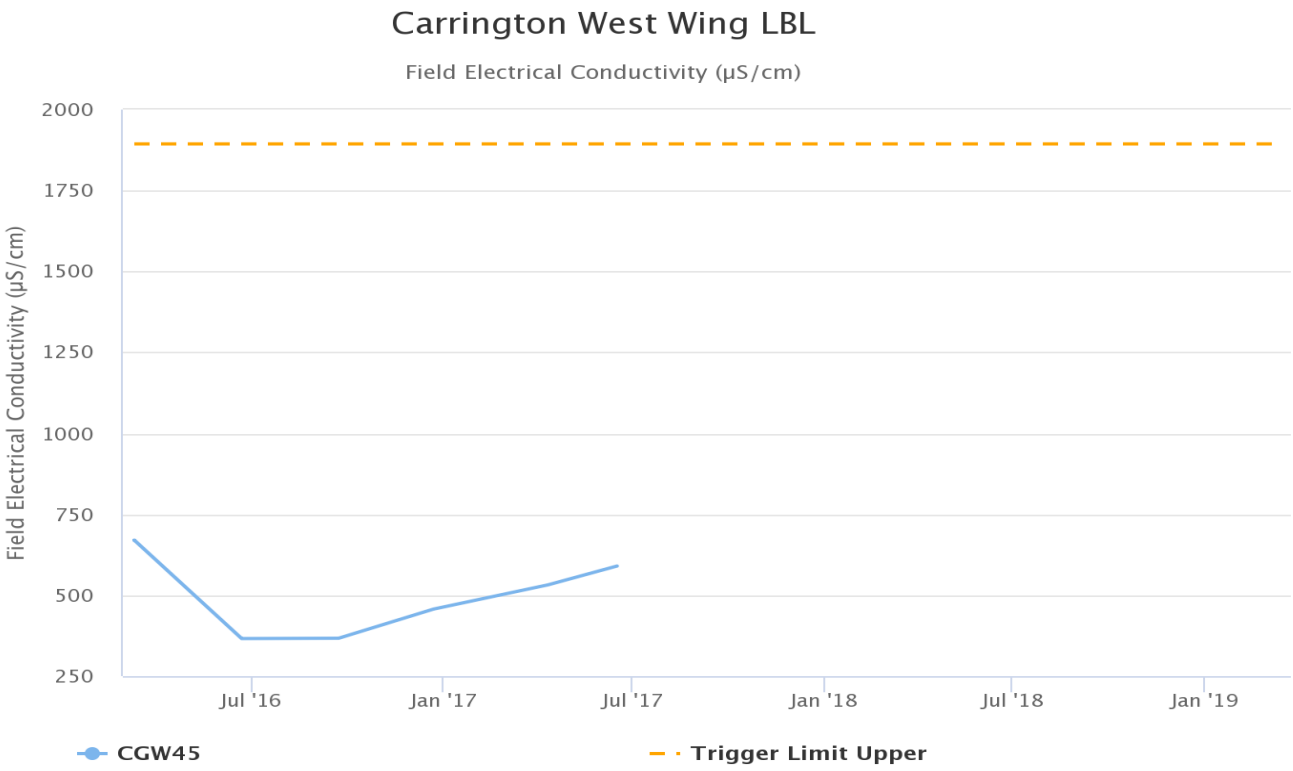

Figure 44: Carrington West Wing LBL Electrical Conductivity Trend – June 2019*

*CGW45 has been blocked since June 2018 hence why no data is shown Figure 44.

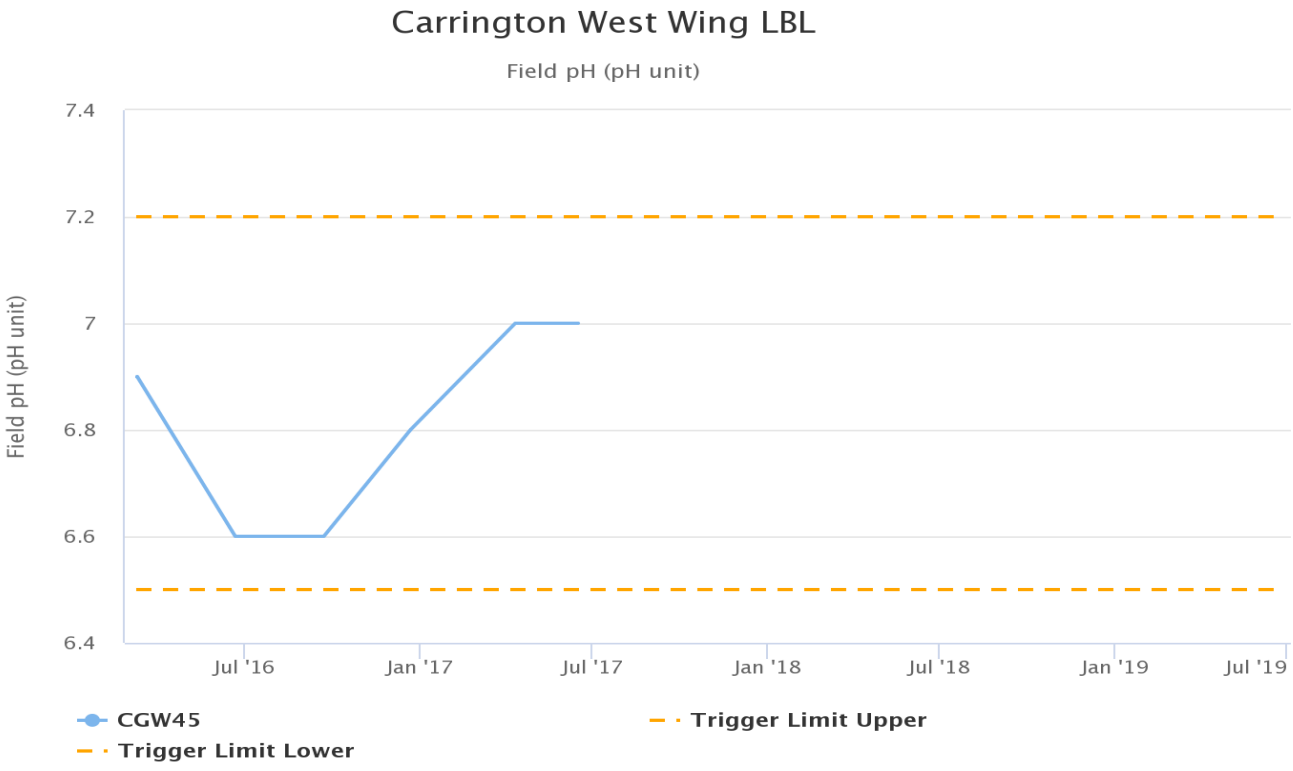

Figure 45: Carrington West Wing LBL pH Trend – June 2019

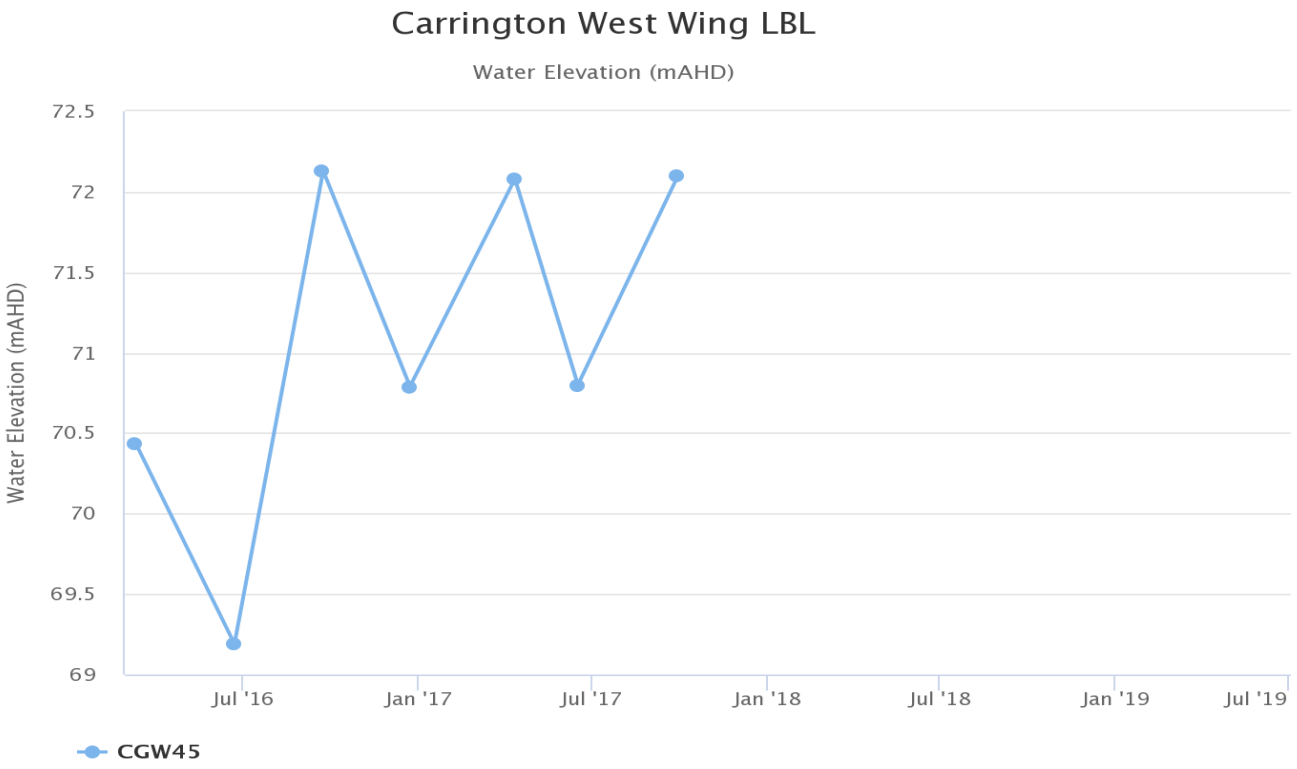

Figure 46: Carrington West Wing LBL Standing Water Level – June 2019

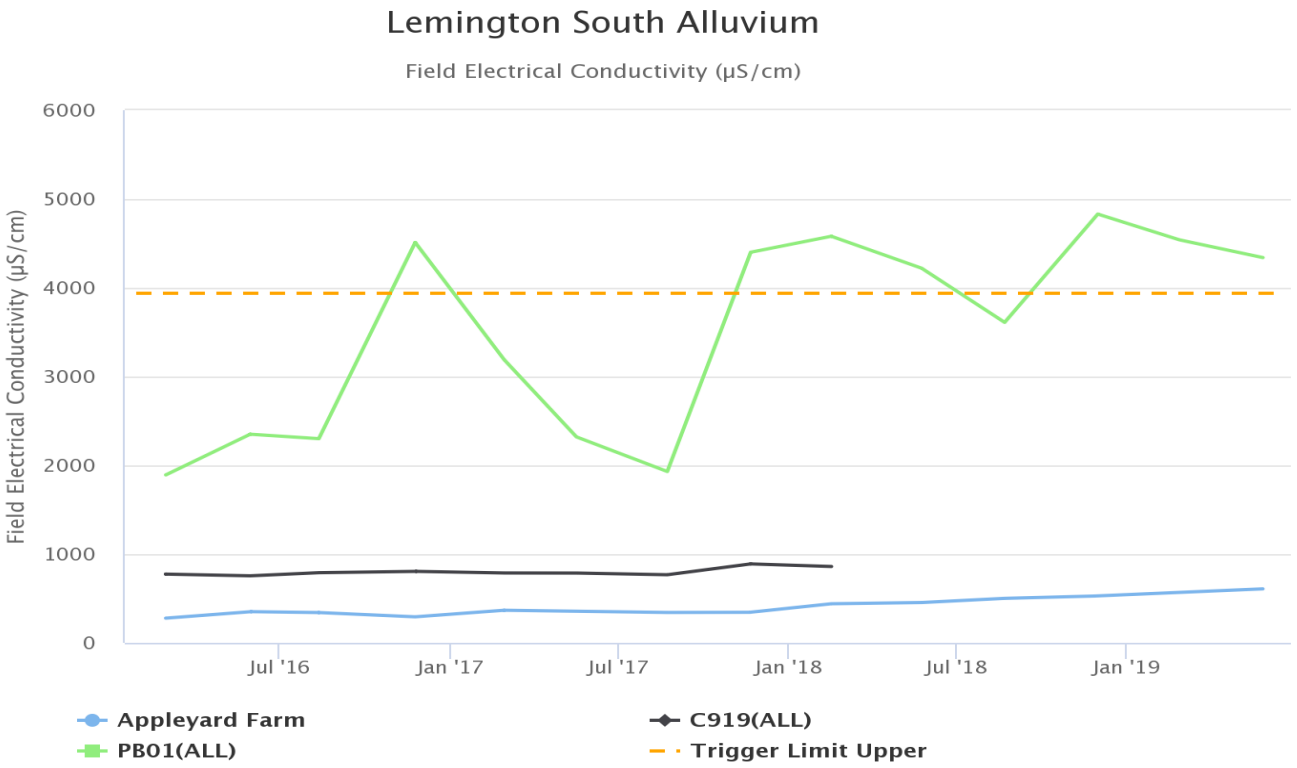

Figure 47: Lemington South Alluvium Electrical Conductivity Trend – June 2019

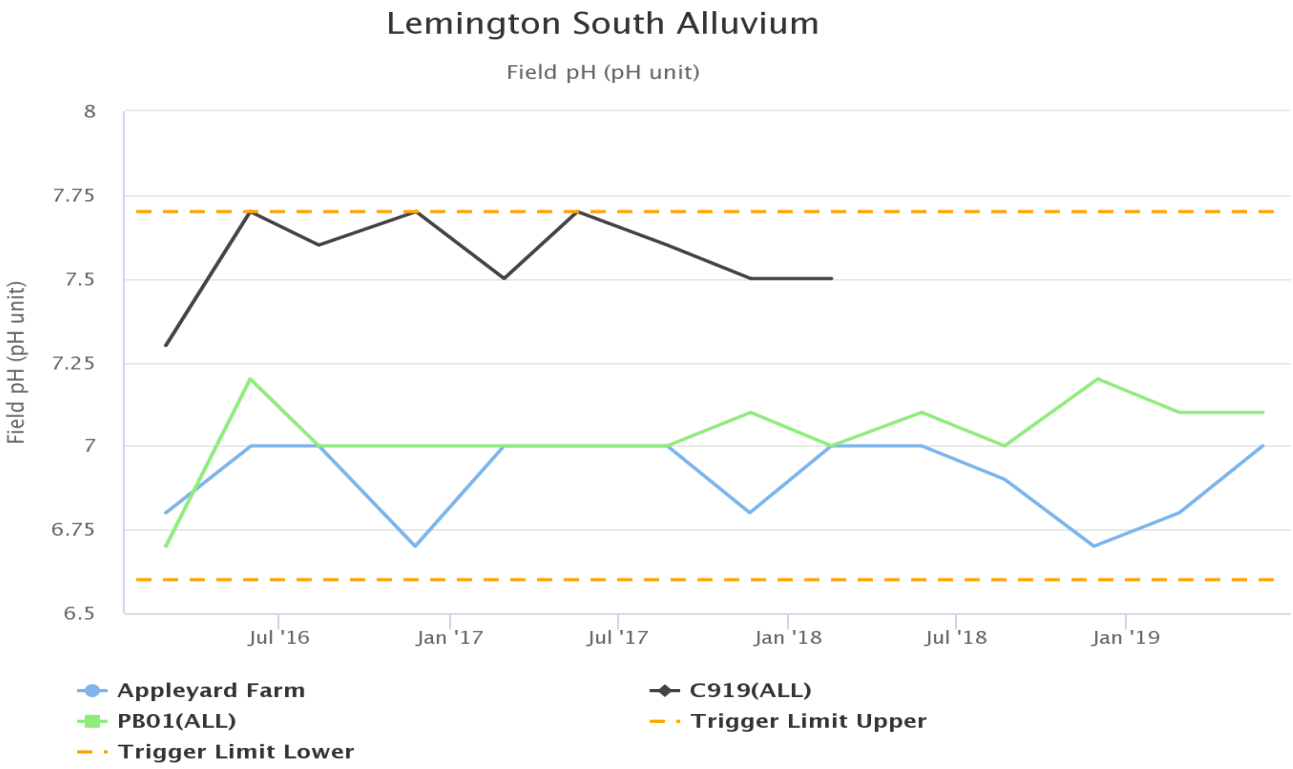

Figure 48: Lemington South Alluvium pH Trend – June 2019

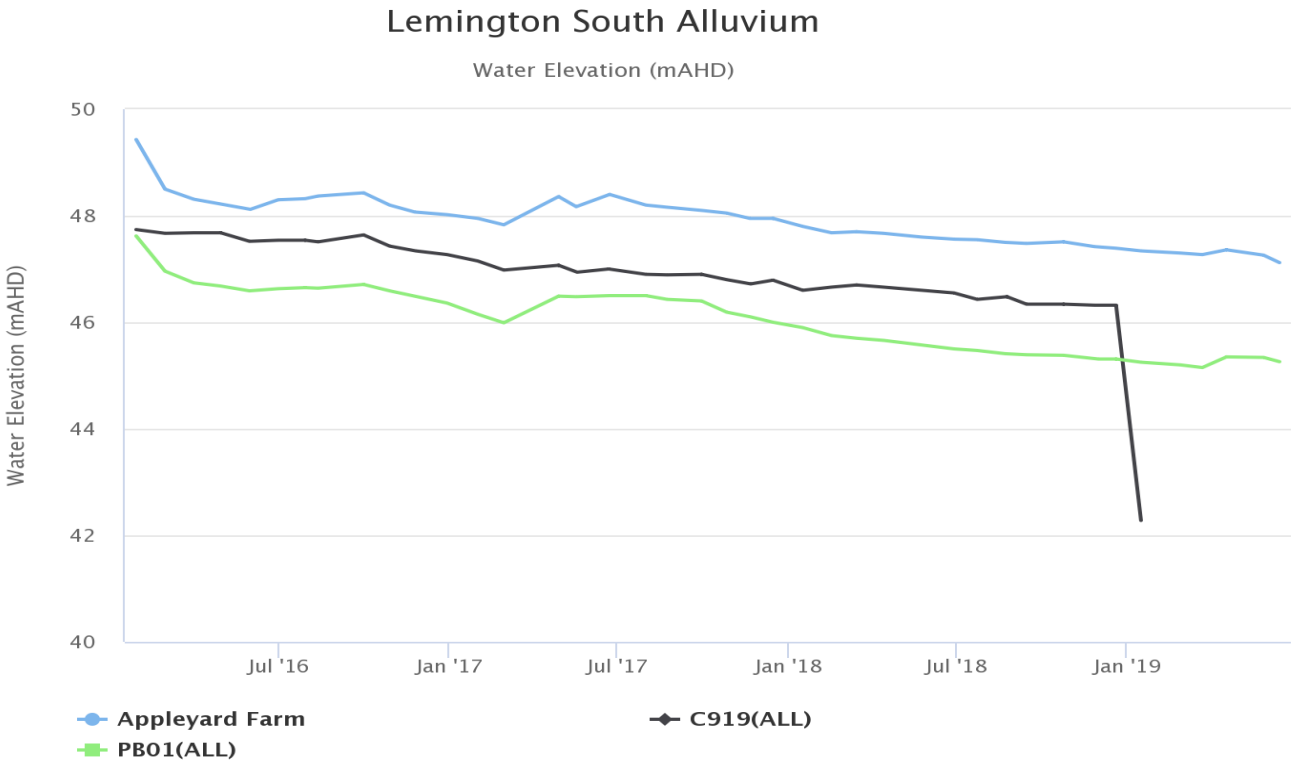

Figure 49: Lemington South Alluvium Standing Water Level Trend – June 2019*

***C919(ALL) has been dry from February to June 2019**

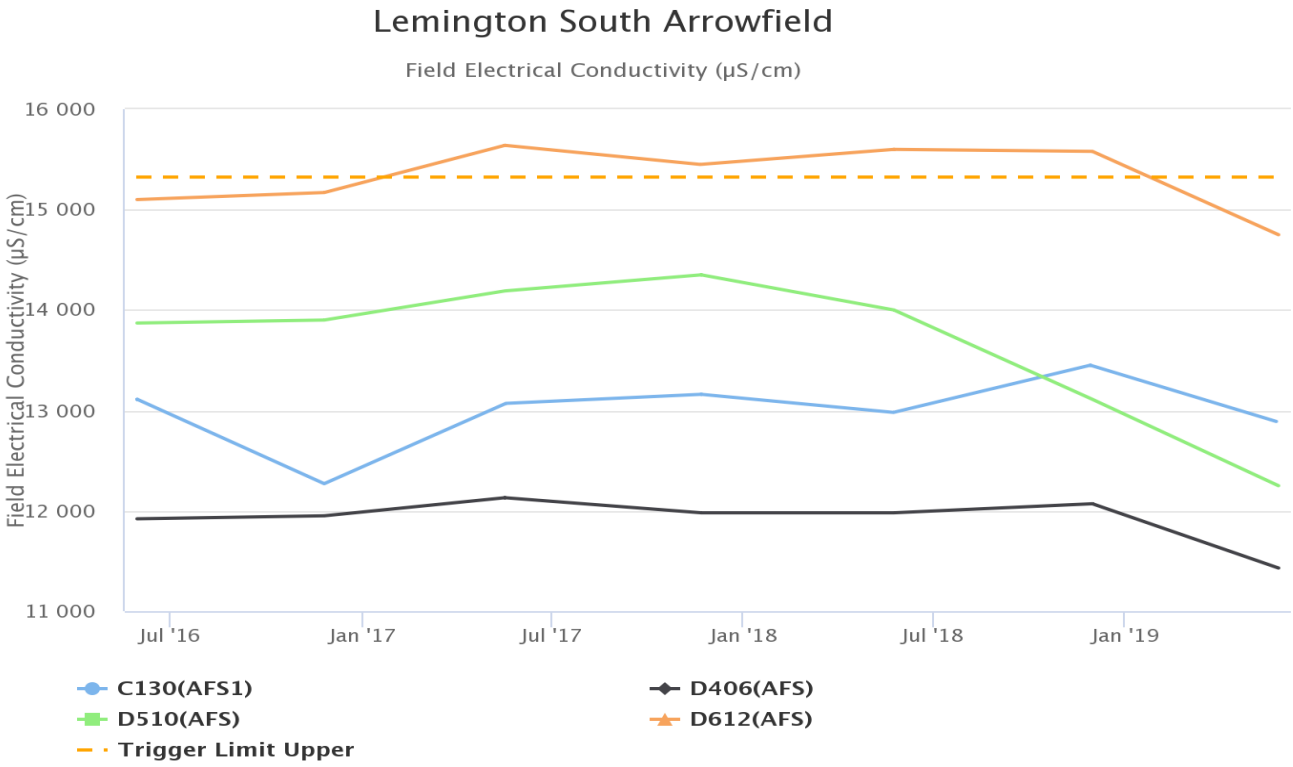

Figure 50: Lemington South Arrowfield Electrical Conductivity Trend – June 2019

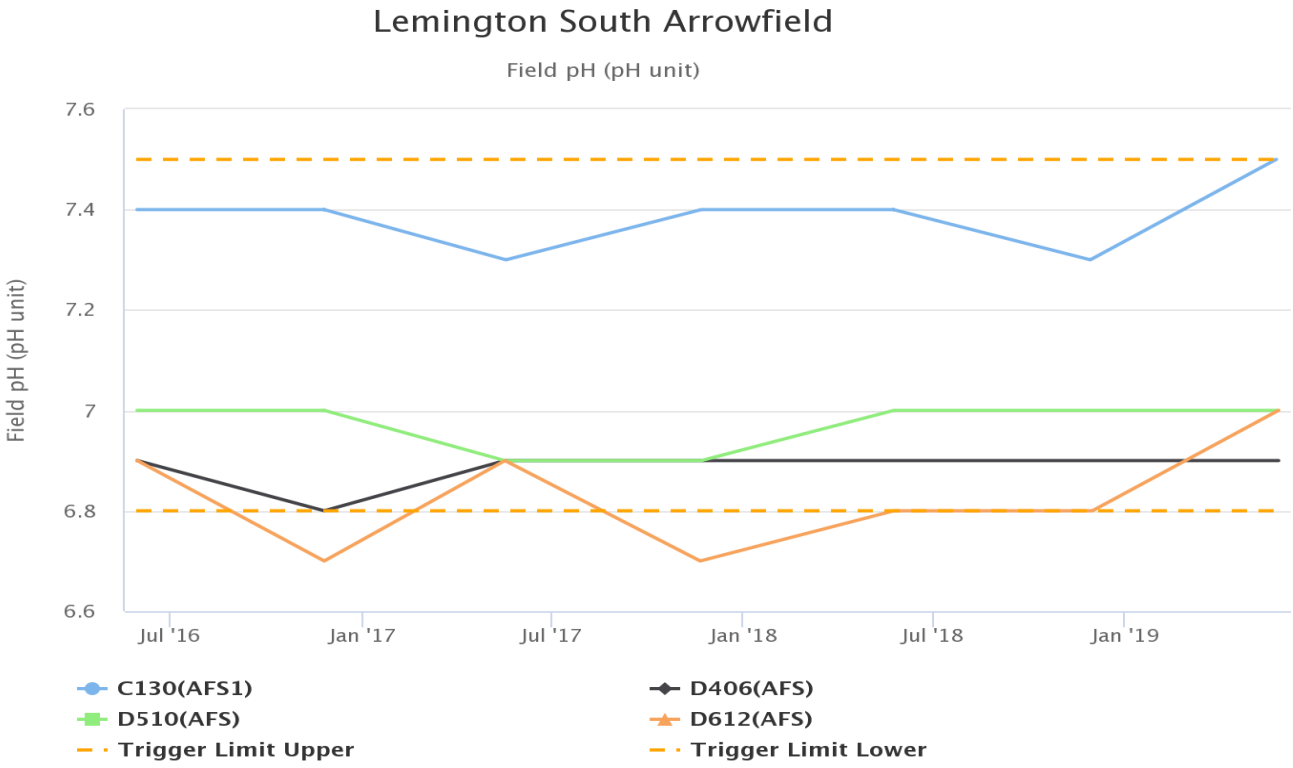

Figure 51: Lemington South Arrowfield pH Trend – June 2019

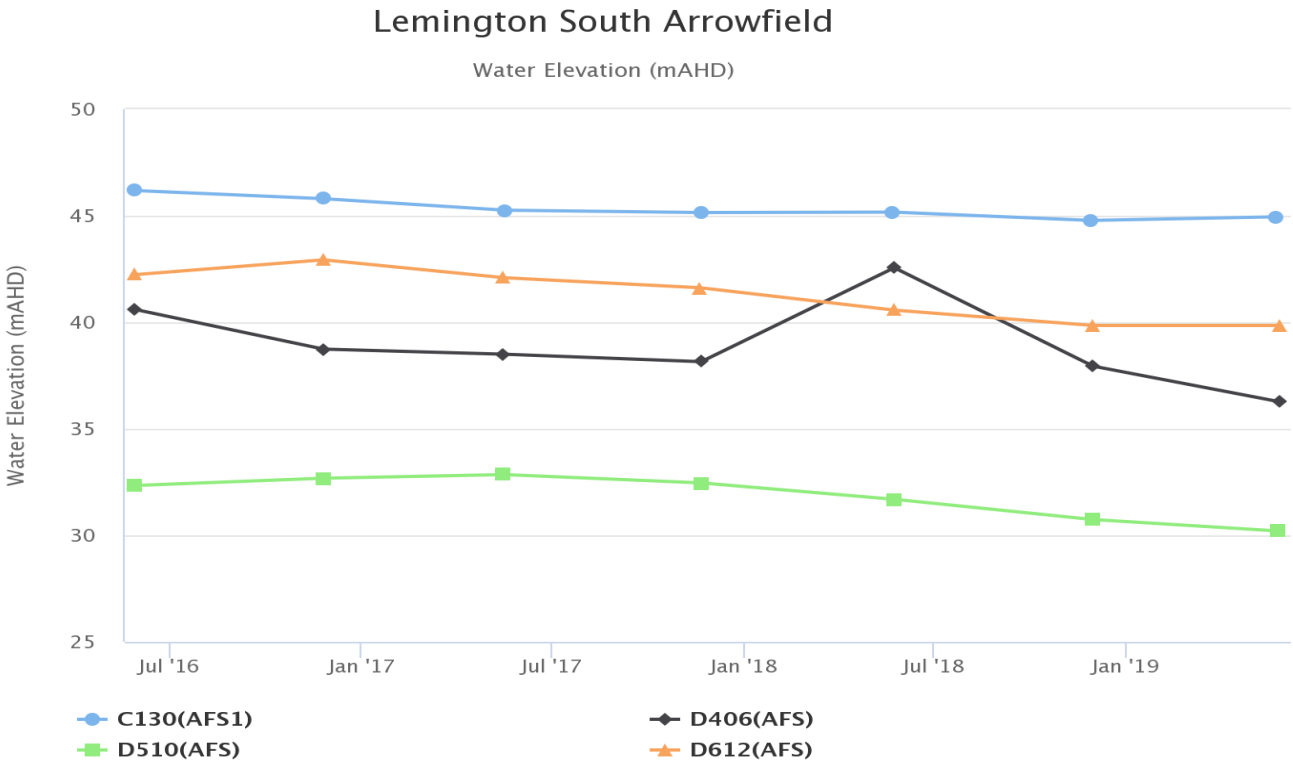

Figure 52: Lemington South Arrowfield Standing Water Level – June 2019

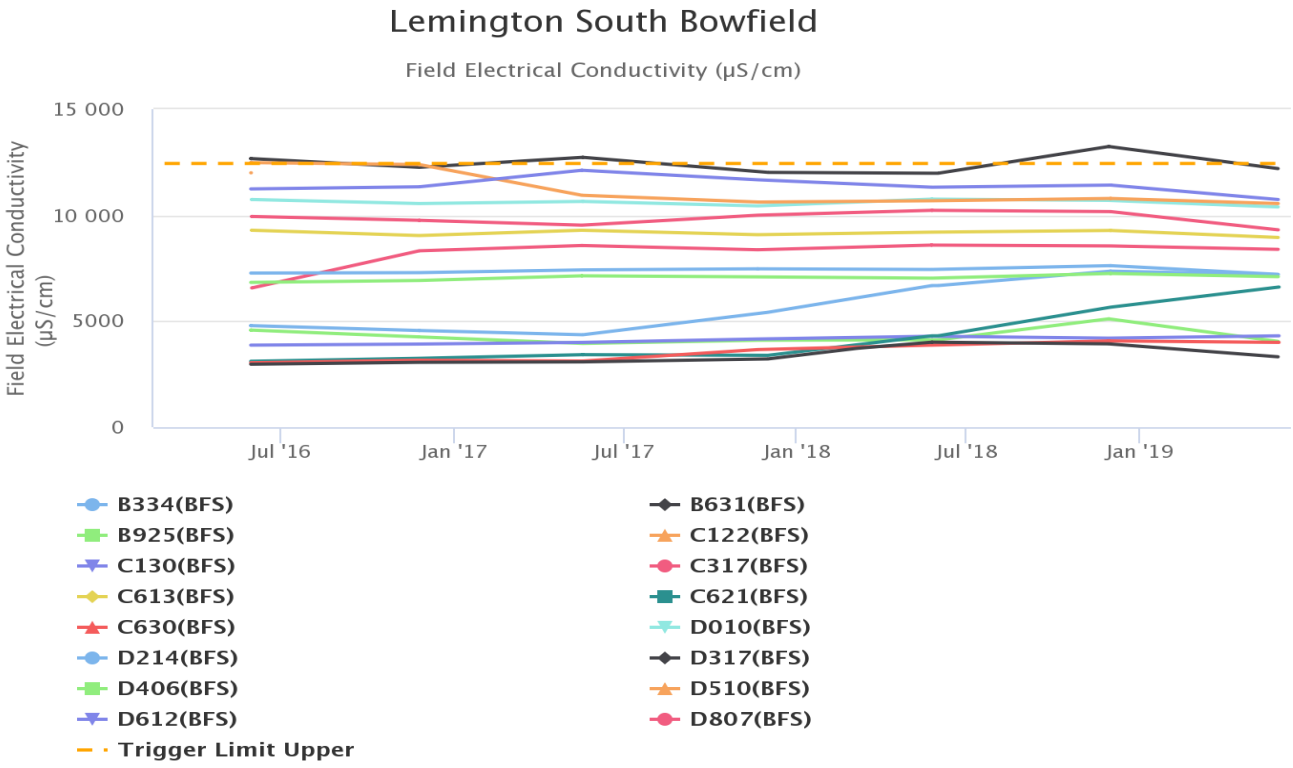

Figure 53: Lemington South Bowfield Electrical Conductivity Trend – June 2019

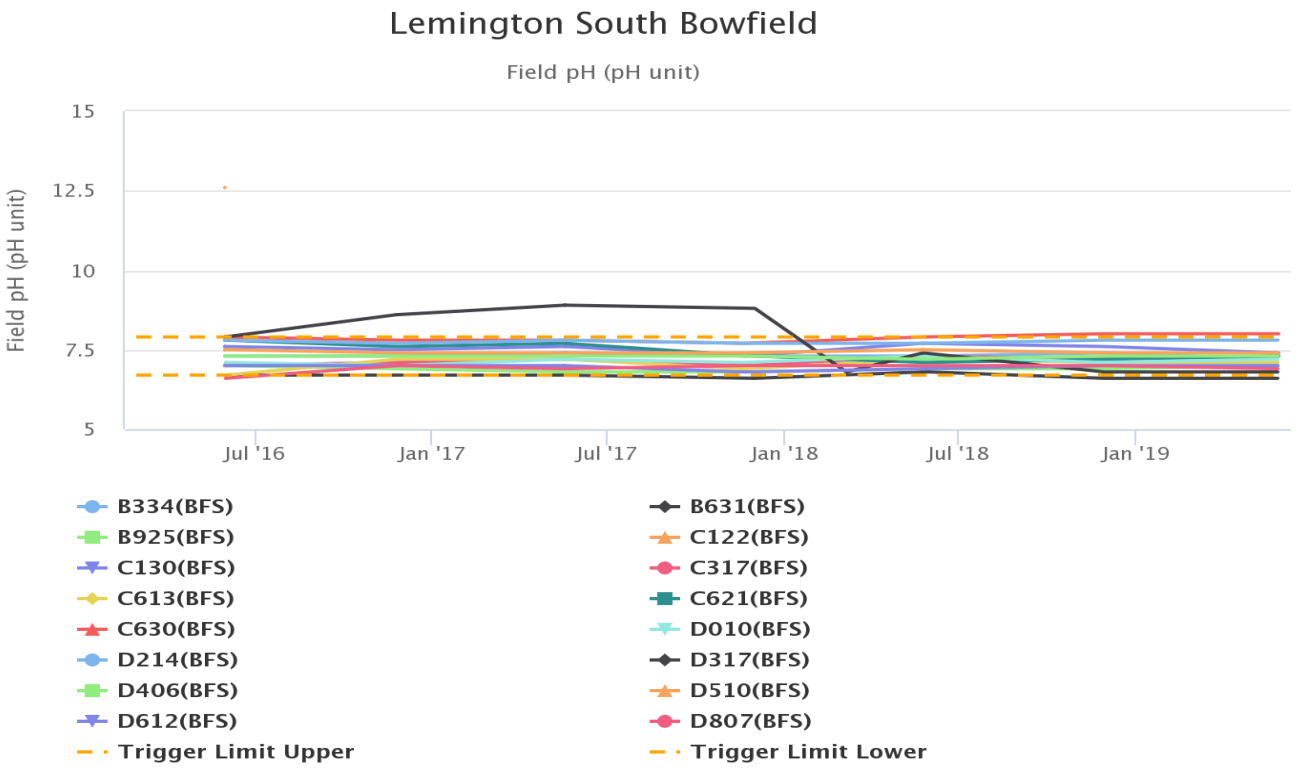

Figure 54: Lemington South Bowfield pH Trend – June 2019

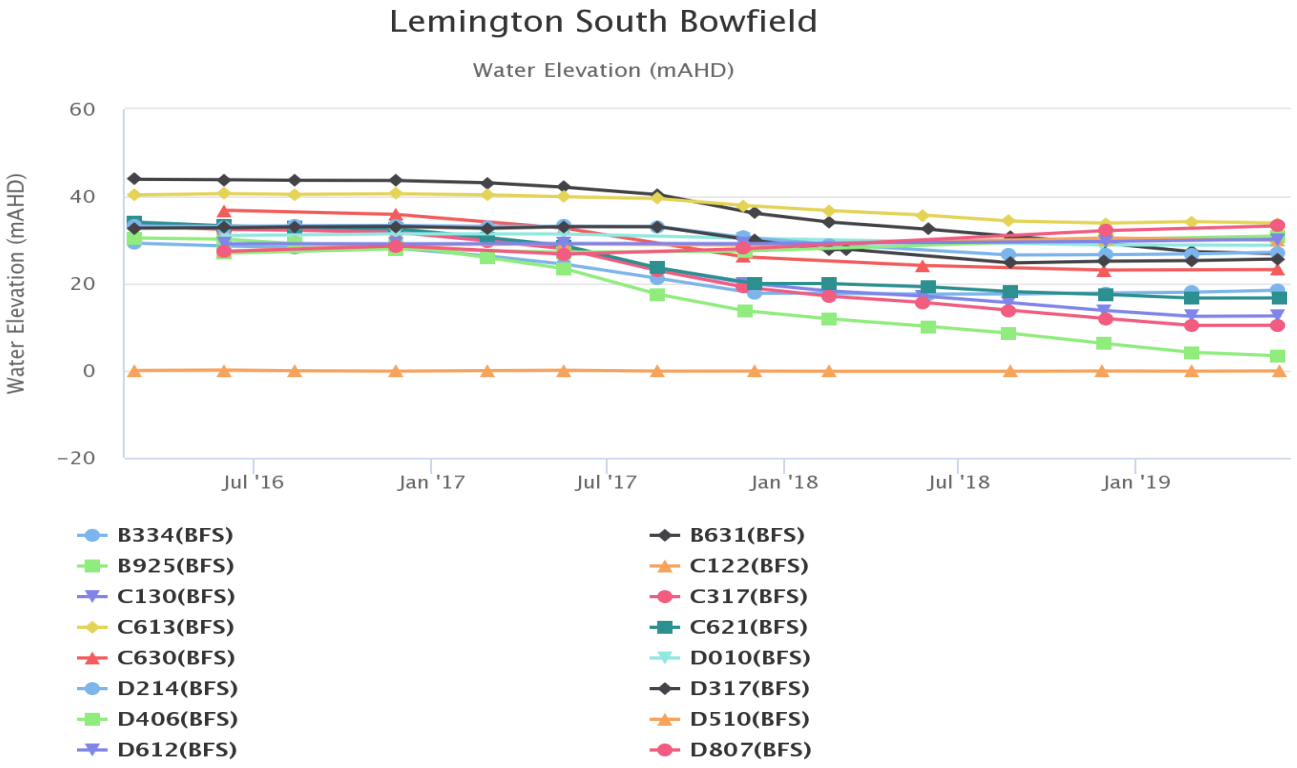

Figure 55: Lemington South Bowfield Standing Water Level – June 2019

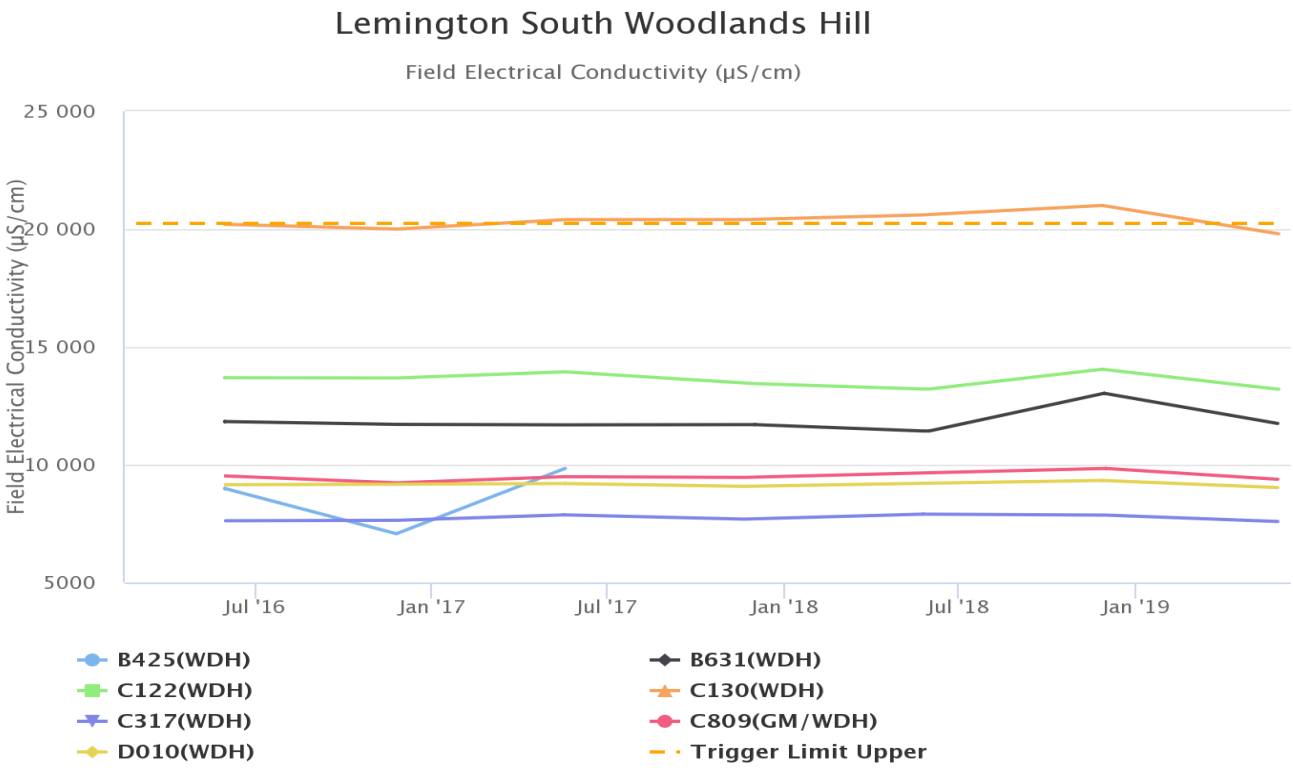

Figure 56: Lemington South Woodlands Hill Electrical Conductivity Trend – June 2019

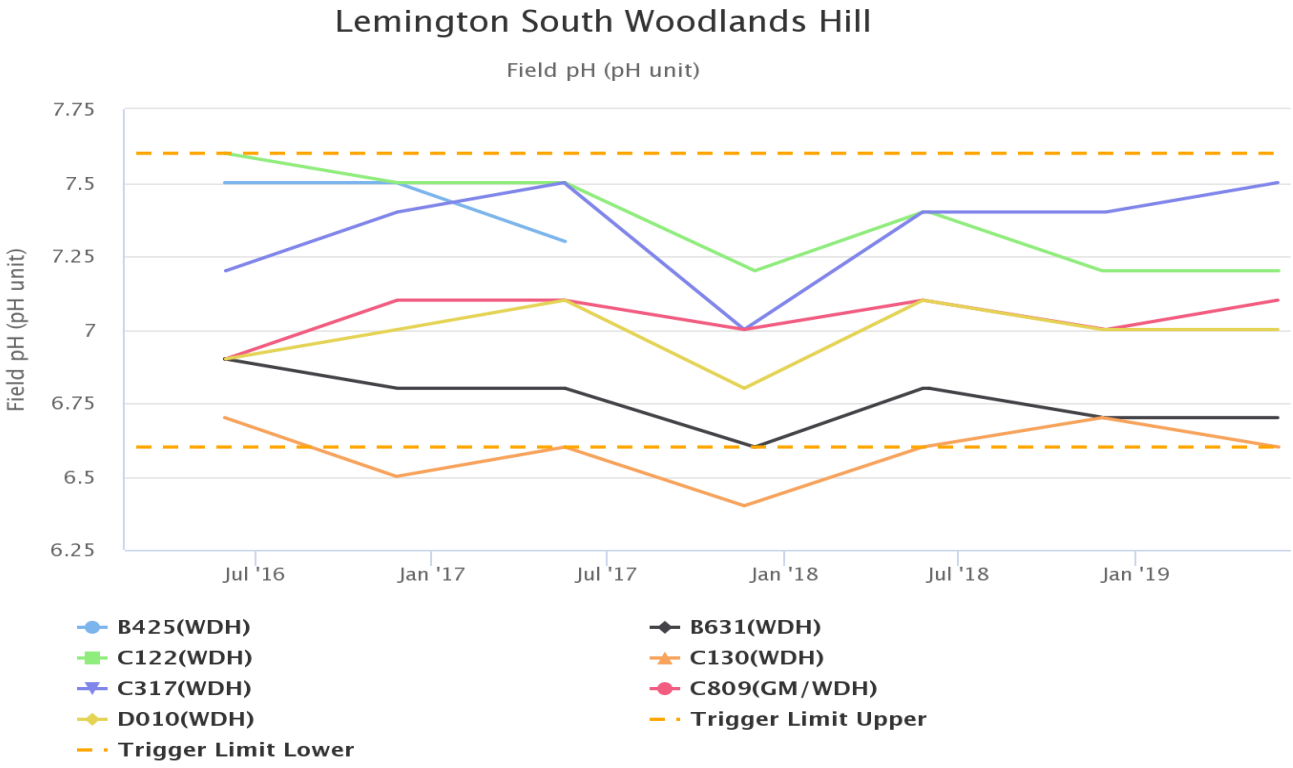

Figure 57: Lemington South Woodlands Hill pH Trend – June 2019

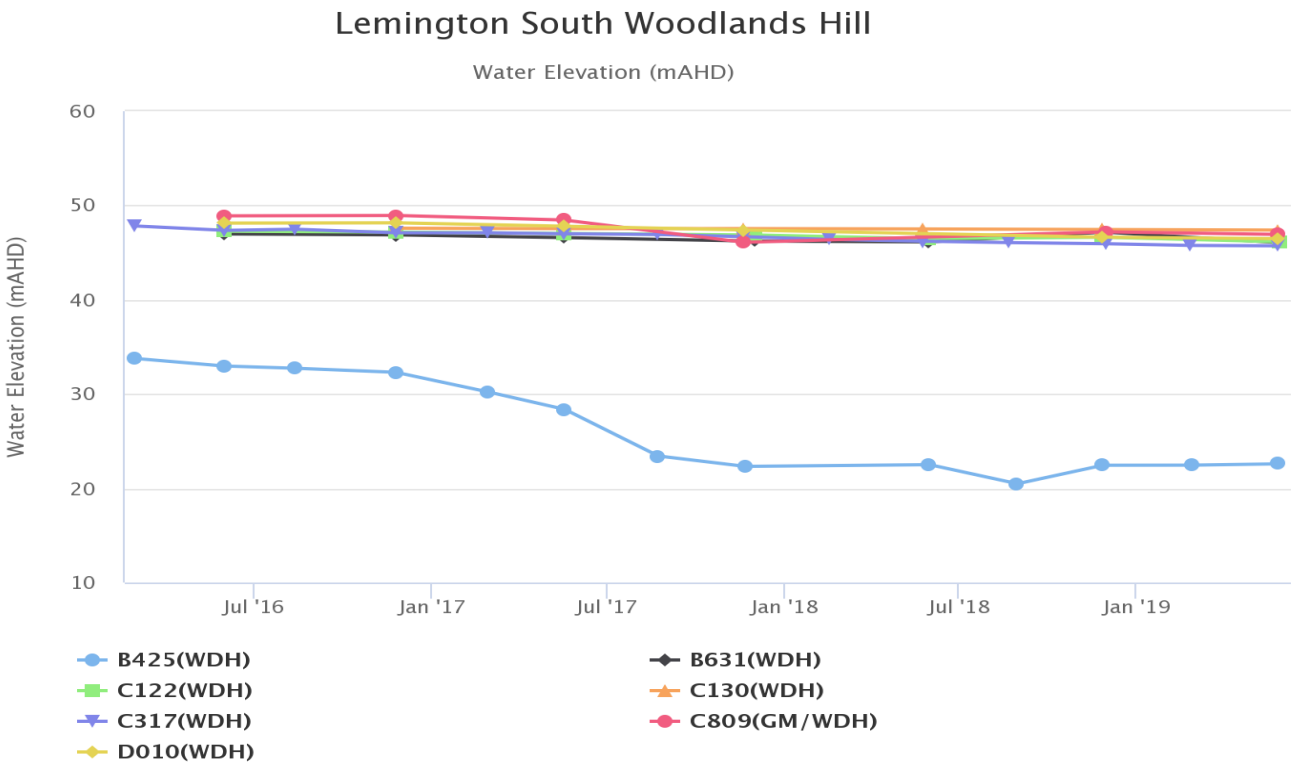

Figure 58: Lemington South Woodlands Hill Standing Water Level – June 2019

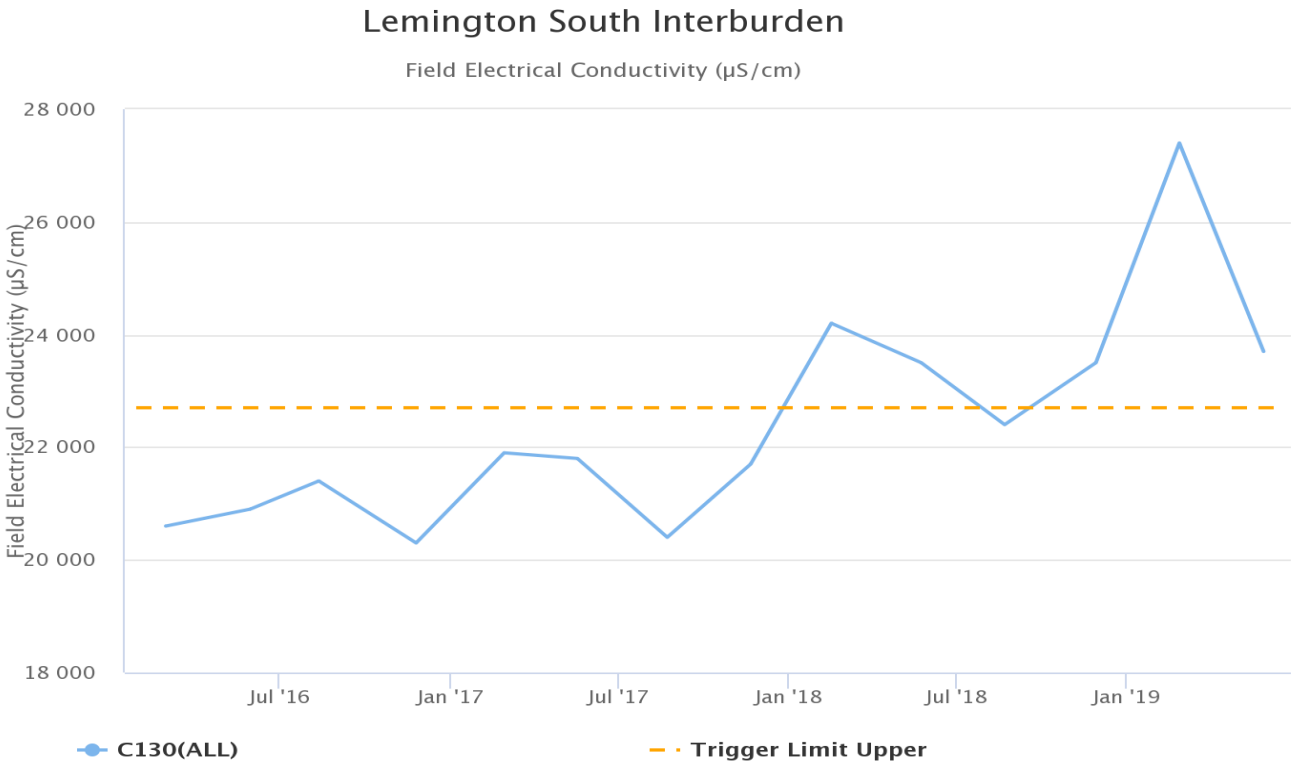

Figure 59: Lemington South Interburden Electrical Conductivity Trend – June 2019

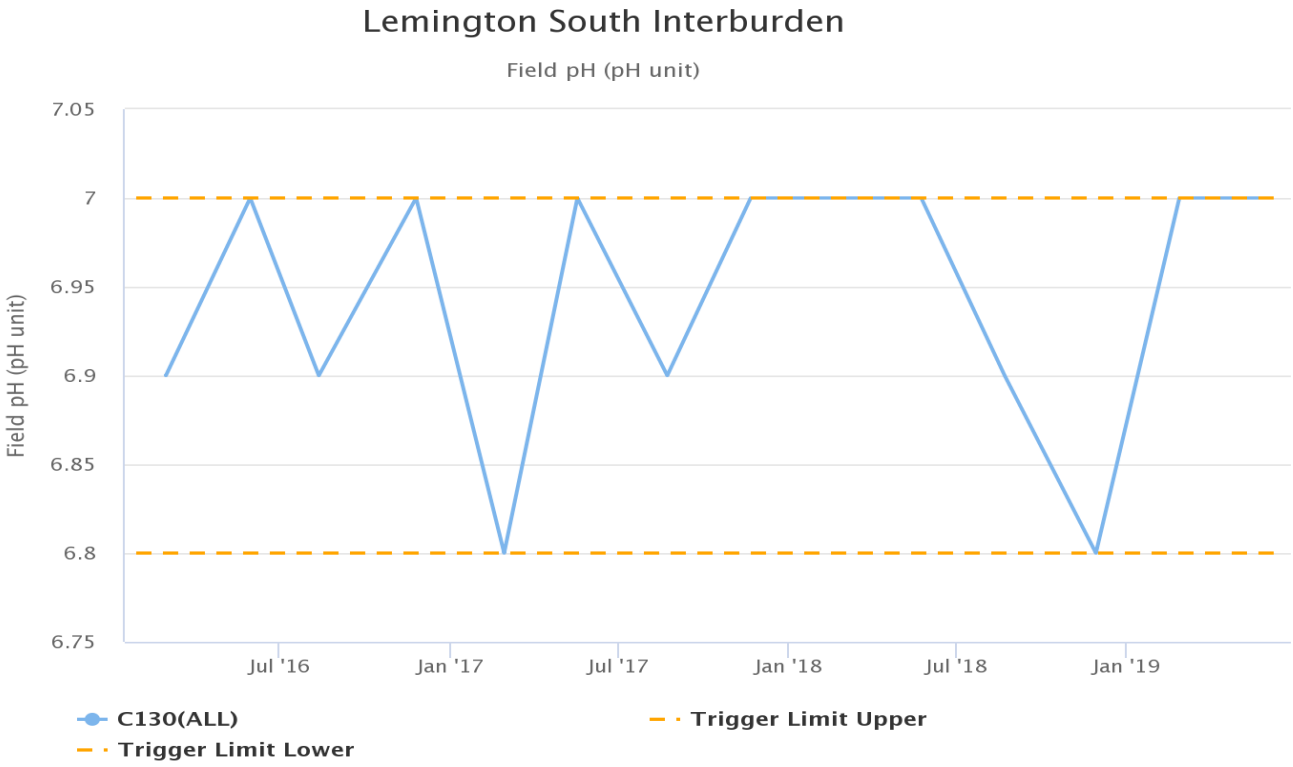

Figure 60: Lemington South Interburden pH Trend – June 2019

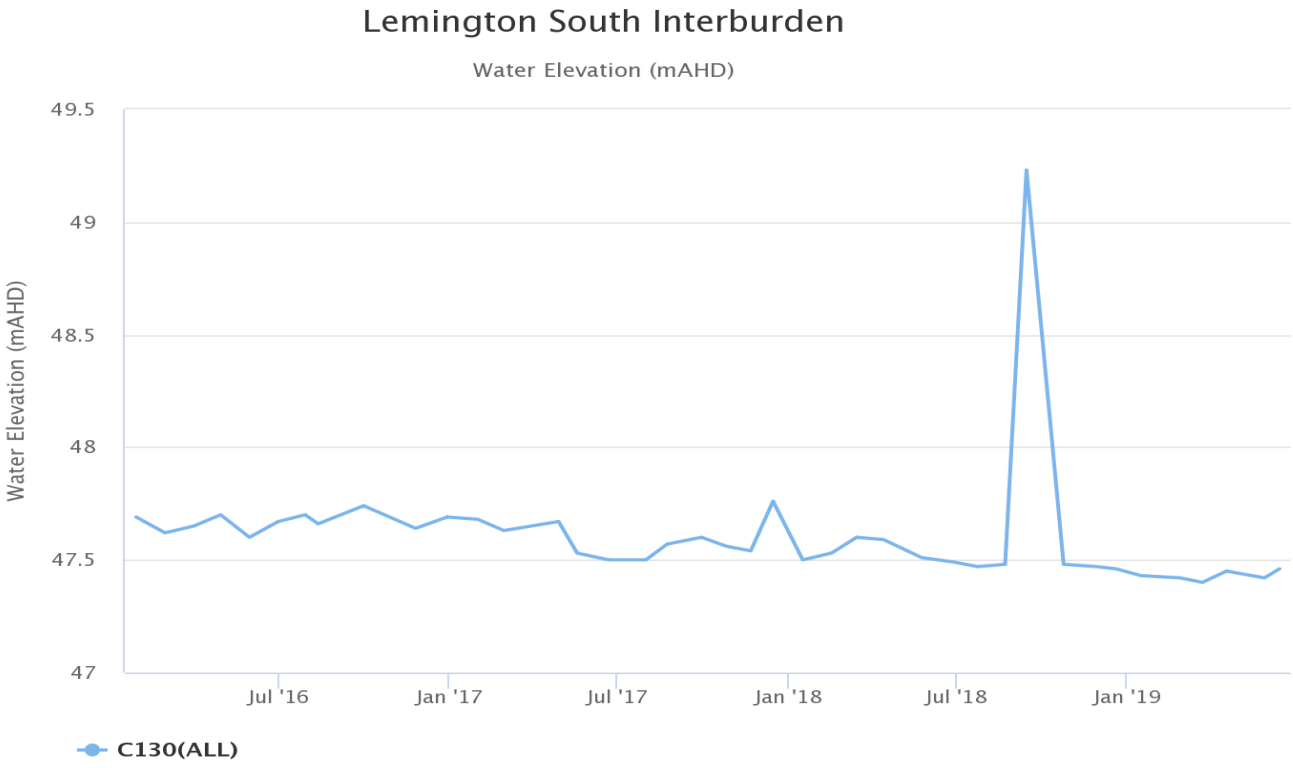

Figure 61: Lemington South Interburden Standing Water Level – June 2019

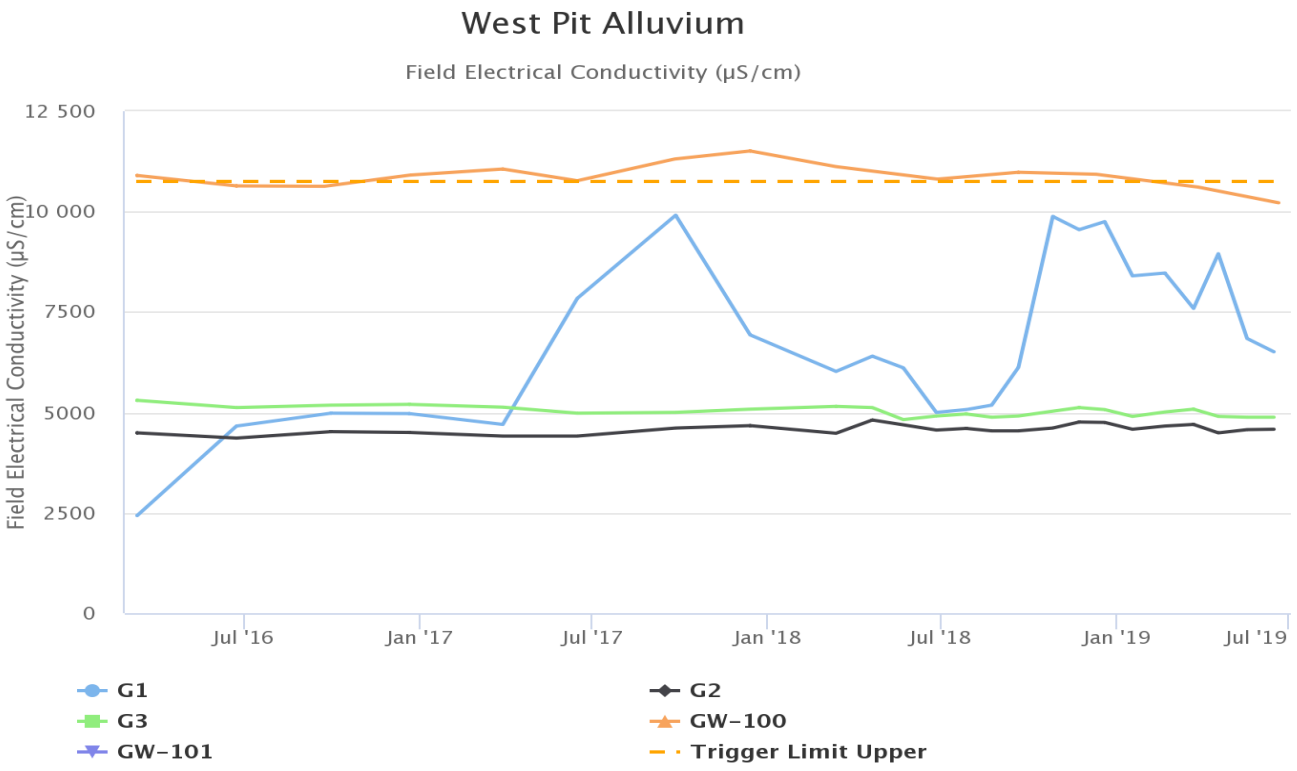

Figure 62: West Pit Alluvium Electrical Conductivity Trend – June 2019

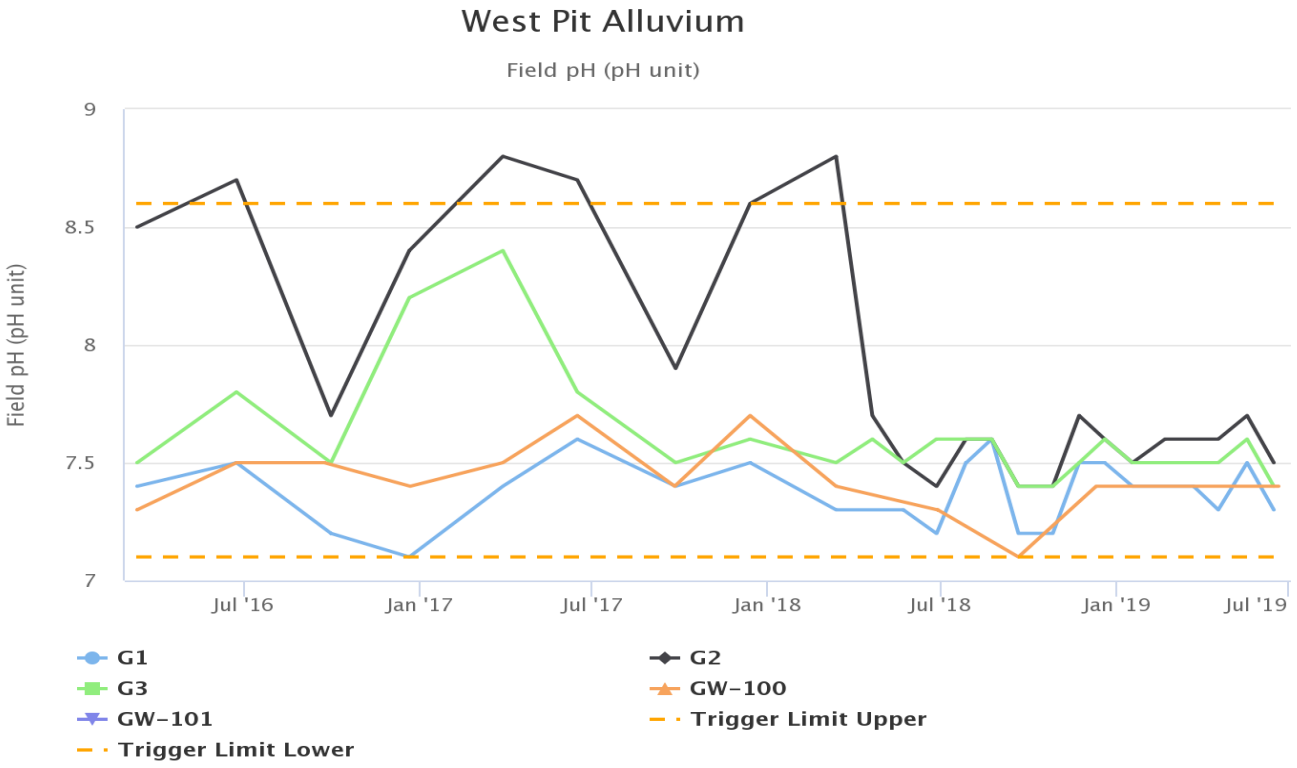

Figure 63: West Pit Alluvium pH Trend – June 2019

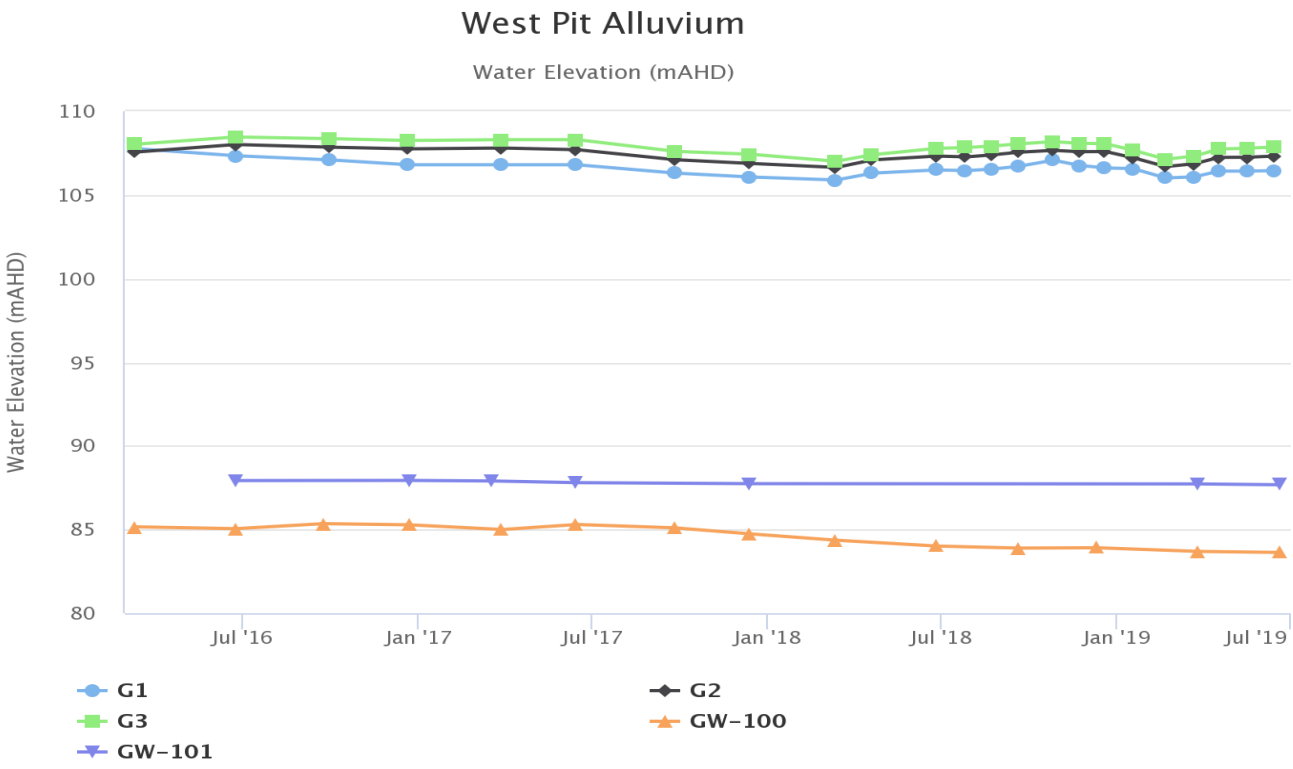

Figure 64: West Pit Alluvium Standing Water Level – June 2019

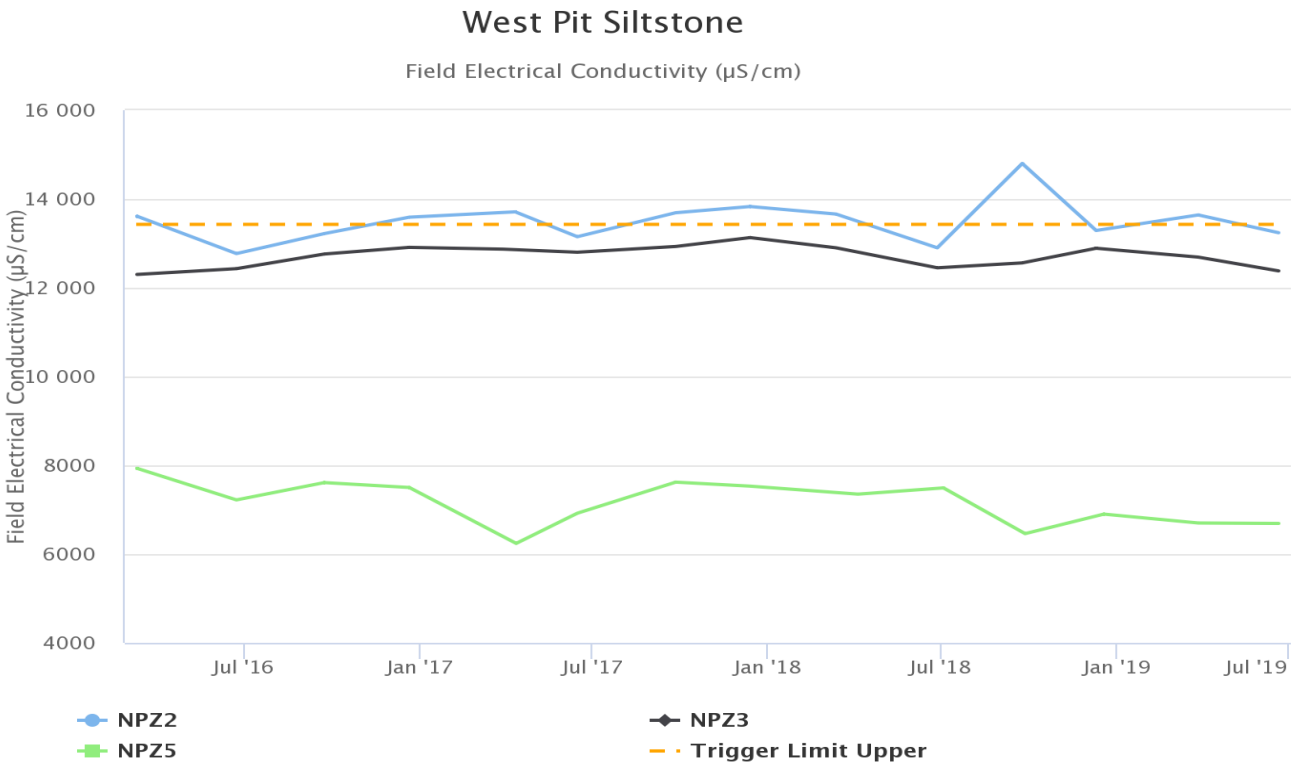

Figure 65: West Pit Siltstone Electrical Conductivity Trend – June 2019

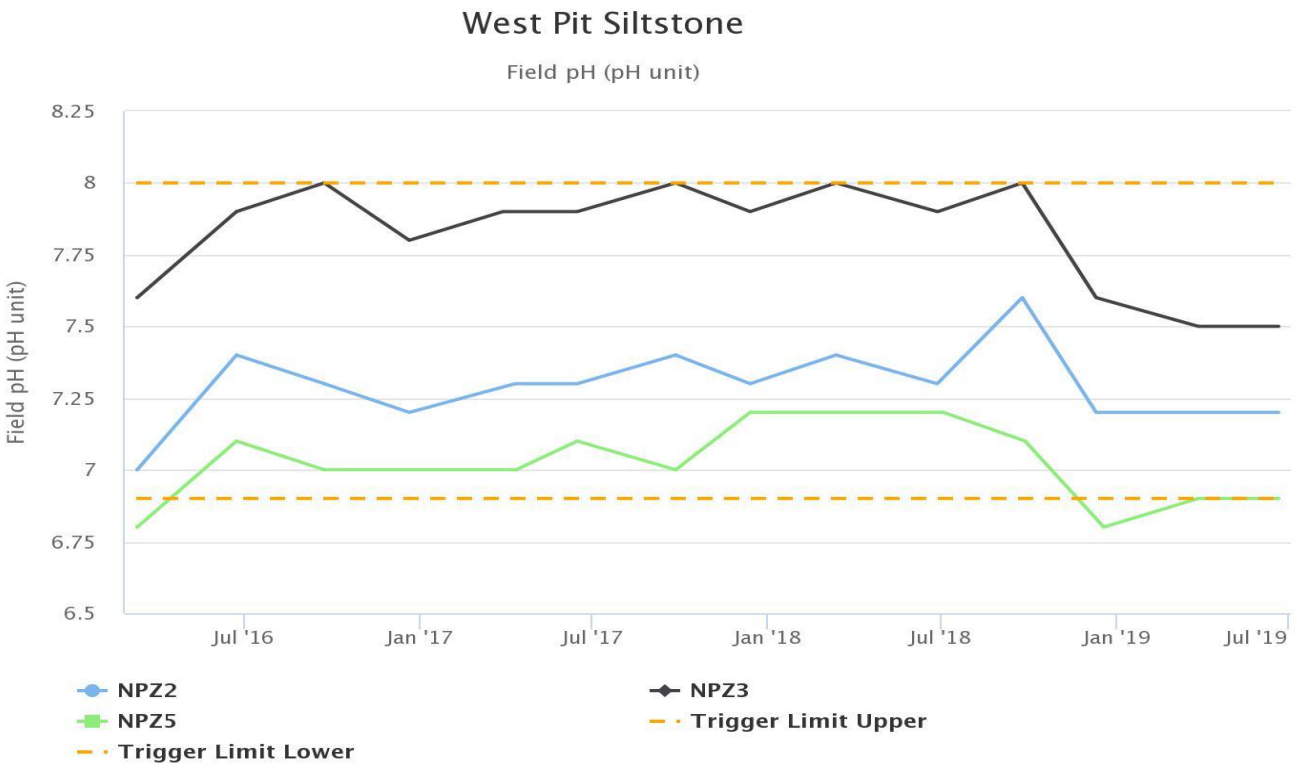

Figure 66: West Pit Siltstone pH Trend – June 2019

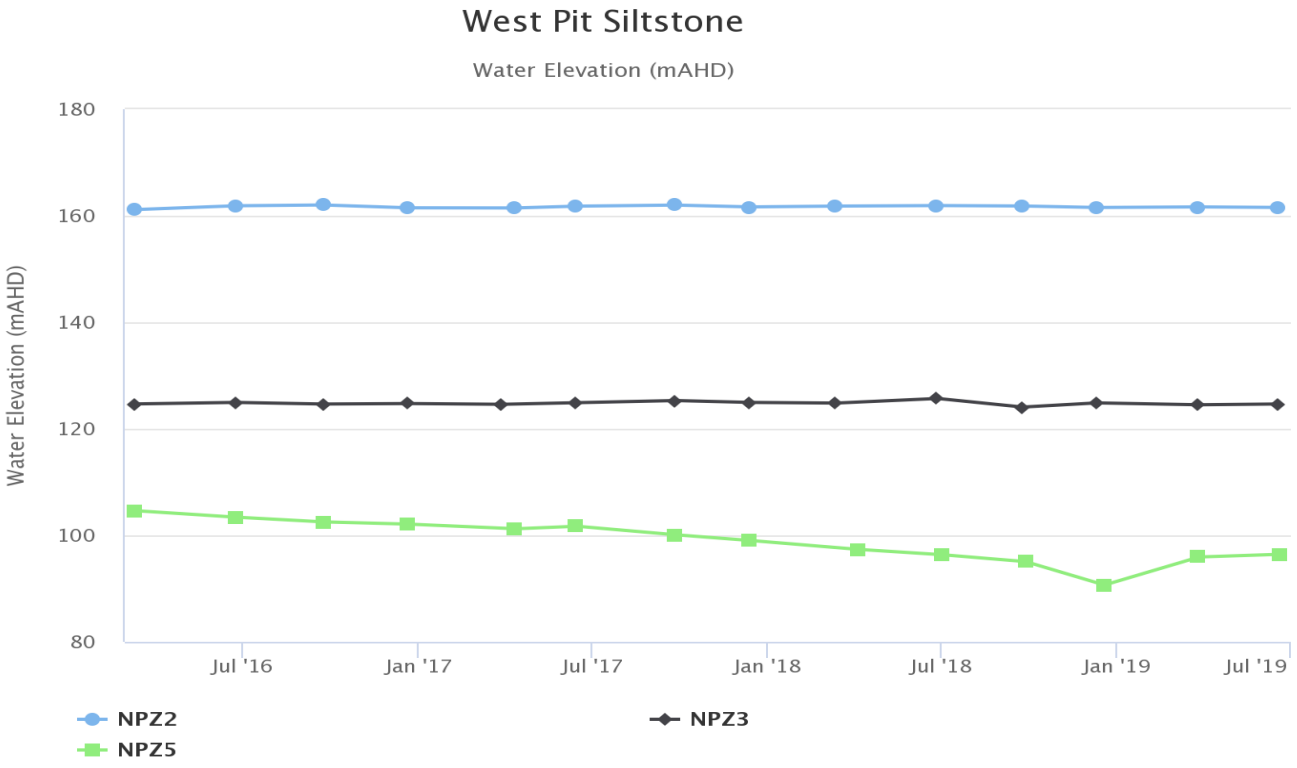

Figure 67: West Pit Siltstone Standing Water Level – June 2019

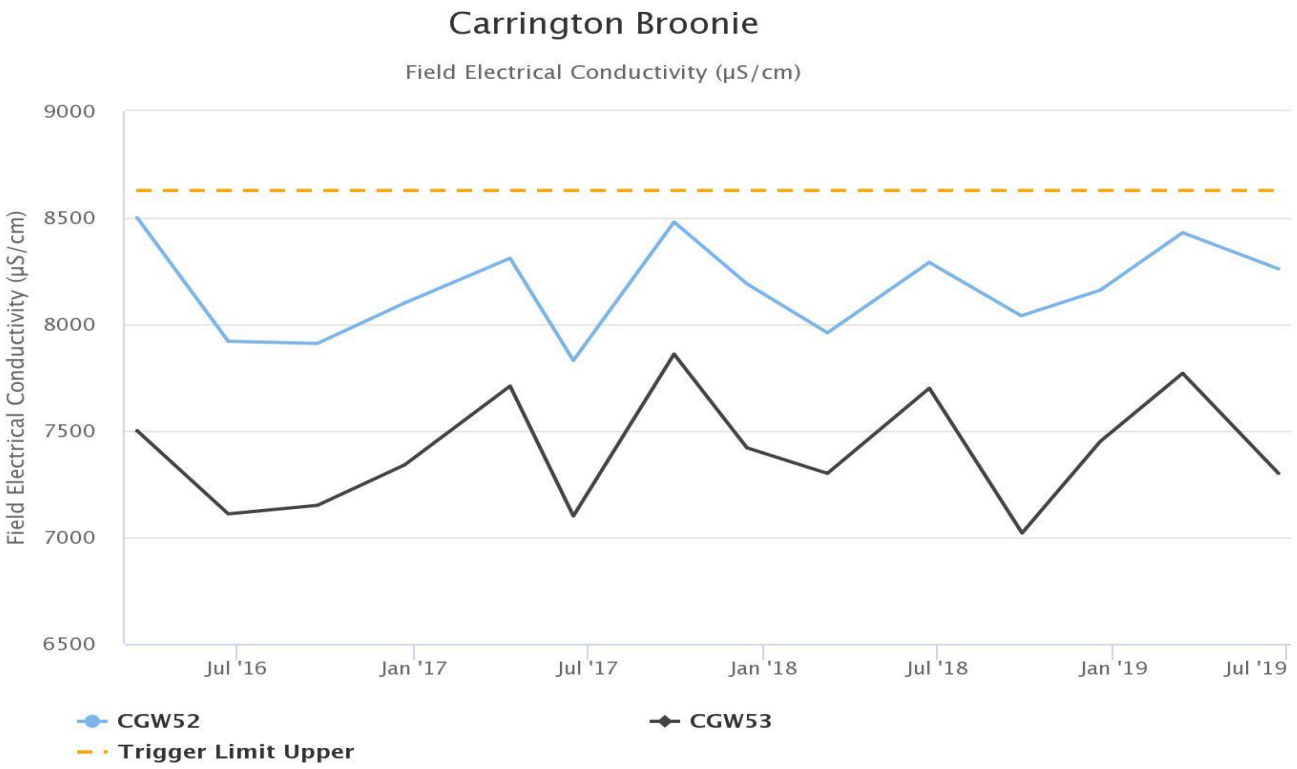

Figure 68: Carrington Broonie Electrical Conductivity Trend – June 2019

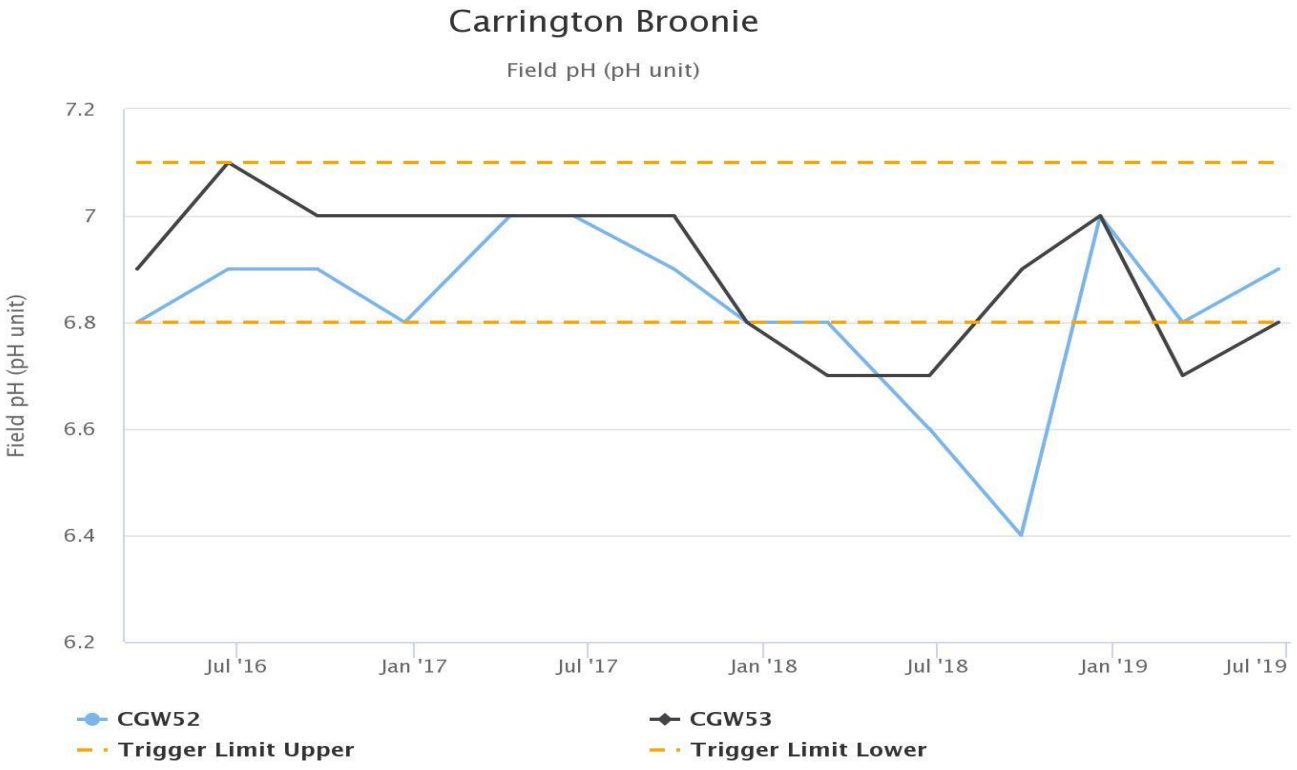

Figure 69: Carrington Broonie pH Trend – June 2019

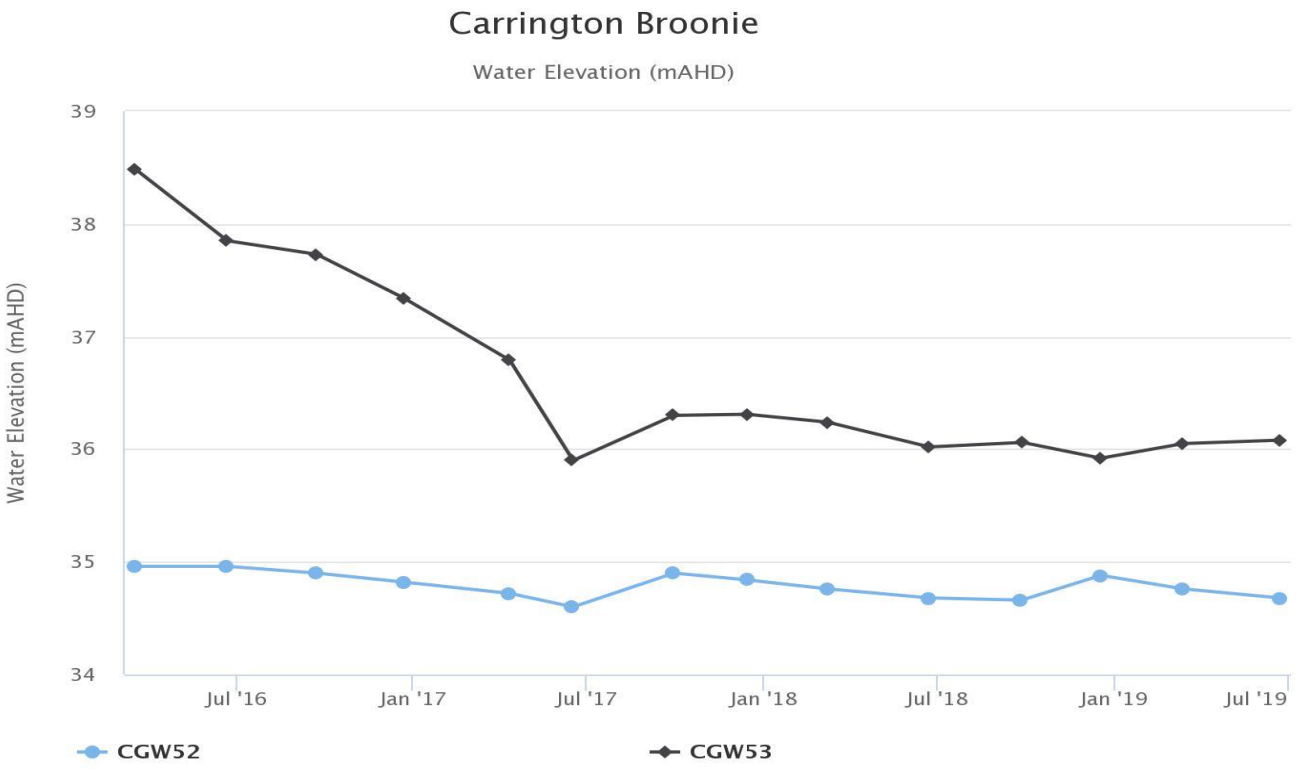

Figure 70: Carrington Broonie Standing Water Level – June 2019

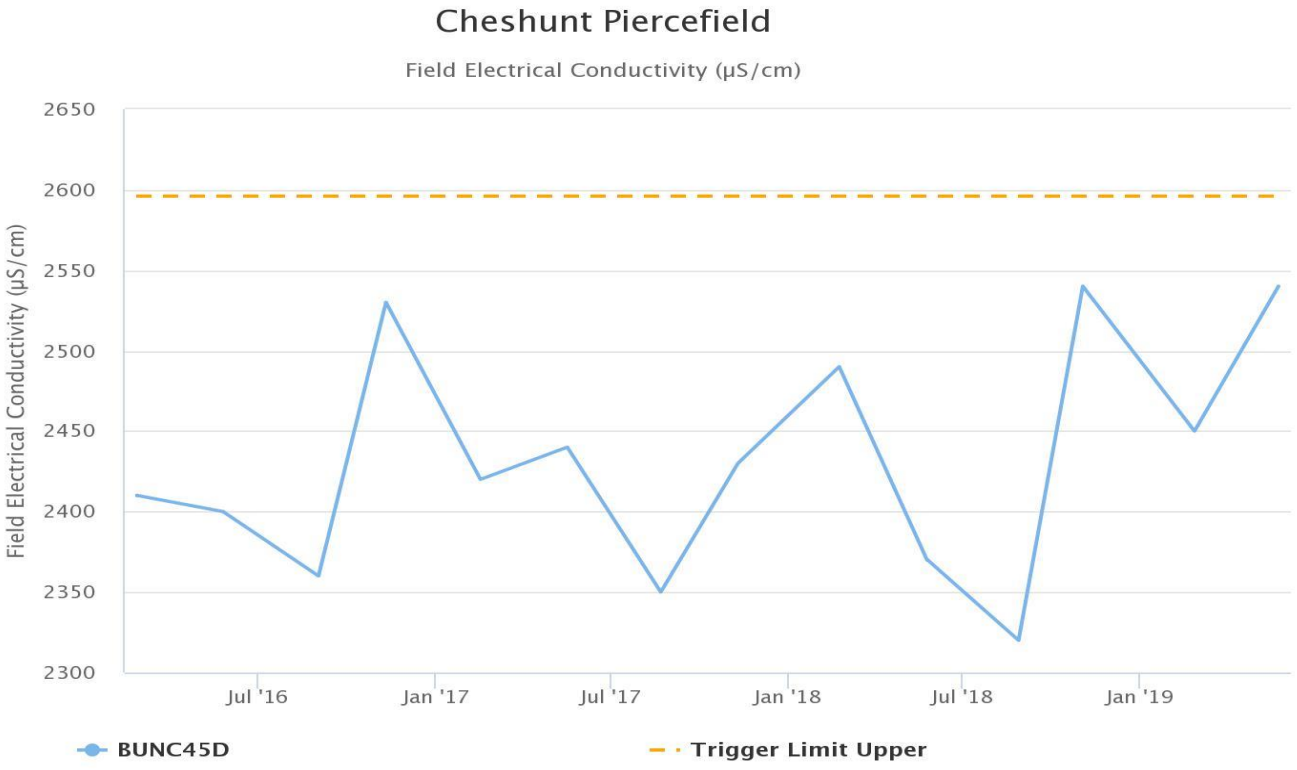

Figure 71: Cheshunt Piercefield Electrical Conductivity Trend – June 2019

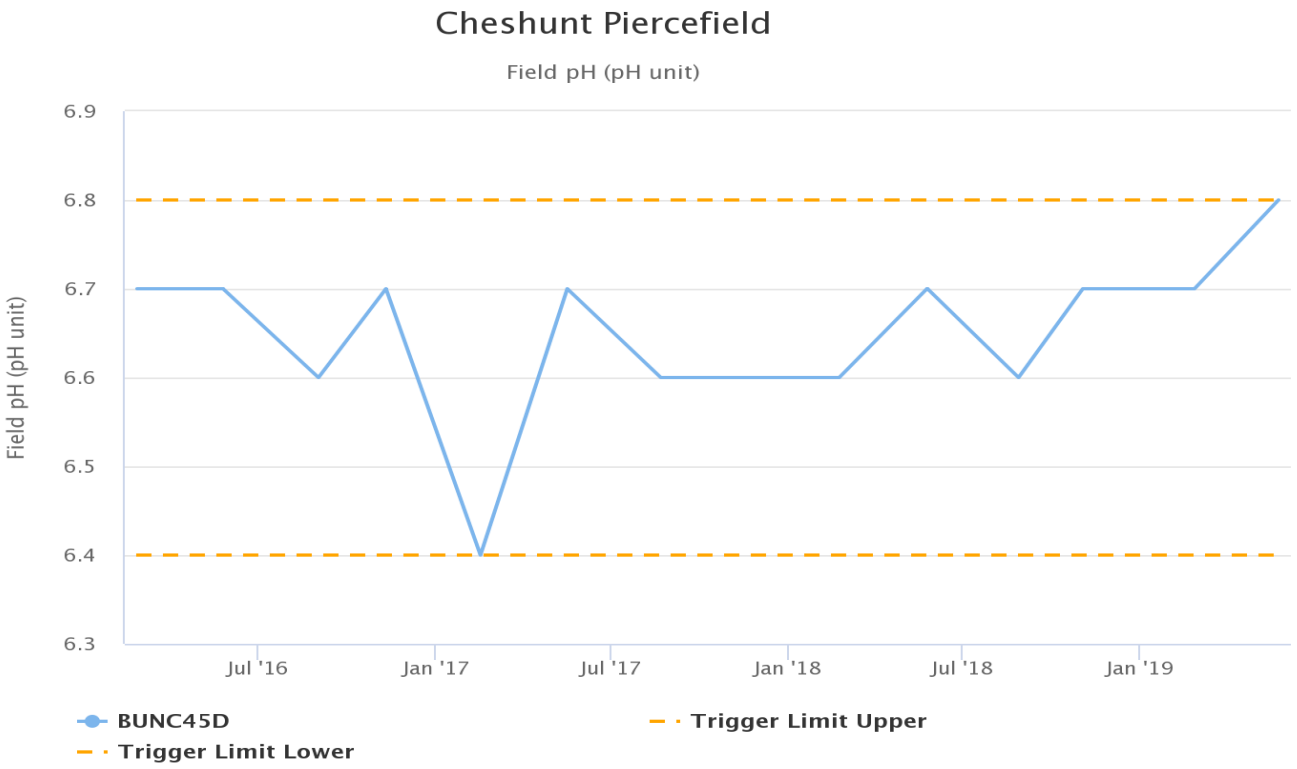

Figure 72: Cheshunt Piercefield pH Trend – June 2019

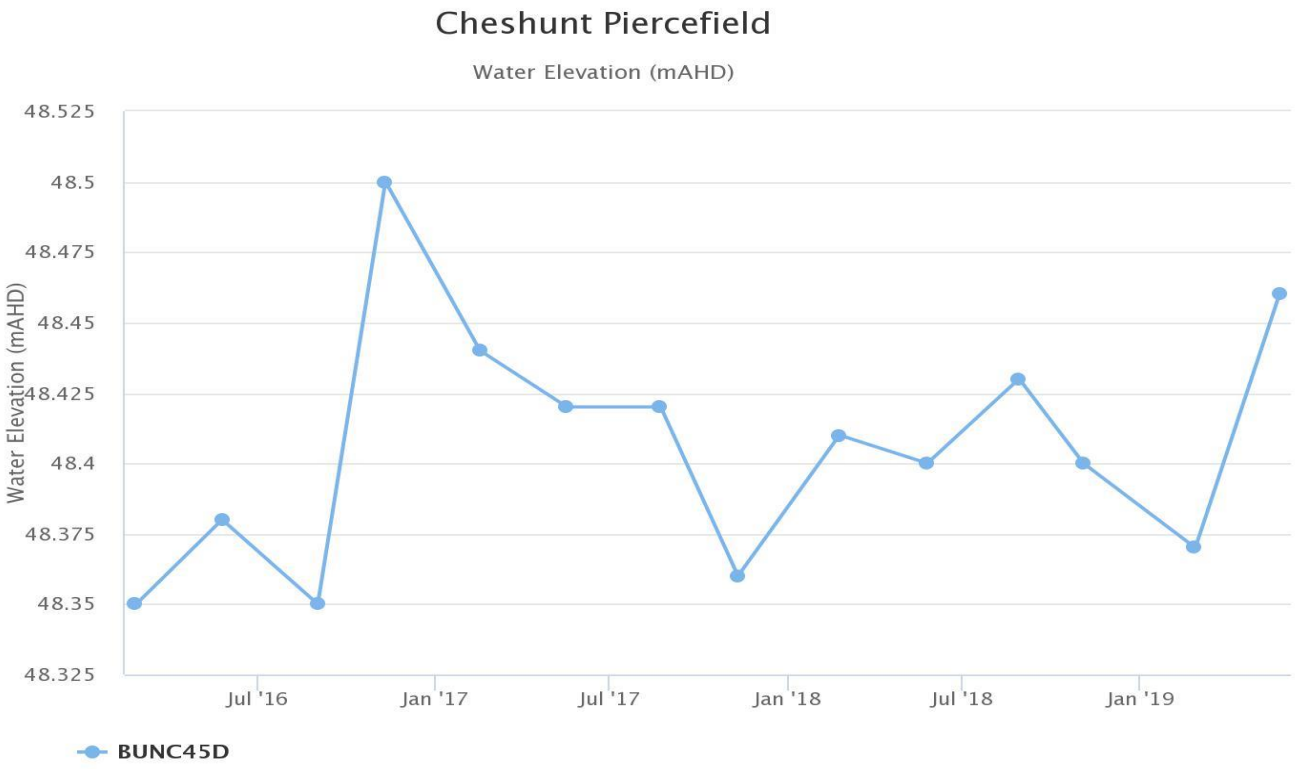

Figure 73: Cheshunt Piercefield Standing Water Level – June 2019

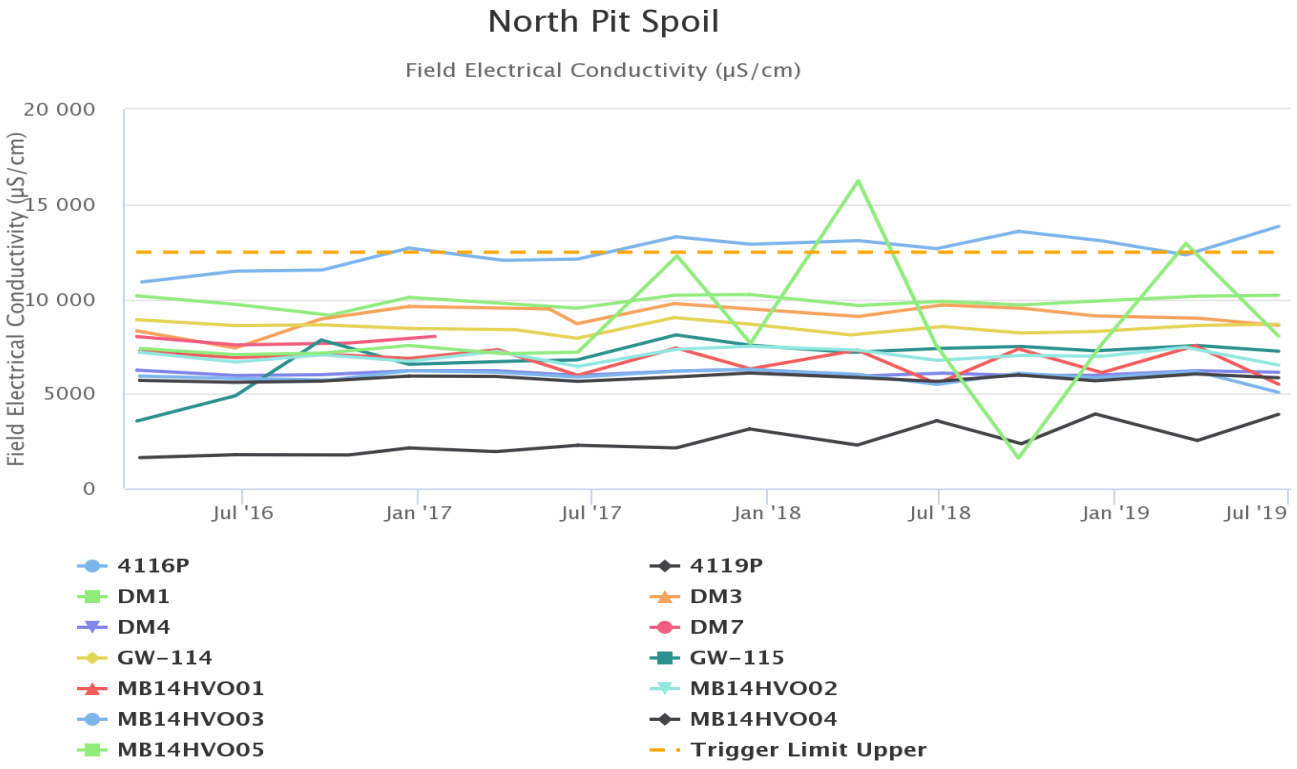

Figure 74: North Pit Spoil Electrical Conductivity Trend – June 2019

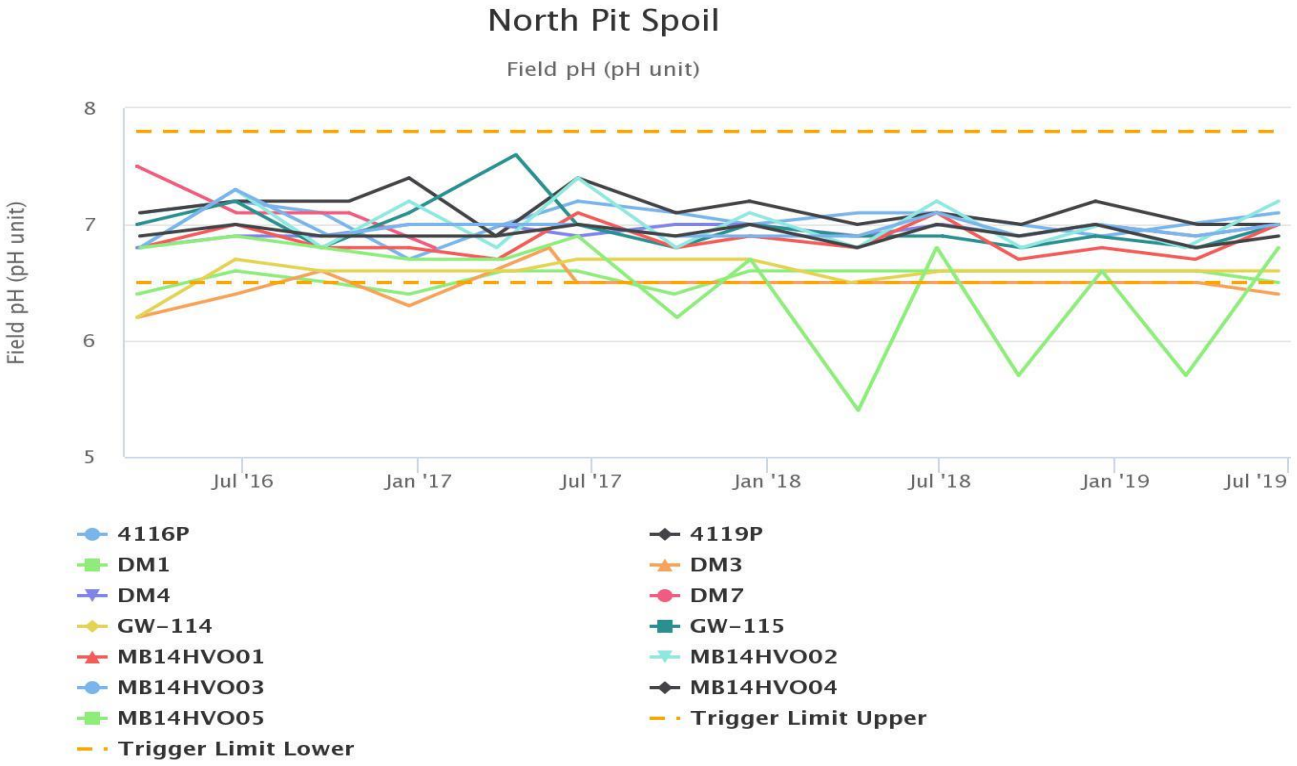

Figure 75: North Pit Spoil pH Trend – June 2019

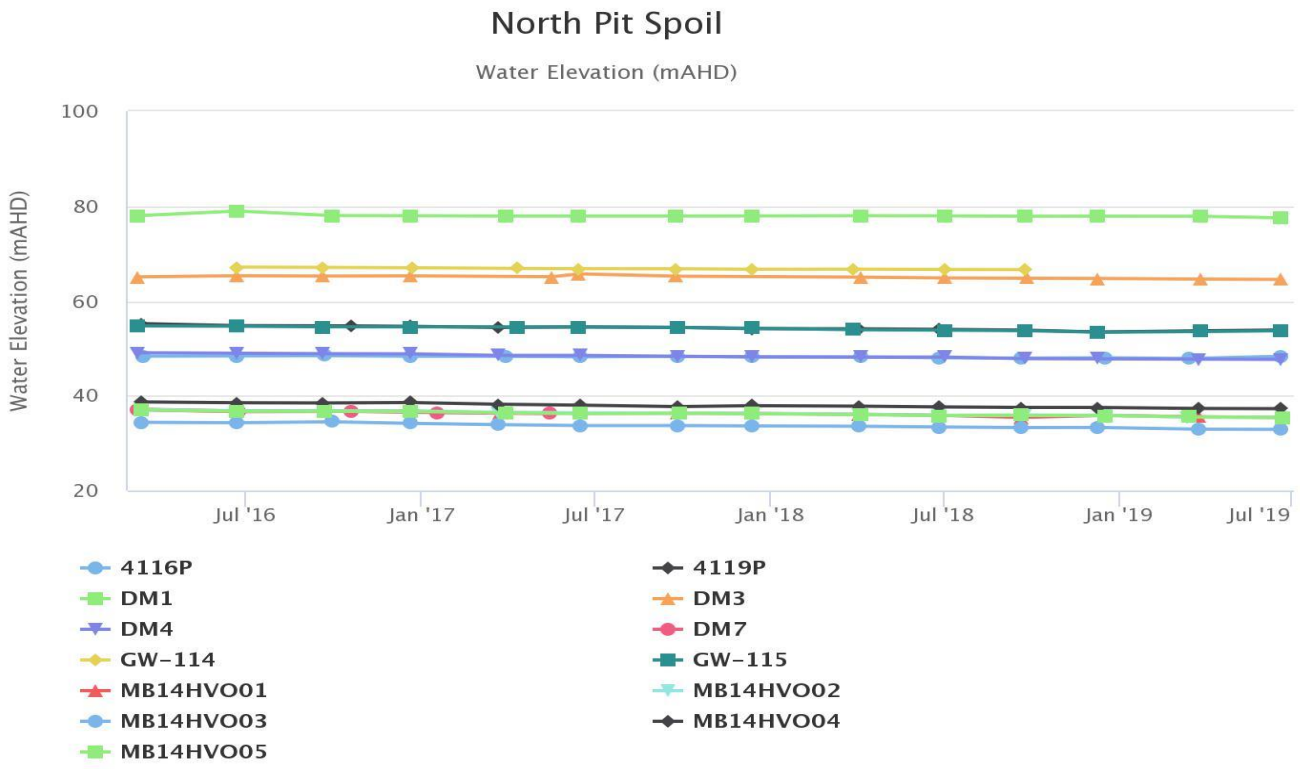

Figure 76: North Pit Spoil Standing Water Level – June 2019

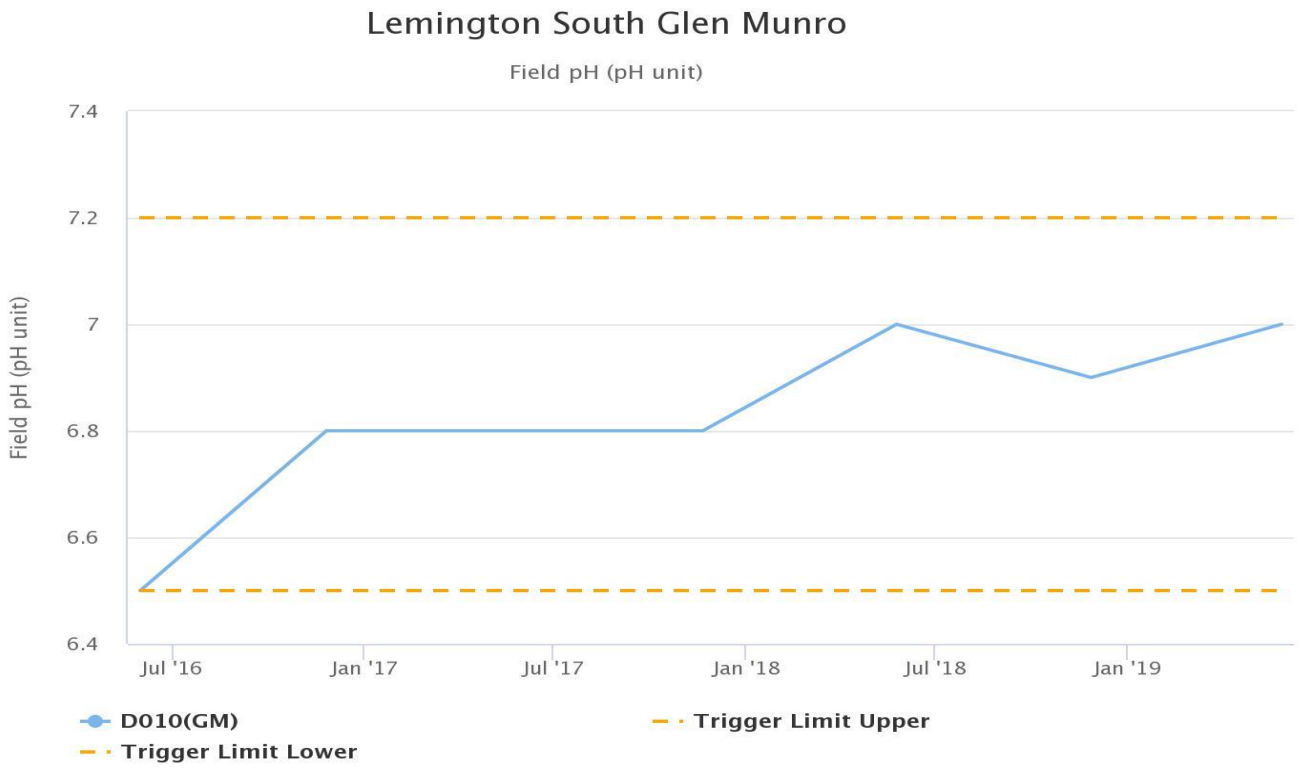

Figure 77: Lemington South Glen Munro pH Trend – June 2019

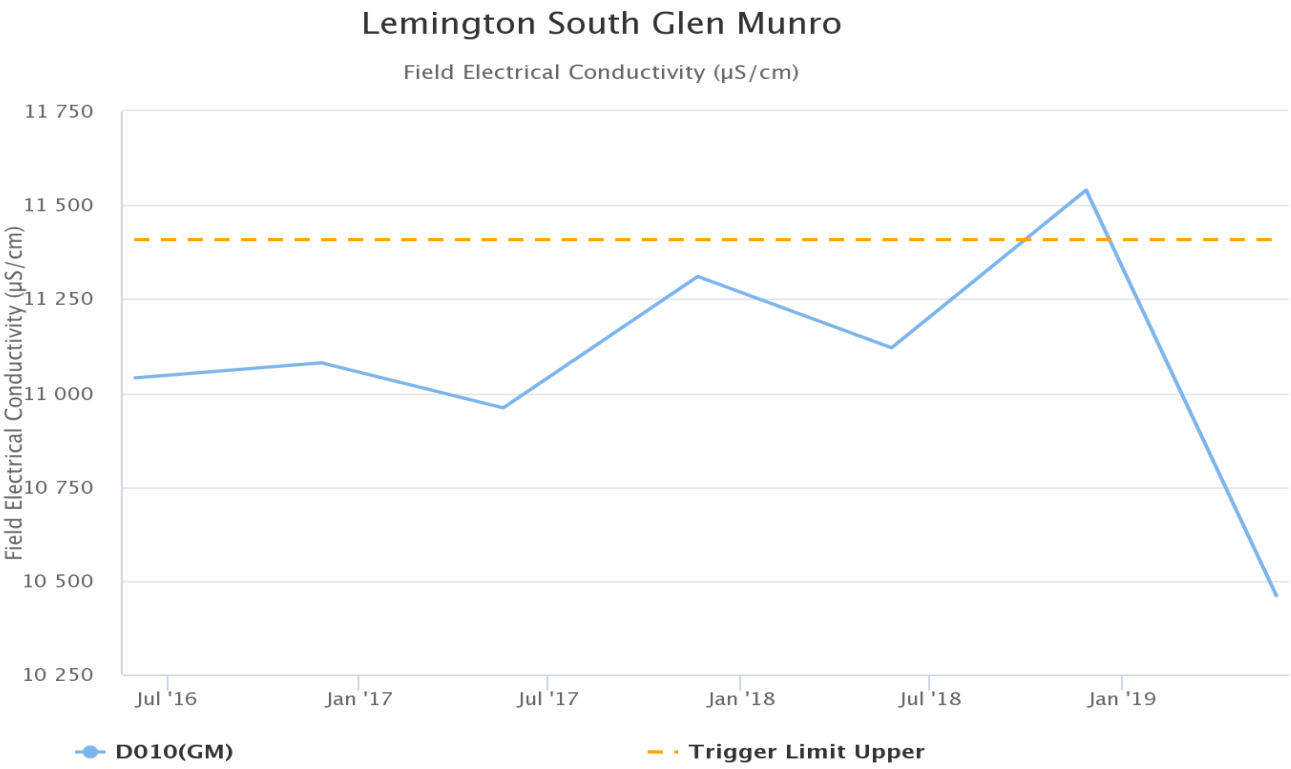

Figure 78: Lemington South Glen Munro Electrical Conductivity Trend – June 2019

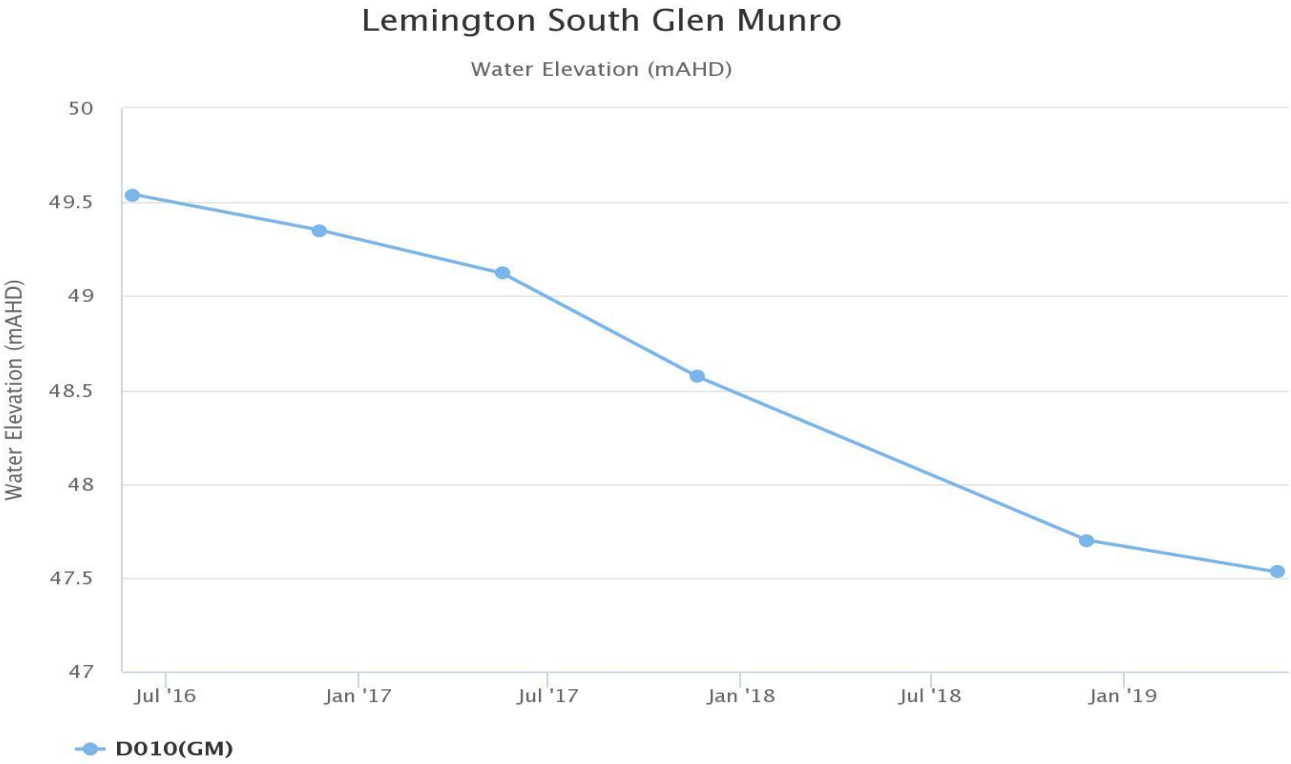

Figure 79: Lemington South Glen Munro Standing Water Level Trend – June 2019

4.2.1 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 HVO Water Management Plan.

Current internal trigger limits breaches are summarised in Table 4.

Table 4: Groundwater Triggers – Q2 2019

Site	Date	Trigger Limit Breached	Action Taken in Response
BZ3-1	24/05/2019	pH – 95th Percentile	First breach. Watching brief established*
BZ3-3	24/05/2019	pH – 95th Percentile	First breach. Watching brief established*
B631(BFS)	27/05/2019	pH – 95th Percentile	First breach. Watching brief established*
PB01(ALL)	27/05/2019	EC – 95th Percentile	First breach. Watching brief established*
C130(ALL)	28/05/2019	EC – 95th Percentile	First breach. Watching brief established*
C630(BFS)	28/05/2019	pH – 95th Percentile	First breach. Watching brief established*
CFW55R	12/4/2019, 24/4/2019, 9/5/2019, 22/5/2019, 5/6/2019 and 24/6/2019	EC – 95th Percentile	Investigation in progress
4051C	21/06/2019	EC – 95th Percentile	First breach. Watching brief established*
4116P	20/06/2019	EC – 95th Percentile	First breach. Watching brief established*

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

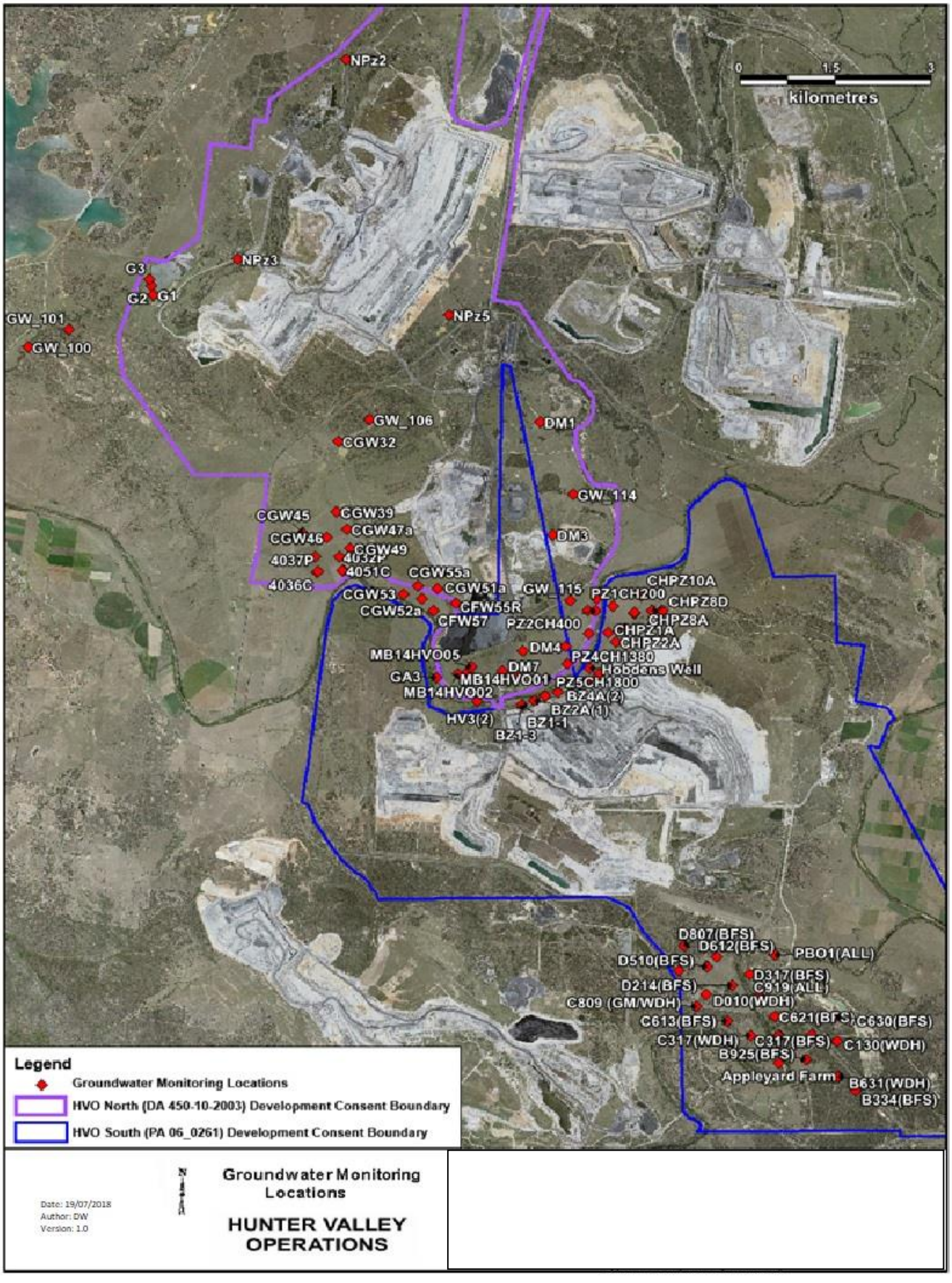

Figure 80: Groundwater Monitoring Location Plan

5.0 BLASTING

5.1.1 Blast Monitoring

HVO have a network of five 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 83.

During June, 19 blasts were initiated at HVO. Figure 81 and Figure 82 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 5.

Table 5: 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 there were no exceedances of the airblast overpressure or ground vibration criteria.

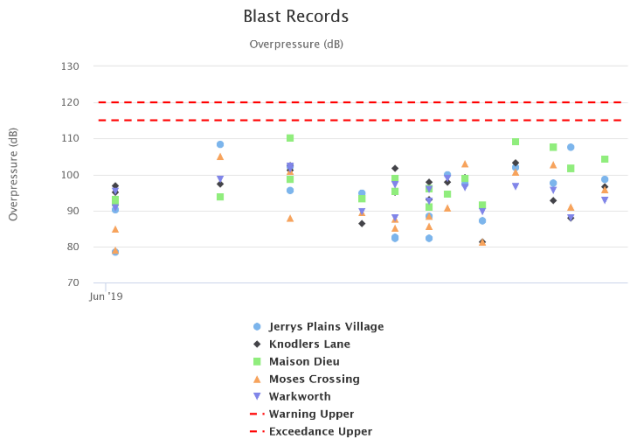

Figure 81: Overpressure Blast Monitoring Results – June 2019

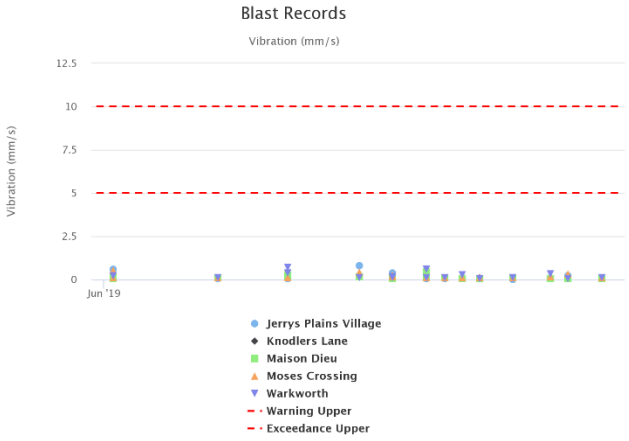

Figure 82: Ground Vibration Blast Monitoring Results – June 2019

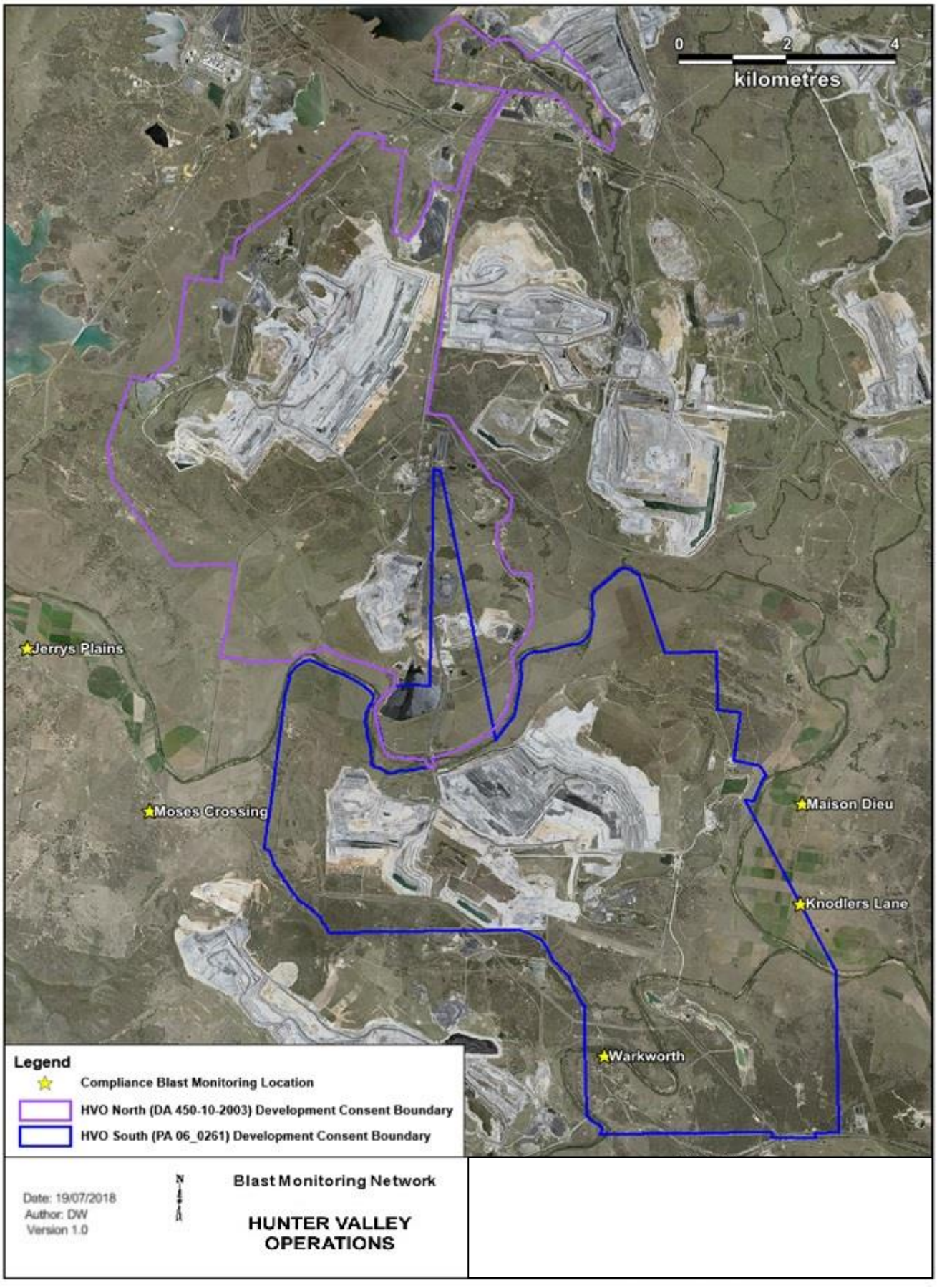

Figure 83: Blast Monitoring Location Plan

6.0 NOISE

Routine attended noise monitoring is carried out at defined locations around HVO as described in the HVO Noise Monitoring Programme. 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 HVO. The attended noise monitoring locations are displayed in Figure 84.

6.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night shift on 20, 24 and 27 June 2019. Monitoring results are detailed in Table 6 to Table 10 . During the reporting period, no exceedances were recorded.

Table 6: $L_{Aeq,\ 15\ minute}$ HVO South - Impact Assessment Criteria – June 2019

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South L_{Aeq} dB[3,4]	Exceedance[4,5]
Knodlers Lane	24/06/2019 22:22	4.4	-1	39	No	IA	NA
Maison Dieu	24/06/2019 22:43	4.4	-1	39	No	IA	NA
Shearers Lane	24/06/2019 23:05	3.9	-1	41	No	IA	NA
Kilburnie South	24/06/2019 21:25	3.7	0.5	39	No	NM	NA
Jerrys Plains Village	24/06/2019 22:12	4.4	-1	35	No	31	NA
Jerrys Plains East	24/06/2019 21:49	3.6	-1	35	No	IA	NA
Long Point Road	20/06/2019 21:00	1.9	-1	35	Yes	IA	Nil
HVGC	24/06/2019 22:54	4.4	-1	55	No	IA	NA

Notes:
1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) weather station using logged meteorological data;
2. Assumed noise emission limits (see Section 2.2 of this report for more information) apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute attributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable

Table 7: $L_{A1, 1minute}$ HVO South - Impact Assessment Criteria – June 2019

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South $L_{A1, 1min}$ dB[3,4]	Exceedance[4,5]
Knodlers Lane	24/06/2019 22:22	4.4	-1	45	No	IA	NA
Maison Dieu	24/06/2019 22:43	4.4	-1	45	No	IA	NA
Shearers Lane	24/06/2019 23:05	3.9	-1	45	No	IA	NA
Kilburnie South	24/06/2019 21:25	3.7	0.5	45	No	41	NA
Jerrys Plains Village	24/06/2019 22:12	4.4	-1	45	No	33	NA
Jerrys Plains East	24/06/2019 21:49	3.6	-1	45	No	IA	NA
Long Point Road	20/06/2019 21:00	1.9	-1	45	Yes	IA	Nil
HVGC	24/06/2019 22:54	4.4	-1	NA	No	IA	NA

Notes:
1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) weather station using logged meteorological data;
2. Assumed noise emission limits (see Section 2.3 of this report for more information) apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. These are results for HVO South Pit Area in the absence of all other noise sources;
4. Bold results in red indicate exceedance of criteria;
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable

Table 8: $L_{Aeq, 15minute}$ HVO North – Impact Assessment Criteria – June 2019

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North L_{Aeq} dB[3,4]	Exceedance[4,5]
Knodlers Lane	24/06/2019 22:22	3.5	-1	35	No	IA	NA
Maison Dieu	24/06/2019 22:43	3.2	-1	35	No	IA	NA
Shearers Lane	24/06/2019 23:05	3.1	-1	35	No	IA	NA
Kilburnie South	24/06/2019 21:25	3.3	-1	39	No	IA	NA
Kilburnie South	27/06/2019 22:20	2.2	0.5	39	Yes	35	Nil
Jerrys Plains Village	24/06/2019 22:12	3.5	-1	36	No	IA	NA
Jerrys Plains Village	27/06/2019 21:00	2.1	0.5	36	Yes	36	Nil
Jerrys Plains East	24/06/2019 21:49	3	-1	39	Yes	IA	Nil
Jerrys Plains East	27/06/2019 21:34	1.9	0.5	39	Yes	35	Nil
Long Point Road	20/06/2019 21:00	1.9	-1	35	Yes	IA	Nil
HVGC	24/06/2019 22:54	3.2	-1	Nil	No	IA	NA

Notes:
1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute attributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable.

Table 9: $L_{Aeq,15minute}$ HVO North - Land Acquisition Criteria – June 2019

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North L_{Aeq} dB[3,4]	Exceedance[4,5]
Knodlers Lane	24/06/2019 22:22	3.5	-1	41	No	IA	NA
Maison Dieu	24/06/2019 22:43	3.2	-1	41	No	IA	NA
Shearers Lane	24/06/2019 23:05	3.1	-1	41	No	IA	NA
Kilburnie South	24/06/2019 21:25	3.3	-1	41	No	IA	NA
Kilburnie South	27/06/2019 22:20	2.2	0.5	41	Yes	35	Nil
Jerrys Plains Village	24/06/2019 22:12	3.5	-1	41	No	IA	NA
Jerrys Plains Village	27/06/2019 21:00	2.1	0.5	41	Yes	36	Nil
Jerrys Plains East	24/06/2019 21:49	3	-1	41	Yes	IA	Nil
Jerrys Plains East	27/06/2019 21:34	1.9	0.5	41	Yes	35	Nil
Long Point Road	20/06/2019 21:00	1.9	-1	41	Yes	IA	Nil
HVGC	24/06/2019 22:54	3.2	-1	NA	No	IA	NA

Notes:
1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute attributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable.

Table 10: $L_{A1, 1Minute}$ HVO North - Impact Assessment Criteria – June 2019

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North $L_{A1, 1min}$ dB[3,4]	Exceedance[4,5]
Knodlers Lane	24/06/2019 22:22	3.5	-1	46	No	IA	NA
Maison Dieu	24/06/2019 22:43	3.2	-1	46	No	IA	NA
Shearers Lane	24/06/2019 23:05	3.1	-1	46	No	IA	NA
Kilburnie South	24/06/2019 21:25	3.3	-1	46	No	IA	NA
Kilburnie South	27/06/2019 22:20	2.2	0.5	46	Yes	38	Nil
Jerrys Plains Village	24/06/2019 22:12	3.5	-1	46	No	IA	NA
Jerrys Plains Village	27/06/2019 21:00	2.1	0.5	46	Yes	39	Nil
Jerrys Plains East	24/06/2019 21:49	3	-1	46	Yes	IA	Nil
Jerrys Plains East	27/06/2019 21:34	1.9	0.5	46	Yes	37	Nil
Long Point Road	20/06/2019 21:00	1.9	-1	46	Yes	IA	Nil
HVGC	24/06/2019 22:54	3.2	-1	NA	No	IA	NA

Notes:
1. Atmospheric data is sourced from the HVO Corporate or (MTW Charlton Ridge for Long Point) weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. These are results for HVO North Pit Area in the absence of all other noise sources;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable

5.2 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. During June 2019 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in Table 11.

Table 11: Low Frequency Noise Assessment – June 2019

Location	Date and Time	Measured Site Only LA_{eq} dB (Sth/Nth)	Site Only LC_{eq} dB[1] (Sth/Nth)	Site Only LC_{eq}-LA_{eq} dB [1,2] (Sth/Nth)	Result Max exceedance of ref spectrum dB[1,3] (Sth/Nth)	Penalty dB(A)[1]
Knodlers Lane	24/06/2019 22:22	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Maison Dieu	24/06/2019 22:43	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Shearers Lane	24/06/2019 23:05	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Kilburnie South	24/06/2019 21:25	NM/IA	NA/NA	NA/NA	NA/NA	NA/NA
Kilburnie South	27/06/2019 22:20	NA/35	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains Village	24/06/2019 22:12	31/IA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains Village	27/06/2019 21:00	NA/36	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains East	24/06/2019 21:49	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains East	27/06/2019 21:34	NA/35	NA/NA	NA/NA	NA/NA	NA/NA
Long Point Road	20/06/2019 21:00	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA
HVGC	24/06/2019 22:54	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA

Notes:
1. 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, or where site-only contributions were more than 5 dB less than the relevant LAeq criterion this is noted as NA (not available) and no further assessment has been undertaken;
2. As per NPfI, if LCeq – LAeq ≥ 15 dB further assessment of low frequency noise required; and
3. 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.

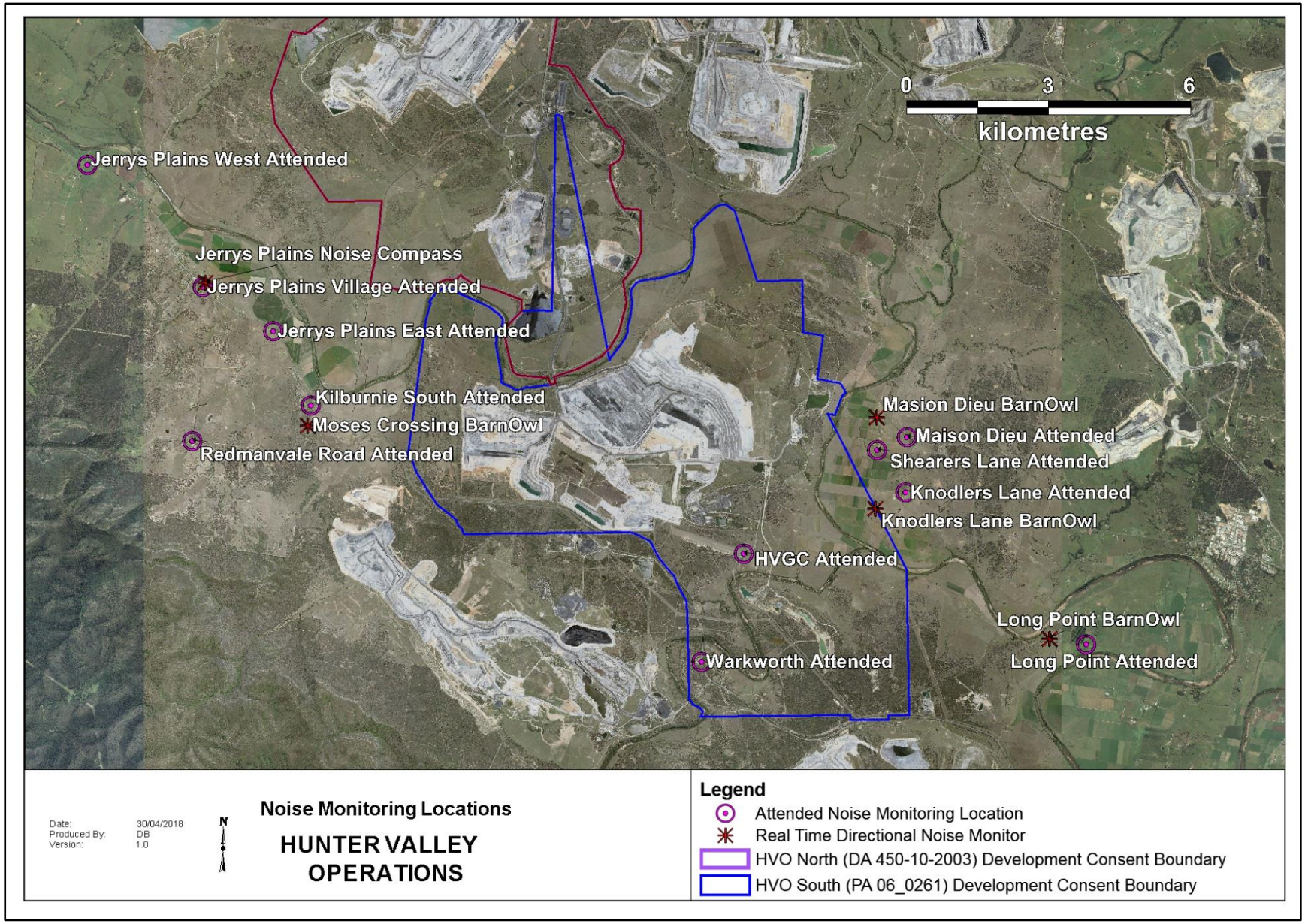

Figure 84: Noise Monitoring Location Plan

6.2 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis. Noise alarms are in place at five monitoring locations (Knodlers Lane, Maison Dieu, Jerrys Plains, Moses Crossing, and Long Point), which alert HVO staff to elevated noise levels likely to be attributable to HVO. Noise alarms are investigated and responded to with the appropriate level of operational modification. Changes in response to a noise alarm can include replacing equipment with quieter (noise attenuated) units, changing or relocating tasks, and shutting down equipment.

It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in Section 6.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

7.0 OPERATIONAL DOWNTIME

During June, a total of 252.3 hours of equipment downtime was logged in response to real time monitoring and visual inspections for environmental reasons such as dust, noise and meteorological conditions. Operational downtime by equipment type is shown in Figure 85.

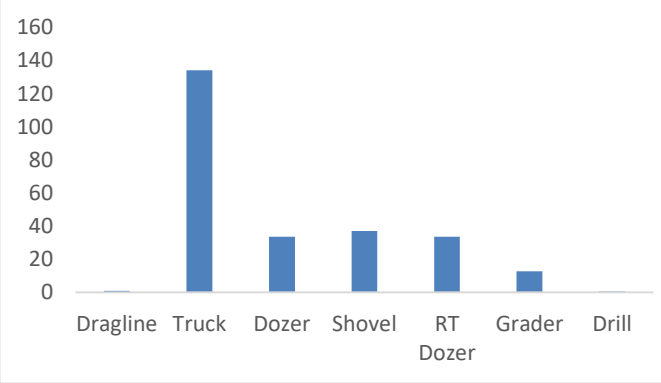

Figure 85: Operational Downtime by Equipment Type – June 2019

8.0 REHABILITATION

During June 0 Ha of land was released, 0 Ha of land was bulk shaped, 0 Ha of land was Topsoiled and 0 Ha of land was Rehabilitated. Year to date progress can be viewed in Figure 86.

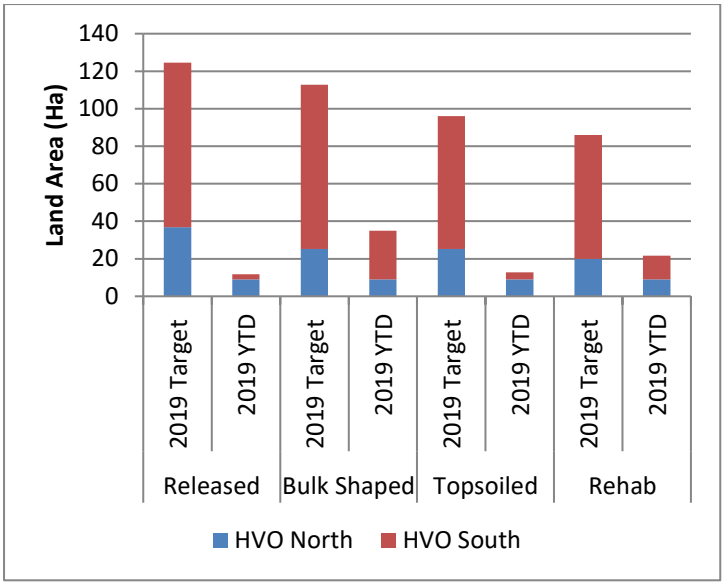

Figure 86: Rehabilitation YTD – June 2019

9.0 COMPLAINTS

During June there were two complaints received, relating to dust and blast fume.

Details of complaints received YTD are shown in Table 12.

Table 12: Complaints Summary YTD

	Noise	Dust	Blast	Lighting	Other	Total
January	-	-	-	-	-	-
May	-	-	-	-	-	-
March	-	1	-	-	-	1
April	-	1	-	-	-	1
May	-	2	-	-	-	2
June	-	1	-	-	1	2
July						
August						
September						
October						
May						
December						
Total	0	5	0	0	1	6

10.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

Appendix A: Meteorological Data

Table 13: Meteorological Data - HVO Corporate Meteorological Station – June 2019

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)
1/06/2019	17.6	5.1	97.5	37.1	671.5	211.3	1.7	0
2/06/2019	16.8	10.2	99.6	51.4	620.5	232.2	1.1	0.2
3/06/2019	14.3	5.9	99	36.1	718.7	284.5	4.4	0.6
4/06/2019	14.8	4.7	81.5	31.9	758.1	227.4	3.6	0
5/06/2019	14.1	8.0	77.19	38.3	764.5	179.8	2.0	0
6/06/2019	17.8	4.6	90.4	13.1	526.7	230	2.3	0
7/06/2019	16.2	5.3	90	42.6	745	191.3	1.4	0
8/06/2019	13.4	8.2	100	69.1	194.7	186.7	1.0	0
9/06/2019	19.6	9.7	98.4	31.5	518	277.1	2.7	0
10/06/2019	20.3	8.1	90.9	32.6	798	-*	3.1	0
11/06/2019	23.0	11.7	81.6	25.1	513.8	237.1	3.0	0
12/06/2019	21.3	8.2	55.87	21.1	712.6	300.3	3.7	0
13/06/2019	22.6	11.5	84.4	19.2	644.4	282.2	4.4	0
14/06/2019	17.8	6.9	95.4	12.7	672.5	266.6	2.0	0
15/06/2019	16.8	3.1	88.6	6.0	517.4	191.6	1.2	0
16/06/2019	13.9	3.6	88.1	46.0	587.3	190.4	0.9	0
17/06/2019	15.9	8.9	86	40.1	771.9	178.6	1.6	0
18/06/2019	15.0	9.9	100	57.5	277.4	286.9	2.3	0.2
19/06/2019	15.9	5.6	80.4	17.6	519.2	213.9	2.1	0
20/06/2019	15.0	1.4	94	36.2	711.6	182.8	1.2	0
21/06/2019	12.9	2.8	87.1	13.3	490	247.3	2.1	0
22/06/2019	13.9	0.0	85.5	29.5	788.6	216.1	1.5	0
23/06/2019	13.4	5.4	94.9	35.5	766	143.1	1.6	0.8
24/06/2019	13.8	6.9	100	62.6	798.8	127.9	2.0	3.2
25/06/2019	13.9	8.9	100	70.2	716.6	124.8	1.5	2.8
26/06/2019	16.8	8.7	100	35.6	681.1	128.2	2.4	0.4
27/06/2019	17.5	8.2	100	50.3	650	115.2	2.1	0
28/06/2019	17.3	6.1	100	46.2	664.9	159.1	1.2	0.2
29/06/2019	20.1	5.2	100	30.0	649.9	211.6	1.4	0.2
30/06/2019	17.5	8.8	77	18.4	829	281.9	3.7	0

*NAN – data not available