HUNTER VALLEY
OPERATIONS

Quarterly Environmental Monitoring Report

June 2020

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FIGURES

TABLES

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 to 30th June 2020.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

HVO maintains two meteorological stations; 'HVO 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 2020 trend and historical trends are shown in Figure 1.

Table 1: Rainfall data - June 2020

2020	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
June	*49.8*	*394.0*

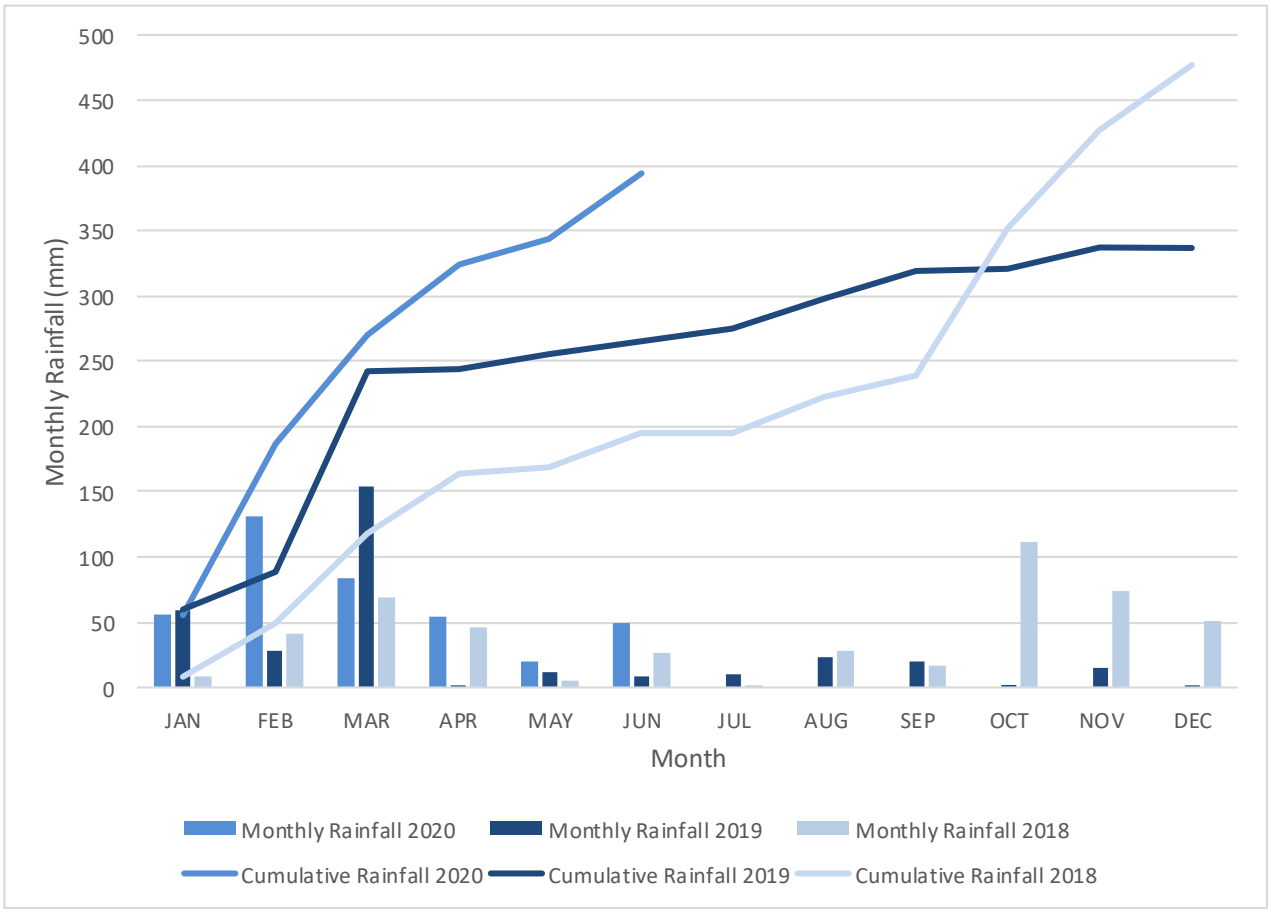


Figure 1: Rainfall Summary 2020

2.1.2 Wind Speed and Direction

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

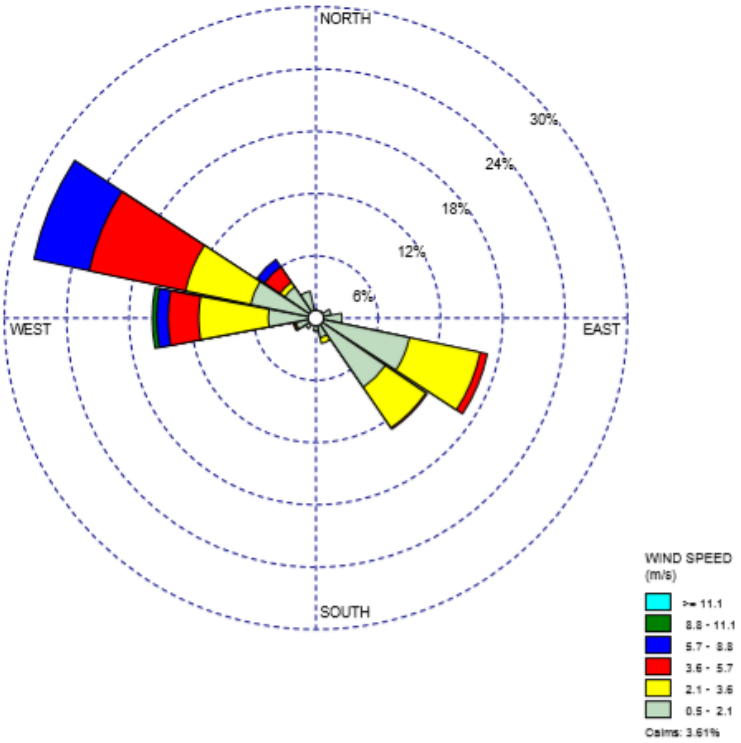


Figure 2: HVO Corporate Wind Rose – June 2020

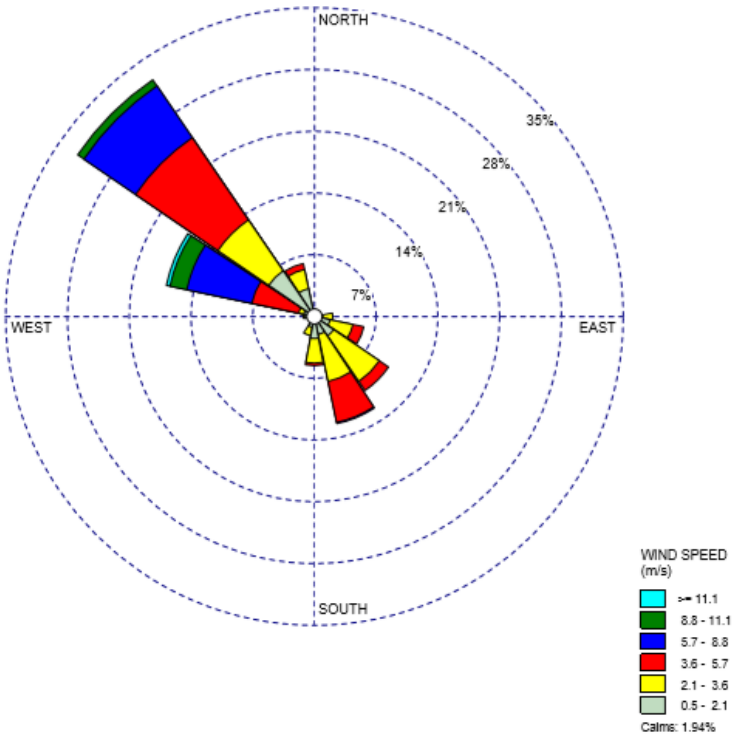


Figure 3: HVO Cheshunt Wind Rose – June 2020

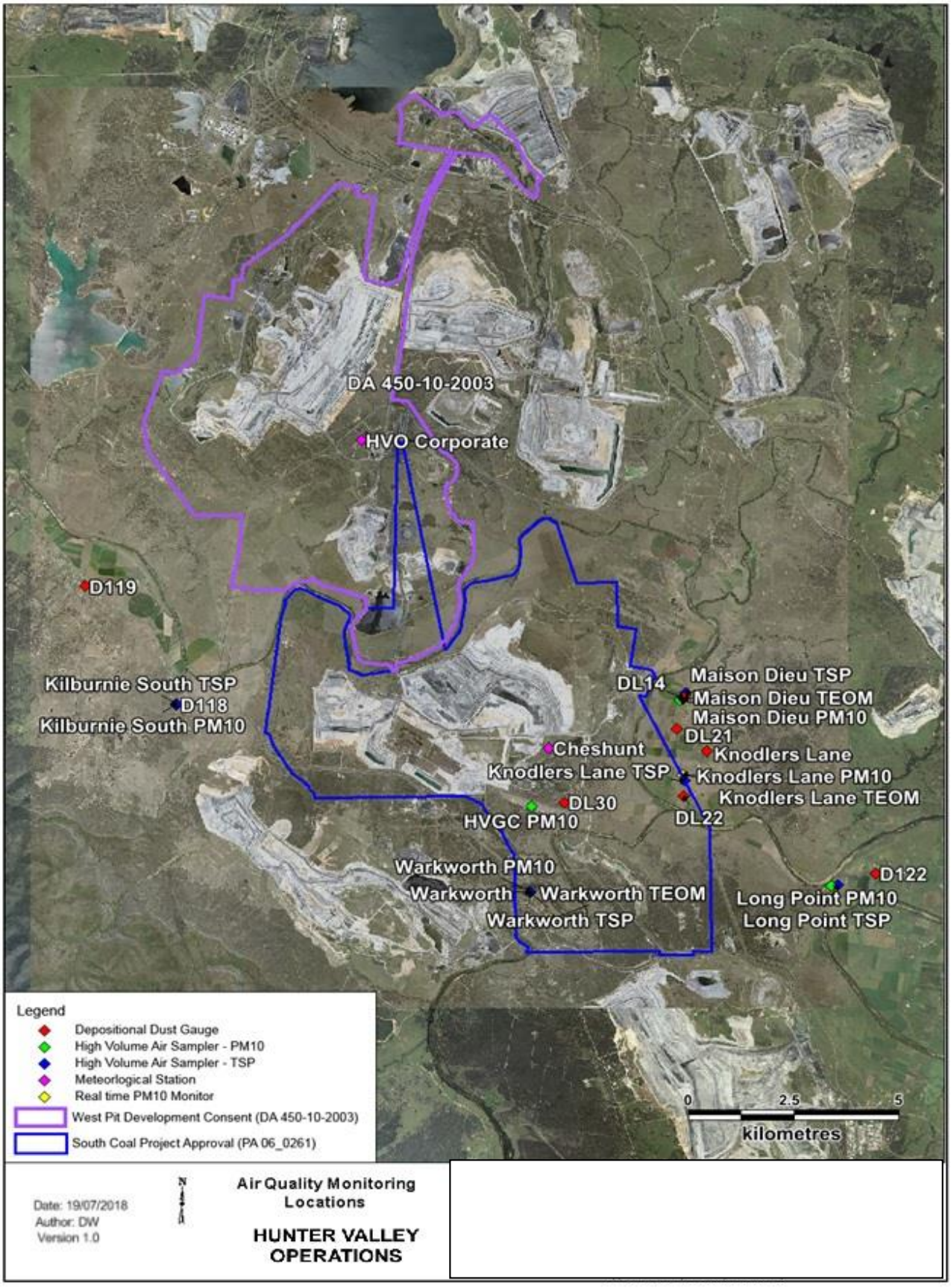


Figure 4: Air Quality Monitoring Location Plan

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 annual impact assessment criteria.

During the reporting period the Warkworth, D118 and DL30 monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m^2 per month.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2020 Annual Review.

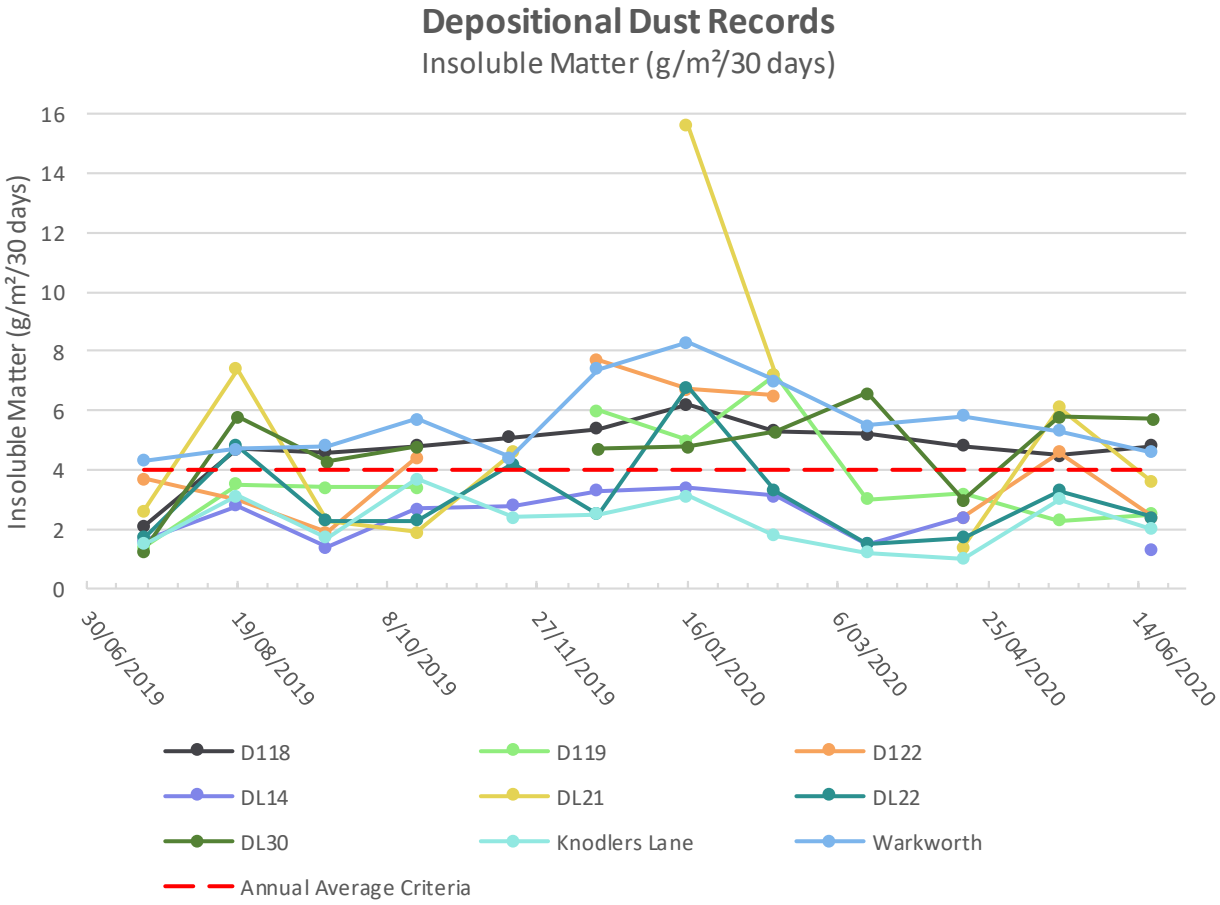


Figure 5: Depositional Dust Results – June 2020

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 Kilburnie South and Maison Dieu HVAS also monitor Particulate Matter <2.5µm ($PM_{2.5}$). The location of these monitors can be found in Figure 4. Each HVAS runs for 24 hours on a six-day cycle.

2.3.1 HVAS PM_{10} Results

Performance against Short Term Impact Assessment Criteria

Figure 6 shows individual PM_{10} results at each monitoring station against the short term impact assessment criteria of 50 µg/m³. During the reporting period, no monitors recorded an exceedance above the short term impact assessment criteria of 50 µg/m³.

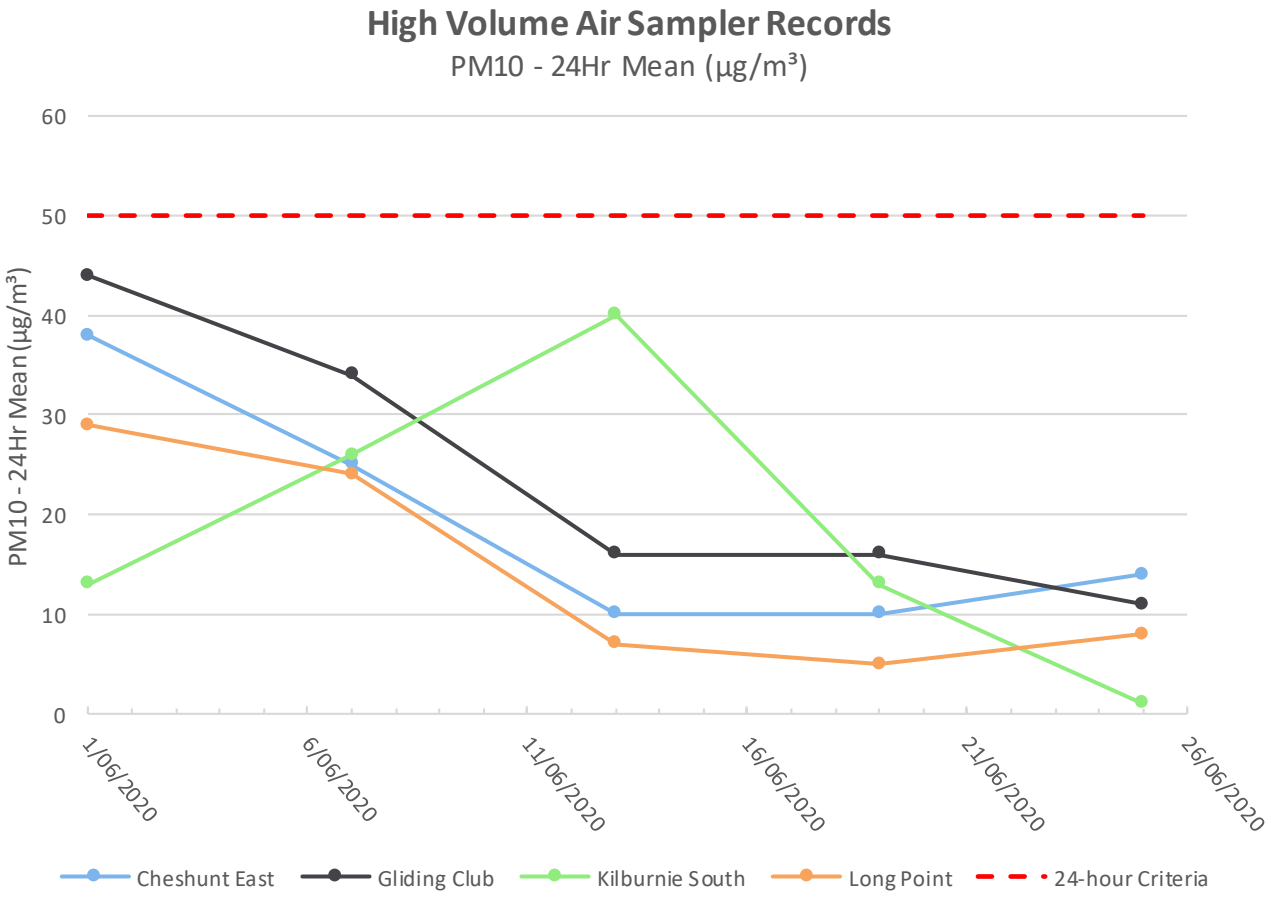


Figure 6: Individual PM_{10} Results – June 2020

Performance against Long Term Impact Assessment Criteria

Figure 7 shows the year to date annual average PM_{10} results. During the reporting period all monitors recorded an annual average above the PM_{10} Annual Rolling Mean of 30µg/m³.

This is likely to be due to the bushfires experienced earlier in 2020, and is expected to decrease over the remainder of the reporting period. However, an assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2020 Annual Review.

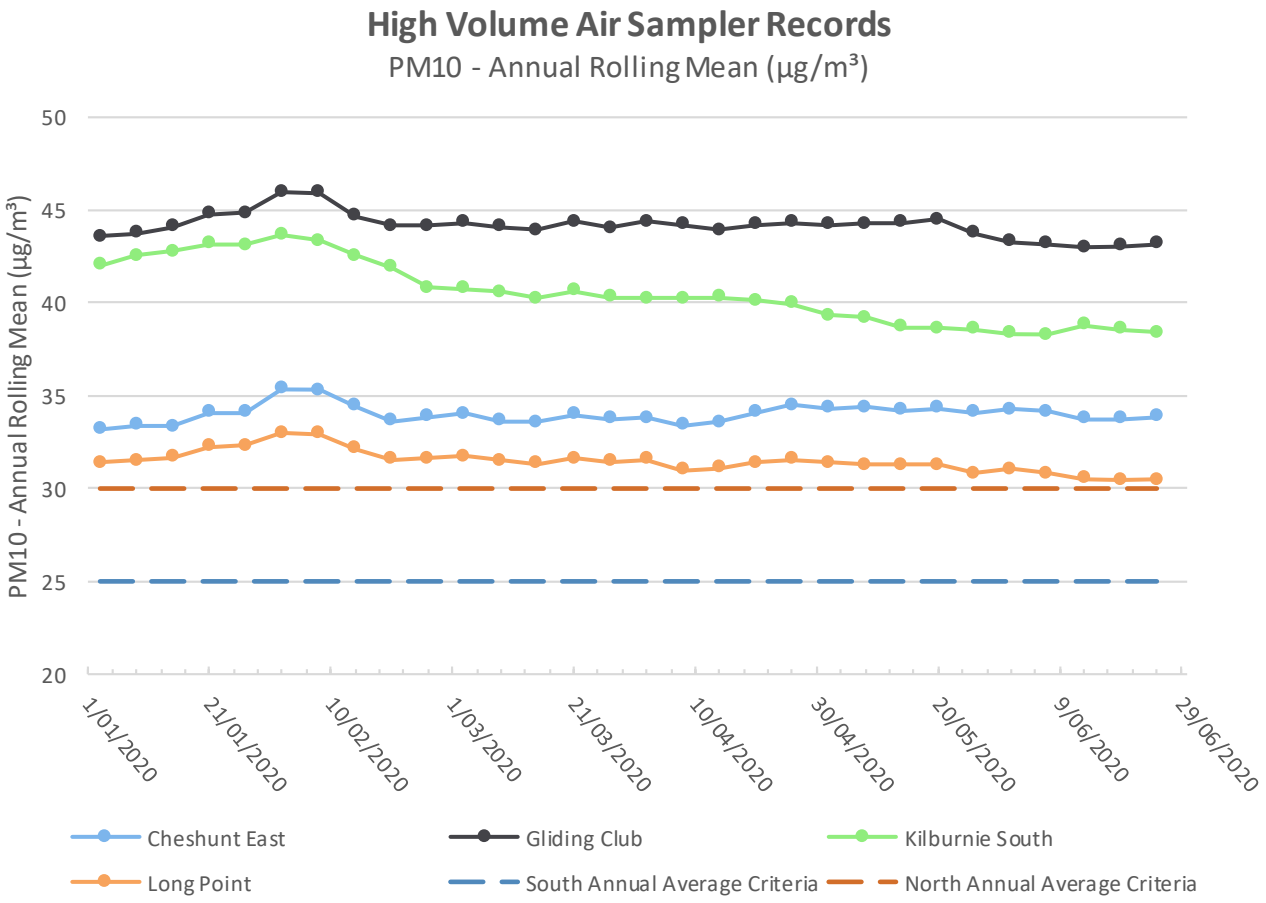


Figure 7: Year to Date Average PM_{10} – as at end of June 2020

2.3.2 HVAS $PM_{2.5}$ Results

HVO monitors $PM_{2.5}$ at two HVAS locations, Kilburnie South and Maison Dieu.

Performance against Short Term Impact Assessment Criteria

Figure 8 shows individual $PM_{2.5}$ results at each monitoring station against the HVO South short term impact assessment criteria of 25 µg/m³.

During the reporting period, neither monitor recorded a measurement above the short term impact assessment criteria of 25 µg/m³.

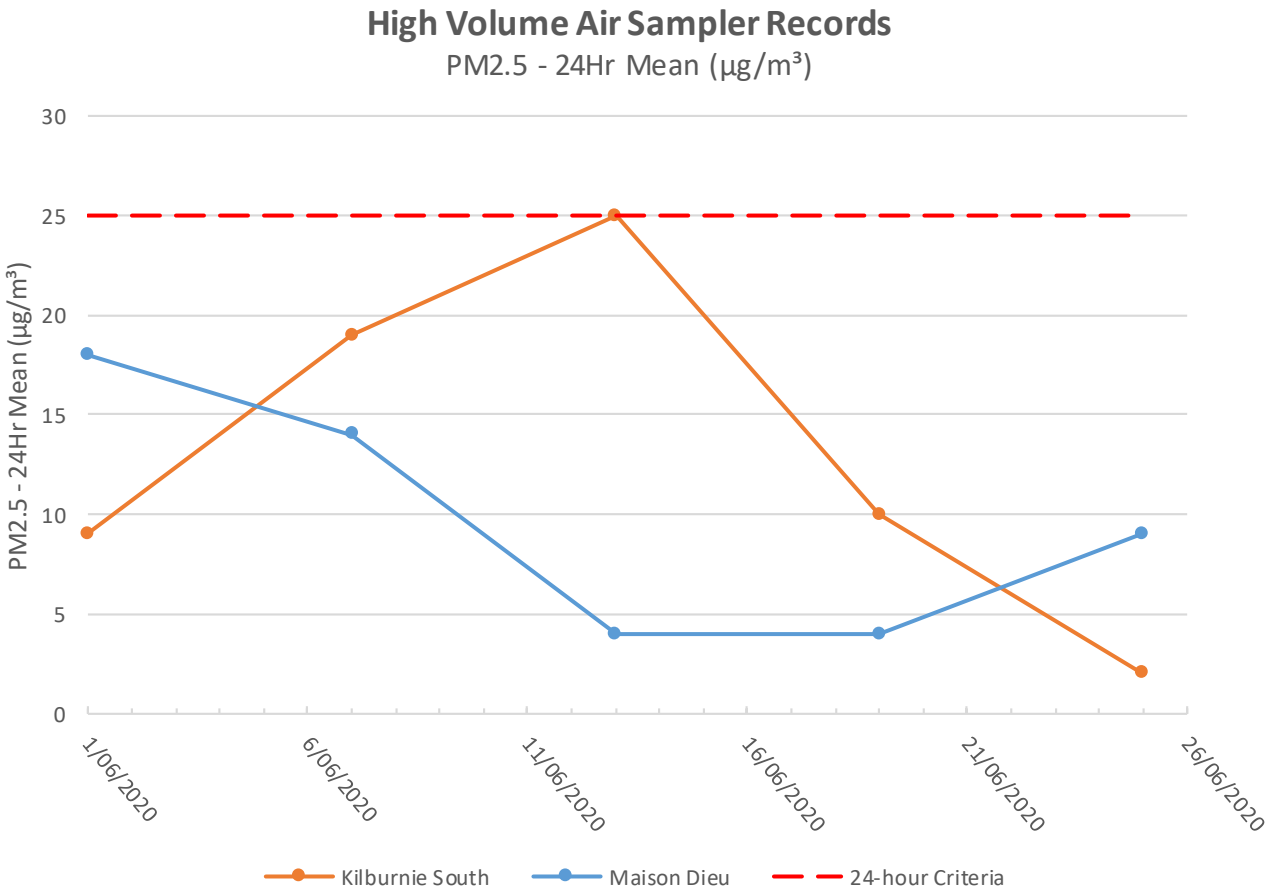


Figure 8: Individual $PM_{2.5}$ Results – June 2020

Performance against Long Term Impact Assessment Criteria

Figure 9 shows the year to date annual average $PM_{2.5}$ results. During the reporting period, both the Maison Dieu and Kilburnie South monitors recorded an annual average above the $PM_{2.5}$ Annual Rolling Mean of 8µg/m³.

This is likely to be due to the bushfires experienced earlier in 2020, and is expected to decrease over the remainder of the reporting period. However, an assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2020 Annual Review.

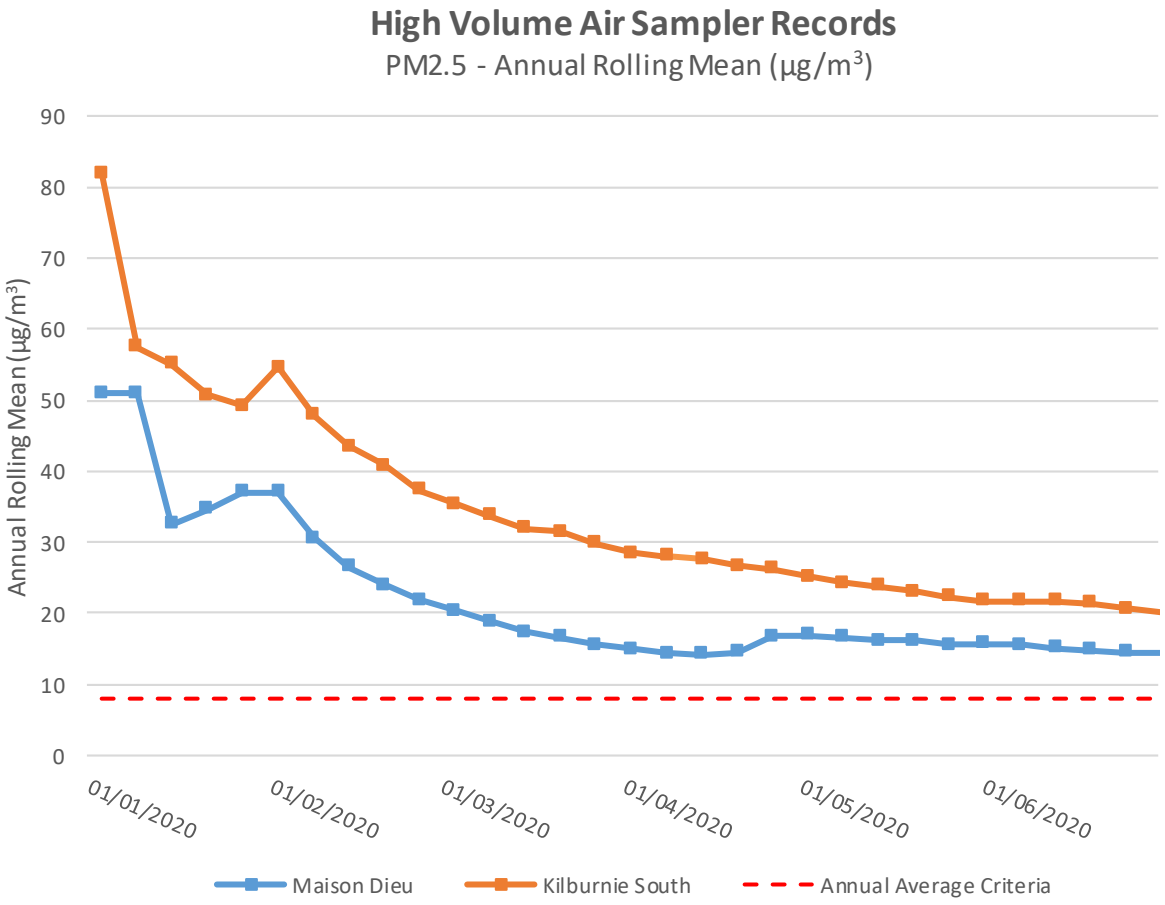


Figure 9: Year to Date Average $PM_{2.5}$ – as at end of June 2020

2.3.3 TSP Results

Performance against Long Term Impact Assessment Criteria

Figure 10 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³.

During the reporting period, the Kilburnie South, Maison Dieu, Knodlers Lane and Warkworth monitors' annual average was above the long term impact assessment criteria of 90µg/m³.

This is likely to be due to the bushfires experienced earlier in 2020, and is expected to decrease over the remainder of the reporting period. However, an assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2020 Annual Review.

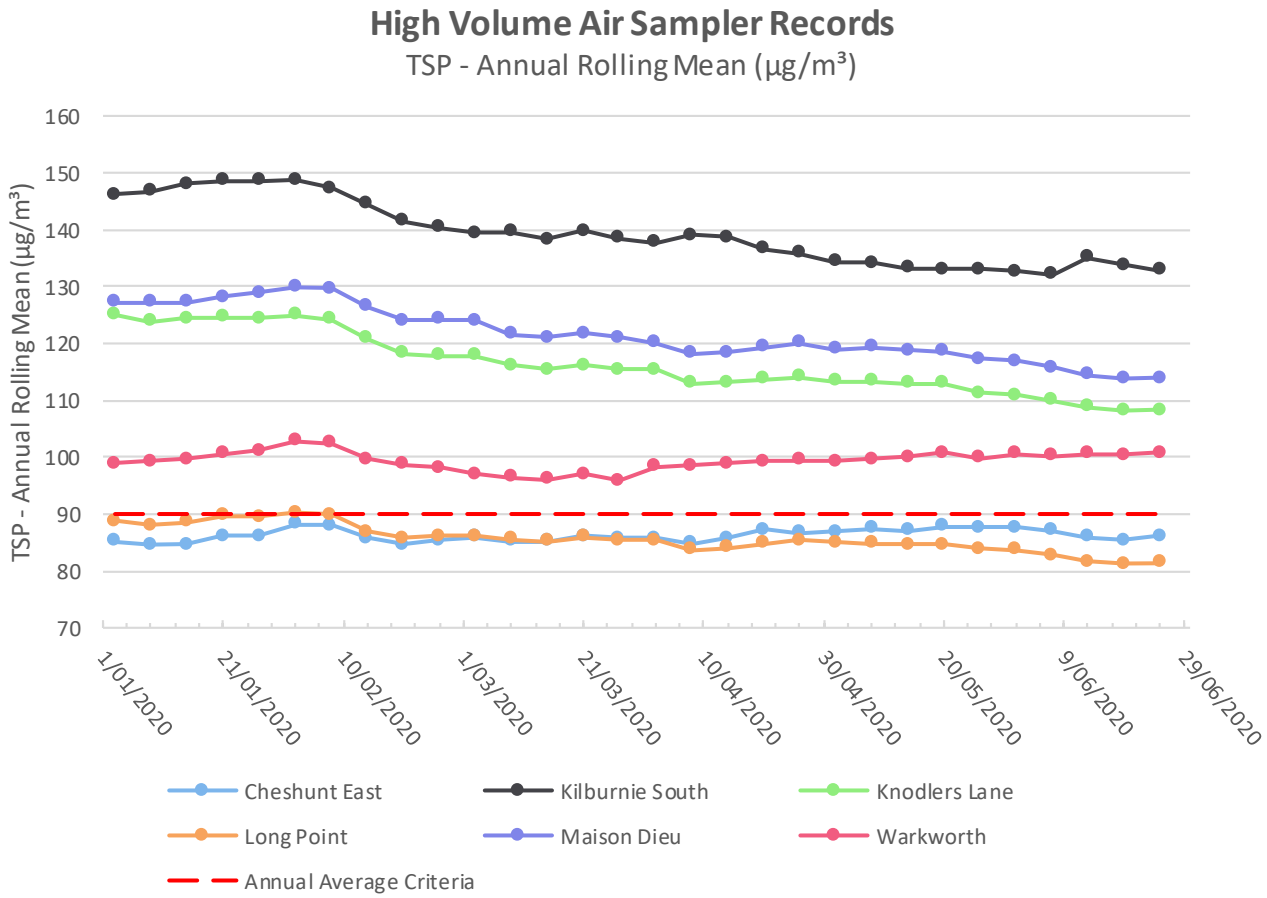


Figure 10: Year to Date Average Total Suspended Particulates – as at end of June 2020

2.3.4 Real Time PM10 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 help achieve compliance with the relevant conditions of the project approval.

Figure 11 shows the daily 24-hour average PM_{10} result from the real time monitoring sites, the year to date annual averages for each monitoring site are shown in Figure 12.

During the reporting period, no monitors exceeded the daily 24 hour average PM_{10} result (50µg/m³) whilst the Warkworth monitor is currently recording an annual average above the HVO South long term impact criteria of 25µg/m³.

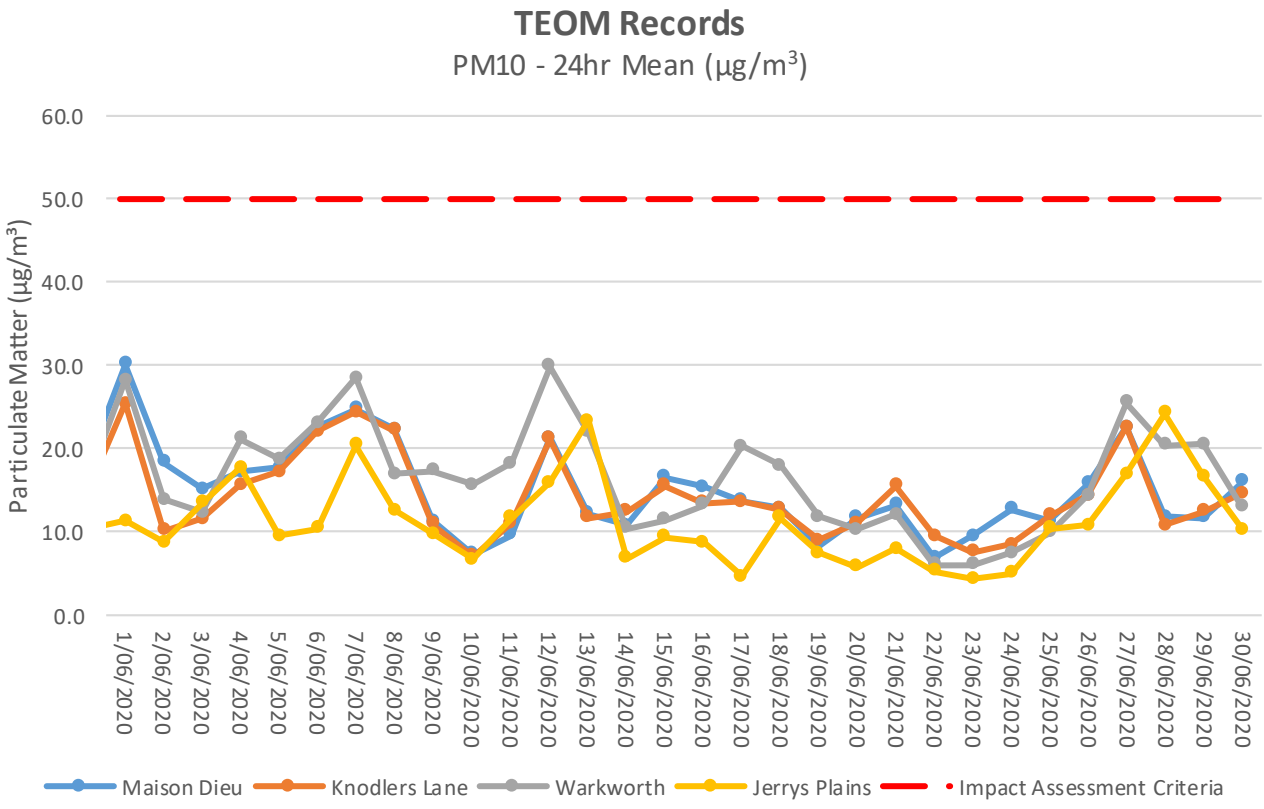


Figure 11: Real Time PM_{10} 24hr average – June 2020

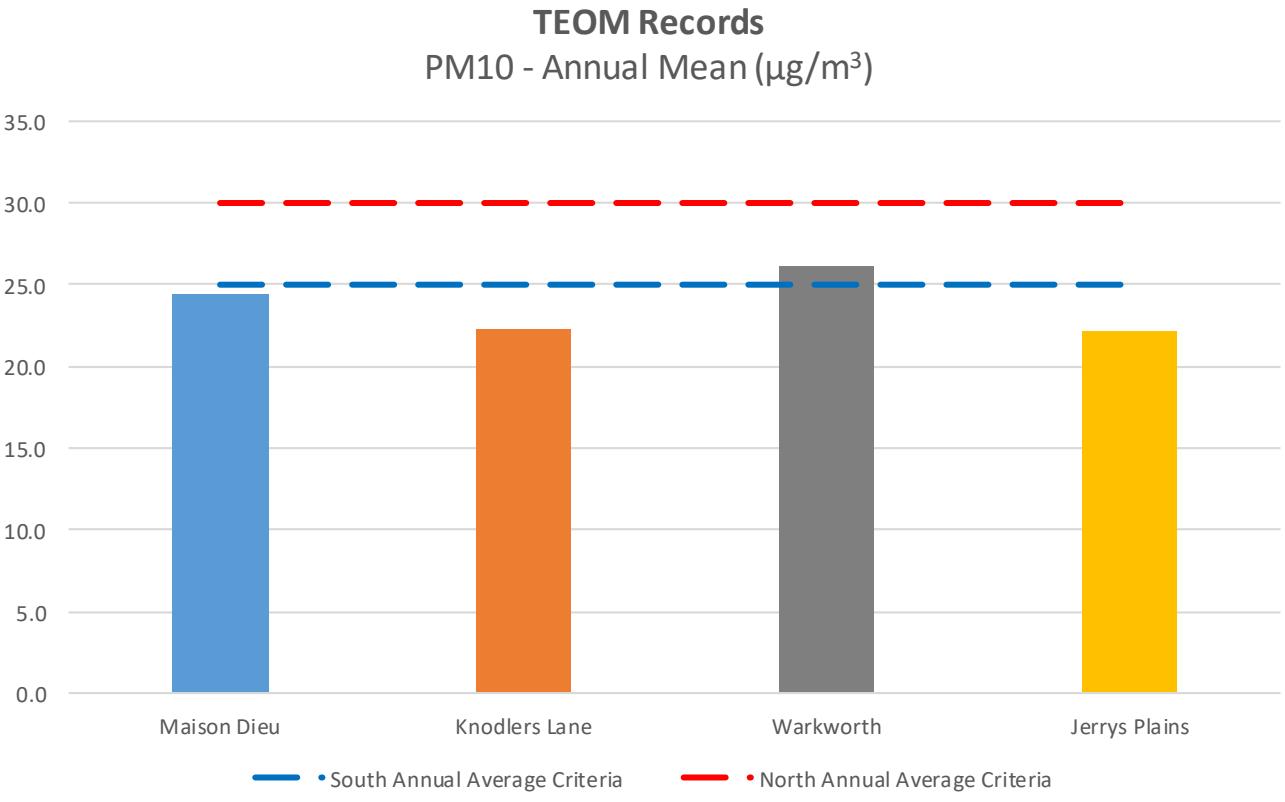


Figure 12: Real Time PM_{10} Annual Average - June 2020

2.3.5 Real Time Alarms for Air Quality

During June the real time monitoring system generated 100 automated air quality related alarms. Fifty five alarms were related to adverse weather conditions and forty five alarms related to PM_{10}.

3.0 WATER QUALITY

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

3.1 Surface Water

Surface water courses are sampled on a quarterly sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS). The location of surface water monitoring locations is shown in Figure 13.

Figure 14 to Figure 16 show the long term surface water trend (2016- current) within HVO mine dams. Figure 17 to Figure 25 show the long term surface water trend (2016 – current) in surrounding watercourses.

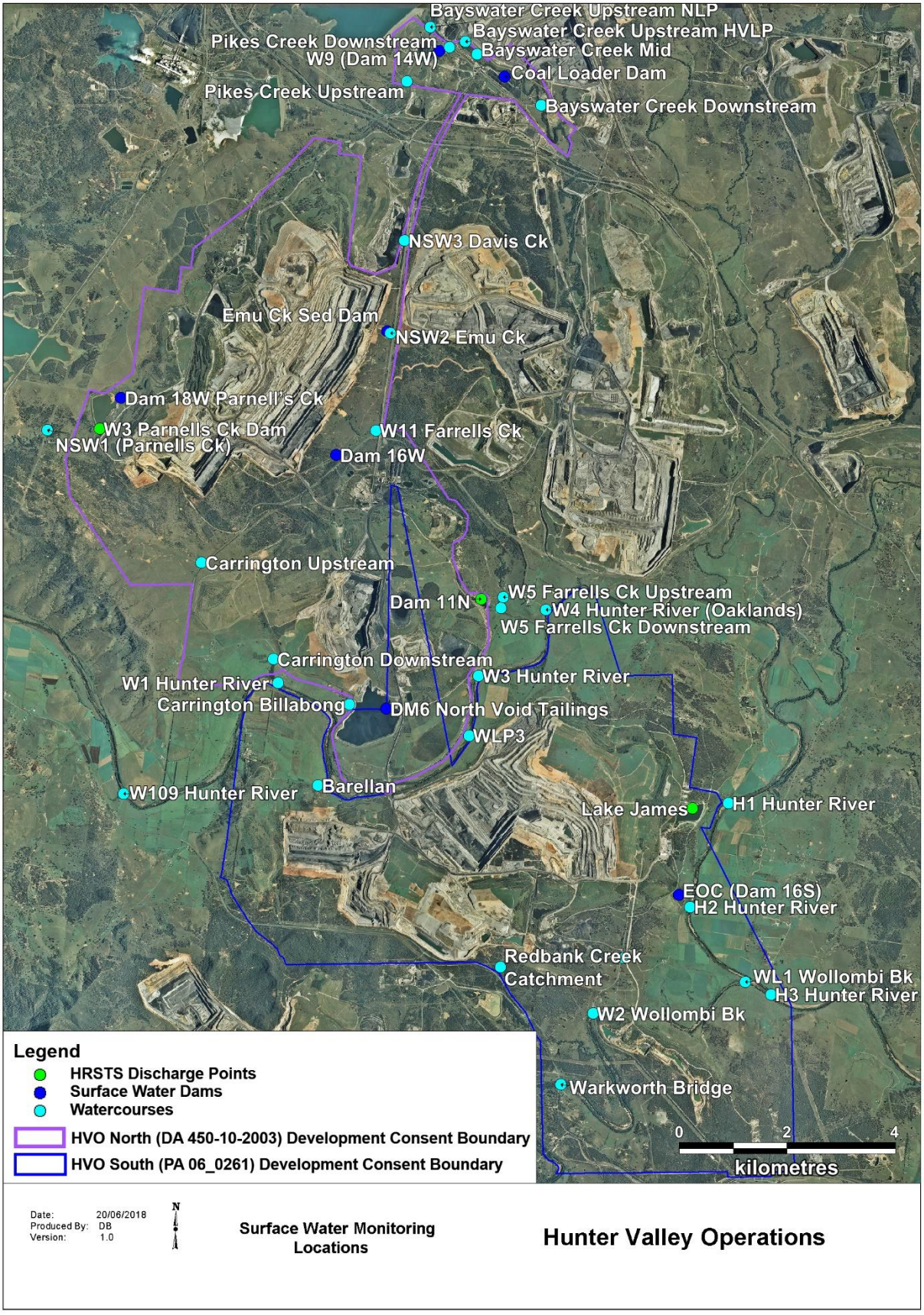


Figure 13: HVO Surface Water Monitoring Locations

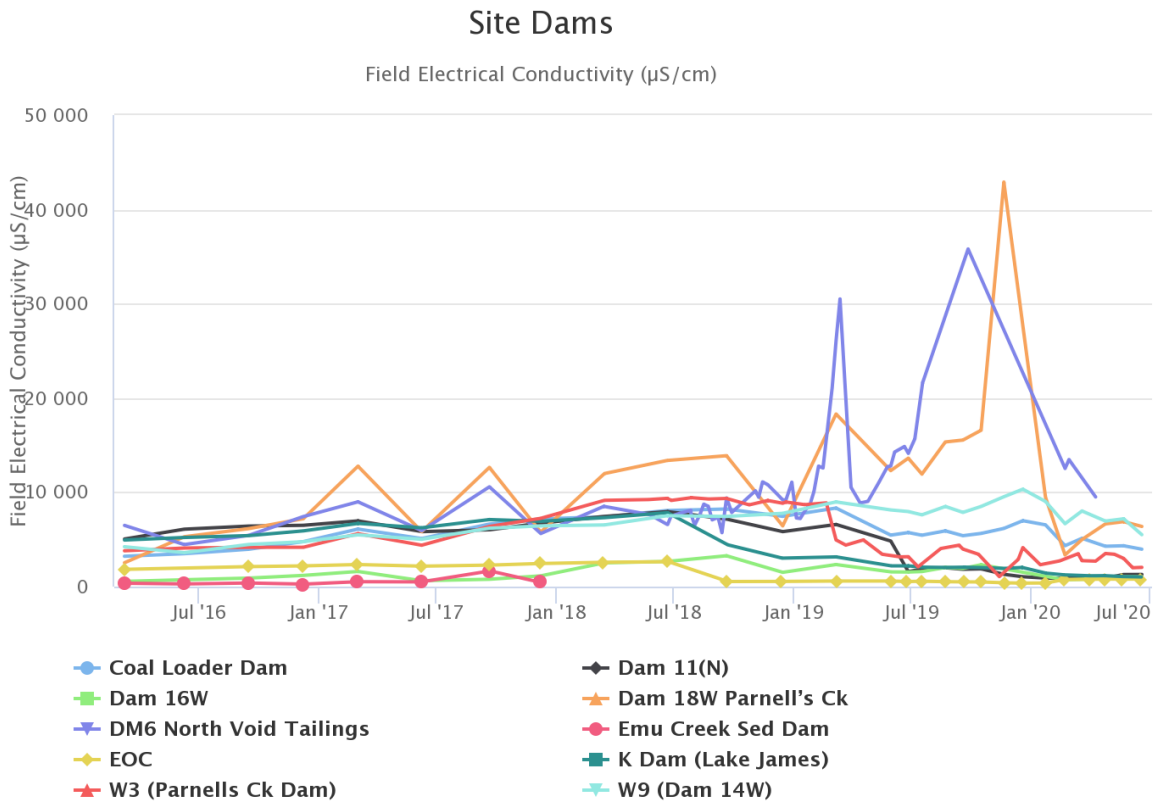


Figure 14: Site Dams Field Electrical Conductivity Trend – June 2020

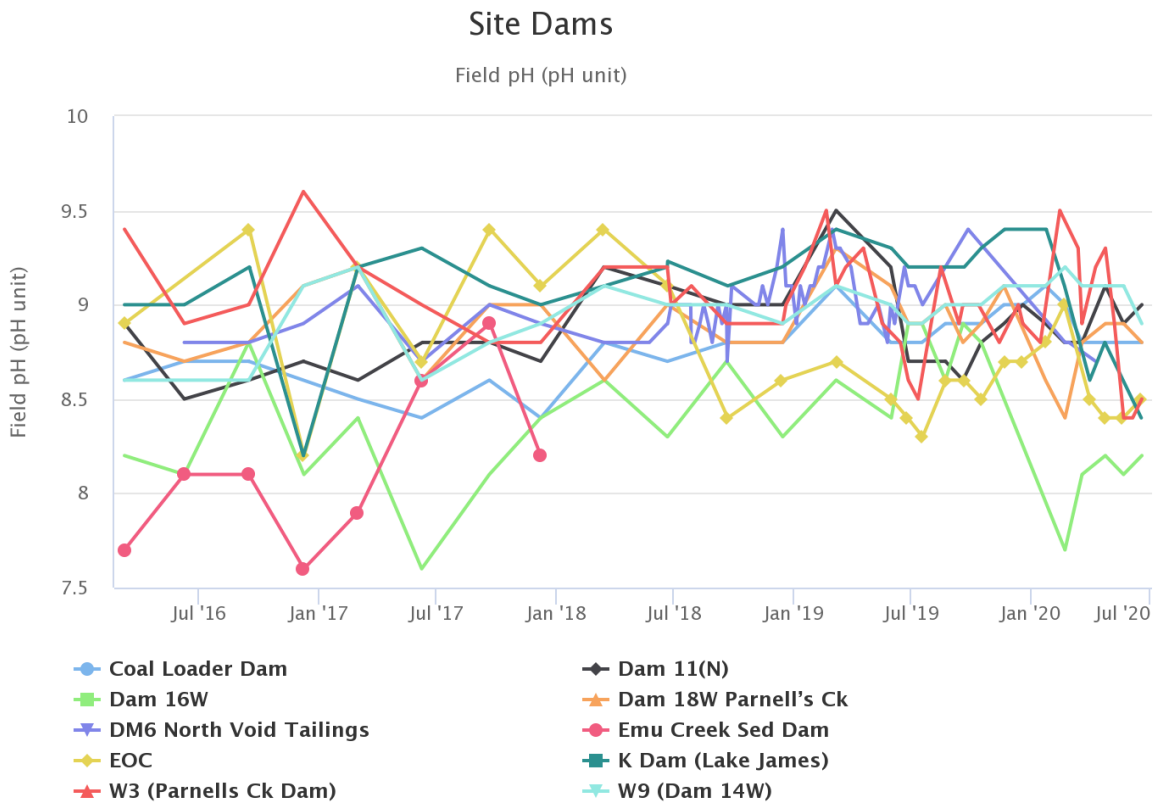


Figure 15: Site Dams Field pH Trend – June 2020

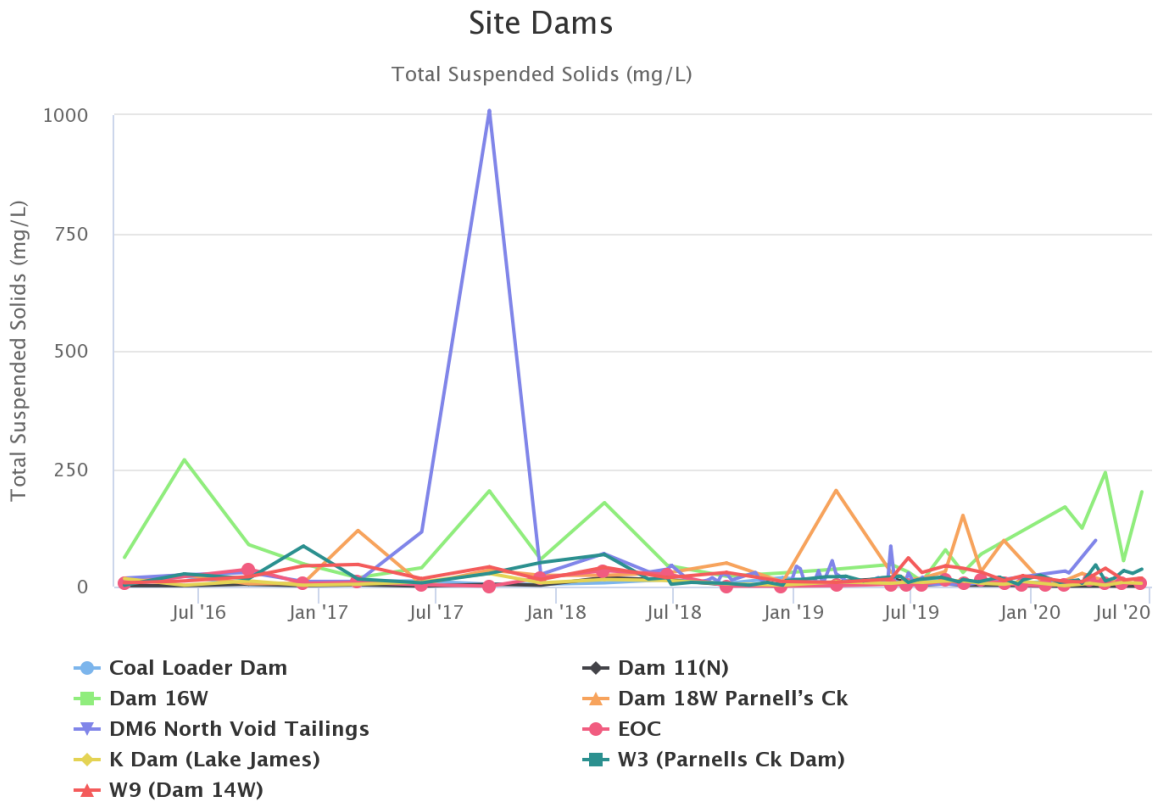


Figure 16: Site Dams Total Suspended Solids Trend – June 2020

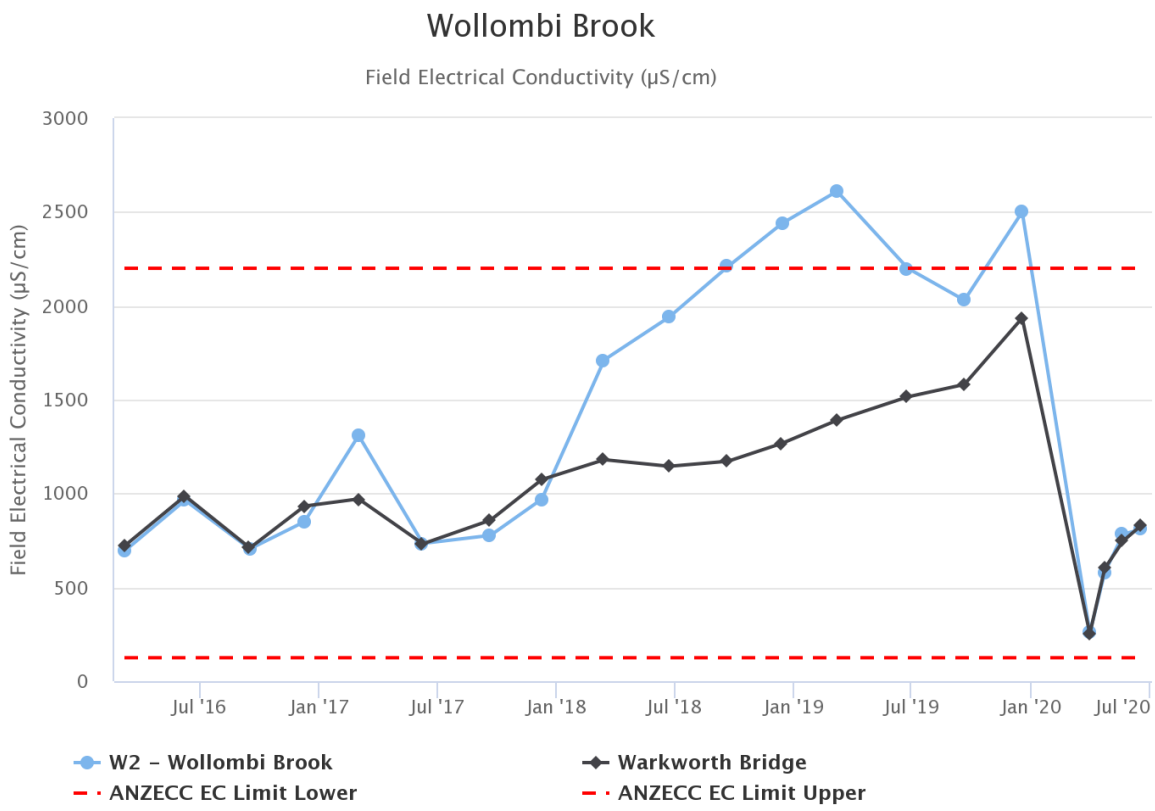


Figure 17: Wollombi Brook Field Electrical Conductivity Trend – June 2020

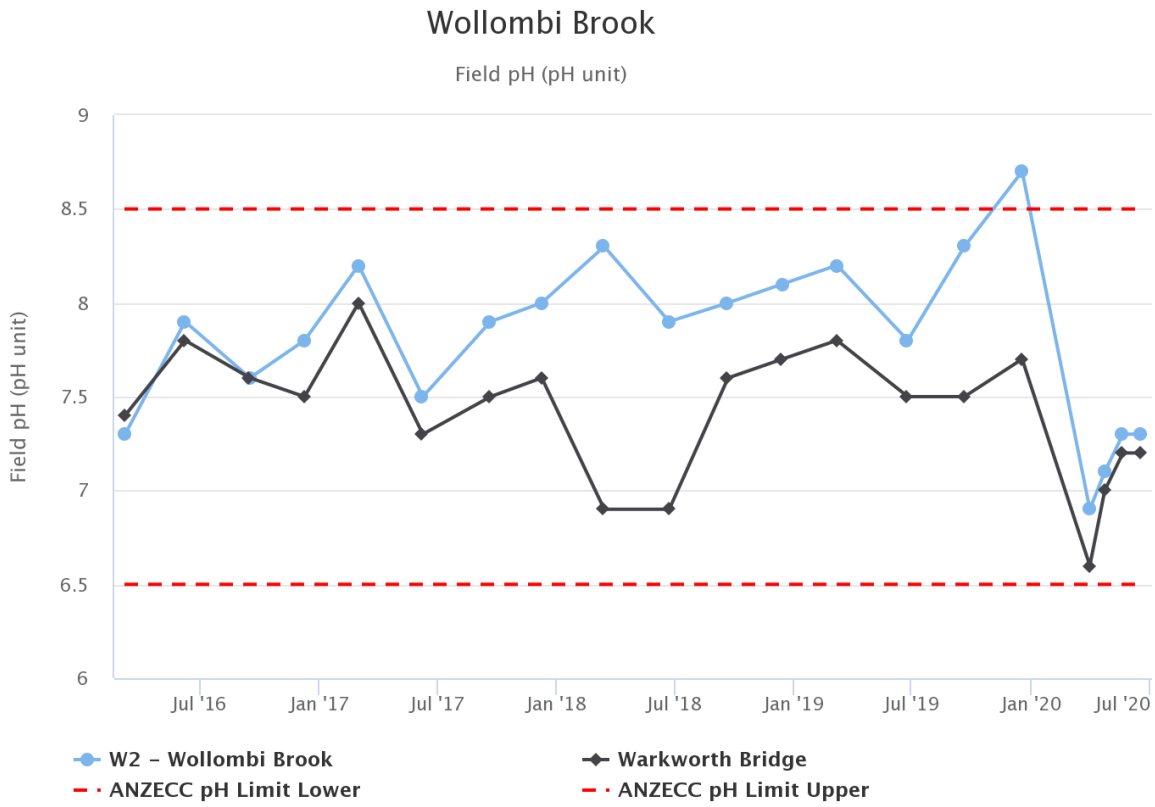


Figure 18: Wollombi Brook Field pH Trend – June 2020

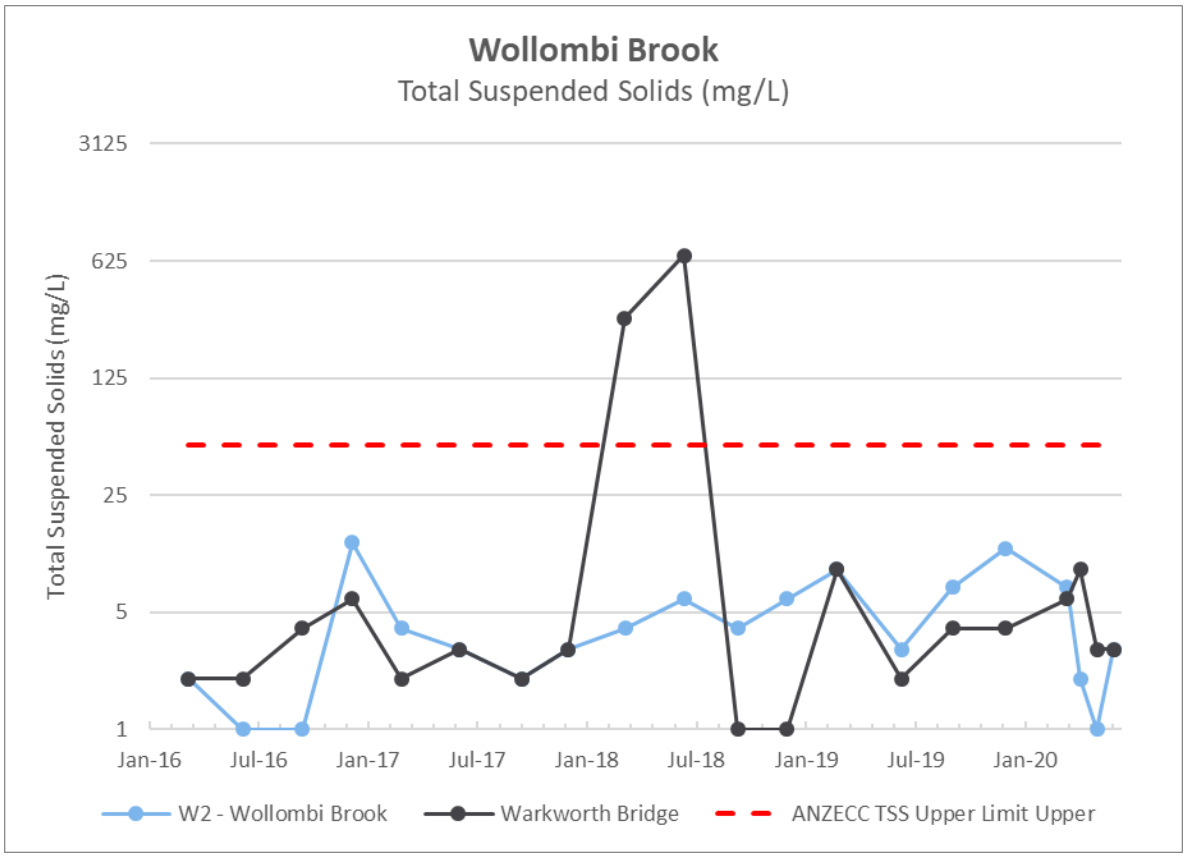


Figure 19: Wollombi Brook Total Suspended Solids Trend – June 2020

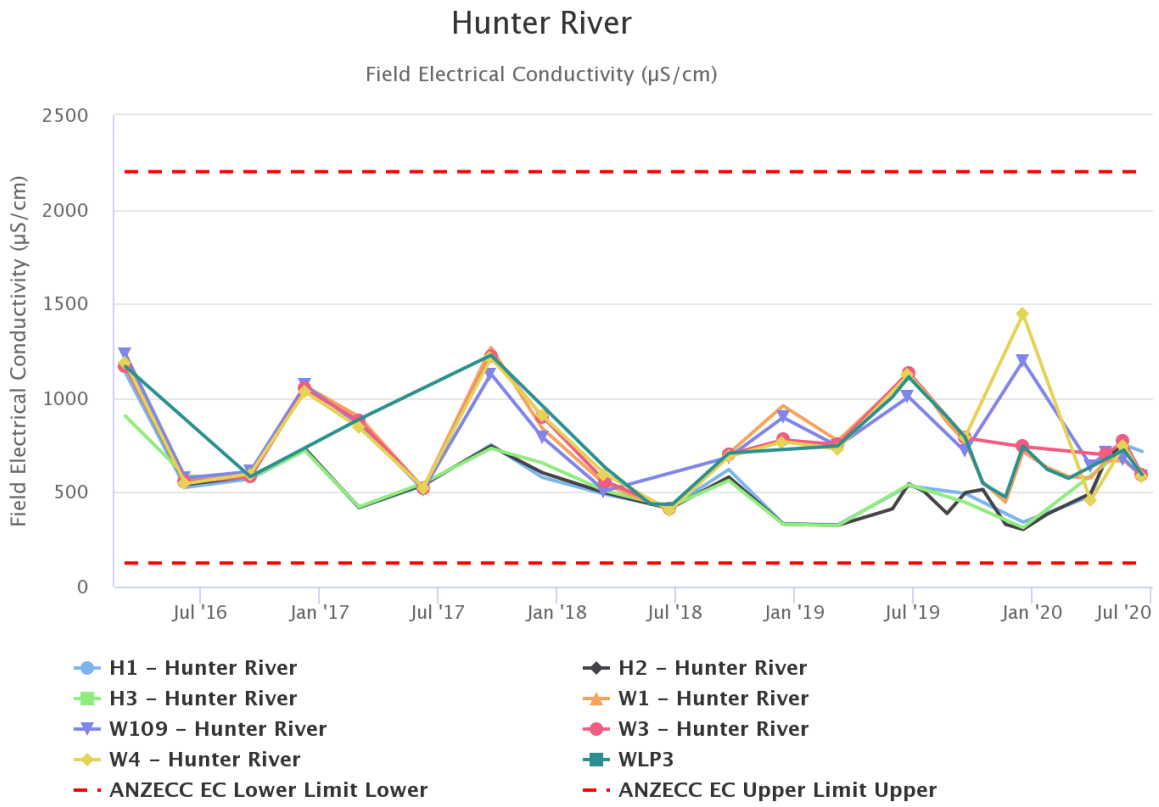


Figure 20: Hunter River Field Electrical Conductivity Trend – June 2020

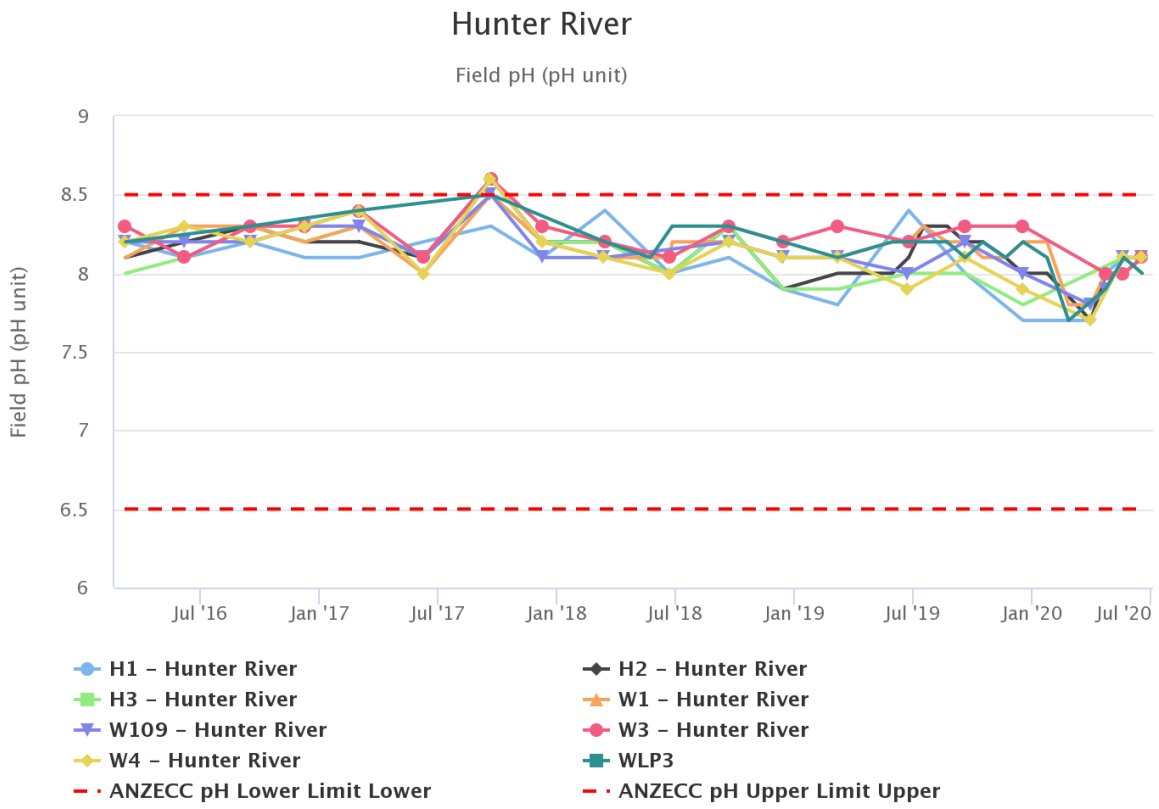


Figure 21: Hunter River Field pH Trend – June 2020

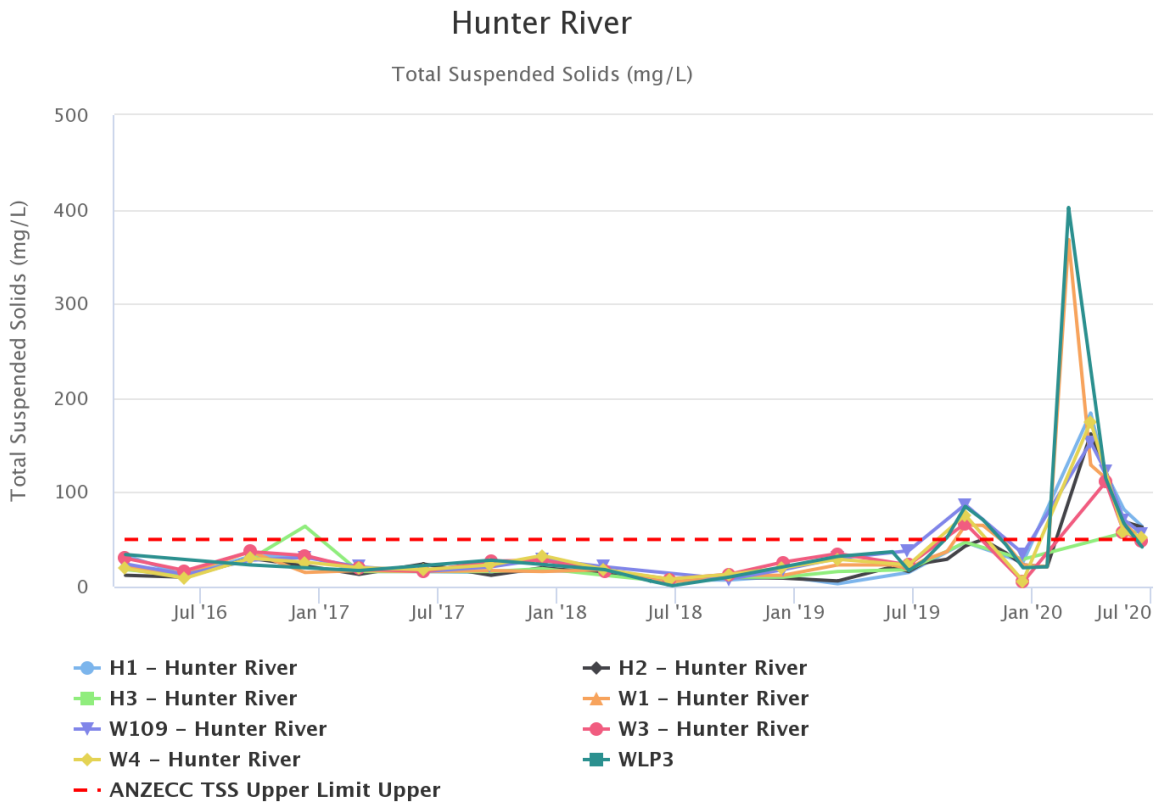


Figure 22: Hunter River Total Suspended Solids – June 2020

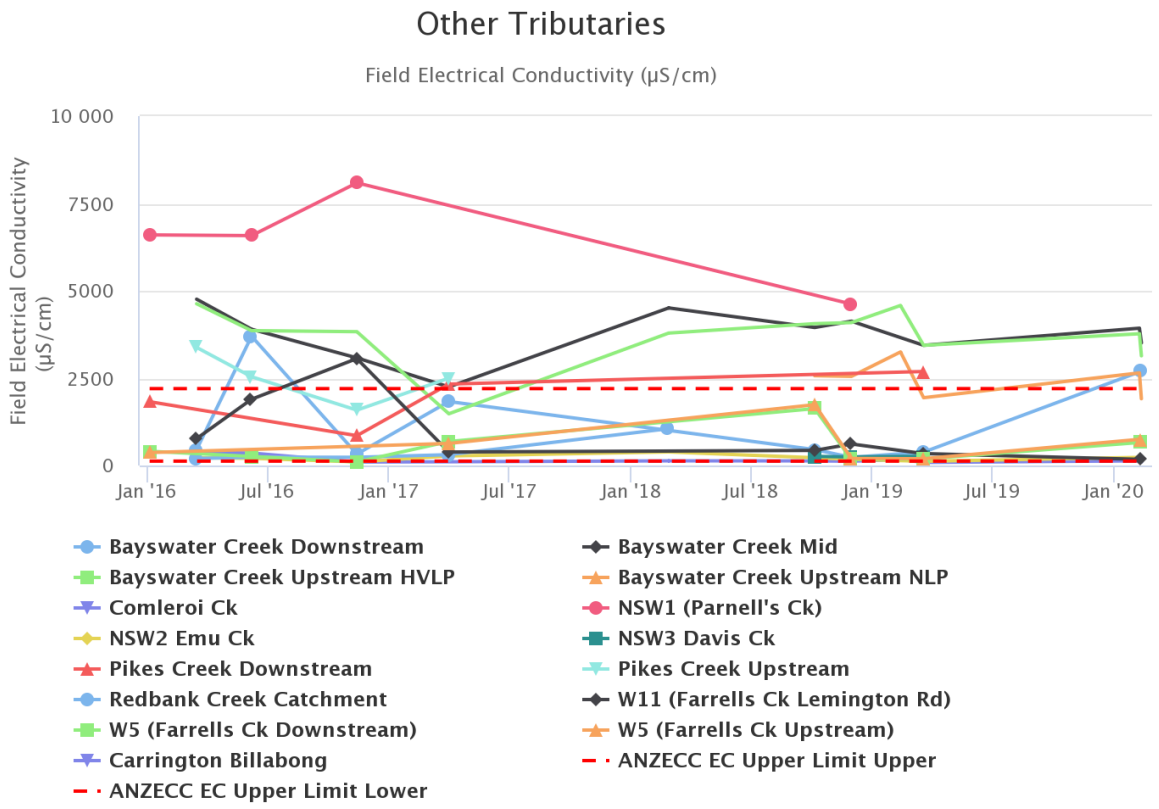


Figure 23: Other Tributaries Electrical Conductivity Trend – June 2020

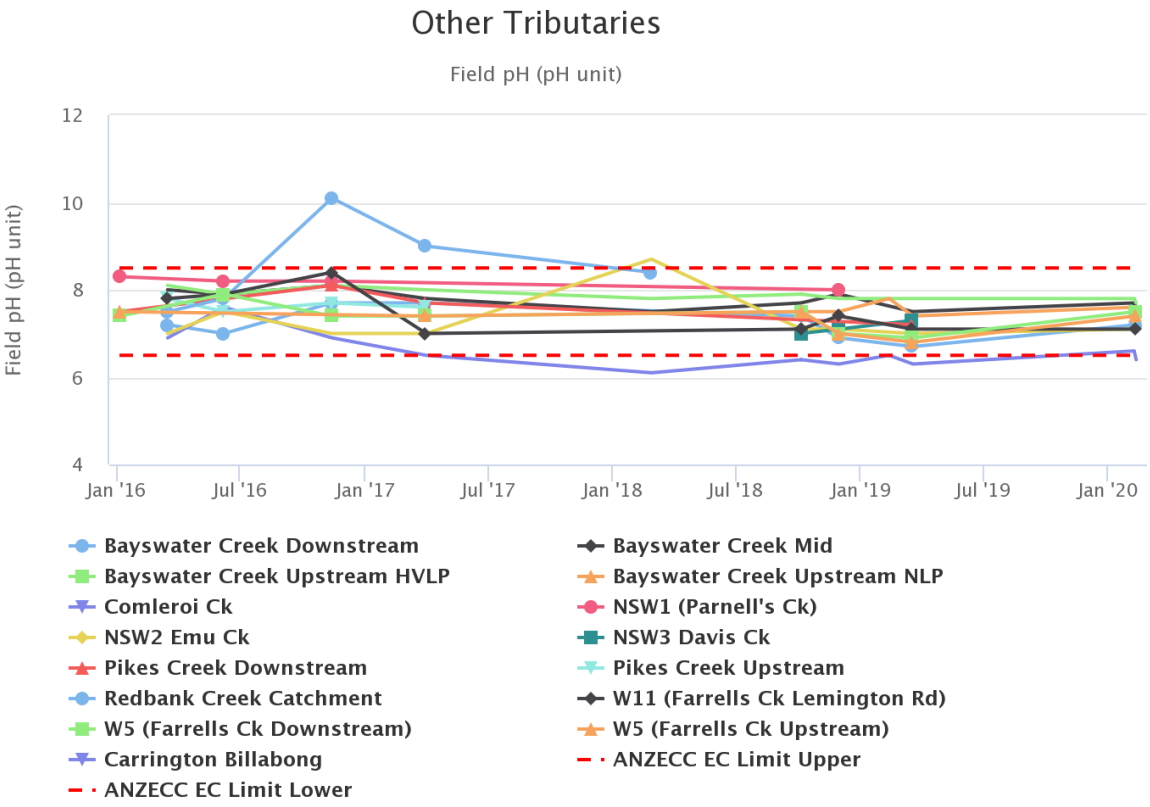


Figure 24: Other Tributaries pHTrend – June 2020

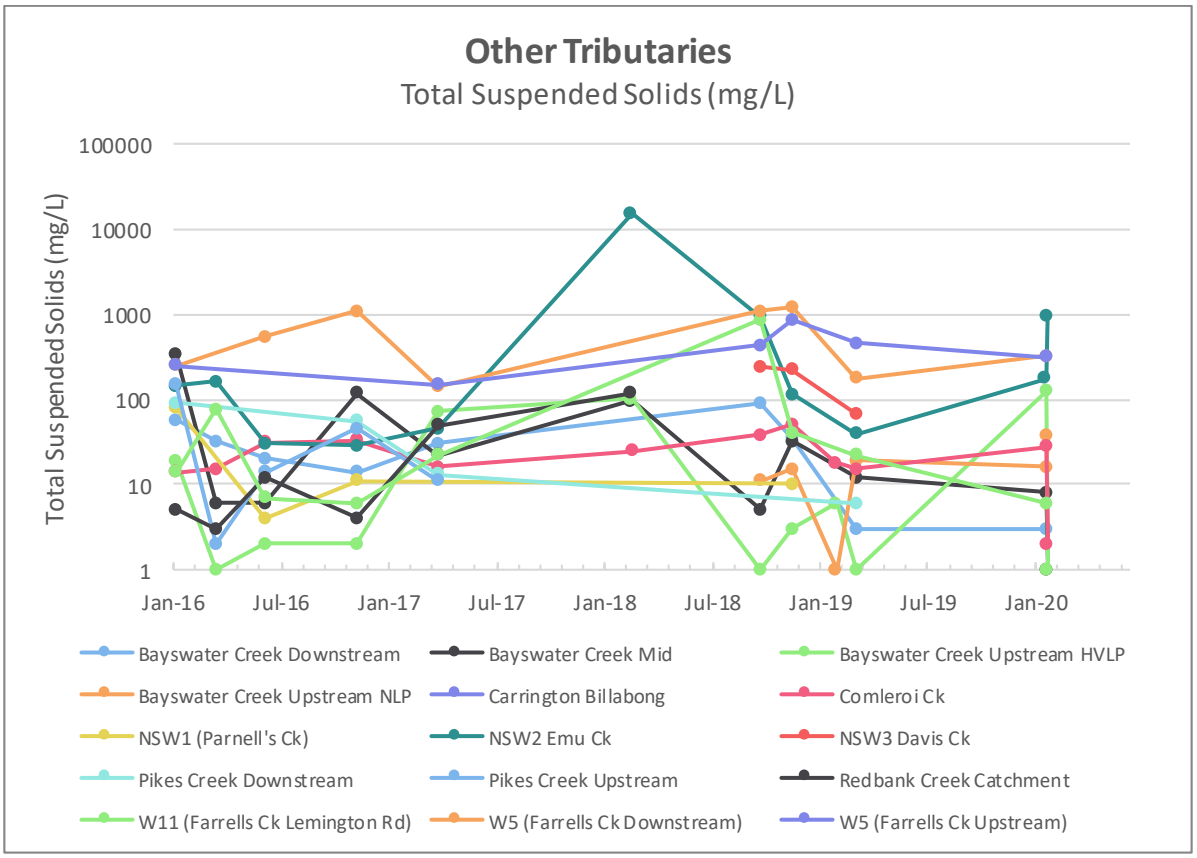


Figure 25: Other Tributaries Total Suspended Solids Trend – June 2020

3.2 Site Water Use

Under water allocation licenses issued by the Water NSW, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO extracted 645.4 ML of water from the Hunter River.

3.3 HRSTS Discharge

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing 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 0ML of water was discharged under the HRSTS.

3.4 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 2.

Table 2: Surface Water Trigger Limit Summary – Q2 2020

Site	Date	Trigger Limit Breached	Action taken in response
WLP3	22/04/2020	TSS	Second breach – investigated and maintain watching brief
W3 – Hunter River	22/04/2020	TSS	First breach – investigated and established watching brief
Warkworth Bridge	22/04/2020	pH	Second breach – Maintain watching brief
WL1	22/04/2020	pH	Second breach – Maintain watching brief
H1- Hunter River	17/06/2020	TSS	Second breach – investigated and maintain watching brief
W4 – Hunter River	17/06/2020	TSS	Second breach – investigated and maintain watching brief
W109 – Hunter River	17/06/2020	TSS	Second breach – investigated and maintain watching brief
WL1	17/06/2020	TSS	First breach – investigated and established watching brief
H3 – Hunter River	17/06/2020	TSS	First breach – investigated and established watching brief
H2 – Hunter River	17/06/2020	TSS	Second breach – investigated and maintain watching brief
West Pit	18/06/2020	TSS	First breach – investigated and established watching brief

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

3.5 Groundwater Monitoring Results

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Groundwater monitoring sites are shown in Figure 26. Figure 27 to Figure 83 show the long term trends (2016 – current) for ground water bores monitored at HVO.

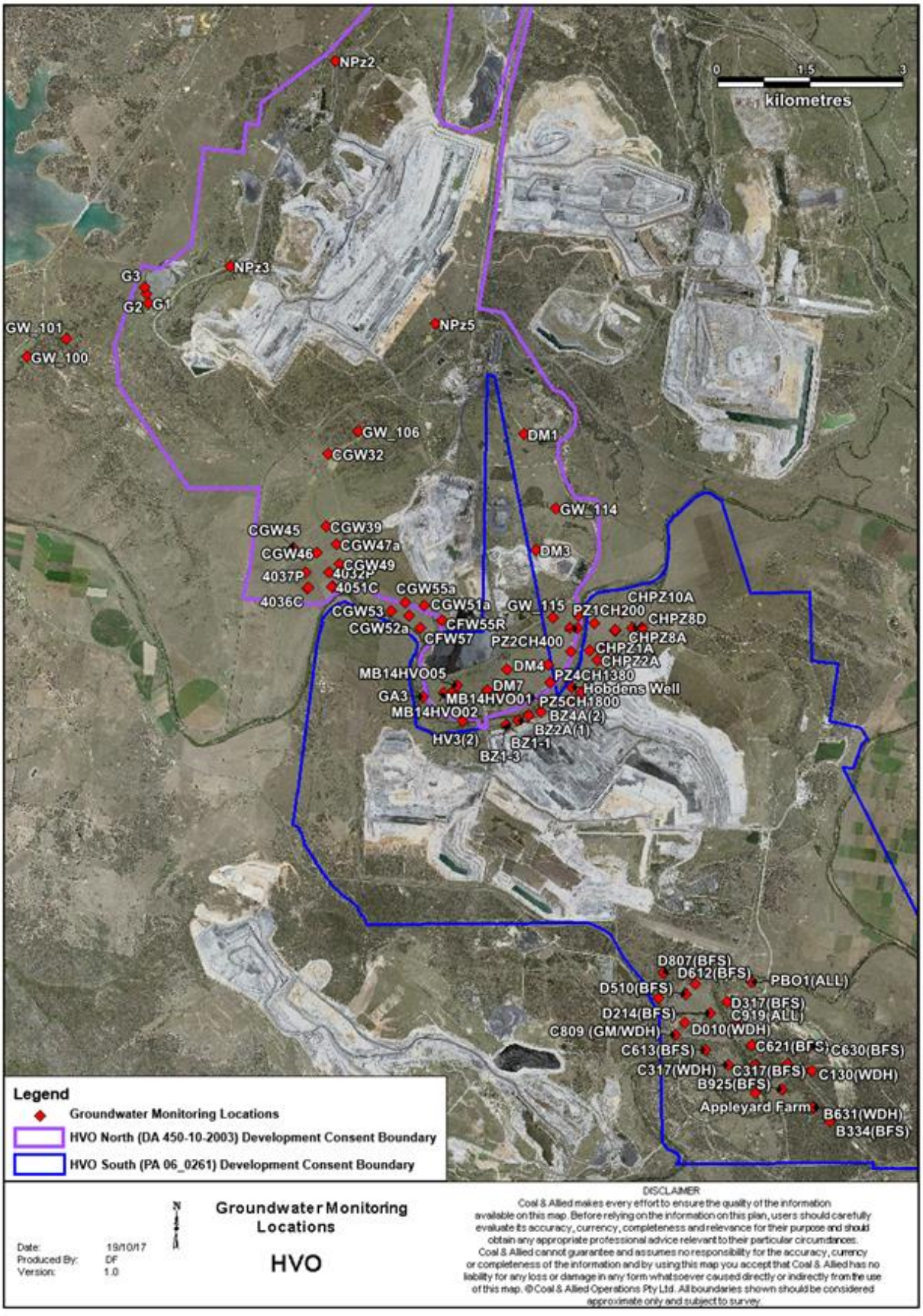


Figure 26: Groundwater Monitoring Locations at HVO

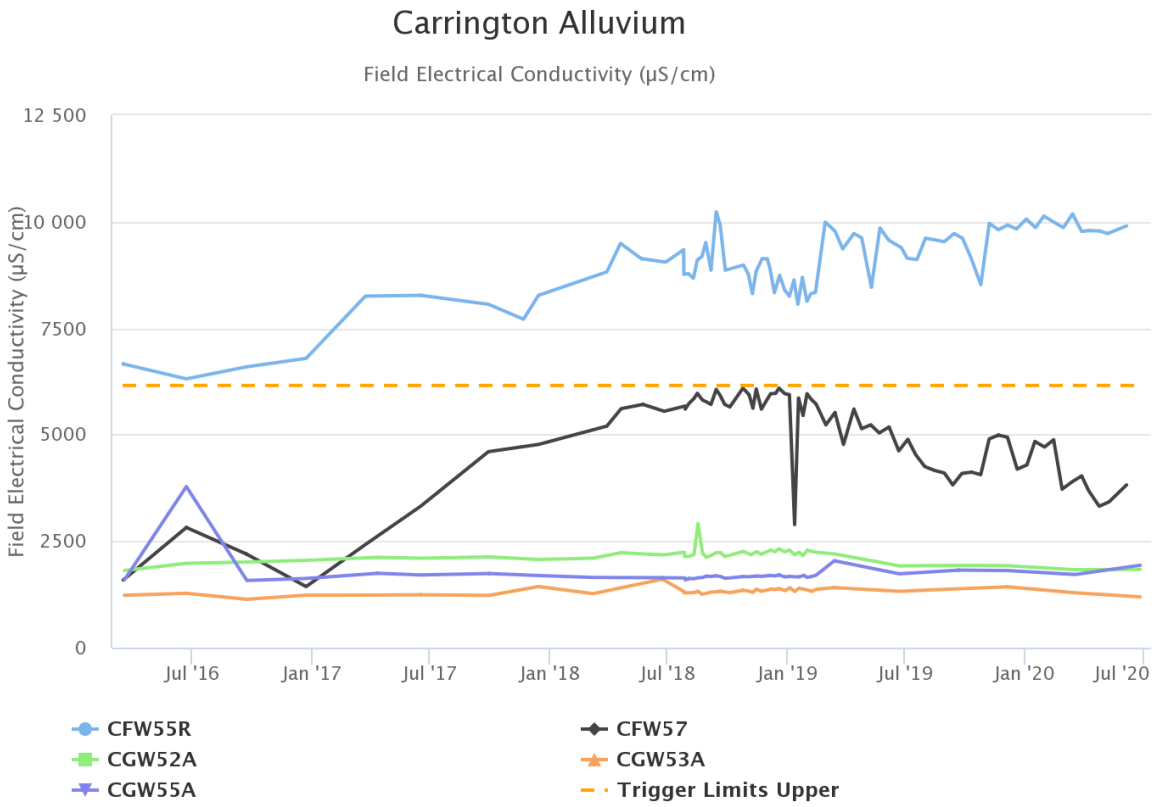


Figure 27: Carrington Alluvium Field Electrical Conductivity Trend – June 2020

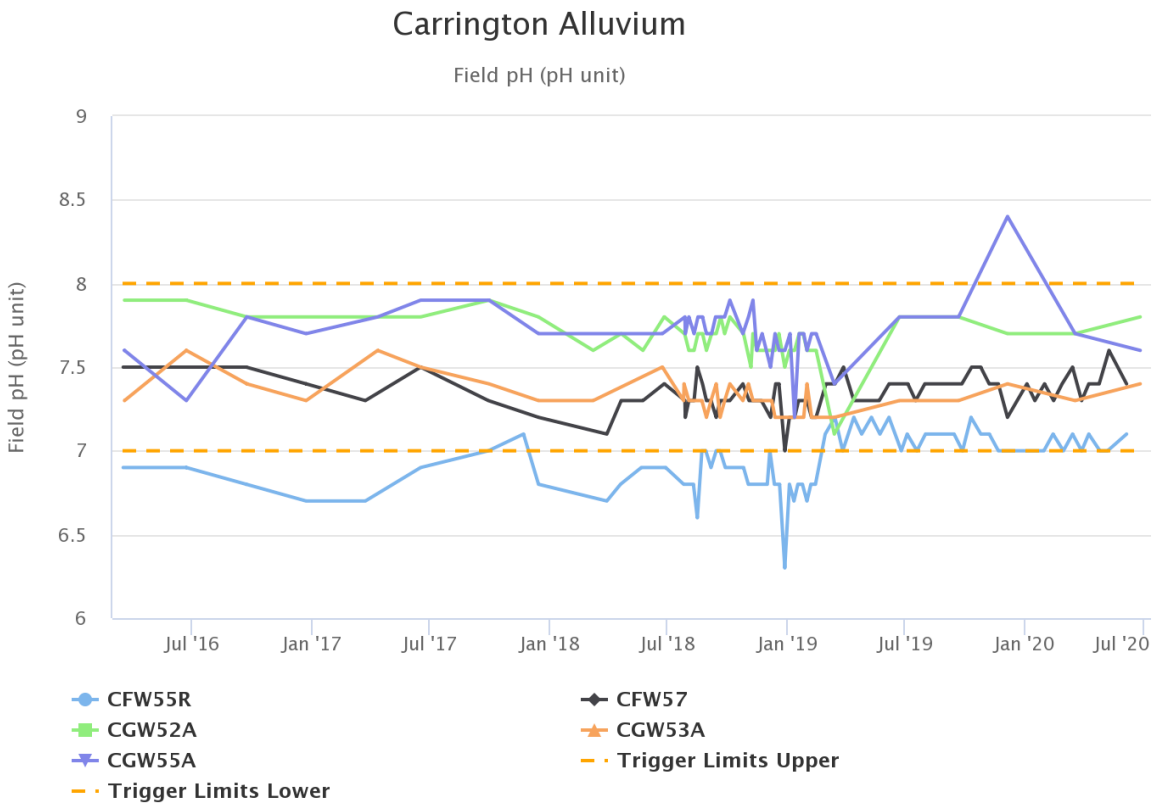


Figure 28: Carrington Alluvium Field pH Trend – June 2020

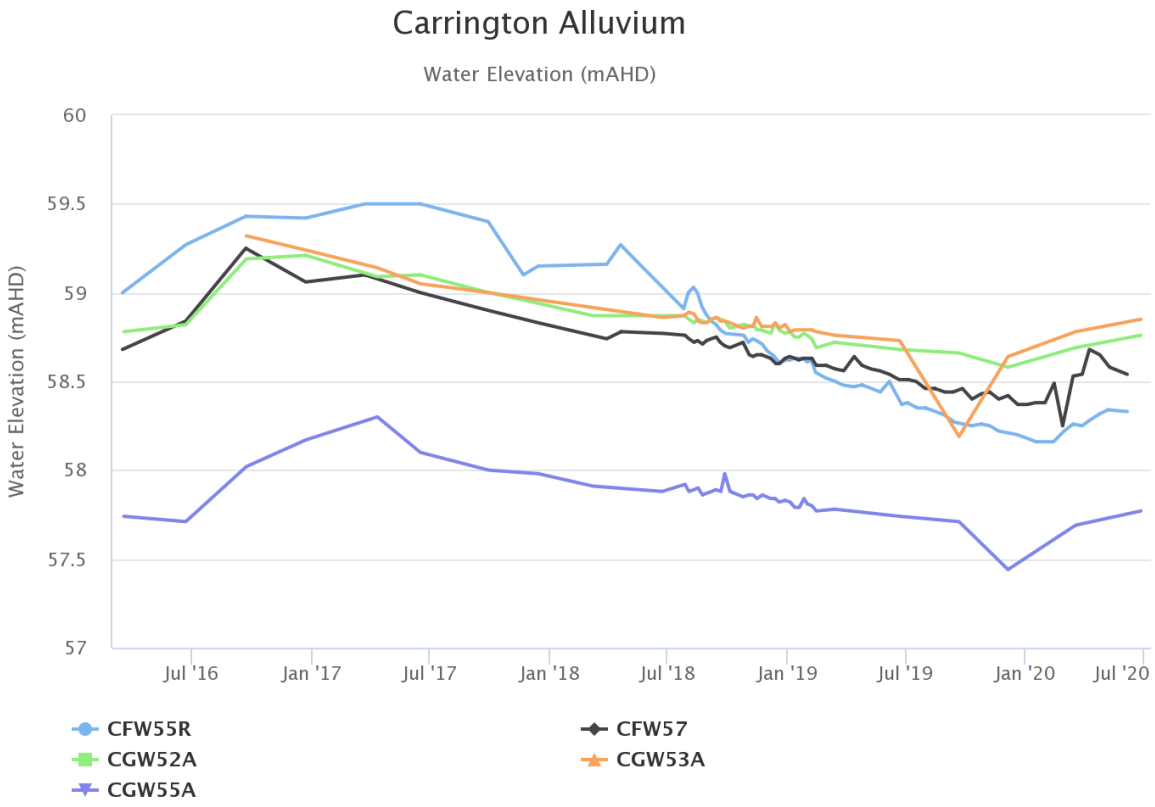
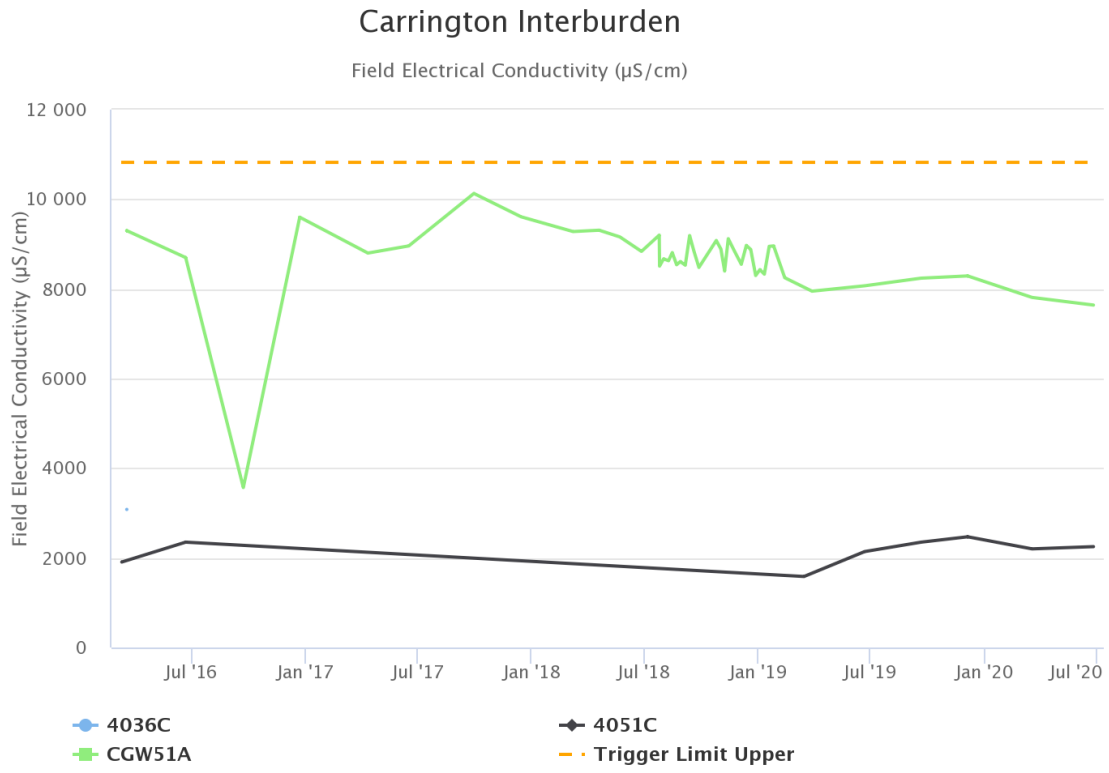
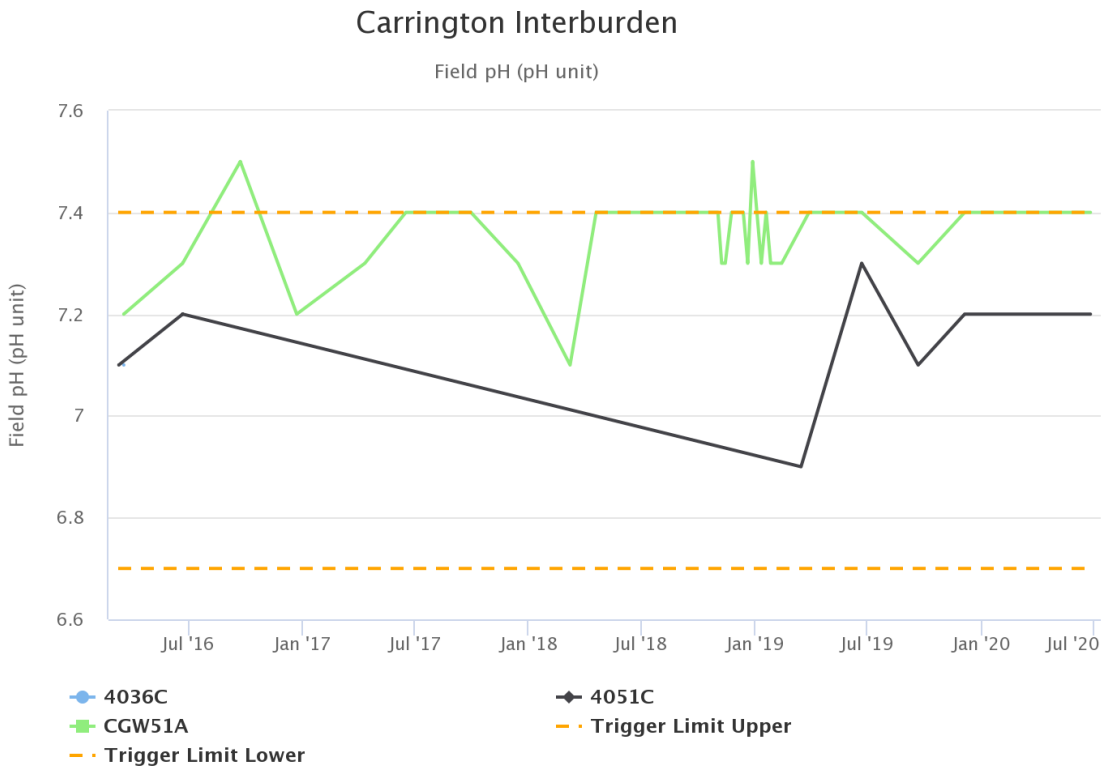


Figure 29: Carrington Alluvium Standing Water Level – June 2020



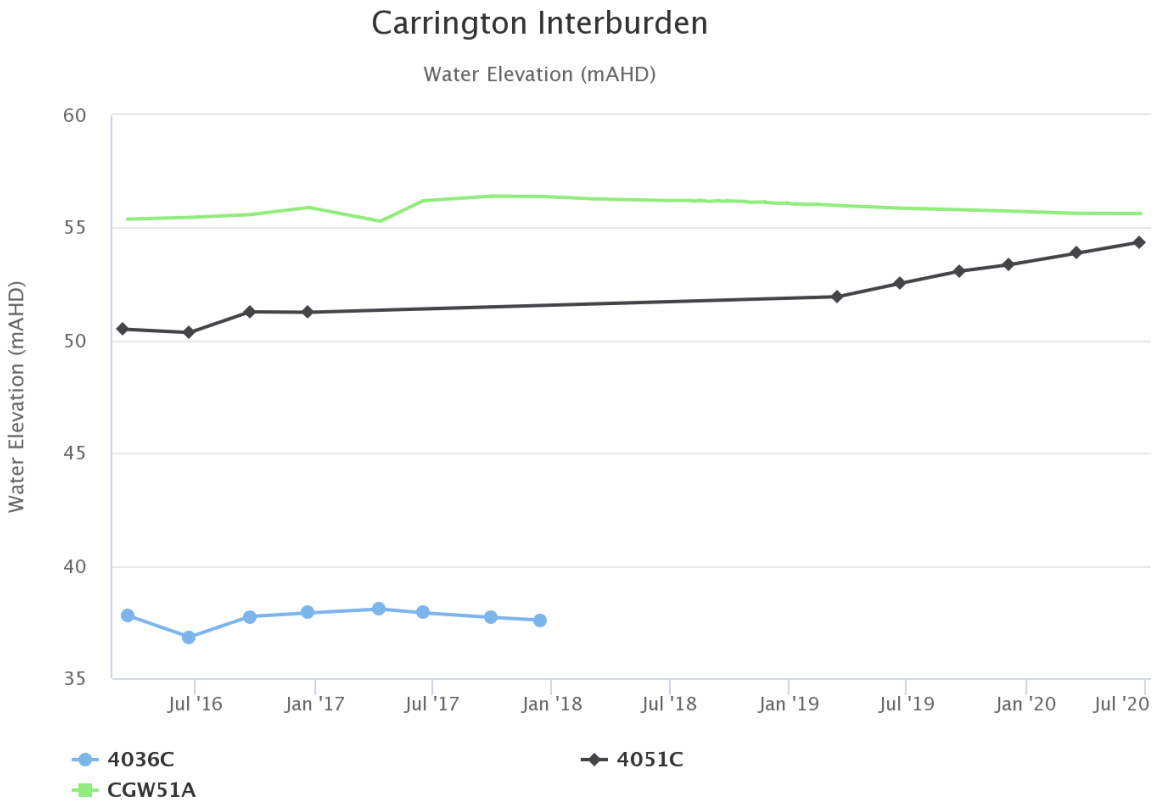
Note: 4036C is dry or produced insufficient water for a sample.

Figure 30: Carrington Interburden Field Electrical Conductivity Trend – June 2020



Note: 4036C is dry or produced insufficient water for a sample.

Figure 31: Carrington Interburden Field pH Trend – June 2020



Note: 4036C is dry or produced insufficient water for a sample.

Figure 32: Carrington Interburden Standing Water Level – June 2020

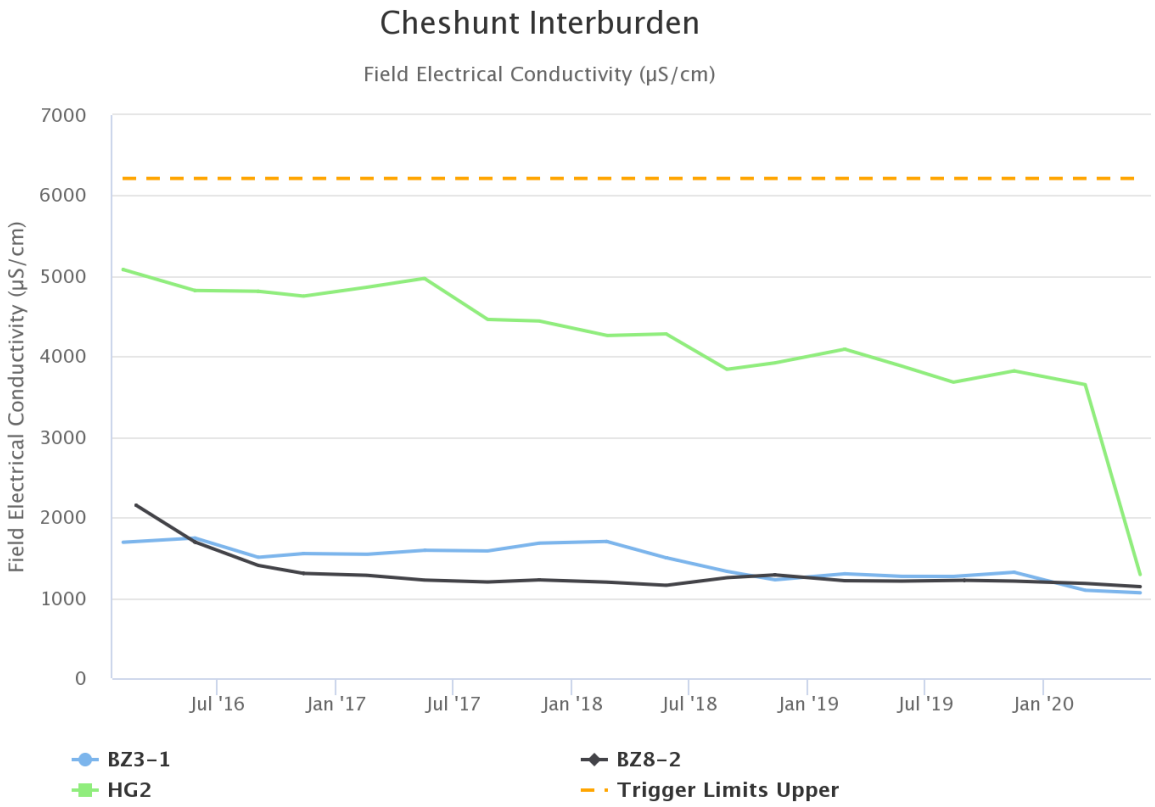


Figure 33: Cheshunt Interburden Field Electrical Conductivity Trend – June 2020

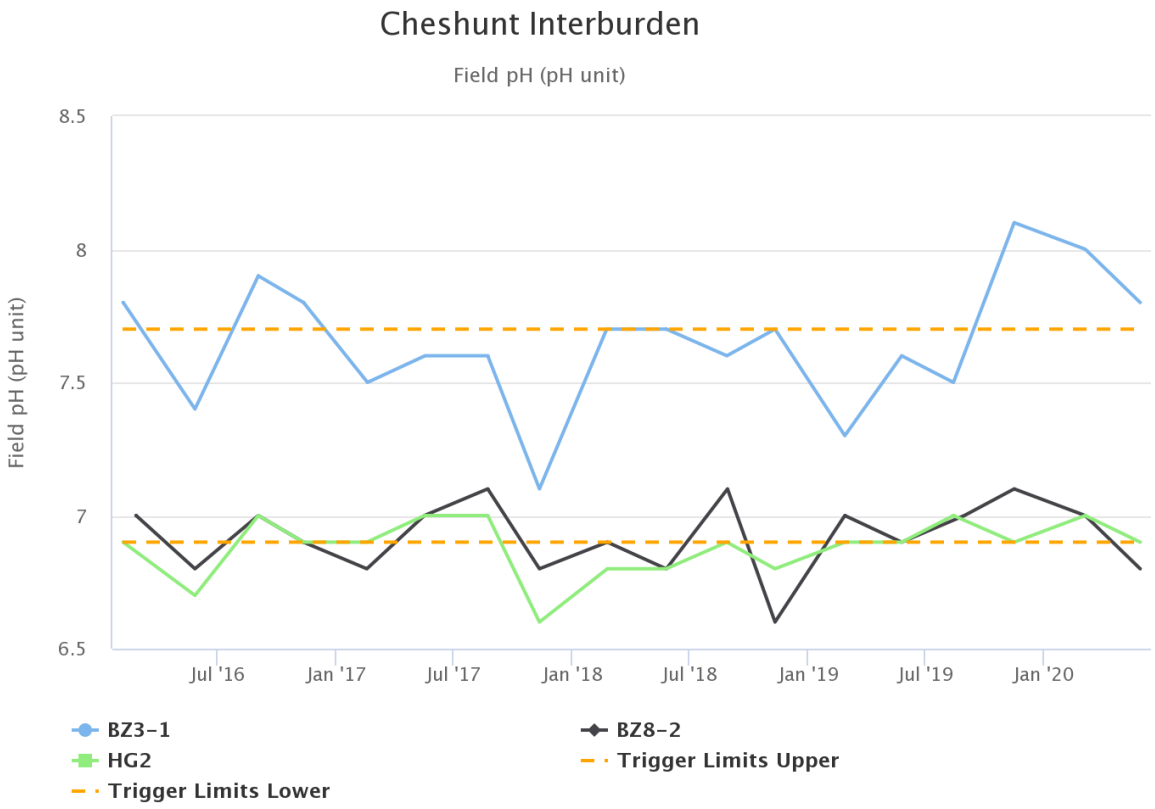


Figure 34: Cheshunt Interburden Field pH Trend – June 2020

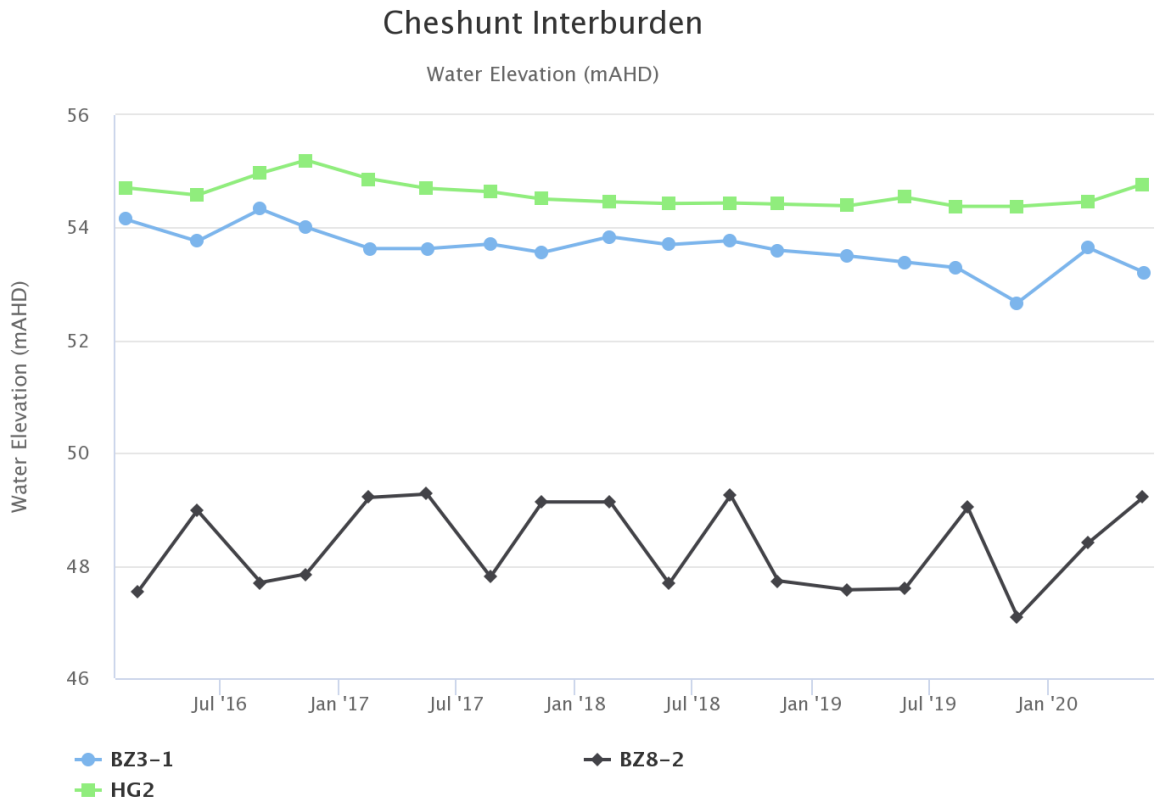


Figure 35: Cheshunt Interburden Standing Water Level – June 2020

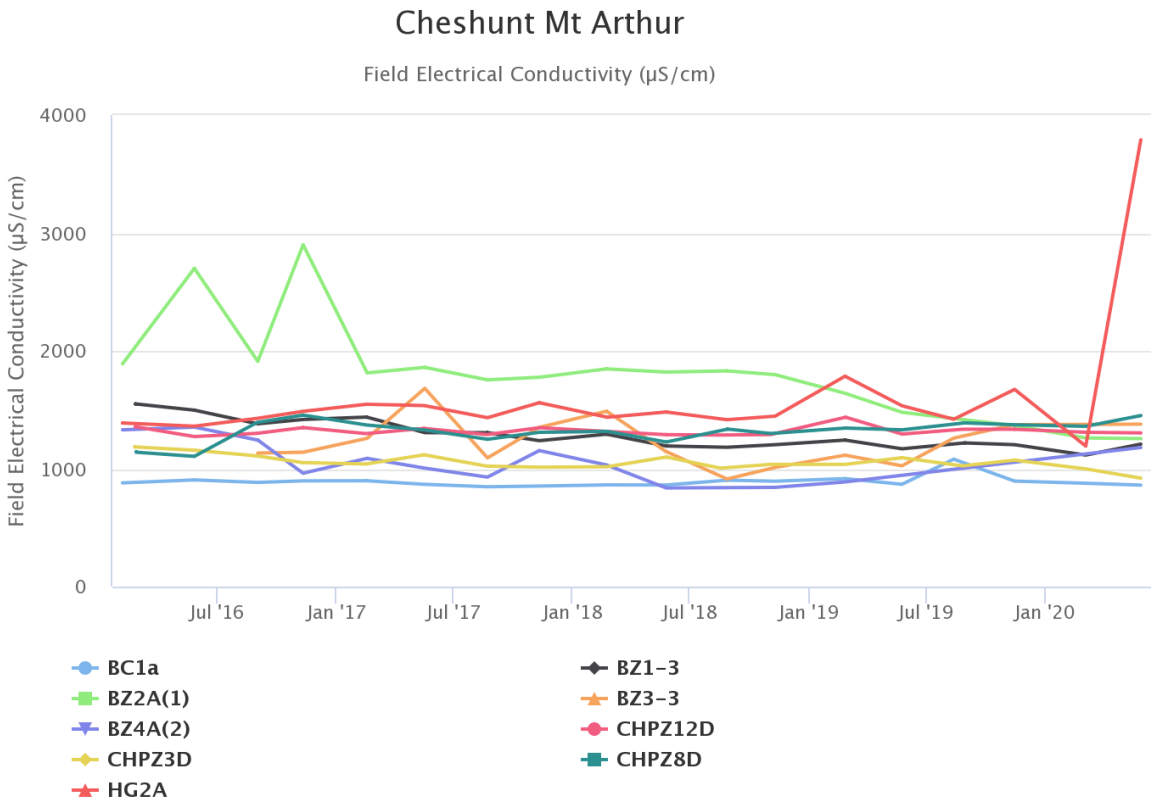


Figure 36: Cheshunt Mt Arthur Field Electrical Conductivity Trend – June 2020

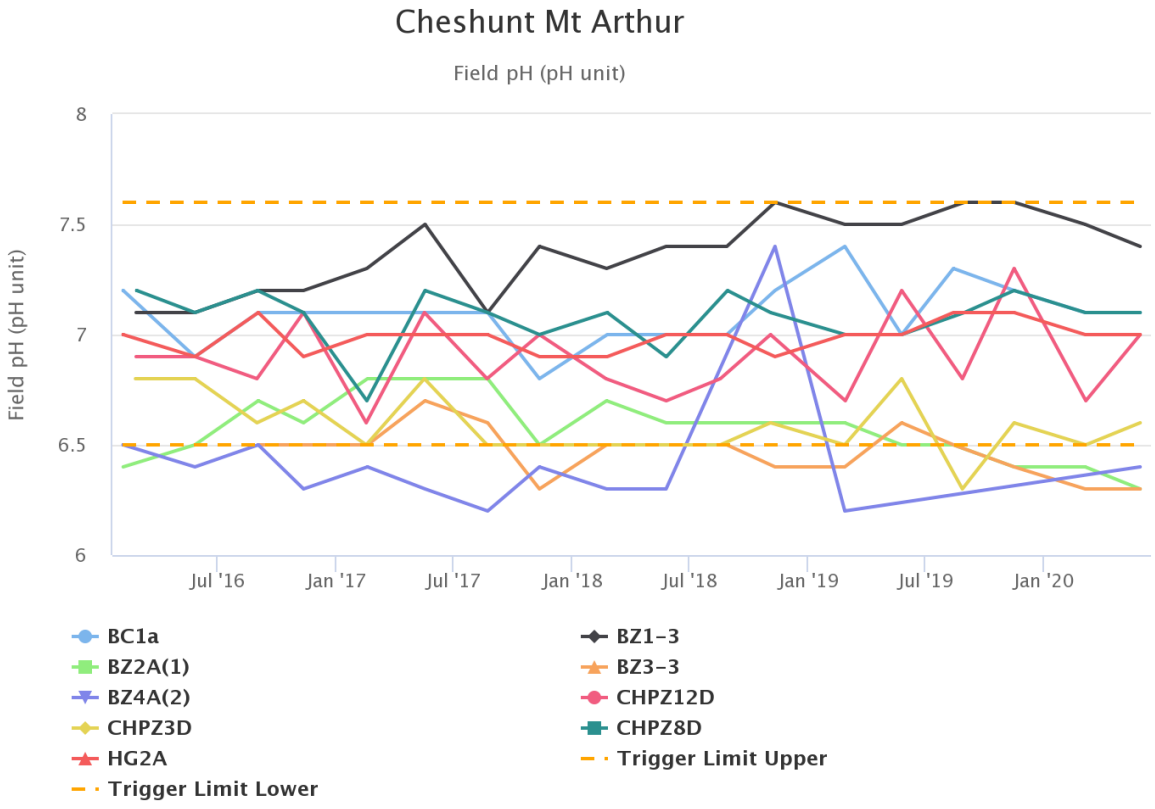


Figure 37: Cheshunt Mt Arthur Field pH Trend – June 2020

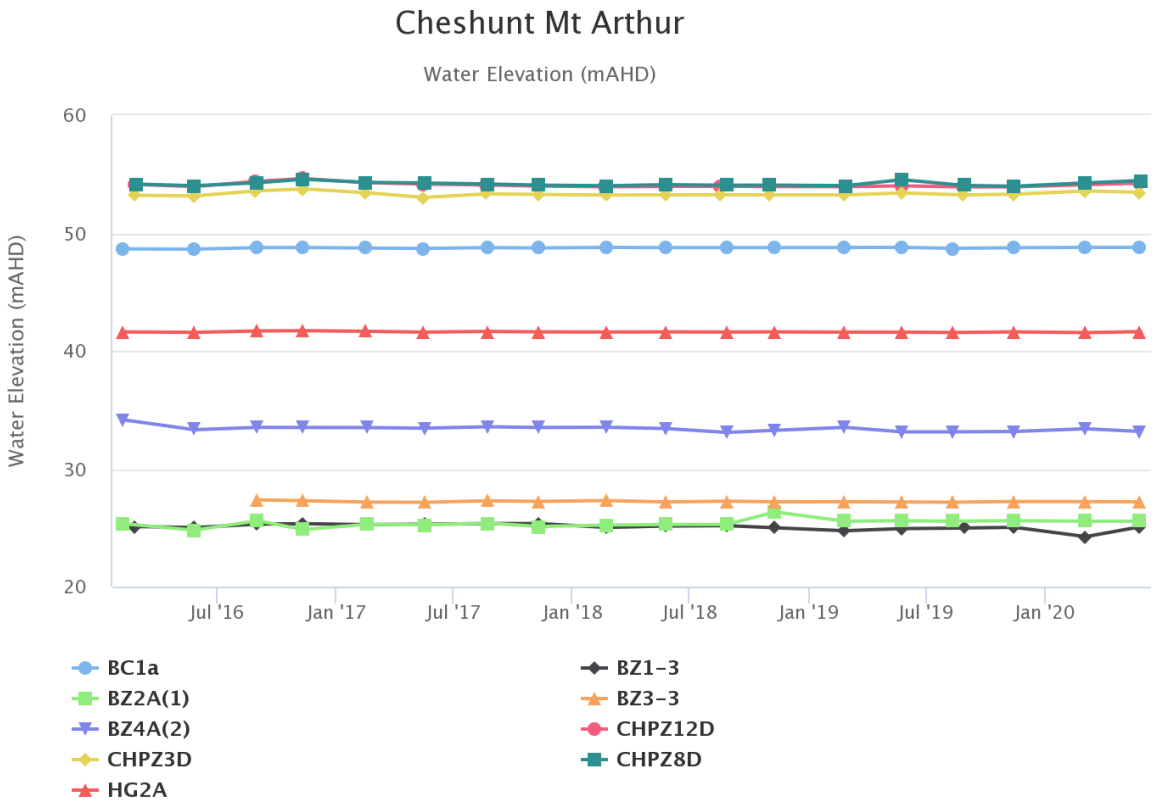


Figure 38: Cheshunt Mt Arthur Standing Water Level – June 2020

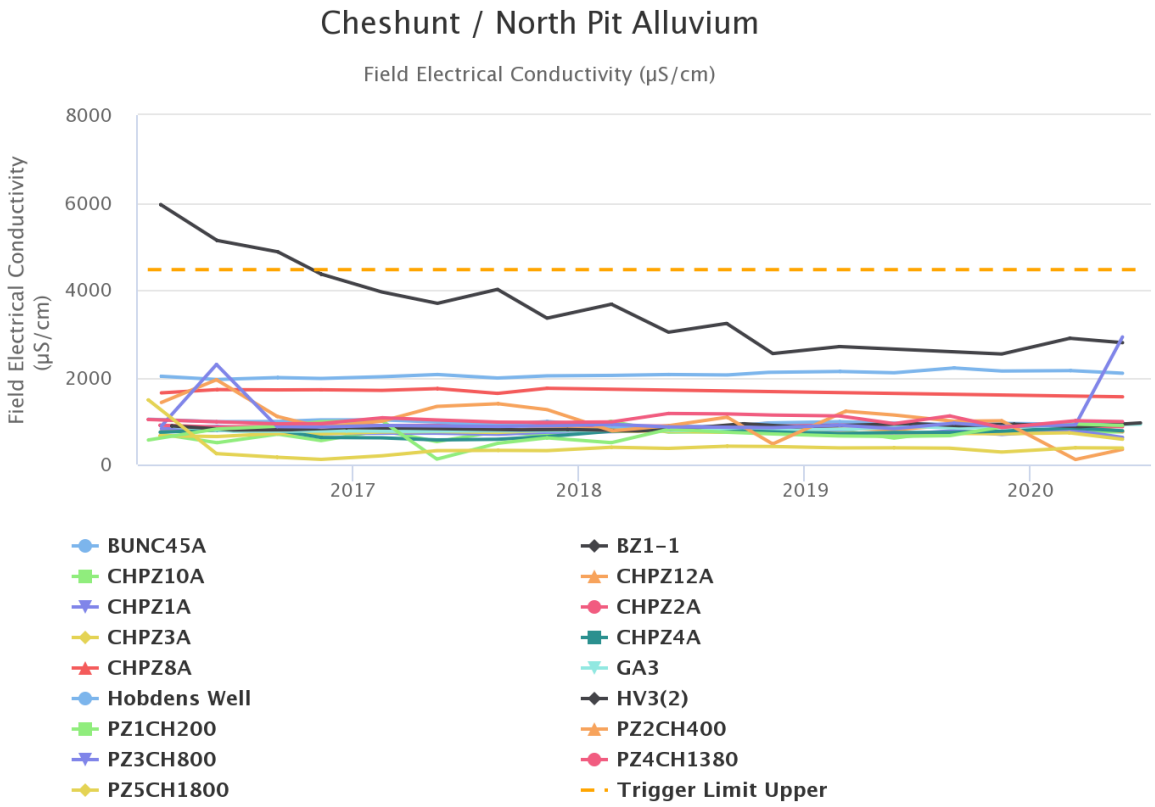


Figure 39: Cheshunt / North Pit Alluvium Field Electrical Conductivity Trend – June 2020

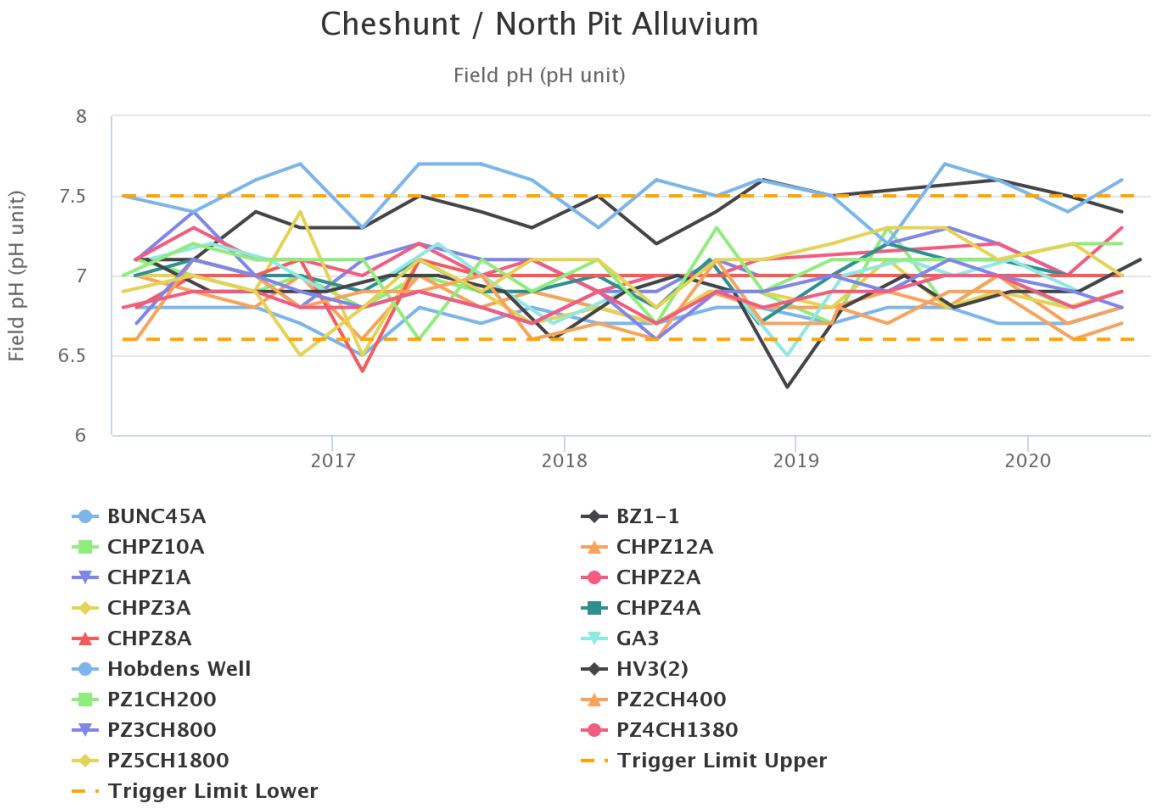


Figure 40: Cheshunt / North Pit Alluvium Field pH Trend – June 2020

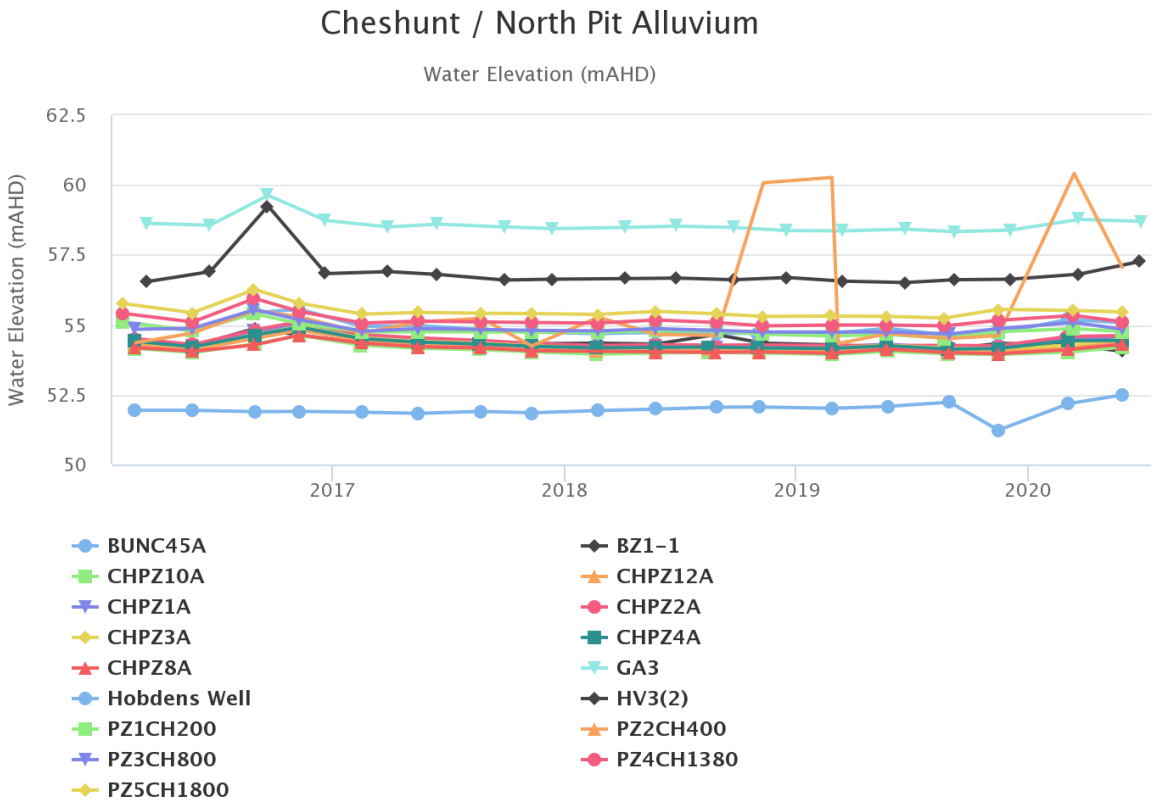


Figure 41: Cheshunt / North Pit Alluvium Standing Water Level – June 2020

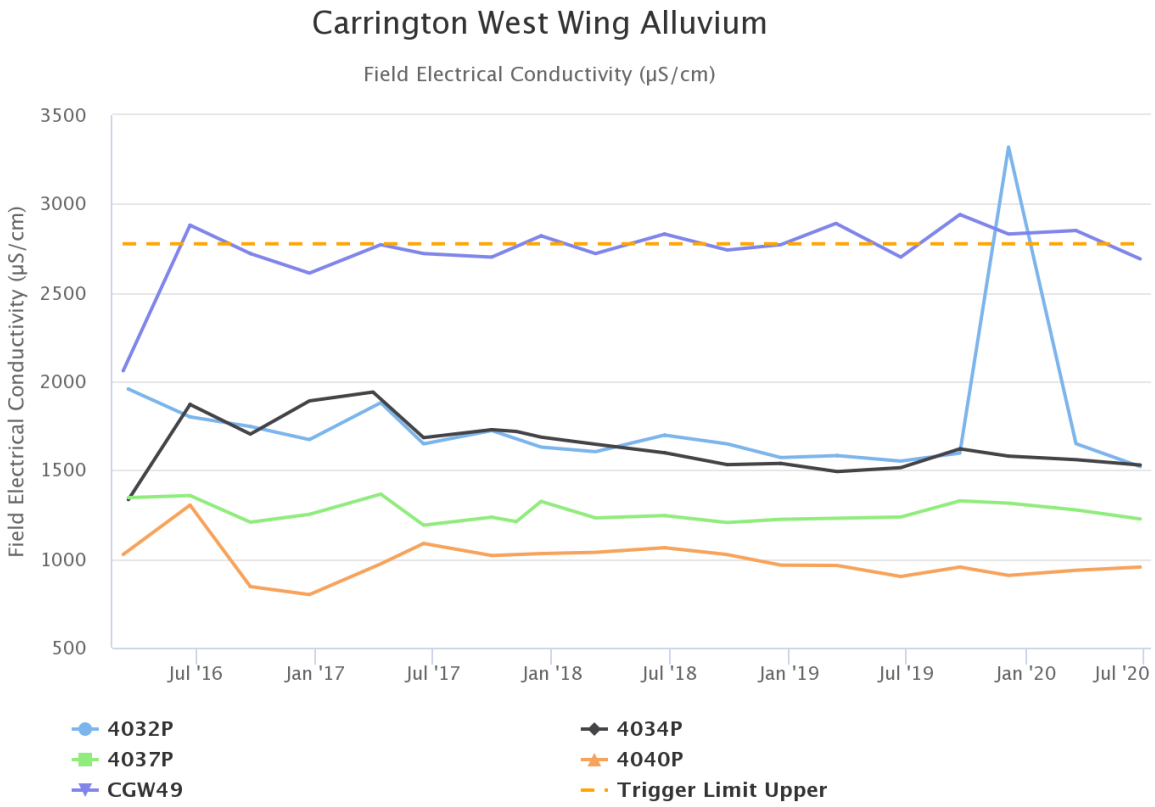


Figure 42: Carrington West Wing Alluvium Field Electrical Conductivity Trend – June 2020

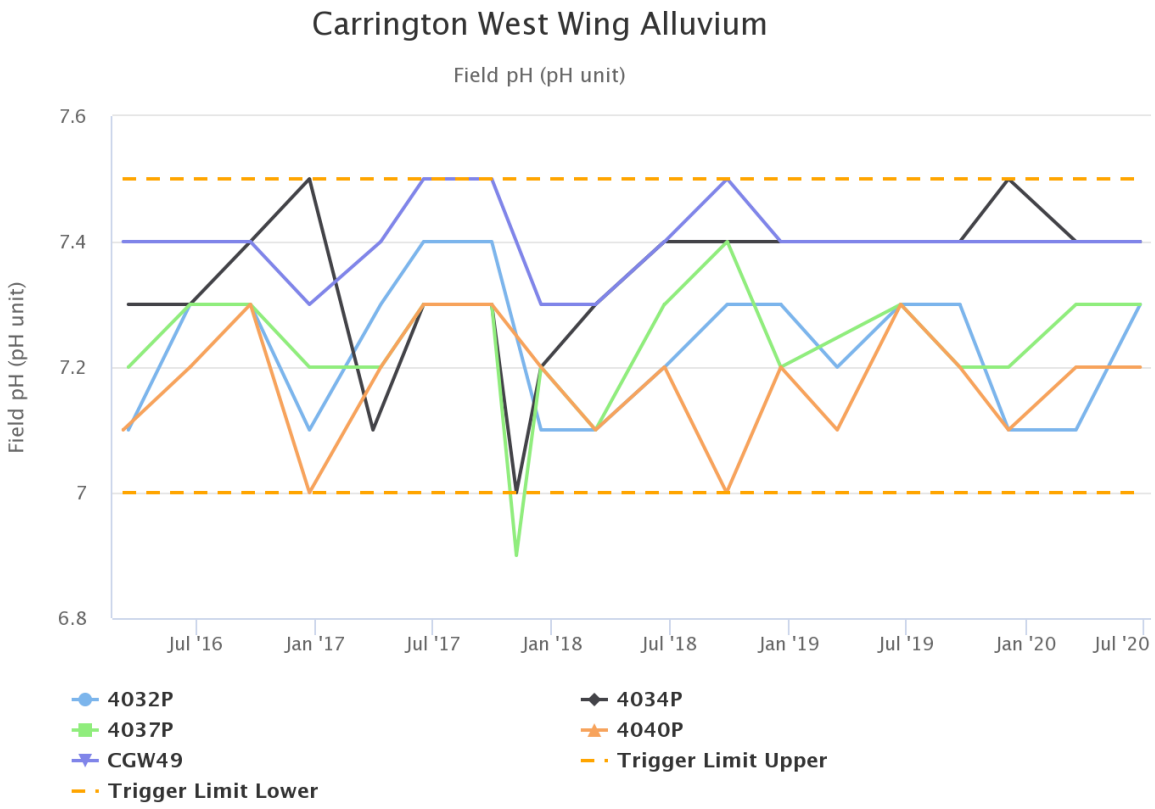


Figure 43: Carrington West Wing Alluvium Field pH Trend – June 2020

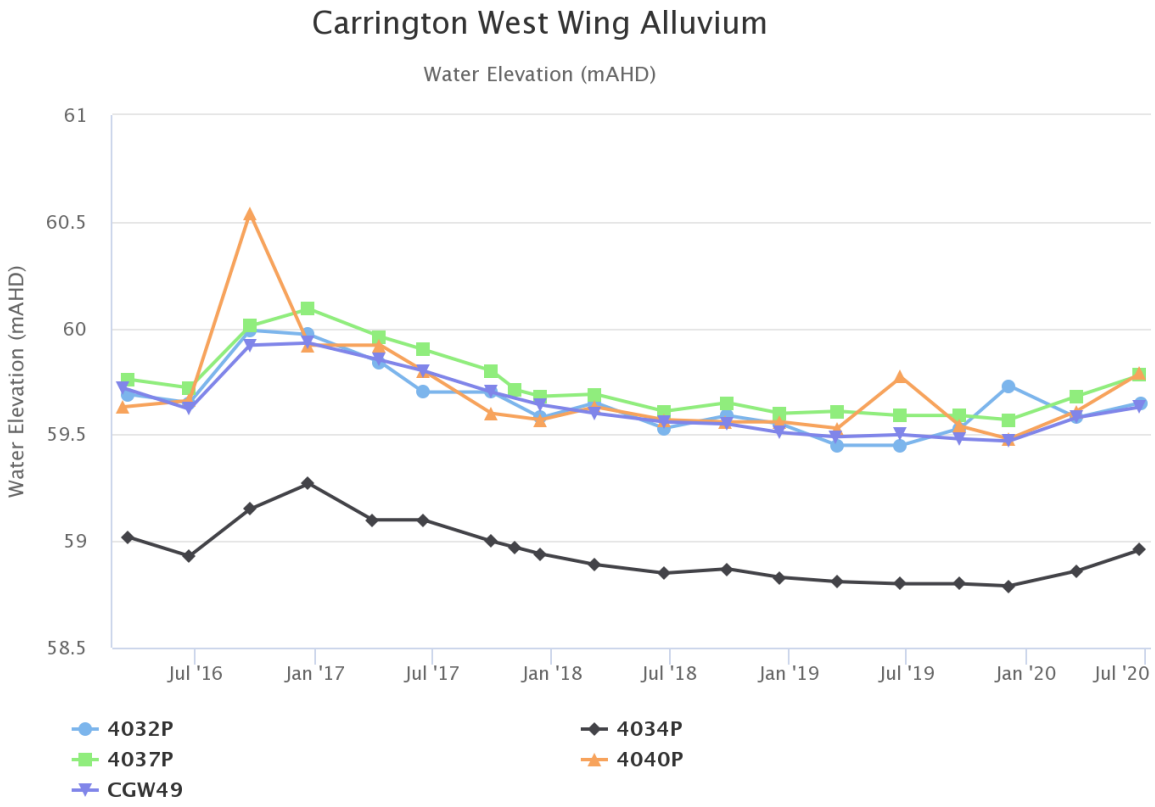


Figure 44: Carrington West Wing Alluvium Standing Water Level – June 2020

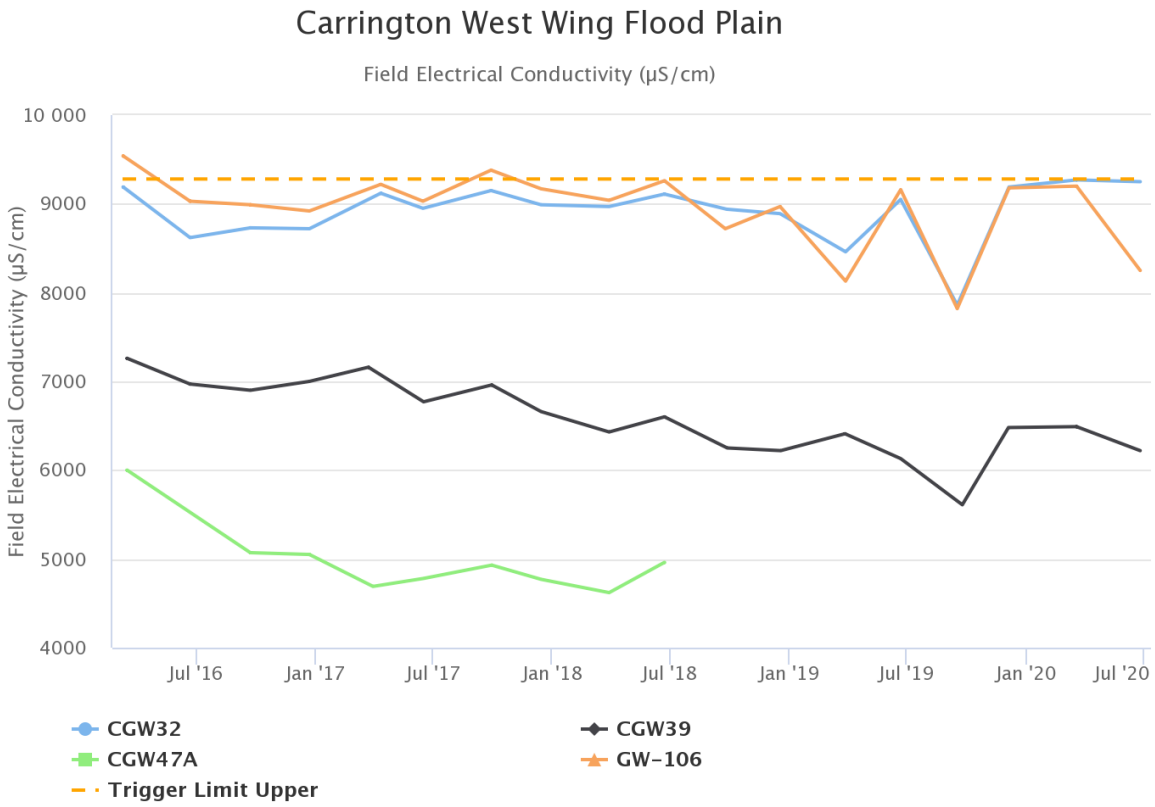


Figure 45: Carrington West Wing Flood Plain Electrical Conductivity Trend – June 2020

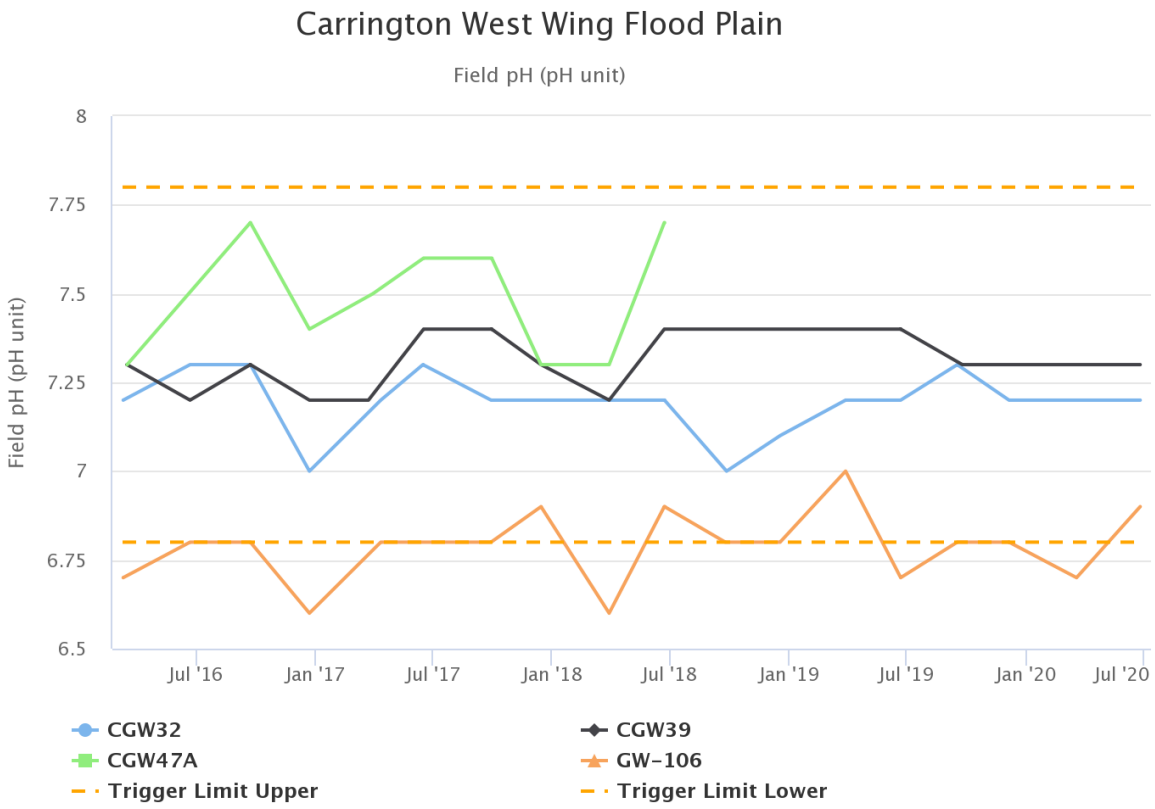


Figure 46: Carrington West Wing Flood Plain Field pH Trend – June 2020

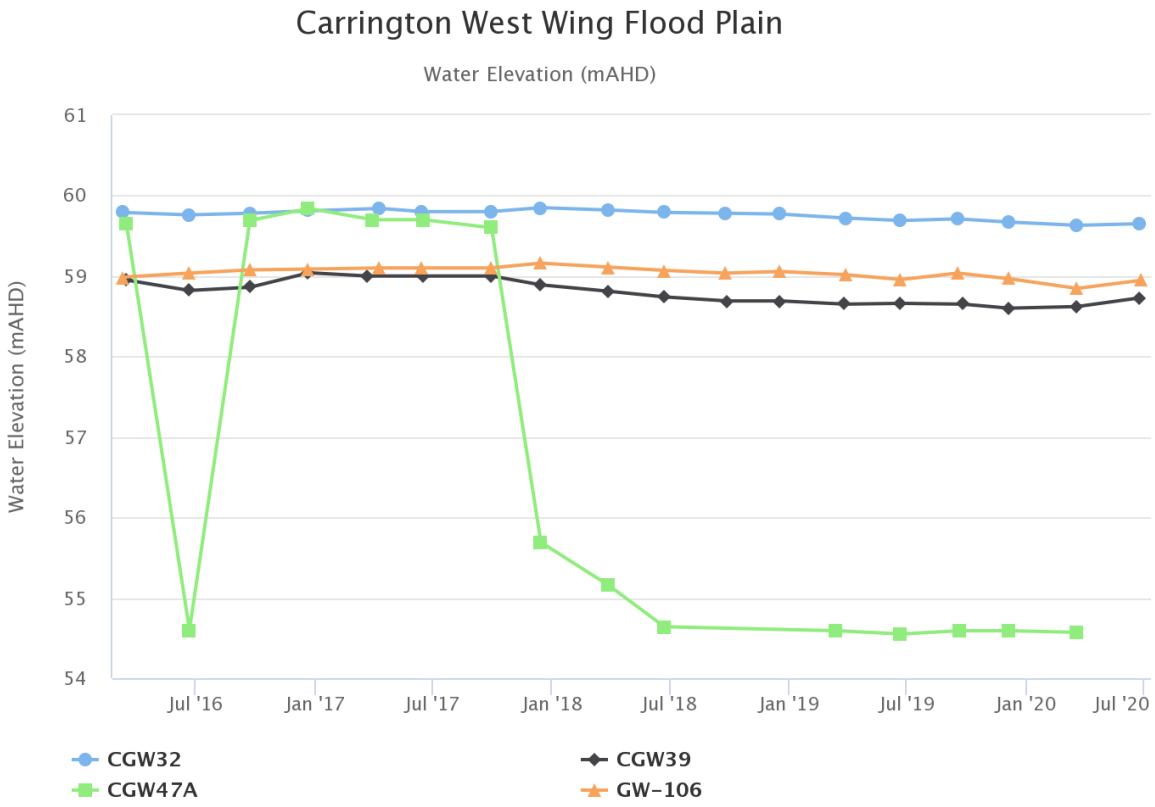
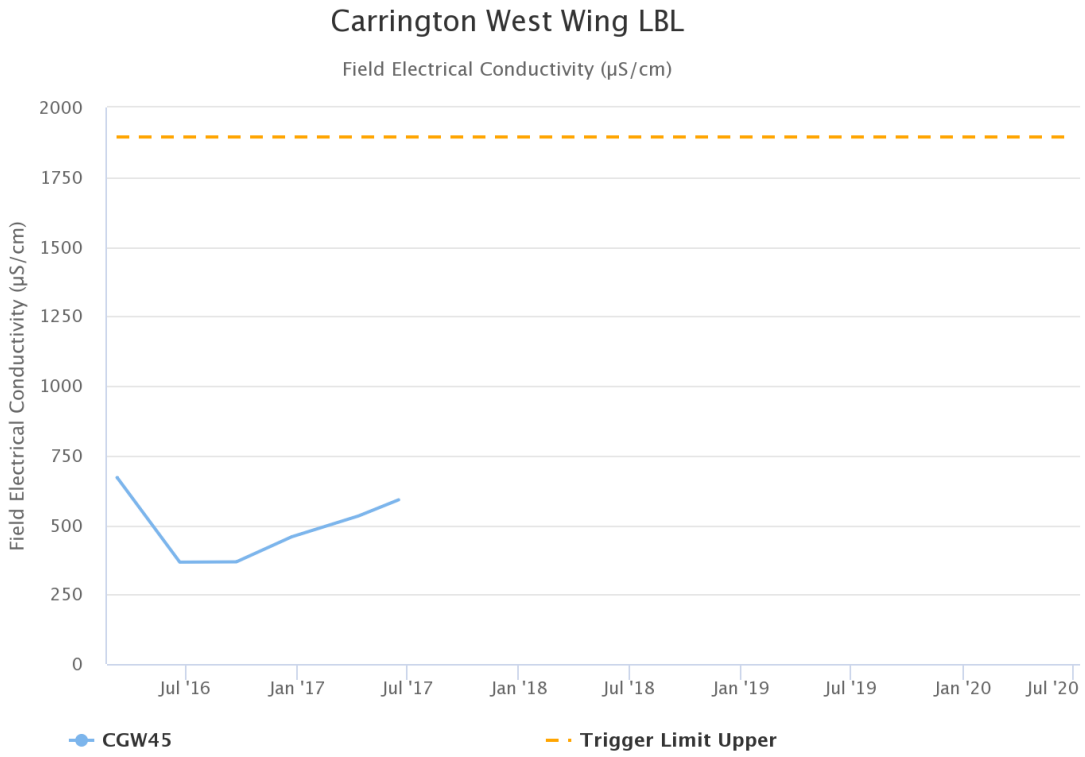
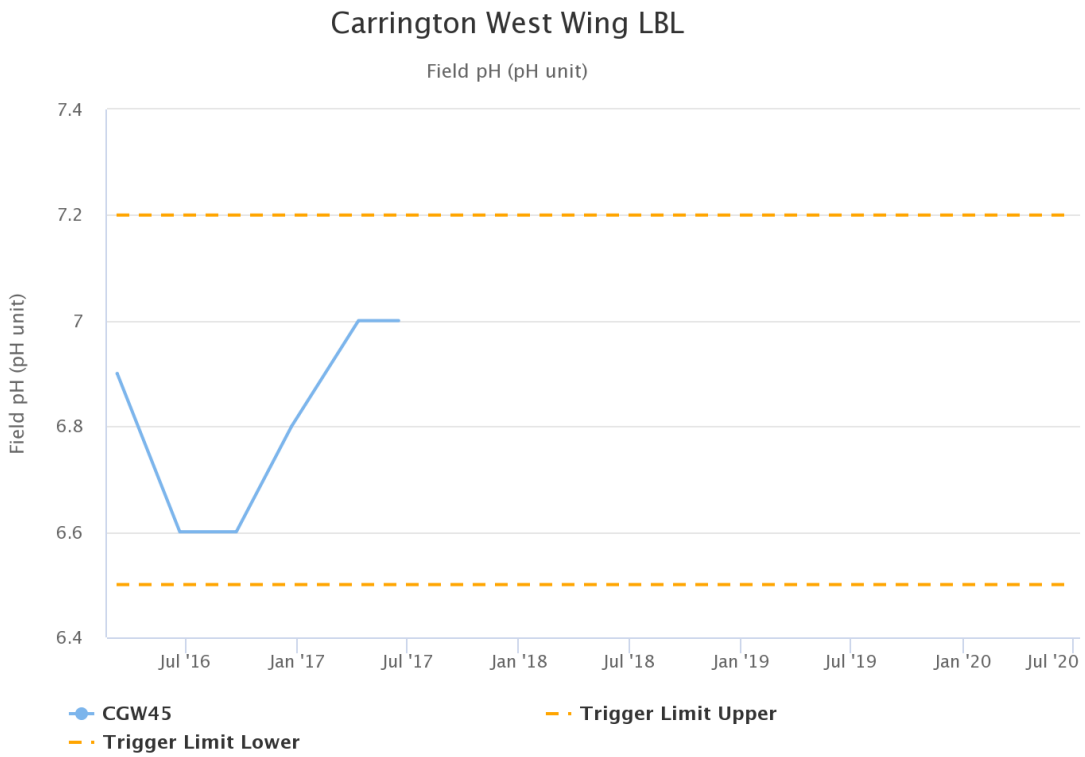


Figure 47: Carrington West Wing Flood Plain Standing Water Level – June 2020



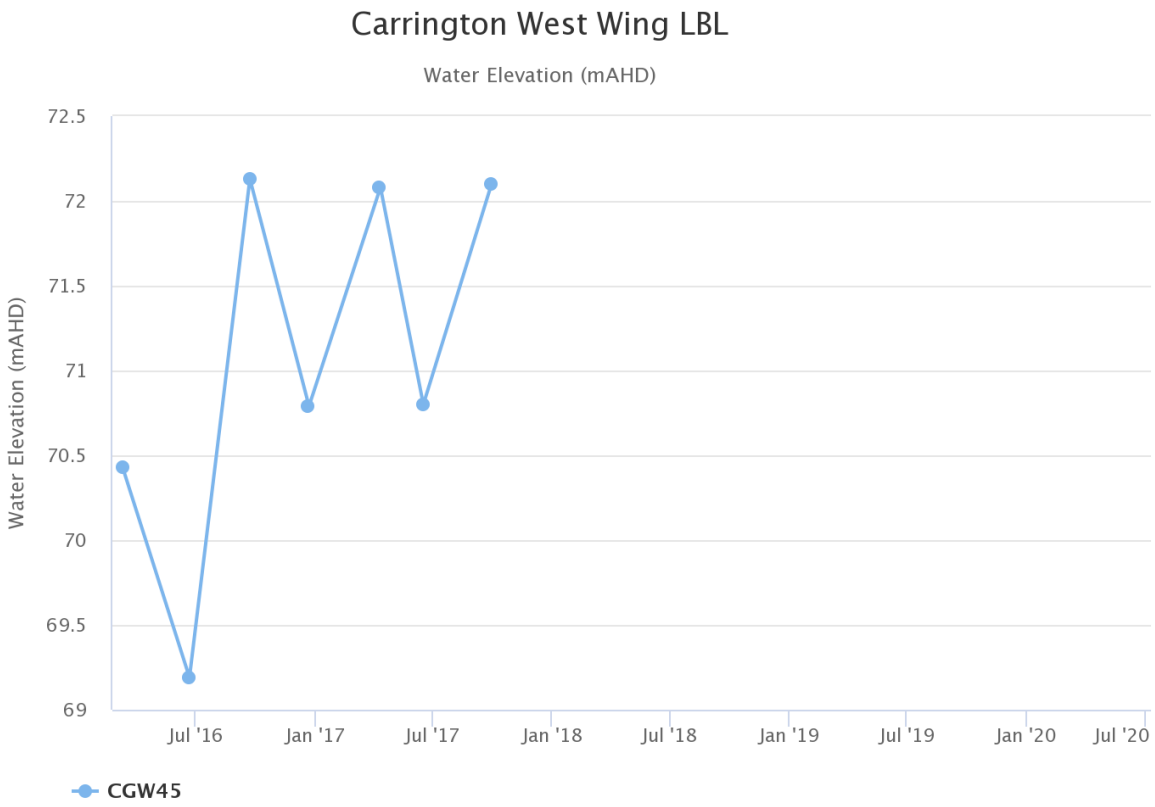
Note: CGW45 has been blocked since June 2017.

Figure 48: Carrington West Wing LBL Field Electrical Conductivity Trend – June 2020



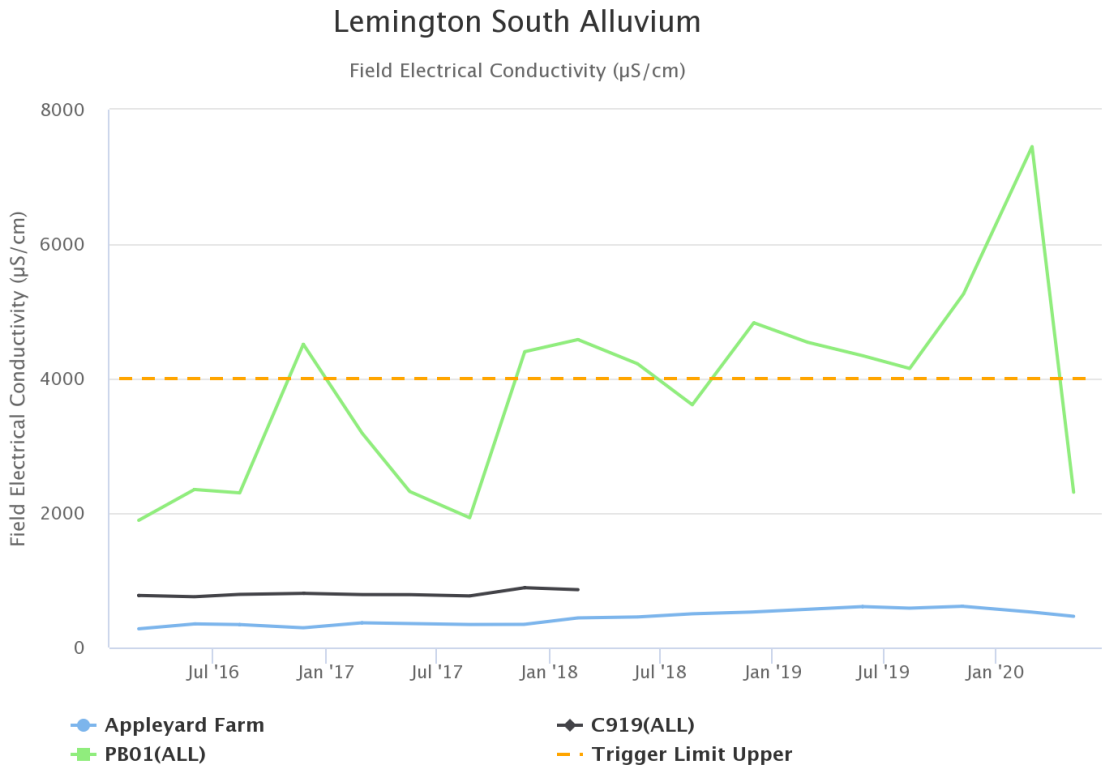
Note: CGW45 has been blocked since June 2017.

Figure 49: Carrington West Wing LBL Field pH Trend – June 2020



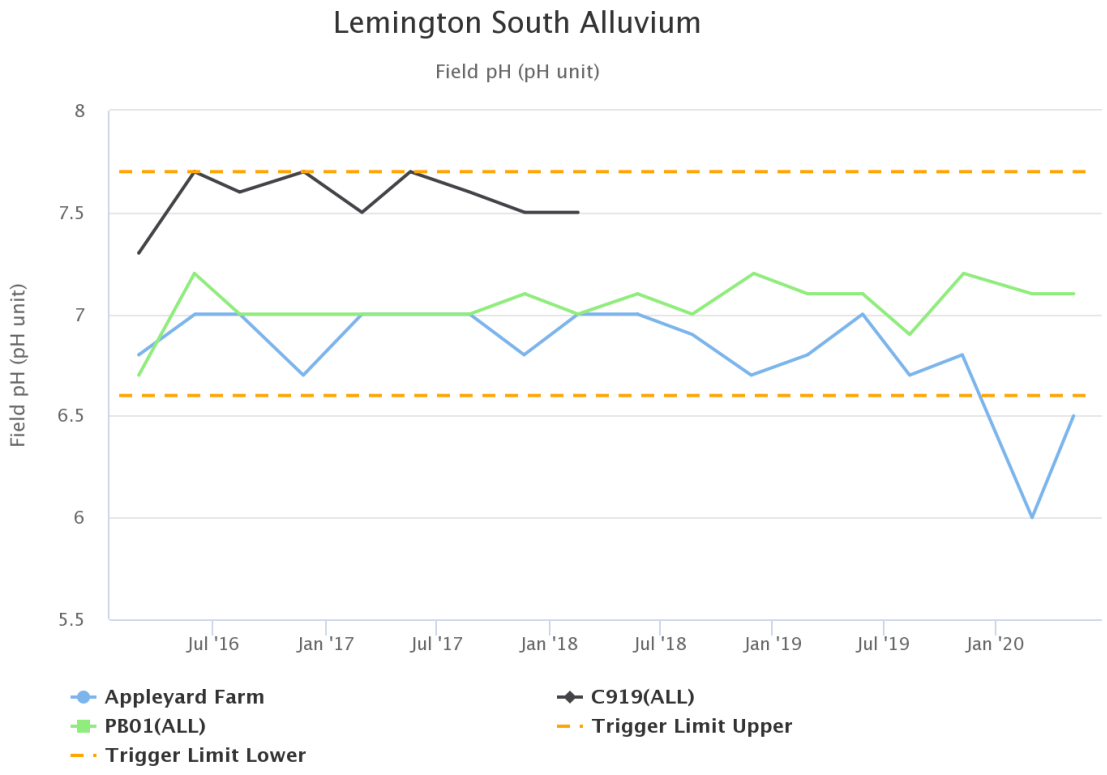
Note: CGW45 has been blocked since June 2017.

Figure 50: Carrington West Wing LBL Standing Water Level – June 2020



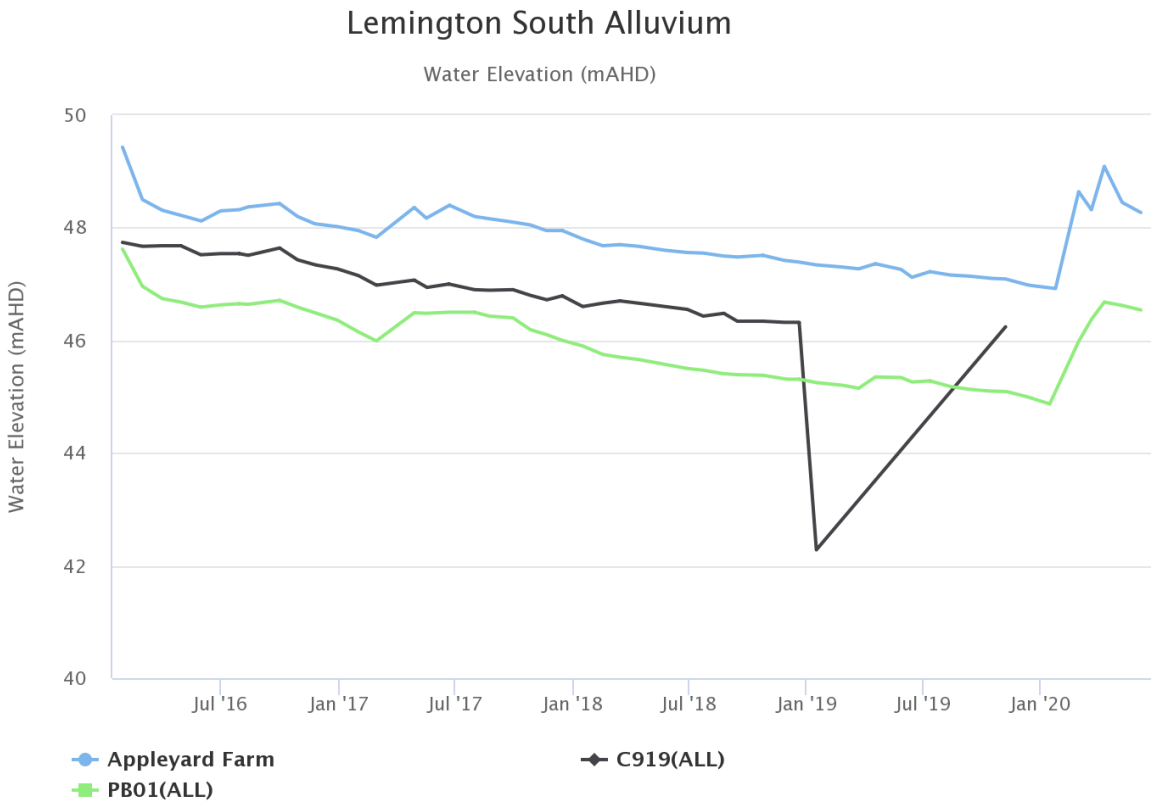
Note: C919(ALL) is dry or has produced insufficient water for a sample.

Figure 51: Lemington South Alluvium Field Electrical Conductivity Trend – June 2020



Note: C919(ALL) is dry, or has produced insufficient water for a sample.

Figure 52: Lemington South Alluvium Field pH Trend – June 2020



Note: C919(ALL) is dry, or has produced insufficient water for a sample.

Figure 53: Lemington South Alluvium Standing Water Level Trend – June 2020

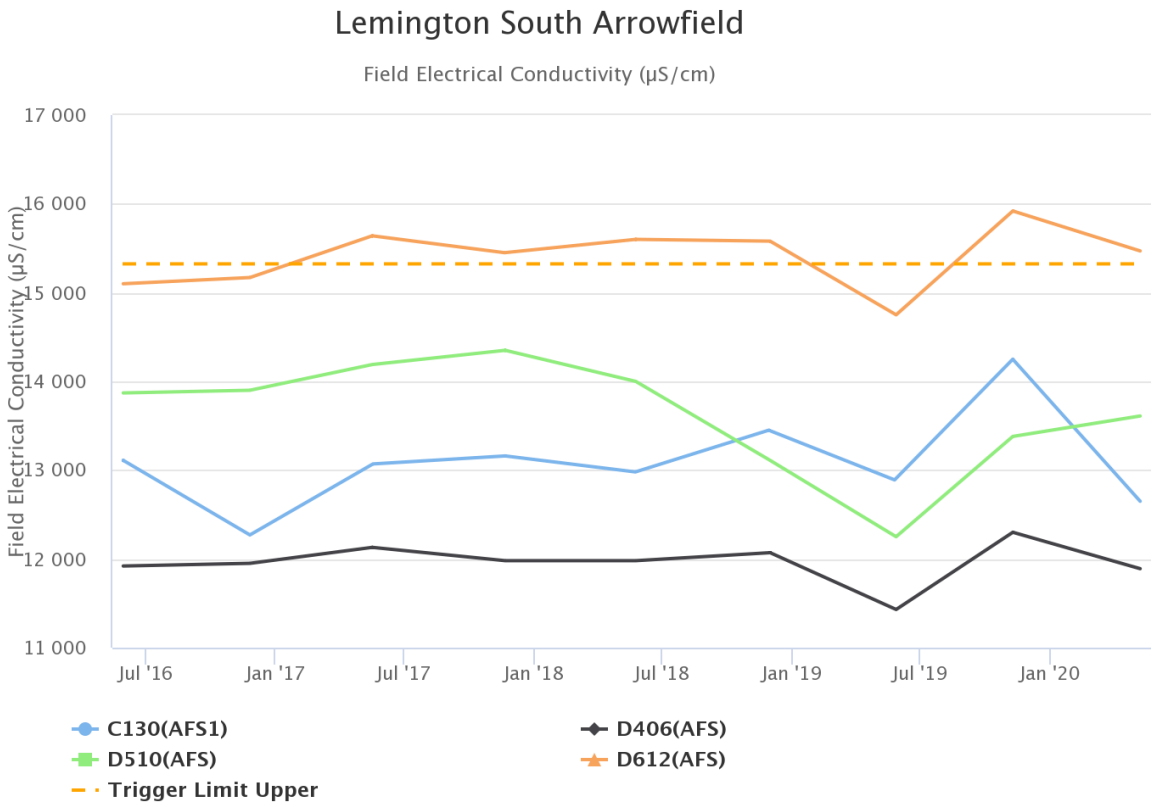


Figure 54: Lemington South Arrowfield Field Electrical Conductivity Trend – June 2020

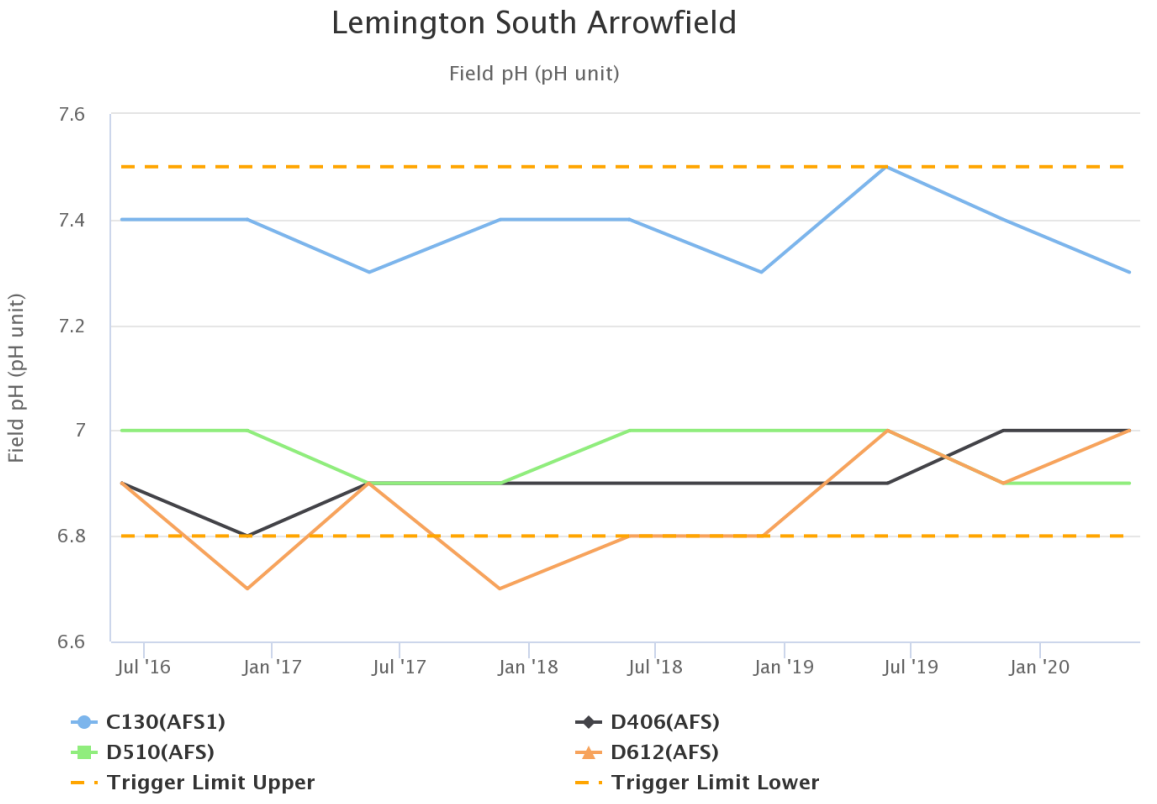


Figure 55: Lemington South Arrowfield Field pH Trend – June 2020

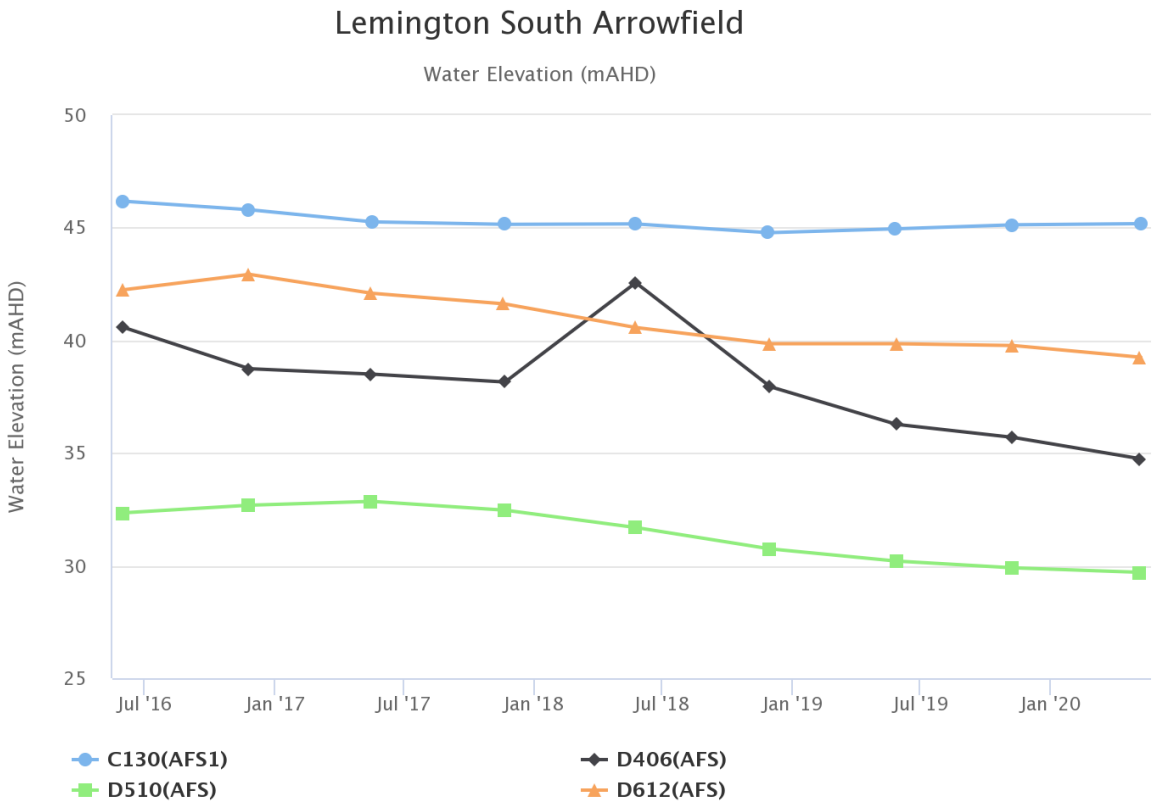


Figure 56: Lemington South Arrowfield Standing Water Level – June 2020

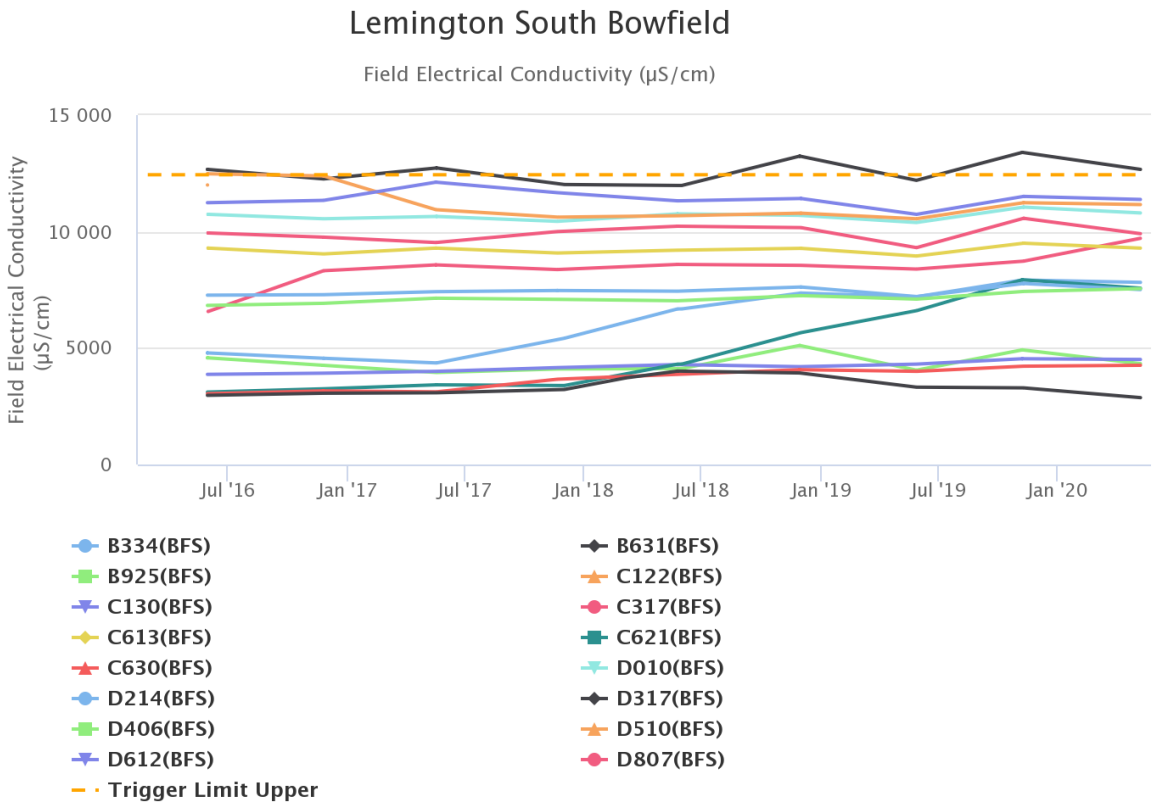


Figure 57: Lemington South Bowfield Field Electrical Conductivity Trend – June 2020

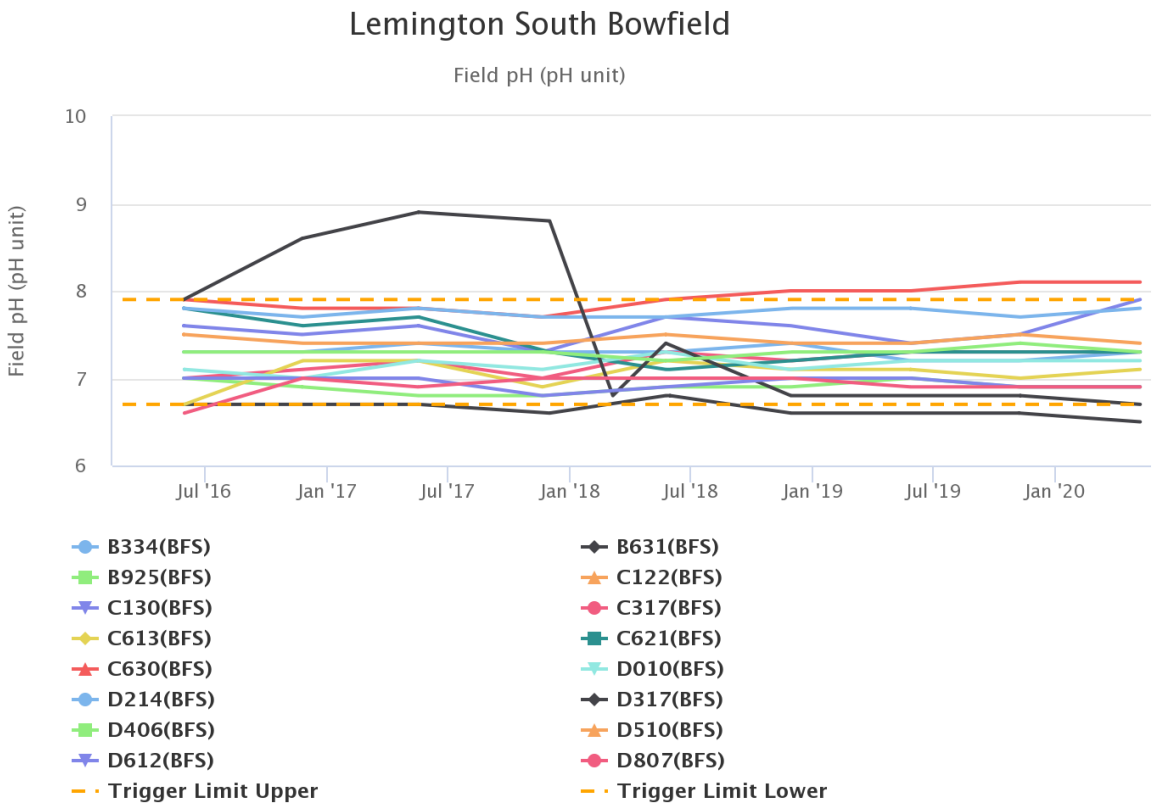


Figure 58: Lemington South Bowfield Field pH Trend – June 2020

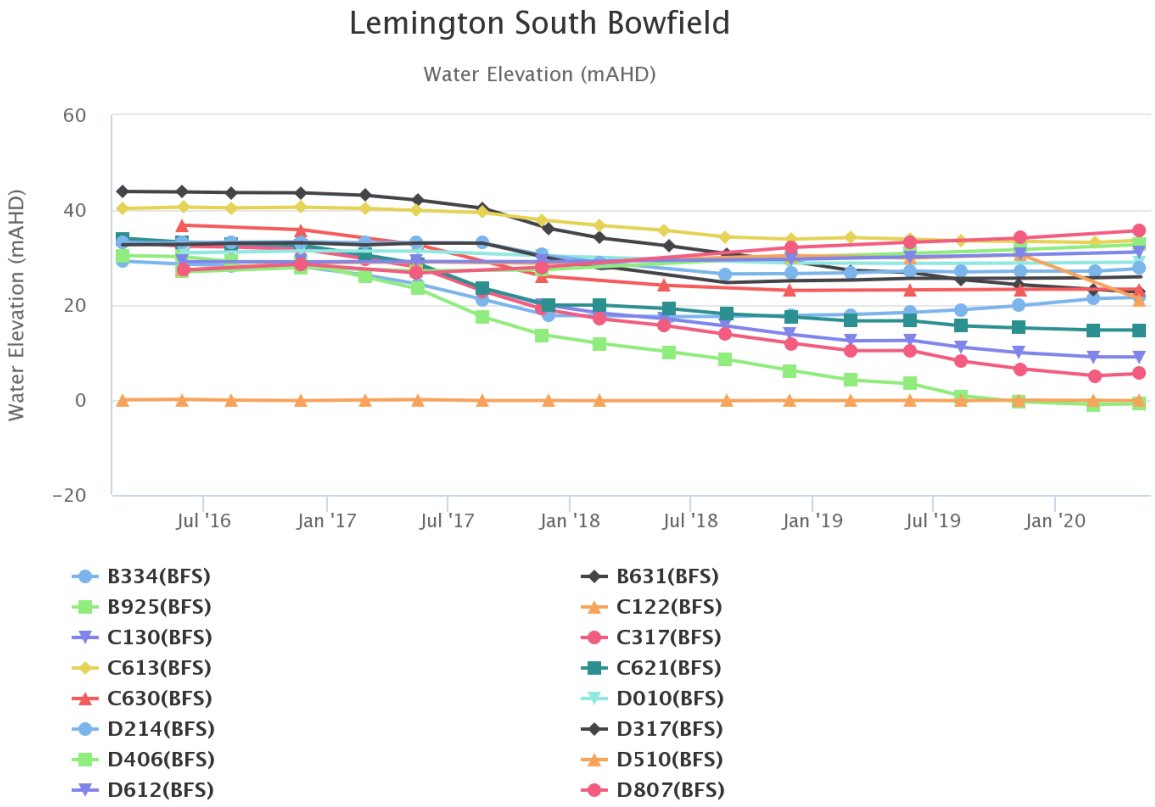


Figure 59: Lemington South Bowfield Standing Water Level – June 2020

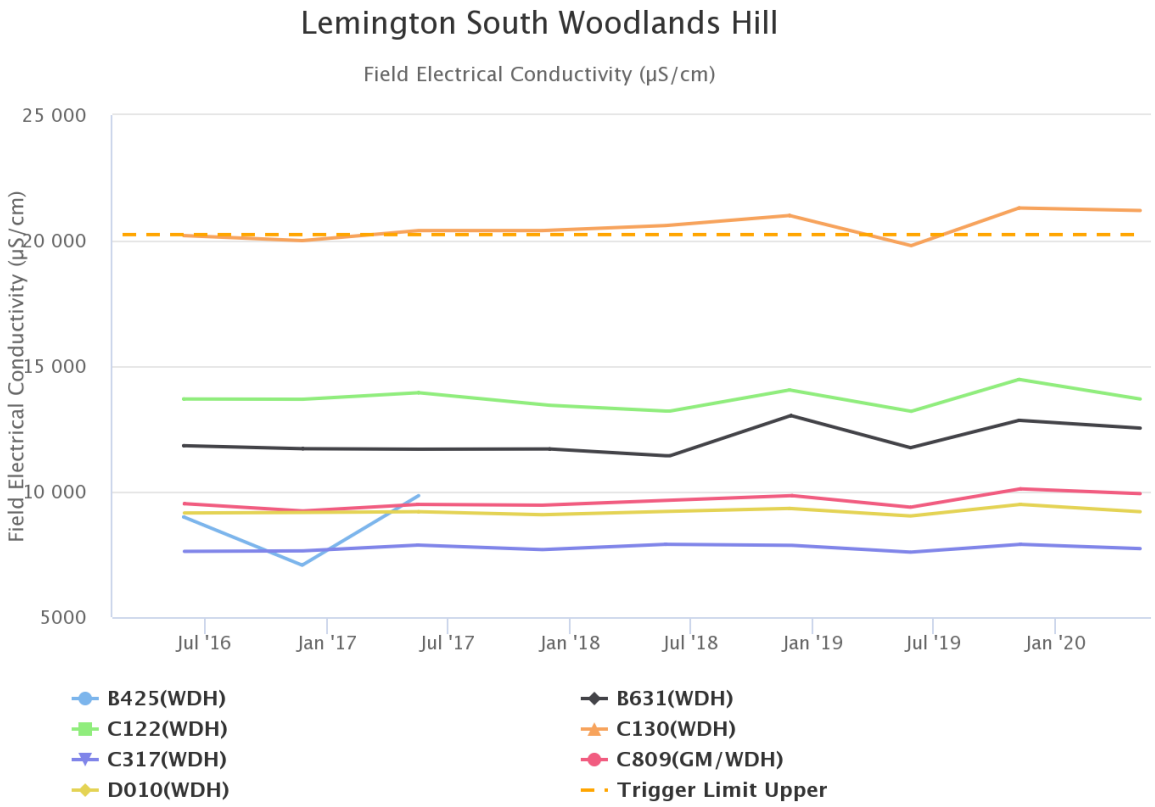


Figure 60: Lemington South Woodlands Hill Field Electrical Conductivity Trend – June 2020

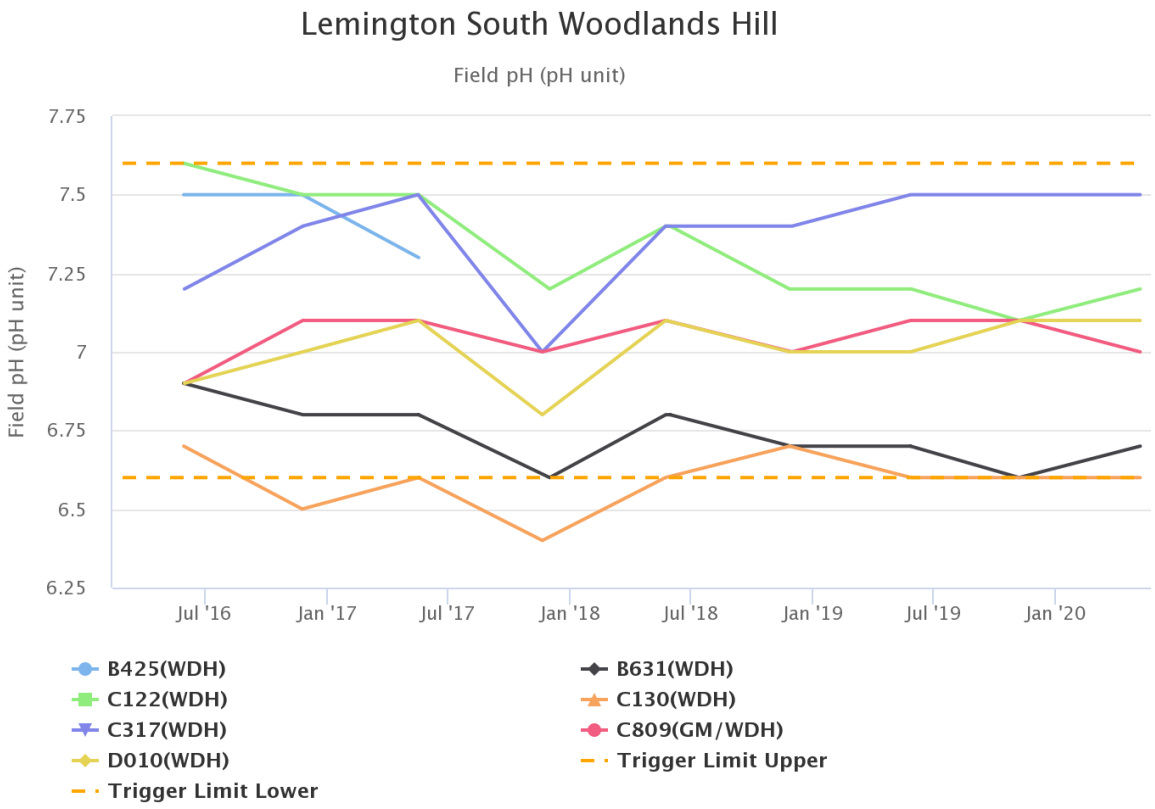


Figure 61: Lemington South Woodlands Hill Field pH Trend – June 2020

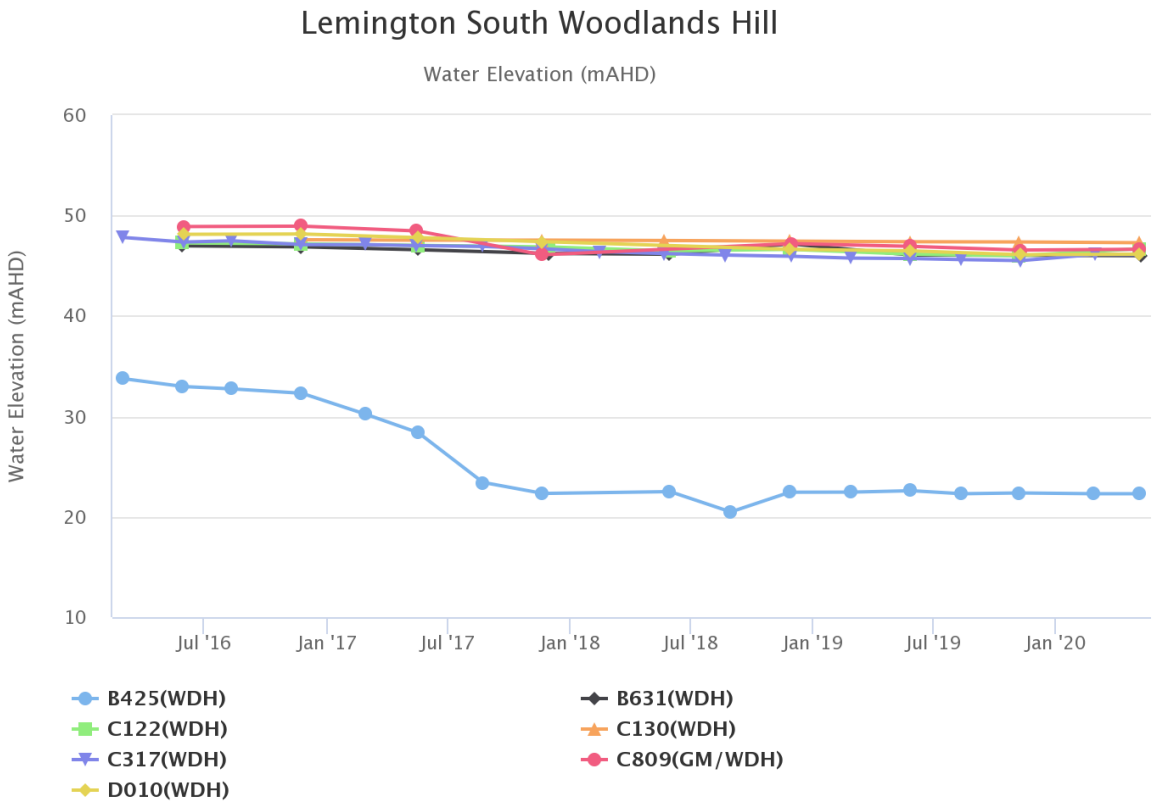


Figure 62: Lemington South Woodlands Hill Standing Water Level – June 2020

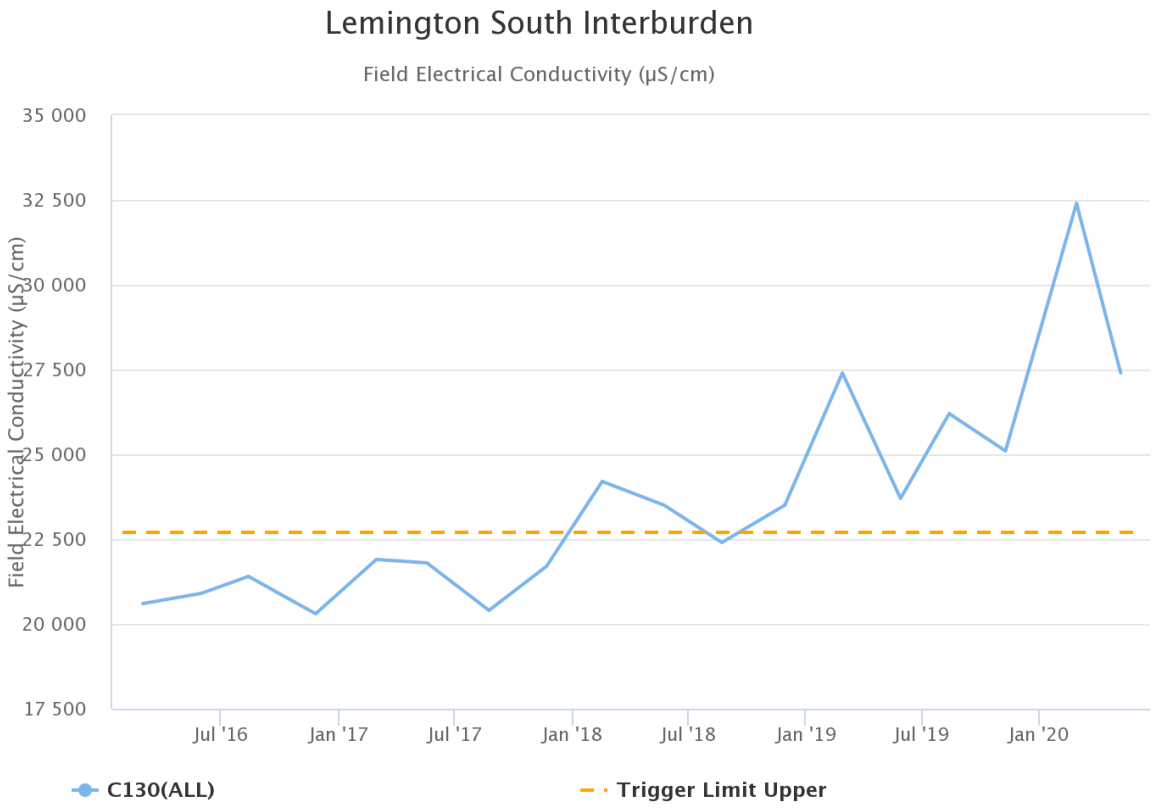


Figure 63: Lemington South Interburden Field Electrical Conductivity Trend – June 2020

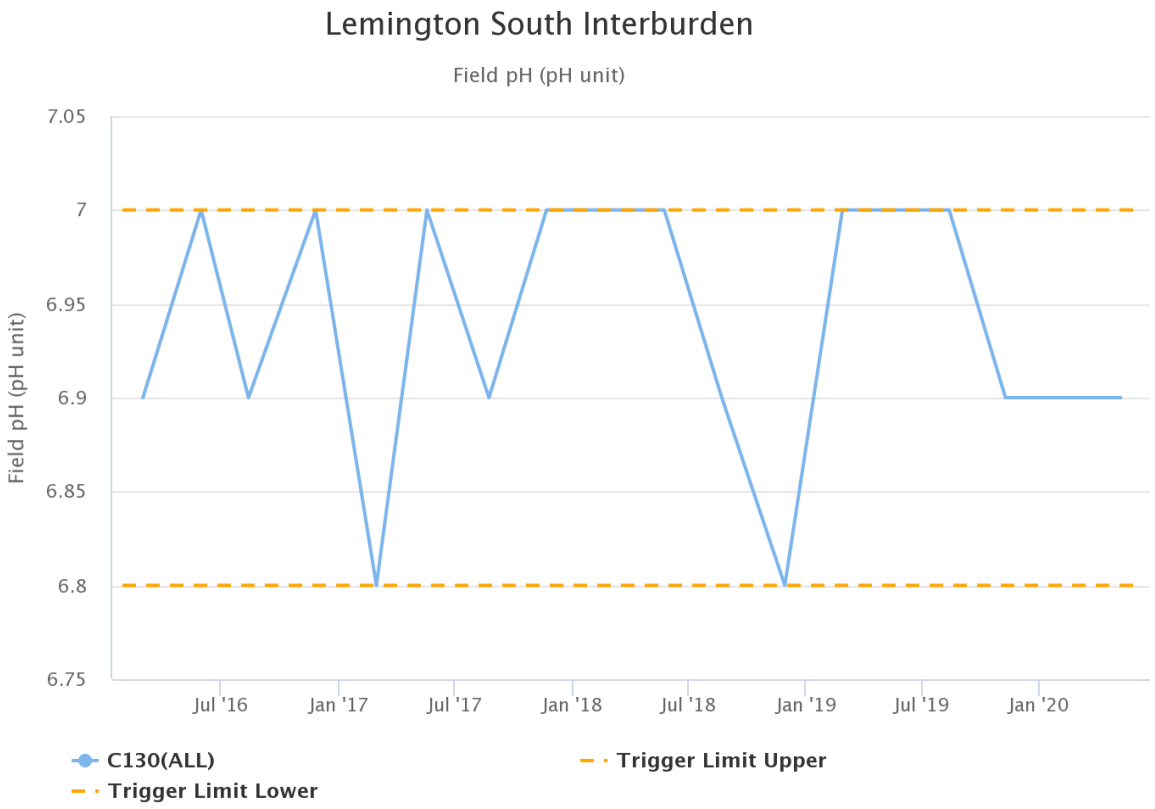


Figure 64: Lemington South Interburden Field pH Trend – June 2020

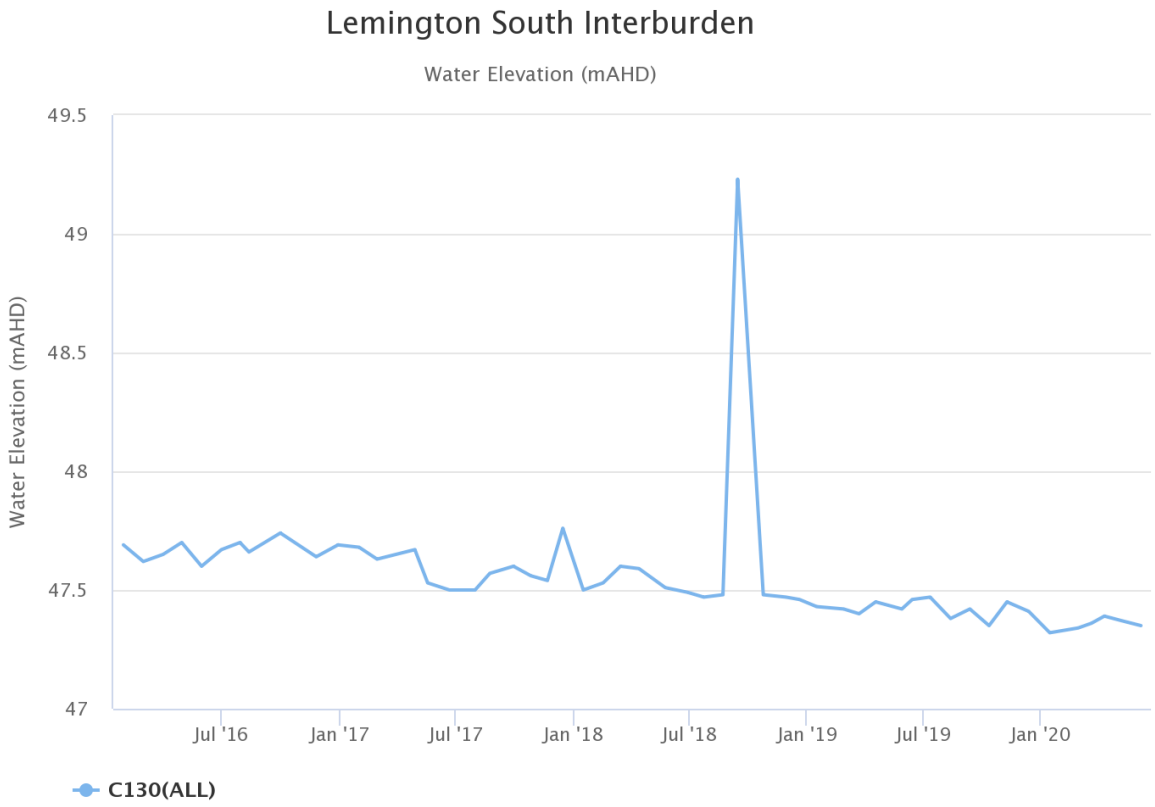


Figure 65: Lemington South Interburden Standing Water Level – June 2020

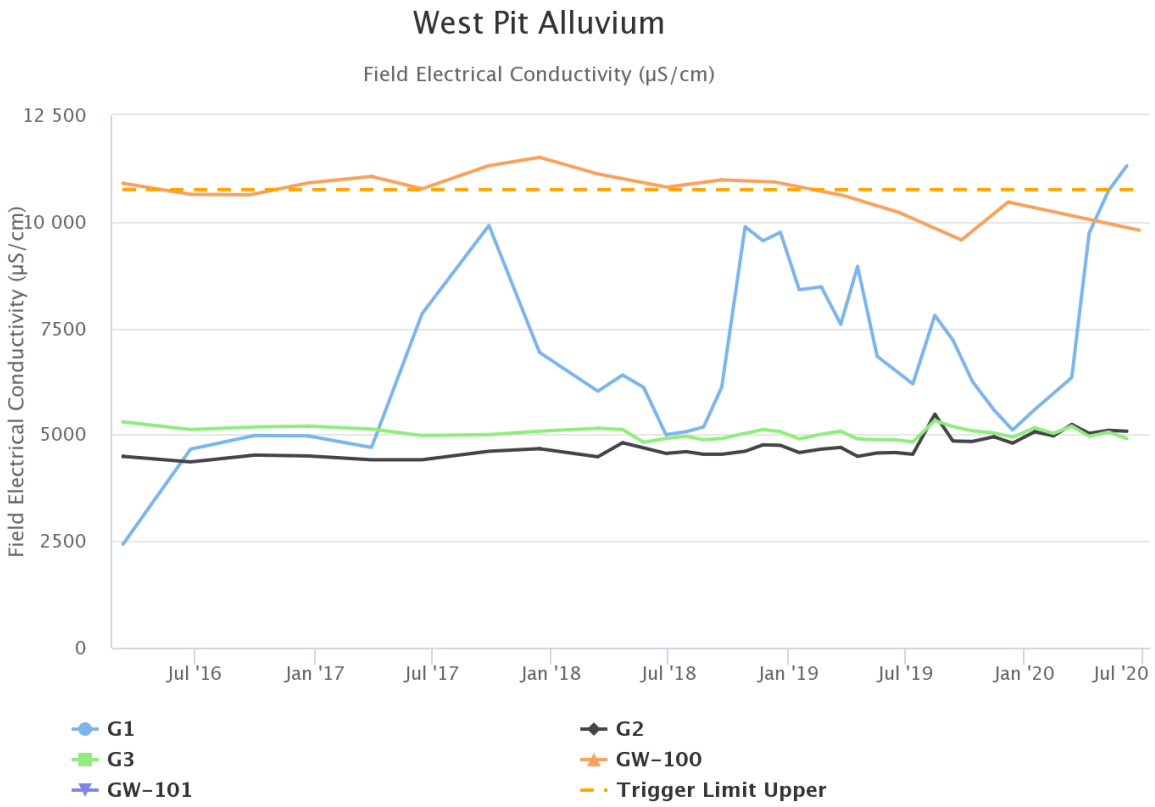


Figure 66: West Pit Alluvium Field Electrical Conductivity Trend – June 2020

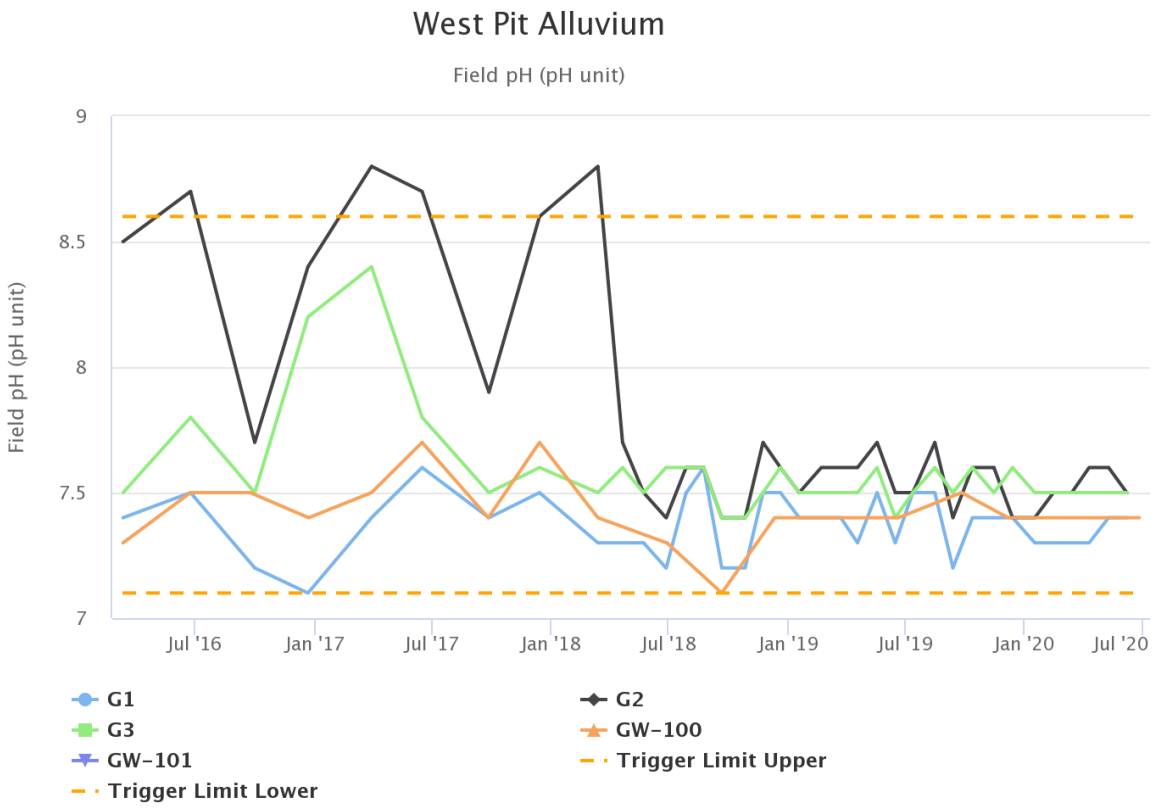
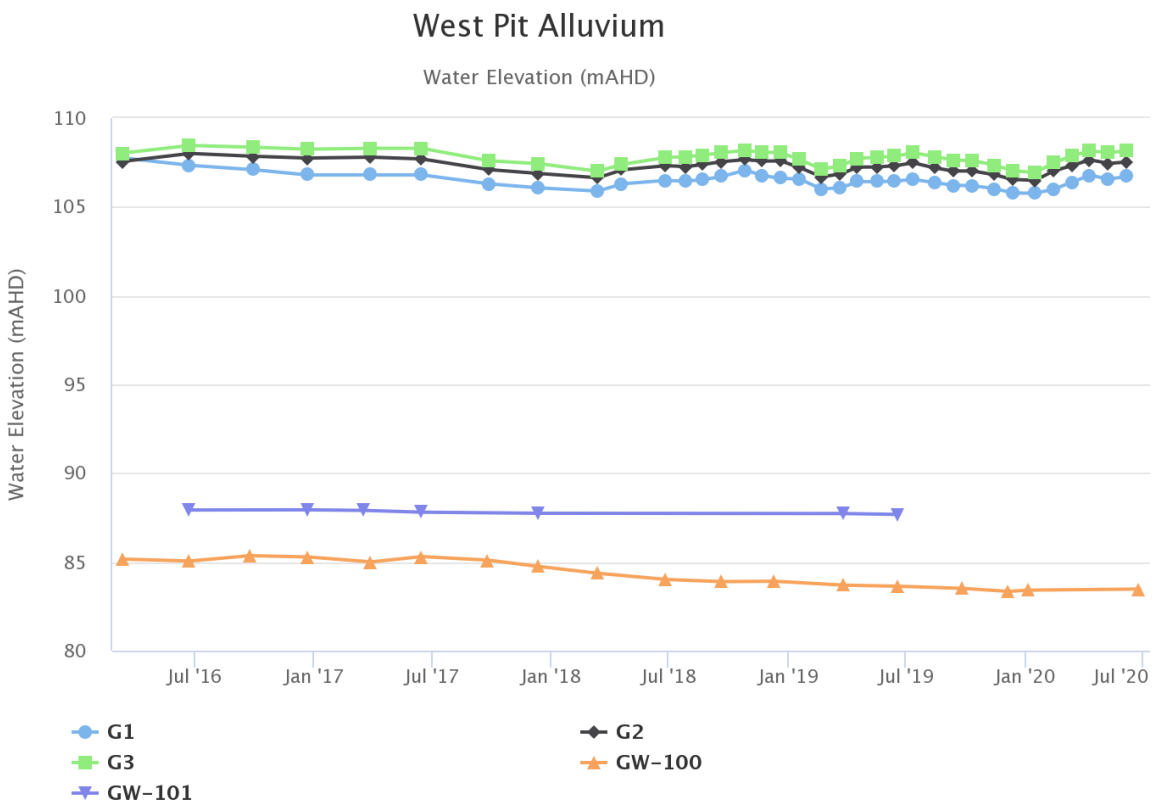
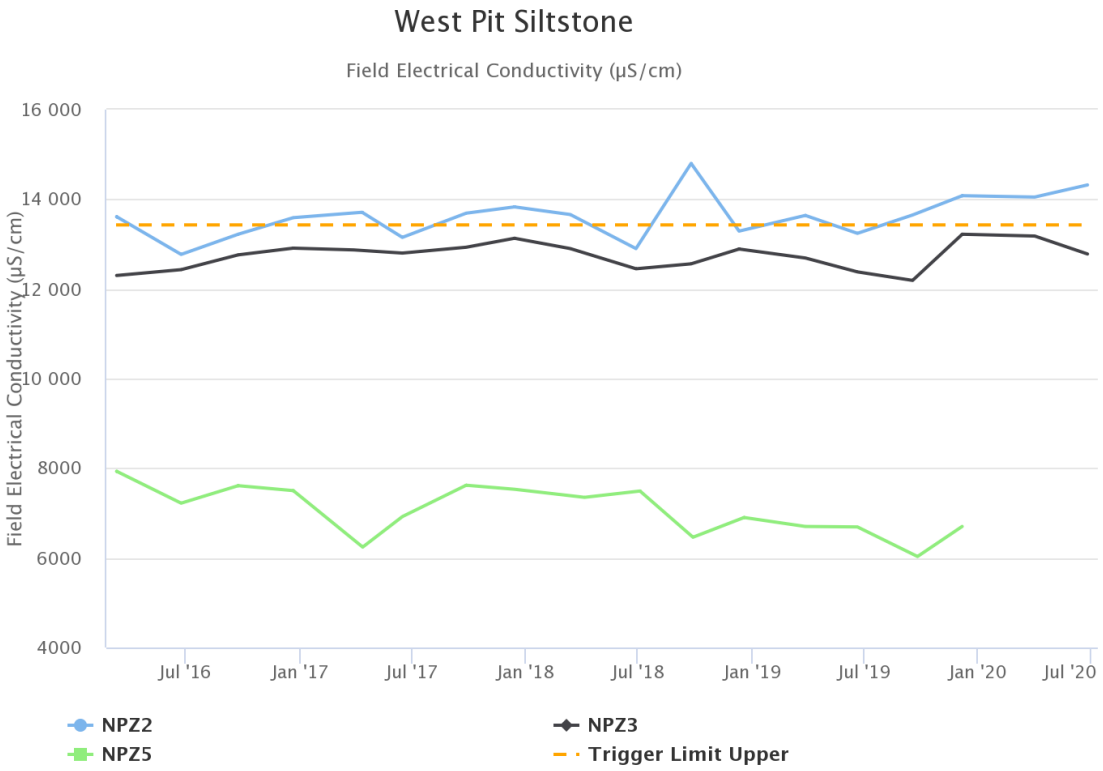


Figure 67: West Pit Alluvium Field pH Trend – June 2020



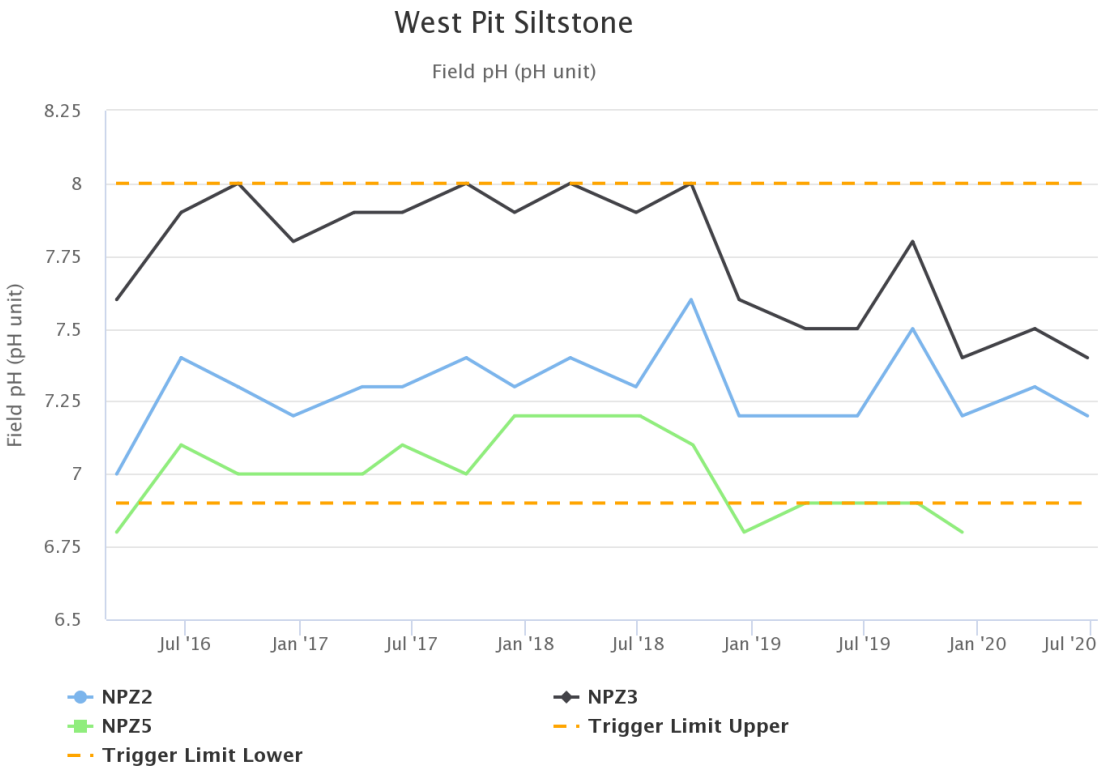
Note: GW101 hasbeen dry since July 2019.

Figure 68: West Pit Alluvium Standing Water Level – June 2020



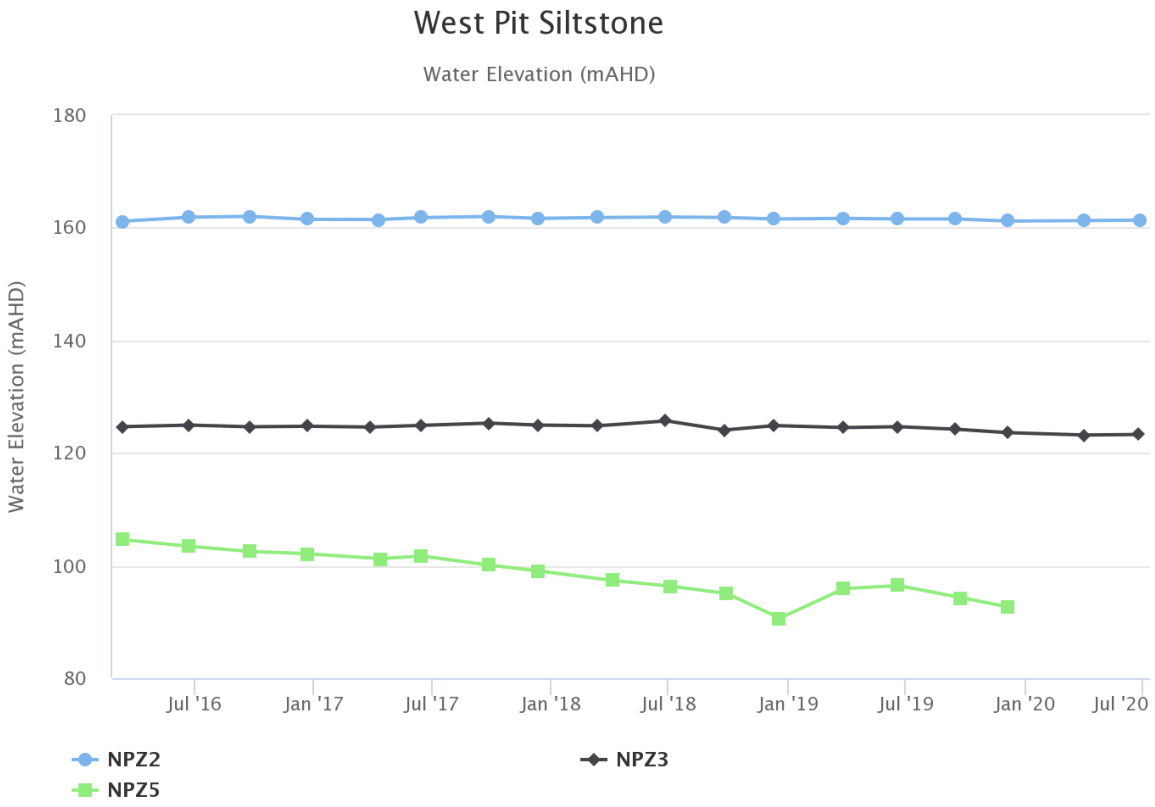
Note: NPZ5 could not be sampled due to unsafe access.

Figure 69: West Pit Siltstone Field Electrical Conductivity Trend – June 2020



Note: NPZ5 could not be sampled due to unsafe access.

Figure 70: West Pit Siltstone Field pH Trend – June 2020



Note: NPZ5 could not be sampled due to unsafe access.

Figure 71: West Pit Siltstone Standing Water Level – June 2020

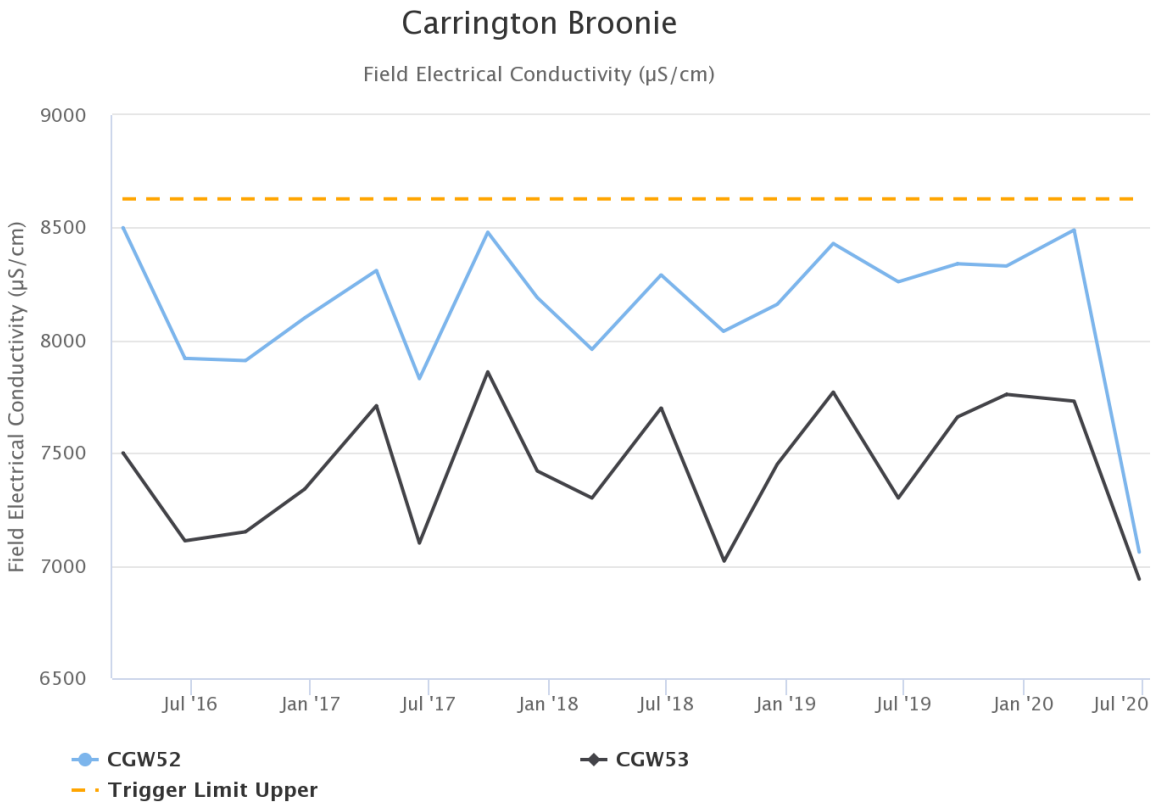


Figure 72: Carrington Broonie Field Electrical Conductivity Trend – June 2020

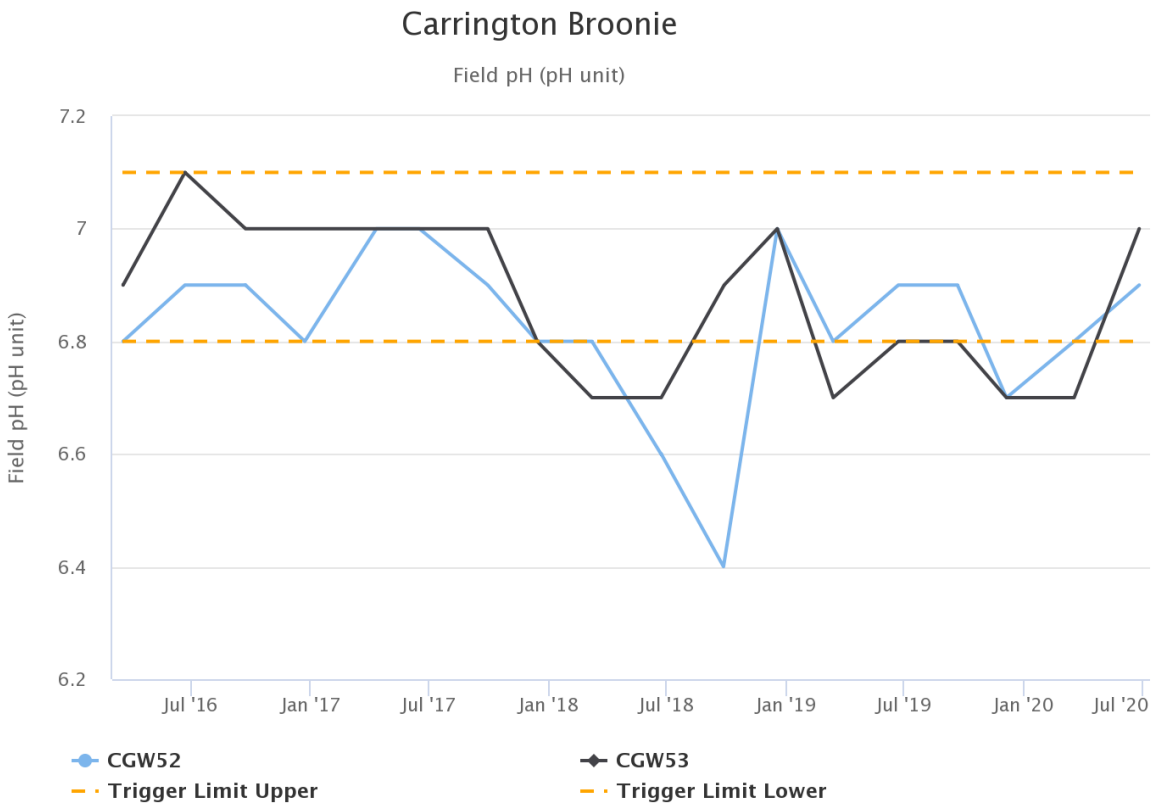


Figure 73: Carrington Broonie Field pH Trend – June 2020

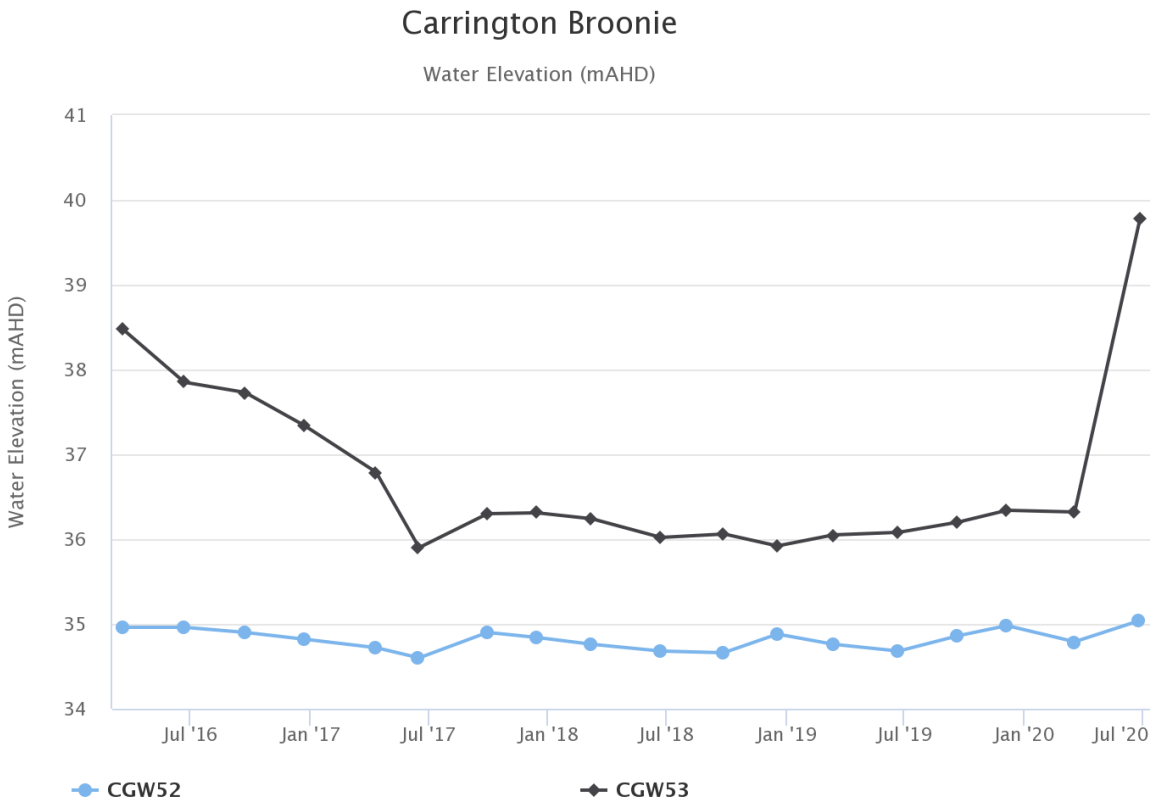


Figure 74: Carrington Broonie Standing Water Level – June 2020

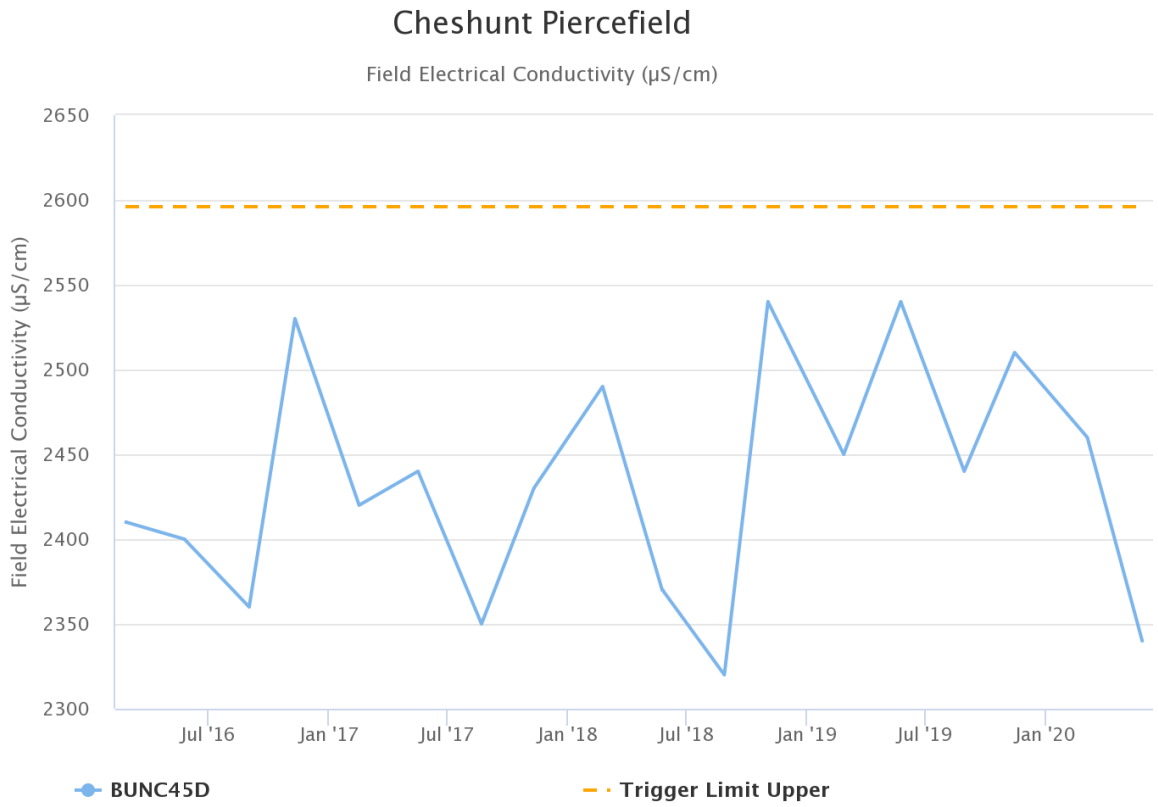


Figure 75: Cheshunt Piercefield Field Electrical Conductivity Trend – June 2020

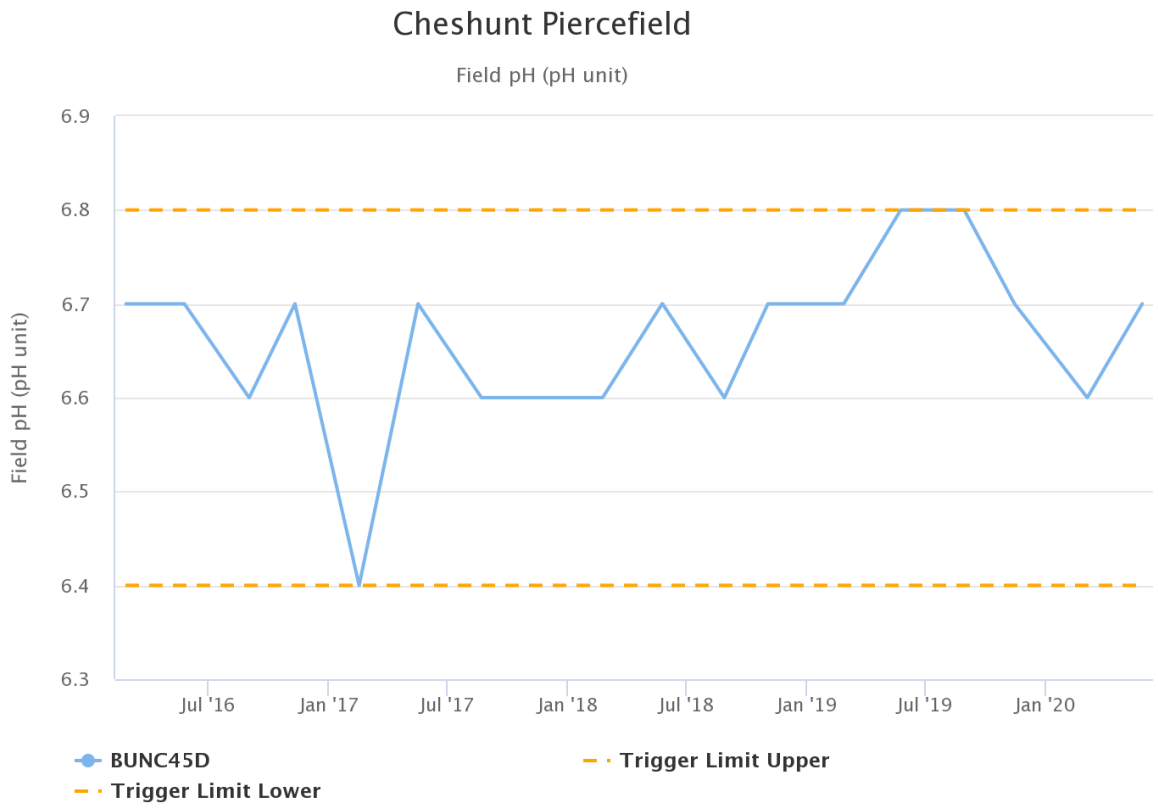


Figure 76: Cheshunt Piercefield Field pH Trend – June 2020

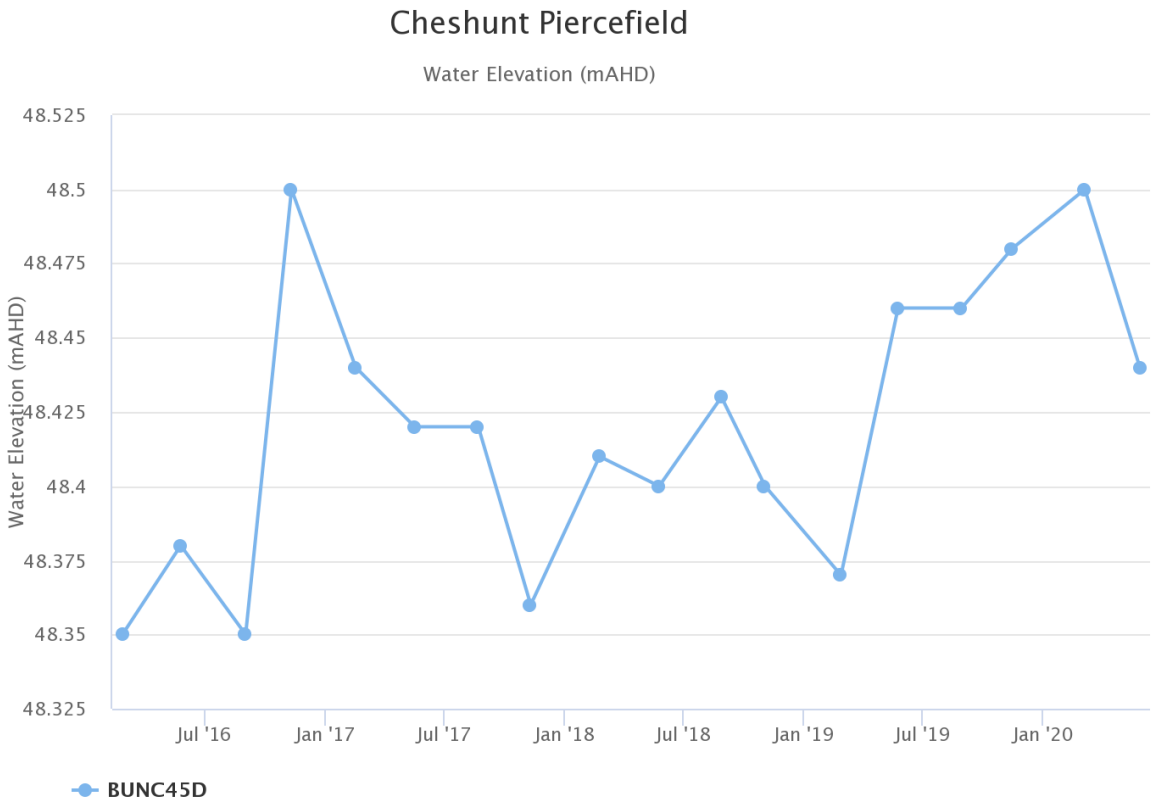


Figure 77: Cheshunt Piercefield Standing Water Level – June 2020

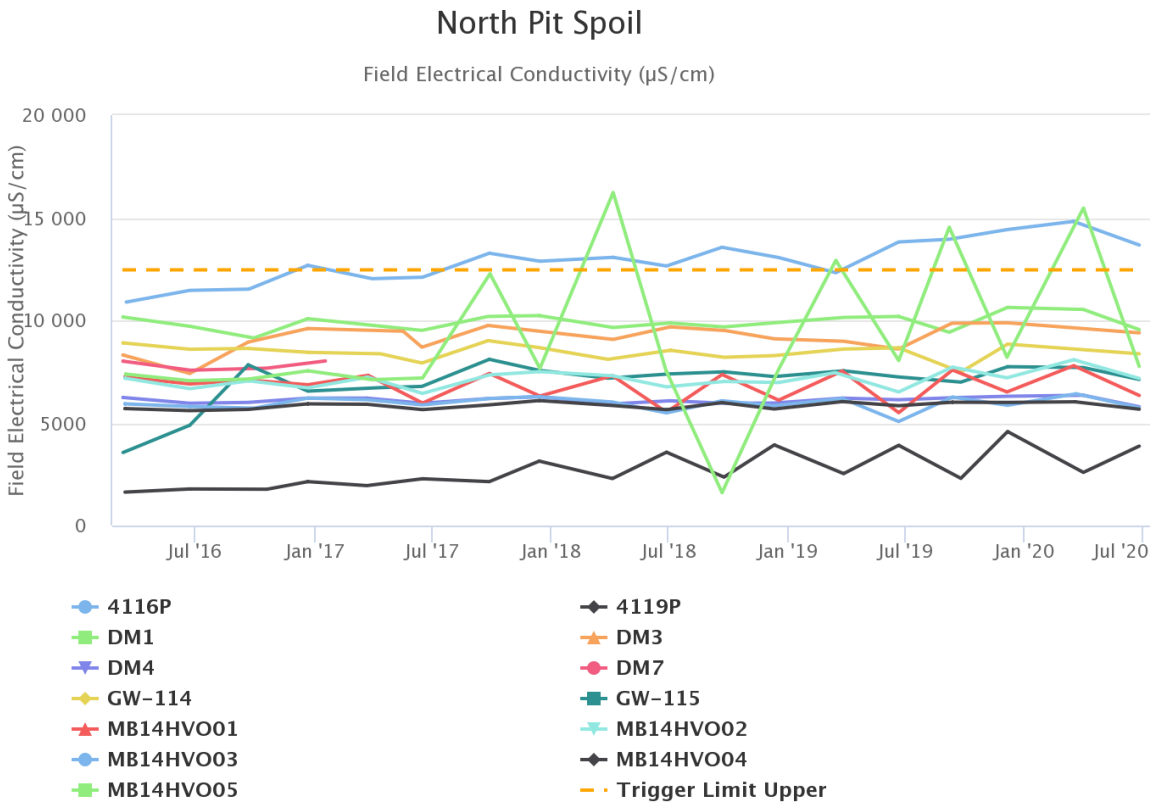


Figure 78: North Pit Spoil Field Electrical Conductivity Trend – June 2020

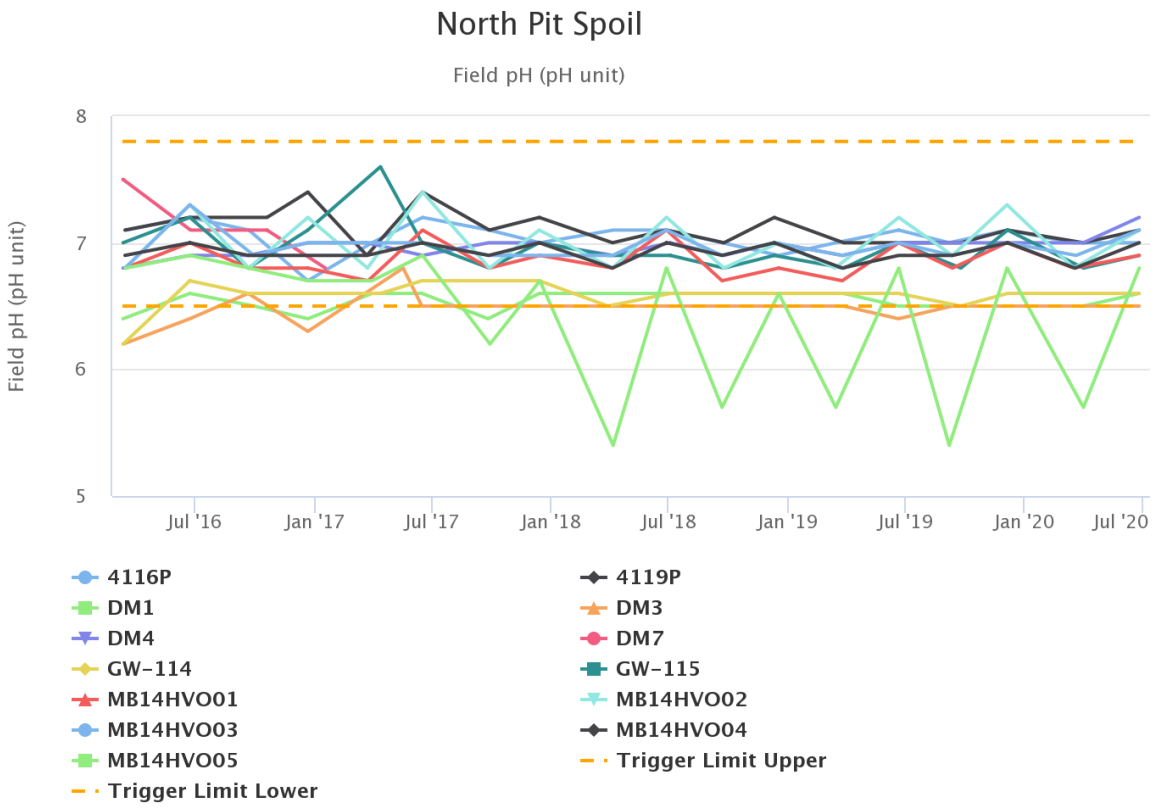


Figure 79: North Pit Spoil Field pH Trend – June 2020

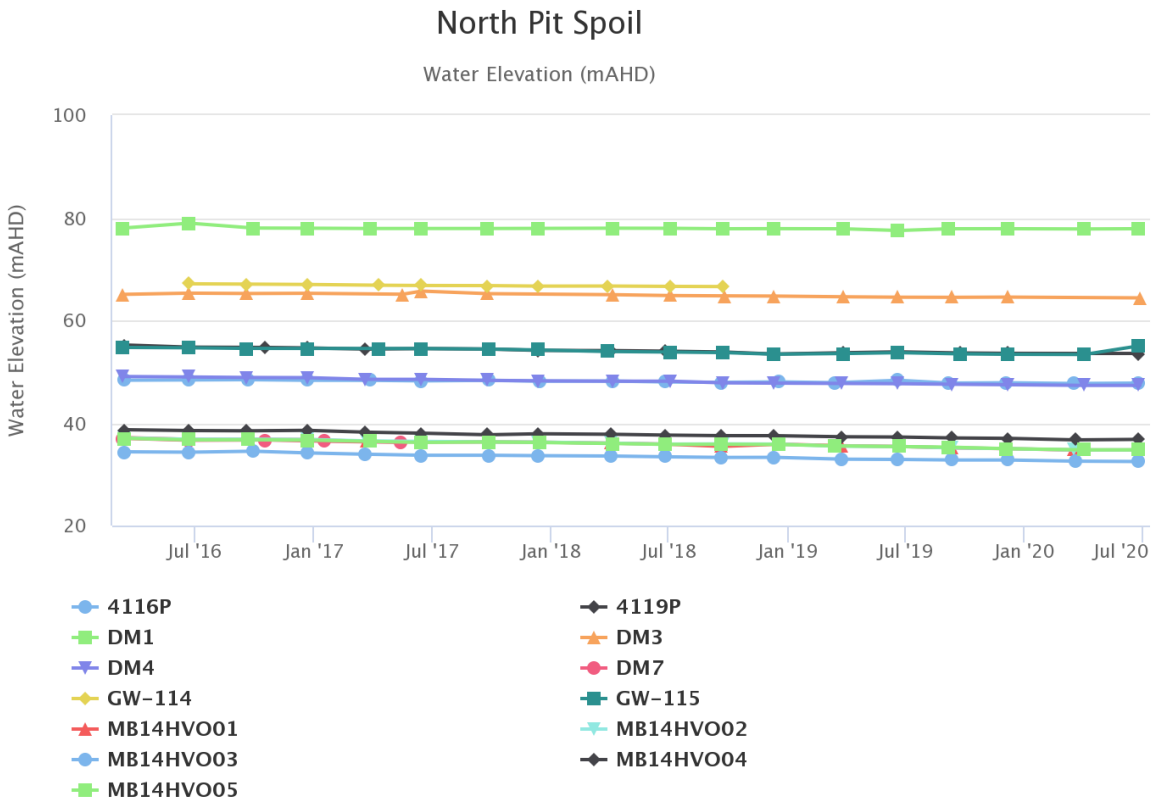


Figure 80: North Pit Spoil Standing Water Level – June 2020

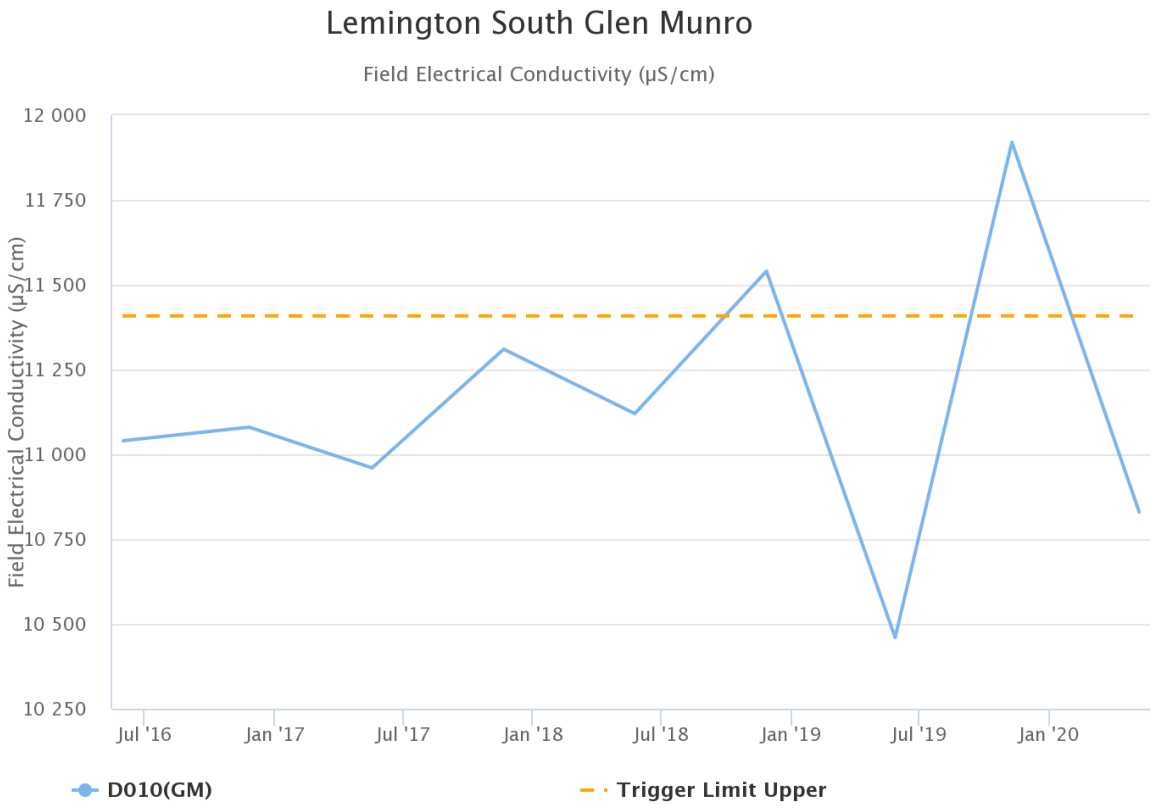


Figure 81: Lemington South Glen Munro Field Electrical Conductivity Trend – June 2020

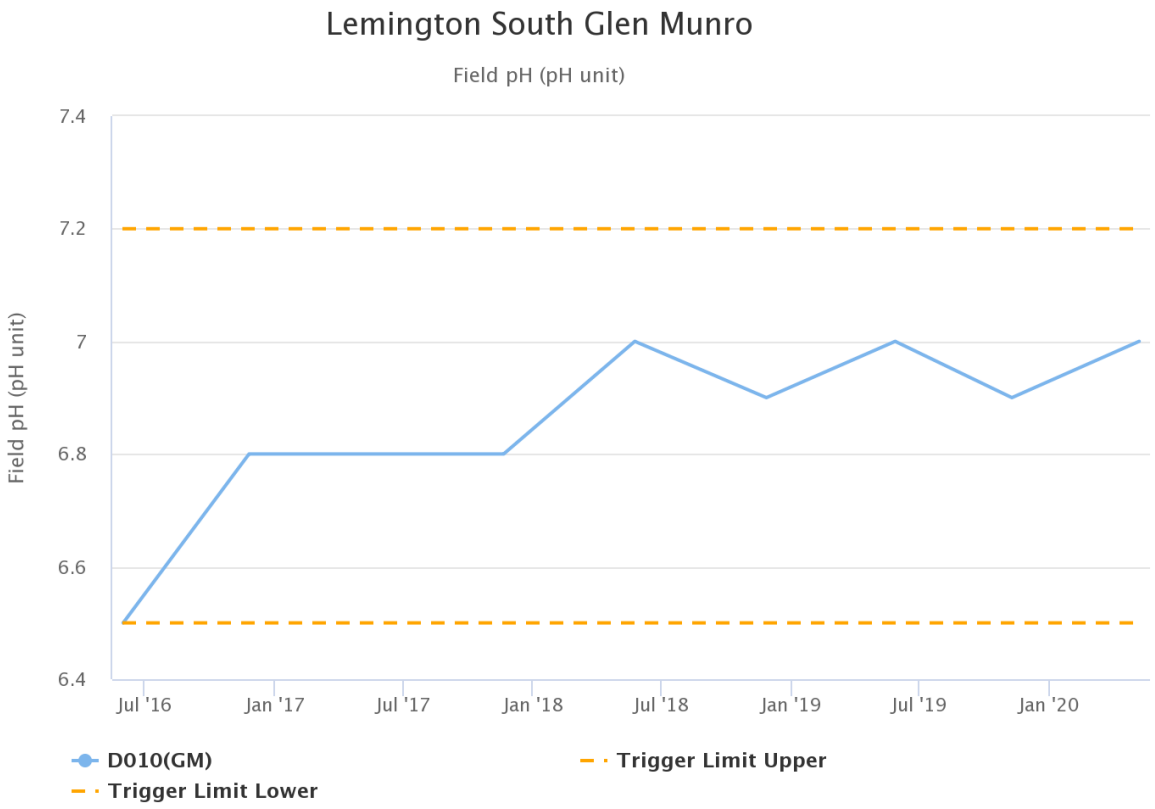


Figure 82: Lemington South Glen Munro Field pH Trend – June 2020

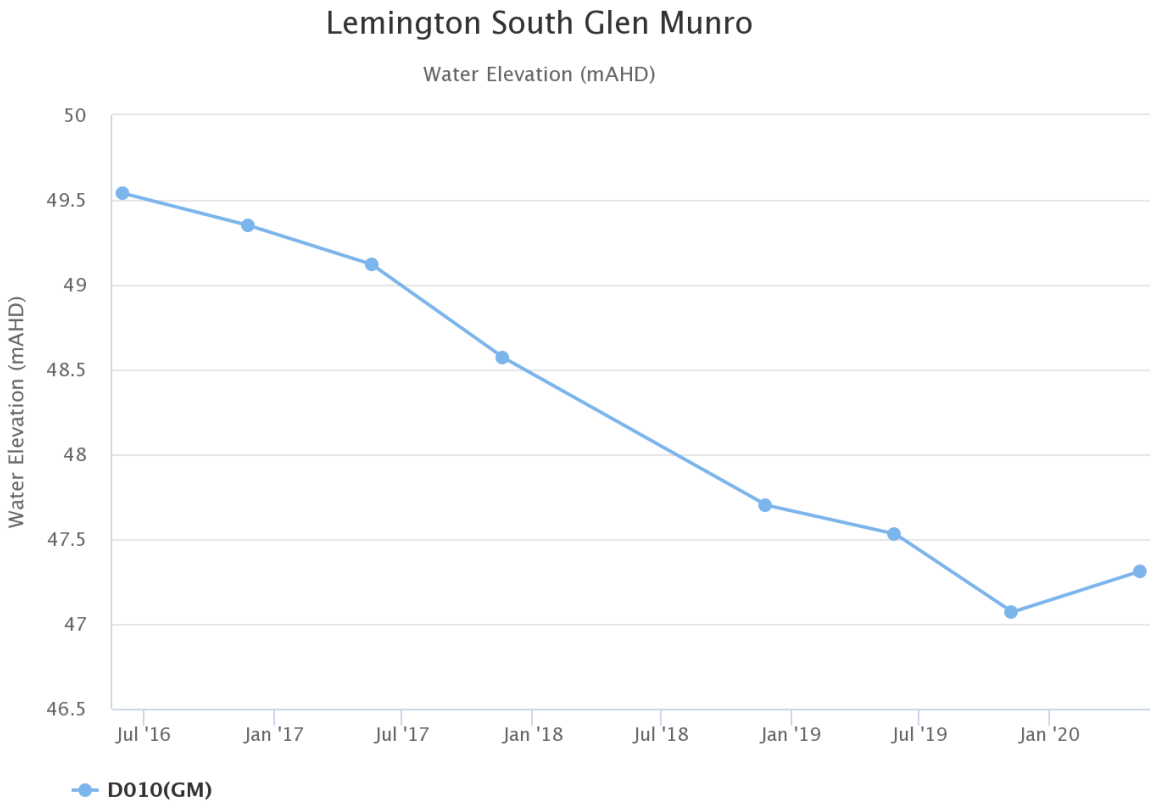


Figure 83: Lemington South Glen Munro Standing Water Level Trend – June 2020

3.5 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 3.

Table 3: Groundwater Triggers – Q2 2020

Site	Date	Trigger Limit Breached	Action Taken in Response
Appleyard Farm	06/05/2020	pH	Second breach – maintain watching brief
B631(BFS)	06/05/2020	pH	First breach – established watching brief
B631(BFS)	06/05/2020	EC	Second breach – maintain watching brief
C130(ALL)	06/05/2020	EC	Investigation in progress
C130(WDH)	06/05/2020	EC	Second breach – maintain watching brief
C630(BFS)	06/05/2020	pH	Second breach – maintain watching brief
D612(AFS)	06/05/2020	EC	Second breach – maintain watching brief
CFW55R	06/05/2020	pH	First breach – established watching brief
CFW55R	06/05/2020	EC	Investigation in progress
BZ2A(1)	27/05/2020	pH	Investigation in progress
BZ3-1	27/05/2020	pH	Investigation in progress

Site	Date	Trigger Limit Breached	Action Taken in Response
BZ3-3	27/05/2020	pH	Investigation in progress
BZ4A(2)	27/05/2020	pH	Second breach – maintain watching brief
BZ8-2	27/05/2020	pH	First breach – established watching brief
HG2A	27/05/2020	EC	First breach – established watching brief
Hobden's Well	27/05/2020	pH	First breach – established watching brief
CFW55R	4/06/2020	EC	Investigation in progress
G1	05/06/2020	EC	First breach – established watching brief
NPZ2	24/06/2020	EC	First breach – established watching brief
4116P	25/06/2020	EC	First breach – established watching brief

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

4.0 BLASTING

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 86. Blasting criteria are summarised in Table 4.

Table 4: Blasting Criteria

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%*

4.1 Blast Monitoring Results

During June, 14 blasts were initiated at HVO. Figure 84 and Figure 85 show the blast monitoring results for the reporting period against the impact assessment criteria.

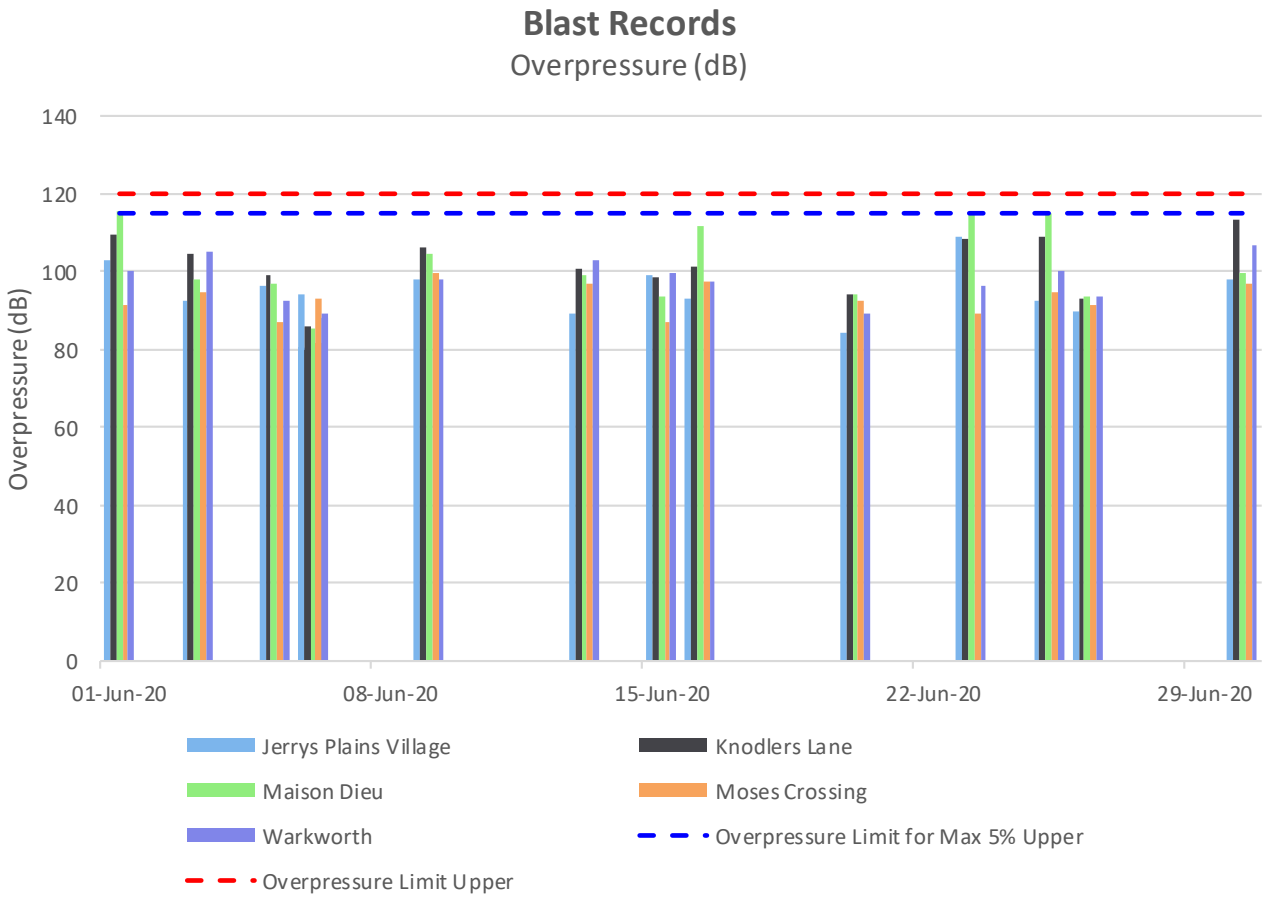


Figure 84: Overpressure Blast Monitoring Results – June 2020

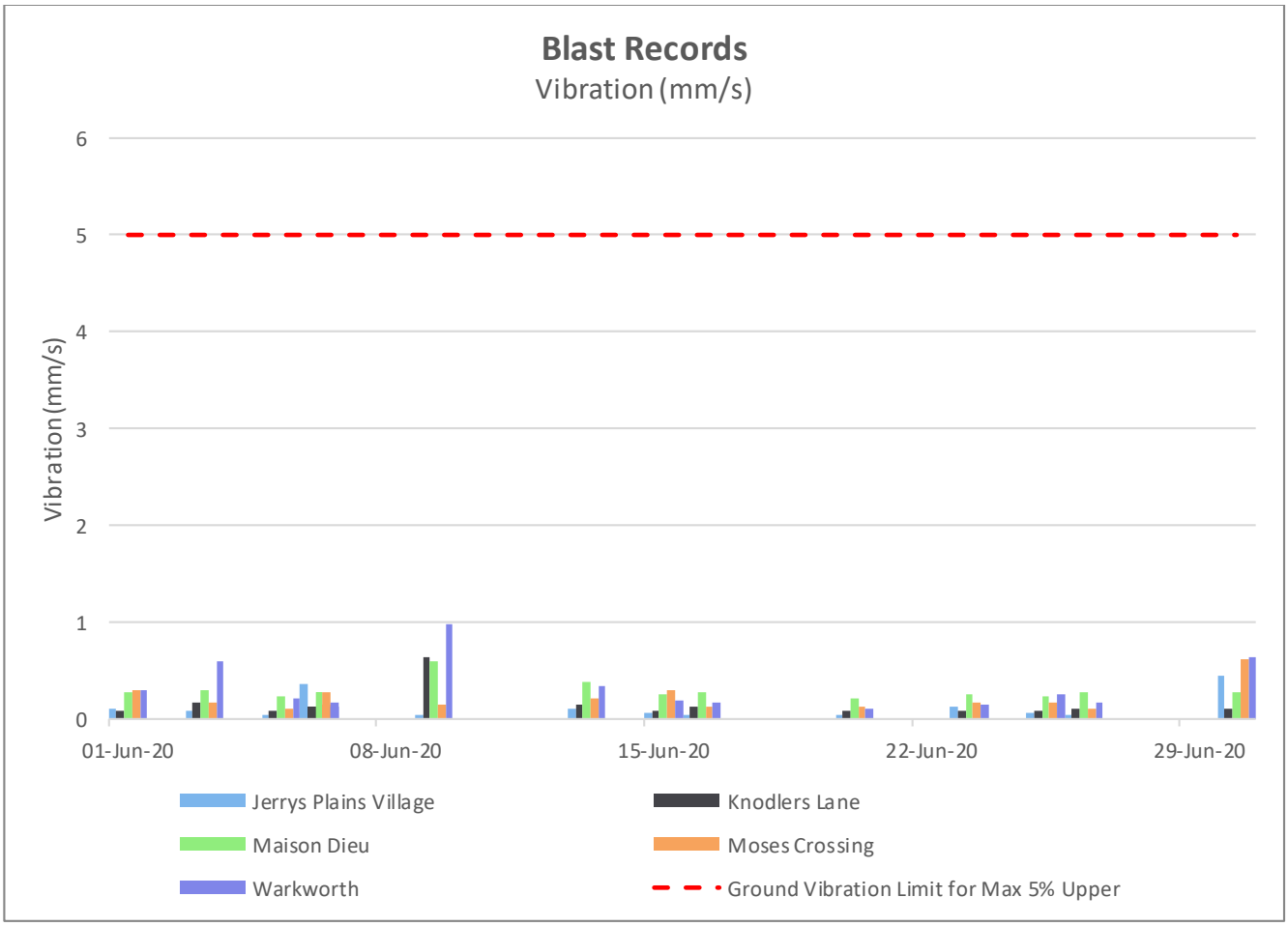


Figure 85: Ground Vibration Blast Monitoring Results – June 2020

Figure 86: Blast Monitoring Location Plan

5.0 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 87.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night of 23rd June 2020 with no non-compliances recorded. Monitoring results are detailed in Table 5 to Table 9.

Table 5: $L_{Aeq,\ 15\ minute}$ HVO South – Against Impact Assessment Criteria – June 2020

Location	Date and Time	Wind Speed (m/s)[1]	Stability Class[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South L_{Aeq} dB[3,4,6,7]	Exceedance[4,5]
Knodlers Lane	*23/06/2020 21:43*	*5.5*	*D*	*39*	*No*	*35*	*NA*
Maison Dieu	*23/06/2020 21:20*	*4.5*	*D*	*39*	*No*	*37*	*NA*
Shearers Lane	*23/06/2020 21:00*	*5.5*	*D*	*41*	*No*	*38*	*NA*
Kilburnie South	*23/06/2020 22:59*	*6.4*	*D*	*39*	*No*	*<25*	*NA*
Jerrys Plains Village	*23/06/2020 21:01*	*5.5*	*D*	*35*	*No*	*IA*	*NA*
Jerrys Plains East	*23/06/2020 21:22*	*4.5*	*D*	*35*	*No*	*IA*	*NA*
Long Point Road	*23/06/2020 21:01*	*5.4*	*D*	*35*	*No*	*IA*	*NA*
HVGC	*23/06/2020 23:31*	*5.8*	*D*	*35*	*No*	*38*	*NA*

Notes:
1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria apply for wind speeds up to 3 metres per second (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LAeq,15minute attributed to HVO South Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of relevant criterion;
5. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and
7. NM means not measurable, noise was audible but could not be quantified.

Table 6: LA1, 1 minute HVO South – Against Impact Assessment Criteria – June 2020

Location	Date and Time	Wind Speed (m/s)[1]	Stability Class[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South $L_{A1,\ 1min}$ dB[3,4,6,7]	Exceedance[4,5]
Knodlers Lane	*23/06/2020 21:43*	*5.5*	*D*	*45*	*No*	*44*	*NA*
Maison Dieu	*23/06/2020 21:20*	*4.5*	*D*	*45*	*No*	*42*	*NA*
Shearers Lane	*23/06/2020 21:00*	*5.5*	*D*	*45*	*No*	*43*	*NA*
Kilburnie South	*23/06/2020 22:59*	*6.4*	*D*	*45*	*No*	*<25*	*NA*
Jerrys Plains Village	*23/06/2020 21:01*	*5.5*	*D*	*45*	*No*	*IA*	*NA*
Jerrys Plains East	*23/06/2020 21:22*	*4.5*	*D*	*45*	*No*	*IA*	*NA*
Long Point Road	*23/06/2020 21:01*	*5.4*	*D*	*45*	*No*	*IA*	*NA*
HVGC	*23/06/2020 23:31*	*5.8*	*D*	*NA*	*No*	*40*	*NA*

Notes:
1. Atmospheric data is sourced fromthe HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;
2. Noise criteria apply for wind speeds up to 3 metres per second (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LA1,1minute attributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of relevant criterion;
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and
7. NM means not measurable, noise was audible but could not be quantified.

Table 7: LAeq, 15 minute HVO North – Against Impact Assessment Criteria – June 2020

Location	Date and Time	Wind Speed (m/s)[1]	Stability Class[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North L_{Aeq} dB[3,4,6,7]	Exceedance[4,5]
Knodlers Lane	*23/06/2020 21:43*	*4.6*	*D*	*35*	*No*	*IA*	*NA*
Maison Dieu	*23/06/2020 21:20*	*5.1*	*D*	*35*	*No*	*IA*	*NA*
Shearers Lane	*23/06/2020 21:00*	*5.1*	*D*	*35*	*No*	*IA*	*NA*
Kilburnie South	*23/06/2020 22:59*	*5.8*	*D*	*39*	*No*	*IA*	*NA*
Jerrys Plains Village	*23/06/2020 21:01*	*5.1*	*D*	*36*	*No*	*IA*	*NA*
Jerrys Plains East	*23/06/2020 21:22*	*5.1*	*D*	*39*	*No*	*IA*	*NA*
Long Point Road	*23/06/2020 21:01*	*5.4*	*D*	*35*	*No*	*IA*	*NA*
HVGC	*23/06/2020 23:31*	*5.6*	*D*	*NA*	*No*	*IA*	*NA*

Notes:
1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) AWS 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 stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LAeq,15minute attributed to HVO North Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of criteria;
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and
7. NM means not measurable, noise was audible but could not be quantified.

Table 8: LAeq,15 minute HVO North - Against Land Acquisition Criteria – June 2020

Location	Date and Time	Wind Speed (m/s)[1]	Stability Class[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North L_{Aeq} dB[3,4,6,7]	Exceedance[4,5]
Knodlers Lane	*23/06/2020 21:43*	*4.6*	*D*	*41*	*No*	*IA*	*NA*
Maison Dieu	*23/06/2020 21:20*	*5.1*	*D*	*41*	*No*	*IA*	*NA*
Shearers Lane	*23/06/2020 21:00*	*5.1*	*D*	*41*	*No*	*IA*	*NA*
Kilburnie South	*23/06/2020 22:59*	*5.8*	*D*	*41*	*No*	*IA*	*NA*
Jerrys Plains Village	*23/06/2020 21:01*	*5.1*	*D*	*41*	*No*	*IA*	*NA*
Jerrys Plains East	*23/06/2020 21:22*	*5.1*	*D*	*41*	*No*	*IA*	*NA*
Long Point Road	*23/06/2020 21:01*	*5.4*	*D*	*41*	*No*	*IA*	*NA*
HVGC	*23/06/2020 23:31*	*5.6*	*D*	*NA*	*No*	*IA*	*NA*

Notes:
1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) AWS 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 stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LAeq,15minute attributed to HVO North Pit Area, including modifying factors if applicable;
4. Bold results in red indicate exceedance of relevant criterion;
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and
7. NM means not measurable, noise was audible but could not be quantified.

Table 9: LA1, 1 Minute HVO North – Against Impact Assessment Criteria – June 2020

Location	Date and Time	Wind Speed (m/s)[1]	Stability Class[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North $L_{A1, 1min}$ dB[3,4,6,7]	Exceedance[4,5]
Knodlers Lane	23/06/2020 21:43	4.6	D	46	No	IA	NA
Maison Dieu	23/06/2020 21:20	5.1	D	46	No	IA	NA
Shearers Lane	23/06/2020 21:00	5.1	D	46	No	IA	NA
Kilburnie South	23/06/2020 22:59	5.8	D	46	No	IA	NA
Jerrys Plains Village	23/06/2020 21:01	5.1	D	46	No	IA	NA
Jerrys Plains East	23/06/2020 21:22	5.1	D	46	No	IA	NA
Long Point Road	23/06/2020 21:01	5.4	D	46	No	IA	NA
HVGC	23/06/2020 23:31	5.6	D	NA	No	IA	NA

Notes:
1. Atmospheric data is sourced from the HVO Corporate (or MTW Charlton Ridge for Long Point) AWS 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 stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;
3. Site-only LA1,1minute attributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of relevant criterion;
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
6. IA means inaudible, there was no site noise at the monitoring location; and
7. NM means not measurable, noise was audible but could not be quantified.

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5.2 NPfI Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. During June 2020 no penalties were applied. The assessment for low frequency noise is shown in Table 10.

Table 10: Modifying Factor Assessment – HVO South – June 2020

Location	Date and Time	Measured HVO South L_{Aeq}dB[1,2,3]	Criterion Applied?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality	Low-frequency Modifying Factor?	Maximum Exceedance of NPfI Reference Spectrum[4]	Total Penalty dB[4]
Knodlers Lane	*23/06/20 21:43*	*35*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Maison Dieu	*23/06/20 21:20*	*37*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Shearers Lane	*23/06/20 21:00*	*38*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Kilburnie South	*23/06/20 22:59*	*<25*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Jerrys Plains Village	*23/06/20 21:01*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Jerrys Plains East	*23/06/20 21:22*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Long Point Road	*23/06/20 21:01*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
HVGC	*23/06/20 23:31*	*38*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*

Notes:
1. NA means not applicable;
2. IA means inaudible, there was no site noise at the monitoring location;
3. NM means not measurable, noise was audible but could not be quantified; and
4. Bold results indicate that NPfI low-frequency modifying factor has been triggered and application of correction is required.

Table 11: Modifying Factor Assessment – HVO North – June 2020

Location	Date and Time	Measured HVO South L_{Aeq}dB[1,2,3]	Criterion Applied?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality	Low-frequency Modifying Factor?	Maximum Exceedance of NPfl Reference Spectrum[4]	Total Penalty dB[4]
Knodlers Lane	*23/06/20 21:43*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Maison Dieu	*23/06/20 21:20*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Shearers Lane	*23/06/20 21:00*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Kilburnie South	*23/06/20 22:59*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Jerrys Plains Village	*23/06/20 21:01*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Jerrys Plains East	*23/06/20 21:22*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
Long Point Road	*23/06/20 21:01*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
HVGC	*23/06/20 23:31*	*IA*	*No*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*

Notes:
1. NA means not applicable;
2. IA means inaudible, there was no site noise at the monitoring location;
3. NM means not measurable, noise was audible but could not be quantified; and
4. Bold results indicate that NPfl low-frequency modifying factor has been triggered and application of correction is required.

5.3 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 5.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

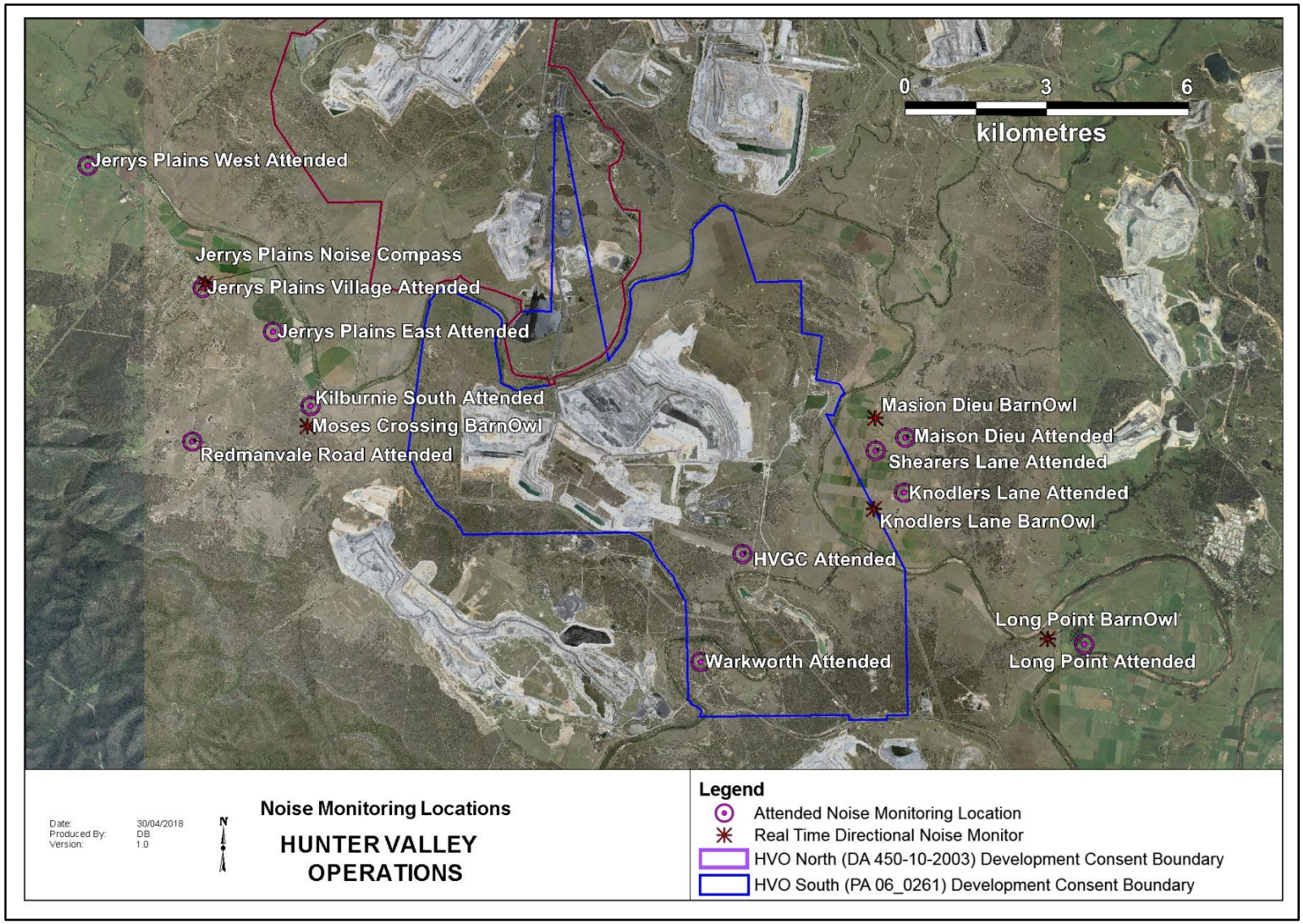

Figure 87: Noise Monitoring Location Plan

6.0 OPERATIONAL DOWNTIME

During June, a total of 10.9 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 and reason is shown in Figure 88.

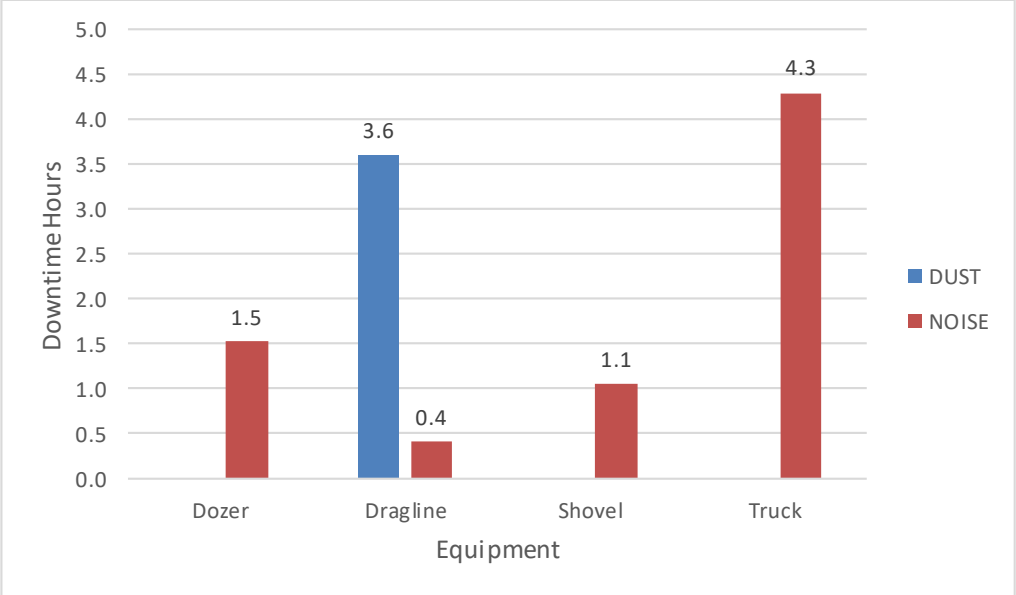

Figure 88: Operational Downtime by Equipment Type – June 2020

7.0 REHABILITATION

During June, 12.15 Ha of land was bulk shaped, 2.61 Ha of land was topsoiled, 25.83 Ha of land was released and no land was rehabilitated. Year to date progress can be viewed in Figure 89.

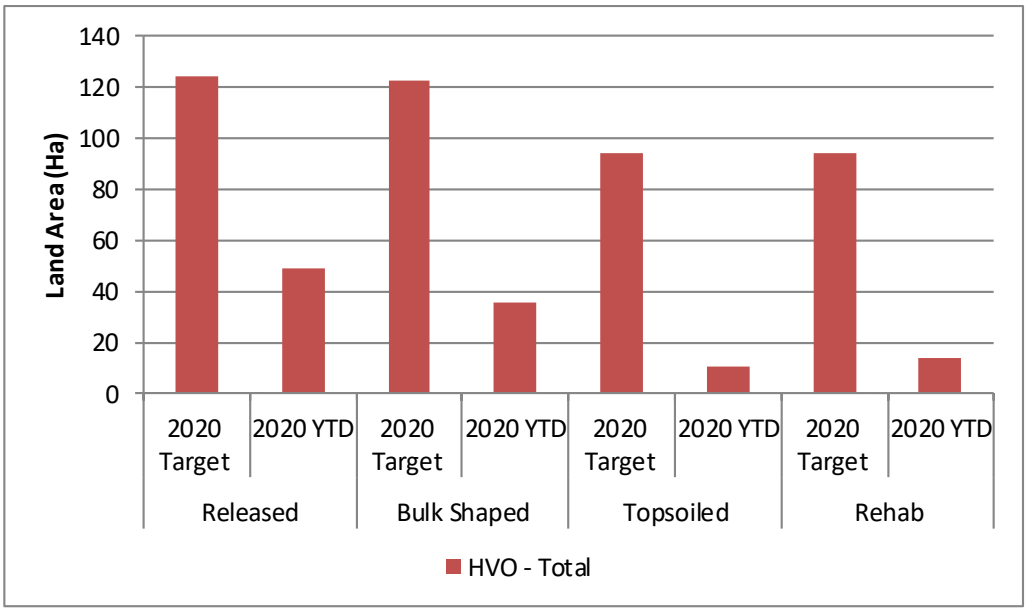

Figure 89: Rehabilitation YTD – June 2020

8.0 COMPLAINTS

Two complaints were received during June 2020. Five complaints have been received in 2020. Details of complaints received are shown in Table 12 below.

Table 12: Complaints Summary 2020

Month	Noise	Dust	Blast	Lighting	Other	Total
January	-	-	-	-	-	-
February	-	-	-	-	-	-
March	-	-	-	-	-	-
April	-	-	-	-	-	-
May	*3*	-	-	-	-	*3*
June	*2*	-	-	-	-	*2*
July						
August						
September						
October						
November						
December						
Total	***5***	***0***	***0***	***0***	***0***	***5***

9.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were two reportable environmental incidents:

- **3/06/2020 – Golden Highway TEOM Data Miscapture**
  The Golden Highway TEOM air quality monitor suffered an unplanned power outage, resulting in insufficient data capture on 03/06/2020 and 04/06/2020.
  Environmental Consequence: Nil Category

- **4/06/2020 – Howick TEOM Data Miscapture**
  The Howick TEOM air quality monitor was taken out of service for annual maintenance, resulting in insufficient data capture on 04/06/2020 and 05/06/2020.
  Environmental Consequence: Nil Category

APPENDIX A: METEOROLOGICAL DATA

Table 13: Meteorological Data - HVO Corporate Meteorological Station – June 2020

Date	Air Temp Max (°C)	Air Temp Min (°C)*	Relative Humidity Max (%)	Relative Humidity Min (%)*	Solar Radiation Maximum (W/Sq. M)	Wind Dir. Avg (°)	Wind Speed Avg (m/sec)	Rainfall (mm)
1/06/2020	21.16	4.47	95.5	36.02	550.9	286.9	5.779	0
2/06/2020	13.08	1.38	85	52.7	705.3	291.8	6.145	0
3/06/2020	18.65	2.56	88.9	39.97	563.4	212.8	2.764	0
4/06/2020	16.22	2.85	92.9	50.32	730.9	149.8	1.191	0
5/06/2020	17.82	0.37	100	42.69	501.6	277.4	2.043	0
6/06/2020	18.69	2.05	100	44.03	498.5	222.7	1.372	0
7/06/2020	16.95	0.73	100	53.08	504.5	195.5	1.454	0
8/06/2020	17.23	3.53	109.3	40.99	505.3	182.4	1.455	0
9/06/2020	15.36	4.97	112.4	86.1	795.2	126.3	2.007	6.2
10/06/2020	15.46	7.92	113.1	100	414	132.9	1.196	5
11/06/2020	20.4	7.24	113.4	61.05	615.4	190.6	1.796	0.2
12/06/2020	17.9	6.81	100	72.94	772.4	122.6	1.824	0
13/06/2020	18.32	6.68	110.9	75.87	814	146	0.789	0
14/06/2020	19.88	5.61	112.9	41.54	734.8	263	3.72	21.6
15/06/2020	17.43	2.75	92.7	48.74	508.7	291.8	2.902	0
16/06/2020	18.97	2.62	95.9	49.47	518.2	282.8	3.165	0
17/06/2020	18.82	3.36	112.2	56.2	727.2	190.9	2.567	3.2
18/06/2020	17.38	4.60	100	58.02	776.7	119.2	2.27	0
19/06/2020	17.01	1.84	112.6	63.08	635.4	200.4	0.755	0.2
20/06/2020	20.4	0.50	112.8	52.48	513.1	214.8	0.948	0.2
21/06/2020	16.51	3.99	111.2	58.68	890	250.9	2.383	13
22/06/2020	13.65	2.95	89.9	60.12	782.3	279.1	4.649	0
23/06/2020	13.52	2.12	96.4	52.96	770.5	288.2	4.315	0
24/06/2020	14.62	2.90	94.4	55.33	503.8	288.5	5.282	0
25/06/2020	14.98	0.85	92.7	56.01	559.4	285.3	3.673	0
26/06/2020	15.98	-1.78	95.9	45.21	515.7	204.7	1.665	0
27/06/2020	15.63	0.35	108.1	60.89	735.5	151	1.8	0
28/06/2020	16.12	2.50	100	52.75	594.9	112.6	1.665	0
29/06/2020	15.85	2.84	112.1	61.05	661	174.8	1.358	0
30/06/2020	17.45	-1.34	113.2	45.05	509.9	240	1.121	0.2