Hunter Valley Operations

Community Consultative Committee

Business Papers – November 2017

Materials ahead of meeting of the committee on 9 November 2017

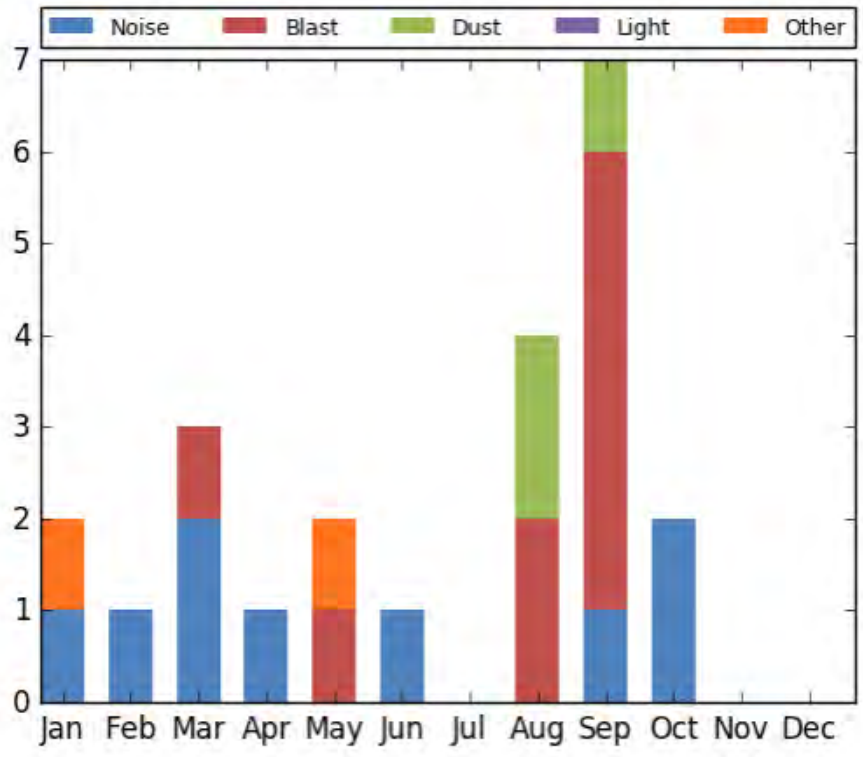
Contents page

1.0 Complaints

Complaints overview for 2017

Hunter Valley Operations Monthly Complaints Summary

	Noise	Dust	Blast	Lighting	Other	Total
January	1	0	0	0	1	2
February	1	0	0	0	0	1
March	2	0	1	0	0	3
April	1	0	0	0	0	1
May	0	0	1	0	1	2
June	1	0	0	0	0	1
July	0	0	0	0	0	0
August	0	2	2	0	0	4
September	1	1	5	0	0	7
October	2	0	0	0	0	2
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	9	3	9	0	2	23

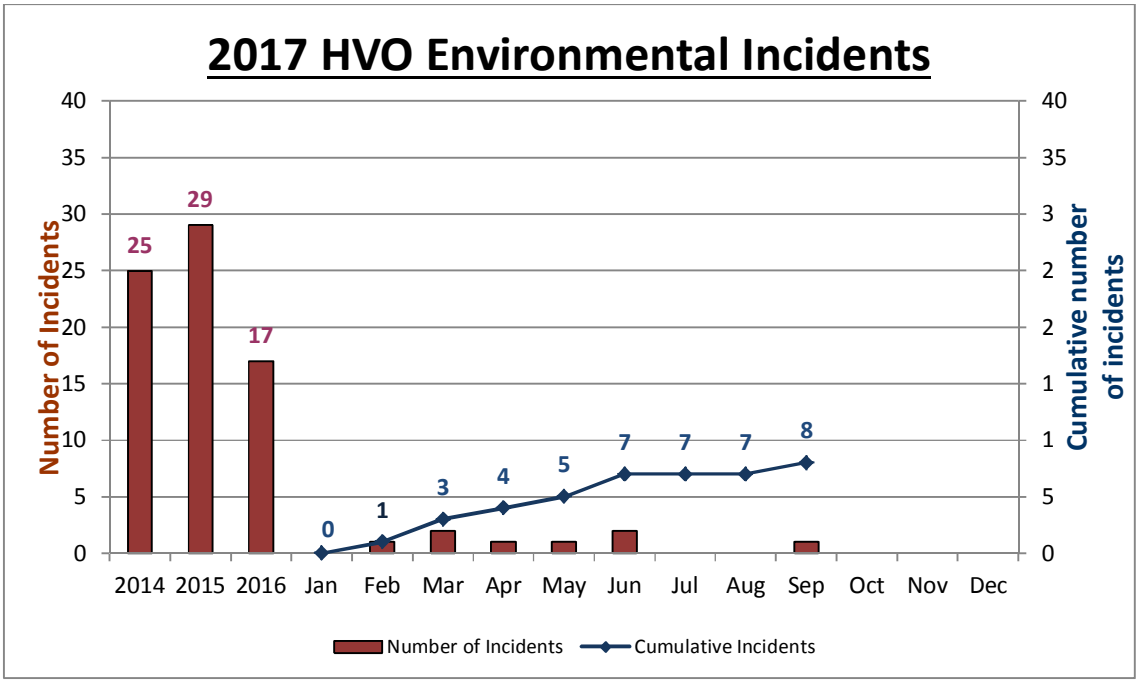


Complaint details for the period 22 February 2017 to 20 June 2017

Date	Time	Type	Location	Method Received	Monitoring Indicates Exceedance?#
27/06/2017	9:12:00 AM	Noise	Redmanvale Road	hotline	No
2/08/2017	7:03:00 PM	Dust	Jerrys Plains	hotline	No
12/08/2017	12:03:00 PM	Blast	Hambledon Hill	hotline	No
16/08/2017	9:30:00 AM	Dust	Maison Dieu	phonecall to shopfront	No
17/08/2017	10:16:00 AM	Blast	Long Point	hotline	No
7/09/2017	9:25:00 AM	Blast	Maison Dieu	phonecall to shopfront	No
7/09/2017	9:35:00 AM	Blast	Long Point	phonecall to shopfront	No
7/09/2017	10:00:00 AM	Blast	Maison Dieu	phonecall to shopfront	No
11/09/2017	3:55:00 PM	Blast	Unknown	hotline	No
20/09/2017	8:21:00 PM	Noise	Jerrys Plains	hotline	No
26/09/2017	5:47:00 PM	Dust	Jerrys Plains	hotline	No
30/09/2017	10:51:00 AM	Blast	Maison Dieu	hotline	No
1/10/2017	9:24:00 PM	Noise	Jerrys Plains	hotline	No
4/10/2017	10:20:00 PM	Noise	Jerrys Plains	hotline	No

2.0 Incidents

Incident overview for 2017 (YTD as at 10 October 2017)



Incident details for the period 20 June 2017 to 10 October 2017

Date	Details	Key Actions	Aspect
23.06.2017	**Loss of topsoil at Riverview South due to mining.** Mining occurred in an area which was host to topsoil stockpiles. Approximately 4230m3 of the 7587m3 of topsoil was lost spoil dumps.	Remaining topsoil was recovered by the OS&P team to allow for mining advance. Topsoil stockpiles surveyed to determine amount of topsoil loss.	Land Stewardship

Date	Details	Key Actions	Aspect
08.09.2017	**Fume produced from West Pit blast.** After firing the blast, post blast emissions were observed coming from the blast. Fume was categorized as 3A. Plume travelled from west pit to north across Lemington Road via a road closure exclusion zone. Fume dissipated over HVO.	Road closure on Lemington Road was extended to ensure no exposure to motorists on the road. The blast design was reviewed and recommendations provided for some minor technical changes including increase of stemming zones and product selection and mix.	Blast

3.0 Community Investment

Our community investment programmes support organisations that deliver projects which make a positive measurable difference to the local communities in which we operate.

The Community Development Fund (CDF) provides funding for larger scale partnerships that build capacity and have a sustainable community benefit. The site donations programme provides smaller one-off grants at a grassroots level.

We are currently reviewing our suite of community investment programmes to further enhance our support and commitment to the local area.

Listed below is a breakdown of our current projects.

Community Development Fund Projects

Note – a CDF meeting has not been held since the previous HVO CCC meeting in July, therefore no further projects have received funding

Partner	Programme	Value
Sirolli Institute	Enterprise Facilitation	$45,000
Upper Hunter Where There's A Will Foundation	Positive Education Programme	$80,000
University of Newcastle	Science and Engineering Challenge, and SMART Programme (2015-2019)	$138,493
Upper Hunter Education Fund	HSC Study Camps and Upper Hunter Education Fund Scholarships (2015-2017)	$84,000
Singleton Business Chamber	Business Development Officer	$72,000
University of Newcastle	University of Newcastle Scholarships	$80,000
Outward Bound Australia	Youth Leadership Programme (2015-2017)	$245,332
Singleton Council	Singleton Economic Development and Funding Coordinator (2015-2017)	$100,000
Ungooroo Aboriginal Corporation	Health Services Programme (2017-2018)	$110,000

Bulga Rural Fire Service	Electronic Datasign	$24,500
Australian Christian College Singleton	STEM Lego Robotics Programme	$10,420
Jerrys Plains Public School	Ready 4 School Programme (2017-2018)	$58,000
Tocal College	Tocal Steers Challenge (2015-2017)	$25,725
Milbrodale Public School	Early Learning Programme (2017-2018)	$64,000

Hunter Valley Operations (HVO) site donations

Applications for the final funding round of 2017 will close the first Friday of November 2017.

Application forms can be requested by contacting our

- Community Information Hotline on freecall 1800 727 745

Since the start of 2017, HVO has provided $30,777 to 16 local projects and initiatives, including.

HVO Site Donations

Organisation / Programme	Value
Rotary Club of Singleton on Hunter – 2017 Singleton Art Prize	$5,000
Australian Families of the Military – Mental Health Retreat	$600
Wildlife Aid Inc – Injured wildlife rescue	$2,000
Singleton Business Chamber - International Women's Day event	$775
Cancer Council NSW – Singleton Relay for Life	$2,500
Singleton Junior Rugby League Club – Sporting equipment	$2,500
Singleton Junior Rugby Club – 2017 Season sponsorship	$2,500
Northern Agriculture Association Inc – 2017 Singleton Show	$3,125
Glendon Brook Hall Inc – Safety fencing for children's play area	$2,000
Singleton Pony Club – Club house improvements	$500

Singleton Theatrical Society – 2017 production	$1,500
Singleton Historical Society & Museum - Copier and printing consumables	$1,000
Singleton Hospital Community Trust - Holes 4 Hospital Charity Golf Day 2017	$2,500
Singleton Council - Christmas on John St - Fireworks	$2,277
Greta Branxton Wildcats Football Club - Jerseys for junior football teams	$500
Australian Stock Horse Eastern Branch – Championships	$1,500
Total	**$30,777**

4.0 Environmental monitoring

Monthly summaries of environmental monitoring – June 2017 – August 2017.

June 2017
Attached as **Appendix A**

July 2017
Attached as **Appendix B**

August2017
Attached as **Appendix C**

5.0 Environmental Documents

Environmental documents uploaded to the RTCA website since July 2017 CCC are listed below:

23/06/2017	HVO EPL 640 Monthly Meaningful Summary May 2017
23/06/2017	HVO EPL 640 Monthly Obtained Data Summary May 2017
2/08/2017	HVO EPL 640 Monthly Meaningful Summary June 2017
2/08/2017	HVO EPL 640 Monthly Obtained Data Summary June 2017
2/08/2017	Addendum to HVO Annual Review 2016
7/08/2017	HVO North DC DA 450-10-2003 Current
18/08/2017	HVO Monthly Environmental Management Report May 2017
23/08/2017	HVO Monthly Environmental Management Report June 2017
23/08/2017	HVO EPL 640 Monthly Meaningful Summary July 2017
23/08/2017	HVO EPL 640 Monthly Obtained Data Summary July 2017
23/06/2017	HVO EPL 640 Monthly Meaningful Summary May 2017
23/06/2017	HVO EPL 640 Monthly Obtained Data Summary May 2017
2/08/2017	HVO EPL 640 Monthly Meaningful Summary June 2017
2/08/2017	HVO EPL 640 Monthly Obtained Data Summary June 2017

Environmental documents uploaded to the HVO Insite website (https://insite.yancoal.com.au)

28/08/2017	Hunter Valley Operations North Development Consent DA 450-10-2003 Current Mod. 7
28/08/2017	Hunter Valley Operations South Coal Project (06_0261)
28/08/2017	Hunter Valley Operations South Modification 5 Response to Submissions Part 1

28/08/2017	Hunter Valley Operations South Modification 5 Response to Submissions Part 2
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix A - Project approval
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix B - Study team
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix C - Land ownership
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix D - HVO CCC presentation
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix E - Noise and vibration study
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix F - Air quality and greenhouse gas study
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix G Part 1 - Groundwater study
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix G Part 2 - Groundwater study
28/08/2017	Hunter Valley Operations South Modification 5 Environmental Assessment 2017 Appendix H - Surface water study
28/08/2017	Hunter Valley Operations South - Proposed Modification Environmental Assessment 2010
28/08/2017	Hunter Valley Operations North Modification 6 Environmental Assessment 2016
28/08/2017	HVO North Modification 6 – Factsheet
28/08/2017	HVO South Modification 5 - Information Package
28/08/2017	2016 HVO Annual Environmental Review
28/08/2017	HVO Air Quality Management Plan

28/08/2017	HVO Blast Management Plan
28/08/2017	HVO Monthly Environmental Management Report - April 2017
28/08/2017	HVO Monthly Environmental Management Report - Febuary 2017
28/08/2017	HVO Monthly Environmental Management Report - January 2017
28/08/2017	HVO Monthly Environmental Management Report - May 2017
28/08/2017	HVO Pollution Incident Response Management Plan
28/08/2017	HVO Monthly Environmental Management Report - March 2017
28/08/2017	Hunter Valley Operations Environment Protection Licence 640
28/08/2017	Hunter Valley Operations Independent Environmental Audit Report and Appenices December 2016
28/08/2017	HVO Water Management Plan
28/08/2017	Hunter Valley Operations 2016 Annual Environmental Review Addendum
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Meaningful Summary June 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary June 2017
28/08/2017	Hunter Valley Operations Environmental Monitoring Report June 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary July 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Meaningful Summary April 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary April2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence

	640 Monthly Meaningful Summary February 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary February 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Meaningful Summary May 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary May 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Meaningful Summary July 2017
28/08/2017	Hunter Valley Operations Annual Environmental Review 2016 Appendix 1-4
28/08/2017	Hunter Valley Operations Community Consultative Committee Business Papers July 2017
28/08/2017	Hunter Valley Operations Community Consultative Committee Business Papers March 2017
28/08/2017	Hunter Valley Operations Community Consultative Committee Business Papers November 2016
28/08/2017	Hunter Valley Operations Community Consultative Committee Meeting Minutes July 2017
28/08/2017	Hunter Valley Operations Community Consultative Committee Meeting Minutes March 2017
28/08/2017	Hunter Valley Operations Community Consultative Committee Meeting Minutes November 2016
28/08/2017	Hunter Valley Operations Community Consultative Committee Presentation July 2017
6/09/2017	Hunter Valley Operations Community Consultative Committee Presentation March 2017
6/09/2017	Hunter Valley Operations Community Consultative Committee Presentation November 2016
6/09/2017	Hunter Valley Operations Community Consultative Committee Presentation October 2016
28/08/2017	Hunter Valley Operations Environmental Protection Licence

	640 Monthly Meaningful Summary March 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary March 2017
28/08/2017	Hunter Valley Operations Bushfire Management Plan 2015
29/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Meaningful Summary January 2017
28/08/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary January 2017
28/08/2017	Annual Environmental Review - Appendix 5 Rehabilitation Monitoring Report
28/08/2017	Hunter Valley Operations South Mining Operations Plan
28/08/2017	HVO South Coal Aboriginal Cultural Heritage Management Plan
28/08/2017	Hunter Valley Operations North Mining Operations Plan
28/08/2017	Hunter Valley Operations North Heritage Management Plan
28/08/2017	HVO River Red Gum Rehabilitation and Restoration Strategy
22/09/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Meaningful Summary August 2017
22/09/2017	Hunter Valley Operations Environmental Protection Licence 640 Monthly Obtained Data Summary August 2017

YANCOAL
兖煤澳大利亚有限公司
HUNTER VALLEY OPERATIONS

Business Papers – Appendix A

Environmental Monitoring Report – June 2017

COAL & ALLIED

Managed by Rio Tinto Coal Australia

Hunter Valley Operations

Monthly Environmental Report

June 2017

Coal & Allied Operations Pty Ltd

ABN 16 000 023 656

Lemington Road, Ravensworth via Singleton NSW 2330 Australia

PO Box 315 Singleton NSW 2330 Australia

Telephone +61 2 6570 0300 Facsimile +61 2 6570 0399

CONTENTS

Figures

Tables

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Graduate	Draft	8/08/2017
1.1	Environmental Specialist	Final	10/07/2017

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 2017 to 30th June 2017.

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 2017 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
June	25.8	339.2

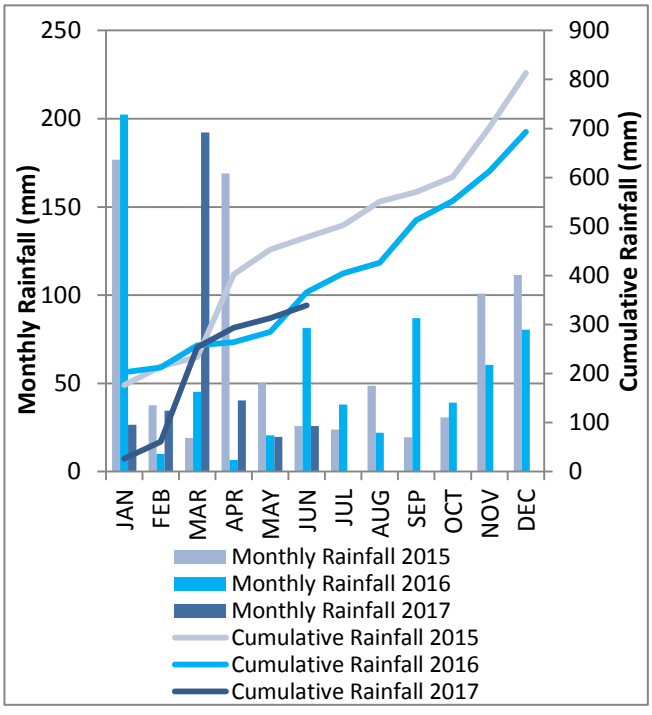


Figure 1: Year to Date Rainfall Summary 2017

2.1.2 Wind Speed and Direction

Dominant winds varied throughout June as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

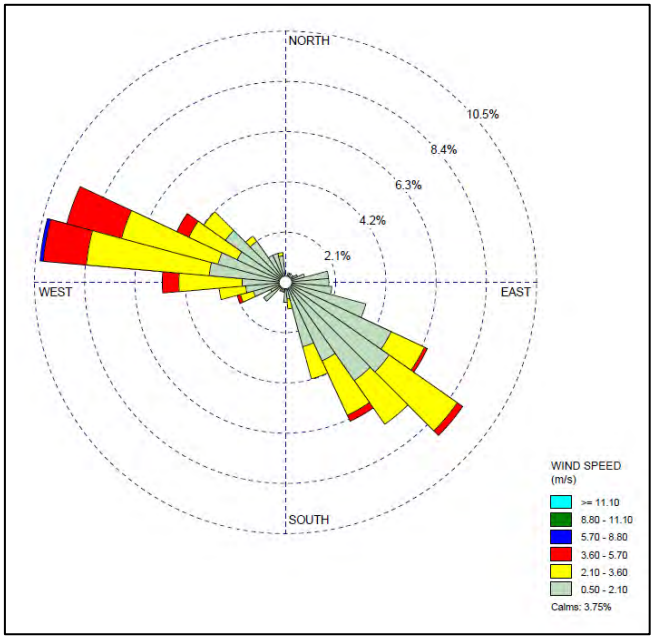


Figure 2: HVO Corporate Wind Rose – June 2017

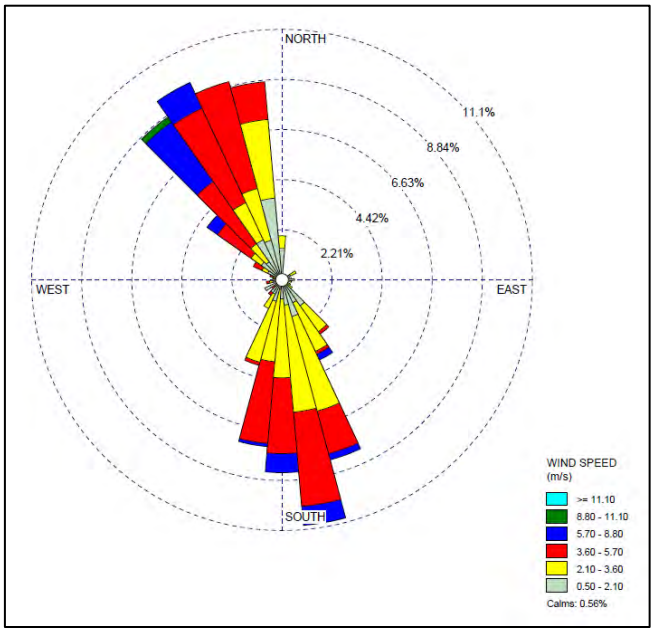


Figure 3: HVO Cheshunt Wind Rose – June 2017

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.

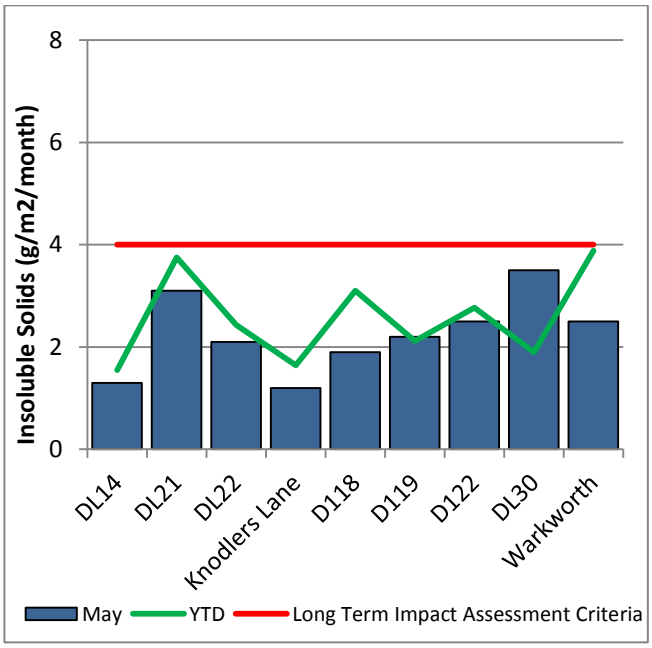


Figure 5: Depositional Dust Results – June 2017

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 in accordance with EPA requirements.

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 50µg/m³.

The Warkworth HVAS monitor failed to collect a valid sample on the 23rd and 29th of June due to a power outage.

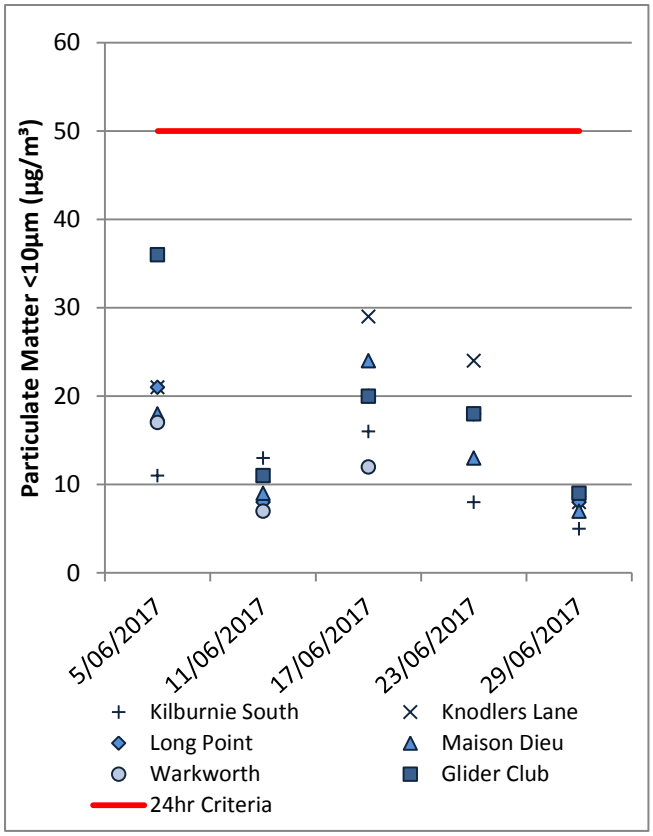


Figure 6: Individual PM_{10} Results – June 2017

Figure 7 shows the annual average PM_{10} results. During the reporting period, all PM_{10} results were below the long term impact assessment criteria.

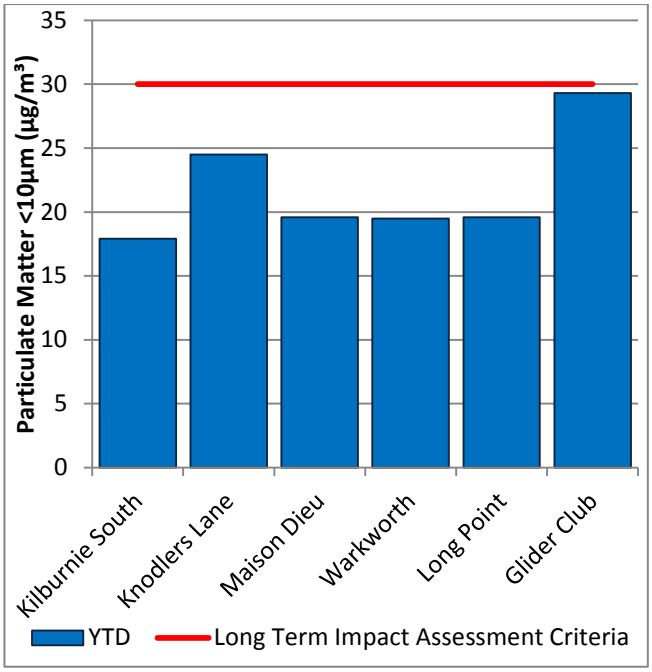


Figure 7: Year to Date Average PM_{10} – June 2017

2.3.2 TSP Results

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

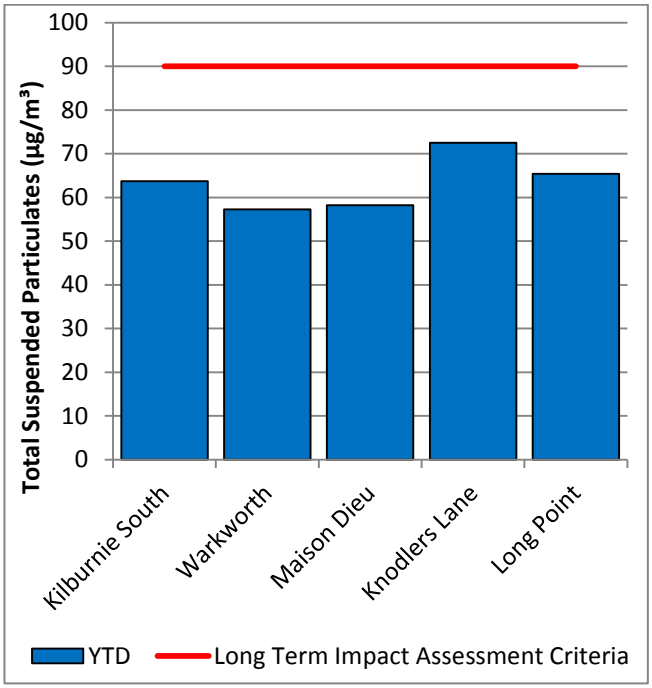


Figure 8: Annual Average Total Suspended Particulates – June 2017

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 are shown in Error! eference source not found., including the daily 24 hour average PM_{10} result and the 24 hour YTD PM_{10} average. There were no results recorded which exceeded the short term (24hr) criteria of 50 µg/m³.

2.3.4 Real Time Alarms for Air Quality

During June, the real time monitoring system generated 7 automated air quality related alarms. 3 alarms were related to adverse weather conditions and 4 alarms related to PM_{10}.

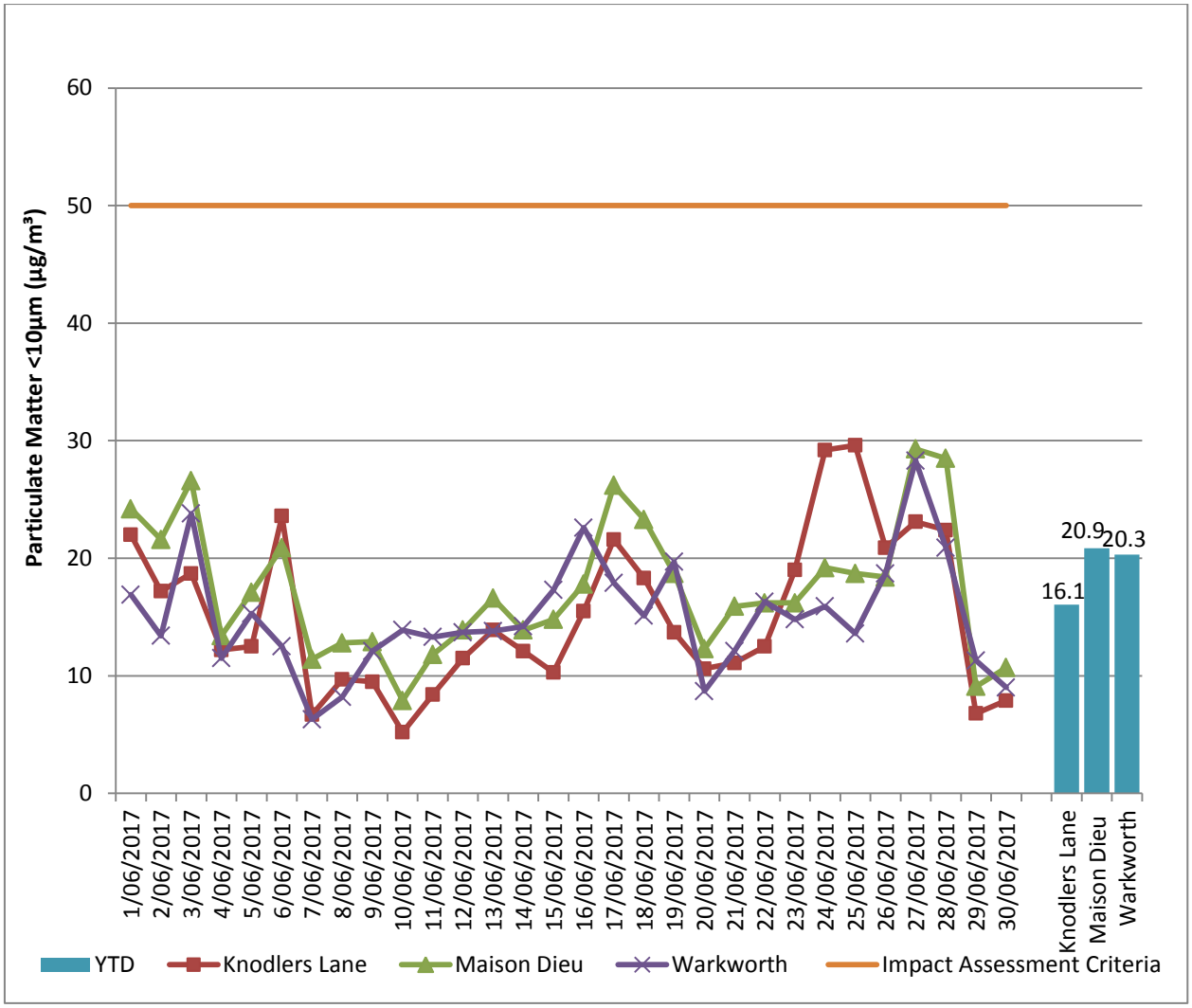


Figure 9: Real Time PM_{10} 24hr average and YTD average – June 2017

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).

Watercourses are assessed against ANZECC Guidelines for Fresh and Marine Water Quality (2000) for:

- pH (6.5 to 8.5);
- Electrical Conductivity (125 to 2200µS/cm); and
- Total Suspended Solids (maximum 50mg/L)

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

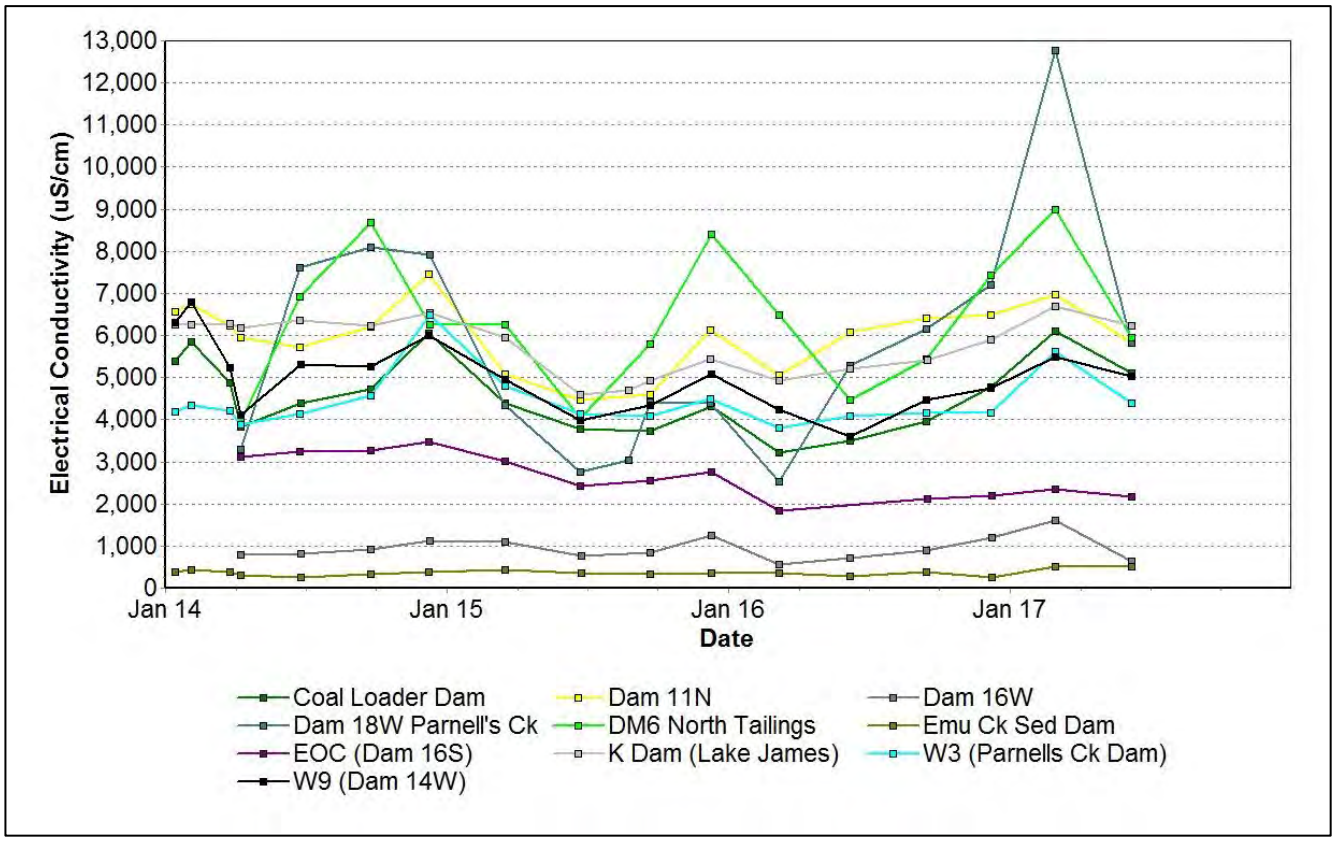


Figure 10: Site Dams Electrical Conductivity Trend - June 2017

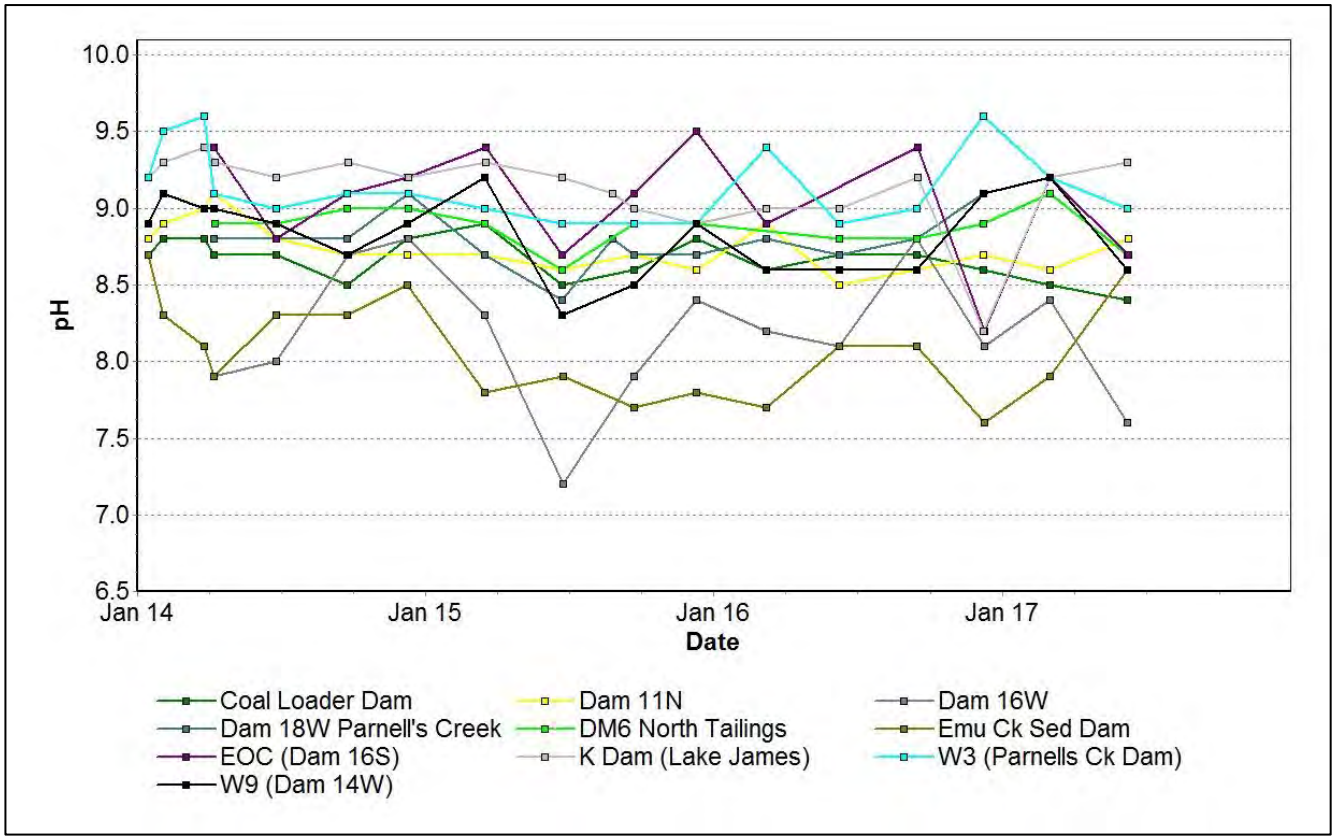


Figure 11: Site Dams pH Trend - June 2017

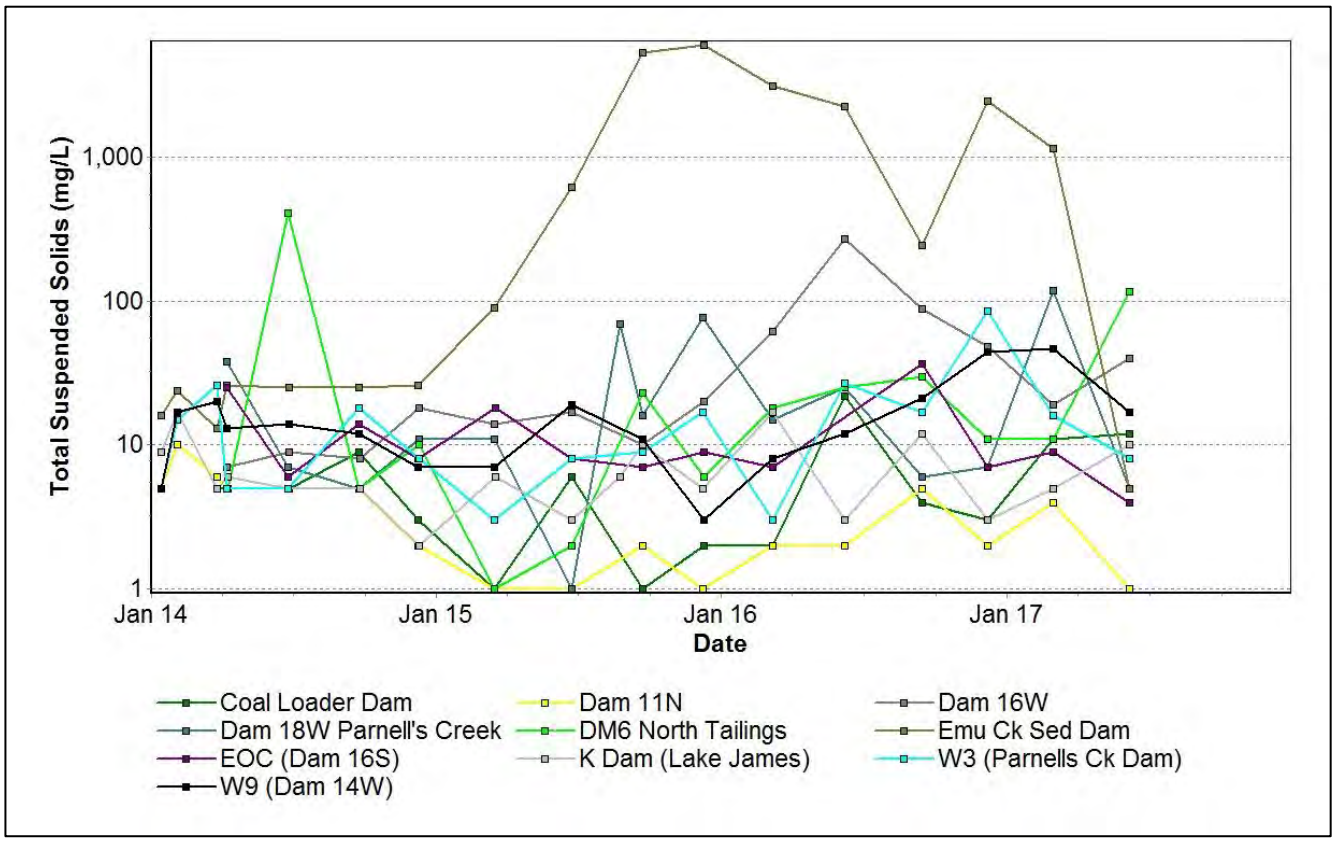


Figure 12: Site Dams Total Suspended Solids Trend – June 2017

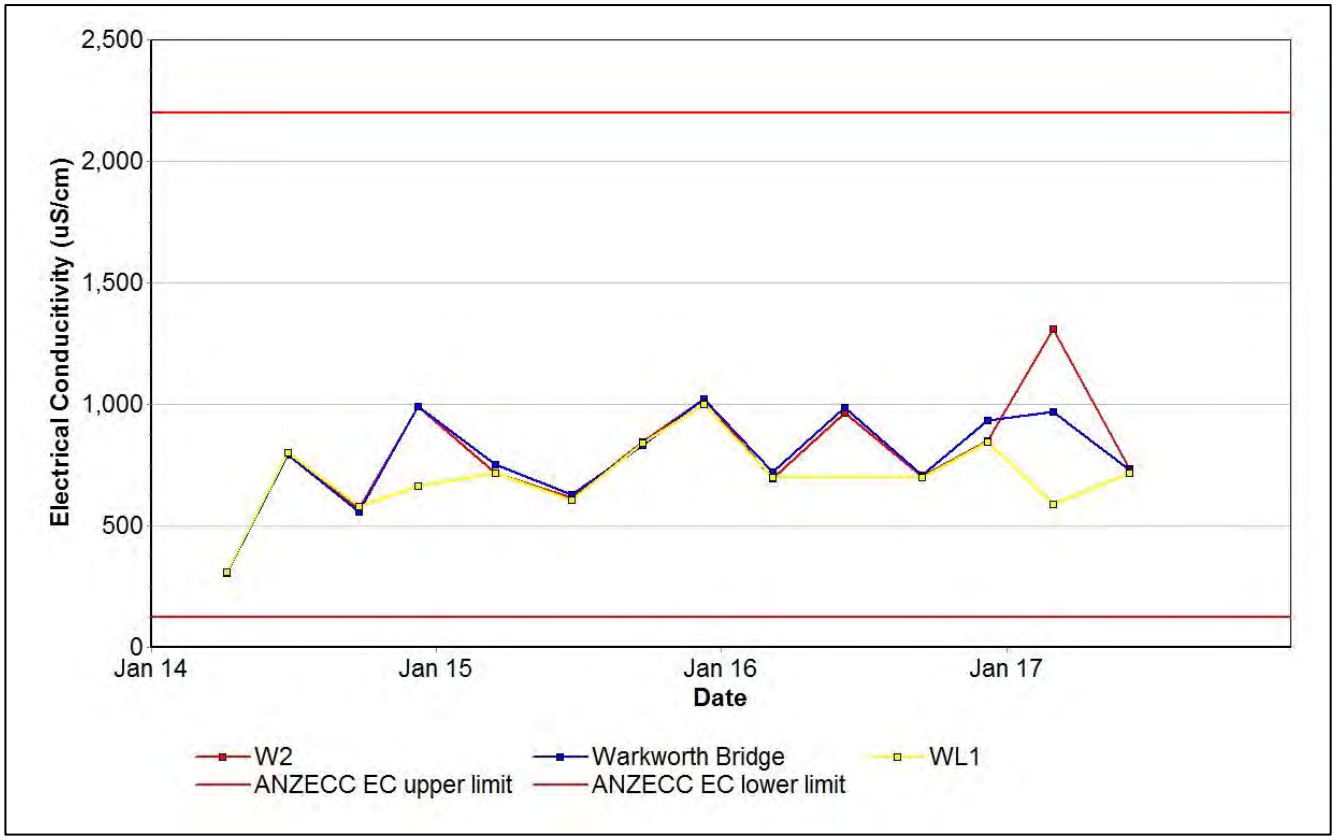


Figure 13: Wollombi Brook Electrical Conductivity Trend - June 2017

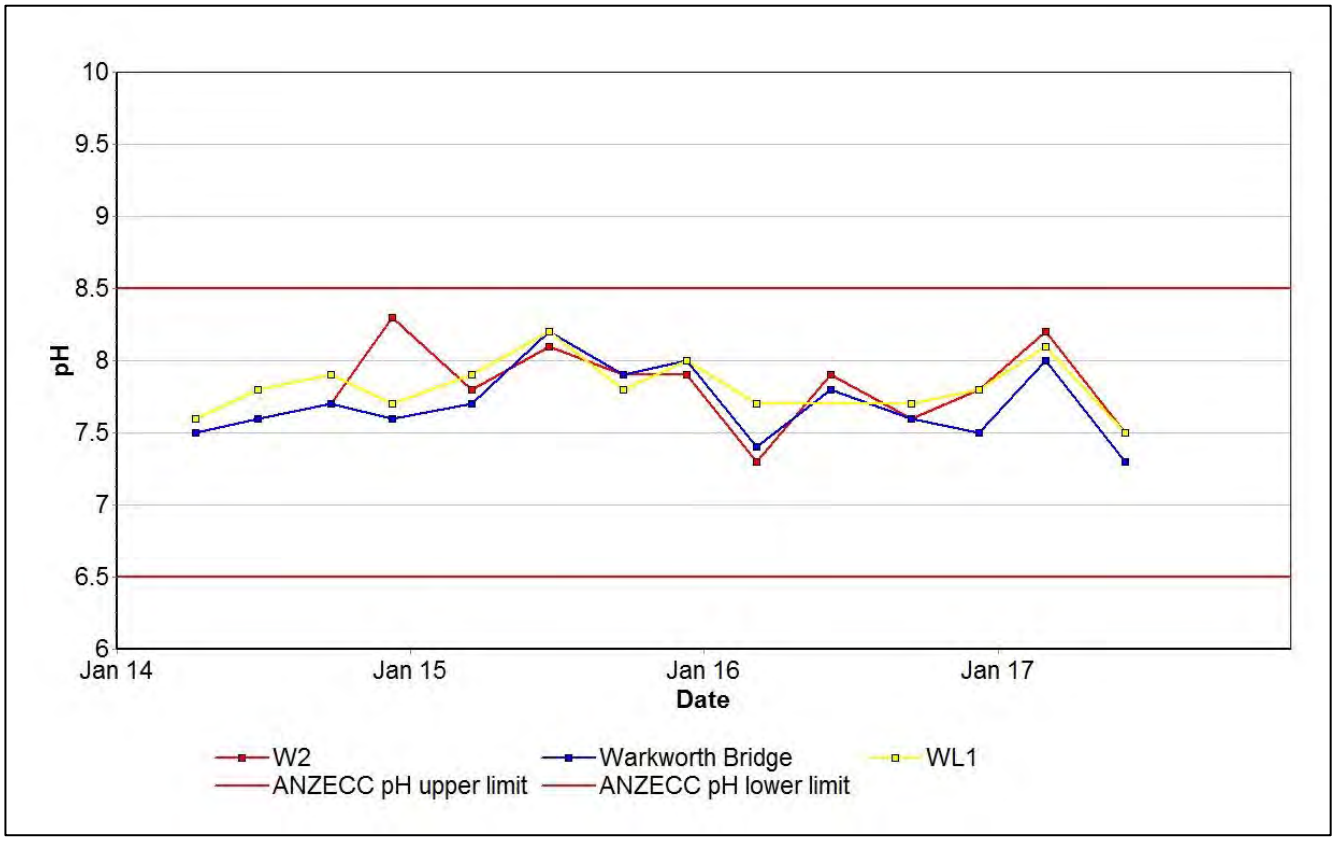


Figure 14: Wollombi Brook pH Trend - June 2017

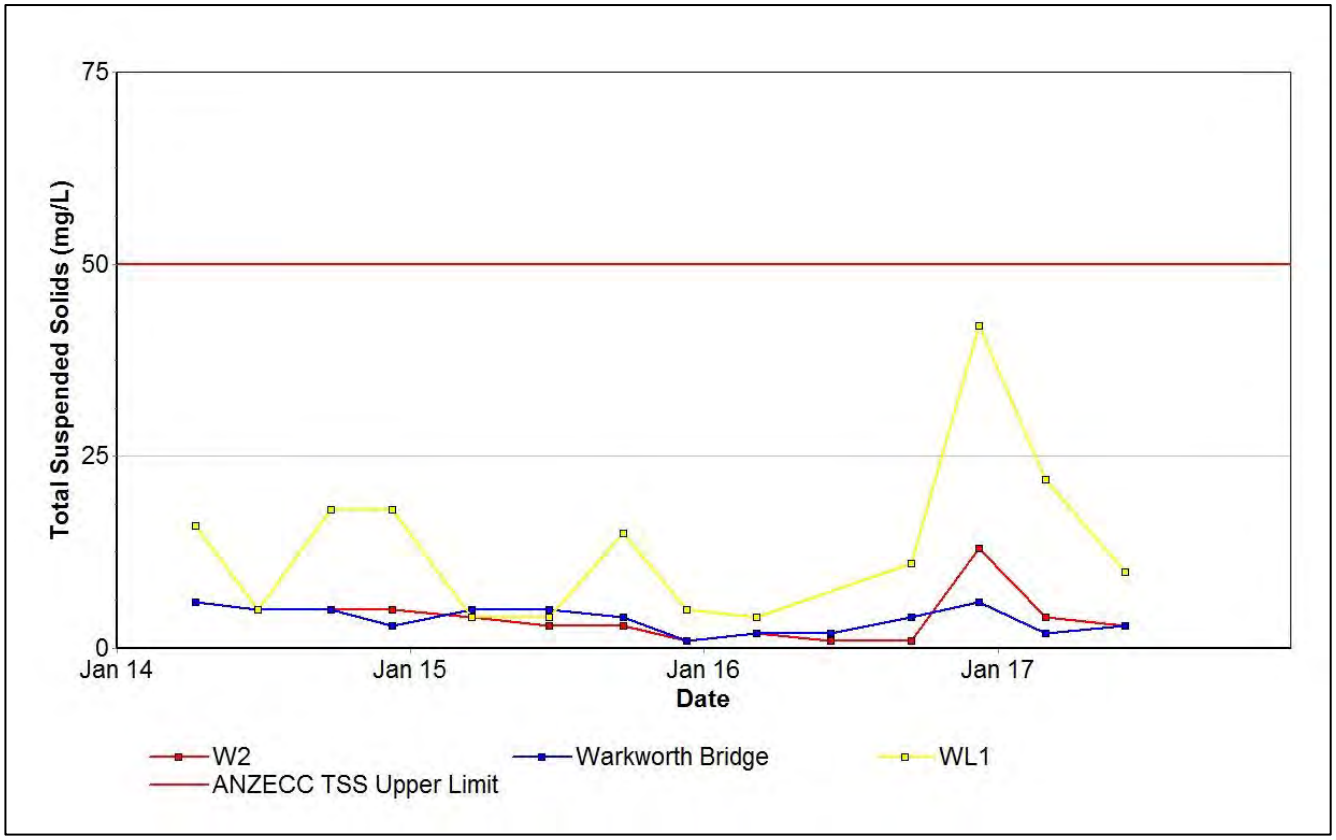


Figure 15: Wollombi Brook Total Suspended Solids Trend - June 2017

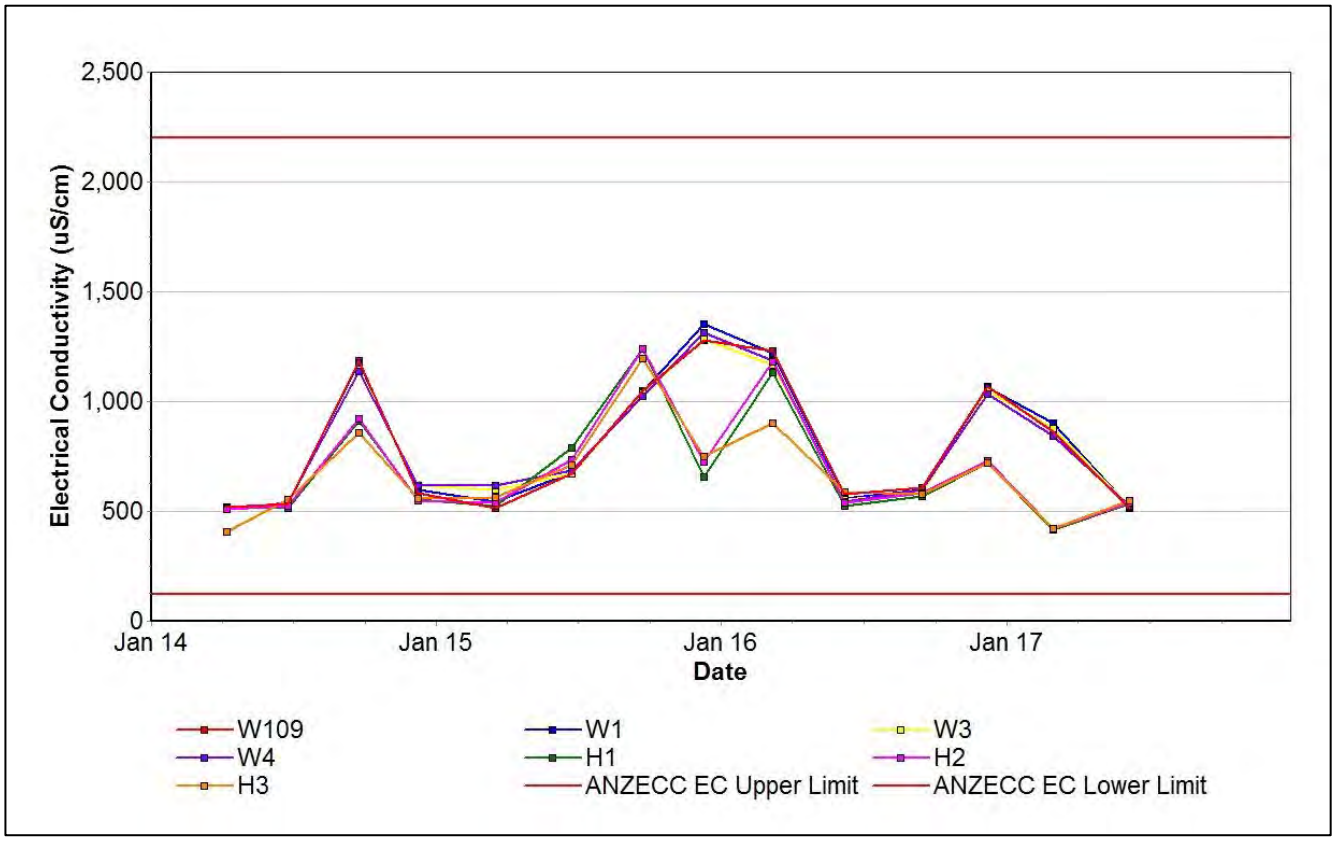


Figure 16: Hunter River Electrical Conductivity Trend - June 2017

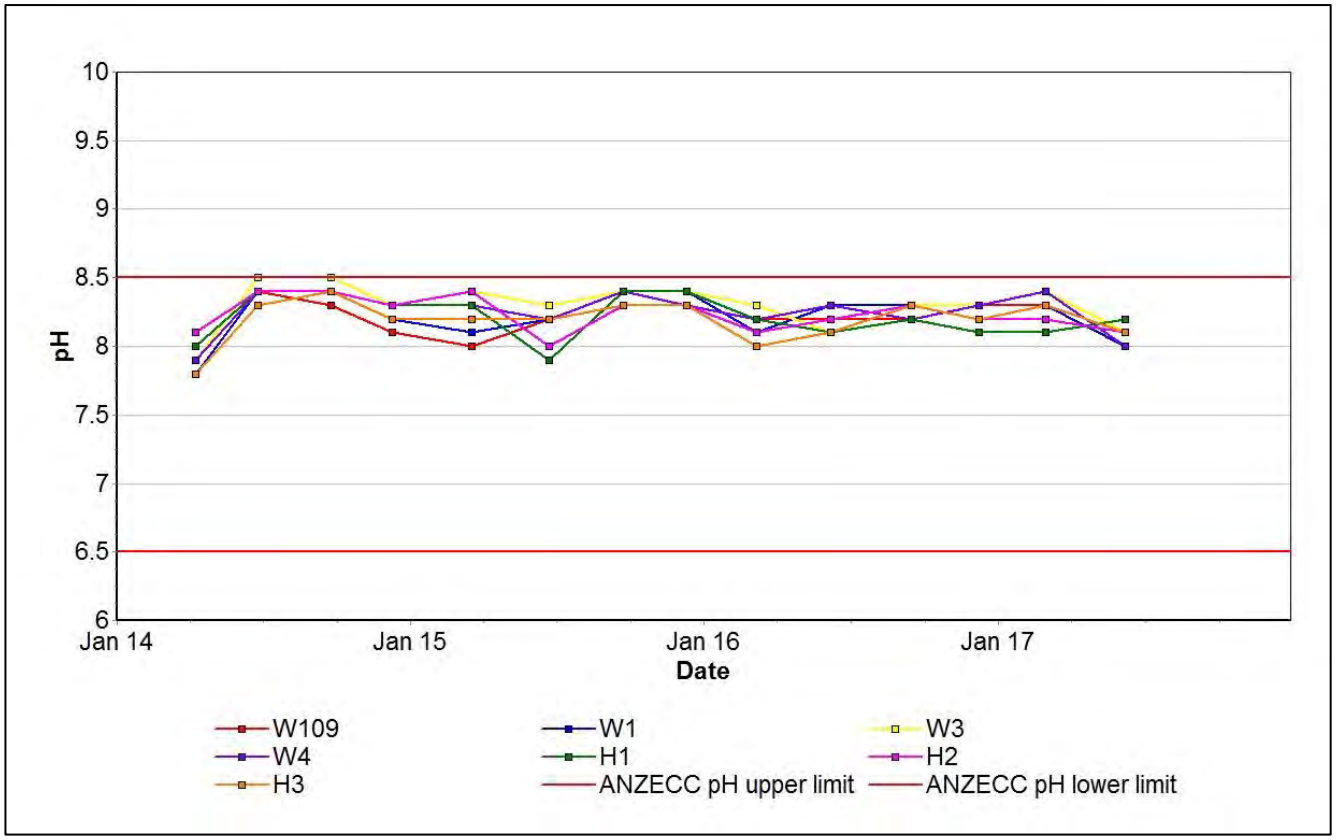


Figure 17: Hunter River pH Trend - June 2017

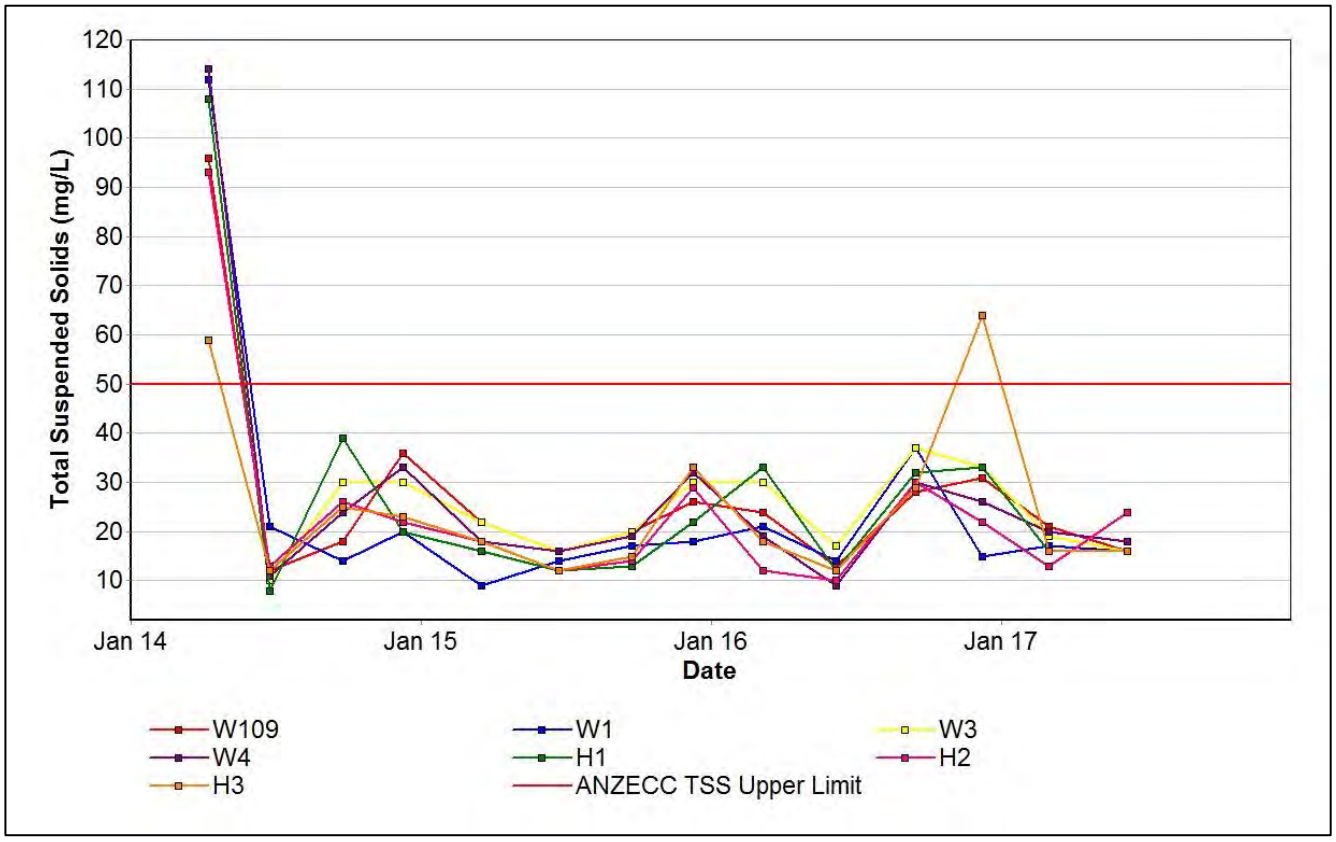


Figure 18: Hunter River Total Suspended Solids - June 2017

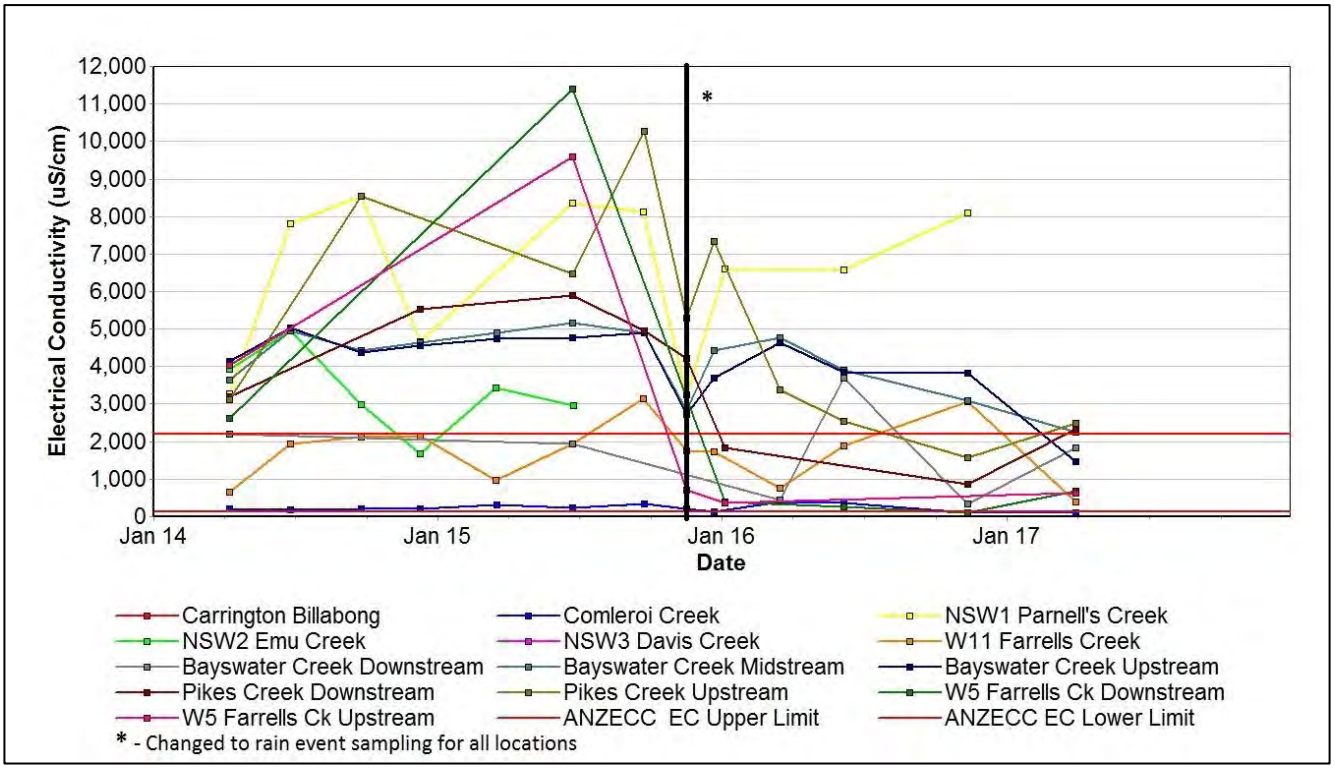


Figure 19: Other Tributaries Electrical Conductivity Trend - June 2017

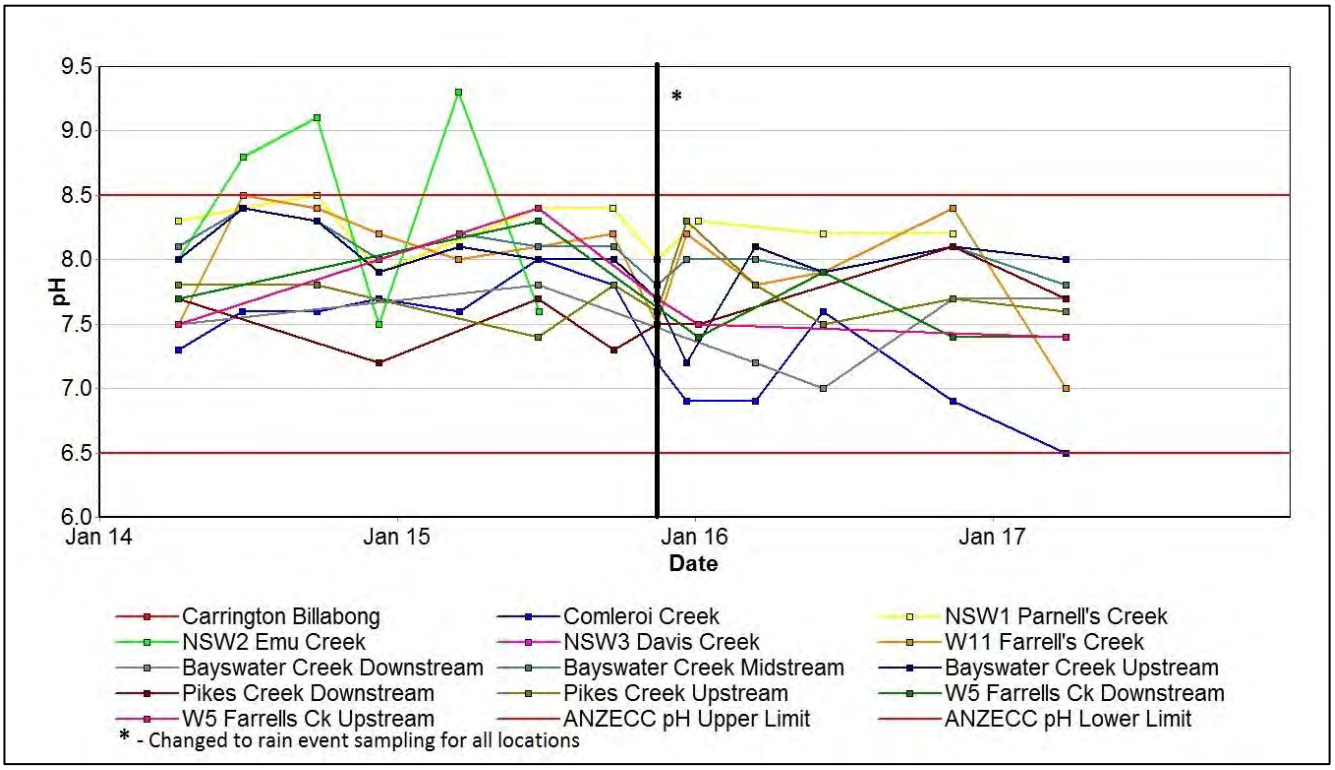


Figure 20: Other Tributaries pH Trend – June 2017

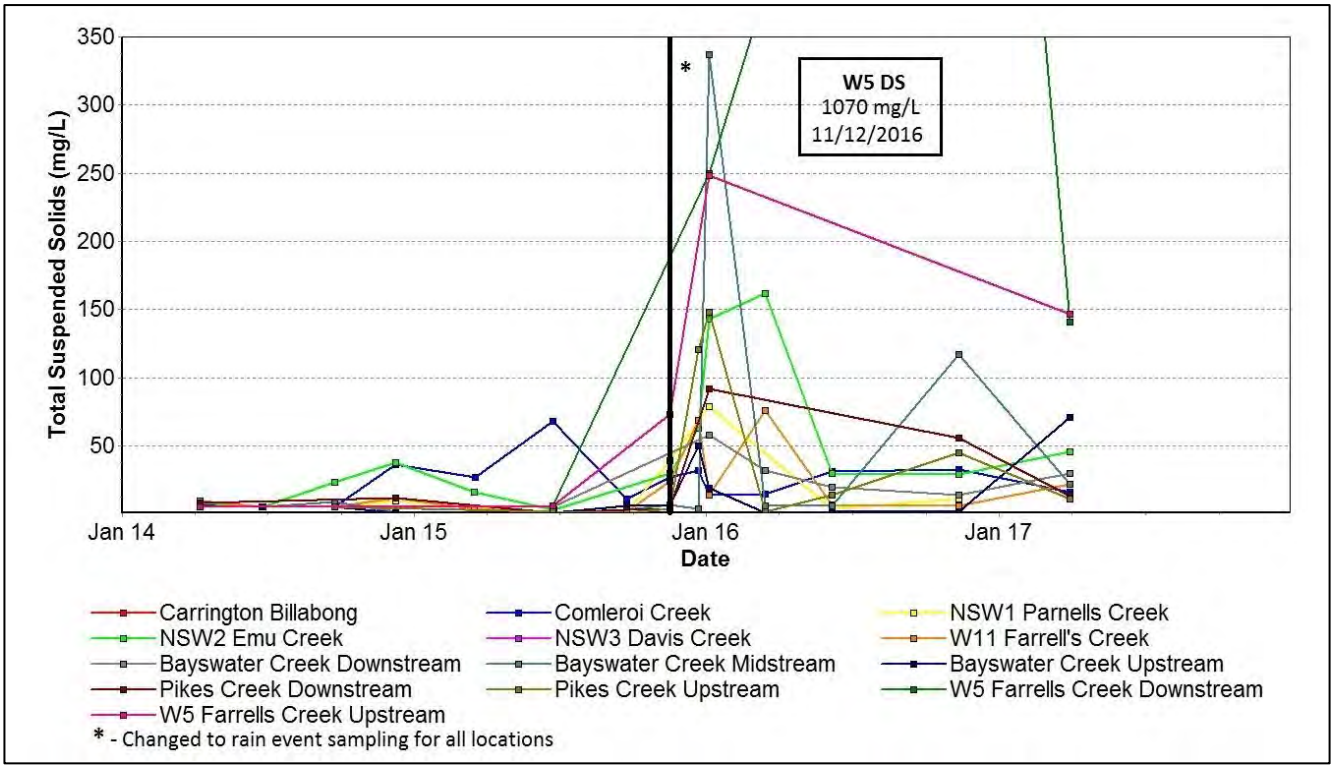


Figure 21: Other Tributaries Total Suspended Solids Trend - June 2017

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 did not extract any 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.

During Q2 2017 2 internal trigger limits were breached, summarised in Table 2.

Table 2: Surface Water Trigger Limit Summary

Site	Date	Trigger Limit Breached	Action taken in response
W1 (Hunter River)	08/06/2017	pH – 5th Percentile	Watching Brief*
W4 Hunter River	08/06/2017	pH – 5th Percentile	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 77**.

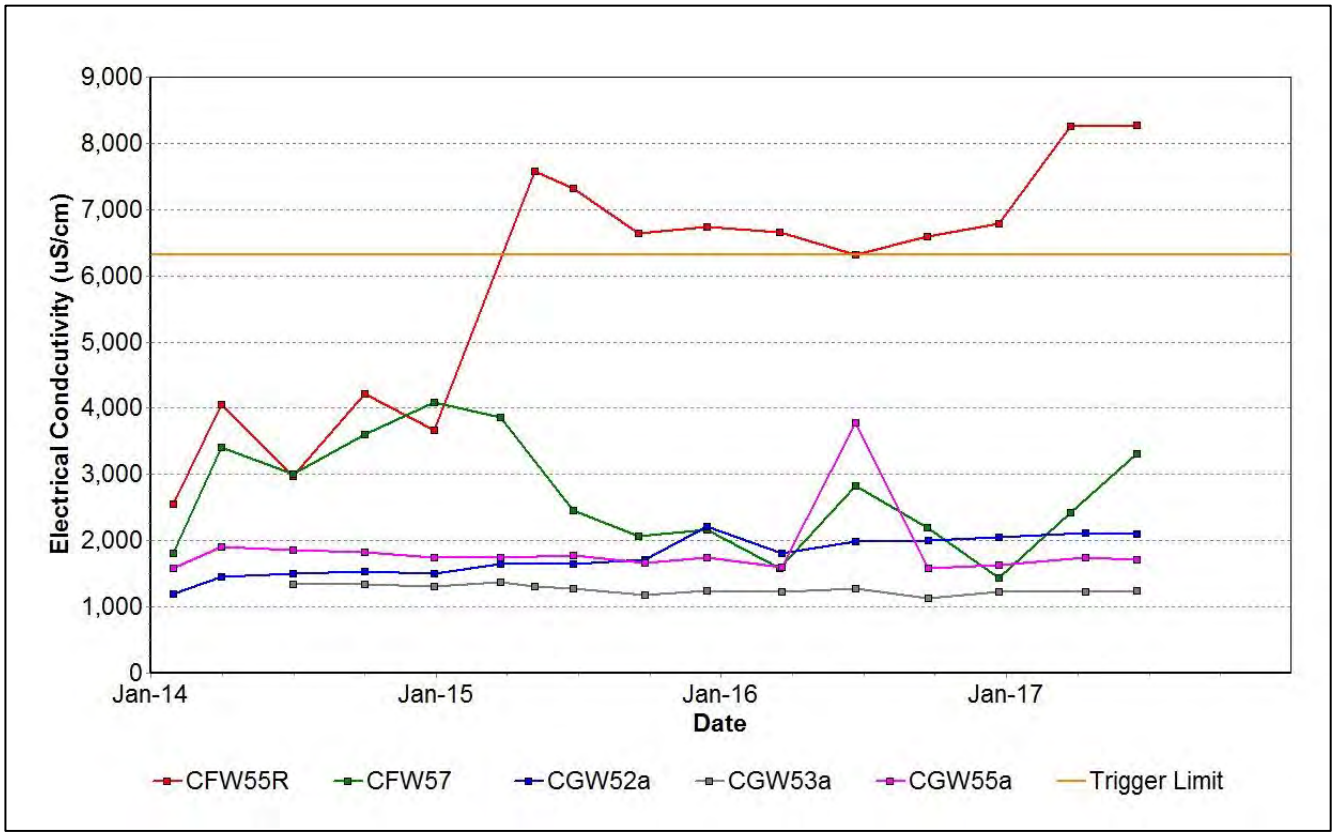


Figure 23: Carrington Alluvium Electrical Conductivity Trend - June 2017

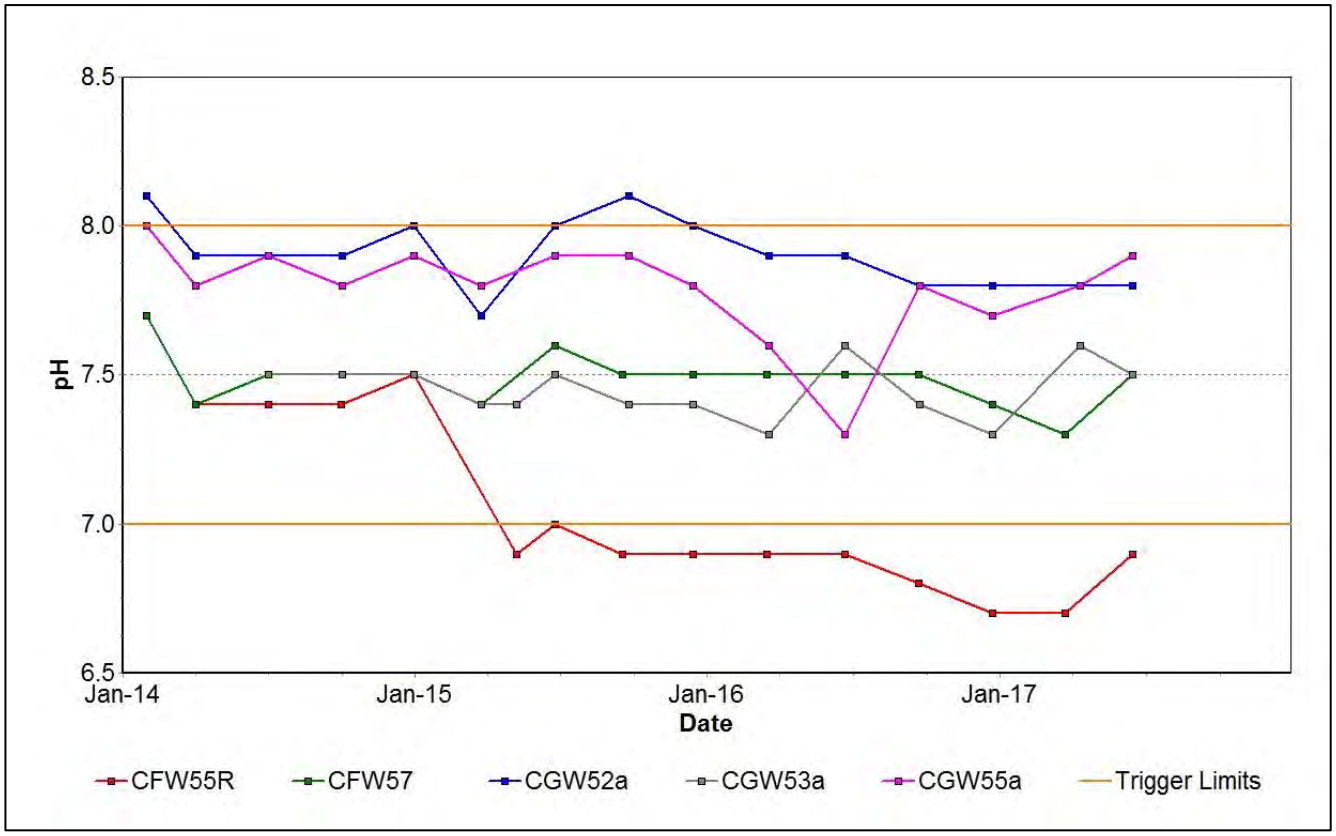


Figure 24: Carrington Alluvium pH Trend – June 2017

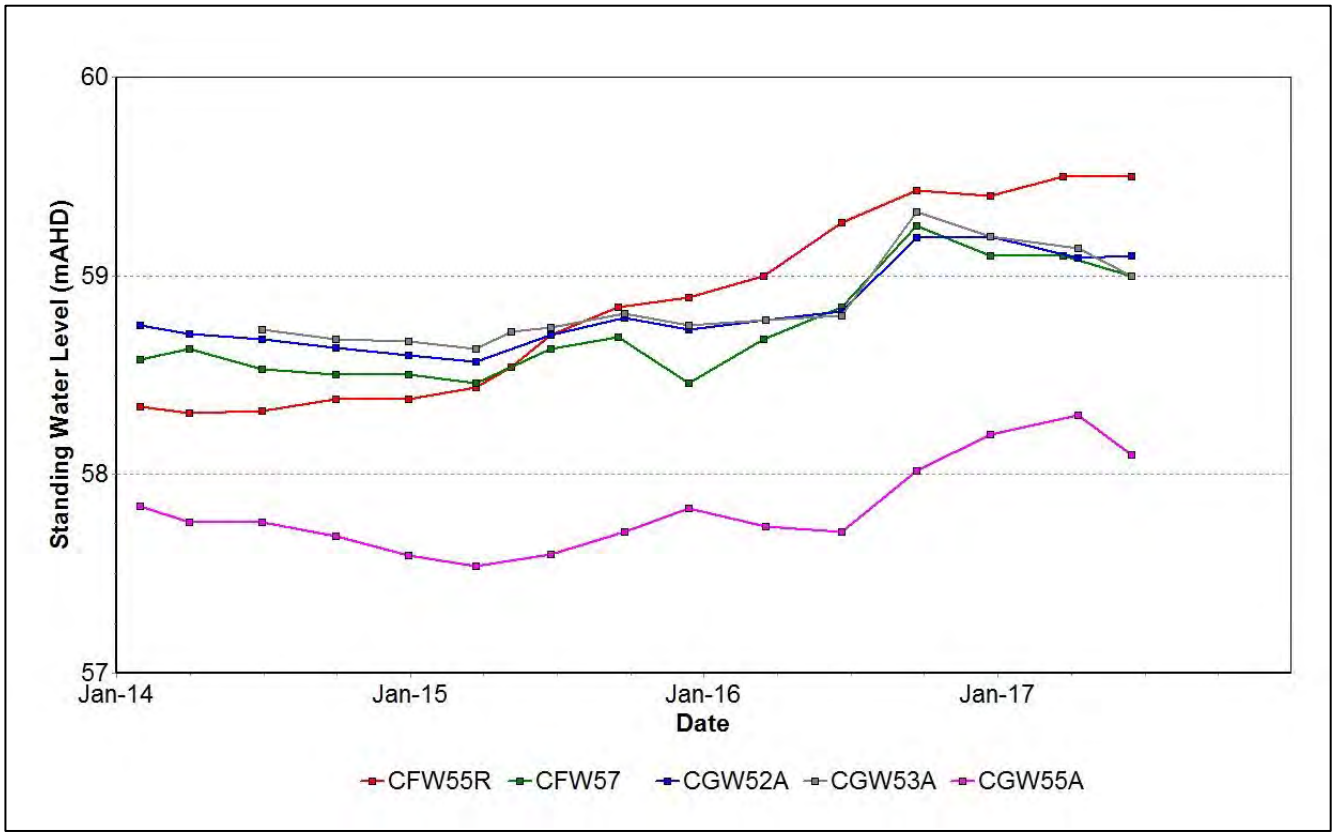


Figure 25: Carrington Alluvium Standing Water Level - June 2017

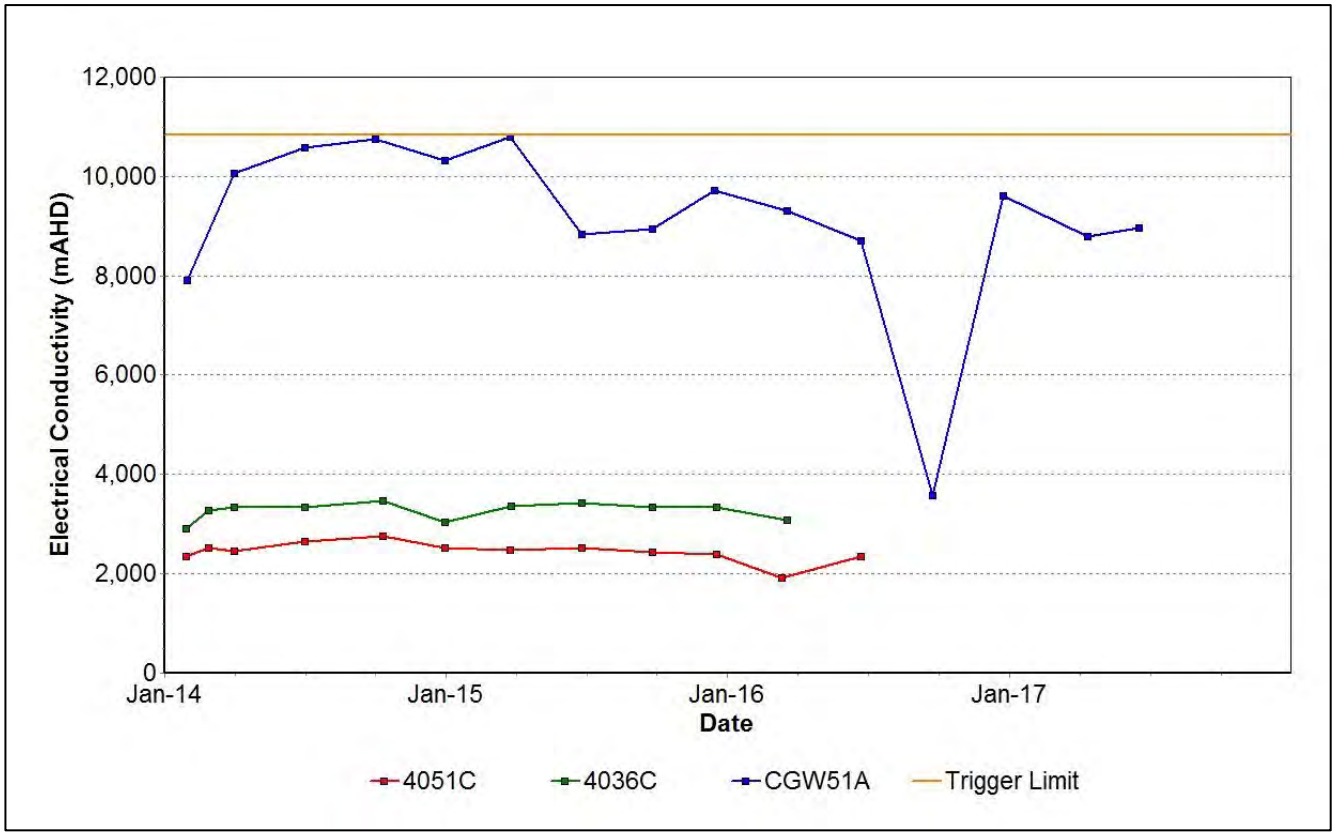


Figure 26: Carrington Interburden Electrical Conductivity Trend - June 2017

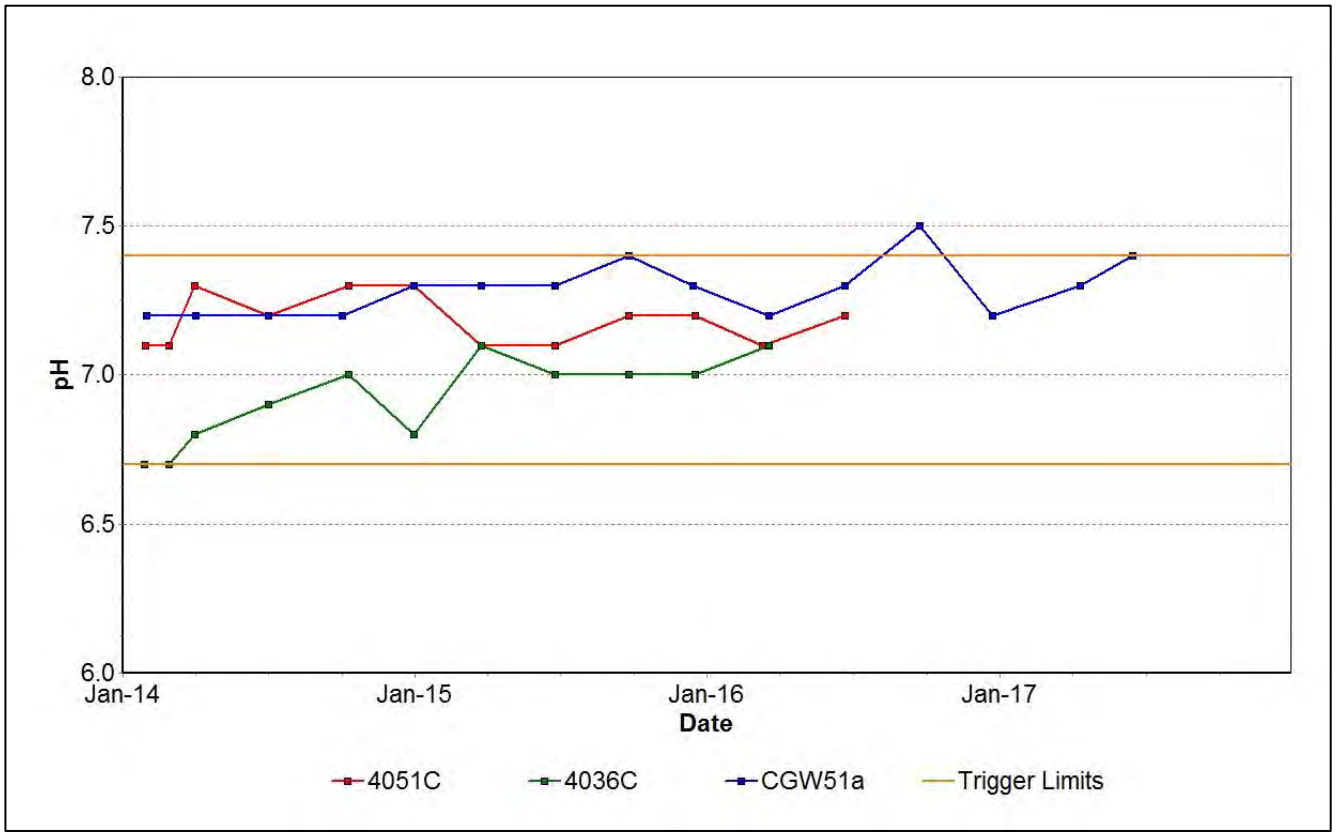


Figure 27: Carrington Interburden pH Trend – June 2017

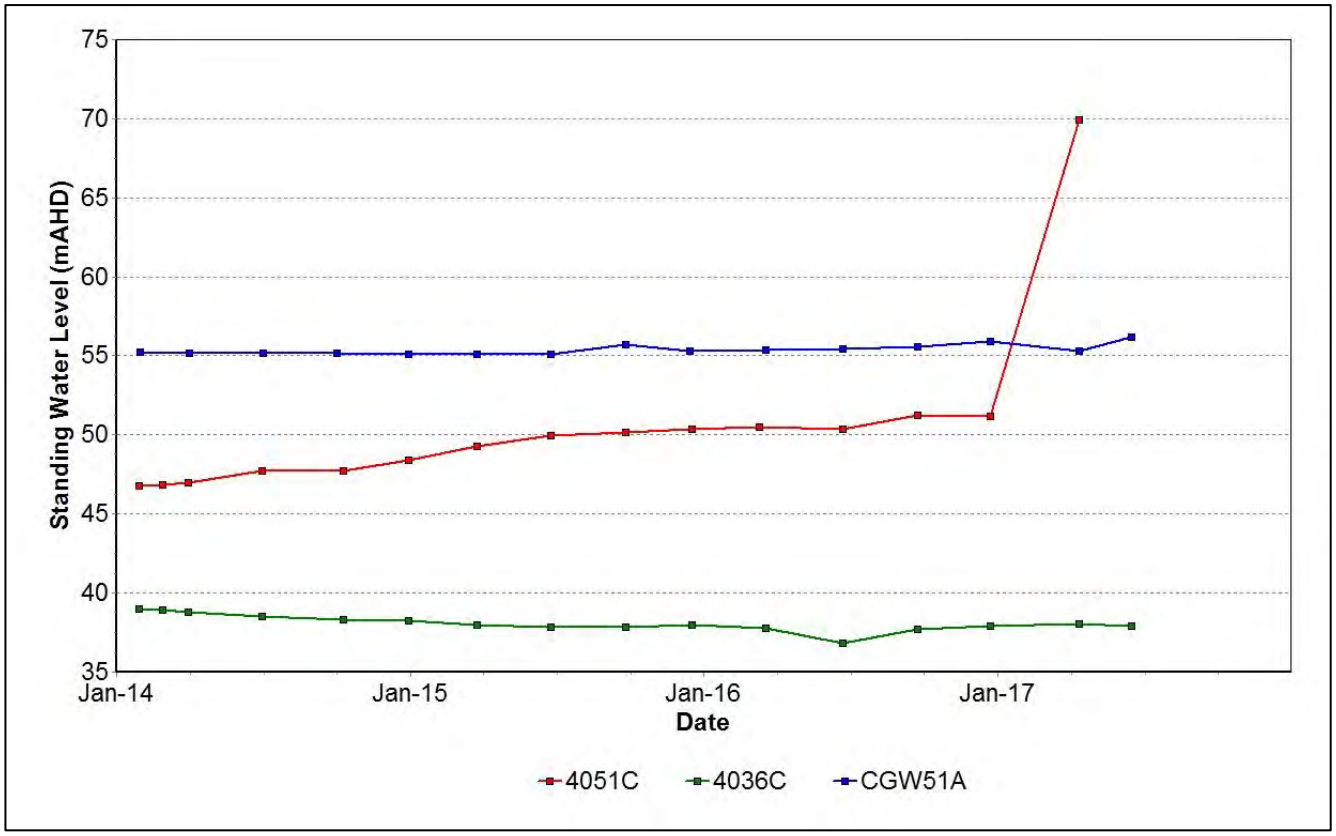


Figure 28: Carrington Interburden Standing Water Level - June 2017

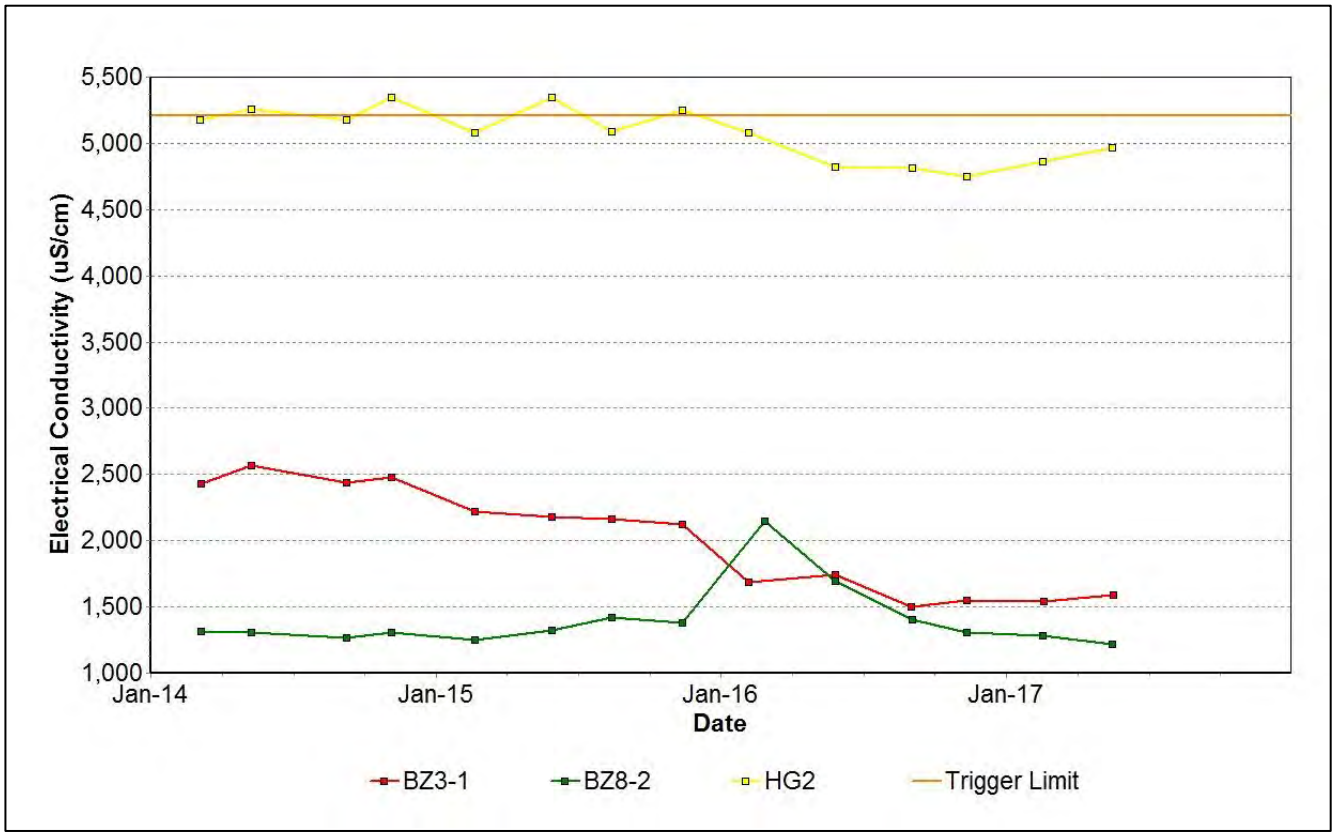


Figure 29: Cheshunt Interburden Electrical Conductivity Trend - June 2017

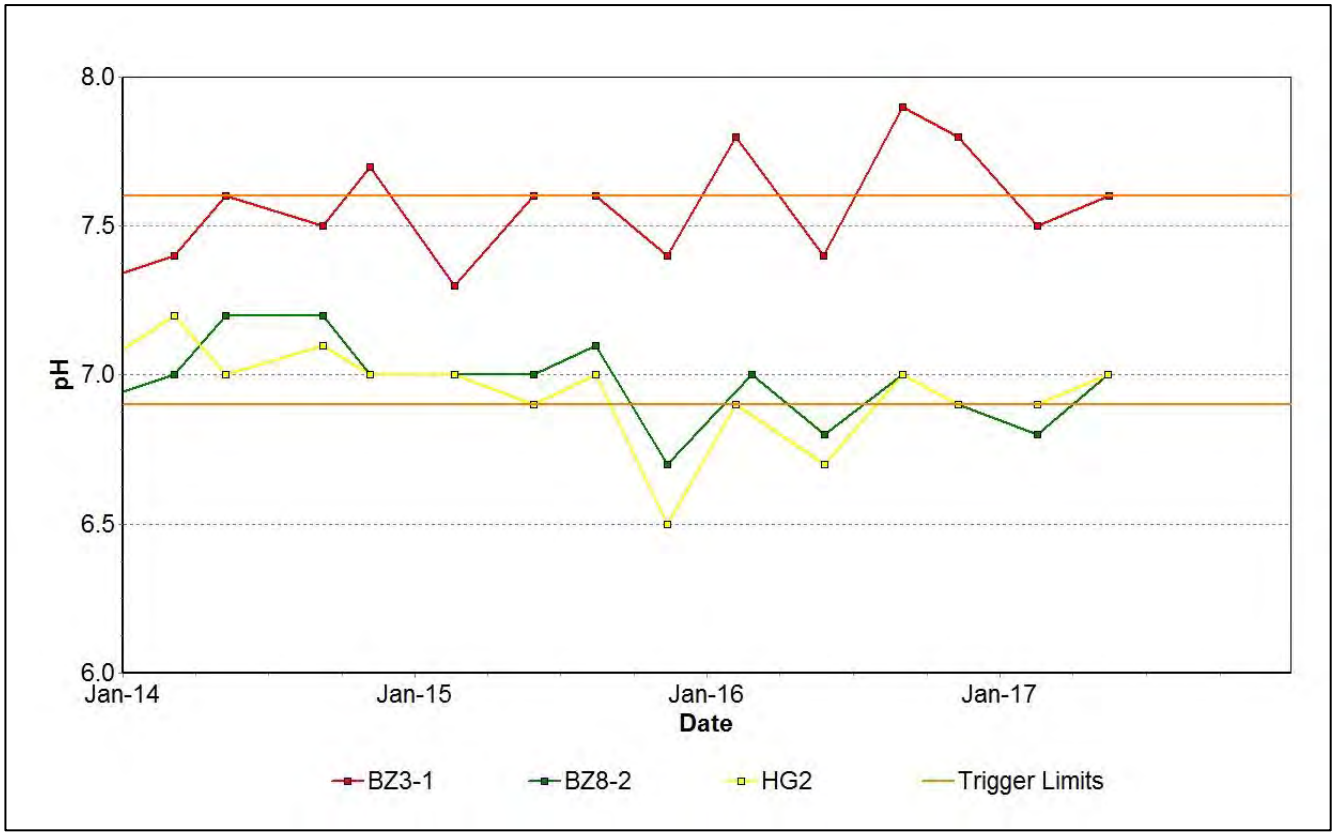


Figure 30: Cheshunt Interburden pH Trend - June 2017

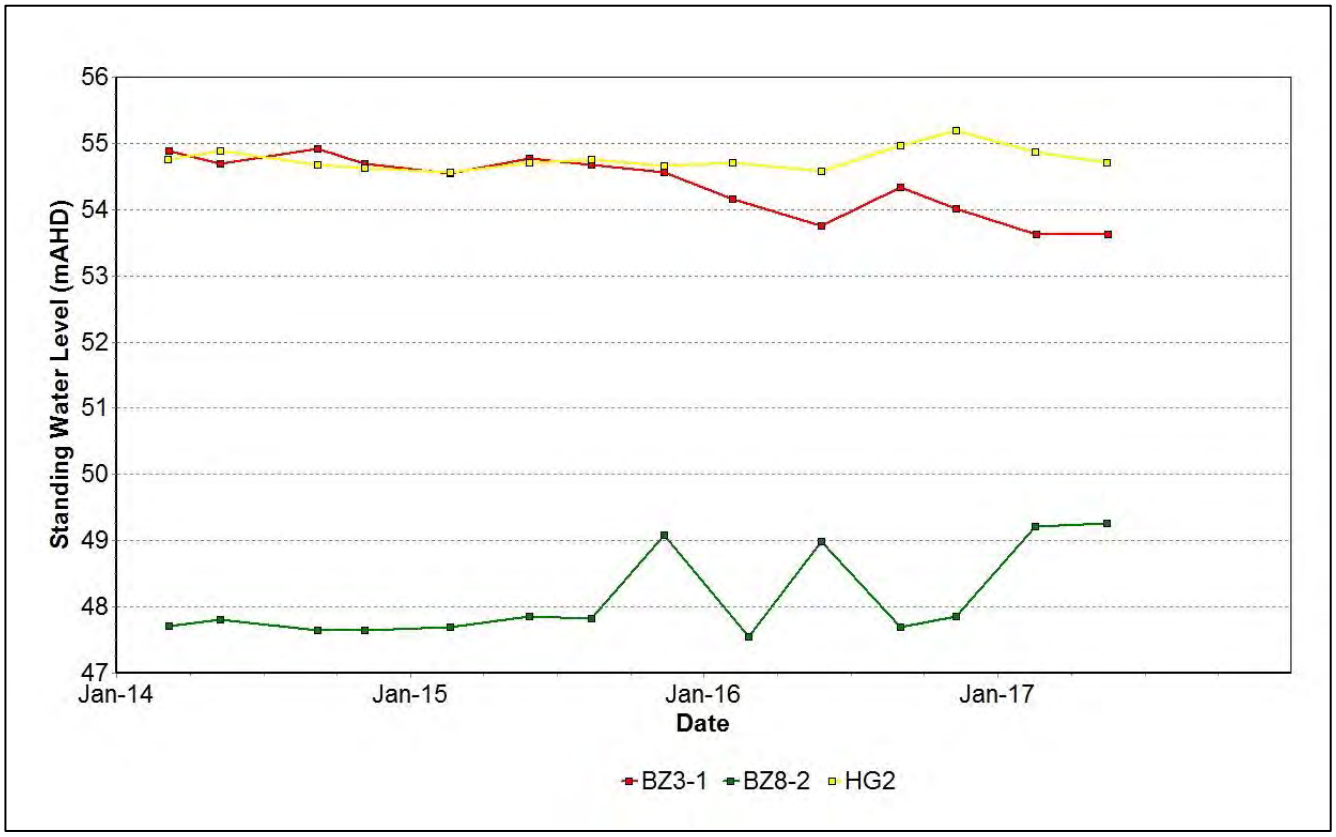


Figure 31: Cheshunt Interburden Standing Water Level – June 2017

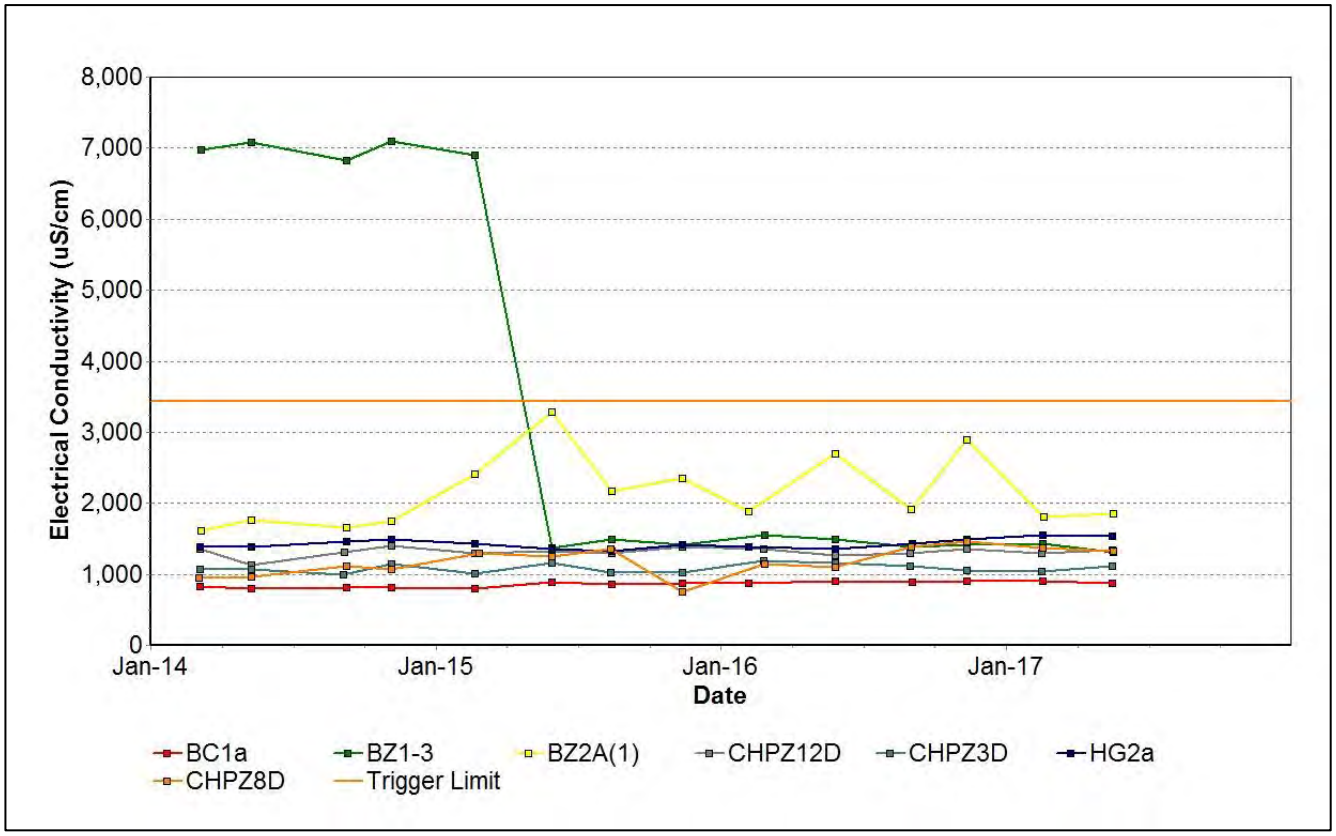


Figure 32: Cheshunt Mt Arthur Electrical Conductivity Trend - June 2017

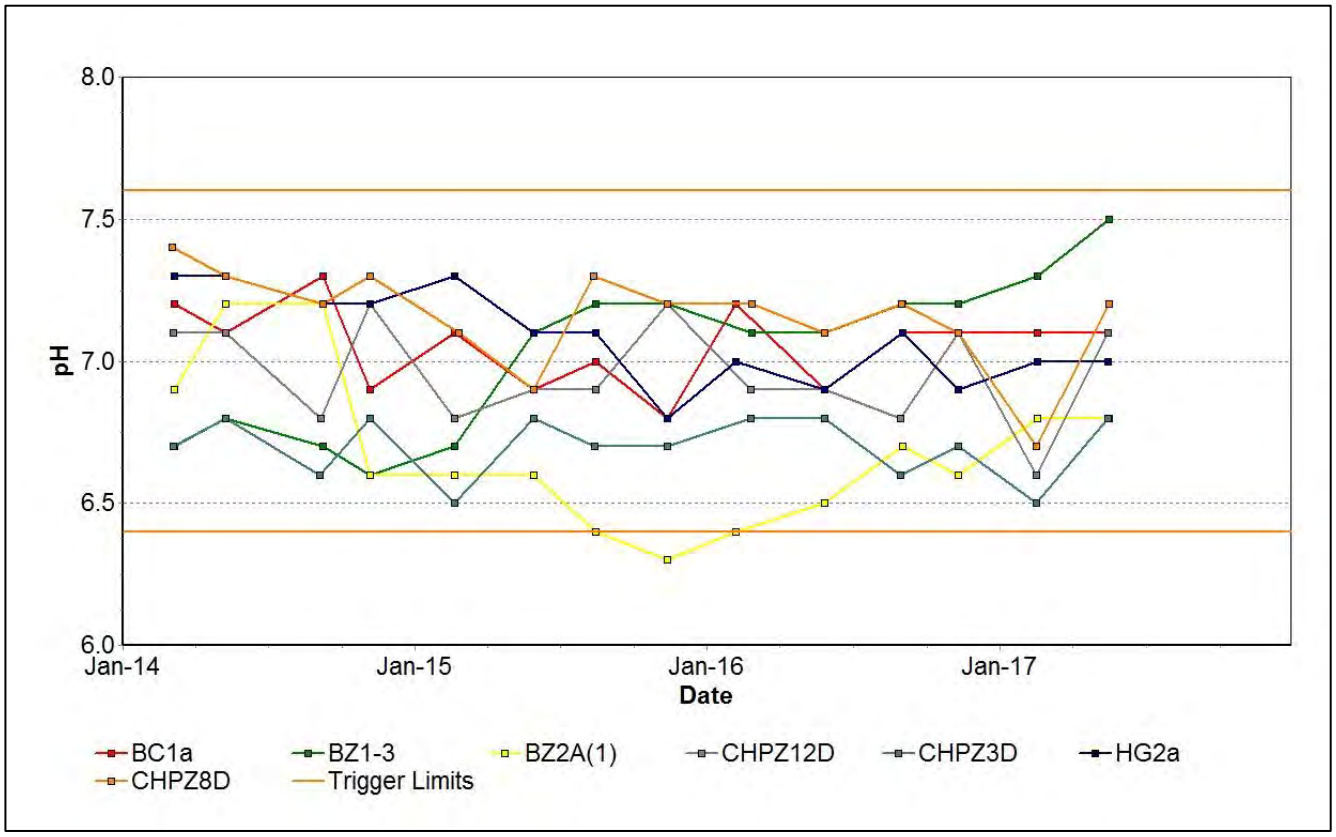


Figure 33: Cheshunt Mt Arthur pH Trend - June 2017

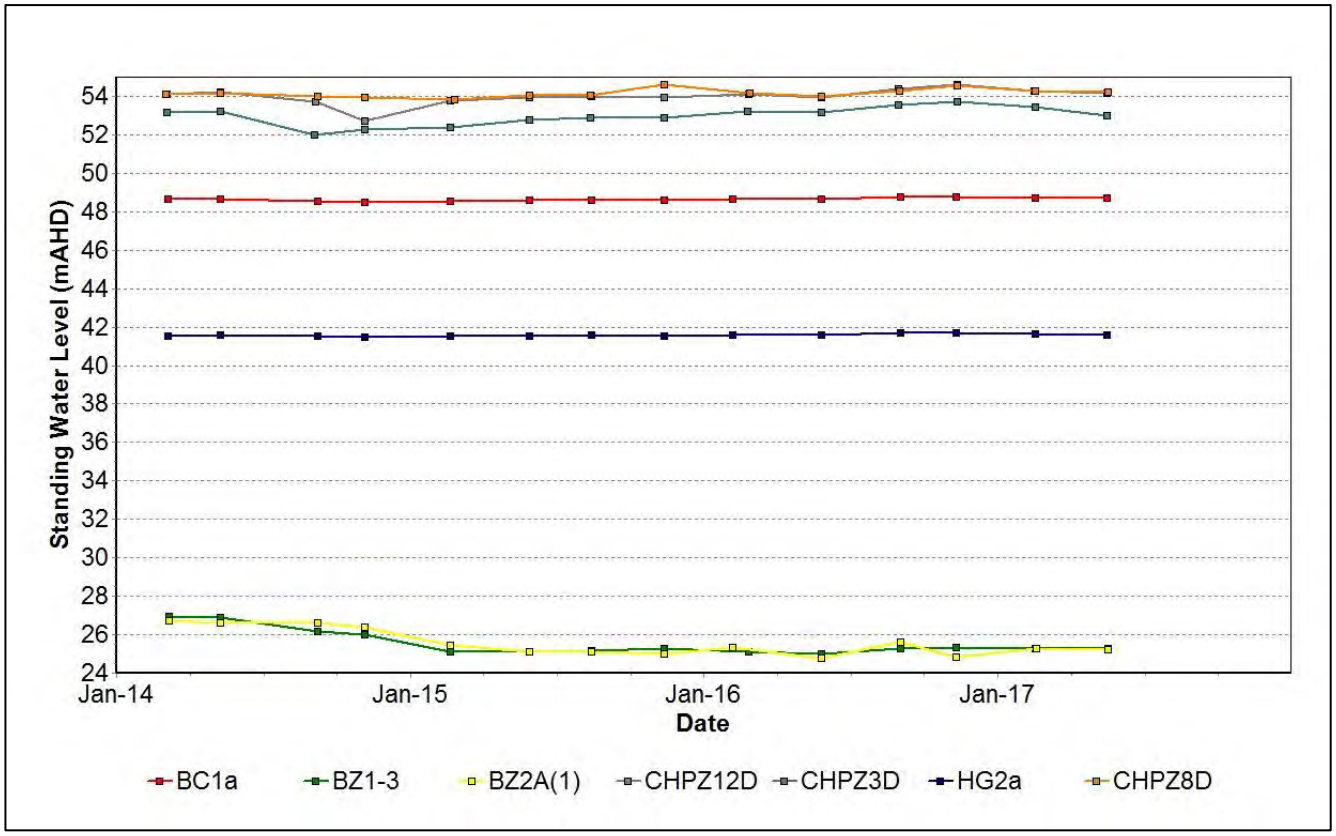


Figure 34: Cheshunt Mt Arthur Standing Water Level – June 2017

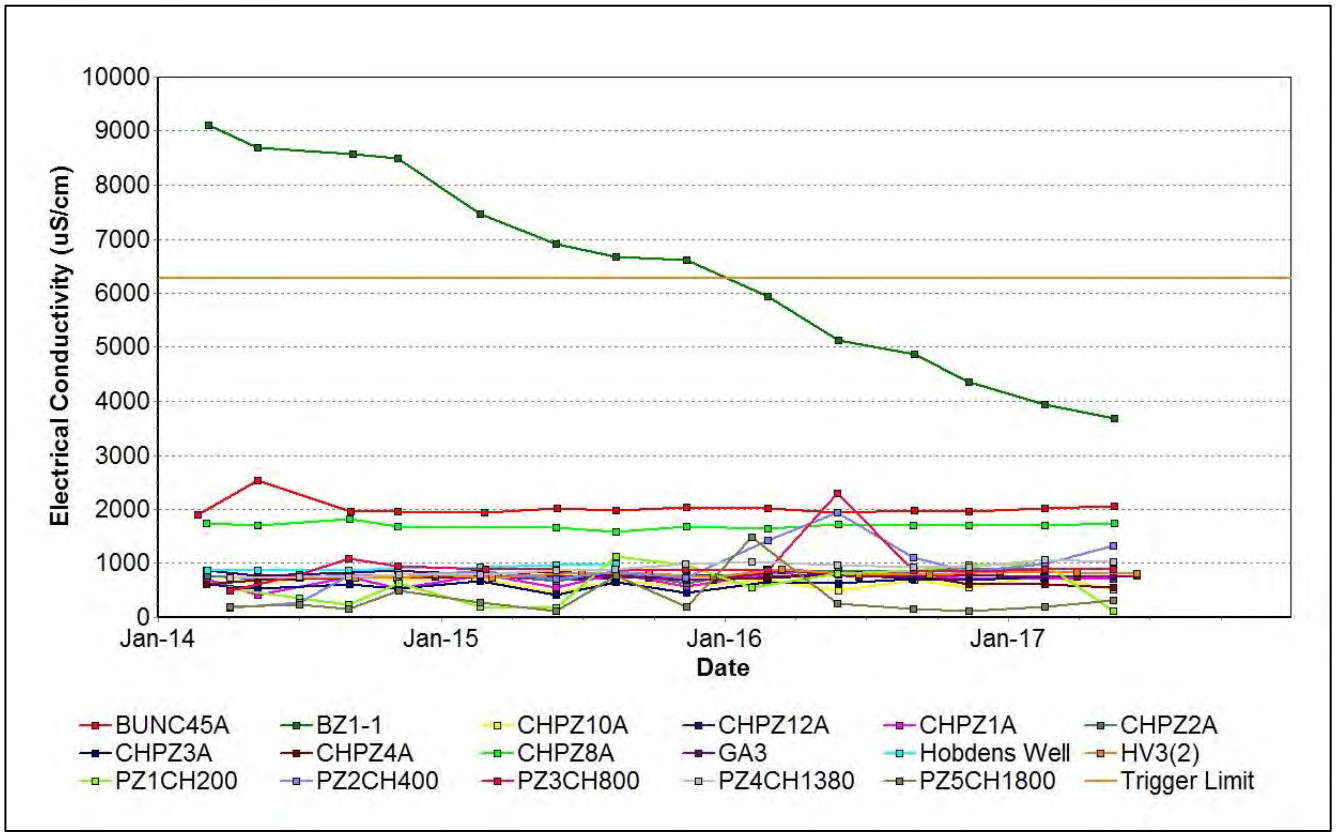


Figure 35: Cheshunt / North Pit Alluvium Electrical Conductivity Trend - June 2017

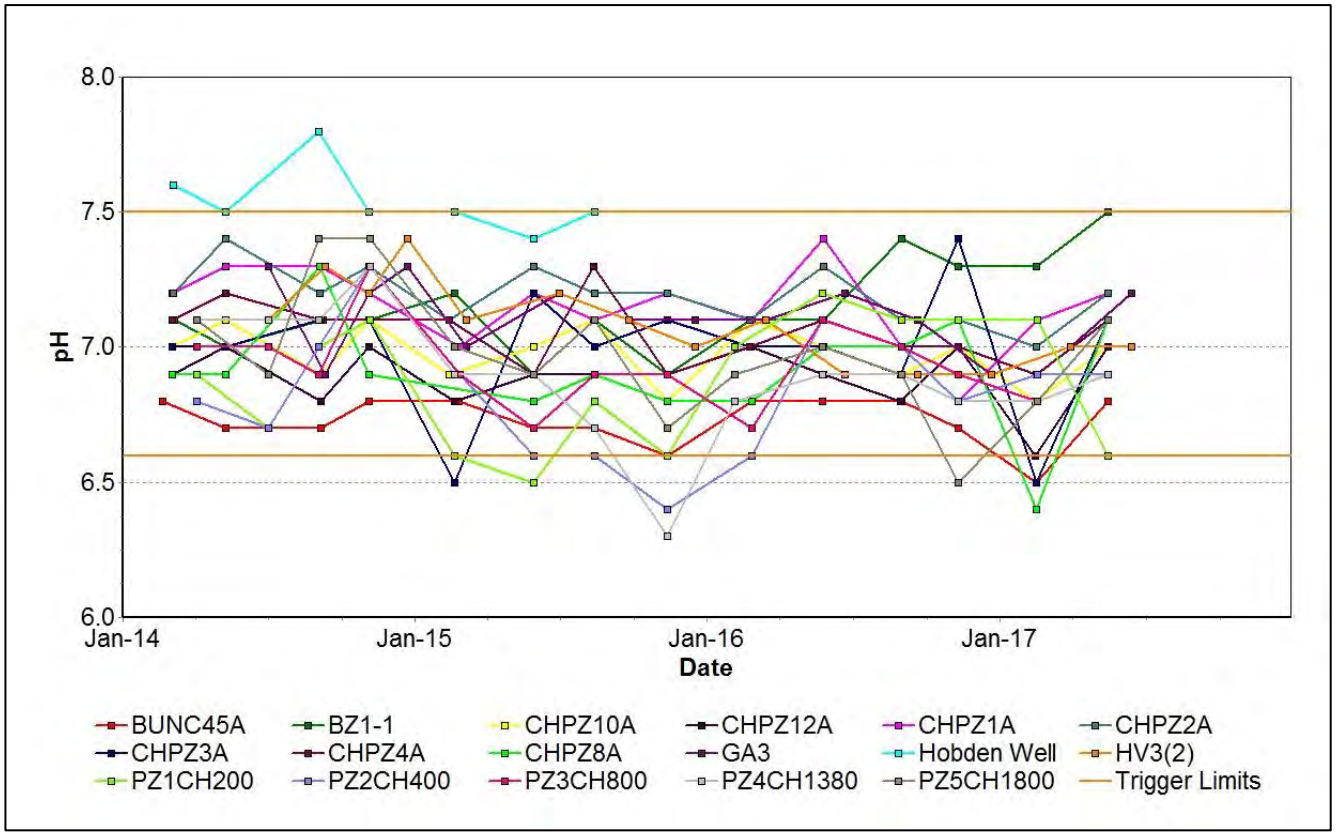


Figure 36: Cheshunt / North Pit Alluvium pH Trend - June 2017

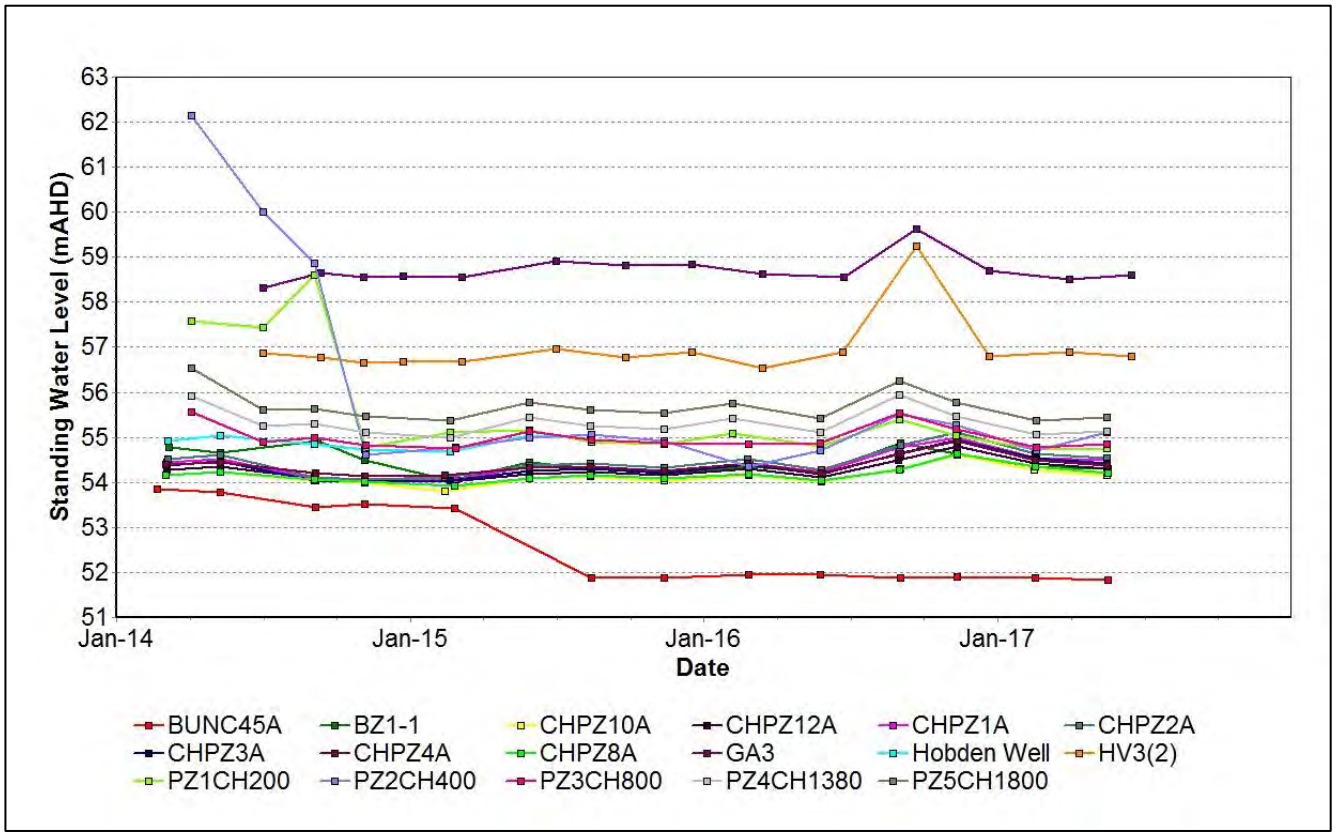


Figure 37: Cheshunt / North Pit Alluvium Standing Water Level – June 2017

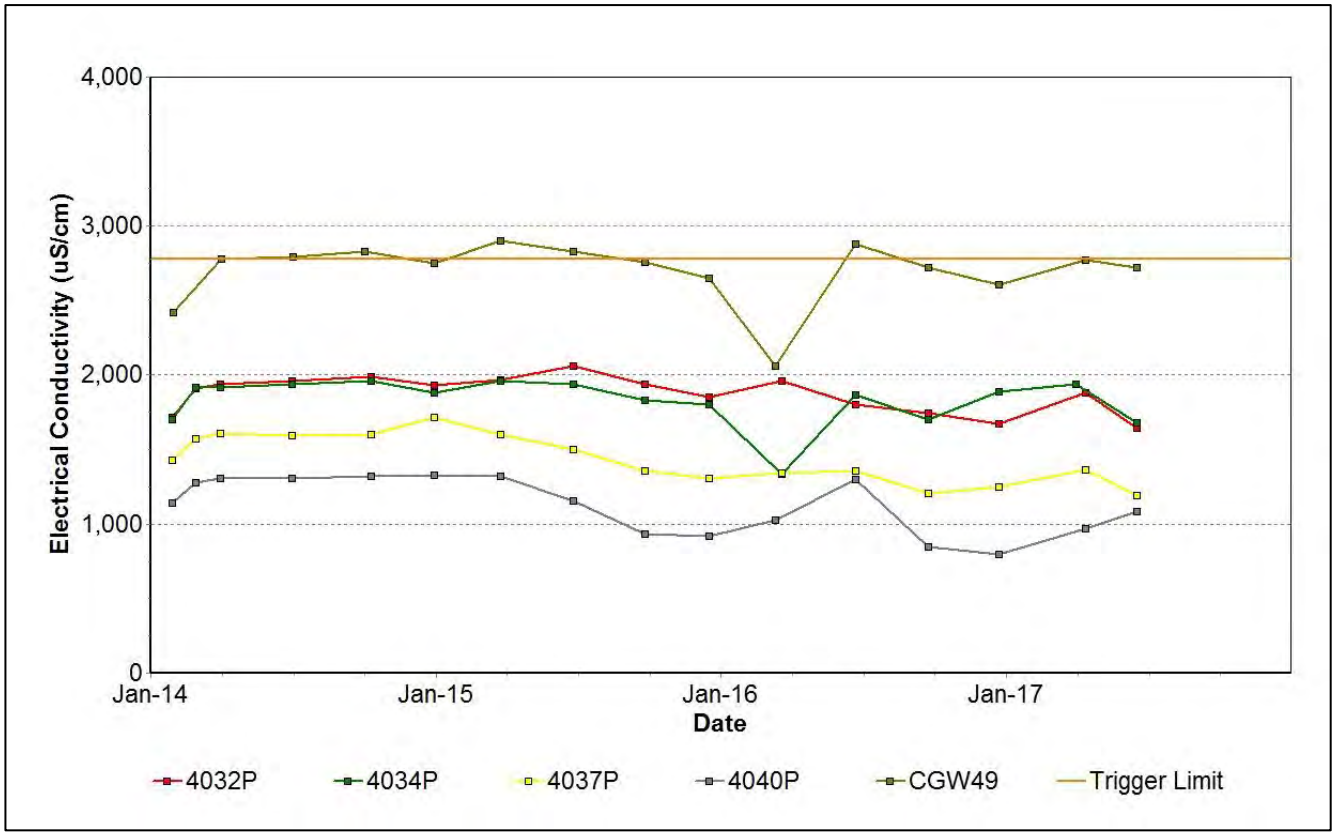


Figure 38: Carrington West Wing Alluvium Electrical Conductivity Trend - June 2017

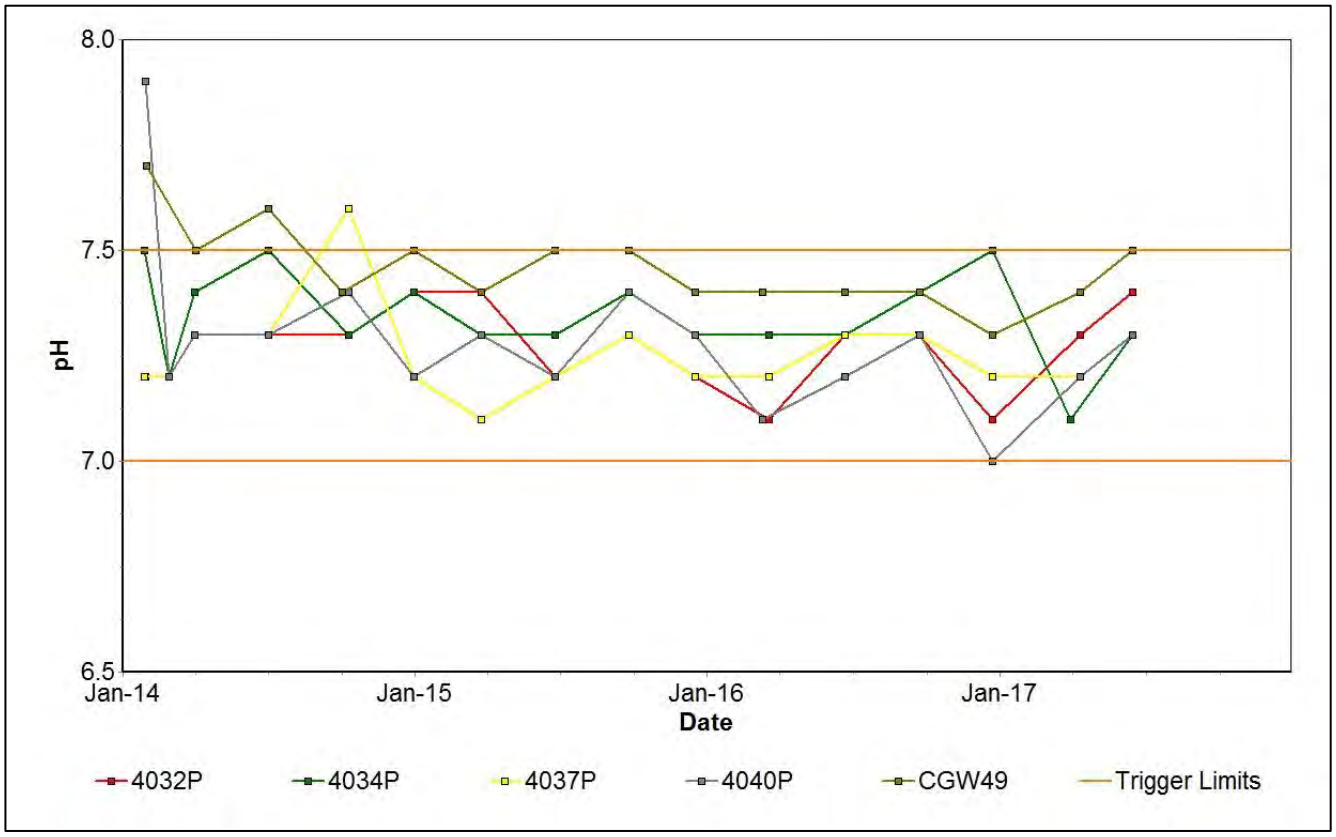


Figure 39: Carrington West Wing Alluvium pH Trend - June 2017

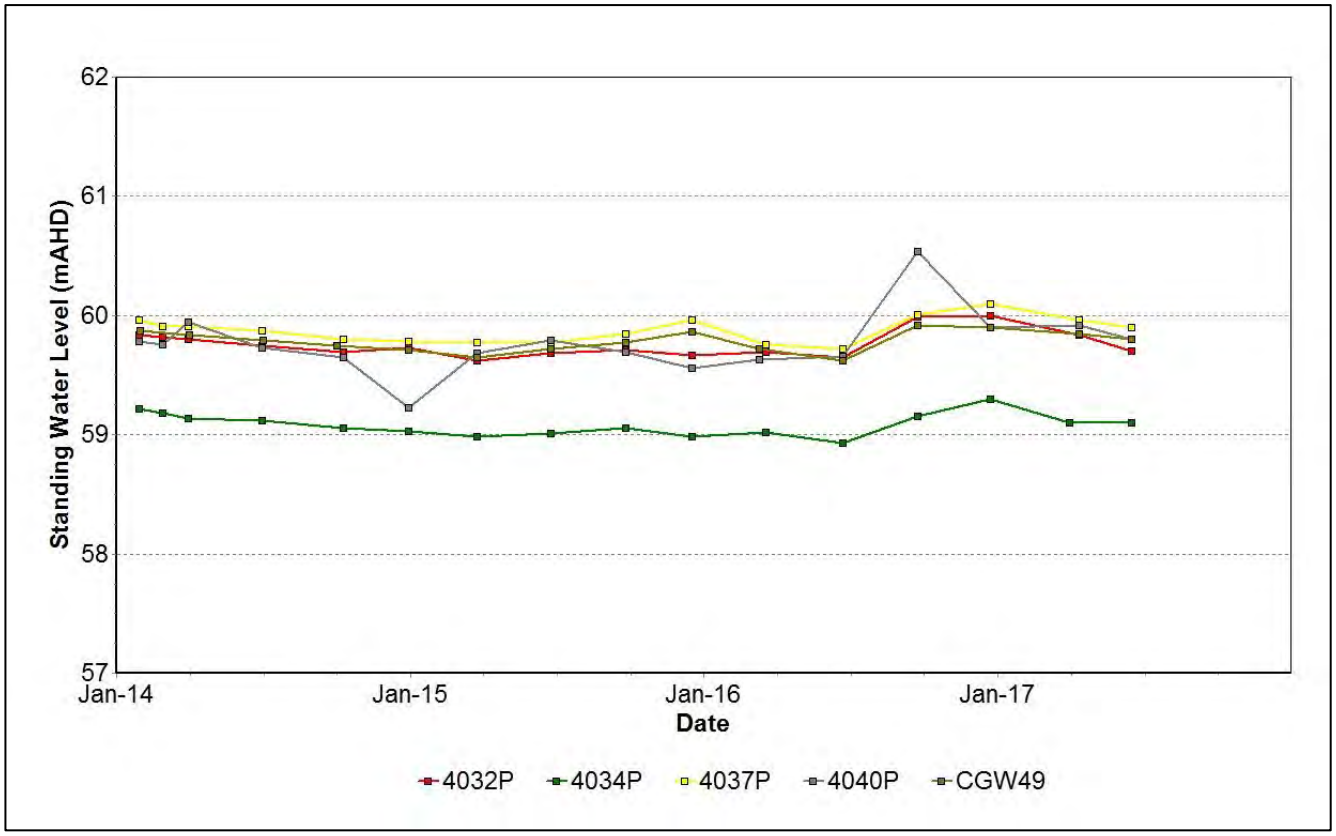


Figure 40: Carrington West Wing Alluvium Standing Water Level – June 2017

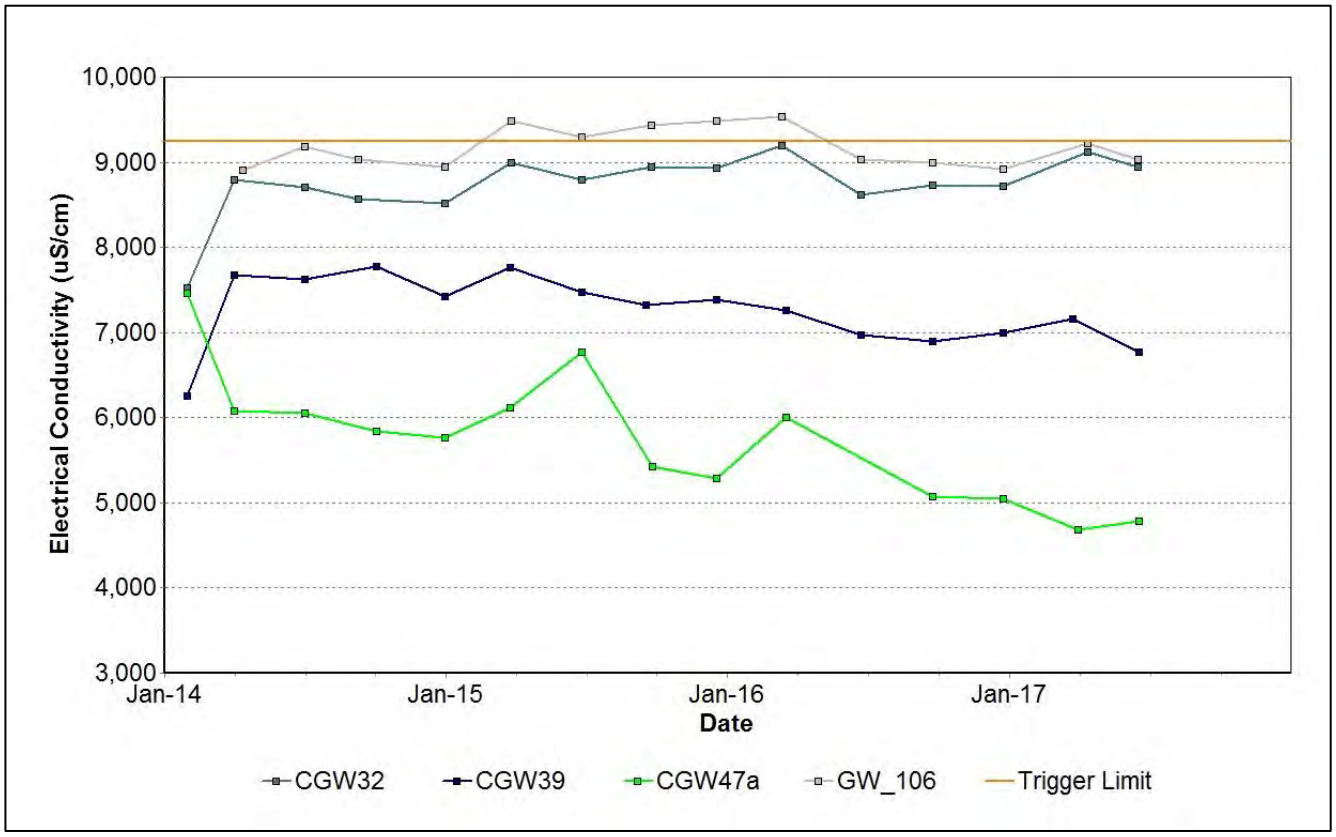


Figure 41: Carrington West Wing Flood Plain Electrical Conductivity Trend - June 2017

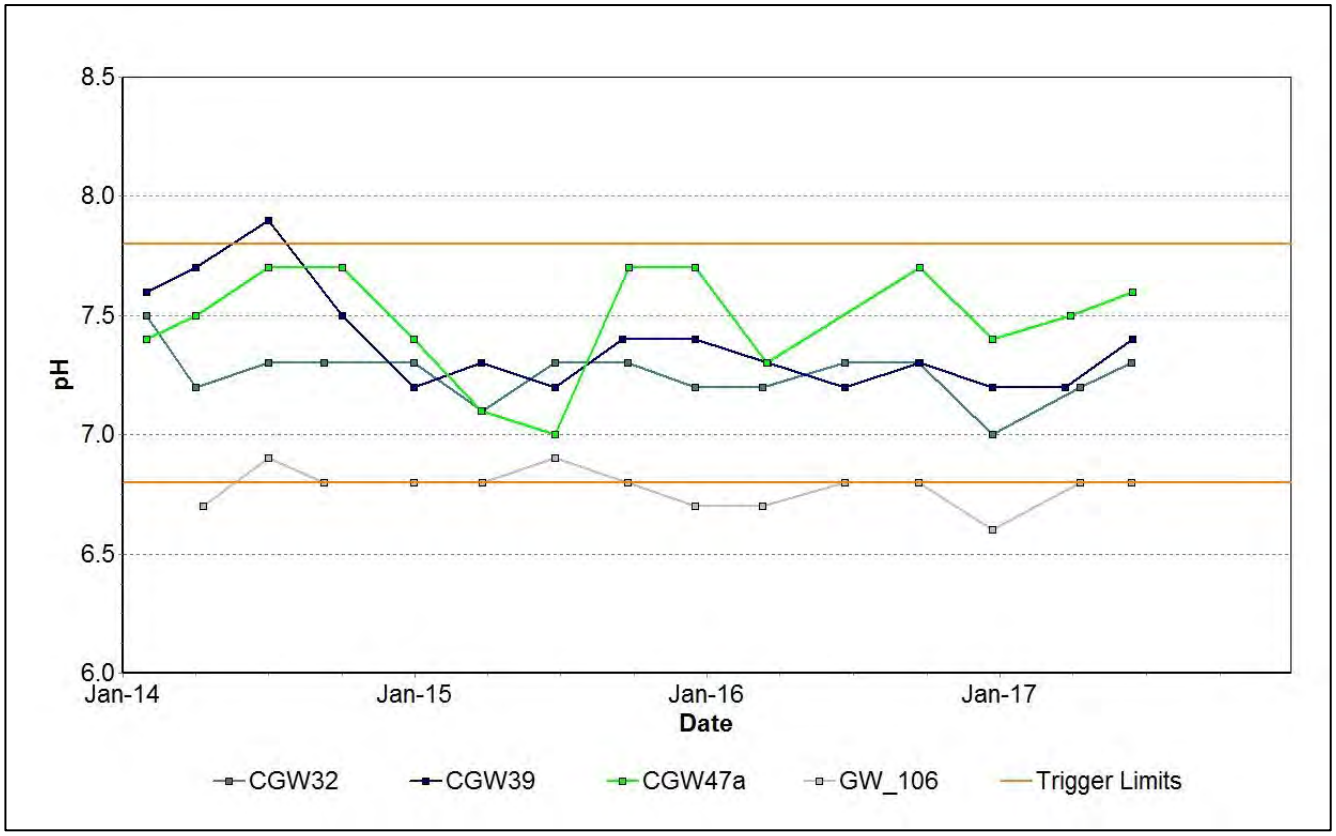


Figure 42: Carrington West Wing Flood Plain pH Trend - June 2017

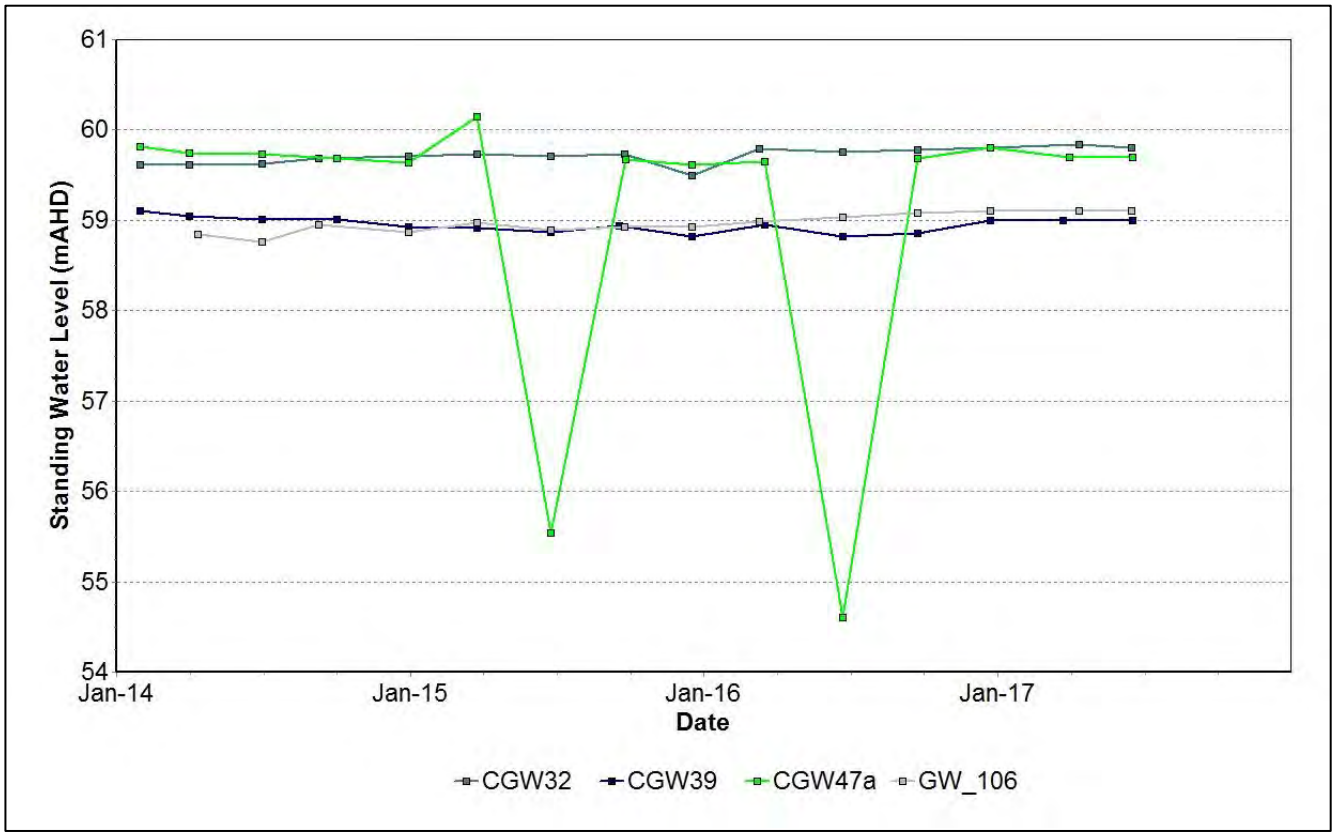


Figure 43: Carrington West Wing Flood Plain Standing Water Level – June 2017

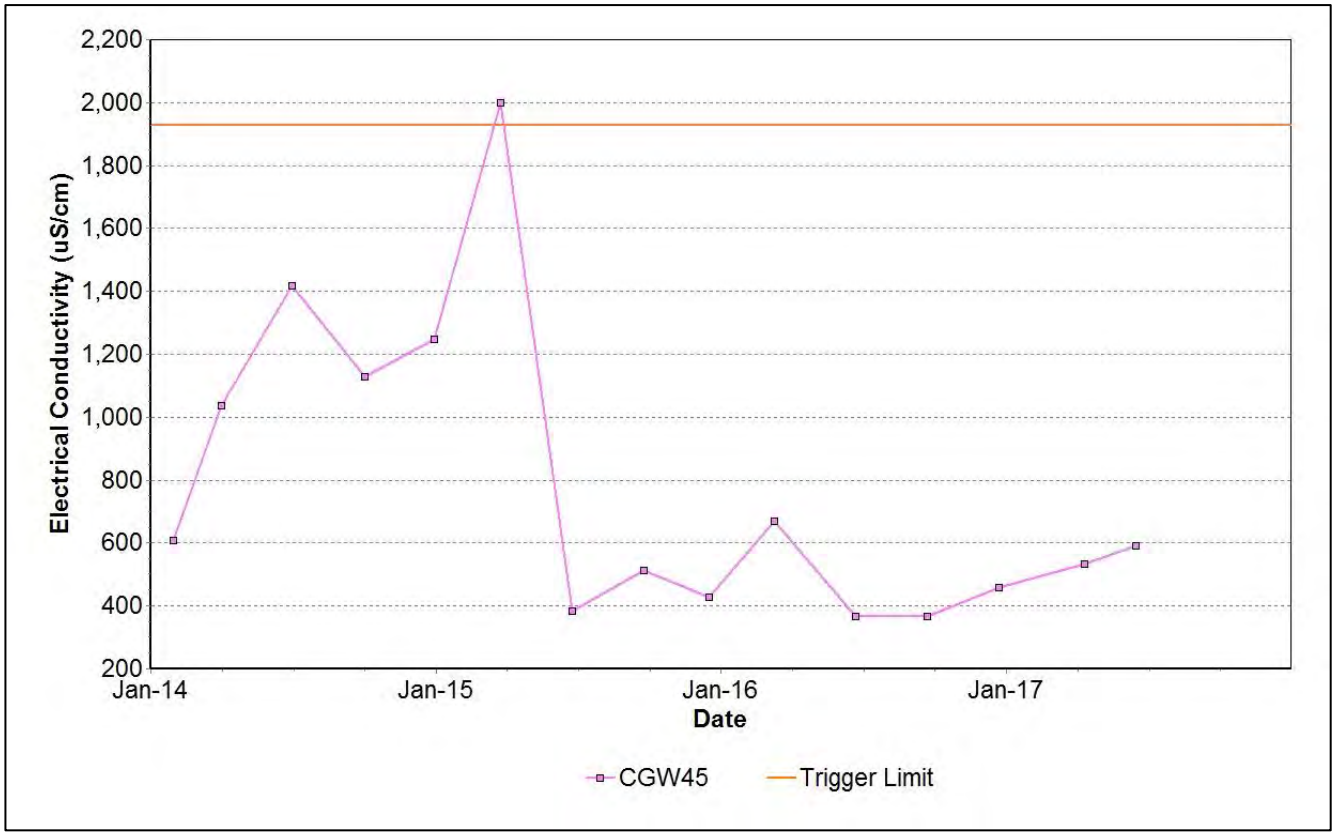


Figure 44: Carrington West Wing LBL Electrical Conductivity Trend - June 2017

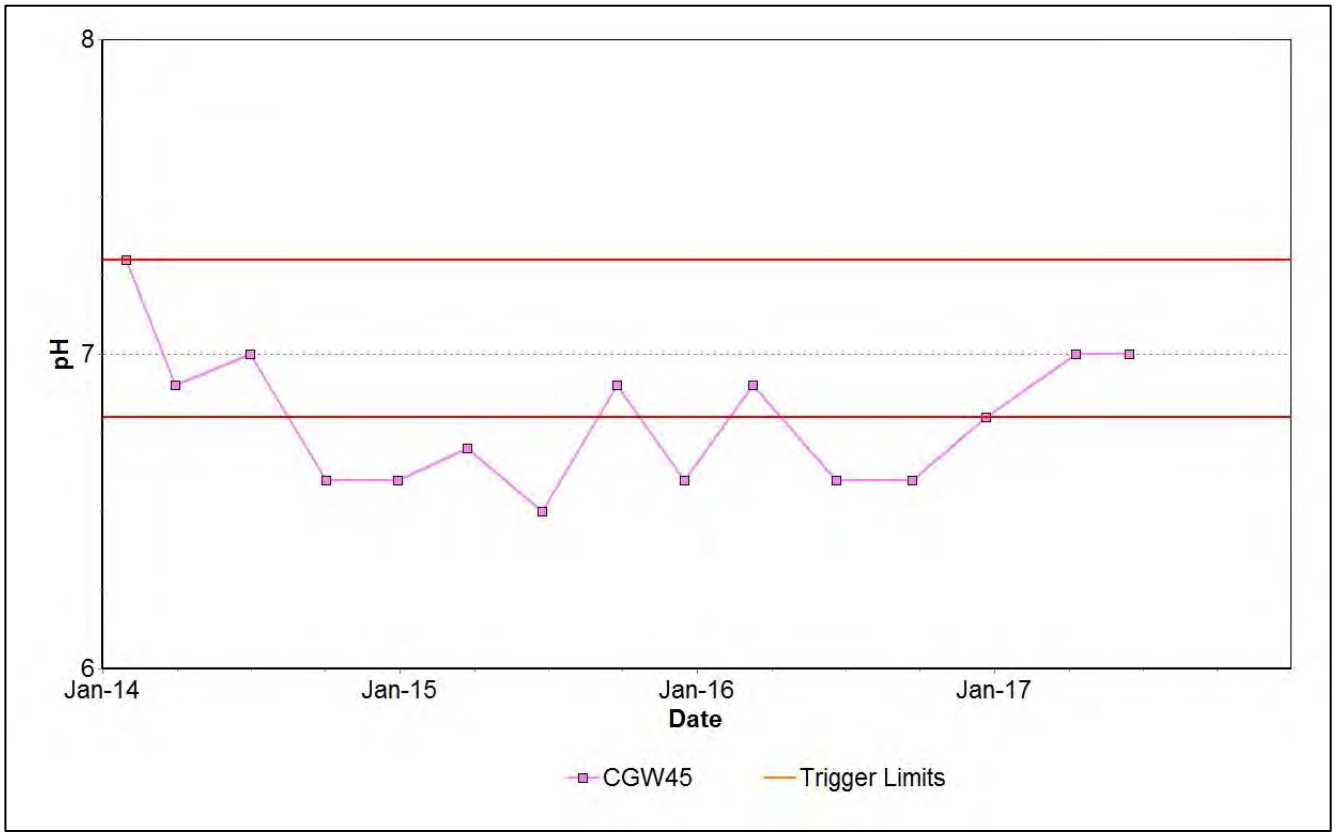


Figure 45: Carrington West Wing LBL pH Trend - June 2017

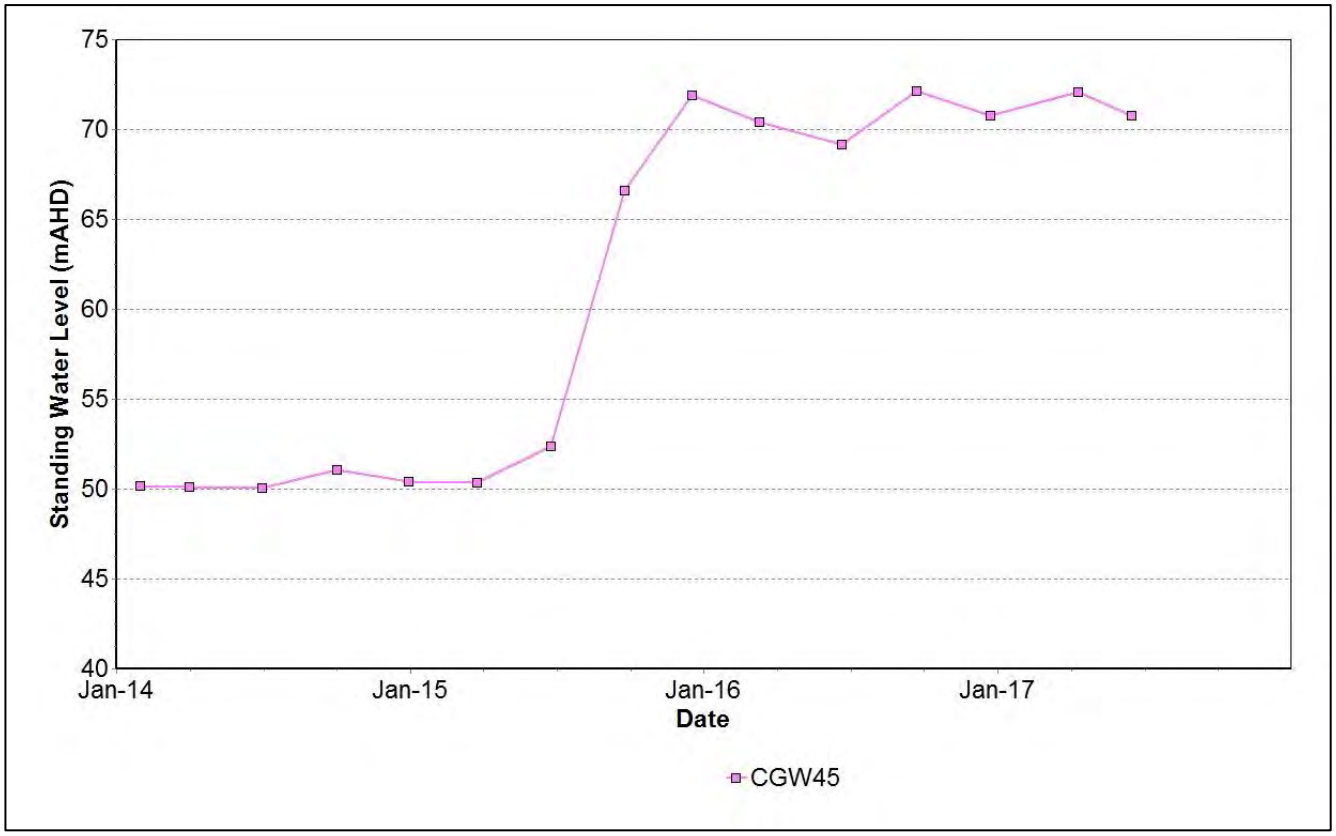


Figure 46: Carrington West Wing LBL Standing Water Level - June 2017

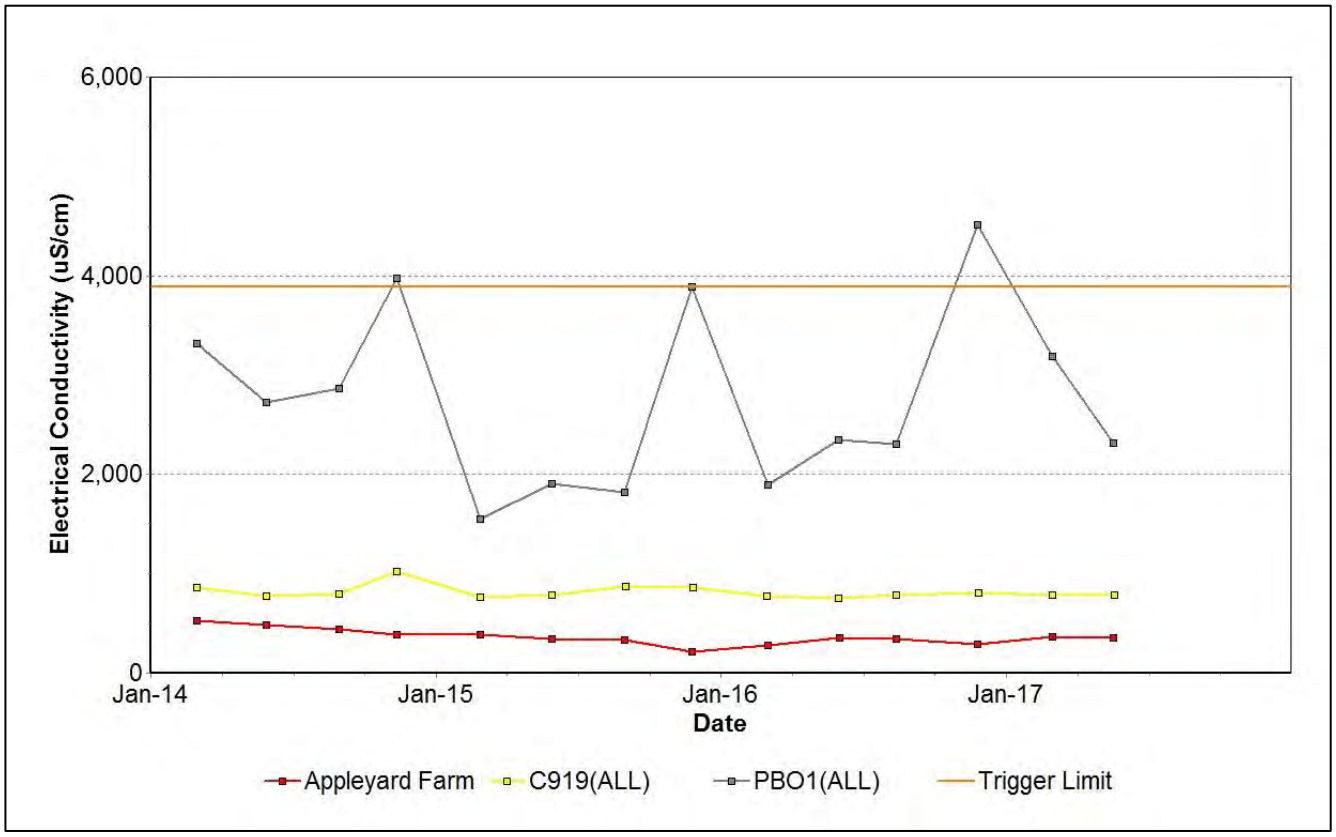


Figure 47: Lemington South Alluvium Electrical Conductivity Trend - June 2017

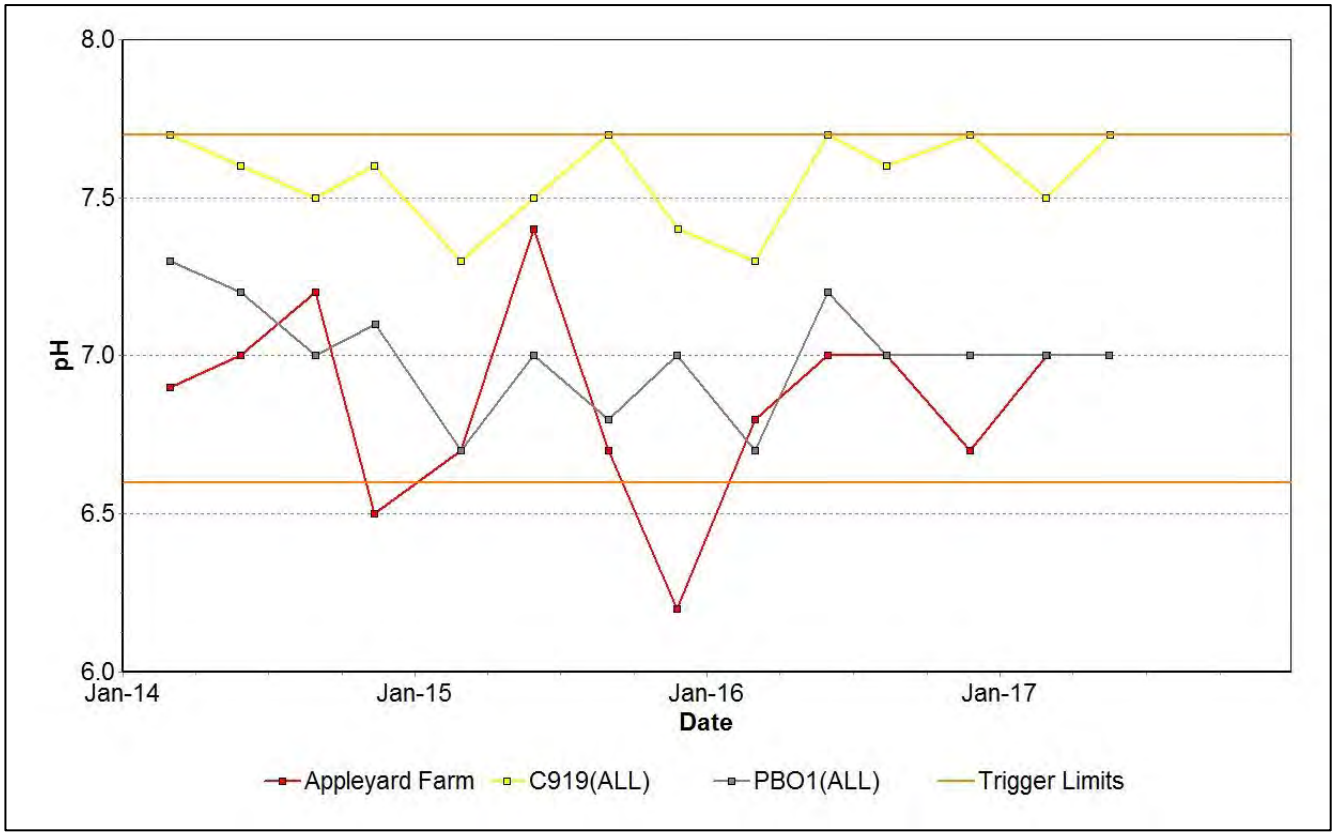


Figure 48: Lemington South Alluvium pH Trend – June 2017

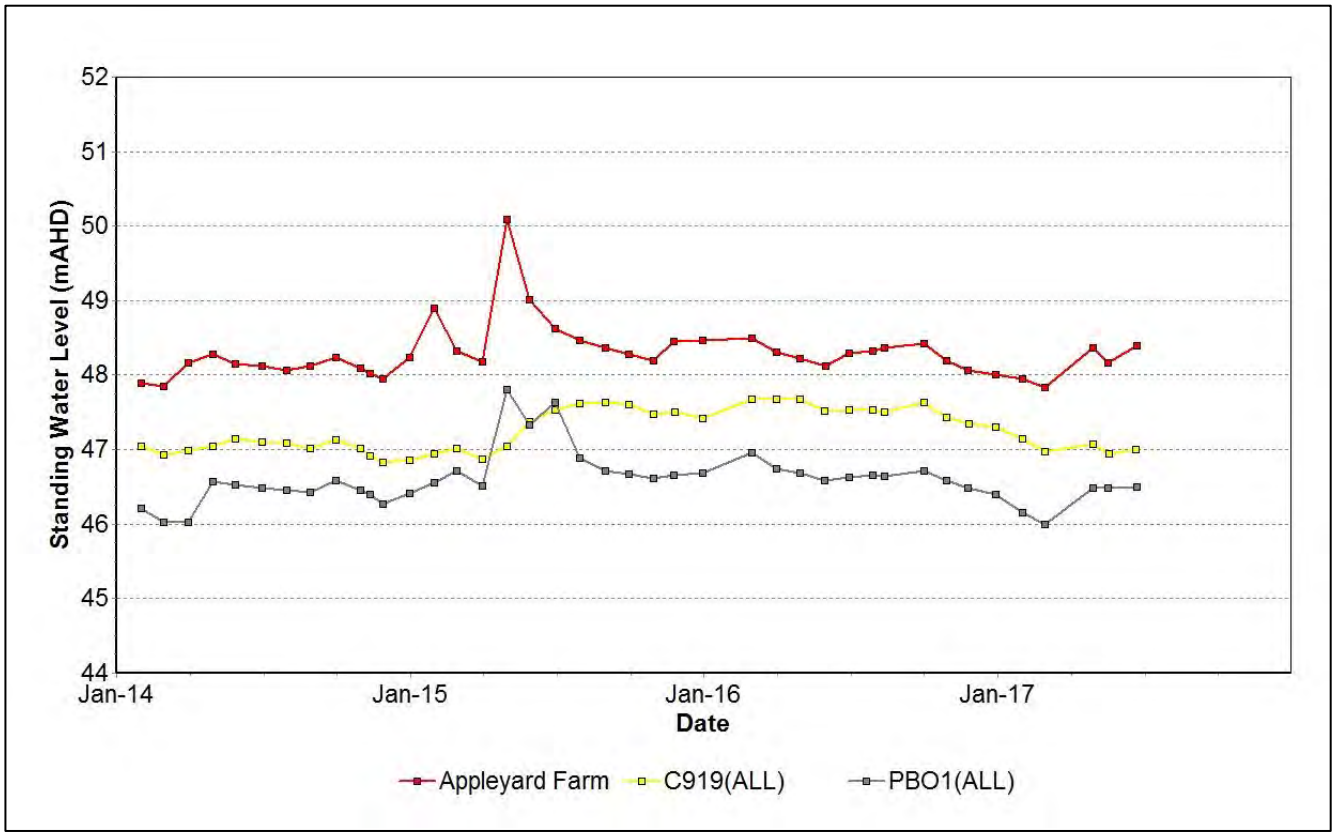


Figure 49: Lemington South Alluvium Standing Water Level Trend – June 2017

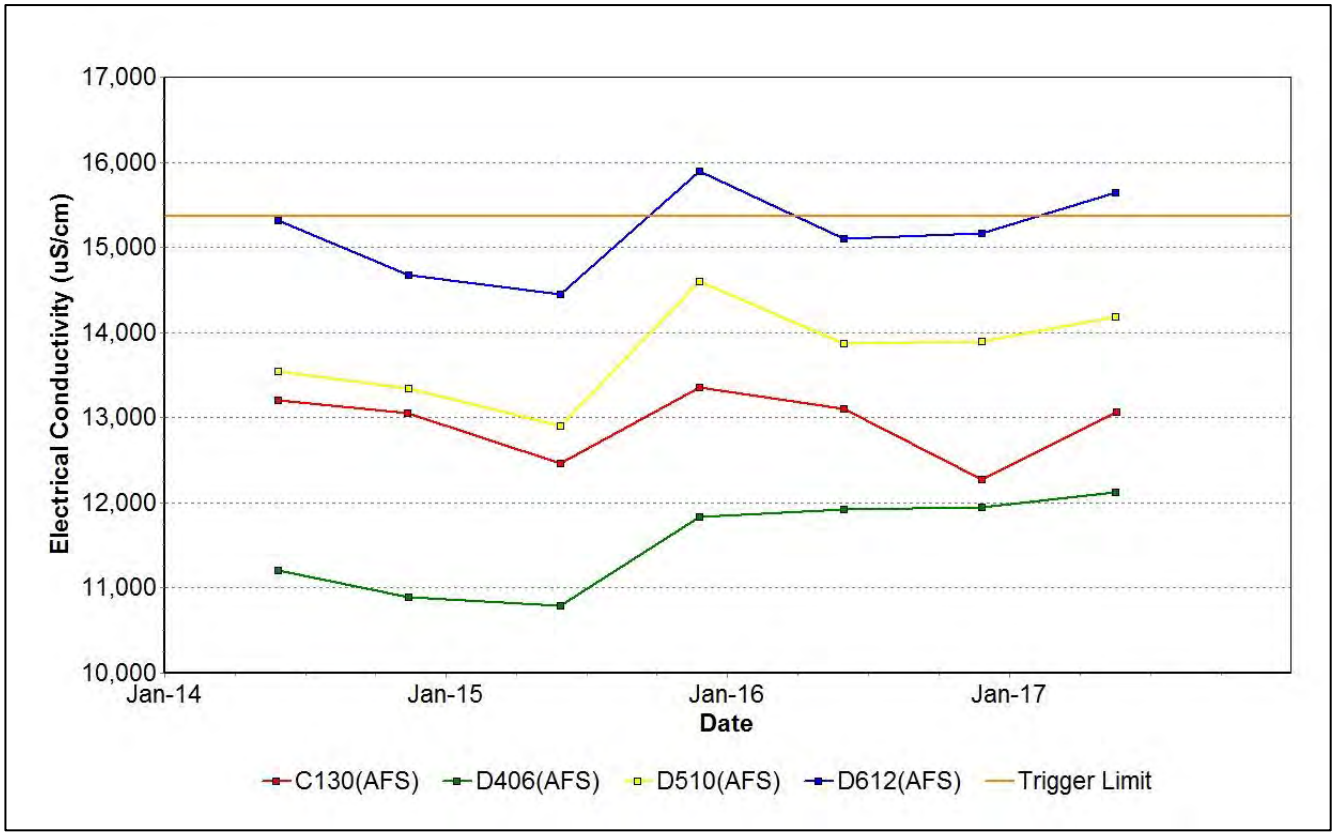


Figure 50: Lemington South Arrowfield Electrical Conductivity Trend – June 2017

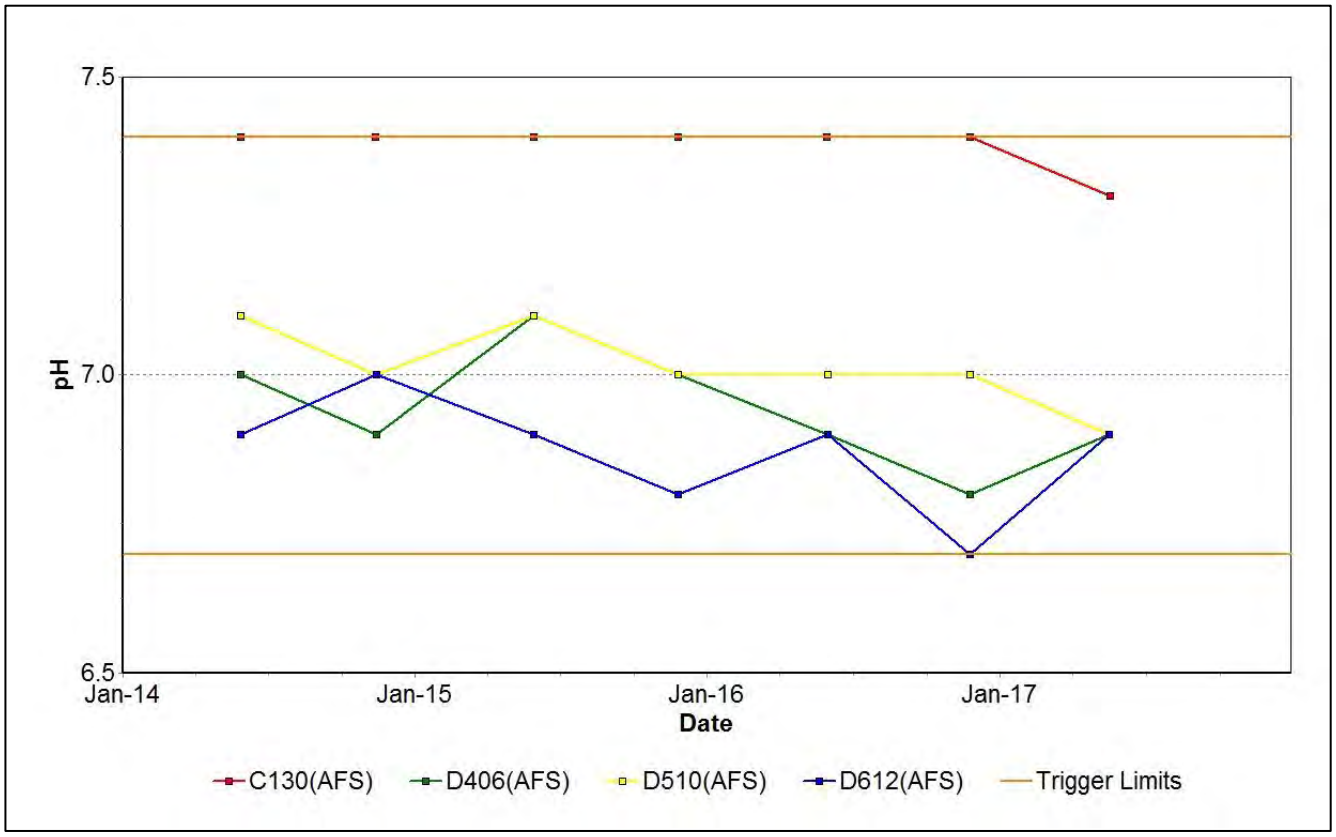


Figure 51: Lemington South Arrowfield pH Trend – June 2017

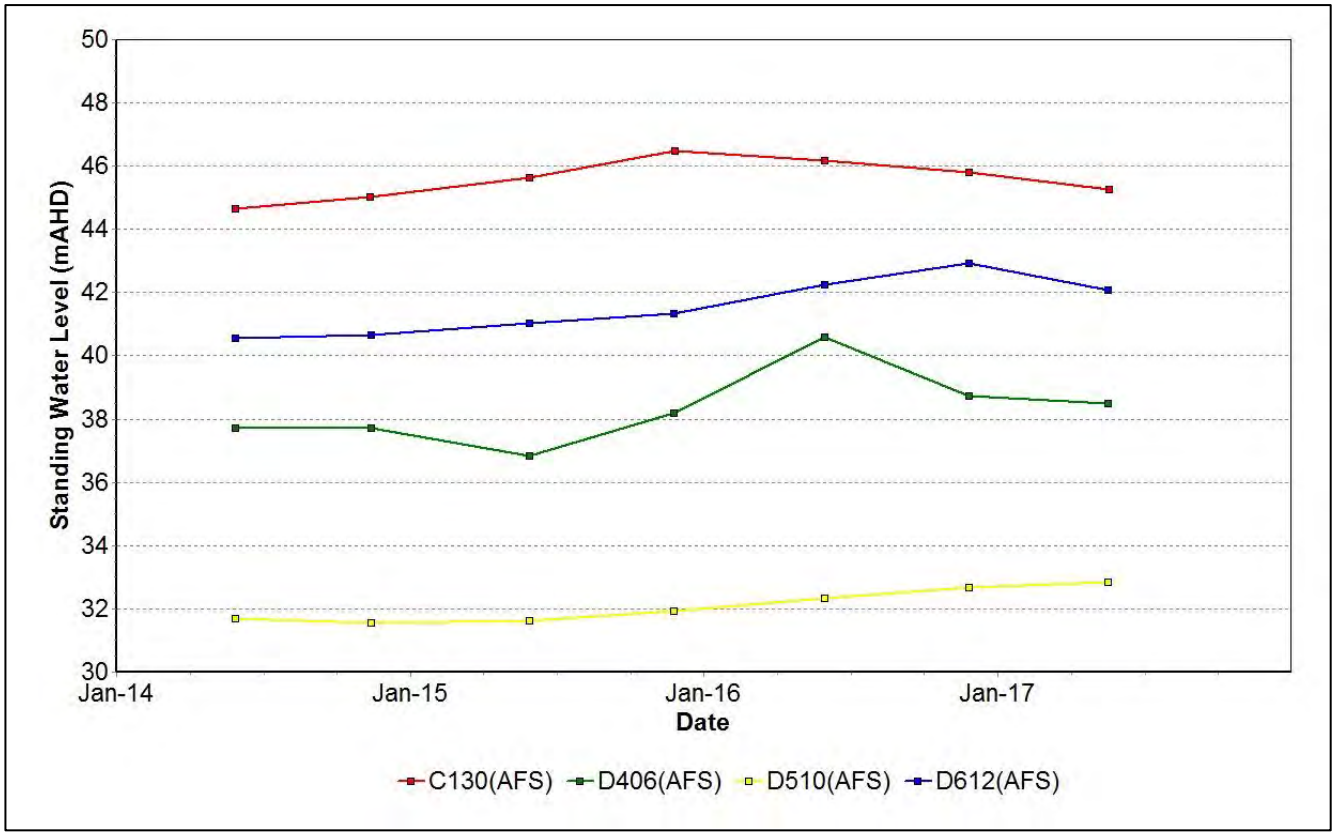


Figure 52: Lemington South Arrowfield Standing Water Level - June 2017

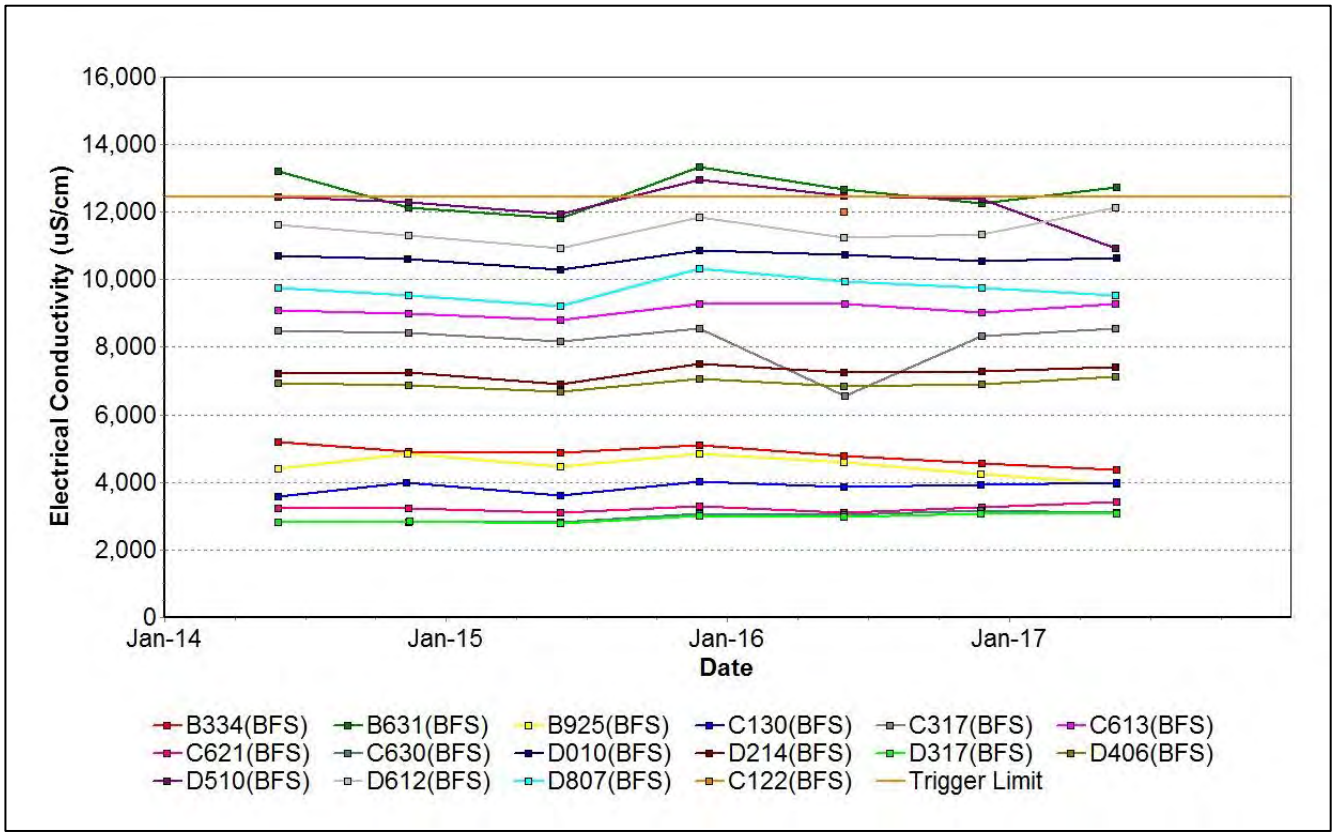


Figure 53: Lemington South Bowfield Electrical Conductivity Trend - June 2017

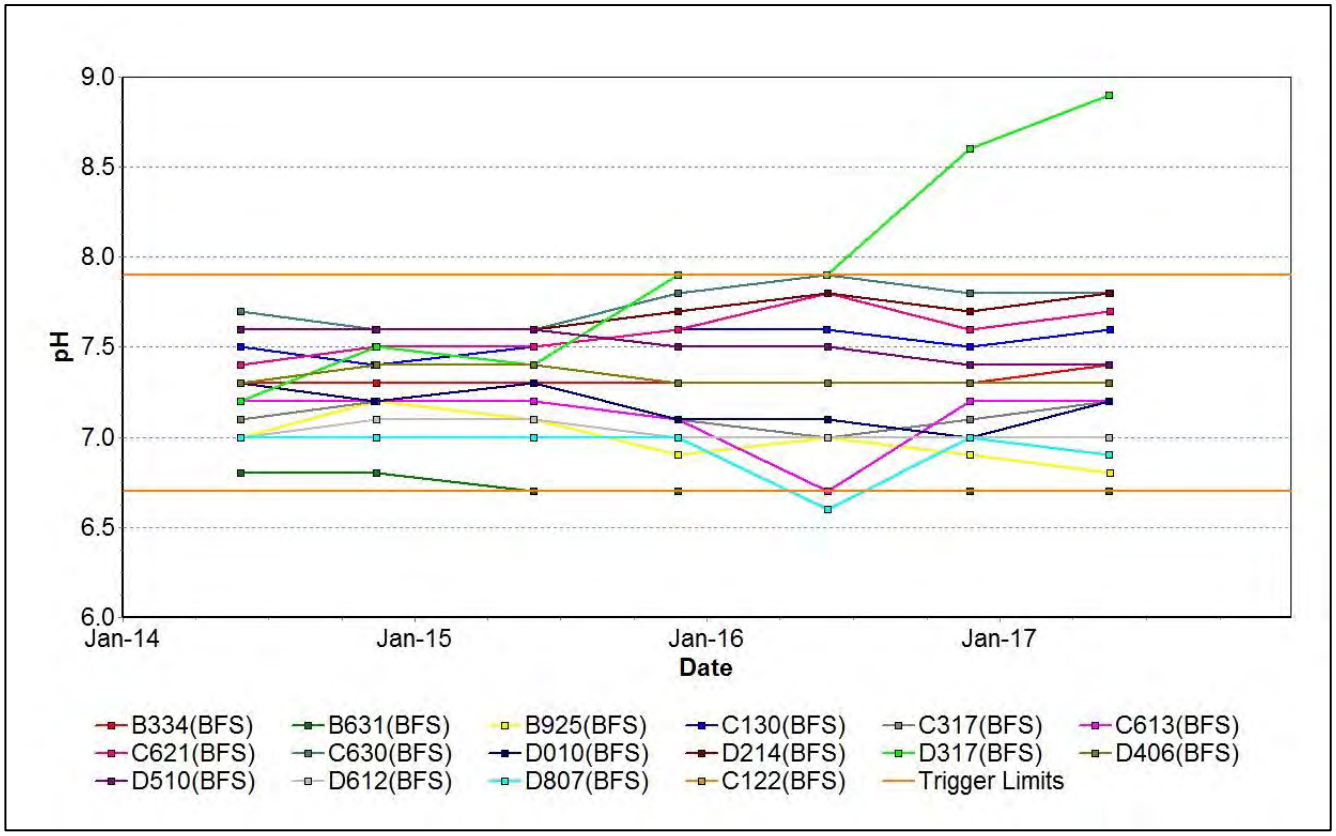


Figure 54: Lemington South Bowfield pH Trend - June 2017

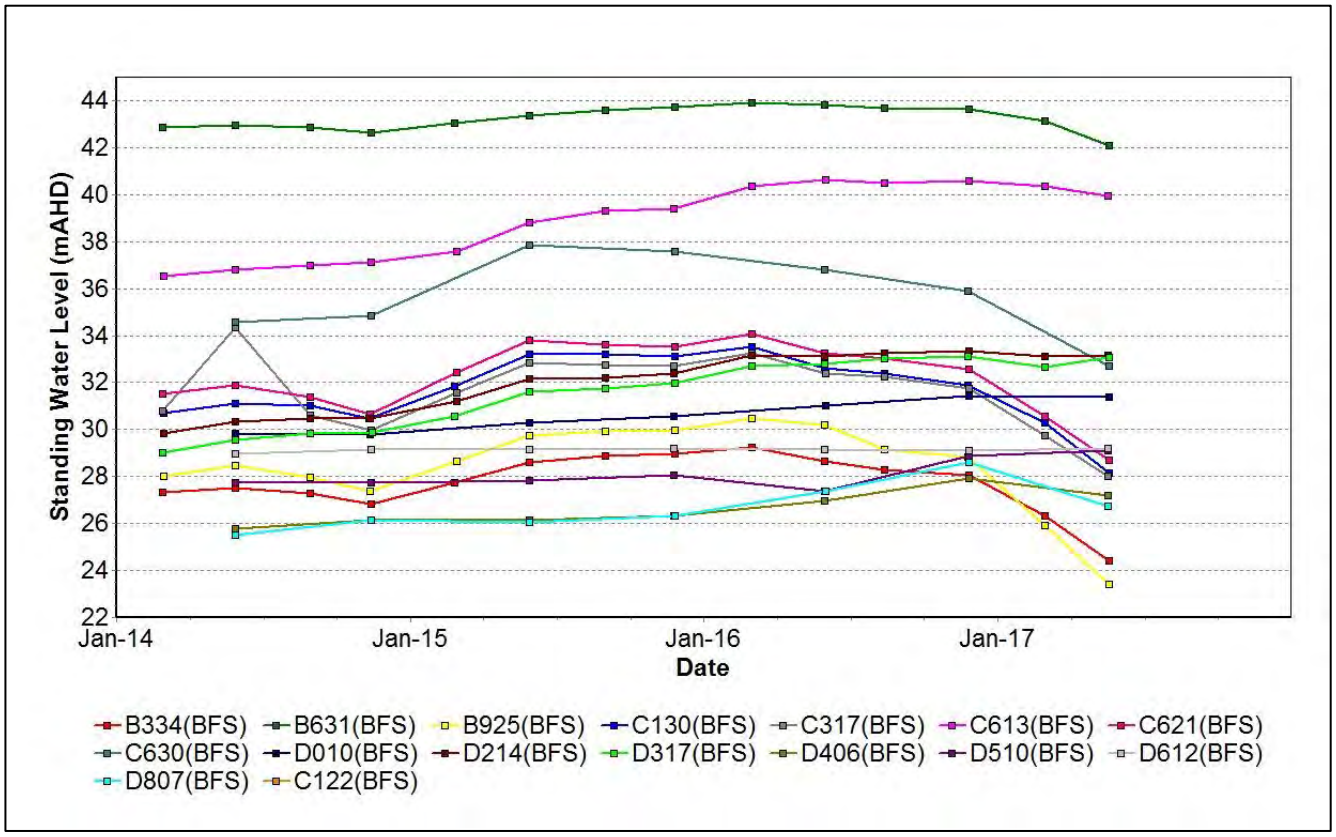


Figure 55: Lemington South Bowfield Standing Water Level - June 2017

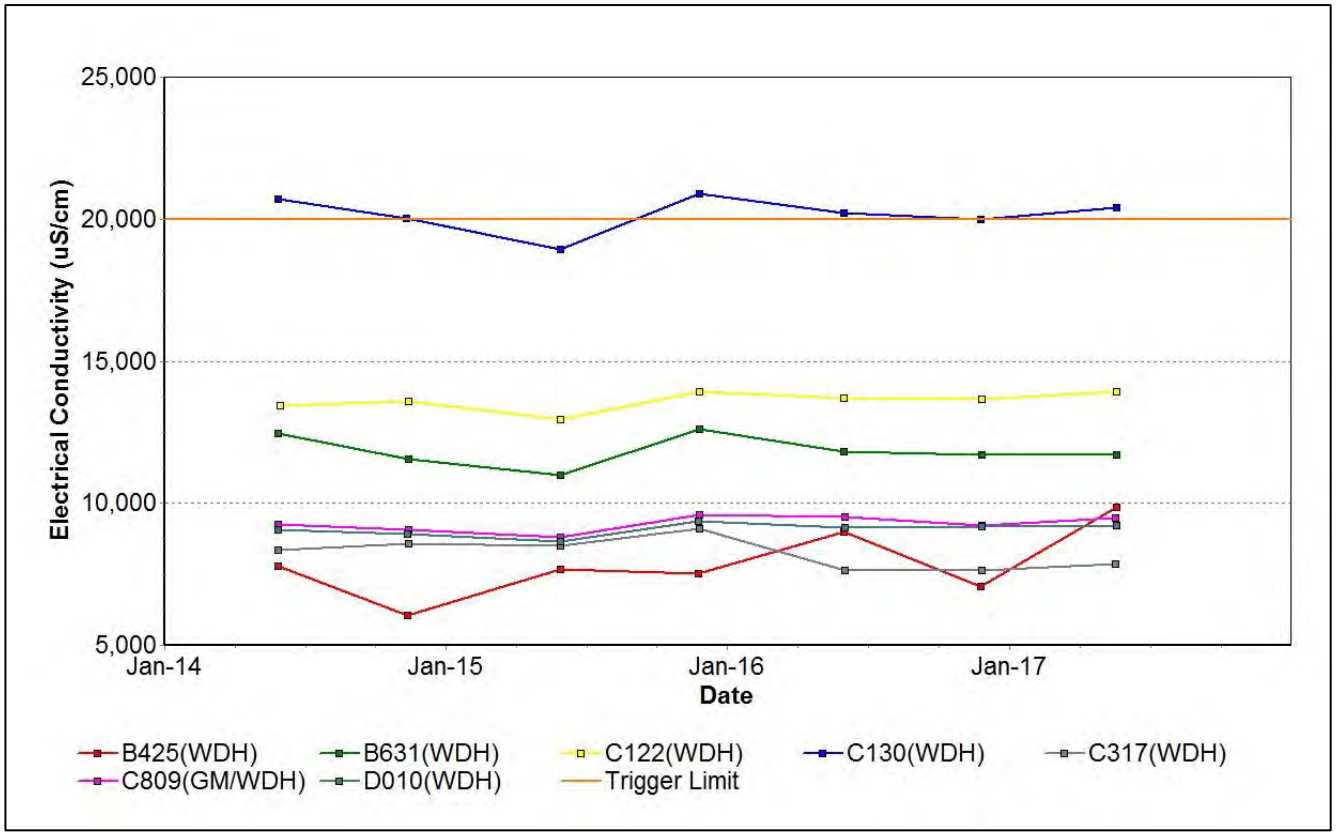


Figure 56: Lemington South Woodlands Hill Electrical Conductivity Trend - June 2017

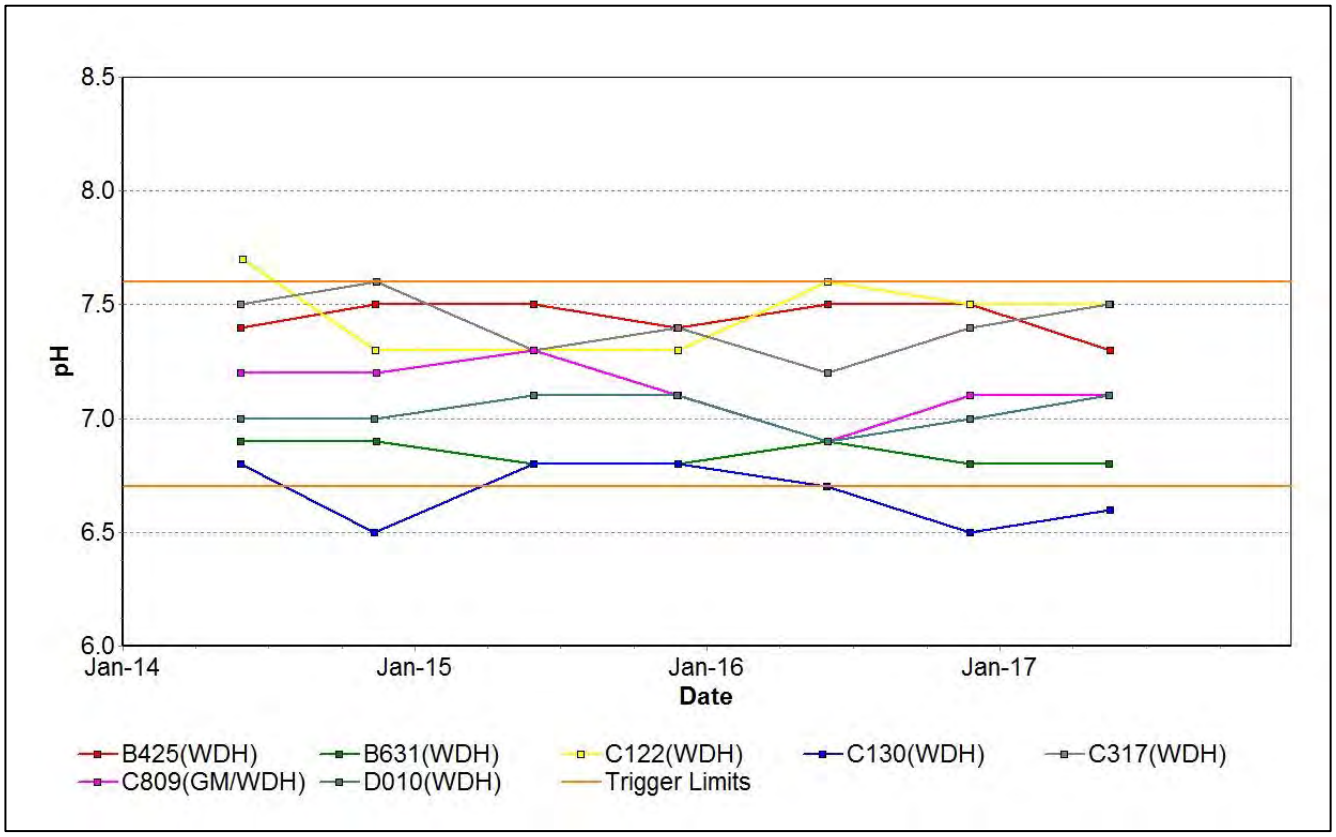


Figure 57: Lemington South Woodlands Hill pH Trend - June 2017

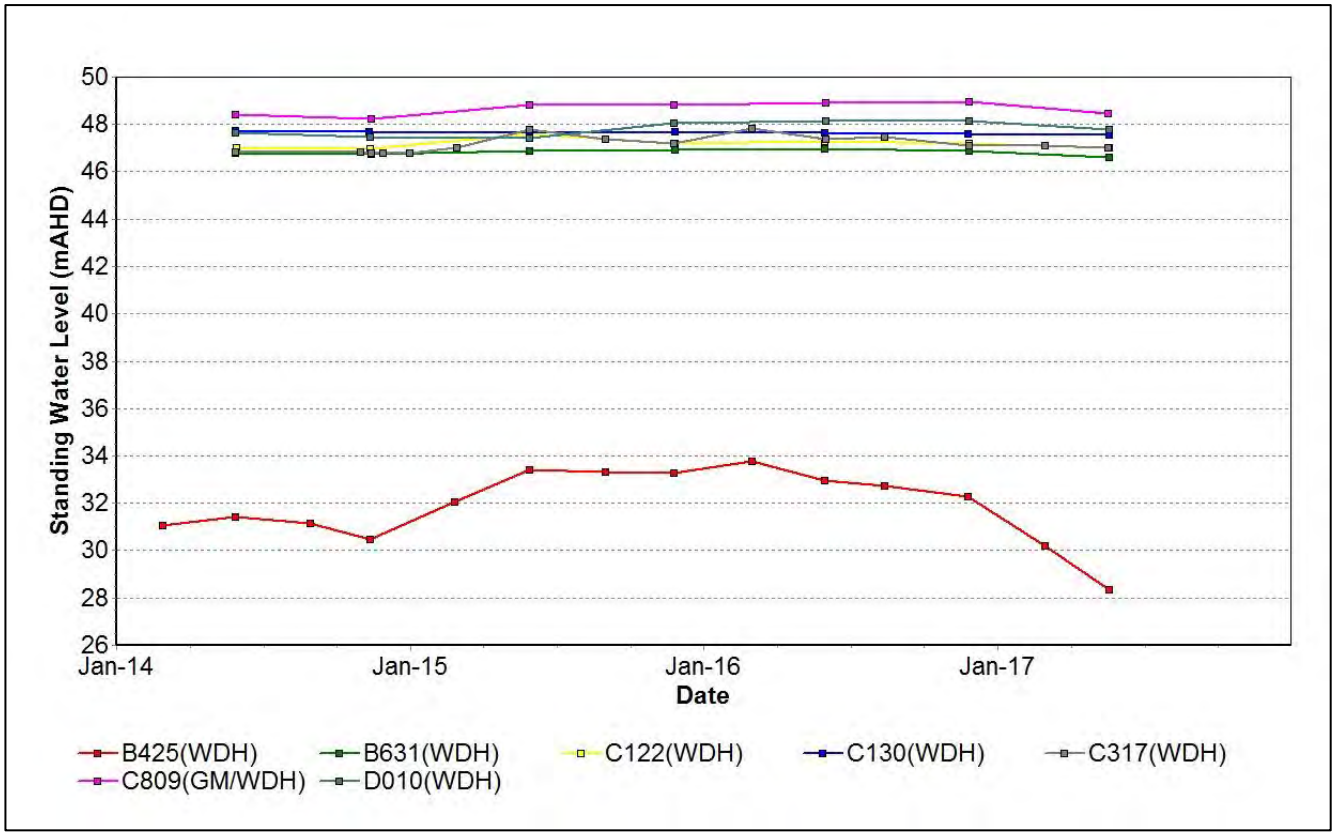


Figure 58: Lemington South Woodlands Hill Standing Water Level – June 2017

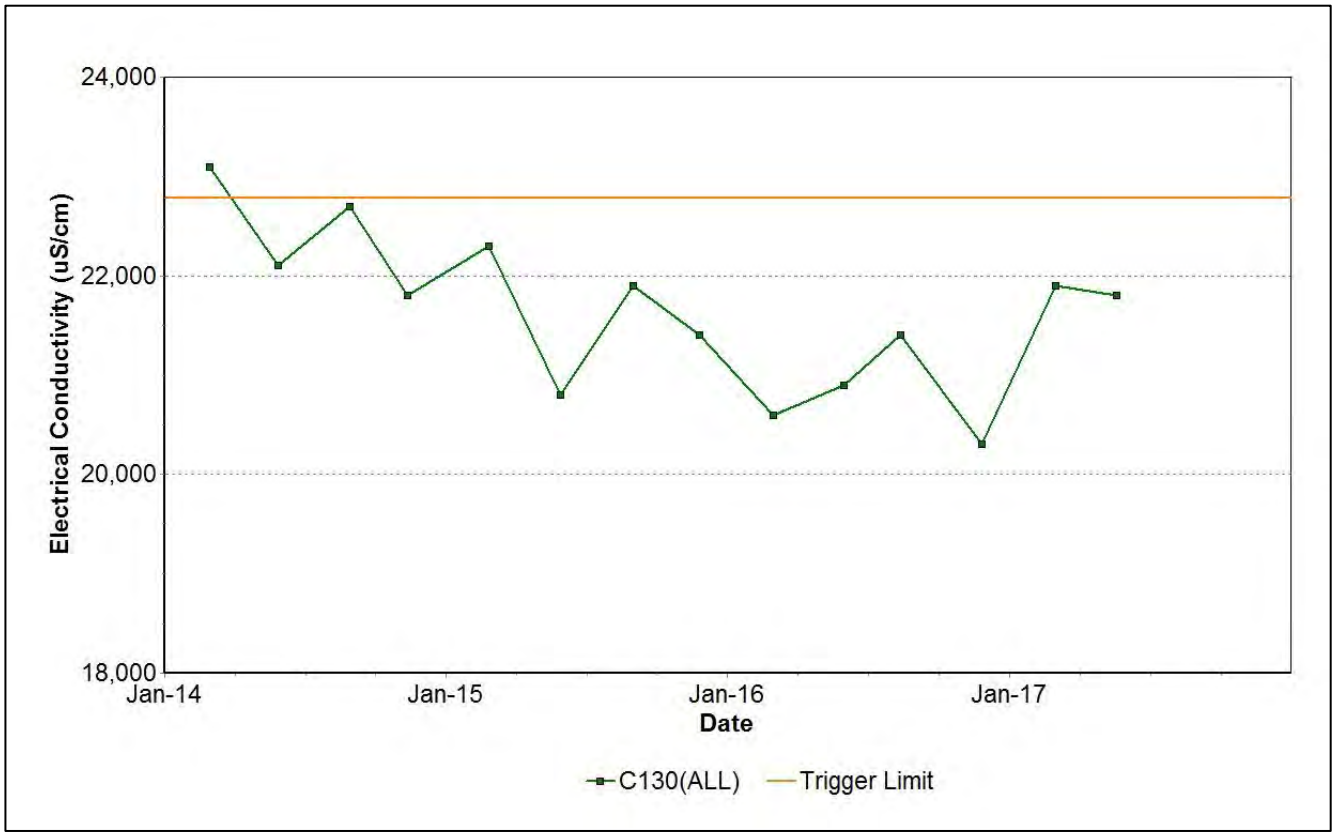


Figure 59: Lemington South Interburden Electrical Conductivity Trend - June 2017

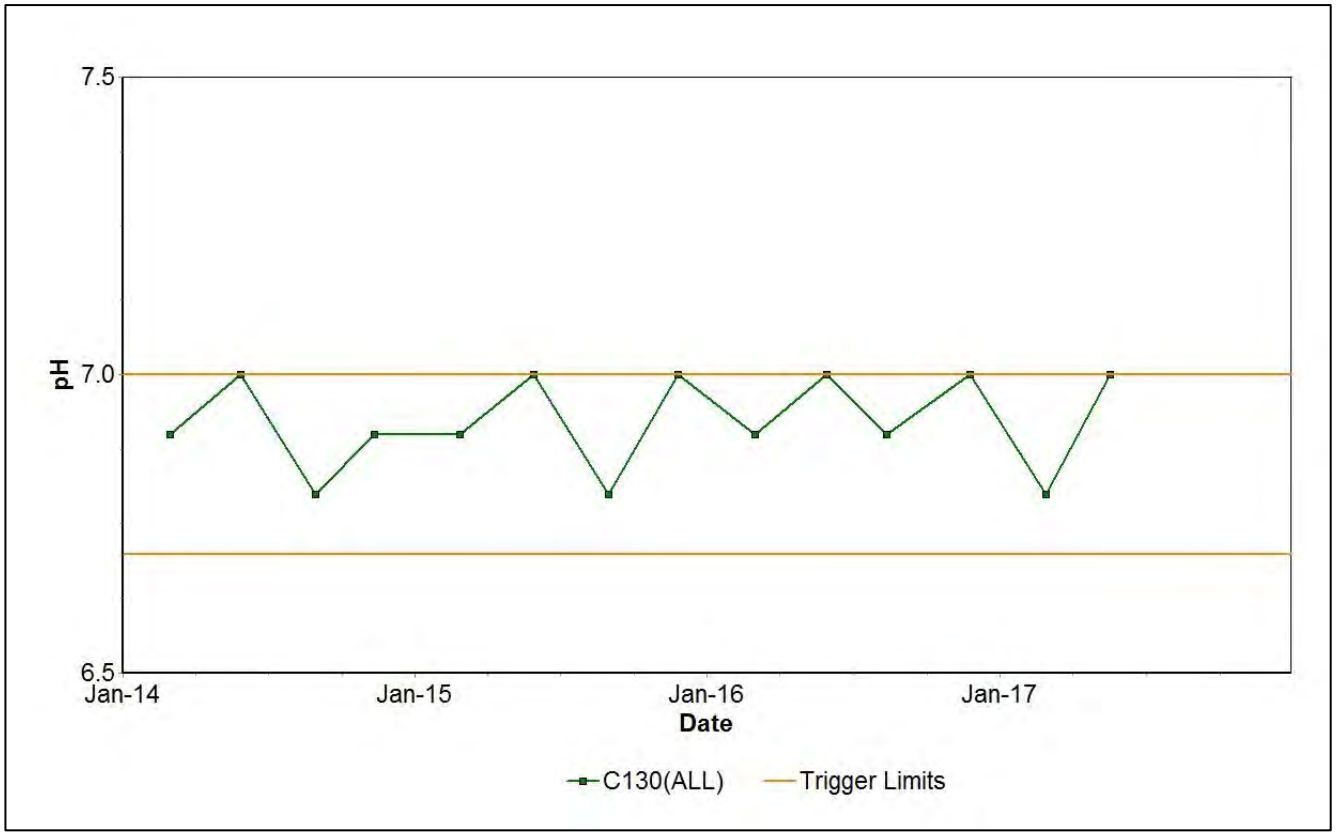


Figure 60: Lemington South Interburden pH Trend - June 2017

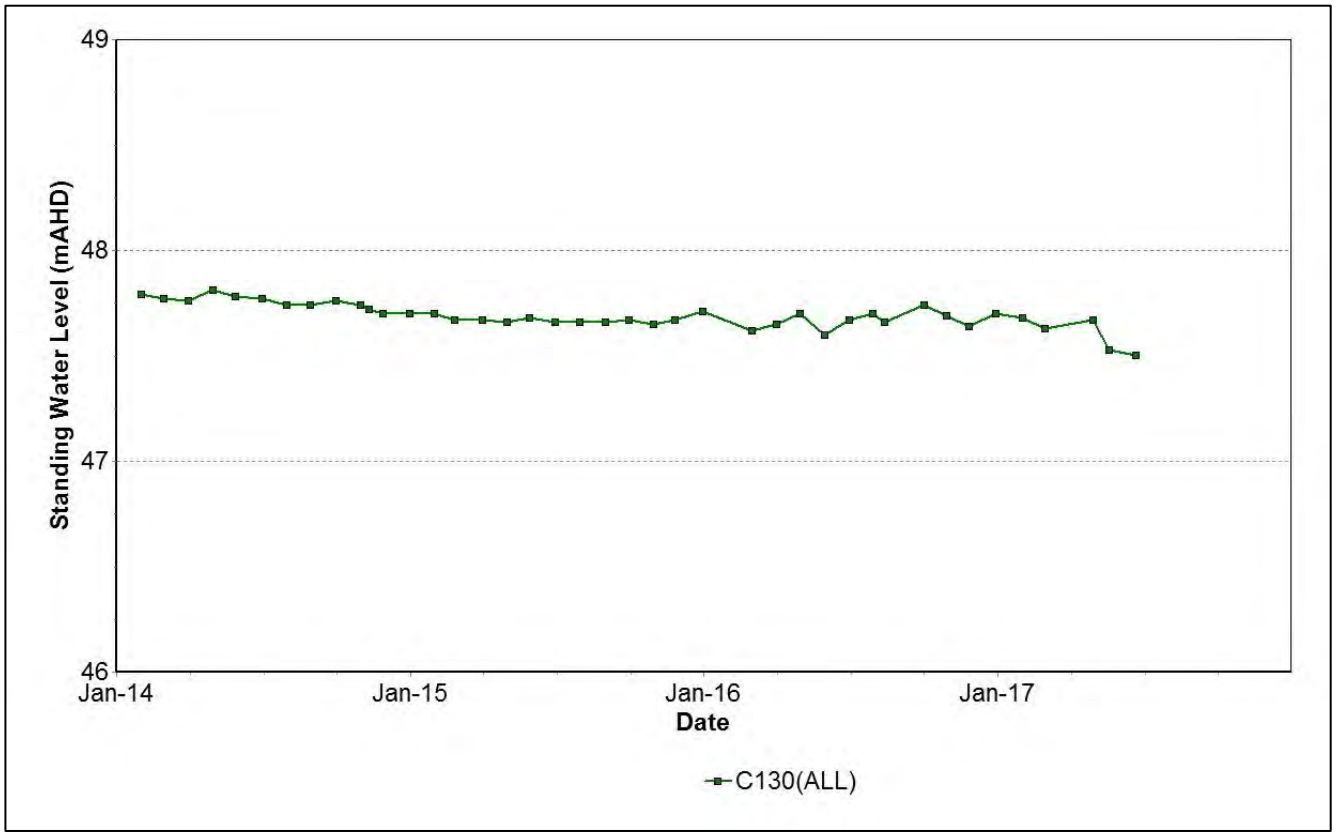


Figure 61: Lemington South Interburden Standing Water Level - June 2017

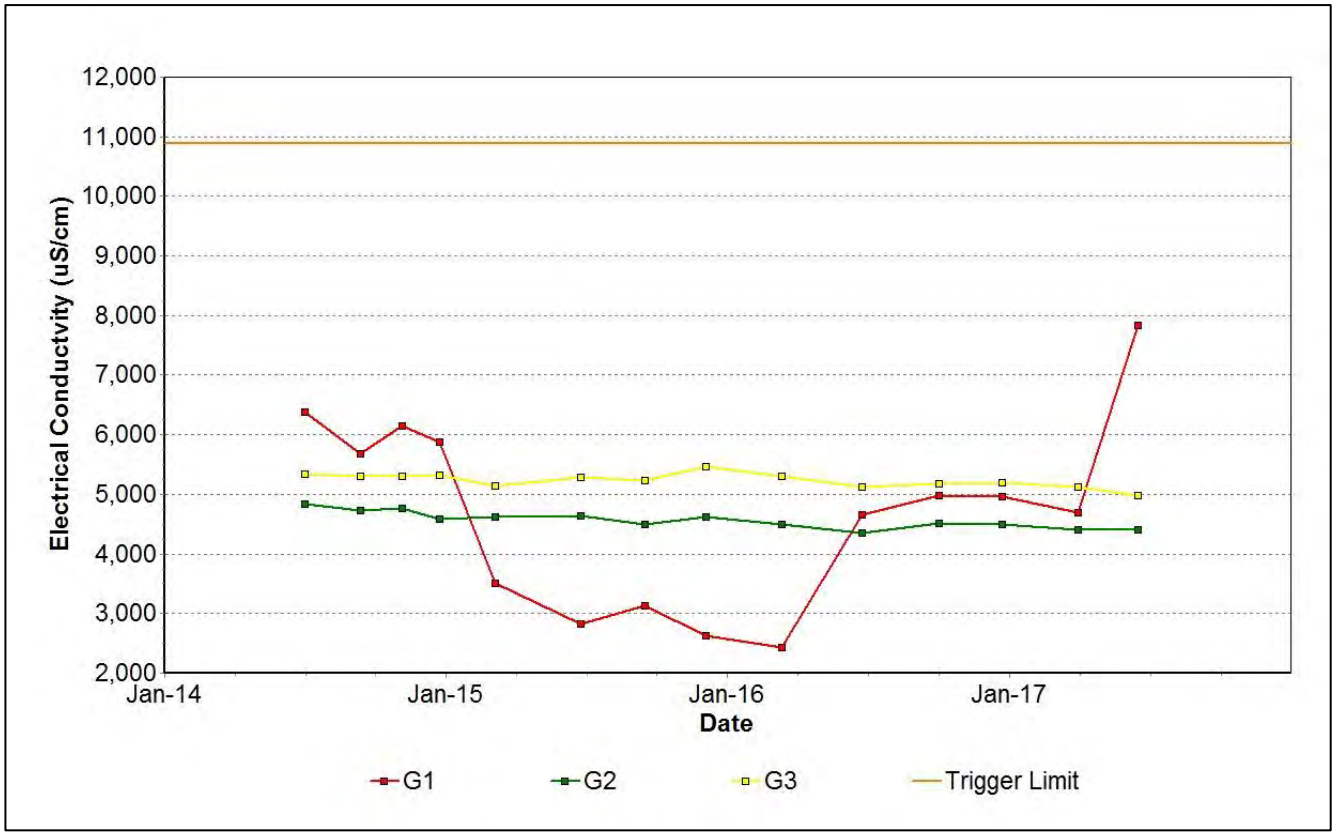


Figure 62: West Pit Alluvium Electrical Conductivity Trend - June 2017

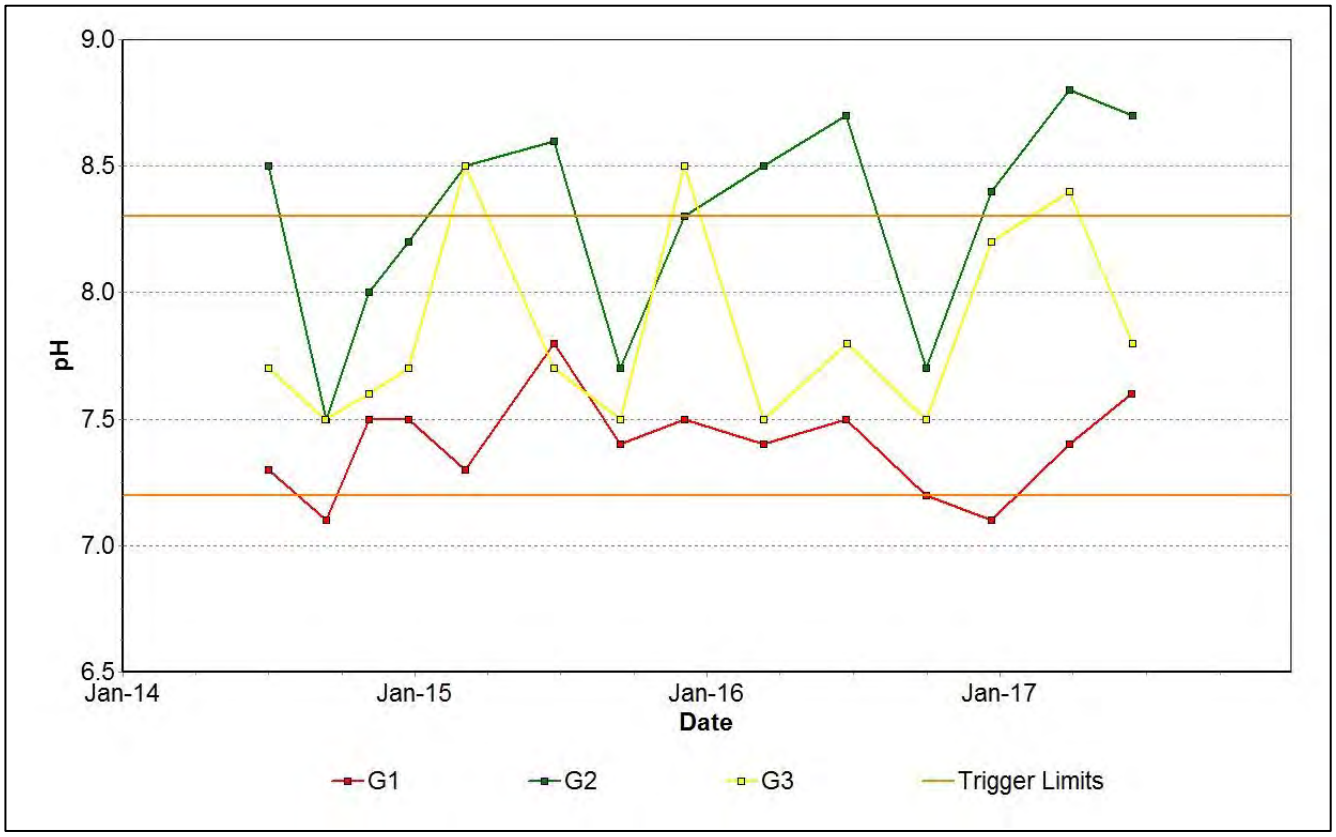


Figure 63: West Pit Alluvium pH Trend – June 2017

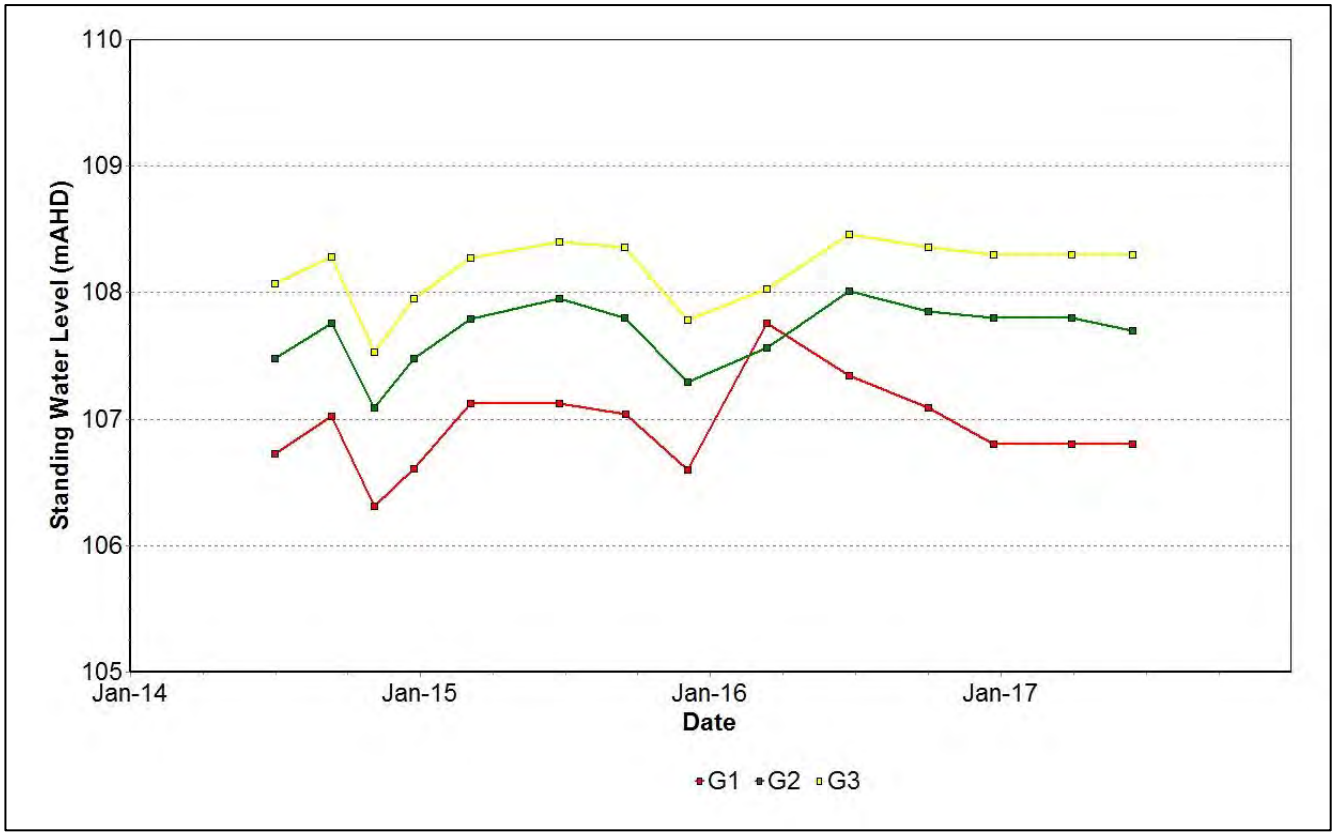


Figure 64: West Pit Alluvium Standing Water Level - June 2017

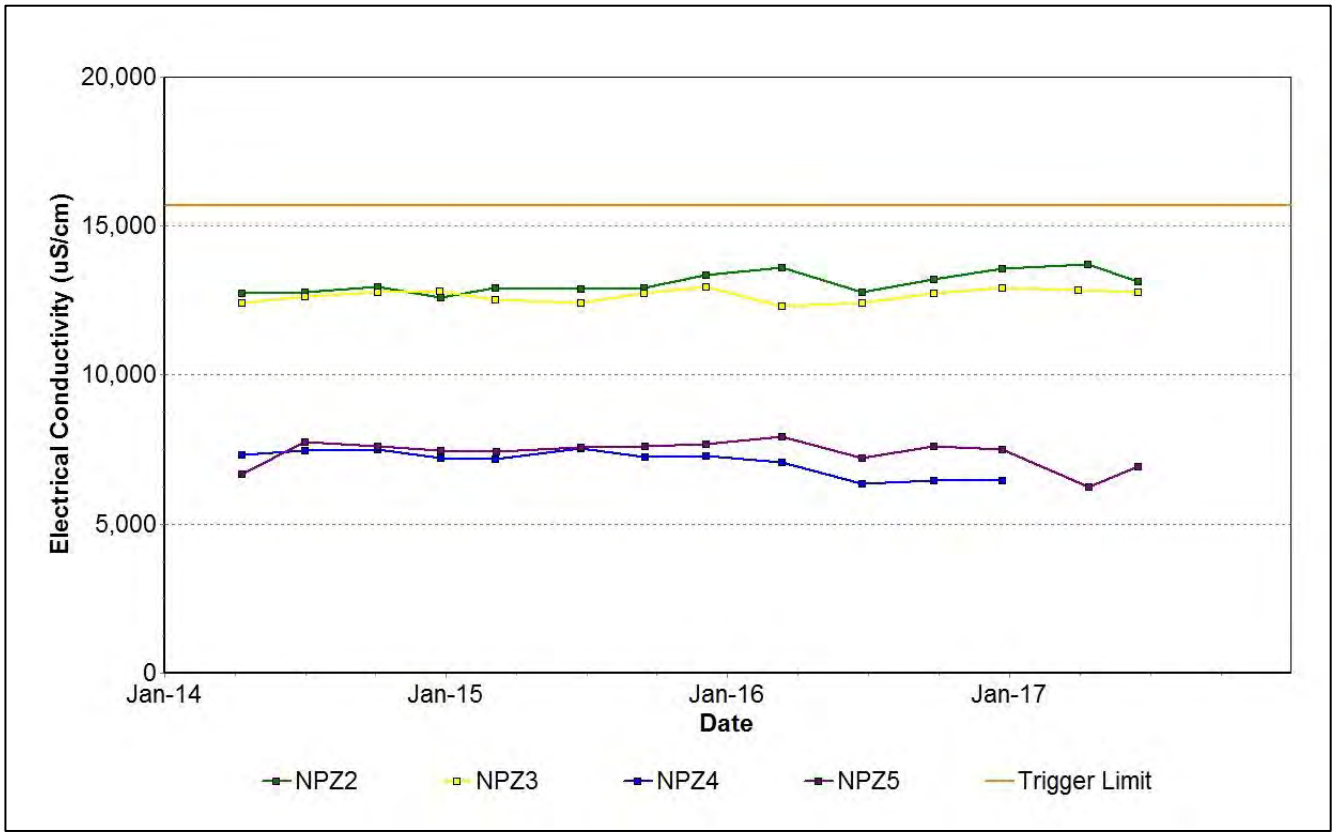


Figure 65: West Pit Siltstone Electrical Conductivity Trend – June 2017

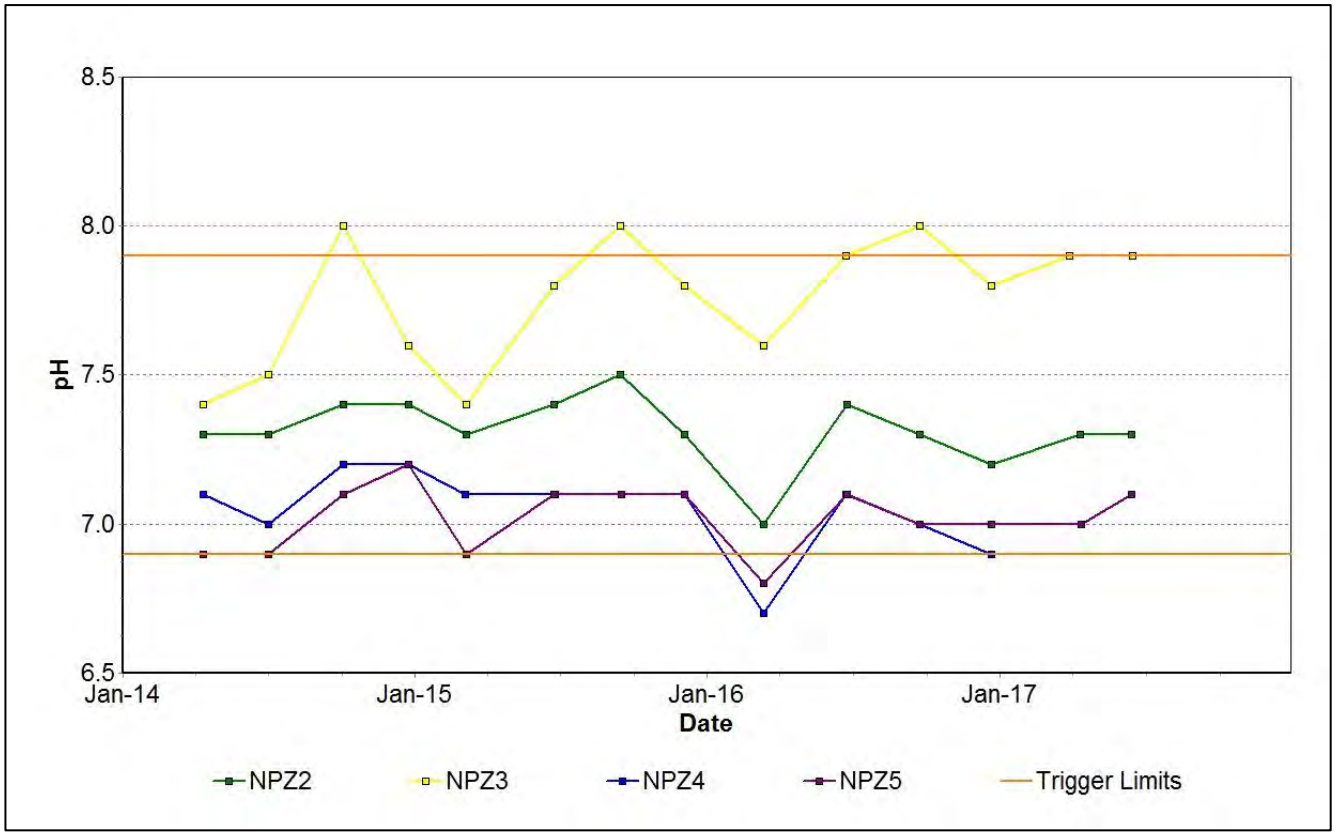


Figure 66: West Pit Siltstone pH Trend – June 2017

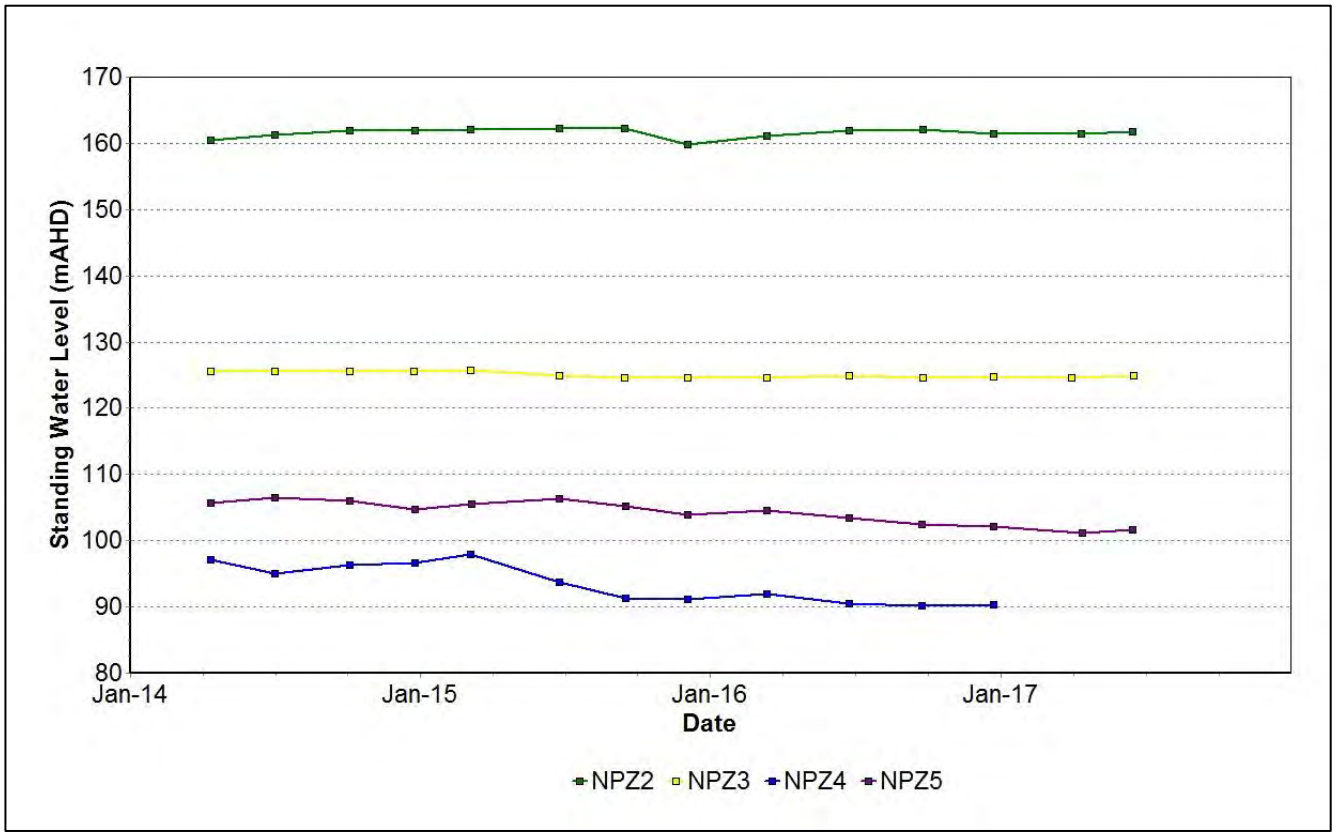


Figure 67: West Pit Siltstone Standing Water Level – June 2017

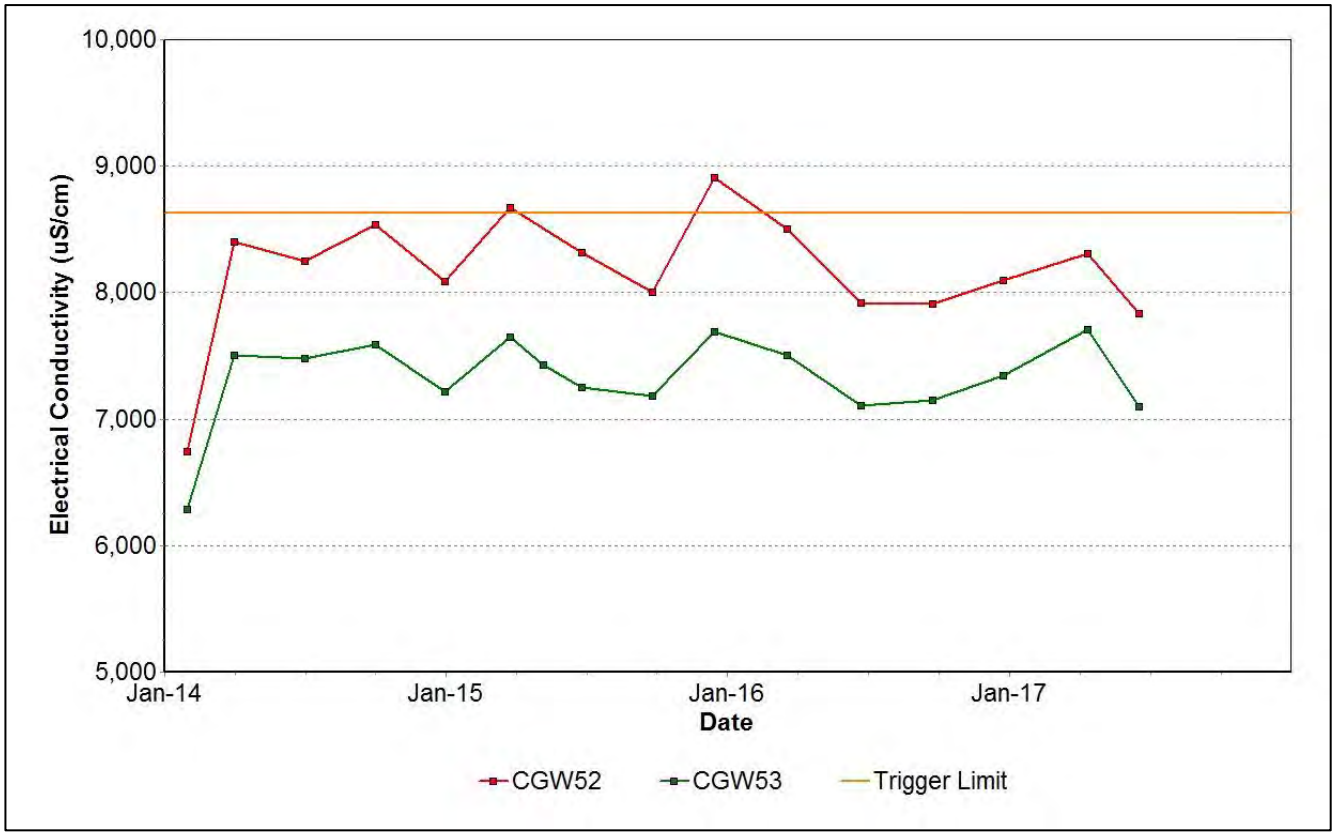


Figure 68: Carrington Broonie Electrical Conductivity Trend - June 2017

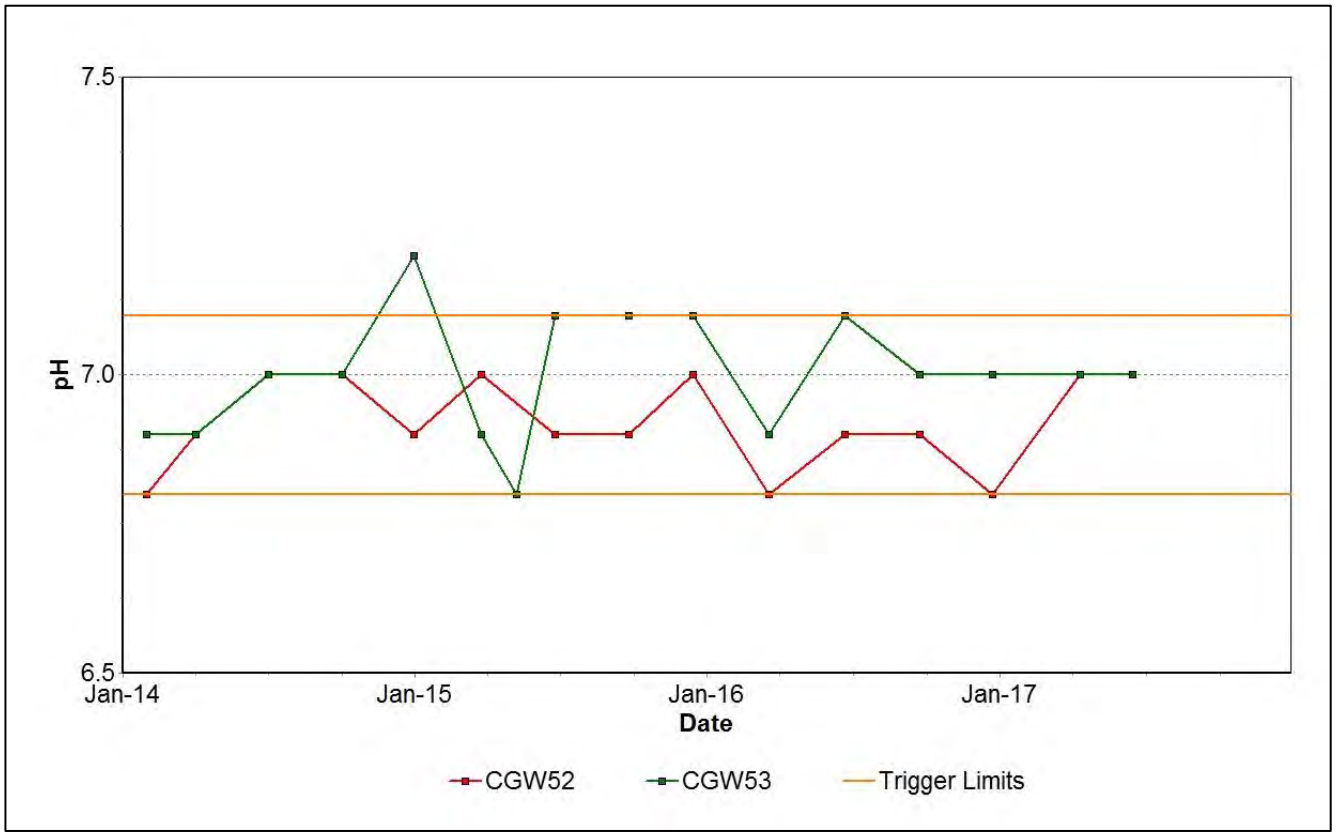


Figure 69: Carrington Broonie pH Trend - June 2017

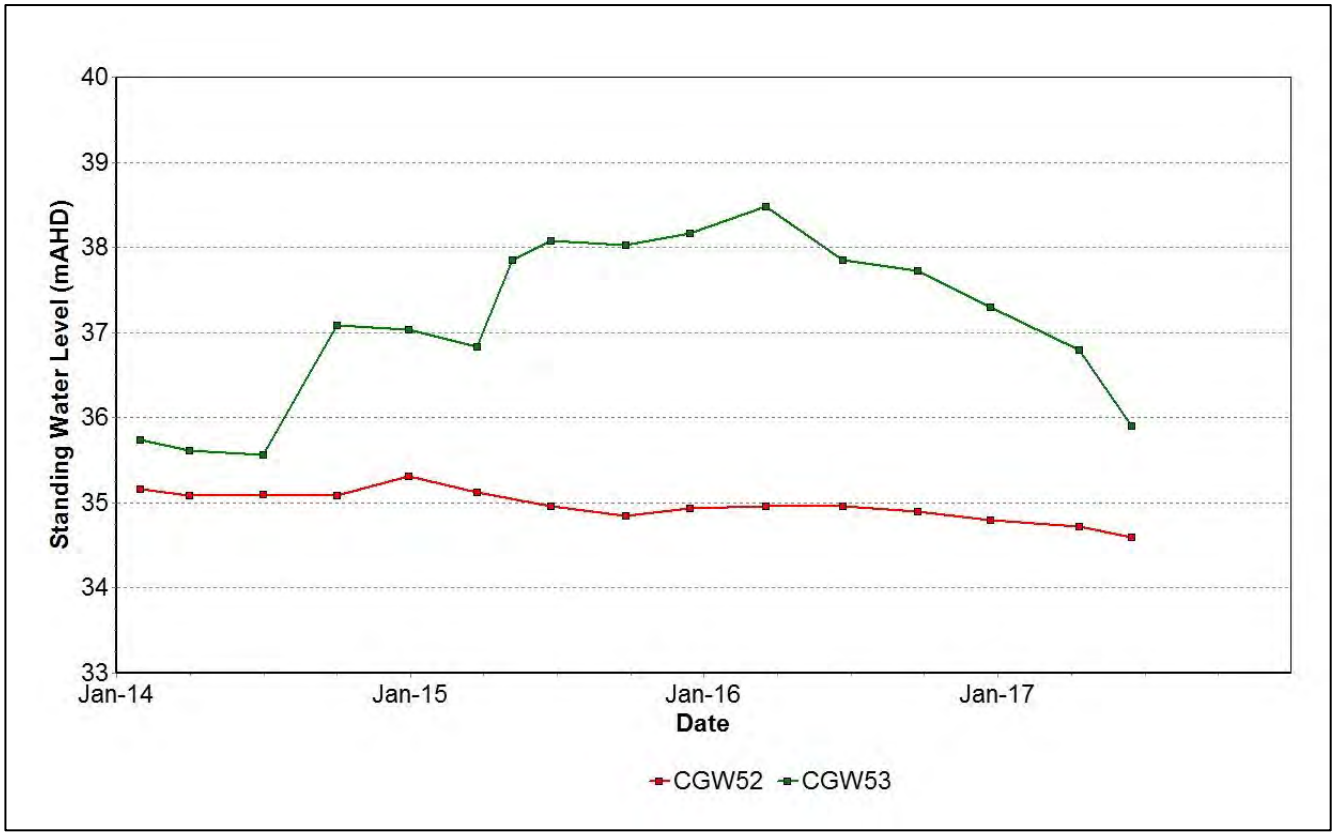


Figure 70: Carrington Broonie Standing Water Level - June 2017

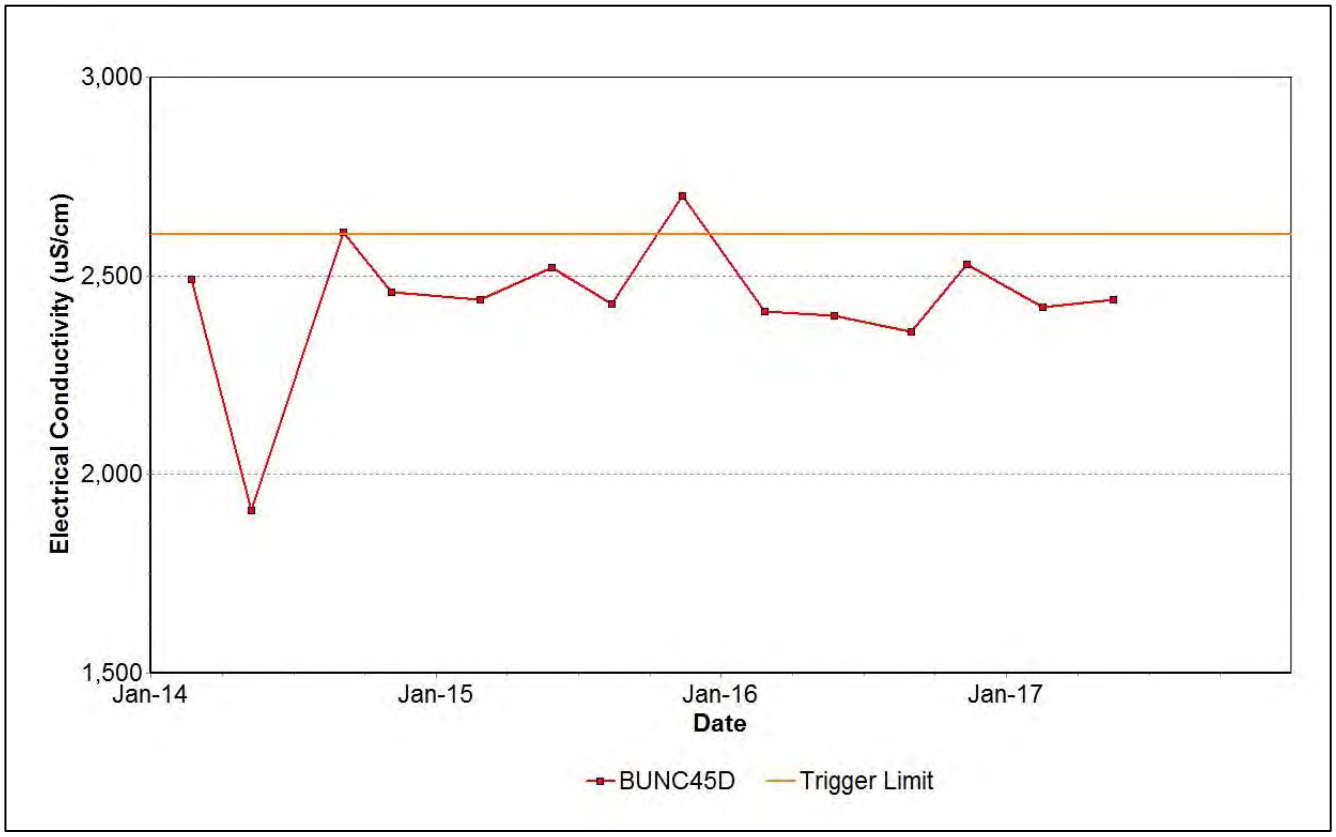


Figure 71: Cheshunt Piercefield Electrical Conductivity Trend – June 2017

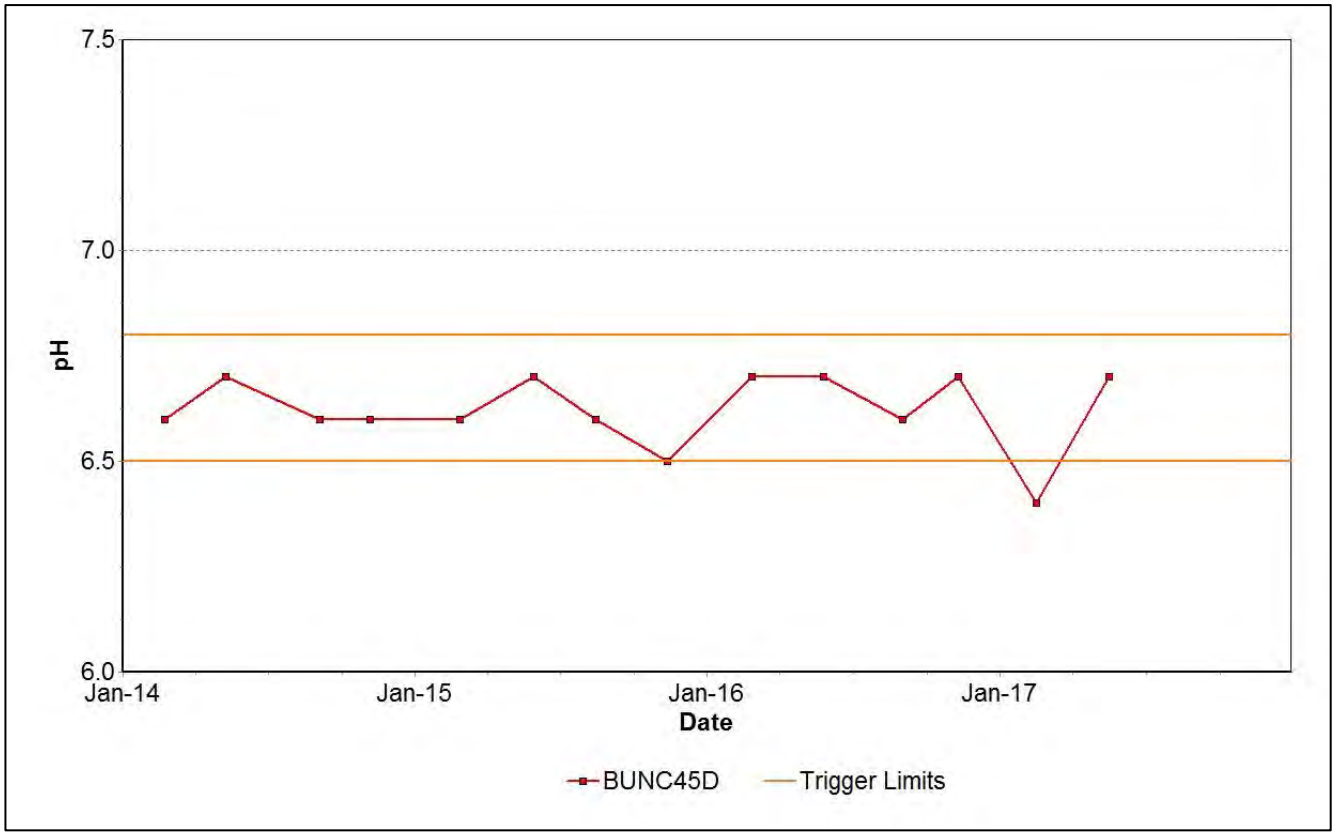


Figure 72: Cheshunt Piercefield pH Trend - June 2017

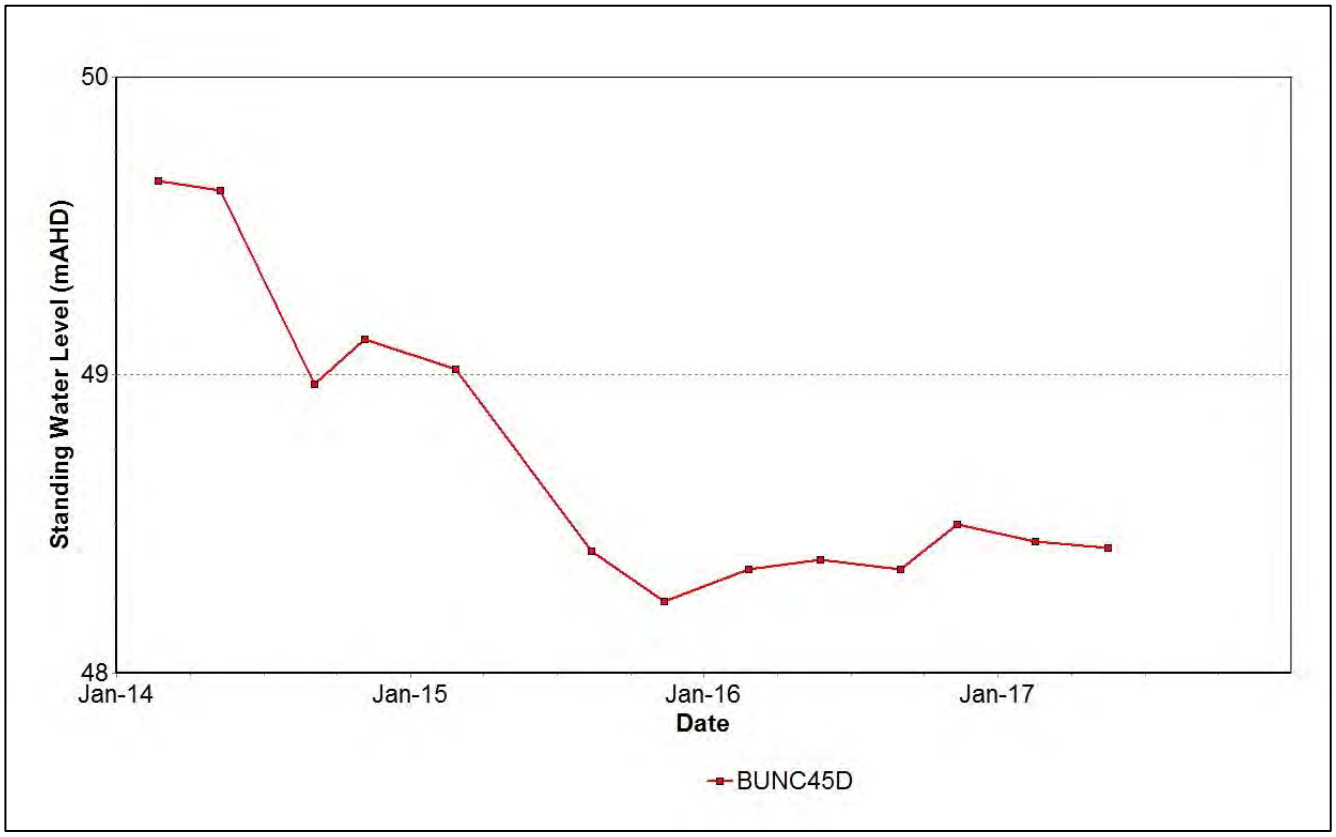


Figure 73: Cheshunt Piercefield Standing Water Level - June 2017

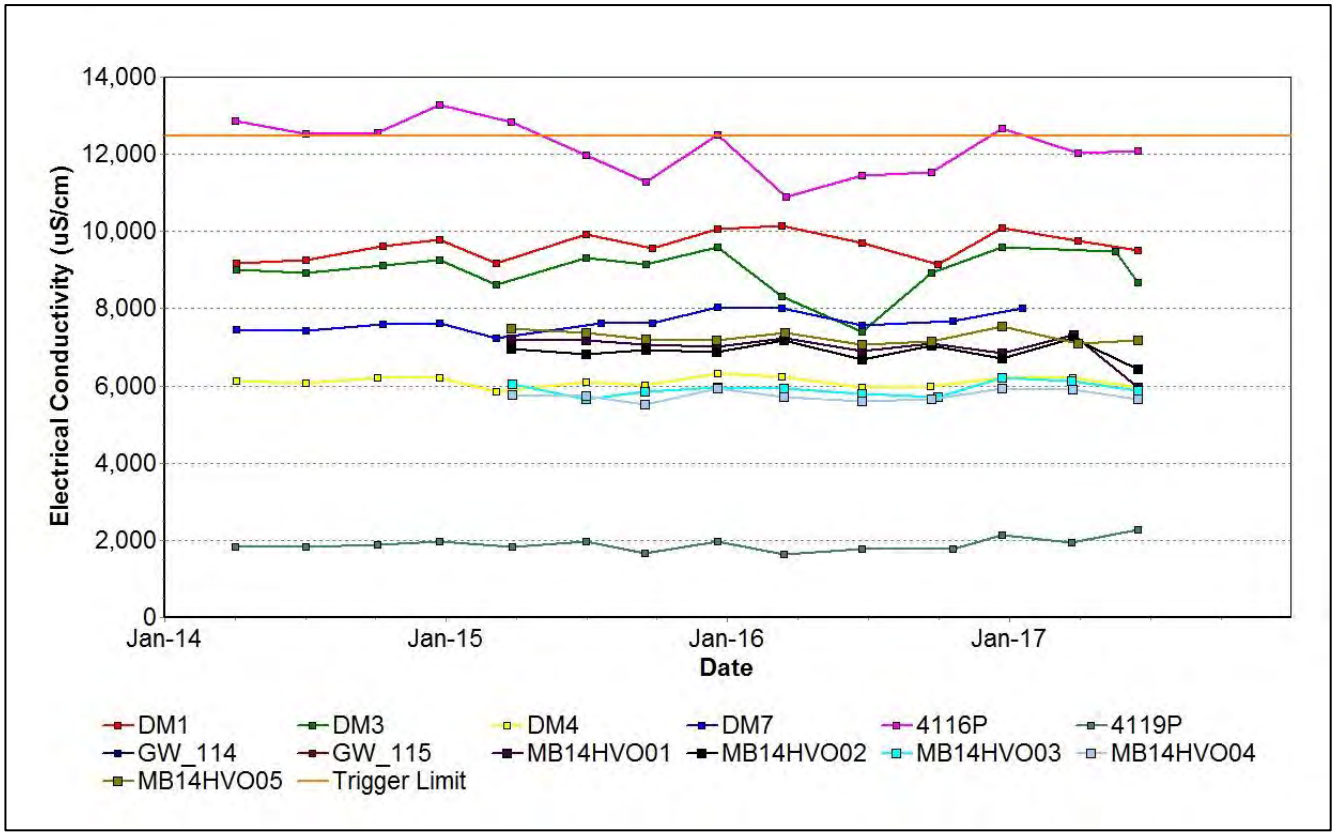


Figure 74: North Pit Spoil Electrical Conductivity Trend - June 2017

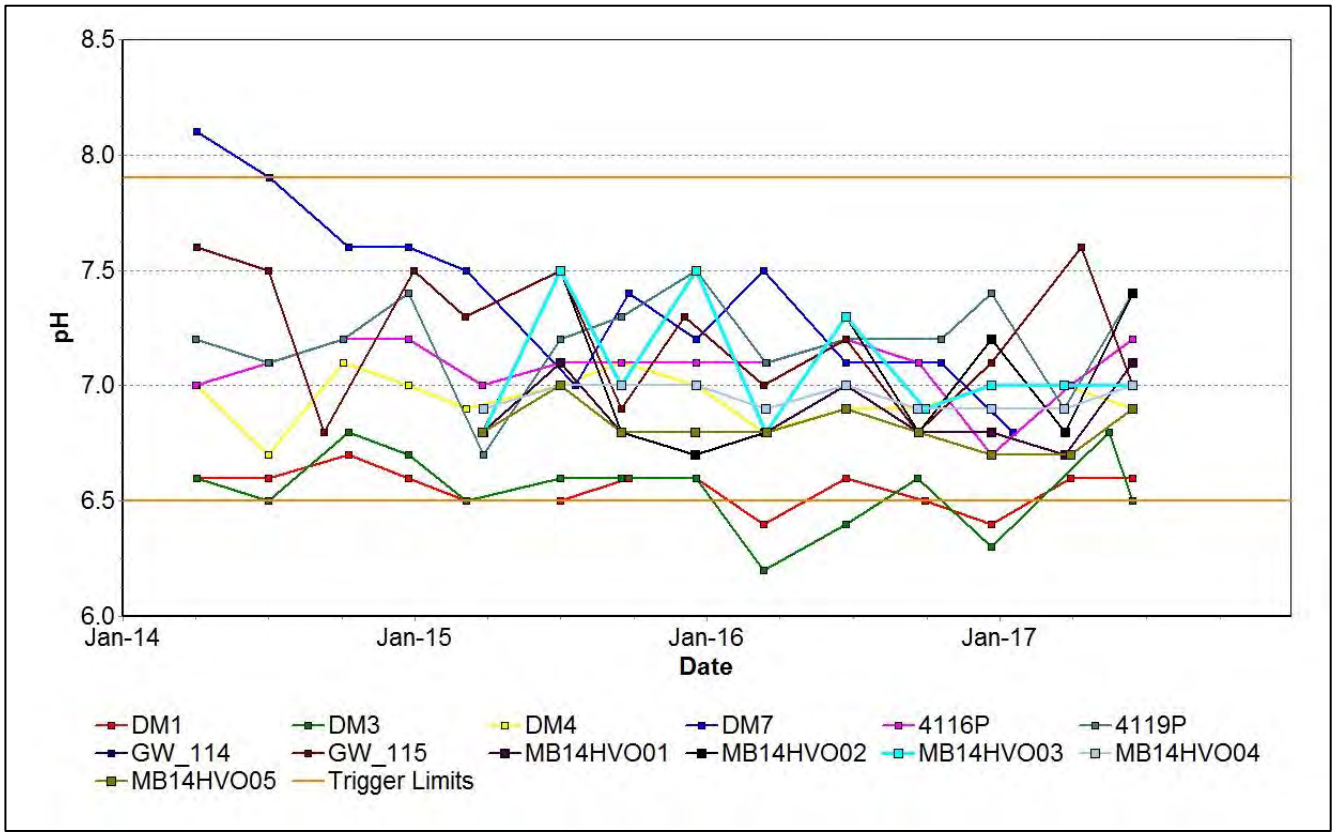


Figure 75: North Pit Spoil pH Trend - June 2017

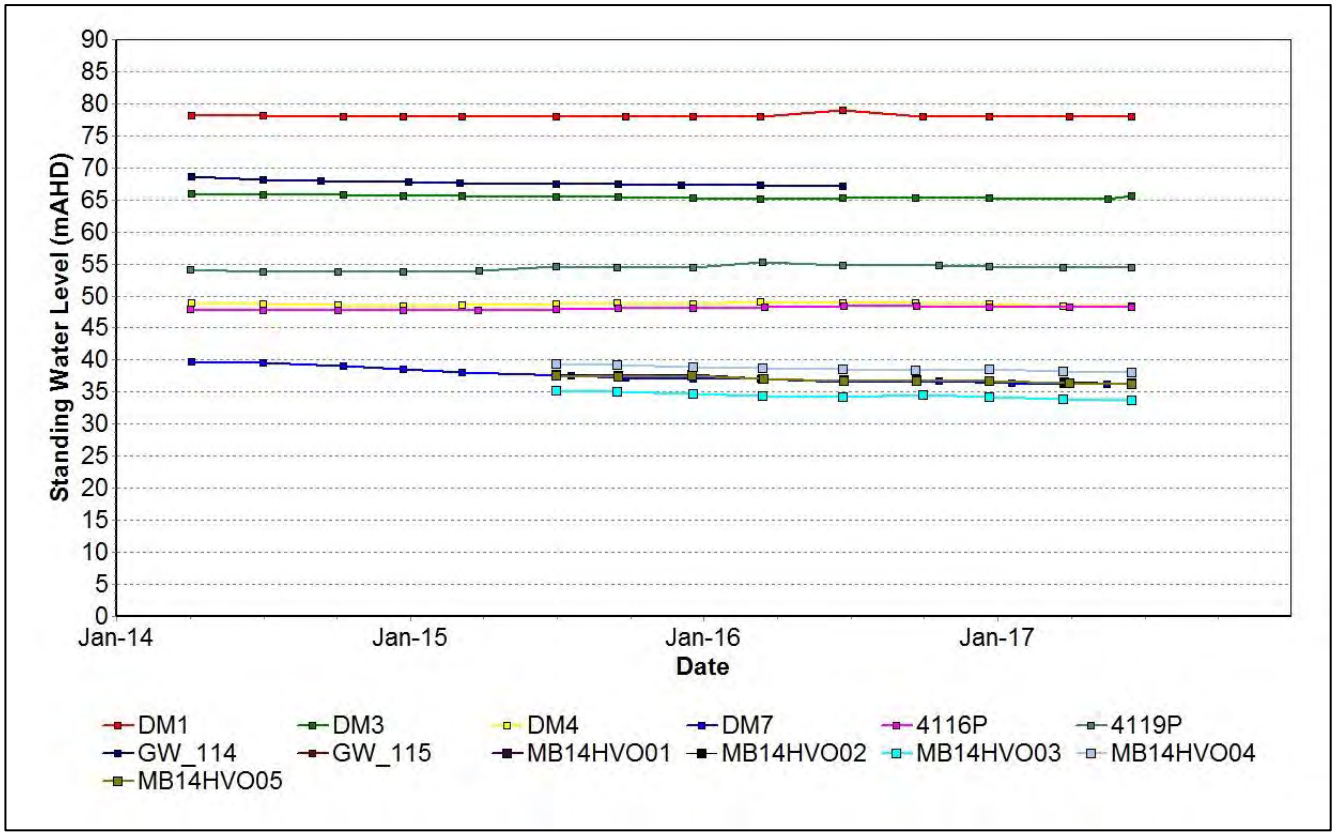


Figure 76: North Pit Spoil Standing Water Level - June 2017

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. Locations of groundwater bores are shown in Figure 77.

During Q2 2017 a range of internal trigger limits were breached, these are summarised in Table 3.

Table 3: Groundwater Triggers - 2017

Site	Date	Trigger Limit Breached	Action Taken in Response
B631(BFS)	18/05/2017	EC – 95th Percentile	Watching Brief*
C130WDH	18/05/2017	EC – 95th Percentile	Watching Brief*
D612(AFS)	17/05/2017	EC – 95th Percentile	Watching Brief*
CFW55R	16/06/2017	EC – 95th Percentile	4th consecutive exceedance: Previous investigation determined that hydro geochemical speciation has not changed and that water quality is consistent with nearby bore CFW57. This, coupled with historical data showing similar elevated EC and depressed pH, suggests the variations are natural and unlikely to be due to anthropogenic impact. Watching brief, no further action required.
B631(BFS)	18/05/2017	PH – 5th Percentile	Watching Brief*
BZ2A(2)	16/05/2017	PH – 5th Percentile	Watching Brief*
C130(WDH)	18/05/2017	PH – 5th Percentile	Watching Brief*
CGW46	16/06/2017	PH – 95th Percentile	Watching Brief*
D317(BFS)	18/05/2017	PH – 95th Percentile	Increasing trend in pH not reflected spatially in neighbouring bores. Water level in bore stable, suggesting water quality changes are not related to any mining-related activity. Continue to watch and monitor.
G2	15/06/2017	PH – 95th Percentile	Measurements highly variable and consistent with historical range. Watch and monitor.
Hobdens Well	16/05/2017	PH – 95th Percentile	Watching Brief*
CFW55R	16/06/2017	PH – 5th Percentile	4th consecutive exceedance: Previous investigation determined that hydro geochemical speciation has not changed and that water quality is consistent with nearby bore CFW57. This, coupled with historical data showing similar elevated EC and depressed pH, suggests the variations are natural and unlikely to be due to anthropogenic impact. Watching brief, no further action required.

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

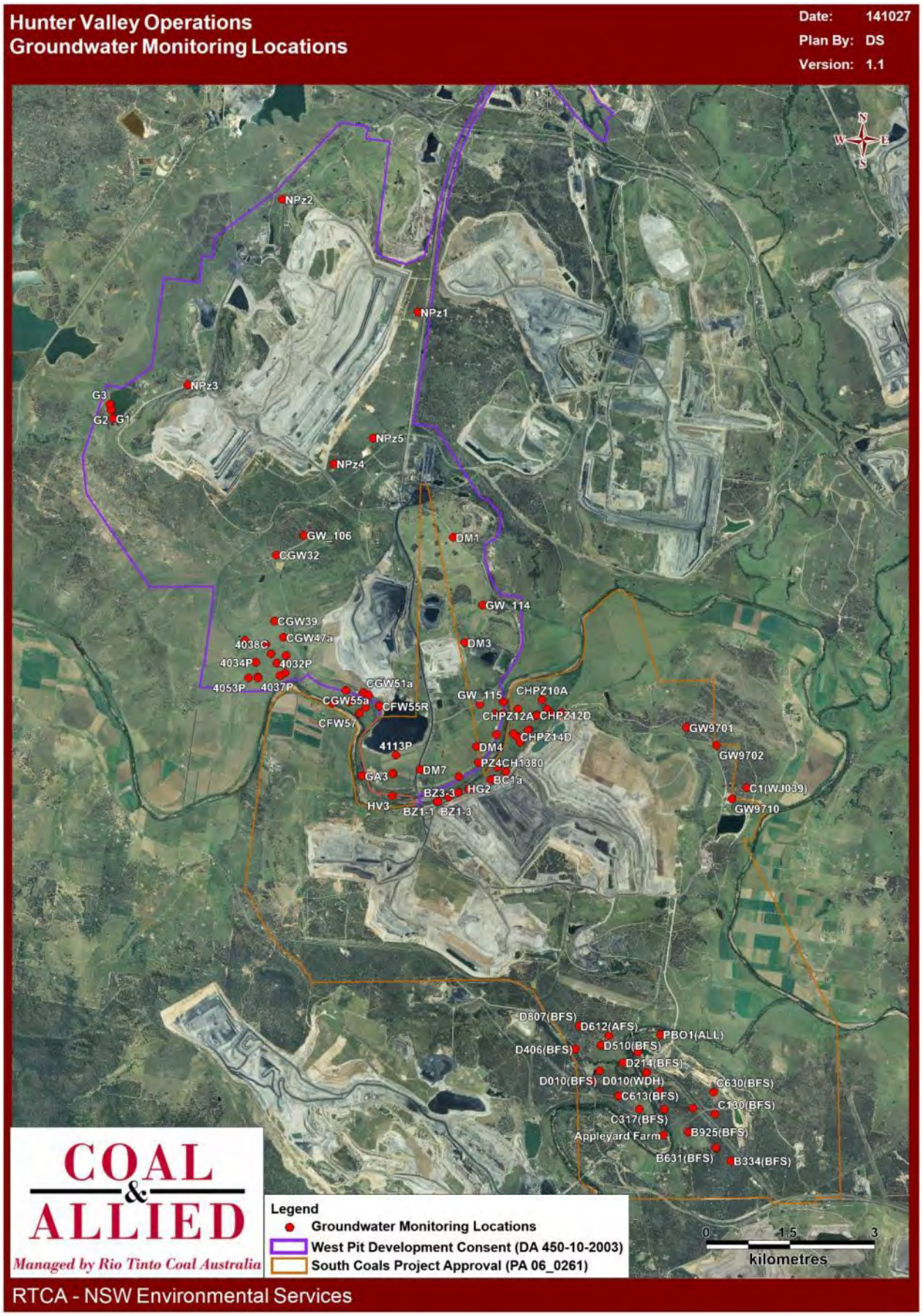


Figure 77: Groundwater Monitoring Location Plan

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, 24 blasts were initiated at HVO. **Figure 78** through to **Figure 82** show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 4.

Table 4: Blasting Limits

Airblast Overpressure (dB(L))	Comments
115	5% of the total number of blasts in a 12 month period
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.

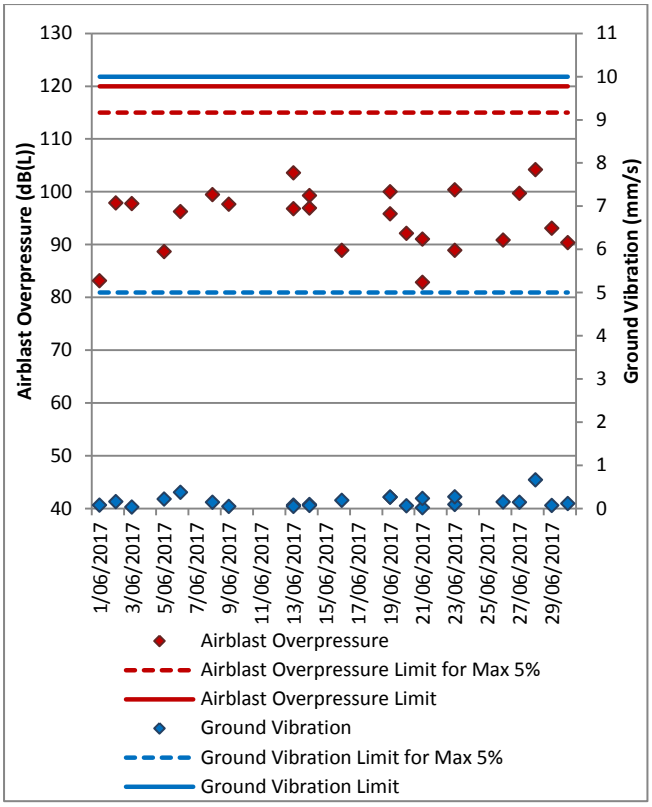


Figure 78: Moses Crossing Blast Monitoring Results – June 2017

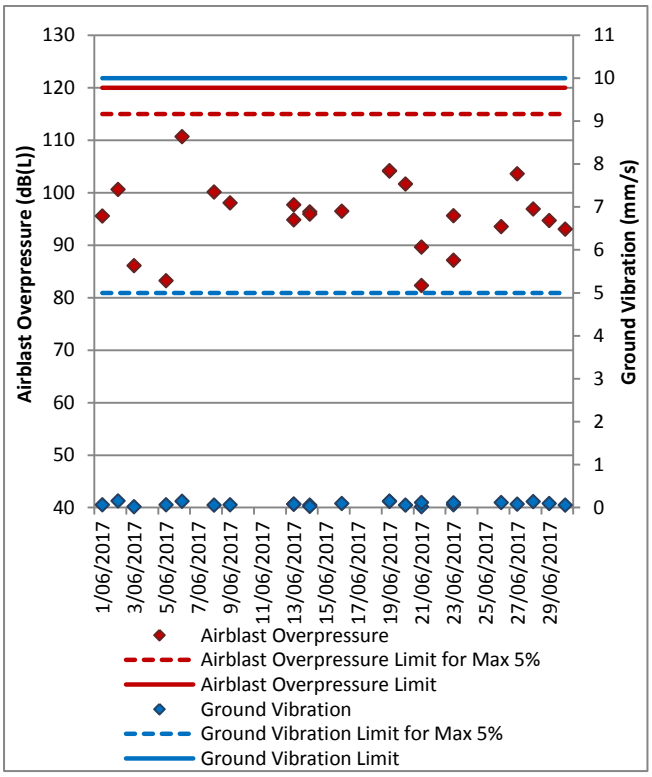


Figure 79: Jerrys Plains Blast Monitoring Results – June 2017

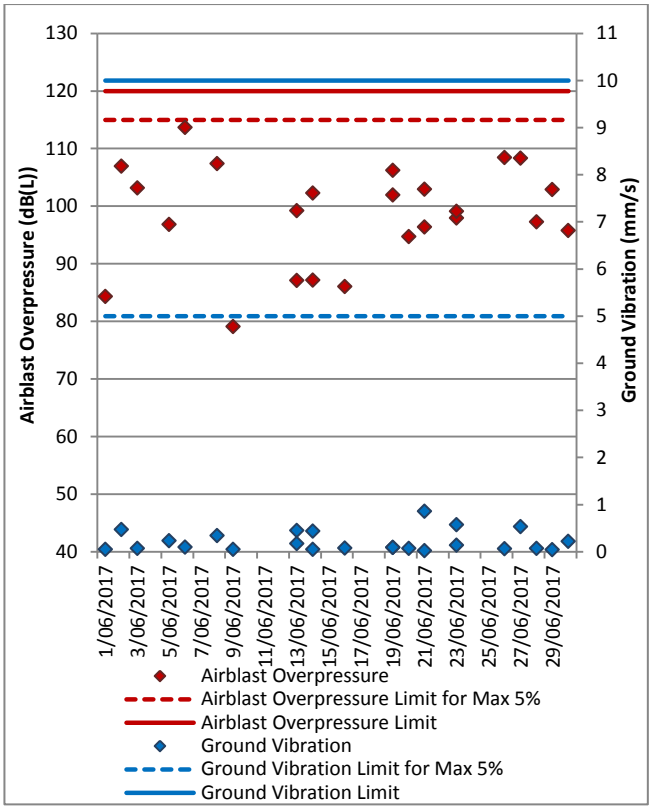


Figure 80: Maison Dieu Blast Monitoring Results – June 2017

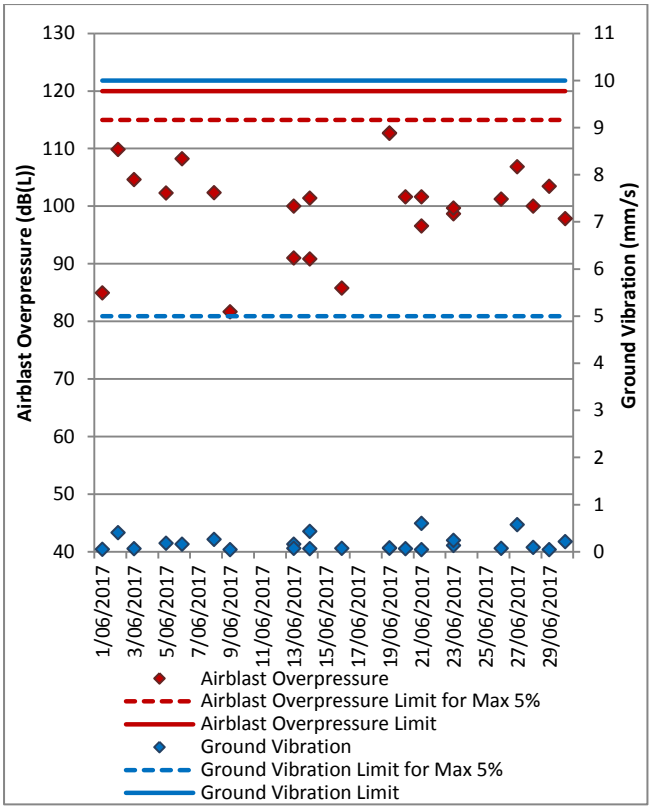


Figure 82: Knodlers Lane Blast Monitoring Results – June 2017

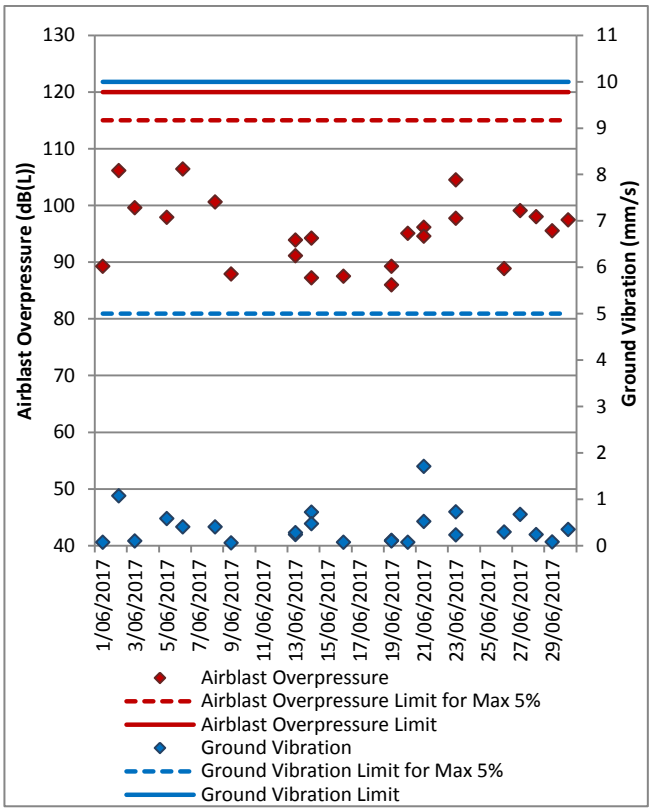


Figure 81: Warkworth Blast Monitoring Results – June 2017

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 **Table 5 to Table 10**.

6.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night of the 13th and 15thof June 2017. Monitoring results are detailed in Table 5 to

Table 10.

Table 5: $L_{Aeq,\ 15\ minute}$ HVO South - Impact Assessment Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	13/06/2017 21:11	1.1	0.5	37	Yes	IA	Nil
Maison Dieu	13/06/2017 21:33	0.8	3	37	No	<30	NA
Shearers Lane	13/06/2017 21:55	1.7	3	41	No	<30	NA
Kilburnie South	13/06/2017 22:40	0.4	3	36	No	IA	NA
Jerrys Plains Village	13/06/2017 21:43	1.1	0.5	35	Yes	IA	Nil
Jerrys Plains East	13/06/2017 21:20	1.1	0.5	35	Yes	IA	Nil
Long Point Road	15/06/2017 21:00	2.5	0.5	35	Yes	IA	Nil
HVGC	13/06/2017 22:53	0.5	3	55	No	IA	NA

Table 6: $L_{Aeq,\ 15\ minute}$ HVO South - Land Acquisition Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	13/06/2017 21:11	1.1	0.5	41	Yes	IA	Nil
Maison Dieu	13/06/2017 21:33	0.8	3	41	No	<30	NA
Shearers Lane	13/06/2017 21:55	1.7	3	41	No	<30	NA
Kilburnie South	13/06/2017 22:40	0.4	3	41	No	IA	NA
Jerrys Plains Village	13/06/2017 21:43	1.1	0.5	40	Yes	IA	Nil
Jerrys Plains East	13/06/2017 21:20	1.1	0.5	40	Yes	IA	Nil
Long Point Road	15/06/2017 21:00	2.5	0.5	40	Yes	IA	Nil
HVGC	13/06/2017 22:53	0.5	3	NA	NA	IA	NA

Table 7: $L_{A1,\ 1minute}$ HVO South – Impact Assessment Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South $L_{A1,\ 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	13/06/2017 21:11	1.1	0.5	45	Yes	IA	Nil
Maison Dieu	13/06/2017 21:33	0.8	3	45	No	33	NA
Shearers Lane	13/06/2017 21:55	1.7	3	45	No	32	NA
Kilburnie South	13/06/2017 22:40	0.4	3	45	No	IA	NA
Jerrys Plains Village	13/06/2017 21:43	1.1	0.5	45	Yes	IA	Nil
Jerrys Plains East	13/06/2017 21:20	1.1	0.5	45	Yes	IA	Nil
Long Point Road	15/06/2017 21:00	2.5	0.5	45	Yes	IA	Nil
HVGC	13/06/2017 22:53	0.5	3	NA	NA	IA	NA

Notes
1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);
2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO South Pit Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data; and
6. Criterion may or may not apply due to rounding of meteorological data values

Table 8: $L_{Aeq,\ 15minute}$ HVO North – Impact Assessment Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	13/06/2017 21:11	1.1	0.5	35	Yes	IA	Nil
Maison Dieu	13/06/2017 21:33	0.8	3	35	Yes	IA	Nil
Shearers Lane	13/06/2017 21:55	1.7	3	35	Yes	IA	Nil
Kilburnie South	13/06/2017 22:40	0.4	3	39	Yes	IA	Nil
Jerrys Plains Village	13/06/2017 21:43	1.1	0.5	36	Yes	IA	Nil
Jerrys Plains East	13/06/2017 21:20	1.1	0.5	39	Yes	IA	Nil
Long Point Road	15/06/2017 21:00	2.5	0.5	35	Yes	IA	Nil
HVGC	13/06/2017 22:53	0.5	3	NA	NA	IA	NA

Table 9: $L_{Aeq,15minute}$ HVO North - Land Acquisition Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	13/06/2017 21:11	1.1	0.5	41	Yes	IA	Nil
Maison Dieu	13/06/2017 21:33	0.8	3	41	Yes	IA	Nil
Shearers Lane	13/06/2017 21:55	1.7	3	41	Yes	IA	Nil
Kilburnie South	13/06/2017 22:40	0.4	3	41	Yes	IA	Nil
Jerrys Plains Village	13/06/2017 21:43	1.1	0.5	41	Yes	IA	Nil

Jerrys Plains East	13/06/2017 21:20	1.1	0.5	41	Yes	IA	Nil
Long Point Road	15/06/2017 21:00	2.5	0.5	41	Yes	IA	Nil
HVGC	13/06/2017 22:53	0.5	3	NA	NA	IA	NA

Table 10: $L_{A1,\ 1Minute}$ HVO North – Impact Assessment Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North $L_{A1,\ 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	13/06/2017 21:11	1.1	0.5	46	Yes	IA	Nil
Maison Dieu	13/06/2017 21:33	0.8	3	46	Yes	IA	Nil
Shearers Lane	13/06/2017 21:55	1.7	3	46	Yes	IA	Nil
Kilburnie South	13/06/2017 22:40	0.4	3	46	Yes	IA	Nil
Jerrys Plains Village	13/06/2017 21:43	1.1	0.5	46	Yes	IA	Nil
Jerrys Plains East	13/06/2017 21:20	1.1	0.5	46	Yes	IA	Nil
Long Point Road	15/06/2017 21:00	2.5	0.5	46	Yes	IA	Nil
HVGC	13/06/2017 22:53	0.5	3	NA	NA	IA	NA

Notes
1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);
2. Estimated or measured LAeq,15minute dB attributed to HVO North Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data; and
6. Criterion may or may not apply due to rounding of meteorological data values.

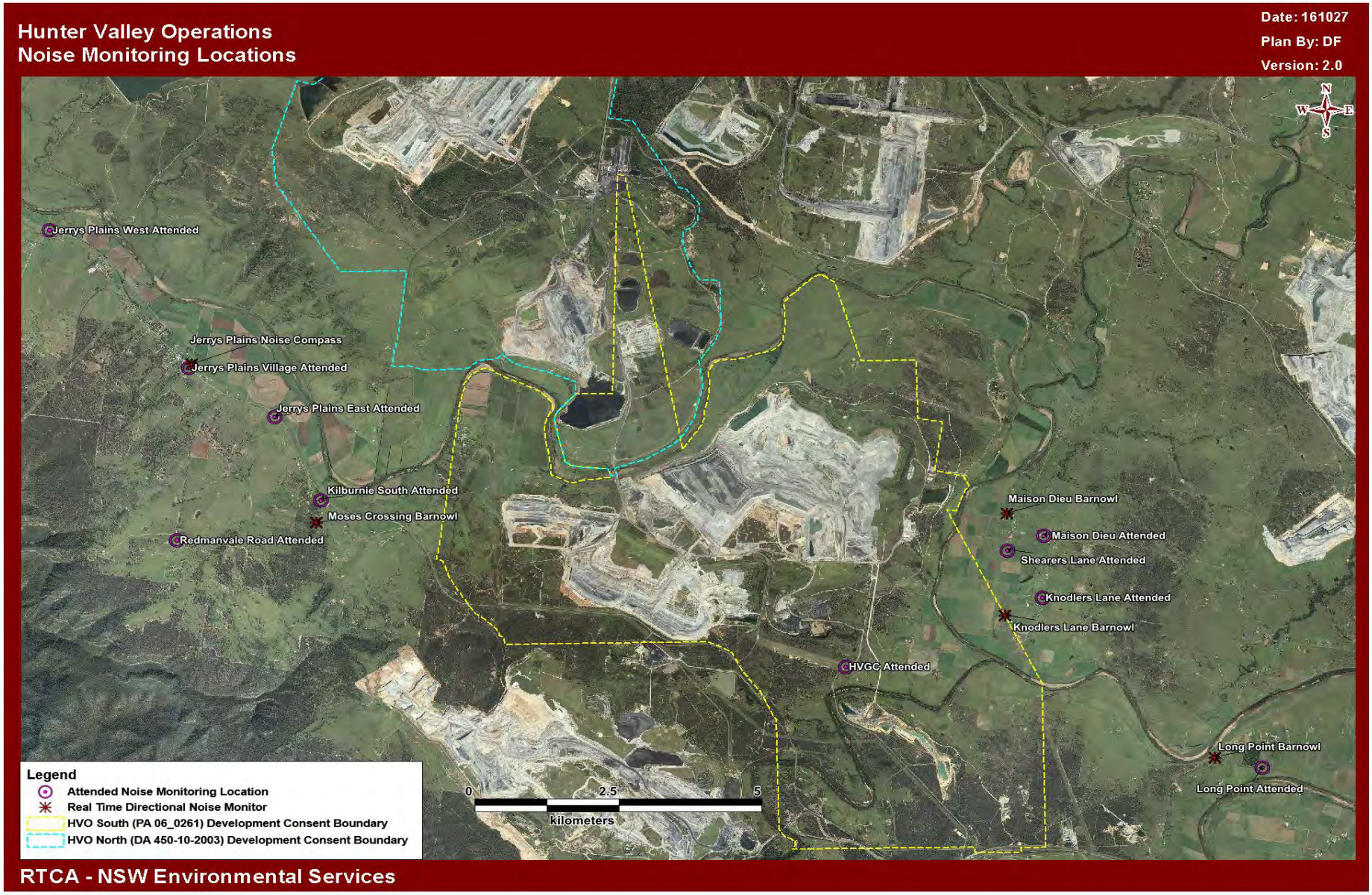


Figure 84: Noise Monitoring Location Plan

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.

HVO's planning approvals stipulate noise criteria which must be met during the life of the development(s). The approvals however do not stipulate requirements or give guidance on noise affectation, or the frequency of any elevated noise event which would constitute noise affectation. Page 6 of the NSW Industrial Noise Policy (INP) comments that criteria "seek to restrict the risk of people being highly annoyed to less than 10 percent, and to meet this for at least 90 percent of the time".

For the purposes of assessing the effectiveness of the noise management system, HVO applies a similar approach with regard to the frequency of any elevated noise event. 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 0.9 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 is shown in **Figure 85**.

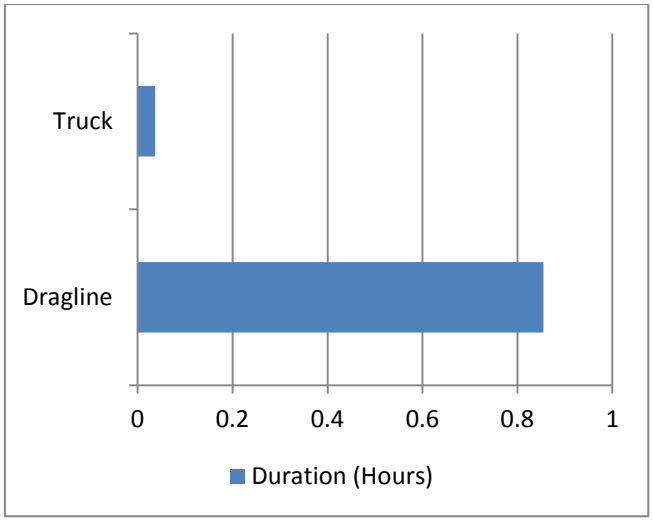


Figure 85: Operational Downtime by Equipment Type –June 2017

8.0 REHABILITATION

During June, 7.6Ha of land was released, 6.1Ha of land was bulk shaped, 7.8 Ha was topsoiled, 9.5 Ha was composted and 2.3 Ha was rehabilitated. Year to date progress can be viewed in **Figure 86**.

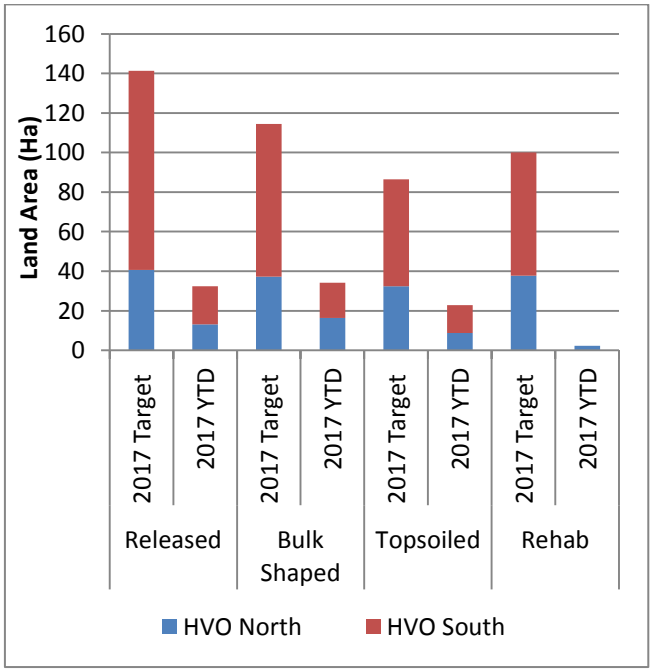


Figure 86: Rehabilitation YTD – June 2017

9.0 COMPLAINTS

One complaint was received during the reporting period. Details of this complaint are shown in **Figure 87** below.

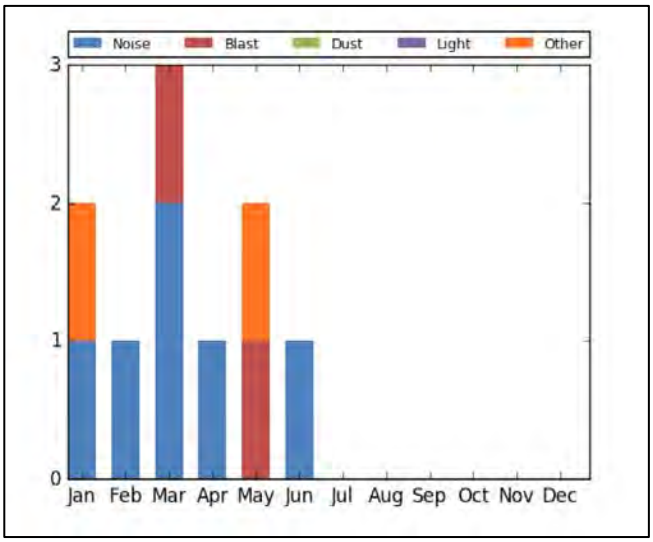


Figure 87: Complaints Graph – June 2017

10.0 ENVIRONMENTAL INCIDENTS

No reportable environmental incidents occurred during the reporting period.

Appendix A: Meteorological Data

Table 11: Meteorological Data - HVO Corporate Meteorological Station – June 2017

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)
1/06/2017	14.4	4.6	81.8	46.6	868	239	2.1	0.0
2/06/2017	16.4	2.4	85.9	37.0	549	232	1.7	0.0
3/06/2017	16.7	1.5	92.5	40.8	587	234	1.6	0.0
4/06/2017	17.5	7.2	82.3	52.4	888	169	1.1	0.0
5/06/2017	18.6	6.3	93.5	48.4	744	178	0.9	0.0
6/06/2017	16.9	3.6	100.0	54.6	647	281	2.1	0.0
7/06/2017	16.1	3.6	90.0	37.1	745	280	4.0	0.0
8/06/2017	12.4	5.1	100.0	65.6	430	233	1.5	10.6
9/06/2017	17.1	6.8	100.0	69.9	872	199	1.9	3.0
10/06/2017	16.3	8.3	100.0	73.8	824	125	1.5	4.8
11/06/2017	16.5	7.3	100.0	78.7	471	120	2.1	1.0
12/06/2017	16.6	8.3	100.0	81.0	641	116	1.2	0.4
13/06/2017	18.8	9.9	100.0	65.0	640	151	1.1	0.0
14/06/2017	18.0	10.2	97.5	63.7	773	141	2.2	0.0
15/06/2017	17.6	9.7	100.0	77.4	740	133	1.4	0.4
16/06/2017	18.8	9.0	100.0	62.7	754	193	1.1	0.0
17/06/2017	17.2	6.2	100.0	73.6	682	168	1.0	0.0
18/06/2017	16.2	7.8	100.0	76.6	279	178	1.0	0.0
19/06/2017	17.3	7.9	100.0	62.4	716	147	2.1	0.0
20/06/2017	18.8	9.6	98.3	53.7	717	129	1.9	0.0
21/06/2017	18.3	8.5	100.0	62.2	744	137	1.2	0.0
22/06/2017	17.3	4.8	100.0	49.4	620	208	2.0	0.2
23/06/2017	18.0	5.8	99.7	55.1	626	198	1.0	0.0
24/06/2017	18.0	5.3	100.0	48.6	639	282	2.6	0.2
25/06/2017	19.1	6.1	64.2	33.7	577	276	3.0	0.0
26/06/2017	18.9	6.8	73.3	35.9	493	280	3.4	0.0
27/06/2017	17.9	5.5	82.2	31.2	507	238	2.3	0.0
28/06/2017	13.9	0.6	100.0	56.9	499	176	1.0	0.0
29/06/2017	-	-	-	-	-	-	-	-
30/06/2017	13.3	6.7	100.0	78.2	363	270	1.8	5.2

"-" Data unavailable due to equipment or communications issue

YANCOAL
兖煤澳大利亚有限公司
HUNTER VALLEY OPERATIONS

Business Papers – Appendix B

Environmental Monitoring Report – July 2017

COAL & ALLIED

Managed by Rio Tinto Coal Australia

Hunter Valley Operations

Monthly Environmental Report

July 2017

Coal & Allied Operations Pty Ltd

ABN 16 000 023 656

Lemington Road, Ravensworth via Singleton NSW 2330 Australia

PO Box 315 Singleton NSW 2330 Australia

Telephone +61 2 6570 0300 Facsimile +61 2 6570 0399

CONTENTS

Figures

Tables

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environmental Graduate**	**Draft**	**23/08/2017**
1.0	**Environmental Advisor**	**Final**	**04/10/2017**

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 July to 31st July 2017.

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 2017 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
July	4.2	343.4

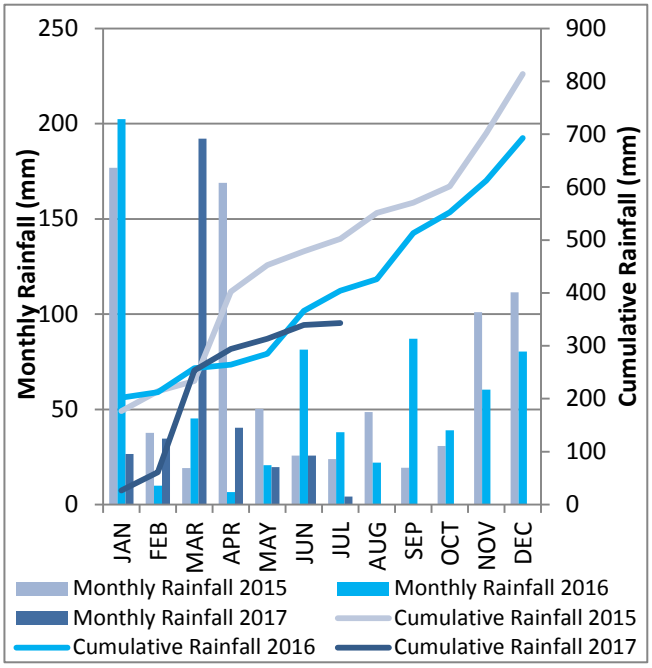


Figure 1: Year to Date Rainfall Summary 2017

2.1.2 Wind Speed and Direction

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

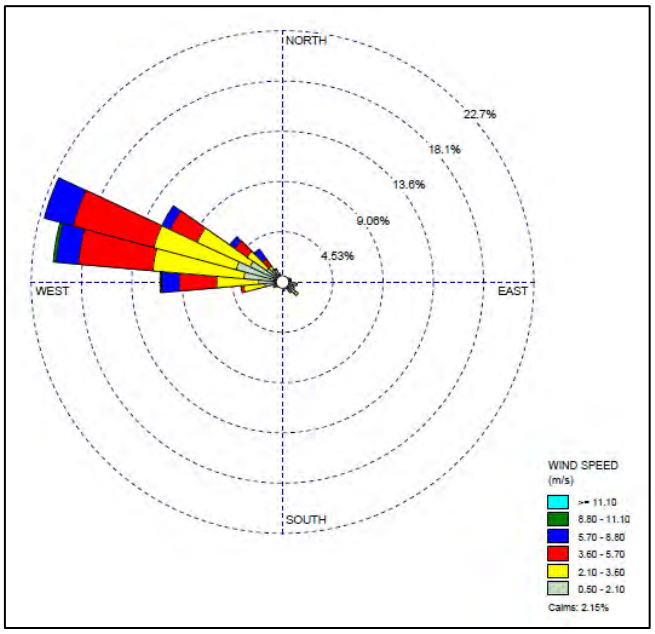


Figure 2: HVO Corporate Wind Rose – July 2017

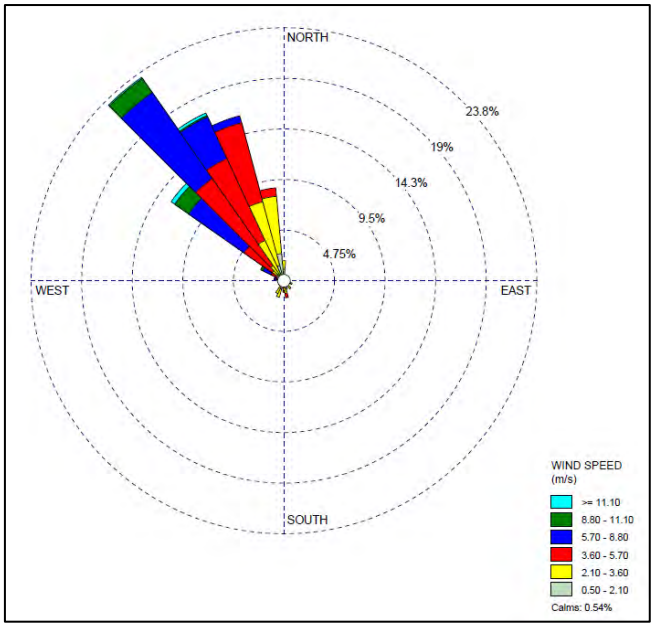


Figure 3: HVO Cheshunt Wind Rose – July 2017

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 DL30 monitor recorded a monthly result above the long term impact assessment criteria of 4.0 g/m^2 per month. There is no evidence to suggest that the DL30 result was contaminated. Accordingly, this result will be included in the annual average calculation.

The field notes associated with the DL14 result confirms the presence of insects, vegetation and bird droppings. As such the result is considered contaminated and will be excluded from calculation of the annual average.

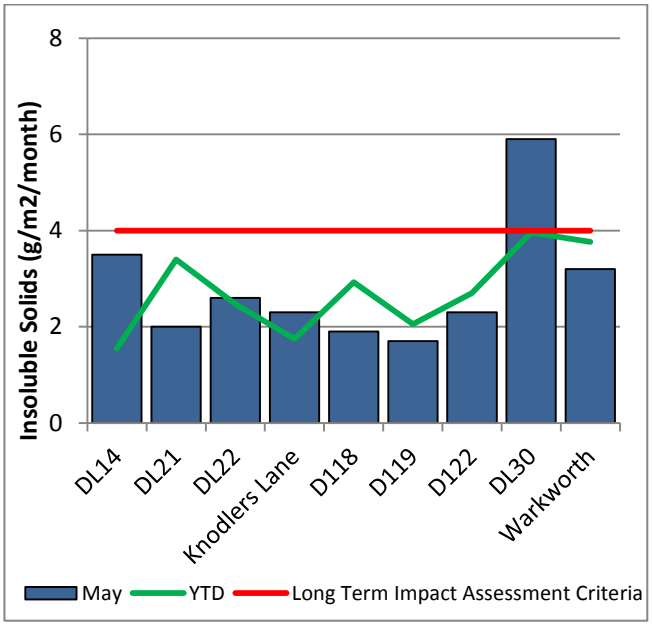


Figure 5: Depositional Dust Results – July 2017

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 in accordance with EPA requirements with the exception of the Warkworth HVAS, which failed to run on 5 July due to an instrument fault..

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/m^3.

On 5/07/2017 the Knodlers Lane HVAS PM_{10} unit recorded a result of of 65 µg/m^3, which is greater than the short term (24hr) PM_{10} impact assessment criteria.

Investigation indicates that the Knodlers Lane HVAS failed to collect a valid sample on the 5th July due to local livestock activity impacting the monitor. There were significant differences between the PM_{10} results recorded at Knodlers Lane and Masion Dieu on 5th July 2017, with Maison Dieu recording a 24 hour PM_{10} value of 17 µg/m^3. This is considered unusual given that both locations would have likely been downwind of HVO for much of the day and are relatively close to each other (approximately 2km apart). A horse and cattle feeding area was located nearby to the monitor on the day of the exceedance and has since been relocated to reduce the impact of livestock activity on future monitoring results.

On 23/07/2017 the Long Point HVAS PM_{10} unit recorded a result of 71 µg/m^3 which is greater than the short term (24hr) PM_{10} impact assessment criteria.

Investigation determined that the Long Point HVAS was likely influenced by localised dust sources. The wind direction data indicates that the Long Point monitor was downwind of HVO, however the Knodlers Lane HVAS located between HVO and the Long Point HVAS recorded a significantly lower result of 45 µg/m^3 on the same day. As the Long Point HVAS monitor is significantly further downwind of HVO, it is unlikely that HVO could have been the primary significant contributor to the level recorded at Long Point without having had a larger impact at the closer interceding Knodlers Lane monitor. HVO's maximum contribution at Long Point is estimated to be less than 33.6 µg/m^3, or less than 47% of the measured result.

On 29/07/2017 two HVAS PM_{10} units recorded results which were greater than the short term (24hr) PM_{10}

impact assessment criteria; Long Point (60 µg/m³) and Glider Club (58 µg/m³).

Investigation determined that HVO's maximum contribution at Long Point is estimated to be less than 33.3 µg/m³, or less than 56% of the measured result. Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

The Hunter Valley Gliding Club was operating on the 29th July 2017. While the impact of Gliding Club activities on the day is unable to be quantified with the available data, it is likely that the Club's activities would have contributed to the PM_{10} levels recorded at the Glider Club HVAS on this day. Investigation determined that HVO's and the Hunter Valley Gliding Club's contribution combined would not have been more than 85% of the measured result, or 49.3 µg/m³. The Hunter Valley Gliding Club and the Department of Planning & Environment were notified of this result.

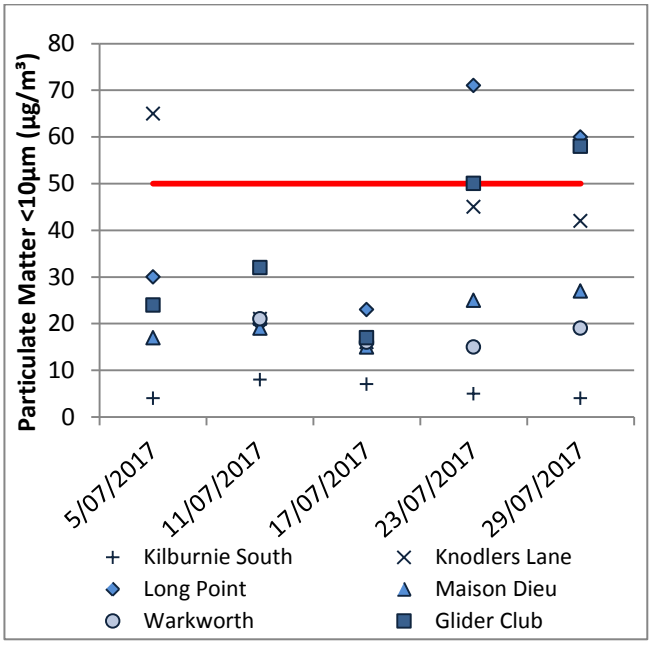


Figure 6: Individual PM_{10} Results – July 2017

Figure 7 shows the annual average PM_{10} results.

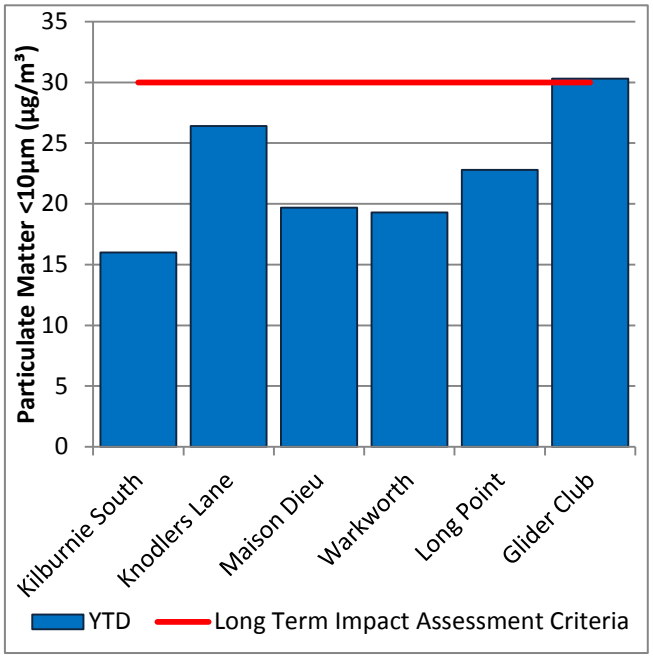


Figure 7: Year To Date Average PM_{10} – July 2017

2.3.2 TSP Results

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

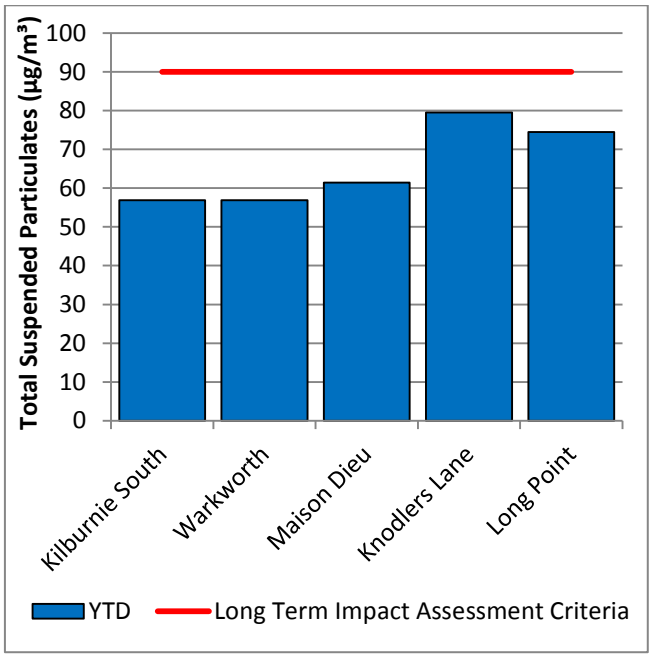


Figure 8: Year To Date Average Total Suspended Particulates - July 2017

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 are shown in Figure 9 including the daily 24 hour average PM_{10} result and the 24 hour YTD PM_{10} average. There was one result recorded which exceeded the short term (24hr) criteria in the approvals. A measurement of 73.1 µg/m³ was recorded at the Knodlers Lane TEOM location on the 30th July 2017.

An investigation was undertaken to assess air quality and meteorological conditions on the day and to assess the maximum potential HVO contribution to the measured result. The investigation determined that HVO's maximum potential contribution to the measured level at Knodlers Lane is estimated to be less than 42 µg/m³, or less than 60% of the measured result on the day.

Data was not available on 26th July 2017 (Knodlers Lane) due to a power outage.

2.3.4 Real Time Alarms for Air Quality

During July, the real time monitoring system generated 58 automated air quality related alarms. 31 alarms were related to adverse weather conditions and 27 alarms related to PM_{10}.

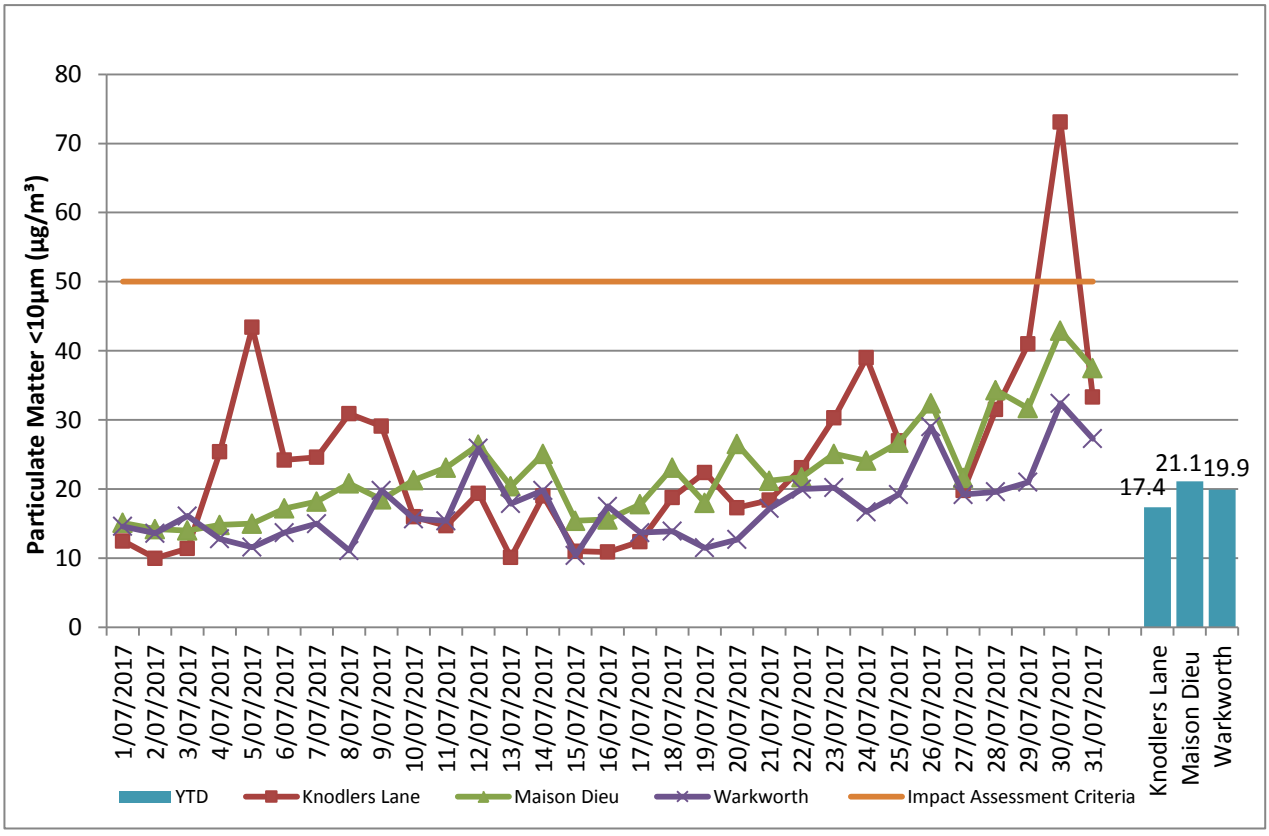


Figure 9: Real Time PM_{10} 24hr average and YTD Average – July 2017

3.0 WATER QUALITY

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

3.1.1 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).

Results of monitoring on Site Dams and the Hunter River as well as other natural tributaries are provided on a quarterly basis, results will appear in the September 2017 report.

3.1.2 Site Water Use

Under water allocation licences issued by the NSWDPI WaterHVO is permitted to extract water from the Hunter River. During the reporting period, HVO did not extract any water from the Hunter River.

3.1.3 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 no water was discharged under the HRSTS.

3.2.1 Groundwater Monitoring Results

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Results of groundwater monitoring are reported quarterly and as such will be reported in the September 2017 monthly report.

4.0 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 15.

During July, 20 blasts were initiated at HVO. Figure 10 through to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

Table 2: 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.

4.1 Blast Monitoring Results

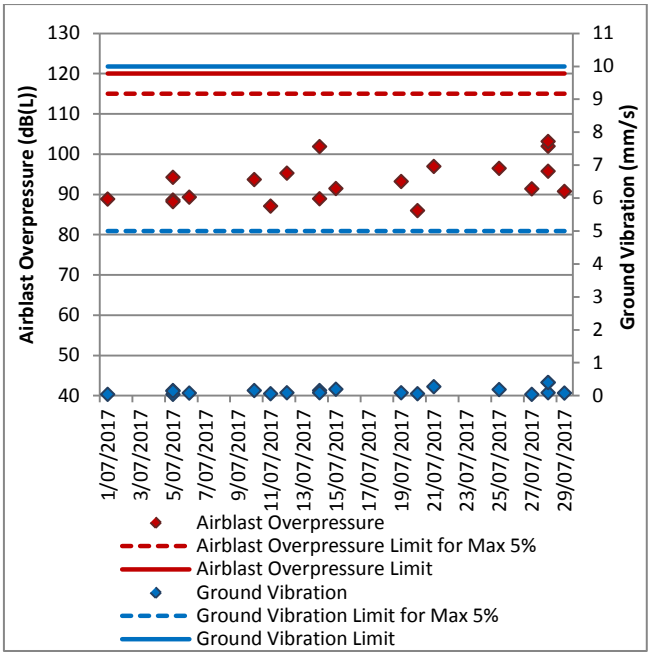


Figure 10: Moses Crossing Blast Monitoring Results – July 2017

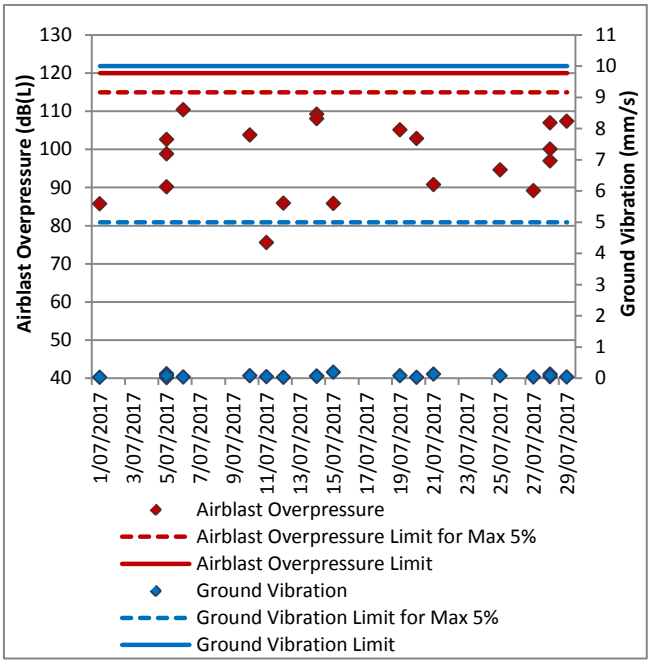


Figure 11: Jerrys Plains Blast Monitoring Results – July 2017

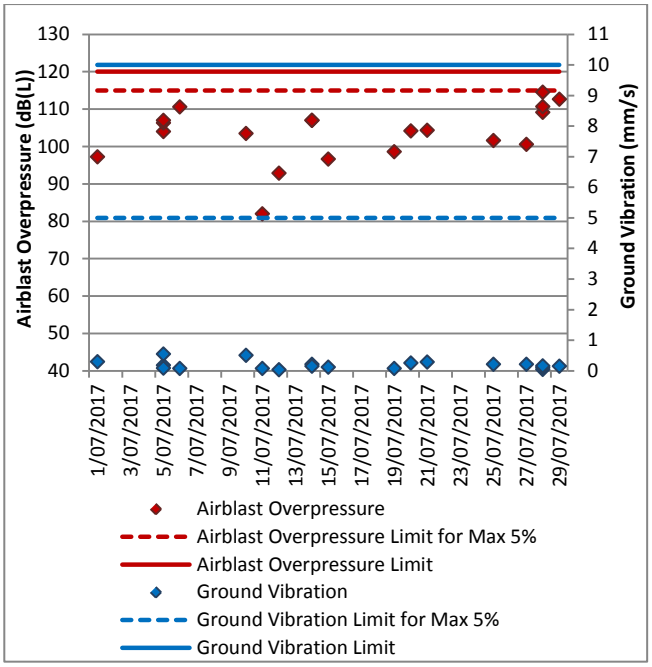


Figure 12: Maison Dieu Blast Monitoring Results – July 2017

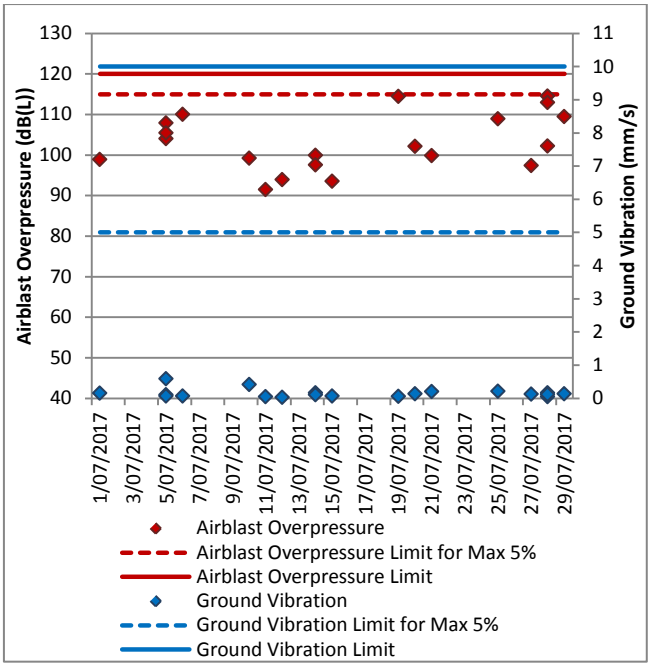


Figure 14: Knodlers Lane Blast Monitoring Results – July 2017

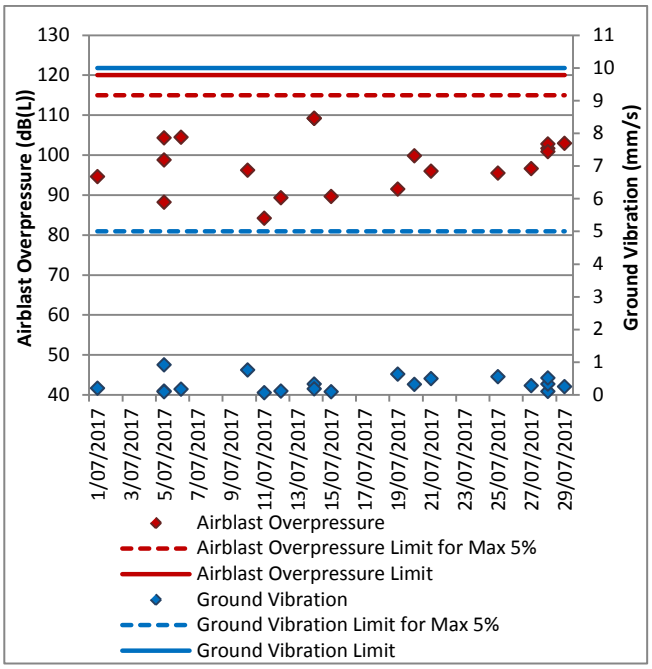


Figure 13: Warkworth Blast Monitoring Results - July 2017

Figure 15: 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 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the nights of 6th and 11th of July 2017. Monitoring results are detailed in Table 3 to Table 8.

Activities from HVO complied with the relevant development consent noise limits during the July 2017 survey at all monitoring locations, except for Maison Dieu.

During an initial measurement at Maison Dieu at 21:33 on 6 July 2017, a continuum from the HVO South Pit Area consisting mostly of engine noise, generated a site only L_{Aeq} of 41 dB. The exceedance procedure was initiated and a remeasure carried out at 22:49. This resulted in a site only L_{Aeq} of 32 dB, which is 5 dB below relevant HVO South Pit Area impact assessment criterion. It was later established that criteria were applicable during the initial measurement, however, were notapplicable during the remeasure due to wind speed conditions. A follow up measurement was scheduled to occur within one week.

The follow up measurement was carried out on 11 July 2017. HVO was inaudible during this measurement,and no further action was required.

The results where reported to the Department of Planning & Environment.

Table 3: $L_{Aeq,\ 15\ minute}$ HVO South - Impact Assessment Criteria – July 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	6/07/2017 21:00	2.2	-1	37	Yes	37	Nil
Maison Dieu	6/07/2017 21:33	1.8	-1	37	Yes	**41**	**4**
Maison Dieu[7]	6/07/2017 22:49	3	-1	37	No	32	NA
Maison Dieu[8]	11/07/2017 21:21	0.5	3	37	No	IA	NA
Shearers Lane	6/07/2017 23:17	2.5	-1	41	Yes	38	Nil
Kilburnie South	6/07/2017 23:08	2.5	-1	36	Yes	NM	Nil
Jerrys Plains Village	6/07/2017 22:05	2.2	-1	35	Yes	IA	Nil
Jerrys Plains East	6/07/2017 21:16	1.9	-1	35	Yes	IA	Nil
Long Point Road	6/07/2017 21:00	1.5	0.5	35	Yes	IA	Nil
HVGC	6/07/2017 23:49	2.1	-1	55	Yes	47	Nil

Table 4: $L_{Aeq,\ 15\ minute}$ HVO South - Land Acquisition Criteria – July 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	6/07/2017 21:00	2.2	-1	41	Yes	37	Nil
Maison Dieu	6/07/2017 21:33	1.8	-1	41	Yes	41	Nil
Maison Dieu[7]	6/07/2017 22:49	3	-1	41	No	32	NA

Maison Dieu[8]	11/07/2017 21:21	0.5	3	41	No	IA	NA
Shearers Lane	6/07/2017 23:17	2.5	-1	41	Yes	38	Nil
Kilburnie South	6/07/2017 23:08	2.5	-1	41	Yes	NM	Nil
Jerrys Plains Village	6/07/2017 22:05	2.2	-1	40	Yes	IA	Nil
Jerrys Plains East	6/07/2017 21:16	1.9	-1	40	Yes	IA	Nil
Long Point Road	6/07/2017 21:00	1.5	0.5	40	Yes	IA	Nil
HVGC	6/07/2017 23:49	2.1	-1	NA	NA	47	NA

Table 5: $L_{A1,\ 1minute}$ HVO South - Impact Assessment Criteria – July 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South $L_{A1,\ 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	6/07/2017 21:00	2.2	-1	45	Yes	44	Nil
Maison Dieu	6/07/2017 21:33	1.8	-1	45	Yes	45	Nil
Maison Dieu[7]	6/07/2017 22:49	3	-1	45	No	39	NA
Maison Dieu[8]	11/07/2017 21:21	0.5	3	45	No	IA	NA
Shearers Lane	6/07/2017 23:17	2.5	-1	45	Yes	45	Nil
Kilburnie South	6/07/2017 23:08	2.5	-1	45	Yes	NM	Nil
Jerrys Plains Village	6/07/2017 22:05	2.2	-1	45	Yes	IA	Nil
Jerrys Plains East	6/07/2017 21:16	1.9	-1	45	Yes	IA	Nil
Long Point Road	6/07/2017 21:00	1.5	0.5	45	Yes	IA	Nil
HVGC	6/07/2017 23:49	2.1	-1	NA	NA	55	NA

Notes
1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);
2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO South Pit Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values
7. Remeasure; and
8. Follow up measurement

Table 6: $L_{Aeq,\ 15minute}$ HVO North – Impact Assessment Criteria – July 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	6/07/2017 21:00	2.2	-1	35	Yes	NM	Nil
Maison Dieu	6/07/2017 21:33	1.8	-1	35	Yes	NM	Nil
Maison Dieu[7]	6/07/2017 22:49	3	-1	35	Yes	NM	NA
Maison Dieu[8]	11/07/2017 21:21	0.5	3	35	Yes	IA	NA
Shearers Lane	6/07/2017 23:17	2.5	-1	35	Yes	NM	Nil
Kilburnie South	6/07/2017 23:08	2.5	-1	39	Yes	NM	Nil
Jerrys Plains Village	6/07/2017 22:05	2.2	-1	36	Yes	<25	Nil
Jerrys Plains East	6/07/2017 21:16	1.9	-1	39	Yes	<25	Nil

Long Point Road	6/07/2017 21:00	1.5	0.5	35	Yes	IA	Nil
HVGC	6/07/2017 23:49	2.1	-1	NA	NA	NM	NA

Table 7: $L_{Aeq,15minute}$ HVO North - Land Acquisition Criteria – July 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	6/07/2017 21:00	2.2	-1	41	Yes	NM	Nil
Maison Dieu	6/07/2017 21:33	1.8	-1	41	Yes	NM	Nil
Maison Dieu[7]	6/07/2017 22:49	3	-1	41	Yes	NM	NA
Maison Dieu[8]	11/07/2017 21:21	0.5	3	41	Yes	IA	NA
Shearers Lane	6/07/2017 23:17	2.5	-1	41	Yes	NM	Nil
Kilburnie South	6/07/2017 23:08	2.5	-1	41	Yes	NM	Nil
Jerrys Plains Village	6/07/2017 22:05	2.2	-1	41	Yes	<25	Nil
Jerrys Plains East	6/07/2017 21:16	1.9	-1	41	Yes	<25	Nil
Long Point Road	6/07/2017 21:00	1.5	0.5	41	Yes	IA	Nil
HVGC	6/07/2017 23:49	2.1	-1	NA	NA	NM	NA

Table 8: $L_{A1,\ 1Minute}$ HVO North - Impact Assessment Criteria – July 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North $L_{A1,\ 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	6/07/2017 21:00	2.2	-1	46	Yes	NM	Nil
Maison Dieu	6/07/2017 21:33	1.8	-1	46	Yes	NM	Nil
Maison Dieu[7]	6/07/2017 22:49	3	-1	46	Yes	NM	NA
Maison Dieu[8]	11/07/2017 21:21	0.5	3	46	Yes	IA	NA
Shearers Lane	6/07/2017 23:17	2.5	-1	46	Yes	NM	Nil
Kilburnie South	6/07/2017 23:08	2.5	-1	46	Yes	NM	Nil
Jerrys Plains Village	6/07/2017 22:05	2.2	-1	46	Yes	<25	Nil
Jerrys Plains East	6/07/2017 21:16	1.9	-1	46	Yes	<25	Nil
Long Point Road	6/07/2017 21:00	1.5	0.5	46	Yes	IA	Nil
HVGC	6/07/2017 23:49	2.1	-1	NA	NA	NM	NA

Notes
1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);
2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO North Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values
7. Remeasure; and
8. Follow up measurement

5.2 INP Low Frequency Assessment

In accordance with the requirements of the Industrial Noise Policy (INP), the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target source is audible. The L_{Ceq} levels reported above are "Total", or "Total mine noise" at best, and cannot be attributed accurately to a single mine. Accordingly, where the INP criteria for the application of the Low Frequency penalty is triggered, the penalty has been applied to the dominant mine noise source. Resulting L_{Aeq} noise levels exceed the HVO South impact assessment criteria at Knodlers Lane, Maison Dieu and Shearers Lane by 5dB, 9dB and 2dB respectively due to the application of a 5 dB penalty to the site only L_{Aeq}.

HVO reports these measurements so as to ensure full disclosure, however it remains HVO's position that the prescribed methodology is unsuitable when applied to receptors at large distances from mine noise sources due to the nature of noise attenuation. Excess attenuation of noise with distance is greater for high frequency noise than it is for low frequency noise. At significant distance from a noise source (such as private residences from HVO) this often results in large differentials between LAeq and LCeq. The NSW Industrial Noise Policy requires the penalty to be applied in these instances, irrespective of actual low frequency affectation. As such, HVO does not consider these instances to constitute non-compliance with the conditions of approval. The results have been reported to the Department of Planning and Environment.

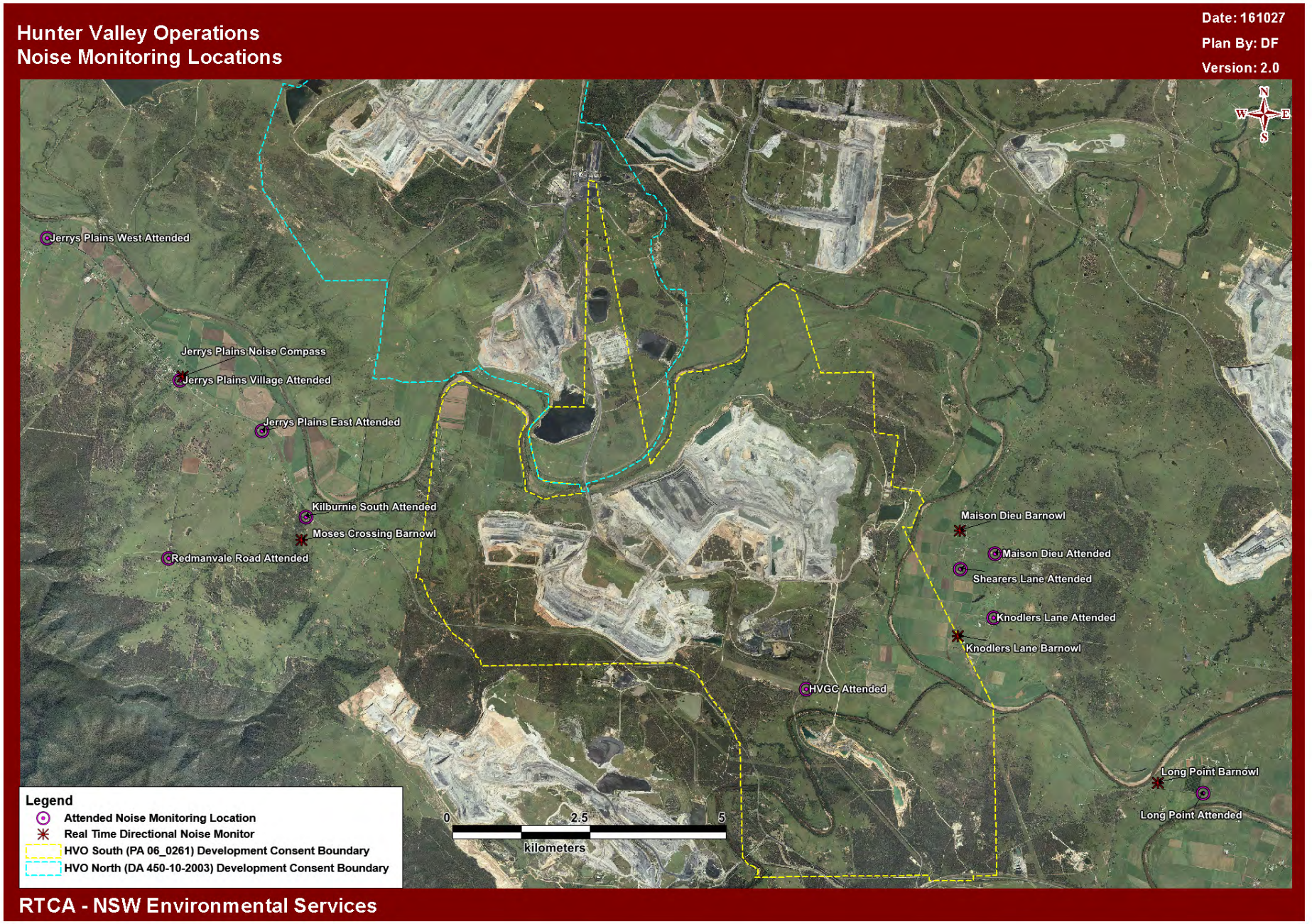


Figure 16: Noise Monitoring Location Plan

5.2 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.

HVO's Planning approvals stipulate noise criteria which must be met during the life of the development(s). The approvals however do not stipulate requirements or give guidance on noise affectation, or the frequency of any elevated noise event which would constitute noise affectation. Page 6 of the NSW Industrial Noise Policy (INP) comments that criteria "*seek to restrict the risk of people being highly annoyed to less than 10 percent, and to meet this for at least 90 percent of the time*".

For the purposes of assessing the effectiveness of the noise management system, HVO applies a similar approach with regard to the frequency of any elevated noise event. 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.

6.0 OPERATIONAL DOWNTIME

During July, a total of 632.3 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 17.

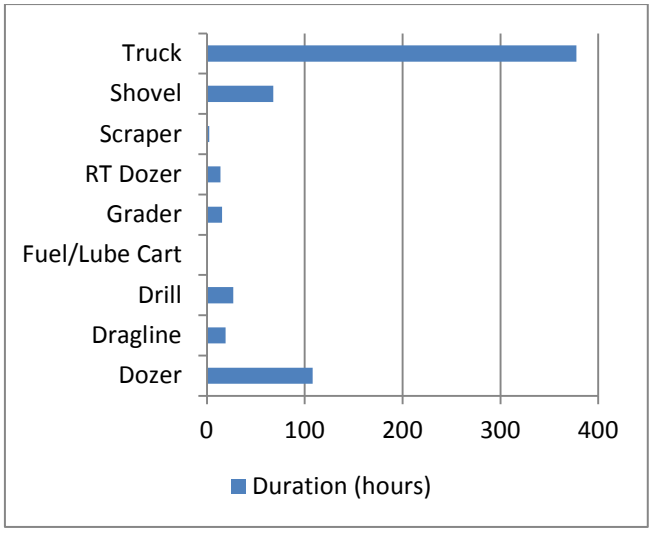


Figure 17: Operational Downtime by Equipment Type – July 2017

7.0 REHABILITATION

During July, 35.7 Ha of land was released, 3.5 Ha of land was bulk shaped, 9.9 Ha of land was topsoiled and 17.5 Ha of land was composted. Year to date progress can be viewed in Figure 18.

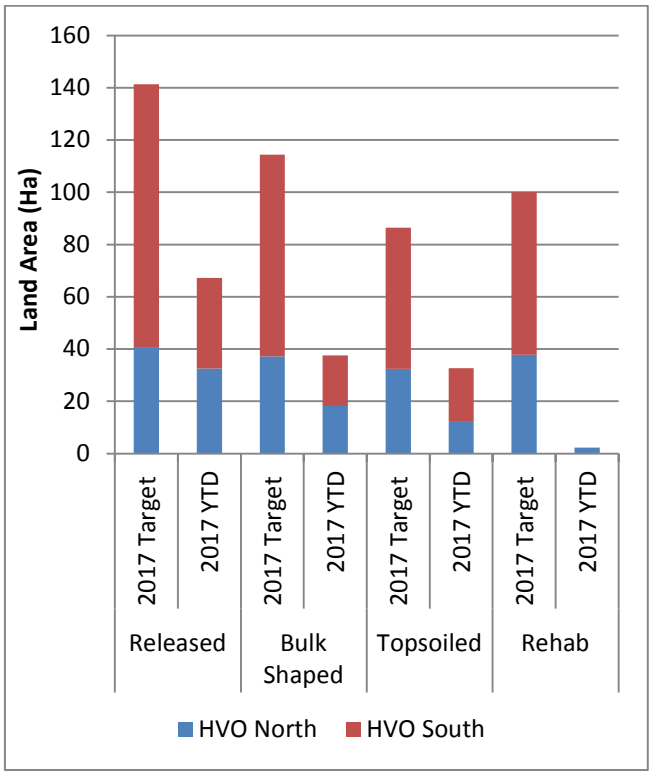


Figure 18: Rehabilitation YTD - July 2017

8.0 COMPLAINTS

No complaints were received during the reporting period. Details of complaints received YTD are shown in Figure 19 below.

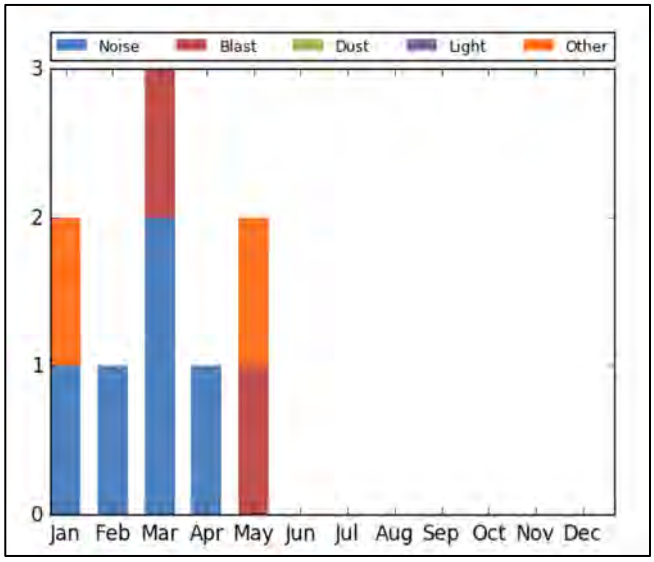


Figure 19: Complaints Graph – July 2017

9.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

Appendix A: Meteorological Data

Table 9: Meteorological Data - HVO Corporate Meteorological Station – July 2017

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)
1/07/2017	14.6	-0.8	100.0	42.2	523	224.5	1.2	0.0
2/07/2017	17.2	-1.0	100.0	33.0	522	236.4	1.4	0.0
3/07/2017	17.7	0.3	100.0	44.4	781	240.8	1.7	0.0
4/07/2017	20.2	8.0	89.9	18.1	531	282.9	5.2	0.2
5/07/2017	18.3	8.1	58.2	29.3	522	281.0	4.0	0.0
6/07/2017	18.7	3.1	77.8	24.5	526	283.2	3.5	0.0
7/07/2017	18.5	1.5	87.9	26.2	560	274.6	3.0	0.0
8/07/2017	16.7	4.0	64.4	32.0	569	280.7	3.7	0.0
9/07/2017	16.5	2.3	80.8	30.4	525	283.5	3.5	0.0
10/07/2017	16.1	1.9	81.7	34.1	625	284.6	2.5	0.0
11/07/2017	16.2	1.4	87.3	37.3	682	213.2	1.6	0.0
12/07/2017	14.6	5.7	94.6	59.2	662	169.9	1.2	0.0
13/07/2017	17.1	1.9	100.0	45.1	834	190.6	1.1	0.0
14/07/2017	20.2	1.4	99.0	39.8	686	279.6	3.1	1.4
15/07/2017	16.1	6.9	95.4	55.6	741	273.2	2.3	0.2
16/07/2017	18.1	4.1	100.0	37.7	552	176.0	1.1	0.0
17/07/2017	18.6	2.6	100.0	41.5	763	240.5	1.5	0.0
18/07/2017	22.4	5.0	90.5	30.6	545	288.7	4.4	1.2
19/07/2017	14.7	8.7	75.5	39.5	557	288.5	4.9	0.2
20/07/2017	16.8	3.7	83.3	22.4	876	288.5	4.9	0.2
21/07/2017	16.7	2.0	76.9	34.6	594	225.0	2.0	0.0
22/07/2017	17.5	0.3	89.9	21.2	587	280.2	2.5	0.0
23/07/2017	19.3	4.1	60.7	14.0	575	299.2	4.8	0.0
24/07/2017	20.0	5.9	54.9	23.8	599	289.7	3.7	0.0
25/07/2017	19.6	2.5	77.4	25.5	593	288.9	3.3	0.0
26/07/2017	21.2	10.8	55.6	21.3	584	280.3	5.3	0.0
27/07/2017	21.6	2.9	86.0	18.1	607	242.1	3.4	0.0
28/07/2017	20.6	3.1	85.4	10.4	890	268.3	3.6	0.0
29/07/2017	20.2	1.5	68.9	10.1	628	290.5	3.1	0.0
30/07/2017	24.4	8.3	40.3	11.6	831	269.2	3.5	0.0
31/07/2017	18.0	7.5	85.3	28.5	371	209.9	2.7	1.0

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

YANCOAL
兖煤澳大利亚有限公司
HUNTER VALLEY OPERATIONS

Business Papers – Appendix C

Environmental Monitoring Report – August 2017

COAL & ALLIED

Managed by Rio Tinto Coal Australia

Hunter Valley Operations

Monthly Environmental Report

August 2017

Coal & Allied Operations Pty Ltd

ABN 16 000 023 656

Lemington Road, Ravensworth via Singleton NSW 2330 Australia

PO Box 315 Singleton NSW 2330 Australia

Telephone +61 2 6570 0300 Facsimile +61 2 6570 0399

CONTENTS

Figures

Tables

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environmental Graduate**	**Draft**	**23/08/2017**
1.0	**Environmental Advisor**	**Final**	**09/10/2017**

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 August to 31st August 2017.

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 2017 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
August	13.0	356.4

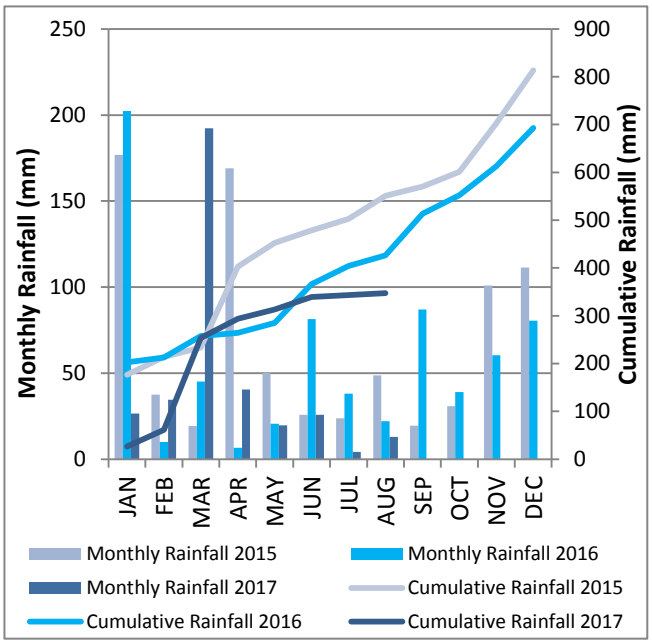


Figure 1: Year to Date Rainfall Summary 2017

2.1.2 Wind Speed and Direction

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

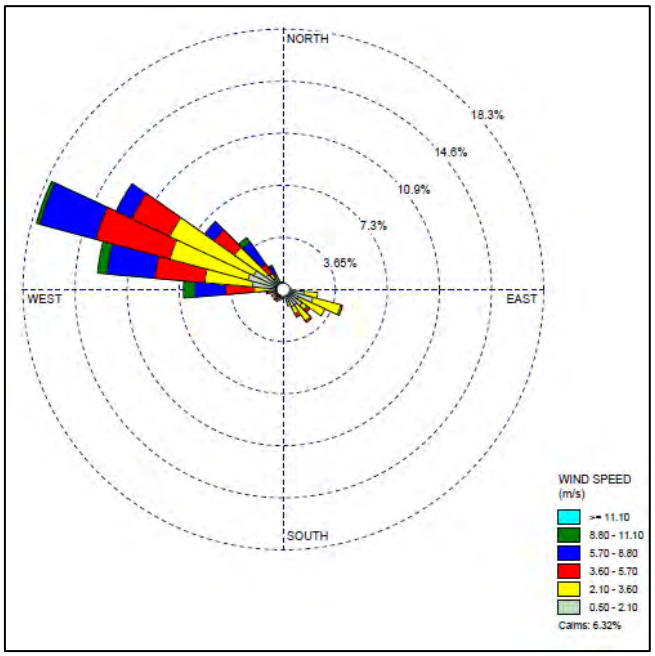


Figure 2: HVO Corporate Wind Rose – August 2017

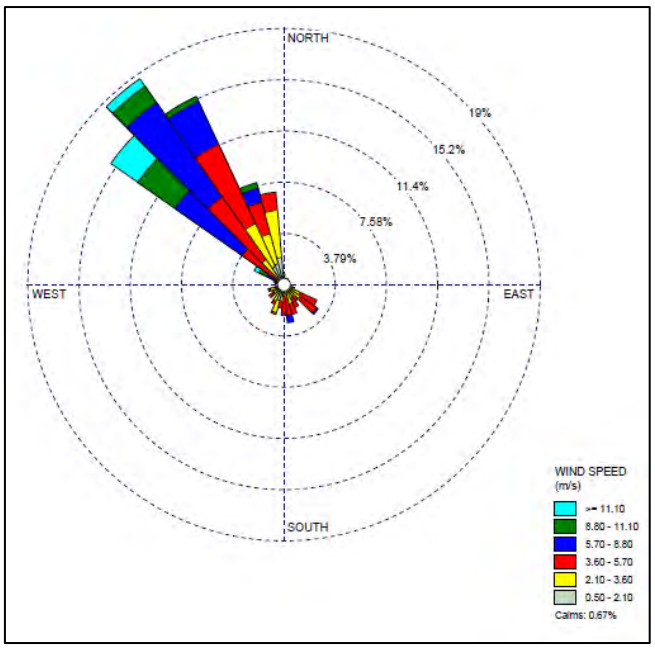


Figure 3: HVO Cheshunt Wind Rose – August 2017

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 DL21 and DL30 monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m² per month. There is no evidence to suggest that the DL21 and DL30 results were contaminated. Accordingly, these results will be included in the annual average calculation.

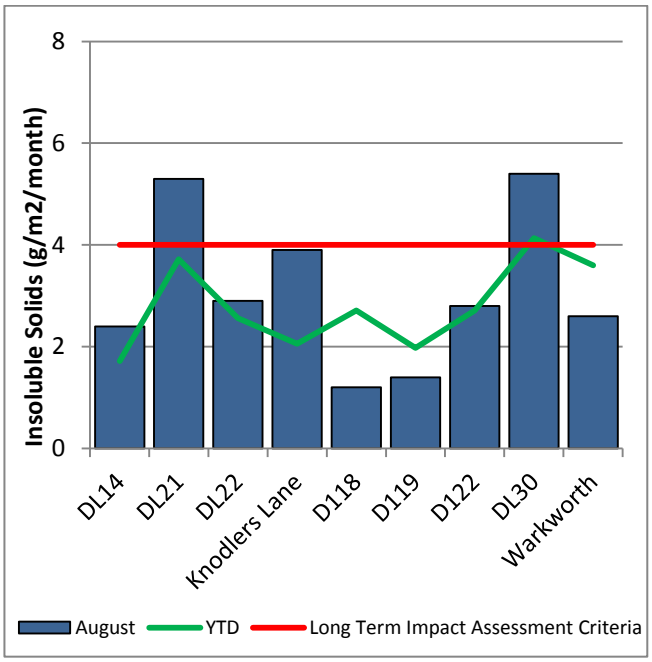


Figure 5: Depositional Dust Results – August 2017

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.

The Long Point HVAS failed to collect a valid sample on 22 August 2017 due to equipment issues.

On 16 August 2017, four HVAS PM_{10} units recorded a result greater than the short term (24hr) PM10 impact assessment criteria; Long Point (132 µg/m³), Knodlers Lane (75 µg/m³), Maison Dieu (51 µg/m³) and Glider Club (64 µg/m³).

At the time of preparation of this report, the results at Long Point and Knodlers Lane are under external investigation, results of these investigations will be provided in the Annual Environment Report.

Internal investigation indicates that the likely HVO contribution to the results at Maison Dieu and the Glider Club on 16 August 2017 is less than 75% of the total measured concentration. It was determined that the maximum HVO potential contribution to the results is in the order of 31 µg/m³ (at Maison Dieu HVAS) and 44 µg/m³ (at Glider Club HVAS). Accordingly, no further action is required (as per approved Air Quality Management Plan).

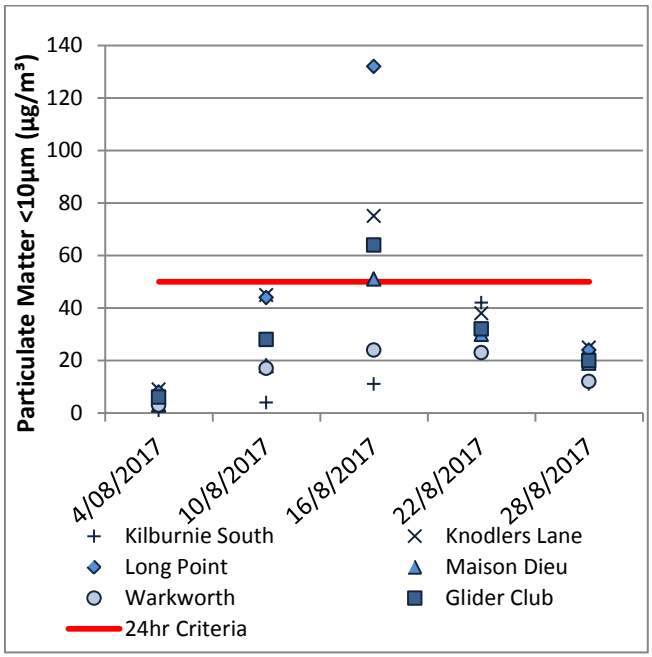


Figure 6: Individual PM_{10} Results – August 2017

Figure 7 shows the total measured year to date annual average PM_{10} results.

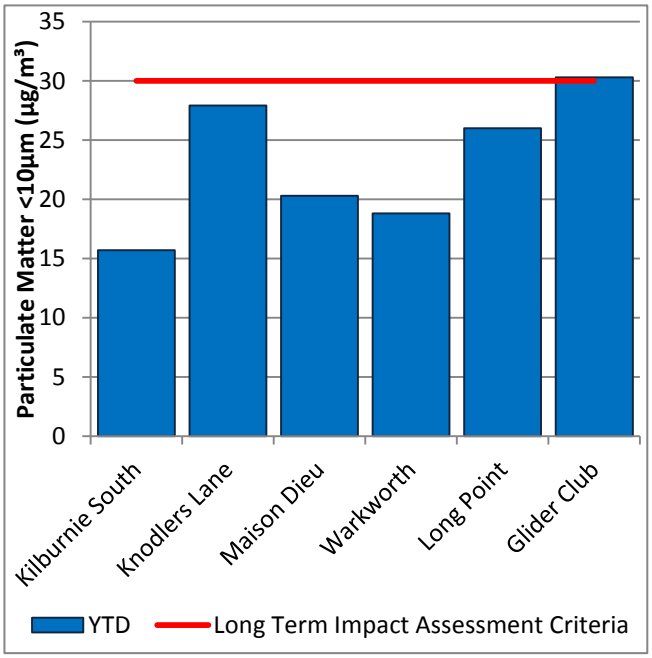


Figure 7: Year To Date Average PM_{10} – August 2017

2.3.2 TSP Results

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

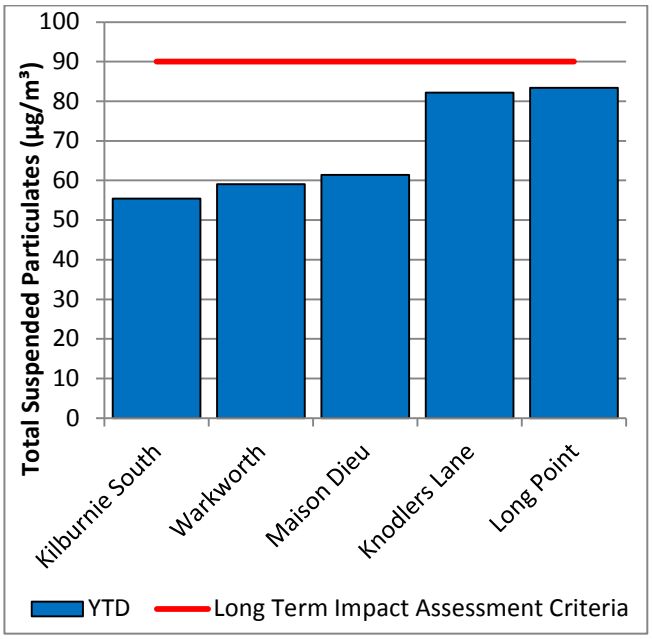


Figure 8: Year To Date Average Total Suspended Particulates - August 2017

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 monitoring are shown in Figure 9 including the daily 24 hour average PM_{10} result and the 24 hour YTD PM_{10} average. Five results recorded elevated levels at the Knodlers Lane TEOM which exceeded the short term (24hr) criteria. These measurements were assessed for HVO's maximum potential contribution based on mining activies and meteorological conditions on these days. Resulting in the following maximum estimated contributions from the direction of HVO:

- 7 August 2017 – 41 µg/m³;
- 11 August 2017 – 44 µg/m³;
- 15 August 2017 - 32 µg/m³;
- 16 August 2017 - 30 µg/m³; and
- 17 August 2017 – 43 µg/m³

2.3.4 Real Time Alarms for Air Quality

During August, the real time monitoring system generated 101 automated air quality related alarms. 33 alarms were related to adverse weather conditions and 68 alarms related to elevated PM_{10} levels.

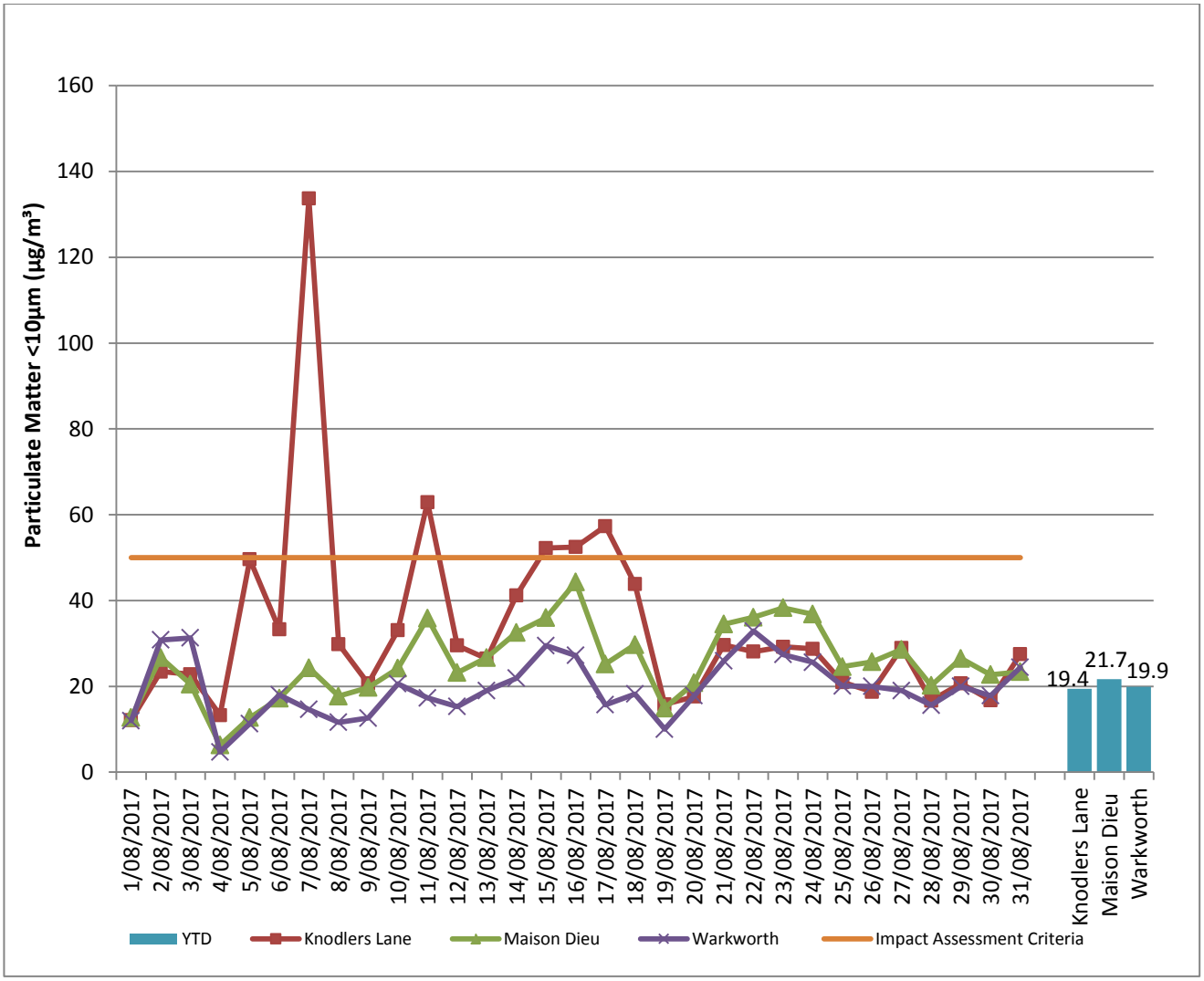


Figure 9: Real Time PM_{10} 24hr average and YTD Average – August 2017

3.0 WATER QUALITY

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

3.1.1 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).

Results of monitoring on Site Dams and the Hunter River as well as other natural tributaries are provided on a quarterly basis, results will appear in the September 2017 report.

3.1.2 Site Water Use

Under water allocation licences issued by the NSW DPI Water, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO did not extract any water from the Hunter River.

3.1.3 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 no water was discharged under the HRSTS.

3.2.1 Groundwater Monitoring Results

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Results of groundwater monitoring are reported quarterly and as such will be reported in the September 2017 monthly report.

4.0 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 15.

During August, 28 blasts were initiated at HVO. Figure 10 through to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

Table 2: 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.

4.1 Blast Monitoring Results

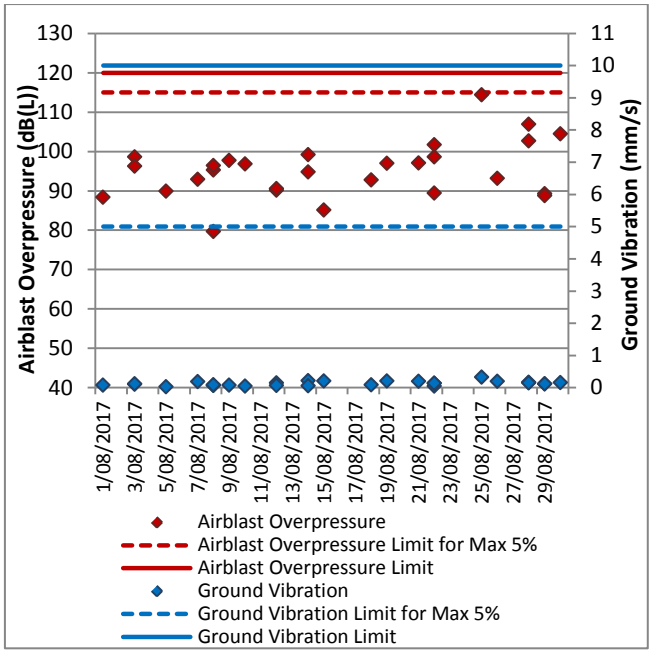


Figure 10: Moses Crossing Blast Monitoring Results – August 2017

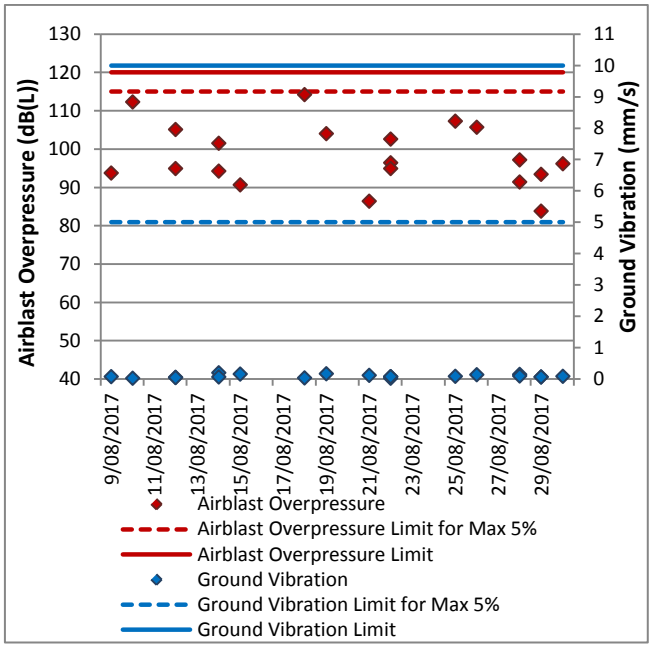


Figure 11: Jerrys Plains Blast Monitoring Results – August 2017

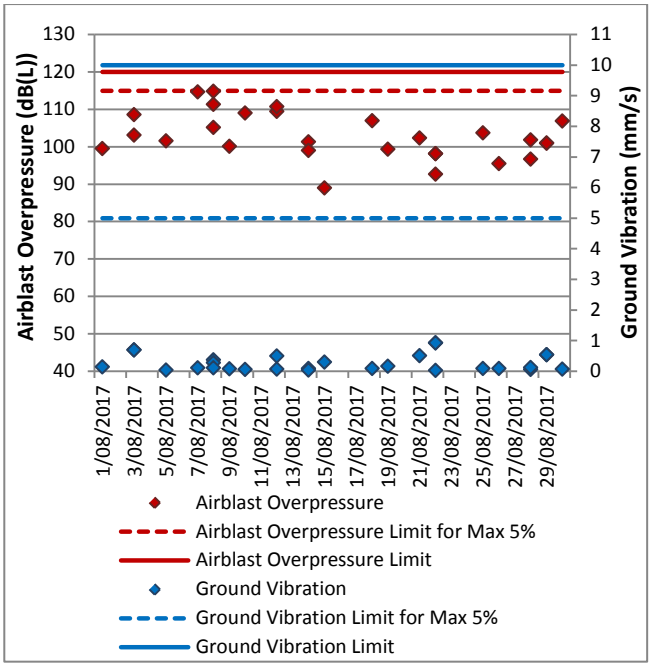


Figure 12: Maison Dieu Blast Monitoring Results – August 2017

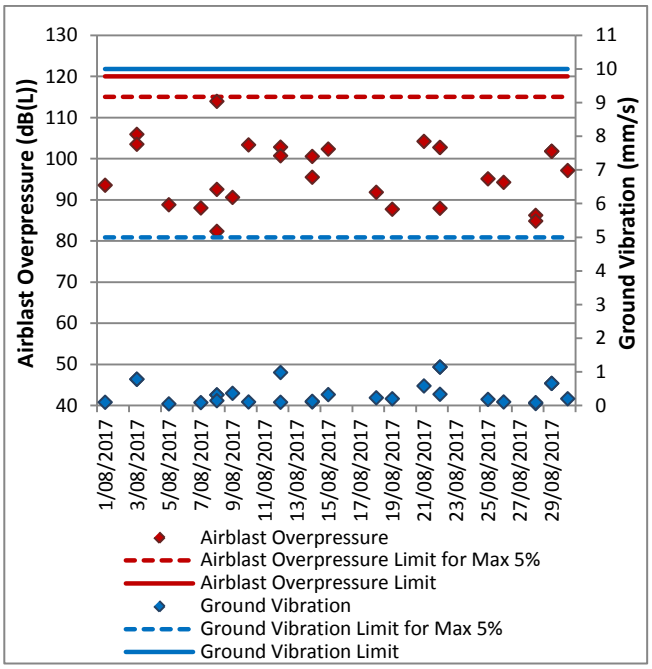


Figure 13: Warkworth Blast Monitoring Results - August 2017

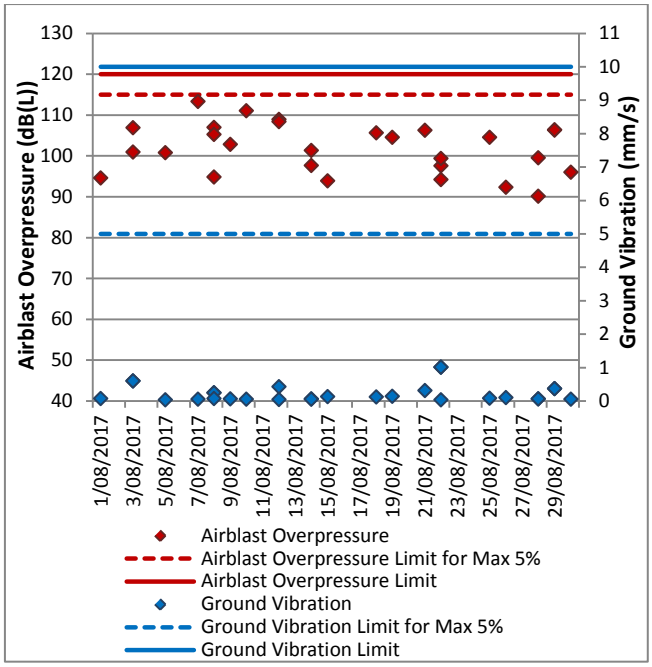


Figure 14: Knodlers Lane Blast Monitoring Results – August 2017

Figure 15: 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 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the nights of 2nd and 28th of August 2017. All measurements complied with the relevant criteria. Monitoring results are detailed in Table 3 to Table 8.

Table 3: $L_{Aeq,\ 15\ minute}$ HVO South - Impact Assessment Criteria – August 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	28/08/2017 21:00	0.3	-1	37	Yes	IA	Nil
Maison Dieu	28/08/2017 21:23	0.8	-1	37	Yes	IA	Nil
Shearers Lane	28/08/2017 21:47	0.8	-1	41	Yes	IA	Nil
Kilburnie South	28/08/2017 22:41	0.2	-1	36	Yes	IA	Nil
Jerrys Plains Village	28/08/2017 21:30	0.8	-1	35	Yes	<30	Nil
Jerrys Plains East	28/08/2017 21:00	0.3	-1	35	Yes	<30	Nil
Long Point Road	2/08/2017 21:00	1.7	-1	35	Yes	IA	Nil
HVGC	28/08/2017 22:45	0.2	-1	55	Yes	<30	Nil

Table 4: $L_{Aeq,\ 15\ minute}$ HVO South - Land Acquisition Criteria – August 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	28/08/2017 21:00	0.3	-1	41	Yes	IA	Nil
Maison Dieu	28/08/2017 21:23	0.8	-1	41	Yes	IA	Nil
Shearers Lane	28/08/2017 21:47	0.8	-1	41	Yes	IA	Nil
Kilburnie South	28/08/2017 22:41	0.2	-1	41	Yes	IA	Nil
Jerrys Plains Village	28/08/2017 21:30	0.8	-1	40	Yes	<30	Nil
Jerrys Plains East	28/08/2017 21:00	0.3	-1	40	Yes	<30	Nil
Long Point Road	2/08/2017 21:00	1.7	-1	40	Yes	IA	Nil
HVGC	28/08/2017 22:45	0.2	-1	NA	NA	<30	NA

Table 5: $L_{A1,\ 1minute}$ HVO South - Impact Assessment Criteria – August 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South $L_{A1,\ 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	28/08/2017 21:00	0.3	-1	45	Yes	IA	Nil
Maison Dieu	28/08/2017 21:23	0.8	-1	45	Yes	IA	Nil
Shearers Lane	28/08/2017 21:47	0.8	-1	45	Yes	IA	Nil
Kilburnie South	28/08/2017 22:41	0.2	-1	45	Yes	IA	Nil
Jerrys Plains Village	28/08/2017 21:30	0.8	-1	45	Yes	33	Nil
Jerrys Plains East	28/08/2017 21:00	0.3	-1	45	Yes	<30	Nil
Long Point Road	2/08/2017 21:00	1.7	-1	45	Yes	IA	Nil
HVGC	28/08/2017 22:45	0.2	-1	NA	NA	36	NA

Notes
1. Noise emission limits apply for wind speeds up to 3 metres per second (at aheight of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m);
2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO South Pit Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values

Table 6: $L_{Aeq,\ 15minute}$ HVO North – Impact Assessment Criteria – August 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	28/08/2017 21:00	0.3	-1	35	Yes	IA	Nil
Maison Dieu	28/08/2017 21:23	0.8	-1	35	Yes	IA	Nil
Shearers Lane	28/08/2017 21:47	0.8	-1	35	Yes	IA	Nil
Kilburnie South	28/08/2017 22:41	0.2	-1	39	Yes	IA	Nil
Jerrys Plains Village	28/08/2017 21:30	0.8	-1	36	Yes	IA	Nil
Jerrys Plains East	28/08/2017 21:00	0.3	-1	39	Yes	IA	Nil
Long Point Road	2/08/2017 21:00	1.7	-1	35	Yes	IA	Nil
HVGC	28/08/2017 22:45	0.2	-1	NA	NA	IA	NA

Table 7: $L_{Aeq,15minute}$ HVO North - Land Acquisition Criteria – August 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	28/08/2017 21:00	0.3	-1	41	Yes	IA	Nil
Maison Dieu	28/08/2017 21:23	0.8	-1	41	Yes	IA	Nil
Shearers Lane	28/08/2017 21:47	0.8	-1	41	Yes	IA	Nil
Kilburnie South	28/08/2017 22:41	0.2	-1	41	Yes	IA	Nil
Jerrys Plains Village	28/08/2017 21:30	0.8	-1	41	Yes	IA	Nil
Jerrys Plains East	28/08/2017 21:00	0.3	-1	41	Yes	IA	Nil
Long Point Road	2/08/2017 21:00	1.7	-1	41	Yes	IA	Nil
HVGC	28/08/2017 22:45	0.2	-1	NA	NA	IA	NA

Table 8: $L_{A1, 1Minute}$ HVO North - Impact Assessment Criteria – August 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North $L_{A1, 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	28/08/2017 21:00	0.3	-1	46	Yes	IA	Nil
Maison Dieu	28/08/2017 21:23	0.8	-1	46	Yes	IA	Nil
Shearers Lane	28/08/2017 21:47	0.8	-1	46	Yes	IA	Nil
Kilburnie South	28/08/2017 22:41	0.2	-1	46	Yes	IA	Nil
Jerrys Plains Village	28/08/2017 21:30	0.8	-1	46	Yes	IA	Nil
Jerrys Plains East	28/08/2017 21:00	0.3	-1	46	Yes	IA	Nil
Long Point Road	2/08/2017 21:00	1.7	-1	46	Yes	IA	Nil
HVGC	28/08/2017 22:45	0.2	-1	NA	NA	IA	NA

Notes
1. 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;2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO North Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values

5.2 INP Low Frequency Assessment

In accordance with the requirements of the Industrial Noise Policy (INP), the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target source is audible. The L_{Ceq} levels reported above are "Total", or "Total mine noise" at best, and cannot be attributed accurately to a single mine. Accordingly, where the INP criteria for the application of the Low Frequency penalty is triggered, the penalty has been applied to the dominant mine noise source. There were no exceedances of noise criteria following application of the INP Low Frequency modification factor during August 2017.

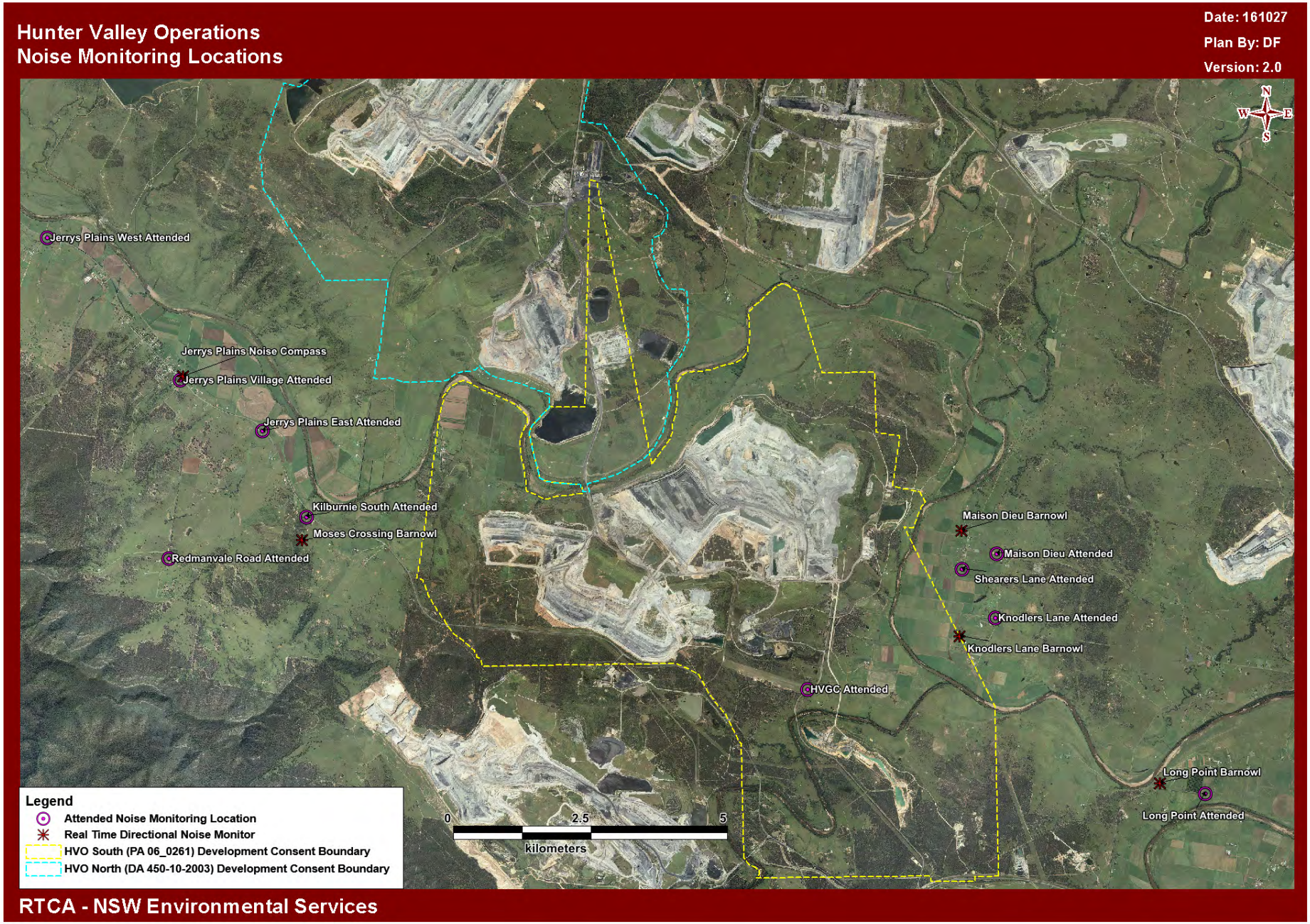


Figure 16: Noise Monitoring Location Plan

5.2 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.

HVO's Planning approvals stipulate noise criteria which must be met during the life of the development(s). The approvals however do not stipulate requirements or give guidance on noise affectation, or the frequency of any elevated noise event which would constitute noise affectation. Page 6 of the NSW Industrial Noise Policy (INP) comments that criteria "*seek to restrict the risk of people being highly annoyed to less than 10 percent, and to meet this for at least 90 percent of the time*".

For the purposes of assessing the effectiveness of the noise management system, HVO applies a similar approach with regard to the frequency of any elevated noise event. 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.

6.0 OPERATIONAL DOWNTIME

During August, a total of 3137.3 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 17.

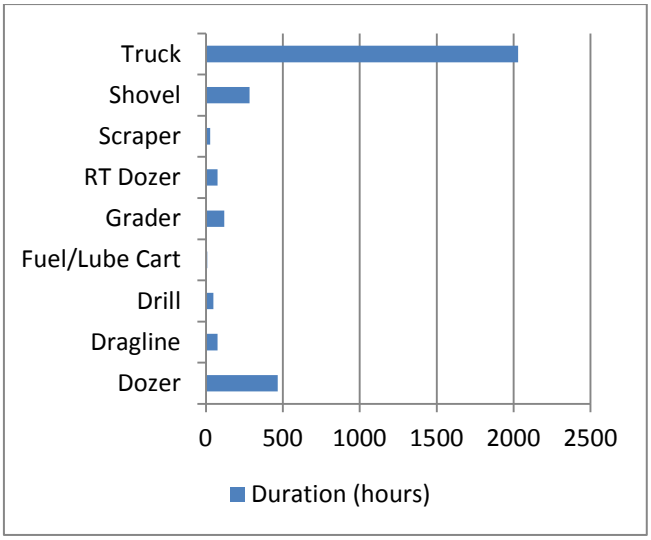


Figure 17: Operational Downtime by Equipment Type – August 2017

7.0 REHABILITATION

During August, 11.7 Ha of land was released, 36.5 Ha of land was bulk shaped, 13.8 Ha of land was topsoiled, 6.9 Ha of land was composted and 26.2 Ha of land was rehabilitated. Year to date progress can be viewed in Figure 18.

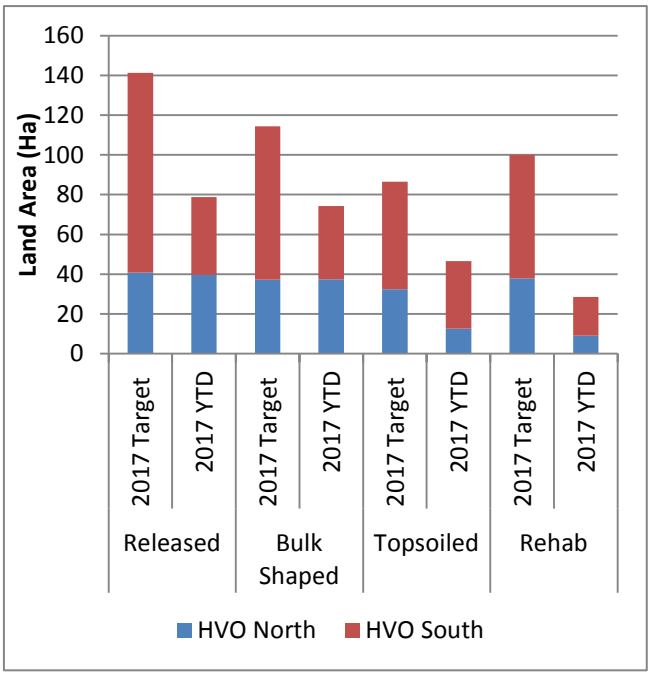


Figure 18: Rehabilitation YTD - August 2017

8.0 COMPLAINTS

Four complaints were received during the reporting period. Details of complaints received YTD are shown in Figure 19 below.

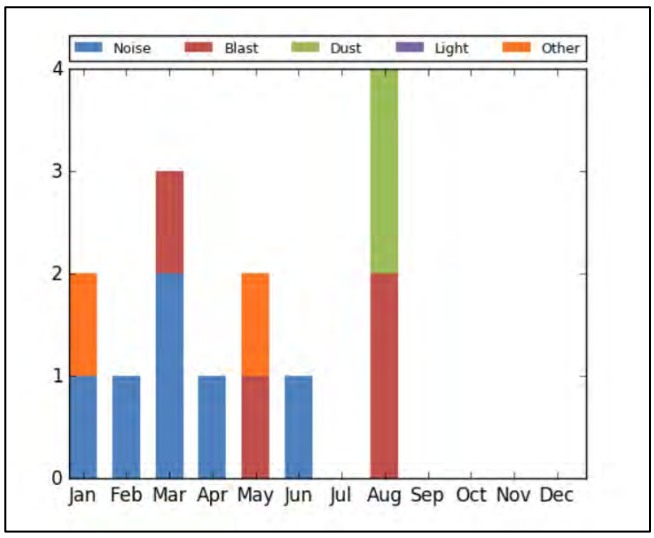


Figure 19: Complaints Graph – August 2017

9.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

Appendix A: Meteorological Data

Table 9: Meteorological Data - HVO Corporate Meteorological Station – August 2017

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)
1/08/2017	17.9	4.3	91.3	34.0	627	223.0	2.3	0.0
2/08/2017	17.4	0.8	100.0	26.9	614	105.0	0.9	0.0
2/08/2017	16.8	4.6	100.0	58.9	904	159.3	1.6	12.6
4/08/2017	14.6	6.2	97.4	47.0	1011	293.2	5.5	0.4
5/08/2017	18.2	7.9	66.0	26.9	891	292.4	5.1	0.0
6/08/2017	19.9	5.8	64.1	26.4	638	298.3	4.7	0.0
7/08/2017	17.6	7.9	45.6	25.9	840	290.4	6.2	0.0
8/08/2017	17.5	5.3	67.4	26.2	695	295.1	5.0	0.0
9/08/2017	19.0	3.0	78.1	30.5	644	299.0	2.6	0.0
10/08/2017	22.9	7.9	70.8	17.7	686	290.6	3.5	0.0
11/08/2017	26.4	10.7	41.1	10.1	665	274.6	5.6	0.0
12/08/2017	20.4	4.8	75.1	20.5	766	290.3	4.0	0.0
13/08/2017	21.5	4.0	77.3	16.9	685	250.1	2.3	0.0
14/08/2017	22.7	3.6	82.6	11.9	708	281.5	2.4	0.0
15/08/2017	25.5	8.1	52.2	19.5	886	284.1	2.9	0.0
16/08/2017	22.5	13.3	42.9	21.5	696	292.0	6.8	0.0
17/08/2017	20.8	7.0	59.9	18.3	956	290.9	6.2	0.0
18/08/2017	15.5	7.0	49.7	26.3	818	274.8	6.9	0.0
19/08/2017	16.5	3.5	62.8	20.6	882	235.6	2.9	0.0
20/08/2017	16.6	3.4	82.3	30.1	791	178.2	1.5	0.0
21/08/2017	17.2	1.7	94.7	25.3	709	260.2	1.8	0.0
22/08/2017	20.6	3.4	84.0	16.9	701	138.0	1.5	0.0
23/08/2017	23.5	4.1	100.0	20.6	678	255.3	1.3	0.0
24/08/2017	19.9	5.5	70.1	19.8	843	186.9	2.0	0.0
25/08/2017	17.8	5.6	78.0	31.6	1010	141.9	2.3	0.0
26/08/2017	20.1	2.1	94.0	16.7	688	284.4	1.8	0.0
27/08/2017	18.8	3.6	61.4	19.2	704	274.5	4.2	0.0
28/08/2017	16.4	2.0	68.1	27.1	966	172.7	1.6	0.0
29/08/2017	17.7	-0.6	96.3	25.2	719	158.9	1.3	0.0
30/08/2017	20.5	4.3	100.0	17.4	696	235.8	1.7	0.0
31/08/2017	17.8	3.2	78.6	23.2	746	126.0	1.6	0.0

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