

2016-2017 ANNUAL ENVIRONMENTAL MANAGEMENT REVIEW

EXTRACTIVE INDUSTRY AT PIT 4, LOT 2 DP 748820 311 OLD TELEGRAPH ROAD, MAROOTA

PREPARED FOR PF FORMATION

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1. Background

Lot 2 DP 748820 at 311 Old Telegraph Road, Maroota is an irregular shaped lot of 30.7 hectares located on the north side of the road near the intersection with Old Northern Road to the west. The site geology is weathered Hawkesbury sandstone underlain by shale. Within the land surface the site elevations and topography varies from 144 metres to 200 metres AHD. The sandstone within the eastern precinct of the land has been extracted and processed for sand. The eastern precinct was constrained by a restricted zone south-west of the extraction area with bushland to be retained. Sandstone is currently being extracted in the western precinct. Figure 1 shows an aerial view of the land with the approximate lot boundaries outlined in red.

Figure 1 Aerial View of Lot 2 DP 748820 and Surrounds



Source: Landair Surveys December 2016

Approximately 11.6 hectares of the land has development consent for the extraction and processing of sand and clay which commenced in 2001 by Maroota Mining Pty Ltd. On 5 June 2009 Etra Pty Ltd trading as PF Formation took over ownership of the land and extractive industry operations for the site which continue to date. The land is also known as Pit 4 by PF Formation.

An Environmental Management Plan (EMP) for the site was provided to Hornsby Shire Council in February 2011. The EMP was revised in September 2012, August 2013 and May 2017. Copies of development consent No. 342/98F including approved plans and drawings and Environment Protection Licence No. 10357 for the site are included in the revised EMP. The EMP also includes a Pollution Incident Response Management Plan, Waste Management Plan, updated Rehabilitation Management Plans and Soil and Water Management Plans.

As part of the EMP an environmental commitments summary checklist is completed each month by the site's Environmental Manager (assisted and delegated to environmental contractors and consultants) and they are included in the Annual Environmental Management Review (AEMR)¹.

The requirements of condition 90 of development consent No. 342/98F relate to monitoring and management of the site including an EMP in which Council is to be satisfied of the overall performance and management of the operation. This document is the 2016-2017 AEMR for the Pit 4 site and reports on the key issues and activities plus the requirements of Condition 90 in Development Consent No. 342/98F. The AEMR should be read in conjunction with the EMP.

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¹ Formerly named an Annual Environmental Management Plan (AEMP).

2. Environmental Management Plan

The revised May 2017 EMP for the site includes 162 environmental commitments and/or actions as safeguards for the following key issues and activities.

- Environment Protection Authority (EPA) requirements.
- National Parks and Wildlife Service requirements.
- Planning requirements.
- Department of Land and Water Conservation requirements.
- Environment requirements.
- Sediment and erosion control requirements.
- Water quality requirements.
- Waste management requirements.
- Rehabilitation requirements.
- Air quality requirements.
- Monitoring and management requirements.
- Engineering requirements.
- Contributions requirements.
- Other operational requirements.

The objectives and/or requirements for the monitoring programme in the revised EMP include the following key issues and activities.

- Operational.
- Traffic.
- Soil and water management.
- Waste management.
- Rehabilitation.
- Air quality.
- Noise.
- Community and complaints.

The EMP for the site was revised in May 2017 including modified development consent 342/98F conditions, an updated Pollution Incident Response Management Plan and revised quarry rehabilitation management plans.

3. Operational

The site has a maximum production rate of 250,000 tonnes/annum with a maximum extraction depth of 160 metres AHD in the eastern and western precincts. The production rate for 2016-2017 was approximately 33,050 tonnes and the maximum extraction depth of 160 metres AHD was not exceeded. The lowest extraction depths at October 2017 were established from surveyed benchmarks within the extraction precincts at 173.87 metres AHD in the eastern precinct and 174.15 metres AHD in the western precinct. Extraction commenced in the eastern precinct in mid-2011 and PF Formation found less of and poorer quality material than anticipated in this precinct. Extraction was completed in the eastern precinct in 2016-2017 and the area is currently a silt pond and for water storage.

Operating hours are limited to between 7am and 5pm Monday to Friday, 7am to 1pm Saturday and at no time on Sundays and Public Holidays. These operating hours were complied with in 2016-2017. The quarry was closed for sales for four months from August 2016 to November 2016 although maintenance continued within the site. In accordance with Hornsby Shire Council's development consents 578/2009B and 342/98F material from other Maroota extraction quarries can also be processed in Pit 4.

The site operations are subject to the conditions in Development Consent No. 342/98F including modifications and the requirements of EPA Licence No. 10357. The Annual Return to the EPA for Pit 4 from 12 October 2015 to 11 October 2016 is included in Appendix 1.

Completed monthly Environmental Commitments Summary Checklists for the site in 2016-2017 are provided in Appendix 2.

The areas of the site currently used for processing, extraction, silt ponds and rehabilitation (areas of reclaimed silt storage) as at October 2017 are shown in Figure 2. The location of a crushed sandstone noise bund under construction (to be vegetated later) to reduce noise impacts on nearby rural residential areas is shown in Figure 2 and Figure 7. The processing plant area is shown in Figure 3 and general views of both precincts in Figures 4, 5 and 6.

Figure 2 Areas of Processing, Extraction and Rehabilitation

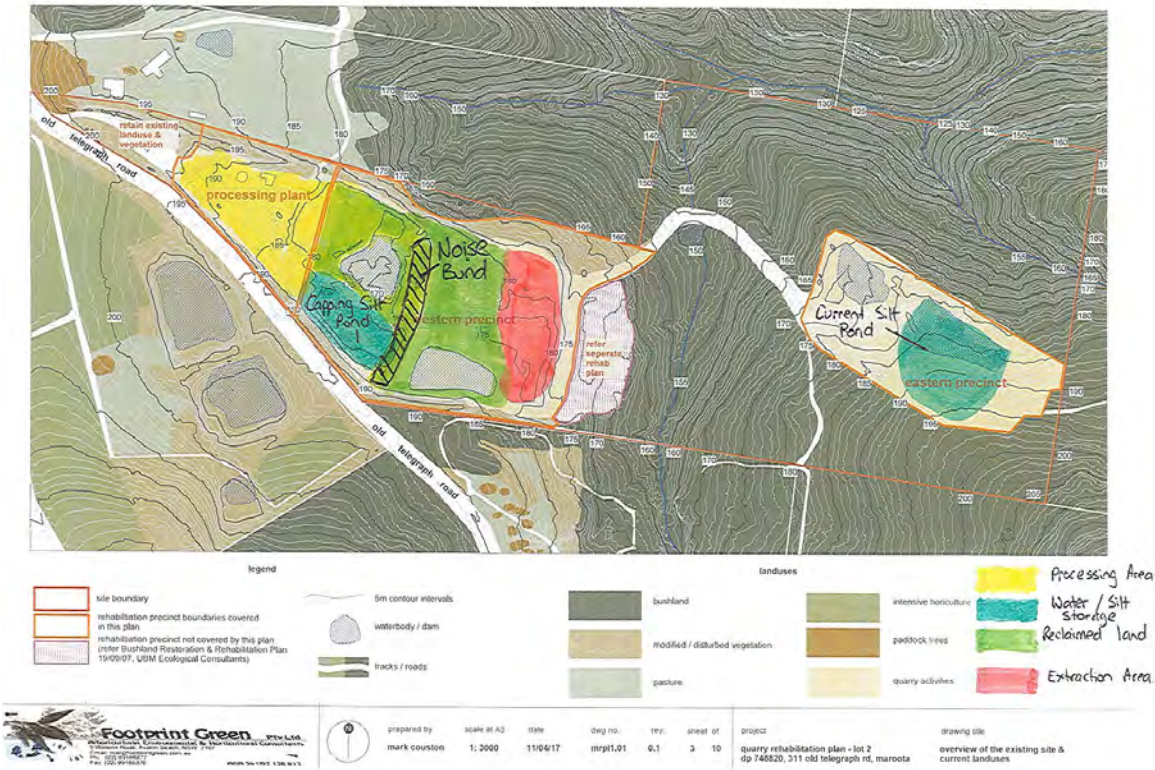


Figure 3 Existing Processing Plant



Figure 4 Panoramic View West of Western Precinct



Figure 5 Panoramic View East of Western Precinct



Figure 6 Water Storage and Silt Pond in Eastern Precinct



Figure 7 Noise Bund Under Construction in Eastern Precinct



Section 2.5 of the *Hornsby Development Control Plan 2013* provides controls for extractive industries at Maroota. The DCP provides desired outcomes and prescriptive measures for various environmental issues. The site operations where relevant generally comply with the DCPs desired outcomes listed below.

Setbacks

- Setbacks to extractive operations that protect the natural environment and provide reasonable visual and acoustic amenity to the area.
- Where extraction is occurring on adjoining properties, the setbacks may be reduced to provide an integrated final land form.

Transport

- Extractive industries that maintain a safe and efficient road network.
- Extractive industries that have minimal impact on the local road network.

Water Resources

- The protection of existing drainage patterns including location, quantity and quality of water.
- The conservation and effective management of the sustainability of surface and groundwater resources.
- The protection of downstream dependent riparian ecosystems and natural habitats.

Soil and Water Management

- Extractive operations that minimise soil erosion and water pollution by minimising land disturbance, and requiring control measures on-site.

Acoustic Environment

- Reasonable acoustic amenity for residents and other users of the area.

Air Quality

- Extractive industries designed with measures to prevent air pollution.

Mitigation and Monitoring

- The implementation of good environmental management practices and mitigation measures throughout the life of an extractive operation.
- The establishment of a framework for ongoing monitoring of the environmental management practices and mitigation measures of an extractive operation including a flora and fauna monitoring program.

Extraction Sequence

- Extraction that occurs in an orderly and controlled manner.
- Extraction that is undertaken in an environmentally acceptable manner.
- Protection of land holdings not currently being extracted and to facilitate future extraction.

Rehabilitation

- Extractive industries that implement progressive rehabilitation strategies that minimise long-term impacts on surrounding land uses and optimise sustainable future land use.
- Extractive industries that adopt measures to ensure ongoing biodiversity conservation and sustainable management of vegetation.

4. Traffic

During operations all trucks are loaded by a wheel loader that has weigh scales connected to the loader bucket. The loader driver completes a delivery docket giving the truck driver a copy of the docket. Copies are retained for entry into the sales system located at the weighbridge. A sequence check of dockets is completed to ensure all dockets are recorded.

Material is then transported by road truck by customers from Pit 4 then via Old Telegraph Road, Old Northern Road and Wisemans Ferry Road onto destinations in the Sydney metropolitan area.

Transport of material from the site is limited to 35 laden road vehicles a day averaged over 1 month. The Environmental Manager or delegate reviews the weighbridge records each month to check the number of laden road vehicles from Pit 4. The results show compliance with the maximum of 35 laden vehicles a day averaged over 1 month. No truck movements were recorded between August 2016 (except for one truck movement) and November 2016 as the quarry was closed for sales although maintenance continued within the site.

5. Water Management

All surface water run-off from site operations is contained within the clean water pond, sediment ponds and tailings ponds. Rainfall discharges over the disturbed and undisturbed portions of the site within the Coopers Creek catchment. No water is drawn from Coopers Creek for production. Monitoring of site operations by the Quarry Manager and Environmental Manager ensures that no sediment laden run-off water reaches Coopers Creek and that no groundwater except the licenced production bore is used in production.

Each quarter the Environmental Manager or delegate collects a water quality sample from an on-site tributary of Coopers Creek for laboratory analyses of pH, turbidity, oil and grease, total suspended solids and conductivity. The 2016-2017 quarterly water quality results are shown in Table 1 over.

Table 1 Pit 4 Causeway Crossing Water Quality Test Results

Sample Date 2016-2017	Pit 4 Causeway Crossing				
	pH	Turbidity NTU	Oil and Grease mg/L	Total Suspended Solids mg/L	Conductivity µS/cm
8 September 2016	7.9	9.9	0.4	10	334
1 December 2016	7.2	11	0.1	6.0	284
21 February 2017	7.7	50	0.5	40	378
6 June 2017	7.4	9.3	0.1	5.6	283

Groundwater quality and depth of groundwater has been continuously monitored in the Hawkesbury Sandstone aquifer below the site by contractors since October 1997. Between January 1999 and June 2009 groundwater quality was monitored only for field parameters such as pH, Electrical Conductivity, Temperature and Redox potential. The revised analytical list which was discussed and agreed upon with the NSW Office of Water includes:

- pH, Electrical Conductivity and Total Dissolved Solids;
- Calcium, Magnesium, Sodium and Potassium;
- Chloride, Sulphate and Bicarbonate; and
- Oil and Grease.

Testing for the above analytes is completed at a NATA registered laboratory. The groundwater in all bores is fresh, with a characteristic rainfall composition, low (slightly acidic) pH and low Total Dissolved Solids. It is of a Sodium-Chloride type and shows consistency over a full seasonal cycle. The groundwater samples were also analysed for oil and grease to monitor the possible effect of the sand extraction operations. Water samples reported an absence of oil or grease. Overall, the quality of the groundwater at the site has remained notably constant with only minor fluctuations as expected from a dynamic groundwater system.

The Environmental Manager or delegate ensures that groundwater is automatically monitored and reported annually in monitoring wells PFPIT4MW1, PFPIT4MW2 and PFPIT4MW3. Groundwater levels in the Hawkesbury Sandstone measured in the monitoring bores indicate that water levels respond in a subdued manner to the rainfall recharge. The trend in late 2013 and 2014 indicated a slight deepening of the water table with a below average rainfall in 2013-2014. A slight rising of the water table occurs in the three bores with the higher rainfall period in 2014-2015 (1321mm/year), followed by a slight deepening (0m to <1m variation) with the lower rainfall during 2015-2016 (1176 mm/year). The annual rainfall for 2016-2017 (957.4 mm/year) was less than previous years. However, a groundwater recharge event is inferred from the wet weather during March 2017 (276.8mm).

The conclusions of the 2016-2017 groundwater management plan provided in Appendix 3 are as follows.

“An assessment of the groundwater data collected at the Old Telegraph Road Pit 4 from 1997 to June 2017 indicate that:

- Water levels in the Hawkesbury Sandstone aquifer vary slightly with rainfall, with the greatest variations observed in Bore PFPIT4MW3 (0.42 m @ 25-7-2017 and higher relative to 10-8-2016).
- Water quality in the aquifer has shown to be consistent over a full seasonal cycle and since the start of monitoring.
- No groundwater was extracted from the Pit 4 production bore (Lic No. 10BL161390, Approval No.10WA109441) during 2016-2017. The production bore has a 30 ML license condition for a 12 month period.
- The inferred maximum extraction depth of the western extraction pit (RL=174 mAHD) is at least 2m above the groundwater table (i.e. approximately 171 mAHD at PFPit4, MW-1).

- Current sand extraction operations in the Pit 4 area do not appear to have any adverse impact upon the groundwater sustainability and meet the Development Approval Conditions.

The data collected during the year are available to the NSW Office of Water for their continued study in the area.”

6. Waste Management

The Environmental Manager or delegate is responsible for monitoring all on-site waste management, ensuring that all waste disposal, recycling and reuse procedures are followed as shown in the Waste Management Plan in Attachment 8 of the EMP. No waste is buried or burnt on site. Compliance with the Waste Management Plan as determined by the Environmental Manager is shown in Table 2.

Table 2 Pit 4 2016-2017 Compliance with Waste Management Plan

Material	Destination for Reuse and Recycling		Destination for Disposal		Compliance
	Estimated Volume	On-site	Estimated Volume	Off-site	
Surplus extraction material	Varies ~25% of total volume of extracted material	Completely reused as backfill in site rehabilitation	Not applicable	Not applicable	Yes
Topsoil	Varies	Stockpiled & completely reused in site rehabilitation	Not applicable	Not applicable	Yes
Vegetation	Varies depending on area of extraction	Completely reused on-site for sediment control and as mulch in landscaping	Not applicable	Not applicable	Yes
Wash water	~130,000 m ³ per month but varies	Completely recycled and reused on-site	Not applicable	Not applicable	Yes
Sullage	Varies	Held in 4,000L underground holding tank for disposal into an on-site absorption trench	Not applicable	Not applicable	Yes
Amenities shed garbage (food scraps, wrappers etc)	~1 m ³ per month	Held on-site in Council wheelie bins	~1 m ³ per month	Council provides weekly service for disposal at landfill	Yes
Glass, Plastics, Metals,	~1 m ³ per month	Stockpiled on-site for transfer to waste bins at	~1 m ³ per month	Recycled by approved waste contractors	Yes

Material	Destination for Reuse and Recycling		Destination for Disposal		Compliance
	Estimated Volume	On-site	Estimated Volume	Off-site	
Paper and Cardboard		1774 Wisemans Ferry Road		with two weekly collection	
Oils, lubricants, used filters	~100 litres per month	Held on-site for transfer to waste oil tank at 1774 Wisemans Ferry Road	~100 litres per month	Recycled by an approved waste oil contractor	Yes

7. Rehabilitation

The western precinct will be progressively rehabilitated for agricultural uses and for bushland in the eastern precinct. The site is being progressively rehabilitated in accordance with the revised rehabilitation management plans provided in Attachment 9 of the May 2017 EMP. Due to the nature of the process the filling, drying and capping of silt ponds takes several years to reach the final rehabilitation stage.

The rehabilitation progress is monitored by the Environmental Manager or delegate. Full documentation is held at 1774 Wisemans Ferry Road, Maroota and is available for inspection.

Existing areas of rehabilitation in the western precinct are shown in Figures 8 and 9. The former silt ponds in the western precinct have been filled in, capped and are being dried out.

Figure 8 View North of Bushland Rehabilitation Area



Figure 9 View South of Bushland Rehabilitation Area



8. Air Quality

The EPA licence does not require dust deposition monitoring for the site although upper limit dust deposition rates should not exceed an annual average of 4.0 grams/m²/month. Dust deposition is monitored monthly via four dust deposition gauges located near other PF Formation quarries and Maroota Public School in the surrounding area and analysed at a NATA registered laboratory. The closest dust deposition monitoring site is located at PF Formation's Pit 15 quarry frontage located on Old Northern Road approximately 1 km north of the site. The dust deposition results for this site in 2016-2017 averaged 2.73 grams/m²/month which was less than the EPA limit of 4.0 grams/m²/month.

PF Formation has an agreement with Dixon Sands to be advised if the rolling 24-hour average PM₁₀ impacts at Maroota Public School reach 42.5 µg/m³. At no time during 2016-2017 were PF Formation advised that the Tapered Element Oscillating Microbalance recorded results of 42.5 µg/m³ or above during working hours.

The Environmental Manager or delegate is responsible for ensuring the air quality monitoring is completed by others with full documentation held at 1774 Wisemans Ferry Road, Maroota and available for inspection.

In addition, regular on-site checks are made by the Environmental Manager that there is no visible dust blowing across the site on windy days; there are no visible continuous exhaust emissions on public lands for greater than 10 seconds; and that dust suppression techniques have been applied during operations including on-site watering and keeping stockpiles damp. In December 2014 a sprinkler system based on a timer adjusted to suit weather conditions was installed to ensure the haul roads are kept moist constantly during dry weather. At no time during 2016-2017 were operations stopped at Pit 4 because of windy conditions.

9. Noise

The EPA licence requires noise monitoring for the site at two locations, at Lot 1 Old Telegraph Road, Maroota with a $L_{Aeq(15\text{ minute})}$ noise limit of 42 dB(A) during the day and at Lot 1 Hart Place, Maroota with a $L_{Aeq(15\text{ minute})}$ noise limit of 40 dB(A) during the day. The $L_{Aeq(15\text{ minute})}$ noise is monitored by a delegate at the two locations on one operating day each quarter using a calibrated noise meter and as specified in the EPA licence and the results reviewed for compliance by the Environmental Manager. Noise is measured using Australian Standard AS 1055.1 1997 *Acoustics - Description and Measurement of Environmental Noise – General Procedures*. Instrumentation is held at 1774 Wisemans Ferry Road, Maroota and monitoring equipment includes a Class 1 Svan Sound Level Meter and a Class 1 Svantek Acoustic Calibrator. Instructions are available for the use of the equipment and the Environmental Manager and a delegate have been trained in their use. Full documentation and results are held at 1774 Wisemans Ferry Road, Maroota and are available for inspection.

An acoustic assessment report (Koikas Acoustics, 9 October 2017) for Pit 4 (Old Telegraph Road being the site) and Pits 5 and 15 (Old Northern Road) in the Maroota area is provided in Appendix 4. Noise monitoring was undertaken at Old Telegraph Road, the western boundary of 4713 Old Northern Road and Lot 1 Hart Place in July 2016, October 2016, February 2017 and June 2017. The results show that in all cases the measured $L_{Aeq(15\text{ minute})}$ was dominated by environmental and intermittent noise sources unrelated to the quarry noise. The noise criteria in the EPA Licence No. 10357 for the site for the hours of operation were not exceeded. Pit 4 complies with the EPA nominated noise criteria despite that the measured noise levels (predominantly traffic and other natural sound sources) are currently producing sound levels in excess of the nominated noise criteria during some days. No noise mitigation measures need to be implemented.

In May 2017 there was a single unresolved noise complaint from a resident located approximately 300m to the south-west of Pit 4. PF Formation has unsuccessfully endeavoured to arrange additional noise testing with the resident to help address the issue.

The location of a noise mound as shown in Figure 2 is under construction to reduce noise impact on neighbouring properties.

10. Community and Complaints

The Maroota Residents Community Committee is composed of residents, Council Managers, PF Formation employees and consultants and other NSW government representatives as required. The February 2011 EMP was discussed at the first Maroota Residents Community Committee meeting held on-site on 26 July 2011. At that meeting neighbouring residents and a Hornsby Shire Council representative confirmed that they were happy to have communication by residents calling PF Formation direct if there were any issues rather than formal annual meetings. It was agreed at the meeting that this action would meet the requirements of condition number 11 in development consent No. 342/98F.

There were no written complaints from neighbours since extraction and processing commenced on-site by PF Formation in July 2009 to early 2015. Three complaints were received from the community in 2015 as reported in the 2014-2015 AEMR. There was one noise complaint from a neighbour in 2016-2017.

PF Formation will contact the neighbouring residents by letter or email in December 2017 requesting them if there are any issues to resolve and to inform them of the 2016-2017 AEMR which will be available on PF Formation's website at www.pfformation.com.au.

The EPA annual return for October 2015-October 2016 showed nil pollution complaints.

No formal third party environmental audits of the site were conducted in 2016-2017 although the Environmental Manager did complete some environmental audits.

No Corrective Action Requests were issued in 2016-2017.

There was no need to implement the Pollution Incident Response Management Plan in 2016-2017.

11. Development Consent No. 342/98F Condition 90

The requirements of Development Consent No. 342/98F Condition 90 relate to monitoring and management. The specific conditions and an assessment of compliance are listed in Table 3.

Table 3 Compliance With Development Consent No. 342/98F Condition 90

Development Consent No. 342/98F Condition 90	Compliance
90. The proponent shall submit to Council every 12 months after the endorsed date of this consent an <u>Environmental Management Plan</u> in which Council is to be satisfied of the overall performance and management of the operation. The Environmental Management Plan should refer to the objectives and principles of Ecologically Sustainable Development and may use and / or reference as chapters the respective management plans required by condition Nos. 1 to 3, 6, 7 and 23 to 87 of this consent in order to address the following matters:-	Revised EMPs submitted to Council in September 2012, August 2013 and May 2017. 2016-2017 AEMR will be submitted to Council in November 2017. Ecologically Sustainable Development principles referred to in Section 3.2 of EMP.
90.1 Acquisition of all necessary licences and permits and an indication of how compliance with licensing and approval requirements will be achieved and due diligence attained	The October 2015 - October 2016 annual return for EPA Licence No. 10357 showed compliance with licence conditions.
90.2 On site materials management including management of operational impacts: if appropriate, include such as: - management of explosive, chemicals and fuel and their use - maintenance an site security plans	Implementation of 162 environmental commitments in EMP manages operational impacts. No explosives or chemicals used on-site. A 26,500 litre diesel tank complying with AS1940-2004 supplies fuel for vehicles, plant and equipment.
90.3 Water Management	See Attachment 10 of EMP, Section 5 and Appendix 3 in this AEMR.
90.4 Acoustic Management	See Section 9 and Appendix 4 in this AEMR.
90.5 Air Quality Management	See Section 8 of this AEMR.
90.6 Transport routes, access & movements	See Section 4 of this AEMR.
90.7 Soil Conservation including geo-technical appraisal of tailing systems and erosion and sediment controls	See Attachment 10 of EMP.
90.8 Social impact management including consultation with community groups, nearby residents and monitoring of complaints received	See Section 10 of this AEMR.

Development Consent No. 342/98F Condition 90	Compliance
90.9 Identification, assessment and evaluation of risks, safeguards and the confidence level of contingency / emergency plans;	The Pollution Incident Response Management Plan in Attachment 7 of the EMP did not need to be implemented in 2016-2017.
90.10 Statement of Compliance with the approved EIS documentation, conditions of this consent and the objectives of Councils DCP - Extractive industries.	General compliance with approved EIS. Final report on the 1.4 hectare area of bushland restoration (cleared by the former land owner) located east of a tributary of Coopers Creek needs to be submitted to Council. General compliance with development consent conditions and DCP.
90.11 Advice and recommendations of all relevant state government agencies;	Compliance with EPA Licence No. 10357.
90.12 Reference to International Standards (ISO) 14001-14004 relating to Environmental Management Systems, which should address issues such as:- - the capacity and support mechanisms necessary to implement and achieve the proponent company's environmental policy, objectives and targets and - the means by which the proponent company measure, monitor and evaluate its environmental performance and	EMP in general compliance with AS/NZ ISO 14001:2004 and AS/NZ ISO 14004:2004. PF Formation's environmental policies in Section 3.1 of EMP.
90.13 Recommendations to adjust operation procedures to improve the overall performance of the operations	Environmental commitment No. 146 requires annual written contact with neighbouring residents. No other amended or additional procedures beyond 162 environmental commitments in EMP required at this stage. The revised rehabilitation management plans are included in the updated May 2017 EMP.
90.14 Strategies to feed information from the monitoring program back into the management practices and action plans to improve the environmental performance and sustainability of all components of the proposal	Section 3.5 of EMP provides for amendments and variations to EMP.
90.15 Training programs for operational staff and incentives for environmentally sound performance	Operational commitment No. 162 in EMP ensures all PF Formation staff working on the site are inducted, trained and aware of their environmental responsibilities,

Development Consent No. 342/98F Condition 90	Compliance
	emergency response procedures and the requirements of the EMP.
90.16 Performance indicators in relation to critical operational issues including: Compliance with the conditions of consent; Compliance with the objectives of this DCP.	Performance indicators have been set in Section 5 Environmental Monitoring of EMP. General compliance with conditions of consent which are included in EMP and Hornsby DCP 2013 desired outcomes.

Appendix 1

EPA Annual Return 12 October 2015 to 11 October 2016

ETRA PTY LTD
1774 WISEMANS FERRY ROAD
MAROOTA NSW 2756

COPY

12-Oct-2016

LICENCE 10357 - ANNIVERSARY NOTICE

I refer to Environment Protection Licence No. 10357, issued to ETRA PTY LTD by the Environment Protection Authority (EPA), under the *Protection of the Environment Operations Act 1997* (the POEO Act).

This letter is to remind you of the annual licensing obligations, in particular the requirement to submit an Annual Return and annual licence fees.

Annual Return

Condition R1.5 of your licence requires that you complete and submit an Annual Return within 60 days of the end of each reporting period.

You can complete and submit your Annual Return online via eConnect EPA - the EPA's licensing portal at: www.epa.nsw.gov.au/licensing/econnectepa.htm.

Your environment protection licence Annual Return is due to the EPA by:

10-Dec-2016

If you do not submit the Annual Return by the due date you may receive a fine of up to \$3000.

If you are unable to submit your Annual Return online, you must complete the attached Annual Return and send it to the EPA by Registered Post to the following address:

Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232

Licence Fees

Once your Annual Return is received by the EPA, the information provided will inform the EPA's determination of your environmental management category which the EPA will use to calculate the annual licence administrative fee. Once the EPA has determined your annual fee a Tax Invoice/Statement will be sent to you.

If the licensed activities are subject to Load-Based Licensing (LBL), payment of a load-based fee may also be required. The EPA will calculate the load based fee using the data you provide in the Annual Return. If the payment of a load based fee is required a separate Tax Invoice/Statement will be sent to you.

The licence fees will need to be paid to the EPA by **08-Feb-2017**.

For information on risk-based licensing please refer to the EPA's website at:
www.epa.nsw.gov.au/licensing/licencereg.htm.

As of 1 July 2016 the EPA will not consider environmental improvement works in the calculation of the environmental management category. For further information regarding this change please refer to www.epa.nsw.gov.au/licensing/EMCP.htm.

The EPA is committed to assisting the licensed community to meet its obligations under the POEO Act. Please refer to: www.epa.nsw.gov.au/licensing for guidance on completing annual returns. If you have any questions relating to the submission of the Annual Return or payment of the licence fee, please contact the EPA on 02 9995 5700.

Yours sincerely



CHRISTOPHER KELLY
Head Regulatory and Compliance Support Unit
Environment Protection Authority

Annual Return

ETRA PTY LTD



ANNUAL RETURN

LICENCE NO	10357
LICENCE HOLDER	ETRA PTY LTD
REPORTING PERIOD	12-Oct-2015 to 11-Oct-2016

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:

REVISED REPORTING PERIOD ____ / ____ / ____ to ____ / ____ / ____

(Note: the revised reporting period also needs to be entered in Section H)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 11-Dec-2016

Your Annual Return must be completed, including certification in Section H, and submitted to the EPA no later than 60 Days after the end of the reporting period for your licence.

Failure to submit this Annual Return within 60 days after the reporting period ends may result in:

- the issue of a Penalty Notice for \$1500 (individuals) or \$3000 (corporations);
- OR
- prosecution.

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232**

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF \$250,000 FOR A CORPORATION OR \$120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the *Protection of the Environment Operations Act 1997*.

Use the checklist below to ensure that you have completed your Annual Return correctly.

(✓ the boxes)

CHECKLIST		
☐	Section A:	All licence details are correct
☐	Section B1:	You have entered the correct number in the complaints table
☐	Section B2 – B3:	If there are tables, you have provided the required details
☐	Section C:	You have answered question 1, and 2 if applicable
☐	Section D:	If applicable, you have completed all load calculation worksheets
☐	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
☐	Section F:	You have answered question 1, 2 and 3 if applicable
☐	Section G:	You have answered question 1 and question 2, 3 and 4 or question 5 through to 11 if applicable
☐	Section H:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
☐	Make a copy of the completed Annual Return and keep it with your licence records	

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232**

Statement of Compliance - Licence Details

ALL licence holders must check that the licence details in Section A are correct

If there are changes to any of these details you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.

Licence variation and transfer application forms are available on the EPA website at: <http://www.epa.nsw.gov.au/licensing>, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

A1 Licence Holder

Licence Number 10357
Licence Holder ETRA PTY LTD
Trading Name (if applicable) PF FORMATION

A2 Premises to which Licence Applies (if applicable)

Common Name (if any) OLD TELEGRAPH ROAD QUARRY
Premises LOT 2 OLD TELEGRAPH ROAD MAROOTA NSW 2756

A3 Activities to which Licence Applies

Crushing, grinding or separating
Extractive activities

A4 Other Activities (if applicable)

A5 Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure
Crushing, grinding or separating	> 100,000.00 - 500,000.00	T annual processing capacity
Land-based extractive activity	> 100,000.00 - 500,000.00	T annual capacity to extract, process or store

A6 Assessable Pollutants (Not Applicable)

B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period. If no complaints were received enter nil in the attached box, otherwise complete the table below.		<i>Nil</i>
Pollution Complaint Category	Number of Complaints	
Air		
Water		
Noise		
Waste		
Other		

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by your licence, **no tables** will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, **no tables** will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☒ the boxes)

- 1 Were all conditions of the licence complied with (including monitoring and reporting requirements)?

☒ Yes

☐ No

(✓ a box)

- 2 If you answered 'No' to question 1, please supply the following details for each non-compliance in the format, or similar format, provided on the following page.

Please use a separate page for each licence condition that has not been complied with.

- a) What was the specific licence condition that was not complied with?
- b) What were the particulars of the non-compliance?
- c) What were the date(s) when the non-compliance occurred, if applicable?
- d) If relevant, what was the precise location where the non-compliance occurred?

Attach a map or diagram to the Statement to show the precise location.
- e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?
- f) What was the cause of the non-compliance?
- g) What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?
- h) What action has been, or will be, taken to prevent a recurrence of the non-compliance?

3. How many pages have you attached?

Each attached page must be initialised by the person(s) who signs Section G of this Annual Return



C2 Details of Non-Compliance with Licence

Licence condition number not complied with
Summary of particulars of the non-compliance (NO MORE THAN 50 WORDS)
If required, further details on particulars of non-compliance
Date(s) when the non-compliance occurred, if applicable
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
Cause of non-compliance
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Action taken or that will be taken to prevent a recurrence of the non-compliance

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

- 1 Have you prepared a PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

- 2 Is the PIRMP available at the premises?

(✓ a box)

☒ Yes

☐ No

- 3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box)

☒ Yes

☐ No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address

www.pinformation.com.au

- 4 Has the PIRMP been tested in the last 12 months?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on

19/10/2016

- 5 Has the PIRMP been updated?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on

19/10/2016

- 6 How many times has the PIRMP been activated in this reporting period?

Nil

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on

  / /

The EPA's guidelines for preparation of pollution incident response management plans are available at

<http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm>

F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1 Are there any conditions attached to your licence that require pollution monitoring to be undertaken?

(✓ a box)

☐ Yes

☒ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Do you operate a web site?

(✓ a box)

☐ Yes

☐ No

3 Is the pollution monitoring data published on your web site in accordance with the EPA's written requirements for publishing pollution monitoring data?

(✓ a box)

☐ Yes

☐ No

If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:

Web site address

The EPA's written requirements for publishing pollution monitoring data are available at
<http://www.epa.nsw.gov.au/legislation/20120263regpubpmdata.htm>

Note - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.

G Statement of Compliance - Environmental Management Systems and Practices

- 1 Do you have an environmental management system (EMS) certified to ISO 14001 or any other demonstrated equivalent system?¹ (see note below on demonstrated equivalent)

(✓ a box)

☐ Yes

☒ No

If your answer to question 1 is 'No', please proceed to question 5. If your answer to question 1 is 'Yes', please proceed to question 2.

- 2 When was the last check of the EMS² completed (see note below on check of EMS)?

- 3 Were there any non-conformances related to environmental issues identified in the last check of the EMS?

(✓ a box)

☐ Yes

☐ No

- 4 If there were non-conformances identified, were these non-conformances rectified?

(✓ a box)

☐ Yes

☐ No

If you answered 'No' to question 1, please answer questions 5 - 11. If you answered 'Yes' to question 1 please proceed to section H. Questions 5-11 relate to any documented environmental practices, procedures and systems in place. Refer to <http://www.epa.nsw.gov.au/licensing/EMCP.htm> for guidance on how to complete questions 5 to 11. If unsure of the answer, tick No.

- 5 Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?

(✓ a box)

☒ Yes

☐ No

- 6 Have you established and implemented an operational maintenance program, including preventative maintenance?

(✓ a box)

☒ Yes

☐ No

- 7 Do you keep records of regular inspections and maintenance of plant and equipment?

(✓ a box)

☒ Yes

☐ No

- 8 Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?

(✓ a box)

☒ Yes

☐ No

- 9 Are the audits of documented environmental practices, procedures and systems undertaken by a third party?

(✓ a box)

☐ Yes

☒ No

- 10 Have you established and implemented an environmental improvement or management plan?

(✓ a box)

☒ Yes

☐ No

- 11 Do you train staff in environmental issues that may arise from your activities and operations and keep records of this

(✓ a box)

☒ Yes

☐ No

¹ Demonstrated equivalent refers to an environmental management system that the EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 system. For further information go to:

<http://www.epa.nsw.gov.au/resources/licensing/150402-environmental-management-systems-guidelines.pdf>

² Undertaking a 'check of an EMS' refers to the ISO 14001 requirements that an organisation demonstrates conformity to the requirements of its EMS and to the standard, these checks require third-party certification that requirements have been met.

Annual Return

ETRA PTY LTD



H Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. Please tick (✓) the box next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is:	the Annual Return must be signed and certified by one of the following:
an individual	☐ the individual licence holder, or ☐ a person acting on behalf of the individual licence holder in accordance with a power of attorney for the individual. A copy of the power of attorney must be submitted with the Annual Return.
a company	☒ by two directors, or ☐ by a director and a company secretary, or ☐ if a proprietary company that has a sole director who is also the sole company secretary - by that director, or ☐ by a person delegated to sign a copy of the Annual Return on the company's behalf in accordance with the Corporations Act 2001. Delegation of authority must be submitted with the Annual Return, or ☐ by affixing the common seal, in accordance with the Corporations Act 2001
a public authority other than a Council	☐ by the Chief Executive Officer of the public authority, or ☐ by a person delegated to sign on the public authority's behalf in accordance with its legislation.
a local Council	☐ by the General Manager in accordance with s377 of the Local Government Act 1993, or ☐ by affixing the seal of the Council in a manner authorised under the Local Government Act 1993.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation or \$120,000 for an individual.

I/We

- declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and
- certify that the information in the Statement of Compliance in sections A, C, D, E, F and G and any pages attached to Section C is correct and not false or misleading in a material respect.

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates below:

For the reporting period 12-Oct-2015 to 11-Oct-2016 or ____/____/____ to ____/____/____

SIGNATURE:

NAME: Joshua Graham
(printed)

POSITION: Director

DATE: 27 / 10 / 2016

SIGNATURE:

NAME: Luke Graham
(printed)

POSITION: Director

DATE: 27 / 10 / 2016

SEAL (if signing under seal)

PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED

Appendix 2

Completed Environmental Commitments Checklists

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA

ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING ...June.... 2017 .

Completed by Environmental Manager - Signature .....*Melissa Mass*..... Date .....30th June 2017.....

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	Truck movements were not exceeded. Weighbridge records were reviewed.
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		No	

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING ...May..... 2017 .

Completed by Environmental Manager - Signature *Melissa Mass* Date 30th May 2017

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	Truck movements were not exceeded. Weighbridge records were reviewed.
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		No	

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: April 2017

Completed by Environmental Manager - Signature  Date: 28th April 2017

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	
NPWS	37 and 38	✓	
Planning	39 to 45	✓	Truck movements were not exceeded, weighbridge records were reviewed.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: March 2017

Completed by Environmental Manager - Signature  Date: 31st March 2017

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	
NPWS	37 and 38	✓	
Planning	39 to 45	✓	Truck movements were not exceeded, weighbridge records were reviewed.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: February 2017

Completed by Environmental Manager - Signature  Date: 28th February 2017

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	Noise from the premises was measured at Lot 1 Old Telegraph Rd and Lot 1 Hart Place in accordance with the EPL. Quarry noise was dominant at times at Lot 1 Old telegraph Rd but remained within the criterion and quarry noise was not measurable at Lot 1 Hart Place.
NPWS	37 and 38	✓	
Planning	39 to 45	✓	Truck movements were not exceeded, weighbridge records were reviewed.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	Water samples were collected downstream from the causeway crossing and sent away for analysis. Results from water testing showed low levels of TSS.
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	Yes

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: January 2017
 Completed by Environmental Manager - Signature Date: 31st January 2017

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED √ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	Noise monitoring will be undertaken next month.
NPWS	37 and 38	✓	
Planning	39 to 45	✓	Truck movements were not exceeded, weighbridge records were reviewed.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA

ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: December 2016

Completed by Environmental Manager - Signature  Date: 23rd December 2016

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	
NPWS	37 and 38	✓	
Planning	39 to 45	✓	Truck movements were not exceeded, weighbridge records were reviewed.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	Water samples were collected on 1/12/16 from the tributary of Coopers Creek downstream from the causeway crossing. Results from testing showed levels of TSS.
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	Footprint Green has been engaged to revise and update the Rehabilitation Plan, final landforms will be slightly different to what was originally anticipated.
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	The EMP will be revised and updated to include Sect 96 changes and updated Rehabilitation Plans. A letter was dropped in the letterbox on 21/12/16 at the residence of Lot 12 DP 1005688 & Lot 1 DP 617014 to advise the AEMP 2016 is on the PF Formation website.
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	Yes

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA

ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: November 2016

Completed by Environmental Manager - Signature  Date: 30th November 2016

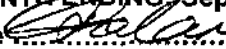
COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	
NPWS	37 and 38	✓	
Planning	39 to 45	✓	No truck movements occurred throughout the month, the quarry was closed for sales and maintenance activities continued throughout the month.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: October 2016

Completed by Environmental Manager - Signature  Date: 31 October 2016

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	Noise monitoring was carried out at the nominated locations. Quarry was not audible or measurable at both locations.
NPWS	37 and 38	✓	
Planning	39 to 45	✓	No truck movements occurred throughout the month, the quarry was closed for sales whilst maintenance work is carried out.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	Yes

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: September 2016

Completed by Environmental Manager - Signature  Date: 30th September 2016

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	
NPWS	37 and 38	✓	
Planning	39 to 45	✓	No truck movements occurred throughout the month as the quarry was closed for maintenance.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	Water samples were collected downstream from the causeway crossing in the tributary to Coopers Creek. Testing showed low levels of TSS and turbidity.
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	Yes

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: August 2016
 Completed by Environmental Manager - Signature Date: 31st August 2016

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED √ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	
NPWS	37 and 38	✓	
Planning	39 to 45	✓	One truck movement occurred throughout the month as the quarry was closed for maintenance.
DECC&W	46 to 51	✓	Groundwater samples were collected and the data loggers were downloaded, the information will be analysed in the Groundwater Report prepared by E 2 Water.
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PIT 4 OLD TELEGRAPH ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: July 2016

Completed by Environmental Manager - Signature  Date: 29th July 2016

COMMITMENT GROUP	EMP Checklist Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
EPA	1 to 36	✓	Noise monitoring was carried out at Lot 1 Hart Place and Lot 1 Old telegraph Rd. Quarry noise was audible but not measurable at both locations, bell birds were the dominant noise source.
NPWS	37 and 38	✓	
Planning	39 to 45	✓	Truck movements were not exceeded; weighbridge records were reviewed.
DECC&W	46 to 51	✓	
Environment	52 to 61	✓	
Sediment & Erosion Control	62 to 72	✓	
Water Quality	73 to 80	✓	
Waste Management	81 to 86	✓	
Rehabilitation	87 to 119	✓	
Air Quality	120 to 134	✓	
Monitoring and Management	135 to 149	✓	
Engineering	150 to 154	✓	
Contributions	155	✓	
Other Operational	156 to 162	✓	
Any As Required commitments implemented?		Yes or No	Yes

Appendix 3

***Groundwater Report: Old Telegraph Road Pit 4, Maroota
Annual Groundwater Management Plan 2016-2017,
26 July 2017, Earth2Water Pty Ltd.***



PF Formation

Groundwater Report: Old Telegraph Road Pit 4, Maroota Annual Groundwater Management Plan 2016-2017

Report E2W-0224 R003c

26 July 2017



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earth₂water
Pty Ltd
Environmental & Groundwater Consulting

Client: PF Formation

**Project: Groundwater Report
Old Telegraph Road (Pit 4), Maroota, NSW
2016-2017 Annual Groundwater Management Plan**

Prepared for:
Josh Graham
PF Formation
1774 Wisemans Ferry Road
Maroota, NSW, 2756

Report: 26 July 2017
Ref: E2W-224 R003c



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1 INTRODUCTION

Earth2Water Pty Ltd (E2W) was engaged by PF Formation (PFF) to provide the Groundwater Report (Maroota 2013-2014 Annual Groundwater Management Plan) for the property on Old Telegraph Road, Maroota (Lot 2, DP 748820), Maroota (Figure 1, known as Pit 4). The water sampling and download of the Solinst Loggers (3) was conducted in consultation with Joshua Graham (Operations Manager from PFF) on 18 July 2017. URS Australia Pty Ltd (URS) was previously retained by PFF to prepare the groundwater component of the report (up to 2013).

PF Formation (PFF) is required under the Development Consent conditions set for the property located at Old Telegraph Road, Maroota, (Lot 2, DP 748820) to prepare an annual Environmental Management Plan (EMP) under the Approval.

The Water Management Plan (WMP) by E2W is part of the overall Environmental Management Plan and addresses the surface water and groundwater aspects of the sand extraction operations at the site. The following Groundwater Management Plan for the year 2016 - 2017 incorporates the monitoring data collected for the previous owner of the site from 1999 to 2009.

2 GROUNDWATER MONITORING NETWORK

At the Pit 4 site, groundwater has been monitored in the Hawkesbury Sandstone aquifer since October 1997 by the previous owner in Bores VEL-MW1, VEL-MW2 and VEL-MW3. Bore VEL-MW2 has been renamed PFPIT4-MW2 and Bore VEL-MW3 has been renamed PFPIT4-MW3. In November 2005, Bore VEL-MW1 was replaced by Bore VEL-MW1A (re-named PFPIT4-MW1), due to the expansion of the quarry area. The location of the monitoring bores is presented in Figure 1. The inferred groundwater flow regime and hydrogeological section for the site is presented in Figures 2 & 3.

In January 1999, the bores were equipped with a Dataflow automatic datalogger, subsequently replaced in June 2006 by Solinst Leveloggers, model 3001, capable of recording up to 10,000 readings and which have a battery life of 10 years at the rate of one daily reading. The Solinst units measure the head of water above the sensor and temperature variations. E2W attempted to download the loggers on 18 July 2017, however the data was not collected due to the age of the loggers (>10 yrs). Water levels from the three bores were measured on 18 July 2017, 26 June 2017, and 10 August 2016 using an acoustic water level probe. Field chemistry (EC, PH, T, DO, Redox) was measured using a calibrated field meter (TPS 90 FLMV) in the three bores on 18 July 2017.

Between January 1999 and June 2009, groundwater quality was monitored only for field parameters, such as pH, EC, Temperature and Redox potential. The chemical parameters were plotted by URS on individual graphs to assess possible trends over time.

The groundwater monitoring event was conducted on 18 July 2017 by E2W in consultation with PFF (Joshua Graham). Water samples were collected from the three bores and submitted for chemical analysis under Chain of Custody procedures to Australian Laboratory Services Pty Ltd. The laboratory reports are presented in Appendix B. The analytical list, which was discussed and previously agreed upon with the DIPNR (now the NSW Office of Water), includes:

- pH, Electrical Conductivity and Total Dissolved Solids;
- Calcium, Magnesium, Sodium and Potassium;
- Chloride, Sulphate and Bicarbonate; and
- Oil and Grease.

Water level gauging (acoustic water level probe) and field chemistry measurements (90 TPS FLMV meter, pH, EC, DO, Eh, T) were obtained during the sampling on 18 July 2017 (Table 2). Additional groundwater level measurements are available from July 2017, June 2017 and August 2016 (Table 2).

All historical water level data since November 1999 for Bores VEL-MW2 (now PFPIT4-MW2) and VEL-MW3 (now PFPIT4-MW3) have been combined (Appendix C, Figures 4 & 5 respectively, together with rainfall records by PFF/BoM Station No. 67014). For historical continuity, a hydrograph of Bore VEL-MW1 (abandoned) is also included in Appendix C, Figure 2.

3 GROUNDWATER DATA ASSESSMENT

3.1 Groundwater Levels

Groundwater levels in the Hawkesbury Sandstone measured in the three monitoring bores indicates that water levels respond in a subdued manner to the rainfall recharge. The trend in late 2013 and 2014 indicate a slight deepening of the water table with a below average rainfall in 2013-2014. A slight rising of the water table occurs in the three bores (PFPIT4MW-1,2,3) with the higher rainfall period in 2014-2015 (1321 mm/year), followed by a slight deepening (0 to <1m variation) with the lower rainfall during 2015-2016 (1176 mm/year).

The annual rainfall for 2016-2017 (957.4 mm/yr) is less than previous years. However, a groundwater recharge event is inferred from the heavy wet weather during March 2017 (276.8mm, Table 1) and reflected in the logger data (PF167MW-1) at the Hitchcock Rd site.

Logger data from the 3 bores is not available from 2016 to 2017. The data was not recorded due to the age of loggers (>10 yrs with diminished battery). Water level measurements are available from the three bores in 25 July 2018, 18 July 2017, 26 June 2017, and 10 August 2016 (Table 2). Data loggers were re-installed at the site on 25 July 2017 to re-assess the loggers for future use and/or replacement. The previous logger data (2013-2016) is presented in Figures G-1, G-2 and G-3.

The inferred groundwater flow regime (18-7-2017) and hydrogeology is presented in Figures 2 and 3. The maximum pit extraction depth for the western pit is measured at 174 m AHD and inferred to be at least 2m above the groundwater table. The water level at the nearby upgradient well (PFPitMW-1) is approximately 171 mAHD (Table 2).

3.2 Bore PFPIT4MW1

Since October 2010, the water level in this bore has been steadily rising (Figure G-1) as a result of the above average rainfall received in the area since that time.

Rainfall for the year July 2013- June 2014 was 595.5 mm, whilst 1321.5 mm (June-July 2015) indicating an above average rainfall for year (Note: These rainfall data are reported from the BOM weather station No. 67014 located on Old Telegraph Road). Approximately 422 mm of rainfall occurred in April 2015, which is reflected in the rising water levels from April to December 2015. The above average rainfall which occurred in March 2017 (276.8mm) is likely to have recharged the groundwater in a similar way to April 2015.

In June 2012 the water level in this bore rose to a level above the range of the datalogger pressure sensor and, as a result, no data are available for most of the year, with the exception of the period December 2012 – February 2013. Since February 2013 to approximately November 2014, the water level decreased steadily to approximately 170.5 mAHD, and then rose steadily to June 2015 (172.5 mAHD) in June 2015 correlating with the higher rainfall period (2014-2015, especially in April 2015). The water levels during November and December 2015 reached 173 mAHD before decreasing steadily to ~171.4 mAHD in June 2016. The water levels are the highest due to the higher topography (i.e. 187 mAHD, Figure 3).

Water levels in the Hawkesbury Sandstone aquifer vary slightly with rainfall, with the greatest variations observed in Bore PFPIT4MW1 (approximately 1.7 m over 12 months during 2015 and 2016).

The water levels measured in August 2016, June and July 2017 indicate relatively stable levels during 2016 to 2017. Water levels fluctuated from 0.04 m (PFPit4, MW-2) to 0.27m (PFPit4, MW-3) in the three wells (Table 1). The groundwater level is at 171.14 mAHD on 18 July 2017, and marginally higher than August 2016 (171.02 mAHD).

3.3 Bore PFPIT4MW2

The water level in this bore has risen to the highest level (153.6 m AHD) in March 2012, after which time it rose and declined in response to the rainfall following similar patterns over the Maroota area. The water levels have been relatively stable since 2013-2014 (approximately 153 mAHD in August 2014) with only minor fluctuations (<0.5m) over the 2014-2015 (~153.2 mAHD in June 2015) and 2015-2016 monitoring periods (~153 mAHD in June 2016, Figure G-2). The water levels are low due to the lower topography (i.e. 158.7 mAHD, Figure 1).

The groundwater level is measured at 153.25 mAHD on 18 July 2017, and is similar to August 2016 (153.24 mAHD).

3.4 Bore PFPIT4MW3

Bore PFPIT4MW3 is located in a remote site from the quarry area and, therefore, it is considered to be substantially unaffected by the current mining operations. The bore was installed in October 1997, but not equipped with a datalogger until November 1999 (Appendix C, Figure 6 & 7). From October 1997, the water level at this site has been rising steadily by approximately 4 m to August 2008 (URS, 2013).

The sudden drop in the water level visible at this site is the result of cleaning work carried out in this bore to remove fine rootlets which entered the bore through the screened section. The following data show the slow recovery of the watertable after those operations. After a period of relative stability, the water level has, since November 2010, risen to 171.3 m in March 2012, followed by a slight fall and levelling out.

The water level falls slightly (erratic fashion) during 2013-2014 (approximately 171.5 mAHD in August 2014) which is similar to previous years (Figure G-3).

During 2014-2015 the water levels show sharp (less than 1m) responses to rainfall and drainage, with water level rising over past 6 months due to the above average rainfall (approximately 170.9 mAHD in June 2015). Water levels decline and rise in an erratic fashion (+/- 1m) following June 2015 to June 2016 (approximately 160.9 mAHD in June 2016). The hydraulics of the sandstone outcrop (& iron hydrochemistry/clogging) is interpreted to affect logger responses (logger is stained with iron indicating some well screen clogging).

The sharp and short term change in water levels over time is interpreted to reflect rainfall recharge in the fractured sandstone (sandstone outcrop visible at surface).

The groundwater level is calculated at 170.85 mAHD on 18 July 2017, and is slightly higher relative to August 2016 (170.59 mAHD).

3.5 Production Bore Extraction

The location of the production bore (Lic No. 10BL161390, Approval No.10WA109441) is illustrated in Figure 1. No pumping occurred during the 2016-2017 monitoring period (allocation is 30 ML).

During the 2015-2016 period, groundwater extraction occurred and totalled 5.074 ML. The previous amount extracted is below the 30ML allocation over a 12 month period.

3.6 Groundwater Quality

Analytical laboratory results for the three wells (PFPIT4MW-1,2,3 are summarised in Tables 3.1, 3.2 & 3.3, and presented in the graphs (multi-parameter time series trends in Graphs:1, 2, 3). The laboratory reports for July 2017 are presented in Appendix B.

The groundwater in all bores is fresh, with a characteristic rainfall composition, low (slightly acidic) pH and low TDS. Water is of a Sodium-Chloride type and shows consistency over a full seasonal cycle.

The three groundwater samples were also analysed for Oil and Grease to monitor the possible effect of the sand extraction operations. Water samples reported an absence of Oil & Grease.

Overall, the quality of the groundwater at this site has remained constant, with only minor fluctuations as expected from a dynamic groundwater system.

3.7 Quality Control

The laboratory quality control samples (laboratory duplicates, procedure blanks and control spikes) returned results within the required limits and acceptance criteria. The quality control data generated by the laboratory are presented with the laboratory certificates in Appendix B.

Based on the evaluation of the data, it is assessed that the accuracy and precision of the analytical data generated in the sampling round, as reported by the analytical laboratory, are acceptable as a basis for interpretation.

It is noted that PH analyses (laboratory) has exceeded the prescribed short holding time (few hours, refer to ALS QCI report in Appendix B), however this is considered impractical to achieve (samples were delivered to the laboratory on the same day as sample collection and is considered satisfactory). The PH was also measured in the field by E2W using a calibrated multi-parameter meter (TPS 90 FLMV).

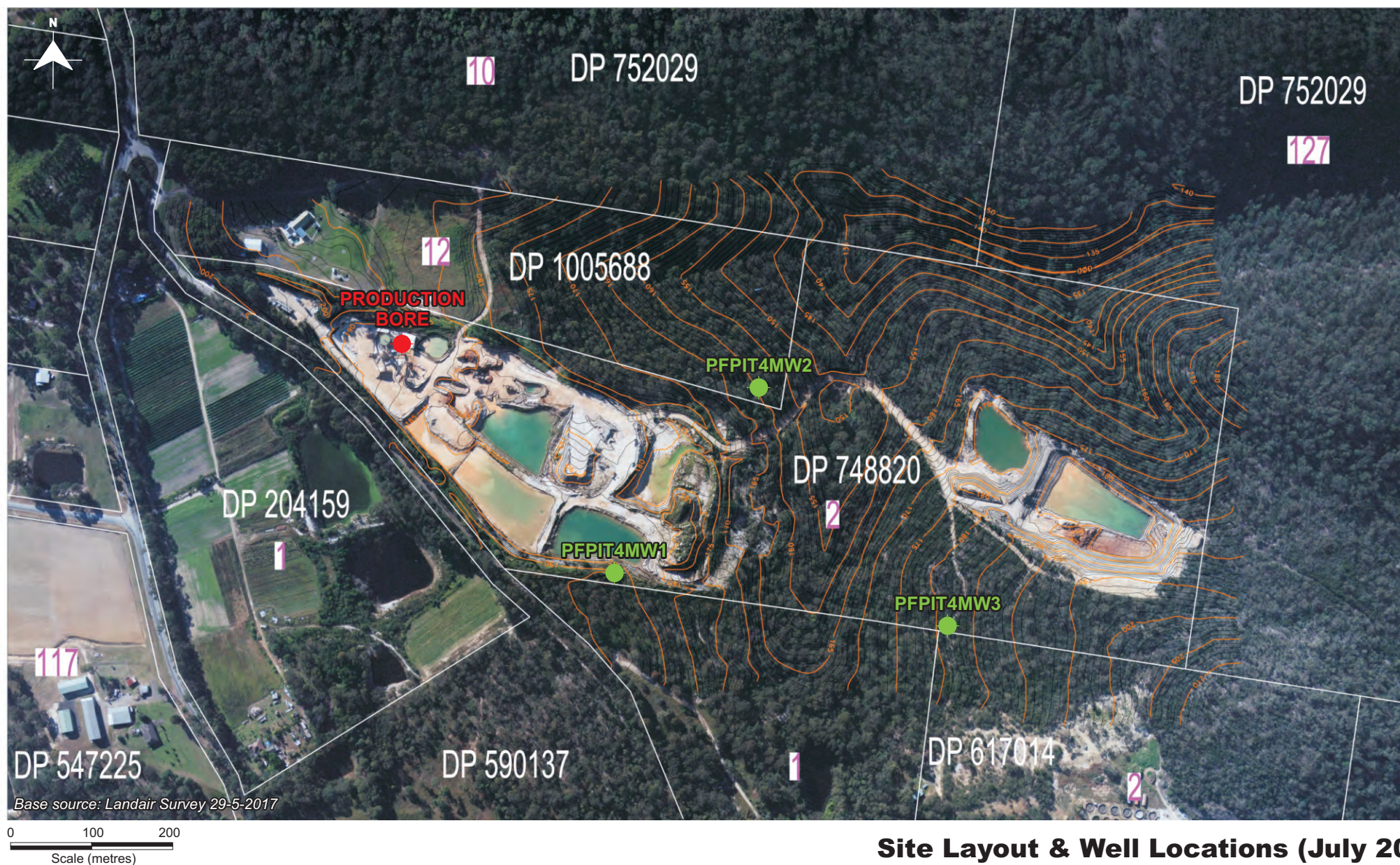
4 CONCLUSIONS

An assessment of the groundwater data collected at the Old Telegraph Road, Maroota (Pit 4) from 1997 to June 2017, indicate that:

- Water levels in the Hawkesbury Sandstone aquifer vary slightly with rainfall, with the greatest variations observed in Bore PFPIT4MW3 (0.42 m @ 25-7-2017 and higher relative to 10-8-2016).
- Water quality in the aquifer has shown to be consistent over a full seasonal cycle and since the start of monitoring;
- No groundwater was extracted from the Pit 4 production bore (Lic No. 10BL161390, Approval No.10WA109441) during 2016-2017. The production bore has a 30 ML license condition for a 12 month period.
- The inferred maximum extraction depth of the western extraction pit (RL=174 mAHD) is at least 2m above the groundwater table (i.e. approximately 171 mAHD at PFPit4, MW-1).
- Current sand extraction operations in the Pit 4 area do not appear to have any adverse impact upon the groundwater sustainability and meet the Development Approval Conditions.

The data collected during the year are available to the NSW Office of Water for their continued study in the area.

FIGURES



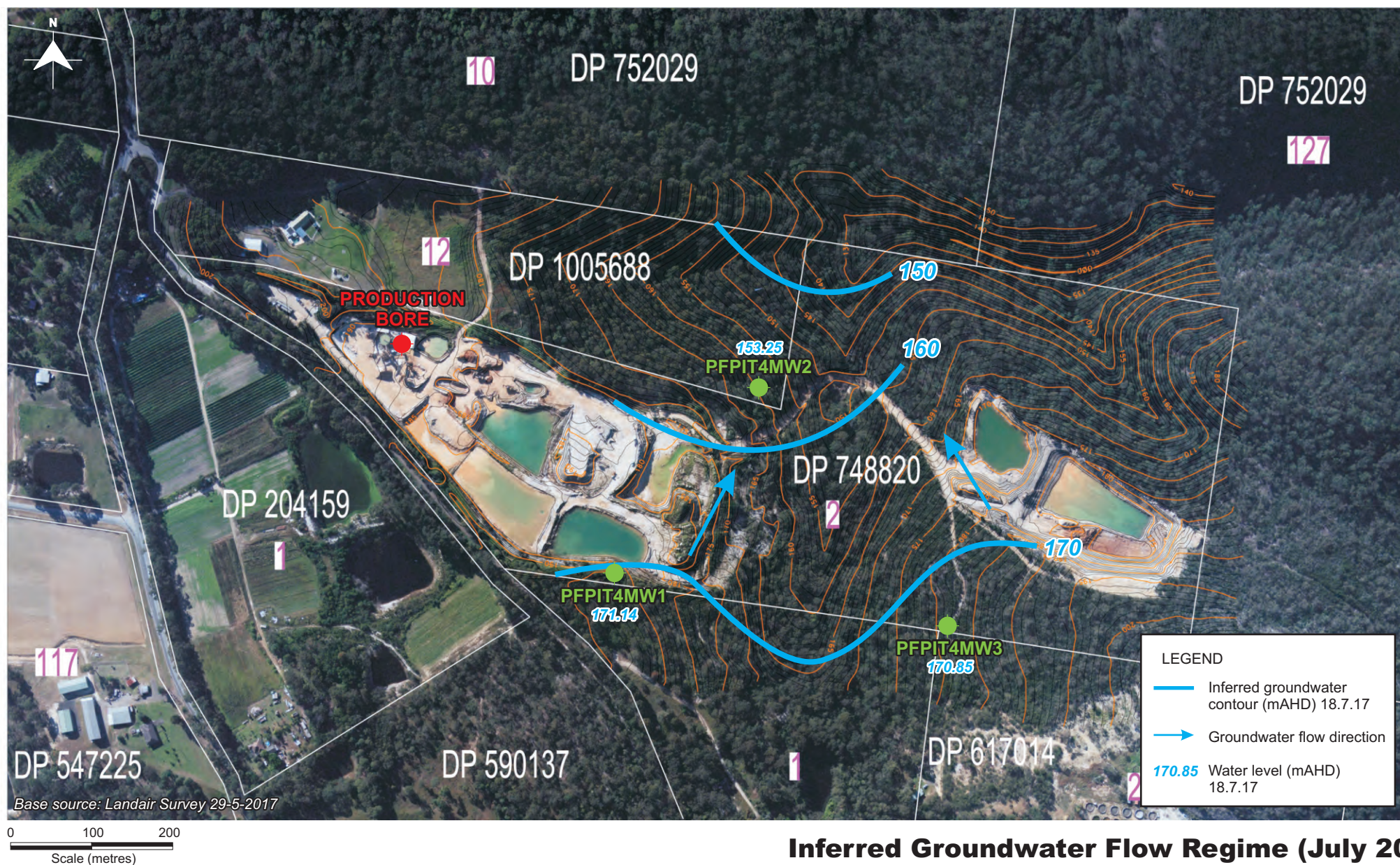
Site Layout & Well Locations (July 2017)

PF FORMATION -Old Telegraph Rd, Maroota (Pit 4 Site)

Figure 1

Date: 25 July 2014

Reference: E2W_224_18.cdr



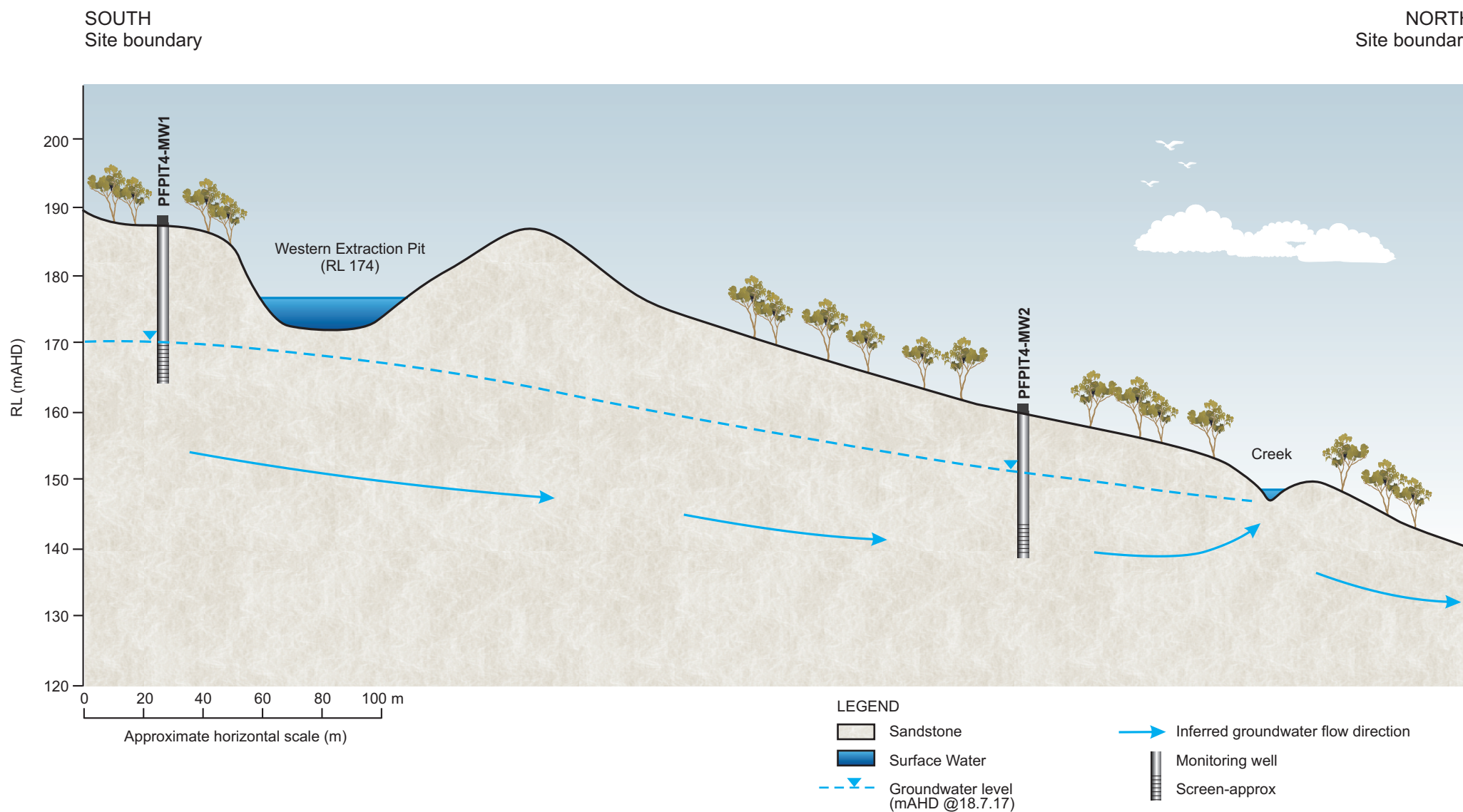
Inferred Groundwater Flow Regime (July 2017)

Date: 25 July 2017

Reference: E2W_224_20.cdr

PF FORMATION - Old Telegraph Rd, Maroota (Pit 4 Site)

Figure 2



PIT 4- INFERRED HYDROGEOLOGICAL SECTION (N-S, July 2017)

Figure G-1: Monitoring Data Bore PFPit4MW-1 (2013-2016)

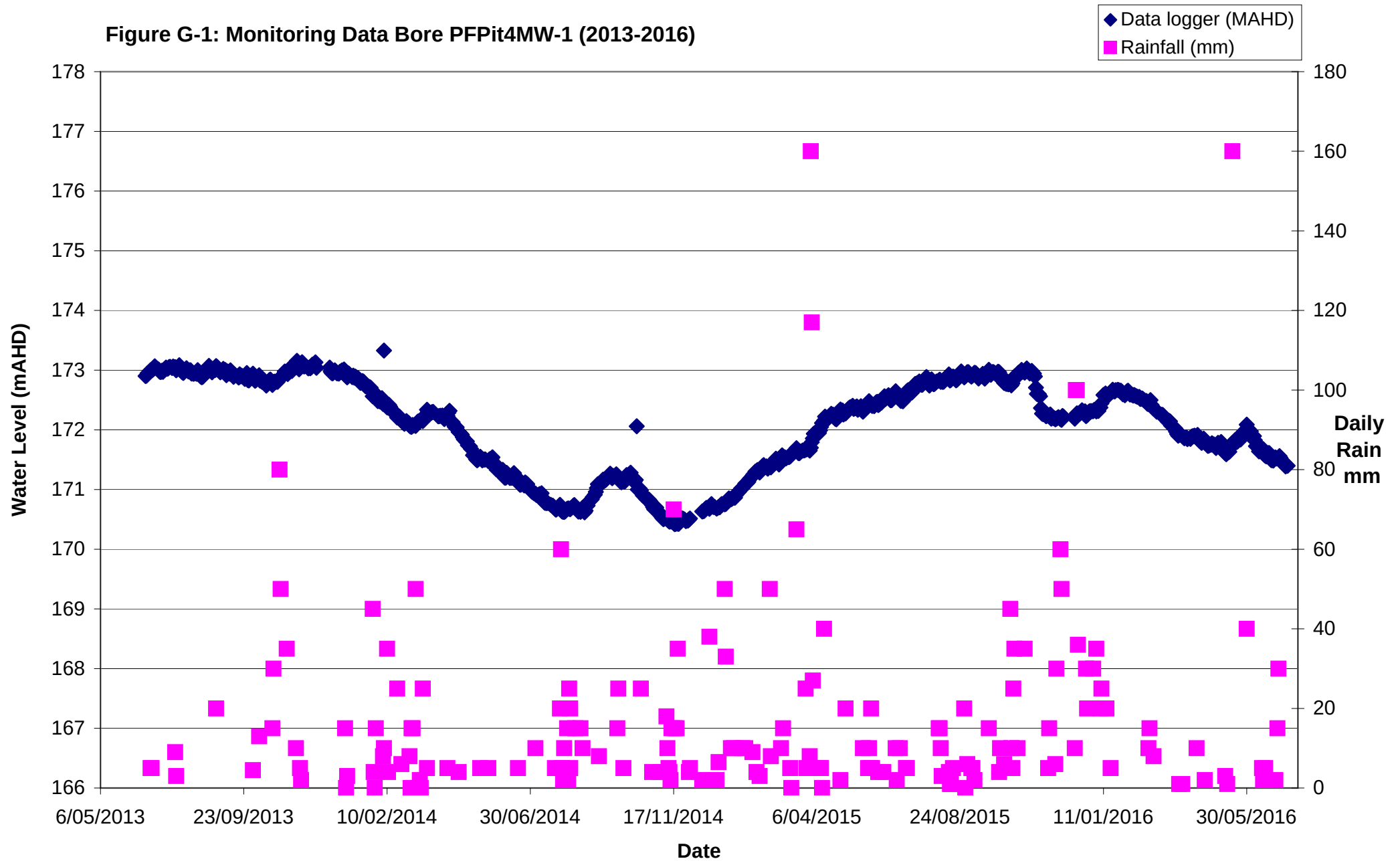


Figure G-2: Monitoring Data Bore PFPit4MW-2 (2013-2016)

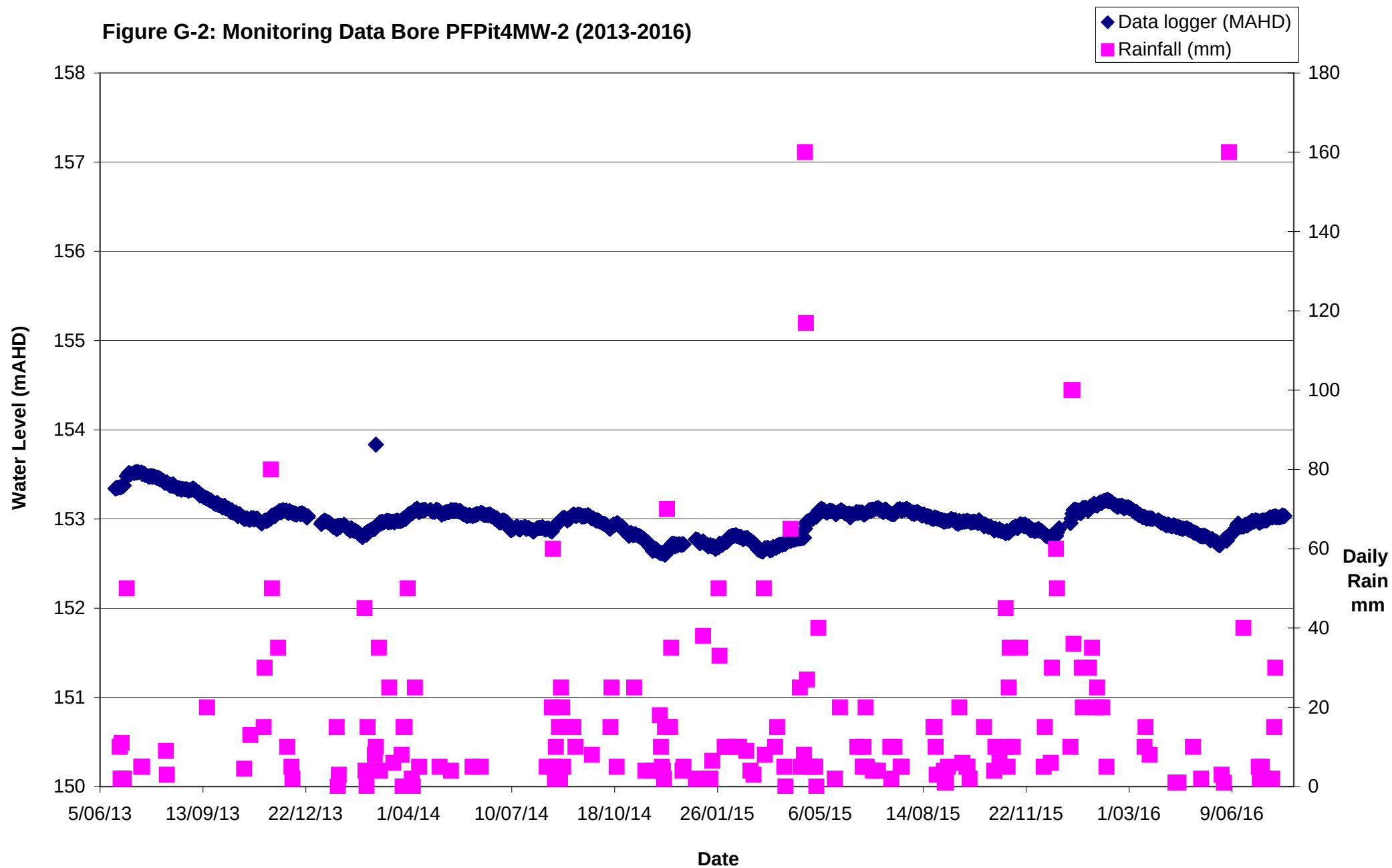
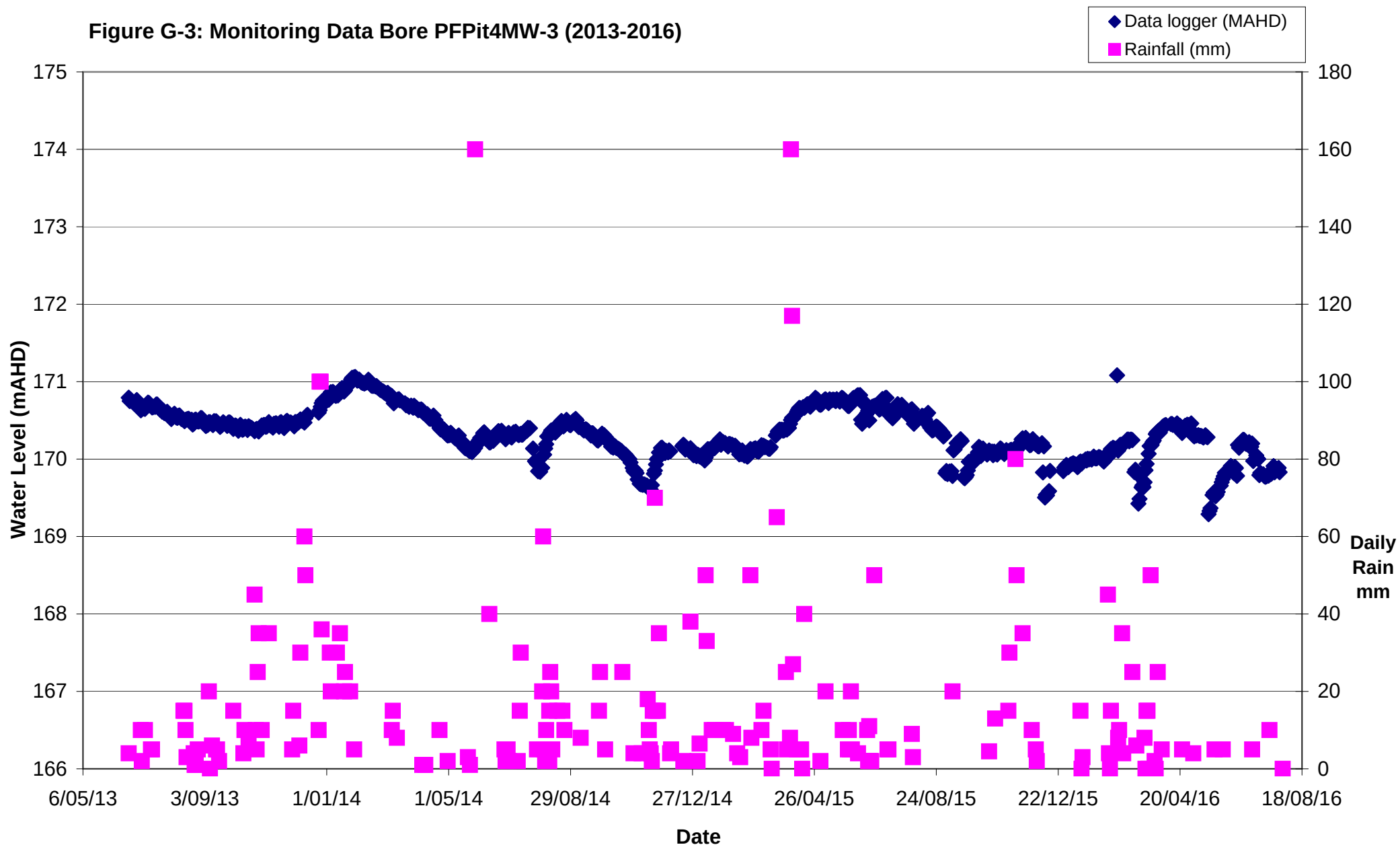


Figure G-3: Monitoring Data Bore PFPit4MW-3 (2013-2016)



TABLES

Table 1: Maroota Climate Summary (2016-2017)



Date	Monthly Rainfall (mm)
July (2016)	61
August	83
September	57
October	34.4
November	68.2
December	66.8
January	59.8
February (2017)	84.2
March	276.8
April	32.2
May	15.2
June	118.8
Total (mm/yr)	957.4

Table 2: Monitoring Well Details and Water Table Gauging (July 2017)
Maroota - Pit 4



Sample ID	SWL (m btoc) 25-7-2017	SWL (m btoc) 18-7-2017	SWL (m btoc) 26-6-2017	SWL (m btoc) 10-8-2016	PVC Stickup *	BOH (mbgl)	Co-ordinates	RL (TOC) *	Reduced SWL (mAHD) 25-7-2017	Reduced SWL (mAHD) 18-7-2017	Reduced SWL (mAHD) 26-6-2017	Reduced SWL (mAHD) 10-8-2016	Aquifer	pH	EC (mS/cm)	DO (%)	DO (mg/L)	Redox (mV)	Temp (°C)	Comments
PFPit4 MW-1	16.55	16.43	16.56	16.55	0.85	22	33.449290 & 150.998200	187.57	171.02	171.14	171.01	171.02	deep sandstone	4.27	0.216	40	4	216	18.2	Cloudy brown
PFPit4 MW-2	6.43	6.335	6.37	6.34	0.75	20	33.447490 & 150.999930	159.58	153.16	153.25	153.215	153.24	deep sandstone	4.07	0.264	20	2	271	16.6	Cloudy brown
PFPit4 MW-3	11.81	11.97	11.94	12.23	0.67	39	33.449870 & 151.002070	182.82	171.01	170.85	170.885	170.59	deep sandstone	4.02	0.169	45	4.3	243	17.6	Cloudy brown

Notes:

NA= not available

SWL= standing water level

BOH= bottom of well (borelogs not available, depths measured from site gauging)

EZW Field parameters (pH, EC, DO, Eh and temperature using a calibrated TPS 90mfl multi-parameter meter)

Redox (Eh mV, based on Ag/AgCl electrode). Need to add 199 to convert to Standard Hydrogen Electrode (SHE)

Bold= measurements for hydrogeological section & flow regime (Figures 2 & 3)

Tables 3.1 to 3.3: Maroota Pit 4- Groundwater Analyses (2009 to 2017)



Table 3-1 Bore PFPIT4MW1 Chemical Analyses Summary

Date		3.07.2009	16.6.2010	22.6.2011	20.6.2012	20.6.2013	8.08.2014	30.6.2015	10.8.2016	18.7.2017
pH	Unit	4.12	4.27	4.22	4.65	4.47	4.28	4.72	4.37	5.27
Electrical Conductivity, EC	uS/cm	162	160	208	100	130	158	136	126	128
Total Dissolved Solids, TDS	mg/L	87	92	88	76	149	73	56	72	65
Calcium, Ca	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium, Mg	mg/L	2	2	2	1	1	1	<1	1	2
Sodium, Na	mg/L	18	16	20	11	15	19	21	15	18
Potassium, K	mg/L	<1	<1	<1	3	5	4	4	4	4
Bicarbonate, HCO ₃	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	3
Sulphate, SO ₄	mg/L	2.14	<0.5	2	5	5	5	6	8	8
Chloride, Cl	mg/L	39.4	42.8	35	21	30	37	18	25	27
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5

Table 3-2 Bore PFPIT4MW2 Chemical Analyses Summary

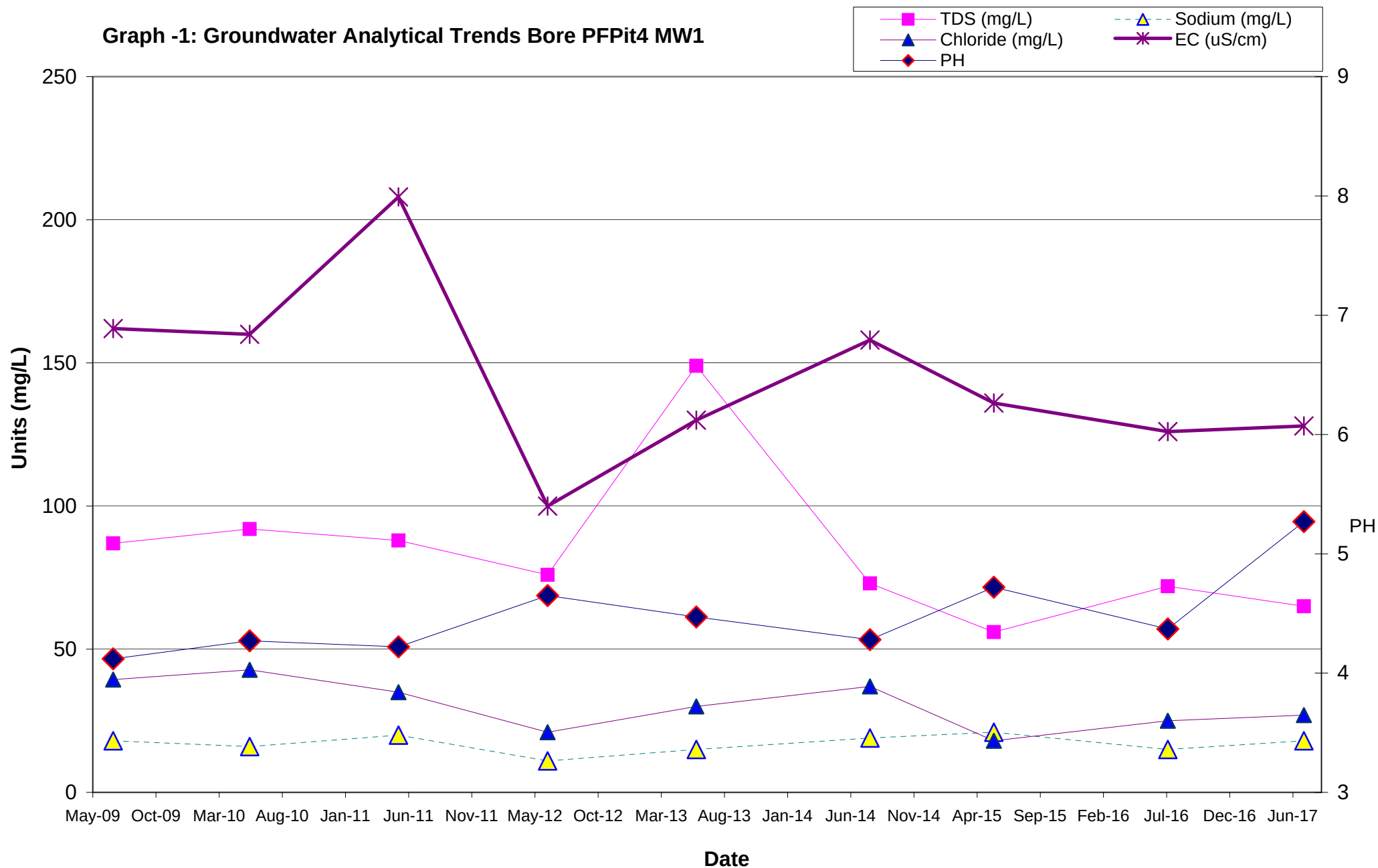
Date		3.07.2009	16.6.2010	22.6.2011	20.6.2012	20.6.2013	8.08.2014	30.6.2015	10.8.2016	18.7.2017
pH	Unit	4.18	4.39	4.02	3.9	4.23	3.73	4.02	4.31	3.85
Electrical Conductivity, EC	uS/cm	325	264	330	294	306	362	328	305	343
Total Dissolved Solids, TDS	mg/L	210	151	174	164	173	224	192	177	170
Calcium, Ca	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium, Mg	mg/L	4	4	4	4	4	4	5	5	4
Sodium, Na	mg/L	47	29	43	37	40	40	44	45	37
Potassium, K	mg/L	<1	1	<1	<1	1	<1	<1	1	<1
Bicarbonate, HCO ₃	mg/L	2	<1	<1	<1	<1	<1	<1	<1	<1
Sulphate, SO ₄	mg/L	17.2	3.64	6	5	5	10	6	9	4
Chloride, Cl	mg/L	88	71.1	79	70	80	84	62	70	68
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5

Table 3-3 Bore PFPIT4MW3 Chemical Analyses Summary

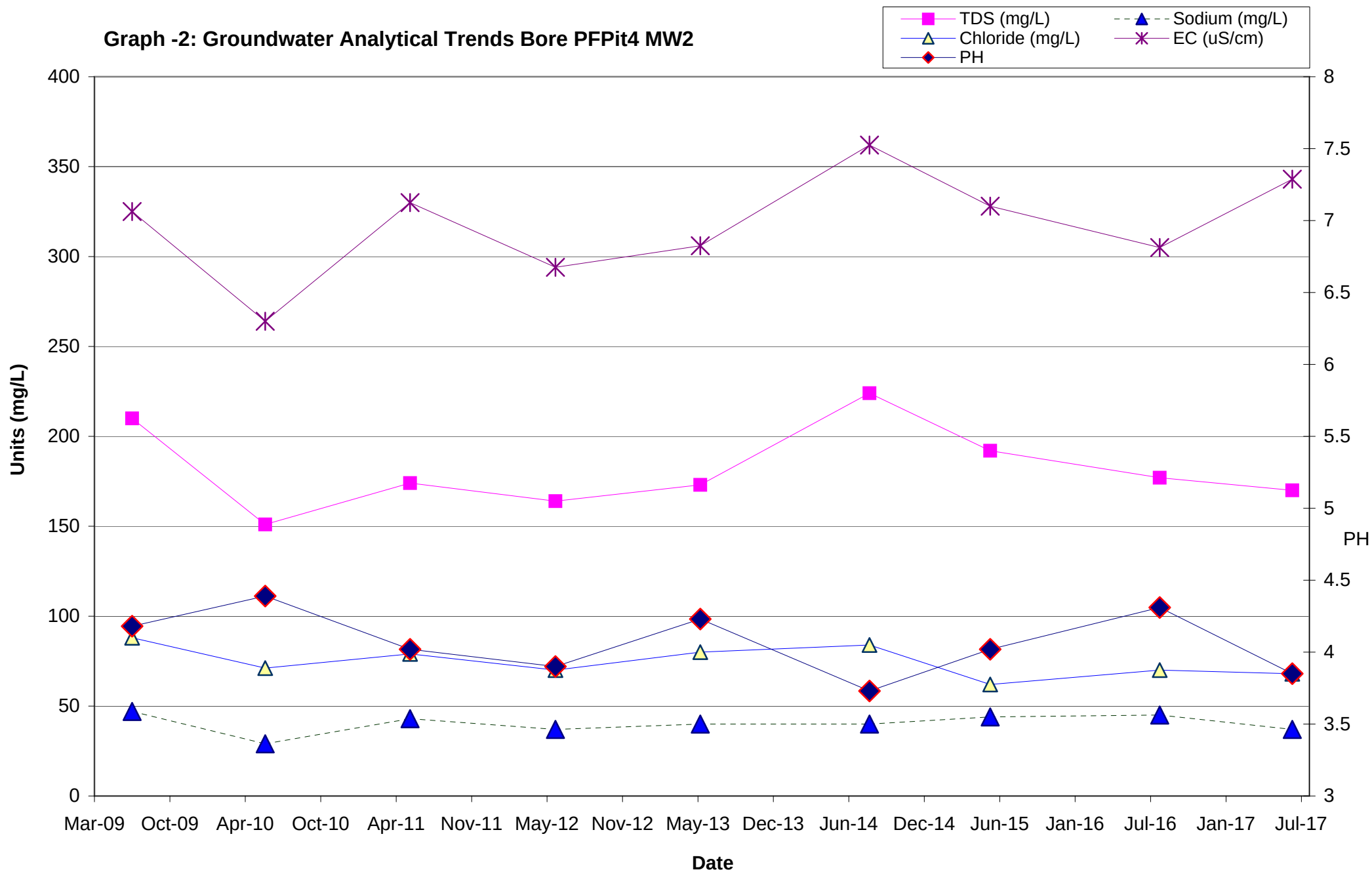
Date		3.07.2009	16.6.2010	22.6.2011	20.6.2012	20.6.2013	8.08.2014	30.6.2015	10.8.2016	18.7.2017
pH	Unit	4.01	3.86	4.23	3.99	4.07	4.17	3.96	4.06	3.76
El. Conductivity	uS/cm	157	154	157	160	169	167	172	163	171
Total Dissolved Solids	mg/L	50	92	76	82	111	131	75	84	85
Calcium, Ca	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium, Mg	mg/L	2	2	2	2	2	2	2	2	2
Sodium, Na	mg/L	16	15	21	17	16	17	20	18	16
Potassium, K	mg/L	<1	<1	<1	<1	5	<1	<1	<1	<1
Bicarbonate, HCO ₃	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulphate, SO ₄	mg/L	2	1.4	2	2	2	2	2	3	2
Chloride, Cl	mg/L	38.7	40.3	34	34	42	41	33	36	38
Oil and Grease	mg/L		<5	<5	<5	<5	<5	<5	<5	<5

GRAPHS

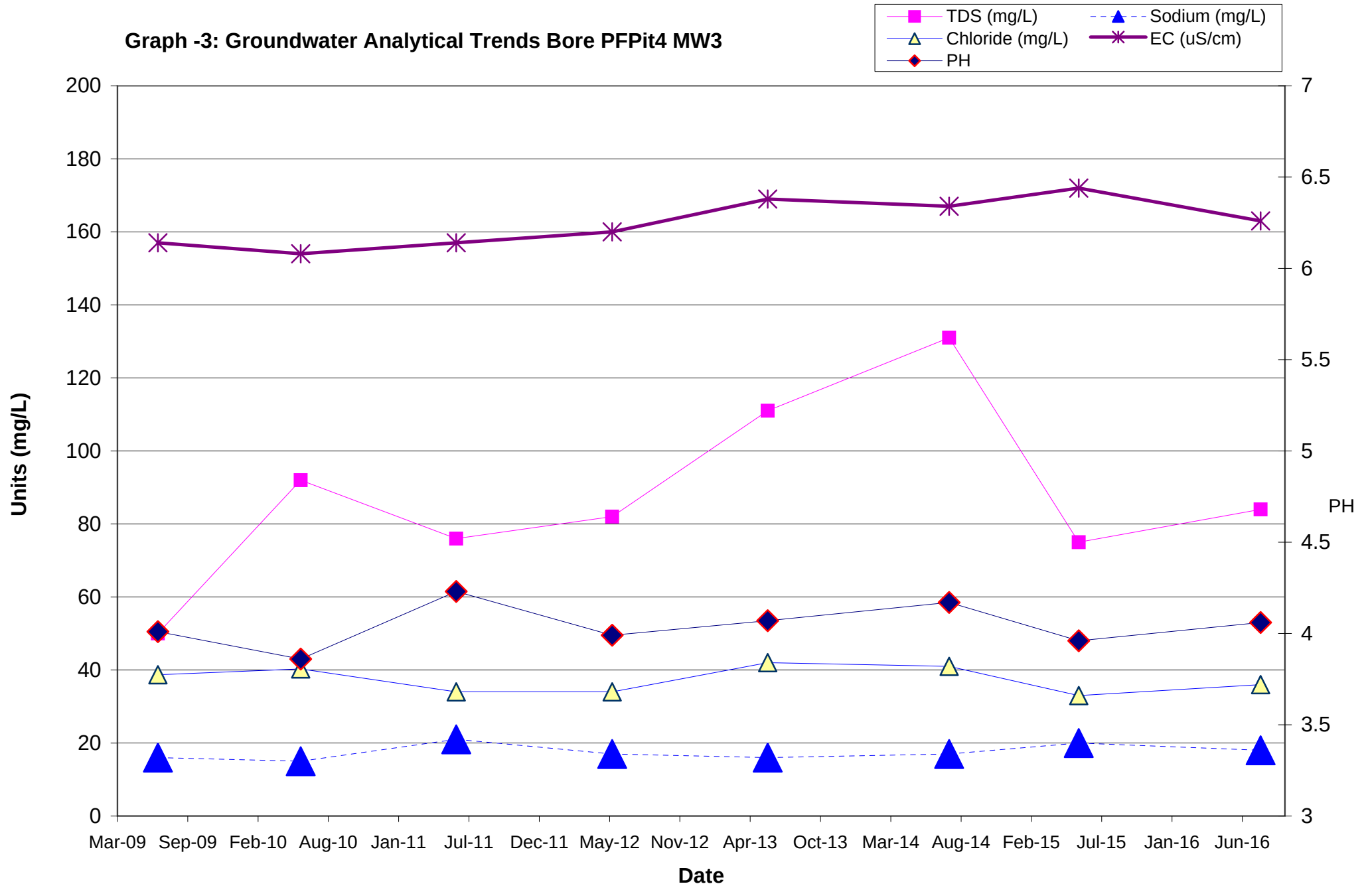
Graph -1: Groundwater Analytical Trends Bore PFPit4 MW1



Graph -2: Groundwater Analytical Trends Bore PFPit4 MW2



Graph -3: Groundwater Analytical Trends Bore PFPit4 MW3



APPENDIX A

Limitations

Earth2Water Pty Ltd has prepared this report for the use of PF Formation in accordance with the standard terms and conditions of the consulting profession. This report is prepared in accordance with the scope of work and for the purpose outlined in the proposal. The methodology adopted and sources of information used by E2W are outlined in this report.

This report was prepared during July 2017 and is based on the information reviewed at the time of preparation. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

The precision with which conditions are indicated depends largely on the frequency and method of sampling, and the uniformity of conditions as constrained by the project budget limitations. The behaviour of groundwater and some aspects of contaminants in soil and groundwater are complex. Our conclusions are based upon the analytical data presented in this report, and our experience.

Where conditions encountered at the site are subsequently found to differ significantly from those anticipated in this report, E2W should be notified of any such findings and be provided with an opportunity to review the recommendations of this report.

APPENDIX B

CERTIFICATE OF ANALYSIS

Work Order : **ES1717849**
Client : **EARTH2WATER PTY LTD**
Contact : **MR DINO PARISOTTO**
Address : **175 FERN ST**
GERRINGONG NSW 2534
Telephone : **+61 4236 1334**
Project : **E2W.224.Pit4**
Order number : **----**
C-O-C number : **----**
Sampler : **DINO PARISOTTO, ELLEN SWANSON**
Site : **Maroota - Pit 4**
Quote number : **BQ 2015**
No. of samples received : **3**
No. of samples analysed : **3**

Page : 1 of 3
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 19-Jul-2017 14:00
Date Analysis Commenced : 19-Jul-2017
Issue Date : 25-Jul-2017 16:45



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Pit 4 MW-1	Pit 4 MW-2	Pit 4 MW-3	----	----
Client sampling date / time					18-Jul-2017 00:00	18-Jul-2017 00:00	18-Jul-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1717849-001	ES1717849-002	ES1717849-003	-----	-----
				Result	Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		5.27	3.85	3.76	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		128	343	171	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		65	170	85	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		3	<1	<1	----	----
Total Alkalinity as CaCO3	----	1	mg/L		3	<1	<1	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		8	4	2	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		27	68	38	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		<1	<1	<1	----	----
Magnesium	7439-95-4	1	mg/L		2	4	2	----	----
Sodium	7440-23-5	1	mg/L		18	37	16	----	----
Potassium	7440-09-7	1	mg/L		4	<1	<1	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		0.99	2.00	1.11	----	----
Total Cations	----	0.01	meq/L		1.05	1.94	0.86	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	----	----

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1717849	Page	: 1 of 5
Client	: EARTH2WATER PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR DINO PARISOTTO	Telephone	: +61-2-8784 8555
Project	: E2W.224.Pit4	Date Samples Received	: 19-Jul-2017
Site	: Maroota - Pit 4	Issue Date	: 25-Jul-2017
Sampler	: DINO PARISOTTO, ELLEN SWANSON	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	----	----	19-Jul-2017	18-Jul-2017	1

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: **x** = Holding time breach ; **✓** = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	19-Jul-2017	18-Jul-2017	✖
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	19-Jul-2017	15-Aug-2017	✔
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	20-Jul-2017	25-Jul-2017	✔
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	19-Jul-2017	01-Aug-2017	✔
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	19-Jul-2017	15-Aug-2017	✔

Page : 3 of 5
 Work Order : ES1717849
 Client : EARTH2WATER PTY LTD
 Project : E2W.224.Pit4



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	19-Jul-2017	15-Aug-2017	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	20-Jul-2017	25-Jul-2017	✓
EP020: Oil and Grease (O&G)								
Amber Jar - Sulfuric Acid or Sodium Bisulfate (EP020) Pit 4 MW-1, Pit 4 MW-3	Pit 4 MW-2,	18-Jul-2017	----	----	----	24-Jul-2017	15-Aug-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Oil and Grease	EP020	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Oil and Grease	EP020	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



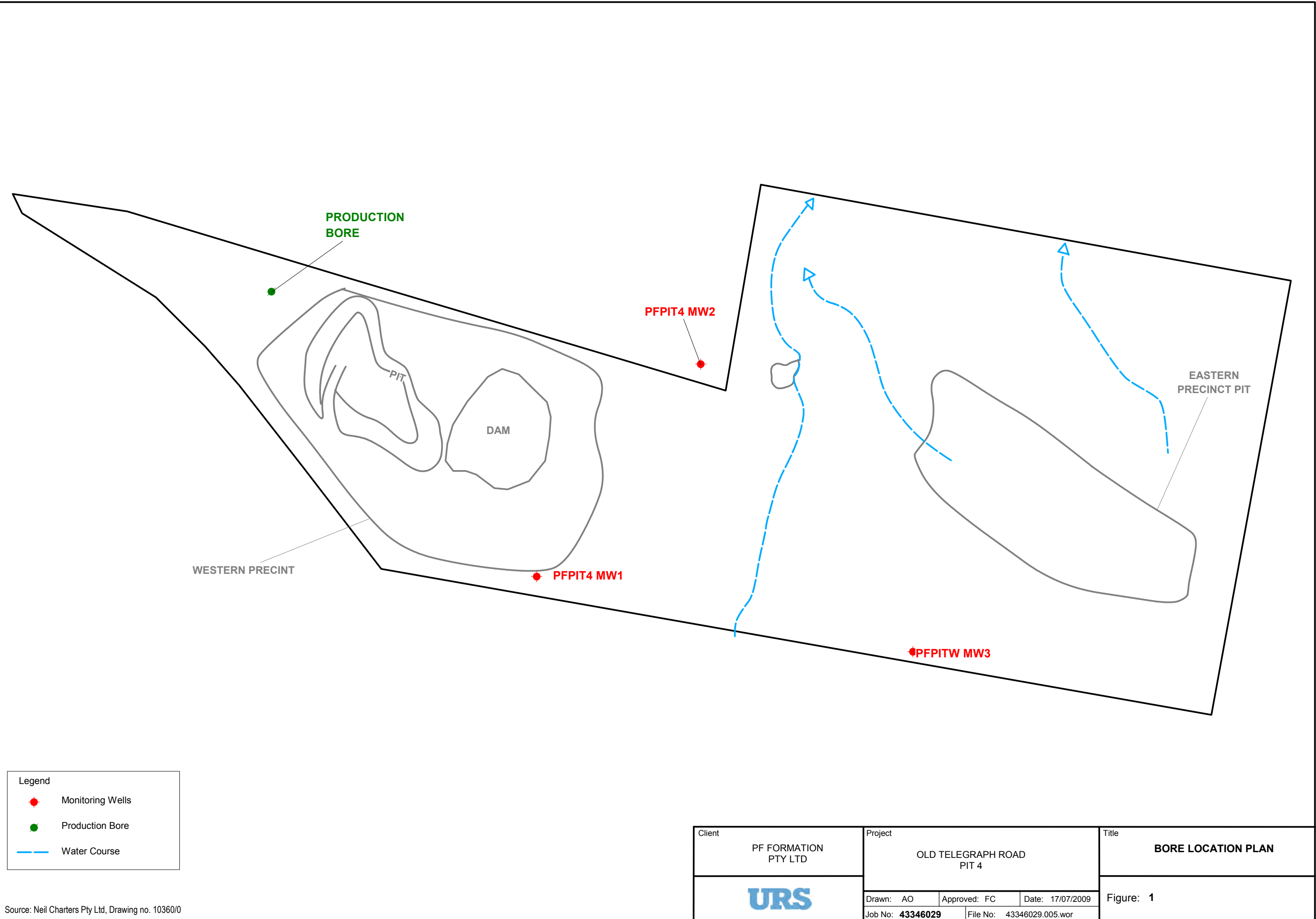
Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of 'filterable' residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)

APPENDIX C

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Maroota Mining Groundwater Monitoring Bore VELMW1

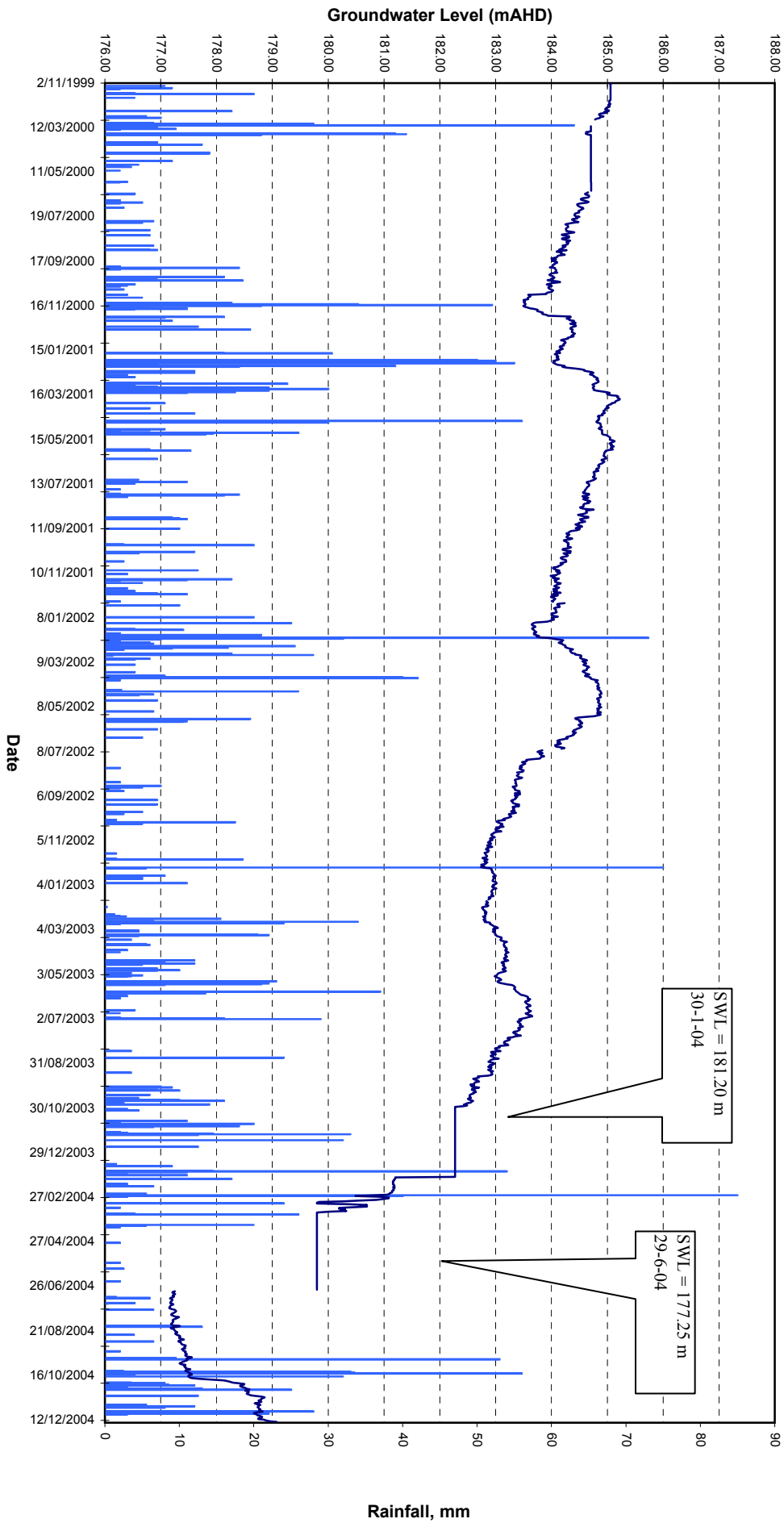


Figure 2



**PF FORMATION
Bore PFPIT4MW1
Groundwater Monitoring Data**

□ Rainfall, mm
— Water Level, m AHD

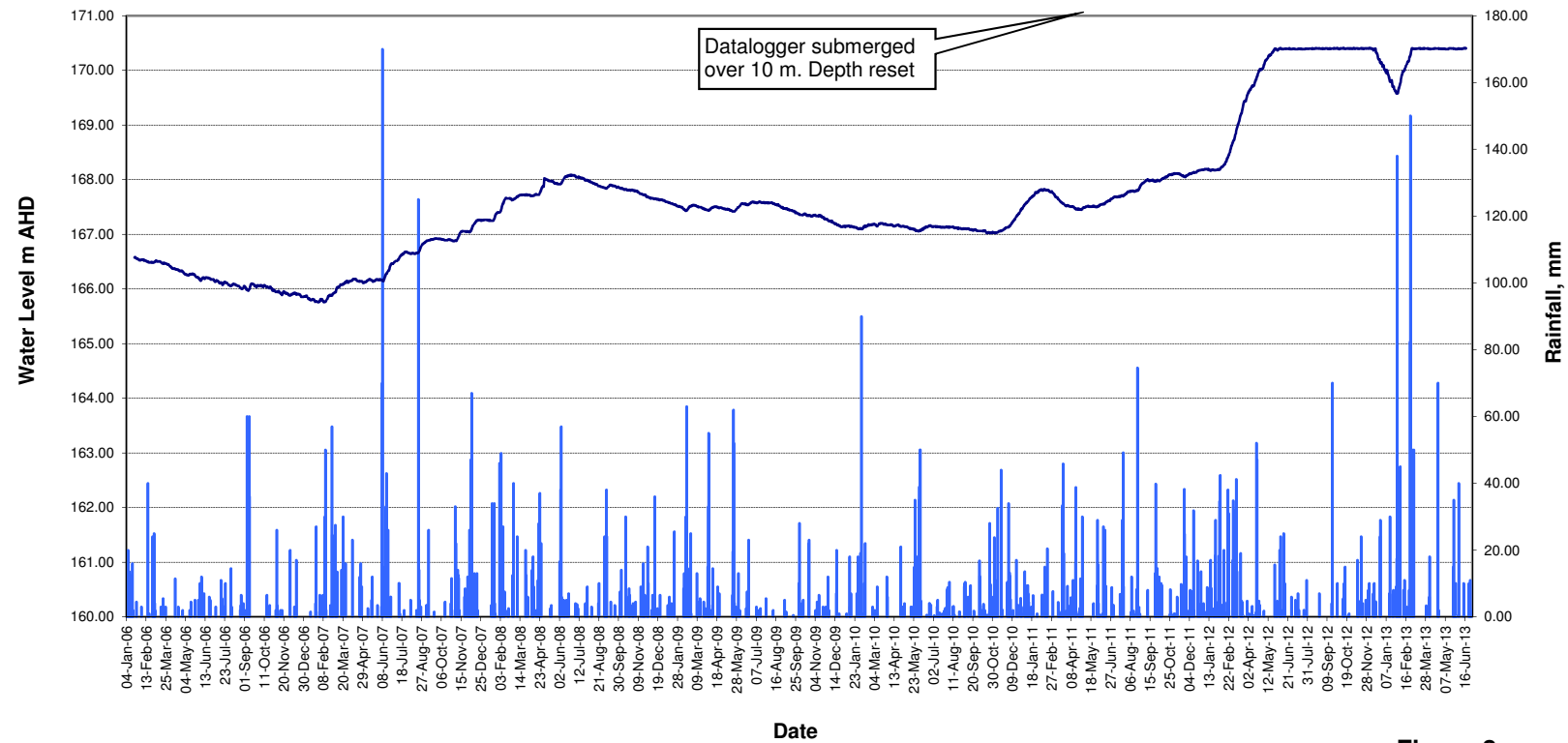


Figure 3

**Maroota Mining
Bore VELMW2 Groundwater Monitoring Data**

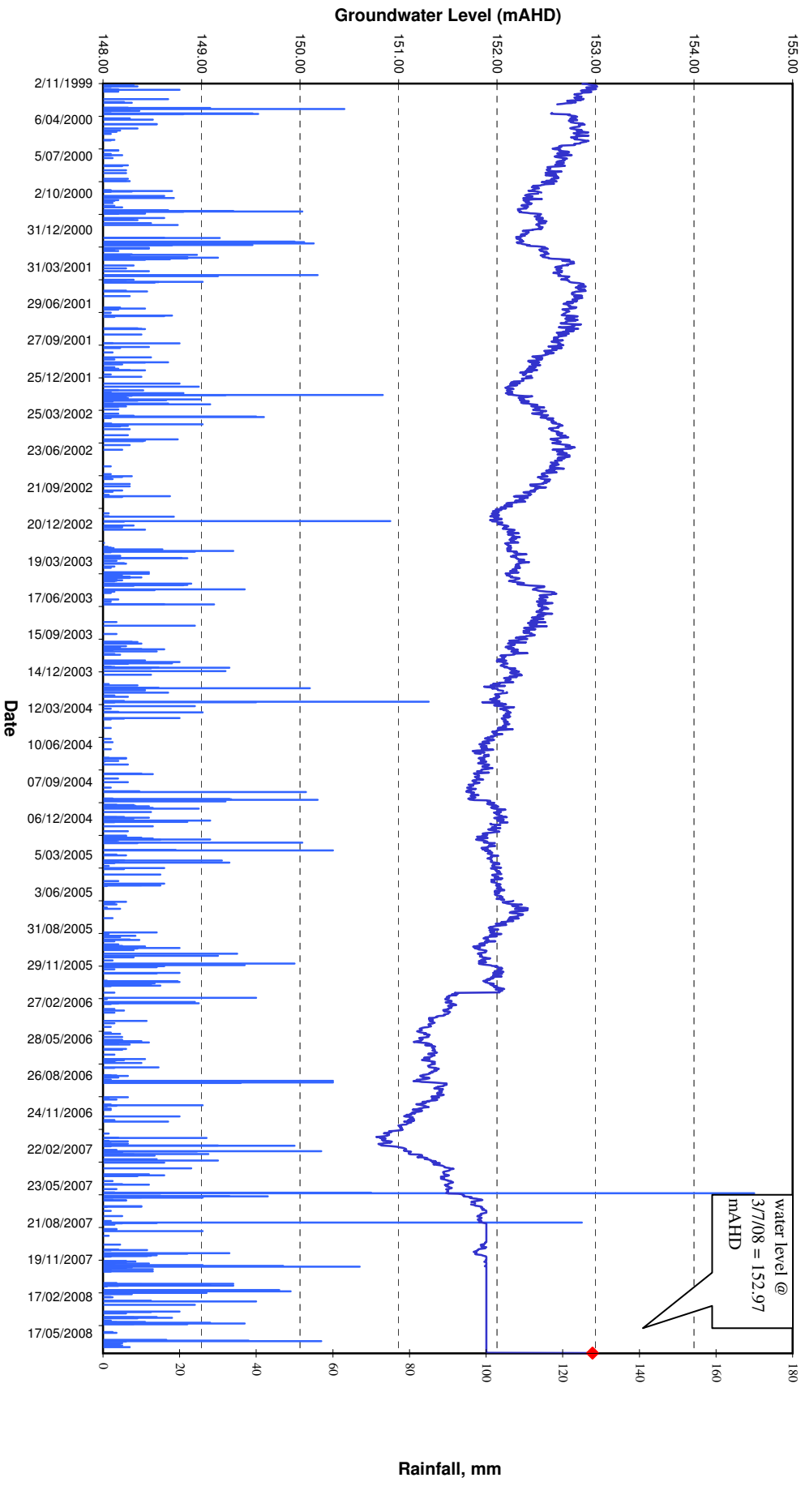


Figure 4



**PF FORMATION
Bore PFPIT4MW2
Groundwater Monitoring Data**

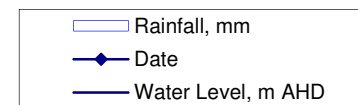
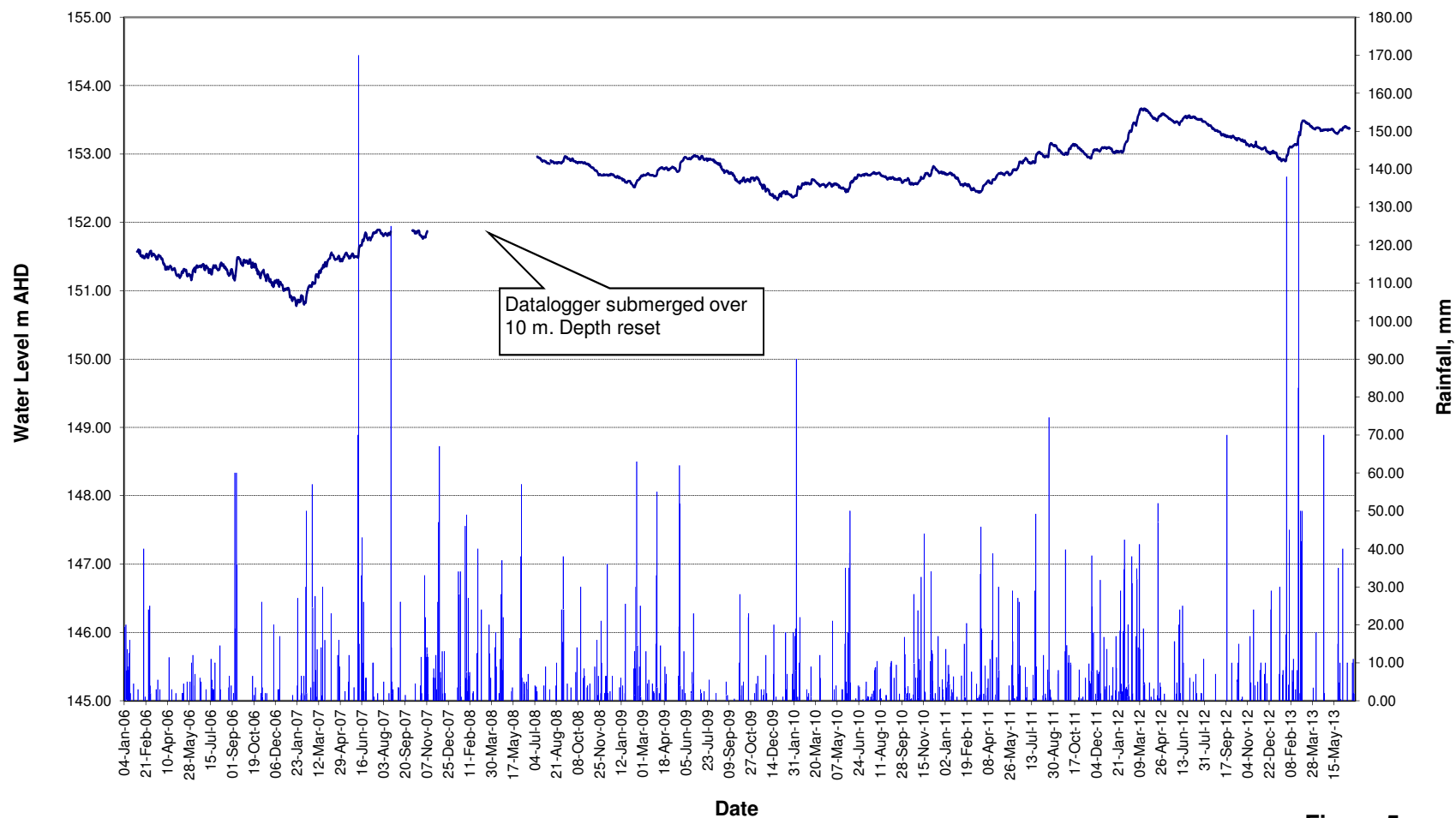


Figure 5



**Maroota Mining
Bore VELMW3 Groundwater Monitoring Data**

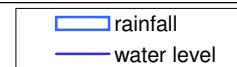
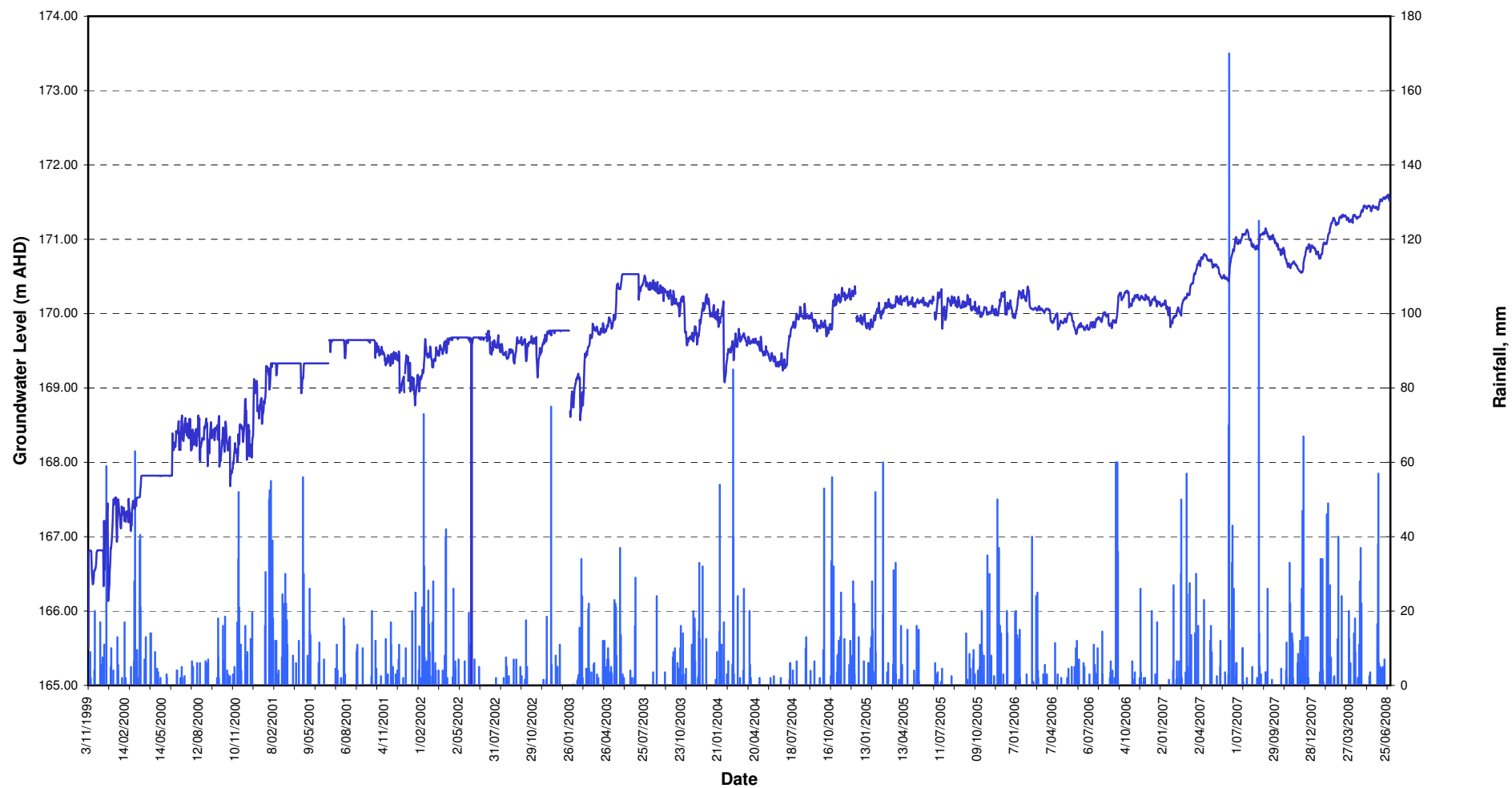


Figure 6



PFFORMATION
Bore PFPIT4MW3
Groundwater Monitoring Data

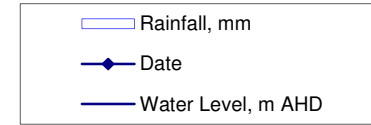
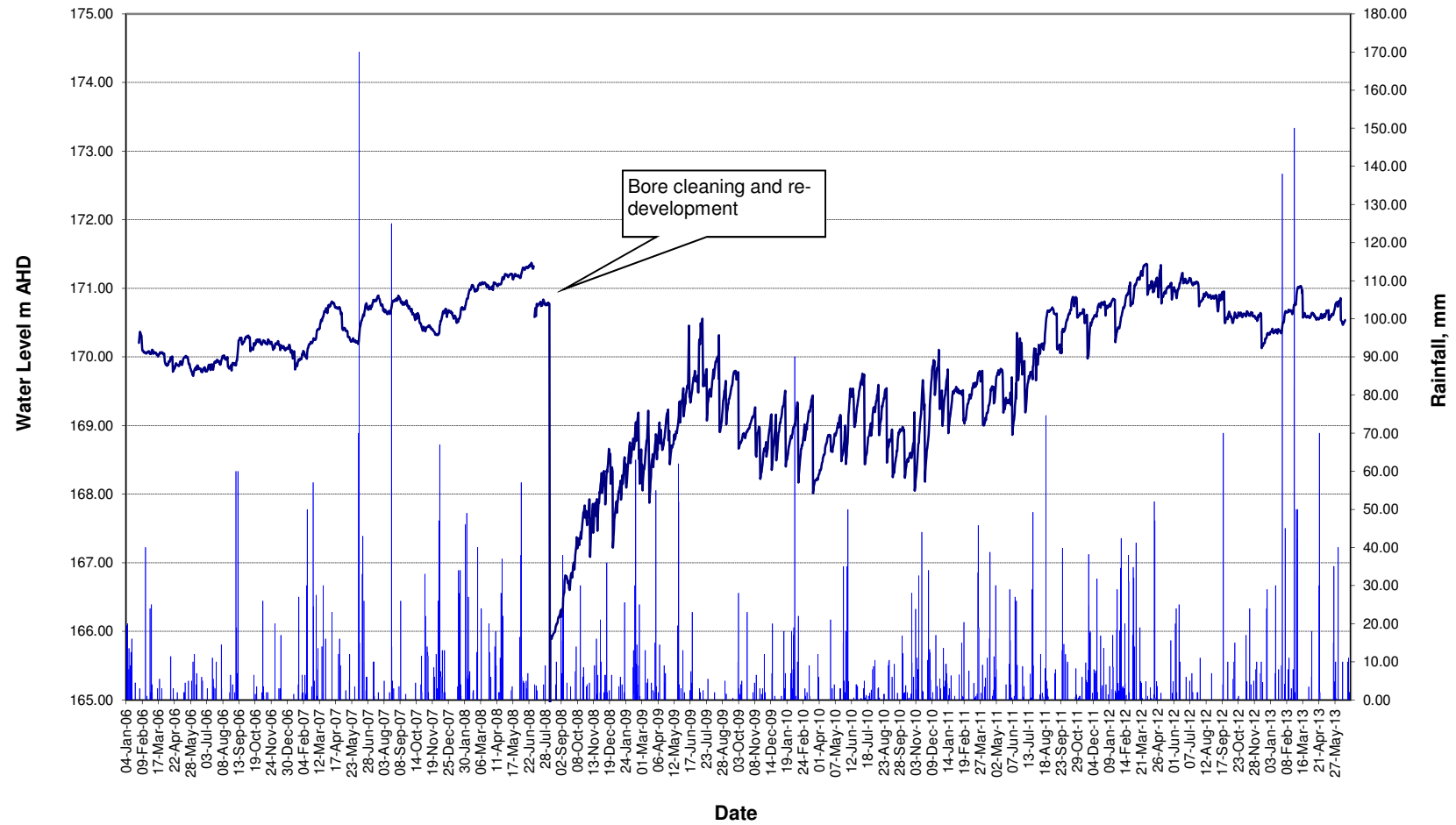


Figure 7

Appendix 4

***Noise Compliance Testing of PF Formation Extractive Industry Operations
at Pit 4 Old Telegraph Road and Pits 5 & 15 Old Northern Road, Maroota,
(July 2016 - June 2017), 9 October 2017, Koikas Acoustics Pty Ltd.***



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NOISE COMPLIANCE TESTING OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS

**AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD
NORTHERN ROAD, MAROOTA**

(JULY 2016 - JUNE 2017)

DOCUMENT CONTROL	
Project Title	NOISE COMPLIANCE TESTING OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD NORTHERN ROAD, MAROOTA (JULY 2016 – JUNE 2017)
Our Project No.	1933
Our File Reference	Z:\ACOUSTICS\ACOUSTICS 17\REPORT\Other\1933C20171009mfcMarootaS5-7v2.docx
Issue Date	9 th October 2017
Revision	V1 22/08/2017
	V2 09/10/2017
Prepared By	Michael Fan Chiang
Approved By	Nick Koikas
Client	PF Formation Trust 1774 Wisemans Ferry Road Maroota NSW 2756 Attention: Joshua Graham E-mail: josh@pfformation.com.au ; accounts@pfformation.com.au

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NOISE COMPLIANCE TESTING
OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS
AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD NORTHERN ROAD, MAROOTA
(JULY 2016 – JUNE 2017)

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Appendix A - Aerial photograph of Monitoring Locations 5, 6 & 7

Appendix B - Aerial photograph of Locations Listed in EPL 3829

NOISE COMPLIANCE TESTING
OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS
AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD NORTHERN ROAD, MAROOTA
(JULY 2016 – JUNE 2017)

1.0 CONSULTANT'S BRIEF

Koikas Acoustics Pty Ltd was engaged by PF Formation Trust to undertake noise compliance testing during the sand extraction operations at various sites including:

- Pit 4, Lot 2 DP 748820 at 311 Old Telegraph Road, Maroota;
- Pit 5, Lot 3 DP 567166 at 4751 Old Northern Road, Maroota, and
- Pit 15, Lot 2 DP 510812 at 4713 Old Northern Road, Maroota.

The assessment provides the following:

- a discussion of the applicable noise criteria at each site, and
- attended noise monitoring survey results.

Sand extractions have been undertaken in this area for many years for Pit 4 Lot 2 DP 748820, Pit 5 Lot 3 DP 567166 and Pit 15 Lot 2 DP 510812. Until recently, there was a single unresolved noise complaint from a resident located to south-east of Pit 4 quarry, approximately 300 meters away.

This assessment has been conducted to demonstrate noise compliance with the Development Consent No.578/2009B (associated with EPA Licence No. 3829 for sand extraction operation at Pit 5 and 15) and Development Consent No. 342/98F (associated with EPA Licence No. 10357 for sand extraction operation at Pit 4).

Some measurements of sleep disturbance could not be taken 1 metre from a bedroom window. Sound level measurements were taken from the boundary. Measurements taken from the boundary were closer to the noise source and therefore louder compared to if measurements had been taken outside a bedroom window.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The sand mining extraction and processing sites are bounded by:

- Old Telegraph Road
- Old Northern Road
- Rural properties and Marramarra National Park to the north, south and east.

A detailed aerial photograph showing the surrounding premises is attached as **Appendix A**. It is noted that this acoustic assessment considered the noise sensitive locations at receivers 5, 6 and 7 marked on the aerial photograph.

2.2 HOURS OF OPERATION

Table 1. Hours of Operation		
Activity	Day	Time [Hours]
Construction	Monday to Friday	0700 – 1800
	Saturday	0800 – 1300
	Sunday and Public Holiday	None
Quarrying and processing including overburden removal	Monday to Saturday	0700 – 1800
	Sunday and Public Holiday	None
Product Transportation	Monday to Saturday	0600 – 1800
	Sunday and Public Holiday	None
Maintenance	Monday to Saturday	0700 – 1800
	Sunday and Public Holiday	None

2.3 AMBIENT NOISE PROFILE OF THE NOISE MONITORING SITES (RECEIVERS)

During the daytime, the perceived intrusiveness of noise of cars and trucks traversing along these roads whilst residents are inside or outside their homes is expected to be significantly greater compared to the noise of sand mining extraction activities.

The rustling of leaves with slight wind speeds would normally raise background noise levels. For periods when the wind is calm, background noise levels would typically be that of distant noises emanating from motor vehicles, and the sound of insects and birds.

2.4 SAND EXTRACTION LOCATIONS

The sand extractions were undertaken at the following sites:

- Pit 4, Lot 2 DP 748820 at 311 Old Telegraph Road, Maroota;
- Pit 5, Lot 3 DP 567166 at 4751 Old Northern Road, Maroota, and
- Pit 15, Lot 2 DP 510812 at 4713 Old Northern Road, Maroota.

2.5 MONITORING LOCATIONS

Noise monitoring was conducted in the Maroota area at the following locations:

Location 5. Old Telegraph Road;

Location 6. Western boundary 4713 Old Northern Road, and

Location 7. Lot 1 Hart Place.

The above were the most noise-sensitive receiver locations near the subject quarry sites. Other receiver locations listed in the Environment Protection Licence (EPA 3829) were further away from the quarry sites as shown in **Appendix B** and therefore noise impact would be less.

The site locations are attached as aerial photographs in **Appendices A** and **B**.

3.0 NOISE CRITERIA

3.1 BACKGROUND NOISE

The noise criterion has been derived from previous noise surveys by undertaking 'long term' ambient noise level measurements at a representative site. The background noise level was determined over consecutive 15 minute periods for a duration of at least one week. From this data of LA90,15 minutes noise levels, the 10 percentile lowest background noise levels were determined for each of the days. The *rating background level* was then determined by calculating the median value of the daily 10 percentile background noise levels for each of the three specific time periods: daytime, evening and night time.

The rating background level result is used to determine the noise criteria applicable for the surrounding residential properties in accordance with the EPA's Industrial Noise Policy (INP) assessment procedures.

The background noise level LA90,15 minutes is normally determined in the absence of extraneous noise such as traffic, wind, rain, conversation, birds chirping, insect noise and unnatural increases in noise from distant sources due to local air movement. The EPA defines such sources as *incidental noise* which can cause the masking of offensive noise from a specific source. When traffic or other incidental noises cannot be excluded, then it is considered that these noise sources are part of the background noise.

3.2 EPA INDUSTRIAL NOISE POLICY

The INP defines two criteria, the Intrusive Noise Criterion and the Amenity Noise Criterion. The EPA requires that compliance with both the intrusive and amenity criteria be achieved for the purpose of controlling the intrusive nature of the industrial noise in the short term and also maintaining the noise level amenity of the area for residences and other land uses.

For the purpose of applying the INP the following time periods apply:

- Daytime   7am to 6pm Monday to Saturday
                         8am to 6pm Sunday
- Evening   6pm to 10pm Monday to Sunday
- Night-time   10pm to 7am Monday to Saturday
                         10pm to 8am Sunday

3.2.1 Intrusive Noise Criterion

The intrusiveness of an industrial noise source is generally considered acceptable by people if the equivalent continuous (A-weighted) noise level (L_{Aeq} , 15 minutes) does not exceed the background noise level by more than 5 dB. The intrusive noise criterion is defined as:

$$L_{Aeq, 15 \text{ minutes}} = (\text{rating background level}) L_{90, \text{Period}} + 5\text{dB}$$

When the noise source contains annoying characteristics such as prominent tonal, impulsive, intermittent, irregular and dominant low frequency components, adjustments are made.

3.2.2 Noise Amenity Criterion

In order to limit the continuing increase in noise, the EPA has nominated recommended acceptable and maximum ambient noise levels for various receiver sites from industrial noise.

Table 2.1 of the EPA's INP (below) specifies the following acceptable and maximum recommended $L_{Aeq, \text{Period}}$ noise levels for this project specific type area. In this case, the area is described as being Rural. The EPA refers to 'rural' as:

Rural—means an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic. Such areas may include:

- an agricultural area, except those used for intensive agricultural activities
- a rural recreational area such as resort areas
- a wilderness area or national park
- an area generally characterised by low background noise levels (except in the immediate vicinity of industrial noise sources).

This area may be located in either a **rural, rural-residential, environment protection zone or scenic protection zone**, as defined on a council zoning map (Local Environmental Plan (LEP) or other planning instrument).

Table 2.1 of the EPA INP

Type of Receiver	Indicative Noise Amenity	Time of Day	Recommended LAeq, Noise Level dB(A)	
			Acceptable	Recommended Maximum
Residential	Rural	Day	50	55
		Evening	45	50
		Night	40	45
Schools	All	Noisiest 1 hour period when in use	35	40
Commercial	All Areas	Day Evening Night	65	70
Industrial	All Areas	Day Evening Night	70	75
Area specifically reserved for passive recreation	All	When in use	50	55

Table 2.2 of the EPA INP (below) specifies the modification to the acceptable noise level to account for the existing level of industrial noise when additional industrial noise sources are proposed for the site:

Table 2.2 of the EPA INP

Total existing LAeq noise level from industrial sources, dB(A)	Maximum LAeq noise level from new sources alone, dB(A)
≥ Acceptable noise level plus 2	If existing noise level is <i>likely</i> to decrease in future: acceptable noise level minus 10 If existing noise level is <i>unlikely</i> to decrease in future: existing level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

The amendments to the EPA INP (2006) state that both the predicted amenity noise level criterion and the intrusive noise level criterion need to be satisfied, which supersedes the requirement of assessing only the most stringent of the two noise criterion. In clearly obvious cases, one or the other noise criterion is considered. In this case, the intrusive noise criterion has been considered as it is clearly the most stringent due to the low Rating Background Level (RBL).

3.3 NOMINATED NOISE CRITERIA

The noise criteria for the sand extraction operation are as follows for the EPA Licences (No.10357 and 3829) are shown in Table 2:

Table 2. Operational Criterion Levels (EPA Licences No.10357 and 3829)		
Site Location	Daytime [LAeq,15 mins]	EPA Licence
5. Lot 1 Old Telegraph Road	42	10357
6. Lot 2 DP567166 at 4713 Old Northern Road	45	3829
7. Lot 1 Hart Place	40	10357

The above receiver locations were the most noise-sensitive receiver locations near the subject quarry sites. Koikas Acoustics has been advised that other receiver locations listed in the Environment Protection Licence (EPA 3829) were further away from the quarry sites and therefore noise impact would be less.

Refer to aerial photo attached in **Appendix A** for all noise-sensitive receiver locations.

4.0 NOISE SURVEYS

4.1 NOISE MONITORING PROCEDURES

All measurement methodologies and equipment used comply with the relevant Australian Standards:

- AS1259.2-1990 "Acoustics - Sound Level Meters - Integrating - Averaging", and
- ISO 1996.2-2007 "Acoustics – Description, measurement and assessment of environmental noise" Part 2: Determination of environmental noise levels.

All sound and noise level measurements were A-frequency and Fast-time weighted.

4.2 ATTENDED NOISE MONITORING

Attended noise monitoring was conducted on the following days at each monitoring location below:

At Location 5 Old Telegraph Road

18 th July 2016	Daytime hours
20 th October 2016	Daytime hours
3 rd February 2017	Daytime hours
1 st June 2017	Daytime hours

At Location 6 Western Boundary 4713 Old Northern Road

18 th July 2016	Daytime hours
20 th October 2016	Daytime hours
3 rd February 2017	Daytime hours
1 st June 2017	Daytime hours

At Location 7 Lot 1 Hart Place

18 th July 2016	Daytime hours
20 th October 2016	Daytime hours
3 rd February 2017	Daytime hours
1 st June 2017	Daytime hours

The noise measurements taken from July 2016 to June 2017 were conducted with a Class 1 Svan 971 S/N 40412 Sound Level Meter and calibrated with a Svanteck SV 33 Class 1 Acoustic Calibrator.

5.0 NOISE SURVEY RESULTS

Table 3, 4 and 5 refers to the measured noise levels obtained at locations 5, 6 and 7 respectively for each monitoring period.

It is noted, that in all cases the measured L_{Aeq} was dominated by environmental and intermittent noise sources unrelated to the quarry noise. The exceeding levels are therefore not that of quarry activities.

Table 3. Location 5 Old Telegraph Road - Noise Survey Results					
Date	Applicable Criterion Level [dB(A)]	Measured Noise Level [dB(A)]	Measured L_{A90} [dB(A)]	Exceeding [dB]	Note
18 th July 2016 Daytime hours	42 $L_{Aeq,15min}$	47 $L_{Aeq,15min}$	44	5	See Note 1.
20 th October 2016 Daytime hours		43 $L_{Aeq,15min}$	34	1	See Note 2.
3 rd February 2017 Daytime hours		39 $L_{Aeq,15min}$	36	-	See Note 5.
1 st June 2017 Daytime hours		41 $L_{Aeq,15min}$	37	-	See Note 1.

Table 4. Location 6 Western Boundary 4713 Old Northern Road - Noise Survey Results					
Date	Applicable Criterion Level [dB(A)]	Measured Noise Level [dB(A)]	Measured L_{A90} [dB(A)]	Exceeding [dB]	Note
18 th July 2016 Daytime hours	45 $L_{Aeq,15min}$	51 $L_{Aeq,15min}$	42	6	See Note 4.
20 th October 2016 Daytime hours		46 $L_{Aeq,15min}$	41	1	See Note 3.
3 rd February 2017 Daytime hours		45 $L_{Aeq,15min}$	35	-	See Note 3.
1 st June 2017 Daytime hours		42 $L_{Aeq,15min}$	41	-	See Note 3.

Table 5. Location 7 Lot 1 Hart Place - Noise Survey Results					
Date	Applicable Criterion Level [dB(A)]	Measured Noise Level [dB(A)]	Measured L_{A90} [dB(A)]	Exceeding [dB]	Note
18 th July 2016 Daytime hours	40 $L_{Aeq,15min}$	46 $L_{Aeq,15min}$	39	6	See Note 1.
20 th October 2016 Daytime hours		43 $L_{Aeq,15min}$	34	3	See Note 2.
3 rd February 2017 Daytime hours		41 $L_{Aeq,15min}$	31	1	See Note 1.
1 st June 2017 Daytime hours		40 $L_{Aeq,15min}$	39	-	See Note 1.

Note 1. Dominant noise source is that of birds chirping/insects and/or other natural sounds. Quarry noise was audible but not significant.

Note 2. Dominant noise source is that of birds chirping/insects and other natural sounds. Quarry noise was not audible and not measurable.

Note 3. Dominant noise source is that of traffic and/or birds chirping and other natural sounds (during lulls in traffic). Quarry noise was barely audible but not measurable.

Note 4. Dominant noise source is that of traffic and/or birds chirping (during lulls in traffic). Quarry noise was not audible and not measurable.

Note 5. Dominant noise source is that of quarry noise and birds chirping. Quarry noise was not intrusive.

On account of the large distances which sound travels from the sand mining extraction activities to the surrounding residential premises, it is often not measureable because it is either less than the prevailing background noise or because it is inaudible.

The noise criterion nominated by the EPA Licences for the hours of operation was therefore not exceeded.

6.0 CONCLUSIONS

Koikas Acoustics was requested to undertake noise level surveys around two Maroota sand mining extraction and processing quarries (July 2016 – June 2017) and ascertain whether the noise from the extraction and processing works currently exceed the noise criteria as nominated by EPA licenses No.10357 and 3829.

The results of the noise surveys show that the site extraction and processing work complies with the EPA nominated noise criteria.

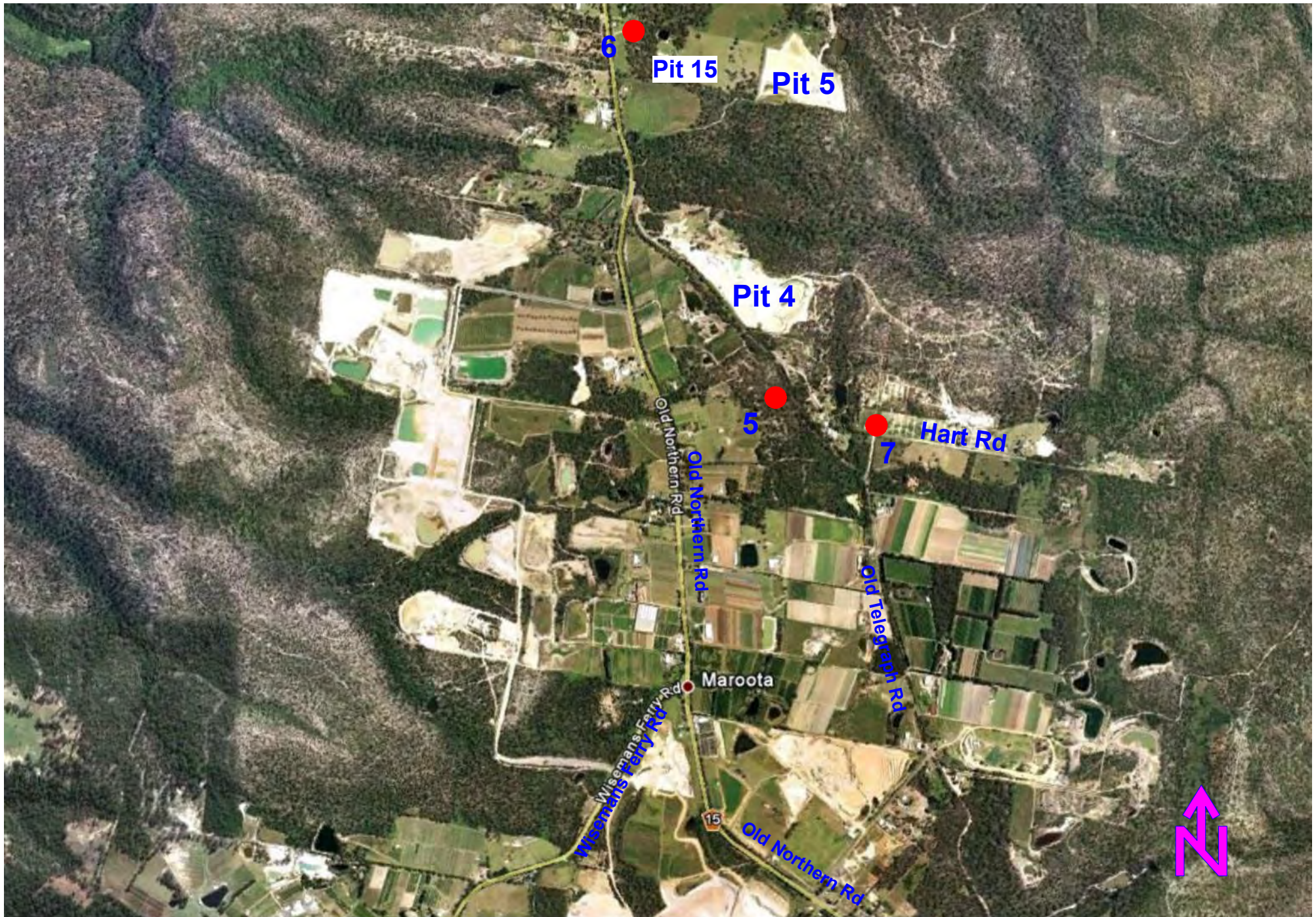
At most sites, quarry activities are either just audible or inaudible and in most cases, the noise emanating from the site was found not to be measureable on account of that the natural noise (which includes birds chirping, insects, rustling of leaves) and un-natural noise (being cars and trucks traversing along the main roads).

There are no noise mitigation measures necessary to be implemented for any of the subject quarry sites.

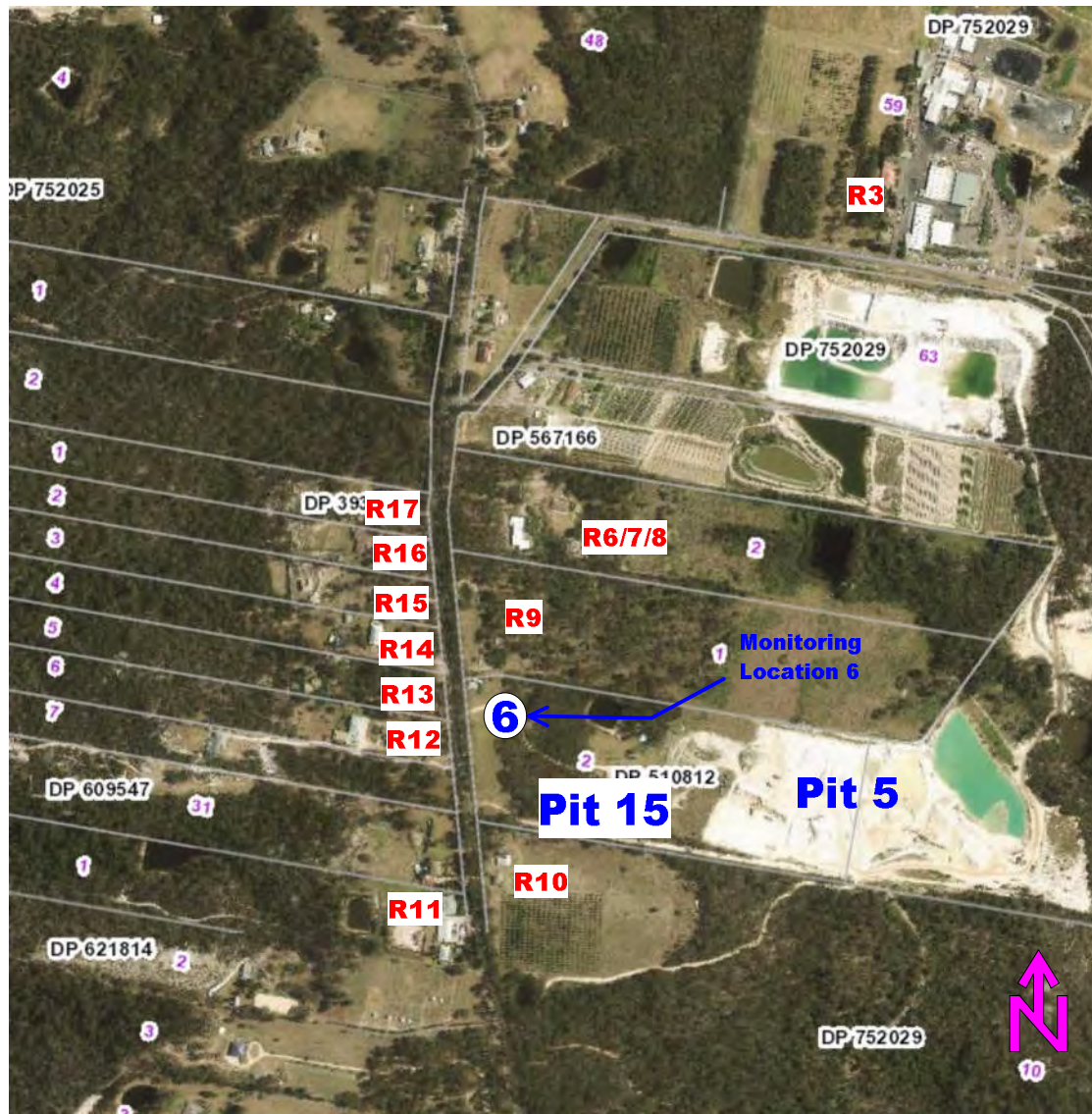
Koikas Acoustics therefore certifies that the subject quarries currently comply with the EPA nominated noise criteria despite that the measured noise levels (predominantly that of traffic and other natural sound sources) are currently producing sound levels in-excess of the nominated noise criteria during some days.

In regards to the unresolved noise complaint from the resident to the south-east direction of Pit 4 quarry, PF Formation has endeavoured to arrange additional noise testing with the resident to address the issue. However, the complainant claimed he is suffering from some medical issues and declined on several occasions for additional noise measurements. At this point in time, PF Formation is continuing to negotiate and endeavouring the arrangement for additional noise measurements in regard to this complainant.

APPENDIX A - AERIAL PHOTOGRAPH



APPENDIX B - AERIAL PHOTOGRAPH OF LOCATIONS LISTED IN EPL 3829



Location	Day; LAeq,15min
R3 - Lot 59, DP 752029	43
R6 - Lot 2, DP 567166	45
R7 - Lot 2, DP 567166	45
R8 - Lot 2, DP 567166	46
R9 - Lot 1, DP 567166	47
R10 - Lot 10, DP 752029	47
R11 - Lot 1, DP 621814	35
R12 - Lot 6, DP 39392	35
R13 - Lot 5, DP 39392	35
R14 - Lot 4, DP 39392	35
R15 - Lot 3, DP 39392	35
R16 - Lot 2, DP 39392	35
R17 - Lot 1, DP 39392	35