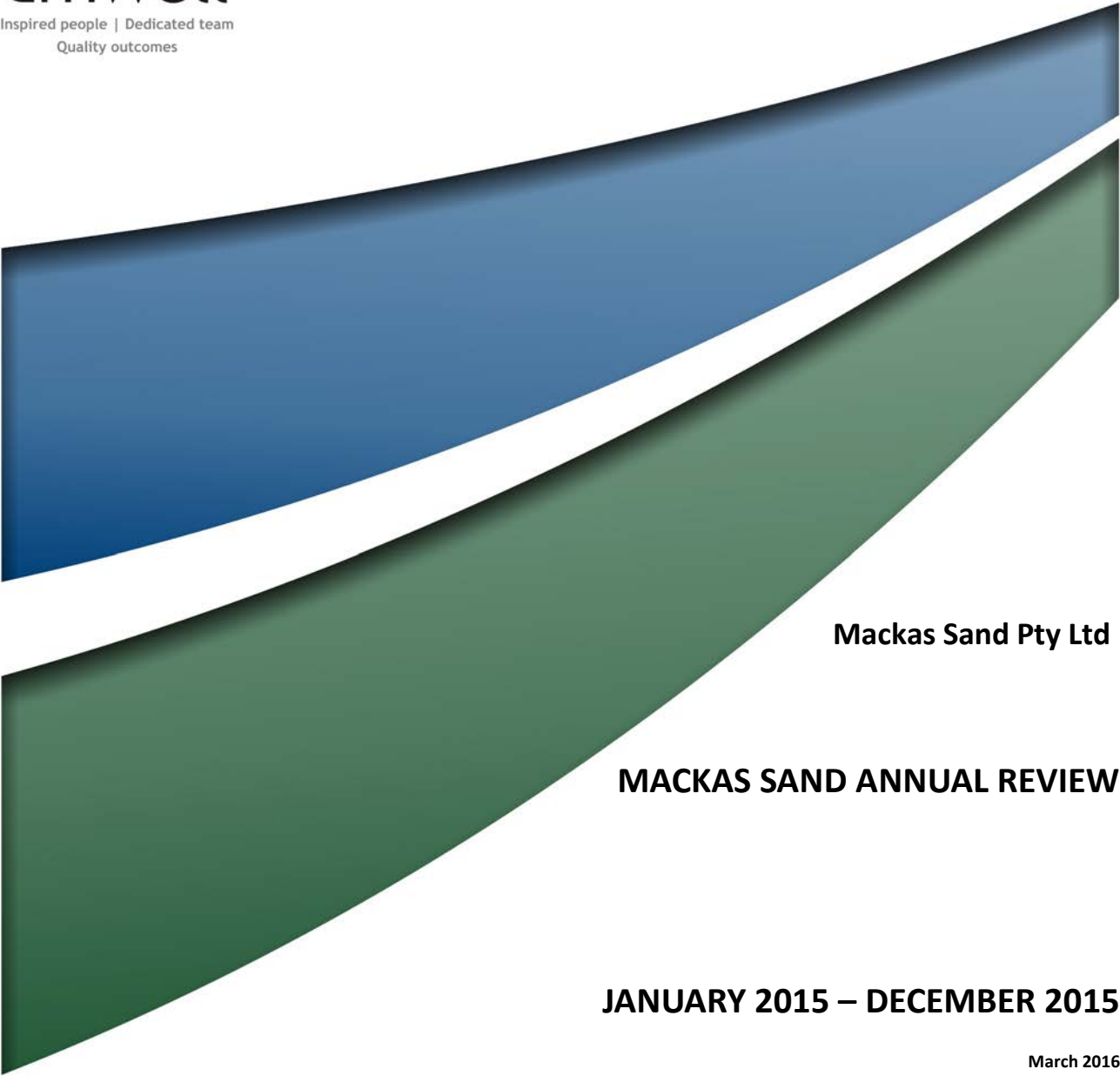




Mackas Sand Pty Ltd

MACKAS SAND ANNUAL REVIEW

JANUARY 2015 – DECEMBER 2015

March 2016

Mackas Sand Pty Ltd

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JANUARY 2015 – DECEMBER 2015

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Mackas Sand Pty Ltd

Project Director: Peter Jamieson
Project Manager: Brendan Rice
Report No. 1646/R58/FINAL
Date: March 2016



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Table of Contents

1.0	Statement of Compliance	2
2.0	Introduction	4
2.1	Quarry Contacts	7
3.0	Approvals	8
3.1	Status of Development Consents / Project Approval	8
3.2	Status of Licences and Permits	10
4.0	Operations Summary	11
4.1	Mining Operations	11
4.2	Construction Activities	12
4.3	2016 Report Period Extraction Operations	13
5.0	2014 Annual Review Actions	14
6.0	Environmental Performance	15
6.1	Operational Noise	24
6.2	Air Quality	28
6.3	Meteorological Monitoring	35
6.4	Ecology	35
6.5	Aboriginal Heritage	36
6.6	Non-Aboriginal Heritage	36
6.7	Erosion and Sediment Control	36
6.8	Waste Management	36
7.0	Water Management	37
7.1	Surface Water	37
7.2	Groundwater	37
8.0	Rehabilitation	39
8.1	Rehabilitation of Disturbed Land	39
8.2	Annual Rehabilitation Inspection	39
8.3	Rehabilitation Trials and Research	41
8.4	Actions for the 2016 Report Period	41
9.0	Community	42
9.1	Community Complaints	42
9.2	Community Liaison	42
10.0	Independent Audits	43
10.1	2014 Independent Audit	43
10.2	DP&E Sand Quarries Audit 2015	43

11.0	Non Compliances during the 2015 Report Period	47
12.0	Activities Proposed in the 2016 Annual Review Period	49
13.0	References	50

Figures

Figure 2.1	Locality Plan	6
Figure 6.1	Mackas Sand Monitoring Locations	25
Figure 8.1	Approximate Areas of Impact Lot 220-2015	40

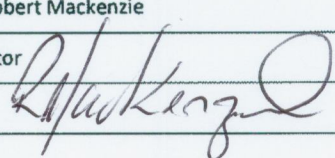
Tables

Table 1.1	Compliance Status Key (NSW Government, 2015).	2
Table 1.2	Non-compliances during the 2015 report period	3
Table 2.1	Project Approval Conditions for the Annual Review	5
Table 2.2	Personnel Responsible for Rehabilitation and Environmental Management at Mackas Sand during 2015	7
Table 3.1	Development Consent History for Mackas Sand	9
Table 4.1	Production Summary 2015	11
Table 4.2	Mackas Sand Approved Operating Hours (Project Approval Mod 1)	12
Table 6.1	Summary of Environmental Performance during 2015	16
Table 6.2	Industrial Noise Impact Assessment Criteria, dB(A)	24
Table 6.3	Alternate Access Road Noise Impact Assessment Criteria dB(A)	24
Table 6.4	Traffic Noise Impact Assessment Criteria, dB(A)	26
Table 6.5	Noise Monitoring Locations	26
Table 6.6	Industrial Noise Criteria for Mackas Sand Project Area dB(A)	26
Table 6.7	Night Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)	27
Table 6.8	Day Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)	27
Table 6.9	Industrial Noise Levels – Alternate Access Road to Lot 218	28
Table 6.10	Mackas Sand 1 hour Night and Day Time Road Traffic Noise Level Contribution versus	
Table 6.11	Noise Criteria, dB(A)	28
Table 6.12	Long term Impact Assessment Criteria for Particulate Matter	29
Table 6.13	Short term Impact Assessment Criterion for Particulate Matter	29
Table 6.14	Long term Impact Assessment Criteria for Deposited Dust	29
Table 6.15	Total Dust Deposition Levels at DDG 1 – Lot 220 (g/m ² /month)	30
Table 6.16	Total Dust Deposition Levels at DDG 2 – Lot 218 (g/m ² /month)	32
Table 7.1	Monthly Rainfall and Number of Rain Days during 2015	35
Table 7.2	Recorded and predicted groundwater levels (mAHD) for duration of operations.	37
Table 8.1	Groundwater Investigation Trigger Values	38
Table 9.1	Summary of Rehabilitation Status at Mackas Sand (Lot 220)	39
Table 10.1	Mackas Sand CCC Members for the 2015 Report Period	42
Table 10.2	Summary of DP&E Audit of Mackas Sand during May 2015.	44
Table 11.1	2015 Report Period non-compliances	47

Appendices

Appendix 1	DPI Water Report
Appendix 2	Dust Deposition
Appendix 3	Ground Water Monitoring Results

Table 1 Annual Review Title Block

Name of operation	Mackas Sand
Name of operator	Mackas Sand Pty Ltd
Development consent / project approval No.	08_0142 MOD 1
Name of holder of development consent / project approval	Mackas Sand Pty Ltd
Mining lease No.	No Mining Lease applicable to site under <i>Mining Act</i> (1992).
Name of holder of mining lease	N/A
Water licence #	N/A
Name of holder of water licence	N/A
MOP/RMP start date	N/A
MOP/RMP end date	N/A
Annual Review start date	1 January 2015
Annual Review end date	31 December 2015
I, Robert Mackenzie, certify that this audit report is a true and accurate record of the compliance status of Mackas Sand Pty Ltd for the period 1 January 2015 to 31 December 2015 and that I am authorised to make this statement on behalf of Mackas Sand Pty Ltd. Note. a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the <i>Environmental Planning and Assessment Act 1979</i>. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000. b) The <i>Crimes Act 1900</i> contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents – maximum penalty 2 years imprisonment or \$22,000, or both).	
Name of authorised reporting officer	Mr Robert Mackenzie
Title of authorised reporting officer	Director
Signature of authorised reporting officer	
Date	31-3-2016

1.0 Statement of Compliance

Mackas Sand operations on Lot 218 and Lot 220 are located approximately 25 kilometres north-east of Newcastle near Salt Ash in the Port Stephens local government area (LGA), New South Wales. Mackas Sand directors have operated sand extraction operations in the area since 1992. Lot 218 and Lot 220 are owned by the Worimi Local Aboriginal Lands Council and operated under agreement by Mackas Sand, refer to **Section 2.1**.

The following section provides a statement of compliance in regards to the operations undertaken at Lot 218 and Lot 220. There were 3 non compliances with the statutory approvals identified in **Table 3.1** during the report period. These non compliances are summarised in **Table 1.2** below and are discussed in further detail in **Section 11**. It is noted that during the report period an independent compliance audit was not required to be undertaken by Mackas Sand, refer to **Section 10**. An audit of the Mackas Sand operation was undertaken during May 2015 by the Department of Planning and Environment (DP&E) as part of a compliance assessment of sand quarries across New South Wales. The non compliances identified during the May 2015 DP&E audits have been incorporated into **Table 1.2** with the DP&E audit also discussed in **Section 10.2**. The key for the compliance status in **Table 1.1** below.

Table 1.1 Compliance Status Key (NSW Government, 2015).

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: - Potential for serious environmental consequences, but is unlikely to occur - Potential for moderate environmental consequences, but is likely to occur.
Low	Non-compliant	Non compliance with: - Potential for moderate environmental consequences, but is unlikely to occur - Potential for low environmental consequences, but is likely to occur.
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 1.2 Non-compliances during the 2015 report period

Relevant Approval	Condition No.	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
	Schedule 3, Condition 4B	Truck movements (in plus out) on the Alternate access road shall be restricted to: c) a maximum of 10 per hour during the shoulder period d) a maximum of 16 per hour between 7 am and 10 pm, unless otherwise approved by the Director-General.	Non-compliant	Following identification of non-compliance during 2015 DP&E Sand Quarries Audit, Mackas Sand indicated confusion with wording of Project Approval (MOD 1) Condition. The issue was clarified by DP&E. Mackas Sand has installed software within their weighbridge to limit the numbers of trucks that are able to be weighed each hour to the consent limits.	Section 10.2
	Schedule 2, Condition 7 and Schedule 3, Condition 2	Extraction will comply with approved maximum depth map.	Non-compliant	The 2015 DP&E Sand Quarries Audit identified extraction beyond maximum depth limit. Mackas Sand has since updated surveying of the operational area and use of equipment based GPS systems will enable more accurate depth management.	Section 10.2
	Schedule 3, Condition 11	Air quality monitoring (depositional dust samples collected from depositional dust gauges on a monthly basis throughout the report period.	Non-compliant	Air quality monitoring was undertaken during the report period for all locations, however on two occasions samples were obtained for an approximate 6 week period, which is not in compliance with the sample timeframes within the NSW Air Sampling Methods. As such the sample duration was not in accordance with relevant measurement standards.	Section 10.2

2.0 Introduction

Mackas Sand operations on Lot 218 and Lot 220 are located approximately 25 kilometres north-east of Newcastle near Salt Ash in the Port Stephens local government area (LGA), New South Wales (refer to **Figure 2.1**). Mackas Sand has operated sand extraction operations in the area since 1992. Lot 218 and Lot 220 operational areas are owned by the Worimi Local Aboriginal Lands Council and operated under agreement by Mackas Sand.

Mackas Sand was granted Project Approval (PA) No. 08_0142 on 20 September 2009 by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* to operate sand extraction operations at Lot 220 and Lot 218. It is estimated that in excess of 21 million tonnes of sand resource will be extracted from Lot 218 and Lot 220, with Lot 218 having an indefinite extraction life due to the ongoing movement of sand from the adjoining mobile dunes.

A modification to PA 08_0142 (MOD1) was approved on 30 September 2013 by the NSW Planning Assessment Commission (PAC) under delegation of the Minister for the former Planning and Infrastructure (DP&I), now DP&E. The modification includes a temporary reduction in extraction level and the approval of an alternate route to access Lot 218. The alternate route connects directly from Lot 218, northward to Nelson Bay Road, as depicted within **Figure 2.1**.

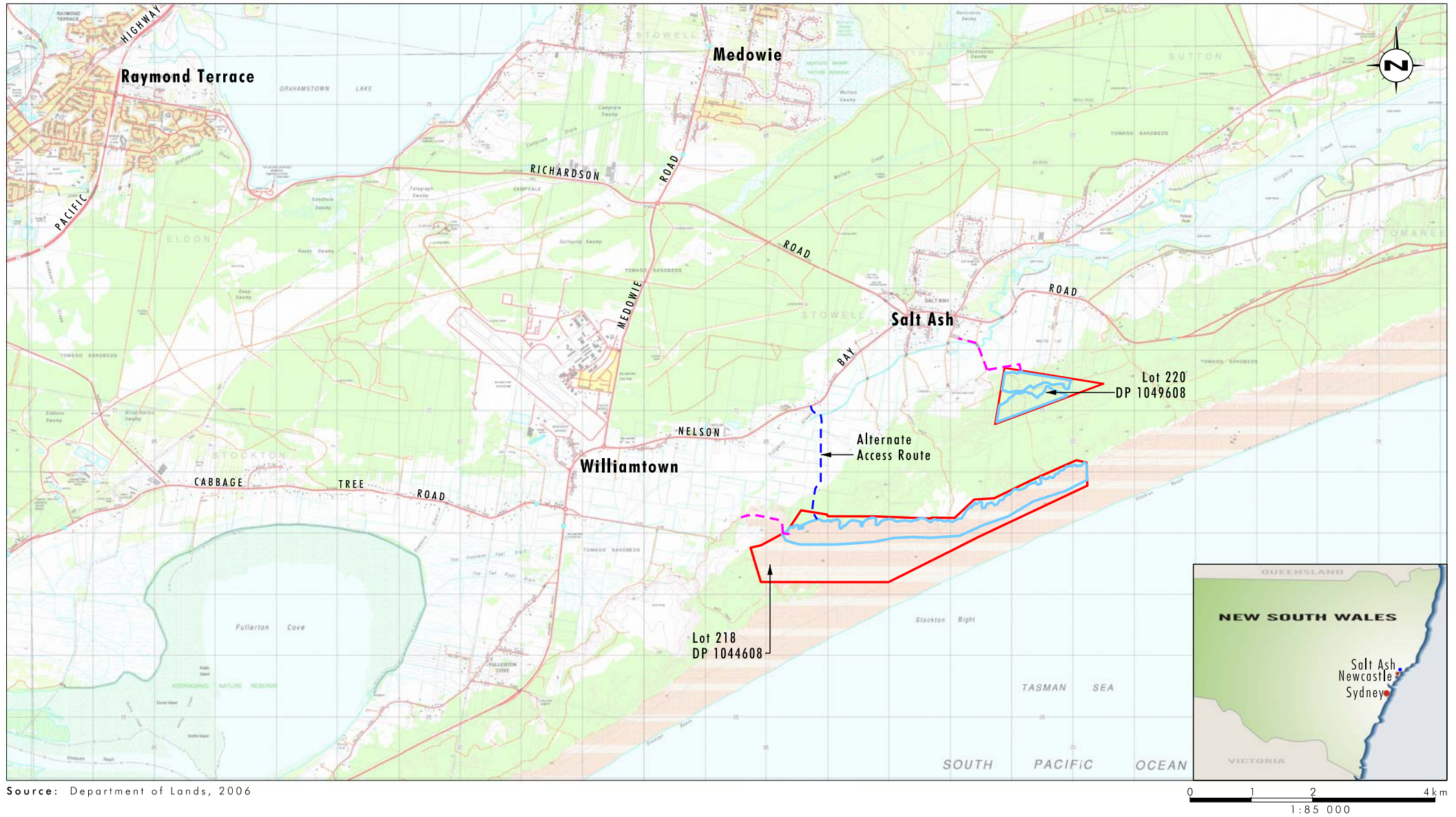
A second modification to PA 08_0142, (MOD2), was approved by the PAC on 16 March 2016. The modification allows for an increase in maximum hourly truck movements (in and out) of Lot 218 via the approved alternate access road.

In accordance with PA 08_0142 Schedule 5 Condition 4, an Independent Environmental Audit was undertaken during November 2014. As the resulting report had not been finalised at the time of previous Annual Review reporting, relevant outcomes have been reported in Section 10 below.

Mackas Sand has engaged Umwelt (Australia) Pty Limited to prepare this annual review to meet the requirement of PA 08_0142 MOD 1, Schedule 5 Condition 4. The report has been produced in accordance with the NSW Government *Annual Review Guideline: Post-approval requirements for State significant mining developments* (October, 2015). Requirements for the Annual Review under PA 08_0142 MOD 1 are presented in **Table 2.1**.

Table 2.1 Project Approval Conditions for the Annual Review

Project Approval Condition	Section of Document
4. By the end of March each year, or other timing agreed by the Director-General, the Proponent shall review the environmental performance of the Project to the satisfaction of the Director-General. This review must:	Whole Document
a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next year	Section 4.0, Section 8.0
b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the: - o relevant statutory requirements, limits or performance measures/criteria - o requirements of any plan, program or strategy required under this approval - o monitoring results of previous years - o relevant predictions in the EA and the EA (MOD1).	Section 6.0
c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance	Section 11.0
d) identify any trends in the monitoring data over the life of the project	Section 6.0
e) identify any discrepancies between the predicted and the actual impacts of the Project, and analyse the potential cause of any significant discrepancies	Section 6.0
f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the Project.	Section 6.0, Section 12.0



2.1 Quarry Contacts

The Mackas Sand Quarry Manager is responsible to the regulatory authorities for all aspects of environmental compliance at the site including day-to-day site environmental management and reporting such as monitoring and supervision of environmental works. The details of the Quarry Manager are listed in **Table 2.2**.

Table 2.2 Personnel Responsible for Rehabilitation and Environmental Management at Mackas Sand during 2015

Name	Position	Company	Contact Phone No.
Robert Mackenzie	Quarry Manager	Mackas Sand Pty Ltd	(w) 02 49826227 (m) 0408 490 911

3.0 Approvals

The operations at Mackas Sand on Lot 218 and Lot 220 were subject to a range of statutory approvals during the report period and these are summarised below and discussed in further detail in the following sections:

- PA 08_0142 MOD1
- approval under the Hunter Water Regulations 2010 Clause 10(1) and the corresponding Draft Operations Management Procedure (Umwelt 2014a)
- Environment Protection Licence (EPL) 13218 and the corresponding Pollution Incident Response Management Plan (PIRMP)
- Department of Environment Approval EPBC 2011/6214 and the corresponding EPBC Landscape Management Plan
- Mackas Sand Environmental Management Strategy (EMS) and related documentation prepared in accordance with the requirements of the Project Approval, including:
 - o Noise Management Plan (NMP)
 - o Air Quality Management Plan (AQMP)
 - o Soil and Water Management Plan (SWMP)
 - o Unexploded Ordinance Management Plan (for operations in Lot 218) (OMP)
 - o Landscape Management Plan (LMP)
 - o Aboriginal Cultural Heritage Management Plan (AHCMP):
 - Non-Indigenous Heritage Management Plan (NHMP).

3.1 Status of Development Consents / Project Approval

3.1.1 Project Approval (PA08_0142)

Mackas Sand was granted Project Approval (PA) No. 08_0142 on 20 September 2009 by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* to operate sand extraction operations at Lot 220 and Lot 218. It is estimated that in excess of 21 million tonnes of sand resource will be extracted from Lot 218 and Lot 220, with Lot 218 having an indefinite extraction life due to the ongoing movement of sand from the adjoining mobile dunes.

3.1.2 Modification 1 of the Project Approval (PA08_0142)

A modification to PA 08_0142 (MOD1) was approved on 30 September 2013 by the NSW Planning Assessment Commission (PAC) under delegation of the Minister for the former Planning and Infrastructure DP&I, now DP&E. The modification includes a temporary reduction in extraction level and the approval of an alternate route to access Lot 218. The alternate route connects directly from Lot 218, northward to Nelson Bay Road, as depicted within **Figure 2.1**, and permits access with reduced impacts upon nearby residents.

3.1.3 Modification 2 of the Project Approval (PA08_0142)

Mackas Sand currently operated in accordance with Major Project Approval (PA08_0142) to undertake sand extraction operations on Lot 218 and Lot 220 under agreement with the landowners, Worimi Local Aboriginal Land Council (WLALC). The original Project Approval was initially modified in 2013 to provide alternative haul road access to Lot 218 (MOD 1).

Mackas Sand then sought a second modification (MOD 2) in 2014. Under this modification, the operation sought to increase laden truck movements from Lot 218 between the hours of 7am and 10pm Monday to Friday and 7am and 4pm on Saturdays. This proposal will not alter truck movements on Sundays and public holidays, or from Lot 220. Further, the licensed extraction limit of the operation will remain the same. MOD 2 was approved by the PAC on the 16 of March 2016.

An overview of the Development Consent history for Mackas Sand is included in **Table 3.1** below.

Table 3.1 Development Consent History for Mackas Sand

Approval No.	Development	Consent Granted/ Endorsed	Status	Duration of Consent
08_0142	Mackas Sand Project	20 September 2009	Determination	31 December 2029
08_0142 MOD 1	Access Road and Extraction Depth	30 September 2013	Determination	31 December 2029
08_0142 MOD 2	Increased hourly truck movements	16 March 2016	Determination	31 December 2029

3.2 Status of Licences and Permits

3.2.1 Environmental Protection Licence

The operations at Mackas Sand at Lots 218 and 220 are regulated under EPL No. 13218. Originally issued in 2012, EPL No. 13218 was reviewed and updated during 2014, to conform with the EPA's risk based licensing system.

3.2.2 EPBC Referral 2011/6214

Mackas Sand was awarded Federal Approval under the Environmental Protection and Biodiversity Conservation Act (EPBC Act) 1999, to construct an alternative haul road from Lot 218 to Nelson Bay Road in November 2013. This approval prescribes specific conditions to the alternative access road, effective until 31 December 2029.

3.2.3 Hunter Water Regulation (2010) Permit

The *Hunter Water Regulations 2010* are a regulation under the *Hunter Water Act 1991* that applies to the Chichester, Grahamstown, Nelson Bay, North Stockton and Tomago Catchment Areas. Mackas Sand lies within the North Stockton Catchment. Under Clause 10 (1) of the Regulation, a person can only engage in an extractive industry with an approval given by the Director-General of the Department of Trade and Investment.

A Permit has been issued by the Director General of DPI – Water (formerly NSW Office of Water) under the Hunter Water Regulation (2010) that consents to the undertaking of sand extraction from Lots 218 and 220 in accordance with the Project Approval. In accordance with Condition 3, Clause 9 of the Hunter Water Regulation 2010 Permit, Mackas Sand has prepared an Operations Report addressing detailing compliance with the Hunter Water Regulation 2010 Permit, refer to **Appendix 1**.

3.2.4 Water Licences

Mackas Sands Operations do not require Water Licences as no water extraction is undertaken at the facility. As per the SWMP (Umwelt 2014d), all clean water used onsite is trucked to the premises by an approved provider.

4.0 Operations Summary

A summary of the operations undertaken at Mackas Sand Quarry during the report period are included in the following sections.

4.1 Mining Operations

During the report period, sand extraction was undertaken within both Lot 218 and Lot 220. An overview of the operations within each lot is below with Mackas Sand production during the report period for Lot 218 and Lot 220 detailed within **Table 4.1**.

Lot 218

Following approval of the alternate access route to Lot 218, construction of the haul route commenced on 8 December 2013 and approval to use the intersection was received by Roads and Maritime Services (RMS) on 16 December 2014.

Sand extraction operations in Lot 218 commenced during February 2015 following the construction of an alternate haul route, as approved by Modification 1 of the Project Approval. Sand extraction involves a front end loader excavating sand which is then sieved and loaded onto haul trucks within the extraction area.

A summary of sand production during the 2015 report period is provided in **Table 4.1**.

Lot 220

Sand extraction operations in Lot 220 commenced during November 2009 and continued throughout the 2015 report period. A mobile screen and stockpiler remained in operation to process sand excavated by front end loader before the sand is transported offsite by haul truck.

Table 4.1 Production Summary 2015 (Lot 218 and Lot 220)

Material	Approved Limit (Source – DA)	2014 Reporting Period (Actual tonnes)	2015 Reporting Period (Actual Tonnes)	2016 Reporting Period (Forecast Tonnes)
Total Saleable Product from Lot 218 and 220	2,000,000 tonnes of product in a calendar year (1,000,000 tonnes from Lot 218; 1,000,000 tonnes from Lot 220).	835,834	1,246,651	Approx 1,600,000

4.1.1 Hours of operations

Sand extraction and haulage activities at Mackas Sand may only occur within the hours specified by Schedule 3, Condition 9 of the Project Approval (MOD1), refer to **Table 4.2**. Mackas Sand continued to operate within the operating hours specified by Schedule 3, Condition 9 of the Project Approval (MOD 1) throughout the report period.

Table 4.2 Mackas Sand Approved Operating Hours (Project Approval Mod 1)

Activity	Day	Time
Quarrying Operations (other than Transportation)	Any day	Any time
Quarrying Operations on Lot 220 (other than transportation), when operating less than 250 metres from residence R27	Monday to Friday	7.00 am to 6.00 pm
	Weekends and Public Holidays	None
Transportation	Monday to Friday	6.00 am to 6.00 pm (EST)
		6.00 am to 7.00 pm (DST)
	Saturday	7.00 am to 4.00 pm
	Sundays and Public Holidays	None

4.1.2 Vehicle Movements

During the DP&E audit undertaken in May 2015, Mackas Sand was found to be non-compliant with Schedule 3, Condition 4B of the Project Approval (MOD 1) relating to maximum truck movements to and from site. Schedule 3, Condition 4B specified that Mackas Sand shall restrict truck movements (in plus out) on the alternate access road to:

...c) a maximum of 10 per hour during the shoulder period

...d) a maximum of 16 per hour between 7 am and 10 pm, unless otherwise approved by the Director-General.

Mackas Sand sought clarification from DP&E regarding the truck movements following the audit, refer to **Section 10**.

4.2 Construction Activities

No construction activities were undertaken in Lot 218 or Lot 220 during the report period.

4.3 2016 Report Period Extraction Operations

The 2016 report period will see continuation of sand extraction in both Lot 218 and Lot 220 in accordance with statutory approvals. It is anticipated that, during 2016, there will be no upgrades made to current plant and equipment utilised onsite.

Mackas Sand will continue with current rehabilitation procedures during the 2016 report period. In addition, Mackas Sand will continue discussions with OEH regarding a voluntary conservation area located within the biodiversity offset area.

5.0 2014 Annual Review Actions

DP&E did not provide any feedback in regards to the Mackas Sand 2014 Annual Review which was submitted to DP&E in accordance with Condition 4 of Schedule 5 of the Project Approval (MOD 1).

6.0 Environmental Performance

In accordance with the Project Approval (MOD 1), Mackas Sand has prepared a number of management plans in consultation with relevant stakeholders. The management plans have been prepared for a number of environmental management aspects. The management plans prepared for Mackas Sand are detailed below, with a copy of all of the management plans available on the Mackas Sand website:

- Noise Management Plan;
- Air Quality Management Plan;
- Soil and Water Management Plan;
- Unexploded Ordinance Management Plan;
- Landscape Management Plan;
- Aboriginal and Cultural Heritage Management Plan; and
- Non-Indigenous Heritage Management Plan.

The following sections provide a summary of environmental monitoring and management undertaken during the 2015 report period. In accordance with the Annual Review Guideline (NSW Government, 2015) this report contains a summary of environmental monitoring data where it is required to explain trends or environmental performance during the report period. It is noted that environmental monitoring data has also been published on the Mackas Sand website (<http://www.mackassand.com.au/>) in accordance with Condition 8 of Schedule 5 of the Project Approval.

A summary of the environmental performance of Mackas Sand is included in **Table 6.1** below with further contextual information included within the following **Sections 6.1 to 6.7**.

Table 6.1 Summary of Environmental Performance during 2015

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Noise (Refer to Section 6.1)	Schedule 3, Conditions 4 -10 of Project Approval and L3 of EPL 13218. Mackas Sand will ensure that the noise generated by the project does not exceed the prescribed criteria.	Compliant. At time of noise monitoring on 19 August, 2015, Mackas Sand was found to comply with Industrial noise assessment criteria and traffic noise assessment criteria.	Ongoing noise assessment at sensitive receivers showed generally similar levels to those previously measured.	The annual attended noise monitoring program will continue in accordance with the Project Approval and EPL 13218.
Air Quality (Refer to Section 6.2)	Schedule 3, Condition 11 of Project Approval. Total Suspended Particulate (TSP) matter < 90 ug/m3, averaged annually.	Installation of TEOM is dependent upon written approval from resident at R27. At this time, the resident at R27 does not permit air quality monitoring on their property.	No monitoring undertaken as monitoring equipment has not been installed.	Mackas Sand will continue to liaise with the DP&E and EPA regarding the installation of a TEOM air quality monitoring unit at this residence.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Air Quality (Refer to Section 6.2)	Schedule 3, Condition 11 of Project Approval. Particulate matter <10 ug/m³ (PM10) <30ug/m³, averaged annually. Schedule 3, Condition 11 of Project Approval. PM10 <50 ug/m³, averaged 24hrs.	It is considered that HVAS or other monitoring of PM₁₀ or TSP near Lot 218 is not considered necessary at this time as: - Extraction operations at Lot 218 are in excess of 1.5 kilometres from residential receivers - Trucks no longer travel past dwellings adjacent to the formerly approved haul road that accessed Lavis Lane due to the approval of the alternate haul route to Lot 218 - The most northern 200 metres of the alternate access road closest to residential receivers on Nelson Bay Road has been sealed.	Letter provided to EPA from Mackas Sand.	N/A

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Air Quality (Refer to Section 6.2)	Schedule 3, Condition 11 of Project Approval. Deposited dust <4 g/m ² /month or <2g/m ² /month increase, averaged annually.	Non-Compliant. 10 of 12 samples collected during report period. Samples obtained for the report period however the sample duration exceeded the required sample duration and as such 10 samples were collected rather than 12. Dust monitoring was undertaken for all locations for the entire report period.	Deposited dust sampling will be undertaken in accordance with AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.	Undertake air quality monitoring in accordance with regulatory requirements.
Air Quality (Refer to Section 6.2)	Schedule 3, Condition 12 of the Project Approval. Mackas Sand shall ensure any visible air pollution generated by operations is assessed regularly and that operations are relocated, modified, and/or stopped appropriately to minimise impacts upon privately-owned land.	Compliant. Mackas Sand did not receive any complaints relating to visible dust production during the report period.	Mackas sand utilises a water cart for dust control on unsealed surfaces as required.	Continued implementation of existing controls.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Meteorological (Refer to Section 6.3)	Schedule 3, Condition 14 of the Project Approval. During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i> guideline.	Compliant.	Meteorological data obtained as required during the report period.	Mackas Sand Operations utilise the Bureau of Meteorology Meteorological Station situated at the nearby Williamtown RAAF base for all weather data.
Soil and Water Management – Groundwater (Refer to Section 7.0) Soil and Water	Schedule 3, Condition 22 of the Project Approval. Mackas Sand shall ensure that it has sufficient water for all stages of the project, and adjust the scale of operations to match supply.	Compliant.	All water supplied to site by licensed external contractor as required.	Continued implementation of existing controls.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Management – Groundwater (Refer to Section 7.0)	Schedule 3, Condition 22 of the Project Approval and M2.2 of EPL 13218. Mackas Sand must monitor groundwater depth levels and specific groundwater quality parameters on a quarterly basis for comparison against previously developed baseline trigger criteria for investigating impacts.	Compliant. pH values recorded at site SP3 on the 26/02/2015 and 18/11/2015 were outside of the developed baseline trigger values.	In accordance with Section 5.4 of the SWMP, pH values recorded at SP3 were within 10% of minimum trigger values and therefore do not require the implementation of contingency management actions.	Groundwater depth levels and specific groundwater quality was monitored at all approved sites on a quarterly basis during the report period, with monitoring to continue to be undertaken during the 2016 report period.
Soil and Water Management – Groundwater (Refer to Section 7.0)	Schedule 2, Condition 7 of the Project Approval. Sand extraction shall not be undertaken within: 0.7m of maximum predicted groundwater level on Lot 220 1.0m of maximum predicted groundwater level on Lot 218, unless the core sample testing program demonstrates that extraction to within 0.7m of the maximum predicted groundwater level can be undertaken without disturbing acid sulphate soils.	Non-compliant. An audit conducted by DP&E during 2015 identified a lack of relevant survey data and extraction depth greater than permitted.	Mackas Sand undertook the following in response to the DPE audit: - Analysis of material revealed no contamination - Dimensions of excavation area re-surveyed and demarcated - Extraction area backfilled with clean product to return pit floor to approved maximum extraction depth.	Sand extraction to be undertaken in accordance with site procedures and additional management measures as detailed in Section 10 .

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Soil and Water Management – Groundwater (Refer to Section 7.0)	Section 1.9.1, Appendix 2 of the Project Approval. Mackas Sand will install table drains and flow dissipation structures along on-site access roads as required in accordance with the Erosion and Sediment Control Regional Policy (Port Stephens Council, 2002) and the Code of Practice for Managing Urban Stormwater – Soils and Construction (Landcom, 2004).	DP&E identified additional locations requiring sediment fencing adjacent to the haul road during the 2015 audit, refer to Section 10.1 .	No significant environmental impacts identified. Sediment control fencing was installed as per DP&E request during 2015 Audit.	Continued implementation of erosion and sediment controls.
Ecology (Refer to Section 6.4)	Schedule 3, Condition 28 of Project Approval. Mackas Sand must prepare and implement a Biodiversity Offsets Strategy for a Biodiversity Offset Area in consultation with the Office of Environment and Heritage (OEH) that includes performance criteria, management measures and a monitoring strategy. Ecological monitoring undertaken every 3 years (last monitoring undertaken during 2014).	An application was submitted to OEH during Q4 2015 to recognise proposed Biodiversity Offset Area.	Mackas Sand awaiting approval from OEH to secure proposed offset area.	The approval application process will continue throughout 2016 report period.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Heritage (Aboriginal and Non-Aboriginal) (refer to Section 6.5)	Schedule 3, Conditions 29 and 30 of the Project Approval. Mackas Sand shall manage both Aboriginal and Non-Aboriginal Heritage items in accordance with approved management plan and in consultation with OEH and relevant Aboriginal community.	Meetings of the Aboriginal Cultural Heritage Management Group (AHMG) occurred in accordance with the ACHMP(Umwelt, 2014f), Additional monthly inspections of operations at Lot 218 by the AHMG commenced during August 2015 and are expected to run for 12 months in accordance with the ACHMP (Umwelt, 2014f).	N/A	Continued AHMG meetings and record keeping as appropriate.
Traffic and Transport (refer to Section 10)	Schedule 3, Condition 4B of the Project Approval. Mackas Sand shall ensure vehicle movements on the Alternate access road are within prescribed limits, vehicles do not obstruct traffic, and vehicles are maintained to a satisfactory level that will prevent deposit of material onto public roads.	Non-compliant. Truck movements in excess of approval conditions for both shoulder period and daytime period from alternate access road were identified during the 2015 DP&E Audit (NSW DP&E, 2016).	Refer to additional controls implemented.	Mackas Sand has installed software within their weighbridge to limit the numbers of trucks that are able to be weighed each hour to the consent limits. Project Approval MOD 2 for increased truck movements was approved by the Planning Assessment Commission on 16 March 2016.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Rehabilitation (refer to Section 8)	Schedule 2, Condition 7A of the Project Approval (MOD 1). The final rehabilitated ground surface level on Lot 218 and Lot 220 is at least 1.0m above the maximum predicted groundwater level.	Shaping for final rehabilitation was undertaken in relevant locations at Lot 220 during the report period.	N/A	Rehabilitation to be undertaken where land is available for rehabilitation.
Rehabilitation (refer to Section 8)	Schedule 3, Condition 24 of the Project Approval (MOD 1). Mackas Sand shall progressively rehabilitate the site in a manner that is generally consistent with the final landform in the EA (Umwelt, 2012).	Compliant.	Progressive rehabilitation measures undertaken during the report period. Refer to Section 8.0 .	Rehabilitation proposed for the 2016 report period is detailed in Section 8 .

6.1 Operational Noise

The Project Approval (MOD 1) and EPL 13218 define industrial noise impact assessment criteria for sensitive receivers during the following stages of operations:

- Noise generated by the Project – Industrial noise (**Table 6.2**)
- Noise generated along the Alternate Access Road (where agreements have not been signed with relevant owner/s of residence/s) (**Table 6.3**)
- Traffic noise generated by offsite haulage (**Table 6.4**).

In accordance with the approved Mackas Sand NMP (Umwelt 2014b) and EPL 13218, noise compliance monitoring was undertaken during 19 August 2015 at locations representative of locally sensitive receivers (**Figure 6.1** and **Table 6.3**). Criteria for the monitoring locations are listed in **Table 6.2**. Results from the compliance monitoring are discussed in **Section 6.1.2**.

6.1.1 Noise Criteria

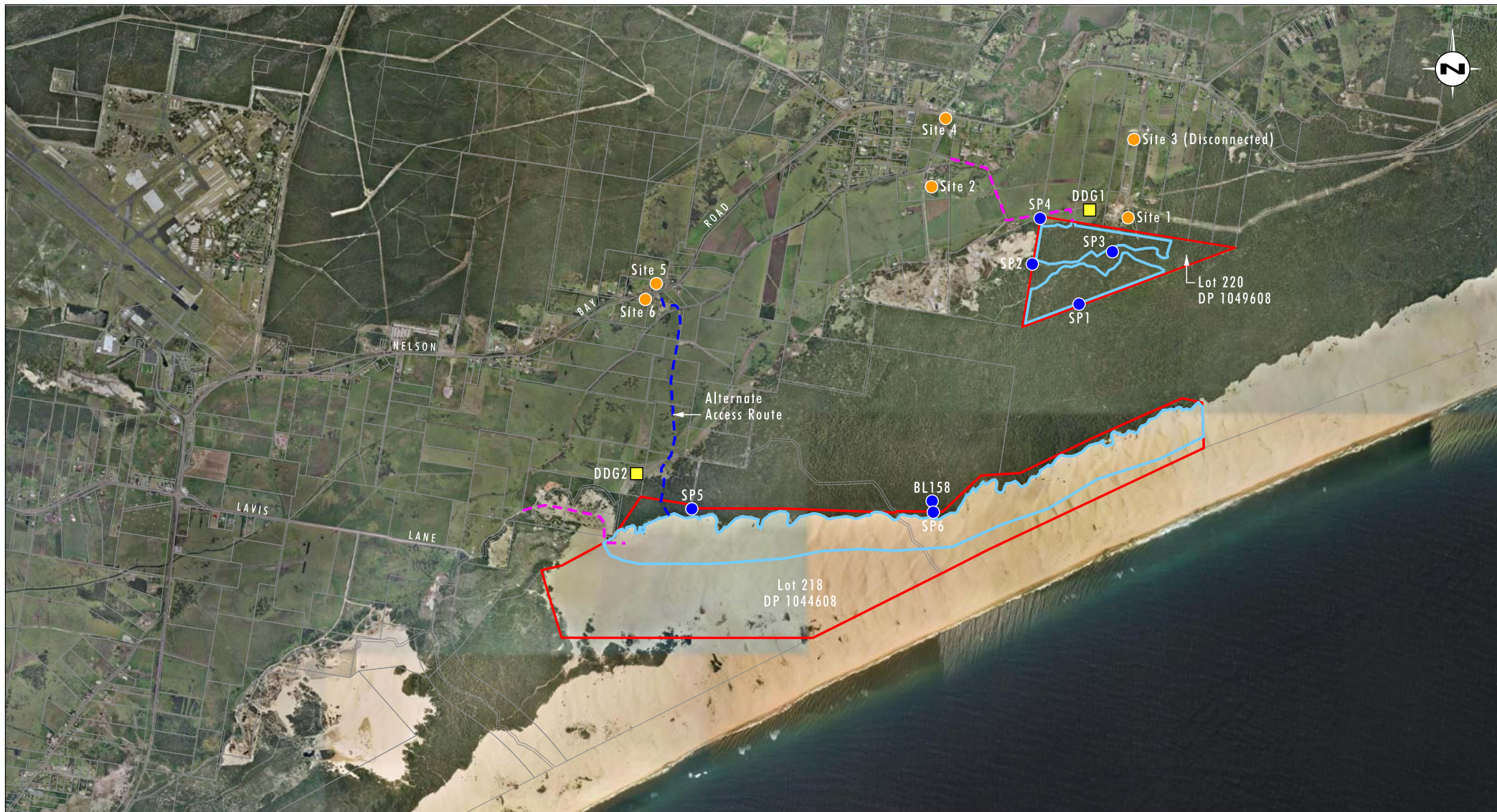
Table 6.2 Industrial Noise Impact Assessment Criteria, dB(A)

Location	Day ¹ LAeq, 15 min	Evening ¹ LAeq, 15 min	Night ¹ LAeq, 15 min	Night ¹ LA1, 1 min
R18 – 2692 Nelson Bay Road, Salt Ash	39	39	40	45
R1 – 39 Lavis Lane, Williamtown	39	39	39	45
R19 – 2758 Nelson Bay Road Salt Ash	36	36	37	45
R26 – 6 Oakvale Drive Salt Ash	36	36	35	45
R27 – 10 Janet Parade, Salt Ash	36	35	35	45
R17 – 2645 Nelson Bay Road, Salt Ash	35	35	36	45
All other residences	35	35	35	45

Table 6.3 Alternate Access Road Noise Impact Assessment Criteria dB(A)

Location	Shoulder ¹ LAeq, 15 min	Day ¹ LAeq, 15 min	Evening ¹ LAeq, 15 min
2344 Nelson Bay Road, Williamtown	38	40	40
2353 Nelson Bay Road, Williamtown	39	41	41
2367 Nelson Bay Road, Williamtown	36	38	38
2368 Nelson Bay Road, Williamtown	38	40	40
All other residences	35	35	35

Note 1: Day time is 7.00 am to 6.00 pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays, evening is 6.00 pm to 10.00 pm (NSW Industrial Noise Policy (INP) EPA, 2000). Shoulder is the period from 5 am to 7 am on Monday to Friday, but only for the use of the Alternate access road (see condition 4A of schedule 3 of Project Approval 08_0142 MOD1).



Source: Department of Lands (2003)

0 0.5 1 2 km
1:45 000

Legend

- Lot Boundaries (218 & 220)
- Approval Area
- Approved Site Access
- Alternate Access Route
- Noise Monitoring Location
- Dust Monitoring Location
- Groundwater Monitoring Bore Location

File Name (A4): R58_V1/1646_427.dgn

FIGURE 6.1

Mackas Sand Monitoring Locations

Table 6.4 Traffic Noise Impact Assessment Criteria, dB(A)

Road	Day ¹ LAeq, 1 hour	Night ¹ LAeq, 1 hour
Lavis Lane, Oakvale Drive, Nelson Bay Road	60	55

Note 1: Day time is 7.00 am to 6.00 pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays, evening is 6.00 pm to 10.00 pm and night time is 10.00 pm to 7.00 am Monday to Saturday and 10.00 pm to 8.00 am Sundays and Public Holidays.

Table 6.5 Noise Monitoring Locations

Monitoring ID	Location
Site 1	Private residence (R27 – Hufnagl residence, 10 Janet Parade, Salt Ash) MGA N = 6370639, MGA E = 399542
Site 2	Private residence (R26 – 6 Oakvale Drive, Salt Ash) MGA N = 6370830, MGA E = 397906
Site 4	Private residence, Lot 2, DP 818198, 2642 Nelson Bay Road, Salt Ash (situated on the corner of Oakvale Drive and Nelson Bay Road) MGA N = 6371455, MGA E = 398102
Site 5	Private residence (2353 Nelson Bay Road, Williamtown) MGA N = 395687, MGA E = 6370072)
Site 6	Private residence (2344 Nelson Bay Road, Williamtown) MGA N = 395656, MGA E = 6370035)

Note: Monitoring Site 3 was discontinued following discussions with DP&E during 2014.

Table 6.6 Industrial Noise Criteria for Mackas Sand Project Area dB(A)

Monitoring ID	Day LAeq (15 min)	Evening LAeq (15 min)	Night LAeq (15 min)	Night LA ₁ (1 min)
Site 1	36	35	35	45
Site 2	36	35	35	45
Site 4	35	35	35	45
Site 5	35	35	35	45
Site 6	35	35	35	45

6.1.2 Monitoring Data

During the attended noise monitoring program, the ambient noise levels surrounding the Mackas Sand site were recorded with particular attention paid to the contribution of the Mackas Sand site operations.

The results of the attended noise monitoring program (Umwelt, 2015a), undertaken on 19 August 2015, are summarised in **Table 6.7**, **Table 6.8** and **Table 6.9**. Under the meteorological conditions at the time of monitoring, the results indicate that Mackas Sand Operations were compliant with both the LA1 - 1 minute industrial noise assessment criteria and the LAeq - 15minute industrial noise assessment criteria for day, evening and night time periods.

Table 6.7 Night Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	LAeq, 15minute		LA1,1minute	
	Noise criteria	Mackas Sand noise level contribution	Noise criteria	Mackas Sand noise level contribution
Site 1	35	<35	45	<35
Site 2	35	<35	45	<35
Site 6	35	<35	45	<35

Table 6.8 Day Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	LAeq, 15minute	
	Noise criteria	Mackas Sand noise level contribution
Site 1	36	Not audible
Site 2	36	Not audible
Site 4	35	Not audible
Site 5	35	Not audible
Site 6	35	Not audible

Table 6.9 Industrial Noise Levels – Alternate Access Road to Lot 218

Location	Period	LAeq, 15minute	
		Noise criteria	Mackas Sand noise level contribution
Site 5	Shoulder (05:50 – 06:05)	39	37
Site 6	Shoulder (05:50 – 06:05)	38	36 ¹
Site 5	Day Time (09:32 – 09:47)	41	Not audible
Site 6	Day Time (09:04 – 09:19)	40	Not audible

Note 1: Estimated based on noise level measured at Site 5

The results of the road traffic noise monitoring program (Umwelt, 2015a) are summarised in **Table 6.10**. Attended monitoring was conducted from 6.00 am to 7.00 am and 9.00 am to 10.00 am, 19 August 2015 at the private residence on the corner of Oakvale Drive and Nelson Bay Road, as well as at 2353 Nelson Bay Road, using a NGARA noise logger. Results indicate that Mackas Sand was complying with the Project Approval (MOD 1) and EPL 13218 LAeq - 1 hour road traffic noise assessment criteria when prevailing meteorological conditions were considered.

Table 6.10 Mackas Sand 1 hour Night and Day Time Road Traffic Noise Level Contribution versus Noise Criteria, dB(A)

Road	Period	Noise criteria LAeq, 1hour	Noise level contribution LAeq,1hour	
			Cnr Oakvale Dr and Nelson Bay Rd	2353 Nelson Bay Rd
Lavis Lane, Oakvale Drive, Nelson Bay Road	Night	55	36	34
	Day	60	38	30

6.2 Air Quality

In accordance with Condition 13 of Schedule 3 of Project Approval 08_0142 (MOD 1), Mackas Sand Operations have prepared and implemented an AQMP (Umwelt, 2014c) for its operations.

Condition 11 of Schedule 3 of Project Approval 08_0142 (MOD 1) sets out air quality impact criteria for Mackas Sand. These criteria are used to assess the potential impacts of operations at nearby residential receivers. Criteria which apply to operations are specified in **Tables 6.11, 6.12 and 6.13** below.

Table 6.11 Long term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 6.12 Short term Impact Assessment Criterion for Particulate Matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³

Table 6.13 Long term Impact Assessment Criteria for Deposited Dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

TSP monitoring (Table 6.10) is not currently undertaken by Mackas Sand, as the condition is dependent upon receiving written approval from the nearest sensitive receiver (R27) for installation of a TEOM air quality monitoring station on their property. At time of writing, resident R27 has not provided such permission. In addition, Mackas Sand does not currently monitor PM10 concentrations near Lot 218 (Table 6.12), refer to Section 6.2.1.

Mackas Sand will continue to liaise with the DP&E and EPA regarding the installation of the TEOM and PM10 units as the AQMP is reviewed.

Recorded dust deposition levels at DDG1 and DDG2 are provided in **Graphs 6.1** and **6.2**. Note that results from within the report period are highlighted in blue. The status of air quality monitoring for PM10 and TSP is discussed in **Section 6.2.1** below.

6.2.1 Management Measures

A Pollution Reduction Program (Condition U1), requiring the installation of HVAS or Tapered Element Oscillating Microbalance (TEOM) units close to Lot 218 and Lot 220 subject to certain constraints remains within EPL 13218. Consultation with EPA determined that the need for a high volume sampler near Lot 218 'will be considered upon the determination of the modification application (08_0142 MOD 1)' during 2013. This determination has remained following the EPA review of EPL 13218 in November 2014. Installation of a HVAS or TEOM unit near Lot 220 is dependent upon the acceptance of the resident at R27 to have a unit on their property. Written refusal of permission was received from the resident at R27, with commitment to contact Mackas Sand in writing should a monitoring unit be permitted.

Extraction operations at Lot 218 are distant from residential receivers (in excess of 1.5 kilometres) and unlikely to cause unacceptable levels of dust with the main source of dust being from product transport on unsealed haul roads. With the approval of the alternate haul route to Lot 218, trucks no longer travel past dwellings adjacent to the formerly approved haul road that accessed Lavis Lane. In addition, the most northern 200 metres of the alternate access road closest to residential receivers on Nelson Bay Road has been sealed. Taking these factors into account, it is considered that HVAS or other monitoring of PM₁₀ or TSP near Lot 218 is not considered necessary at this time.

Discussions with the EPA regarding the units were continued in March 2015. As the resident at R27 remains opposed to the installation of equipment on their property, no further action has taken place during the report period.

6.2.2 Dust Monitoring Data

Dust Deposition at DDG1 (Lot 220) recorded Total Dust Deposition levels varying between 0.4 g/m²/month and 4.5 g/m²/month during the report period. There were no significant changes to operations on Lot 220 during 2015. Concentrations during February 2015 were slightly elevated (4.5 g/m²/month) as a result of steady, prevailing winds of 28 – 30 km/h from the East –South –East throughout February 2015. Mackas Sand reported that farm activities on neighbouring and other nearby properties during windy periods may be the cause of increased measurement (e.g. during February 2015). The remainder of samples received indicate that operations on Lot 220 are complying with an increase of less than 2 g/m²/month annual average from the previous report period and total dust deposition of less than 4 g/m²/month, not including outlying data, refer to **Appendix 2** and **Table 6.14**.

Table 6.14 Total Dust Deposition Levels at DDG 1 – Lot 220 (g/m²/month)

Sample date:	Ash Content	12 Month Average	Total Insoluble Matter	12 Month Average
	g/m ² .month	g/m ² .month	g/m ² .month	g/m ² .month
4/01/2011	0.7		6.2	
13/04/2011	0.7		1.6	
20/05/2011	0.6		0.7	
20/06/2011	0.5		0.5	
25/07/2011	0.4		0.6	
23/08/2011	0.7		0.7	
23/09/2011	0.9		1.2	
24/10/2011	0.2		0.2	
22/11/2011	1.1		2	
24/12/2011	2.4		3.2	
25/01/2012	1.1		1.9	
23/02/2012	0.7	0.83	1	1.65
23/03/2012	1.8	0.93	2.8	1.37

Sample date:	Ash Content	12 Month Average	Total Insoluble Matter	12 Month Average
	g/m ² .month	g/m ² .month	g/m ² .month	g/m ² .month
23/04/2012	1	0.95	1.7	1.38
23/05/2012	0.2	0.92	0.3	1.34
21/06/2012	0.4	0.91	0.6	1.35
20/07/2012	14.7	2.1	19.4	2.92
29/08/2012	1.3	2.15	1.7	3
25/09/2012	0.3	2.1	0.4	2.93
24/10/2012	0.3	2.11	0.5	2.96
26/11/2012	0.1	2.03	0.3	2.82
26/11/2012	0.1	1.83	0.3	2.58
27/12/2012	0.5	1.78	1.4	2.53
28/01/2013	0.6	1.78	1.9	2.61
28/02/2013	1	1.71	2.8	2.61
22/03/2013	0.8	1.69	0.8	2.53
29/04/2013	1.1	1.77	1.1	2.6
26/05/2013	3.4	2.02	3.7	2.86
27/07/2013	0.08	0.75	1.5	1.34
3/09/2013	0.1	0.73	0.1	1.31
6/10/2013	0.8	0.78	1.4	1.39
12/11/2013	1	0.86	2.2	1.56
27/12/2013	2.1	1.04	1.4	1.66
6/01/2014	0.4	0.99	3.5	1.82
1/02/2014	0.8	1.02	1.9	1.86
4/03/2014	1.2	1.07	2	1.87
14/04/2014	0.8	1.05	1.3	1.74
31/05/2014	0.3	1.01	0.8	1.74
26/07/2014	0.8	0.98	1.4	1.77
30/08/2014	0.5	0.74	1.3	1.57
1/10/2014	0.4	0.77	1.1	1.53
20/10/2014	0.9	0.83	1.1	1.62

Sample date:	Ash Content	12 Month Average	Total Insoluble Matter	12 Month Average
	g/m ² .month	g/m ² .month	g/m ² .month	g/m ² .month
12/11/2014	0.4	0.8	0.7	1.56
15/12/2014	0.7	0.78	1.7	1.52
30/01/2015	0.8	0.67	2.7	1.63
27/02/2015	3.5	0.93	4.5	1.71
29/03/2015	1.5	0.98	2.7	1.78
30/04/2015	2.4	1.09	3.5	1.91
30/05/2015	0.4	1.03	1	1.83
29/06/2015	0.7	1.02	1.5	1.85
10/08/2015	0.6	1.05	0.9	1.85
22/09/2015	0.8	1.09	1.2	1.88
29/10/2015	0.3	1.08	0.4	1.83
18/12/2015	0.7	1.07	1.4	1.85

Results from dust deposition samples at DDG2 (Lot 218) vary significantly, with readings of Total Insoluble Matter from 0.9 g/m²/month to 73.2g/m²/month during the report period. While there were no significant operational changes during the report period, previous observations of sand movement on the mobile dune system have demonstrated that during high wind conditions significant volumes of sand can be transported over large distances. This confirms that this area can, on occasions, be a high sand deposition environment where deposition levels naturally exceed the criteria set out in Condition 11 of Schedule 3 of Project Approval 08_0142 (MOD 1) of 4 g/m²/month. Due to regular events of winds greater than 50 km/h during the report period, monthly concentrations were above 4 g/m²/month during March, April, June, September, October and December at Lot 218, DDG2. When outlying data resulting from the significant April storm event is excluded, results indicate that operations on Lot 218 are complying with an increase of less than 2 g/m²/month annual average and total dust deposition of less than 4 g/m²/month refer to **Table 6.15**.

Table 6.15 Total Dust Deposition Levels at DDG 2 – Lot 218 (g/m²/month)

Sample date:	Ash Content	12 Month Average	Total Insoluble Matter	12 Month Average
	g/m ² .month	g/m ² .month	g/m ² .month	g/m ² .month
4/01/2011	0.4		0.9	
13/04/2011	0.8		2.9	
20/05/2011	7.4		7.5	
20/06/2011	23.1		23.1	

Sample date:	Ash Content	12 Month Average	Total Insoluble Matter	12 Month Average
	g/m ² .month	g/m ² .month	g/m ² .month	g/m ² .month
25/07/2011	0.8		0.8	
23/08/2011	3.9		4	
23/09/2011	1.9		2.1	
24/10/2011	1.2		1.6	
22/11/2011	1.9		2	
24/12/2011	8.6		10	
25/01/2012	3		4.6	
23/02/2012	1	4.5	1.3	5.07
23/03/2012	1.1	4.56	1.4	5.11
23/04/2012	2	4.66	2.5	5.08
23/05/2012	0.3	4.07	0.6	4.5
21/06/2012	0.9	2.22	1.5	2.7
20/07/2012	2.2	2.33	3.8	2.95
29/08/2012	1	2.09	1.7	2.76
25/09/2012	0.1	1.94	0.3	2.61
24/10/2012	0.7	1.9	1.2	2.58
26/11/2012	1.2	1.84	1.8	2.56
26/11/2012	1.2	1.23	1.8	1.88
27/12/2012	1.3	1.08	2.1	1.67
28/01/2013	3.7	1.31	4.6	1.94
28/02/2013	1.8	1.37	2.8	2.06
22/03/2013	8.7	1.93	8.8	2.58
29/04/2013	3.4	2.18	3.7	2.84
26/05/2013	1.1	2.2	1.1	2.81
27/07/2013	1.9	2.28	2.1	2.75
3/09/2013	0.1	2.28	0.2	2.75
6/10/2013	5.8	2.75	6.9	3.26
12/11/2013	1.7	2.79	2	3.28
27/12/2013	1.3	2.8	0.5	3.16

Sample date:	Ash Content	12 Month Average	Total Insoluble Matter	12 Month Average
	g/m ² .month	g/m ² .month	g/m ² .month	g/m ² .month
6/01/2014	0.7	2.63	1.1	2.99
1/02/2014	0.8	2.58	1.2	2.92
4/03/2014	2.6	2.49	5.3	2.98
14/04/2014	6.7	2.9	7.1	3.33
31/05/2014	1.4	2.29	2.5	2.81
26/07/2014	0.3	2.03	0.4	2.53
30/08/2014	1.9	2.1	2.1	2.62
1/10/2014	0.7	2	0.7	2.5
20/10/2014	0.7	2.05	1.1	2.58
12/11/2014	0.4	1.6	0.6	2.05
15/12/2014	1.4	1.58	2.6	2.1
30/01/2015	0.4	1.5	0	2.06
27/02/2015	0.9	1.52	2.1	2.14
29/03/2015	8.3	2.14	12.3	3.07
30/04/2015	72.6	7.56	73.2	8.46
30/05/2015	2.1	7.52	3.1	8.29
29/06/2015	10.4	7.81	12.4	8.7
10/08/2015	0.5	7.74	0.9	8.58
22/09/2015	4.5	8.58	5.4	9.53
29/10/2015	5.8	9	6.4	10.01
18/12/2015	2.5	9.15	4.7	10.31

Dust deposition monitoring will continue on a monthly basis at DDG1 and DDG2 to detect any impacts due to sand extraction operations at Lot 220 and Lot 218 in the next report period.

6.2.3 Proposed Improvements 2016

Further investigations and consultation will continue with the EPA during the 2016 report period to identify dust monitoring locations that may be less impacted by natural mobile dune emissions and more representative of emissions associated with Mackas Sand operations.

6.3 Meteorological Monitoring

Meteorological monitoring data is collected from the Bureau of Meteorology station located at the nearby Williamstown RAAF Base (Station 061078), **Figure 6.1**. The results of the meteorological monitoring for 2015 are presented in the following sections.

6.3.1 Rainfall monitoring

Rainfall data has been sourced from the records of the Williamstown RAAF Base meteorological station and is summarised in **Table 6.16**.

Table 6.16 Monthly Rainfall and Number of Rain Days during 2015

Month	Rainfall (mm)	Rain Days (>0.2 mm)
January	118.6	17
February	60.6	6
March	58.4	8
April	364	11
May	152.4	5
June	102.0	10
July	44.0	10
August	30.2	3
September	147.0	11
October	58.6	7
November	61.6	6
December	123.0	10
Total	1,320.4	104

6.4 Ecology

Long term ecological monitoring is required to be undertaken every three years and occurred during the 2014 report period (Umwelt, 2014). Ecological monitoring will therefore be undertaken during 2017.

6.5 Aboriginal Heritage

6.5.1 Aboriginal Cultural Heritage Management Measures

Mackas Sand is operated in accordance with the approved ACHMP (Umwelt, 2014f) during the report period.

6.5.2 Aboriginal Site Impacts

Some shell material of likely cultural significance was identified by the AHMG during the report period. Subsurface material had been previously exposed during the construction process. Materials were only exposed following exposure to rain and wind subsequent to clearing activities. Mackas Sand communicated to the AHMG to the presence of the shells and the management action of covering with clayey soil to ensure they remained subsurface into the future was decided on by the AHMG members, as materials were considered to be of an insufficient density for subsurface testing, and the specific circumstances not triggering collection activities within Section 5.4 of the ACHMP (Umwelt, 2014f).

6.6 Non-Aboriginal Heritage

No actions or impacts in relation to non-Aboriginal heritage occurred during the report period.

6.7 Erosion and Sediment Control

A short section of haul road entering Lot 218 extraction area was identified as requiring installation of sediment fencing following the DP&E sand quarries audit undertaken during 2015, refer to **Section 10.1**. The sediment fencing was installed as requested but was washed out during a significant rain event that occurred in September 2015. Mackas Sand operation has since re-installed the fencing to manage sediment migration from the access road into the adjacent vegetated depression.

6.8 Waste Management

The current waste management program utilises licensed waste contractors to incorporate recycling, in addition to the disposal of wastes in accordance with the waste provisions of the *Protection of the Environment Operations (Waste) Regulation 2014 (NSW EPA, 2014)*. There were no changes to the waste management system at Mackas Sand during the report period.

7.0 Water Management

7.1 Surface Water

There are no surface flow or drainage lines on either Lot 218 or Lot 220 due to the high permeability of the underlying sand. As a result, there is no surface water that can be monitored to establish baseline conditions other than in low-lying areas that may intermittently be inundated when the groundwater level is high. As this water is intermittent and directly connected to the groundwater, it is considered that these areas would have water quality that is consistent with that recorded in the groundwater of the site as discussed in **Section 7.2** below.

7.2 Groundwater

7.2.1 Groundwater Monitoring

Groundwater monitoring was undertaken on a quarterly basis during the report period in accordance with Condition M2 of the EPL 13218. Bore locations are shown in **Figure 7.1**. Groundwater level measurements are shown in **Appendix 3**. Note that the report period is highlighted in blue within all tables and charts.

In accordance with the Project Approval 08_0142 (MOD 1), Schedule 5 Condition 4 (b), the Annual Review must include a comprehensive review of the monitoring results and predictions within the environmental assessment (EA). A comparison between predicted and recorded groundwater levels from the SWMP is provided in **Table 7.1**, and a summary of trigger values developed in analysis of previous data and the Australian Drinking Water Guidelines (NHMRC, NRMCC 2011) is presented in **Table 7.2**.

During 2015, all groundwater monitoring undertaken at the site was conducted in accordance with the requirements of the site Groundwater Monitoring Program. A total of 5 monitoring events were undertaken at an approximate quarterly basis during 2015.

Noting the discussion within **Section 7.1** regarding the SWMP (Umwelt, 2014d) and **Table 7.2**, it is considered that recorded groundwater levels are consistent with the requirements within the SWMP (Umwelt, 2014d) and previous monitoring results.

Table 7.1 Recorded and predicted groundwater levels (mAHD) for duration of operations.

Monitoring Point	Recorded Maximum	Approximate Predicted Maximum	Difference
SP1	2.51*	3.6	-1.09
SP2	3.43*	2.8	0.63
SP3	2.7	2.6	0.1
SP4	1.03	1.25	-0.22
SP5	3.37*	3.6	-0.24
SP6	2.77	3.6	-0.83
BL158	3.13	3.7	-0.58

*Recorded maximum groundwater level occurred during the report period. SP1 and SP2 levels were recorded during 13/5/2015 sampling event following extreme rainfall in the days prior to sample collection. SP5 groundwater level was recorded during 31/8/2015 sampling event.

The maximum recorded value for SP2 was outside predictions and collected in May 2015. This value resulted from an extreme rainfall event in the days prior to sample collection. The maximum recorded value for SP3 was outside predictions and observed in May 2012. Values above predictions have not been observed at SP3 since this time.

Noting the discussion within **Section 7.1** regarding the SWMP and **Table 7.2**, it is considered that recorded groundwater levels are consistent with relevant predictions within the EA (Umwelt, 2012) and other documentation (e.g. Umwelt (2011) *Determination of Maximum Predicted Groundwater Level and Maximum Extraction Level at Lot 218 and Lot 220, Salt Ash*).

Table 7.2 Groundwater Investigation Trigger Values

Parameter	Units	Minimum	Maximum
pH	pH Unit	4.5**	8.5*
Conductivity	uS/cm	NA	600**
Turbidity	NTU	NA	50**
Arsenic	mg/L	NA	0.01*
Manganese	mg/L	NA	0.1*
Iron	mg/L	NA	5.70**

*These values are based on NHMRC, NRMCC 2011.

**These values are based on long term groundwater monitoring from a previous operation in the local area.

Noting the discussion within **Section 7.1** regarding the SWMP and **Table 7.2**, it is considered that with the exception of two pH values, recorded groundwater quality results are generally consistent with the requirements within the SWMP (Umwelt, 2014d). Collected at site SP3 on the 26/02/2015 and 18/11/2015, the pH of the samples were 4.24 and 4.3 respectively, and are lower than the minimum trigger values defined within the SWMP (Umwelt, 2014d). In accordance with Section 5.4 of the SWMP (Umwelt, 2014d), pH values were within 10% of minimum trigger values and therefore do not require further contingency management actions. In addition, as the lowered pH values did not correspond with elevated arsenic levels, it is considered that there were no risks relating to acid sulphate soils (ASS) during the report period.

It is considered that recorded groundwater quality results are generally consistent with previous monitoring results, refer to **Appendix 3**.

8.0 Rehabilitation

8.1 Rehabilitation of Disturbed Land

In accordance with Schedule 24, Condition 3 of the Project Approval (MOD 1), progressive rehabilitation of disturbed areas is being undertaken in a manner that is generally consistent with the final landform in the EA (Umwelt, 2012), in alignment with statutory conditions and requirements within plans.

Although there were limited opportunities for further rehabilitation during the report period, maintenance works were undertaken across previously rehabilitated areas. Maintenance includes spreading of brushmatting and native seeds, and planting of additional native tree tube stock to supplement previous plantings. Nine salvaged tree hollows were also attached to existing trees along the length of the haul road in Lot 218 during the report period (Umwelt, 2015b).

Figure 8.1 identifies the approximate areas of rehabilitation, extraction and planned extraction within Lot 220 during the report period. **Table 8.1** shows the status of rehabilitation at Mackas Sand.

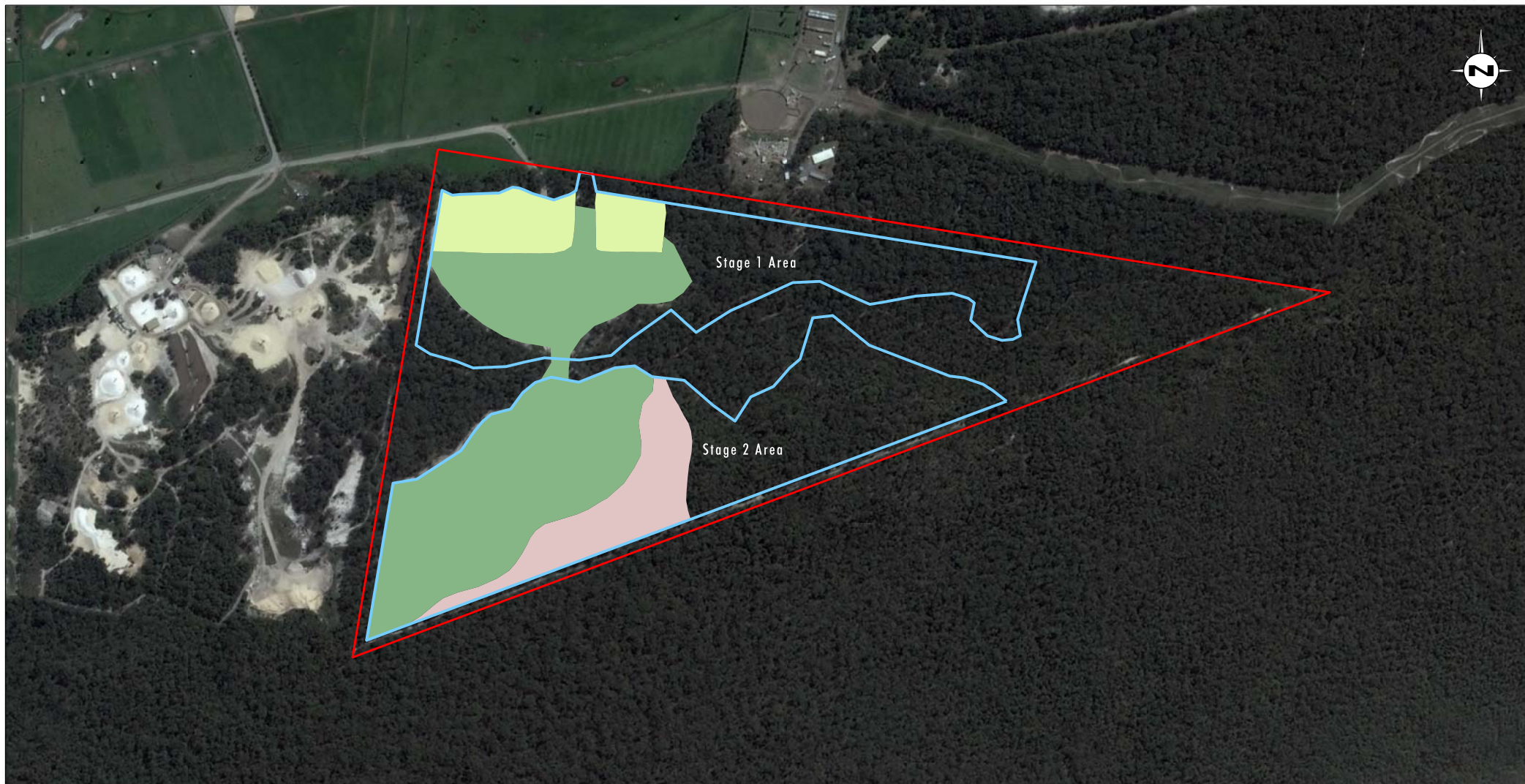
8.2 Annual Rehabilitation Inspection

The annual rehabilitation inspection of extracted areas within Lot 218 and Lot 220 was undertaken on 14 August 2015. Key observations included:

- Approximately half of the rehabilitation established to date in Lot 220 contains a mix of native shrubs and ground cover species indicative of the surrounding vegetation community type
- Additional native tubestock has been planted in low density since the previous inspection
- The remaining half of the Lot 220 rehabilitation area is dominated by weed species such as red natal grass (*Melinis repens*) and kikuyu grass (*Pennisetum clandestinum*)
- Nine salvaged tree hollows have been attached to existing trees along the length of the haul road in Lot 218.

Table 8.1 Summary of Rehabilitation Status at Mackas Sand (Lot 220)

	2014 Reporting Period (ha)	2015 Reporting Period (ha)
Active Extraction Area	17.2	18.4
Area cleared for Extraction	2.6	4.6
Rehabilitation commenced	3.9	3.9



Source: Google Earth (November 2014)

0 100 250 500m
1:10 000

Legend

- ▬ Lot Boundaries (220)
- ▬ Approved Operational Areas
- Rehabilitation Commenced
- Active Extraction Area
- Underscrubbed/Cleared for Planned Extraction

File Name (A4): R58_V1/1646_426.dgn
20160329 10.51

FIGURE 8.1

Approximate Areas of Impact
Lot 220 - 2015

8.3 Rehabilitation Trials and Research

No rehabilitation trials were undertaken during the report period.

8.4 Actions for the 2016 Report Period

During the 2016 report period, Mackas Sand will maintain the current rehabilitated area in Lot 220 and seek to continue installation of nest boxes and salvaged tree hollows as per recommendations provided within the 2015 rehabilitation inspection (Umwelt, 2015b).

9.0 Community

9.1 Community Complaints

A single noise complaint was received by Mackas Sand operations during the report period relating to engine noise produced by trucks turning onto the quarry entry road in the first two days of activity in Lot 218. In response to the complaint, the offending driver was disciplined, all drivers and truck owners were formally notified of the expectations when entering site and signage was erected to notify of the issue. Noise monitoring was undertaken to determine the level of noise in relation to the limits within PA08_0142. Results of the noise monitoring indicated that Mackas Sand was operating within consent conditions. Mackas Sand had ongoing contact with the complainant throughout the report period, with no further concerns raised since the resolution of the initial noise complaint.

No complaints had been previously received regarding Mackas Sand Operations.

9.2 Community Liaison

The Mackas Sand Community Consultative Committee (CCC) met twice during the report period, as agreed by the CCC. CCC meetings were held on 15 April 2015 and 9 December 2015. The meeting minutes are available on the Mackas Sand website (<http://www.mackassand.com.au/>). Members of the Mackas Sand CCC are included in **Table 9.1** below.

Table 9.1 Mackas Sand CCC Members for the 2015 Report Period

Name	Organisation
Ms Margaret Macdonald-Hill	Chairperson
Mr Robert Mackenzie	Mackas Sand
Ms Julie Towers	Community Representative
Mr Cliff Johns	Port Stephens Council representative
Mr Stephen Hufnagel	Community Representative
Mr Kent Sampson	Community Representative
Mr Andrew Smith	Worimi Aboriginal Land Council
Mr Brendan Rice	Umwelt (Australia) Pty. Ltd.

10.0 Independent Audits

An independent audit of the Mackas Sand Operation was undertaken during 2014 with this audit discussed in **Section 10.1**. During 2015, DP&E undertook an audit of Mackas Sand as part of a state wide audit of NSW Sand Mining operations with the results of this audit discussed in **Section 10.2**.

10.1 2014 Independent Audit

In accordance with Schedule 5, Condition 4 of the Project Approval, an Independent Environmental Audit of Mackas Sand, Lot 218 and Lot 220, was undertaken by AQUAS consulting on 17 November 2014. Outcomes are discussed here as the report had not been finalised prior to submission of the previous Annual Environmental Review. The audit is available on the Mackas Sand website (<http://www.mackassand.com.au/>).

On the basis of the audit findings, Mackas Sand was considered compliant with the requirements of the approval conditions and environmental management plans for activities carried out to date. No non-compliances were identified, with a single opportunity for improvement identified (refer to **Table 10.1**).

Table 10.1 Summary of Issues Identified During 2014 Independent Environmental Audit

Condition	Issue Raised	Outcome/Action
Project Approval (MOD 1) – Statement of Commitments 1.2.1 Mackas Sand will develop and implement a Vegetation Clearance Management Plan prior to any vegetation clearing occurring for the proposal.	Inspections undertaken by ecologists prior to removal of hollow bearing trees are not formally recorded. Ensure records are maintained to ensure compliance with conditions of LMP (Umwelt, 2014g).	Mackas Sand is committed to further increases to record keeping practices, particularly relating to clearing and rehabilitation.

10.2 DP&E Sand Quarries Audit 2015

A state-wide audit of sand quarries was undertaken by DP&E between May 2015 and August 2015. As part of this audit program, an audit of Mackas Sand was undertaken by DP&E during May 2015, with the outcomes of the audit provided in **Table 10.2** below.

Table 10.2 Summary of DP&E Audit of Mackas Sand during May 2015.

Non-Compliance	Outcome/Action
Schedule 3, Condition 4B (c) and (d) Hourly truck movements in and out of Lot 218 exceeded criteria for both prescribed time periods, Monday – Friday, and Saturday.	• Mackas Sand clarified Project Approval (MOD 1) Condition requirements with DP&E • Mackas Sand has installed software within their weighbridge to limit the numbers of trucks that are able to be weighed each hour to the consent limits • Project Approval MOD 2 application was approved to increase permitted vehicle movements on 16 March 2016.
Schedule 2, Condition 7 and Schedule 3, Condition 1 (c) Maximum permitted extraction depth limit exceedance due to absence of current survey flagging and records to define operational dimensions.	• Mackas Sand completed surveys of the site during August 2015 • GPS units have since been installed within selected site plant to provide operators with greater extraction height precision.
Schedule 3, Condition 2 (d) Unable to provide evidence of survey records to verify sand extraction depths as per the approved map.	• Mackas Sand completed surveys of the site during August 2015 • GPS units have since been installed within selected site plant • Demarcation of the operational area is designated by significant landform barriers such as the edge of the transgressive dune system.
Schedule 3, Condition 28 (b) Unable to provide evidence of long-term security of the Biodiversity Offset Area, as required by 31 December 2014. Section 5 of the approved Landscape Management Plan commits to the Biodiversity Offset Area through a Voluntary Conservation Agreement (VCA).	• Section 5 of the approved Landscape Management Plan (LMP) commits to long term security through a VCA, as approved by DP&E. • Mackas Sand is currently applying to have the Biodiversity Offset Area registered as a VCA. Noting the established conservation management program of the offset area, it is considered that there is low risk to the environment throughout the VCA application process

Non-Compliance	Outcome/Action
Schedule 3, Condition 25 Mackas sand must develop and implement a LMP to the satisfaction of the Director-General. The LMP (Umwelt 2014), was approved by DP&E in November 2014.	• Mackas Sand has reviewed current land clearance and revegetation practices and proposed to update the LMP accordingly; • Mackas Sand is committed to further increases to record keeping practices, particularly relating to clearing and rehabilitation; • Signposting of the Biodiversity offset area was undertaken during August 2015; • Weed management was undertaken in the Biodiversity Offset Area during August 2015 in accordance with the Weed Management Plan (WMP) and LMP. • Mackas Sand is committed to seasonal strategic slashing along existing tracks in accordance with LMP.
Schedule 3, Condition 3 Review and update of the maximum extraction depth limit was not documented following the previous Independent Environmental Audit (IEA) in 2012 (AQUAS, Sep 2012). 2014 IEA was submitted to DP&E during the second week of May 2015. Further review of the Maximum Extraction Limit had not been triggered at the time of this audit.	• The Maximum Extraction Depth Map was reviewed and found to be consistent with the existing map by Mackas Sand in Q3 2015. The Extraction Depth Map will be reviewed again following the next IEA in 2017.
Schedule 3, Condition 4 AEMR 2014 (Umwelt), reports attended noise monitoring conducted 15 August 2014 compliant with all criteria, although Properties R1 and R19 were not monitored in accordance with the NMP.	• Noise monitoring Sites 5 and 6 represent 'all other locations' in the NMP, and therefore are considered inclusive of R1 and R19 • Accordingly, Mackas Sand is considered compliant with the condition.
Schedule 5, Conditions 2 and 3 Exceedance of depositional dust gauge (25 January 2012) was not notified to DP&E. This dust gauge is not reflective of operations due to Lavis Lane not being utilised, however, notification is still expected.	• Monitoring of Depositional Dust Gauge 3 is undertaken outside of PA 08_0142 and so reported voluntarily • As there were no operations occurring in the affected area, and DD3 does not have specific performance criteria, Mackas Sand did not consider reporting necessary.

Non-Compliance	Outcome/Action
Schedule 5, Condition 10(b) Monitoring not up to date on the website at time of site inspection (Air quality – 4/1/2011 to 27/2/2015, and Groundwater 6/1/2014-25/2/15)	At time of site inspection (May 2015), data on website was up to date. Monitoring data received 05/03/2015, uploaded 20/03/2015. Three months following this date would be 20/06/2015. Mackas Sand is considered compliant with the condition and no further action is proposed.

11.0 Non Compliances during the 2015 Report Period

A summary of non-compliances during the 2015 Report Period is detailed in **Section 11.1** below.

Table 11.1 2015 Report Period non-compliances

Date	Description of Non-Compliance / Incident	Corrective Action Taken/Status
14 May 2015	DP&E Audit of sand quarries in NSW identified a non-compliance with the Project Approval regarding hourly truck movements in and out of Lot 218 exceeded criteria for both prescribed time periods, Monday – Friday, and Saturday.	• Mackas Sand undertook consultation with DP&E to clarify the requirements of the Project Approval (MOD 1) Condition in regards to the interpretation of terminology within the Project Approval • Issue since clarified by DP&E • Mackas Sand has installed software within their weighbridge to limit the numbers of trucks that are able to be weighed each hour to the consent limits • MOD 2 application to increase permitted vehicle movements was approved on 16 March 2016.
14 May 2015	DP&E Audit of sand quarries in NSW identified that extraction of material breached maximum approved depth in both Lot 218 and Lot 220 voids of Mackas Sand.	• Exposed material determined uncontaminated following analysis • Extracted product spread across floor of void to return to compliant depth • Pit dimensions surveyed in and demarcated in accordance with DP&E guidance.

Date	Description of Non-Compliance / Incident	Corrective Action Taken/Status
2015 Report Period	Depositional Dust Gauges DDG1 and DDG2 were not sampled at the required frequency of once per month during the report period.	Air quality monitoring was undertaken during the report period for all locations, however on two occasions samples were obtained for an approximate 6 week period, which is not in compliance with the sample timeframes within the NSW Air Sampling Methods. As such the sample duration was not in accordance with relevant measurement standards.

12.0 Activities Proposed in the 2016 Annual Review Period

Anticipated activities for Mackas Sand during the 2016 report period include:

- continuation of extraction operations in Lot 218 and Lot 220
- continuation of rehabilitation activities as detailed in **Section 9**
- continued liaison with OEH regarding the Biodiversity Offsets Strategy
- continued liaison with the EPA regarding suitable locations for dust monitoring equipment
- implementation of conditions as prescribed under MOD 2 approval.

13.0 References

Aquas (2015) *2014 Independent Environmental Audit of Mackas Sand Quarry*. Prepared for Mackas Sand Pty Limited.

NHMRC, NRMCC (2011) *Australian Drinking Water Guidelines Paper 6 – National Water Quality Management Strategy*.

NSW Department of Planning and Environment (2016) *Summary of the Compliance Audit Campaign of NSW Sand Quarries (May - August 2015)*.

NSW Government (2015) Annual Review Guideline: Post-approval requirements for State significant mining developments

Umwelt (Australia) Pty Limited (2015a) *Mackas Sand Annual attended noise monitoring report, 2015*.

Umwelt (Australia) Pty Limited (2015b) *Mackas Sand Lot 218 Ecological Offset Monitoring Briefing, 2015*.

Umwelt (Australia) Pty Limited (2014a) *Mackas Sand Draft Operations Management Procedure, Lot 218 and Lot 220, Salt Ash* Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2014b) *Mackas Sand Noise Management Plan For Extraction Operations, Lot 218 And Lot 220, Nelson Bay Road, Salt Ash, NSW*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2014c) *Mackas Sand Air Quality Management Plan For Lot 218 and Lot 220, Salt Ash, NSW*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2014d) *Mackas Sand Soil and Water Management Plan For Lot 218 and Lot 220, Salt Ash, NSW*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2014e) *Mackas Sand Ecological Monitoring Program for Lot 220 DP 1049608, Salt Ash*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2014f) *Mackas Sand Aboriginal Cultural Heritage Management Plan for Sand Extraction Operations From Lot 218 DP 1044608 and Lot 220 DP 1049608, Salt Ash*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2014g) *Mackas Sand Landscape Management Plan Including Rehabilitation Management Plan and Long Term Management Strategy*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2011) *Determination of Maximum Predicted Groundwater Level and Maximum Extraction Level at Lot 218 and Lot 220, Salt Ash*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2012) *Environmental Assessment of Modifications to Mackas Sand Extraction Operations on Lot 218 and Lot 220, Salt Ash*. Prepared for Mackas Sand Pty Limited.

NSW Environmental Protection Agency (NSW EPA) (2014) *Protection of the Environment Operations (Waste) Regulation 2014*



APPENDIX 1
DPI Water Report

Project Background

Mackas Sand Pty Ltd (Mackas Sand) was granted Major Project Approval 08_0142 in September 2009 by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* to operate sand extraction operations at Salt Ash, approximately 25 kilometres north-east of Newcastle, in the Port Stephens local government area of New South Wales (NSW) (refer to **Figure 1.1**).

Mackas Sand has approval to extract and process sand from Lot 218 and Lot 220 as shown on **Figure 1.1**. Lot 220 has an identified resource of 9.6 million tonnes however Lot 218 has a potentially indefinite extraction life due to the ongoing movement of sand from the mobile dunes into the approved extraction area.

At the time of preparing this report, sand extraction was being undertaken on both Lot 220 and Lot 218.

Scope

This report has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Mackas Sand. The reporting requirements for Mackas Sands are outlined in the DPI – Water (formerly New South Wales Office of Water (NOW)) Approval to undertake extraction works within the North Stockton Catchment Area.

In accordance with Condition 3 of Clause 9 of the NOW Approval under Clause 10(1) of the Hunter Water Regulation 2010 (the 'NOW Approval') Mackas Sand is required to submit the following to Hunter Water Corporation (HWC) and NOW:

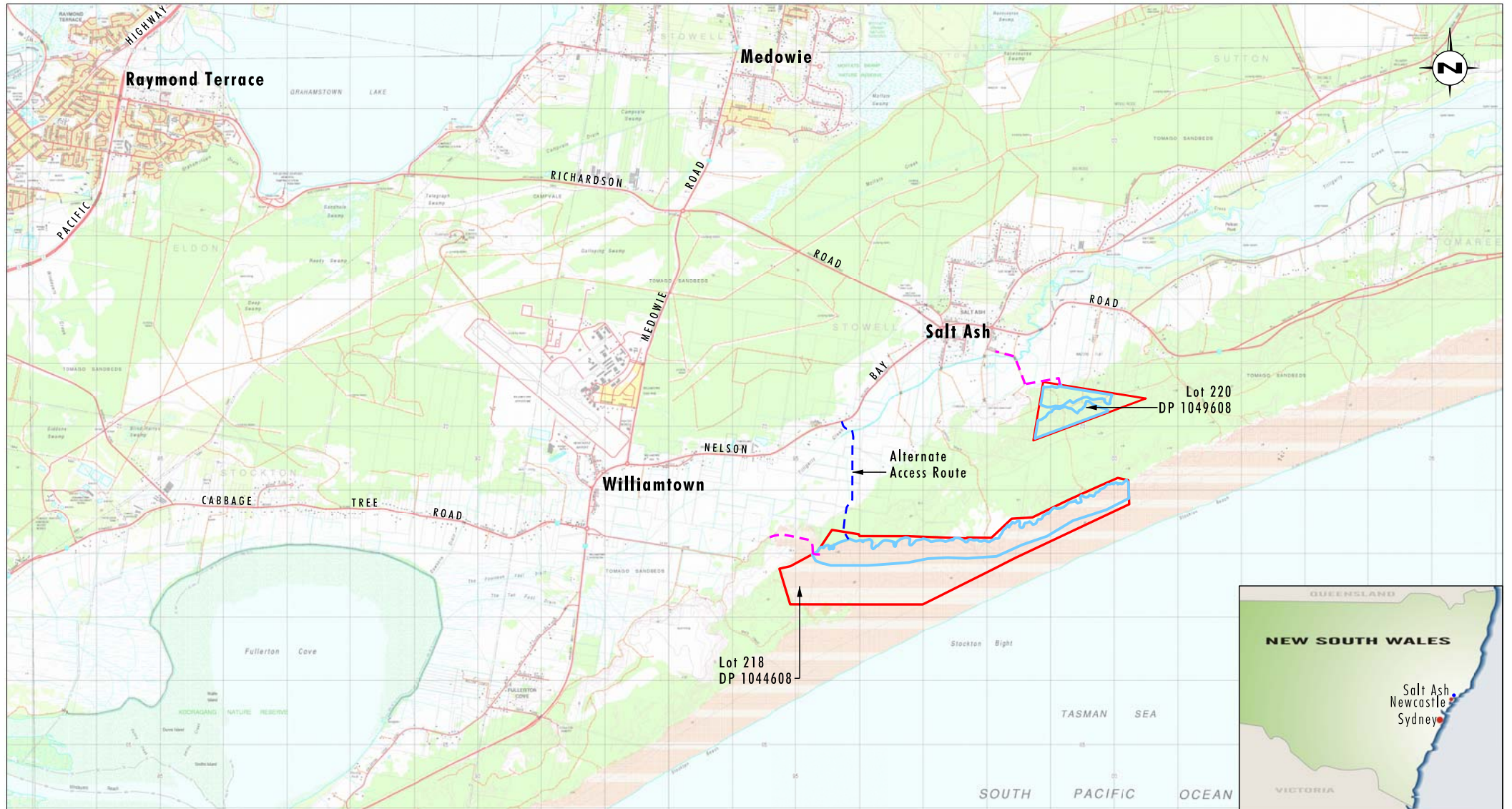
'...a written report (Operations Report) addressing whether the Approval Holder has achieved compliance with:

- i. the requirements for the method of Extractive Operations in Clause 3 of the Schedule;
- ii. the Operations Management Procedure;
- iii. the Hydrocarbon Spill Procedure; and
- iv. the requirement for the progressive replacement of topsoil provided in Clause 6(3) of the Schedule'

In addition, in accordance with Condition 4 of the NOW Approval, the Operations Report must:

- '4a) identify any non-compliance during the previous year; and
- 4b) Identify what actions were, or are being, taken to ensure compliance.'

The details of compliance with the above conditions are detailed in the sections below.



Source: Department of Lands, 2006

0 1 2 4 km
1:85 000

Legend

- Lot Boundaries
- Approval Areas
- - - Approved Site Access
- - - Alternate Access Route

FIGURE 1.1

Locality Plan

Requirements for the Method of Extractive Operations

Laser Level Monitoring

As part of a May 2015 audit of Mackas Sand Operations, the Department of Planning and Environment (DPE) identified that extraction of material breached the maximum approved depth level in both Lot 218 and Lot 220 voids of Mackas Sand Quarry. As a result, Mackas Sand has since undertaken laser level monitoring to demarcate extraction limits using GPS equipment installed on machinery and physical markers on the ground where possible. In addition to laser level monitoring, Mackas Sand completed analysis of exposed material for contamination before returning the floor to approved AHD depth level using clean product material.

Mackas Sand will continue regular surveying of the site in accordance with the Operational Management Practices.

Machinery and Equipment

Mackas Sand has advised that during the report period, that all site machinery and equipment was maintained in a proper and efficient condition. Clause 3 (2) of the NOW approval states that 'the approval holder must remove all machinery used in the Extractive Operations from the Land at the end of each day's operation'. Mackas Sand has approval to operate for 24 hours a day. However, all mobile machinery not anticipated to be in active use is to be removed from Lot 218 or Lot 220. Vehicle storage locations are located outside of the North Stockton Catchment Area.

Storage of Contaminants

Mackas Sand has advised that during the report period, no hydrocarbon materials or other potential contaminants were stored on either Lot 218 or Lot 220, within the North Stockton Catchment Area.

Refuelling

Mackas Sand has advised that during the report period, all refuelling was undertaken by a registered contractor. Refuelling of mobile equipment occurs at the Mackas Sand and Soil administration and maintenance facility, or at the vehicle storage area at the northern end of the Alternate Access Route, as appropriate. Mackas Sand uses sieves and/or stockpilers at Lot 220 and Lot 218 that have limited mobility, being moved once or twice a year. Offsite refuelling of plant with limited mobility is not considered feasible. As such, refuelling of plant with limited mobility occurs within the extraction areas via the usage of mobile refuelling equipment. In order to minimise the risk of fuel spills, and the impact of spills should they occur, refuelling equipment consists of a fuel tank, spill catch tray and spill kit. An additional mobile spill kit is located within the extraction area to enable prompt clean up in the event of an accidental spill during refuelling activities.

Operations Management Procedure

The Operations Management Procedure outlines the standard methods and practices of utilisation of plant and equipment at the site. Mackas Sand has advised that the works at the site were undertaken in accordance with the Operations Management Procedure during 2015.

Hydrocarbon Spill Procedure

Mackas Sand has advised that the works at the site were undertaken in accordance with the Hydrocarbon Spill Procedure during 2015. No spills were recorded during 2015.

Any spills, should they occur, will be managed in accordance with Section 4.3.3 of the Operational Management Procedure to prevent fuel from contaminating the North Stockton groundwater source. Any contaminated material to be disposed of will be done so in accordance with relevant waste management requirements.

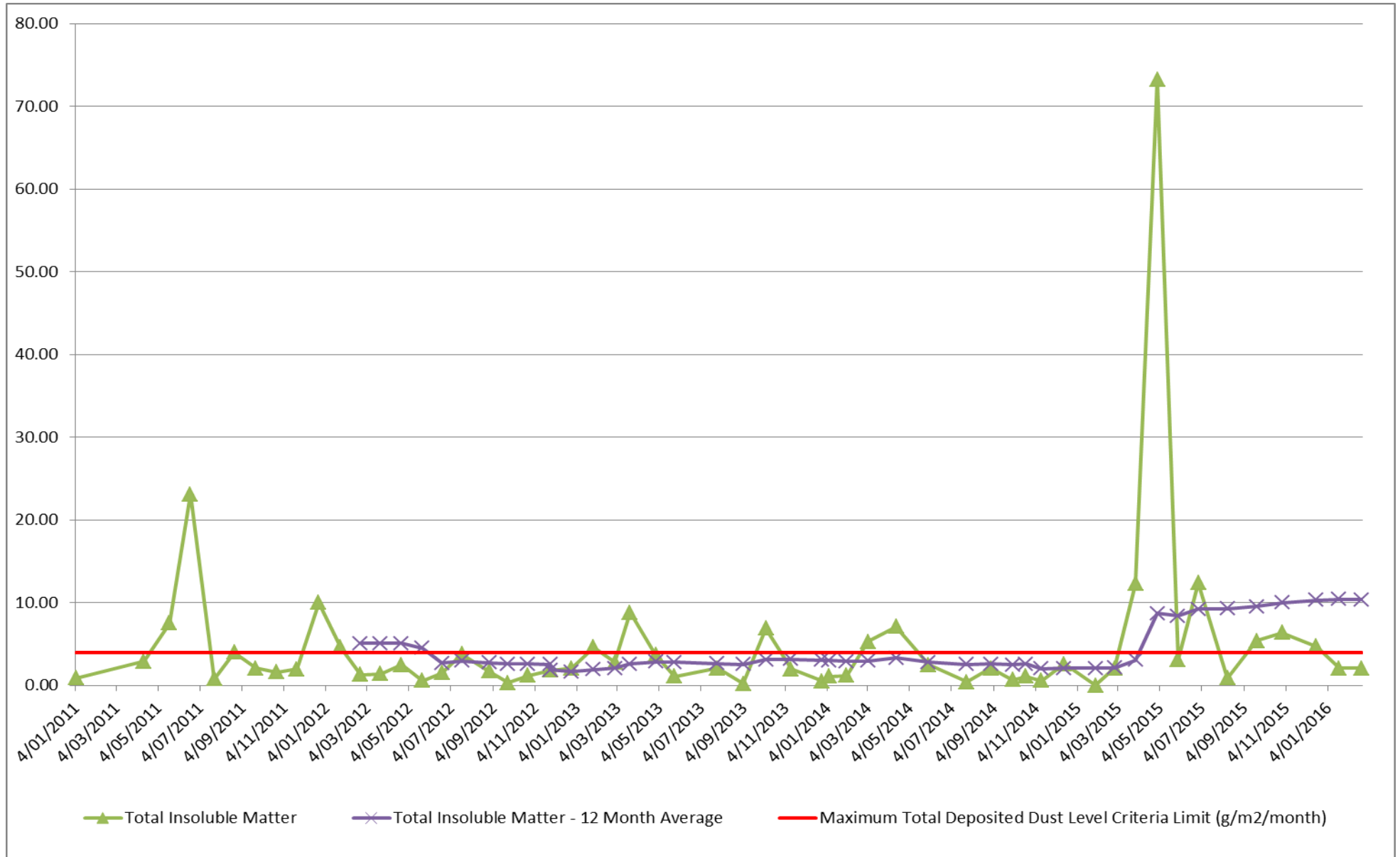
Rehabilitation

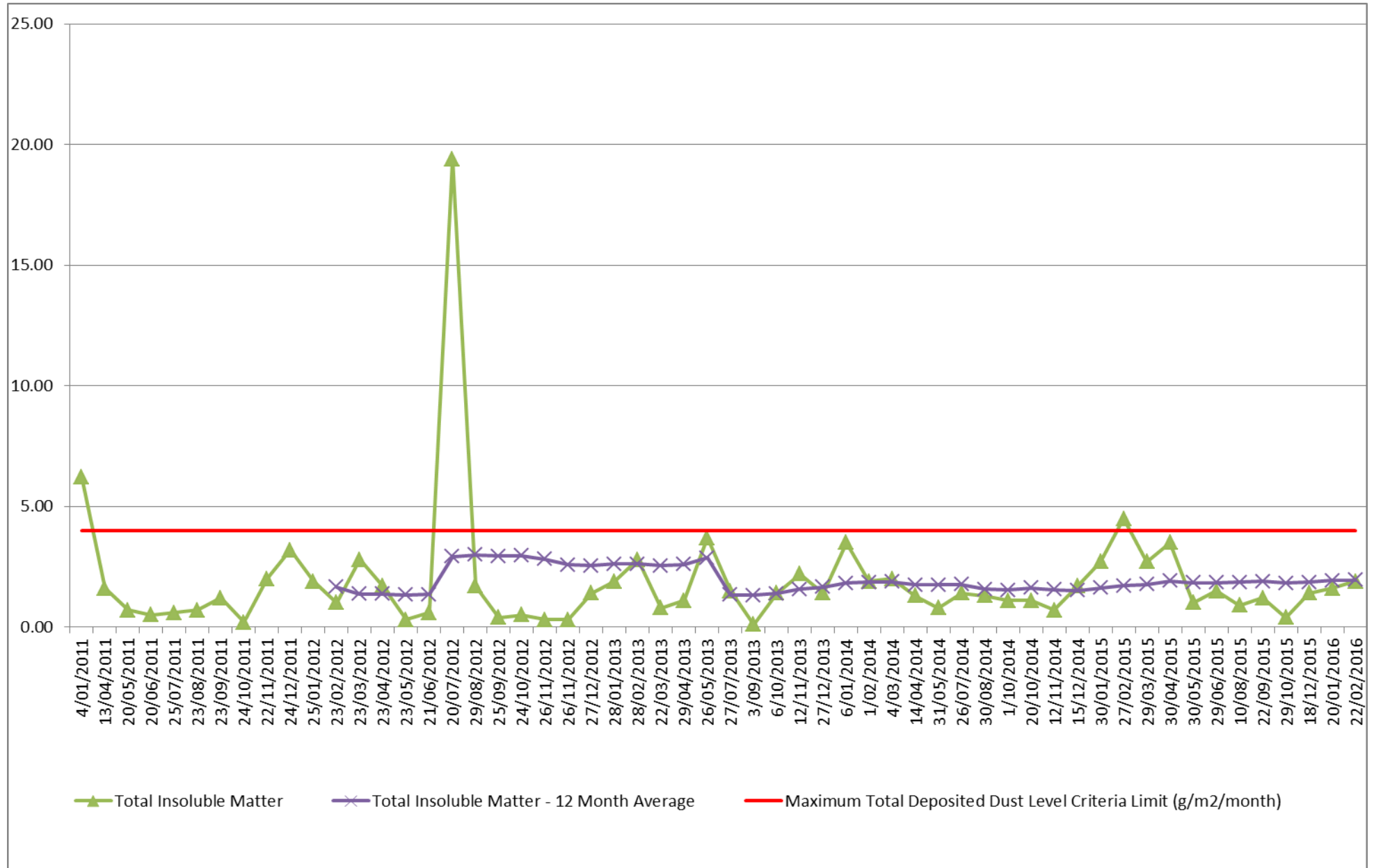
No topsoil was emplaced at Lot 220 as part of rehabilitation works during 2015.

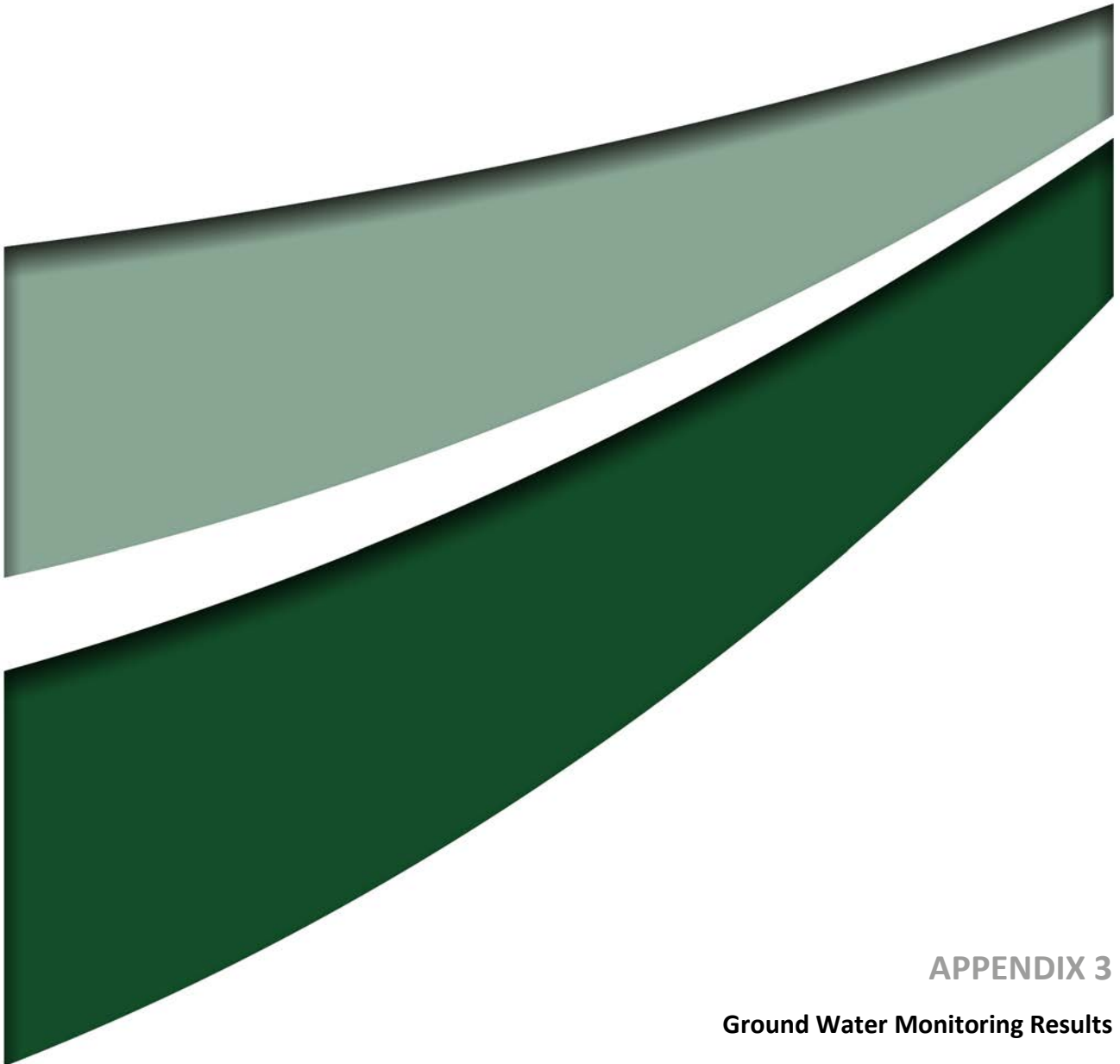


APPENDIX 2

Dust Deposition

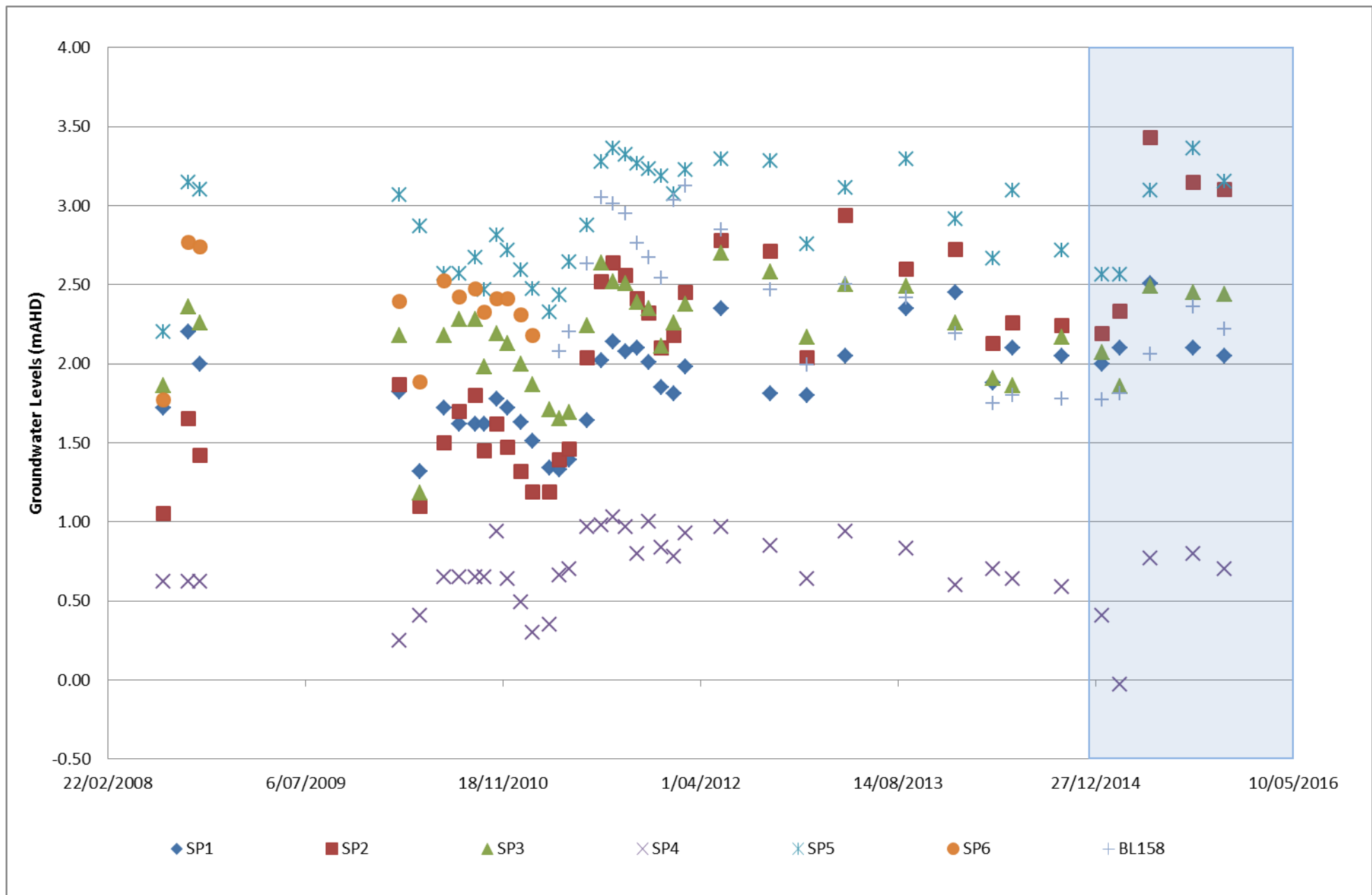


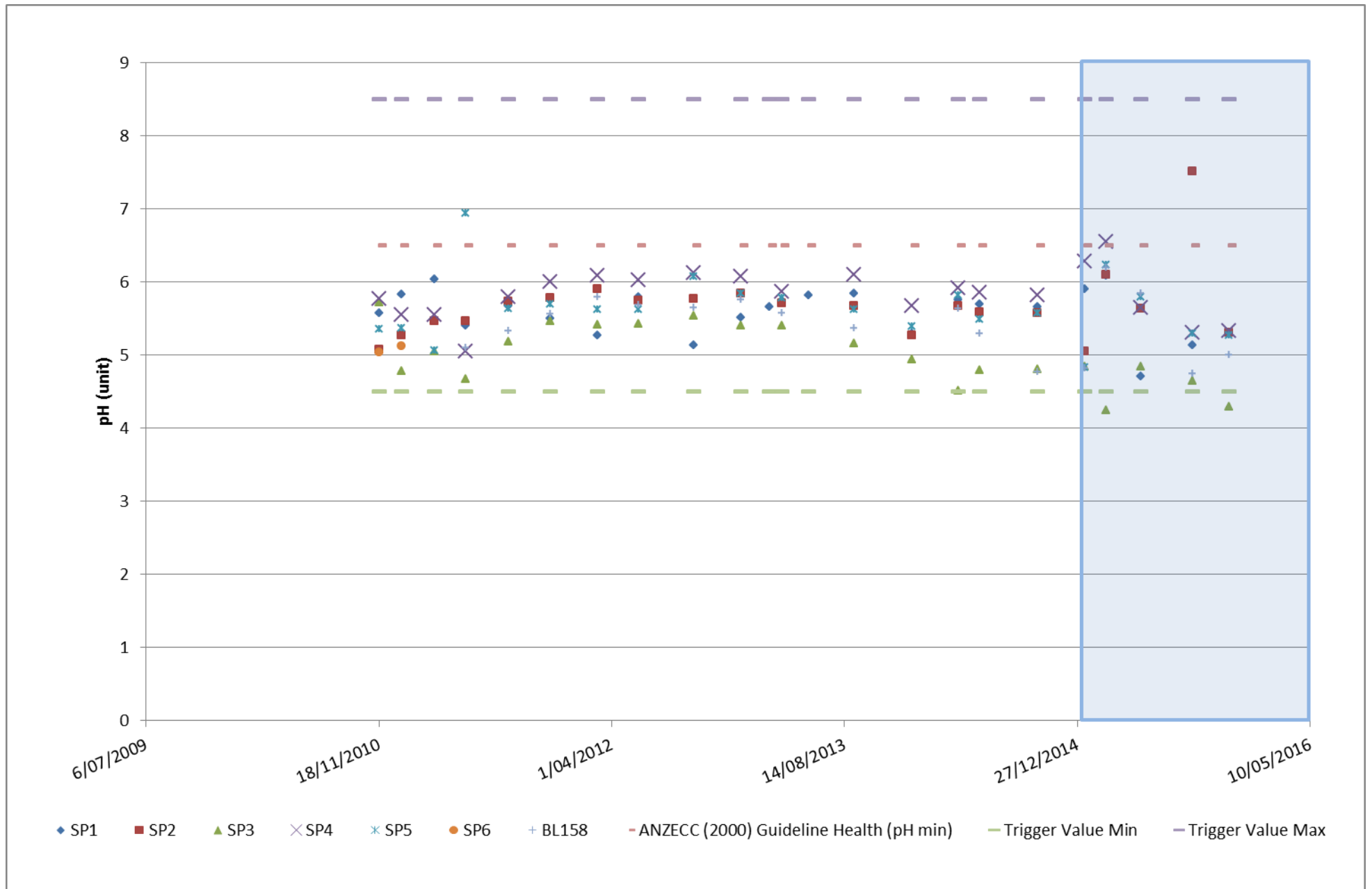


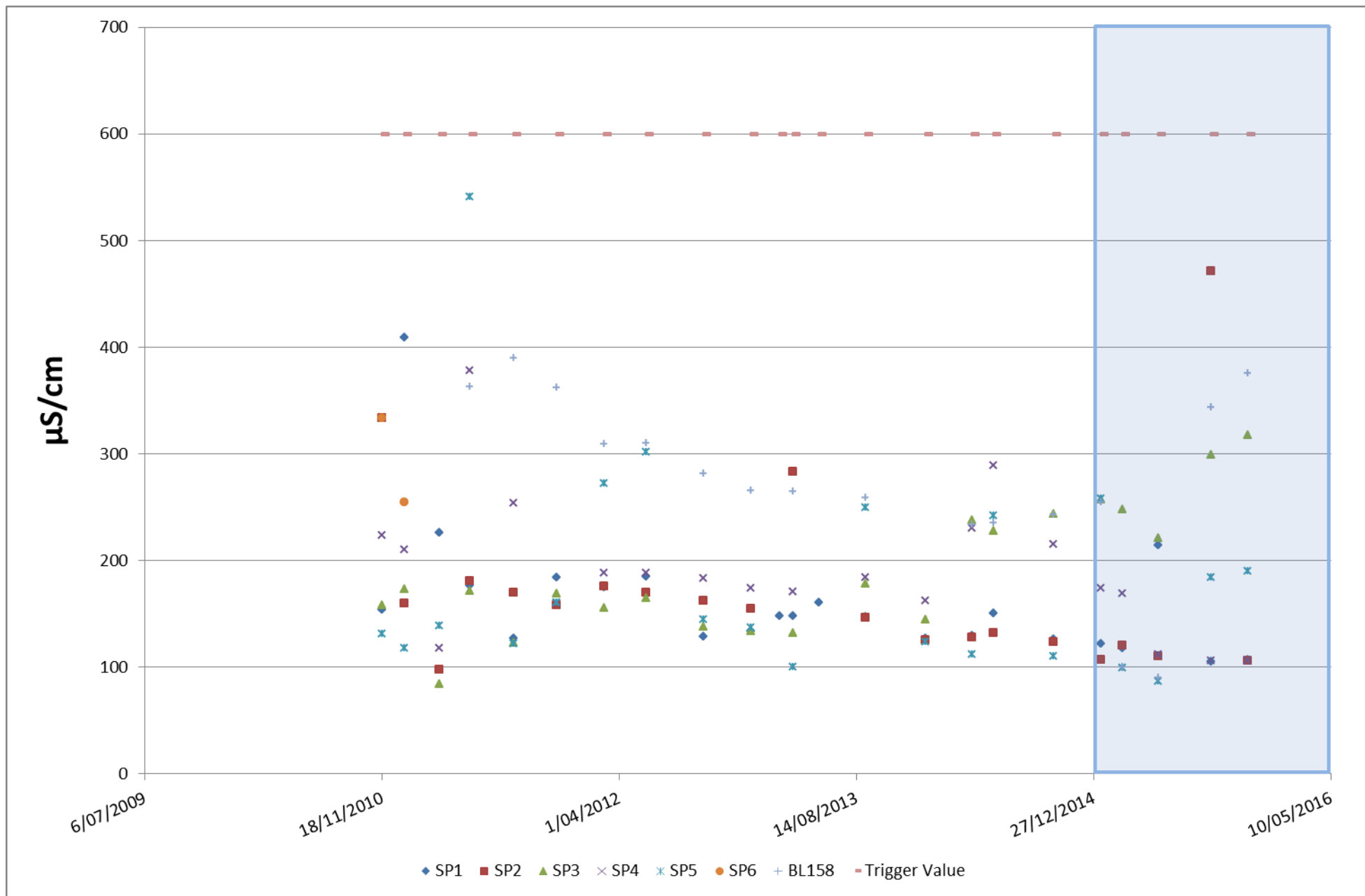


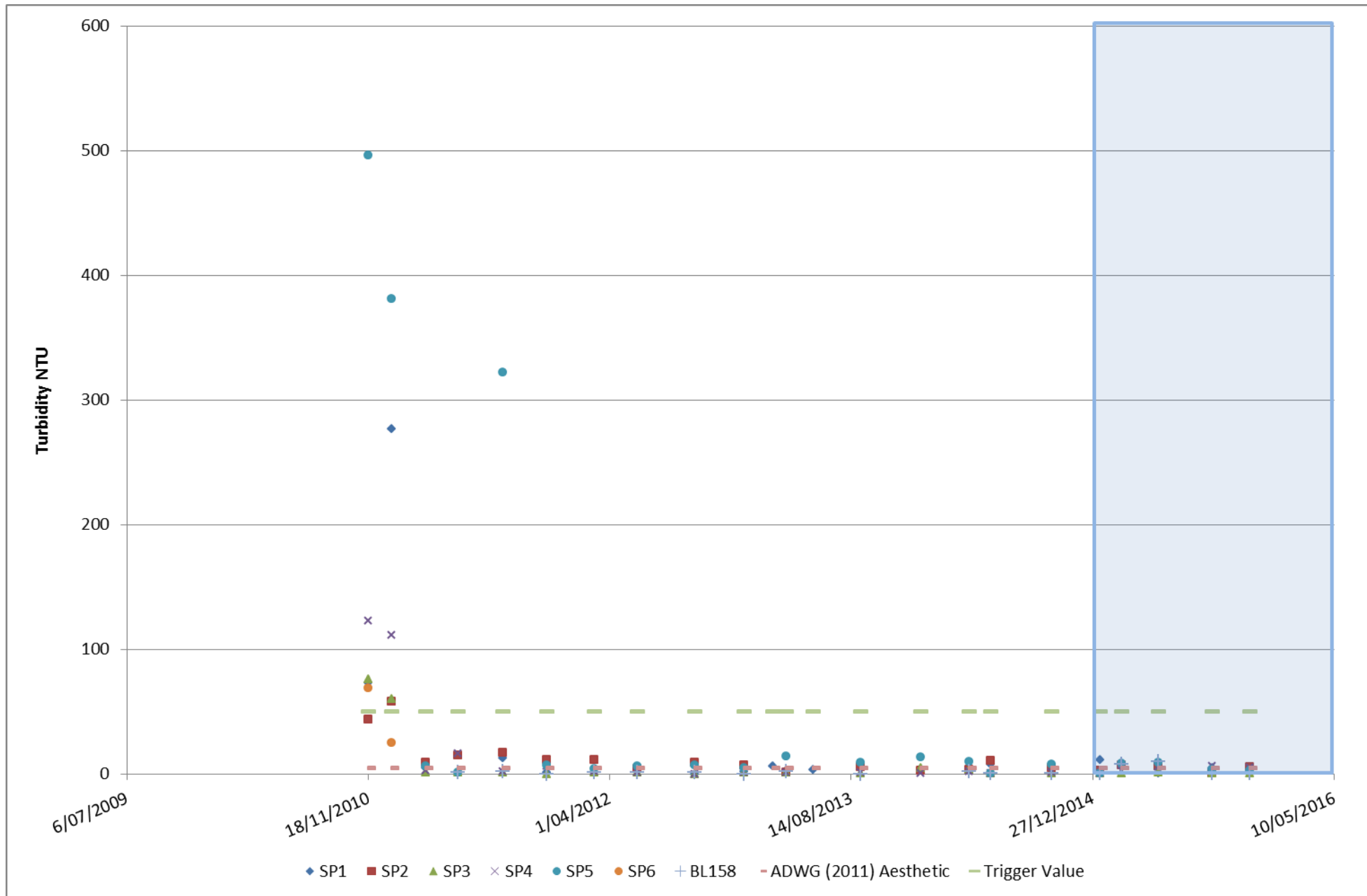
APPENDIX 3

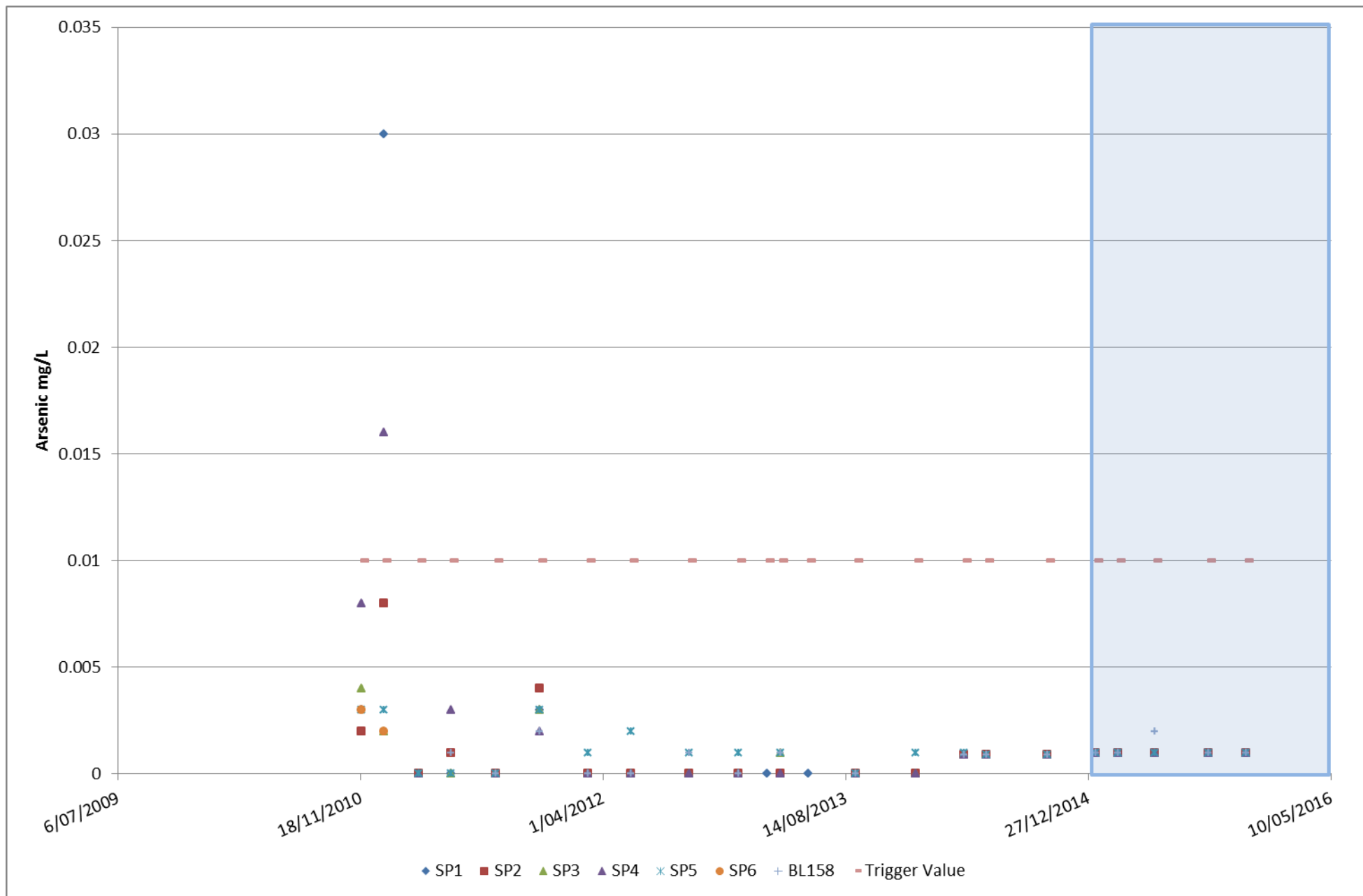
Ground Water Monitoring Results

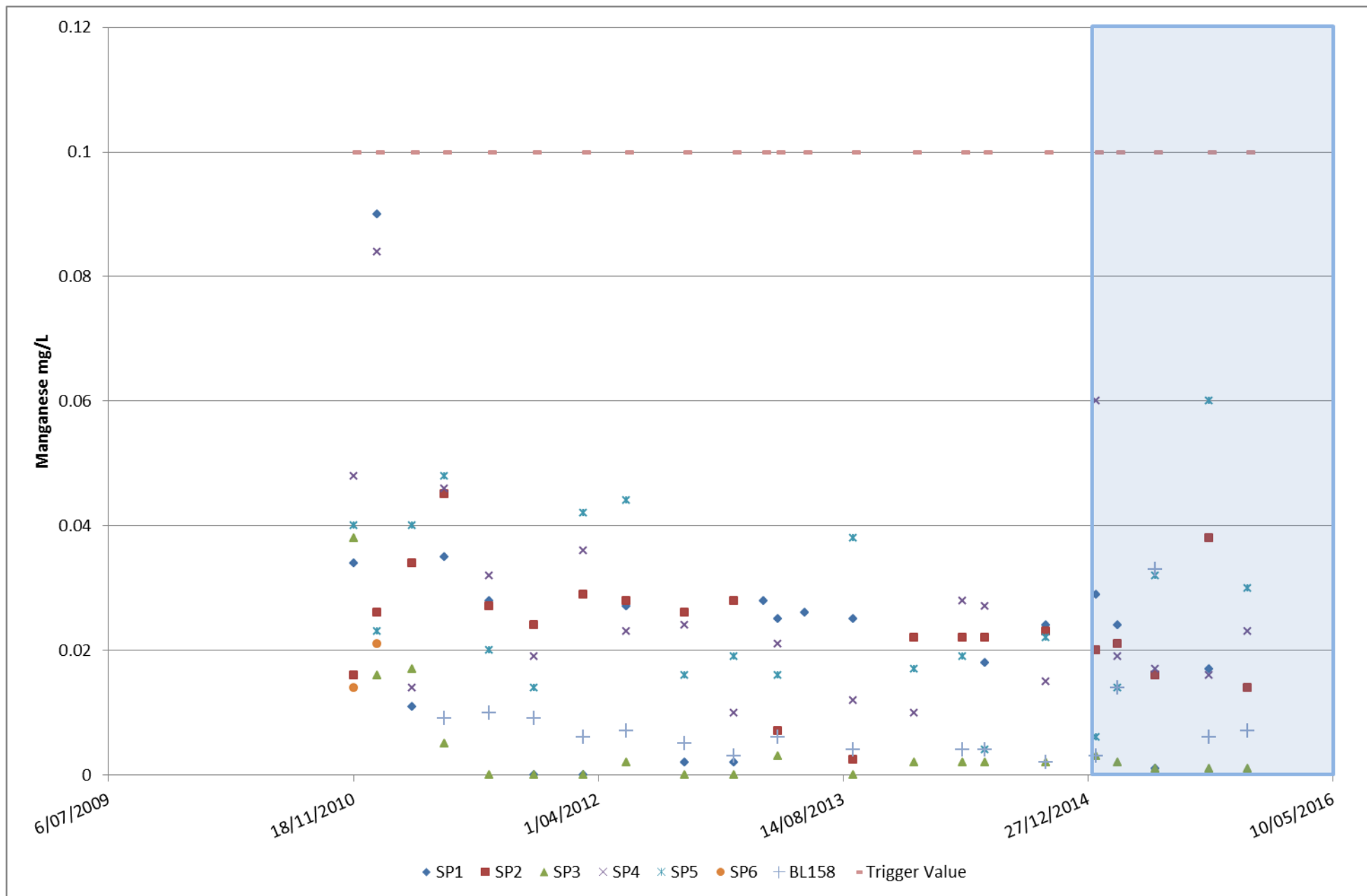


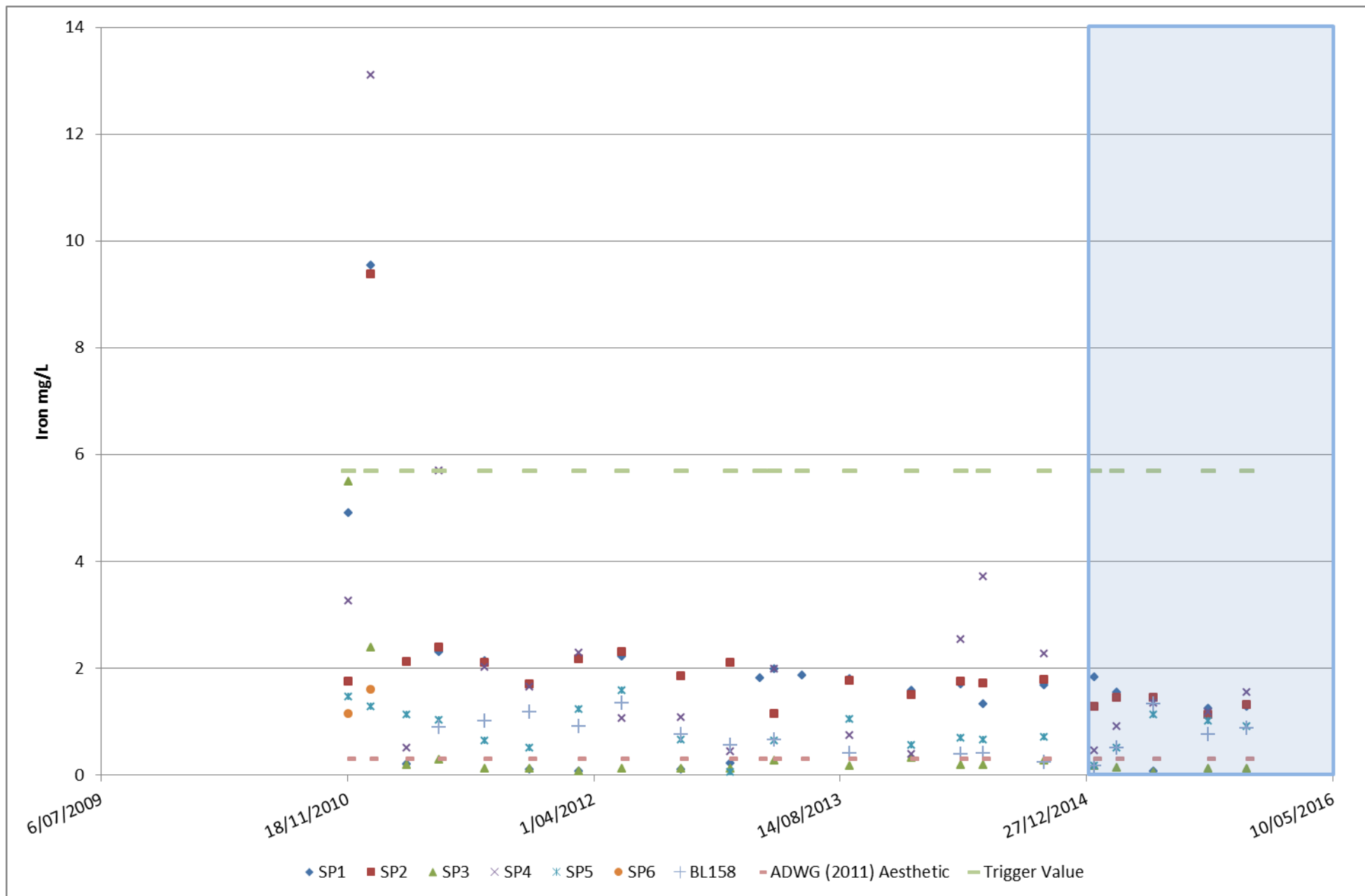












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