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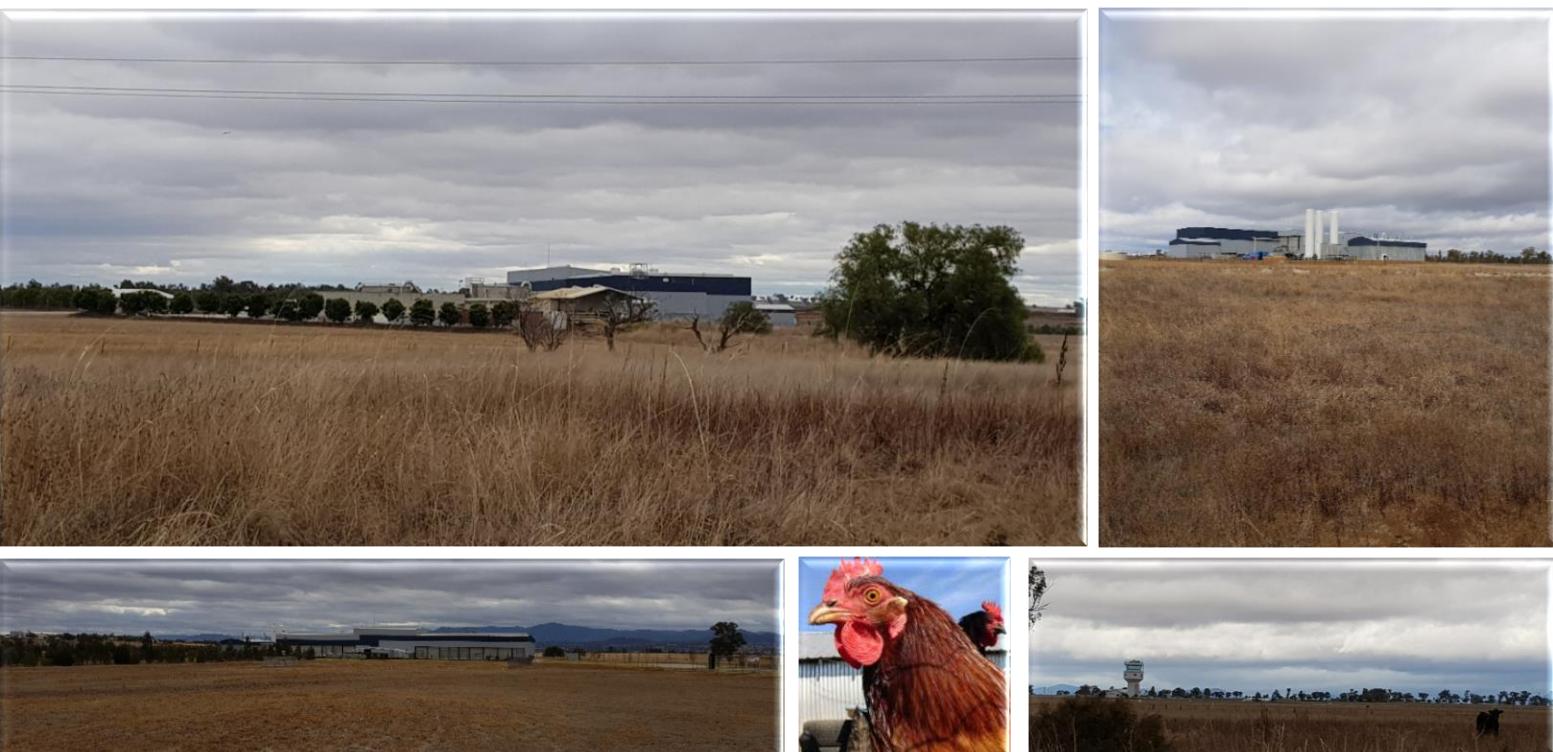
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“Oakburn”, 1154 Gunnedah Road, Tamworth

Detailed Contaminated Site Assessment

Baiada Poultry Pty Ltd

642 Greater Western Highway, Pendle Hill NSW 2145

September 2018

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0	September 2018	James Maxwell	Initial Issue

EXECUTIVE SUMMARY

SMK Consultants were engaged by Baiada Poultry Pty Ltd to undertake a detailed contaminated site investigation in support of the EIS for the proposed “Oakburn” poultry processing plant at Gunnedah Road, Tamworth.

The Investigation Area included the development site, the property of “Oakburn”, and the southern portions of the east-adjoining, TRC owned, Lots 101 & 102 DP 1097471, through which a new site access road will be constructed.

The property “Oakburn” was historically utilised as grazing land for livestock production. More recently, it has been the site of Baiada’s Tamworth Poultry Rendering Plant. The adjoining Lots 101 and 102 are similar grazing lands that have been acquired by Tamworth Regional Council. The proposed development would create an easement through these lots to construct a new access road between the proposed processing plant and the Glen Artney Industrial Estate to the east.

Following a desktop assessment, review of available site history and site investigation, this report provides a Conceptual Site Model detailing the potential risks to human health and the environmental receptors in the vicinity of the site.

The investigation did not identify any existing contamination of concern within the property boundary of the proposed development site.

PFAS was detected in watercourse sediment on Lot 101, at a concentration well beneath the PFAS NEMP human health and ecological threshold level. This concentration is not considered to have originated onsite, but it likely migrated north, from the Tamworth Regional Airport, via surface water flows. The identified concentration is not considered unsuitable for the proposed development. If further migration of PFAS occurs, it will only affect the land to the north of the proposed development site. It is also noted that the source of the PFAS contamination is being dealt with by authorities involved with the airport facility.

This investigation has not identified contamination of concern within the Investigation Area that would pose an unacceptable risk to either human health or the surrounding environment. No further action in the form a remediation of the site is considered necessary.

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1. Introduction and Scope of Works

This report has been prepared on behalf of Baiada Poultry Pty Ltd, in support of the Environmental Impact Statement associated with the Oakburn Poultry Processing Plant at Gunnedah Road, Tamworth.

The scope of the investigation was to carry out a Detailed Site Investigation to determine if any contamination existed. If contamination was found to exist at a level that was considered unsuitable for the intended land use, the study was to be extended to provide an appropriate course of action, such as remediate the site or to impact manage the contamination through various mitigation strategies to minimise the risk on the intended land use.

This report presents the results and recommendations of the contaminated site investigation and provides a conceptual site model detailing the potential risks to human health and the environmental receptors.

2. Site Details and History

The Investigation Area comprises the property "Oakburn" located at 1154 Gunnedah Road, Westdale (Lot 100 DP 1097471) and the southern portions of the adjoining Lots 101 & 102, through which the proposed site access easement will traverse.

All three Lots have historically been utilised as grazing land for sheep and wool production.

More recently, Lot 100 has served as the site of Baiada's Tamworth Rendering Plant. Following extensive fire damage in 2014, the original facility has since been replaced by the current rendering plant, located centrally on the Lot. Existing onsite infrastructure includes the rendering plant and associated workshop and wastewater treatment plant/disposal. All former farm related, and residential infrastructure has been dismantled and removed from site, leaving only the former house-pad, located west of the current property access.

The Southern portions of Lots 101 & 102 were also developed as grazing land; with a small farm dam being the only other past or existing infrastructure identified during the investigation. An unnamed watercourse runs south to north along these Lots, eventually flowing into Bolton's Creek to the north of the site. The drainage line receives surface runoff from Oxley Highway, in addition to the Investigation Area. At the time of inspection, the entire draining line, including farm dam was dry. No surface water was present in this watercourse.

The attached Plan 1 presents an aerial photograph of the Investigation Area and surrounding region. There are no known occurrences of acid sulfate soils within this region.

3. Adjoining Land Use

Based on site observations and a review of aerial imagery, the surrounding land use includes:

- North – Tamworth Regional Council owned rural lands; currently unoccupied and subject to revegetation and erosion control works.
- East – Industrial agricultural facilities such as Thomas Foods International and Tamworth Regional Livestock Exchange. Tamworth cemetery. Glen Artney Industrial Estate further to the east and in the catchment of a different unnamed watercourse network.
- South – Oxley Highway and Tamworth Regional Airport.
- West - Tamworth Regional Council owned rural lands, Oakburn Speedway and Oxley Highway.

The majority of the adjoining industrial area is located in a separate catchment to the proposed development. Runoff from the industrial area that may impact on Lots 101 and 102 would be limited to small industrial facilities. Site investigations noted that the adjoining landuse include an industrial gas and chemical supplier. This facility was surrounded by a levee and had an internal holding pond capturing runoff from the work site. Other industrial work sites would drain downstream of the proposed development site.

The Tamworth regional airport is located upslope of the proposed development. The western half of the runway area drains northwest into Boltons Creek. The central section drains through the unnamed gully traversing Lot 101. The majority of the terminal area drains east into another catchment. The proposed access road to the Baiada development site would be exposed to drainage from the central part of the runway area.

None of the other adjoining landuse was considered to have a potential impact on the development area, other than on Lot 101 being the entrance road.

4. Conceptual Site Model

The following conceptual site model (CSM) has been developed to provide an understanding of potential site contamination throughout the Investigation Area and surrounds.

4.1 Potential Contamination Sources

Table 1 lists the potential sources of contamination that have been identified by desktop assessment, review of all available historical and anecdotal information and site inspection of the Investigation Area.

Table 1: Potential Contaminants and Sources

Description	Rationale	Potential Contaminant
Site Maintenance	Historical use of herbicides and pesticides	OCP's, OPP's and Arsenic.
Imported Fill	Imported fill material has been used for the construction of roads and surface mounds across the site. Origin of fill material is unknown.	Heavy Metals, TPH, PAH's, BTEX, PCB's, OCP's, OPP's and Asbestos.
Onsite Infrastructure	Previous and existing infrastructure including: homestead, various work and storage sheds, stockyards, industrial plant and office.	Asbestos, Lead, Arsenic, OCP's and OPP's.
Storage and Use of Chemicals	Spillage or leakage of chemicals used in wastewater treatment process. Spillage or leakage of oils, fuels and lubricants during maintenance works. Spillage or leakage of fertilisers.	Heavy Metals, TPH, PAH's, BTEX, OCP's and OPP's.
Parking of Light Vehicles	Spillage or leakage of fuels and oils from light vehicles parked onsite.	Heavy Metals, TPH, PAH's, BTEX and Lead.
Adjoining Industry	Tamworth Airport has been reported as a PFAS contaminated site and is located <100m south and upstream of the Investigation Area.	PFAS

4.2 Migration Pathways

The following migration pathways have been identified for the Investigation Area:

4.2.1 Soils

Soils across the Investigation Area generally consist of shallow clay loams and light clays of moderate permeability. These soils present some potential for vertical migration of surface contamination into subsurface soils. Surface contaminations could also migrate from site via windborne dust or intermittent surface water flows.

4.2.2 Surface Water

Surface water generated onsite either infiltrates into surface soils or falls towards the north flowing drainage lines of Bolton's Creek to the west and an unnamed watercourse to the east that runs through Lots 101 and 102. No significant ponding occurs within the Oakburn property boundary; however, the eastern watercourse has developed into a small chain of ponds as it flows northwards. The existing and proposed onsite wastewater treatment ponds are bunded to prevent ingress of surface flows.

4.2.3 Groundwater

Regional groundwater is relatively deep (generally 10m+ below ground level). The single groundwater well located within the Investigation Area is consistent with the surrounding region, with a water bearing zone occurring at 21m below surface and flowing north, towards the Peel River. Given the depth and overlying shale and clay soils, the potential for impact to regional groundwater is considered low.

4.3 Receptors

The following potential sensitive human and environmental receptors have been identified for the Investigation Area and its surrounds.

4.3.1 Human Health Receptors

- Current and future occupants of the Investigation Area (e.g. Baiada employees, subcontractors and visitors).
- Current and future occupants of surrounding properties (e.g. residents, workers and visitors).

4.3.2 Environmental Receptors

- Flora and fauna within the Investigation Area and its surrounds.
- Bolton's Creek to the west of the Investigation Area and the Peel River, to the north.
- Unnamed watercourse within Investigation Area.
- Surface water bodies within Investigation Area (e.g. farm dam and drainage line ponding).
- Groundwater beneath the Investigation Area.

5. Sampling and Analysis Plan

A Contaminated Site Investigation was undertaken in accordance with NSW Environment Protection Authority (EPA) Guidelines. The investigation involved an assessment of previous land use and identification of potential contamination. The objective of the investigation was to determine whether contamination existed within the Investigation Area and whether this may impact on the proposed or future land use.

Following a desktop review of the site and its surrounds, SMK Consultants undertook a survey of the Investigation Area to identify areas of potential contamination.

Potential contamination of concern related largely to the sites' agricultural history and current intensive agricultural/industrial use. These potential contaminants include heavy metals, hydrocarbons and OC/OP based pesticides, commonly utilised throughout general farming practices, as well as building materials such as asbestos, lead paint and PCB's. Additionally, given that the adjoining Lots 101 & 102 are located downstream of a registered PFAS contaminated site (Tamworth Regional Airport), the potential for PFAS migration across the proposed access easement was also considered. The PFAS contamination is believed to have occurred as a result of historical use of PFAS containing firefighting foams by defence force and other aircraft training operations. This potential migration pathway is not considered to cross into the property boundary of the "Oakburn" development site.

Based on desk top assessments and a result indicating the lack of obvious contaminated sites or activities, a selective sampling methodology was considered appropriate for this site to provide an indication of contamination. The selective required detailed traverses across the property based on catchment flow directions and any structures identified during the field inspection. The methodology to be adopted following this selective sampling approach, would therefore be dictated by the results of the selective sampling and field observations.

6. Relevant Guidelines

The National Environmental Protection Measure 1999 (NEPM) provides a nationally consistent approach to the assessment of site contamination for a broad range of potential contaminants. The guideline values or site criteria of the NEPM are referred to as "Health Based Investigation Levels (HIL's). Other similar documents have been prepared by NSW EPA and National Authorities to provide additional threshold levels for contaminants. The following list of Guidelines were utilised to determine acceptable levels of contamination during the preparation of this report:

- (1) National Environment Protection (Assessment of Site Contamination) Measure 1999
- (2) PFAS National Environmental Management Plan – HEPA 2018
- (3) *Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens*
NSW EPA, 2005
- (4) *Contaminated Sites – Guidelines for the NSW Site Auditor Scheme* – NSW EPA 1998
- (5) *Contaminated Sites – Guidelines for Assessing Service Station Sites* – NSW EPA
1994
- (6) *Health based soil investigation levels*, National Environmental Health Forum (NEHF),
1999

The Guidelines for maximum threshold levels are based on the existing or potential land use for the site Investigation Area. The chosen guideline levels should be based on criteria of land use and therefore risk of exposure to the contaminant material. In this case, the proposed use of the site is considered to be an expansion of the existing Poultry Processing industry. Due to the commercial nature of this facility, Industrial investigation levels are considered to be the limiting threshold, while consideration is given to thresholds for Open Spaces, due to the rural setting of the development and potential for exposure to accessible soils.

On the basis of the proposed land-use of the subject area, the most suitable threshold criteria are Health Investigation Levels for Industrial areas. These are set out within:

- **HIL D (Commercial/Industrial)** [Table 1A(1) of Schedule B1 – Guideline to Investigating Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure 1999]
- **PFAS Industrial/commercial** [*Table 2: Soil criteria for investigation – human health-based guidance values*, PFAS NEMP 2018].

The available threshold levels from these guidelines are presented with the results of sample analysis in the following tables.

7. Laboratory Results and Analysis

Sampling location was based on a *selective sampling process* in accordance with options available under NSW Guidelines. Four soil samples and one sediment sample were obtained from across the Investigation Area. No physical or visible signs of contamination, such as hydrocarbon soil staining or odour, were identified during field investigations. The location of sampling targeted areas that potential contaminants were considered most likely to occur as a result of the site's past operations and potential migration of contaminants via surface water flows.

A detailed walkover and shallow soil pits of the former homestead site on Lot 100 did not identify any asbestos containing debris. Anecdotal evidence indicates that the homestead was removed from the property.

A description of five samples and analysis undertaken is presented in Table 2 and location is shown in the attached Plan 2.

Table 2: Sample Details and Analysis

SMK Sample Number	Sample Description	Sample Depth (mm)	ALS Laboratory Sample Number	Analytes
18-168-1	Topsoil – Former Homestead Site (Fill Material)	00–300	ES1818266001	Heavy Metals, OCP's and OPP's
18-168-2	Sediment – Watercourse Dam Bed (Access Easement)	00–300	ES1818266002	PFAS
18-168-3	Topsoil – Proposed Processing Plant Construction Area (Composite)	00–300	ES1818266003	Heavy Metals, OCP's and OPP's
18-168-4	Topsoil – Existing Effluent Disposal Area	00–300	ES1818266004	Heavy Metals, OCP's and OPP's
18-168-5	Topsoil – Northern Corner of Lot	00–300	ES1818266005	Heavy Metals, OCP's and OPP's

These samples were obtained in accordance with standard SMK Consultants sampling procedure as described in Appendix 2. A NATA accredited laboratory was used for the laboratory assessment of the soils and water. As this is a preliminary assessment, no duplicate field samples were obtained. Appropriate quality assurance was adopted using a chain of custody form and surrogate sampling within the laboratory.

Tables 3, 4 & 5 present a summary of laboratory results of samples obtained on-site and their relevant published threshold levels that have been selected as representative of the proposed land use. Analytes identified in concentrations exceeding their adopted thresholds are highlighted.

Table 3: Summary of Heavy Metals and Pesticides Soil Analysis and Comparison of General Threshold Criteria

Analyte (mg/kg)	Published Threshold Criteria - NEPM Commercial/Industrial	18-168-1	18-168-3	18-168-4	18-168-5
Total Metals					
Arsenic	3,000	6	7	<5	<5
Cadmium	900	<1	<1	<1	<1
Chromium	3,600	25	17	32	20
Copper	240,000	31	31	33	23
Lead	1,500	10	13	13	12
Nickel	6,000	16	14	16	11
Zinc	400,000	44	68	36	31
Mercury	730	<0.1	<0.1	<0.1	<0.1
Organochlorine Pesticides (OC)					
alpha-BHC		<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	80	<0.05	<0.05	<0.05	<0.05
beta-BHC		<0.05	<0.05	<0.05	<0.05
gamma-BHC		<0.05	<0.05	<0.05	<0.05
delta-BHC		<0.05	<0.05	<0.05	<0.05
Heptachlor	50	<0.05	<0.05	<0.05	<0.05
Aldrin		<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide		<0.05	<0.05	<0.05	<0.05
Total Chlordane (sum)	50	<0.05	<0.05	<0.05	<0.05
trans-Chlordane		<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan		<0.05	<0.05	<0.05	<0.05
cis-Chlordane		<0.05	<0.05	<0.05	<0.05
Dieldrin		<0.05	<0.05	<0.05	<0.05
4,4'-DDE		<0.05	<0.05	<0.05	<0.05
Endrin	100	<0.05	<0.05	0.06	<0.05
beta-Endosulfan		<0.05	<0.05	<0.05	<0.05
Endosulfan (sum)	2,000	<0.05	<0.05	<0.05	<0.05
4,4'-DDD		<0.05	<0.05	<0.05	<0.05
Endrin aldehyde		<0.05	<0.05	<0.05	<0.05

Analyte (mg/kg)	Published Threshold Criteria - NEPM Commercial/Industrial	18-168-1	18-168-3	18-168-4	18-168-5
Endosulfan sulfate		<0.05	<0.05	<0.05	<0.05
4,4'-DDT		<0.2	<0.2	<0.2	<0.2
Endrin ketone		<0.05	<0.05	<0.05	<0.05
Methoxychlor	2,500	<0.2	<0.2	<0.2	<0.2
Sum of DDD + DDE + DDT	3,600	<0.05	<0.05	<0.05	<0.05
Sum of Aldrin + Dieldrin	45	<0.05	<0.05	<0.05	<0.05
Organophosphorus Pesticides (OP)					
Dichlorvos		<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl		<0.05	<0.05	<0.05	<0.05
Monocrotophos		<0.2	<0.2	<0.2	<0.2
Dimethoate		<0.05	<0.05	<0.05	<0.05
Diazinon		<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl		<0.05	<0.05	<0.05	<0.05
Parathion-methyl		<0.2	<0.2	<0.2	<0.2
Malathion		<0.05	<0.05	<0.05	<0.05
Fenthion		<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2,000	<0.05	<0.05	<0.05	<0.05
Parathion		<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl		<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos		<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl		<0.05	<0.05	<0.05	<0.05
Fenamiphos		<0.05	<0.05	<0.05	<0.05
Prothiofos		<0.05	<0.05	<0.05	<0.05
Ethion		<0.05	<0.05	<0.05	<0.05
Carbophenothion		<0.05	<0.05	<0.05	<0.05
Azinphos Methyl		<0.05	<0.05	<0.05	<0.05

Source of Threshold Levels

- Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens – NSW EPA, 2005
- Contaminated Sites – Guidelines for the NSW Site Auditor Scheme – NSW EPA 1998
- Contaminated Sites – Guidelines for Assessing Service Station Sites – NSW EPA 1994
- National Environment Protection (*Assessment of Site Contamination*) Measure 1999 – NEPC 1999
- National Water Quality Management Strategy - Australian Drinking Water Guidelines 6 – NHMRC 2011

Table 4: PFAS Sediment Analysis - Human Health Screening Criteria

Analyte (mg/kg)	Industrial/Commercial	Public Open Space	18-168-2
PFOS (+ PFHxS)	20	1	0.0049
PFOA	50	10	<0.0002

Source of Threshold Levels

- PFAS National Environmental Management Plan – HEPA, 2018

Table 5: PFAS Sediment Analysis - Ecological Screening Criteria

Analyte (mg/kg)	Direct Toxicity	Indirect Toxicity	18-168-2
PFOS (+ PFHxS)	1	0.14	0.0049
PFOA	10	NA	<0.0002

Source of Threshold Levels

1. PFAS National Environmental Management Plan – HEPA, 2018

Laboratory results and Certificate of Analysis are presented in Appendix 1. Standard protocols were followed during the sampling and submission of samples. The laboratory completed a standard in-house quality assurance process using surrogate sampling techniques to ensure the results presented are considered reliable.

8. Discussion

8.1 Heavy Metals in Soil

No elevated concentrations of the tested heavy metals were identified. These results from the soil sampling are considered consistent with standard background levels and significantly below adopted NEPM health investigation thresholds.

8.2 Pesticides in Soil

Soils were analysed for a suite of organochlorine and organophosphorus based pesticides. All analytes returned results beneath the laboratory's limit of reporting. The results suggest that there were no pesticide contamination present. Pesticide screening include a range of more common pesticides used in agriculture and industrial activity.

8.3 PFAS in Sediment

PFAS was identified within the sediment sample, taken from a shallow stock dam located on the unnamed gully to the east of the development area and within Lot 101. The concentration identified is well below the human health screening criteria and ecological screening criteria for direct and indirect toxicity. The gully dam is filled from a catchment that extends onto the airport facility via a pipe culvert beneath the Oxley Highway. The gully extends through the airport to New Winton road to the south. Land to the south of this road is utilised for rural residential development which would not involve the use of PFAS based chemicals. The central part of the airport would have been utilised for fire fighting training and therefore historically may have used fire retardant materials containing PFAS. Given that the Tamworth airport has been identified by NSW EPA as a PFAS contaminated site, it is considered to be the likely origin of the trace PFAS levels detected.

This sediment sample was taken upstream of the proposed access easement across Lot 101. The preliminary access route crosses the gully but plans available at the time on this report indicate that the small gully dam would remain. The gully below the dam site is being eroded and therefore lacks silt deposition areas similar to the gully dam.

The concentration of PFAS in the sediment sample is significantly below published threshold levels. The results indicate levels of 0.0049 mg/kg and less than 0.0002 mg/kg (Below limit of reporting) for PFAS (+ PFHxS) and PFOA respectively. The PFAS levels for these analytes are

10 and 2 mg/kg respectively. The level of PFAS present in the sediment sample provides an indication that at some stage, this chemical has washed off the airport facility.

8.4 PFAS in Surface Water and Groundwater

Tamworth Regional Council have provided notification of a recent NSW EPA investigation of groundwater and surface waters from properties surrounding the Tamworth Airport, including the proposed development site. The notification states that no PFAS contamination has been identified at this time.

In consideration of the results of this recent EPA investigation and the lack of surface waters available onsite during inspection, no further investigation was considered necessary at this point in time.

It is recommended that the developer remain in contact with Tamworth Regional Council to ensure they are updated on any ongoing investigations and results for the PFAS investigations associated with the Tamworth Regional Airport and surrounds.

Comment was also sought from NSW EPA in relation to PFAS around the Tamworth Airport site. NSW EPA has published online advice indicating the presence of PFAS at the airport site. The Tamworth Regional Council investigation expanded the area of testing outside the main contaminated site identified by NSW EPA. The EPA online advice provides a warning which has now been superseded by the test result advice published by Tamworth Council.

9. Conclusion

SMK Consultants were engaged by Baiada Poultry to undertake a detailed site investigation in support of the EIS for the proposed poultry processing plant. The Investigation Area included the development site, the property of "Oakburn", and the eastern adjoining, TRC owned lands through which a new site access road will be constructed.

This investigation did not identify any contamination of concern within the property boundary of the "Oakburn" development site.

PFAS was detected within the watercourse sediment of Lot 101 to the east of the processing site. The PFAS was identified at a concentration below adopted investigation threshold levels for human health or ecological screening. The PFAS chemicals are considered at trace levels in the sediment retained in a small gully dam within the adjoining Council land. This trace PFAS concentration is considered most likely to occur onsite because of lateral migration from the upstream registered PFAS contaminated site, mainly the Tamworth Regional Airport. This migration pathway is not expected to impact directly upon the proposed poultry plant development site. No physical contact pathways are present between the gully and the development site, other than during a period where the proposed access road would be constructed.

Based on the methodology adopted for this investigation, the development site does not contain contaminated land that would impact construction of the Oakburn Processing Plant or pose an unacceptable risk to human health or the surrounding environment.

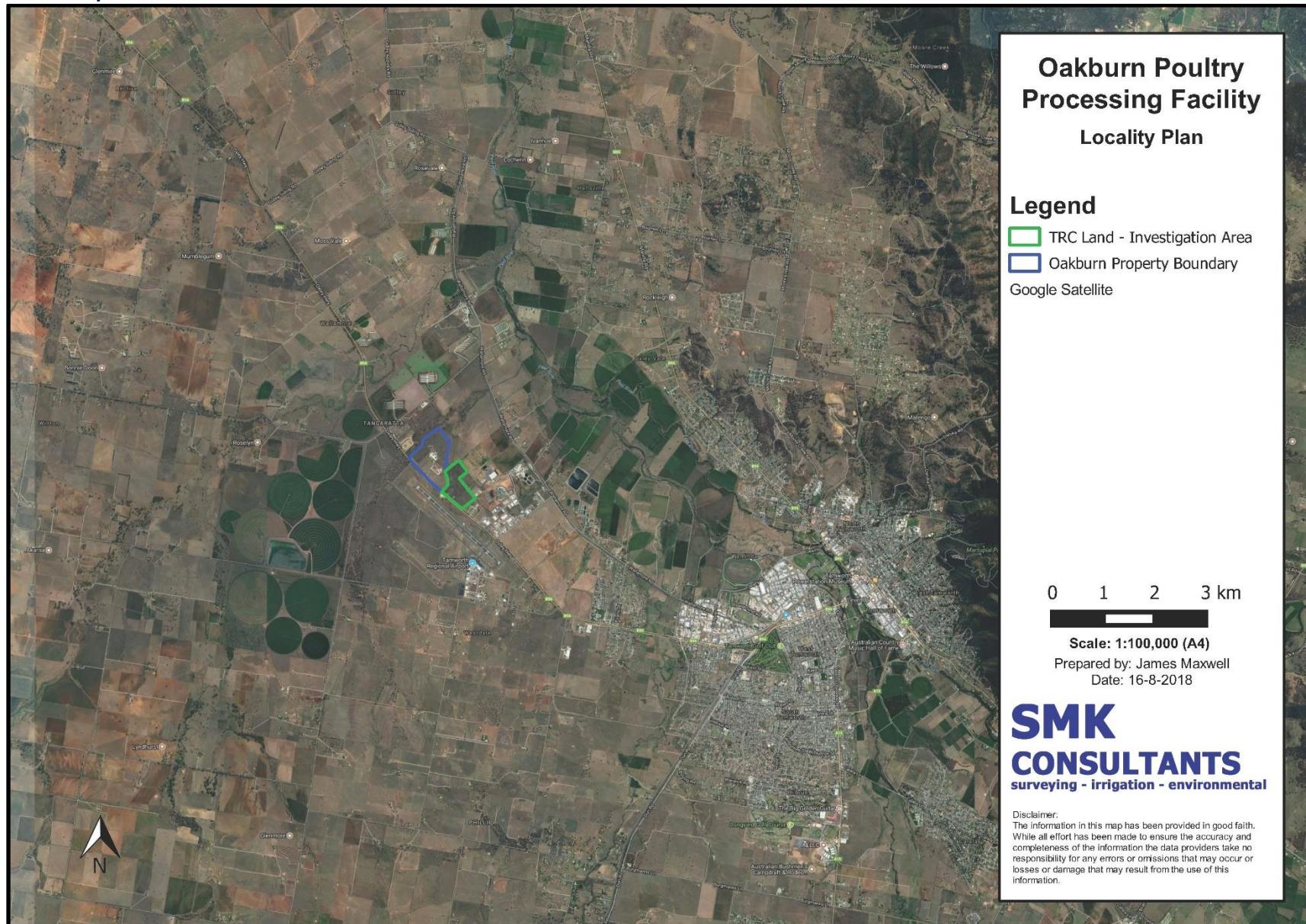
Limitations

This report is based on observation at the time of the investigation and history of the site provided by the property owner. The conclusions and recommendations are based on the scope of works adopted, the methodology presented in this report and the results of laboratory analysis undertaken for this investigation.

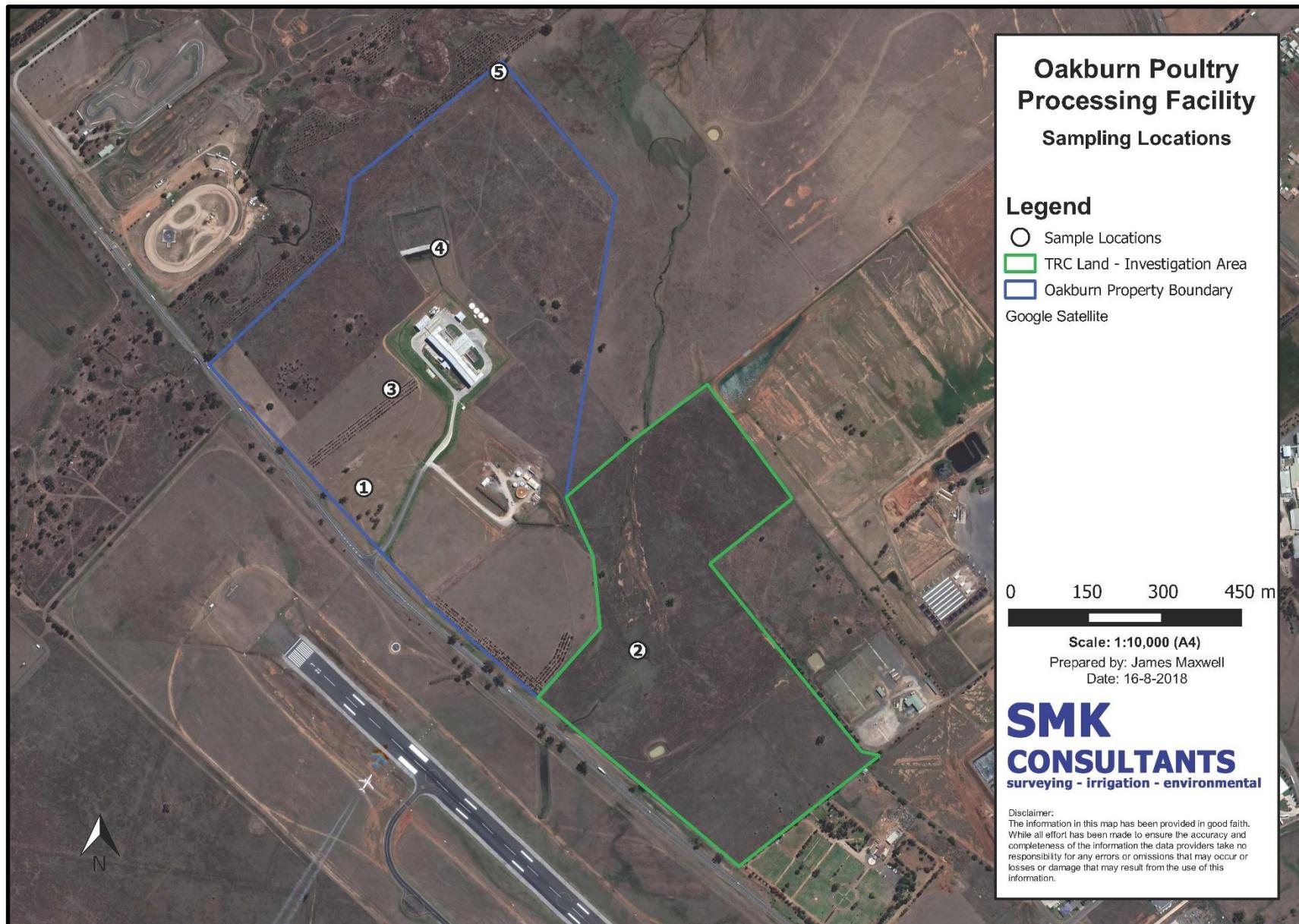
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- *Arsenic and DDT residues at cattle dip yards [Factsheet]* (NSW DPI, 2014)
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines*, Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000).
- *Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens* (NSW EPA, 2005)
- *Contaminated Sites – Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 1998)
- *Contaminated Sites – Guidelines for Assessing Service Station Sites* (NSW EPA, 1994)
- *Designing Sampling Programs for Sites Potentially Contaminated by PFAS* (NSW EPA, 2016)
- *Health based soil investigation levels*, (National Environmental Health Forum, 1999)
- *National Environment Protection (Assessment of Site Contamination) Measure* (National Environment Protection Council, 1999)
- *PFAS Environmental Investigation Sampling [Factsheet]* (Department of Defence, 2016)
- *PFAS National Environmental Management Plan – (Heads of EPA's Australian and New Zealand*, 2018)
- *Tamworth Airport: PFAS investigations* (NSW EPA, 2017)

Plan 1: Locality Plan



Plan 2: Soil Sample Locations



Appendix 1 – Laboratory Certificates



CERTIFICATE OF ANALYSIS

Work Order	: ES1818266	Page	: 1 of 7
Client	: SMK CONSULTANTS	Laboratory	: Environmental Division Sydney
Contact	: JAMES MAXWELL	Contact	: Customer Services ES
Address	: P.O.Box 774 39 FROME STREET MOREE NSW, AUSTRALIA 2400	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6752 1021	Telephone	: +61-2-8784 8555
Project	: 18/168 Oakburn Poultry Processing Plant	Date Samples Received	: 21-Jun-2018 08:20
Order number	: ----	Date Analysis Commenced	: 25-Jun-2018
C-O-C number	: ----	Issue Date	: 28-Jun-2018 15:47
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/364/15		
No. of samples received	: 5		
No. of samples analysed	: 5		

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
- Surrogate Control Limits

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
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini		Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

RIGHT SOLUTIONS | RIGHT PARTNER

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Work Order : ES1818266
Client : SMK CONSULTANTS
Project : 18/168 Oakburn Poultry Processing Plant



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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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.

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Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	18-168-1	18-168-2	18-168-3	18-168-4	18-168-5		
			Client sampling date / time	19-Jun-2018 00:00						
Compound			CAS Number	LOR	Unit	ES1818266-001	ES1818266-002	ES1818266-003	ES1818266-004	ES1818266-005
EA055: Moisture Content (Dried @ 105-110°C)										
Moisture Content	---	0.1	%	—	8.3	—	—	—	—	
Moisture Content	---	1.0	%	8.3	—	5.4	8.8	9.2		
EG005T: Total Metals by ICP-AES										
Arsenic	7440-38-2	5	mg/kg	6	—	7	<5	<5		
Cadmium	7440-43-9	1	mg/kg	<1	—	<1	<1	<1		
Chromium	7440-47-3	2	mg/kg	25	—	17	32	20		
Copper	7440-50-8	5	mg/kg	31	—	31	33	23		
Lead	7439-92-1	5	mg/kg	10	—	13	13	12		
Nickel	7440-02-0	2	mg/kg	16	—	14	16	11		
Zinc	7440-66-6	5	mg/kg	44	—	68	36	31		
EG035T: Total Recoverable Mercury by FIMS										
Mercury	7439-97-6	0.1	mg/kg	<0.1	—	<0.1	<0.1	<0.1		
EP068A: Organochlorine Pesticides (OC)										
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
beta-BHC	319-85-7	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
delta-BHC	319-86-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Aldrin	309-00-2	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
^ Total Chlordane (sum)	---	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Dieldrin	60-57-1	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Endrin	72-20-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05		
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	—	<0.2	<0.2	<0.2		

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Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID		18-168-1	18-168-2	18-168-3	18-168-4	18-168-5
Compound	CAS Number	LOR	Unit	19-Jun-2018 00:00				
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	—	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	—	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	—	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	—	<0.2	<0.2	<0.2
Pirimiphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	—	<0.05	<0.05	<0.05
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	—	<0.0002	—	—	—
Perfluoropentane sulfonic acid (PFPes)	2706-91-4	0.0002	mg/kg	—	<0.0002	—	—	—
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	—	0.0006	—	—	—
Perfluorooctane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	—	<0.0002	—	—	—

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Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID		18-168-1	18-168-2	18-168-3	18-168-4	18-168-5
Compound	CAS Number	LOR	Unit	19-Jun-2018 00:00				
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	---	0.0043	---	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	---	<0.0002	---	---	---
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	---	<0.001	---	---	---
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	---	<0.0002	---	---	---
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	---	<0.0005	---	---	---
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	---	<0.0002	---	---	---
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	---	<0.0005	---	---	---
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	---	<0.0005	---	---	---
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	---	<0.0005	---	---	---
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	---	<0.0005	---	---	---
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	---	<0.0002	---	---	---

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Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID		18-168-1	18-168-2	18-168-3	18-168-4	18-168-5
Compound	CAS Number	LOR	Unit	19-Jun-2018 00:00				
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	---	<0.0002	---	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	---	<0.0005	---	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	---	<0.0005	---	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	---	<0.0005	---	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	---	<0.0005	---	---	---
EP231P: PFAS Sums								
Sum of PFAS	---	0.0002	mg/kg	---	0.0049	---	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	---	0.0049	---	---	---
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	---	0.0049	---	---	---
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	89.8	---	91.6	97.5	87.4
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	62.9	---	65.9	66.8	62.8
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.0002	%	---	60.0	---	---	---
13C8-PFOA	---	0.0002	%	---	60.0	---	---	---



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Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP231S: PFAS Surrogate			
13C4-PFOS	---	60	130
13C8-PFOA	---	60	130

SMK CONSULTANTS

surveying – irrigation - environmental

ABN 63 061 919 003

39 Frome Street
PO Box 774
Moree NSW 2400
Ph 02 6752 1021
Fax 02 6752 5070
jmaxwell@smk.com.au

Client: Baiada Poultry Pty Ltd Project No: 18/168 Date: 20/06/18	SMK Consultants Analysis Request & Chain of Custody This form is to be completed and submitted with all samples		
Company: SMK Consultants	Project Name: Oakburn Poultry Processing Plant		
Contact: James Maxwell	ALS Quotation No: SYBQ/364/16		
Address: SMK Consultants, P.O. Box 774, Moree NSW 2400	Final Report: By Email		
Telephone: 02 6752 1021	Email <input checked="" type="checkbox"/>	Fax	Post*
Fax: 02 6752 5070	Turnaround Time: Standard		
Email: jmaxwell@smk.com.au	Date of Submission: 20/06/18		

Sample Description

Sample ID	Sample Type	Sample Description	Analysis Required	Sampling Date	Container Type/s
1	18-168-1	Soil Former House Site	S-2 & S-12	19/06/18	Orange glass
2	18-168-2	Soil Watercourse Dam Bed (Access Easement)	EP231X	19/06/18	Orange glass
3	18-168-3	Soil Proposed Processing Plant Construction Area (Composite)	S-2 & S-12	19/06/18	Orange glass
4	18-168-4	Soil Effluent Disposal Area	S-2 & S-12	19/06/18	Orange glass
5	18-168-5	Soil Northern Corner of Lot	S-2 & S-12	19/06/18	Orange glass

Environmental Division
Sydney

Work Order Reference

ES1818266

Telephone : +61 2 8784 8555

Calibration:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Cold Stored:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No				
Legal Sample:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Obtained by:	SMK Consultants					
Chain of Custody									
From:	SMK Consultants, 39 Frome Street, Moree 2400. Ph.02 6752 1021					To: ALS, 277 Woodpark Road, Smithfield NSW 2164. Ph. 02 8784 8555			
Date:	20/04/18					Date:			
Cold Stored:	<input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No			Containers Intact:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Relinquished By:	James Maxwell to Courier					Received By:	Rasika 21/6/18 8:20 am		

Appendix 2 - Procedures for Quality Control

SMK Consultants - Soil Sampling, Storage, Transport and Laboratory Procedures

1. Field sampling

- **Preparation of Equipment** - All equipment to be utilised for the excavation, collection and storage of field samples is to be cleaned prior to entering the investigation site.
- **Onsite Sampling** – All equipment used for sample collection and excavation is to be cleaned between sampling action. Cleaning to be done using clean water and cleaning equipment to be dried prior to the next sampling action to ensure that all soil and water is removed from the sampling implement.
- **Field Observations** – The sampler is to record date of sampling, location of sampling, conditions of sampling (weather), observation of condition of soil, odours, potential contamination, level and type of contamination.
- **Sampling Order** – Where it is envisaged that parts of the investigation area are more contaminated than other parts, the less contaminated areas are to be sampled before contaminated areas.

2. Sample Storage

- All samples are to be placed in cold storage (esky, fridge) and chilled to approximately 3-4 C° as soon as practicable.
- All samples are to be documented and forwarded to the selected laboratory as soon as practicable.

3. Transport of Samples

- Chain of Custody forms are to be prepared for inclusion with samples for Transport. Forms are to include project reference, Client, date of sampling, listing of laboratory testing to be done on each sample, sample container description, date of transport, and condition of samples at time of despatch.
- Laboratory to be advised by fax/email of pending arrival date for samples and type of testing to be done. (E.g. Forward a copy of COC form)
- Samples to be securely packed in esky with sufficient ice to maintain the sample temperature at the required level until received by the Laboratory.
- Courier to be contacted for pick-up of samples at latest possible time

4. Laboratory Analysis

- The laboratory is to prepare a response COC to indicate that samples were delivered in suitable condition to maintain integrity of samples, a list of testing required was received and expected date for issue of results.
- The Laboratory is to undertake the required and documented QC/QA procedures as set out by the national Association of Testing Authorities (NATA)
- Where the Laboratory has its own procedures, these procedures are to be documented and noted on the test results.
- Laboratory to maintain their appropriate system of internal check samples, duplicates and external laboratory comparisons.

5. Correlation of Field Observations and Laboratory Results

- Field observations are to be correlated with laboratory results.
- Where a laboratory results does not correlate with a field observation, the investigation must consider re-sampling of the site to provide additional evidence to determine whether the contamination is present.

6. Laboratory Duplication Requirements

- Laboratory duplications are required during a detailed site investigation where the risk of contamination and the potential consequences of contamination are considered as significant to human health or the environment, or where the laboratory operates this procedure as part of standard quality assurance management practices.
- Duplications are to be in two forms when it is determined that duplications are required.
- Field duplications are to be undertaken at a rate of one sample per 10-field samples. The field duplicate preparation involves obtaining sufficient sample material from the randomly selected point to prepare two samples. The duplicate is to be identified with a reference known to the sampler to ensure that the laboratory is unaware of the field duplicate identification or reference. The duplicate sample is to be tested for the same parameters as the original sample and then results are to be compared once laboratory results are provided. The scientist/sampler is then required to assess the results for the duplicated sample to determine variations in laboratory results. If a significant variation is noted, the laboratory should be advised to enable retesting of the sample to determine whether the results are correct or whether procedural errors have occurred in the laboratory.
- Laboratory duplicates and external duplicates to be determined by the Laboratories QC/QA system. Laboratory to be advised of duplicate requirements prior to submission of samples.

Appendix 3 – Onsite Groundwater Bore Log

NSW Office of Water Work Summary

GW013598

Licence: 90BL009046

Licence Status: CONVERTED

Authorised Purpose(s): STOCK,DOMESTIC
Intended Purpose(s): NOT KNOWN

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Cable Tool

Owner Type: Private

Commenced Date:
Completion Date: 01/01/1912

Final Depth: 34.70 m
Drilled Depth: 34.80 m

Contractor Name:

Driller:

Assistant Driller:

Property: OAKBURN

Standing Water Level

(m):

Salinity Description:

Yield (L/s):

GWMA: 005 - PEEL VALLEY
GW Zone: 002 - PEEL CATCHMENT
MISCELLANEOUS FRACTURED
ROCK

Site Details

Site Chosen By:

County	Parish	Cadastre
Form A: PARRY	PARRY.017	42
Licensed: PARRY	MURROON	Whole Lot //

Region: 90 - Barwon

CMA Map: 9035-1N

River Basin: 419 - NAMOI RIVER
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6560839.0
Easting: 293839.0

Latitude: 31°04'05.3"S
Longitude: 150°50'21.1"E

GS Map: -

MGA Zone: 0

Coordinate Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.30	-0.30	152			Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
21.30	21.30	0.00	(Unknown)	15.20					

Geologists Log Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.83	1.83	Surface	Topsoil	
1.83	34.75	32.92	Shale Nominal Water Supply	Shale	
1.83	34.75	32.92	Mudstone Nominal	Mudstone	