# Appendix F

ERA 53(a) (Composting) Report



# Proposed Environmentally Relevant Activity (53a) - organic material processing by composting

Proposed Scenic Rim Agricultural Industrial Precinct 6200 – 6206 Cunningham Highway, Kalbar, Queensland

Kalfresh Pty Ltd

Version 3 April 2020

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# ATTACHMENTS

ATTACHMENT A: SRAIP CONCEPT LAYOUT ATTACHMENT B: SRAIP ALLOTMENTS (SMART MAP) ATTACHMENT C: MAPPED MSES, WATERCOURSES AND BORES ATTACHMENT D: COMPOSTING AREA CONCEPT LAYOUT ATTACHMENT D: SOIL ANALYSIS LABORATORY CERTIFICATES ATTACHMENT F: GROUNDWATER BORE CARDS ATTACHMENT F: GROUNDWATER BORE CARDS ATTACHMENT G: RISK ASSESSMENT MATRIX ATTACHMENT H: PRELIMINARY LEACHATE POND AND STORMWATER BASIN DESIGN



# 1 INTRODUCTION

### 1.1 Purpose of the report

This report has been prepared by Precise Environmental (PE) on behalf of Kalfresh Pty Ltd (the client) for the Scenic Rim Agricultural Industrial Precinct (SRAIP) project at 6200 – 6206 Cunningham Highway, Kalbar, Queensland (the site) and is specific to the proposed Environmentally Relevant Activity 53(a) - organic material processing (> 200 tonnes per annum) – by composting.

The purpose of the report is to provide the administering authority with information required to support the proposed development application to undertake the abovementioned Environmentally Relevant Activity (ERA).

Accordingly, the report was prepared with the following key objectives based on Section 125 of the Environmental Protection (EP) Act 1994:

- To describe the proposed activity and context of the activity as part of the SRAIP
- To describe the land use and environmental setting of the site and its surrounds, potential sensitive receptors (PSR) and associated environmental values (EVs) and public health risks which may be affected by the activity
- To provide details of emissions or releases (potential contaminants) which may be generated by the activity
- To assess the risk of impacts on EVs and public health
- To describe the management practices proposed to be implemented to prevent or minimise adverse impacts
- To describe how the land will be rehabilitated after the activity ceases
- To describe the proposed measures for minimising and managing waste generated by the activity
- To details of any site management plan that relates to the land the subject of the project.

# 1.2 Scope of work

The following scope of work was undertaken in the meeting the report objectives:

- A desktop review of site and surrounding environmental characteristics through published information including geology sheets, soil maps, registered groundwater bores, EVs specified under the Environmental Protection (Water) Policy 1999, and other environmental data sets available through Queensland Globe and MinesOnlineMaps
- A desktop review of the local land uses and catchment sensitivity
- A detailed site inspection to observe the physical characteristics of the site and surrounding environment, and to complete characterisation of soils representative of the subject area through sampling, laboratory analysis, and other observation
- Assessment of emissions or releases which may be generated by the activity based on the proposed feedstocks and composting process, including potential contaminants and characteristic of concern (PCCoC), and risk of adverse impacts to EVs and public health
- Development of management strategies and general control measures to mitigate risk of adverse impacts
- Assessment of options for rehabilitation of the subject area.



# 1.3 Overview of proposed activity

Kalfresh propose to develop land surrounding its current vegetable processing facility located in Kalbar to create a rural enterprise precinct. The SRAIP will create a place where primary rural activities and secondary rural industry activities are located within proximity to each other and transport links to form a hub for the local food production industry. The current concept plan for the precinct is provided in Attachment A, including the location of the proposed composting activity.

The SRAIP will occupy a total of 40 hectares of land comprising six allotments (Attachment B), with the proposed composting activity utilising 15.4 ha (separate to the 40 hectare SRAIP) located in the northwest portions of Lot 3 and Lot 4 SP192221 (the subject area – Attachment C, Figure 1 and Attachment D). The proposed composting facility lots are comprised as follows:

- Lot for windrow pad (A) 3.92 hectares
- Lot for windrow pad (B) lot 2.57 hectares
- Lot for feedstock holding bay 2.08 hectares
- Lot for plant and equipment storage, parking, office amenities, waste storage and dam 2.72 hectares
- Lot for finished product storage 1.5 hectares
- Lot for unspecified activities 1.66 hectares

It is noted the above areas total 14.45 hectares. The balance of the area is occupied by the dam adjacent to the feedstock holding bay lot.

Kalfresh currently undertakes a small-scale composting operation over part of the subject area. The balance of the area is currently used for grazing which shall be developed to accommodate multiple compost pads, feedstock holding bays and other associated infrastructure across an area. Surrounding land to the north and east (i.e. topographically downgradient of the subject area) is owned and operated by Kalfresh for cropping and grazing. Land to the south and west is also used for grazing by Kalfresh (Lot 2 RP44024) and private landholders. A hardrock quarry is located ~ 100 m northwest of the subject area.

Production of up to 50,000 tonnes per annum (tpa) of total (finished) compost product is proposed as part of the overall SRAIP concept to provide high quality organic fertiliser for existing crop production within the precinct and other cropping by Kalfresh and independent local producers.

The activity will utilise typical open windrow composting methods from feedstocks including green waste, wood chip, vegetable waste, anaerobic digestion solids fraction, chicken litter and used mushroom substrate. All material that requires shredding or sorting to be suitable for composting shall be imported in pre-processed forms negating the need for onsite shredding or sorting.

The activity will not be utilising a GORE cover system which was a preliminary design option. Whilst a GORE cover can increase the rate of compost production, the organic composting methods described above will better suit Kalfresh's operational requirements.

### 1.4 Development application details

As proponents of the SRAIP (Kalfresh) are in the process of seeking 'coordinated' development approval(s)<sup>1</sup> for commercial / industrial land development component of the proposal along with new environmental authority approvals for the following ERAs:

 53(a) - Organic material processing more than 200t of organic material in a year - by composting the organic material (i.e. the subject activity)

<sup>&</sup>lt;sup>1</sup> The project has 'coordinated project' status under Part 4 of the State Development and Public Works Organisation Act 1971.



- 53(b) Organic material processing more than 200t of organic material in a year by anaerobic digestion (AD)
- 63(1bi) Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but not more than 1,500 equivalent persons
   where treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.

Environmental Authority approval for ERA 53(a) - organic material processing requires a site-specific application which shall be lodged by Kalfresh, which also proposes to make an application as the Registered Suitable Operator.

### 1.5 Compliance with model conditions

Preliminary assessment of the proposed activity and management strategies against the relevant Department of Environment and Science (DES) technical guidelines (Section 1.7) and Model Operating Conditions: ERA 53(a) – Organic material processing by composting, indicates the activity can comply with the model conditions (in the current form) subject to implementation of appropriate environmental control measures.

## 1.6 Relevant environmental legislation

Key legislation relevant to the activity is detailed below:

- Biosecurity Act 2015
- Environmental Protection Act 1994
- Environmental Protection Regulation 2019
- Environmental Protection (Water and Wetland Biodiversity) Policy 2019
- Bremer River environmental values and water quality objectives Basin No 143 (part) including all tributaries of the Bremer River 2010
- Environmental Protection (Air) Policy 2019
- Environmental Protection (Noise) Policy 2019
- Environmental Protection (Regulated Waste) Amendment Regulation 2018
- Land Protection (Pest and Stock Route Management) Act 2002
- Nature Conservation Act 1992
- Vegetation Management Act 1999
- Water Act 2000
- Waste Reduction and Recycling Act 2011
- Work Health and Safety Act 2011.

### 1.7 Relevant standards and guidelines

The following documents describe standard and guidelines applicable to the activity:

Erosion & Sediment Control

• Best Practice Erosion and Sediment Control (IECA 2008)

Environmental Management Systems

- AS ISO 14001: 2016 Environmental Management Systems
- AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines

### Feedstock and end-product quality

- AS 4454-2012: Composts, soil conditioners and mulches
- Determination of Acceptable Levels of Preservative Treated Timber in Timber Reuse Applications (J. Hann et.al. 2010)

Hazardous materials

- AS 1940: 2004 The storage and handling of flammable and combustible liquids
- Managing risks of hazardous chemicals in the workplace Code of Practice (SWA 2018)

<u>Noise</u>

• Noise Measurement Manual (ESR/2016/2195, DEHP 2013a)

### Water quality

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)
- AS/NZS 5667-1998: Water quality Sampling
- Monitoring and Sampling Manual (DES 2018a)
- Queensland Water Quality Guidelines (DEHP 2013b)
- Guideline: Environmental Protection (Water) Policy 2009 Deciding aquatic ecosystem indicators and local water quality guidelines (DES 2018b)

Technical guidelines - application / activity requirements

- Guideline: Open windrow composting under environmentally relevant activity 53(a) organic material processing by composting (DES 2018c)
- Guideline: Application requirements for activities with waste impacts (DES 2019)
- Guideline: Application requirements for activities with impacts to water (DES 2017a)
- Guideline: Application requirements for activities with noise impacts (DES 2017b)
- Guideline: Application requirements for activities with impacts to land (DES 2017c)
- Guideline: Application requirements for activities with impacts to air (DES 2017d)
- Guideline: Noise Control Planning for Noise Control (DEHP 2015)
- Guideline: Odour Impact Assessment from Developments (DEHP 2013c)
- Compost guideline (EPA 2013)

### 1.8 Limitations

The findings of this report are based on the objectives and scope of work outlined above. PE performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties or guarantees, express or implied, are made. Subject to the scope of work, PE's assessment is limited strictly to identifying typical environmental conditions associated with the subject property, and does not include evaluation of any other issues.

This report does not comment on any regulatory obligations based on the findings, for which a legal opinion should be sought. This report relates only to the objectives and scope of work stated, and does not relate to any other works undertaken for the client. The report and conclusions are based on the information obtained at the time of the assessment. Changes to the surface and subsurface conditions may occur subsequent to the investigation described herein, through natural processes or through the intentional or accidental addition of contaminants, and these conditions may change with space and time.

The results of this assessment are based upon site inspection and fieldwork conducted by PE personnel and information provided by the client and site management. All conclusions regarding the property area are the professional opinions of the PE personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, PE assumes no responsibility or liability for errors in any data obtained from regulatory agencies, information from sources outside of PE, or developments resulting from situations outside the scope of this project.

# 2 SITE CHARACTERISTICS AND SURROUNDING ENVIRONMENT

### 2.1 Site and allotment detail

Site and allotment details are provided in Table 1.

Table 1. Site and allotment de	etail.			
Aspect	Detail			
Local Government	Scenic Rim Regional Council (SRRC)			
Zoning	Rural			
Address	6200 – 6206 Cunningham Highway, Kal	bar, Queensland		
Real property description	Lot 3 SP192221	Lot 4 SP192221		
Area in hectares (ha)	48.93	61.16		
Current land use and site structures	The primary use of the subject area is c (~ 1.7 ha) is used for small-scale compo	attle grazing. A portion of the land osting of organic material.		
New land use	Organic material processing by compo	osting		
Surrounding land uses	The primary use of the surrounding area vegetables and cattle grazing. The ma Highway operate as a distribution cent bulk sale.	a is farmland for growing and processing in structures located along Cunningham re to wash, sort and process vegetables for		

### 2.2 Site characteristics

A summary of the physical characteristics is provided in Table 2.

Aspect	Detail
Subject area	15.4 ha
Site elevation	Old Globe contour layer indicates site elevations of 90 – 120 m AHD
Slope (%)	Gently – moderate inclined (~10 %)
Slope aspect	Downward to the northeast
Q10 and Q100 flood levels	80 - 83 m AHD (Q10 and Q100)*
Vegetation	Short grass
Exposure	High sun and wind exposure

A quarry is located ~ 100 m to the northwest at the nearest point.

Table 2. Physical characteristics of the subject area.

\* Developed flood level (6/12 hr critical duration) nearest to subject area (Sourced Cardno 2019).

### 2.3 Soil characteristics

A site inspection was conducted by PE on 21 October 2019 which included the sampling and analysis of soils at onsite locations outside, yet representative, of the subject area.

### 2.3.1 Soil type

Four boreholes were constructed by PE using a hand auger to a maximum depth of 0.9 m in the area proposed for effluent irrigation (BH1 and BH2), and 0.6 m in the proposed digestate liquid fertiliser (DLF) irrigation area (BH3 and BH4) adjacent to the subject area. The soil profiles observed were consistent with other onsite observations at open cut borrow pits at the site.

The encountered soil profiles were as follows:

<u>BH1</u>

0.0 - 0.1 m (Natural) Silty Sand, fine to medium grained sand, grey brown, moist.

0.1 – 0.6 m Clayey Gravelly Sand, fine to medium sized angular gravel, fine to medium grained sand,

yellow brown, moist.

0.6 m - Borehole terminated in extremely weathered granite.

### <u>BH2</u>

0.0 - 0.6 m (Natural) Light to Medium Clay, grey with orange mottles, moist.

0.6 - 0.9 m Clayey Sand, fine to medium grained sand, yellow brown, moist.

0.9 m – Borehole terminated extremely weathered rock.

<u>BH3</u>

0.0 – 0.6 m (Natural) Light to Medium Clay, with trace of fine to medium grained sand, orange, moist.

0.6 m Extremely weathered bedrock (granite).

### <u>BH4</u>

0.0 – 0.4 m (Natural) Light to Medium Clay, with trace of fine to medium grained sand, orange, moist.

0.4 – 0.8 m Medium Clay, with trace of fine to medium grained sand, occasional gravel and weather granite fragments, brown, moist.

0.8 m Extremely weathered bedrock (granite).

### 2.3.2 Soil erodibility indicators

Soil laboratory analysis for investigation of the sewage (wastewater) treatment plant (STP) and DLF irrigation areas included parameters indicative of soil erodibility, dispersiveness (sodicity). Results for these parameters are summarised in Table 3, with the laboratory certificate of analysis provided in Attachment E.

The samples (BH1 and BH2) collected ~ 400 m east of the subject area had low soluble salts (measured by electrical conductivity - EC) and organic carbon (OC %) which in isolation are weak indicators of dispersive soils. Results for the sample collected nearest to the subject area also presented indicators of slightly to moderately sodic soils based on the low OC and Ca:Mg ratio, Exchangeable Sodium Percentage ESP.

Notwithstanding the above, the overall erosion risk is low given the very slight slope to be adopted for construction of compost pads and operational areas and maintenance of ground cover proposed for non-operation areas.

	Indicators of increased propensity for slaking and dispersion (DPIRD 2019)	Sample			
Parameter		BH1 (0.1 - 0.25)	BH2 (0.0 - 0.6)	BH3 (0.3 - 0.6)	BH4
EC <sub>1:5</sub> (mS/m)	< 20	4	5	30	-
OC (%)	Low OC: < 1%	0.933	1.40	0.688	-
ESP (%)	6 – 10 % (slightly - moderately sodic)	-	-	6.6	-
Ca:Mg ratio	< 2	-	-	1.91	-

Table 3. Soil chemistry indicators of soil erosion potential.

#### Table notes

(-) denotes not analysed.

Grey shading denotes positive indicator.

# 2.4 Geology and hydrology

Geology details for the site and surrounds are provided in Table 4. Hydrology characteristics are detailed in Table 5. Mapped water courses and groundwater bores are shown in Attachment C, Figure 1. Bore cards for the nearest registered bores are provided in Attachment F.

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Aspect	Detail
Acid sulfate soil	There is no acid sulfate soil mapping associated with this site.
Geology	The geology across the site is mapped as 1:500,000 as Quaternary: Flood plains, river terraces (Geological Survey of Queensland, Moreton Geology 1978). Local soil mapping 1:25,000 shows the site classified as Bromelton (eroded phase) with soils comprising dark clay loam or light clay with neutral or alkaline structured clay subsoil (Qld Department of Primary Industries 1979).

Table 4. Regional geology.

### Table 5. Hydrology details for the site and surrounding area.

Aspect	Detail
Direction of stormwater drainage	Stormwater is expected to follow the natural contour of the gullies flowing northeast from the subject area to low-lying land towards the centre of the SRAIP development area (Attachment C, Figure 1). Water draining from the soak shall flow to the overland (stormwater) flow path to be constructed around western perimeter of the proposed SRAIP subdivision. This drainage line will flow north through SRAIP land and adjacent properties before flowing east under Cunningham Highway to Warrill Creek.
Flooding	The site is mapped as low to high flood hazard.
	The composing area is not mapped as a flood hazard.
Onsite surface waters	Numerous ephemeral gullies are located on the site which are expected to flow seasonally or in a heavy rain event – which flows to Warrill Creek ~2.6 m northeast. These gullies converge at the low-lying land towards the centre of the SRAIP development area (Attachment C, Figure 1) which is permanently inundated from process water from the existing vegetable processing facility which is circulated (recycled) in various areas of the site areas for agriculture irrigation purposes. There are also several dams located in the northern portion of the site. The closest dam to the composting area is 535 m east.
Onsite groundwater bores	There are five onsite operational bores located within Lot 2 SP192221 which are associated with the existing Kalfresh processing facility; the nearest of these is located 830 m from the composting area. A non-operational bore exists in Lot 2 and another in Lot 3 SP192221. Onsite records indicate a standing water level (SWL) of ~ 10 m below ground level (BGL) in one of the shallow bores (total depth - 16.3 m) which would draw from the alluvial aquifer based on local registered bore reports.

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Aspect	Detail				
Registered groundwater bores in the locale (Queensland Globe)					
Nearest bores to feature with relevant information	RN138334 – within Lot 2 1.1 km southeast	RN14310270 1.3 km east	RN124727 1.4 km southeast		
Status	Existing	Existing	Existing		
Use / past use	Water supply	Sub-artesian monitoring	Water supply		
Borehole depth (m)	141.7 m	17.3 m	518.0 m		
Screen depth (m)	129.5 – 141.7 m	14.9 – 15.9 m	No data		
Soil profiles	Varying clay gravel profiles from 0.0 – 15.8 m. Underlying material comprises granite, basalt, shale to the total depth.	0.0 – 12.1 m clay; underlain by gravel to 15.8 m. Basal from 15.8 – 17.3 m.	0.0 – 15.0 m clay; 15.0 – 36.0 sandstone and tuff. 36.0 – 518.0 m mixture of basalt, coal, sandstone and shale.		
Water bearing zone / upper aquifer depth	134.7 m	12.1 m	36.0 m		
SWL (m)	17.7 m	2.05 - 6.24 m	10.0 m		
Upper aquifer status	Confined in basalt	The pressure head indicates this is a confined / semi-confined aquifer.	Semi-confined to confined.		
Quality detail - bore card	EC 1800 µS/cm (saline)	No data.	Described as 'Potable' in aquifer section.		

SWL = standing water level

EC = electrical conductivity

### 2.5 Potential sensitive receptors and environmental values

A summary of land (including water) based PSR and EVs as mapped by various regulatory authorities and government agencies is provided in Table 6. An overlay of the mapped land-based environmental receptors is provided in Attachment C, Figure 1.

Details of air, noise and odour related PSR are provided in the SRAIP air quality and noise assessment reports (MWA 2020a & MWA 2020b) provided in draft impact assessment report Appendix P and Appendix Q.

Table 6. Summary of potential sensitive receptors	Table 6	. Summary	of potential	sensitive	receptors.
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Potential sensitive receptors	Details
Queensland Globe mapping	
Matters of state	An MSES high ecological significance wetland is located ~ 2 km downstream.
environmental significance	No other declared high ecological value waters (watercourses or wetlands)
(MSES) - downstream waters	are located within a 5 km radius.
and wetlands	



Potential sensitive receptors	Details
Matters of state environmental significance - vegetation and habitat	<ul> <li>MSES regulated vegetation (defined watercourse) transects the eastern portion of composting area, through the SRAIP and adjacent land, and down to Warrill Creek (1.4 km southeast). Warrill Creek is also defined as a regulated vegetation watercourse.</li> <li>The following MSES mapped areas are located hydraulically upgradient of the subject area: <ul> <li>Essential habitat – 450 m west and northeast (hydraulically upgradient)</li> <li>Wildlife habitat (threatened and special least concern animal) – 1.2 km northwest</li> <li>Regulated vegetation (Category B - endangered or of concern) – 900 m southwort</li> </ul> </li> </ul>
Wetland protection area	None mapped within a 5 km radius.
Downstream Water Act defined watercourses	Warrill Creek is a defined watercourse for the purposes of the Water Act.
Downstream dams and other waterbodies	Two dams exist along the watercourse draining from the SRAIP sites northeast corner, approximately 1.3 km downstream. The dam proposed for onsite use as part of the SRAIP development is located 65 southeast.
Groundwater dependant ecosystem	The ephemeral gully and Warrill Creek are mapped as 'surface GDE areas' (81-100% derived GDE – moderate confidence) - alluvial aquifers with permanent / near permanent connection between surface water and groundwater. Surface expression GDEs (e.g. wetlands, regional ecosystems) are dependent on the discharge of groundwater to maintain their ecological processes / communities.
Fish habitat and marine parks	None mapped within a 5 km radius.
Mines Online Maps (DNRM 2017)	
National Parks	Moogerah Peaks National Park ~ 5.1 km southeast
	Main Range National Park ~ 13.7 km west
World Heritage Area (WHA)	Main Range National Park ~ 13.7 km west
Native Title	~ 1 km south
Environmental Protection (Wate	r and Wetland) Policy 2019 (EPP)

The watercourses onsite and immediately downstream are tributaries of Warrill Creek mapped as lowland freshwaters of middle Warrill Creek. The Bremer River environmental values and water quality objectives Basin No 143 (part) including all tributaries of the Bremer River (EHP 2010) applies to these watercourses. Definitions of these EVs and corresponding WQOs are detailed therein.

Environmental values (EVs) for groundwater in the Bremer River catchment	Aquatic ecosystem, irrigation, farm supply/use, stock and drinking water.
EVs for middle Warrill Creek – lowland freshwater	Aquatic ecosystem, irrigation, farm supply/use, stock water, human consumer, primary/secondary/visual recreation, drinking water and cultural/spiritual values.
EVs for other freshwater tributaries (of Warril Creek)	Irrigation, farm supply/use, stock water, secondary/visual recreation, and cultural/spiritual values.

Potential sensitive receptors Details		
Built environment		
Nearest residential dwellings	14 dwellings ≥ 600 m from subject area	
Nearest commercial activities	Surrounding cropping and grazing	
	Adjoining quarry (southwest)	
	Fertiliser supply activity (~ 600 m east)	
	Proposed SRAIP industrial precinct allotments (≥ 400 m southeast)	

### 2.6 Local meteorology

A summary of local mean monthly rainfall and temperature for the period 1941 to October 2019 is provided in Table 7.

MONTHLY	J	F	М	А	М	J	J	А	S	0	Ν	D
Rainfall (mm)	115.4	119.9	85.7	54.2	52.4	46.8	37.2	28.3	33.1	73.4	80.9	119.3
Max. temp (°C)	31.2	30.5	29.4	27.2	24.1	21.6	21.3	22.9	25.7	27.8	29.6	30.8
Min. temp (°C)	19.6	19.5	17.8	14.0	10.0	7.1	5.3	6.2	9.5	13.3	16.3	18.4

 Table 7. Mean monthly rainfall and temperature summary.

Source: Bureau of Meteorology (BOM) for Amberley AMO (Weather station 40004).

### 2.7 Surface water quality

Baseline water quality data for downstream waters is not currently available. Section 5.5 and Section 5.6 outline the water quality monitoring program to be implemented as part of the activity, including baseline surface water monitoring.

# 2.8 Groundwater quality

Baseline water quality data for downstream waters is not currently available. The mitigated risk of adverse impacts to groundwater has been assessed as low (Refer Section 4) based on the following:

- Low permeability leachate barriers to be incorporated in construction of the compost pads, feedstock holding bays, finished product storage and leachate collection system
- Clayey soil profile and relatively shallow bedrock expected across the subject area based on information for the adjacent land
- Depth to the upper water bearing zone (WBZ) and depth of overlying confining strata based on records for registered bores located on the low-lying adjacent land, which indicate the depth to local WBZ is at least 10 m BGL and confined below bedrock and/or > 10 m of clay soil (Refer Table 5)
- Local GDE are mapped as surface expression GDE i.e. Potential contaminant pathways are groundwater to surface water (not vice versa) which is mitigated by the leachate barrier and containment system
- Proposed reuse of leachate in the SRAIP anaerobic digestor.

Investigation of existing or future groundwater quality is therefore not necessary for the purposes of the activity, at this stage.



# 3 DETAILS OF COMPOSTING ACTIVITY

### 3.1 Location and layout

The composting activity shall operate over 15.4 ha of land (i.e. the subject area) located in the southwest corner of the SRAIP development (Attachment A). The site's elevation's ranging between ~ 90 – 120 m AHD, above the modelled Q10 and Q100 flood levels of 80 - 83 m AHD (Cardno 2019).

The concept layout for the composting activity is shown in Attachment D. Transition from the existing operation shall involve expansion of the existing southwest compost pad to accommodate feedstock storage, composting, and finished product storage. The existing northeast pad shall be used for composting until finished product storage is relocated to this area. All drainage (leachate) from these material handling areas shall report to leachate basins.

Plant and equipment storage, carparking and amenities are located central to the material handling pads. Stormwater from these areas shall report to the proposed stormwater basin. Site access is by the existing internal (unsealed) road which will connect with the sealed SRAIP precinct access road off the Cunningham Highway. Non-operational areas will remain as grazing pasture.

### 3.2 Flow process

The activity will utilise open windrow composting methods which involve the general process and integration with the SRAIP concept, as described in Figure 2.



Figure 2. Flow process - windrow composting (LP = Leachate pond).



### 3.3 Infrastructure, plant and equipment

Descriptions of the infrastructure, plant and equipment directly associated with the activity are summarised in Table 8. An indicative site layout showing fixed infrastructure is provided in Attachment D.

Infrastructure, plant and equipment	Details
Compost pads	Windrow Pad (A) 3.92 ha and Pad (B) 2.57 ha constructed by expansions of existing southwest pad by cut-fill within the subject area. Pads shall be constructed with a low permeability base and wearing layer (gravel / rock) with leachate collection system.
Feedstock holding bays	Open bays of 2.08 ha constructed as part of the windrow pads.
Finished product storage	Open storage area of 1.51 ha constructed by expansion of existing northeast windrow pad by cut-fill within the subject area.
Plant and equipment storage & maintenance	Onsite storage on constructed hardstand area. Existing maintenance facilities located at Kalfresh processing complex on Cunningham Highway.
Leachate containment system (LCS)	<ul> <li>LCS incorporating:</li> <li>leachate barrier system</li> <li>100 % separation of leachate and stormwater</li> <li>minimum design capacity for one-in-ten ARI (24 hour) storm events plus additional desired storage for leachate reuse and/or evaporation.</li> </ul>
Stormwater management system	<ul> <li>Stormwater drainage and basin incorporating:</li> <li>100 % separation leachate and stormwater</li> <li>minimum design capacity for one-in-ten ARI (24 hour) storm events</li> <li>spillway design for 50 year ARI critical event.</li> </ul>
Windrow turner	Task specific windrow turner as per below examples.
	Output capacity of each machine shall vary to produce windrow height and width based on pad area and target productivity rates.
	Start-up phase shall utilise trailer turner (~ 1 x 1.8 m H/W) driven by standard tractor (e.g. 70 – 150 hp).
	Expansion phase shall utilise self-propelled turner (~ 2.0 m x 5.5 m H/W) to achieve higher productivity rates.
	Fractor-assisted trailer windrow turner.Self-propelled windrow turner.
Front end loader	Standard front-end loader (e.g. small-wheel loader – 3 – 5 m³ bucket)
Tanker truck(s)	Standard water tanker style truck(s) with two-way pumping system.
Body (tip) trucks	Standard body trucks (e.g. 13 – 25 t dual axle, truck & dog or semi tippers)
Ancillary equipment	Portable pumps and hoses (e.g. 2inch flex-drive)

 Table 8. Summary of infrastructure, plant and equipment.

# E

# 3.4 Feedstock quantities and compost productivity rates

The maximum productivity rate for the activity shall be up to 50,000 tpa of total compost product based on ~ 65% conversion of the feedstocks to be utilised, as detailed in Table 9. Digestate liquid fertiliser shall be added as required for compost wetting to maintain optimum windrow moisture. At peak capacity the activity will produce 4 – 5 batches of 10,000 t – 12,500 t per annum based on a typical 12 week composting period per batch.

Feedstock	Approx. quantity (tpa)	Primary source	Category – potential environmental impact	
Green waste	Up to 46,000	Municipal green waste – tub ground	Low	
		Wood chip - local tree loppers		
Digestate solid fraction	Up to 13,500	SRAIP anaerobic digestor	Low - medium	
Vegetable food waste	Up to 9,000	SRAIP processing facilities	Low	
Chicken litter	Up to 5,500	Local producers	Low - medium	
Mushroom substrate	Up to 5,500	Local producers	Low	

### Table 9. Feedstock summary.

### Table notes

Feedstock category (potential environmental impact) derived from Guideline: Open windrow composting under environmentally relevant activity 53(a) - organic material processing by composting (DES 2018)

# 3.5 Feedstock and product handling

All feedstock and finished product shall be placed directly into open holding bays with leachate collection located in the southwest portion of the subject area (Attachment D). Basic construction details of the holding bays are provided in Section 5.7.

Feedstock materials shall be imported to the site by supplier operated trucks (i.e. green waste, chicken litter, mushroom substrate), or relocated internally by Kalfresh operated trucks from SRAIP processors and AD facility. All feedstocks shall be subject to strict acceptance criteria (Section 5.2) including pre-processing (shredding and sorting) prior to receipt at the composting site.

Onsite storage of raw materials shall be necessary to acquire enough feedstock to supply the next batch of compost. Proposed storage quantities and timeframes for each feedstock at any given time are provided in Table 10, which take into consideration quantities required, availability, and leachate and odour risks associated with specific materials.

Feedstock	Approx. quantity (t)	Holding time (weeks)
Green waste	Up to 7,500	Cumulatively up to 14 weeks
Digestate solid fraction	Up to 2,500	1 - 2 days – imported from AD storage building as required
Vegetable food waste	Up to 1,500	Cumulatively up to 4 weeks
Chicken litter	Up to 1,000	Cumulatively up to 4 weeks
Mushroom substrate	Up to 1,000	Cumulatively up to 14 weeks

Table 10. Feedstock storage – maximum quantities and holding times.

On commencing a new compost batch, a loader, or similar plant, shall be used to transfer feedstock from the holding bays to the composting pads for mixing and windrow formation by a windrow turner. Finished product shall be transferred from the compost pad(s) into stockpile as soon as practicable following completion of the composting cycle (refer Section 3.6). A loader, or similar plant, shall be used to load Kalfresh or customer operated trucks with the finished product for on-site or external use.

### 3.6 Windrow preparation and blending

All feedstocks will be tested for C:N ratio and the feedstock ratios will be calculated to ensure that the C:N ratio of the aggregate mixture is within the 25-30:1 target ration.

Green waste will be laid out in lines with front end loader (FEL) first. Feedstocks will be blended as per calculations by 'patting down' wood chips with the FEL and laying calculated quantities of additional feedstocks along the length of the windrow to achieve the target C:N ratio. The windrow turner will then pass over the feedstocks to blend and lay out windrow. Further blending will occur during subsequent windrow turns.

Blending ratios will be subject to change depending on feedstock availability however will abide by the following rules:

- C:N ratio between 25-30:1
- Digestate solid fraction to green waste/wood chips ratio between 1:3 and 1:4

Documented standard operating procedures (SOP) will be prepared for the operator which aligns with the methodologies specified above, and the conditions set within the environmental authority.

# 3.7 Windrow turning and pasteurisation

Windrow turning and pasteurisation shall follow the process detailed in AS 4454-2012: Composts, soil conditioners and mulches, as summarised below:

- Windrows will be turned at least four times to ensure all material is exposed to at least 55°C for three consecutive days and for at least 15 days during the composting period:
  - temperature will be monitored using a temperature gauge that stores data electronically.
  - when the internal windrow temperature has been maintained for three consecutive days above 55°C the windrow will be turned.
- Water is added, from both the facility runoff (onsite leachate and/or stormwater) and bulk water supply (if required), to ensure moisture content of between 40% and 60% is maintained.
- The compost is windrowed at the above temperature requirements and turned for a minimum of 12 weeks.
- Once the pasteurisation process is complete the material will be stockpiled for internal use, or sale.

# 3.8 Compost area design and construction

Operational areas for the compost pads, holding bays and finished product storage shall be constructed with low permeability bases and walls as part of the overall leachate barrier and collection system. The concept layout of the site (Attachment D) has been designed to maintain separate leachate collection and stormwater management systems to the extent practicable. Further information on the management system layout is provided in Section 5.5 and 5.6.

Design and construction standards and principles of these and other key environmental aspects of the activity's establishment and operation such as site access, waste storages are discussed in Section 5.

# 4 CONCEPTUAL MODEL - PCCOC AND ENVIRONMENTAL RISKS

Potential contaminants and characteristics of concern, potential pathways, and risk of adverse impacts to potential sensitive receptors associated with the activity are summarised in Table 11.

Inputs used in the conceptual model include, yet are not limited to, the site characteristics, feedstock type and sources, *modus operandi*, reference material, related technical reports (MWA 2020a, MWA 2020b, PE 2020) described in previous sections. Risks ratings were derived based on AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines using the risk assessment matrix included in Attachment G. The preliminary mitigated risk ratings consider implementation of environmental management measures outlined in Section 5.

The risk ratings presented in the Environmental Risk Assessment Register (Attachment B, Table D) are to be interpreted as follows:

- Low: Risk can be adequately managed by routine procedures
- Medium: Control measures other than administrative controls are needed
- High: Significant risk control measures need to be implemented, and must be maintained until such time as a reduced risk level is demonstrated.
- Extreme: The aspect of the operation causing the risk is not to be undertaken without extensive risk control and mitigation measures in place and such measures must be maintained for the duration of the operation.

Table 11. PCCoC, pathways and PSR risks associated with activity.

Flowers	PCCoC	Potential exposure		Risk ratings		
Liement		pathways	Psk potentially exposed to adverse impacts	Unmitigated	Mitigated	
Feedstock	Chemical contaminants from green waste - timber preservatives <sup>1</sup> , other heavy metals and residual (modern) pesticides <sup>2</sup> , and tannins Chemical contaminants from digestate solids <sup>3</sup> Chemical contaminants from mushroom substrate - heavy metals Pathogens – all feedstocks <sup>2, 3</sup> Nutrients (leachable)	Onsite leaching to: - soil - surface water - groundwater	Refer 'Leachate'			
	Air emissions (particulates / dust)	Airborne release	Refer MWA 2020a	Medium (C3)	Low (D2)	
	Offensive odour emissions	Airborne release	Refer MWA 2020a	High (C4)	Medium (D3)	
	Weed seed / propagules	Wind	Viability of adjacent agricultural land	High (C4)	Medium (D3)	
			Surrounding ecological EVs (MSES essential habitat)	High (C4)	Medium (D3)	
		Leachate releases to land / waters	Refer 'Leachate'			
		Compost use	Refer 'Compost'			
			Surrounding land / crop (value / viability)	High (C4)	Low (E3)	
	Fire ants	Spreading (onsite)	Surrounding ecological EVs (MSES essential habitat)	High (C4)	Low (E3)	
		Compost use	Refer 'Compost'			
	Foreign matter (e.g. metal, plastics)	Compost use	Refer 'Compost'			
			Neighbouring properties	High (C5)	Low (E3)	
	Fire (spontaneous combustion)	Spreading	Surrounding ecological EVs (MSES essential habitat)	High (C5)	Low (E3)	

	PCCoC	Potential exposure		Risk ratings			
Element		pathways	PSR potentially exposed to adverse impacts	Unmitigated	Mitigated		
Compost			Land / crop (value / viability)	High (C4)	Low (E3)		
			Food consumer (health)	Medium (D4)	Medium (E4)		
	Feedstock chemical contaminants and pathogens	Land application of end-product	Downstream surface water users (water quality)	High (C4)	Low (E3)		
		(Compost use)	Downgradient groundwater users (water quality)	Medium (E4)	Low (E1)		
			Downstream ecological EVs	High (C4)	Low (E3)		
	Feedstock chemical contaminants and pathogens, and leachable nutrients	Leaching (onsite stored product)	Refer 'Leachate'				
	Air emissions (particulates / dust)	Airborne release	Refer MWA 2020a	Medium (C3)	Low (D2)		
	Offensive odour emissions	Airborne release	Refer MWA 2020a	Medium (C3)	Low (D2)		
	Weed seed / propagules	Wind	Viability of adjacent agricultural land	High (C4)	Low (E3)		
			Surrounding ecological EVs (MSES essential habitat)	High (C4)	Low (E3)		
		Leachate releases to land / waters	Refer 'Leachate'				
		Compost use	Applied land / crop (value / viability)	High (C4)	Low (E3)		
			Potential ecological EVs surrounding applied land	High (C4)	Low (E3)		
		Spreading (onsite)	Surrounding land / crop (value / viability)	High (C4)	Low (E3)		
			Surrounding ecological EVs (MSES essential habitat)	High (C4)	Low (E3)		
	Fire ants		Land / crop (value / viability / amenity)	High (C4)	Low (E3)		
		Compost use	Surrounding ecological EVs (MSES essential habitat)	High (C4)	Low (E3)		
	Foreign metter (e.g. metal, plastice)	Compositure	Land / crop (value / viability)	Medium (B3)	Low (E3)		
	roreign matter (e.g. metal, plastics)	Compost use	Food consumer (health)	Low (E3)	Low (E2)		

	<b>B</b> CC-C	Potential exposure		Risk ratings	
Element	PCCOC	pathways	Psk potentially exposed to adverse impacts	Unmitigated	Mitigated
Compost			Neighbouring properties	High (C5)	Low (E3)
	Fire (spontaneous combustion)	Spreading	Surrounding ecological EVs (MSES essential habitat)	High (C5)	Low (E3)
Leachate			Surrounding land / crop (value / viability)	Medium (C3)	Low (E3)
	Feedstock chemical contaminants and pathogens		Downstream surface water users (water quality)	High (C4)	Low (E3)
	Nutrients Biological oxygen demand (BOD)	Leachate releases to land / waters	Downgradient groundwater users (water quality)	Medium (E4)	Low (E1)
	Chemical oxygen demand (COD)		Downstream ecological surface water EVs	High (C4)	Low (E3)
			Downgradient ecological groundwater EVs	Medium (E4)	Low (E1)
	Offensive odour emissions	Airborne release	Refer MWA 2020a	High (C4)	Medium (D3)
Stormwater	Suspended sediment, sheens / films, litter	Runoff	Downstream ecological surface water EVs	High (C4)	Low (D2)
Compost mixing / turning	Air emissions (particulates / dust)	Airborne release	Refer MWA 2020a	Low (C2)	Low (D2)
	Offensive odour emissions	Airborne release	Refer MWA 2020a	Medium (C3)	Medium (D3)
Plant & Equipment	Air emissions (particulates / dust)	Airborne release	Refer MWA 2020a	Low (D2)	Low (D1)
	Offensive noise emissions	Airborne release	Refer MWA 2020a	Low (D2	Low (D1)
	Nuisance noise	Air vibration	Refer MWA 2020b	Low (D2)	Low (D1)
	Leaks and spills (fuels and oils)	Releases to land / waters	Adjacent land and downstream waters	Medium (B3)	Low (E2)

Table notes

1) Determination of Acceptable Levels of Preservative Treated Timber in Timber Reuse Applications (Jann et. al., 2012)

2) AS 4454-2012: Composts, soil conditioners and mulches

3) Refer PE 2020

### 5 ENVIRONMENTAL MANAGEMENT MEASURES

The following sections introduce the environmental management measures proposed for the activity's establishment and operation. The management measures shall be reviewed as part of the detailed design of the composting site, and preparation of the site-based (environmental) management plan (SBMP) incorporating measures for ensuring compliance with EA conditions.

# 5.1 Administrative controls

### 5.1.1 Roles and responsibilities

Key roles and responsibilities for implementation of the SBMP are detailed in Table 12.

Position	Responsibilities and authorities
	Primary person responsible for preparation and implementation of the SBMP.
	Compliance with environmental requirements of the operation, including all applicable legislation, and consent conditions.
	Development and maintenance of standard operating procedures (SOP) and environmental control procedures (ECP).
	Training, awareness and competency of activity personnel.
Chief Executive Officer (CEO)	Communicating and directing the above to operation staff including activity management, site workers, sub-contractors and suppliers as applicable.
	Allocation of resources.
	Corrective and preventative action including emergency preparedness and response.
	Reporting and investigating any environmental non-conformances, complaints, incidents/emergencies or breach of approval conditions to the appropriate authorities.
	Environmental record management and reporting.
	Monitoring and review of environmental performance, and improvement opportunities.
	On-the-ground implementation of the SBMP.
	Assisting the CEO and HR Manager in training, awareness and competency of operation personnel.
Compositing	Assisting the CEO in monitoring and review of environmental performance, and improvement opportunities.
Supervisor (CS)	Supervision of feedstock acceptance – criteria and management.
	Waste and resource recovery management.
	Servicing and maintenance of plant and equipment.
	Inspection and monitoring.
	Site maintenance.
Human Resources (HR) Manager	Assisting the CEO and CS in training, awareness and competency of operation personnel.
Purchasing Manager	Communication and implementation of feedstock acceptance criteria for imported material.

 Table 12.
 Responsibilities of key personnel.

# 5.1.2 Training, awareness and competency

All operation personnel, including sub-contractors, shall receive awareness training (induction) in the environmental risks, and specific environmental requirements, of the composting activity relevant to the persons activities and responsibilities. Records of induction shall be maintained in accordance with Section 5.1.5.

Information about the environmental aspects of the activity is to be communicated by:

- discussing the SBMP during induction and at refresher sessions
- initiating monthly toolbox discussions on environmental performance.

After the induction the person shall be aware of the following with respect to their involvement in the project:

- understanding the requirements of the SBMP and the individual's role
- site operating and environmental procedures
- environmental incident emergency response procedures
- an outline of the potential consequences of not meeting their environmental responsibilities.

The selection of persons for specific roles shall ensure competency levels are well matched to the employee responsibilities. Supplementary training shall be provided as required to ensure competency levels are established and maintained at appropriate levels for a person's designated responsibilities.

Where technical expertise beyond that of existing operation personnel is required the operator shall engage persons suitably qualified and experience in the relevant field.

# 5.1.3 Standard operating and environmental control procedures

The SBMP to be prepared for the activity shall include SOPs and/or ECPs addressing, yet not limited to, the following aspects of the activity:

- Pad inspection and maintenance
- Plant and equipment inspection and maintenance
- Compost blending and production (windrow management)
- Feedstock management (including acceptance criteria)
- Leachate management
- Stormwater management.

The documented procedures shall detail control measures, monitoring program/s and performance objectives for environmental and public health elements including, yet not limited to:

- Air emissions
- Noise emissions
- Odour emissions
- Spontaneous combustion
- Surface water quality
- Weed and pest management
- Waste and resource recovery
- Finished product quality / contaminant levels.

### 5.1.4 Incidents and corrective action

Corrective action shall be undertaken where a site or operational condition that does not comply with the performance indicators stated in the SBMP (i.e. an incident) is identified.

A Corrective Action Request (CAR) shall be logged in a CAR register to ensure the matter is properly addressed in a timely manner. The status of CARs shall be routinely reviewed by the CEO and updated on a weekly basis, or shorter timeframe where required by the CAR.

Where necessary, investigation of the root cause and subsequent impacts of significant incidents shall be initiated by the CEO. This shall involve a review of operational procedures and control measures, and environmental monitoring (if required). Environmental monitoring shall be undertaken where necessary to assess potential impacts, address complaints which cannot be amicably resolved in an efficient manner, or where requested by regulatory authorities.

Where requested, any CAR registered in accordance with this SBMP shall be provided to a regulatory authority or other person, consensually or as lawfully required.

# 5.1.4.1 Complaints

Complaints received in relation to operational activities shall be logged in the CAR register and managed in general accordance with the corrective action requirements described above, as appropriate to the nature of the complaint.

All public complaints shall be validated and appropriately responded to in a timely manner. The complainant shall be notified of completed corrective actions.

All records of complaints and associated investigations shall be available for inspection by relevant authorities upon request.

# 5.1.4.2 Reporting and notification of incidents and complaints

All staff and sub-contractors are responsible for immediately notifying their direct supervisor of an environmental incident, who will in turn notify the CEO.

Records of incidents and complaints (i.e. other than trivial matters) shall be detailed in a Corrective Action Report form and logged in the CAR Register. The CAR will include, as a minimum:

- date and time of incident / non-compliance / complaint
- contact details of the person(s) who detected or notified the matter
- nature of the matter and potential impacts
- outcomes of any investigation of the matter
- details of the corrective actions undertaken.

### 5.1.4.3 Reporting environmental harm to regulatory authorities

DES shall be notified of any incident which has caused, or may cause, material or serious environmental harm (refer Terms & Abbreviations). The CEO is responsible for notifying DES of the nature and circumstance in which the event happened and potential environmental impacts.

Notification shall be made to DES immediately via the Pollution Hotline, and subsequently in writing via email as soon as practical but within 24 hours of becoming aware of a breach.

The following information must be obtained for notification purposes:

- name of person who identified the incident and person responsible for completing the notification
- name and telephone number of a designated contact person
- quantity and substance released
- person(s) involved
- the location and time of the release
- the suspected cause of the release
- a description of the effects of the release
- the results of any monitoring performed in relation to the release
- conclusions formed and actions taken to mitigate any environmental harm caused by the release
- proposed actions to prevent a recurrence of the release.

# 5.1.5 Record management

Records must be stored in a safe and secure manner which limits the potential for deterioration, damage or loss for a minimum of 5 years. Records to be maintained shall include:

- induction register including persons trained, date of training, trainer and summary of training delivered
- daily / weekly inspection reports, checklists, diary entries
- material origin, inspection and testing records demonstrating conformance with feedstock acceptance criteria, and compost quality objectives
- leachate and water quality monitoring results
- correspondence relating to environmental management matters
- incident and corrective action register
- non-conformance reports and / or correspondence regarding environmental incidents
- results, analysis and corrective actions
- waste tracking records
- records of compliance with relevant approvals
- other records identified in the environmental sub-plans and control procedures.

The above project records shall be made available to relevant authorities on request.

# 5.1.6 Environmental monitoring and review

Monitoring of compliance and general performance will be achieved through a program of inspection, sampling and analysis detailed in the SBMP. All monitoring shall be recorded and maintained in accordance with Section 5.1.5. Results of the environmental monitoring program shall be reviewed at least monthly.

The compost quality monitoring program shall comply with AS 4454-2012: Composts, soil conditioners and mulches.

The surface water monitoring shall incorporate the following elements:

- Methodologies based on Monitoring and Sampling Manual (DES 2018a) and AS/NZS 5667-1998: Water quality – Sampling
- Development of site-derived WQOs based on select locations immediately upstream and downstream compost activity area with reference to Guideline: Environmental Protection (Water) Policy 2009 - Deciding aquatic ecosystem indicators and local water quality guidelines (DES 2018b)
- Routine and event based monitoring at select upstream (background) and downstream (impact) locations to monitor potential adverse impacts on downstream waters
- Assessment of water quality results against relevant WQOs for Warril Creek and 'other freshwater tributaries' as specified in the Bremer River environmental values and water quality objectives, until such time as site-derived WQOs have been established
- Adoption of Guideline: Environmental Protection (Water) Policy 2009 Deciding aquatic ecosystem indicators and local water quality guidelines (DES 2018b) for the assessment of potential water quality impacts, and guidance from Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) where further investigation of potential water quality impacts is identified.

The Environmental Risk Assessment Register and SBMP (where appropriate) shall be reviewed on an as required basis guided by the environmental monitoring and CAR processes, yet no greater than every two years, to ensure the SBMP remains effective in achieving environmental objectives and performance targets.

# 5.2 Feedstock and Compost

Implementation of strict feedstock acceptance criteria and management (Section 5.2.1) shall provide a line of preventive measures against chemical and biological (i.e. pathogens and pests) contamination of the feedstock and finished product.

The composting methodology shall adopt processes and management measures described in AS 4454-2012: Composts, soil conditioners and mulches to ensure effective pasteurisation and finished product quality as outlined in Section 3.4 – 3.6, to further mitigate risks to environmental receptors and food consumers.

A program for in-process monitoring and product validation shall be prepared as part of the SBMP. The monitoring program shall be undertaken by the Composting Supervisor (or delegate) to ensure conformance with AS 4454-2012 and best practice management. Visual monitoring for pest species (e.g. fire ants, restricted plants) shall be on arrival of feedstock and then routinely (e.g. weekly minimum); this shall include both operational and surrounding areas. Finished product quality shall be validated prior to land application by Kalfresh use or sale through qualitative sampling and analysis based on the requirements and performance criteria specified in AS 4454-2012.

Non-conforming product shall be either treated to ameliorate parameters not complying with the adopted performance criteria, restricted for use under conditions that do not present a significant risk to the environment or public health, or lawfully disposed of offsite.

# 5.2.1 Feedstock acceptance - criteria and management

Quality management procedures for feedstock acceptance shall be developed as part of the SBMP incorporating, yet not limited to, the quality control strategies summarised in Table 13.



### Table 13. Feedstock acceptance criteria.

Feedstock	Control / acceptance criteria
All feedstocks	Visual inspection prior to, and on, unloading to assess that the feedstock:
	<ul> <li>does not contain materials other than the proposed feedstocks (Section 3.4)</li> </ul>
	<ul> <li>does not contain stones or soil lumps ≥ 5 % w/w</li> </ul>
	<ul> <li>does not contain foreign material<sup>1</sup></li> </ul>
	o plastics (light flexible or film) ≥ 0.5 % w/w
	o glass, metal and rigid plastics ≥ 5 % w/w
	o other anthropogenic materials
	<ul> <li>particle size is suitability for use (i.e. without further processing – grinding, screening)</li> </ul>
	<ul> <li>does not contain free-draining liquid</li> </ul>
	<ul> <li>is free of vermin or vector (insect) infestations.</li> </ul>
	Rejection (return to supplier) of feedstock suspected of not conforming to the above.
Digestate solid fraction	Certification of compliance with quality limits specified in AS 4454-2012: Composts, soil conditioners and mulches prior to transfer to the compost activity site.
Green waste (including wood chip)	Materials shall not be sourced from high risk sites including, yet not limited to:
	<ul> <li>Waste or resource recovery facilities other than designated green waste handling areas (nominally municipal green waste management areas)</li> </ul>
	<ul> <li>Airports, defence land or other areas potentially impacted by aqueous Film-Forming Foams (AFFF) or other potential Per- and polyfluoroalkyl substances (PFAS) containing substances</li> </ul>
	- Fire ant restricted areas.
	Documented memorandum of understanding with suppliers regarding prohibition of unsuitable feedstocks (refer 'All feedstock') all and return to supplier policy

### Table notes

1) As defined by the Biosecurity Act 2014

2) Refer PE 2020

### 5.3 Air and odour emissions

Air quality modelling was incomplete at the time this report was prepared. Regardless of these model outcomes the activity shall adopt typical best practice air quality controls as a minimum including, yet not limited to, the following:

- Selection of plant and equipment which offer value for money air emission reduction technology, where possible.
- Avoid use of oversized plant and equipment.
- Avoiding dust generating activities during high wind conditions.
- Instigate control methods on polluting machinery and activities.
- Implement where feasible alternative work practices which generate less air and/or noise emissions, for such as use of electric equipment instead of fuel powered equipment.

- Repair and maintain plant and equipment in good working order.
- Where possible throttling down or shut down equipment used intermittently.
- Enforcement of speed limits that minimise dust generation.
- Maintenance, repair and wetting of access tracks to minimise dust.
- Routine monitor trucks leaving the site to ensure all loads are appropriately covered and tracking of soil onto external roads is minimised.
- Day-to-day monitoring of activities for potential nuisance air emissions.

# 5.4 Noise emissions

Modelling of noise emissions has predicted the activity can comply with the acoustic quality objectives of the Environmental Protection (Noise) Policy 2019 (MWA 2020b). The assessment was based on measured sound power levels for comparable plant with standard emission controls.

The activity shall therefore adopt typical best practice noise controls including, yet not limited to, the following:

- Operations shall be restricted to approved hours (nominally 6:30 AM to 6:30 PM, except for regulated devices 7:00 AM to 6:30 PM, Mondays to Saturdays)
- Selection of plant and equipment which offer value for money noise reduction technology, where possible.
- Avoiding use of oversized plant and equipment.
- Implementing, where feasible, alternative work practices which generate less air and/or noise emissions, for such as use of electric equipment instead of fuel powered equipment.
- Scheduling noisy activities around times of high background noise (local road traffic or when other local noise sources are active), to the extent practicable.
- Repair and maintain plant and equipment in good working order, including fitting of noise suppression mufflers (if required).
- Where possible throttling down or shut down equipment used intermittently.
- Keeping panels and covers of silenced plant shut.
- Day-to-day monitoring of activities for potential nuisance noise.

# 5.5 Leachate management

The leachate containment system shall be designed by a suitably qualified engineer; the preliminary design for the leachate collection ponds (DAM 1, DAM 2, DAM 4) and stormwater management system is provided in Attachment H.

Construction and maintenance of all material handling pads shall incorporate a leachate barrier and collection system designed by a suitably qualified engineer. Basic design principles shall include:

- separation of drainage from material handling pads (leachate) and other operational areas (stormwater) to the extent practicable
- bunding and/or catch drains, low permeability base and walls
- clay- or synthetically-lined leachate ponds with a minimum design capacity for at least one-in-ten ARI (24 hour) storm events plus additional desired storage for leachate reuse and/or evaporation.

Integrity of the LCS shall be routinely inspected by the Composting Supervisor, and maintained as required.

A nil release approach under typical weather conditions shall be adopted under the SBMP. This shall involve the following management hierarchy (in order of preference) for collected leachate:

- onsite reuse for compost wetting
- evaporation
- collection and reuse at the AD facility
- collection by a licensed contractor for lawful disposal offsite.

A program for visual and quantitative surface waters monitoring of PCCoC (Section 4) shall be prepared as part of the SBMP. The program shall include both routine monitoring, and event based monitoring for exceptional circumstances where releases of leachate to the environment occur. The water quality monitoring program shall be overseen by a suitably qualified person who shall review and report on monitoring results which respect to potential adverse environmental impacts and requirements for preventive and corrective actions.

# 5.6 Stormwater management

The stormwater management system shall be designed by a suitably qualified engineer; the preliminary design for the stormwater basin (DAM 3) and drainage system is provided in Attachment H. The stormwater system shall incorporate the following design principles:

- separation of leachate and stormwater to the extent practicable
- basins and drainage shall be designed with a minimum capacity for one-in-ten ARI (24 hour) storm events
- sediment storage capacity in accordance with industry best practice standards
- basin spillways designed for 50 year ARI critical event.

Where leachate and stormwater catchments are connected, or in the event stormwater becomes impacted by leachate the resultant water shall be managed as leachate.

Reuse of collected stormwater within the SRAIP shall be prioritised for compost wetting, dust suppression and crop irrigation.

A program for routine and event based visual and quantitative surface waters monitoring of PCCoC (Section 4) shall be prepared as part of the SBMP. The monitoring program shall be overseen by a suitably qualified person who shall review and report on monitoring results which respect to potential adverse environmental impacts and requirements for preventive and corrective actions.

### 5.7 Erosion and sediment control

An erosion and sediment control (ESC) plan shall be prepared by a suitably qualified person (e.g. Registered Professional Engineer of Queensland, or Certified Professional in ESC) as part of the SBMP, based on IECA ESC best practice standards.

### 5.8 Hazardous materials

Storage of hazardous materials (HAZMAT) within the subject area is not intended. Should HAZMAT storage be required appropriate control measures based on applicable standards and codes of practice (Section 1.7) shall be incorporated into relevant SOP(s) and/or ECP(s).

### 5.9 Waste and resource recovery

Waste and recoverable resources associated with the activity are limited to non-conforming product, reject feedstock (where not returnable to the supplier), leachate, general solid waste associated with plant and equipment and personnel, and liquid waste from the site amenities.

The SBMP shall incorporate procedures for waste management and resource recovery based on the avoid, reduce, reuse, recycle, recover, dispose hierarchy. Previous sections outline control measures for avoiding management of reject feedstock, and managing potential bulk waste including non-conforming product and leachate.

The following outlines key control measures on which the procedures shall be based:

- Waste storage and management shall be limited to designated areas.
- All solid waste material will be transported from the site via a waste contractor on a weekly basis as part of the Kalfresh processing facility contract.
- All materials shall be collected and disposed of by a DES licensed operator.
- Reusable or recyclable materials will be separated onsite into dedicated bins/areas, where practicable, for either reuse onsite or collection by a contractor and transport to off-site facilities.
- Where practicable, and where materials cannot be separated on-site, they will be sorted off-site by a contractor.
- Materials packaging waste will be returned to suppliers where possible.
- All waste and recyclables will be stored in appropriate covered receptacles secure from wildlife or vermin. Receptacles shall be of sufficient capacity for site activities and visitor numbers, and situated at appropriate locations onsite.
- All wastewater from the site shall be transferred to the proposed SRAIP STP and managed in accordance with the associated SBMP.

# 5.10 Emergency preparedness and response

An emergency preparedness and response procedure addressing the following potential events shall be developed as part of the SBMP:

- Chemical spills on land
- Chemical spills on water
- Fire
- Heavy or prolonged rainfall.

# 5.11 Land rehabilitation

A land rehabilitation plan shall be developed as part of the SBMP. At this stage the most likely land use following cessation of the activity is a return to grazing pasture, or cropping.



# 6 **REFERENCES**

ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.

Cardno. 2019. Integrated Water Management Plan – Scenic Rim Agricultural Industrial Precinct (Draft), Cardno, dated 13 December 2019.

DEHP. 2013a. Noise Measurement Manual, Department of Environment and Heritage Protection (DEHP), August 2013.

DEHP. 2013b. Queensland Water Quality Guidelines 2009, Department of Environment and Heritage Protection (DEHP), July 2013.

DEHP. 2013c. Guideline: Odour Impact Assessment from Developments Department of Environment and Heritage Protection (DEHP) 2013.

DEHP. 2015. Guideline: Noise Control - Planning for Noise Control, Department of Environment and Heritage Protection (DEHP) 2015.

DES. 2017a. Guideline: Application requirements for activities with impacts to water Version 4.02, Department of Environment and Science (DES), 6 March 2017.

DES. 2017b. Guideline: Application requirements for activities with noise impacts Version 3.03, Department of Environment and Science (DES), 6 March 2017.

DES. 2017c. Guideline: Application requirements for activities with impacts to land Version 4.02, Department of Environment and Science (DES), 6 March 2017.

DES. 2017d. Guideline: Application requirements for activities with impacts to air Version 4.03, Department of Environment and Science (DES) 6 March 2017.

DES. 2018a. Monitoring and Sampling Manual: Environmental Protection (Water) Policy. Brisbane: Department of Environment and Science (DES), 2018.

DES. 2018b. Guideline: Environmental Protection (Water) Policy 2009 - Deciding aquatic ecosystem indicators and local water quality guidelines, Department of Environment and Science (DES), December 2018

DES. 2018c. Guideline: Open windrow composting under environmentally relevant activity 53(a) - organic material processing by composting Version 2.00, Department of Environment and Science (DES), 23 November 2018.

DES. 2019. Guideline: Application requirements for activities with waste impacts Version 5.01, Department of Environment and Science (DES), 4 February 2019.

DNRM. 2014. Queensland Globe. Department of Natural Resources and Mines (DNRM), February 2015.

DPIRD. 2019. Identifying dispersive (sodic) soils, Western Australia Department of Primary Industries and Regional Development (DPIRD), https://www.agric.wa.gov.au/dispersive-and-sodic-soils/identifying-dispersive-sodic-soils (updated 4 September 2019), accessed 5 December 2019.

EPA. 2013. Compost guideline, South Australia Environment Protection Authority (EPA), updated June 2019.



Geological Survey of Queensland (1971) Bowen 1:250,000 Geology Sheet, Geological Survey of Queensland, Brisbane.

IECA. 2008. Best Practice Erosion and Sediment Control, International Erosion and Sediment Control Association (IECA) (Australasia), Picton NSW.

Hann, J., Daian, G., Cookson, L.J. and Przewloka, S. 2010. Determination of Acceptable Levels of Preservative Treated Timber in Timber Reuse Applications, Forest & Wood Products Australia Limited, September 2010.

MWA. 2020a. Draft Air Quality Impact Assessment - Scenic Rim Agricultural Industrial Precinct - 6200 Cunningham Highway, Kalbar, MWA Environmental.

MWA. 2020b. Draft Noise Impact Assessment - Scenic Rim Agricultural Industrial Precinct - 6200 Cunningham Highway, Kalbar, MWA Environmental.

PE. 2020. Proposed Environmentally Relevant Activity 53 (b) - organic material processing by anerobic digestion Proposed Scenic Rim Agricultural Industrial Precinct 6200 – 6206 Cunningham Highway, Kalbar, Queensland, Precise Environmental (PE), 6 April 2020.

SWA. 2018. Managing risks of hazardous chemicals in the workplace – Code of Practice, Safe Work Australia (SWA), May 2018.
ATTACHMENT A: SRAIP CONCEPT LAYOUT

	18 RP2095	23	9 RP209733
17 RP20993			
Yield Breakdown - Industry Allotments	SRAIP Overall		WINDROW PAD (A) AREA: 3.92/bg

15 SP229448

Yield Breakdown - SRAIP							
Industry Allotments	Overall						
4000m <sup>2</sup> -1HA	2						
1HA- 2.99HA	8						
3HA +	4						
Total Industry Allotments	14						
Infrastructure							
Digester and Energy Site	1						
Sewer Treatment Plant	1						
Total Infrastructure Allotments	2						

Land Budget - SRAIP								
	Overall							
	Area							
Area of SRAIP	59.299 ha	100.0%						
Saleable Area								
Industry Allotments	31.565 ha	53.2%						
Road								
Private Road	2.749 ha	4.6%						
Stormwater								
Drainage	19.550 ha	33.0%						
Infrastucture								
Digester and Energy Site	5.000 ha	8.4%						
Sewer Treatment Plant	0.435 ha	0.7%						





## SCENIC RIM AGRICULTURAL INDUSTRIAL PRECINCT

6200 CUNNINGHAM HWY KALBAR CONCEPT OVERALL

DATE: 16 MAR CLIENT: KALFRE DRAWN BY: LZ CHECKED BY: PHE

 PLAN REF:
 142489-06L

 DATE:
 16 MARCH 2020

 CLIENT:
 KALFRESH



 Site Boundary
SRAIP Industrial Precinct
0.25m Contours
Existing Boundaries
Existing Easement
Drainage
Proposed Overland Flow Path
Proposed Flow Path Q100
Proposed Bio Basin
Proposed Effluent Irrigation
Proposed Digestate Irrigation
Proposed Dam
Proposed Digestate Storage
Proposed Composting Area
Lechate Pond
Proposed Composter Lot Road Access
Proposed Plant & Equipment
Proposed Windrow & Finished Product
Proposed Stormwater Basin
Proposed Wagner Quarry Access - (not part of the SRAIP proposal and subject to separate development approval)
Environmental Protection Area (clearing within the Environmental Protection Area is subject to future investigation/approvals)
Low Order Queensland Waterway
Medium Order Queensland Waterway
Road Connection to Composter Area
Access Easement for Wagners Road Alignment

Note: All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information: Site boundaries: DCDB Adjoining information: DCDB. Contours: RPS Survey Aerial photography: RPS Survey Overland Flow Path: Aurecon



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ATTACHMENT B: SRAIP ALLOTMENTS (SMART MAP)



or further information on SmartMap products visit http://nrw.qld.gov.au/property/mapping/blinmap

ATTACHMENT C: MAPPED MSES, WATERCOURSES AND BORES



## LEGEND

Allotment boundary

Watercourse (Water Act 2000)

Unmapped watercourse

MSES vegetation (defined watercourse)

MSES high ecological significance wetlands

MSES Endangered or of concern

Remnant vegetation

**MSES Essential Habitat** 



Registered groundwater bores



 $\mathbf{X}$ 

Onsite groundwater bores

All locations indicative only

Image sourced and modified from Queensland Globe, Queensland Government, Department of Natural Resources, Mines and Energy (2019)

14310270



Drawing version: B

Drawing title: SITE LAYOUT LAND-BASED SENSITIVE RECEPTORS





Unit 7 / 14 Fremantle Street, Burleigh Heads, Old, 4220 PO Box 4424, Robina Town Centre, Old 4230 Ph: (07) 5593 7848 Fax: (07) 5593 7020 mail@preciseenvironmental.com.au ATTACHMENT D: COMPOSTING AREA CONCEPT LAYOUT



Yield Breakdown - SRAIP							
Industry Allotments	Overall						
4000m <sup>2</sup> -1HA	2						
1HA- 2.99HA	8						
3HA +	4						
Total Industry Allotments	14						
Infrastructure							
Digester and Energy Site	1						
Sewer Treatment Plant	1						
Total Infrastructure Allotments	2						

Land Budget - SRAIP								
Overall								
	Area	%						
Area of SRAIP	59.299 ha	100.0%						
Saleable Area								
Industry Allotments	31.565 ha	53.2%						
Road								
Private Road	2.749 ha	4.6%						
Stormwater								
Drainage	19.550 ha	33.0%						
Infrastucture								
Digester and Energy Site	5.000 ha	8.4%						
Sewer Treatment Plant	0.435 ha	0.7%						

# SCENIC RIM AGRICULTURAL INDUSTRIAL PRECINCT

10 20 40 60 80 **1 : 2,500 @ A1** 

6200 CUNNINGHAM HWY KALBAR CONCEPT LAYOUT

PLAN REF: DATE: CLIENT: DRAWN BY: CHECKED BY:

142489-05M 16 MARCH 2020 KALFRESH LZ PHE

## Legend

	Site Boundary
	SRAIP Industrial Precinct
	0.25m Contours
	Existing Economent
	Drainage
	Proposed Overland Flow Path
sle	Proposed Flow Path Q100
木	Proposed Bio Basin
	Proposed Effluent Irrigation
	Proposed Digestate Irrigation
	Proposed Dam
	Proposed Digestate Storage
	Proposed Composting Area
	Lechate Pond
	Proposed Composter Lot Road Access
_	Proposed Plant & Equipment
	Proposed Windrow & Finished Product
	Proposed Stormwater Basin
	Proposed Wagner Quarry Access - (not part of the SRAIP proposal and subject to separate development approval)
	Environmental Protection Area (clearing within the Environmental Protection Area is subject to future investigation/approvals)
	Low Order Queensland Waterway
	Medium Order Queensland Waterway
	Road Connection to Composter Area
	Access Easement for Wagners Road Alignment

Note: All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres. Areas have been rounded down to the

nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information: Site boundaries: DCDB Adjoining information: DCDB. Contours: RPS Survey Aerial photography: RPS Survey Overland Flow Path: Aurecon



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ATTACHMENT E: SOIL ANALYSIS LABORATORY CERTIFICATES



## **Analysis Report**

Job Number: 19-0928

Precise Environmental 7/14 Fremantle Street **Burleigh Heads** 

QLD 4220

Attn : Danae Bragg

# **Final Report** Report ID: 19-0928-F-V2

This report supersedes report : 19-0928-I-V1 issued on 26-Nov-2019.

### **MISCEX**, Miscellaneous External

#### PE2898.19

NOTE: Results pertain to samples as received by this laboratory and relate to the items tested

**Additional Notes** 

Eco Sciences Precinct Level 3, Block A, 41 Boggo Rd Dutton Park Qld 4102 Telephone: 07 3170 5696 Facsimile: 07 3170 5801

21-Oct-2019 to 21-Oct-2019 Date Sampled: 25-Oct-2019 to 25-Oct-2019 Date Received: Date Tested: 25-Oct-2019 to 1-Dec-2019 Date Reported: 1-Dec-19

Queensland Government Department of Environment and Science - Chemistry Centre



Department of Environment and Science - Chemistry Centre

#### Soil Analysis Report

Job No: 19-0928 Report ID: 19-0928-F-V2

			Method Component Units	S_AQ4_EL pH -	S_AQ4_EL EC dS/m	S_AQ4_AA CI mg/kg	S_AQ4_AA NO3-N mg/kg	S_COLWELL P mg/kg	* S_PBI PBI col	* S_PBI PBI unadj	S_DUM_CN TC %	S_DUM_CN TN %	S_DUM_TOC OC %	S_KJ_AA TKN %
Sample No	Customer's ID	Description	Depth (m)											
19-0928-0001	1	BH1 0.1 - 0.25	0.10-0.25	6.36	0.04	<20	5	131	73	50	0.94	0.085	0.933	0.072
19-0928-0002	2	BH2 0.0 - 0.6	0.00-0.60	6.23	0.05	23	2	5	184	182	1.44	0.110	1.40	0.094
19-0928-0003	3	BH3 0.3 - 0.6	0.30-0.60	7.87	0.30	257	11	16	195	191	0.69	0.065	0.688	0.054
			Method Component Units	S_KJ_AA TKP %	S_KC2_AA_D NH4-N air dry mg/kg	S_KC2_AA_D NO3-N air dry mg/kg	S_CAT_EQ Ca cmol_c/kg	S_CAT_EQ Mg cmol_c/kg	S_CAT_EQ K cmol_c/kg	S_CAT_EQ Na cmol_c/kg	S_CAT_EQ Na corr cmol_c/kg	S_CAT_ALC Ca cmol_c/kg	S_CAT_ALC Mg cmol_c/kg	
Sample No	Customer's ID	Description	Depth (m)											
19-0928-0001	1	BH1 0.1 - 0.25	0.10-0.25	0.038	3	4	6.83	3.58	0.588	0.166	0.166			
19-0928-0002	2	BH2 0.0 - 0.6	0.00-0.60	0.018	3	<2	18.9	9.38	0.414	1.42	1.36			
19-0928-0003	3	BH3 0.3 - 0.6	0.30-0.60	0.092	9	12						15.8	8.26	

			Method Component Units	S_CAT_ALC K cmol_c/kg	S_CAT_ALC Na cmol_c/kg	S_CAT_ALCC Base sat %	S_CAT_ALCC CEC:Clay	S_CAT_ALCC Ca:CEC	S_CAT_ALCC ESP %	S_CAT_ALCC Ca:Mg	S_CAT_ALCC K:CEC	S_CAT_ALCC Mg:CEC	S_CAT_ALCC Mg:Ca	
Sample No	Customer's ID	Description	Depth (m)											
19-0928-0001	1	BH1 0.1 - 0.25	0.10-0.25											
19-0928-0002	2	BH2 0.0 - 0.6	0.00-0.60											
19-0928-0003	3	BH3 0.3 - 0.6	0.30-0.60	0.350	1.79	97	0.6	0.582	6.6	1.91	0.0129	0.304	0.523	

			Method S Component Units	S_CAT_ALCC Mg:K	S_CAT_ALCC Na:K	* S_CEC CEC cmol/kg	S_ADM_105 ADMC %	S_PSA Coarse sand %	S_PSA Fine sand %	S_PSA Silt %	S_PSA Clay %	S_03_BAR 1/3 Bar %	S_15_BAR 15 Bar %	
Sample No	Customer's ID	Description	Depth (m)											
19-0928-0001	1	BH1 0.1 - 0.25	0.10-0.25				4.1	32.3	37.1	21.9	14.0	35.7	13.2	
19-0928-0002	2	BH2 0.0 - 0.6	0.00-0.60				8.3	8.4	16.8	15.4	57.9	48.1	25.1	
19-0928-0003	3	BH3 0.3 - 0.6	0.30-0.60	23.6	5.12	27	3.7	11.0	35.8	9.5	45.1	40.7	19.9	
Manag	America MacTimes													

 Name :
 Angus McElnea

 Title :
 Team Leader Soil and Plant

NATA Accredited Laboratory Number: 5072

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance ISO/IEC 17025 - Chemical testing The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Department of Environment and Science - Chemistry Centre

## **Sample Details**

Job No: 19-0928 Report ID: 19-0928-F-V2

### Soil

Sample No	Customer's ID	Description	Date Sampled Site	Obs	SNo	Depth (m)
19-0928-0001	1	BH1 0.1 - 0.25	21-Oct-2019	0	0	0.10-0.25
19-0928-0002	2	BH2 0.0 - 0.6	21-Oct-2019	0	0	0.00-0.60
19-0928-0003	3	BH3 0.3 - 0.6	21-Oct-2019	0	0	0.30-0.60



Department of Environment and Science - Chemistry Centre

#### Methods of Analysis

### Job No: 19-0928 Report ID: 19-0928-F-V2

Method	Analyte	Name	ALHS	Uncertainty ±%	PQL	Unit	Method Description	Reporting Basis	Method Notes
S_03_BAR v1	1/3 Bar	Field capacity moisture (1/3 Bar)	2E2	15	1.500	%	Soil: Moisture 1/3 Bar pressure plate	Oven dry (24 hours at 105°C)	
S_15_BAR v1	15 Bar	Permanent wilting point (15 Bar)	2E1	15	1.500	%	Soil: Moisture 15 Bar pressure plate	Oven dry (24 hours at 105°C)	
S_ADM_105 v1	ADMC	Air dry moisture content (105°C)	2A1	8	1.500	%	Soil: Moisture air dry	Oven dry (48 hours at 105°C)	
S_AQ4_AA v2	CI	Chloride	5A2	10	20.000	mg/kg	Soil: CI NO3-N Aqueous (1:5)	Oven dry (48 hours at 40°C)	
S_AQ4_AA v2	NO3-N	Nitrate nitrogen	7B1	15	1.000	mg/kg	Soil: CI NO3-N Aqueous (1:5)	Oven dry (48 hours at 40°C)	
S_AQ4_EL v1	EC	Electrical conductivity	3A1	10	0.010	dS/m	Soil: pH EC Aqueous (1:5)	Oven dry (48 hours at 40°C)	
S_AQ4_EL v1	pH	pH	4A1	5	0.100	-	Soil: pH EC Aqueous (1:5)	Oven dry (48 hours at 40°C)	
S_CAT_ALC v1	Ca	Calcium	15C1_Ca	10	0.600	cmol_c/kg	Soil: Cations exchangeable alcoholic NH4Cl p	H 8. Oven dry (48 hours at 40°C)	
S_CAT_ALC v1	К	Potassium	15C1_K	12	0.050	cmol_c/kg	Soil: Cations exchangeable alcoholic NH4Cl p	H 8. Oven dry (48 hours at 40°C)	
S CAT ALC v1	Mg	Magnesium	15C1 Mg	8	0.070	cmol c/kg	Soil: Cations exchangeable alcoholic NH4Cl p	H 8. Oven dry (48 hours at 40°C)	
S CAT ALC v1	Na	Sodium	15C1 Na	10	0.070	cmol c/kg	Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Base sat	Base saturation	15L1	10	1.000	%	Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	CEC:Clay	Cation exchange capacity:clay	15Z1 CEC/clar	0	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Ca:CEC	Calcium to cation exchange capacity ratio	15M1 Ca/CEC	10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Ca:Mg	Calcium to magnesium ratio	15M1 Ca/Mg	10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	ESP	Exchangable sodium percentage	15N1	0	0.000	%	Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	K:CEC	Potassium to cation exchange capacity ratio	15M1 K/CEC	10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Mg:CEC	Magnesium to cation exchange capacity ratio	15M1 Mg/CEC	: 10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Mg:Ca	Magnesium to calcium ratio	15M1 Mg/Ca	10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8 Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Mg:K	Magnesium to potassium ratio	15M1 Mg/K	10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8. Oven dry (48 hours at 40°C)	
S CAT ALCC v1	Na:K	Sodium to potassium ratio	15M1 Na/K	10	0.000		Soil: Cations exchangeable alcoholic NH4Cl p	H 8. Oven dry (48 hours at 40°C)	
S CAT EQ V3	Ca	Calcium	15A1 Ca	10	0.140	cmol c/kg	Soil: Cations extractable NH4Cl pH 7 ICP	Oven dry (48 hours at 40°C)	
S CAT EQ V3	К	Potassium	15A1 K	10	0.030	cmol c/kg	Soil: Cations extractable NH4Cl pH 7 ICP	Oven dry (48 hours at 40°C)	
S CAT EQ v3	Mg	Magnesium	15A1 Mg	10	0.030	cmol c/kg	Soil: Cations extractable NH4Cl pH 7 ICP	Oven dry (48 hours at 40°C)	
S_CAT_EQ v3	Na	Sodium	15A1_Na	10	0.080	cmol_c/kg	Soil: Cations extractable NH4Cl pH 7 ICP	Oven dry (48 hours at 40°C)	
S_CAT_EQ v3	Na corr	Exchangeable Sodium	15A3_Na	0	0.080	cmol_c/kg	Soil: Cations extractable NH4Cl pH 7 ICP	Oven dry (48 hours at 40°C)	
* S CEC v2	CEC	Cation exchange capacity	15C1 CEC	15	2.000	cmol/kg	Soil: CEC alcoholic NH4Cl pH 8.5 AA	Oven dry (48 hours at 40°C)	
S COLWELL v2	Р	Phosphorus (Colwell)	9B2	10	2.000	mg/kg	Soil: P extractable 0.5M NaHCO3 AA	Oven dry (48 hours at 40°C)	
S DUM CN v5	TC	Total carbon	6B2a	5	0.050	%	Soil: C N total Dumas	Oven dry (48 hours at 40°C)	
S DUM CN v5	TN	Total nitrogen	7A5	10	0.005	%	Soil: C N total Dumas	Oven dry (48 hours at 40°C)	
S DUM TOC v3	OC	Organic carbon	6B5	10	0.050	%	Soil: Total Organic Carbon; Combustion	Oven dry (48 hours at 40°C)	
S KC2 AA D v1	NH4-N air dry	Ammonium nitrogen	7C2 NH4-N	10	2.000	mg/kg	Soil: Air dry sample  NO3-N NH4-N 2M KCI ex	trac Air dry (48 hours at 40°C)	Soil: Air dry sample, NO3-N NH4-N 2M KCI extractable AA
S KC2 AA D v1	NO3-N air dry	Nitrate nitrogen	7C2 NO3-N	10	2.000	mg/kg	Soil: Air dry sample  NO3-N NH4-N 2M KCI ex	trac Air dry (48 hours at 40°C)	Soil: Air dry sample, NO3-N NH4-N 2M KCI extractable AA
S KJ AA v3	TKN	Kieldahl Nitrogen	7A2	10	0.013	%	Soil: Total N and P Kieldahl digest AA	Air dry (48 hours at 40°C)	Soil: Total N and P Kieldahl digest AA
S KJ AA v3	TKP	Kieldahl Phosphorus	9A3a	10	0.013	%	Soil: Total N and P Kieldahl digest AA	Air dry (48 hours at 40°C)	Soil: Total N and P Kieldahl digest AA
* S PBI v5	PBI col	Phosphorus buffer index (Colwell)	912	15	1.000		Soil: Phosphorus Single Point Buffer Index	Oven dry (48 hours at 40°C)	,
* S PBI v5	PBI unadi	Phosphorus buffer index (unadjusted)	914	15	1.000		Soil: Phosphorus Single Point Buffer Index	Oven dry (48 hours at 40°C)	
S PSA v1	Clay	Clay: hydrometer <2 µm	2Z2 Clav	5	1.000	%	Soil: Particle size analysis	Oven dry (48 hours at 105°C)	
S PSA v1	Coarse sand	Coarse sand: Sieve 0.2 – 2.0 mm	2Z2 CS	10	1.000	%	Soil: Particle size analysis	Oven dry (48 hours at 105°C)	
S PSA v1	Fine sand	Fine sand: Sieve 0.02 – 0.2 mm	2Z2 FS	8	1.000	%	Soil: Particle size analysis	Oven dry (48 hours at 105°C)	
S_PSA v1	Silt	Silt: hydrometer 2 – 20 µm	2Z2_Silt	8	1.000	%	Soil: Particle size analysis	Oven dry (48 hours at 105°C)	

Analyses marked '\*' are not NATA accredited

Analyses prefixed by 'X\_' have been sub-contracted to an external laboratory listed in 'Method Description'. The sub-contracted laboratory report will be sent as an attachment to this report.

The minimum Practic

Codes appearing in this report:

Key	Meaning
CO	Sample contaminated
DA	Sample damaged in transit
FL	Sample flocculated

IS LS NA ND NR Insufficient sample Sample lost

- Not analysed Not detected

Not received

Measurement of uncertainty is applicable between 10 times the PQL and 90% of the linear range

ATTACHMENT F: GROUNDWATER BORE CARDS



**Report Date:** 14/10/2019 15:22

### From Year:

		_					
Registered Number	Facility Type	Fac	cility Status D	rilled Date Off	ice	Shire	
124727	Sub-Artesian Facilit	y Exi	sting 12	2/07/2005 Gat	ton	6510 - SCENIC	RIM REGIONAL
Details				Location			
Description				Latitude	27-57-06	Basin	1431
Parish	1854 - FASSIFERN	1		Longitude	152-34-50	Sub-area	
Original Name				GIS Latitude	-27.9518043	Lot	5
				GIS Longitude	152.5804708	Plan	CC1915
				Easting	458732		
Driller Name	HOFFMANN, SCO	TT BRADLEY		Northing	6908066	Map Scale	
Drill Company	ABUNDANT WATE	R SOLUTIONS		Zone	56	Map Series	
Const Method	ROTARY AIR & RO	DTARY MUD		Accuracy	GPS	Map No	9442.33
Bore Line				GPS Accuracy	10	Map Name	
D/O File No	515/000/0163	Polygon		Checked	Yes	<b>Prog Section</b>	
R/O File No		Equipment					
H/O File No		RN of Bore Replace	ed				
Log Received Date	08/08/2005	Data Owner					
Roles	Water Supply						

## Casing

7 records for RN 124727

Pipe	Date	Rec	Top (m)	Bottom (m)	Material Description	Mat Size (mm)	Size Desc	Outside Diameter (mm)
А	12/07/2005	1	1.00	40.00	Steel Casing	9.500	WT - Wall Thickness	335
А	12/07/2005	2	1.00	268.00	Steel Casing	8.800	WT - Wall Thickness	273
А	12/07/2005	3	268.00	512.00	Steel Casing	7.100	WT - Wall Thickness	219
А	12/07/2005	4	460.00	510.00	Stainless Steel	2.500	AP - Aperture Size	219
А	12/07/2005	5	10.00	518.00	Gravel Pack	4.000	GR - Gravel Size	

Pipe	Date	Rec	Top (m)	Bottom (m)	Material Descripti	on			Mat Size (mm	) Size Desc	Outside Diameter (mm)
А	12/07/2005	6	0.00	40.00	Grout						406
А	12/07/2005	7	0.00	10.00	Grout						315
Strat	a Logs									10 red	cords for RN 124727
Re	c Top (m)	Bottom (m)	Strata D	escriptio	n						
	1 0.00	10.00	TOP SO	IL							
	2 10.00	15.00	SILTY C	LAY							
	3 15.00	23.00	MUDST	ONE SAN	DSTONE						
	4 23.00	36.00	CRUMB	LY TUFF	*						
	5 36.00	40.00	DECO B	BASALT							
	6 40.00	162.00	BASALT	* WATEF	R IN BASALT						
	7 162.00	272.00	COAL S	HALE SO	FT MUDSTONE *						
	8 272.00	363.00	SOFT C	OAL TUR	N INTO HARD SAN	DSTONE *					
	9 363.00	454.00	HARD/S	OFT SAN	IDSTONE BANDS *						
	0 454.00	518.00	HARDEI	R CONSIS	STANT SANDSTON	E					
Strat	igraphies									0 red	cords for RN 124727
Aqui	fers									1 <i>r</i> ec	cords for RN 124727
Rec	Top (m) B	ottom L (m)	ithology		Date	SWL Flow (m)	Quality	Yield Contr Co (L/s)	ond Formation Nam	e	

POTABLE

12/07/2005

-10.00 N

4.00 Y

SC

1 36.00 454.00 COAL - Coal SDST - Sandstone SHLE - Shale

**Pump Tests Part 1** 

Queensland Government									Page: 3 of 4			e: 3 of 4					
Repor	t Date: 14/10/	/2019 15:	:22				G	iroundwater	Informa	tion						GV	VDB8250
								Bore R	eport								
From \	/ear:																
Pum	p Tests Par	rt 2												0	rec	ords for RN	124727
Bore	Conditions	S												0	) rec	ords for RN	124727
Eleva	ations													C	) rec	ords for RN	124727
Wate	er Analysis	Part 1												0	) rec	ords for RN	124727
Wate	er Analysis	Part 2												C	) rec	ords for RN	124727
Wate	er Levels													1	rec	ords for RN	124727
Pipe	Date	Time	Measure (m)	Meas	Point	Rema	rk Meas	Туре	Coll Auth	Coll	Method	Proje	ct	Quali	ity		
А	12/07/2005		-10.00	R	Reference Po	int	NR	Not Recorded	NR	NR	Not Recorded			130 Data is	; of unk	known quality	
Wire	Line Logs													0	rec	ords for RN	124727
Field	I Measurem	ents												1	rec	ords for RN	124727
Pipe	Date	Depth	n (m) C	onduct (uS/cm)	рН Т )	emp No (C)	O3 (mg/L)	) DO2 (mg/L)	Eh	(mV)	Alkalinity (mV)	Samp	Method	:	Samp	Source	
A	12/07/2005				7.6							AI	Air Lifting	(	ЗB	Groundwat Bore	er - from
Spec	cial Water A	nalysis												(	) rec	ords for RI	124727

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**Report Date:** 14/10/2019 15:15

			-		-		
Registered Number	Facility Type	Facili	ity Status D	rilled Date Off	ice	Shire	
138334	Sub-Artesian Facilit	y Existi	ng 1	5/10/2008 Gat	tton	6510 - SCENIC	RIM REGIONAL
Details				Location			
Description				Latitude	27-56-59	Basin	1431
Parish	1854 - FASSIFERN	1		Longitude	152-34-46	Sub-area	
Original Name	KALFRESH			GIS Latitude	-27.9496203	Lot	2
				GIS Longitude	152.5794043	Plan	SP192221
				Easting	458627		
Driller Name	HARCH, RUSSELL	. KEVIN		Northing	6908307	Map Scale	
Drill Company	HARCH DRILLING			Zone	56	Map Series	
Const Method	ROTARY AIR			Accuracy	GPS	Map No	9442-33
Bore Line				GPS Accuracy	10	Map Name	
D/O File No	515 000 0163	Polygon		Checked	Yes	<b>Prog Section</b>	
R/O File No		Equipment					
H/O File No		RN of Bore Replaced					
Log Received Date	07/11/2008	Data Owner					
Roles	Water Supply						

Casi	ng						6 records for	r RN 138334
Pipe	Date	Rec	Top (m)	Bottom (m)	Material Description	Mat Size (mm)	Size Desc	Outside Diameter (mm)
А	15/10/2008	1	0.00	15.80	Steel Casing	8.000	WT - Wall Thickness	275
А	15/10/2008	2	0.00	141.70	Polyvinyl Chloride			177
А	15/10/2008	3	129.50	141.70	Perforated or Slotted Casing	4.000	AP - Aperture Size	177
Х	15/10/2008	4	0.00	6.10	Grout			324
Х	15/10/2008	5	0.00	91.40	Grout			242

Report Date: 14/10/2019 15:15					Que Grou	ensland Go undwater In Bore Re	overnment oformation port					Page GV	: 2 of 4 VDB8250	
From Y	ear:													
Pipe	Date	Rec	Top (m)	Bottom (m)	Material Descript	ion					Mat Size (mm)	Size Desc	O Di	utside ameter (mm)
Х	15/10/200	8 6	91.40	141.70	Gravel Pack						5.000	GR - Grave	l Size	242
Strat	a Logs											10	records for RN	138334
Re	ec Top (m)	) Bottom (m)	Strata De	escriptio	n									
	1 0.00	) 12.20	TOPSOIL	CLAY &	LOAM									
	2 12.20	0 14.00	GRAVEL											
	3 14.00	) 15.80	CLAY BC	OUND GR	AVEL									
	4 15.80	38.10	GRANITE	E										
	5 38.10	) 42.70	BASALT											
	6 42.70	50.30	HARD BL	ACK SH	ALE									
	7 50.30	67.70	BLACK S	HALE										
	8 67.70	76.20	BASALT											
	9 76.20	) 134.70	VERY HA	ARD BAS	ALT									
1	0 134.70	) 141.70	SMALL F	RACTUR	RED BASALT									
Strat	igraphies	6										0	records for RN	138334
Aqui	fers											1	records for RN	138334
Rec	Top (m)	Bottom L (m)	ithology		Date	SWL Flow (m)	Quality	Yield (L/s)	Contr	Cond	Formation Name			
1	134.70	141.70 IN	NTR - Intru	sive	15/10/2008	-17.70 N	1800 US/CM	25.20	Y	FR	VOLCANICS - UN	IDIFF.		
Pum	p Tests P	Part 1										0	records for RN	138334

Pump Tests Part 2

0 records for RN 138334

Queensland Government									Page: 3 of 4			3 of 4					
Repor	rt Date: 14/10/	2019 15	:15				G	Boro B	Informa	ition						GW	DB8250
								Bore R	eport								
From \	Year:																
Bore	e Conditions	6												0	record	ds for RN	138334
Eleva	ations													0	record	ds for RN	138334
Wate	er Analysis	Part 1												0	record	ds for RN	138334
Wate	er Analysis	Part 2												0	record	ds for RN	138334
Wate	er Levels													1	record	ds for RN	138334
Pipe	Date	Time	Measure (m)	Meas	Point	Rem	ark Meas	Туре	Coll Auth	Coll	Method	Proje	ct	Quali	y		
А	15/10/2008		-17.70	R	Reference P	oint	NR	Not Recorded	NR	NR	Not Recorded			130 Data is	of unkno	wn quality	
Wire	Line Logs													0	record	ds for RN	138334
Field	d Measurem	ents												1	record	ds for RN	138334
Pipe	Date	Dept	n (m) C	onduct (uS/cm	рН <sup>-</sup> )	Temp (C)	NO3 (mg/L	.) DO2 (mg/L)	Eh	(mV)	Alkalinity (mV)	Samp	Method	S	amp 🖇	Source	
A	15/10/2008			1800	)			,				AI	Air Lifting	C	BB (	Groundwate Bore	r - from
Spec	cial Water A	nalysis	;											C	recor	ds for RN	138334

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**Report Date:** 14/10/2019 15:20

<b>Registered Number</b>	Facility Type		Facility Status	Drilled Date Off	ice	Shire		
14310270	Sub-Artesian Fac	ility	Existing	07/06/2011 Gat	tton	6510 - SCENIC	RIM REGIONAL	
Details				Location				
Description				Latitude	27-56-25	Basin	1431	
Parish	1854 - FASSIFE	RN		Longitude	152-35-14	Sub-area		
Original Name				GIS Latitude	-27.94025842	Lot		
				GIS Longitude	152.5871179	Plan		
				Easting	459382			
Driller Name	HANNANT, GRA	HAM WILLIAM		Northing	6909347	Map Scale	253 - 1: 25 000	
Drill Company	GW & JJ HANNA	NT		Zone	56	Map Series	M - Metric Series	S
Const Method	CABLE TOOL			Accuracy	GPS	Map No	9442-33	
Bore Line				GPS Accuracy	2	Map Name		
D/O File No	520 000 0051	Polygon		Checked	Yes	Prog Section		
R/O File No		Equipment	NE					
H/O File No		RN of Bore R	eplaced					
Log Received Date	09/06/2011	Data Owner	DNR					
Roles	WR Investigation Sub-Artesian Mo	nitoring						
Casing							8 records	for RN 14310270
Pipe Date	Rec Top (m) E	Bottom Materia (m)	I Description			Mat Size (mm)	Size Desc	Outside Diameter (mm)

A       07/06/2011       1       0.00       16.00       Polyvinyl Chloride       6.000       WT - Wall Thickness         A       07/06/2011       2       14.90       15.90       Perforated or Slotted Casing       4.000       AP - Aperture Size         X       07/06/2011       3       0.00       5.00       Grout       For the sing and hole wall         X       07/06/2011       4       5.00       8.00       Cuttings or other fill between casing and hole wall       For the sing and hole wall         X       07/06/2011       5       8.00       11.00       Cuttings or other fill between casing and hole wall							· · ·
A07/06/2011214.9015.90Perforated or Slotted Casing4.000AP - Aperture SizeX07/06/201130.005.00Grout	А	07/06/2011	1	0.00	16.00 Polyvinyl Chloride	6.000 WT - Wall Thickness	80
X07/06/201130.005.00GroutX07/06/201145.008.00Cuttings or other fill between casing and hole wallX07/06/201158.0011.00Cuttings or other fill between casing and hole wall	А	07/06/2011	2	14.90	15.90 Perforated or Slotted Casing	4.000 AP - Aperture Size	80
X07/06/201145.008.00Cuttings or other fill between casing and hole wallX07/06/201158.0011.00Cuttings or other fill between casing and hole wall	Х	07/06/2011	3	0.00	5.00 Grout		160
X 07/06/2011 5 8.00 11.00 Cuttings or other fill between casing and hole wall	Х	07/06/2011	4	5.00	8.00 Cuttings or other fill between casing and hole wall		160
	Х	07/06/2011	5	8.00	11.00 Cuttings or other fill between casing and hole wall		145

Outside

Diameter (mm)

8 records for RN 14310270

2 records for RN 14310270

145

145

#### Pipe Date Top (m) Bottom Material Description Mat Size (mm) Size Desc Rec (m) 12.00 Bentonite Seal Х 07/06/2011 6 11.00 07/06/2011 12.00 17.20 Gravel Pack 5.000 GR - Gravel Size Х 7 07/06/2011 15.90 Centraliser Х 8 8.00 Strata Logs Rec Top (m) Bottom Strata Description (m) 0.40 DARK GREY TOPSOIL 0.00 1 2 2.90 GREY CLAY 0.40 3 2.90 6.00 BROWN CLAY 6.00 12.10 BROWN WITH SOME LIGHT GREY CLAY 4 12.10 13.30 CLAYBOUND GRAVEL & ROCKS 5 13.30 15.00 RIVER GRAVEL 6 7 15.00 15.80 CLAYBOUND GRAVEL & LARGE ROCKS 8 15.80 17.30 BASALT

## Stratigraphies

Source	Rec	Top (m)	Bottom (m)	Strata Description
DNR	1	0.00	15.80	WARRILL CREEK ALLUVIUM
DNR	2	15.80	17.30	VOLCANICS - UNDIFF.

Aqui	fers									1 records for RN 14310	270
Rec	Top (m)	Bottom (m)	Lithology	Date	SWL (m)	Flow Quality	Yield (L/s)	Contr	Cond	Formation Name	
1	12.10	15.80	GRAV - Gravel	07/06/2009	-2.50	Ν	ζ,	Y	UC	WARRILL CREEK ALLUVIUM	

								C	Queensland	l Governn	nent								Pag	e: 3 of 8
Repor	t Date: 14/10	/2019	15:20					G	Groundwate	er Informa	ation								G	WDB8250
									Bore	Report										
From Y	'ear:																			
Pum	p Tests Pa	rt 1															0	records f	or RN	14310270
Pum	p Tests Pa	rt 2															0	records f	or RN	14310270
Bore	Condition	S															0	records f	or RN	14310270
Eleva	ations																2	records f	or RN	14310270
Pipe	Date		Elevation	(m) Prec	ision				Datum			Meas	Point	Surv	vey Sou	urce				
А	01/01/1900		8	0.50 EST	Es	stimate Us	sing Contou	irs	AHD - Aust	. Height D	atum	R	Reference	e Point ESTIN	ATED F	ROM	MAPI	NFO		
Х	01/01/1900		8	0.00 EST	Es	stimate Us	sing Contou	irs	AHD - Aust	. Height D	atum	N	Natural S	urface ESTIN	MATED F	ROM	MAPI	NFO		
Wate	er Analysis	Part	1														1	records f	or RN	14310270
Pipe	Date	Rec	Analyst	Analysis No	b Dept (n	h Metl n)	n Src	Con (uS/cr	nd pH m)	Si (mg/L)	Tot Ior (ma	al 1s /L)	Total Solids (mg/L)	Hard		Alk	Fig M	j. of lerit	SAR	RAH
А	11/07/2011	1	GCL	303317		PH	GB	192	20 7.7	44	1210.	00	1000.00	668		410		2.5	2.0	0.00
Wate	er Analysis	Part	2														1	records f	or RN	14310270
Pipe	Date	Rec	Na	K	Са	Mg	Mn	HCO	3 Fe	CO3		CI	F	NO3	SO4		Zn	AI	В	Cu
A	11/07/2011	1	121.0	1.5	127.0	85.0	<0.01	496.	.0 <0.01	1.8	360	5.0	0.26	3.2	12.0	<0.	.01	<0.05	0.02	<0.03
Wate	er Levels															8	84	records f	or RN	14310270
Pipe	Date	Time	e Meas	ure Mea: (m)	s Point		Remark	Meas	Туре	Coll Auth	Coll	Met	hod	Project		C	Qua	lity		
А	07/06/2011		-;	2.50 R	Referen	ce Point		NR	Not Recorded	d NR	NR	Not F	Recorded			130 🛛	Data i	is of unknov	vn quality	/
А	15/06/2011		-3	3.41 R	Referen	ce Point		NR	Not Recorded	d NR	NR	Not F	Recorded			130 🗆	Data i	is of unknow	vn quality	/
А	14/07/2011		-:	3.27 R	Referen	ce Point		NR	Not Recorded	d NR	NR	Not F	Recorded			130 [	Data	is of unknow	vn quality	/

Not Recorded NR

NR

NR

Not Recorded

-3.75 R

22/08/2011

А

**Reference** Point

130 Data is of unknown quality

Pipe	Date	Time	Measure (m)	Meas	Point	Remark	Meas	Туре	Coll Auth	Coll	Method	Project	Quality
А	14/09/2011		-3.68	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	01/11/2011		-3.39	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	01/12/2011		-3.48	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	02/02/2012		-2.70	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	02/03/2012		-2.06	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	17/04/2012		-2.78	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	13/06/2012		-2.99	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	11/07/2012		-3.09	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	15/08/2012		-3.36	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	25/09/2012		-3.85	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	25/10/2012		-4.21	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	22/11/2012		-4.19	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	11/12/2012		-4.67	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	15/01/2013		-4.61	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	27/03/2013		-2.64	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	26/07/2013		-3.53	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	26/09/2013		-4.38	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	05/11/2013		-4.60	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	18/12/2013		-4.35	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	04/02/2014		-4.61	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	19/03/2014		-5.11	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	08/05/2014		-4.89	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	17/06/2014		-4.76	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	16/07/2014		-5.00	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality
А	19/08/2014		-5.28	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded	130	Data is of unknown quality

Pipe	Date	Time	Measure (m)	Meas	Point	Remark	Meas	Туре	Coll Auth	Coll	Method	Project		Quality
А	10/09/2014		-4.98	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded		130	Data is of unknown quality
А	21/10/2014		-5.25	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded		130	Data is of unknown quality
А	19/11/2014		-5.43	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded		130	Data is of unknown quality
А	20/01/2015		-4.82	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded		130	Data is of unknown quality
А	18/02/2015		-4.56	R	Reference Point		NR	Not Recorded	NR	NR	Not Recorded		130	Data is of unknown quality
А	19/03/2015		-4.50	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	21/04/2015		-3.88	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	25/05/2015		-3.86	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	19/06/2015		-3.98	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	27/07/2015		-4.49	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	25/08/2015		-4.68	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	21/09/2015		-4.57	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	02/11/2015		-4.59	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	30/11/2015		-4.66	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	23/12/2015		-4.72	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	27/01/2016		-4.81	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	23/02/2016		-4.76	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	22/03/2016		-5.07	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	27/04/2016		-5.03	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	25/05/2016		-5.16	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	22/06/2016		-4.58	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	28/07/2016		-4.69	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	14/09/2016		-4.63	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	12/10/2016		-4.74	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements
А	15/11/2016		-4.99	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1	Good - Actual Manual Measurements

Pipe	Date	Time	Measure (m)	Meas	Point	Remark	Meas	Туре	Coll Auth	Coll	Method	Project	Quality
А	08/12/2016		-5.18	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	05/01/2017		-5.00	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	28/02/2017		-5.11	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	03/04/2017		-4.78	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	08/05/2017		-4.92	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	13/06/2017		-4.28	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	17/07/2017	1603	-4.27	R	Reference Point		ACT	Actual	DH	DL	Data Logger		1 Good - Actual Manual Measurements
А	15/08/2017	1327	-4.52	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	12/09/2017	1027	-5.14	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	18/10/2017	0944	-4.80	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	23/11/2017		-4.52	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	21/02/2018		-4.54	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	15/03/2018		-3.50	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	17/04/2018		-4.16	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	15/05/2018		-4.28	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	06/06/2018		-4.68	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	16/07/2018		-4.80	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	14/08/2018		-5.07	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	25/09/2018		-5.31	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	22/10/2018		-4.88	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	26/11/2018		-5.27	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	19/12/2018		-5.09	R	Reference Point		ACT	Actual	DG	MA	Manual/Hand	GWAN	1 Good - Actual Manual Measurements
А	18/01/2019		-5.34	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	12/03/2019		-5.60	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements
А	11/04/2019		-5.24	R	Reference Point		ACT	Actual	DH	MA	Manual/Hand		1 Good - Actual Manual Measurements

**Report Date:** 14/10/2019 15:20

From Year:

#### Pipe Date **Remark Meas Type** Project Quality Time Measure Meas Point Coll Coll Method (m) Auth 15/05/2019 **Reference Point** Actual MA Manual/Hand 1 Good - Actual Manual Measurements -5.46 R ACT DH Α -5.35 R **Reference** Point Actual 1 Good - Actual Manual Measurements А 21/06/2019 ACT DH MA Manual/Hand 16/07/2019 -5.81 R **Reference Point** Manual/Hand 1 Good - Actual Manual Measurements ACT Actual MA А DH **Reference** Point Manual/Hand 1 Good - Actual Manual Measurements -5.97 R Actual А 20/08/2019 ACT DH MA **Reference Point** Actual Manual/Hand 1 Good - Actual Manual Measurements А 18/09/2019 -6.24 R ACT DH MA Wire Line Logs 0 records for RN 14310270 **Field Measurements** 1 records for RN 14310270 NO3 (mg/L) DO2 Eh (mV) Alkalinity Samp Source Pipe Date Depth (m) Conduct pH Temp Samp Method (uS/cm) (C) (mg/L) (mV) PU Pump - Other or Groundwater - from 08/07/2011 1899 GB А Flowing Bore Bore **Special Water Analysis** 0 records for RN 14310270

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ATTACHMENT G: RISK ASSESSMENT MATRIX



#### Table A. Risk assessment criteria.

Level	Descriptor	Description
А	Almost certain	The event is expected to occur; event will occur on an annual (or more frequent) basis.
В	Likely	Probable that it will occur; event has occurred several times before at similar activities.
С	Possible	May or may not occur; heard of happening from time to time at similar activities.
D	Unlikely	The event may occur at some time but is unlikely; event may occur once during the activity.
E	Rare	The event may occur in exceptional circumstances; not heard of at similar activities.

#### Table B. Consequence levels.

Descriptor	Description
Insignificant	Environment: Negligible potential impacts.
Minor	Environment: Minor impact of short duration that can be reversed.
	Amenity: Minor, localised and short-term amenity impacts, no complaints.
	Public health: Potential nuisance; no medical attention required.
Moderate	<b>Environment</b> : Short term damage, localised impact, that could be reversed with intensive efforts.
	Amenity: One or two complaints, impacts lasting for several days.
	Public health: Medical attention may be required; rapid recovery of the consumer expected.
Major	Environment: Significant impact locally and potential for offsite impacts.
	Amenity: Many complaints, impacts extensive and/or lasting for many days.
	Public health: Medical attention required; recovery of the consumer expected.
Catastrophic	<ul> <li>Environment: Significant impacts to regional ecosystems and threatened species, potential for widespread offsite impacts.</li> <li>Public health: Medical attention required; no chance of recovery of the consumer expected</li> </ul>
	Descriptor Insignificant Minor Moderate Major Catastrophic

### Table C. Risk assessment criteria matrix.

				Consequence	es	
	Potential	1	2	3	4	5
		(Insignificant)	(Minor)	(Moderate)	(Major)	(Catastrophic)
	A (Almost certain)	Low	Medium	High	Extreme	Extreme
7	B (Likely)	Low	Medium	Medium	High	Extreme
ikelihood	C (Possible)	Low	Low	Medium	High	High
-	D (Unlikely)	Low	Low	Medium	Medium	High
	E (Rare)	Low	Low	Low	Medium	Medium

## ATTACHMENT H: PRELIMINARY LEACHATE POND AND STORMWATER BASIN DESIGN





Springfield Tel: 07 3381 0111

on the content of this document.

# Cardno<sup>®</sup>

	Comp	osting Dan	n			PROJECT	NO 5103	5-57-007		
	Prelim	ninary Sizin	na Notes			Designed	Travis W	/illiams		
			ig notoo			Date 11-0	)2-2020	S	heet 1	of 2
Casara						Duto				
Scope:	1	Sizo o rotor	ation booin to o	ator for a ator	mulator rur	off from distu	rhad araaa	apparated b	v o otorm o	ant un to an
		including of	24hour storm of	vent with and	Inwaler fur	ourronoo int	nuel of ono	in ton voor	by a storm e	vent up to an
	2	Woir docian	241001 Storme	a 24 hour etc	rm poriod			m-ten year.		
	2	Comply with	h Queensland (	a 24-nour sil	Model one	ating conditic	ne EDA 53(	a) organic	material pr	ocessing by
	5	composting	ı"	Jovenninent				a) – organic	, material pro	Jeessing by
	4	Catchment	area to he imp	ervious to nre	vent aroun	dwater contai	mination			
		. Outonniont			vont groun					
Software		12D Model V14	tusing the ILSA	X runoff met	hod and H	ortons Losses	j			
Rainfall data		Rainfall data ob	otained from Bu	reau of Meter	oroloav usi	na the ARR 2	019			
		AR2019 Tempo	oral patterns = '	'East Coast n	orth"					
Hortons losse	es	Hortons losses	applied to the	previous perc	entage of t	he catchment				
(Infiltration los	sses)	Green highlight	ted values used	I for the stand	lard basin	and the yellow	v highlighted	values use	d for the cor	nposting bas
		Table 1: Horton	ns Losses							
		Туре		Initial	Final	Decay	AMC 1	AMC 2	AMC 3	AMC 4
				Loss	Loss	Rate	(mm)	(mm)	(mm)	(mm)
				(mm/hr)	(mm/hr	)				
		A-High infill S	Sand Gravel	250	25	2	0	50	100	150
		B-Mod Well D	Drained	200	13	2	0	38	75	100
		C-Slow Infiltra	ation	<mark>125</mark>	<mark>6</mark>	2	O	<mark>25</mark>	<mark>50</mark>	<mark>75</mark>
		D-Very Slow-	-Clays	<mark>75</mark>	<mark>3</mark>	<mark>2</mark>	<mark>0</mark>	<mark>18</mark>	<mark>38</mark>	<mark>50</mark>
		D-Very Slow- Sourced: ARR 2	<mark>-Clays</mark> 2019	<mark>75</mark>	3	<mark>2</mark>	0 	18	38	<mark>50</mark>
		D-Very Slow- Sourced: ARR 2	<mark>-Clays</mark> 2019	<mark></mark>	3	<mark>2</mark>		18	38 	50
		D-Very Slow- Sourced: ARR : 1. Type A - low	<mark>-Clays</mark> 2019 <sup>,</sup> runoff potentia	75 I, high infiltrat	3 ion rates (	2	0 nd and grave	18 el)	38 	50
		D-Very Slow- Sourced: ARR 2 1. Type A - Iow 2. Type B - moo	-Clays 2019 runoff potentia derate infiltratio	75 I, high infiltrat n rates and n	3 ion rates ( noderately	2 consists of sar well-drained	0 nd and grave	91)	38	<b>50</b>
		D-Very Slow- Sourced: ARR : 1. Type A - Iow 2. Type B - moo 3. Type C - slov	Clays 2019 runoff potentia derate infiltratio w infiltration rate	75 I, high infiltrat n rates and n es (may have	3 ion rates ( noderately layers tha	2 consists of sat well-drained t impede dow	0 nd and grave nward move	18 el) ment of wat	38 :er)	50
		D-Very Slow- Sourced: ARR : 1. Type A - Iow 2. Type B - moo 3. Type C - slov 4. Type D - high	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potenti	75 I, high infiltrat n rates and n es (may have al, very slow i	3 ion rates ( noderately layers tha nfiltration r	2 consists of sam well-drained t impede dow ates (consists	0 nd and grave nward move of clays wit	18 el) ment of wat h a perman	38 er) ent high-wat	er table and
		D-Very Slow- Sourced: ARR 2 1. Type A - Iow 2. Type B - moo 3. Type C - slov 4. Type D - high high	Clays 2019 runoff potentia derate infiltratio w infiltration rat h runoff potenti n swelling poter	75 I, high infiltrat n rates and n es (may have al, very slow i ntial)	3 ion rates ( noderately layers tha nfiltration r	2 consists of sat well-drained t impede dow ates (consists	0 nd and grave nward move of clays wit	18 el) ment of wat h a perman	38 er) ent high-wat	er table and
		D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slov 4. Type D - high high	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potenti n swelling poter	75 I, high infiltrat n rates and n es (may have al, very slow i ttial)	3 ion rates ( noderately layers tha nfiltration r	2 consists of sam well-drained t impede down ates (consists	0 nd and grave nward move s of clays wit	18 el) ment of wat h a perman	38 er) ent high-wat	er table and
Evaporation		D-Very Slow- Sourced: ARR 2 1. Type A - Iow 2. Type B - mod 3. Type C - slow 4. Type D - high high	Clays 2019 runoff potentia derate infiltratio w infiltration rat h runoff potenti n swelling poter	75 I, high infiltrat n rates and n es (may have al, very slow i ntial)	3 ion rates ( noderately layers tha nfiltration r	2 consists of sam well-drained t impede dow ates (consists	0 nd and grave nward move of clays wit	18 el) h a perman	38 er) ent high-wat	er table and
Evaporation		D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slov 4. Type D - high high Over the 24hou	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potenti n swelling poter	75 I, high infiltrat n rates and n es (may have al, very slow i ntial)	3 ion rates ( noderately layers tha nfiltration r een made	2 consists of same well-drained t impede down ates (consists for evaporatio	0 nd and grave nward move s of clays wit	18 el) ment of wat h a perman his will act a	er) ent high-wat	er table and
Evaporation		D-Very Slow- Sourced: ARR 2 1. Type A - low 2. Type B - mod 3. Type C - slov 4. Type D - high high Over the 24hou evel of design.	Clays 2019 runoff potentia derate infiltratio w infiltration rat h runoff potenti n swelling poter ur period no allo	75 I, high infiltrat n rates and n es (may have al, very slow i ntial)	3 ion rates ( noderately layers tha nfiltration r	2 consists of sam well-drained t impede dow ates (consists for evaporatio	0 nd and grave nward move of clays wit	18 ment of wat h a perman his will act a	er) ent high-wat	er table and
Evaporation Losses		D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slov 4. Type D - high high Over the 24hou evel of design.	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potentia n swelling poter ur period no allo	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has b	3 ion rates ( noderately layers tha nfiltration r een made	2 consists of sar well-drained t impede dow ates (consists for evaporatio	0 nd and grave nward move s of clays wit	18 el) ment of wat h a perman his will act a	er) ent high-wat	er table and
Evaporation Losses Storage Loss	es	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slow 4. Type D - high high Over the 24hou evel of design. Both Impervious	Clays 2019 2019 e runoff potentia derate infiltration w infiltration rate h runoff potenti h swelling poter ur period no allo	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has b portions of th	3 ion rates ( noderately layers tha nfiltration r een made	2 consists of sam well-drained t impede dow ates (consists for evaporation nts have stora	0 nd and grave nward move of clays wit on losses. The age losses a	18 ment of wat h a perman his will act a pplied.	er) ent high-wat	er table and
Evaporation Losses Storage Loss	es	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slow 4. Type D - high high Over the 24hou evel of design. Both Impervious This is the amo	Clays 2019 2019 runoff potentia derate infiltratio w infiltration rate h runoff potention swelling poter ur period no allo	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has b portions of th epth in mm re	3 ion rates (noderately layers tha nfiltration r een made ecatchme emoved fro	2 consists of sar well-drained t impede dow ates (consists for evaporatio nts have stora m the start of	0 nd and grave nward move s of clays wit on losses. The age losses a the rainfall p	18 ment of wat h a perman his will act a pplied.	er) ent high-wat	er table and
Evaporation Losses Storage Loss	es	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slow 4. Type D - high high Over the 24hou evel of design. Both Impervious This is the amo	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potention swelling poter ur period no allo s and pervious ount of rainfall d rvious depress st	75 I, high infiltrat n rates and n es (may have al, very slow i tial) wance has b portions of th epth in mm re storage applied	3         ion rates (noderately layers that inderately layers that is a second seco	2 consists of sam well-drained t impede down ates (consists for evaporation for evaporation nts have stora m the start of	0 nd and grave nward move of clays wit on losses. The age losses a the rainfall p	18 ment of wat h a perman his will act a pplied.	er) ent high-wat	er table and
Evaporation Losses Storage Loss	es	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slow 4. Type D - high Nover the 24hou evel of design. Both Impervious This is the amo Impervious Pervio	Clays 2019 2019 runoff potentia derate infiltratio w infiltration rate h runoff potentia n swelling poter ur period no allo us and pervious bunt of rainfall d rvious depress ous depress sto	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has b portions of th epth in mm re storage applied	3         ion rates (noderately layers than nfiltration r         een made         een made         een made         een made         and the catchme         emoved from         ed = 2mm         = 10mm	2 consists of sam well-drained t impede dow ates (consists for evaporation nts have stora m the start of	0 nd and grave nward move of clays wit on losses. The age losses a the rainfall p	18 ment of wat h a perman his will act a pplied.	38 er) ent high-wat	er table and
Evaporation Losses Storage Loss	es	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - moo 3. Type C - slow 4. Type D - high Nover the 24hou evel of design. Both Impervious This is the amo Impervious Pervio	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potention swelling poter ur period no allo us and pervious bunt of rainfall d rvious depress ious depress sto	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has b portions of th epth in mm re storage applied	3         ion rates (noderately layers that and the second secon	2 consists of sam well-drained t impede down ates (consists for evaporation nts have stora m the start of	0 nd and grave nward move s of clays wit on losses. The age losses a the rainfall p	18 el) ment of wat h a perman his will act a pplied. pattern.	ier) ent high-wat	er table and
Evaporation Losses Storage Loss Critical Storm	es n Selectio	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - mod 3. Type C - slow 4. Type D - high high Over the 24hou evel of design. Both Impervious This is the amo • Imper • Pervio	Clays 2019 2019 runoff potentia derate infiltration w infiltration rate h runoff potentia h runoff potentia swelling poter ur period no allo sand pervious bunt of rainfall d rvious depress ious depress sto	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has b portions of th epth in mm re storage applied	3         ion rates (noderately layers than filtration r         een made         een made         een made         and	2 consists of sam well-drained t impede dow ates (consists for evaporation nts have stora m the start of	0 nd and grave nward move of clays wit on losses. The age losses a the rainfall p	18 ment of wat h a perman his will act a pplied. pattern.	er) ent high-wat is a factor of	er table and safety for th
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Evaporation Losses Storage Loss Critical Storm	n Selectio	D-Very Slow- Sourced: ARR : 1. Type A - low 2. Type B - mod 3. Type C - slow 4. Type D - high high Over the 24hou evel of design. Both Impervious This is the amo • Imper • Pervious n Following mytho and event. 1. Asses 2. For ea 3. Selec	Clays 2019 runoff potentia derate infiltratio w infiltration rate h runoff potentia n swelling poter ur period no allo is and pervious punt of rainfall d rvious depress ious depress sto ology was adop es all durations ach duration (so	75 I, high infiltrat n rates and n es (may have al, very slow i ntial) wance has be portions of th epth in mm re storage applied ted for workir and temporal elect the temp	3         ion rates (noderately layers that inderately layers that inderately layers that inderately layers that inderate emoved from the emoved from	2 consists of sam well-drained t impede down ates (consists for evaporation ints have stora m the start of critical duration in the hydrolog n which produces	o nd and grave nward move s of clays wit on losses. Th age losses a the rainfall p n and tempo jic model; uces the mere s the maximu	18 ment of wat h a perman his will act a pplied. pattern.	ier) ent high-wat is a factor of for a particul ow; then ws across th	er table and safety for th ar catchmen
Evaporation Losses Storage Loss Critical Storm	n Selectio	D-Very Slow- Sourced: ARR 2 1. Type A - low 2. Type B - mod 3. Type C - slow 4. Type D - high high Over the 24hou evel of design. Both Impervious This is the amo • Imper • Pervious following mytho and event. 1. Asses 2. For ea 3. Selec adopt	Clays 2019 runoff potentia derate infiltration w infiltration rate h runoff potentia n swelling poter ur period no allo s and pervious punt of rainfall d rvious depress ious depress sto ology was adop ess all durations ach duration, so t the duration (a t this combination)	75 I, high infiltrat n rates and n es (may have al, very slow i tital) wance has b portions of th epth in mm re storage applied ted for workir and temporal elect the temp and temporal	3         ion rates (noderately layers tha nfiltration r         een made         een made         een made         acatchme         emoved fro         ed = 2mm         = 10mm         ng out the or         patterns in         poral patter         pattern) w         cal duration	2 consists of sam well-drained t impede dow ates (consists for evaporation ints have stora m the start of critical duration the hydrolog n which produces and tempora	o nd and grave nward move s of clays wit on losses. The age losses a the rainfall p n and tempo jic model; uces the men s the maximu	18 el) ment of wat h a perman his will act a pplied. pattern.	38 er) ent high-wat is a factor of for a particul ow; then ws across th	er table and safety for th ar catchmen e system and


PROJECT Composting Dam Preliminary Sizing Notes				PROJECT NO. 5103-57-007 Designed Travis Williams Date 11-02-2020 Sheet 2of 2	
Poculto	Table 2: C	atahmant			
	DAM ID	Catchment A	rea Fraction	Time of Conc.	Critical Storm
	1	(ha)	Impervious (%)	(min)	(AEP_Storm ID_Duration)
		5.400	0.9	O	2 5302 1440
	2	2 302	0.9	5	10 5377 1440
		2.002	0.0		2 5302 1440
	3	1.867	0.9	5	10_5377_1440
					2_5302_1440
	4	1.408	0.9	5	10_5377_1440
					2_5302_1440
	Table 3: D	am Properties for	- 10% AEP		
	DAM	Volume Required (m <sup>3</sup> )	Full Capacity and with	Initial sizing	Weir Sizing
		7 8/Q		<b>1.6m</b> Deen with 1in/ hatter	rs 1m wide x 0 3m deep
		7,045	(10,083)	Top size = 150 x 50m	
				Base size = 127.2 x 37.2m	
	2	3,306	3,348	<b>1.6m</b> Deep with 1in4 batter	rs 1m wide x 0.3m deep
			(4,341)	l op size = <b>65 x 52m</b> Base size = 52.2 <b>x 39.2m</b>	
	3 2,611 2,693		2,693	1.3m Deep with 1in4 batter	rs 1m wide x 0.3m deep
		(3,70		Top size = 100 <b>x 35m</b> Base size = 89.6 <b>x 24.6m</b>	
	4	2 023	2 050	<b>1 3m</b> Deep with 1in4 batter	rs 1m wide x 0.3m deen
		(2.822)		Top size = 52 x 51m	
			(=,-=-)	Base size = 41.6 <b>x 40.6m</b>	
	Notes:				
	1. Calcu	ulations assume th	nat dam is empty at the s	tart of each 10% AEP event.	
	2. 300mm Freeboard adopted.				
	3. Weir to be resized if full Capacity is reduced.				
	4. The sizes shown above are indicative only and are			are subject to change.	
	5. This	document is inten	ded as supporting inform	ation only.	