

Decision Report

Application for Licence

Part V Division 3 of the Environmental Protection Act 1986

Licence Number	L9307/2021/1
Applicant	Kalium Lakes Potash Pty Ltd
ACN	601 436 060
File number	DER2021/000412
Premises	Beyondie Sulphate of Potash Project LITTLE SANDY DESERT WA 6646
	Legal description –
	Part of mining tenements L69/31, L69/40, M69/145 and M69/146
	As defined by the coordinates in Schedule 1 of the licence
	As defined by the premises maps attached to the issued licence
Date of report	15 December 2021
Decision	Licence granted

Lauren Edmands MANAGER RESOURCE INDUSTRIES an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, licence L9307/2021/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary and overview of premises

Kalium Lakes Potash Pty Ltd (applicant) currently holds works approval W6241/2019/1 for category 89: putrescible landfill under Part V of the *Environmental Protection Act 1986* (EP Act), which is due to expire on 25 June 2022.

The applicant previously held works approval W5939/2015/1 for category 14: solar salt manufacturing, which expired on 1 January 2021 and works approval W6149/2018/1 under Part V of the EP Act for category 85: sewage facility, which expired on 3 October 2021.

The premises is located approximately 160 kilometres (km) south-east of Newman in the Shire of Wiluna.

On 21 July 2021, the applicant submitted an application for a new licence to the department under section 57 of the EP Act. The application is to:

- undertake construction/installation and operation of category 14: solar salt manufacturing;
- expand category 14: solar salt manufacturing capacity from 90 kilotonnes per annual period (ktpa) to 100 ktpa. The assessed production capacity of expired works approval W5939/2015/1 was 90 ktpa, therefore a proposed increase of 10 ktpa is being sought;
- operate the category 85: sewage facility;
- operate the category 89: putrescible landfill site; and
- undertake operations of infrastructure incidental to prescribed premises activities including:
 - o reverse osmosis (RO) plant;
 - o fuel storage and refuelling area; and
 - washdown bay.

The premises relates to the categories and assessed production capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations), which are defined in licence L9307/2021/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk assessments* (DWER 2020b), are outlined in licence L9307/2021/1.

2.3 Existing infrastructure

The applicant has already constructed and/or installed the below infrastructure. Therefore, only the operational aspects of these existing infrastructure have been considered for the Part V assessment for the new licence application:

- Category 14: solar salt manufacturing:
 - $\circ~$ A list of the existing category 14: solar salt manufacturing infrastructure is provided in Table 1.

Quantity	Existing infrastructure	Purpose	Location		
Groundwa	Groundwater abstraction bores				
_	Groundwater abstraction bores For noting: The groundwater abstraction bores are regulated under existing Rights in Water and Irrigation Act 1914 (RIWI Act) licences and Ministerial Statement 1098 (MS 1098); therefore, these have not been considered further in the Part V risk assessment.	Enable the extraction of fresh, brine and saline to hypersaline groundwater	_		
Trenches					
_	Trenches For noting: The applicant has requested to have all trench infrastructure excluded from the Part V licence and therefore these have not been considered further in the Part V risk assessment.	Enable the extraction of brine and saline to hypersaline groundwater	_		
Evaporati	Evaporation ponds				
2	Concentrator lakes (Sunshine Pre-concentrator and Ten Mile Pre-concentrator)	Primary brine solar concentrators to reduce pumping volume	Evaporation ponds as shown in Figure 1 and Figure 2 of Schedule 1 (licence L9307/2021/1)		
2	Feed ponds	Concentrator lake mixing			
6	Concentrator ponds	Secondary brine solar concentrator			
10	Sodium chloride (NaCl) ponds	Crystallise sodium salts			
3	Astrakanite ponds	Mixing plant mother liquor			

 Table 1: Category 14: solar salt manufacturing – existing infrastructure

Quantity	Existing infrastructure	Purpose	Location		
14	Leonite ponds	Crystallise Leonite salts			
7	Potassium rich salts (KTMS) ponds	Crystallise KTMS			
2	Carnallite ponds	Crystallise Carnallite salts			
3	Bittern ponds	Storage of Magnesium brine			
Pipelines					
_	Transfer pipelines	Transportation of brine and saline to hypersaline water	'Pipeline' located within the prescribed premises boundary as shown in Figure 1 of Schedule 1 (licence L9307/2021/1)		
Run of mi	Run of mine (ROM) pad				
_	High-density polyethylene (HDPE) lined storage pad with earthen bunding and drainage sump	Storage of raw salts (for processing)	'ROM pad' as shown in Figure 1 and Figure 5 of Schedule 1 (licence L9307/2021/1)		
Sulphate	Sulphate of potash (SOP) purification plant				
-	Mixing tanks, pumps, pipes and control circuits	SOP purification plant operations as described in Table 3	'Plant' as shown in Figure 1 and Figure 5 of Schedule 1 (licence L9307/2021/1)		

- Category 85: sewage facility:
 - A list of the existing Category 85: sewage facility infrastructure is provided in Table 2.

Table 2: Category 85: sewage facility – existing infrastructure

Existing infrastructure	Purpose	Location	
Wastewater treatment plant (WWTP)			
Raw wastewater/Balance tank	Tanks designed to hold the peak flow influent whilst delivering a steady flow to the sequence batch reactor (SBR), allowing for complete treatment over a 24-hour period	Schematic layout of WWTP as shown in Figure 8 of Schedule 3 (licence L9307/2021/1)	
SBR contained within a sea container lined with HDPE:	Sewage is pumped into the SBR and enters via the anaerobic tank		

Existing infrastructure	Purpose	Location
 two anaerobic chambers; one clarification chamber for sludge settlement and removal; one aerobic biofiltration chamber; and a disinfection chamber with tablet form chlorination. 	 From the anaerobic tank, effluent passes through several treatment stages including an anoxic tank, aeration tank and a classifier tank The SBR methodology of wastewater treatment utilises a biological treatment process whereby highly aerated effluent flows through inert media that is completely submerged, promoting formation of a fixed microbial film that reduces the biochemical oxygen demand (BOD₅) and ammonia content of the effluent (sludge) settles out and is then removed and stored separately in appropriate tanks The effluent is then filtered and dosed with chlorine to a low exposure risk level (ERL) quality, prior to discharging into the treated effluent tank, ready for disposal 	
Irrigation/Treated wastewater tanks	 Low ERL water is transferred from the SBR to the treated wastewater tank Chlorination will occur via manually loaded tablets, at a frequency based on daily checks of the SBR 	
Sludge tanks	 Sludge produced by the WWTP is collected in sludge tanks Sludge is removed from the tanks by a licensed controlled waste carrier and taken for disposal to an approved waste facility Sludge will be removed approximately every 6-12 months, with an estimated 1 m³ of sludge generated annually 	
HDPE piping and joiners	Transportation of influent and effluent (WWTP and RO plant)	
Spray irrigation field		
• At least 5.11 ha spray irrigation field (to ensure that sufficient surface area is available to minimise likelihood of nutrient loading); and	A dedicated irrigation area has been installed to dispose of the treated wastewater For noting: The applicant determined the appropriate size of the irrigation area	'Irrigation Spray Fields' as shown in Figure 1 and Figure 4 of Schedule 1 (licence L9307/2021/1)

Existing infrastructure	Purpose	Location
A wire fence constructed around the perimeter of the spray irrigation field. The fence line is 5 m from the sprinkler spray pattern.	for wastewater disposal using Total Phosphorous (TP) and Total Nitrogen (TN) loading figures as per the Water Quality Protection Note (WQPN) 22: Irrigation with nutrient-rich wastewater. Using these calculations, an irrigation area of at least 5.11 ha was proposed to ensure that sufficient surface area is available to minimise the likelihood of nutrient loading.	

- Category 89: putrescible landfill site:
 - Stock proof perimeter fence as per the *Environmental Protection (Rural Landfill) Regulations 2002* (Rural Landfill Regulations);
 - 5 m wide x 40 m length x 3 m depth trenches; and
 - Two groundwater monitoring bores: one installed upstream and one downstream of landfill.
- Infrastructure incidental to prescribed premises activities:
 - o RO plant:
 - generating approximately 24,000 L of RO wastewater per day.

For noting:

The applicant has advised that the RO wastewater is fed directly into the WWTP irrigation tank, which is then discharged directly to the irrigation spray field. As the applicant is seeking approval to discharge wastewater from the RO plant, the operation of this infrastructure has been considered further in the Part V risk assessment.

- Fuel storage and refuelling area:
 - two 110,000 L diesel fuel pods located within sealed containers; and
 - concrete refuelling pad with bunding.

For noting:

The applicant has advised that the bunded fuel containment is compliant with Australian Standard AS 1940 – The storage and handling of flammable and combustible liquids and is equipped with spill response kits, which are inspected regularly to ensure they are suitable stocked.

As the applicant is not seeking approval to discharge from the fuel storage and refuelling area, the operation of this infrastructure has not been considered further in the Part V risk assessment.

- Washdown bay:
 - self-contained area comprised of a concrete pad with bunding.

For noting:

The applicant has advised that all waste (generated from washing activities) is stored within 1,000 L intermediate bulk container(s) (IBC) prior to removal from site by a licensed controlled waste carrier to an approved waste facility and that no waste is discharged to land.

As the applicant is not seeking approval to discharge from the washdown bay, the operation of this infrastructure has not been considered further in the Part V risk assessment.

2.4 Description of proposed activities

2.4.1 Construction

The proposed construction phase activities include the following works:

- Category 14: solar salt manufacturing:
 - Construction of new evaporation ponds:
 - One Pre-concentrator pond;
 - Four NaCl ponds;
 - Six Leonite ponds;
 - Three KTMS ponds;
 - One Carnallite pond; and
 - One Bittern pond,
 - Construction of an earthen bund capable of containing saline to hypersaline water and stormwater runoff from the excess salt stockpile; and
 - Construction/Installation of new transfer pipelines as required (for transporting brine and saline to hypersaline water).

2.4.2 **Operations**

The proposed operational activities include the following:

- Category 14: solar salt manufacturing:
 - Commissioning of the new evaporation ponds, which will take approximately 12-15 months. Each new evaporation pond will be progressively filled with brine to achieve the following:
 - Weighting down of the HDPE liner; and
 - Crystallisation of a 100 mm salt floor, which will be retained to protect the HDPE liner,
 - Operation of all evaporation ponds;
 - Operation of transfer pipelines (for transporting brine and saline to hypersaline water);
 - Operation of the SOP purification plant as described in Table 3:

Table 3: SOP purification plant operations

Step	Process	Description	Location
1	Storage and crushing of potash salts	 Harvested raw salts from different evaporation ponds are stored in separate stockpiles Stockpiles of harvested raw salts are then mixed in a controlled ratio and crushed down to a 1 mm particle size 	'Plant' as shown in Figure 5 of Schedule 1 (licence L9307/2021/1)

Step	Process	Description	Location
2	Conversion of potash salts to raw schoenite	The crushed, mixed salts are mixed with cooled SOP mother liquor causing conversion of the mixed salts to schoenite	
3	Flotation of schoenite	The schoenite slurry undergoes conditioning before direct flotation in flotation cells.	
		200 mg/t of Lilaflot D817 is utilised as a flotation medium to extract schoenite slurry from the overflow. After the schoenite slurry is removed from the overflow, it is then dewatered and the Lilaflot is either decomposed or recycled back into the plant to be used again.	
		Halite tailings are discarded during this process step.	
4	Cooling crystallisation of secondary schoenite	• Hot SOP mother liquor is cooled in a five-stage vacuum cooling crystallisation unit, the temperature decreases results in crystallisation of secondary schoenite	
		 Crystalised secondary schoenite is centrifuged and mixed with the floated schoenite from the previous step 	
5	Decomposition of schoenite to SOP	 The schoenite is decomposed into SOP by mixing with warm water in a continuously stirred tank reactor 	
		 The SOP is first centrifuged before being purified further by washing with additional water 	
6	Drying	The wet, purified SOP is dried through the use of a fluidised bed drier	
7	Compaction and packing of SOP	Depending on product quality requirements (Standard, soluble grade etc.) and packaging requirements, the product is compacted in a hammer mill and/or packaged into bags/stored as a bulk product	

• Storage of SOP (product).

For noting:

The applicant has advised that SOP (product) will be stored in a fully enclosed purposebuilt building which has a concrete pad. SOP is fed via an enclosed conveyor from the building and utilising an enclosed feed hopper, bulk bags will be filled and secured immediately.

As the applicant is not seeking approval to discharge from the SOP (product) storage area, the operation of this infrastructure has not been considered further in the Part V risk assessment.

• Use of excess salt (salt waste generated through the solar salt manufacturing operations) on evaporation pond embankments to create roads.

For noting:

The applicant sought approval to use excess salt (salt waste generated through the solar salt manufacturing operations) for dust suppression activities throughout the premises. As the applicant has not provided information in relation to specific application location(s), application methods, application rates, background levels of soil quality at proposed discharge locations and loading studies, the Delegated Officer has determined that there is insufficient information to undertake a Part V risk assessment in relation to this aspect.

Considering the above, the applicant will need to apply for a licence amendment should they wish to utilise excess salt (salt waste generated through the solar salt manufacturing operations) for dust suppression activities.

- Excess salt (salt waste generated through the solar salt manufacturing operations) sourced from the SOP purification plant discharged to the excess salt stockpile.
- Category 85: sewage facility:
 - The applicant has requested to alter the process described within the historical category 85: sewage facility works approval W6149/2018. The proposed change is to add RO plant wastewater to the treated WWTP wastewater; and
 - Operation of the WWTP with combined disposal of treated wastewater and RO wastewater to the dedicated irrigation spray field.
- Category 89: putrescible landfill site:
 - Disposal of Class II waste types into the putrescible landfill facility.

2.5 Mining Proposal

The mining proposal (registration ID: 77706) (MP 77706) seeking approval to develop a subsurface brine deposit to produce a SOP product was approved by the Department of Mines, Industry Regulation and Safety (DMIRS) on 17 September 2019.

2.6 Part IV of the EP Act

The Beyondie Sulphate of Potash Project has been assessed under Part IV of the EP Act by the Environmental Protection Authority (EPA). It is subject to the requirements of MS 1098. The EPA's assessment is provided in EPA Report 1631.

MS 1098 was published on 7 June 2019. There are no conditions directly related to management or control of emissions and discharges.

Included in the statement are conditions to minimise direct and indirect impacts to the following:

- Tecticornia shrubland vegetation and Tecticornia species listed as Priority Flora (Tecticornia globulifera, Tecticornia sp. Christmas Creek, Tecticornia sp. Little Sandy Desert and Tecticornia sp. Sunshine Lake);
- Subterranean Fauna (Stygofauna); and
- Macrotis Lagotis (Greater Bilby).

In addition to the above requirements, the applicant is required to prepare and submit a Tecticornia Monitoring and Management Plan, a Subterranean Fauna Management Plan and to conduct pre-clearance surveys for the Greater Bilby within 2 weeks prior to ground disturbing activities being undertaken.

Potential impacts to Tecticornia, Subterranean Fauna (Stygofauna) and the Macrotis Lagotis (Greater Bilby), including any requirements of monitoring in relation to these, have not be considered in the Part V assessment given these have been considered under MS 1098.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020b).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation, which have been considered in this decision report, are detailed in Table 4 below. Table 4 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Emission	Sources	Potential pathways	Proposed applicant controls		
Construction	Construction				
Dust	Movement of mobile equipment (e.g. light	Air/Wind dispersion	• Water carts with spray bars available on site for use in dust suppression (as required).		
	vehicles and heavy equipment)		• Water applied to any roads or cleared areas that pose a dust risk.		
			Vehicle speed limits implemented on site:		
			 80 km site access road to Sunshine pre-concentrator pond to evaporation ponds; 		
			 60 km site access road Ten Mile pre-concentrator pond to evaporation ponds; 		
			 40 km on roads between accommodation and administration buildings; 		
			 20 km around the plant and evaporation ponds; and 		
			 10 km in built up areas (accommodation and administration), 		
			• Areas will not be disturbed until they are required to be used, and the area to be disturbed minimised where practicable.		
			Biodegradable stabilising agents may be used to minimise dust lift-off.		
			Monitoring:		
			• opportunistic inspections for dust emissions undertaken during construction of the project to ensure dust control measures are being implemented and are effective.		
			• if visible dust emissions are noted then an assessment of the source will be undertaken and additional water applied to key source areas, or alternative treatments		

Emission	Sources	Potential pathways	Proposed applicant controls
			 applied. the potential for high-risk weather conditions for dust emissions (i.e. windy conditions) will be monitored and extra water applied in preparation. Incident management: an incident reporting system maintained to assist in managing environmental incidents such as excessive dust emissions.
Saline to hypersaline water	Abstraction of saline to hypersaline groundwater via deep production bores and storage within evaporation ponds	Overspray or runoff from dust suppression operations (e.g. action of spraying saline to hypersaline water)	No applicant controls proposed.
Operations			
General			
Hydrocarbons (e.g. hydraulic oil or diesel) and chemicals	Operation of mobile equipment (e.g. light vehicles, heavy equipment, generators and pumps)	Spills or leaks, overflow during filling and/or breach of containment resulting in direct discharge/overland flow to soil/sediment, surface water and infiltration to groundwater	 Contractor shall ensure all mobile plant and vehicles are regularly serviced and maintained to the manufacturer's and regulatory requirements. Hydrocarbons and chemicals stored in bunded facilities compliant with Australian Standard AS 1940 <i>The storage and handling of flammable and combustible liquids</i>. All hydrocarbon or chemical storage facilities fitted with spill kits. Fuel stored in self-bunded tanks. Refuelling of drill rigs and other immobile or semi-mobile equipment conducted using a service vehicle, fitted with a spill kit. Light vehicle refuelling facilities conducted in a dedicated

Emission	Sources	Potential pathways	Proposed applicant controls
			 area. Vehicle refuelling/washdown areas fitted with oil-water separator. Dangerous goods risk assessments conducted where required. Any spills controlled, contained and cleaned up. Monitoring: hydrocarbon and chemical storage areas inspected on a regular basis. spill kits inspected on a regular basis and replenished as required. Incident management: an incident reporting system maintained to assist in managing environmental incidents.
Saline to hypersaline water	Use of saline to hypersaline water for onsite dust suppression	Overspray or runoff from dust suppression operations (e.g. action of spraying saline to hypersaline water)	No applicant controls proposed.
Category 14: solar salt r	nanufacturing		·
Brine Saline to hypersaline water	Evaporation ponds	Seepage of brine and/or saline to hypersaline water through the base and embankments of evaporation ponds	 Evaporation pond specifications: constructed in an area that is not susceptible to flooding; constructed using a cut and fill method; embankment designs in accordance with Figure 6 (licence L9307/2021/1): typical embankment design, used for evaporation pond walls on flat ground; and/or

Emission	Sources	Potential pathways	Proposed applicant controls
			 different elevation embankment design, used on sloped land; and/or
			 trafficable embankment design, with a wider surface to allow vehicle access.
			 lined with a 1 mm HDPE liner;
			 HDPE liner terminations in accordance with Figure 7 (licence L9307/2021/1);
			 access and egress to evaporation ponds via specially designed ramps;
			 leak detection infrastructure:
			 broad array of sensor cables installed under the salt bed floor of each evaporation pond;
			 sensor cabling terminates at a single point on each evaporation pond where trailer mounted hardware facilitates data collection; and
			 data is delivered to offsite contractor for processing and preparation of a Pond Status Report.
			 400-600 mm deep sodium chloride salt layer grown on floor of newly constructed evaporation ponds. The hard salt floor will not be harvested, only additional salt that grows on top is harvested, maintaining a 100-200 mm salt floor to assist in protecting the integrity of the HDPE liner.
			 Installed HDPE liner inspected prior to filling evaporation ponds with brine.
			Management of potential leak:
			 if a suspected evaporation pond leak is detected via the leak detection infrastructure, a survey of the relevant evaporation pond is undertaken using a high-resolution probe (HRP) to identify the location

Emission	Sources	Potential pathways	Pr	oposed applicant controls
				and extent of any leaks; and
				\circ survey data analysed and report of results issued.
			•	HDPE liner repairs:
				 damaged evaporation pond HDPE liners repaired via:
				 closure and draining of the damaged evaporation pond (if necessary);
				 salt covering the damage is excavated; and
				 repair patch is welded using sheet(s) of HDPE liner and plastic welding.
			•	Monitoring:
				 visual assessments of HDPE liners.
		Overtopping of evaporation ponds	•	evaporation pond specifications:
				 constructed in an area that is not susceptible to flooding;
				o designed to maintain a minimum 250 mm freeboard;
				 operating depth of 300 mm of brine; and
				 inter-pond weirs installed between all evaporation ponds, allowing water to be directed as required to the bittern ponds.
			•	Constructed embankments inspected prior to filling evaporation ponds with brine.
			•	Regular harvesting schedule to ensure the salt floor level is maintained at 100-200 mm.
			•	Monitoring:
				 stability of the embankments inspected on a regular basis during commissioning and operations.

Emission	Sources	Potential pathways	Proposed applicant controls
			o freeboard inspections.
Airborne salt particulates/dust		 Air/Wind dispersion from: dry harvesting; and liftoff from dry evaporation ponds. 	Water carts with spray bars available on site for use in dust suppression (as required).
Saline to hypersaline water	ROM pad	Seepage of saline to hypersaline water through the base and embankments of ROM pad and drainage sump	 The ROM pad has been lined with HDPE liner and a bund has been constructed surrounding the salt stockpile utilising locally sourced borrow material. A drainage sump has been installed to capture any runoff during extensive rainfall. This material will be harvested and re-stocked on the ROM pad.
Stormwater – sediment and salt laden		Overtopping of drainage sump	A drainage sump has been installed to capture any runoff from the ROM pad during extensive rainfall. This material will be harvested and re-stocked on the ROM pad to maintain capacity within the drainage sump.
Airborne salt particulates/dust		Air/Wind dispersion from liftoff from stockpiling of raw salts	 Water carts with spray bars available on site for use in dust suppression (as required). For noting: The applicant has advised that the raw salt stockpile is 'wet' as such dust emissions are unlikely.
Airborne salt particulates/dust	SOP purification plant	Air/Wind dispersion from crushing of harvested raw salts	 Water carts with spray bars available on site for use in dust suppression (as required). For noting: The applicant has advised that raw salts are crushed using a hammer mill.
Brine		Overtopping of infrastructure and direct discharge to soil/sediment,	All equipment constructed on a concrete pad.

Emission	Sources	Potential pathways	Proposed applicant controls
Saline to hypersaline water		surface water and/or infiltration to groundwater	
Lilaflot D817 (flocculant)	Transfer pipelines	Transfer pipeline leak/rupture and direct discharge to soil/sediment, surface water and/or infiltration to groundwater	 Transfer pipeline specifications: located off access road surfaces; buried if they need to cross roads; constructed and/or installed according to manufacturer specifications; fitted with a leak detection system; and flow meters installed at all the pumps and pressure gauges. Leak detection and management: each pumping skid has the following limitations that trigger automatic pumping cut offs: low pressure – set below the pressure of the pump running at its lowest possible speed; high pressure – set beneath the temperature derated maximum allowable operating pressure of the pipeline immediately following the pumping skid; and low flow – five (5) second timed trip if there is no flow detected in the pumping skid. Post incident management: investigations will be conducted into the cause of any spills and remedial actions taken to minimise the chance of reoccurrence. Monitoring: daily visual inspections of transfer pipelines for leaks and damage.

Emission	Sources	Potential pathways	Proposed applicant controls
			 Training: spill response training for site-based personnel.
Stormwater – sediment and salt laden	Excess salt stockpile	Overland runoff from excess salt stockpile	 Earthen bund capable of containing saline water and runoff from the excess salt stockpile.
Category 85: sewage fac	cility		
Contaminated influent	WWTP	Overtopping of infrastructure and direct discharge to soil/sediment, surface water and/or infiltration to groundwater	 WWTP specifications: WWTP is located outside of a 1:100 year flood risk area; all wastewater storage components of the WWTP are impermeable (i.e. fiberglass or HDPE lined); installed as per manufacturer specifications; WWTP tanks installed on a compacted earthen pad; sludge stored in sealed tanks; and SBR contained within a sealed shipping container. Sufficient freeboard maintained within each tank to ensure overspill does not occur. Infrastructure is equipped with an audible and visual alarm system. If high water levels in the tank or pump failure occur, the audible alarm and red flashing light will activate. Sludge generated from the treatment process stored in separate sludge storage tanks and pumped directly from the tanks during sludge removal to avoid spillage. Sludge removed on a bi-annual basis and in accordance with the <i>Environmental Protection (Controlled Waste) Regulations 2004.</i>

Emission	Sources	Potential pathways	Proposed applicant controls
			 daily visual inspections of tanks for leaks, damage and wastewater levels.
			Incident management:
			 any incident involving a spill of untreated sewage will be responded to immediately with contaminated soil cleaned up and removed by a controlled waste carrier and taken for disposal to an approved waste facility; and
			 remediation actions will be taken to minimise the risk of reoccurrence.
		Pipeline leak/rupture and direct discharge to soil/sediment,	• WWTP (including pipelines) installed as per manufacturer specifications.
		surface water and/or infiltration to groundwater	Incident management:
			 any incident involving a spill of untreated sewage will be responded to immediately with contaminated soil cleaned up and removed by a controlled waste carrier and taken for disposal to an approved waste facility; and
			 remediation actions will be taken to minimise the risk of reoccurrence.
			Monitoring:
			 daily visual inspections of pipelines for leaks and damage.
Treated effluent (combined wastewate from WWTP and RO)		Direct discharge to land, with infiltration to groundwater	• The spray irrigation field location was chosen as it is not subject to inundation or flooding and water table is approximately 15 m below the surface. The nearest water body is 500 m from the spray irrigation field.
			 Treated wastewater disposed to land within a designated spray irrigation area calculated to comply with Water Quality Protection Note (WQPN) 22: Irrigation with

Emission	Sources	Potential pathways	Proposed applicant controls
			nutrient-rich wastewater (DoW 2008).
			 Irrigation designed such that runoff, spray drift or other discharge will not occur beyond the boundary of the irrigation area.
			 Wastewater evenly distributed over the irrigation area to prevent soil erosion and pooling.
			 Irrigation is not to occur during significant rainfall events to prevent potential discharges to surface water flows. Suitable storage maintained in the treated wastewater tank in case irrigation cannot occur for several days.
			 Spray irrigator operated to deliver treated wastewater at a maximum rate of 2.16 m³/hour.
			 No more than 1.02 mm/m²/day of treated effluent will be applied to the irrigation spray field.
			Monitoring:
			 monthly sampling and analysis of wastewater and in the event of a non-compliance, weekly monitoring to follow until levels are within target values;
			 all wastewater samples collected in accordance with Australian Standard AS/NZS 5667.10:1998 – Water quality - Sampling Guidance on sampling of waste waters;
			 samples submitted to a laboratory with current National Association of Testing Authorities (NATA) accreditation for the parameters to be monitored;
			 operational monitoring conducted in accordance with DoH Guidelines for the Non-potable Uses of Recycled Water (DoH 2011); and
			 a flow meter installed to record the volume of treated wastewater discharged to the irrigation area.

Emission	Sources	Potential pathways	Proposed applicant controls
			For noting: The applicant provided wastewater output characteristics for the WWTP. These have been incorporated as target values within Schedule 6 of licence L9307/2021/1.
		Irrigation spray field accessible to native fauna	The irrigation spray field area will be enclosed with a two strand 1.2 m high wire fence around the perimeter to restrict access to the area. The fence will be a minimum of 5 m from the sprinkler spray pattern to allow for spray drift.
Contaminated		Overland flow to soil/sediment,	• WWTP is located outside of a 1:100 year flood risk area.
stormwater – runoff of treated effluent		surface water and/or infiltration to groundwater	• WWTP tanks installed on a compacted earthen pad.
(combined waste from WWTP and RO)			• Stormwater diverted around the WWTP area using appropriate drainage.
			• The spray irrigation field location was chosen as it is not subject to inundation or flooding and water table is approximately 15 m below the surface. The nearest water body is 500 m from the spray irrigation field.
			Monitoring:
			 Stormwater drainage inspected on a regular basis.
			For noting:
			The applicant has advised that minimal stormwater runoff is anticipated due to infiltration into the highly porous sands (CDM Smith 2021a).
Category 89: putrescibl	e landfill site	·	·
Leachate	Putrescible waste	Leaching of landfill waste to soil/sediment and infiltration to groundwater Overland runoff to soil/sediment	 The putrescible landfill has been constructed to comply with <i>Environmental Protection (Rural Landfill) Regulations 2002</i> (Rural Landfill Regulations). Waste volumes reported monthly.

Emission	Sources	Potential pathways	Proposed applicant controls
		and infiltration to groundwater	 Monitoring: groundwater monitoring bores were installed upstream and downstream specifically for the landfill; no groundwater chemistry monitoring has been undertaken to date. The first groundwater chemistry monitoring undertaken in October 2021 and continue annually; and standing water levels (with each groundwater monitoring well) taken monthly.
Litter/Waste	Uncovered and/or accessible waste	Wind mobilised Landfill accessible to native fauna and vermin/scavengers	 Stock proof perimeter fence installed to comply with the Rural Landfill Regulations. Rubbish from the village deposited directly into the landfill and covered weekly at a minimum. Minimising the size of the active tipping area. Using litter screens at the active tipping area. Cleaning of litter from surrounding fences and areas. During high wind periods, disposal might be reduced or covering rates increased. Monitoring: weekly visual inspections of the landfill undertaken to: ensure no windblown rubbish is present; ensure wastes being disposed of are approved; and monitor evidence of fauna and feral animals.
Firefighting water runoff	Inadequate management of waste disposed in	Fire wastewater runoff to land and infiltration to groundwater	A firebreak installed to reduce the risk of bushfires impacting the landfill facility.

Emission	Sources	Potential pathways	Proposed applicant controls
	landfill		• Fires will not be lit within the landfill site.
			• Wastes covered with non-combustible material as per the requirements of the Rural Landfill Regulations.
			Incident management:
			 fire fighting vehicles and equipment on site; and
			 water stored on site for fire-fighting purposes and other water sources around premises can be sourced if required.
			Training:
			 trained emergency response personnel to quickly respond to any fires at the landfill facility; and
			 workforce education to minimise the potential for ignition sources such as hot materials and lead-acid batteries being placed within the tipping area.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020b), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 5 below provides a summary of potential human and environmental receptors that may be impacted because of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020)).

Sensitive receptors	Distance from prescribed premises boundary	Pathway assessment
Environmenta	al receptors	
Surface water bodies	 Excess salt stockpile and pre- concentrator pond are located on Ten Mile Lake as approved under MS 1098 SOP plant, primary and recycle evaporation ponds, putrescible landfill, WWTP, RO plant, irrigation spray field, washdown bay and fuel storage area are located adjacent to Ten Mile Lake; Pre-concentrator pond located on Sunshine Lake as approved under MS 1098; and Beyondie Lakes located approximately 2.5 km west of prescribed premises boundary. Due to the distance and location of the Beyondie Lakes being upstream of the prescribed premises operations, potential impacts to this receptor are likely to be minimal and therefore not further considered in the risk assessment. 	 Construction Dust via air/wind dispersion. Operations Potential impacts to surface water quality via: Overland runoff (sediment and salt laden stormwater); Seepage of brine and saline to hypersaline water through base and walls of evaporation ponds; Overtopping of evaporation ponds; Discharges from pipeline ruptures or leaks; and Direct discharge, runoff or drift of untreated influent/treated effluent/RO wastewater to soil and infiltration to groundwater.
Groundwater	Premises is located within the East Murchison Groundwater Area proclaimed under <i>Rights in Water</i> <i>and Irrigation Act 1914</i> . Groundwater is considered brackish to saline at 1,000 to 3,000 mg/L Total Dissolved Solids (TDS)	 Operations Potential impacts to groundwater quality via: Seepage of brine and saline to hypersaline water through base and walls of evaporation ponds to soil and groundwater;

Table 5: Sensitive	environmental	receptors	and	distance	from	prescribed	premises
boundary		-				-	-

Sensitive receptors	Distance from prescribed premises boundary	Pathway assessment
	 (DWER Geocortex). The applicant has advised that TDS content in the groundwater typically ranges from 100,000 - 250,000 mg/L in the vicinity of the salt lakes, which decreases slowly away from the lake edges. The TDS in the surficial aquifer to the east of Ten Mile Lake decreases from approximately 250,000 mg/L at the lake edge to approximately 20,000 mg/L at approximately 20,000 mg/L at approximately 3 km away, indicating a salinity gradient of 1:80 (CDM Smith 2021a). Monthly groundwater monitoring in the Ten Mile Lake area indicates groundwater levels range from 1-40 metres below ground level (mbgl), depending on pumping regimes (Kalium Lakes 2021). Groundwater adjacent to Ten Mile Lake ranges from 1-3 mbgl depending on their proximity to the trenches (Kalium Lakes 2021). The landfill groundwater monitoring bores record an average depth of 19 mbgl (Kalium Lakes 2021). The applicant notes that there are no monitoring bores located adjacent to the Irrigation spray field (Kalium Lakes 2021). 	 Overtopping of evaporation ponds; Discharges from pipeline ruptures or leaks to soil and groundwater; Seepage of leachate from landfill to soil and groundwater; Hydrocarbon discharges via refuelling or damage to mobile plant/equipment causing leaks; Direct discharge, runoff or drift of untreated influent/treated effluent/RO wastewater to soil and infiltration to groundwater; and/or Firefighting water runoff.
Native fauna	A total of 128 vertebrate fauna species were recorded during the field surveys at Beyondie Lakes, Ten Mile Lake and Lake Sunshine including seven amphibians, 43 reptiles, 50 birds and 28 mammals (eight introduced and 20 native) (Preston Consulting 77706).	 Operations Potential impacts to native fauna via: Wind mobilised litter and waste; Native fauna gaining access to landfill and irrigation spray field; and Native fauna gaining access to evaporation ponds. For noting: Hypersalinity (>50,000 mg/L TDS) provides a natural barrier for wildlife exposure to the water stored within the evaporation ponds, because at this salinity the solutions are outside

Sensitive receptors	Distance from prescribed premises boundary	Pathway assessment
		the physiologically safe drinking range of wildlife and wildlife seek to avoid its ingestion while foraging (MERIWA 2008).
		Considering the above, native fauna are not considered to be impacted during construction or operations of category 14: solar salt manufacturing operations and are therefore not further considered for this aspect within the risk assessment.
Native	Native vegetation located adjacent	Construction
vegetation	to prescribed premises boundary.	Dust via air/wind dispersion.
	Regional vegetation mapping by Shepherd <i>et al.</i> (2002) identifies four	Operations
	vegetation associations within and adjacent to the prescribed premises	Potential impacts to native vegetation health via:
	boundary. All vegetation associations have the status of 'Least Concern' with more than 90%	 Overland runoff (sediment and salt laden stormwater);
	 of their pre-European extent remaining (Preston Consulting 77706): Most native vegetation to the north and north-east of Ten Mile Lake, along the transfer pipeline route and surrounding Sunshine 	 Seepage of brine and saline to hypersaline water through base and walls of evaporation ponds, resulting in groundwater mounding and hypersaline water entering root zone of native vegetation;
	Lake is considered 134: Mosaic: Hummock grasslands, open low	 Overtopping of evaporation ponds;
	tree steppe; desert bloodwood and feathertop spinifex (on) sandhills;	 Hydrocarbon discharges via refuelling or damage to equipment causing leaks;
	• Native vegetation to the east and south of Ten Mile Lake is composed of 18: Low woodland; mulga (<i>Acacia aneura</i>); and	 Direct discharge, runoff or drift of untreated influent/treated effluent/RO wastewater to soil and infiltration to groundwater;
	Along the transfer pipeline route, there are two smaller patches of native vegetation composed of	 Discharges from pipeline ruptures or leaks; and/or
	178: Hummock grasslands, grass steppe; hard spinifex <i>Triodia basedowii</i> .	Airborne salt particulates/dust via air/wind dispersion.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk assessments* (DWER 2020b) for each identified emission source and considers potential source-pathway and

receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 6.

Licence L9307/2021/1 that accompanies this decision report authorises emissions associated with the operation of the premises i.e. category 14, 85 and 89 activities.

The conditions in the issued licence, as outlined in Table 6 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Risk Event					Risk rating ¹	Annligent		Justification for	
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
Construction									
 Source: Movement of mobile equipment (e.g. light vehicles and heavy equipment) Activities: Construction of new evaporation ponds; Construction of bund for the excess salt stockpile; and Installation of new transfer pipelines (for transporting brine and saline to hypersaline water) as 	Dust	Air/Wind dispersion	Reduced quality or contamination of surface water Impacts to native vegetation health	Surface water (Ten Mile Lake) Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 1	N/A
required. Source: Abstraction of saline to hypersaline groundwater via deep production bores and storage within evaporation ponds	Saline to hypersaline water	Overspray or runoff from dust suppression operations (e.g. action of spraying saline to hypersaline water	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Soil sodicity – areas where saline to hypersaline water is sprayed may become	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake) Native	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 2	Additional regulatory requirement applied to prevent impacts to native vegetation

Table 6: Risk assessment of potential emissions and discharges from the premises during construction and operation

Risk Event						Risk rating ¹	Annellanad		Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
Activities: • Use of saline to hypersaline water for onsite dust suppression			dispersive, causing increased erosion/sedimentation Impacts to native vegetation health	vegetation					
Operations									
General									
Source: • Operation of mobile equipment (e.g. light vehicles, heavy equipment, generators and pumps) Activities: • Refuelling; and • Damage to equipment causing leaks.	Hydrocarbons (e.g. hydraulic oil or diesel) and chemicals	Spills or leaks, overflow during filling and/or breach of containment resulting in direct discharge/overland flow to soil/sediment, surface water and infiltration to groundwater	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Impacts to native vegetation health	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake and Sunshine Lake) Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 8 (item 1, Schedule 5)	N/A
Source: Abstraction of saline to hypersaline groundwater via deep production bores Activities: • Use of saline to hypersaline water for onsite dust	Saline to hypersaline water	Overspray or runoff from dust suppression operations (e.g. action of spraying saline to hypersaline water)	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Soil sodicity – areas where saline to hypersaline water is sprayed may become dispersive, causing increased erosion/sedimentation	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake) Native vegetation	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 2	Additional regulatory requirement applied to prevent impacts to native vegetation

Risk Event						Risk rating ¹	Annella and		Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
suppression			Impacts to native vegetation health						
Category 14: solar sa	alt manufacturing								
Source: • Evaporation ponds Activities: • Abstraction of saline to hypersaline groundwater via deep production bores and storage within evaporation ponds	Brine Saline to hypersaline water	Seepage of brine and/or saline to hypersaline water through the base and embankments of evaporation ponds	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Groundwater mounding Impacts to native vegetation health	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake and Sunshine Lake) Native vegetation	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 3 (item 1, Schedule 4) Conditions 4-5 Condition 6 Condition 8 (item 1, Schedule 5) Condition 8 (item 1, Schedule 5)	 Additional regulatory requirement applied to: Ensure HDPE liner of new evaporation ponds achieves a hydraulic conductivity of less than 1 x 10⁻⁹ m/s; Specify leak detection and management processes; and Ensure surveys are undertaken by a suitably qualified surveyor (definition also incorporated) Some additional regulatory requirements apply to compliance reporting.
		Overtopping of evaporation ponds			Refer to section 3.1.1	C = Moderate L = Possible	Yes	Condition 8 (item 1, Schedule 5)	N/A

Risk Event						Risk rating ¹	Annelland		Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
						Medium Risk			
	Airborne salt particulates/dust	 Air/Wind dispersion from: dry harvesting; and liftoff from dry evaporation ponds. 	Impacts to native vegetation health	Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 1	N/A
Source: • ROM pad Activities: • Stockpiling of raw salts (for processing)	Saline to hypersaline water	Seepage of saline to hypersaline water through the base and embankments of ROM pad and drainage sump	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Groundwater mounding Impacts to native vegetation health	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake) Native vegetation	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 6 <u>Condition 8</u> (item 1, Schedule 5)	Additional regulatory requirement applied to: • Ensure HDPE liner is maintained with a hydraulic conductivity of less than 1 x 10 ⁻⁹ m/s; and • Ensure a minimum freeboard of 250 mm is maintained with in the drainage sump.
	Stormwater – sediment and salt laden	Overtopping of drainage sump			Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 8 (item 1, Schedule 5)	N/A

Risk Event						Risk rating ¹	Annella and		Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
	Airborne salt particulates/dust	Air/Wind dispersion from liftoff from stockpiling of raw salts	Impacts to native vegetation health	Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 1	N/A
Source: SOP purification plant	Airborne salt particulates/dust	Air/Wind dispersion from crushing of harvested raw salts	Impacts to native vegetation health	Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 1	N/A
Activities: • Operation of SOP purification plant	Brine	Overtopping of infrastructure and direct discharge to soil/sediment, surface water and/or infiltration to groundwater	Reduced quality or	Land/Soil Groundwater (1-40 mbgl)	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 8 (item 1, Schedule 5)	N/A
Source: • Transfer pipelines Activities: • Transport of brine and saline to hypersaline water via pipelines	Saline to hypersaline water Lilaflot D817 (flocculant)	Transfer pipeline leak/rupture and direct discharge to soil/sediment, surface water and/or infiltration to groundwater	contamination of soil/sediment, groundwater and/or surface water Impacts to native vegetation health	Surface water (Ten Mile Lake and/or Sunshine Lake) Native vegetation	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 3 (item 1, Schedule 4) <u>Condition 3</u> (<u>item 1,</u> <u>Schedule 4)</u>	Additional regulatory requirements for the construction of any new pipelines (to Australian standards and with anchoring).
Source: • Excess salt stockpile Activities: • Stockpiling of excess salt (salt waste generated through the	Stormwater – sediment and salt laden	Overland runoff from excess salt stockpile	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Groundwater mounding Impacts to native vegetation health	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake) Native vegetation	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 3 (item 1, Schedule 4) Condition 6 Condition 8 (item 5, Schedule 5)	N/A

Risk Event	Risk Event								Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
solar salt manufacturing operations) sourced from the SOP purification plant									
Category 85: sewage	facility	•							
Source: • WWTP Activities:	Contaminated influent	Overtopping of infrastructure and direct discharge to soil/sediment, surface water and/or infiltration to groundwater		Land/Soil	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 3 (item 1, Schedule 4) Condition 8 (item 6, Schedule 5) <u>Condition 8</u> (item 6, <u>Schedule 5</u>)	Additional regulatory requirement applied to maintain a minimum freeboard of 250 mm within each tank and vessel.
Operation of the WWTP		Pipeline leak/rupture and direct discharge to soil/sediment, surface water and/or infiltration to groundwater	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Impacts to native	Groundwater (1-40 mbgl) Surface water (Ten Mile Lake)	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 8 (item 6, Schedule 5)	N/A
Source: • WWTP Activities: • Discharge of treated effluent to a dedicated irrigation spray area	Treated effluent (combined wastewater from WWTP and RO)	Direct discharge to land, with infiltration to groundwater	vegetation health	Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 6 Condition 8 (item 7, Schedule 5) <u>Conditions</u> <u>12 and 13</u> Condition 17	Additional regulatory requirements applied to investigate and report any exceedances against wastewater output characteristics for the WWTP.

Risk Event						Risk rating ¹	Annlinent		Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
		Irrigation spray field accessible to native fauna	Ingestion affecting health of fauna	Native fauna	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 8 (item 7, Schedule 5)	N/A
	Contaminated stormwater – runoff of treated effluent (combined waste from WWTP and RO)	Overland flow to soil/sediment, surface water and/or infiltration to groundwater	Reduced quality or contamination of soil/sediment, groundwater and/or surface water Impacts to native vegetation health	Land/Soil Groundwater (1-40 mbgl) Surface water (Ten Mile Lake) Native vegetation	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 8 (item 7, Schedule 5)	N/A
Category 89: putresc	cible landfill site								
Source: • Putrescible waste Activities: • Disposal of Class II waste types into landfill facility	Leachate	Leaching of landfill waste to soil/sediment and infiltration to groundwater Overland runoff to soil/sediment and infiltration to groundwater	Reduced quality or contamination of soil/sediment and/or groundwater Leachate has the potential to disrupt ecological processes in soil/sediment and groundwater with excess nutrients	Land/Soil Groundwater (average depth of 19 mbgl at landfill)	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 7 Condition 8 (item 8, Schedule 5)	N/A
Source: • Uncovered and/or accessible waste Activities: • Disposal of putrescible waste into	Litter/Waste	Wind mobilised Landfill accessible to native fauna and vermin/scavengers	Ingestion affecting health of fauna Increase in vermin/scavengers	Native fauna	Refer to section 3.1.1	C = Slight L = Possible Low Risk	Yes	Condition 8 (item 8, Schedule 5)	N/A

Risk Event						Risk rating ¹	A		Justification for
Source/Activities	Potential emission	Potential pathways	Potential adverse impacts	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	additional regulatory requirements
landfill facility									
Source: Inadequate management of waste disposed in landfill Activities: Disposal of putrescible waste into landfill facility	Firefighting water runoff	Fire wastewater runoff to land and infiltration to groundwater	Reduced quality or contamination of soil/sediment and/or groundwater Impacts to native vegetation health	Land/Soil Groundwater (average depth of 19 mbgl at landfill) Native vegetation	Refer to section 3.1.1	C = Moderate L = Possible Medium Risk	Yes	Condition 8 (item 8, Schedule 5)	N/A

Note ¹: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020b).

Note ²: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4. Consultation

Table 7 provides a summary of the consultation undertaken by the department.

Table 7: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 14 October 2021	None received	N/A
Local Government Authority advised of proposal on 14 October 2021	None received	N/A
The Department of Planning, Lands and Heritage (DPLH) advised of proposal on 14 October 2021	DPLH responded on 21 October 2021 and advised that they have no no objections to the proposed licence, subject to consultation with the pastoral lessee.	N/A
DMIRS advised of proposal on 14 October 2021	DMIRS replied on 14 October 2021 advising that the proposed solar salt manufacturing and putrescible landfill site appear consistent with approvals granted by DMIRS under the <i>Mining</i> <i>Act 1978</i> via MP 77706. Given this, DMIRS has no concerns regarding this application.	N/A
Applicant was provided with draft documents on 10 December 2021	The applicant provided comments on 14 December 2021. The summarised applicant provided comments are provided in Appendix 1.	DWER responses to applicant comments are provided in Appendix 1.

5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

- 1. CDM Smith 2021a, Beyondie Sulphate of Potash Project Expansion 100 Ktpa Licence Approval Application – Supporting Information, West Perth, Western Australia.
- 2. CDM Smith 2021b, *100ktpa Operating Licence Request for information*, West Perth, Western Australia.
- 3. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
- 4. Department of Health (DoH) 2011, *Guidelines for the Non-potable Uses of Recycled Water in Western Australia*, West Perth, Western Australia. Accessed via the DoH website: <u>https://ww2.health.wa.gov.au/-/media/Files/Corporate/general-</u>

documents/water/Recycling/Guidelines-for-the-Non-potable-Uses-of-Recycled-Waterin-WA.pdf.

- Department of Water (DoW) 2008, Water Quality Protection Note (WQPN) 22: Irrigation with nutrient-rich wastewater, Perth, Western Australia. Accessed via DWER's website: <u>https://www.water.wa.gov.au/__data/assets/pdf_file/0013/4045/82324.pdf</u>.
- 6. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Environmental siting*, Perth, Western Australia.
- 7. DWER 2020b, Guideline: Risk assessments, Perth, Western Australia.
- 8. Kalium Lakes 2021, *Response to Schedule 1- List of Information required under assessment*, Balcatta, Western Australia.
- MERIWA 2018, Adams, M.D., Donato, D.B., Schulz, R.S. and Smith, G.B., 2008, Influences of Hypersaline Tailings on Wildlife Cyanide Toxicosis; MERIWA Project M398 (II) 'Cyanide Ecotoxicity at Hypersaline Gold Operations' Final Report Volume 2 – Definitive Investigation.
- 10. Preston Consulting 2019, *Beyondie Sulphate of Potash Project, Revised Mining Proposal*, East Perth, Western Australia.

Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Relevant condition or section within corresponding document	Summary of applicant's comment	Department's response					
DRAFT decision report (DRAFT decision report (L9307/2021/1)						
Table 1	To incorporate 'brine production bores' as part of the existing infrastructure.	The Delegated Officer is satisfied with the applicant's proposed update. Table 1 (decision report) has been updated accordingly.					
		The Delegated Officer notes that 'brine production bores' was updated to 'groundwater abstraction bores' to encompass all infrastructure pertaining to the abstraction of fresh, brine and saline to hypersaline water.					
		The Delegated Officer notes that the groundwater abstraction bores are regulated under existing RIWI Act licences and MS 1098; therefore, these were not considered further in the Part V risk assessment.					
Table 1	To specify that the commencement of category 14 activities (solar manufacturing) occurs at the Pre-concentrator pond, this is the point where the evaporation process commences, as such the trench network does not form part of the manufacturing.	The Delegated Officer has determined not to incorporate the additional text proposed by the applicant as the trenches are considered category 14: Solar salt manufacturing infrastructure.					
		On 28 September 2021, the applicant requested for trenches to be excluded from the new Part V licence.					
		On 1 October 2021, DWER responded in writing advising that Kalium Lakes Potash Pty Ltd is ultimately responsible for determining if they wish this infrastructure to be included or excluded from the new licence. The applicant was advised that should a					

Relevant condition or section within corresponding document	Summary of applicant's comment	Department's response	
		decision be made to exclude the trenches from the Part V prescribed premises boundary, then Kalium Lakes Potash Pty Ltd may not have any defences under the <i>Environmental Protection Act 1986</i> should any environmental issues arise from construction and/or operational activities in relation to this infrastructure.	
		On 4 October 2021, the applicant responded in writing and made a determination to exclude the trenches from the new Part V licence.	
DRAFT licence (L9307/202	21/1)		
7 (Table 2)	Update the landfill waste quantity limit from 450 to 25 tonnes per annual period.	The Delegated Officer is satisfied with the applicant's proposed update. Table 2 (licence) has been updated accordingly.	
		The Delegated Officer notes that the original value of 450 tonnes per annual period was due to an administrational error.	
8 (item 1, Schedule 5)	• Operation of 'mobile' equipment, the applicant has requested this be amended to 'fixed plant' equipment such as re-fuelling facilities and generators.	The Delegated Officer has reviewed the applicant's request to update the regulatory requirement to only include 'fixed plant' equipment.	
	• Maintaining all mobile equipment as per manufacturer's specifications (including light vehicles) would be very onerous. Therefore, the applicant has requested for this operational requirement to be removed.	The Delegated Officer notes that the intent of the regulatory requirement is to manage potential hydrocarbons (e.g. hydraulic oil or diesel) and chemical emissions during the operation of mobile equipment throughout the entire prescribed premises and not restricted to the purpose built 'refuelling area'.	
		Additionally, section 4.6 (item 3) of the supporting information supplied by the applicant (CDM Smith 2021b) states:	

Relevant condition or section within corresponding document	Summary of applicant's comment	Department's response
		 <i>The Contractor shall ensure:</i> <i>All mobile plant and vehicles are regularly serviced and maintained to the manufacturers and regulatory requirements,</i> The above proposed applicant control has now been incorporated into Table 4. Considering the above, the Delegated Officer has determined that light vehicles can be removed from the list of 'mobile equipment'; however heavy equipment, generators and pumps will be retained as this mobile equipment is integral to the prescribed premises operations and must be maintained to manufacturer's specifications.
8 (item 2, Schedule 5)	 Visual inspections every 12 hours when in use to check the freeboard and integrity of the HDPE liner. The inspections are to be no more than 12 hours apart. Due to lighting issues, it would not be feasible to undertake inspections of the evaporation ponds every 12 hours. It would become a safety issue as driving on the evaporation pond walls at night is hazardous due to poor visibility. The applicant has requested for the inspection frequency to be updated to twice daily inspections at the commencement of day shift and end of dayshift, during daylight hours. 	The Delegated Officer is satisfied with the applicant's proposed update to the evaporation ponds inspection scheduling and item 2, Schedule 5 (licence) has been updated accordingly.
8 (item 3, Schedule 5)	Rename 'Pipelines' to 'Transfer pipelines (for transporting saline to hypersaline water)' to distinguish between prescribed premises pipelines and those located outside of the prescribed premise boundary.	The Delegated Officer is satisfied with the applicant's proposed update. Additionally, the Delegated Officer has added 'brine' to the list of items being transferred via these pipelines. Section 2.4.1, 2.4.2, Table1, Table 4,

Relevant condition or section within corresponding document	Summary of applicant's comment	Department's response
		Table 5, Table 6 (decision report), Table 1 and item 3,Schedule 5 (licence) have been updated accordingly.
8 (item 6, Schedule 5)	Visual inspections every 12 hours when in operation to check the integrity of the tanks, pipelines, flow meters, alarm system (audible and visual) and stormwater drainage infrastructure. The inspections are to be no more than 12 hours apart.	The Delegated Officer is satisfied with the applicant's proposed update. Item 6, Schedule 5 (licence) has been updated accordingly.
	• The applicant has requested for the inspection frequency to be updated to daily inspections to align with the daily inspection of the facilities as prescribed by the manufacturer.	
8 (item 7, Schedule 5)	Visual inspections every 12 hours when in operation to check the integrity of the irrigation system valves, pumps, pipelines, and other fittings. The inspections are to be no more than 12 hours apart.	The Delegated Officer is satisfied with the applicant's proposed update. Item 6, Schedule 5 (licence) has been updated accordingly.
	• The applicant has requested for the inspection frequency to be updated to daily inspections. The pipeline and irrigation spray field are not well lit, undertaking inspections every 12 hours could become a safety issue if doing them in the dark.	
Table 5: Definitions	No applicant comments provided.	DWER initiated amendment of the definition for a 'suitable qualified surveyor' based on internal department advise. Table 5 has therefore been updated accordingly.
11 (Schedule 6)	The applicant has requested for the frequency of WWTP monitoring to be reduced from weekly to monthly and the applicant has advised that in the event of a non-compliance, weekly monitoring to follow until levels are within target values.	The Delegated Officer is satisfied with the applicant's proposed update. Schedule 6 (licence) has been updated accordingly.
	The applicant notes that weekly sampling was used during commissioning to ensure the system was operating correctly.	

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)					
Application type					
		Relevant works approval numbers:	 W5939/2015/ (Category 14) expired on 1 January 2021 W6149/2018/ (Category 85) expired on 3 October 2021 W6241/2019/ (Category 89) due to expire 25 June 2021 	, 1 , None 1,	
Licence		Have the works approvals been complied with?		Yes ⊠ No □ The applicant has submitted reports to demonstrate compliance with historical works approvals.	
		Has time limited operations under the works approvals demonstrated acceptable operations?		Yes D No The applica yet commen operations. licence will construction operational requiremen	nt has not nced The new include n and
		Environmental Compliance Report submitted?		Yes ⊠ No The applica submitted re demonstrate compliance historical we approvals.	nt has eports to e with
		 Date Report received: 13 March 2018 – Partial compliance document submitted for initial trial ponds – 180312 Kalium Trial Ponds Works Approx Compliance Report (A1634171). 22 May 2020 – Commissioning and Compliance Report submitted for Submitted for a submitted fo		oproval	
		 for the Sewage facility (DWERDT286391). 21 July 2021 – Commissioning and Compliance Report submitted for the Solar salt manufacturing (A2028308). 			submitted
		• 22 September 2021 – Commissioning and Compliance Report submitted for the Putrescible landfill (A2070871).			Report
Date application received	21 July 2021				

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)					
Applicant and premises details					
Applicant name/s (full legal name/s)	Kalium Lakes Potash Pty Ltd				
Premises name	Beyondie Sulphate of Potash Project				
Descris es la satism	Legal description –				
Premises location	Part of mining tenements L69/31, L69/40, M69/145 and M69/146				
Local Government Authority	Shire of Wiluna				
Application documents					
HPCM file reference number:	DER2021/000412				
Key application documents	Supporting information, dated 21 July 2021 (A2028308)				
(additional to application	 Response to first request for further information, dated 4 October 2021 (RFI) (DWERDT511501) 				
form):	Response to second RFI, dated 4 October 2021 (A2050961)				
Scope of application/assess	ment				
	New Licence				
	Construction				
	Category 14: Solar salt manufacturing:				
	1. Construction of new evaporation ponds; and				
	 Construction of an earthen bund capable of containing saline water and run-off from the excess salt stockpile. 				
	Operations:				
	Category 14: Solar salt manufacturing:				
	3. Operation of the new evaporation ponds:				
	Commissioning of these new ponds will take approximately 12-15 months. Each pond will be progressively filled with brine to achieve the following:				
Summary of proposed activities or changes to	Weighting the liner down; and				
existing operations.	 Crystallisation of the 100 mm salt floor (liner protection). 				
	4. Operation of the SOP purification plant.				
	Category 85: Sewage facility:				
	 Operation of the wastewater treatment plant (WWTP) with disposal of treated wastewater to the dedicated irrigation spray field. 				
	For noting:				
	The applicant has requested to alter the process described within the existing works approval W6149/2018. The proposed change is to add RO plant wastewater to the treated WWTP wastewater. The combined wastewater is proposed to be discharged to the dedicated irrigation spray field.				
	Category 89: Putrescible landfill site:				
	6. Disposal of putrescible waste into the landfill facility.				

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)

Category number/s (activities that cause the premises to become prescribed premises) Table 1: Prescribed premises categories

Table 1: Prescribed premises categorie Prescribed premises category and description	Ass	essed production or gn capacity	Proposed changes to the production or design capacity (amendments only)
Category 14: Solar salt 100 I manufacturing		kilotonnes per annum (ktpa)	Application to expand solar salt manufacturing capacity from 90 ktpa to 100 ktpa.
Category 85: Sewage facility	52 c	ubic metres (m ³) per day	No change
Category 89: Putrescible landfill site	25 to	onnes per annum	No change
Legislative context and other approv	vals		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?		Yes 🗆 No 🖂	 Referral decision No: Managed under Part V ⊠ Assessed under Part IV □ For noting: The project was referred and approved under MS 1098. The Delegated Officer notes that information provided within the Part V licence submission aligns with MS 1098.
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?		Yes 🗵 No 🗆	Ministerial statement No: 1098 EPA Report No: 1631
Has the proposal been referred and/or assessed under the EPBC Act?		Yes 🗵 No 🗆	Reference No: EPBC 2017/8088
Has the applicant demonstrated occupancy (proof of occupier status)?		Yes ⊠ No □	 Certificate of title □ General lease □ Expiry: Mining tenement ⊠ Expiry: M69/31, no expiry date listed; M69/40, no expiry date listed; M69/145, expiry: 05/06/2039; and M69/146: expiry: 05/06/2039. Other evidence □ Expiry:
Has the applicant obtained all relevant planning approvals?		Yes □ No □ N/A ⊠	Approval: N/A Expiry date: N/A If N/A explain why?

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)				
		Premises is on mining tenure.		
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal? Yes ⊠ No □		MS 1098 covers disturbance areas and clearing of priority flora.		
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes 🛛 No 🗆	MS 1098 covers disturbance areas and clearing of priority flora.		
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ⊠ No 🗆	Licence/permit No: GWL203052(1) GWL203053(1) GWL203054(1) GWL203055(1) GWL203056(1)		
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ⊠ No □	Name: East Murchison Groundwater AreaType: Proclaimed Groundwater AreaHas Regulatory Services (Water) been consulted?Yes □ No ⊠ N/A □		
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes 🗆 No 🗆	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to <u>WQPN 25</u>)? Yes □ No □ N/A ⊠		
Is the Premises subject to any other Acts or subsidiary regulations?	Yes ⊠ No □	 Environmental Protection (Noise) Regulations 1997 Environmental Protection (Unauthorised Discharge) Regulations 2004 Mining Act 1978 Rights in Water and Irrigation Act 1914 		
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes □ No ⊠	N/A		
Is the Premises subject to any EPP requirements?	Yes □ No ⊠	N/A		

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)				
Is the Premises a known or suspected contaminated site under the Contaminated Sites Act 2003?Yes □ No ⊠Classification: N/ADate of classification: N/A				