



## Application for amendment to a works approval

### Division 3, Part V *Environmental Protection Act 1986*

---

<b>Works approval number</b>	W6282/2019/1
<b>Works approval holder</b>	Piper Preston Pty Ltd
<b>ACN</b>	142 862 409
<b>File number</b>	DER2019/000390
<b>Premises</b>	Lake Way Potash Project Goldfields Hwy WILUNA WA 6646  Legal description – Mining tenement M53/796, M53/797, M53/798, M53/123 & M53/910, and part of mining tenement M53/53
<b>Date of report</b>	10 March 2020
<b>Decision</b>	Amendment granted

## Amendment description

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the works approval issued under the EP Act for a prescribed premises as set out below. Notice of amendment is hereby given under section 59B(9) of the EP Act.

The guidance statements which have informed the decision made on this amendment are listed in Appendix 2.

## Purpose and scope of assessment

This amendment relates to adding 'off-lake' infrastructure to the existing works approval, including:

- a 'demonstration' brine processing plant; and
- a sewage treatment plant.

## Background

The works approval holder proposes to construct and operate a demonstration brine processing plant at Lake Way, a dry saline lake located in the Mid West region, around 15 km south of Wiluna. The proposal involves treating potassium-containing salts, harvested from solar evaporation ponds on the Lake Way playa, to produce sulfate of potash (SOP).

Works approval W6206/2018/1 was issued in March 2019 regarding a proposal to construct a series of two temporary holding ponds and a collection trench on the Premises, to produce brine from the Lake Way playa and an adjoining gold mine pit (Williamson Pit), for the purpose of testing the resource and developing a brine manufacturing process. Licence L9208/2019/1 was subsequently issued in September 2019 to authorise this activity.

A separate works approval, W6282/2019/1, was issued in October 2019 regarding the construction of a series of evaporation ponds on the Lake Way playa, to produce brine as feed for a proposed demonstration plant. Five types of ponds would be constructed 'on-lake' and cover a disturbance footprint of around 700 hectares: four halite ponds (including the temporary ponds previously constructed under W6206), four kainite ponds, a carnallite pond and a bitterns pond.

An appeal was subsequently lodged in objection to the issuing of W6282 with concerns that, amongst other things, it permits the construction of ponds that appear much larger than that required for a trial operation, i.e. the works approval holder is carrying out construction of its proposed full-scale, 260,000 tonnes per annum (tpa), brine processing project, before the Environmental Protection Authority (EPA) finalises its assessment of the project. The appeal is currently being determined by the Minister for Environment.

## Proposed amendments

The works approval holder has submitted an application for the following:

- construction of a demonstration brine processing plant, including associated stockpiles and product storage facilities; and
- construction of a sewage treatment plant, to support a 300-bed mine camp.

## SOP processing plant

The works approval holder aims to confirm confidence in the commercial viability and sustainable quality of the Lake Way potash resource by constructing a small scale brine processing plant capable of producing 50,000 tonnes of SOP per year.

The expected project life (demonstration project) is around 5 years. A larger commercial scale project (260,000 tpa) has been referred to the EPA for assessment and is not considered in this assessment. The works approval holder expects to have gathered sufficient operational knowledge within the first 12 to 18 months to confirm the full operational equipment specifications for the larger commercial scale operation.

## Process overview

Potassium-containing salts harvested from the evaporation ponds will be treated in a processing plant to produce SOP. The process plant will receive a blend of harvest salt from the ponds constructed on the Lake Way playa.

Drained salts will be delivered to a feed preparation area by haul trucks, with up to 3,000 tonnes of salt feed storage maintained at the process plant. The feed preparation area comprises a receiving hopper with a grizzly screen, conveyor feeder, roll type lump breaker and transfer conveyors.

Sized salts will be fed to a series of attrition/scrubbing banks, prior to a flotation circuit at ambient temperature. Flotation tails consisting mostly of halite will be de-brined via belt filter, and the resulting halite solids will be deposited on the halite waste stockpile for disposal back in ponds on the lake (around 200,000 tonnes per year).

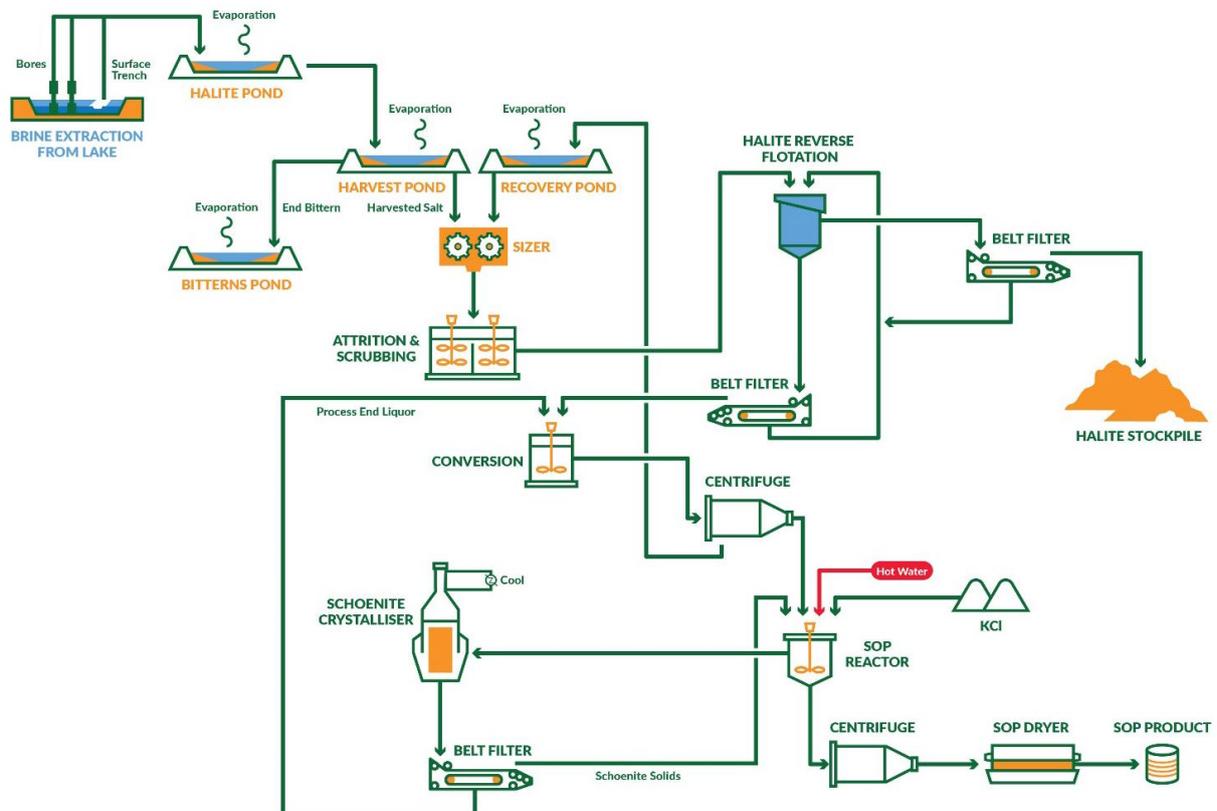
Potassium-containing salts from flotation will be converted to 'schoenite', a mixed salt containing potassium and magnesium sulfate, and leached with water to remove any residual halite. The schoenite slurry will then be de-brined via a centrifuge and fed into a crystalliser, which together with potassium chloride and water, is converted to high quality SOP.

Overflow from the crystalliser will be recycled back to the process as brine while the underflow, which will consist of high grade SOP in a sulfate-rich brine, will be dewatered and dried in a gas-fired rotary dryer.

Dryer off-gas will report to cyclones, with larger particles returned to the product storage and residual dust reporting to a dust collector baghouse. The de-dusted gases will be extracted by an extraction fan and discharged to air.

Dried SOP from the drying area will report to a product stockpile, from where it will be loaded directly into trucks in the product load out area for transport off-site for export.

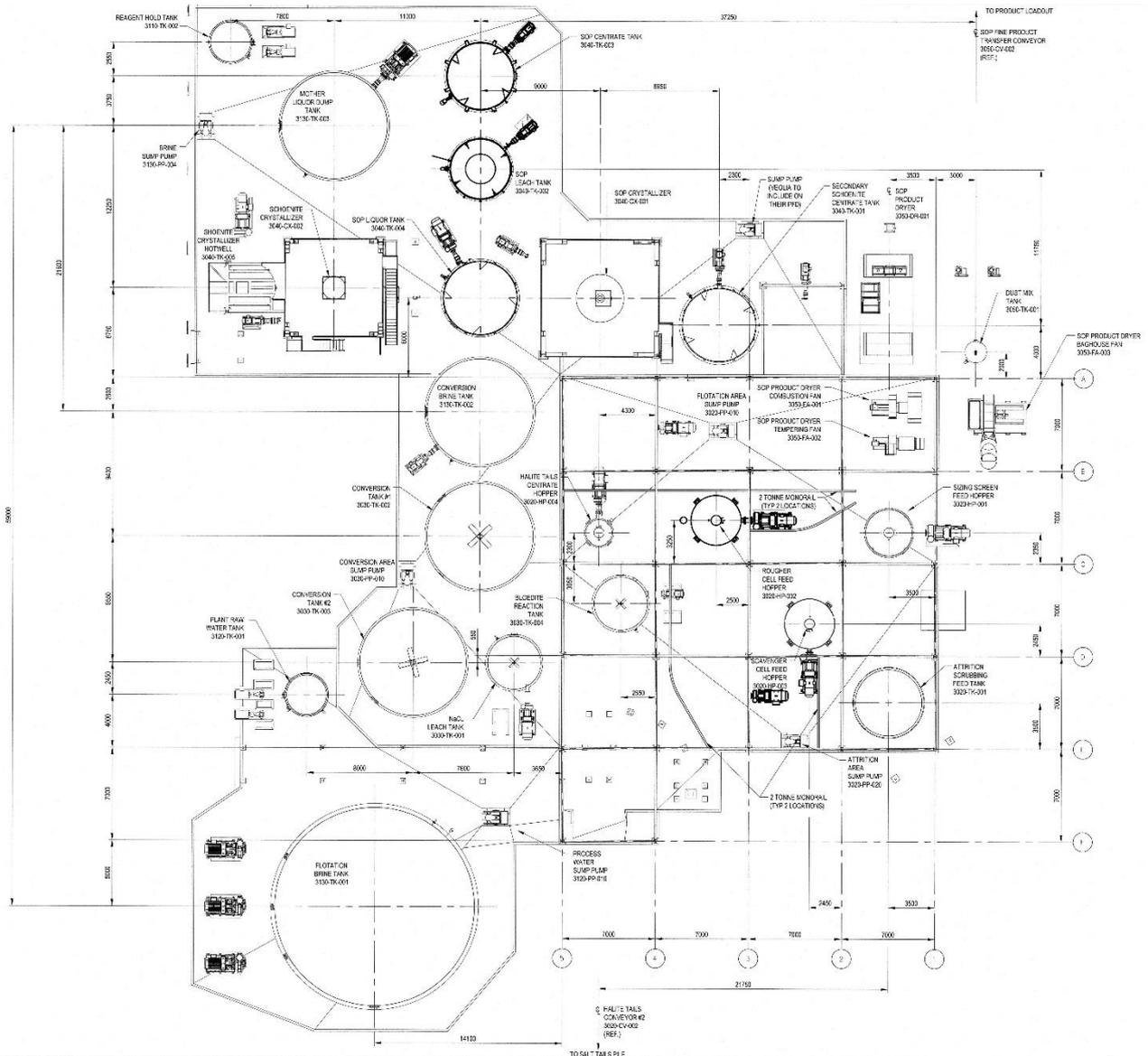
A schematic diagram of the process flow is illustrated below.



▲ SOP manufacturing process flow sheet

## Plant design and specifications

The process plant operations include feed sizing, flotation, conversion, crystallization, drying and storage, and load out processes. A description of each key infrastructure is provided below:



Infrastructure	Description
Feed preparation	<ul style="list-style-type: none"> <li>- salt will be drawn out of a receiving hopper via a transfer conveyor to a harvest salt surge bin, which will provide a controlled, measured rate via a volumetric feeder to the process plant;</li> <li>- salt will be delivered to a roll type lump breaker, before being fed into an attrition scrubbing feed tank;</li> <li>- feed preparation area comprises a reclaim brine pond, to contain runoff within the area</li> </ul>
Attrition/ flotation	<ul style="list-style-type: none"> <li>- crushed and blended harvest salt will be fed to an attrition scrubbing feed tank into which brine from a flotation brine tank will be used to slurry the solids (70% w/w);</li> <li>- slurry gravitates to a bank of attrition-scrubbing cells, to break down smaller lumps;</li> <li>- slurry feed box further dilutes slurry with flotation brine;</li> <li>- flotation collector is added and pH adjusted to 4.5 by addition of sulfuric</li> </ul>

Infrastructure	Description
	acid - waste halite is floated and the valuable potassium-rich salts report as underflow; - scavenger circuits are used to remove remaining impurities before conversion feed slurry reports to the conversion centrifuge; - halite tailings are dewatered and returned to the lake;
Conversion	- two conversion tanks in series convert harvest salt into schoenite; - schoenite slurry is thickened and de-brined, before being fed into a SOP crystalliser;
Crystallisation	- schoenite filter cake is fed to an atmospheric SOP crystalliser to convert schoenite to SOP; - the plant is designed with two operating modes – with or without KCl addition (KCl may be added as a reagent to the circuit to take advantage of the excess sulfate);
Drying	- SOP filter cake is then dried in a direct gas-fired rotary dryer; - dried solids report to a product conveyor for load out; - dryer off-gas report to dust capturing cyclones, with cyclone overflow reporting to a baghouse

### Production and process waste

The ratio of feedstock to product for the demonstration plant is estimated to be around 10:1, with the feedstock amount dependent on the grade achieved from the evaporation ponds.

Three excess salt waste streams will be generated by the process:

- dewatered halite salt from the process plant flotation, which will be returned to the salt stockpile on-lake;
- epsomite, which will be reclaimed from the recovery pond and stockpiled for potential resale or transferred to the excess salt stockpile for disposal on-lake; and
- liquid bischofite, being the remnant brine from the process plant recovery pond that will be pumped to the bischofite pond on the lake.

### Site layout

The product storage area, process plant buildings and associated tanks, workshop and vehicle washdown area will all be sealed, with the remainder of the site unsealed. An indicative layout of the site is illustrated below.

The plant is located on a relatively flat site on the western side of the lake. A defined drainage line is located to the south outside of the plant site.

Site drainage has been designed to accommodate flows from at least the 1:20 year ARI event. Surface water runoff from operational areas will be directed to engineered ponds to contain sediment-laden, saline or otherwise impacted water within the plant footprint. Water within the ponds will either evaporate or be used for operational purposes, including dust suppression.

### Water management

- Clean water system – a sediment pond in the southeast corner of the site will collect surface water runoff from the southern section of the site. The pond has been sized to accommodate a 20 year ARI 24 hour event (17,000 m<sup>3</sup>), and incorporates an overflow spillway. A second sediment pond in the central north section of the site will collect surface water runoff from the northern section of the site. The pond has also been sized to accommodate a 20 year ARI 24 hour event (6,000 m<sup>3</sup>);
- Reclaim brine pond – the feed preparation area and waste halite stockpile will be graded to provide drainage to the reclaim brine pond. The pond will be HDPE-lined and has a design capacity of 2,200 m<sup>3</sup>. A sump pump is proposed to transfer the brine runoff back to the on-lake pond system, via the recovery pond feed hopper;

- Contaminated water collection pond – a small pond will be constructed to contain hydrocarbon-contaminated surface water runoff from the HME/LME re-fuelling area and washdown standpipe area. The pond will be HDPE-lined and has a design capacity of 232 m<sup>3</sup>, which is sized on 6 days storage.



▲ **Site layout (generalised) and location of key infrastructure**

### Commissioning

The commissioning (testing) process will comprise the following phases:

- pre-commissioning: static checks on unpowered equipment to confirm the plant has been constructed to design specifications. This process will not involve the use of any chemicals, water or salt;
- dry commissioning: includes energisation and testing of electrical and control equipment, to verify safe operation prior to wet commissioning;
- wet commissioning: test operation of the constructed plant and associated infrastructure under no-load conditions or water, in isolation or in conjunction with other equipment. Includes simulation of plant operation to test equipment, piping, electrical interlocks, instrumentation, control systems, to the maximum extent prior to the introduction of salt;
- commissioning: test operation of the constructed plant and associated infrastructure with the introduction of feed salt, under design load conditions using salt, slurry and reagents.

Commissioning will be complete once the plant is operating stably, and the commissioning manager verifies that the scope of work has been completed.

## Sewage treatment plant

### Process overview

A packaged sewage treatment plant will be installed to service the mine camp and plant processing site, to treat influent to an acceptable standard for irrigating a designated spray field.

The plant is sized to deal with wastewater generated by up to 300 persons, with a maximum treatment capacity of 90 m<sup>3</sup>/d. The plant will treat influent using a biofilm-based system, which uses multiple tank zones operated in anoxic and aerobic modes. The treatment process essentially comprises influent screening, balance tank mixing, anoxic and aerobic treatment for nitrification and denitrification, clarification, effluent sterilisation (chlorine tablets) and bag filtration.

Tanks will be equipped with hydrostatic level transducers and when the water level reaches set limits, it will start the forward pumps to transfer water from one tank to another when required, and also to prevent overflow while maintaining treatment time. Other management controls include overflow alarms.

### Irrigation of effluent

It is proposed to discharge treated effluent over a designated irrigation spray field located south of the mine camp. The spray field will cover around 1.5 hectares (100 m x 150 m) and is sized in accordance for a design irrigation rate of 4 mm/day at a maximum daily discharge of 60,000 litres.

The irrigation spray field comprises native vegetation (hummock grassland and shrubs) that forms part of the area authorised for clearing, however the vegetation will not be physically cleared.

### Sludge and screened waste disposal

Screened materials from the influent will be collected in a bag at the bottom of the chute, to enable the waste to be dewatered. The bag of dry waste will then be removed for disposal to landfill. A controlled waste contractor will be engaged periodically to remove sludge from the sludge tank, for off-site disposal.

### Design specifications

The plant to be constructed is a MAK Water Moving Bed Bioreactor Plus (MBBR+90) type packaged sewage treatment plant, with the 'Class A' upgrade. Treated effluent water quality for this system is detailed in the below table.

<b>Treated effluent specifications</b>		
<b>Parameter</b>	<b>Unit</b>	<b>Value</b>
Biochemical oxygen demand	mg/L	<20.0
Total suspended solids		<10.0
Total nitrogen		<30.0
Total phosphorus		<12.0
Chlorine residual		0.2 – 2.0
pH	-	6.5 – 8.5
<i>E. coli</i>	cfu/100 mL	<10

The system will be positioned on an above ground leveled earthen pad, with external balance, sludge and irrigation tanks. All internal tanks will consist of reinforced polyethylene sections; external tanks will be constructed of molded polyethylene.

## Commissioning

The commissioning (testing) process will comprise the following phases:

- pre-commissioning: static checks on unpowered equipment to confirm the packaged plant has been installed according to manufacturer specifications. This process will not involve the use of any chemicals, water or wastewater;
- wet commissioning: test operation of the packaged plant and all associated tanks and pipework with water. Wet commissioning of each component will not commence until pre-commissioning tests have been completed;
- commissioning: test operation of equipment and facilities with chemicals and wastewater. This phase will not commence until wet commissioning tests have been completed.

Commissioning will be complete when treated effluent with a residual chlorine concentration in the range 0.2 – 2.0 mg/L has been disposed to the irrigation spray field over 7 days.

## Infrastructure

<b>Prescribed activity – category 14</b>	
Solar salt manufacturing – demonstration brine processing plant: limited production 50,000 tpa.	
1	Modular plant design, comprised of several circuits including attritioning/flotation, conversion, crystallisation and drying
2	Feed preparation area
3	Sediment ponds (2)
4	Reclaim brine pond
5	Raw water pond
<b>Prescribed activity – category 54</b>	
Sewage facility – activated sludge bioreactor-type packaged sewage treatment plant: design capacity of 90 m <sup>3</sup> /d. Treated effluent to be discharged to an on-site irrigation spray field.	
1	Self-contained, modular treatment plant, consisting of influent screening, balance tank mixing, anoxic and aerobic treatment, clarification, effluent sterilisation (chlorine tablets) and bag filtration (100 micron)
2	Treated effluent storage tank (90 m <sup>3</sup> )
3	Irrigation spray field (1.5 ha) comprising native vegetation
4	PVC pipework linking the office/village/process plant to the sewage plant and to the irrigation spray field

## Exclusions to this assessment

The following matters are out of the scope of this assessment and have not been considered within the technical risk assessment detailed in this amendment report:

- proposed full scale 260,000 tpa SOP processing facility, which is currently being assessed by the EPA;
- power generation for the demonstration plant (does not trigger prescribed threshold), and the full scale 260,000 tpa SOP processing facility proposal;
- construction and operation of supporting infrastructure, such as reagents and fuel storage facilities, vehicle washdown, potable water treatment and storage;
- construction and operation of ancillary facilities, such as the worker's accommodation village, offices, maintenance workshops; and
- additional trenches or evaporation ponds, and expansion of existing trenches and ponds, for the full scale 260,000 tpa SOP processing facility proposal.

The works approval amendment is related to category 14 and 54 activities only and does not offer the defence to offence provisions in the EP Act (see s.74, 74A and 74B) relating to

emissions or environmental impacts arising from non-prescribed activities, including those referenced in the above table.

## Environmental siting

The site is located in the northeastern Goldfields, on the Norseman-Wiluna greenstone belt. The local area is a major mineral province with several operating gold and nickel mines, and numerous prospects for uranium, rare earths and base metals.

The climate is considered to be arid to semi-arid, with the area characterised by undulating areas of sandplain and granite outcrop, and by ephemeral creek lines which drain into large salt lakes. Groundwater is saline to hypersaline, and occurs in the bedrock, palaeochannels and in overlying alluvial, colluvial and calcrete deposits. There is no fresh groundwater in the region – limited areas of brackish groundwater can occur in the upper reaches of some catchments.

The below table lists the relevant sensitive land uses and specified ecosystems in the vicinity of the site.

Human receptors	Distance from site
Goldfields Hwy (road users)	Less than 350 m west of the proposed plant site
Blackham Resources mine camp	Around 13 km north (300 room accommodation)
Nganganawilli community	Around 15 km north
Millbillillie pastoral station	Around 16.5 km northwest
Millgool outcamp	Around 16 km southwest
Wiluna town site	Around 25 km north (pop. ~700)
Lake Way pastoral station	Around 31.5 km southeast
Environmental receptors	
Lake Way	Premises is located both on and off the lake playa On-playa infrastructure – brine extraction trenches, evaporation ponds and associated pipework Off-playa infrastructure – proposed brine processing plant, workers accommodation village, sewage plant and associated infrastructure
<i>Tecticornia</i> dominated vegetation (includes diverse and novel taxa including conservation significant species) (no surveys have been completed to identify the individual <i>Tecticornia</i> species) <i>Tecticornia</i> species are on the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) list of threatened flora (status listed as vulnerable)	At Lake Way (Not considered in this assessment. Potential impacts to receptor were considered in the EPA's determination not to assess the demonstration plant project. The EPA report noted that there is potential that the proposal will cause indirect impacts of up to 138 hectares of <i>Tecticornia</i> vegetation. Conservation significant <i>Tecticornia</i> protected by Ministerial Statement 1051 for the Wiluna Uranium Project that is adjacent to the premises are unlikely to be impacted by the proposal. No Ministerial conditions in relation to the application are in place)
Surface geology	Soil type is SV5: Saline soils associated with salt lakes
Groundwater	The shallow near surface aquifer (0 to 1.1 m) comprises a high porosity, moderate transmissivity sandy clay. The deeper aquifer (1.1 to 10 m) consists of several horizons of clay and sandy clay.

## Other approvals

Legislation	Approval
<i>Part V of the Environmental Protection Act 1986 (WA)</i>	<ul style="list-style-type: none"> <li>Licence L9208/2019/1 issued September 2019 for pumping up to 1.5 GL of water from Williamson's pit to the temporary holding pond, for the purpose of producing brine</li> </ul>
<i>Part IV of the EP Act</i>	<ul style="list-style-type: none"> <li>Demonstration plant project not assessed – public advice given (CMS17578);</li> <li>Full scale 260,000 tpa expansion project – under assessment (Environmental review – no public review)</li> </ul>
<i>Mining Act 1978 (WA)</i>	<ul style="list-style-type: none"> <li>Mining proposal (Reg ID 80903) approved September 2019 for on-lake infrastructure associated with the demonstration plant project;</li> <li>Mining proposal (Reg ID 83761) approved January 2020 for off-lake infrastructure associated with the demonstration plant project</li> </ul>
<i>Rights in Water and Irrigation Act 1914 (WA)</i>	<ul style="list-style-type: none"> <li>GWL 182329(1) – licensed allocation 1.115 GL/yr from the East Murchison Palaeochannel, for the purpose of dewatering the Williamson's pit;</li> <li>GWL 202044 – licensed allocation 0.3 GL/yr from the East Murchison Palaeochannel, for the purpose of mineral exploration</li> </ul>
<i>Environmental Protection (Clearing of native vegetation) Regulations 2004 (WA)</i>	<ul style="list-style-type: none"> <li>CPS 8677/1 issued December 2019 for clearing of native vegetation within M53/53 for the purpose of constructing the process plant</li> </ul>

### Part IV of the EP Act

#### Background

The proposed demonstration plant project was referred to the EPA in March 2019 under s.38 of the EP Act. The extent of the proposal included the establishment of brine harvesting and treatment facilities sufficient to feed a small commercial scale plant capable of producing 50,000 tpa.

In considering the potential direct and indirect impacts of the proposal on flora and vegetation, terrestrial fauna, subterranean fauna and social surrounding, the EPA had regard to the following:

- the high environmental values but relatively short duration of the project;
- there being existing disturbance and infrastructure both on and off the Lake Way playa, due to historical mining activities that are being used to reduce the impacts of the project;
- the mitigation strategies proposed to avoid and minimise impacts, e.g. location of on-playa infrastructure to avoid direct and indirect impacts on *Tecticornia sp.* vegetation;
- monitoring of hydrological regimes and implementation of adaptive management measures through an environmental monitoring and management plan, to minimise impacts on *Tecticornia sp.* vegetation;
- use of dewatering water from existing mine pits as the water source for the project; and
- presence of other statutory processes, including Part V of the EP Act and the Mining Act.

In considering the above, the EPA considered the likely environmental effects of the proposal were not so significant to warrant formal assessment, and that potential impacts can be adequately managed by the applicant's mitigation measures and dealt with by other statutory processes.

The EPA noted that although the demonstration plant is a large scale trial, it may form part of a larger and ongoing proposal, and advised that any future expansions and/or ongoing operation should be referred to the EPA.

## Current referral

The works approval holder referred an expansion proposal to the EPA in September 2019 regarding a full scale, 260,000 tpa, commercial brine processing operation.

In December 2019, the EPA decided to assess the proposal and set the level of assessment at 'environmental review - no public review'. The works approval holder is currently preparing the environmental scoping document, prior to EPA assessing the proposal.

### **Key Findings:**

1. The application for an amendment to works approval W6282 (to include construction of a demonstration processing plant) is consistent with the key characteristics of the proposal referred to the EPA in March 2019 (Lake Way Sulfate of Potash Demonstration Plant), which relates to the establishment of brine harvesting and treatment facilities sufficient to feed a small commercial scale plant capable of producing 50,000 tpa.
2. In its determination the EPA considered that potential impacts from the demonstration plant project can be dealt with by other statutory processes. DWER is therefore not constrained from making a decision under Part V by the EPA's determination not to formally assess the proposal.
3. The key characteristics of the most recent referral to the EPA in September 2019 are not consistent with the application for an amendment to works approval W6282 (assessed in this amendment report). This referral relates to increasing the capacity of the project to 260,000 tpa and extending the lifespan to around 20 years, which is not part of this assessment. A separate works approval will be required regarding such a proposal.

## **Clearing of native vegetation**

Clearing of native vegetation in Western Australia requires a clearing permit, unless exemptions apply. DWER is responsible for administering the native vegetation clearing provisions; however DMIRS has delegated authority under s.20 of the EP Act to administer the clearing provisions for mining activities regulated under the Mining Act.

Up to 42 hectares of native vegetation is required to be cleared within M53/53 to facilitate construction of the process plant and associated infrastructure. The vegetation has been assessed as being of 'very good' condition, based on a flora survey commissioned by the works approval holder in 2019.

DMIRS has assessed the environmental impacts of the clearing against the clearing principles contained in Schedule 5 of the EP Act. The proposed clearing has been deemed unlikely to cause environmental harm and DMIRS subsequently granted a clearing permit for this area in December 2019 (CPS 8677/1).

## Risk assessment\*

Risk Event				Consequence rating <sup>1</sup>	Likelihood rating <sup>1</sup>	Risk <sup>1</sup>	Reasoning	Regulatory controls (Refer to conditions of the granted amendment)	
Source/Activities	Potential emissions	Potential receptors	Potential pathway & receptor (impact)						
<b>Construction, installation, positioning of infrastructure and other pre-production works</b>	Civil excavation/ earthworks/ vehicle movements on unsealed roads	Noise and dust associated with construction works	Users of Goldfields Hwy (350 m)	Air / wind dispersion, causing amenity impacts (noise) and reduced visibility (dust)	Minimal impacts to amenity Low level off-site impact (visibility) <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>	<b>Low</b> Acceptable, not subject to controls	Some noise and dust is expected during construction works, however based on separation to human receptors and short duration of the works, the delegated officer does not reasonably foresee off-site receptors being impacted.	None specified in revised works approval.
	Construction of brine processing plant		Blackham Resources mine camp (13 km)						
	Construction of sewage facility		Nganganawilli community (15 km)						
<b>Category 14: Solar salt manufacturing</b>  <b>Operation – includes commissioning, time limited and operation up to 50,000 tpa</b>	Salt handling/ storage/ stockpiling	Dust lift-off from harvest salt feed prep/ halite waste stockpiles	Users of Goldfields Hwy (350 m)	Air / wind dispersion, causing reduced visibility	Low level off-site impact (visibility) <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>	<b>Low</b> Acceptable, not subject to controls	Raw harvested salt delivered to the plant will have a moisture content of 5-10%, with minimal water loss before the salt is fed into the crusher. Similarly, waste salt discharged from the plant will have a moisture content in the range 8-12%, and will generally have a low propensity to generate dust. The delegated officer therefore does not reasonably foresee off-site receptors being impacted from salt dust from raw salt or waste salt stockpiles.	None specified in revised works approval.
			Lake Way, soil and native vegetation in proximity to stockpiles	Air / wind dispersion, causing impacts to surface water quality within Lake Way, soil contamination and impacts to the health and condition of native vegetation	Low level on-site impacts <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>			
		Hypersaline water runoff from harvest salt feed prep/ halite waste stockpiles	Lake Way, soil and native vegetation in proximity to stockpiles	Direct discharge via overland runoff, causing impacts to water quality within Lake Way	Low level on-site impacts <b>Minor</b>	Unlikely to occur in most circumstances <b>Unlikely</b>	<b>Medium</b> Acceptable, subject to regulatory controls	Runoff from concentrated salt stockpiles may occur during rainfall events, and cause impacts to environmental values if not controlled. Raw salt and imported KCl will be stockpiled on hardstand bunded areas, with saline runoff collected in a HDPE lined brine reclaim pond. In accordance with DWER's Guidance Statement: risk Assessments (DER, 2017), as the proposed controls lower the risk of runoff causing impacts, it will be imposed on the revised works approval.	Revised works approval controls: - Stockpiles to be hardstand and sloped to allow collection of runoff; - Collected runoff to be contained within a brine reclaim pond; - Brine reclaim pond to be lined
	Processing of raw salt	Noise associated with operation of fixed and mobile plant	Users of Goldfields Hwy (350 m)	Air / wind dispersion, causing amenity impacts	Minimal impacts to amenity <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>	<b>Low</b> Acceptable, not subject to controls	Some noise is expected during commissioning and time limited operation of the process plant, however based on the remoteness of the site, the delegated officer does not reasonably foresee off-site receptors being impacted, with the exception of minor impacts to transient receptors using the adjacent Goldfields Hwy.	None specified in revised works approval.
		Particulate emissions from operating the dryer	Users of Goldfields Hwy (350 m)	Air / wind dispersion, causing amenity and health impacts Impacts to existing ambient air quality and local airshed	Low level health effects Low level impacts to amenity <b>Moderate</b>	Unlikely to occur in most circumstances <b>Unlikely</b>			

	Disposal of waste (halite)	Seepage of water entrained within halite to groundwater	Groundwater	Direct discharge, causing groundwater contamination	Low level on site impacts <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>	<b>Low</b> Acceptable, not subject to controls	Waste halite will be temporarily stockpiled, before being returned to the halite ponds as part of the process. The risk of impacts from operation of the ponds has been assessed as part of the original works approval. Groundwater in the local area is hypersaline, with no other beneficial users of the resource in the local area.	Revised works approval controls: - Requirement to dispose of waste halite to the halite ponds (on-playa)
	Stockpiling of SOP product	Dust lift-off from stockpiles	Users of Goldfields Hwy (350 m)	Air / wind dispersion, causing reduced visibility	Low level off-site impact (visibility) <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>	<b>Low</b> Acceptable, not subject to controls	SOP product will be stockpiled in an enclosed shed, before bulk load out. The delegated officer therefore does not reasonably foresee off-site receptors being impacted from SOP product stockpiles.	None specified in revised works approval.
<b>Category 54: Sewage facility</b> <i>Operation – includes commissioning, time limited and full operation</i>	Infrastructure and influent pipework	Overtopping/ overflow/ rupture or failure of pipework	Soil and native vegetation associated with drainage lines to Lake Way in proximity to the sewage treatment plant	Direct discharge, causing soil contamination, impacts to the health and condition of native vegetation	Low level on site impacts <b>Minor</b>	Unlikely to occur in most circumstances <b>Unlikely</b>	<b>Medium</b> Acceptable, subject to regulatory controls	The proposed treatment plant is automated and will contain operational controls such as hydrostatic level transducers and overflow alarms.  The process site is designed to contain all surface water runoff within the plant site boundary, through the use of v-drains and sediment ponds. It is considered that should there be an overtopping of the tanks or failure of pipework that any sewage (treated or untreated) would be contained within the Premises.	Revised works approval controls: - Construct treatment plant in accordance with design specifications.
	Discharge of treated sewage – applied to irrigation spray field using reticulated sprinklers	Pooling/ infiltration/ surface runoff of treated sewage (nutrient-rich effluent)	Groundwater	Direct discharge, causing groundwater contamination	Low level on- and off-site impacts <b>Minor</b>	Unlikely to occur in most circumstances <b>Unlikely</b>	<b>Medium</b> Acceptable, subject to regulatory controls	Groundwater was not encountered during site investigations of the proposed irrigation spray field (depth to 0.6 m, terminates at gravel).	None specified in revised works approval.
			Soil and native vegetation associated with drainage lines to Lake Way in proximity to the sewage treatment plant and irrigation spray field	Direct discharge, causing soil contamination, impacts to the health and condition of native vegetation	Low level on site impacts <b>Minor</b>	Unlikely to occur in most circumstances <b>Unlikely</b>	<b>Medium</b> Acceptable, subject to regulatory controls	The irrigation spray field is set back around 3 km from the nearest shoreline of the Lake Way playa, and is outside the 1:100 year flood zone for Lake Way and contributing tributaries.  A maximum of 60 kL/day will be irrigated over the spray field, to achieve a hydraulic loading of around 4mm/day.	Revised works approval controls: - Authorised irrigation area specified; - Requirement to monitor effluent quality and determine loading rates to validate performance during commissioning and time limited operations
		Odour	Users of Goldfields Hwy and others (see above)	Air / wind dispersion, causing amenity impacts	Minimal impacts to amenity <b>Minor</b>	May only occur in exceptional circumstances <b>Rare</b>	<b>Low</b> Acceptable, not subject to controls	The risk of odour causing impacts to amenity during commissioning and time limited operation is considered to be low, based on the transient nature of the receptors (users of Goldfields Hwy) and separation to other human receptors, e.g. Wiluna town site.	None specified in revised works approval.
<b>Other</b>	Clearing of native vegetation	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>	Clearing provisions on this site are regulated by DMIRS under delegated authority under the clearing regulations.	N/A.
	Power generation	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>	Proposed power generation for demonstration plant is less than 10 MW and therefore does not trigger the prescribed threshold for categories 52 or 84.	N/A.
	Storage and handling of dangerous goods, e.g. reagents	N/A	N/A	N/A	N/A	N/A	<b>N/A</b>	Storage subject to Dangerous Goods legislation. Handling and spill management subject to the unauthorised discharges regulations.	N/A.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

\* The works approval that accompanies this amendment report authorises construction, commissioning and time limited operations only. A licence is required to conduct full operations beyond the time limited operations phase.

## Decision

DWER has previously assessed the risk of construction and operation of the evaporation ponds at the Lake Way site, and notes the total size of the ponds appears much larger than that required for a trial operation. However this assessment (of the demonstration processing plant) should be considered separate to the existing assessments for the Premises.

It is acknowledged this application forms part of a larger scale proposal that is currently being assessed by the EPA. For all intents and purposes however, this assessment has only considered the construction and operation of a small scale, demonstration plant, which will be used principally for testing and analysis of the Lake Way resource and demonstrating the viability of a commercial scale operation.

The delegated officer understands the proposed demonstration plant comprises the first of several modules, with each module having a maximum design throughput of 595 m<sup>3</sup>/hr. The works approval authorises construction of the first module, with the maximum annual production for the Premises limited to 50,000 tonnes.

Conditions are required to authorise construction works as specified by the works approval holder in the application. Additional operational and management controls are required to ensure emissions and discharges from the plant are acceptable during operations.

### Works approval controls

#### Infrastructure

The infrastructure authorised for construction has been specified in Table 1 of the existing works approval, and includes:

- brine treatment infrastructure, including process plant, rotary dryer and associated infrastructure;
- plant site infrastructure, including sediment ponds, return brine pond, contaminated water pond, stockpile pads; and
- mine camp infrastructure, including sewage treatment plant and irrigation spray field.

The works are required to be constructed in accordance with the engineering designs and drawings submitted with the application. Evidence of the works will be required to be submitted to the CEO in a construction compliance report, prior to the commencement of commissioning works.

An environmental commissioning report will be required to be submitted to the CEO following the completion of commissioning works, which includes a summary of commissioning activities and the environmental performance of the as constructed plant. Commissioning of the plant will be restricted to a 3-month period, followed by a time-limited operational period.

#### Emissions from construction works and time limited operations

Conditions have been imposed to specify the requirements for disposal of solid and liquid waste salts, and disposal of treated effluent. In addition, monitoring requirements have been imposed for the dryer, to validate the performance of the baghouse during commissioning.

A general disclaimer is also included on the works approval, to stipulate that general emissions and discharges that may arise from the undertaking of the works must not be unreasonable or result in pollution or the like.

## Consultation

#### Public consultation

The application was publicly advertised on DWER's website in December 2019. No public submissions were received within the specified timeframe.

A submission was received from a local stakeholder, who raised the following:

- the application is described as being for a 50 ktpa demonstration plant, however based on an ASX announcement dated 26 November 2019, it is clearly evident the company intends to construct and commission a full scale, 245 ktpa SOP facility, commencing Q1 2020 and finish commissioning by Q4 2020, which is the same timeframes listed in the application;
- this works approval amendment will grant the company the ability to build their full scale, 245 ktpa SOP manufacturing plant, sewage treatment plant and electric power generation plant without having to go through the full scale EPA approvals process;
- the supporting document for the 50 ktpa demonstration plant contains an almost identical site layout to that of the 245 ktpa facility as seen in recent public announcements; and
- the application includes construction of accommodation facilities for up to 350 people – compared to Kalium Lakes which is a peer company constructing a 90 ktpa operation requires a peak construction capacity of 140 people – it is reasonable to assume that a workforce of 350 people is for a project much larger than 50 ktpa.

**DWER response:** the application submitted to DWER for assessment pertains to a small scale demonstration plant with a maximum throughput of 50,000 tpa. DWER's risk assessment is therefore based on this application, which is understood to be for the purpose of testing and analysis of the Lake Way resource and to demonstrate the viability of a commercial operation – no consideration has been given to a larger scale plant in this assessment. It is noted the design throughput of the plant is 595 m<sup>3</sup>/hr, therefore to avoid any potential misinterpretation, the works approval will contain a condition which limits the maximum production to 50,000 tpa.

#### Direct interest authorities

- The Department of Biodiversity, Conservation and Attractions advised it has no comments to make on the application;
- The Department of Mines, Industry Regulation and Safety advised it has no comments to make on the application; and
- The Shire of Wiluna did not provide a response within the specified timeframe.

#### Applicant consultation

The works approval holder was provided with the amended drafts on 28 February 2020. A summary of the comments and DWER's response is provided in Appendix 1.

## Conclusion

This assessment of the risks of activities on the premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this amendment report (summarised in Appendix 2).

Based on this assessment, it has been determined that an amendment will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

An amendment to licence L9208/2019/1 will be required following construction of the process plant and sewage treatment plant, to provide the necessary authorisation for the continuation of operations beyond the time limited operational phase.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the approval under the EP Act.

**Tim Gentle**  
**MANAGER, RESOURCE INDUSTRIES**  
**REGULATORY SERVICES**

*An officer delegated by the CEO under section 20 of the EP Act*

## Appendix 1: Summary of works approval holder comments

Condition	Specific Text	Comment	DWER response
Table relating to Prescribed Activity	50,000 tonnes per annual period	Please note that 50,000 tonnes refers to the production of SOP rather than the throughput of the plant. This is consistent with other similar instruments we are aware of and provides greater clarity in relation to the approval.	Noted - this has been changed to "assessed maximum production/design capacity", with design capacity referring to the sewage plant
Conditions 1(c) and 2(d)	Whole condition	We suggest that there may be circumstances when there are divergences with what is contained within Table 1 that may not require rectification or may not constitute a defect. In such circumstances, Salt Lake Potash should have the option to be able to explain why such changes are appropriate (and not require them to be rectified per the current wording of the Conditions)	A new condition has been added to this effect. See condition 3
Table 1	Design Capacity of the plant	We note our comments relating to design capacity as they relate to production. We also query the need for repetition in this row given that the first page contains reference to limits of production.	The reference on the first page is not an enforceable condition, hence why the capacity is specified in Table 1.
Table 1	Rotary Dryer – "The dryer installed to dry sulfate-rich brine..."	We note that the dryer is installed to dry 'salt', not specifically 'sulfate-rich brine' as currently referred to. The wording should be modified accordingly.	Noted - updated now.
Table 1	Rotary Dryer - "natural gas-fired"	We note that the dryer may be fired using gas (e.g. LPG), not necessarily natural gas. Whilst I think we understand that this is a standard condition, we note this for the purpose of clarity.	Noted - updated to include LPG.
Table 1	Rotary Dryer	We question the need for any monitoring to be conducted from the stack of the rotary dryer. We have advised that the dryer will incorporate low NOx technology and include a baghouse which will easily achieve results below 50 mg/m <sup>3</sup> of particulates. Given this and the location of the project, with no environmental receptors nearby, the requirement to install technology and monitor its emissions seems inappropriate and redundant.	Monitoring is only required under the works approval during the commissioning phase, to validate emissions and to demonstrate the as constructed dryer meets the design performance. Ongoing monitoring will not be required (unless there are issues).
Table 1	Pond Construction	All conditions containing the expression "must be constructed to a maximum height of XX metres". It is not clear whether this condition seeks to impose a requirement to construct the embankment height to exactly the specified 'XX metres' or whether, conversely, to say that the embankment may be any height up to and including the specified maximum height, providing it meets the other specified conditions. If the former, suggest deleting the word 'maximum' and replacing the phrase with, "must be constructed to a height of XX metres'. If the latter (which makes more sense), suggest replacing the phrase with "...must not exceed an embankment height of XX metres and must provide....".	Noted - this has been rectified to state that embankment wall height must not exceed 1.5 m above natural ground level.
Table 1	Pond Construction	All conditions containing the phrase "must be constructed to allow an operational freeboard of at least 300 mm" should be deleted. It is not how a dam is constructed that determines freeboard – it is how it is operated that determines freeboard.	Noted - this can be removed.
Table 1	Rotary Dryer	The baghouse will not include an ability to isolate broken bags without a bypass to exchange/replace these bags. Despite this, we are of the view that given the low concentration of dust emissions anyway, there will be no unacceptable impacts during these circumstances and emissions will not exceed 50 mg/m <sup>3</sup> of particulates during these times.	Noted - have updated this to remove reference to a bypass system.
Table 1	Sediment Ponds	It should be noted that the sediment ponds are designed to contain uncontaminated stormwater (directed away from the plant and associated infrastructure). As such, we question the need for lining of these ponds.	Noted, and updated.
Table 1	Reclaim Brine Pond	Given that the ponds will be designed to meet a permeability of no greater than 1x10 <sup>-9</sup> ms <sup>-1</sup> we are of the view that specifying the source of the materials to be used to achieve this permeability is inappropriate.	Have removed reference to Williamson's pit.
	Contaminated Water Collection Pond	We also note that the proposed approach at this time is to use a 1.0mm HDPE liner, not 1.5mm as specified in the draft conditions.	Have never heard of 1.0 mm being used for lining a pond - 1.5 mm is typically the minimum thickness. Is this pond sitting on sand or clay?
Condition 6	Commissioning	Please confirm that 3 months of environmental commissioning pertains specifically to commissioning of the process plant and does not imply that production must commence within 3 months of pond construction. Ponds will be constructed over a 6-12 month period and each individual pond will be progressively filled with brine as soon as it is completed to: commence crystallisation of salt so it can be harvested in time to feed the process plant. Without this the process plant is not able to be commissioned.	Commissioning of the plant can commence at any stage and does not necessarily need to be straight after construction.
		Please confirm that a staged commissioning approach with which ponds constructed under this works approval will be licenced under an amendment to the existing pond licence L9208/2019/1.	Correct - following validation of the works and commissioning, the existing licence will require amending to authorise operation of the constructed ponds. This can be done via submitting separate compliance/commissioning reports
Condition 11	Time Limited Operations	We suggest that these be allowed for 6 months to ensure that DWER has sufficient time to consider/process the Licence Amendment application.	DWER's target timeframe for completing amendments is 60 working days, therefore 3 months is considered sufficient to process an application.
		We also note that ponds will be constructed/operated first and request that the 6-month time-limited operations period only commence following plant construction.	Correct - the time limited operations pertains to the process plant. An amendment application for the licence will need to be submitted following construction of the ponds, to authorise 'operation'
Condition 12	Air Quality Monitoring	See previous comments relating to our views on the need for AQ monitoring	This condition does not relate to monitoring - it specifies that air emissions from the dryer are authorised during commissioning/time limited operations if done so in accordance with the requirements in the condition.
Condition 18	Process Monitoring	We request that the data provided as part of this monitoring is not made public as it contains process information that is confidential to the SO4 process.	DWER does not consider production data to be exempt under FOI, merely because its disclosure would reveal information about the business. SO4 will need to provide adequate justification as to <u>how</u> the disclosure of this data would be exempt under clause 4.
		Please change 'disposal of tailings' to 'disposal of halite'.	Updated.

		We note that the wording of the second requirement be changed to "Amount of salts processed from ponds". This is technically more accurate.	Updated.
Schedule 1 Maps	Premises Map	Map to be updated to reflect previous discussions/agreements with DWER (see attached shapefiles)	The attached shapefile is only of the pond infrastructure and the process plant site. The premises boundary needs to be a contiguous area that encompasses the entire prescribed activity, hence why the mining tenement boundaries have been adopted.
Schedule 1 Maps	Process Plant Site Layout Map	Details associated with this map/layout are confidential. SO4 has provided a generalised plan to replace this map (see attached). SO4 confirm the original layout provided can be publicly issued.	Generalised plan is not sufficient for purposes of the works approval. Noted.
Schedule 3: Drawings	Documents	We note that LY-WOD-3000-PR-DCR-0001 should be replaced by the Basis of Design document previously supplied (LY-SO4-7000-DE-BOD-0001-Rev1). SO4 confirm the BOD can be publicly issued.	Noted, and updated.
Process Mill	Layout	We note that this plan is clearly marked as Commercial In Confidence and should not be included in the Works Approval when issued. SO4 confirm this plan can be now publicly issued.	Noted.
Sewage Treatment Plant	Incorrect drawings referenced	Please replace drawings with those attached.	Noted, and updated.
Numerous	-	It is noted there have been numerous changes made to the existing and approved conditions of the works approval. We acknowledge that some of these may have been made to reflect template changes to the DWER's standard suite of conditions, some of them may also fundamentally affect what has already been built on-site as part of the current approval.	DWER has attempted to align the wording of specific conditions to its current wording in its conditions library. It is acknowledged that some re-wording has been drafted to intentionally provide added flexibility to the original approval, however for consistency all changes have been reverted, except where the change does not materially change the requirement(s) of the original condition.

## Appendix 2: Key documents

Document title	In text ref	Availability
Salt Lake Potash Ltd, November 2019. Lake Way Potash Project – Amendment to Part V EP Act Works Approval W6282/2019/1 – 50 ktpa plant	Application	DWER records (DWERDT222220)
DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	DER, 2015a	accessed at <a href="http://www.der.wa.gov.au">www.der.wa.gov.au</a>
DER, October 2015. <i>Guidance Statement: Setting Conditions</i> . Department of Environment Regulation, Perth.	DER, 2015b	
DER, February 2017. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	DER, 2017a	
DER, February 2017. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	DER, 2017b	
Licence L9208/2019/1 – Lake Way Potash Project	Existing licence	
Works Approval W6282/2019/1 – Lake Way Potash Project	Existing works approval	

## Attachment 1: Amended works approval W6282/2019/1