Beyondie Potash Project

Preliminary Water Supply Assessment

14/07/2017

Level 4, 600 Murray St
West Perth WA 6005
Australia

201320-14624

www.**advisian**.com

Advisian
WorleyParsons Group

Disclaimer

This report has been prepared on behalf of and for the exclusive use of Kalium Lakes Potash Pty Ltd, and is subject to and issued in accordance with the agreement between Kalium Lakes Potash Pty Ltd and Advisian.

Advisian accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

Project No: 201320-14624- – Beyondie Potash Project: Preliminary Water Supply Assessment

Rev	Description	Author	Review	Advisian Approval	Date
0	Issued for Use	L Siraz	A Lloyd	C Chalmers	

Table of Contents

Table List

Appendix List

1 Introduction

Kalium Lakes Potash Pty Ltd (KLP) engaged Advisian in April 2017 to undertake a preliminary assessment of potential fresh water supply options for the Beyondie Sulphate of Potash Project (BSOPP). The lakes being assessed under the ongoing resource assessment of the Project are Beyondie, Ten Mile and Sunshine. The Project requires a water supply as part of the processing of the brine to produce a sulphate of potash (SOP) product. It is understood that the current estimated water demand for the Project is between 0.7 and 1.5 Gigalitres / annum (GLpa) for an equivalent 75,000 or 150,000 tonnes per annum production rate of SOP.

This preliminary desktop water supply assessment aims to identify a water supply source for the Project and estimate potential yields and impacts based on the available hydrogeological information.

The Project is located on the edge of the Little Sandy Desert and is characterised by dry salt lakes, extensive sand dunes and flat plains. The playa lakes are located in a broad, easterly trending valley, which hosts a non-perennial water course. The Beyondie and Ten Mile Lakes are part of the Ilgarari palaeochannel system (Beard, 2005), which joins the Disappointment palaeochannel, approximately 250 km to the east. The site setting and KLP's tenure in the area is shown in Figure 1.

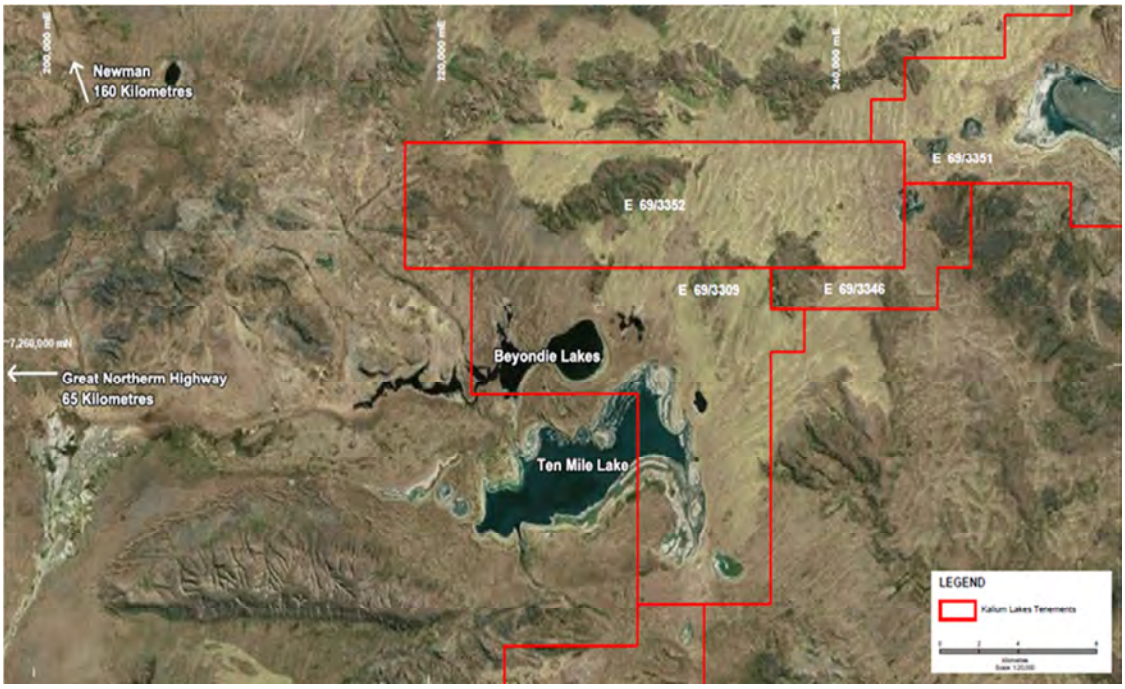


Figure 1: Project Location Map showing KLP's Tenements

1.1 Previous Hydrogeological Work

Regional palaeovalley mapping has been undertaken by Geoscience Australia, the work involved an assessment of regional palaeovalley systems throughout Australia mainly using remote sensing techniques. A palaeovalley map covering Western Australia, South Australia and Northern Territory (WASANT) was produced indicating the location of all interpreted palaeovalleys within these states (Bell, et al, 2012). The delineation of the palaeovalley for the Project area was also indicated on this map, identified as the Ilgarari Palaeovalley system. To define the extent of the thalweg of the palaeovalley (deepest section) with the aim of identifying a basal sand palaeochannel aquifer, KLP are undertaking gravity and passive seismic geophysical surveys within their tenements, with the results being processed as part of the current resource exploration.

KLP are currently updating a pre-feasibility study (PFS) of the Project (KLP, 2016), providing the hydrogeological and resources basis for its development and operation. A H2 level hydrogeological report was submitted to the Department of Water (DoW), Western Australia (WA) in May 2016 (AQ2, 2016) in support of a 1.5 GLpa groundwater abstraction licence. These works concentrated mainly on the palaeochannel sand aquifer that hosts the brine for a long duration pumping and evaporation trial.

Current hydrogeological investigations and geophysical interpretation is in progress to delineate the basal sand aquifer, understand its geometry and hydraulic properties in the process of estimating the SOP Resource. This report is focused on the potential freshwater resources to support the processing and potable supplies for the Project. Whilst the investigations to date have been focused on the hypersaline groundwater resources, they also provide a better understanding of the upper alluvial and calcrete aquifer and improve the hydrogeological understanding of this unconfined aquifer as a water supply source for the Project.

2 Hydrogeological Setting

In order to develop a preliminary hydrogeological understanding of the Project area the available data and regional information on the following topics was collated and analysed:

- Climate, particularly rainfall and evaporation;
- Geology, focussing on the shallow geology in the vicinity of the Project;
- Hydrogeology, concentrating on the shallow alluvium and calcrete aquifers;
- Groundwater quality, particularly salinity, and
- Groundwater-surface water interactions in the vicinity of the Project.

It should be noted that site specific groundwater data from the calcrete aquifer outside of the brine resource area was limited to pastoral well surveys. Regional geological data and the site specific geophysical data collected by Kalium were used for hydrogeological understanding.

2.1 Climate

The climate within the Project area is arid. Nearby Bureau of Meteorology stations with long-term data sets include Meekatharra, Newman and Three Rivers. Average rainfall at these sites is listed in Table 1. The average annual rainfall at the Three Rivers station has been adopted in this study.

Table 1: Average Climate Data

Site	Annual Rainfall (mm)	Annual Evaporation (mm)
Meekatharra Airport (007045)	239.1	3506
Newman Aero (007176)	327.7	Not recorded
Kalium Lakes (K-UTEC, 2016)	238.4	4100
Three Rivers Station	227	-

2.2 Geology and Hydrogeology

Details of the geological and hydrogeological setting are provided in previous reports (KLP, 2016, AQ2, 2016). Tertiary palaeovalley sediments comprise a basal sand unit (often referred to as the palaeochannel), overlain by an interbedded sequence of dense, plastic clay with minor interfingering sand lenses towards the base of the sequence. The palaeochannel sand underlying the clay constitutes an important regional aquifer and is the target of the resource assessment. Johnson *et al* (1999) report that the overlying clay is possibly of lacustrine origin and rests on the basal sand with a gradational contact, comprising several metres of dark-grey clayey sand. At the Beyondie and Ten Mile Project site, the clay has been mapped to be up to 65m thick and forms a

confining unit in the project area. Overlying the clays is a shallow unconfined surficial alluvial aquifer composed of mostly silty and clayey deposits along with locally occurring calcrete deposits.

The bedrock geology is dominated by the Proterozoic sedimentary rocks of the North-West Officer Basin, comprising a generally coarsening up sequence of mudstones, siltstones and sandstones within the project area. Mafic igneous rocks have intruded the sedimentary sequence typically interpreted as sills. The sedimentary sequence dips at a shallow angle in a north-easterly direction.

The basin margin environment within the Project area has resulted in complex structural features evident in the GSWA mapping and aerial photography. It is considered that the main structures are related to a regional scale half graben feature with a number of major shear zones evident.

This water supply assessment is concentrated on abstraction from shallow alluvial and calcrete aquifer, supplemented where possible by structural features in the bedrock

2.3 Alluvium and Calcrete

The alluvial deposits are generally formed as transported sediments during rain periods forming creek sediments and outwash fans on the flanks of the topographic lows and valleys. Thicker deposits of colluvium may also occur within tributaries in general break of slope areas and along steeper valley sides. These deposits are heterogeneous due to the nature of their deposition. Localised groundwater supplies may also be obtained from intersections of present day drainage and bedrock fracture zones. Storage may be within alluvial sediments fed by groundwater flows through the fractures and/or within the weathered profile of the bedrock where the upper alluvium is thin. Groundwater occurrence will depend on the nature of fractures, whether they are open or closed and if they act as conduits of water. Yields can be low to moderate and highly variable. Groundwater in the alluvial zones will be rainfall dependent and will be higher in areas of highly heterogeneous coarser sediments. In windblown arid areas, the shallow alluvial sediments may have been eroded away to expose the calcrete deposits which have become hard outcrop features at the surface.

Calcretes are carbonate deposits formed within alluvial and colluvial sediments. They comprise of magnesium and calcium carbonate precipitates from percolating carbonate-saturated water and can be seen generally occurring in present-day salt lakes in some of the main palaeodrainages. They form an important water resource in the Goldfields region and are capable of producing significant bore yields of up to 2,000 kilolitres per day (kL/d) where there is sufficient thickness below the water table (Johnson *et al*, 1999). Calcrete is often associated with lower salinity water than other surrounding and deeper aquifers due to their ability to accept recharge. Within the Project area the palaeochannel sand constitutes the main aquifer however these are likely to be saline to hypersaline in quality. The overlying alluvial aquifer composed of silty and clayey deposits and calcrete represent a relatively fresher quality aquifer.

Calcrete occurs in the region at the margins of the present day salt lakes, and in some of the main sub-catchments in the palaeodrainages. Across the GoldFields Region calcrete aquifers are reported to be generally less than 10 m in thickness and occur associated with karstic features, including sinkholes and gilgai structures (Johnson and Commander, 2006). In the Project area the

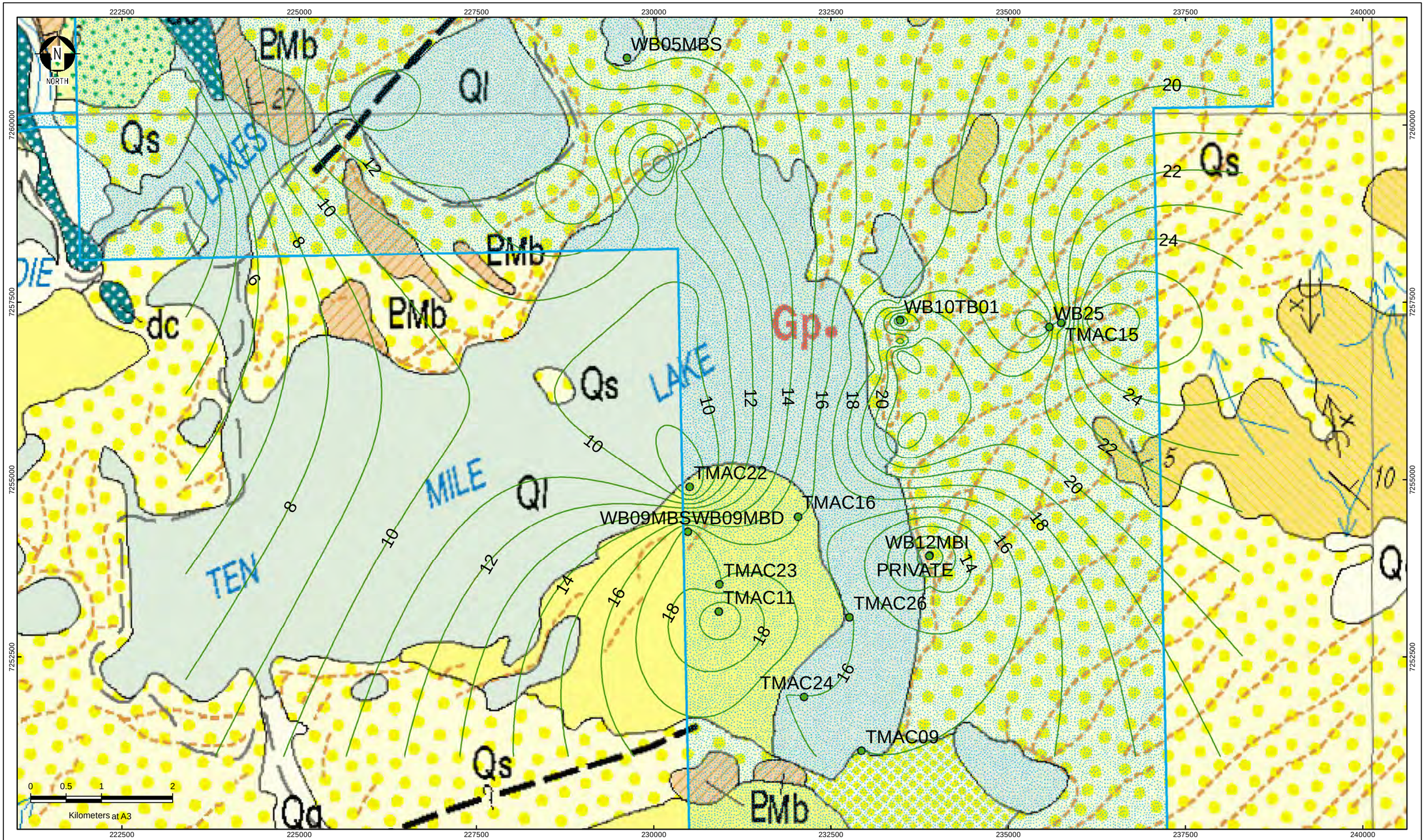
surficial unconfined aquifer comprising alluvium and colluvium associated with the present day drainage and calcrete is interpreted to average around 10 to 15m overlying the confining stiff clays. The thickness of surficial sediments is interpreted from the drilling data presented in .

Groundwater occurrence and availability in calcrete aquifers are related to well-developed secondary porosity that results in high hydraulic conductivities. They can yield high volumes of water, whilst salinity may vary depending on their occurrence in the landscape and proximity to regular surface water flows that facilitates regular recharge. They are used regionally as potable water supplies where relatively fresh and for supply of stock and mineral processing water, where brackish.

The H2 Level Hydrogeological report (AQ2, 2016) identified the shallow surficial deposits as a minor aquifer comprising gypsiferous sand, silts and calcrete within the project area. This unconfined aquifer was reported to be generally less than 10 m thick.

2.4 Existing Groundwater Bores and Users

Information on available groundwater bores in the vicinity of the Project, including the KLP bores currently being assessed for subterranean fauna by Phoenix Environmental, and Department of Water Information Reporting (WIR, DoW, 2017) database records, were obtained (see bore locations in Figure 3 and details in Appendix A).



GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

LEGEND

- Bores
- Mining Tenement
- Surficial Aquifer Thickness

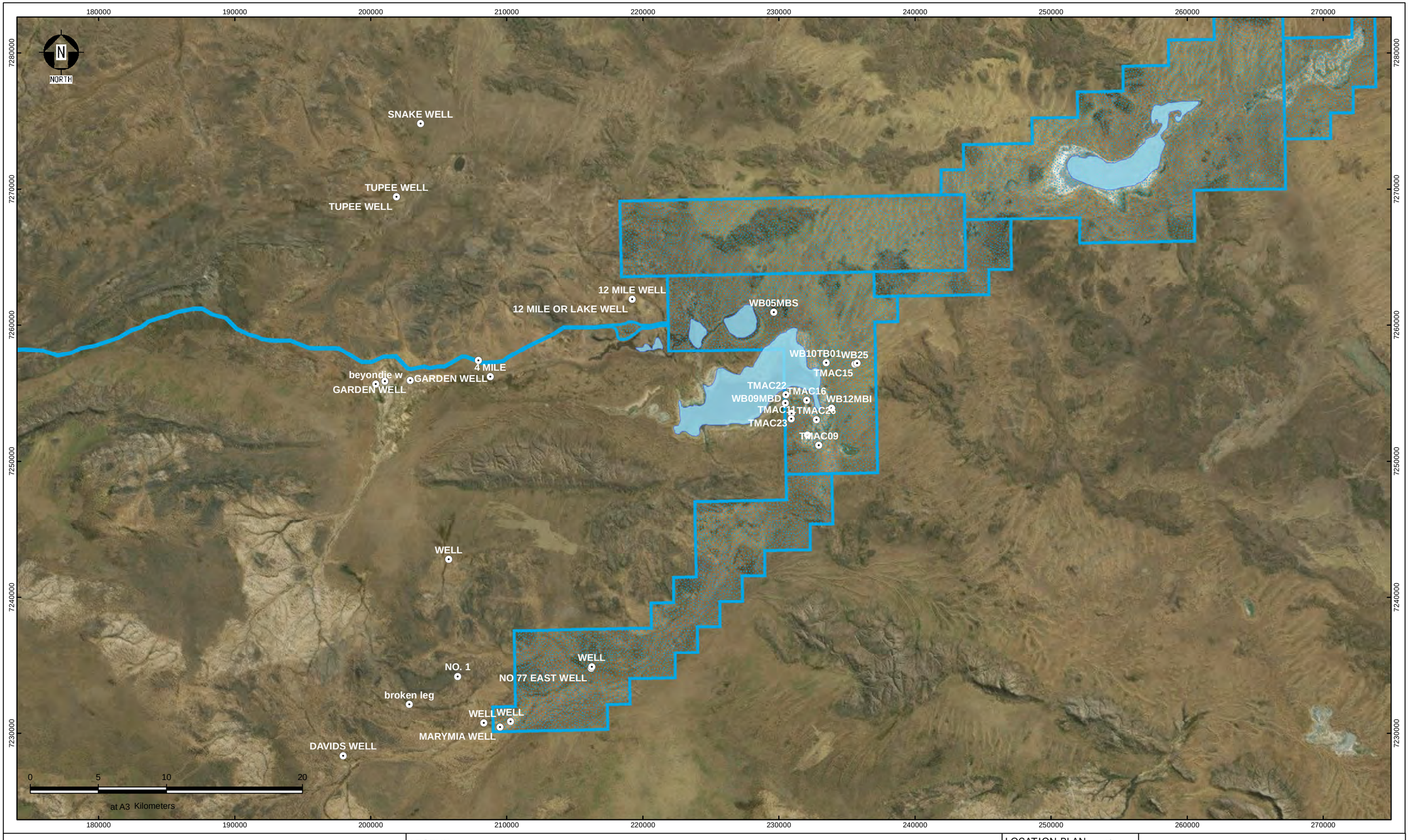
LOCATION PLAN

FIG 2: Interpreted thickness of surficial sediments based on downhole data in the 10 mile area

Customer: Kalium Lakes — Rev: A

Date: 12 Jul 2017 — M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 2.mxd



Advisian
WorleyParsons Group

KALIUM LAKES

GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

LEGEND

- Bores
- Lake
- Mining Tenement

LOCATION PLAN

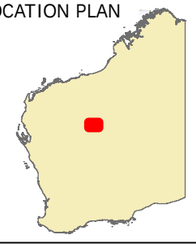


FIG 3: Regional Bore Locations

Customer: Kalium Lakes — Rev: A

Date: 14 Jul 2017 — M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 3.mxd

The WIR database records 36 regional bores in the vicinity of the Project, within a search radius of approximately 100 km. These are generally shallow (between 4 and 22 metres below ground level (mbgl), low yielding stock bores, and provide limited information on the seasonal groundwater flow regime.

There are unlicensed bores within the search area believed to be constructed in the shallow alluvium and calcrete aquifer. Bore construction details, downhole geology, borehole logs and abstraction volumes are mostly unknown.

Phoenix Environmental has monitored some of the regional bores that are on the WIR database as part of the recent subterranean fauna survey. Homestead well has historically been used for stock watering however current use or volumes are unknown. It is also understood that Garden well and 4 Mile well supply water to tanks and cattle troughs and that 12 Mile well is currently unused. The bores on the Kalium database including those assessed by Phoenix Environmental show depths between 9.8 m and >100 mbgl, in areas of the resource exploration. Groundwater levels range between 1 and 16 metres below Top of Casing (mbToC) and the available records suggest that the water quality is likely to be fresh to saline, depending on the geology, depth and relative position in the basin.

2.5 Groundwater Levels

Standing water levels (SWLs) range between 1 and 17 mbToC in the WIR database and between 1 and 16 mbToC in the bores in the immediate vicinity of the Project area, as derived from the Phoenix Environmental database (Appendix A). Groundwater table elevations have been derived from SRTM data and/or Google Earth and contours presented in Figure 4. This contour map indicates that shallow groundwater flow is from west to east across the wider project area, approximately reflecting topography.

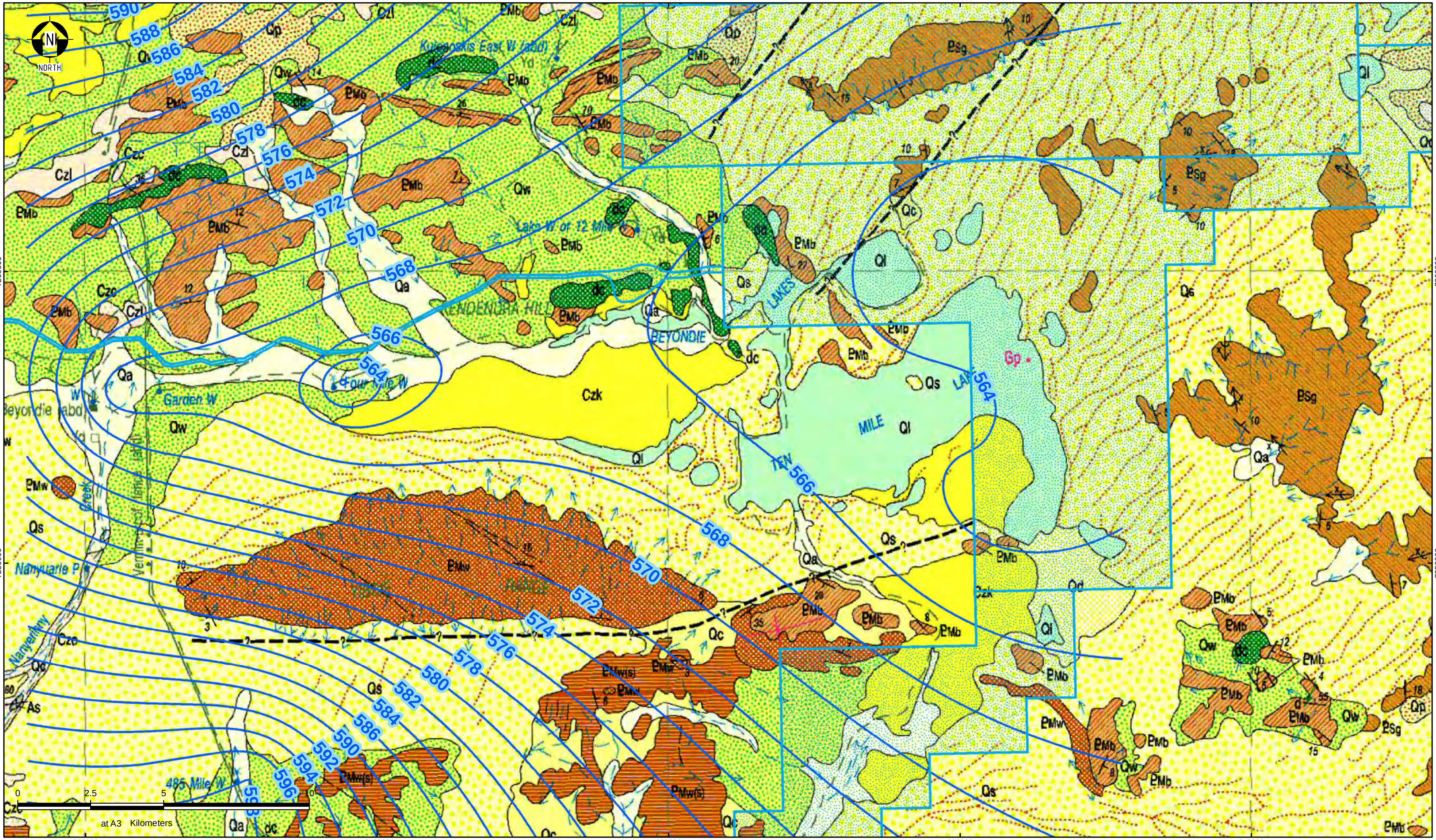
2.6 Groundwater Salinity

Recorded groundwater salinities as Total Dissolved Solids (TDS) range between 340 and 4,500 milligrams /litre (mg/L) in the WIR regional bores. In the vicinity of the Project area, salinity values range between 100 and 4,500 mg/L (Appendix A). Figure 5 shows the salinity values recorded and indicates that the lower salinities occur at break of slope areas within small catchment divides and near direct surface recharge zones whereas the higher salinities are recorded closer to the palaeodrainage.

2.7 Groundwater Dependent Ecosystems

The Bureau of Meteorology (BoM) Groundwater Dependent Ecosystems (GDE) Atlas (BoM, 2017) does not indicate GDEs of concern in the project area. The preliminary PFS and subsequent hydrogeological report (KLP 2016, AQ2 2016) also reported that there are no GDEs within 30 km radius from the Beyondie Lakes project. It is concluded in the PFS that the proposed pumping from the main basal sand aquifer and shallow surficial aquifers during mining are highly unlikely to have

any adverse impacts on the environment, owing to groundwater being hypersaline. However, abstraction of groundwater from shallow calcrete and alluvial aquifers may have a potential localised impact on groundwater dependent vegetation (GDVs) due to reduced water availability. This will need to be quantified in future water supply impact assessments.



LEGEND

Mining Tenement

Groundwater Contours

LOCATION PLAN

Advisian
WorleyParsons Group

KALIUM LAKES

GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

FIG 4: Groundwater Elevations in the Shallow Aquifer

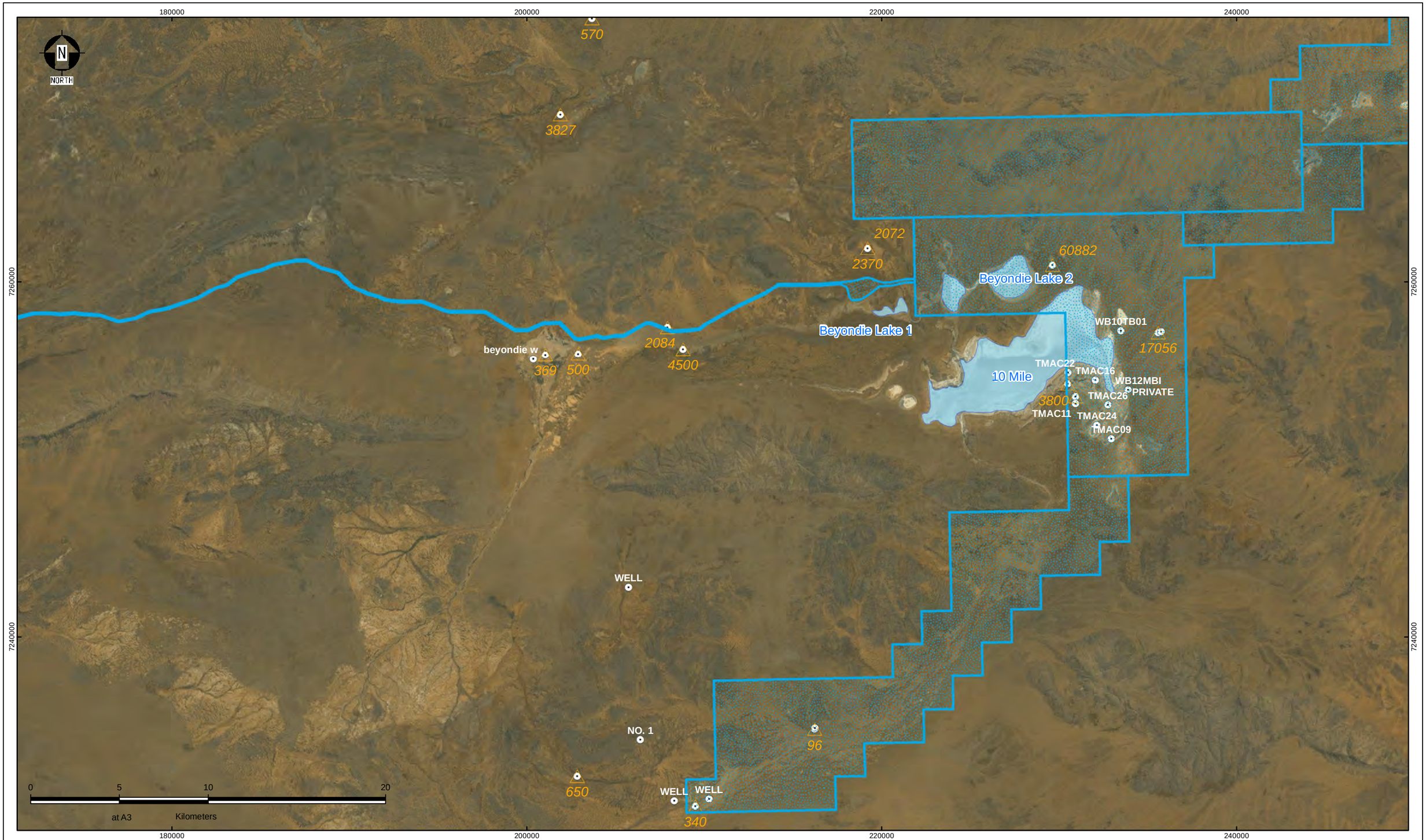
Customer: Kalium Lakes

Rev: A

Date: 12 Jul 2017

M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 4.mxd



Advisian
WorleyParsons Group

KALIUM LAKES

GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

LEGEND

- TDS
- Bores
- Mining Tenement
- Lake

LOCATION PLAN

FIG 5: Recorded salinities (TDS in mg/L) in the vicinity of Beyondie Lakes

Customer: Kalium Lakes — Rev: A

Date: 14 Jul 2017 — M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 5.mxd

2.8 Hydraulic Properties

Regionally, calcrete aquifers are reported to have highly varying hydraulic conductivities (k) and specific yield (Sy) values. Johnson *et al*, 1999 state that specific yields are high where associated with karstic development, commonly close to or at the water table, and lowest where the calcrete is massive. Hydraulic conductivity will depend on the vuggy and karstic nature of the calcretes.

Within the Project area, test bore WB11 was completed in calcrete and test pumped during the 2016 program at approximately 3 L/s, the aquifer parameters derived from the test indicated a k value of approximately 4 metres / day (m/d) for the calcrete aquifer (AQ2, 2016). Mini constant rate aquifer tests, conducted in bores in the calcrete aquifer recorded k values between 12 m/d (WB10_I) and 7.6 m/d (WB11_I), which gives an average of 10.1 m/d. These k values show that the aquifer is potentially capable of supplying water if an adequate thickness of the aquifer is encountered.

2.9 Groundwater Recharge and Availability

Calcrete aquifers are recharged through direct rainfall, local runoff where they outcrop and / or by infiltration during sheet run off or stream flows. Groundwater recharge and available groundwater storage in the calcrete aquifer has been estimated (Table 2) by assuming that calcrete bodies form 10% of the total available catchment areas of Beyondie and Ten Mile creek. The catchment areas for Beyondie and Ten Mile Lake extend more than 50 km upstream (Figure 6), with the lakes fed by ephemeral streams that drain from west to east and terminate at 10 Mile Lake. Catchment areas were calculated from the available SRTM data and are presented in Table 2.

Available groundwater recharge is estimated by multiplying the annual rainfall, assumed as 227 mm/yr, based on data from the Three Rivers Station rainfall gauge, catchment areas of the two individual sub-catchments and the areal extent of the individual calcrete bodies assumed to be 10% of the total catchment area. Recharge to groundwater is assumed to range between 0.7 and 3% of rainfall from available literature. The results in Table 2 indicate that based on available data annual recharge of the calcrete aquifers is estimated to range between 0.06 and 0.2 GLpa.

Available storage volume in the aquifer was also estimated for the assumed calcrete area, using a conservative thickness of 10 m and a specific yield of 0.1. The results indicate that the aquifer depletion for the project water demand of 0.7 GLpa for the 20 year mine life is approximately 4% of the total available storage volume and approximately 10% for 1.5 GLpa. This is an indicative estimate only and will need to be confirmed after field exploration, aquifer testing and predictive modelling.

160000 180000 200000 220000 240000 260000 280000

7280000 7260000 7240000 7220000

NORTH

North Sunshine

Sunshine

Beyondie Lake 2

Beyondie Lake 1

10 Mile

0 5 10 20

Kilometers

GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

LEGEND

- Mining Tenement
- Lake
- Catchments

LOCATION PLAN

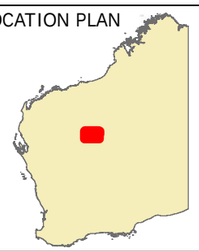


FIG 6: Catchment areas for Beyondie and Ten Mile Lakes

Customer: Kalium Lakes Rev: A

Date: 12 Jul 2017 M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 6.mxd

Table 2: Groundwater Recharge Estimates

Catchment Name	Total Catchment Area (km2)	% of the Total catchment	% of Area of calcrete bodies (assumed to be 10% of total catchment area)	Estimated Catchment Recharge to Calcrete Aquifers Assuming 0.8% recharge (GLpa)	Estimated Catchment Recharge to Calcrete Aquifers Assuming 0.8% recharge (GLpa)	Estimated Catchment Recharge to Calcrete Aquifers Assuming 3% of recharge (GLpa)	Storage Volume (m^3)	Available Volume (GL)	Percent of Aquifer Depletion at 0.7GLpa for 20 Years
Ten Mile	1735	55%	174	0.032	0.039	0.118	173,529,89	174	8%
Beyondie	1419	45%	142	0.026	0.032	0.097	141,861,91	142	10%
Total	**3154**	**100%**	**315**	**0.06**	**0.07**	**0.21**	**315,391,81**	**315**	**4%**

- *Assumptions:*
  - *Area of calcrete as a % of total catchment area = 10%*
  - *Annual rainfall = 227mm (adopted from Three Rivers station (Table 1); % of rainfall recharge to the aquifer = 1%*
  - *Specific yield = 0.1, Aquifer thickness = 10m*
- *Previous Recharge Rate Calculations:*
  - *Northern Goldfields - 0.01 = Bestow (1992), Forbes, C. F., 1978*
  - *Calcretes – Wiluna - 1.3% and 3.3% = Chapman (1962), 0.7% and 0.79% = Sanders (1971, 1972)*

3 Groundwater Supply Target Areas

Surface drainage catchments running from west to east within the Beyondie and Ten Mile Lake catchments feeding large calcrete deposits are interpreted to be primary water supply targets. Calcretes occurring in drainage depressions or valleys and alluvial material transported by the present day channel or deposited along intersections of fractures and drainage lines can form potential water supply zones in these areas where they have saturated thicknesses of greater than 10 m. Assuming a bore yield of 2 to 5 L/s, it is estimated that between 5 and 12 bores may be needed in the calcrete and alluvial aquifer to meet the project water demand of 0.7 GLpa (Approximately 22 L/s). Drilling and exploration will be needed to confirm the saturated thickness and water quality within these aquifer targets.

3.1 Water Supply Targets

Potential exploration drill targets have been identified based on the results of the geophysical testing program, surface geology, topography and analytical predictions. Two main water supply areas, one to the west of the lakes and the other to the south have been selected, keeping the minimum distance between targets to be greater than 1 km. The western locations are shown on and the rationale behind their selection is presented in Table 3.

The Figure 7 shows that three of the locations are selected in the main alluvial channel of the present day drainage. The remaining target locations are along the break of slope where smaller tributaries join the main channel and the change in slope, even if minor, may result in a change in velocity resulting in deposition of alluvial and colluvial sediments. EH-W3 and EH-W4 are closer to Homestead Well, where groundwater quality has been tested to be fresh, may be better locations than EH-W2 if the site reconnaissance indicates evidence of thicker sediments and relative intersection with the structural feature at depth, specifically at EH-W3. The order of preference is indicative at this stage and will be finalised during a site reconnaissance that is essential prior to commencement of the exploration program.

Locations and the rationale behind the selection of the exploration drill targets in the southern water supply area are outlined in Table 3.

Table 3: Preliminary Groundwater Supply Targets -Western Water Supply Area

Area/Basin	Target Name	Easting	Northing	Target Geology	Estimated drill depth (m)	Order to drill	Rationale/ Comments
Western target	EH-W1	213207	7256759	Alluvium and calcrete	15 to 20	1	Drainage Low, Thicker upper profile from geophysics
Western target	EH-W2	215271.8	7258688.8	Alluvium and colluvium	10 to 15	2	Scree deposit of the sub drainage joining the main drainage

Area/Basin	Target Name	Easting	Northing	Target Geology	Estimated drill depth (m)	Order to drill	Rationale/ Comments
Western target	EH-W3	204951	7256516	Alluvium and calcrete?	15 to 25	3	Approximately 3.9 km downgradient of the Homestead Well. Fresher groundwater anticipated, enhanced by creek recharge.
Western target	EH-W4	202393	7253487	Alluvium and calcrete?	15 to 25	4	Up gradient of Homestead Location. Fresher groundwater anticipated, enhanced by creek recharge and fracture intersection.
Western target	EH-W5	211350	7259948	Alluvium and colluvium	10 to 15	5	Scree deposits; alluvium and colluvium of the sub drainage joining the main drainage
Western target	EH-W6	215840	7261367	Alluvium and colluvium	10 to 15	6	Scree deposits; alluvium and colluvium of the sub drainage joining the main drainage

Figure 8 shows the target locations for exploration in the southern water supply area. This area is closer to and at the edge of the palaeodrainage where there could be higher salinities. Extensive areas of calcretes are inferred from the surface depositions as seen on Google Earth imagery. A number of locations have also been selected where there are major intersections between the drainage lines and fracture zones.

Locations and the rationale behind the selection of the exploration drill targets in the southern water supply area are outlined in Table 4. There are some selected targets outside the current KLP tenement and access to these will need to be agreed with the pastoral lease holder.

200000 210000 220000 230000

7260000

7250000

NORTH

12 MILE WELL
12 MILE OR LAKE WELL
EH-W6
EH-W5
EH-W2
EH-W1
EH-W3
EH-W4
4 MILE
GARDEN WELL
beyondie_w
WB05MBS
Beyondie Lake 2
Beyondie Lake 1
10 Mile Lake
TMAC22
WB09MBD
WB09MBS
TMAC11
10 Mile
EH-S4
EH-S1
EH-S2
EH-S9
EH-S6
EH-S5
EH-S3
EH-S8
EH-S12
EH-S10
EH-S7
EH-S11

0 1 2 4
Kilometers at A3

200000 210000 220000 230000

Advisian
WorleyParsons Group

KALIUM LAKES

GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

LEGEND

- Bores
- Exploration Target
- Geophys Survey Pts
- Lake
- Mining Tenement

LOCATION PLAN

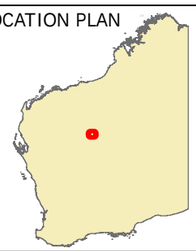


FIG 7: Groundwater Supply Exploration Target Location Western Water Supply Area

Customer: Kalium Lakes — Rev: A

Date: 12 Jul 2017 — M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 7.mxd

Table 4: Preliminary Groundwater Supply Targets –Southern Water Supply Area

Area/ Basin	Target Name	Easting	Northing	Target Geology	Estimated drill depth (m)	Order to drill	Rationale/ Comments
Southern target	EH-S1	225892.8	7249648.6	Calcrete/ alluvium	20 to 50	1	Intersection of the channel and fracture zone
Southern target	EH-S2	224710.4	7249050.5	Calcrete/ alluvium	20	2	Intersection of the channel
Southern target	EH-S3	229410	7247739	Calcrete/ alluvium	20	3	At the intersection where the main channel changes direction and flows WNW.
Southern target	EH-S4	229813.7	7250071	Calcretes	20	4	Calcretes, at the edge of the palaeochannel. Salinity could be a limiting factor?
Southern target	EH-S5	230561.8	7248280.9	Calcretes	20	5	Calcretes, 1.3km approx. from WH-S3
Southern target	EH-S6	221518.3	7248268.3	Alluvium	15 to 50	6	Intersection of drainage line and two fracture zones
Southern target	EH-S7	228867.8	7245360.2	Calcrete/ alluvium	15 to 20	7	Diverted channel of the drainage, Calcrete
Southern target	EH-S8	227895	7247005	Calcrete/ alluvium	15 to 20	8	Narrow constriction of the drainage before entering main channel. Calcretes on the surface?
Southern target	EH-S9	227258	7248976	Calcrete/ alluvium	15 to 50	9	Drainage diverted by fracturing, Calcrete Could be a more favourable location? Could be moved up the priority list based on site reconnaissance

Area/ Basin	Target Name	Easting	Northing	Target Geology	Estimated drill depth (m)	Order to drill	Rationale/ Comments
Southern target	EH-S10	227278.6	7245195.8	Calcrete	15 to 20	10	Calcrete In the main channel
Southern target	EH-S11	226354.8	7244023.9	Calcrete	15 to 20	11	Calcrete In the main channel
Southern target	EH-S12	230616	7246120.4	Calcrete/ alluvium	15 to 20	12	Calcrete. Maybe lower priority depending on site observations. EH-S13 and 14 are potentially better locations but further in distance
Southern target	EH-S13	225683.5	7242552.3	Alluvium	15 to 50	13	Major intersection of fault and drainage. Maybe lower in calcrete thickness?
Southern target	EH-S14	226370.5	7241740.3	Alluvium	15 to 50	14	Major intersection of fault and drainage. Maybe lower in calcrete thickness?
Southern target	EH-S15	227870.5	7241610	Alluvium	20	15	Drainage
Southern target	EH-S16	223258.6	7237381.6	Calcrete	20	16	In the main channel, calcrete on the surface
Southern target	EH-S17	221688	7237596	Calcrete	20	17	In the main channel
Southern target	EH-S18	223442	7240097	Drainage	10 to 50	18	Intersection of minor lineament and drainage

200000 210000 220000 230000 240000

7260000 7250000 7240000

NORTH

12 MILE WELL
EH-W6
EH-W5
EH-W2
EH-W1
EH-W3
EH-W4
4 MILE
GARDEN WELL
beyondie w
BEYONDIE BORE
BEYONDE HOMESTEAD WELL

WB05MBS
Beyondie Lake 2
Beyondie Lake 1
WB10TB01
WB25
TMAC15
TMAC22
10 Mile Lake
WB09MBD
TMAC16
WB12MBI
PRIVATE
TMAC11
TMAC26
TMAC24
10 Mile
TMAC09

EH-S4
EH-S19
EH-S1
EH-S20
EH-S9
EH-S6
EH-S5
EH-S21
EH-S22
EH-S8
EH-S23
EH-S12
EH-S7
EH-S10
EH-S11
EH-S13
EH-S14
EH-S15
EH-S18
EH-S17
EH-S16

WELL
WELL

0 1 2 3 4 5
Kilometers at A3

Advisian
WorleyParsons Group

KALIUM LAKES

GDA 1994 MGA Zone 51
Proj:Transverse Mercator
Datum: GDA 1994

LEGEND

- Exploration_Target
- Bores
- Geophys Survey Pts
- Lake
- Mining Tenement

LOCATION PLAN

FIG 8: Groundwater Supply
Exploration Target Location
Southern Water Supply Area

Customer: Kalium Lakes Rev: A

Date: 14 Jul 2017 M.P - Geomatics

Location: I:\Projects\201320-14624 Kalium Lake potash\5_Engineering\GM-Geomatics\03Project\Workspace\EPA Submission - Fig 8.mxd

3.2 Drawdown and Radius of Influence

A preliminary estimate of theoretical drawdown at distance from a proposed pumping well was undertaken by analytical modelling using a solution to the Theis equation below:

$$s = \frac{Q}{4\pi T} W(u)$$

Where, T is the aquifer transmissivity, Q is the steady pumping rate, s is the drawdown, and W(u) is the well function. Values of u are calculated as:

$u = (r^2 S / 4 T t)$

where t is time, r is the radius and S is storativity (assumed to be specific yield in this case).

The following assumptions have been used in the calculations:

- Pumping volume = 432m^3/d
- Storativity – 0.1
- Aquifer thickness = 10m
- Hydraulic Conductivity = 3 metres /day (m/d);
- No recharge is considered; and
- The aquifer is homogenous, isotropic, of uniform thickness and of seemingly infinite areal extent.

The analytical results presented in Appendix B indicate that after continuous pumping at 5 L/s (432 m^3/day) for one year, the theoretical drawdown is approximately 16 m in the vicinity of the well and 0.5 m at a distance of 500m from the well. At the end of the LoM, assumed to be 20 years (7300 days) the drawdown is predicted to be 19 m near the well and 0.1 m at a distance of 800m from the well if no recharge is accounted for.

The pumping estimates indicate that a distance of 500 m to one kilometre will need to be maintained as optimum distance between wells so that drawdown interference effects do not become excessive. These results are only indicative and further detailed analytical or numerical modelling using field tested parameters will need to be undertaken to predict drawdowns and sustainability of the aquifer prior to seeking dewatering licences and approvals from the regulatory authorities such as the DoW and the Environmental protection Authority (EPA).

3.3 GDE Considerations

Bore field configurations and pumping volumes will also need to be optimised to ensure drawdown impacts do not exceed 70% of the saturated thickness of the aquifer to minimise the risk of potential subterranean fauna impacts. This may require a more conservative average flow rate to be applied and consequently more bores, so that an adaptive management strategy can be employed during times of peak demands and drought periods.

4 Summary and Future Works Program

4.1 Summary of the Desktop Assessment

The Beyondie Potash Project requires a fresh water supply as part of the processing of the brine to produce a sulphate of potash (SOP) product. The current estimated water demand for the Project is between 0.7 GLpa to 1.5 GLpa. A preliminary desktop hydrogeological assessment has been undertaken which aims to identify a water supply source for the Project and estimate potential yields and impacts based on the available hydrogeological information. The results of the assessment are summarised as follows:

- The water supply assessment concentrated on potential abstraction from shallow alluvial and calcrete of the surficial aquifer that overlies the regional palaeovalley system. The palaeovalley sediments comprise thick lacustrine clay of up to 65m thick within the Beyondie and Ten Mile Project area, which acts as a confining layer between the basal sand aquifer of the palaeochannel and the surficial aquifer.
- The shallow surficial alluvial aquifer is composed of mostly silty and clayey deposits along with locally occurring calcrete deposits.
- Calcrete, heterogeneous creek sediments and outwash fans on the flanks of the topographic lows and valleys are the primary targets for project water supply from this surficial aquifer. Localised groundwater supplies may also be obtained from intersections of present day drainage and fracture zones.
- Groundwater occurrence and availability in calcrete is related to well-developed secondary porosity that results in high hydraulic conductivities. They can yield high volumes of water, whilst salinity may vary depending on their occurrence in the landscape and proximity to regular recharge.
- There are existing bores in the vicinity of the Project recorded to be used for stock watering and pastoral water supply needs will need to be maintained.
- Recorded groundwater salinities are variable between fresh to brackish in the shallow alluvium with the lower salinities occurring at break of slope areas within small catchment divides and near direct surface recharge zones whereas the higher salinities are recorded closer to the palaeodrainage. In general terms the closer to the salt lake the higher the salinity.
- There are no GDEs of concern currently mapped in the project area. However, abstraction of groundwater from shallow calcrete and alluvial aquifers may have a potential impact on GDEs (including subterranean fauna and vegetation) locally due to reduced water availability. Groundwater modelling and impact assessments based on results of the water supply exploration program will determine the potential imapcts.
- Recorded hydraulic conductivity values in regional shallow bores indicate that the aquifer is potentially capable of supplying the required volume of water for the Project if an adequate saturated thickness is encountered during drilling.
- Annual recharge to the shallow aquifer in the Beyondie Lakes and Ten Mile Lake catchments is estimated to range between 0.06 and 0.2 GLpa, based on a number of assumptions that are

outlined in the report. Further studies and longer term monitoring is required to improve these estimates.

- Assuming a bore yield of 2 to 5 L/s it is estimated that between 5 and 12 bores may be needed in the calcrete and alluvial aquifer, spaced at between 500 m and 1 km apart to meet the minimum project water demand of 0.7 GLpa.
- Potential exploration targets for groundwater supply bores have been identified based on the results of the geophysical testing program, surface geology, topography and analytical predictions. Two main water supply areas, one to the west of the Lakes and the other to the south have been selected.
- Exploration holes will be drilled and aquifer tests carried out with an approach to identifying potential impacts and applying Adaptive management approach to minimise risks based on a future works program outlined below.

4.2 Future Works Program

A field exploration and hydrogeological investigation comprising the following tasks will be required as a part of the detailed water supply assessment.

- A site walk over / field reconnaissance will be conducted to assess the identified target sites, potential constrains, if any, and the suitability of each site, drill rig access, tenement status etc.
- KLP will organise and obtain adequate tenement access, approvals and appropriate licences including DoW licences to 'drill' and 'take water'; for testing.
- Vegetation and subterranean fauna risk mapping based on the exploration program to be undertaken will be completed so that high risk areas can be excluded from the exploration drilling.
- Exploration holes will be drilled using air rotary or aircore methods and logged by a suitably qualified geologist/hydrogeologist. The alluvial profile will be logged appropriately and nature of the alluvial horizons recorded. This will drive the selection of appropriate screen intervals for the monitoring and production bores. Groundwater information, including airlift yields, flow and quality variations with depth will be recorded on site by a site hydrogeologist.;
- Drilled exploration holes will be converted to monitoring bores (50mm PVC casing slotted over target interval, based on downhole geology / logs). This will establish a baseline shallow aquifer monitoring network on site. Slug testing of monitoring bores will be undertaken by removing a known quantity of water and measuring the water level recovery, to assess the hydraulic conductivity. This will aid in collecting baseline data on the aquifer for abstraction licence approvals.
- Up to four test production bores will be drilled and constructed based on exploration drilling results.
- Test pumping of the production bores will be undertaken (including step rate tests and constant rate tests) and continuous monitoring of the test wells and monitoring wells to provide data on aquifer conditions.
- The results of test pumping will be analysed to provide information on aquifer conditions, hydraulic conductivity, storage potential, bore efficiency and likely sustainable yield.

- Groundwater monitoring loggers will be deployed within the monitoring bores so that seasonal groundwater levels can be monitored and recharge estimates improved.
- A groundwater flow model will be designed, constructed and calibrated using the drilling and test pumping results to assess longer term sustainable yields, optimise a well field configuration and potential impacts from operating a borefield.
- In reference to the DoW reporting guidelines for hydrogeological assessment (DoW 2009), Table 1 indicates that the water supply assessment would fall under the H3 level of assessment (22 points), mainly due to the volume (8 points), proximity to GDEs and other users (5 points each), and salinity (4 points).
- The results of the field investigation, modelling and impact assessment will be presented in a H3 level hydrogeological report for submission to regulatory authorities for approval.

5 References

AQ2, 2016. Beyondie Lakes Project H2 Level of Assessment Prepared for Kalium Lakes May 2016

Beard, J.S., 2005. Drainage Evolution in the Lake Disappointment catchment, Western Australia – a discussion, Journal of the Royal Society of Western Australia, 88: 57-64.

Bell, J.G., Kilgour, P.L., English, P.M., Woodgate, M.F., Lewis, S.J. and Wischusen, J.D.H. (compilers), 2012. WASANT Palaeovalley Map – Distribution of Palaeovalleys in Arid and Semi-arid WA-SA-NT (First Edition), scale: 1:4 500 000, Geoscience Australia Thematic Map (Geocat № 73980) – hardcopy and digital data publication: http://www.ga.gov.au/cedda/maps/96.

BOM, 2017. Atlas of Groundwater Dependent Ecosystems. http://www.bom.gov.au/water/groundwater/gde/map.shtml, accessed May 2017

Bureau of Meteorology (BOM), 2017. Climate Data Online, Http://Www.Bom.Gov.Au/, accessed May 2017

Department of Water (DoW), 2009. Operational policy no. 5.12 – Hydrogeological Reporting Associated with a Groundwater Well Licence: Department of Water Perth.

DoW, 2017. Water Information Reporting Data Online. http://www.water.wa.gov.au/maps-anddata/monitoring/water-information-reporting, accessed April 2017

Johnson S.L. and Commander D.P 2006, Mid West Minerals Province – Groundwater Resource Appraisal, Water Resource Management Division, Department of Water, Department of Water Hydrogeological Record Series Report No. HG

Johnson, S. L., Commander, D. P. & O'boy, C. A. 1999, Groundwater resources of the Northern Goldfields, Western Australia: Water and Rivers Commission, Hydrogeological Record Series, Report HG 2, 57p.

Kalium Lakes, Draft Pre-Feasibility Study, Section 3, Hydrology, Hydrogeology & Resources, April 2016.

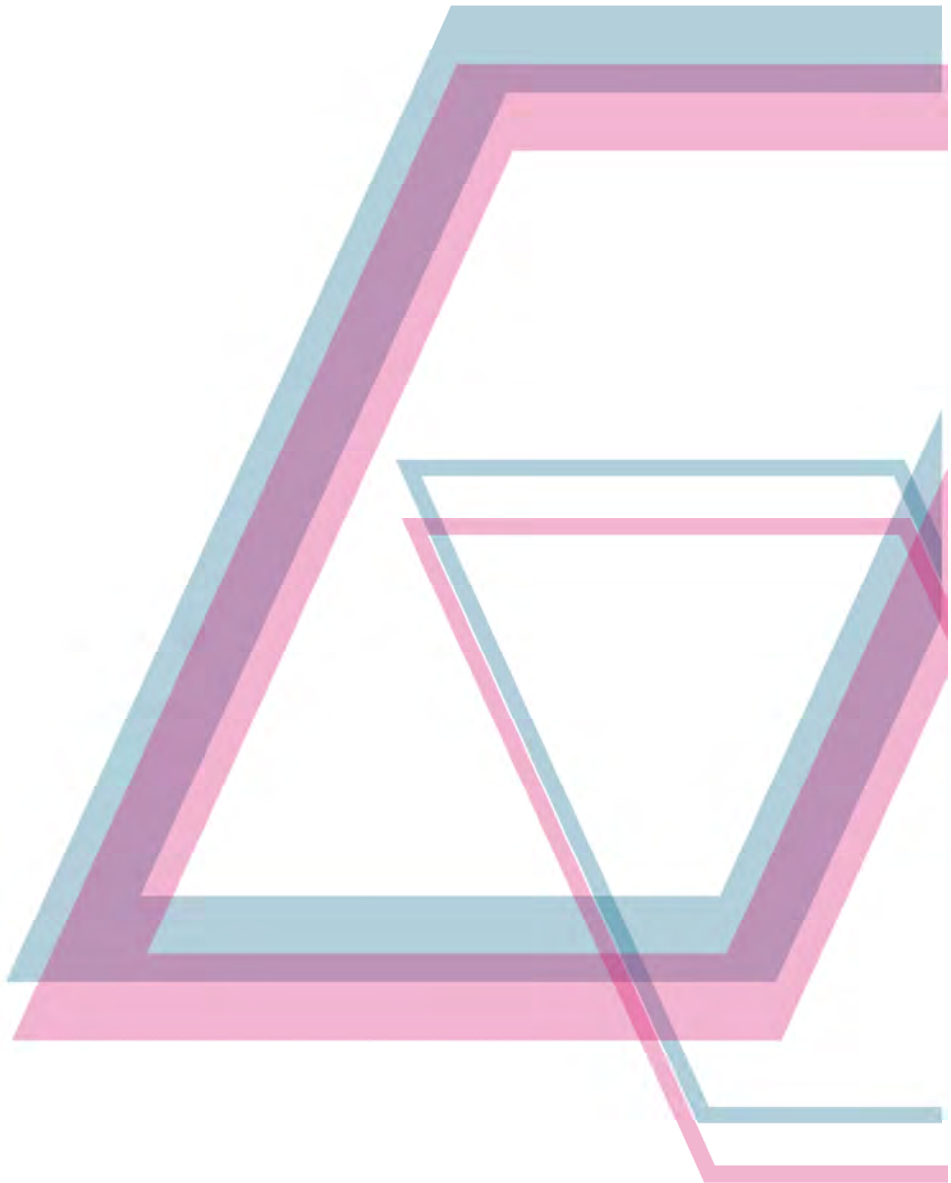
Magee, J.W., 2009. Palaeovalley Groundwater Resources in Arid and Semi-Arid Australia – A Literature Review. Geoscience Australia Record 2009/03. 224 pp.

Advisian
WorleyParsons Group

Appendix A Bore Data

Site Name	Source	Easting	Northing	Depth	SWL	TDS
No. 7 Well Canning S R	DoW_WIR	327592.4	7216433	21.49	10.5	50
Marymia Well	DoW_WIR	209504.9	7230468		6.53	340
No. 10 Well Canning S R	DoW_WIR	363908.5	7250325	21.49	9.22	549
Piccaninny Bore	DoW_WIR	356836.9	7240395			550
Snake Well	DoW_WIR	203670.9	7274811	11.7	8	570
Joes Well	DoW_WIR	355200.3	7242372	16.46	5	580
Bullen Water Bore - 2	DoW_WIR	288543.3	7240572	50		630
Bullen Water Bore - 5	DoW_WIR	287720.2	7245950	20	3.1	840
Willy Willy Bore	DoW_WIR	331765.4	7219090			860
Bullen Water Bore - 4	DoW_WIR	320308.5	7248179	44.5	4.45	1050
Snells Bore	DoW_WIR	345516.3	7252012			1200
No. 12 Well Canning S R	DoW_WIR	385798.7	7279428	7.77	2.75	2090
12 Mile Or Lake Well	DoW_WIR	219208.7	7261900		7.25	2370
No 8 Well Canning S R	DoW_WIR	337270.4	7222372	18.29	3.9	2650
Lake Bore	DoW_WIR	336072.3	7229937			2840
No. 11 Well Canning S R	DoW_WIR	371888.2	7261587	2	1.7	3270
4 Mile	DoW_WIR	208797.9	7256222		6.13	4500
Beyonde Homestead Well	DoW_WIR	201051.9	7255893	14.1	13.5	
Bore	DoW_WIR	343118.4	7229104	3.66		
Bore	DoW_WIR	343362.3	7237370	3.66		
Bore	DoW_WIR	344318.3	7244472	3.66		
Bore	DoW_WIR	351121.1	7245983	3.66		
Bore	DoW_WIR	354352.4	7246129	3.66		
Bullen Water Bore - 1	DoW_WIR	287719.2	7245982			
Bullen Water Bore - 3	DoW_WIR	305889.4	7239589		4.3	
No. 1	DoW_WIR	206394.9	7234210	27.43		
No. 13 Well Canning S R	DoW_WIR	398219.2	7298018	7.77		
Private	DoW_WIR	233891.4	7253931	48		
Well	DoW_WIR	205742.8	7242803	10.7	1.07	
Well	DoW_WIR	208306	7230774	10.7	1.07	
Well	DoW_WIR	210273.9	7230874	10.7	1.07	
Well	DoW_WIR	216244.9	7234887	10.7	1.07	
Well	DoW_WIR	371888.2	7261587	10.7	1.07	
No 77 East Well	Phoenix_DB	216216.6	7234800	9.8	1	96
Beyondie Bore	Phoenix_DB	201051.9	7255893	24.43	10.95	369
Davids Well	Phoenix_DB	197968.6	7228384	20.7	5.5	463
Garden Well	Phoenix_DB	202895.6	7255953	22.24	9.5	500
Broken Leg	Phoenix_DB	202835	7232154	41.8	16	650
12 Mile Well	Phoenix_DB	219208.7	7261900	11.2	5.2	2072
Unamed 1	Phoenix_DB	207916.8	7257437	19.8	4.2	2084
Tmac23	Phoenix_DB	230929	7253520	11.53	2.92	3800
Tupee Well	Phoenix_DB	201893.4	7269434	13	8.1	3827
Wb25	Phoenix_DB	235581	7257148	29.15	7.18	17056
Wb05mbs	Phoenix_DB	229624	7260943	53	2.5	60882
Wb09mbs	Phoenix_DB	230482.1	7254262	31	2.5	61507
Wb09mbd	Phoenix_DB	230482.1	7254262	33.9	1.05	92278
Beyondie W	Phoenix_DB	200360.1	7255657			
Tmac09	Phoenix_DB	232932	7251174			
Tmac11	Phoenix_DB	230920	7253138			
Tmac15	Phoenix_DB	235748	7257207			
Tmac16	Phoenix_DB	232037	7254479			
Tmac22	Phoenix_DB	230509	7254896			
Tmac24	Phoenix_DB	232122	7251935			
Tmac26	Phoenix_DB	232760	7253061			
Wb10tb01	Phoenix_DB	233476	7257242			
Wb12mbi	Phoenix_DB	233887.6	7253922			

Appendix B Drawdown Calculations



Project Name: Kalium Water Supply
Project Number: 201320-14624

The following parameter values and assumptions were used.

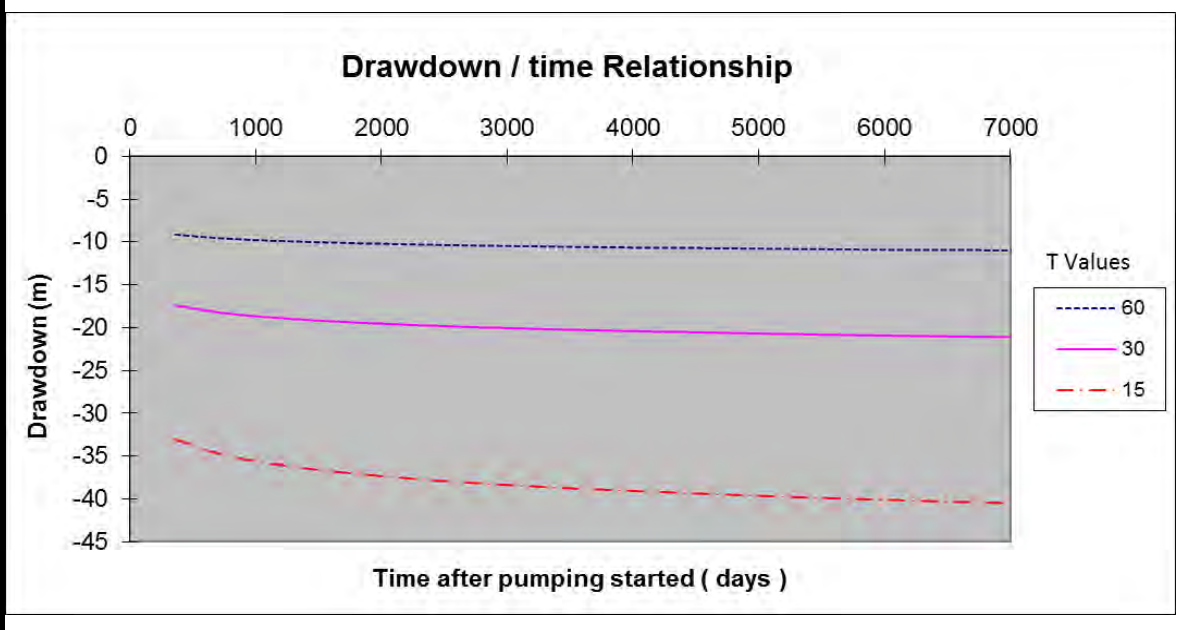
Bore Pump Rate:	432.0	m^3 per	5	L/sec	
Aquifer Storativity:	0.1	-			
Time after pumping:	365	days			
Transmissivity:	30	m^2 per day		K	3
Minimum Radius:	0.5	m		b	10

Drawdown at given distance from Pumped bore at nominated time

	Transmissivity values						
Distance	3	15	24	30	36	60	300
0.5	131.7	30.0	19.4	15.8	13.4	8.3	1.8
1	115.9	26.9	17.5	14.2	12.0	7.5	1.7
2	100.0	23.7	15.5	12.6	10.7	6.7	1.5
4	84.1	20.5	13.5	11.0	9.4	5.9	1.4
5	79.0	19.5	12.8	10.5	9.0	5.7	1.3
6	74.8	18.6	12.3	10.1	8.6	5.5	1.3
7	71.3	17.9	11.9	9.8	8.3	5.3	1.2
8	68.2	17.3	11.5	9.5	8.1	5.1	1.2
10	63.1	16.3	10.9	8.9	7.6	4.9	1.2
25	42.2	12.1	8.2	6.8	5.9	3.8	0.9
50	26.8	9.0	6.3	5.3	4.6	3.0	0.8
100	12.8	5.9	4.3	3.7	3.3	2.2	0.6
500	0.0	0.4	0.5	0.6	0.6	0.5	0.3
1000	0.0	0.0	0.0	0.0	0.1	0.1	0.1
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Drawdown at the minimum radius for different time

	Transmissivity values						
Time	3	15	24	30	36	60	300
365	131.7	30.0	19.4	15.8	13.4	8.3	1.8
730	139.7	31.6	20.4	16.6	14.0	8.7	1.9
1095	144.3	32.6	21.0	17.1	14.4	8.9	2.0
1460	147.6	33.2	21.4	17.4	14.7	9.1	2.0
1825	150.2	33.7	21.8	17.7	14.9	9.2	2.0
2190	152.3	34.1	22.0	17.9	15.1	9.3	2.1
2555	154.0	34.5	22.2	18.0	15.2	9.4	2.1
2920	155.6	34.8	22.4	18.2	15.3	9.5	2.1
3285	156.9	35.1	22.6	18.3	15.4	9.6	2.1
3650	158.1	35.3	22.7	18.5	15.6	9.6	2.1
5475	162.8	36.2	23.3	18.9	15.9	9.9	2.2
7300	166.1	36.9	23.7	19.2	16.2	10.0	2.2
9125	168.6	37.4	24.1	19.5	16.4	10.1	2.2
10950	170.7	37.8	24.3	19.7	16.6	10.3	2.2
12775	172.5	38.2	24.5	19.9	16.7	10.3	2.3



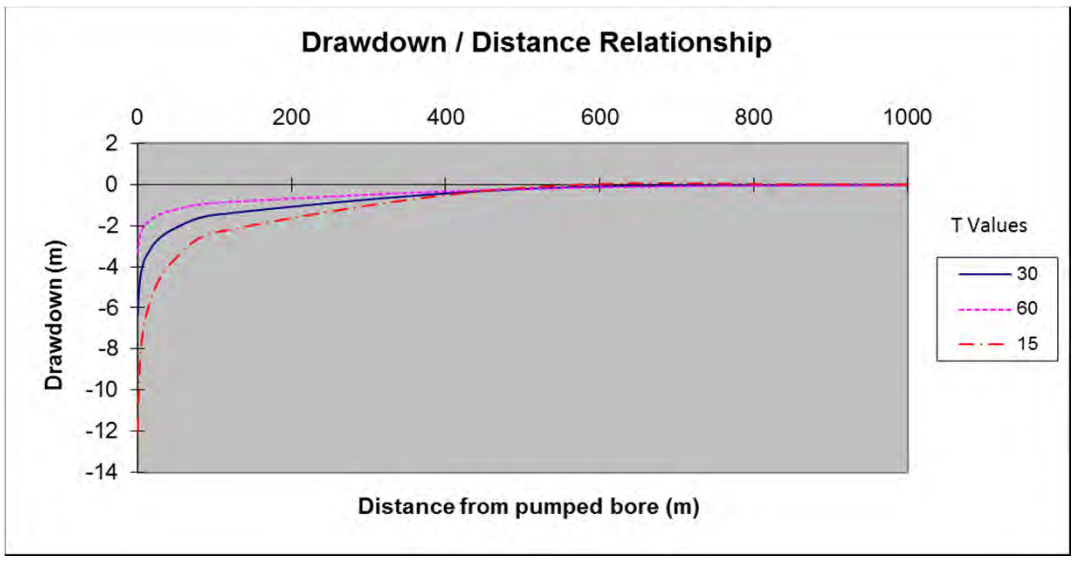
Project Name: Kalium Water Supply
Project Number: 201320-14624

The following parameter values and assumptions were used.

Bore Pump Rate:	172.8	m^3 per	2	L/sec	
Aquifer Storativity:	0.1	-			
Time after pumping:	365	days			
Transmissivity:	30	m^2 per day		K	3
Minimum Radius:	0.5	m		b	10

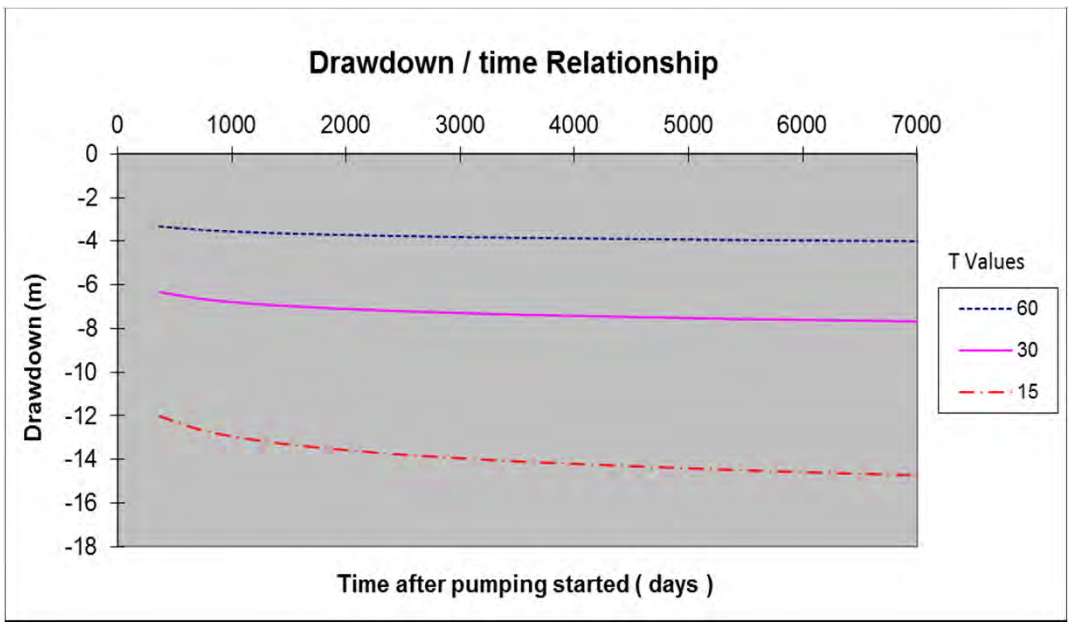
Drawdown at given distance from Pumped bore at nominated time

	Transmissivity values						
Distance	**3**	**15**	**24**	**30**	**36**	**60**	**300**
0.5	52.7	12.0	7.8	6.3	5.3	3.3	0.7
1	46.3	10.7	7.0	5.7	4.8	3.0	0.7
2	40.0	9.5	6.2	5.1	4.3	2.7	0.6
4	33.6	8.2	5.4	4.4	3.8	2.4	0.5
5	31.6	7.8	5.1	4.2	3.6	2.3	0.5
6	29.9	7.5	4.9	4.0	3.4	2.2	0.5
7	28.5	7.2	4.8	3.9	3.3	2.1	0.5
8	27.3	6.9	4.6	3.8	3.2	2.1	0.5
10	25.2	6.5	4.3	3.6	3.1	1.9	0.5
25	16.9	4.8	3.3	2.7	2.4	1.5	0.4
50	10.7	3.6	2.5	2.1	1.8	1.2	0.3
100	5.1	2.3	1.7	1.5	1.3	0.9	0.3
500	0.0	0.2	0.2	0.2	0.2	0.2	0.1
1000	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0



Drawdown at the minimum radius for different time

	Transmissivity values						
Time	**3**	**15**	**24**	**30**	**36**	**60**	**300**
365	52.7	12.0	7.8	6.3	5.3	3.3	0.7
730	55.9	12.7	8.2	6.6	5.6	3.5	0.8
1095	57.7	13.0	8.4	6.8	5.8	3.6	0.8
1460	59.1	13.3	8.6	7.0	5.9	3.6	0.8
1825	60.1	13.5	8.7	7.1	6.0	3.7	0.8
2190	60.9	13.7	8.8	7.1	6.0	3.7	0.8
2555	61.6	13.8	8.9	7.2	6.1	3.8	0.8
2920	62.2	13.9	9.0	7.3	6.1	3.8	0.8
3285	62.8	14.0	9.0	7.3	6.2	3.8	0.8
3650	63.3	14.1	9.1	7.4	6.2	3.8	0.8
5475	65.1	14.5	9.3	7.6	6.4	3.9	0.9
7300	66.4	14.8	9.5	7.7	6.5	4.0	0.9
9125	67.5	15.0	9.6	7.8	6.6	4.1	0.9
10950	68.3	15.1	9.7	7.9	6.6	4.1	0.9
12775	69.0	15.3	9.8	8.0	6.7	4.1	0.9



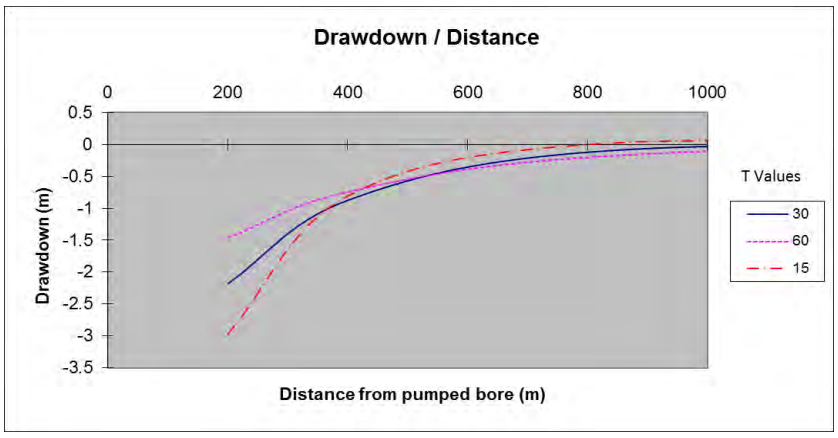
Project Name: Kalium Water Supply
Project Number: 201320-14624

The following values were used for this case:

Bore Pump Rate:	432.0	m^3 per 5	L/sec	
Aquifer Storativity:	0.1	-		
Time after pumping:	365	days		
Transmissivity:	30	m^2 per day	K	3
Minimum Radius:	200	m	b	10

Drawdown at given distance from Pumped bore at nominated time

	Transmissivity values						
Distance	3	15	24	30	36	60	300
200	2.9	3.0	2.4	2.2	2.0	1.5	0.5
400	0.0	0.8	0.9	0.9	0.9	0.7	0.3
800	0.0	0.0	0.1	0.1	0.1	0.2	0.2
1600	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1000	0.0	0.0	0.0	0.0	0.1	0.1	0.0
1200	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1400	0.0	0.0	0.0	0.0	0.0	0.0	0.0



The following values were used for this case:

Bore Pump Rate:	432	m^3 per day
Aquifer Storativity:	0.1	-
Time after pumping:	365	days
	0	
Transmissivity:	30	m^2 per day
Minimum Radius:	200	m

Drawdown at the minimum radius for different time

	Transmissivity values						
Time	3	15	24	30	36	60	300
365	2.9	3.0	2.4	2.2	2.0	1.5	0.5
730	7.1	4.4	3.4	2.9	2.6	1.8	0.6
1095	10.3	5.2	3.9	3.4	3.0	2.1	0.6
1460	12.8	5.9	4.3	3.7	3.3	2.2	0.6
1825	14.9	6.3	4.6	3.9	3.5	2.4	0.7
2190	16.6	6.7	4.9	4.2	3.6	2.5	0.7
2555	18.2	7.1	5.1	4.3	3.8	2.6	0.7
2920	19.5	7.4	5.3	4.5	3.9	2.6	0.7
3285	20.7	7.7	5.4	4.6	4.0	2.7	0.7
3650	21.8	7.9	5.6	4.7	4.1	2.8	0.7
5475	26.1	8.8	6.2	5.2	4.5	3.0	0.8
7300	29.3	9.5	6.6	5.5	4.8	3.2	0.8