

Ms Kylie Fitzpatrick
Department of Environment, Parks and Water Security
GPO Box 3675
Darwin NT 0801

Dear Ms Fitzpatrick

Re: Supplementary environmental report - Core Lithium Ltd - Finnis Lithium Project BP33 Underground Mine

The Department of Environment, Parks and Water Security (DEPWS) has assessed the additional information submitted for the above supplementary environmental report (SER) and provides the following comments:

Flora and Fauna Division

Section of SER	Theme or issue	Comment
SER Section 2.2.5 and 10.6 Avoidance and mitigation	Surplus water management strategies, Irrigation	<p>The proponent proposes to “irrigate” an area of approximately 20ha using surplus water for a period of 16 months with approximately 120-210ML of water (total volume). No information on the selection of an area to be “irrigated” is provided, beyond stating that it will be identified during the mine design phase. In Table 10-4, the proponent mentions that ‘irrigation area(s) will be delineated by land suitability assessment in accordance with the NT Land Clearing Guidelines...’. This suggests that native vegetation would be cleared in order to establish the “irrigation” area. The Flora and Fauna Division seeks clarification on whether this is the case and, if so, why clearing of native vegetation is required, instead of the use of either an already cleared area within the mining footprint and/or retention of native vegetation in the “irrigation” area. If the latter option is chosen, the area should preferentially contain soils and vegetation that indicate that the area experiences seasonal waterlogging (e.g. hydrosols), and is thus better able to withstand periodic inundation. Irrigation of the volumes identified by the proponent in areas that are not naturally ‘wet’ (floodplains, swamps, drainage flats) is more likely to adversely impact vegetation.</p> <p>To summarise, the Flora and Fauna Division recommends that no ‘new’ clearing of native vegetation be undertaken for this purpose.</p>

SER Section 2.3	Mining closure and rehabilitation	<p>The proponent commits to rehabilitating the site “with native vegetation species”. However, this should be with plants that are not just native to Australia, but local to that area. The following condition should be included in a draft environmental approval:</p> <ul style="list-style-type: none"> • Rehabilitation should be with native vegetation species local to the area. <p>The proponent should also manage for weeds during the life of the mine, including during rehabilitation and during the monitoring phase of rehabilitation.</p>
SER Table 5-1 Response to submissions	Pre-clearing inspections	<p>Ad-hoc, poorly defined relocation programs provide a misleading impression of minimisation of the mortality caused by clearing of native vegetation. The Flora and Fauna Division does not support “pre-clearing inspections” for fauna in the imprecise way that is currently proposed by Core Lithium. Firstly, it would not be possible to “identify and relocate any non-mobile species”, as claimed by the proponent, because it is simply not possible to capture all individuals. Secondly, it is unclear how and why “non-mobile species” are differentiated from ‘mobile’ species as this is not a taxonomically valid separation. There are a range of taxonomic groups (frogs, reptiles, birds, mammals, invertebrates) and many of these have small home ranges and/or are restricted to particular types of habitat (e.g. termite mounds, burrows, nests). Limiting any “pre-clearing inspections” to “any non-mobile species” does not make practical or biological sense.</p> <p>If pre-clearing is to occur, it should have a realistic objective and target relevant taxonomic groups. It should also detail to where fauna would be relocated, how those locations are selected, what their existing faunal densities are, how relocated individuals will be monitored, and what thresholds are in place to intervene if they are failing to survive post-relocation. Simply “relocating” animals to an unspecified destination does not prevent them from dying as a result of a range of potential causes, including injury, starvation, competition with other fauna present at the destination, habitat fragmentation, insufficient access to required habitat, and/or introduced predators.</p> <p>There are two important aspects to consider in determining the ‘success’ of a fauna relocation program: the proportion of animals of the total present that are relocated, and the survival of those relocated animals. This is complicated by the fact that fauna can be small, cryptic, difficult to identify and/or shelter <i>in situ</i> (e.g. in the soil, in hollows, in nests, under tree bark). The volume of individuals impacted by vegetation clearing are also often underestimated. For example, in research conducted in Western Australia, 960 individual vertebrate fauna were caught during vegetation clearing of ~14ha; there were 17,057 individual animals caught in ~1,000ha (Thompson and Thompson 2015). There were also significant differences in survivorship amongst taxa during vegetation clearing. In the absence of data such as these, it is not possible to claim – as is done by Core Lithium for the Grants project – that “there have been no incidences involving fauna”.</p> <p>The proponent should either detail the objectives, methods and monitoring expected of their “pre-clearing inspections” or establish sensitive clearing protocols (see Thompson and Thompson 2015). These</p>

		<p>might include initial use of a 'raised blade' on a bucket or machine so that some fauna have the opportunity to escape from the area being cleared, hand-searching the remaining clumps of vegetation for fauna and the hand-capture of those individuals, hand-based deconstruction of termitaria instead of demolition using heavy machinery, and having a short period of time (~5min) between the removal of the vegetation using the 'raised blade' and the removal of the top soil (Thompson and Thompson 2015).</p> <p>Thompson, S.A. and Thompson, G.G. (2015) Fauna-rescue programs can successfully relocate vertebrate fauna prior to and during vegetation-clearing programs. <i>Pacific Conservation Biology</i> 21(3): 220-225.</p>
SER Section 7.4 and Appendix i	Environmental values – threatened flora and fauna	The Flora and Fauna Division acknowledges that a survey for the threatened plant <i>Styliidium ensatum</i> was undertaken for the SER, and the survey used appropriate methods. No <i>Styliidium ensatum</i> were found, as such the project is not likely to have a significant impact on this threatened plant species. No further assessment or mitigation measures are required for this species.
SER Section 7.6 Avoidance and mitigation and Appendix C and SER Section 9.7 Predicted outcome	Riparian vegetation degradation through changes to hydrological regime	<p>The proponent suggests that “annual riparian vegetation monitoring will occur to record changes to vegetation extent, structure and composition compared to baseline conditions” and refers to Appendix C. In Appendix C, Section 8.4 ‘Riparian vegetation monitoring’, the proponent suggests that “any significant retraction in riparian vegetation patch boundaries should trigger further assessment to determine the extent and potential cause of impact”. Furthermore, the proponent indicates that changes in vegetation structure and composition will be monitored, but that “these changes could also occur because of bushfire and weed invasion unrelated to the project activities”.</p> <p>It is unclear what would constitute a “significant retraction in riparian vegetation patch boundaries”. Similarly, it is unclear what the thresholds (trigger points or ‘limits of acceptable change’) are for changes in vegetation structure and composition, given the interacting factors of bushfire and weed invasion. An absence of thresholds, trigger points or ‘limits of acceptable change’ will make it challenging (if not impossible) to establish definitively whether or not there has been an impact by mining on riparian vegetation. In the absence of this information, the Flora and Fauna Division disagrees with the proponent’s claim (SER p. 51) that “the riparian vegetation monitoring program described in...Appendix C will detect changes in the riparian vegetation”.</p> <p>The proponent should commit to mapping, qualifying and quantifying the extent, structure and composition of riparian vegetation and to establishing definitive thresholds (or trigger points or ‘limits of acceptable change’) for these parameters. This should include defining what actions will be taken if thresholds are breached.</p>
SER 9.6 Avoidance and mitigation	Table 9-3 Summary of assessment criteria and corrective actions for	The proponent suggests that, if monitoring in bores closest to the riparian zone indicates that drawdown is greater than predicted, and if monitoring identifies an impact to riparian vegetation, an appropriate response is that “the [mining closure plan] will include post-mining reinstatement of habitat values in the affected areas and monitoring of ecosystem recovery”.

	surface water flows and groundwater levels	If drawdown is greater than predicted and there is an impact to riparian vegetation, then the proponent is obligated to determine the cause of that greater than expected drawdown, and ameliorate the situation as much as possible. Simply deferring the management to the post-mining stage may not be appropriate, or at least only after other management responses have been exhausted.
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Water Resources Division

The subject area is located within the Darwin Rural Water Control District and overlies the Burrell Creek Formation and Charlotte River. There are no Water Allocation Plans or Water Management Zones within the proposal area. There are two Declarations of Beneficial Use over the site: Declaration of Beneficial Uses Darwin Rural Water Control District in 2019 and the Declaration of Beneficial Uses Fog Bay Area in 1998. The beneficial uses consist of agriculture, aquaculture, public water supply, environment, cultural, industry, rural stock and domestic, mining and petroleum activity, and aquatic ecosystem protection.

There are not any major rivers and creeks within the proposed mine site, only minor (stream order 1 drainage lines). Therefore, no comments are required on riverine flooding and its risks within the mine site area.

Section of SER	Theme or issue	Comment
Table 1-1 and Section 5	Licensing requirements for Dewatering	<p>The SER indicates that water will be extracted from the mine site, with a forecast peak dewatering rate of 7ML per day. Take of water through pit dewatering may trigger water extraction licensing requirements under the <i>Water Act 1992</i>. The proponent should engage with the Water Resources Division to understand its obligations under the <i>Water Act 1992</i>.</p> <p>Should an application for a water extraction licence be required, it is recommended that the proponent include a detailed water balance documenting volumes of water proposed for beneficial use and volumes extracted for the purpose of maintaining safety and integrity of the underground works. Where water entitlements in excess of that documented in the site water balance is applied for, documentation verifying the need for excess volumes should be provided. This may include documentation of:</p> <ul style="list-style-type: none"> • Rationale for applying for excess water (e.g. to ensure drought resilience, provide economic certainty, mitigate uncertainty in modelled water demands etc.). • Water demand for staged/incremental increases in drought severity including estimated probability of occurrence. • Impacts to productivity if water volumes were unavailable. • Impacts on business viability/economic cost if water volumes were unavailable. <p>A licence application should also include information about impacts to riparian vegetation due to the cumulative impact of surface water take from Observation Hill Dam under existing surface water Extraction Licence 8151018 and predicted groundwater draw down due to pit dewatering.</p>
	Licensing requirements	Core Lithium Ltd currently holds Surface Water Extraction Licence 8151018 (SWEL 8151018) for take from Observation Hill Dam (OHD)

	for Observation Hill Dam	<p>associated with mining activities at Grants Deposit. Take from OHD to support activities at BP33 will require an amendment of SWEL 8151018 to facilitate changes or additions to:</p> <ul style="list-style-type: none"> • Extraction points • Licence term • Land on which the water is to be used • Maximum water entitlements. <p>Changes to the maximum water entitlements of the licence will require public advertisement of the proposed extraction volume in accordance with section 71B of the <i>Water Act 1992</i>. In this case, the applicant should apply for amendment of the licence at least three months prior to commencement of activities requiring licence amendment.</p> <p>To support an application to amend SWEL 8151018 it is recommended that the proponent prepare a water balance documenting volumes of water use for both the Grants and BP33 projects. Where water entitlements in excess of that documented in the site water balance is applied for, documentation verifying the need for excess volumes should be provided. This may include details of:</p> <ul style="list-style-type: none"> • Rationale for applying for excess water (e.g. to ensure drought resilience, provide economic certainty, mitigate uncertainty in modelled water demands etc.) • Water demand for staged/incremental increases in drought severity including estimated probability of occurrence. • Impacts to productivity if water volumes were unavailable. • Impacts on business viability/economic cost if water volumes were unavailable.
Appendix a & b	Water Balance & groundwater assessment	<p>The Groundwater Assessment Unit has reviewed the updated water balance and supporting documents supplied by the proponent with their SER submission. The new water balance is based on site-specific field investigations and numerical modelling, which are both found to be adequate for the purposes of this project and a much-improved submission compared to the original Environmental Impact Statement.</p> <p>Due to a surplus of groundwater inflow over the life of the project, excess water is proposed to be managed by irrigation or controlled release during the period when Grants void is not available for storage, then storage within Grants void when it is available. These both appear to be viable options and will require further investigation by the proponent to identify the preferred method(s).</p> <p>The proponent states that storage of excess groundwater in the Grants void, and the subsequent seepage into the local groundwater system in that area, represents a low water quality risk (i.e. arsenic) because both groundwater from BP33 and Grants already have elevated natural arsenic concentrations. While this is mostly true, groundwater inflow to the proposed project is shown by the proponent in Appendix C to have double the arsenic concentration (215ug/L) compared to the receiving groundwater in the area of Grants pit (94ug/L). However, both of these concentrations are already above drinking water and environmental guidelines, and a large amount of dilution, both in the pit (from rainfall)</p>

		<p>and within the aquifer (mixing and diffusion), is likely to reduce the water quality impact to a negligible level.</p> <p>The proponent has also presented an assessment of groundwater dependent ecosystems (GDEs) based on publicly available data and recent field surveys. The modelling over the project life indicates that water availability for identified or potential GDEs is likely to be reduced (due to water table drawdown) for up to five years. The proponent states their belief that the identified and potential GDEs are likely to be facultative GDEs, with partial or infrequent reliance on ground water. As such, the proponent states the likely impact of the water table drawdown will be negligible and has committed to monitoring vegetation health at key riparian sites prior to development and during the project lifetime. The Groundwater Assessment Unit is satisfied with this assessment of impacts to GDEs as long as the proponent remains committed to pre-development, operational and post-closure monitoring of groundwater levels and ecosystem health in the areas of identified or potential GDEs.</p> <p>Given the above assessments, what is lacking from this submission are monitoring plans related to the key components (groundwater, surface water and ecosystems) mentioned throughout the documents, and how that monitoring relates to ensuring minimal/negligible impact is achieved as predicted by modelling, etc. These monitoring plans should outline the objective of monitoring (e.g. baseline data collection, GDE health, drawdown propagation, model validation/calibration, water quality, etc.), parameters to be monitored (e.g. water levels, chemistry, species health, etc.), location, frequency, reporting, and identification of likely thresholds at which further investigation is triggered. This document will clearly state the proponent's commitment to the monitoring mentioned throughout the SER documents.</p>
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Environment Division

Section of SER	Theme or issue	Comment
SER	Water quality	<p>The provided site water balance is not considered best practice in that it:</p> <ul style="list-style-type: none"> • does not provide adequate capacity to manage poor quality water, • relies entirely on dilution during discharge, and • does not demonstrate the ability to adapt to changing conditions such as increase groundwater inflows, significant monsoonal events or higher concentrations of contaminants. <p>The proponent's reliance on the movement of significant amounts of mine impacted water from BP33 to the Grants pit void after mining ceases is contingent on multiple discharge points, likely under multiple Waste Discharge Licences (WDLs). These being for discharge from the Grants pit and from BP33.</p> <p>Approximately 88% of the water generated from BP33 is from groundwater infiltration. The groundwater quality summary displays that the deeper aquifer has detectible concentrations of Al, As, Li, Fe, Ni and Zn. While the shallow aquifer also has detectible concentrations of metals, some such as</p>

	<p>Cu and Zn above ANZECC default guideline values (DGVs). While these might not be in concentrations above ANZECC DGVs, consideration will need to be given if evapo-concentration in storages should occur through the dry season or if concentrations increase seasonally or over time. The surface water quality summary identifies that it has variable pH values but typically has very low EC, very low turbidity and low dissolved metals. As such it is likely that discharges from BP33 and Grants will influence surface water quality.</p> <p>The proponent has not identified any potential wastewater treatment options for the site. The treatment of wastewater should be such that the proponent does not rely solely on dilution of wastewater in the receiving environment to meet the required species protection values. If the water quality within the storage pits declines to levels where the species protection values are unachievable, there are currently no contingencies in place to enable discharge and this may affect the site water balance such that uncontrolled discharge or discharge that does not meet water quality criteria may occur.</p> <p>The proposed use of mine/groundwater (containing elevated levels of arsenic and phosphorus) as haul road dust suppressant has the potential to influence surface water quality. The evapo-concentration of wastewater on/along the haul road is likely each Wet season to cause an arsenic/phosphorus plume during first flush of the catchment.</p> <p>For proposed discharges under a WDL, the proponent will be required to demonstrate that the receiving environment is not adversely impacted. This will require at a minimum:</p> <ul style="list-style-type: none"> • Site specific trigger values (or ANZECC 95% species protection) for all key contaminants. • Demonstration through predictive modelling that the discharge will not exceed the total assimilative capacity of the receiving environment. • That the potential cumulative impacts of all discharges in the receiving environment in the immediate vicinity is such that it does not exceed the total assimilative capacity of the receiving environment. • That the loads of key contaminants of concern do not exceed the carrying capacity of the receiving system. • Monitoring programs (biota, sediment, surface and groundwater) are developed and implemented to assess if management is appropriate in preventing environmental harm. • The mine site water balance must be monitored and contingency measures ready to enact to prevent uncontrolled discharge. • A water quality monitoring program, including source monitoring. Discharge volumes and quality will need to be measured and recorded.
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Should you have any further queries regarding these comments, please contact Rebecca de Vries by email Rebecca.deVries@nt.gov.au or phone (08) 8999 4454.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'M Wauchope'.

Maria Wauchope
A/Executive Director, Rangelands

24 December 2021