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Our Ref. No.: Application for Approval – F & G Row Pits160701

Dear Greg,

PM 248 - Application for Permission to Trial the Filling of F and G Row Pits with Salt Residues

Introduction

This letter is submitted on behalf of Buckland Dry Creek Pty Ltd which is the mine tenement owner for PM248 in the Dry Creek Salt Field (see Attachment 1).

This letter revises the previous application dated 2 March 2016, and takes account of discussions held with DSD staff, EPA staff and DEWNR hydrogeologists following their review of that application. The following table lists the issues raised in these discussions and for which changes have been made in the trial plan that supports this letter of application.

The purpose of this revised application is to seek approval to conduct Stages 1, 2 and 3 of the trial, as per the attached plan.

Table 1: Issues Reflected in Changes in the Trial Plan

	Issue Raised	Where the Revised Information Is
1	Clearer staging of the trial, with definition of "hurdle" criteria to be satisfied for the next stage to proceed. Hurdle criteria to be limited in number and to relate to measurable parameters from monitoring over a stated and limited time frame	The attached Revised Trial Plan
2	Laboratory cylinder tests to obtain "ball park" measures of the dissolution rates and settlement rates for salt placed a) above the water table and b) below the water table and subject to annual net rainfall infiltration rates typical of the Dry Creek site.	The attached Revised Trial Plan
3	Inclusion of a section or appendix in the plan that provides or references the published evidence for considering that there would be very low rates of dissolution (and hence settlements) of the salt under a cap (to limit rain infiltration), and with a very low hydraulic gradient through the placed salt (to limit inflow of lower salinity water and outflow of saturated salinity water).	The attached Revised Trial Plan
4	Inclusion, in the risk assessment for the long term situation, of an outline of the approach and rationale that would be used to devise a compliance criterion for settlement rates for the caps on the filled pits (eg: reference to settlements that are on going from aquifer depletion, to rates of sea level rise, to "normal" rates of erosion / deposition in intertidal environments; as well as consideration of what might be acceptable mass flux rates for salt transfer into the external environment (and have negligible impact on the salinity of outgoing tidals water in Dry Creek).	The attached Revised Trial Plan
5	Division of the Risk Assessment more clearly into two parts <ul style="list-style-type: none"> o Part 1 - Risks from the conduct of each Stage of the trial o Part 2 - Risks from the envisaged long term (permanent) situation. 	The attached Revised Trial Plan
6	Provide information explaining how the outcome of the trial (if successful) would not compromise the future land use of the area of the PIts	This letter – See Below

Possible Future Land Use

Section 1 of the Dry Creek Salt Field comprises the mine tenement land south of Dry Creek. There was the following description in the call for expressions of interest that triggered the process resulting in Buckland Dry Creek Pty Ltd purchasing Ridley Dry Creek Pty Ltd and its land, mine tenement and other assets

- Section 1 – South of Globe Derby Park – comprises primarily freehold land that was utilised as salt crystallisation pans. The eastern half of this land, abutting the western side of Port Wakefield Road and to the south of Globe Derby Park, is owned by Ridley. Land to the west of this, abutting the Barker Inlet and St Kilda Aquatic Reserve, is owned by Renewal SA. This Section generally comprises shallow crystallizer pans, buildings, levee banks, pumps and pipe infrastructure, deep stores and contains a considerable volume of 'surplus' salt. The land has long term urban development potential, having been identified within Adelaide's 30 Year Plan for such purposes;

There has been previous work by Ridley, with Delfin and involvement from Renewal SA , and Salisbury Council to create a draft master plan for the development of Section 1 for residential and mixed use purposes. That draft master plan is now being reviewed, and is illustrated in Figure 1 below.

Figure 1

Possible Future Land Uses – the Ridley / Delfin Concept – Now Under Review



In the Ridley / Delfin Concept, the land occupied by the F and G Row pits is destined to become open space. Discussions held with Salisbury Council, and with Renewal SA, who are prime actors (along with Buckland Dry Creek Pty Ltd) in the review of the Master Plan, indicate that this form of land user here will remain in the revised Master Plan.

Figure 2 below shows, for the purposes of planning the trial of filling in F and G Row Pits, our present illustrative concept for the long term landform. In this concept:

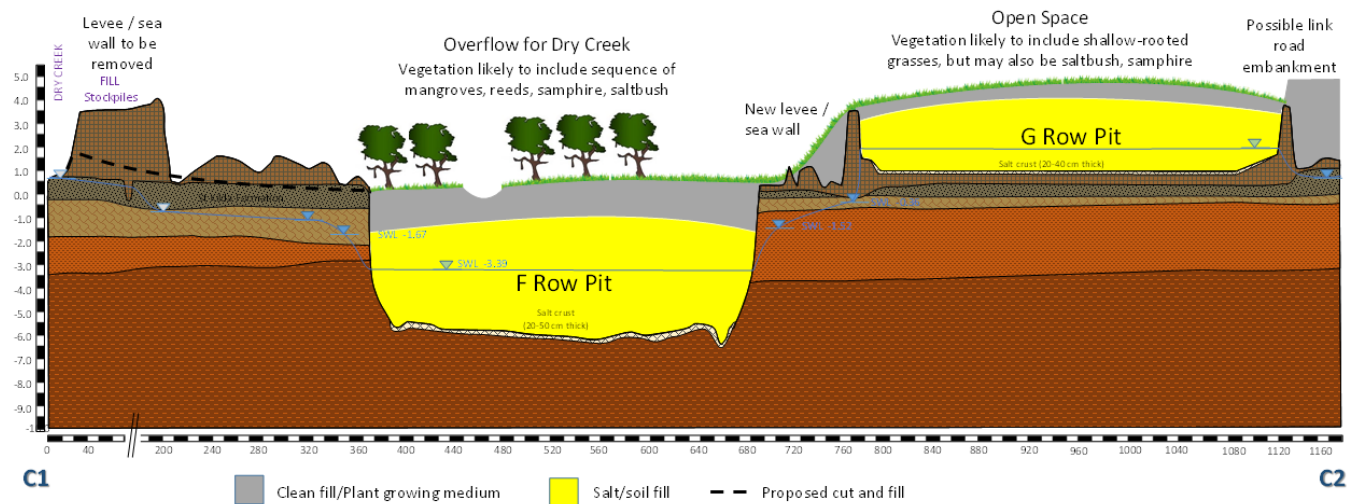
- The present sea wall along the northern side of F and G Row pits would be demolished.
- A new sea wall would be constructed along the southern sides of the pits – and possibly be functionally integrated with an embankment that would carry a road linking Elder Smith Road to an interchange on the Northern Connector¹;
- The salt residues in F Row Pit would be located between its floor (approx. – 6 m AHD) and about – 2 to - 1m AHD. The bottom half of a suitably designed 2m thick cap would have the function of encapsulating the salt residues. The top half would be designed to resist erosion by stream flows and also to provide the substrate for revegetation. The surface of this 2m thick cap would be between 0 and +1 m AHD;
- The salt residues in G Row Pit be located between its floor (approx. 0.5 to 1 m AHD) and about + 2 to +3m AHD. The bottom 1m of a suitably designed 1.5 m thick cap would have the function of encapsulating the salt residues. The top 0.5 m would be designed to provide the substrate for revegetation.
- The land to the north of the new sea wall would become an integral part of the Dry Creek corridor. The lower part – over F Row pit would be landscaped to provide an additional flow path for the Creek, and width to accommodate peak water flows. This is envisaged to potentially reduce peak water levels in this part of Dry Creek which are presently constrained by the width of the channel between the existing sea walls. It is also envisage that, outside tidal flow channels, the ground levels of the constructed landform here would favour colonization by mangroves and samphire, and salt bush. The land over G Row pit would be at higher elevations and experience inundation but rarely. It would be landscaped with suitable shallow rooted grasses, and bushes.

Our preliminary discussions with Salisbury Council (H Pitrans. pers. comm.) indicate that this form of land use would in principle be acceptable to the Council

¹ The alignment for this link road and the position of the interchange are (so far as we are aware) not yet defined

Figure 2

Possible Future Land Uses Over F and G Row Pits



Potential Impacts on Future Land Use

The purpose of the stage programme of trials proposed in the attached Trial Plan is to provide evidence with which to assess the potential impacts on the envisaged future land use (see above).

The two key risk issues that the trials seek to obtain evidence about include:

- Settlement rates for the caps over the encapsulated salt residues. Understanding of these settlement rates will enable judgements on their acceptability to be made;
- The flux rate of salt from the filled pits into the external environment and whether these could adversely affect the aquatic / intertidal ecosystems of Dry Creek

The attached revised trial plan now includes an explanation for our view that the dissolution rate of the encapsulated salt should be very low.

The revised trial plan also now provides a preliminary and illustrative assessment of risks to the potential long term impacts to groundwater, surface water; the future land uses (from subsidence), and site workers from the longer term disposal and capping of waste salt/soil into the G Row Pit. This assessment will be reviewed, expanded and revised in light of the results from Stages 1 to 3 of the trial.

Based on the expectation for very low dissolution rates and this risk assessment, it is our expectation that the settlement rates and flux rates should also be very low and not have material impacts.

Furthermore, at the appropriate time (and for inclusion in any PEOR/MOP for this), an equivalent risk assessment for the long term use of F Row pit will be prepared. However to do so now would be premature.

It is proposed that, on successful completion of the Trial, appropriately worded Environmental Outcomes and Measurement Criteria for the long term disposal of salt into F and G Row Pits will be developed and embodied in a PEPR/MOP (to be approved by DSD). This PEPR/ MoP will be needed to close and surrender the parts of the mine tenements that F and G row pits occupy.

At this stage we envisage the target outcomes will address the following

- **The end results are acceptable for the defined future land uses:** In essence this will mean that:
 - One of the measurement criteria would be sign-off, on completion of the works for long term disposal (including the construction and landscaping of the final landform), by an EPA accredited Auditor; and
 - The design and construction of the landform over F and G Row Pits, and its landscaping, being acceptable to the relevant planning authority under the Development Act.
- **Protect the intertidal receiving environment:** In essence this will mean that the quality of surface water or groundwater discharging to surface waters from these Pits must not detrimentally impact the receiving environment.
- **Assure the stability of the final landform:** In essence this will mean that:
 - The settlements of the constructed landform over the capped, contained salt will need to be acceptably small both in quantity and rate; and
 - Landform erosion will need to be prevented by appropriate drainage and earthworks engineering, and by vegetation.
- **Enhance and Conserve the biodiversity and aesthetics of the adjacent as well as the constructed landscape:** In essence this means that:
 - The constructed and adjacent landscape needs to be protected from undue erosion or sediment deposition from stream flows; and
 - The landscape at the F Row Pit should be returned to natural vegetation indigenous to the supra-tidal environment that existed prior to commencement of salt harvesting in Section 1; and
 - The G Row pit area should be revegetated with native vegetation and provide an accession area for samphire vegetation in light of regional pressures, and serve as a buffer zone to existing (or proposed) residential land-use adjacent to the site.

Risk Management Measures

In the original trial proposal, the ultimate risk management measure was to remove the placed salt in the pits, in the event that data from the trials confounded our expectation of no material impacts. Clearly this would be an expensive measure and so we have added the following to strengthen the risk management provisions in the trial plan.

- **Clearer staging of the trial.** The Stages are:
 - Stage 1: Preliminary Laboratory Characterisation of Salt/Soil (and reporting)
 - Stage 2: Phase 1 of Field Trial in G Row Pit (and reporting)
 - Stage 3: PEPR / MOP Revision for Phase 2 of G Row Pit Trial and for F Row Pit Trial
 - Stage 4: Phase 2 of G Row Pit Trial and for F Row Pit Trial (and reporting)
 - Stage 5: Preparation of Revised PEPR / MOPs for the Long Term Disposal of Salt into F and G Row Pits, and the “Mine Closure” of these Pits.
- **Between each of these Stages are “hold points” with triggers that:**
 - Require either adaptation of the design or / scope of the next Stage; or
 - Prevent the next Stage from proceeding.

The purpose of these “hold points” is to enable both DSD and Buckland Dry Creek Pty Ltd to be satisfied that the environmental risks from each next Stage are acceptable.

- **In addition, formal DSD approvals of a further revised PEPR / MOPs will be required for:**
 - For Stage 4

Environmental Outcomes and Risk Assessment for the Trial Itself

The attached plan for the trial assesses the potential risks of non-compliance with the current approved PEPR/MOP’s environmental outcomes (Table 30 in the PEPR /MOP) and using the same approach for risk assessment as is in that PEPR/MOP.

The conclusions are:

- The work for Stage 1 involves sampling and laboratory testing of waste salts and this kind of work is covered by the existing, approved PEPR / MOP;\
- The risks from the conduct of Stages 2 and 3 of the trial are negligible to low, assuming the comments and controls, and measurements described in the Table apply.

Therefore we consider that the proposed trial (Stages 1 to 3) :

1. Requires no amendment of the EPA licence conditions;
2. Is essential to devising a plan for the rehabilitation of Section1 – a plan which will itself require a revision to the approved PEPR / MOP. The proposed trial falls constitutes an essential investigation, and as such is within the purpose of the approved PEPR / MOP; and
3. Requires no changes to the approved outcomes and measurement criteria .

We also consider that the proposed trial (Stages 1 to 3) constitutes a Minor Change to this PEPR / MOP, for the reasons listed below (copied from Table 1 in the referenced Report by Tonkin on the Trial Plan – see below).

<https://ws.onehub.com/workspaces/1007791/folders/2036064401>

Table 1.2 Justification for Minor Change to PEPR/MOP

Requirement to be Minor Change	Works Proposed
Within the scope for the approved mining lease	The works proposed require the excavation and transport of salt, which is approved within the PEPR/MOP. The monitoring includes the installation of groundwater monitoring bores which is covered as Environment Management under the PEPR/MOP
No additional risks nor an increase in the existing risk profile that affects the approved set of outcomes	A risk assessment has been completed which has found the risk of the trial failing to meet the Required Outcomes of the PEPR/MOP is negligible or low. As a result, no change to the controls described in the PEPR/MOP are proposed for the trial.
No change to the measurement criteria or monitoring program is required	No change to the environmental measurement criteria for the demonstration of compliance with the Environmental Outcomes is required.

In support of this submission we provide under separate cover (accessible via the OneHub Folder <https://ws.onehub.com/workspaces/1007791/folders/2036033091>) the following documents:

1. Letter from Buckland Dry Creek Pty Ltd
2. Tonkin Report: 20155395R005RevE_Trial Plan_160701.pdf with its Appendices:
 - a. Appendix A to Tonkin Report: 20155395FR001A ESH_BT4_NW.pdf
 - b. Appendix B to Tonkin Report: 20155395FR4_Baseline Conditions_Feb25.pdf

Concluding Remark

We trust this revised application deals satisfactorily with all the issues raised in our discussions to date. We would be pleased to meet with DSD at the earliest opportunity to discuss and resolve any remaining or further issues arising from this submission.

Yours sincerely,
WithERS Environmental Risk Strategies Pty Ltd



N J Withers