



SEEC

Construction Environmental Management Plan

Dargues Gold Mine Waste Rock Emplacement

Prepared by: Mark Passfield

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SEEC

Strategic Environmental and Engineering Consulting

PO Box 1098, Bowral NSW 2576
phone: (02) 4862 1633 • fax: (02) 4862 3088 • email: reception@seec.com.au

Document Certification

This report has been developed based on agreed requirements as understood by SEEC at the time of investigation. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects.

Any recommendations contained in this report are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, subject to the limited scope and resources available. Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

Mark Passfield
Director, SEEC
19 September 2017

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1 INTRODUCTION

1.1 Background Information

This Construction Environmental Management Plan (CEMP) relates to the construction of the Eastern Waste Rock Emplacement (the WRE) at Dargues Gold Mine. It is a Sub-Plan of the Water Management Plan (WMP). The Mine is operated by Dargues Gold Mine Pty Ltd (the “Company”).

The works will include construction of:

- Spring Creek Haul Road including an extension from Spring Creek Haul Road to the WRE;
- The WRE area itself and its associated stockpiles and erosion and sediment controls.

The WRE will be built to temporarily store waste rock derived from underground workings. Eventually, the waste rock will be replaced underground and the footprints of the WRE and its associated stockpiles and erosion and sediment controls would be rehabilitated.

1.2 Reference Documents

The following documents have been referenced in the preparation of this Plan:

- Dargues Gold Mine Pty Ltd (2017a). *Water Management Plan for the Dargues Gold Mine*.
- DEE (2017). *Approval: Dargues Gold Mine Third Modification, Majors Creek, NSW (EPBC 2015/7539)*. Department of the Environment and Energy.
- DECC (2008a). *Managing Urban Stormwater. Volume 2e; Mines and Quarries*. NSW Department of Environment and Climate Change.
- DECC (2008b). *Managing Urban Stormwater. Volume 2c; Unsealed Roads*. NSW Department of Environment and Climate Change.
- Landcom (2004). *Managing Urban Stormwater. Volume 1: Soils and Construction*.
- SEEC (2015). *Surface Water Assessment (Appendix 7 of the WRE Environmental Assessment)*.

1.3 Purpose of the CEMP

The purpose of this CEMP is to ensure that appropriate environmental practices are followed during construction of the WRE. Environmental practices related to the operation of the WRE are discussed in the Project’s Water Management Plan (WMP) (Dargues Gold Mine Pty Ltd, 2017a).

The objectives during construction are:

- To implement and maintain effective environmental management systems;
- To ensure adequate management, monitoring and mitigation regimes are in place to protect the surrounding environment;
- To provide details of environmental protection infrastructure or controls and identify their operation and reporting procedures; and
- To ensure compliance with relevant legislation, regulatory requirements and any other undertakings given by Big Island Mining Pty Ltd.

1.4 CEMP Requirements

Table 1.1 gives the locations within this document and within the WMP where the environmental management and monitoring measures required by DEE (2017) can be found. Note where those responses and measures are given in the WMA they are not repeated here; they are just referenced.

Table 1.1 –Requirements of the CEMP

Condition number (DEE, 2017)	Paraphrased Requirement	Location in CEMP/WMP	
		CEMP	WMP
2b	<i>Include measurable performance indicators and limits for protecting, conserving, and managing listed threatened species from sedimentation impacts and construction activities</i>	2.4, 2.5, Table 6.1	7, 8
2c	<i>Include management actions and measures to be implemented, including those in the sediment and erosion plans</i>	Appendix 3	6, 7,8
2d	<i>Be consistent with the Surface Water Assessment (SEEC, 2015a)</i>	overall	
2e	<i>Include indicative contingency responses, corrective actions, and remediation actions</i>	2.4, 2.5	7, 8
2f	<i>Include a monitoring program that measures sediment loads and Spring and Majors Creeks. That program must:</i>	2.4, 2.5	7, 8
2f (i)	<i>Include methods, control sites, baseline data, and frequency of sampling</i>	2.4, 2.5	7, 8
2f (ii)	<i>Be designed to detect any changes to sediment loads associated with significant rainfall events</i>	2.5, 2.5	7, 8
2f (iii)	<i>Be designed to inform adaptive management</i>	6	7, 8
2g	<i>Include a self-audit program</i>	6, Appendix 1	7, 8, 10
2h	<i>Specify timing and frequency of management actions, reporting and implementation of contingencies and the persons responsible.</i>	2.4, 2.5, 6	7, 8, 10

1.5 Overview

The WRE will have the following features:

- A haul road across Spring Creek;
- Extensions from that haul road to the WRE and to the soil stockpile area;
- Clean water diversion drains to define the WRE catchment;
- The WRE itself which will be contained within a defined catchment of approximately 6 ha;
- Soil stockpiles;
- The Operational Sediment Basin (WRESB1); and
- A Temporary Sediment Basin (WRESB3) used during the construction of the WRESB1.

Works will be undertaken in the following order:

- (i) Construct Spring Creek Haul Road and the extension from it to the WRE (refer to Erosion and Sediment Control Plans 17000009-P02-ESCP00 to 11 for additional detail):
 - Barrier fencing should be installed around the edge of the construction boundary to restrict access and in any additional locations as necessary to minimise unnecessary disturbance.
 - Establish sediment fencing.
 - Establish a site office, toilet and parking area (alternatively existing amenities can be used).
 - Temporary waterway crossings are to be installed.
 - Prior to stripping topsoil, gypsum is to be spread evenly over the ground surface at a rate of 5 t/ha to be stripped up with the topsoil.
 - Clean water diversion drains and topsoil bunds are to be formed and stabilised. Energy dissipaters are to be installed at the outlets.
 - Sediment basins are to be constructed including their outlet spillways and energy dissipaters.
 - Dirty water diversion drains are to be formed and stabilised. Energy dissipaters are to be installed at the outlets and check dams are to be installed as nominated.
 - Establish stockpile areas within nominated locations. Note: Other locations may be possible, however, approval must be granted and appropriate erosion and sediment controls implemented.
 - Earthworks can now commence. Stockpile topsoil and subsoil separately.
- (ii) Construct Temporary Sediment Basin (WRESB3) and the Operational Sediment Basin (WRESB1) including the access road extensions to the Temporary Sediment Basin (WRESB3) and Soil Stockpile Area (refer to Erosion and Sediment Control Plans 17000009-P01-ESCP00 to 11):

- Phase 1 – Construction access.
 - Phase 2 – Install diversion drains and temporary sediment basins (WRESB3).
 - Phase 3 – WRESB1 works.
- (iii) Prepare the WRE area ready to accept waste rock (refer to Erosion and Sediment Control Plans 17000009-P01-ESCP00 to 11).

1.6 Staffing

The Company will have the following on-site personnel responsible for managing the requirements of this CEMP:

- Mine Manager
- HSEC¹ Superintendent.

The earthworks would be undertaken by a contractor. It is expected they would have the following personnel on site during works:

- Construction Site Manager (permanent)
- Construction Site Foreman (permanent)
- Construction Environmental Manager (periodic)
- General staff (e.g. machine operators) (permanent or periodic).

¹ Health, Safety, Environment and Community

2 ENVIRONMENTAL MANAGEMENT

2.1 Soil Management

2.1.1 Introduction

Topsoil is a valuable resource but the manner in which it is collected and stored can affect soil characteristics and reduce its revegetation value. Soil seeds, nutrients and microbes rely on oxygen to survive. If topsoil is stockpiled for long periods, or it is excessively compacted, these qualities can gradually deteriorate over time, but simple measures can be taken to minimise this.

Soil structure is important for drainage and air flow through the soil. It can be reduced or even destroyed if topsoil is collected when saturated or if the soil is compacted during handling and stockpiling.

Subsoil and overburden material are of lower value for revegetation than topsoil but they may still be required for rehabilitation. They must be stored separately from the topsoil.

2.1.2 Stripping

- If weeds are present, spray them with selective herbicide at least two weeks before stripping.
- Spread fine agricultural gypsum at 500 gsm (i.e. 5t/ha) over the topsoil before stripping it.
- Strip the topsoil layer separately from the subsoil.
- Avoid stripping topsoil when it is either very wet or very dry.
- Minimise handling of topsoil; move it once only if possible.
- Keep topsoil separate from subsoil, overburden, gravel and other materials.

2.1.3 Stockpiling

- Topsoil and subsoil will be stockpiled close to the work areas; refer to the relevant ERSED Plans.
- Stockpile areas must not be established outside of the approved locations.
- Mulched vegetation, topsoil and subsoil must be stockpiled separately.
- Sediment fencing must be installed around the lower edge of stockpiles.
- A diversion drain/bund must be installed on the high side of stockpiles if run-on from upslope lands could impact on the stockpile.
- Stockpiles are not to be positioned within 5m of possible concentrated water flow (includes table drains).
- Stockpiles must be sited at least 50m from any watercourse, natural drainage line or creek and at least 2m from any trees to be retained.

- Inactive stockpiles or their inactive faces must be provided with at least 60% equivalent ground cover within 10 days of formation.
- Stabilisation of stockpiles can be achieved by seeding and spraying with a soil stabiliser (e.g. Vital Stonewall or equivalent), covering with geotextile or matting or equivalent. Note; seeding is not required for stockpiles if they are to be in place for less than three months or if they have an existing seedbank (non-weeds).
- Stockpiles of topsoil or mulch should be constructed to no more than two meters in height; stockpiles of subsoil may be higher.
- Stockpiles faces must be no steeper than 2:1 (H:V).
- Install drainage measures to allow drainage through or around stockpile areas.
- Do not excessively compact topsoil; the maximum permissible height of a topsoil stockpile is 2m.
- Subsoil and/or overburden stockpiles may be greater than 2m in height but must be stabilised with vegetation; this might require a topsoil veneer and/or seeding and mulching.
- Avoid long term stockpiling of topsoil by using it to rehabilitate worked-out areas as soon as practicable.
- If weeds become evident, spray them with a selective herbicide before they seed.
- Align stockpiles parallel to the slope contour as much as possible.

2.2 Erosion and Sediment Control During Construction

2.2.1 Erosion and Sediment Control Plans

There are two sets of Erosion and Sediment Control Plans that should be read in conjunction with this CEMP:

- **Spring Creek Haul Road:** SEEC Drawings 17000009-P02-ESCP00 to 11
- **The WRE:** SEEC drawings 17000009-P01-ESCP00 to 11.

2.2.2 Clean Water Diversion

Clean run-on water from upslope must be diverted around all works areas during construction of the Spring Creek Haul Road, the Operational Sediment Basin (WRESB1) and preparation of the WRE.

2.2.3 Erosion Control

Erosion control will be undertaken throughout the works program as detailed on the Erosion and Sediment Control Plans. The entire works will be on moderately steep lands and/or near to Spring Creek and so the Soil Loss Class is identified as Class 6 (Very High). Works undertaken through October to March inclusive will require enhanced erosion control during significant rainfall. If there is more than 50% chance of more than 10 mm of rain in 24 hours², exposed surfaces will be treated with hydraulic soil binder (e.g. Vital Stonewall or equivalent³) or covered with temporary materials such as organic or synthetic matting, plastic etc.).

Whether or not the Soil Loss Class is 6 or less, all lands will be progressively stabilised as they are completed rather than waiting until the end of all works; this will include exposed lands that are inactive for more than 20 days, even though works might continue later (reduced to 10 days on stockpiles and steep batters (e.g. the downstream face of Basin WRESB1)). Refer to the Erosion and Sediment Control Plans for further details.

2.2.4 Stormwater Management - Spring Creek Haul Road and Extension to the WRE

During construction of Spring Creek Haul Road and the extension of it to the WRE, sediment laden water will be managed in four sediment basins (SCCSB1, SCCSB2, SCCSB3, WRESB2). Water trapped in these basins must be managed as follows:

- Within 5 calendar days of the conclusion of any rainfall causing runoff the sediment basins must be empty, ready for the next rainfall event. If rainfall (causing runoff) occurs again within 5 days of the previous rain event, the 5-day requirement re-sets.
- Dirty water accumulating in the sediment basins can be used onsite for dust suppression or construction purposes without treatment; as long as it is used on lands that (ultimately) drain back to the basins. Note that the 5-day maintenance requirement for basins to be emptied still applies.
- Excess water will be sent to the Mine Water Settlement Dam (MWSD01) or the Project's irrigation fields for disposal (Refer to the Water Flocculation and Discharge Plan (WFDP)). There it will be applied in a manner that does not cause saturation or runoff (Section 2.2.6).
- The design 5-day rainfall event for the temporary sediment basins is 42.4mm. Therefore, it is assumed the basins might overflow in an event of more than 42.4mm over any 5-day period.
- If there is an overflow of sediment-laden water from the temporary sediment basins, Level 4 of the Trigger Action and Response Plan (TARP) presented in Table 7.5 of the Water Management Plan (WMP) must be implemented.

² As identified by the Bureau of Meteorology

³ Allow sufficient time to apply and cure the binder (24 hours).

2.2.5 Stormwater Management - Waste Rock Emplacement

- The first stage of the WRE is to build the Operational Sediment Basin (WRESB1). During construction of the Operational Sediment Basin (WRESB1) sediment-laden stormwater will be delivered to a temporary sediment basin (WRESB3) by dirty water diversion drains. Once the Operational Sediment Basin (WRESB1) is completed and the lands are stabilised the temporary sediment basin (WRESB3) may be removed.
- All water trapped in the Temporary Sediment Basin (WRESB3) must be managed as follows:
 - Within 5 calendar days of the conclusion of any rainfall causing runoff the sediment basin must be empty, ready for the next rainfall event. If rainfall (causing runoff) occurs again within 5 days of the previous rain event, the 5-day requirement re-sets.
 - Dirty water accumulating in the sediment basin can be used onsite for dust suppression or construction purposes without treatment, as long as it is used on lands that (ultimately) drain back to the basin. Note that the 5-day maintenance requirement for the basin to be emptied still applies.
 - Excess water will be sent to the Mine Water Settlement Dam (MWSD01) or to the Project's irrigation fields for disposal. There it will be applied in a manner that does not cause saturation or runoff; refer to the Water Flocculation and Discharge Plan (WFDP).
 - The design 5-day rainfall event for the Temporary Sediment Basin (WRESB3) is 42.4 mm. Therefore, it is assumed the basin will overflow in an event of more than 42.4 mm over any 5-day period.
 - If there is an overflow of sediment-laden water from the Temporary Sediment Basin (WRESB3), Level 4 of the Trigger Action and Response Plan (TARP) presented in Table 5.10 of the Water Management Plan (WMP) must be implemented.
- Works may begin on preparing the WRE on completion of the construction of the Operational Sediment Basin (WRESB1).
- Soil and water management during preparation of the WRE is described in Erosion and Sediment Control Plans 17000009-P01-ESCP00 to 11.
- Water collected in the Operational Sediment Basin (WRESB1) will be managed as follows:
 - Within 10 calendar days of the conclusion of rainfall causing runoff the sediment basin must be empty, ready for the next rainfall event. If rainfall (causing runoff) occurs again within 10 days of the previous rain event, the 10-day requirement re-sets.
 - Dirty water accumulating in the sediment basin can be used:
 - For onsite for dust suppression or other construction purposes as long as it is used on lands that (ultimately) drain back to the

basin. Note that the 10-day maintenance requirement for the basin to be emptied still applies; and/or

For processing; but note that the 10-day maintenance requirement for the basin to be emptied still applies.

- Excess water will be sent to MWSD01 and/or the Project's irrigation fields for disposal. There it will be applied in a manner that does not cause saturation or runoff (Section 2.2.6).
- The design 10-day rainfall event for the Operational Sediment Basin (WRESB1) is 110.4mm. Therefore, it is assumed the basin might overflow in an event of more than 110.4mm over any 10-day period⁴ (refer to Section 5.3.8 of the WMP).
- If there is an overflow release of sediment-laden water from the Operational Sediment Basin (WRESB1), Level 4 of the Trigger, Action and Response Plan (TARP) presented in Table 5.11 of the WMP will be implemented.

2.2.6 Irrigation Management

To prevent runoff, the interval between irrigation and the amount of water to apply when irrigating depends on how much water is held in the root zone and how fast it is used by the vegetation. This is determined by:

- Prevailing weather
- Soil texture
- Soil structure/water penetration
- Depth of effective root zone of the soil
- The vegetation grown; and
- The stage of development of the vegetation.

A simple spreadsheet tool is used to enable appropriate scheduling. An *example* is given in **Table 2.1**. As experience with irrigation develops, the HSEC Superintendent will monitor the irrigation practices and make adjustments to the assumed maximum soil water storage assumed in **Table 2.1** if deemed necessary.

⁴ If the full catchment is active

Table 2.1 – EXAMPLE Irrigation Schedule Spreadsheet

Date	Evapotranspiration ⁵ (mm)	Effective Rainfall ⁶ (mm)	Soil Water Storage ⁷ (mm)	Potential Irrigation (L/m ²)	Actual Irrigation (L/m ²) ⁸
Day 1	2.7	NA	70	NA	NA
Day 2	2	0	67.3	2.7	0
Day 3	4.5	0	65.3	4.7	0
Day 4	7.2	0	60.8	9.2	0
Day 5	5.4	0	53.6	16.4	0
Day 6	5	0	48.2	21.8	0
Day 7	6.8	0	43.2	26.8	0
Day 8	7.7	0	36.4	33.6	0
Day 9	3.9	0	28.7	41.3	0
Day 10	0	5	24.8	45.2	0
Day 11	0	5	29.8	40.2	0
Day 12	4.5	0	34.8	35.2	20
Day 13	2.7	0	50.3	19.7	10
Day 14	5.5	0	57.6	12.4	5
Day 15	0	25	57.1	12.9	0
Day 16	0	15	70	0	0
ETC.					

Operation rules for the spreadsheet are summarised as follows.

- The spreadsheet is started following a rainfall or irrigation event equal to, or higher than, the maximum water storage (initially assumed at 70 mm/70 L/m²). On this date the soil water storage is set to the maximum permissible (70 mm).
- Evapotranspiration and rainfall are recorded on a daily basis.
- Except in winter, actual rainfall is reduced by 5mm to yield Effective Rainfall.
- Evapotranspiration and Effective Rainfall are entered into the relevant cells.
- Irrigation is permissible if the potential irrigation is greater than zero. However, the actual irrigation must not be higher than the potential irrigation.
- Cease irrigation on a rainy day when the total of effective rainfall plus irrigation reaches the allowable potential irrigation.

⁵ Evapotranspiration is be obtained from the Bureau of Meteorology's weather station at Braidwood (BOM Product Code: IDCKWCDEA0)

⁶ Daily rainfall is measured on site. The "effective" rainfall is set assuming the first 5 mm of any rainfall event in spring, summer and autumn is ignored.

⁷ Equal to: the soil water storage the day before plus effective rainfall the day before plus actual irrigation the day before less evapotranspiration the day before. Cannot be negative or greater than the maximum water storage value.

⁸ Must not be higher than potential irrigation.

- The daily amount of water applied would be recorded in L/m² (mm)
- Site monitoring must concentrate on the wetter areas to minimise waterlogging.

2.2.7 Water Collecting in Low Points and Excavations

Turbid water collecting in other localised low points and excavations (including the incomplete WRESB1) must be managed by either:

- Using it for dust suppression or construction purposes, as long as it is used on lands that (ultimately) drain back to a basin or the same low point; or
- Pumping it to the Temporary Sediment Basin (WRESB3) for later use or disposal by irrigation (ensuring the 5-day basin turnaround time is still met); or
- Sending it directly to MWSD01 or to the irrigation areas.

2.3 Maintenance of Erosion and Sediment Control Measures

The following inspection and monitoring regime will apply to soil and water management measures:

- The soil and water management self-audit checklist in Appendix 1 must be completed:
 - At least two days prior to significant forecast rainfall (defined as >50% chance of rainfall of more than 10 mm in 24 hours);
 - Within 24 hours of significant rainfall (>10 mm/24 hours); and
 - Monthly, whether or not it has rained.
- Any actions identified before predicted significant rainfall must be addressed before the rainfall event.
- Any actions identified after significant rainfall must be actioned within seven days, or before that if another significant rainfall event is forecast within seven days (assuming it is safe to do so).
- Action close-outs must be documented by the HSEC Superintendent.
- The Checklist in Appendix 1 may be adapted/revised as deemed necessary by the HSEC Superintendent.

2.4 Water Quality Monitoring

The following water quality monitoring will occur:

- Water quality in Spring Creek and Majors Creek will be monitored throughout the construction period as detailed in the Water Management Plan (WMP), particularly Sections 7.4 and 7.8.
- In addition to the regular monitoring frequency given in Table 7.2 of the WMP, turbidity will be measured in the field at water quality sampling

locations⁹ SW1 to SW10 within 24 hours of the cessation of a significant rainfall event (>10mm in 24 hours) if safe to do so.

- The results will be compared to the NTU trigger value given in Table 7.4 of the WMP.
- If there is an exceedance, Level 3 of the Trigger, Action and Response Plan (TARP) presented in Table 7.5 of the WMP will be followed.

2.5 Ecological Monitoring

- The ecological health of Spring Creek and Majors Creek will be monitored throughout the construction period following the details provided in Section 8 of the WMP.
- The monitoring must be done by an independent, Ecological Consultant.
- Generally the monitoring will be done in Spring and Autumn. However, additional standardised descriptions of the land adjacent to each of the ecological monitoring locations¹⁰ and the condition of the riverbank, channel and bed at each location will be done if:
 - There is an exceedance of the turbidity trigger value during routine water quality testing which is attributed to the works being undertaken.
 - There is an overflow from any the sediment basins (temporary or operational).
 - There is runoff from the irrigation areas which reaches nearby watercourses.
- If the independent Ecological Consultant determines there has been a non-negligible project-related reduction in the condition of the creeks(s) during construction the requirements of Section 8.6 in the WMP will be implemented.

⁹ Refer to Figure 5.3 in the WMP for locations of the water quality monitoring locations

¹⁰ Refer to Figure 7.1 of the WMP for these locations

3 RESPONSIBILITIES

Responsibilities of Mine staff and contractors under this CEMP are set out in Section 13 of the WMP.

Machinery operators, earthworks contractors and haulage drivers will be inducted in the relevant requirements of this CEMP and the WMP as part of the site induction.

4 TRAINING

The following training will be provided:

- The Mine Manager and HSEC Superintendent must undertake suitable training in:
 - Health and Safety (including bushfire and other emergency)
 - Spill response
 - Traffic management
 - Erosion and sediment control
 - Noxious weed management
 - Vegetation management
 - Irrigation management
- Refresher training will be undertaken every two years or as otherwise required to maintain accreditation or the relevant skills levels.
- The training program and any updates must be documented.
- Employees and contractors must be briefed on key aspects of this CEMP as part of their site induction and training, particularly regarding legal requirements not to pollute downstream waterways.
- Contracted employees must hold relevant qualifications for their job (e.g. suitable licenses for operating equipment, a construction industry “White Card” etc.). The Mine Manager must ensure the qualifications are always current.
- Refer also to Section 14 of the WMP.

5 COMMUNITY CONSULTATION

Refer to Sections 11 and 12 of the WMP for complaints handling/reporting.

Publication of environmental monitoring results, and sediment and erosion control inspections is included in **Section 7**.

6 REPORTING AND EVALUATION OF COMPLIANCE

Consistent with Section 7 and 9 of the WMP, the company will, within three business days of the receipt of all monitoring data, review that data against the trigger values identified in Tables 7.4 to 9.4 of the WMP.

At the end of each calendar month, all water-related monitoring data and sediment and erosion control inspections will be collated into a monthly environmental report, together with monitoring data relevant to other aspects of the surrounding environment. That report will provide the following in relation to monitoring results relevant to the detection of sediment and erosion impacts:

- An overview of the monitoring undertaken during the month, including identification of monitoring for which results have been received and for which results are still pending.
- An overview of whether any of the trigger values identified in Tables 7.4 to 9.4 of the WMP have been exceeded and the status of the resulting actions, if any.
- A graphical presentation of the monitoring data received during the month compared with historic monitoring data.
- A discussion of the status of any investigations into exceedances of the relevant trigger values during previous months.
- An outline of the results from the inspection programs undertaken and the corrective actions required, if any. The corrective actions would be broadly consistent with those required by **Table 6.1**.

The monthly environmental monitoring report will be reviewed by the HSEC Superintendent, Mining Manager and General Manager. Once approved, the report will be made publicly available on the Project's website within 28 days of the end of the month. Finally, the monthly environmental monitoring reports would be collated into the *Annual Environmental Management Report* for the Project which would also be made publicly available on the Project website once approved by the Division of Resources of Energy.

Table 6.1 - Performance Indicators for Pre Construction, Construction and Operation

ID	Proposed Mitigation Measure	Monitoring and Timing	Performance Threshold	Corrective Action if Performance Threshold is not Achieved
Pre – Construction				
1	All sediment erosion control plans, CEMP and WMP to be appended to the earthworks contract for the WRE and Spring Creek Crossing.	At time of award of earthworks contract	Documents appended to earthworks contract issued to successful contractor.	The Company Directors not to sign contract until documents appended to the contract.
2	Independent Auditor for Sediment and Erosion Control to be engaged for construction period.	Prior to commencement of construction of WRE or Spring Creek Crossing.	Consultancy agreement signed with Independent Auditor prior to commencement of construction. Independent auditor to oversee construction of the Spring Creek Crossing and WRE.	HSEC Superintendent to restrict earthworks contractor access to site until Independent Auditor engaged.
3	Sediment and erosion controls to be included in the site induction.	Prior to commencement of bulk earthworks.	All earthworks contractors to be inducted. Induction includes sediment and erosion control requirements for the site.	HSEC Superintendent to review site induction.
4	Water Quality Monitoring	Baseline monitoring consistent with the WMP. Monthly at monitoring points SW01 to SW-10 or following significant rainfall events (monitoring during rainfall events at the discretion of the HSEC Superintendent).	Baseline data collected is sufficient for determining extent of any impact from construction and operation of the Spring Creek Crossing and WRE.	None. Three years of data currently available.
5	Aquatic Ecology Monitoring	Baseline aquatic ecology monitoring undertaken consistent with the WMP at monitoring points AE01 to AE08.	Baseline data collected is sufficient for determining extent of any impact from construction and operation of the Spring Creek Crossing and WRE.	None. Five years of data currently available.

ID	Proposed Mitigation Measure	Monitoring and Timing	Performance Threshold	Corrective Action if Performance Threshold is not Achieved
6	Detailed sediment and erosion control plans developed to manage construction related sediment and erosion impacts.	Prior to commencement of construction.	Sediment and erosion control plans approved by the Department prior to commencement of construction.	No construction activities to occur until plans approved.
7	Inspections (Appendix 1)	<p>Inspection of existing sediment and erosion controls prior to construction activities taking place.</p> <p>Inspection of all sediment and erosion controls prior to predicted Significant Rainfall (25mm in a 24hr period).</p>	Each control measure is rated as either compliant or non-compliant. Where an existing sediment and erosion control structure is in place and is either effective or requires maintenance.	Immediate actions are delegated to the responsible parties following the completion of the audit. Existing sediment and erosion control structures will be in a serviceable condition prior to commencement of construction works.
8	Stock take of available silt control consumables	A stock take of available silt control materials and consumables will be done prior to construction. Records will be kept by the HSEC Superintendent.	Materials will be kept on hand for deployment at the construction area if and when extra materials are required.	A minimum level of available materials will be kept by the HSEC Superintendent depending on the stage of works taking place. e.g. diversion works in Spring creek will require silt curtains to be made available for that stage of works.
9	Entire construction workforce kick-off meeting	Meeting will be held immediately prior to commencement of works	Expectations and performance requirements of the client to be extended to all contract personnel involved.	Less than satisfactory performance will be documented and brought to the attention of management during pre-start and toolbox meetings.
Construction				
1	Reduction in discharge of sediment laden water via the sediment basin spillway.	All sediment basins to be inspected following Significant Rainfall or discharge of water via the spillway.	Sediment basin contains the designed rainfall depth for that basin as specified in the 17000009_P01_ESCP and / or 17000009_P02_ESCP.	<p>Ensure disturbance area that feeds the sediment basin is as designed.</p> <p>Check silt level in sediment basin to confirm it is below the relevant level marker.</p>

ID	Proposed Mitigation Measure	Monitoring and Timing	Performance Threshold	Corrective Action if Performance Threshold is not Achieved
2	Water Quality Monitoring	Water quality monitoring undertaken consistent with the WMP Section 2.4 . Monthly at monitoring points SW01 to SW-10 or following significant rainfall events (monitoring during rainfall events at the discretion of the HSEC Superintendent).	Monitoring data collected is sufficient for determining extent of any impact from construction of the Spring Creek Crossing and WRE.	Monitoring data reviewed after each monitoring event to ensure it is measuring the full extent of water quality related impacts.
3	Aquatic Ecology Monitoring	Aquatic ecology monitoring undertaken consistent with the WMP at monitoring points AE01 to AE08, and following discharge of sediment laden water from the sediment basins.	Monitoring data collected is sufficient for determining extent of any impact from construction of the Spring Creek Crossing and WRE.	Monitoring data reviewed after each monitoring event to ensure it is measuring the full extent of water quality related impacts.
4	Implementation of sediment and erosion control plans.	Prior to commencement of construction or phase as outlined in either 17000009_P01_ESCP and / or 17000009_P02_ESCP.	Sediment and erosion controls described in 17000009_P01_ESCP and / or 17000009_P02_ESCP are fully implemented as required by the plans	Construction works suspended until sediment and erosion controls fully implemented.
5	Inspections (Appendix 1)	Daily inspection of sediment and erosion controls during construction. Inspection of all sediment and erosion controls prior to predicted Significant Rainfall.	Each control measure is rated as either compliant or non-compliant.	Immediate actions are delegated to the responsible parties following the completion of the audit. Where a control is found to be ineffective or damaged construction works will be halted until an effective control is put in place.
6	Stock take of available sediment and erosion control consumables	Records of available sediment control materials and consumables will be kept by the HSEC Superintendent. As materials are deployed replacements will be ordered and kept in surplus.	Materials will be kept on hand for deployment at the construction area if and when extra materials are required.	A minimum level of available materials will be kept by the HSEC Superintendent depending on the stage of works taking place.

ID	Proposed Mitigation Measure	Monitoring and Timing	Performance Threshold	Corrective Action if Performance Threshold is not Achieved
7	Regulators invited to attend site	EPA, DPE and other regulators will be invited to attend site during construction works to witness sediment controls in action	Any constructive feedback will be included in pre-start and toolbox meetings	If corrective actions are suggested by the regulator these will be implemented as soon as practicable
8	Pre-start and toolbox meetings with workforce	Meeting will be held immediately prior to commencement of works	Expectations and performance requirements of the client to be extended to all contract personnel involved.	Less than satisfactory performance will be documented and brought to the attention of management during pre-start and toolbox meetings.
9	Spot checks of field works	Random spot checks of individual activities such as those done under a JSA will be conducted by the HSEC Superintendent	JSAs will be inspected and must include sediment control actions in the task process	If sediment control actions are incorrect or missing follow up training of the workforce will be actioned. Specific breaches will be documented and discussed at pre-start meetings
Operation				
1	Reduction in discharge of sediment laden water via the sediment basin spillway.	All sediment basins to be inspected following Significant Rainfall or discharge of water via the spillway.	Sediment basin contains the designed rainfall depth for that basin as specified in the 17000009_P01_ESCP and / or 17000009_P02_ESCP.	Ensure disturbance area that feeds the sediment basin is as designed. Check silt level in sediment basin to confirm it is below the relevant level marker. Review rainfall data to determine whether it is representative.
2	Water Quality Monitoring	Baseline monitoring consistent with the WMP. Monthly at monitoring points SW01 to SW-10 or following significant rainfall events (monitoring during rainfall events at the discretion of the HSEC	Monitoring data collected is sufficient for determining extent of any impact from operation of the Spring Creek Crossing and WRE.	Monitoring data reviewed after each monitoring event to ensure it is measuring the extent of water quality related impacts.

ID	Proposed Mitigation Measure	Monitoring and Timing	Performance Threshold	Corrective Action if Performance Threshold is not Achieved
		Superintendent).		
3	Aquatic Ecology Monitoring	Aquatic ecology monitoring undertaken consistent with the WMP at monitoring points AE01 to AE08, and following discharge of sediment laden water from the sediment basins.	Monitoring data collected is sufficient for determining extent of any impact from operation of the Spring Creek Crossing and WRE.	Monitoring data reviewed after each monitoring event to ensure it is measuring the full extent of water quality related impacts.
4	Inspection of Spring Creek Crossing and WRE.	Inspection of Spring Creek Crossing and WRE as built infrastructure. Monthly or prior to significant rainfall.	As built infrastructure in an operable condition and well maintained with no maintenance activities required.	Undertake required maintenance as identified during the inspection.
5	Stock take of available silt control consumables	Records of available silt control materials and consumables will be kept by the HSEC Superintendent. As materials are deployed replacements will be ordered and kept in surplus.	Materials will be kept on hand for deployment at the construction area if and when extra materials are required.	A minimum level of available materials will be kept by the HSEC Superintendent depending on the stage of works taking place. e.g. diversion works in Spring creek will require silt curtains to be made available for that stage of works.

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7 APPENDICES

7.1 Appendix 1 – Soil and Water Management Self-Audit Checklist (Pro-forma)

Dargues Gold Mine		Date:
Construction of Spring Creek Haul Road and the WRE		
Inspected by:		
Signature:		

Instructions:

- This checklist is to be completed by the HSEC Superintendent (or approved representative) at the time of making the site inspection.
- A tick (✓) should be placed in the applicable **Yes/No** box as appropriate.
- Where an item is not applicable, the notation **N/A** should be placed in the **Comments and Actions** box.
- Where a non-conformance is identified (a tick in a shaded box), a brief explanation is to be provided in the corresponding **Comments and Actions** box.
- The completed checklist and details of any corrective actions must be placed in the project file.
- The checklist should be completed in conjunction with the relevant erosion and sediment control plan for the area being inspected. Any hazards identified should be marked up on the plan and included with the inspection report.

	Yes	No	Comments & Actions
General			
Is the site is in a generally tidy condition?			
Is all equipment, materials, etc. contained within work area boundary?			
Are there any obvious signs of disturbance outside of approved work area(s)?			
Is the weather station active and is data recorded since last inspection?			
Soil Disturbance and Erosion Control			

	Yes	No	Comments & Actions
<p>Have required erosion control measures been correctly installed and are they functional? Check that there are/is:</p> <ul style="list-style-type: none"> ▪ no gaps in silt fences/barriers ▪ correct ground cover to achieve required C-Factors ▪ any areas of dirty water concentrated flow that do not flow to sediment basins/traps? 			
Are there any obvious signs of uncontrolled drainage leaving the site?			
Are any materials, temporary structures/works in drainage lines?			
Are drainage outlets provided with energy dissipaters to minimise erosion? Are they stable?			
<p>Are areas where construction activities have ceased being stabilised and rehabilitated? Are these areas being rehabilitated in a timely manner? (Refer to the ESCP)</p>			
Are any diversion banks/drains stable?			
Sediment Control (other than Sediment Basins)			
Are dirty water diversion drains functional, unblocked, and connected to their correct sediment basin (refer to the ESCP)?			
Are all clean water diversion drains functional, unblocked and in a good state of repair?			
Are any sediment fences in place and intact? Do they conform to SD 6-8 (refer to the ESCP)			
Are any other sediment traps (e.g. mitre drains, U-shaped sediment traps) operational and below capacity?			
Is dirty water collecting in excavations and/or localised low points?			
Stockpile Management			
Are non-active stockpiles (or parts thereof) stabilised with vegetation or other suitable cover?			
Are there separate stockpiles for different materials (topsoil and subsoil)?			
Are topsoil stockpiles less than 2 m in height?			
Are stockpiles located at least 5m from concentrated			

	Yes	No	Comments & Actions
water flow and on slopes less than 10%?			
Are there are diversion banks on the upper sides of stockpiles?			
Are sediment fences intact?			
Has excess sediment been removed from behind sediment fences?			
Sediment Basins			
Is the top water level at or above the maximum permissible water storage level?			See next item
Has it rained in the last 5 days (temporary construction basins) or the last 10 days (WRESB3)?			Wait until the rain event ceases
			The sediment basins must be empty within 5 days (temporary basin) or 10 days (WRESB3) of a rainfall event – immediately pump water to MWSD01 and/or the irrigation fields.
If yes, are the irrigation pumps operational?			
Are the basins' inlets and outlets stable?			
Are pump (irrigation) records being kept and up to date?			
Has there been any uncontrolled discharge from a sediment basin?			Level 4 of the Trigger, Action and Response Plan (TARP) presented in Tables 5.0 and 5.11 of the WMP must be implemented immediately.
Are the dirty water drains directing all dirty water to the basins?			
Is the level of sediment in a basin more than 60% of the maximum allowable level?			Remove the sediment to a defined stockpile area
The Irrigation Area			
Is the irrigation infrastructure operational?			
Are there signs of waterlogging in the lowest part of the irrigation area?			

	Yes	No	Comments & Actions
Is there evidence of irrigated water reaching nearby watercourses?			
Has the vegetation been cropped (manually or by stock)			
Is the vegetation healthy, i.e. no scalding/dieback?			
Air Quality (Dust)			
Are there any obvious signs of dust deposition outside of approved work areas?			
Are the access/haul roads being kept damp?			
Is the air quality monitoring equipment installed and operating correctly?			
Are the dust monitoring results being recorded?			
Is there adequate stabilisation of stockpiles?			
Are dust-related complaints being documented?			

HAZARDS IDENTIFIED (ticked items)	Signed off and Date

- Attached copies of any Site Instructions issued.
- Results of the Inspection must be discussed at Site Meetings.
- Results of the Inspections must be discussed with the Mine Manager.
- Provide a copy of this page (with “Corrective Actions Required”, including NIL Actions) to the Office. If required send further copy of page once all corrective actions have been signed off.
- Ensure marked up plans are attached if required.

HSEC Superintendent _____ Signature & Date __/__/__

7.2 Appendix 3 – The Erosion and Sediment Control Plans

Refer to attached plans:

- Spring Creek Crossing and Extension to WRE: 1700009-P01-ESCP00 to ESCP11.
- The WRE: 17000009-P02-ESCP00 to ESCP11.