Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 1

Licence Holder	Agnew Gold Mining Company Pty Ltd
ACN	098 385 883
File Number:	2012/006836
Premises	Agnew Gold Mine LEINSTER WA 6437 Mining tenements M36/27, M36/32, M36/53, M36/55, M36/65, M36/150, M36/174, M36/248, M36/314, M36/450 and L36/174
Date of Amendment	8 September 2017

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 8 September 2017

Tim Gentle

Manager Licensing – Resource Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@der.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
DER	The former Department of Environment Regulation
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
Licence Holder	Agnew Gold Mining Company Pty Ltd
Licensee	has the same meaning as Licence Holder
m^3	cubic metres
Mining Act	*Mining Act 1978* (WA)
mbgl	metre(s) below ground level

mg/L	milligrams per litre
mtpa	million tonnes per annum
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in *Guidance Statement: Risk Assessment*
RL	refers to the term 'Relative Level' and is the height or elevation above the point adopted as the site datum for the purpose of establishing levels.
TSF	Tailings Storage Facility

Amendment Notice

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

This notice authorises amendments to the Licence under Category 5 to construct and operate an In-pit Tailings Storage Facility (TSF) at the Songvang open pit.

Additionally authorisation to install and operate a cyanide detoxification unit to treat tailings prior to discharge, is granted under category 5.

An increase to the amount of dewatering discharge under category 6 is also authorised.

The following guidance statements have informed the decision made on this amendment*;*

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Decision Making (November 2016)*
- *Guidance Statement: Risk Assessment (November 2016)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

On 10 January 2017, Agnew Gold Mining Pty Ltd (Agnew) submitted an application to DWER for an amendment to the Agnew Gold Mine licence L4611/1987/11. The application to amend the licence relates to an In-pit tailings storage facility (TSF) being constructed and operated at the Songvang open pit at the Agnew Gold mine. The current tailings storage facilities are reaching capacity and a new storage facility is required. Tailings from the Agnew process plant will be piped 17 km and deposited into the mined out Songvang open pit.

The Songvang pit has the capacity to store up to 13,500,000 m^3 if completely filled to RL 439m however this amendment proposes the final level of the pit will be RL 404 m. This is equivalent to a storage capacity of 9.1 million tonnes (~6,000,000 m^3) of tailings which will cater for seven years of plant processing and tailings disposal.

The TSF will require construction of delivery and return pipelines, pumps and process water ponds plus protective bunds to divert and collect process liquors should ruptures or failures occur. Tailings are deposited by multi-point spigots and shall be operated as per a deposition plan submitted with the application by Agnew.

The gold processing plant currently operates at 1,300,000 tonnes per annual period with no change of production throughput proposed.

Groundwater will continue to be dewatered from Hidden Secret pit (which contains New Holland, Vivien and Waroonga dewatering), plus Fairyland or New Woman Borefield or Daisy Queen Pit.

An additional amendment application was received on 6 April 2017 to increase the permitted dewatering amount under category 6 from 1,200,000 tpa to 2,000,000 tpa. There are no changes proposed to the existing authorised groundwater sources and discharge locations. The application also sought approval for installation and operation of a cyanide treatment unit to reduce the concentration of weak acid dissociable (WAD) cyanide in the tailings. This treatment unit may take the form of dosing tailings with hydrogen peroxide (H_2O_2), or with Caro's Acid (H_2SO_5) formed by mixing sulfuric acid and hydrogen peroxide. As this process will alter the nature of the tailings discharged (albeit in a positive manner) the installation and operation of the cyanide detoxification unit requires licensing in accordance with section 53 of the EP Act.

Table 2 below outlines the proposed changes to the Licence.

Table 2: Proposed throughput capacity changes

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
6	1,200,000 tpa	2,000,000 tpa	Increase in volume; no change to discharge locations or groundwater sources

Other approvals

The Licence Holder has provided the following information relating to other approvals as outlined in Table 1.

Table 1: Relevant approvals

Legislation	Number	Approval
Mining Act 1978 (WA) *(Department of Mines, Industry Regulation and Safety)*	Registration Id: 63802	Songvang In-pit Tailings Storage Facility Mining Proposal
Rights in Water and Irrigation Act 1914 (WA) *(Department of Water)*	GWL64335 – Agnew GWL55840 – Lawlers Mine Area GWL151398 – Fairyland Borefield GWL63840 – Fairyland Mine Area	Gold process plant Mine dewater Mine dewater Mine dewater
Mining Act 1978 (WA) *(Department of Mines, Industry Regulation and Safety)*	Approved through Mining Proposal Reg. ID63802 under the 10 hectare per tenement clearing exemption.	Approval to clear 13 ha of native vegetation within M36/27, M36/55, M36/65, M36/89, M36/150, M36/248 & M36/450.
Environmental Protection Act 1986 (WA) *(delegated to Department of Mines, Industry Regulation and Safety)*	Native Vegetation Clearing Permit CPS #596	Approval to clear 4.36 ha within E36/49, M36/89, M36/90, M36/353, M36/450

Amendment history

Table 2 provides the amendment history for L4611/1987/11.

Table 2: Licence amendments

Instrument	Issued	Amendment
L4611/1987/11	17/10/2013	New Licence issued with 5 year tenure
L4611/1987/11	29/04/2016	Amendment Notice - amend to extend licence expiry to 17 October 2022.
L4611/1987/11	26/05/2016	Licence amendment to add mining tenements from L5110 and include prescribed activity category 6. Abandoned monitoring bores and redundant licence conditions removed plus an alignment of the licence format.
L4611/1987/11	08/09/2017	Amendment Notice 1 – amend to construct and operate Songvang In-pit TSF, increase category 6 capacity and install and operate a cyanide detoxification unit (this Notice)

Location and receptors

Table 3 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 3: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Residential – Township of Leinster	*Located 33.5 km east of the Songvang open pit to closest sensitive receptor.*

Table 4 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

The area surrounding the In-pit TSF does not contain any rare or threatened flora, fauna or ecological communities. The majority of the proposed area is open woodlands, Mulga woodland or drainage flats. Flora, fauna and ecosystems will be managed in accordance with requirements provided in the Licence Holder's Flora and Fauna Management Plan. *(Reference: Agnew Gold Mining Proposal* March 2017 *by Golder Associates).*

The location for the hydrogen peroxide and sulfuric acid storage tanks is directly south of the existing unloading area for the processing plant and requires a small area of clearing.

Table 4: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Goldfields Groundwater Area (Goldfields GWA)	*Agnew Mine is located in the Lake Carey subarea of the Goldfields GWA*
Depot Springs Water Reserve	*Premises is located 15 km east of Reserve.*
Clearing Regulation - Environmentally Sensitive Areas (ESAs)	*Premises is located 30 km east and 75 km south of the restricted clearing areas.*

Risk Assessment Methodology

The risk assessment following utilises the risk rating matrix as shown in Table 2, recently updated in accord with DWER's *Guidance Statement: Risk Assessments (November 2016).* The risk criteria used in the matrix below is further defined in Table 3.

Table 2: Risk Rating Matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Table 3: Risk criteria definitions (taken from DWER's *Guidance Statement: Risk Assessments*)

Consequence		
The following criteria will be used to determine the consequences of a risk event occurring:		
	Environment	**Public Health* and Amenity (such as air and water quality, noise, and odour)**
Severe	• **on-site impacts**: catastrophic • **off-site impacts local scale**: high level or above • **off-site impacts wider scale:** mid level or above • Mid to long term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Major	• **on-site impacts**: high level • **off-site impacts local scale**: mid level • **off-site impacts wider scale**: low level • Short term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Moderate	• **on-site impacts**: mid level • **off-site impacts local scale**: low level • **off-site impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid level impact to amenity
Minor	• **on-site impacts**: low level • **off-site impacts local scale**: minimal • **off-site impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Slight	• **on-site impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal impacts to amenity • Specific Consequence Criteria (for public health) criteria met

Likelihood	
The following criteria will be used to determine the likelihood of the risk event occurring.	
Almost Certain	The risk event is expected to occur in most circumstances
Likely	The risk event will probably occur in most circumstances
Possible	The risk event could occur at some time
Unlikely	The risk event will probably not occur in most circumstances.
Rare	The risk event may only occur in exceptional circumstances

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*

* In applying public health criteria, DER may have regard to the Department of Health's, *Health Risk Assessment (Scoping) Guidelines*

"on-site" means within the prescribed premises boundary

Risk assessment

Tables 5 and 6 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 5: Risk assessment for proposed amendment during construction

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 5: Processing or beneficiation of metallic or non-metallic ore.	*Construction of Songvang In-pit TSF infrastructure (pipelines, stormwater diversion bunds, under river crossings and new process settling dam)*	***Dust**: associated with pipeline and decant pond construction*	***Nearby residents:** Agnew Gold mine is isolated with the closest community being the township of Leinster located 33.5 km from the Premises.*	***Air:** Wind dispersion*	*None*	*N/A*	*N/A*	*No*	*No sensitive (human) receptors present*
		***Noise:** associated with pipeline and decant pond construction*			*None*	*N/A*	*N/A*	*No*	*No sensitive (human) receptors present*
	Construction of hydrogen peroxide tank and sulfuric acid tank and related pipework	***Dust**: associated with construction/installation of tank, bund and associated pipework*	***Nearby residents:** Agnew Gold mine is isolated with the closest community being the township of Leinster located 33.5 km from the Premises.*	***Air:** Wind dispersion*	*None*	*N/A*	*N/A*	*No*	*No sensitive (human) receptors present*
		***Noise:** associated with construction/installation of tank, bund and associated pipework*			*None*	*N/A*	*N/A*	*No*	*No sensitive (human) receptors present*

Table 6: Risk assessment for proposed amendment during operation

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 5 *Processing or beneficiation of metallic or non-metallic ore*	*Operation of Songvang In-pit TSF*	***Dust:*** *Release of particulate matter from TSF surface*	***Nearby Residents:*** *Agnew Gold mine is isolated with the closest community being the township of Leinster located 33.5 km from the Premises.*	***Air:*** *Wind dispersion*	*Health and amenity impacts*	*N/A*	*N/A*	*N/A*	*No sensitive (human) receptors present* *In addition dust generation should be minimal during operations as the tailings will be deposited wet in the pit at depths greater than 35 mbgl (metres below ground level).*
			Local Flora species		*Impact to native vegetation*	*Slight*	*Unlikely*	*Low*	*The vegetation around the pit has been extensively cleared by previous mining operations and there is only minimal native vegetation remaining.*
		Waste: *Tailings leachate and seepage*	***Groundwater:*** *Local shallow aquifer is of low salinity (~1500 mg/L) (Golder 2017).*	***Land:*** *infiltration through the base and internal walls of the TSF to groundwater.*	*Contamination of groundwater with potential impacts upon beneficial uses. Groundwater quality is acceptable for domestic and livestock use.*	*Slight*	*Rare*	*Low*	*The consequence is rated as "slight" with overall risk "low" because the pit will act as a groundwater sink during operations.* *The greatest risk of seepage is from the supernatant pond. The supernatant water level will be managed to be at least 1 metre below the lowest currently measured groundwater elevation (currently 407.5 RL)* *Local groundwater at the Songvang pit is contained within an aquifer at depths located between 14 mbgl to 30.5 mbgl (RL 425 m to RL 408.5 m respectively). Tailings deposition will be limited to 35 mbgl (RL 404 m). See Figures 3*

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
									and 4 of Schedule 1 for indicative cross sections of tailings deposition (Golder 2017). *The Licence Holder proposes monitoring six existing groundwater monitoring bores to confirm tailings deposition predictions by measuring groundwater quality and water table depth over time.* *Condition 1.2.1 will be amended to include Songvang In-pit TSF specifications plus tailings deposition limit of RL 404 m below the level of the aquifer. Also, condition 3.4.1 is to be amended to include parameters and frequency for the six existing monitoring bores around Songvang pit.* *Note: this Amendment Notice only addresses emissions and discharges associated with the operation of the In-pit TSF. Planning for TSF closure will be addressed through the mine closure planning process administered by the Department of Mines, Industry Regulation and Safety under the Mining Act 1978.*
Category 5 *Processing or beneficiation of metallic or non-*	*Operation of new process pond*	***Waste:*** *Uncontrolled release of tailings/ decant water*	***Groundwater:*** *Local shallow aquifer is of low salinity (~1500 mg/L) (Golder 2017).*	***Land:*** *infiltration through the base and internal walls of the TSF to*	*Contamination of groundwater with potential impacts upon beneficial uses. Groundwater*	*Moderate*	*Unlikely*	*Medium*	*The Licence Holder has committed to the following management control for the new process pond to manage the risk of seepage:*

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
metallic ore				*groundwater*	*quality is acceptable for domestic and livestock use.*				• *A composite geo-synthetic liner with leak detection.* *Applicant's proposed control will be conditioned*
Category 5 *Processing or beneficiation of metallic or non-metallic ore*	*Tailings and decant return pipelines*	***Waste:*** *Release of tailings or tailings decant water (return water) from pipeline failure*	***Terrestrial ecosystems:*** *local soils, vegetation and surface water*	***Land:*** *Direct discharge from pipeline failure*	*Contamination of soil, vegetation, and surface water with trace cyanide, metals/metalloids.*	*Moderate*	*Unlikely*	*Medium*	*The Licence Holder has committed to the following controls for the new pipelines to Songvang pit;* • *Flow meters on either end of the pipelines with pressure sensors along the pipeline.* • *Isolation valves installed at discharge pumps and return water pumps;* • *Telemetry system on pipelines to alert plant personal of any ruptures, failures or leaks;* • *New pipelines will be bunded;* • *Sections of pipe traversing creeks will be enclosed in a HDPE outer protective sleeve; and* • *Daily inspections of pipelines will be conducted during operations.* *Given these controls, the risk of release in the event of a failure is deemed to be medium.* *Existing conditions 1.2.3 and 1.2.4 will be amended to include the new infrastructure.*
	Pipelines beneath creek crossings	***Waste:*** *Release of tailings or tailings decant water (return*	***Terrestrial ecosystems:*** *local soils, vegetation and surface water*	***Land:*** *Direct discharge*	*Contamination of soil, vegetation, and surface water with trace cyanide,*	*Slight*	*Rare*	*Low*	*The overall risk is rated as "low" because the stream crossing will be constructed so as to effectively remove this event as a credible risk..*

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
		water)			*metals/metalloids.*				*The new pipeline routes will include under-creek crossings beneath Crusader and Songvang creeks. At the stream crossings the pipelines will be buried and also encased within an HDPE outer protective sleeve which will connect to spill collection pit on either side of the creeks. The under creek pipeline crossing infrastructure will be designed to withstand a 1 in 100 year's flood event. See Figure 5 in Schedule 1 for design of river crossings.* *A licence condition will be added that requires the under creek crossing to be constructed as proposed.*
Category 5 *Processing or beneficiation of metallic or non-metallic ore*	*Overtopping of Songvang In-pit TSF*	***Waste:*** *Uncontrolled release of tailings/ decant water*	***Terrestrial ecosystems:*** *local soils, vegetation and surface water*	***Land:*** *Direct discharge from overtopping of In-pit TSF*	*Contamination of surrounding soils with metals and metalloids, affecting soil and vegetation*	*Slight*	*Rare*	*Low*	*The consequence is rated as "slight" with overall risk rated as "low"; tailings disposal will be limited to a final height of 35 mbgl during operations therefore overtopping occurring is not considered a credible risk.* *In addition, the Licence holder has committed to construct new bunds around the Songvang pit and the new process pond. All overflows within the bund will be directed towards the Songvang pit. These controls further reduce the risk.* *Applicant controls will be conditioned. No further controls*

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
									are necessary.
	Overtopping of new process pond					*Slight*	*Rare*	*Low*	*The consequence is rated slight and the overall risk as low because the bunded spillway directs any excess water from the pond back to the Songvang Pit, meaning that pond overtopping is not a credible risk.* *The Licence Holder has committed to the following management control for the new process pond:* • *A 5 m wide emergency spillway and 160 mm diameter under-wall return drain that directs all excess water back to the Songvang pit.* *A new Licence condition will specify that the pond shall include a spillway and return drain.*
Category 5 *Processing or beneficiation of metallic or non-metallic ore*	*Ponding decant water from new process dam and TSF decant water*	***Waste:*** *Tailing leachate*	***Local fauna*** *Birds and other Wildlife*	***Land:*** *Direct ingestion*	*Fauna sickness or death*	*Moderate*	*Possible*	*Medium*	*The decant water in the In-pit TSF and new process pond is considered fresh to marginal quality therefore attractive for drinking by native birds/wildlife.* *The Licence Holder has taken a proactive approach to this issue and is now a signatory to the International Cyanide Compliance Code (ICMC). Consistent with the requirements of the ICMC, the Licence Holder has committed*

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
									to ensure the tailings weak acid dissociable cyanide (WAD) concentration in the tailings is less than 50 parts per million This concentration limit is to protect birds or other wildlife from toxic effects. This will be achieved through operation of the new cyanide treatment plant (authorised through this Amendment Notice). *The Applicant also proposes:* • *Daily TSF and process pond inspections;* • *Management of decant water back to the water process circuit therefore reducing the supernatant pond size;* • *Maintaining fauna egress at the new process pond and In-pit TSF.* • *WAD analyser at the mill to undertake regular (30 minute) readings* • *Automated and manual control of pH and cyanide addition to the mill* • *Fencing around TSFs to exclude wildlife'* • *Fauna deterents (gas cannons) are turned on if WAD CNs are high to scare away birds* • *Daily wildlife mornoring* • *Additional wildlife monitoring if WAD CNs are high*

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
	Spill during filling tanks or transfer of sulfuric acid or hydrogen peroxide to tailings hopper	*Sulfuric acid or hydrogen peroxide*	*Soil*	*Direct discharge to ground*	*Localised soil contamination; occupational safety (OHS) risk to workers*	*N/A*	*N/A*	*Not managed under Licence*	*The tanks will be bunded in accord with relevant Australian Standards and managed as part of the site Dangerous Goods' Licence, regulated by DMP under Dangerous Goods Safety Act 2004. OHS risks are regulated by DMP under the Mines Safety and Inspection Act.* *No regulatory controls required beyond authorising the operation of the cyanide detoxification unit.*
Category 6	*Increased discharge of groundwater (mine dewater to Hidden Secret Pit)*	*Mine dewater to open pit (same aquifer)*	*Groundwater*	*Direct discharge to groundwater*	*None (capacity is available within the pit). Groundwater may marginally increase in salinity through evaporation in the pit; however increased deposition should reduce the rate of salinisation*	*N/A*	*N/A*	*None*	*Given that the increase in deposition rates may improve overall groundwater quality, there is no risk associated with increasing the discharge amount and no additional regulatory controls required. Table 2.2.1 of the Licence will be amended to clearly state the permitted discharge volume.*

Decision

The potential emissions associated with operation of the proposed Songvang In-pit TSF are releases of either tailings or tailings decant water from pipeline rupture/failure or from overtopping of a new process pond. These releases may impact upon adjacent native vegetation.

The risk of tailings seeping into groundwater is not considered credible because the pit will act as a groundwater sink. The final tailings deposition level of RL 404m will ensure that the aquifer is not contacted by tailings and this is a significant management control for this proposal.

New conditions and amended existing conditions in the licence for the Songvang In-pit TSF are:

- Addition of Songvang In-pit TSF and new process pond to the list of authorised containment infrastructure. The TSF has a limit to operate to a final height of RL 404m;
- Redefining management and inspection of containment infrastructure;
- Updating ambient groundwater monitoring to include Songvang monitoring bores; and
- Add conditions to ensure compliance with what was proposed to be constructed.

Changes have also been made to the Licence in accordance with changes to definitions and administrative changes implemented within DWER.

The risk to the environment at the Premises is unchanged. The construction and operation of the Songvang In-pit TSF, with the proposed management controls, will not result in emissions which are unacceptable to public health or the environment and DWER has therefore granted the Licence amendment.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 13 June 2017. A second draft was provided on 5 September 2017. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

Amendment

1. Definitions of the Licence are amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

"CEO" for the purpose of correspondence means:
Director General
Department Administering the *Environmental Protection Act 1986*
Locked Bag 33 Cloisters Square
PERTH WA 6850
~~Telephone: (08) 9333 7510~~
~~Facsimile: (08) 9333 7550~~
info@der.wa.gov.au

"mbgl" means metres below ground level

"RL" means Relative Level and is the height or elevation above a survey point adopted as the site datum for the purpose of establishing levels.

2. Conditions 1.2.1, 1.2.2, 1.2.3 and 3.4.1 of the Licence are amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

1.2.1 The Licensee shall ensure that tailings, decant water, dewater effluent and hydrocarbon contaminated soil are only discharged into containment cells and/or a turkey's nest with the relevant infrastructure requirements and at the locations specified in Table 1.2.1 and identified in Schedule 1.

Table 1.2.1: Containment Infrastructure		
Vessel or compound	**Material**	**Requirements**
Redeemer In-pit TSF3	Tailings	In-pit facility with monitoring bore network to identify any environmental impacts Operate to final height of 472 m RL (2 m below surrounding surface).
Songvang In-pit TSF	Tailings	In-pit TSF with monitoring bore network Operate to final height of RL 404 m.
TSF2[1]	Tailings	Lined with 200mm of compacted clay.
Waroonga Turkeys Nest	Mine dewater from Waroonga underground operations	Lined with 200mm of compacted clay, or 150mm of compacted clay and 1.5mm HDPE liner to achieve a permeability of $<10^{-9}$m/s or equivalent
New Holland Turkeys Nest	Mine dewater from New Holland underground operations	Lined with 200mm of compacted clay, or 150mm of compacted clay and 1.5mm HDPE liner to achieve a permeability of $<10^{-9}$m/s or equivalent
TSF2 Process Water Pond	Redeemer In-pit TSF return water and Songvang pit water	Lined with 200mm of compacted clay, or 150mm of compacted clay and 1.5mm HDPE liner to achieve a permeability of $<10^{-9}$m/s or equivalent
Redeemer TSF Return Pond	Redeemer In-pit TSF Return water	Lined with 200mm of compacted clay, or 150mm of compacted clay and 1.5mm HDPE liner to achieve a permeability of $<10^{-9}$m/s or equivalent
Songvang TSF Process Pond	Songvang In-pit TSF Return water	Lined with 150 to 200 mm of compacted clay with primary and secondary HDPE liners to achieve a permeability of $<10^{-9}$m/s or equivalent. Spillway plus under wall return drain shall direct all overflow back to the Songvang In-pit TSF.
Hidden Secret Pit	Mine dewater from Waroonga, Genesis, New Holland and Vivien underground operations. Mine dewater from Songvang Pit	In-pit facility with water discharge monitoring to identify any environmental impacts
~~Songvang Turkeys Nest~~	~~Songvang pit water~~	~~Lined with 200mm of compacted clay, or 150mm of compacted clay and 1.5mm~~

		~~HDPE liner to achieve a permeability of <10^{-9}m/s or equivalent~~
New Holland Bioremediation pad	Hydrocarbon contaminated soil	Hydrocarbon contaminated materials are either put in bioremediation area or taken off site by a licensed contractor. Any contaminated runoff from the treatment cell is contained.
Waroonga Bioremediation pad	Hydrocarbon contaminated soil	Hydrocarbon contaminated materials are either put in bioremediation area or taken off site by a licensed contractor. Any contaminated runoff from the treatment cell is contained.

Note 1: TSF2 currently decommissioned and not operational.

1.2.2 The Licensee shall manage containment infrastructure in Table 1.2.1 such that a ~~minimum top of~~ ~~embankment~~ freeboard of at least 300mm or containment for a 1 in 100 year/72 hour storm event (whichever is greater) is maintained in order to prevent overtopping. For the Songvang in-pit TSF, freeboard shall be maintained to ensure water level does not exceed RL 404 m.

1.2.3 The Licensee shall:

(a) undertake inspections as detailed in Table 1.2.2;

(b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences; and

(c) Maintain a record of all inspections undertaken.

Table 1.2.2: Inspection of infrastructure

Scope of inspection	Type of inspection	Frequency of inspection
Mine dewater pipelines	Visual integrity	Daily when operating or weekly when not operating.
Tailings delivery pipelines	Visual integrity	
Tailings return water lines	Visual integrity	
Tailings deposition	Visual assessment of beaching and record bird / other wildlife presence	
Decant pond	Visual assessment of pond, size and location and record bird / other wildlife presence	
Internal embankment freeboard of the TSF and decant ponds	Visual to confirm required freeboard capacity is available	
Bird or wildlife mortality within the TSF infrastructure	Record any mortality of birds or other wildlife. If safe to do so, retrieve any specimens of dead birds or other wildlife and preserve (freeze) to allow for identification / further study	

3.4.1 The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table and record and investigate results that do not meet any target specified.

Table 3.4.1: Monitoring of ambient groundwater quality and WAD cyanide concentrations					
Monitoring point reference and location	**Parameter**	**Limits**	**Units**	**Averaging period**	**Frequency**
EC473, EC476, EC477, EWB61, EWB62, EWB66, EWB67, EWB68	pH[1]	6.0 to 9.0	-	Spot sample	Quarterly[3]
	Electrical Conductivity (EC)	-	µg/cm		
	Standing water level (SWL)[2]	-	mbgl		
	Total dissolved solids[1] (TDS)	-	mg/L		Six monthly[4]
	Major Ions[5]	-			
	Total cyanide	-			
	Weak acid dissociable cyanide	0.5			
	Selenium	-			
	Thallium	-			
REDIPMW1, REDIPMW2, REDIPMW3, REDIPMW5, REDIPMW6, REDIPMW7, REDIPMW8, REDIPMW9, REDIPMW10. SV1-1, SV2-1, SV2-2, SV4-1, SV5-1, SV6-1.	pH[1]	6.0 to 9.0	-	Spot sample	Quarterly[3]
	Electrical Conductivity (EC)	-	µg/cm		
	Standing water level (SWL)[2]	-	mbgl		
	Total dissolved solids[1] (TDS)	10 000	mg/L		Six monthly[4]
	Major Ions[5]	-			
	Total cyanide	-			
	Weak acid dissociable cyanide	0.5			
	Selenium	-			
	Thallium	-			
Decant (supernatant) pond of each operating tailings storage facility	Weak acid dissociable cyanide	50	mg/L	Spot sample	Monthly[5]

Note 1: Field sample results are to be reported as per condition 4.2.1. An exemption from NATA laboratory analysis is allowed given geographical remoteness of the sample site and the short holding time of the parameter.
Note 2: Standing water level shall be determined prior to collection of water samples.
Note 3: Quarterly monitoring is undertaken at least 45 days apart.
Note 4: Six monthly monitoring is undertaken at least 165 days apart.
Note 5: Monthly monitoring to be undertaken at least 14 days apart
Note 6: Major Ions include elements; Ca, Na, Mg, K, Fe, SO_4, Cl, SiO_2 , NO_3, HOC_3, CO_3, Al, Sb, As, B, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Mo, Se, Ag, Sn, and Zn.

3. Table 2.2.1 of the Licence is amended by the insertion of red text in underline shown below:

Table 2.2.1: Point source emissions to groundwater			
Emission point reference	**Description**	**Source including abatement**	**Authorised discharge volume**
Hidden Secret Pit	Receiving environment – previously mined pit	Water from dewatering operations of Agnew mine operations	2,000,000 tpa

Hidden Secret Pit	Receiving environment – previously mined pit	Water from dewatering operations of Vivien mine operations (in the same aquifer)	

4. Condition 1.2.8 is added to the Licence as shown below:

1.2.8 The Licensee must construct the infrastructure in Column 1 of Table 1.2.5 in accord with the requirements specified in Column 2 and to plans and locations referenced in Column 3.

Table 1.2.5: Infrastructure and equipment requirements table

Column 1	**Column 2**	**Column 3**
Infrastructure/ Equipment	**Requirements (design and construction)**	**Site plan reference**
Songvang In-pit TSF Process pond	• Lined with a composite geosynthetic liner (double HDPE geomembrane with embedded drainage system to detect leakage) • 5 m wide emergency spillway with a bunded drain directing any spillage back to Songvang In-pit TSF.	Location shown in Figure 2 and indicative layout shown in Figure 6 of Schedule 1.
Tailings and decant return pipelines	• Flow meters installed with pressure sensors along the pipeline; • Isolation valves installed at discharge pumps and return water pumps; • Telemetry system for monitoring flow; • Pipelines will be bunded with the exception of sections of pipeline crossing the creeks; • All pipelines crossing the creeks shall be installed below the bed of the creeks, and contained within another HDPE pipe.	Route as shown in Figure 1 of Schedule 1. Plan reference 5300-370-001_B to 006_B. Pipeline crossings as shown in Figure 5 of Schedule 1.
Songvang groundwater monitoring bores	Maintenance on six monitoring bores as necessary.	As shown in Figure 7 of Schedule 1.
Cyanide detoxification unit (including pipework to tailings hopper)	Not specified (storage facilities authorised under the *Dangerous Goods Act 2004*)	N/A

5. Condition 1.2.9 is added to the Licence as shown below:

1.2.9 The Licensee must not depart from the requirements specified in Table 1.2.5 except:

(b) Where such departures are minor in nature and do not materially change or affect the infrastructure; and

(c) Where such departure improves the functionality of the infrastructure and does not increase the risks to public health, public amenity or the environment.

If condition 1.2.9(b) applies, then the Licensee must provide the CEO with a list of

departures and demonstrate that these have not increased the risk to public health, public amenity or the environment.

6. Condition 1.2.10 is added to the Licence as shown below:

1.2.10 The Licensee shall submit a construction compliance document to the CEO, following construction of the infrastructure listed in Table 1.2.5 and prior to operation.

7. Condition 1.2.11 to be added to the Licence as shown below:

1.2.11 The Licensee must ensure the construction compliance document:
(a) Is certified by a qualified engineer stating that each item of infrastructure specified in Table 1.2.5 has been constructed in accordance with the conditions of the Licence; and
(b) Be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company.

8. Condition 1.2.12 is added to the Licence as shown below:

1.2.12 The Licensee shall operate the Songvang In-pit TSF in accordance with the conditions of this Licence, following submission of the construction compliance document required by condition 1.2.10.

9. Condition 1.2.13 is added to the Licence as shown below:

1.2.13 Following submission of the construction compliance document required by condition 1.2.10, the Licensee shall operate the cyanide detoxification unit to ensure that the weak acid dissociable (WAD) cyanide concentration in the tailings decant pond is less than 50 parts per million at all times.

10. The Licence is amended by removing the Annual Audit Compliance Report template in Schedule 2. The Compliance Report template is available from the DWER's website https://www.der.wa.gov.au/our-work/regulatory-framework.

11. The Map of Landfill Locations in the Licence is deleted and replaced by the Map following:


New Holland Pit
New Holland Landfill
Waroonga Pit
Waroonga Landfill
Redeemer Landfill
Redeemer Pit
0 370 740 1,110 1,480 1,850
Meters
Legend
Current Landfills
N
W
E
S
Projection: GDA94 Z51
AGNEW GOLD MINE
Agnew Gold Mining Company
L4611/1987 Landfill Locations
Date: 17/07/2017
Compiled: LW
File Name:
A4P
Scale: 1:43,734
Drawn: LW

Schedule 1 – Maps

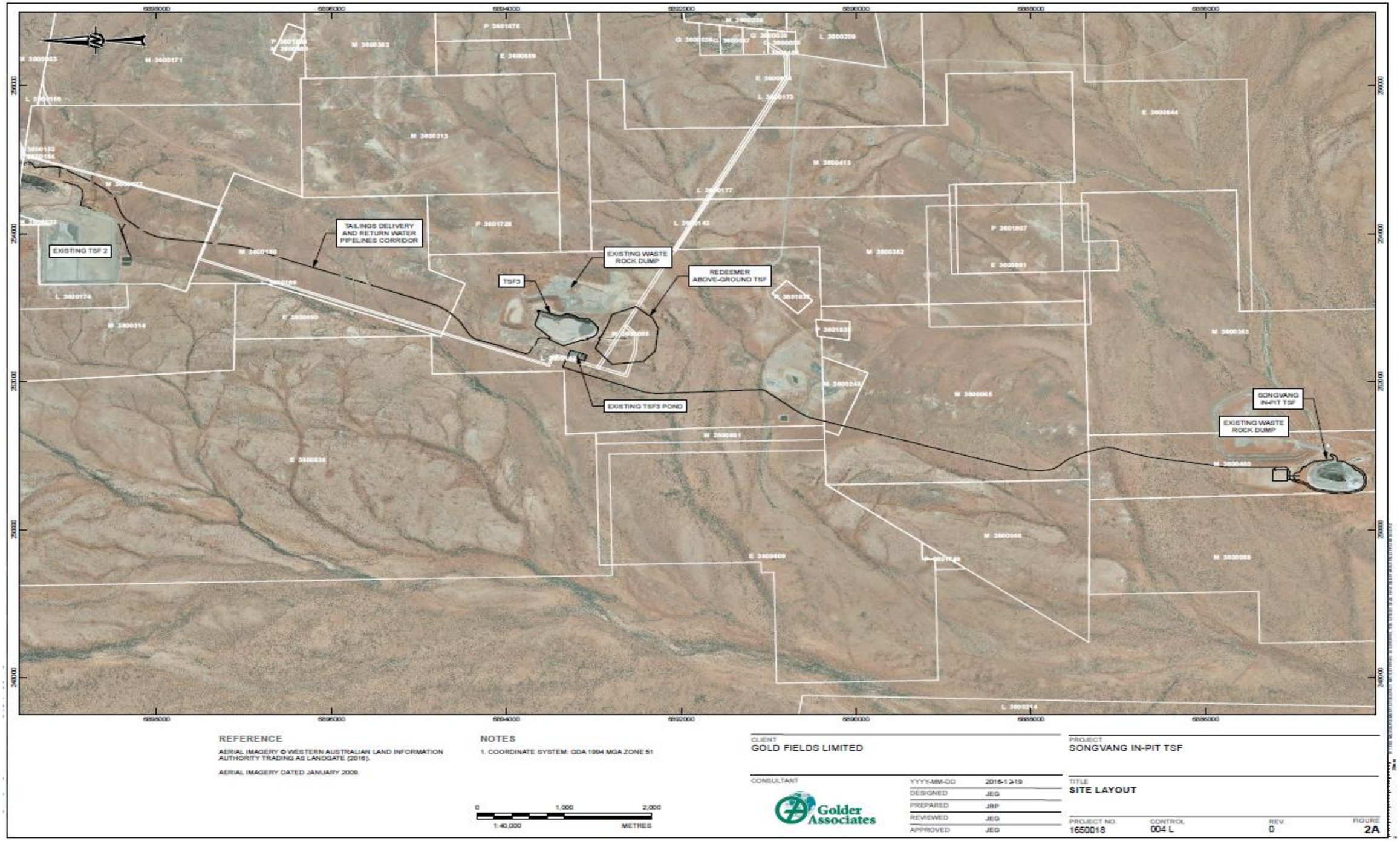

Figure 1: Site Layout showing indicative tailings and decant (return water) pipeline route from TSF3 to Songvang In-pit TSF (Golder 2016)

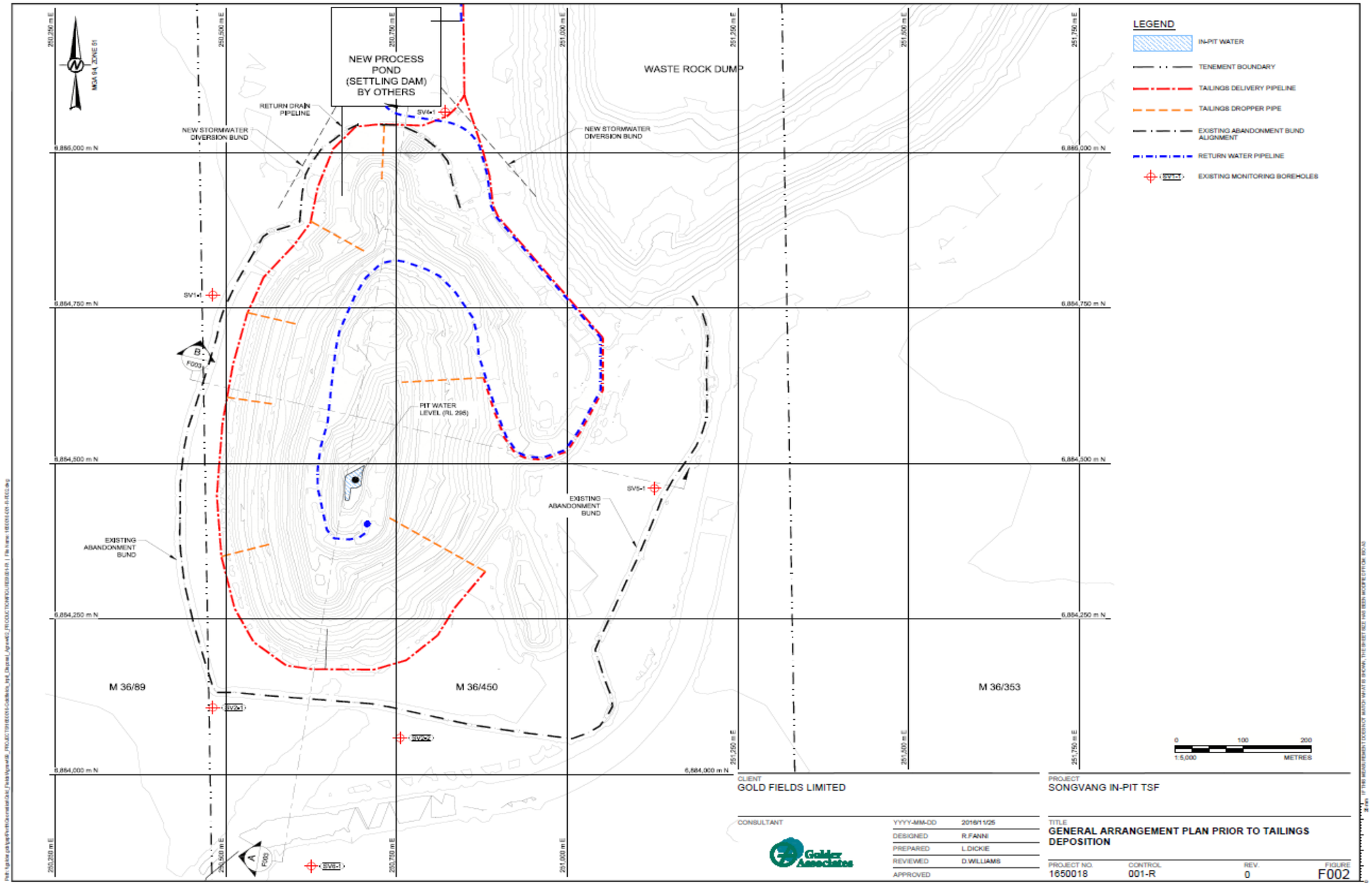

Figure 2: General arrangement of Songvang Pit showing cross sections A and B, used in seepage modelling shown in Figure 3 and 4 following. Pipelines within the pit also shown (Golder 2016).

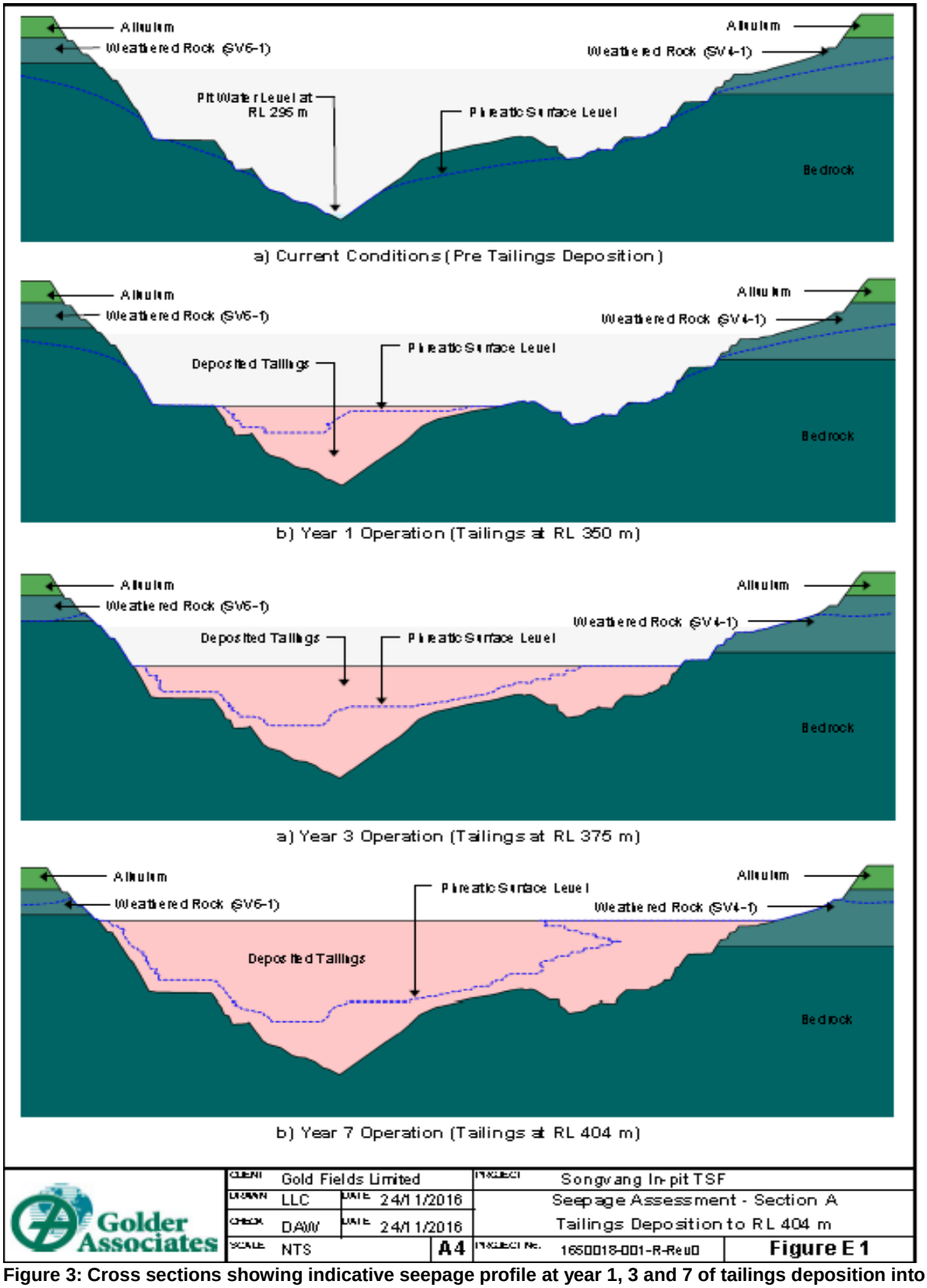

Figure 3: Cross sections showing indicative seepage profile at year 1, 3 and 7 of tailings deposition into Songvang In-pit TSF – Section A (Golder 2016)

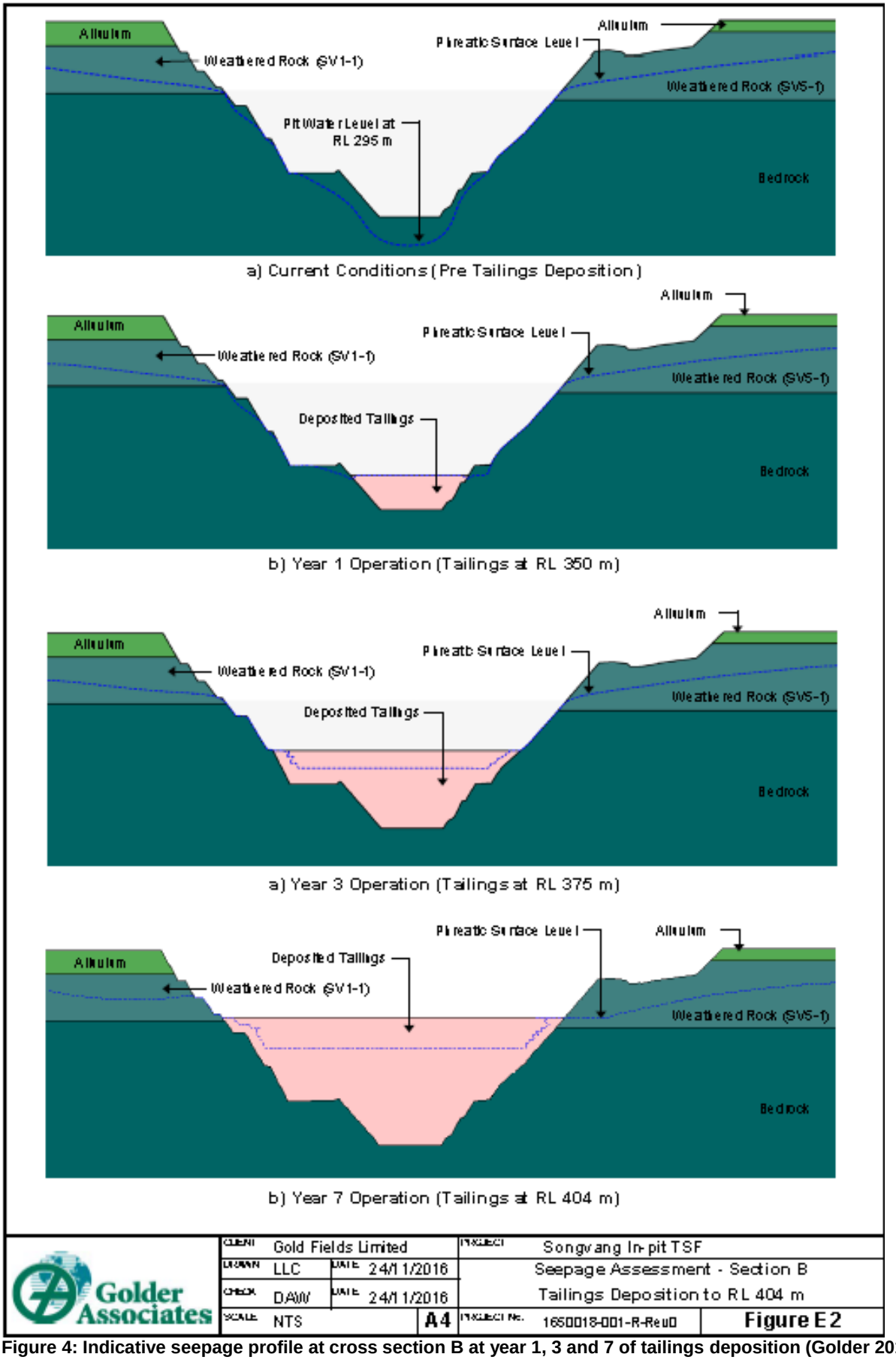

Figure 4: Indicative seepage profile at cross section B at year 1, 3 and 7 of tailings deposition (Golder 2016)

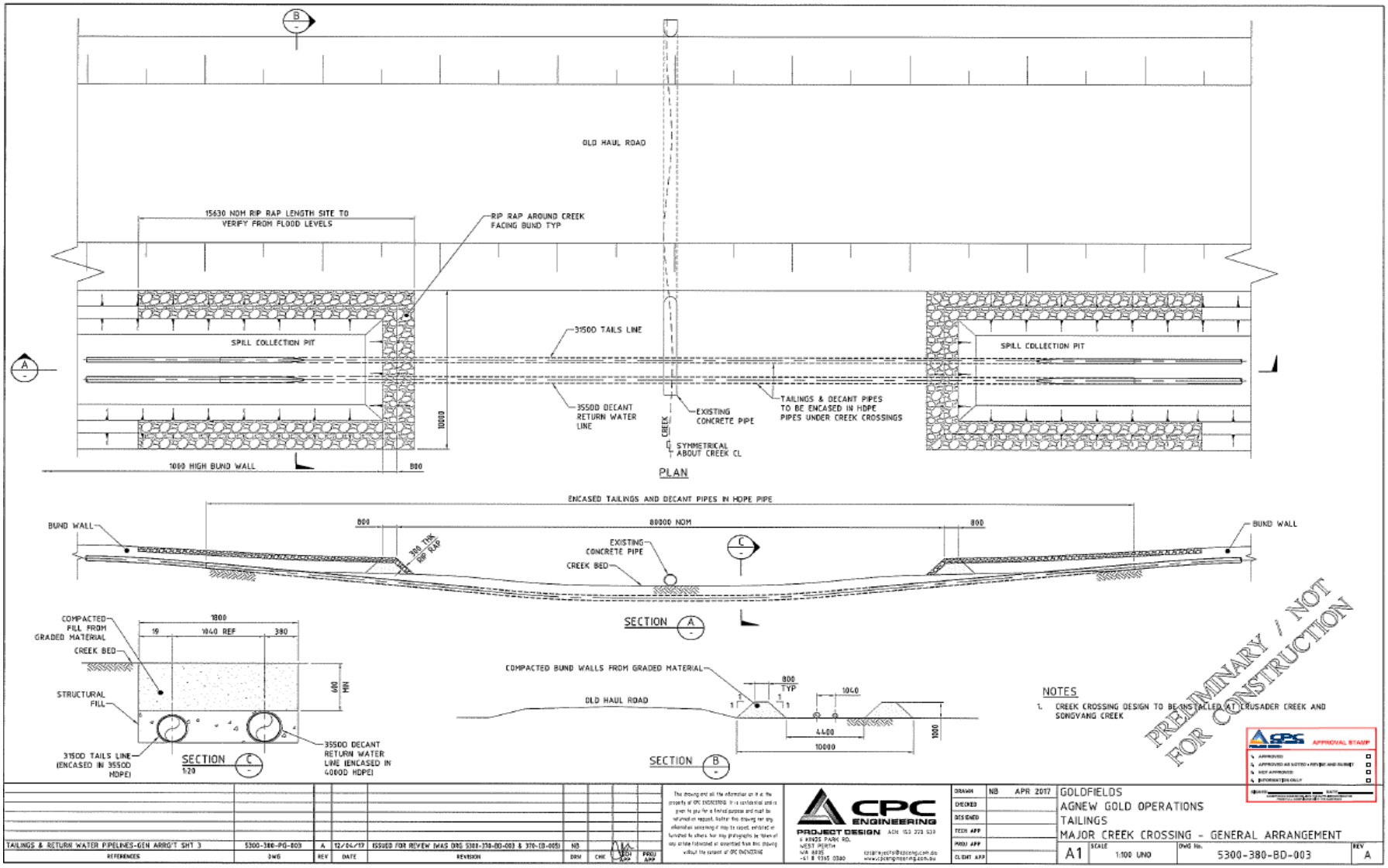

Figure 5: General arrangement design for pipework at major creek crossings (Agnew 2017d)

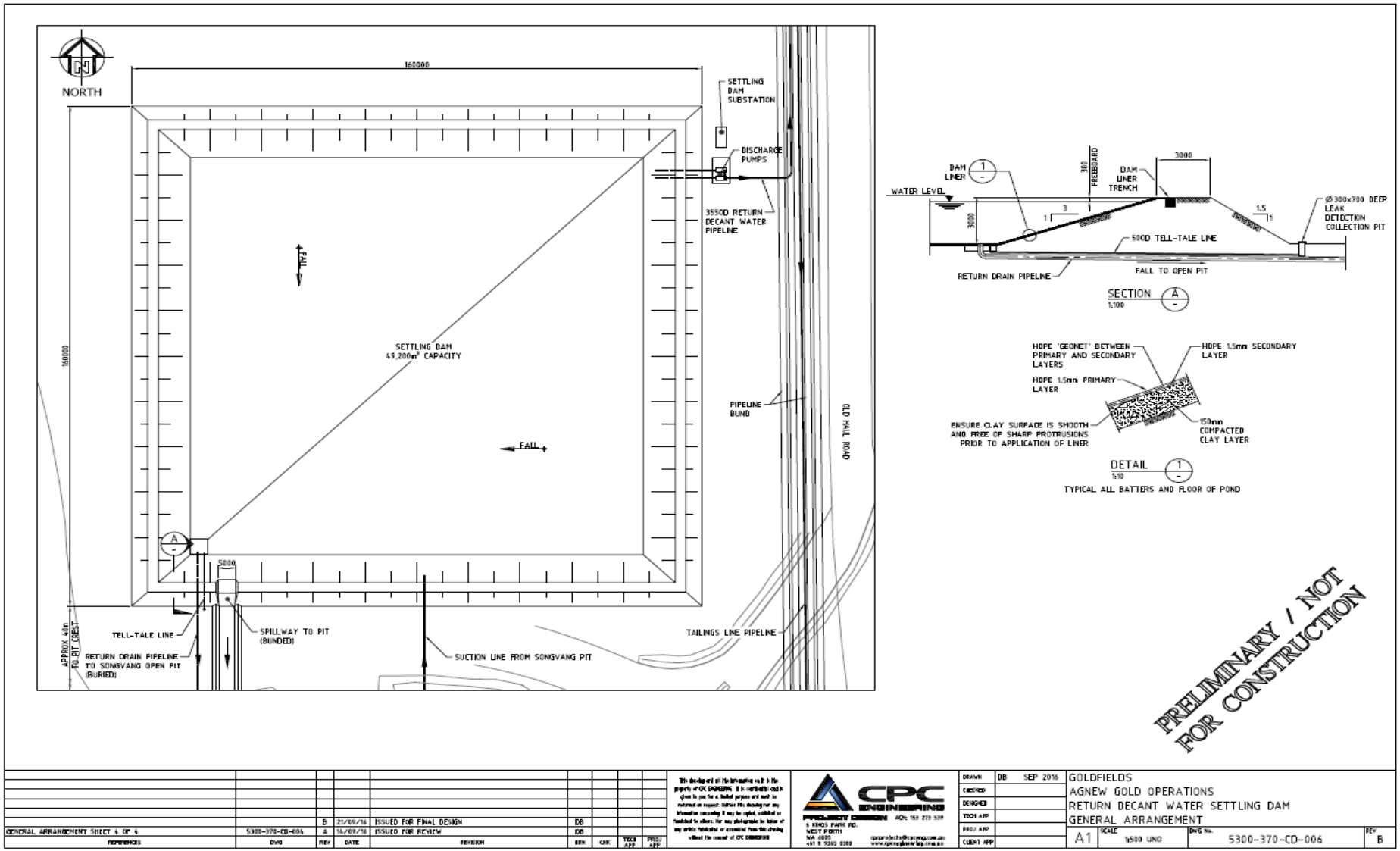

Figure 6: Songvang Process Pond design (Agnew 2017b)

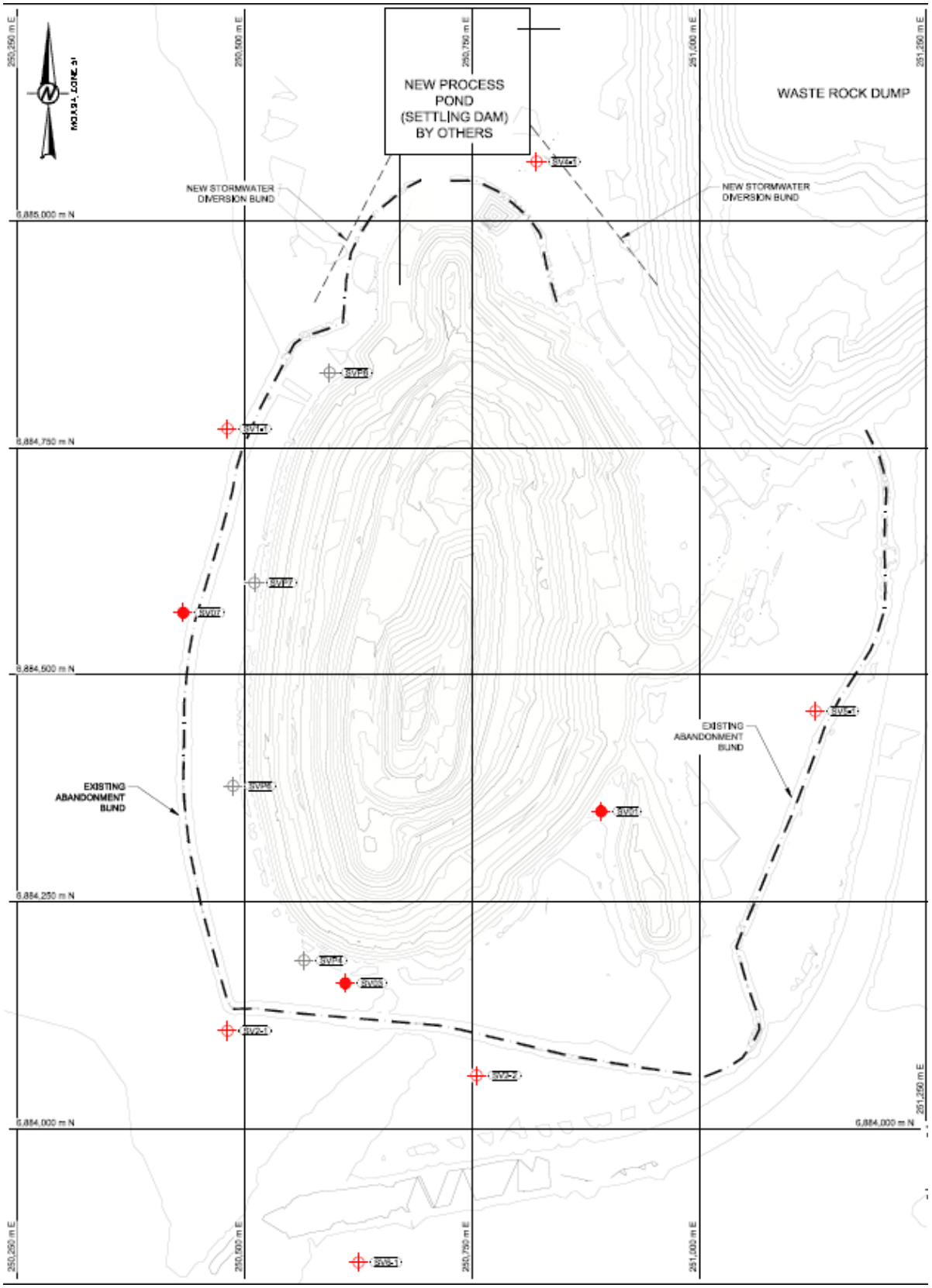

Figure 7: Location of groundwater monitoring bores (shown in red outline) surrounding Songvang In-Pit TSF. (Solid red dots indicate decommissioned production bores) (Golder 2016)

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L4611/1987/11 – Agnew Gold Mining Company Pty Ltd	L4611/1987/11	accessed at www.der.wa.gov.au
2	Application for amendment of Licence L4611/1987/11 dated 16 January 2017	Agnew 2017a	DWER records (A1354477 & A1355518)
3	Supporting documentation to the application to amend Licence L4611/1987/11 dated 16 January 2017	Agnew 2017b	DWER records (A1354471 - A1354476)
4	Application for amendment of Licence L4611/1987/11 dated 7 April 2017	Agnew 2017c	DWER record (A1409013)
5	Golder (2016) *Agnew Gold Mine – Design Report for In-pit Tailings Disposal at Songvang,* unpublished report to Gold Fields Limited, November 2016	Golder 2016	DWER record (A1354477)
6	Email from Michael Mead to DER (2017) Agnew works approval (Songvang TSF) - Creek crossing update, dated 3:06 PM 13 April 2017.	Agnew 2017d	DWER records (A1416024 & A1416023)
7	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.der.wa.gov.au
8	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	
9	DER, November 2016. *Guidance Statement: Environmental Siting.* Department of Environment Regulation, Perth.	DER 2016a	
10	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2016b	
11	DER, November 2016. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2016c	

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 13 June 2017 and 5 September 2017 for review and comment. The Licence Holder responded on 17 June 2017 and 6 September 2017. The following comments were received on the draft Amendment Notice:

Condition	Summary of Licence Holder comment	DWER response
- Schedule 1	New map supplied for the New Holland landfill location.	Included in the final version as clause 11 of the Amendment Notice 1.
Table 3.4.1	Correction to be made to the concentration for WAD cyanide limit in the decant ponds to ensure consistency with new Condition 1.2.13.	Adopted.
Table 1.2.2	Accepted by the Licence Holder.	In second draft issued 5 September 2017, DWER added an additional requirement to the inspection schedule to require bird and wildlife mortality on the tailisng
Table 1.2.5	-	DWER removed the requirement for tailings deposition as this is covered by Table 1.2.1 and relates to an operation requirement and not a design and construction requirement.
Condition 1.2.9	-	DWER altered the text of the final version of this condition to clarify what should be included in the list of departures report to the CEO.