Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 3

Licence Number	L8558/2011/1
Licence Holder	Sandfire Resources NL
ACN	105 154 185
File Number:	2011/004602
Premises	DeGrussa Copper-Gold Project Mining Tenement 52/1046 MEEKATHARRA WA 6642
Date of Amendment	30 January 2019

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.

Alana Kidd

Digitally signed by Alana Kidd
Date: 2019.01.30 12:46:52 +08'00'

Alana Kidd

Manager, 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
ACN	Australian Company Number
Amendment Notice	refers to this document
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
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@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
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
IWL	Integrated Waste Landform
km	kilometre

Licence Holder Licensee	Sandfire Resources NL
m^3	cubic metres
m/s	metres per second
mbgl	metres below ground level
Occupier	has the same meaning given to that term under the EP Act.
PAF	Potentially Acid Forming
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.
PEC	Priority Ecological Community
Risk Event	as described in *Guidance Statement: Risk Assessment*
RIWI Act	*Rights in Water and Irrigation Act 1914*
TSF	Tailings Storage Facility
UDR	*Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA)

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 is limited only to an amendment for Category 5. No changes to the aspects of the Licence relating to Categories 6, 52, 54 or 64 have been requested by the Licence Holder.

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 (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

Sandfire Resources NL (Sandfire Resources) (Licence Holder) (Applicant) operates the DeGrussa Copper-Gold Project through Licence L8558/2011/1 (Licence). The prescribed activities authorised through the Licence are described below.

Category number	Category description	Category production or design capacity	Approved Premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	2,050,000 tonnes per annual period
6	Mine dewatering	50,000 tonnes or more per year	2,000,000 tonnes per annual period
52	Electric power generation:	10 megawatts or more in aggregate (using a fuel other than natural gas)	23 megawatts in aggregate
54	Sewage facility	100 cubic metres or more per day	240 cubic metres per day
64	Class II putrescible landfill	20 tonnes or more per year	1,300 tonnes per annual period

Sandfire Resources submitted an application to DWER on 14 November 2018 to amend the Licence for construction and operation of Stage 4 and 5 lifts of the DeGrussa Tailings Storage Facility (TSF).

There are no proposed changes to the existing footprint or TSF operating methodology.

Background

The layout of key infrastructure on site is shown in Figure 1 below.

Ore is processed through a crushing and screening plant, then a flotation circuit to produce copper product. A small amount of ore is sent to the nearby Plutonic Gold Mine for processing to produce gold. Ore trucked in from the Monty project is also processed on the Premises.

The TSF has been operating since 2012. The facility is within an Integrated Waste Landform, with wet tailings deposited into a circular impoundment surrounded by waste rock. The TSF has been constructed in three stages to its current approved height of 575.5 Australian Height Datum (AHD).

The inner impoundment has a composite HDPE (base 2 mm and sides 1 mm) overlying a compacted clay liner.

An underdrainage collection system extends along the upstream toe of the Stage 1 embankment and this will be maintained during Stage 4 and 5 operations. Approximately 400 m^3/day of seepage return water is currently recovered from the underdrainage system.

The TSF is inspected daily.

Stormwater from operational areas including the TSF, ROM Pad and Paste Plant are collected and either re-used within the operations or directed to settlement ponds.

Proposed Lifts

The existing TSF is anticipated to reach storage capacity by June 2019. Sandfire proposes to raise the TSF perimeter embankments via a further two x 5 metre (m) lifts (Stage 4 and Stage 5) to increase the tailings storage capacity on site.

Construction of the two lifts will increase the TSF embankment height from 17 m to 27 m above ground level, and the final height of the TSF within the IWL height of 35 m.

Commencement of Stage 4 works is planned for February 2019 with construction completed in April 2019. Stage 5 works are expected to commence in February 2022 (if required).

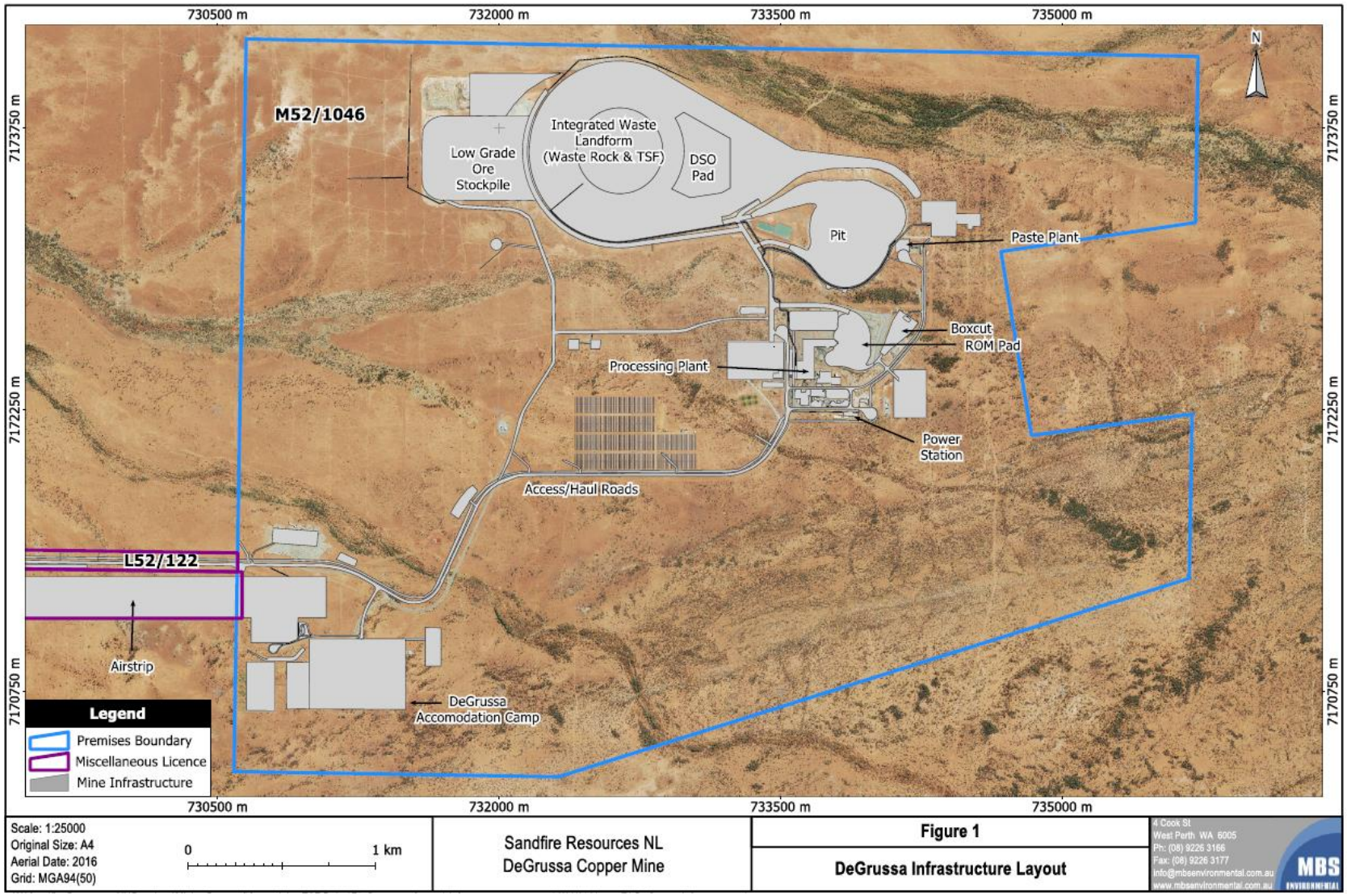
The two lifts have been designed to conform to the *Code of Practice for Tailings Storage Facilities in Western Australia* and the ANCOLD *Guidelines on Tailings Dams Planning Design, Construction, Operation and Closure.*

The Stage 4 and Stage 5 embankment liner system will be similar to the existing TSF design. The composite liner system will be extended up the inner slopes of the facility and consist of:

- Zone C – general waste rock with a hydraulic conductivity of 10^{-5} m/s.
- Zone B – track rolled mine waste providing a hydraulic conductivity of 10^{-6} m/s.
- Zone A – compacted homogeneous low permeability material providing a hydraulic conductivity of greater than 10^{-7} m/s (5 m width).
- HDPE – 1 mm HDPE with hydraulic conductivity of greater than 10^{-12} m/s.

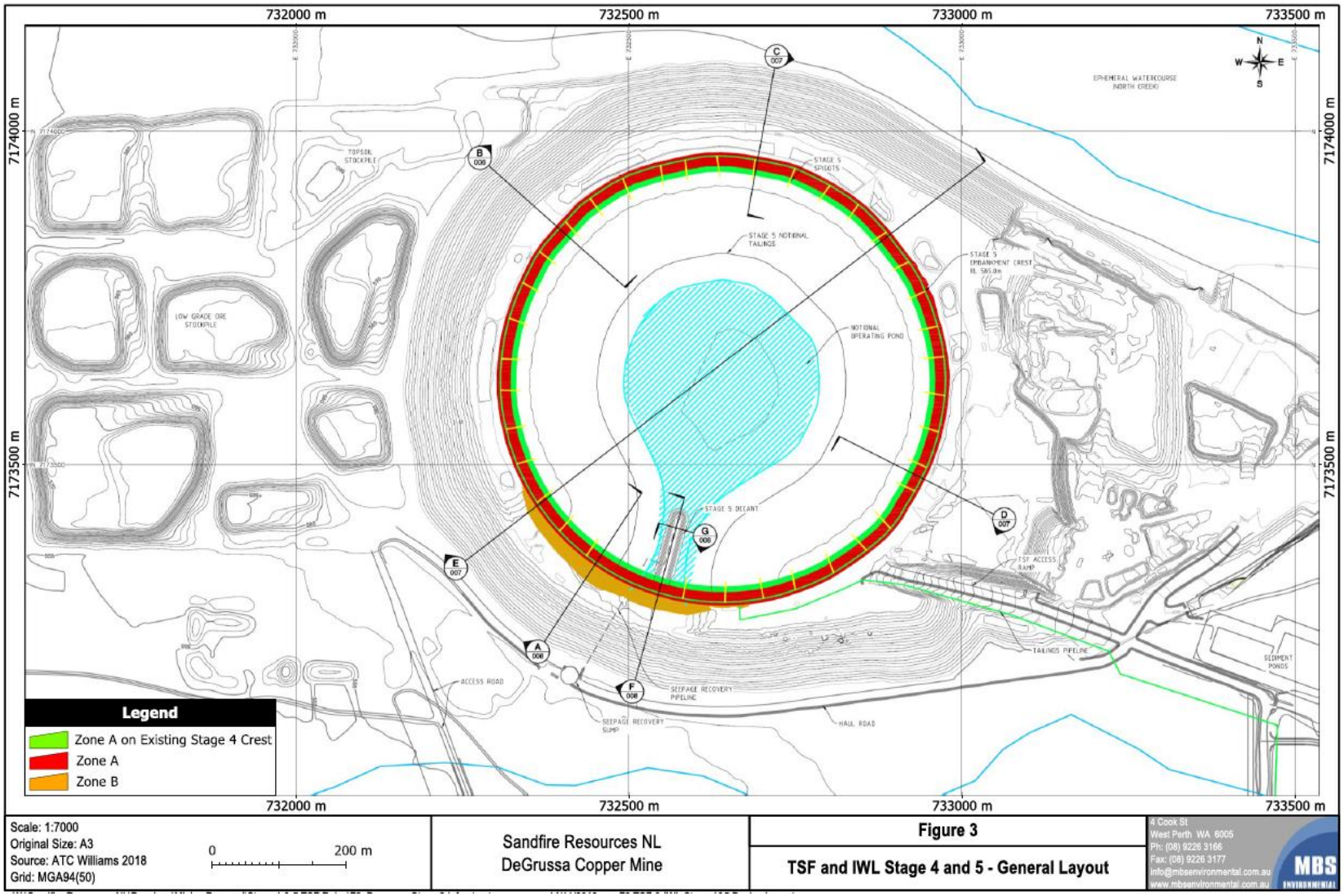
Each lift of the inner containment zones will be laid back against the surrounding mine waste, and HDPE liner will be extended up the face of the Zone A lifts (see Figures 2 & 3) and anchored in a trench around the inner perimeter. To facilitate a two-stage lift and anchoring of the HDPE, a 10 m wide bench excavation will be required into the Zone B upstream slopes of the existing landform (Figures 2 and 3). Material from the excavation will be used to construct infill Zone B embankments in a surface depression in the southern section of the waste rock perimeter.

Figure 1: Infrastructure layout



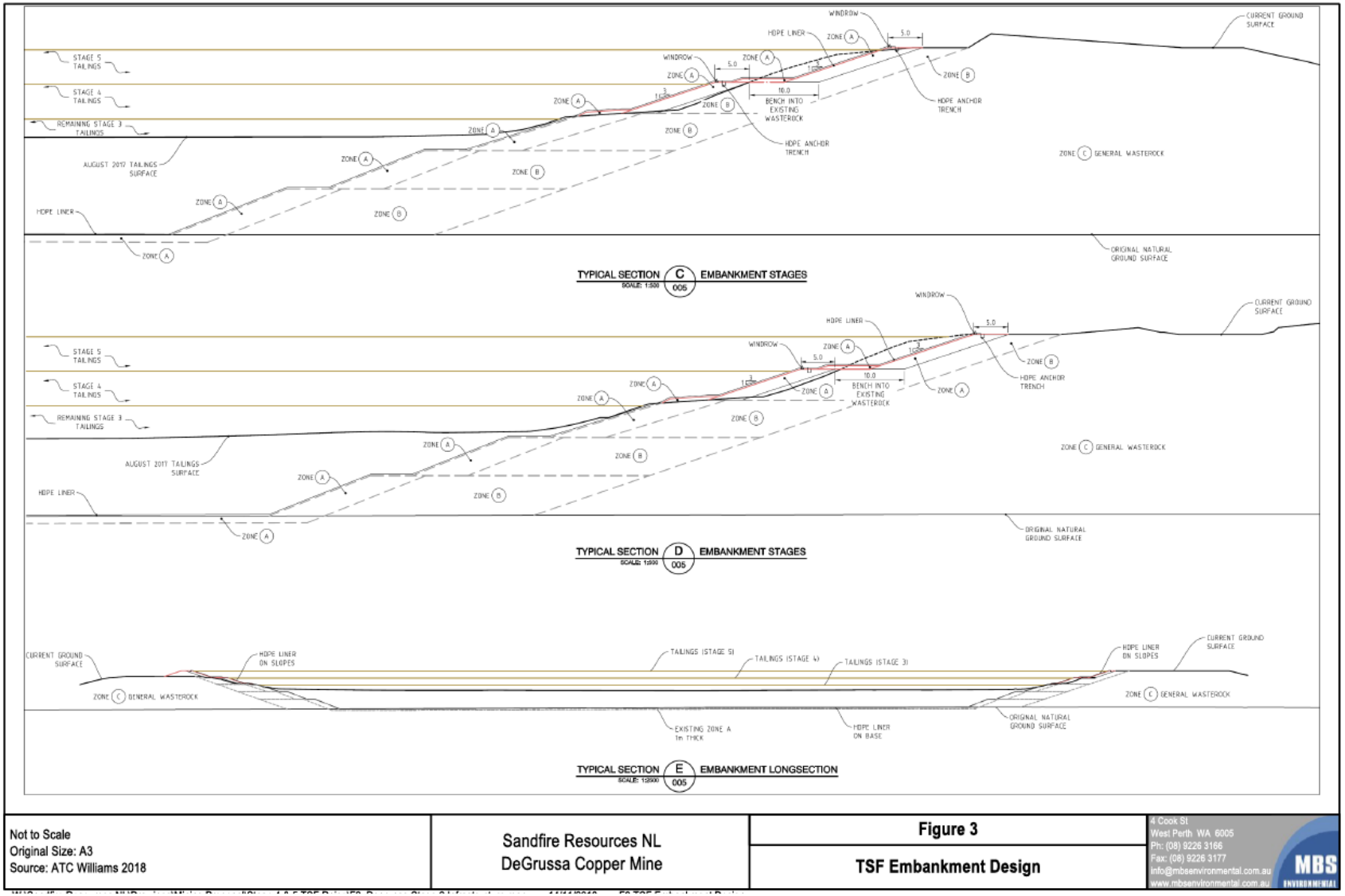
Licence: L8558/2011/1

Figure 2: TSF Stage 4 and 5 – general layout.



Licence: L8558/2011/1

Figure 3: TSF embankment design



Not to Scale Original Size: A3 Source: ATC Williams 2018	Sandfire Resources NL DeGrussa Copper Mine	**Figure 3** **TSF Embankment Design**	4 Cook St West Perth WA 6005 Ph: (08) 9226 3166 Fax: (08) 9226 3177 info@mbsenvironmental.com.au www.mbsenvironmental.com.au MBS ENVIRONMENTAL

Licence: L8558/2011/1

Tailings Discharge

The existing pipeline and spigot system will be lifted onto Stage 4 and Stage 5 inner embankments. The decant tower and causeway will also be raised with each lift.

Decant water management

The TSF catchment is contained within the outer perimeter of the waste rock embankment crest. Each Stage is designed to contain up to 1.2 million cubic metres additional tailings storage and provide sufficient stormwater capacity to hold rainfall associated with a 1 in 100 year Annual Exceedance Probability (AEP), 72 hour event, plus a 0.5 m freeboard (MBS, 2018).

Tailings geochemical characterisation

Tailings deposition into the proposed Stage 4 and 5 TSF raises will consist of tailings generated from processing of the following ore types:

- DeGrussa ore; and
- Monty ore.

Geochemical characterisation studies for these ore types determined that Monty and DeGrussa tailings are Potentially Acid Forming (PAF) materials. Monty tailings are considered to be geochemically compatible with DeGrussa tailings for co-disposal in the lined DeGrussa IWL. Monty tailings have similar geochemical properties to the DeGrussa tailings, but are less sulphidic and generally contain lower concentrations of chalcophile metals and metalloids, and higher concentrations of tellurium, thorium, uranium, and vanadium (Mine Proposal Reg. ID 64481).

The tailings slurry is acidic (pH 3) though measured pH in the decant water has been around pH 6 (ATC Williams, 2018).

EP Act Part V – licences and works approvals

Table 2 provides the history of works approvals and licences for the premises.

Table 2: History of works approvals and licences issued

Instrument	Commenced	Description
L8558/2011/1	23/06/2011	New Application - Category 54
W4960/2011/1	7 July 2011	New Application for Works Approval – Categories 5, 52 and 73
L8558/2011/1	9/02/2012	Amended to include category 5, 6, and 64
L8558/2011/1	22/11/2012	Licence amendment – Administration error
L8558/2011/1	9/05/2013	Licence amendment – Increase category 6 throughput
L8558/2011/1	20/06/2013	Licence amendment – Change to monitoring targets
L8558/2011/1	1/08/2013	Licence amendment – Increase category 6 throughput
W5697/2014/1	18/08/2014	New application for works approval – Category 6 and 64
L8558/2011/1	9/10/2014	Licence amendment – REFIRE format conversion and incorporate changes from completed works under W5697/2014/1.

L8558/2011/1	27/11/2014	Licence amendment – construction of additional dewater pipelines to provide for discharge up to 200 L/s.
W5866/2015/1	19/10/2015	New works approval – increase cat 6 throughput and additional dewater discharge points to Central Drainage and John's Creek, and expansion of the landfill.
L8558/2011/1	3/12/2015	Licence amendment – to increase category 5 throughput and installation of synthetic liner to the TSF
L8558/2011/1	26/04/2016	Notice of Amendment to extend licence duration to 23/12/2026
L8558/2011/1	18/09/2017	Amendment Notice to increase Category 52 design/production to 23 MW by additional of 2 x 2 MW power units.
L8558/2011/1	9/05/2018	Amendment Notice 2 for: installation of a larger thickener and filter to increase grade and volume of concentrate produced (assessment included processing ore from the Monty Mine deposit); installation of deeper replacement TSF monitoring bores; operation of dewatering discharge to Central Creek; and removal of Cat 52 commissioning conditions.
L8558/2011/1	30/01/2019	Amendment Notice 3 for Stage 4 and 5 lifts of the TSF.

Other approvals

Other approvals relating to the amendment are outlined in Table 3.

Table 3: Relevant approvals

Legislation	Number	Approval
Mining Act 1978	Reg. Id 30745	Mining Proposal for Stage 2 of the DeGrussa Copper-Gold Project on M52/1046 – decided 03/08/2011
	Reg. Id 64481	Mining Proposal - Revised ROM Pad Ramp and Minor Infrastructure - DeGrussa Copper Mine – decided 27/04/2017
	Reg. Id 77058	Mining Proposal for TSF Embankment Raise (Stages 4 and 5) DeGrussa Copper Mine - M52/1046 - Sandfire Resources NL - November 2018 – decided 10/01/2019.

Location and receptors

The DeGrussa Copper Mine is located approximately 150 km north of Meekatharra. The closest sensitive land uses to the Premises are listed in Table 4.

Table 4: Sensitive land uses and distance from the premises

Residential and sensitive premises	Distance from Prescribed Premises
Doolgunna station homestead	18 km south west of the premises
Meekatharra	150 km south of the premises

Table 5 below lists relevant environmental receptors and distances from the Prescribed Premises.

Table 5: Environmental receptors

Specified eco-systems – biological component	Distance from Prescribed Premises
Parks and Wildlife Managed Lands and Waters	The Premises is on unallocated crown land (Former Doolgunna station) that is proposed for addition to the conservation estate.
Priority 1 Priority Ecological Communities (PEC) - Doolgunna Calcrete PEC and Robinson Range PEC Priority 3 PEC - Blech Land System	Doolgunna Calcrete PEC located approximately 3.5 km west of the premises. Robinson Range PEC located approximately 5 km west of the premises. Blech Land System located approximately 10 km north east of the premises
Threatened/Priority Flora	The nearest record of priority flora is located approximately 8 km to the south east of the premises.
Threatened/Priority Fauna	The nearest record of threatened or priority fauna is located approximately 46 km to the north east of the premises.
Public Drinking Water Sources Area	None within the premises or the local vicinity.
Rights in Water and Irrigation Act 1914 (RIWI Act) proclaimed area - East Murchison Groundwater Area	Premises is located within the area.
RIWI Act Area proclaimed area - Gascoyne River and Tributaries	Premises is located within the area.

Hydrogeology

MBS (2018) reports that the hydrogeology of the site is characterised by low permeability saprolite clays and bedrock with minor fracturing.

ATC Willams (2018) reports that prior to construction, a geotechnical investigation was carried out in 2010 at the TSF site and the general stratigraphy encountered was typically characterised as;

- Alluvial sheetwash deposits of gravelly silt to depths of less than 1 m;
- Cemented Ferricrete hardpan between 3.4 m and 6.4 m thick; and
- Alluvial channel deposits of gravelly silt.

ATC Williams (2018) provides a summary of a review of the mine hydrogeology conducted by RPS in 2016, which is further summarised below.

The regional extensive stratigraphic unit is the Johnson Cairn Formation. The presence of a significant dolomite aquifer in the Johnson Cairn Formation was not identified at the time of the original hydrogeological investigations. The Johnson Cairn Formation comprises dolomite, dolomitic siltstone and shale. The unit occurs around the margins of a large basinal structure and has been subjected to extensive jointing and fracturing during slumping on the basin margin. The unit is deeply weathered (down to 400 m depth in places) and some karst development has been reported.

The aquifer system is characterised by the:

- Main aquifer zone – highly variable moderate to high permeability aquifer with good hydraulic connection within this section.

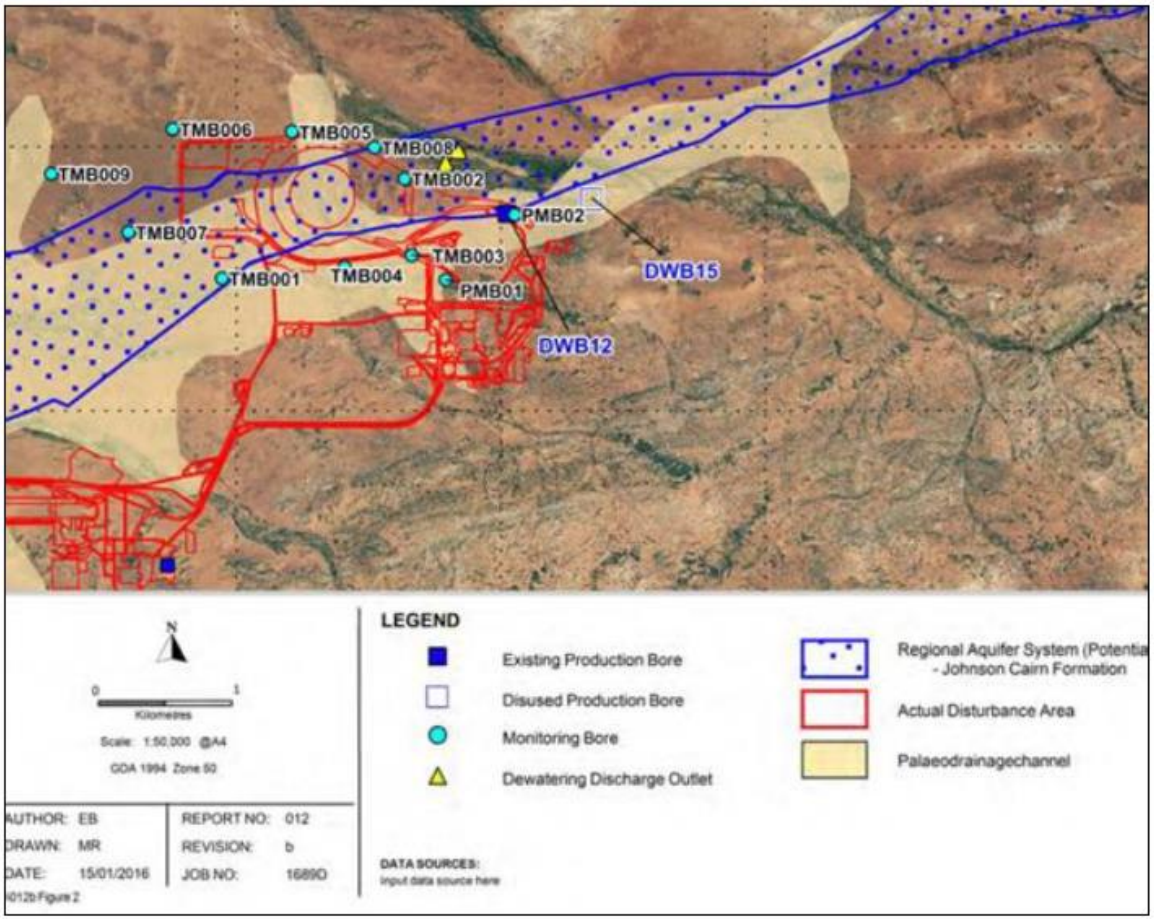
- Secondary aquifer zone – highly variable low to moderate permeability aquifer within the rest of the Johnson Cairn Formation. Hydraulic connection within the secondary aquifer zone and with the main aquifer zone will be variable and linked to fracture/joint connection between pods of higher permeability.

A palaeodrainage channel exists to the north of the DeGrussa Pit and extends beneath the TSF. The channel forms a tributary of the main trunk palaeochannel to the west in which the mine water supply borefield was installed.

The palaeochannel sediments are inferred to have a low to very low permeability and do not form an aquifer (but rather they form an aquitard or aquiclude).

The locations of the palaeochannel and aquifer system are relative to the TSF and monitoring bores is shown in Figure 4.

Figure 4: Palaeochannel and regional aquifer system



Groundwater

Groundwater quality is generally fresh to slightly brackish, neutral to slightly alkaline with a naturally high nitrate/nitrite concentration. Dominant ions include sodium, chloride and bicarbonate. Groundwater quality is suitable for stock drinking water (ANZECC 2000).

Prior to the commencement of mining, groundwater was present just below the hardpan layer, 6 to 10 metres below ground level (mbgl). Standing water levels have generally fallen in response to mine dewatering and are currently range from about 8 to 14 mbgl around the IWL (MBS, 2018).

Groundwater is likely to broadly flow west across the project area.

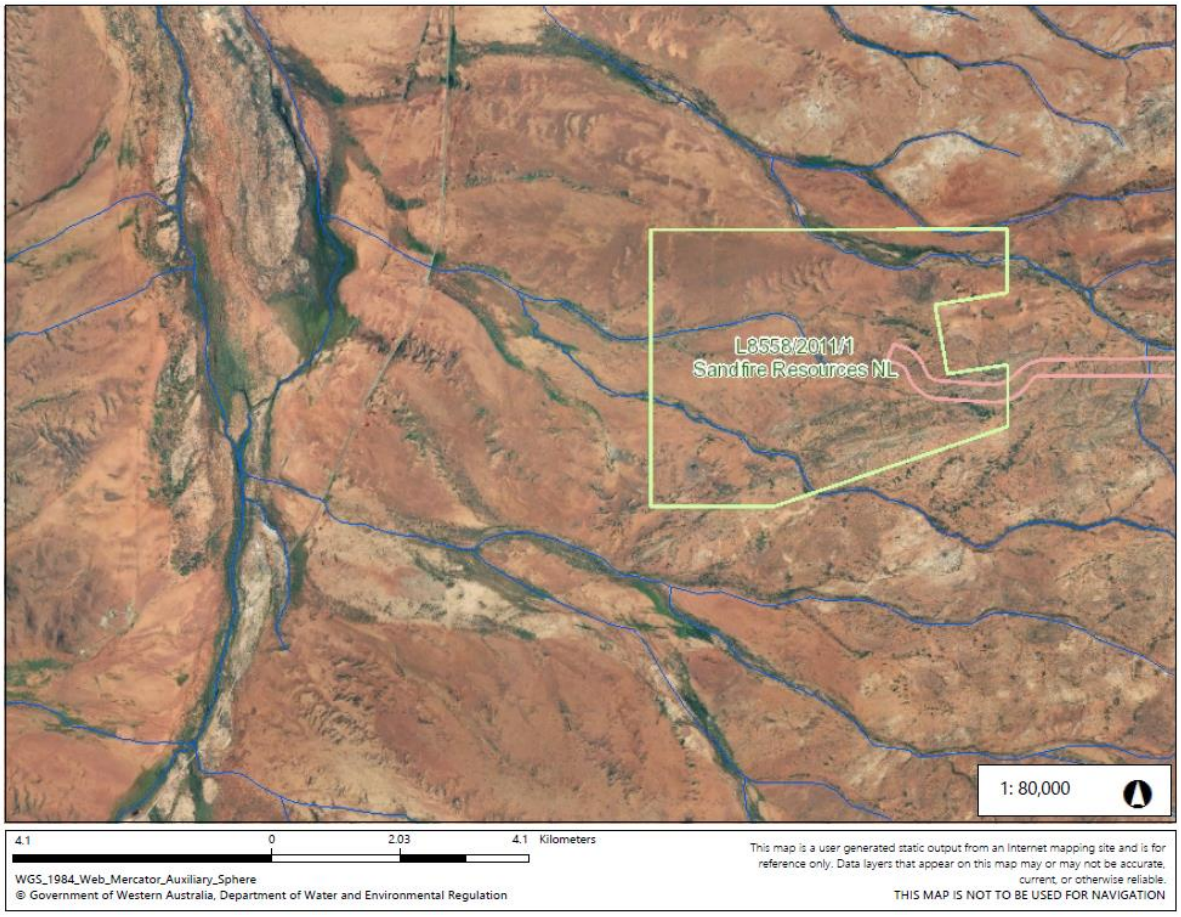
Surface water

Three Minor Non Perennial Watercourses intersect the premises and drain west northwest into a Non Perennial tributary of the Gascoyne River as shown in Figure 5 below. The Gascoyne River is located 40 km from the premises.

The project area is characterised by low lying gently sloping ground. (ATC Williams, 2018).

The TSF was sited in an area of sheet flow. According to MBS (2018) the facility has been shown to have minimal effect on sheet-flows after high rainfall events. MBS reports that surrounded by mine waste, the TSF receives only incidental rainfall which is collected from the decant tower and returned to the process plant for reuse.

Figure 5: Surface water features



Risk assessment

Tables 6 and 7 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 6: Risk assessment for proposed amendments during construction

Risk Event								
Source / Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**	**Consequence rating**	**Likelihood rating**	**Risk**	**Reasoning**
Earthmoving activities associated with construction of the TSF Stage 4 and Stage 5 lifts.	Dust	Doolgunna station - 18 km SW of the premises	Air	Health and amenity impacts	N/A	N/A	N/A	Distance to closest sensitive land use is sufficient to inform the risk of dust emissions as not foreseeable. The general provisions of the EP Act are applicable.
	Noise	Doolgunna station - 18 km south west of the premises	Air	Amenity impacts	N/A	N/A	N/A	Distance to closest Specified Ecosystem is sufficient to inform the risk of noise emissions as not foreseeable. The *Environmental Protection (Noise) Regulations 1997* are applicable.
	Storm water laden with sediment	Surface water bodies and vegetation in the path of the sediment load.	Path of stormwater flow	Erosion, or increased sediment load – smothering vegetation.	Minor Low level on site impacts	Unlikely The risk event will probably not occur in most circumstances	Medium	The closest Specified Ecosystem is 3.5 km from the premises boundary. Surface water on the premises are ephemeral minor drainage lines. Construction is of relatively short duration. <u>Regulatory controls</u> The *Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA) are applicable.
Refueling of construction vehicles.	Fuel spills	Soils and ground	Direct discharge and infiltration through ground.	Hydrocarbon contamination of soils and groundwater of beneficial use.	Minor Low level on site impacts	Unlikely The risk event will probably not occur in most circumstances	Medium	The closest sensitive environmental receptor is 3.5 km from the premises boundary and impact is contained to the area of the spill. Surface water on the premises are ephemeral minor drainage lines. Groundwater is approximately 10 mbgl. <u>Regulatory controls</u>

								The *Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA) are applicable.

Table 7: Risk assessment for proposed amendments during operation

Risk Event								
Source / Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**	**Consequence rating**	**Likelihood rating**	**Risk**	**Reasoning**
Tailings disposal into the TSF with embankment heights to: Stage 4 580.0 m RL Stage 5 585.0 m RL	Tailings dust	Doolgunna station - 18 km south west of the premises	Air	Health impacts	Minor Low level on site impacts & minimal off-site impacts	Rare The risk event will probably not occur in most circumstances	Low	The closest sensitive land user is 18 km away. The closest Specified Ecosystem is 3.5 km from the premises boundary. Tailings are located inside the waste dump with some protection from wind which may reduce the potential for dust generation. Dust suppression on the tailings surface during operation is managed by maintaining a regular deposition cycle of wet tailings around the perimeter. <u>Regulatory controls</u> The general provisions of the EP Act are applicable.
		Native vegetation, fauna	Air	Contamination of soils and uptake of toxicants by vegetation entering the food chain				
	Tailings release by dam wall break, seismic activity, land sink.	Soils, ephemeral streams, native vegetation and fauna.	Direct discharge and flow path	Contamination of soils, impacts to native vegetation and fauna in the vicinity of the flow path.	N/A	N/A	N/A	Outside of scope: Department of Mines, Industry Regulation and Safety (DMIRS) assesses and regulates structural stability of the TSF.
	Tailings leachate – (acidic and containing	Ground water with beneficial use (suitable	Seepage of tailings leachate through the	Contamination of groundwater of beneficial use.	Moderate Specific consequence criteria	Unlikely The risk event will probably not occur in	Medium	Seepage may be acidic and contain toxic metals and metalloids. Contamination of groundwater may impact on water resources of beneficial use.

	metals and metalloids including arsenic, selenium tellurium, thorium, uranium, and vanadium)	for livestock watering)	walls and base of the TSF and infiltrating through ground.		(ANZECC 2000) are at risk of not being met.	most circumstances		Prior to dewatering groundwater was 6 to 10 mbgl, and is now in the range of 8 to 14 mbgl. Minor fractures occur in the underlying bedrock. Groundwater monitoring at the TSF has not indicated increased concentrations of potential contaminates. There is no vegetation of conservation significance within 3.5 km. Un-named ephemeral drainage systems are located on either side of the Integrated Waste Landform (see Figures 1 and 4). <u>Applicant controls</u> Embankment liner design is compacted low permeability material (permeability of 10^{-7} m/s) overlain by a HDPE liner (permeability of 10^{-12} m/s). Stages 4 and 5 construction will be in accordance with the TSF Design Report by ATC Williams (2018). The base of the TSF is lined with 2 mm HDPE installed over a compacted clay layer. An underdrainage collection system extends along the upstream toe of the Stage 1 embankment, and will be maintained during construction and operation of Stage 4 and Stage 5. Tailings distribution network will be maintained to distribute tailings evenly to promote drying. The existing pipeline and spigot system will be lifted onto Stage 4 and Stage 5 inner embankments and the decant tower and causeway raised. The TSF is visually inspected daily. <u>Regulatory controls</u> Applicant controls have minimised the likelihood of the risk of seepage and will be conditioned on the Licence. Applicant controls for operating the TSF are conditioned by the existing Licence and no change is required.
		Soils and vegetation in the vicinity of mounding within the root zone.		Contamination of soils/and uptake of toxicants by vegetation (including riparian vegetation of ephemeral watercourses) and entering the food chain.	Moderate Mid-level on site impacts	Unlikely The risk event will probably not occur in most circumstances	Medium	

	Tailings and stormwater overflow (acidic and containing metals and metalloids including arsenic, selenium tellurium, thorium, uranium, and vanadium).	Soils, surface water and vegetation in the path of the overflow	Direct discharge and flow path	Contamination of soils/and uptake of toxicants by vegetation (including riparian vegetation of ephemeral watercourses) and entering the food chain.	Moderate Mid-level on site impacts	Unlikely The risk event will probably not occur in most circumstances	Medium	The closest Specified Ecosystem is 3.5 km from the premises boundary. The TSF is constructed on a in a relatively flat area and is located within a waste rock dump. Un-named ephemeral drainage systems are located on either side of the Integrated Waste Landform (see Figures 1 and 4). <u>Applicant controls</u> The lifts are designed for anticipated tailings capacity and to maintain a1:100 AEP, 72 hr run-off superimposed on normal operating pond plus 0.5 m total freeboard. <u>Regulatory controls</u> Applicant controls have minimised the risk and will be conditioned on the Licence.
	Tailings and return spillage from pipeline spills /ruptures	Soils, surface water and vegetation in the path of the overflow	Direct discharge and flow path	Contamination of soils/and uptake of toxicants by vegetation (including riparian vegetation of ephemeral watercourses) and entering the food chain.	Moderate Mid-level on site impacts	Unlikely The risk event will probably not occur in most circumstances	Medium	The closest Specified Ecosystem is 3.5 km from the premises boundary. Tailings pipeline crosses an un-named ephemeral drainage system (see Figures 1). <u>Applicant controls</u> The existing tailings delivery network and operation including visual inspection will be maintained. At the TSF, the pipeline and spigot system will be lifted onto the Stage 4 and 5 inner embankments. <u>Regulatory controls</u> The existing licence condition 1.3.6 requires daily visual inspection of tailings and return pipelines. Condition 1.3.7 requires the pipelines to be either equipped with sensors and auto cutoffs in the event of leaks or failure, or provided with secondary containment sufficient to contain any spill between inspections. No additional regulatory controls are required as a consequence of the proposed TSF lifts.

Decision

Approval for construction and operation of the Stage 4 and Stage 5 lifts is granted. Applicant controls are conditioned on the Licence where they have lowered risk, as outlined in Table 7.

Condition 1.3.4 of the existing licence requires the TSF containment to be lined to achieve a permeability of 1 x 10^{-9} m/s. This condition remains applicable following construction of each lift.

Conditions 1.3.5 and 1.3.6 of the existing licence for maintaining freeboard of 500 mm and for daily inspection of the TSF, remain applicable for operation of the TSF following construction of each lift.

Condition 3.5.1 of the existing licence for groundwater monitoring at the TSF remains applicable.

Construction compliance documents will be required to be submitted prior to operation.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 15 January 2019 for review and comment. The Licence Holder responded on 15 January 2019 with no comments and waiving the remaining comment period.

Amendment

1. The Licence is amended by the insertion of the following Condition 1.3.10:

1.3.10 The Licensee must construct and undertake the Works for the infrastructure and equipment specified in Column 1 to the requirements specified in Column 2, of Table 1.3.7 below:

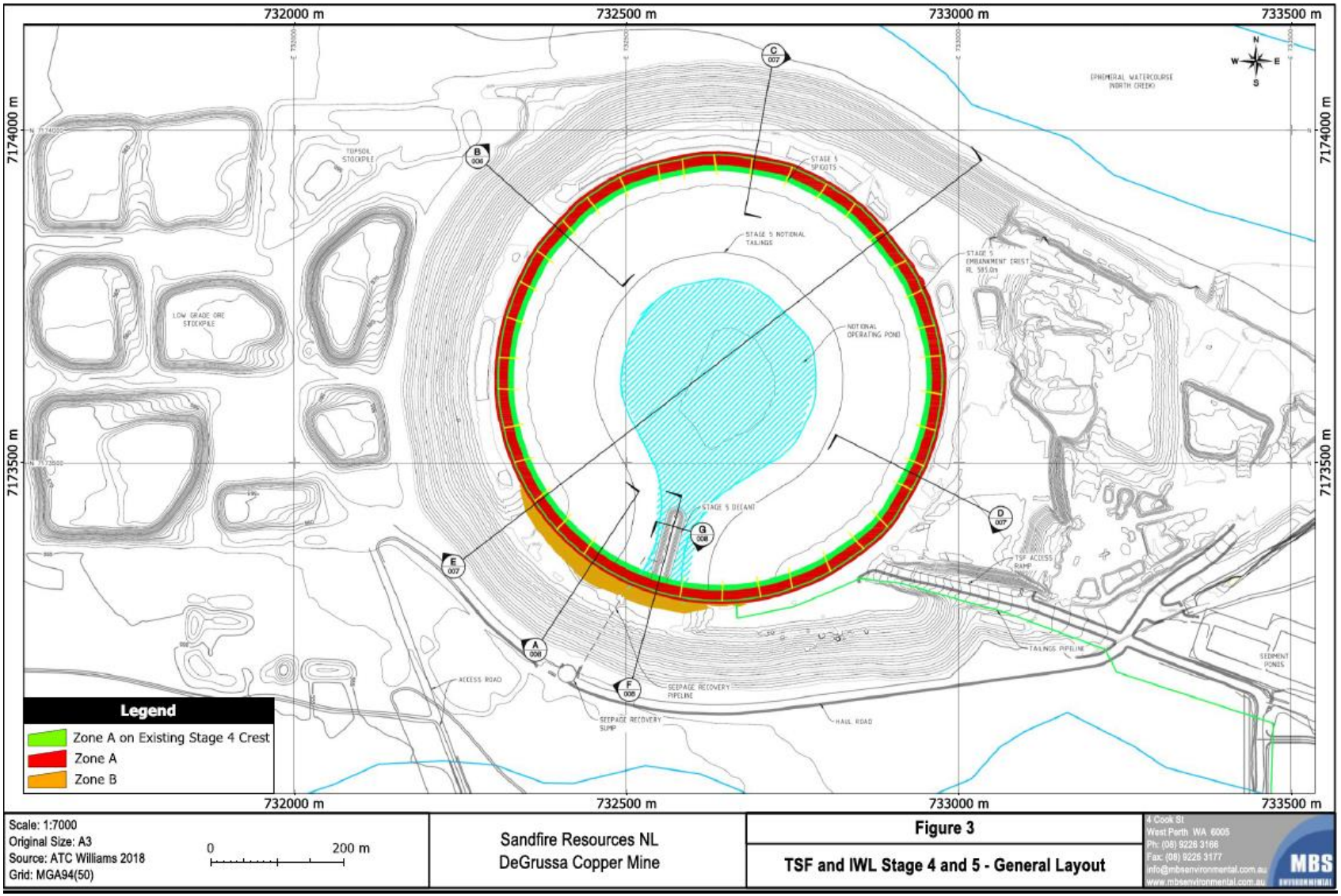
Table 1.3.7: Construction Requirements	
Column 1	**Column 2**
Infrastructure/Equipment	**Requirements (design, construction and location)**
TSF embankment Stage 4	**Embankment crest elevation 580.0 m RL**
TSF embankment Stage 5	**Embankment crest elevation 585.0 m RL** **Final landform height 27 m (within IWL height of 35 m)**
TSF Embankment Design - Stage 4 and Stage 5	**Constructed as depicted in Schedule 1: Maps: *"Map of TSF Stage 4 and 5 – general layout"* and "*TSF Design – Sections"* (both from *Mining Proposal for TSF Embankment Raise (Stages 4 and 5) DeGrussa Copper Mine - M52/1046,* prepared by MBS Environmental, November 2018).** **Zone A - 5 m width and constructed of compacted low permeability material (permeability of greater than 10^{-7} m/s), overlain by a 1 mm thick HDPE liner (permeability greater than 10^{-12} m/s).** **Each lift of the inner containment zones laid back against the surrounding mine waste and HDPE liner extended up the face of the Zone A lifts and anchored in a trench around the inner perimeter.**
TSF Stage 4 and Stage 5	**Each Stage constructed and designed to contain up to 1.2 million cubic metres additional tailings storage, and provide sufficient stormwater capacity to hold rainfall**

	associated with a 1 in 100 year Annual Exceedance Probability 72 hour event, plus a 0.5 m freeboard.
TSF underdrainage collection system	**Underdrainage collection system extends along the upstream toe of the Stage 1 embankment, maintained during construction and operation of Stage 4 and Stage 5.**
Tailings distribution	**The existing decant tower raised.** **Existing pipelines and spigot system lifted onto the Stage 4 and Stage 5 inner embankments.**

2. The Licence is amended by the inclusion of the text in Table 4.3.1 as shown in bold underline text below.

Table 4.3.1: Notification requirements			
Condition or table (if relevant)	**Parameter**	**Notification requirement[1]**	**Format or form[2]**
-	Any failure or malfunction of any pollution control equipment or any incident, which has caused, is causing or may cause pollution.	Part A: As soon as practicable but no later than 5pm of the next usual working day. Part B: As soon as practicable	N1
Table 1.3.7	**Construction Compliance Report certifying each item of infrastructure or component of infrastructure specified in Column 1 of Table 1.3.7 has been constructed with no material defects and to the requirements specified in Column 2.** **The report must be prepared or reviewed by a person with tertiary qualifications in Civil or Geotechnical Engineering and at least two years employment in geotechnical structures.**	**Within 60 days of the completion of each Stage of the Works specified in Column 1 of Table 1.3.7, and prior to deposition of tailings into the completed Stage.**	**None specified**
Table 2.3.2	Limit exceedance	Within 72 hours of becoming aware that a limit has been exceeded.	

Map of TSF Stage 4 and 5 – general layout



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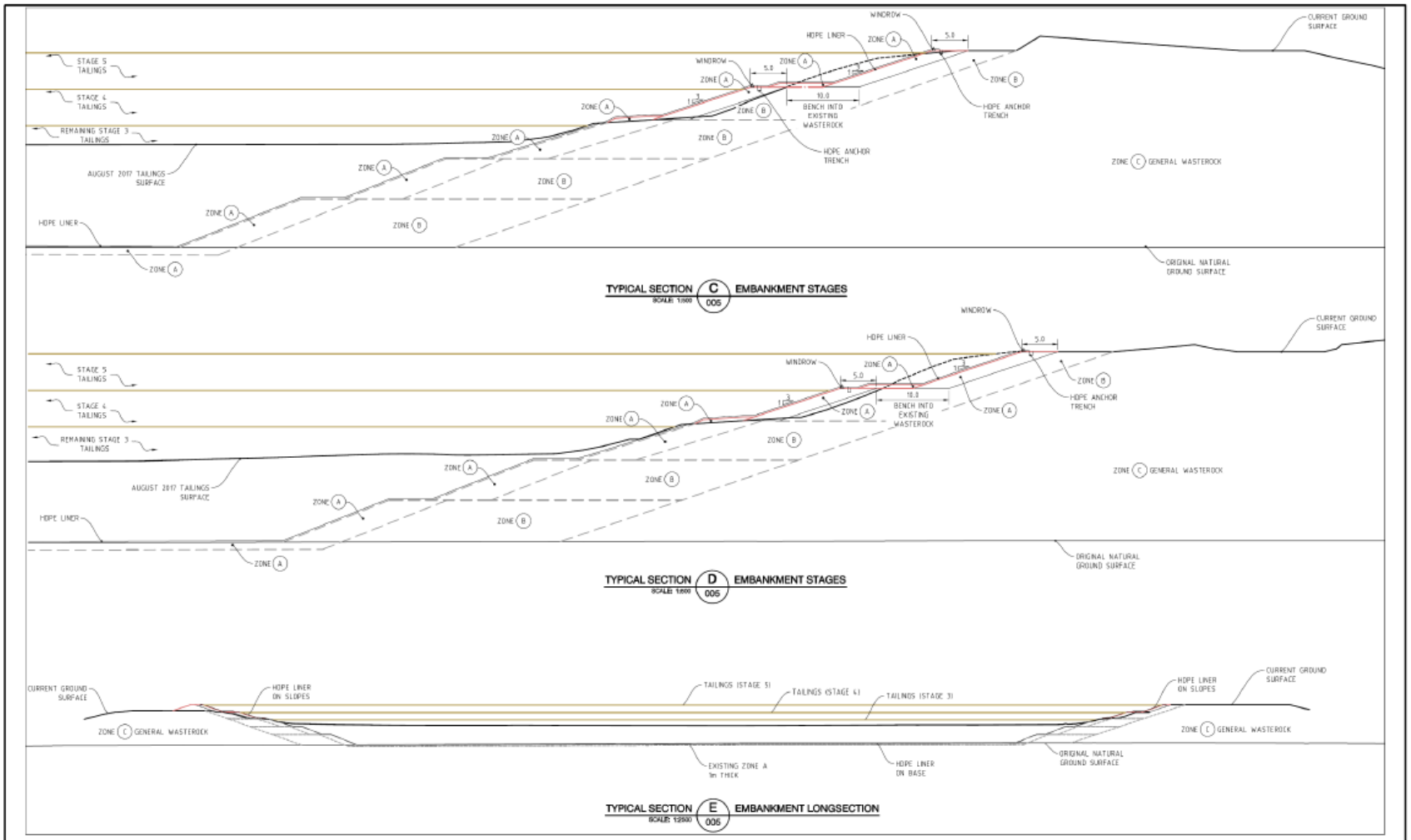
TSF Design - Sections



Not to Scale Original Size: A3 Source: ATC Williams 2018	Sandfire Resources NL DeGrussa Copper Mine	**Figure 4** **TSF Stage 4 Design - Sections**	4 Cook St West Perth WA 6005 Ph: (08) 9226 3166 Fax: (08) 9226 3177 info@mbsenvironmental.com.au MBS

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Appendix 1: Key documents

	Document title	In text ref	Availability
1	Application: PDF Application Form including Attachments, received by email: From Karen Ganza, MBS Environmental, 14/11/2018 3:08 PM. *DeGrussa TSF Lifts (Stages 4 and 5)*	Application	DWER Records (A1739584)
2	ATC Williams, October 2018. *DeGrussa Copper Mine, IWL TSF Stage 4 & 5 Design.* Prepared for Sandfire Resources NL.	ATC Williams, 2018	DWER Records (A1739584)
3	Australian and New Zealand Environment and Conservation Council, (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). 2000. *Australian and New Zealand guidelines for fresh and marine water quality. Volume 1*, *The Guidelines* / Australian and New Zealand Environment and Conservation Council, Agriculture and Resource Management Council of Australia and New Zealand.	ANZECC 2000 Guidelines	DWER Records (A1739584)
4	MBS Environmental, November 2018. *Mining Proposal For TSF Embankment Raise (Stages 4 and 5) DeGrussa Copper Mine - M52/1046*. Prepared for Sandfire Resources NL.	MBS, 2018	
5	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	-	accessed at www.dwer.wa.gov.au
6	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	-	
7	DER, November 2016. *Guidance Statement: Environmental Siting.* Department of Environment Regulation, Perth.	-	
8	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	-	

9	DER, February 2017. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	-	