Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6280/2019/1
Applicant	BHP Billiton Nickel West Pty Ltd
ACN	004 184 598
File Number	DER2019/000419
Premises	Nickel West Leinster Nickel Operations Tenements ML255SA, M36/230, L36/93, M36/4, M36/389, G36/49 and G36/50
Date of Report	28 November 2019 Final
Status of Report	Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in **Table 1** have the meanings defined.

Table 1: Definitions

Term	Definition
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
Decision Report	refers to this document.
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.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	L4612/1989/11
m^3	cubic metres
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
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
Priority Flora	Species listed as priority flora by the Department of Biodiversity, Conservation and Attractions
Risk Event	As described in *Guidance Statement: Risk Assessment*
RWP	Return water pond

2. Purpose and scope of assessment

On 1 August 2019, BHP Billiton Nickel West Pty Ltd submitted an application for a Works Approval to construct a new tailings storage facility (TSF3 Cell F) at the Leinster Nickel Mine (NLN). The proposed cell is located across mineral lease ML255SA and general purpose leases G36/49 and G36/50. The Applicant is the Lessee for G36/49 and G36/50 and holder for the respective underlying tenements (M36/230 and M36/439) so the Delegated Officer is satisfied that the Applicant has legal access to this land.

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Works Approval Application - Nickel West Leinster TSF Cell F (A1798341) Documents extracted from file transfer link provided above: • NiW works approval application form NLN TSF Cell F 2019 (A1812138) • NLN TSF Cell F - Supplementary Information Final 01082019 (A1812145) • Appendix D Cell F Design Report (A1812146)	1/8/19
Email Correspondence from Stacey Cook regarding Priority Flora (A1815979)	19/8/19
Email Correspondence from Stacey Cook regarding premises boundary, and clearing (A1825347)	12/9/19
Email Correspondence from Stacey Cook - *Technical clarification – puddle flange* (A1830752)	9/10/19
Email Correspondence from Stacey Cook - *Technical clarification – seepage interception* (A1833696)	15/10/19
Email Correspondence from Stacey Cook - *Perimeter drains and RWP bypass from toe drain* (A1840058)	5/11/19

3. Background

The Nickel West Leinster Operations Premises is situated approximately 370km north east of Kalgoorlie and approximately ten kilometres north of the Leinster township.

BHP Billiton Nickel West Pty Ltd (NiW) processes sulphide ore to produce nickel concentrate which is then transported via road to Leonora, then via rail to the Kalgoorlie Nickel Smelter for smelting (L8653/2012/2). The site is authorized to processes up to 3,600,000 tonnes of ore annually and during the 2018-2019 annual period approximately 2,185,484 tonnes of tailings were produced requiring on site disposal to TSF2 and TSF3 (cells AB, CD and E). This Works Approval is for the construction of a new TSF3 Cell F, to the North of existing TSF3 Cell AB as shown in **Figure 1**.

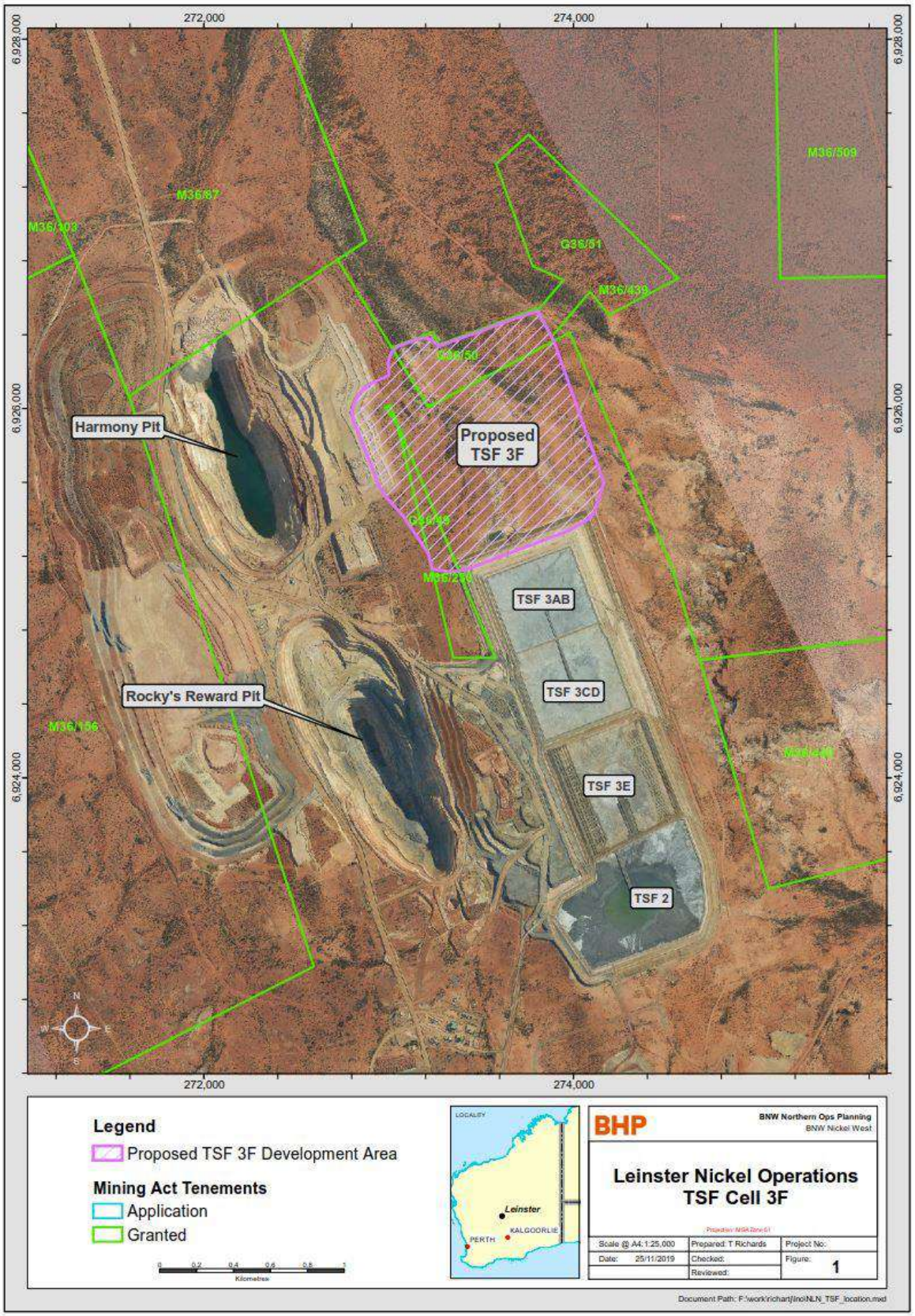


Figure 1: Location of TSF3 Cell F

The Existing Licence L4612/1989/11 relates to Categories 5, 6, 57, 64 and 85. This Works Approval relates only to Category 5, as outlined in Table 3.

Table 3: Prescribed Premises Categories in the Existing Licence L4612/1989/11

Classification of Premises	**Description**	***Approved Premises production or design capacity or throughput***
Category 5	Processing or beneficiation of metallic or non-metallic ore: premises on which — (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	3,600,000 tonnes per year

4. Overview of Premises

4.1 Prescribed Premises boundary

The proposed works are predominantly on an existing prescribed premise, operated by the Applicant under Licence L4612/1989/11. However, a portion of the works are located outside this L4612 Prescribed Premise, on general purpose lease G36/50 and also within L4612 Prescribed Premise on a new general purpose lease G36/49. The Premises for this works approval is therefore as per L4612 (ML255SA, M36/230, L36/93, M36/4 and M36/389) plus G36/49 and G36/50. After completion and compliance certification of the works within the Issued Works Approval, L4612 will require amendment to include G36/49 and G36/50 within the premises boundary. **Figure 2** shows the premises prescribed for this Works Approval.

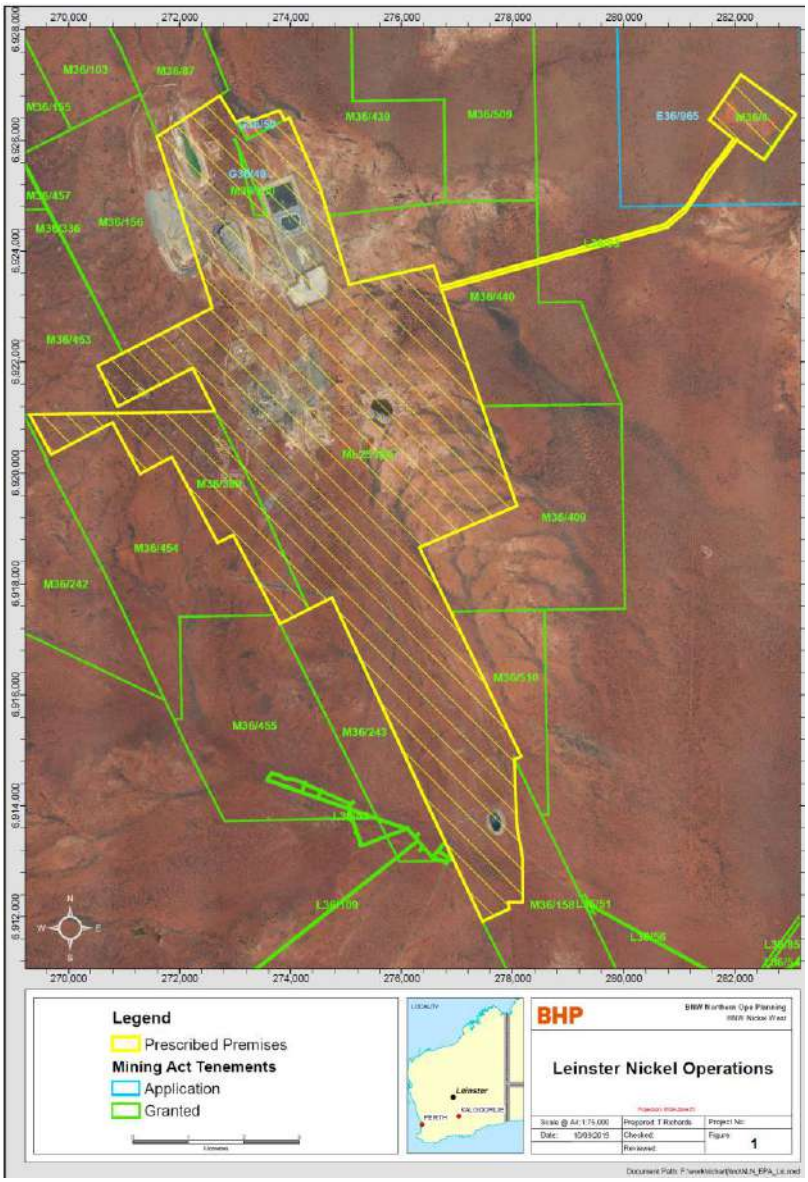


Figure 2: Prescribed Premises boundary

4.2 Operational aspects

TSF3 Cell F has a design capacity of approximately 29 Mt. This is required to supplement the existing TSFs at NLN in order to accommodate projected tailings generation until 2040. Cell F will be constructed in 9 stages, as follows:

- Stage 1a will comprise two embankments on the northern and eastern sides of the Cell F footprint (to RL 10516m). This will accommodate about 12 months of tailings deposition.
- Stage 1b will involve construction of the southern and western embankments and raising of the northern and eastern embankments to RL 10520m, completing the cell perimeter
- Stages 2 to 8 will be upstream lifts to Cell F. Each lift will raise the cell by 2.5m except the final lift of 2.8m. The final design crest elevation is up to RL 10540m.

Stages 1A and 1B embankments will be formed from compacted mine waste. Subsequent stages (7 proposed lifts) will be constructed from compacted tailings sourced from the adjacent tailings beaches. This is the same process that has been used for existing TSF cells.

Tailings deposition for current and future cells is described in the Nickel West Tailings Management Master Plan (NiW, 2019d) as follows:

> *'Tailings are pumped from the Plant (via an overland HDPE pipe) and discharged into the storage cell from a perimeter ring main. Tailings deposition is cycled around the cell by discharging from spigots located at intervals along the perimeter ring main. The tailings are deposited in thin layers to form a "beach" adjacent to the perimeter embankment with the liquor released from the settling tailings collected in a pool around a central decant tower.'*

In stage 1a, decanted liquor from this pool will be pumped to the return water pond located to the north of TSF3 Cell AB via a return water line. A total operational freeboard of 300mm will be maintained at all times (NiW, 2019e). Decant liquor from subsequent stages will gravity drain into a new return water pond constructed to the north of TSF3 Cell F.

Piezometer locations are proposed in the design documents for TSF3 Cell F. The Delegated Officer considers that piezometers are primarily used to assess the phreatic surface for the purpose of stability assessments. Placement suitability is therefore best regulated under the *Mines Safety and Inspection Act 1994.* A Mining Proposal (ID 82020) has been submitted to the Department of Mines, Industry Regulation and Safety for their assessment.

Measures to limit movement of seepage from the existing TSF cells include:

- Downstream seepage trenches, in accordance with condition W4 of licence L4612.
- Groundwater recovery bores to recover seepage surrounding the TSF in accordance with condition W9 of the Existing Licence, to ensure seepage does not enter the root zone of vegetation.

4.3 Infrastructure

The TSF3 Cell F infrastructure is detailed in Table 4.

Table 4: Leinster Nickel Operations new Cell F infrastructure

	Infrastructure
	Prescribed Activity Category 5
Nickel West processes nickel sulphide ore to produce nickel concentrate. Ore treatment involves crushing and grinding with water and then chemicals are added in the flotation process to separate and suspend the nickel in solution. The primary chemical additive is sodium ethyl xanthate, and also includes a flocculent, copper sulphate and guar. Tailings resulting from this process are discharged as a slurry to the paddock style TSFs located approximately 2.5km north of the plant.	
Stage 1a	• Northern and eastern TSF embankments constructed to RL 10516m as per Figure 3 in the Issued Works Approval, including a cut-off trench down to caprock • Seepage interception system - underdrainage pipeline constructed as per Figure 4 in the Issued Works Approval (see also **To replace** bores to be lost in the construction of TSF3 Cell F, installation of four monitoring bores to the north and two to the east of TSF3 Cell F. • To replace the recovery bores lost in the construction of Cell F, installation of at least one groundwater recovery bore to the north of TSF Cell F. • **Figure 9** for conceptual design) • Stormwater diversion drains and temporary stormwater bund constructed to divert stormwater away from the TSF3 Cell F as shown in Figure 5 in the Issued Works Approval.

	Infrastructure
	• Temporary access causeway, on which a skid-mounted pump is placed to return water to existing return water pond. • Underdrainage outlet pipes, TSF3 Cell F decant outlet pipe, and extension pipes for TSFs 3AB, 3CD and 3E outfall pipes all installed in trenches and covered. Commissioning will be undertaken prior to the operation of Stage 1b. • Puddle flanges installed on all pipes penetrating the embankments (See **Figure 3** for indicative depiction of a puddle flange) • Initial stages of permanent decant structure • Installation of 4 groundwater monitoring bores to the north of TSF3 Cell F to replace existing bores in the TSF3 Cell F footprint; and installation of two groundwater monitoring bores to the east of TSF3 Cell F (Figure 7 in the Issued Works Approval) • Installation of 1 groundwater recovery bore to the north of Cell F to replace recovery bores in the TSF3 Cell F footprint. • Installation of piezometers consistent with designs approved under the *Mines Safety and Inspection Act 1994 (approval pending for ID 82020)* • Return water pond constructed as per Figure 6 in the Issued Works Approval; lined with 2mm thick HDPE geomembrane.
Stage 1b	• Southern and western TSF embankments constructed to RL10520m as per Figure 3 in the Issued Works Approval • Northern and eastern TSF embankments downstream raised to RL10520m as per Figure 3 in the Issued Works Approval • Decant structure constructed from precast concrete rings. Coarse rock placed surrounding tower to reduce turbidity of return water. • Decant pipeline installed to gravity feed decant water to the Cell F return water pond, with a valve so water can be retained on the TSF in case of emergency • Finalise extension of gravity outfalls from existing TSFs through Cell F • Installation of piezometers consistent with designs approved under the Mines Safety and Inspection Act 1994 (approval pending for ID 82020)
Stage 2-8	TSF embankments raised upstream as per Figure 3 in the Issued Works Approval. Stages 2-7 will each be 2.5m raises; stage 8 will be 2.8m raise. Final crest height is up to RL 10540m. Each raise stage will involve: • Phased removal of Cell F tailings delivery lines and associated infrastructure • Bulk earthworks for raise of Cell F embankments to next design height • Raising of central decant tower and causeway to the next design height • Reinstallation of Cell F tailings delivery lines and associated infrastructure • Installation of piezometers consistent with designs approved under the *Mines Safety and Inspection Act 1994 (approval pending for ID 82020)*
Requirements common to every stage 1a-8	<u>Tailings and return water pipelines</u> • Will be contained within bunded open trenches to contain leaks and spillages from pipe burst events • Will be fitted with automatic leak detection and shut off systems to minimise discharge and allow for maintenance and recovery of materials <u>Tailings deposition</u> • Embankment perimeter wall fitted with a tailings deposition main ring that contains multiple spigot attachment valves located at nominal 40m intervals.

Nickel West provide the following explanation of the form and function of a puddle flange:

> *Puddle flanges are "collars" fitted around pipes installed within earth embankments, such as the decant pipe. The collars reduce seepage / water movement along the outside of the pipe, (e.g. between the pipe and the surrounding soil) by diverting any water around the flange, thereby increasing the flow path and reducing seepage. Puddle flanges are normally constructed from concrete or bentonite.* (Cook, 2019c)

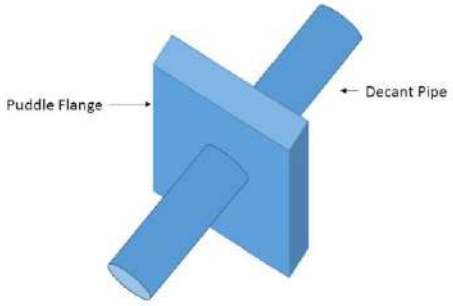


Figure 3: Conceptual depiction of a puddle flange

5. Legislative context

Table 5 summarises approvals relevant to the assessment.

Table 5: Relevant approvals and tenure

Legislation	Number	Approval
Nickel (Agnew) Agreement Act 1974 (WA)	ML255SA	Legal contract between the State of Western Australia and the proponent to develop a major nickel project within the boundary of Western Australia. An Additional Proposal for the B11 development, including TSF3 Cell F has been submitted to the Department of Jobs, Tourism, Science and Innovation and approved by the Minister for State Development (13 November 2019).
Environmental Protection Act 1986	CPS 2222/4 (Expires 21/10/2030)	Permit to clear vegetation – covers much of ML255SA (**Figure 4**)
	CPS 8008/2 (Expires 12/5/2023)	Permit to clear vegetation –covers a portion of M36/439 including all the area covered byG36/50. An administrative amendment has been applied for to include G36/50 on the clearing permit.
	-	Clearing on G36/49 will only be 5.7 ha, and therefore does not require a permit under the Clearing Regulations

Legislation	Number	Approval
Environmental Protection Act 1986	L4612/1989/11	To undertake the mining and processing of ore (including tailings storage); mine dewatering, used tyre storage, landfilling of waste and treatment of sewage.
Mining Act 1978	G36/49 and underlying tenement M36/230 held by Applicant G36/50 and underlying tenement M36/439 held by Applicant	Mining Act tenure permits mining activities.

Figure 4: Area covered by CPS 2222/4

5.1 Part V of the EP Act

5.1.1 Recent works approval and licence history

Nickel West Leinster Operations have an operational record spanning decades. Table 6 summarises the works approval and licence history for the premises over the last 7 years.

Table 6: Relevant Works Approval and Licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment	Approved Height (m)
W5314/2012/1	14/01/2013	TSF 2 Cell raise	RL10550.0
W5576/2013/1	2013	Cell E raise	RL 10545.5
W5331/2013/1	2013	Cell CD raise	RL 10554.0
W5331/2012/1	14/03/2013	Cell CD raise	RL 10554.0
W5479/2013/1	20/9/2013	Cell AB raise	RL 10554.0
L4612/1989/11	29/04/2016	The Licence duration extended from 18	-

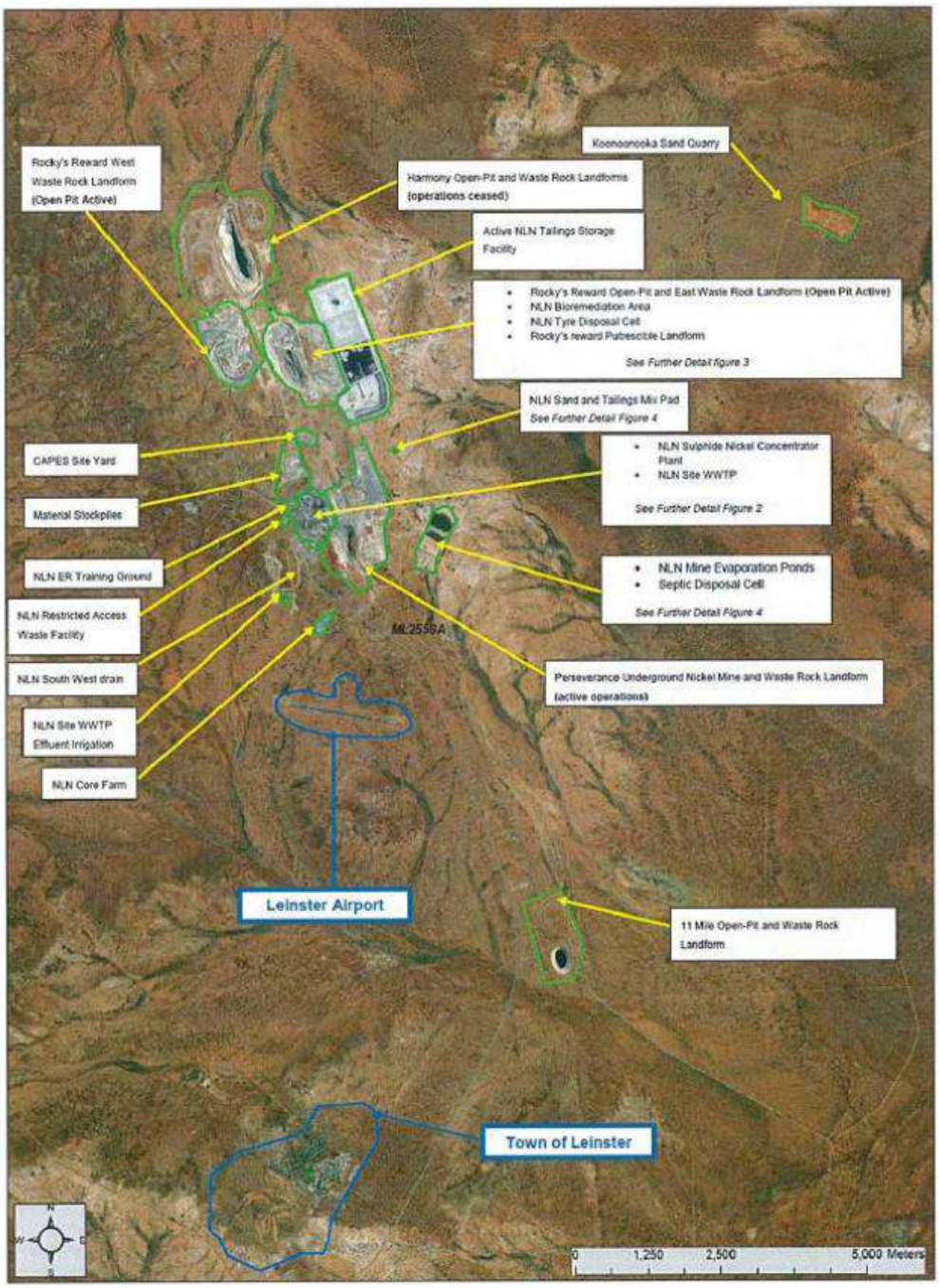
		October 2018 to 18 October 2030 by Amendment Notice.	
L4612/1989/11	22/08/2017	Amendment Notice 2 to authorise embankment raise to TSF3 Cell CD to RL 10,556.5m	RL10556.5
L4612/1989/11	20/03/2018	Amendment Notice 3 to authorise embankment raise to TSF3 Cell AB to RL 10,556.5m	RL 10556.5
W6620/2019/1	7/03/2019	For TSF3 Cell E embankment raise from RL 10545.5 to a final height of RL 10547.5m	RL 10547.5
W6270/2019/1	20/9/19	For TSF3 Cells AB and CD embankment raise	RL 10559m

6. Location and siting

6.1 Residential and sensitive premises

The only sensitive land use identified in the vicinity of the Prescribed Premises is the town of Leinster. This is located 15 km south of TSF3 as shown in **Figure 5**.

Figure 5: Location of Town of Leinster with respect to the Leinster Nickel Operations



Source: Existing Licence L4612/1989/11

6.2 Environmental receptors

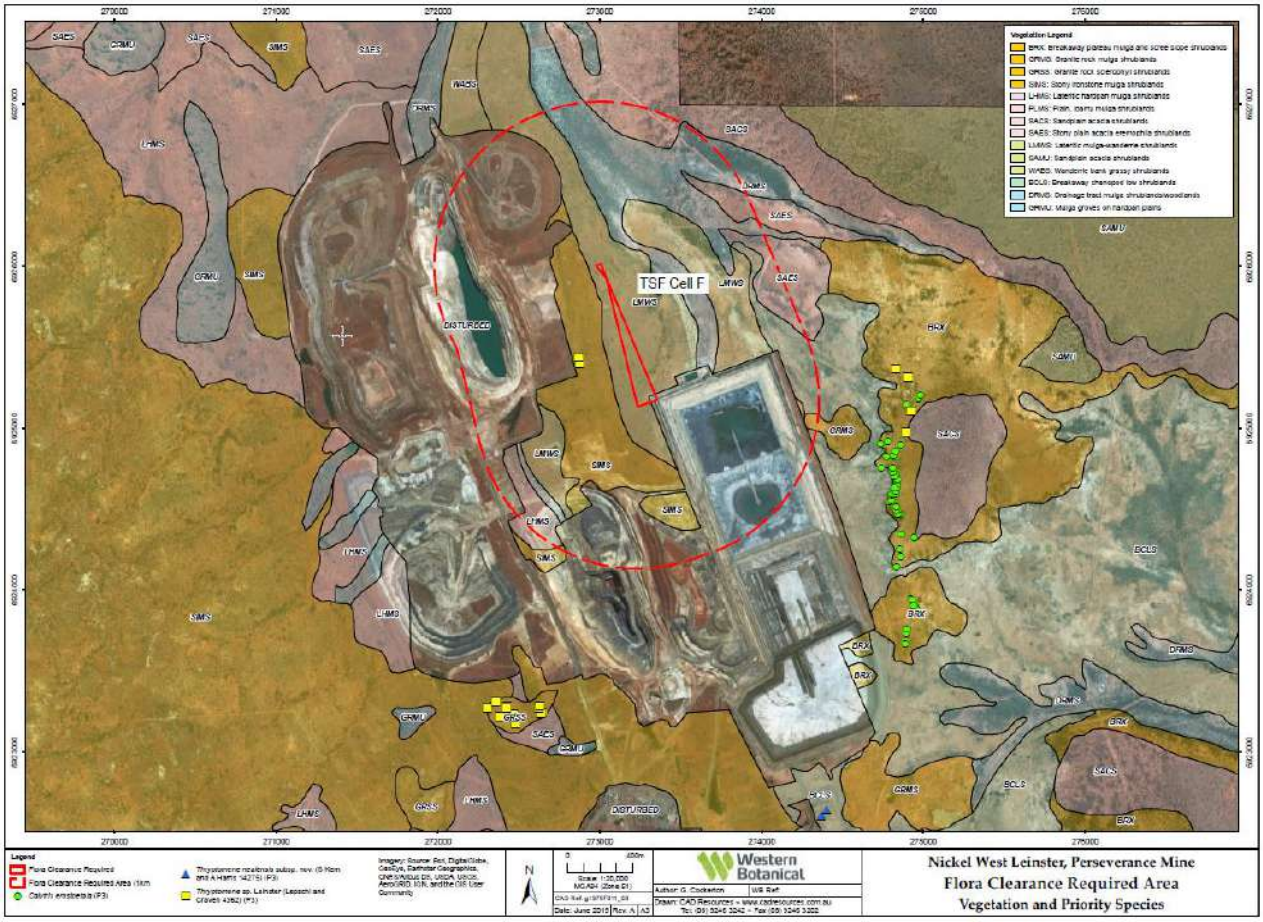
Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. These are defined in the *Guidance Statement: Environmental Siting*. (DER, 2016b). The distances to specified ecosystems are shown in Table 7. Table 7 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

Table 7: Environmental receptors and distance from activity boundary

Environmental Receptors	Distance from the Premises

11 mile (potable) borefield	5 km (~12 km south of TSF3)
McArthurs (historical pastoral) Bore	5 km to the north
Priority Flora (P3) - *Thryptomene* sp. Leinster & *Thryptomene nealensis* subsp. Nov	As shown in **Figure 6** Note: *Calytrix erosipetala* shown on this figure, as well as *Calytrix uncinata* identified as P3 in previous assessments are now classified as 'Not threatened' (Florabase Aug 2019)

Figure 6: Location of Priority flora in the vicinity of TSF3 (Cook, 2019a)



6.3 Local hydrogeology, and groundwater level monitoring data

The TSFs are located on a regional catchment divide at a ground elevation of 520m AHD, more than 10km from significant aquifers (valley fill alluvial groundwater systems including 11 Mile Potable borefield). Drilling programs in 1991 – 1992, prior to construction of TSF3, encountered no underlying groundwater systems. In 1996 three years post operation of TSF3, a section of deep weathered fractured bedrock running north – south under TSF2 was detected, with seepage consequently expected to run north-south with spread to east and west less (Berry, 2017).

Immediately underlying the TSFs is alluvial soil, of moderate permeability to a depth of less

than 5m, overlying low permeability saprolitic clay. Highly weathered granite extends to 20-30m deep and pre-development static water levels were at this level (~490 m AHD). The only natural groundwater occurrences were minor and discontinuous zones associated with bedrock fractures (Berry, 2017).

The tailings seepage salinity of 15,000 mg/L is distinct from the salinity of local groundwater. The seepage is also chemically distinct with elevated arsenic, magnesium, nickel and sulfate concentrations (Berry; 2017). Vertical seepage from the TSF has mounded in the previously unsaturated materials and this water has a slight tendency to migrate laterally through low permeability geology which were previously unsaturated.

A ground conductivity survey in 2007 provided evidence of the extent of impact from seepage over the 15 year operating period 1993 – 2007. Areas of elevated conductivity are indicative of seepage impact, with the area most affected being to the north and south of the TSFs (Berry, 2017). Limited lateral seepage to the east was observed.

There are a number of minor non-perennial watercourses, or drainage lines within the vicinity of the of the premises and these flow towards the Lake Miranda and Lake Raeside salt lake systems following heavy rainfall. Rainfall is sporadic and although the annual average is 274mm per annum, up to 100mm can fall within a 24 hour period. These salt lake systems are over 15km away from the premises boundary.

The 2018 Annual Environmental Report (AER, 2018) shows some bores to the north of TSF3 (in the current Cell F footprint) to be between 5m and 6m of the ground surface. Two groundwater recovery bores (RB01 and RB02) were operated throughout the reporting year. These are both located within the proposed TSF3 Cell F footprint.

7. Risk assessment

7.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 8 and Table 9.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 8 and Table 9 below.

Table 8. Identification of emissions, pathway and receptors during construction

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Construction, mobilisation and positioning of infrastructure associated with TSF3 Cell F	Vehicle movements on unsealed access roads	Noise	No residences or other sensitive land uses within 12km of TSF3 Cell F	Air / wind dispersion	Amenity impacts	No	The Delegated Officer considers the distance is sufficient between the construction area and residential dwellings to manage potential impacts. The Noise Regulations apply
		Dust	Vegetation, including Priority Flora No residences or other sensitive land uses within 15km of TSF3 Cell F	Air / wind dispersion	Amenity Impacts Deposition which may harm plants by reducing photosynthesis and plant respiration	No	The Delegated Officer considers the distance is sufficient between the construction area and residential dwellings to manage potential impacts. No impacts evident on native vegetation from existing vehicle activities. The Works Approval Holder is required to undertake the works in accordance with the application supporting documentation and these includes a commitment to control dust over the works area by spraying with water (NiW, 2019b). Applicant controls are considered adequate to manage dust from construction activities and include the use water carts on roads
	Earthworks for construction of new TSF3 Cell F and associated infrastructure; including clearing of	Noise	No residences or other sensitive land uses within 15km of TSF3 Cell F	Air / wind dispersion	Amenity impacts	No	The Delegated Officer considers the distance is sufficient between the construction area and residential dwellings to manage potential impacts. The Noise Regulations apply

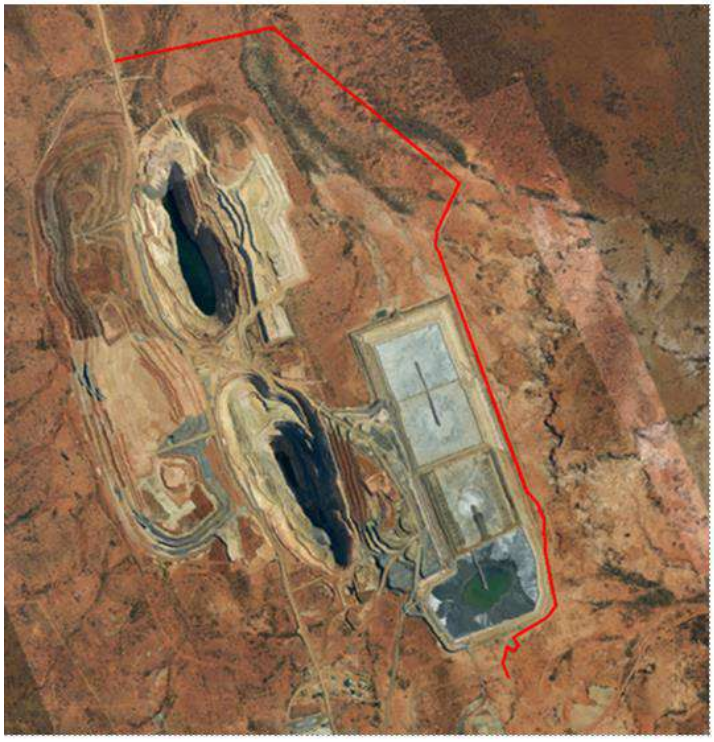
Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	vegetation	Dust	No residences or other sensitive land uses within 15km of TSF3 Cell F	Air / wind dispersion	Dust	No	The Delegated Officer considers the distance is sufficient between the construction area and residential dwellings to manage potential impacts. Impacts on vegetation including Priority Flora from particulate dust are considered to be insignificant and unlikely to occur due to short duration of works. The Works Approval Holder is required to undertake the works in accordance with the application supporting documentation and these includes a commitment to control dust over the works area by spraying with water (NiW, 2019b). Vegetation monitoring occurs near TSF 2 and TSF3 under Licence Condition W10 and is undertaken annually, and no declines in vegetation health has been observed due to previous TSF embankment raise events. No further assessment.
		Sediment/soil	Vegetation, including Priority Flora	Storm water runoff	Partial burial of vegetation	No	The Delegated Officer considers the impacts on vegetation to be insignificant and unlikely to occur. Rainfall is generally low, and should a high rainfall event occur during the short construction phase, the contractor is required to divert any surface water from the works. No further assessment
		Hydrocarbons	Soil, surface water and vegetation, including Priority Flora	Direct discharge/ stormwater	Soil contamination inhibiting vegetation growth and survival	No	No large storage of hydrocarbons is required, so the risk of hydrocarbon spills is limited to vehicle related and is adequately regulated under the EP (Unauthorised Discharge) Regulations. The applicant states that any contaminated material would be disposed of to an approved location.

Table 9: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Tailings deposition into TSF3 Cell F after embankment raise	Tailings surface	Dust	No residences or other sensitive land uses within 15km of TSF3 Cell F	Air/ wind dispersion	Human health and amenity	No	The Delegated Officer considers the distance is sufficient between the construction area and residential dwellings to manage potential impacts Existing Licence Condition A1(a) requires the licence holder to prevent and minimise the generation of dust for open areas, such as the TSF surface area. No further assessment.
	Tailings delivery and return water pipelines	Rupture of pipelines causing tailings discharge to land	Native vegetation and soil adjacent to tailings pipelines	Direct discharge	Soil contamination inhibiting vegetation growth and survival	Yes –refer to section **7.4**	Potential for soil and vegetation damage
	Seepage from TSF3 Cell F, or return water pond	Leachate	Soil and groundwater; vegetation	Direct discharge; vegetation uptake from groundwater	Groundwater contamination and mounding; may lead to vegetation stress or death	Yes –refer to section **7.5**	Some seepage from TSF is likely, as for existing TSF3 cells. Return water pond to be lined, but additional controls needed
	Overtopping of TSF3 Cells, or return water pond	Release of tailings or return water	Native vegetation, including Priority Flora and soils	Overtopping of tailings or decant water	Soil contamination. Impacts to terrestrial vegetation and ecosystems. Seepage leading to groundwater contamination	Yes –refer to section **7.6**	Potential for significant contamination in the case of tailings or return water release

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Failure of TSF3 Cell F, or return water pond	Uncontrolled release of tailings and/or decant water	Native vegetation, including Priority Flora and soils	Failure of cell or pond wall, leading to uncontrolled release of tailings	Soil contamination. Impacts to terrestrial vegetation and ecosystems. Seepage leading to groundwater contamination	No	TSF stability is assessed under the *Mines Safety and Inspection Act 1994.*
	Stormwater runoff	Stormwater contaminated with tailings and tailing liquor	Soil and vegetation, including Priority Flora, within the stormwater catchment area	Sheet runoff and infiltration	Soil contamination inhibiting vegetation growth and survival	Yes –refer to section **7.7**	Potential for contamination
	Contact by wildlife (Facility is fenced to prevent access by large animals)	Birds / other animals exposed to potentially hazardous/ toxic materials from the surface of the TSF	Birdlife / other animals	Direct contact and ingestion of water elevated levels of metals/ metalloid contaminants; dermal contact and ingestion of aquatic organisms.	Reduced health and potentially soft tissue damage (eyes, digestive tract) cause by ingestion and contact with tailings liquor and contaminated organisms.	No	There will be no significant change in the risk of harm to birds by the addition of Cell F to the existing TSF3. Boundary fencing separates the mine site infrastructure from pastoral activities (**Figure 7**), preventing access by livestock and kangaroos. If this needs to be removed in the construction of Cell F, it will be reinstated. Bird deaths have not been encountered on the TSFs to date, but any occurrences associated with the TSFs would be reported. No further assessment required.

Figure 7: Current location of boundary fence preventing large animal access to TSFs



7.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 10 below.

Table 10: 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

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 11 below.

Table 11: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		**The following criteria has been used to determine the consequences of a Risk Event occurring:**		
			Environment	**Public health* and amenity (such as air and water quality, noise, and odour)**
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite 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
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite 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
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite 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
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite 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
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*
* In applying public health criteria, DWER may consider the Department of Health's *Health Risk Assessment (Scoping) Guidelines*
"onsite" means within the Prescribed Premises boundary.

7.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 12 below:

Table 12: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and

		appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

7.4 Risk Assessment – TSF3 Cell F tailings delivery or return water pipeline failure causing discharge

▪ Description of discharge due to pipeline failure

There is potential for the discharge of tailings slurry or return water to the environment through pipeline failure – be this through bursting or leaking.

▪ Identification and general characterisation of emission

Tailings slurry and return (decant) water contain soluble metals and metalloids which are toxic to vegetation and fauna. The tailings liquor has elevated salinity, typically ~ 15,000 mg/L. When compared to ANZECC livestock guidelines the water also contains elevated arsenic, magnesium, nickel and sulphate concentrations (Berry, 2017).

▪ Description of potential adverse impact from the emission

The discharge of tailings and decant water may cause vegetation and faunal death through contact. Discharges of tailings and return water may cause contaminants to seep into the soil profile and contaminate soils.

▪ Applicant controls

Leakage or other failure of tailings and decant water pipelines will be minimised by regular maintenance. Any actual leakage or failure would be detected and managed through the use of an automatic leak and flow rate detection system, shut off valves and regular inspections. The impact of the release will be mitigated by the provision of secondary containment of all pipelines in open trenches (if not buried). An Operating Manual has been provided for the Leinster Nickel Operations TSFs and includes inspection of tailings and decant lines at least every 12 hours during operations (NiW, 2019d).

Priority Flora identified in the area surrounding the TSF are predominantly upslope of the TSF, which reduces the likelihood of being impacted in the case of any spills.

▪ Existing regulatory controls

The following Existing Licence conditions are already in place to manage the risk of soil and vegetation damage due to pipe leaks or rupture.

- Existing Condition W1(a) requires the storage of all matter containing saline and alkaline constituents within TSFs in a manner which prevents pollution, including TSF return water and TSF seepage.
- Existing Condition W16(a) requires 12 hourly visual inspections of infrastructure including tailings delivery and return water pipelines.
- Existing Condition W17(a) and (b) require pipelines to be buried or bunded with appropriate catch pits to contain any spills.

All of these are relevant for the pipelines associated with TAF3 Cell F, as well as existing cells. Prior to commissioning, the premises description and licence summary will require updating to include TSF3 Cell F.

- **Consequence**

If a tailings or decant water spillage due to pipe failure occurs, then the Delegated Officer has determined that there could be low level on-site impacts to soil and vegetation, and Priority Flora species are unlikely to be impacted. Therefore, the Delegated Officer considers the consequence of pipe failure causing soil or vegetation damage outside of the containment bund to be **minor**.

- **Likelihood of Risk Event**

The Delegated Officer has considered the infrastructure requirements for tailings and return water pipelines on the Existing Licence, distance to sensitive receptors; the impermeable nature of the in-situ soils and determined that environmental impact from a tailings/decant liquor pipeline failure will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of the consequence occurring to be **unlikely**.

- **Overall rating of soil or vegetation impact from a tailings or decant liquor pipeline failure**

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix Table 10 and determined that the overall rating for the risk of environmental impact from a tailings/decant liquor pipeline failure is **medium.**

7.5 Risk Assessment – Seepage from TSF3 Cell F or new return water pond (RWP)

7.5.1 Description of Seepage from TSF3 Cell F or RWP

Tailings seepage to groundwater from the base or embankments of TSF3 Cell F or RWP; resulting in alteration of groundwater quality and groundwater mounding into the root zone of vegetation.

7.5.2 Identification and general characterisation of emission

Some seepage to groundwater is occurring from the existing TSF3 cells (AER, 2018), leading to groundwater contamination and mounding. The applicant anticipates that seepage from TSF3 Cell F will be lower than from the existing cells, since the design of TSF3 Cell F includes an underdrain and to collect much of the seepage for reuse as process water. It is expected though that some seepage will still occur and therefore the area affected by seepage will extend northward with the operation of TSF3 Cell F.

Any seepage from the RWP would be similar in composition to that from the tailings cell.

Groundwater in the area is naturally saline and the only beneficial use of the water in the area is as a process water supply for the processing of ore in mining operations. Tailings slurry and return (decant) water contain soluble metals and metalloids which at elevated levels can be toxic to vegetation and fauna. The tailings liquor has elevated salinity, typically ~ 15,000 mg/L. When compared to ANZECC livestock guidelines the water also contains elevated arsenic, magnesium, nickel and sulphate concentrations (Berry, 2017).

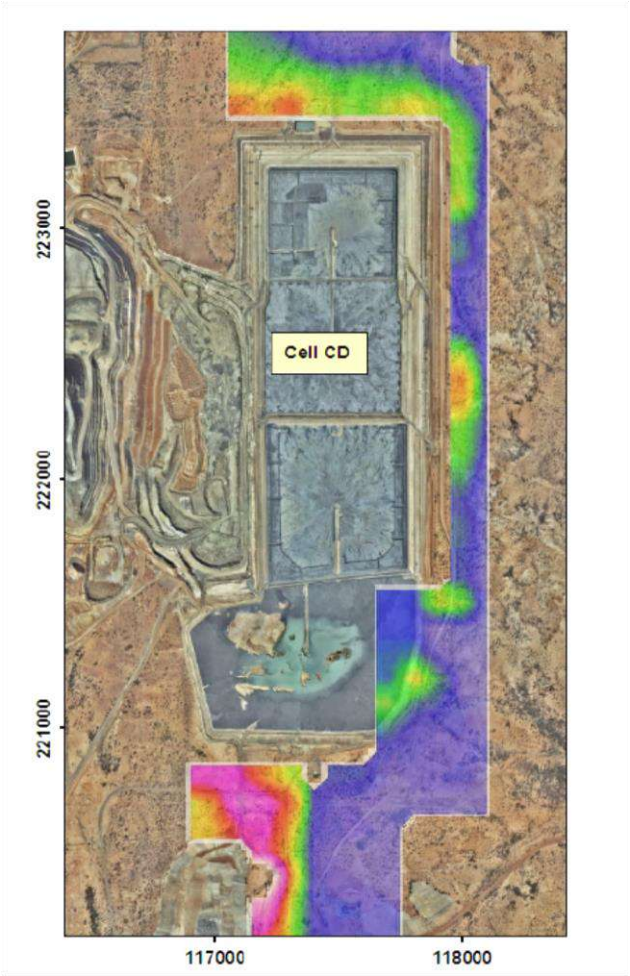
7.5.3 Description of potential adverse impact from the emission

Should seepage rise to the root zone of adjacent vegetation (expected to be at least 6m below ground level) stress or death of deep rooted vegetation could result. The dominant direction of seepage is to the north and south. There are no Priority Flora to the north of TSF3. To the south lie existing cells, and the Existing Licence includes limits to groundwater levels to the south of TSF 2 (which is south of TSF3).

Actual depth to ground water varies around TSF2 and TSF3. Rising groundwater has been observed to coincide with deposition into the TSFs. The closest vegetation, including Priority Flora, to the east of TSF3, is partially protected by the natural ground elevation rise to the east and less permeable geology. This is reflected in seepage mapping shown in Figure 8. Areas affected by shallow saline groundwater from 15 years of TSF3 operation (1993 -2007) are shown as warm colours (high conductivity) and unaffected areas shown in blue. (Berry, 2017)

Higher rates of seepage occur to the north of Cell AB (proposed Cell F footprint), and to the south of TSF2. The latter is toward highly disturbed operating areas and may originate more from TSF2, being the southernmost cell.

Figure 8: 2007 Ground conductivity survey using surface Electro Magnetic soundings.



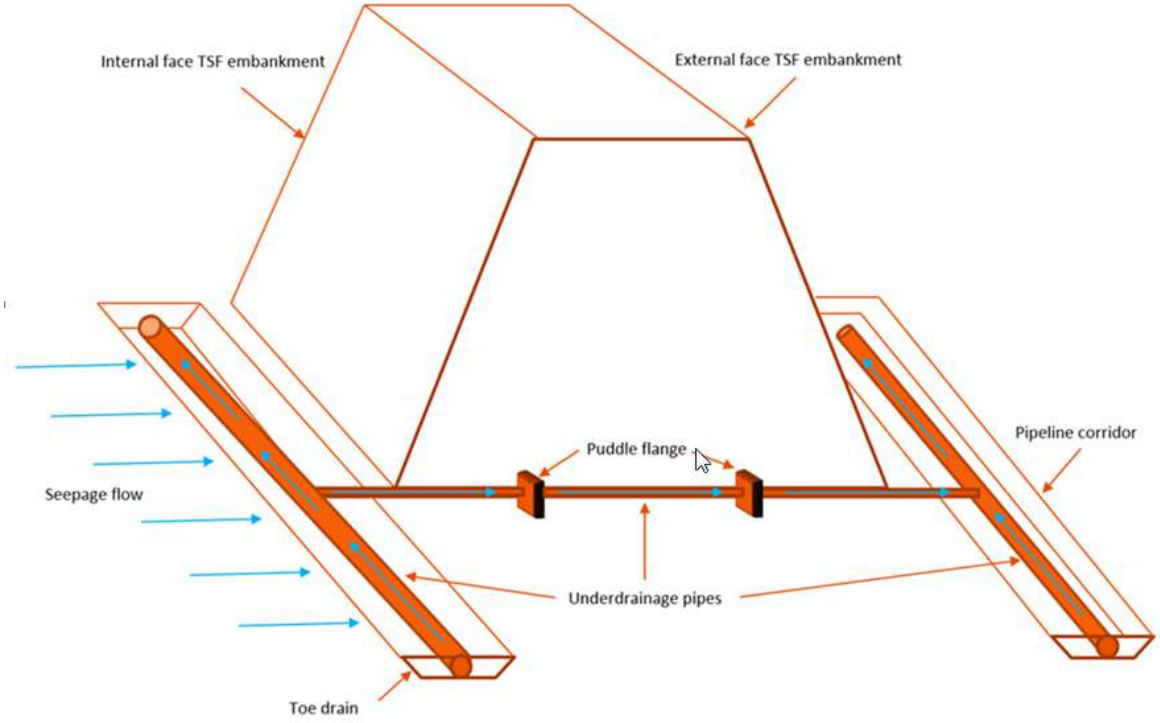
7.5.4 Applicant controls

To reduce the magnitude of seepage and therefore the potential vegetation impact, the applicant has proposed the following controls:

- RWP will be lined with 2mm thick HDPE geomembrane.
- Use low permeability compacted materials with specified performance criteria for the TSF embankment.
- Incorporate underdrainage system into Cell F design; as per **To replace** bores to be lost in the construction of TSF3 Cell F, installation of four monitoring bores to the north and two to the east of TSF3 Cell F.

- To replace the recovery bores lost in the construction of Cell F, installation of at least one groundwater recovery bore to the north of TSF Cell F.
- **Figure 9**. This includes a pipeline corridor drain (equivalent to 'perimeter drains' referred to in W4 of Existing Licence) to capture seepage that is not captured by the internal toe drain. (Cook, 2019d)
- Cut-off key down to cap rock in Stage 1a and eastern section of 1b design; to minimise seepage under the downstream embankments.
- Decant structures installed to maximize the recovery of process water.
- Conduct tailings discharge in a manner to ensure process water is constantly positioned around the central decant structure, keeping ponding away from the perimeter embankments.
- Piezometer arrays will be constructed along the perimeter embankments to allow for early detection of seepage within the embankments. Location will be consistent with designs approved under the *Mines Safety and Inspection Act 1994* (approval pending for ID 82020). Monitoring required for assessment of TSF stability will meet or exceed requirements for seepage monitoring.
- Undertake groundwater monitoring and recovery in accordance with Existing Licence L4612 (noting that some bores are under the Cell F footprint, so will be decommissioned and removed from the licence).
- To replace bores to be lost in the construction of TSF3 Cell F, installation of four monitoring bores to the north and two to the east of TSF3 Cell F.
- To replace the recovery bores lost in the construction of Cell F, installation of at least one groundwater recovery bore to the north of TSF Cell F.

Figure 9: conceptual diagram of Cell F seepage interception system



Source: Cook, 2019b

7.5.5 Existing regulatory controls

The following Existing Licence conditions are already in place to manage the risk of seepage from TSF3 Cell F:

- Existing Condition W4 for maintenance of perimeter drains for seepage recovery. This will needed to be updated to include reference to the pipeline corridor drain, which is the equivalent structure in the design of TSF3 Cell F.
- Existing Conditions W5, W6(a), W6(b) and W6(c) for the installation, maintenance and monitoring of groundwater wells and recovery bores for the purpose of monitoring and recovering seepage in the vicinity of the TSFs. However W(5) and W6(a) will require updating as some of these bores will be lost with the construction and commissioning of TSF3 Cell F.
- Existing Condition W7 for minimum required depth to groundwater in compliance bores (south of TSF2 only)
- Existing Condition W8(a), W8(b) and W9 triggering and specifying requirements of a groundwater recovery program to minimise vegetation impact should the target of 6m below ground level be exceeded in any compliance monitoring bore (south of TSF2 only, due to location of receptors)
- Existing Condition W10 requires monitoring to detect any vegetation impacts, so that further control measures can be implemented if any impact is shown
- Existing Condition W16 requires inspection of the TSFs 12 hourly and to note the ponding of decant within the TSF cells, seepage on the embankment walls and tailings deposition.

7.5.6 Consequence

The Delegated Officer has considered the siting of TSF3 Cell F, the poor groundwater quality and proximity of Priority Flora and determined that low-level on site impacts may result from tailings seepage from these cells. Therefore, the Delegated Officer considers the consequence to be **minor**.

7.5.7 Likelihood of Risk Event

The Delegated Officer has considered the design and construction standards of the proposed TSF3 Cell F, the operational procedures for management of TSF3, and the natural low permeability of the in situ soils and determined that the impacts of seepage to vegetation (including Priority Flora) will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of the consequence occurring is **unlikely**.

7.5.8 Overall rating of Seepage from TSF3 Cell F

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 10) and determined that the overall rating for the risk of seepage from TSF3 Cell F to groundwater causing vegetation death, is **medium.**

7.6 Risk Assessment – Overtopping of TAF3 Cell F, or return water pond

7.6.1 Description of overtopping of TSF3 Cell F, or return water pond

Overtopping of TSF3 Cell F could occur due to a significant rainfall event, if deposition into the cell exceeds the holding capacity, if the decant fails to remove sufficient liquor or by a combination of these events.

7.6.2 Identification and general characterisation of emission

Tailings slurry and decant water contain soluble metals and metalloids and other chemicals which are toxic to vegetation and fauna. The tailings liquor has elevated salinity, typically ~ 15,000 mg/L. When compared to ANZECC livestock guidelines the water also contains elevated arsenic, magnesium, nickel and sulphate (Berry, 2017). The quantity of discharge would depend on the magnitude of the overtopping event.

7.6.3 Description of potential adverse impact from the emission

The risks of an overtopping event are assessed against relevant land and groundwater criteria including the Guidelines for fresh and marine waters (ANZECC and ARMCANZ, 2000), and the National Environmental Protection (Assessment of Site Contamination) Measure (NEPC, 2013) for soil and groundwater.

In the instance of an overtopping event, saline tailings slurry or decant water containing soluble metals and metalloids would be discharged to the environment. This would lead to localised soil and possibly groundwater contamination. Depending on spread, there may also be plant and animal deaths. It is unlikely that any Priority Flora species would be impacted, as they are predominantly on elevated ground.

7.6.4 Applicant controls

The key control mechanisms for preventing overtopping are of TSF3 Cell F are;

- the design specifications (including freeboard, minimising stormwater inflows and operation of a central decant tower), and
- the Leinster Nickel Operation Tailings Management Master Plan - TSF Operating Manual (NiW, 2019e) and Tailings Storage Water Management Plan (NiW, 2019f) - which include use of freeboard markers, routine inspections (twice daily), regular maintenance, minimising the size and extent of the centrally located decant pond and by ensuring maximum water is returned to the processing plant area.

The *Guide to the preparation of a design report for tailings storage facilities (TSFs)* (DMP, 2015) requires a minimum operational freeboard of 300mm to be maintained as well as a 200mm tailings beach freeboard (a total of 500mm). The Applicant therefore proposes a combined freeboard of 500mm will be maintained at all times during normal operations which is easily able to accommodate rainfall from a 1 in 100 year, 72 hour rainfall event of 194.4mm, which is calculated to result in an additional 300,000m^3 of water across all TSF2 and TSF3 cells. This volume will take approximately 30 days to be returned back to the processing plant (NiW, 2019e).

Stage 1a will include stormwater diversion drains and a bund to divert stormwater away from the tailings area. On completion of stage 1b the cell will be raised above the surrounding land in a paddock style impoundment with no external catchment into TSF3 Cell F.

After completion of embankment stage 1b, the central decant tower will gravity feed tailings liquor to the new TSF3 Cell F RWP. During stage 1a, decant liquor will be pumped to the existing TSF3 Cell AB RWP.

The key control mechanisms for preventing overtopping of the new return water pond are;

- the design specifications (accommodates 10 hours of TSF decant with no removal from the RWP, in additional to design freeboard)
- the TSF Operating Manual (NiW, 2019d) which includes using sluice gates to divert runoff from external toe drains to the environment during high rainfall, rather than the RWP and
- The Tailings Storage Water Management Plan (NiW, 2019f) which includes the objective to 'maximise water return from the Return Water Pond'.

7.6.5 Existing regulatory controls

The following Existing Licence conditions are already in place to manage the risk of overtopping of TSF3 Cells:

- Existing Licence Condition W3 requires stormwater diversion away from TSFs;
- Existing Licence Condition W15 requires the maintenance of a 300mm freeboard to accommodate extreme rainfall events without over topping. This applies to 'all storage facilities containing saline or alkaline constituents', which includes TSF cells and return water ponds.
- Existing Licence Condition W16(a) for 12 hourly visual inspections of the TSFs including for ponding on the surface, and internal embankment freeboard.

7.6.6 Consequence

If an overtopping event occurs, the Delegated Officer has determined there may be mid-level onsite impacts. Therefore, the Delegated Officer considers the consequence of an overtopping event to be **moderate.**

7.6.7 Likelihood of Risk Event

The Delegated Officer has determined that given the existing design, operational and regulatory controls, the likelihood of TSF3 Cell F overtopping, resulting in environmental contamination will be probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of this Risk Event to be **unlikely.**

7.6.8 Overall rating of overtopping of TSF3 Cell F or the RWP, resulting in vegetation impact

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 10) and determined that the overall rating for the risk of overtopping of TSF3 Cell F or the RWP impacting on environmental receptors during operation is **medium** and acceptable subject to regulatory controls.

7.7 Risk Assessment – Stormwater contamination

7.7.1 Description of stormwater contamination

Stormwater runoff from the TSF3 area has the potential to become contaminated through contact with decant liquor or tailings slurry.

7.7.2 Identification and general characterisation of emission

Tailings slurry and decant water contain soluble metals and metalloids which are toxic to vegetation and fauna. The tailings liquor has elevated salinity, typically ~ 15,000 mg/L. When compared to ANZECC livestock guidelines the water also contains elevated arsenic, magnesium, nickel and sulphate (Berry, 2017). Concentration and total contaminant load would depend on the degree of contamination.

7.7.3 Description of potential adverse impact from the emission

Contaminated stormwater is highly mobile, and may carry contaminants to downstream soil, vegetation and waterway receptors. Soluble metals and metalloids can form metal complexes which are toxic and highly soluble in water. This can lead to contamination of land through direct contact and infiltration into soils. Soil contamination may inhibit vegetation growth and cause health impacts to fauna through bioaccumulation in the food chain.

Prolonged stormwater contact with TSF embankments can also act to destabilise the embankments. Stormwater events, through poor management of saturation within the embankments, can also cause erosions to poorly designed and constructed embankments. Both erosion and prolonged contact with stormwater have the ability to contribute to dam break events where the contents of the TSF are discharged to the environment in an uncontrolled manner, often with significant and lasting effects spread over a wide geographical area.

7.7.4 Applicant controls

The primary control mechanism for managing contaminated stormwater runoff is to limit contact of surface runoff with the TSF and associated infrastructure, as follows:

- Stormwater diversion drains surrounding TSF2 and TSF 3 to divert surface stormwater runoff away from the TSFs
- Construction of stage 1a will include a bund to divert stormwater away from the tailings area. On completion of stage 1b the cell will be raised above the surrounding land in a paddock style impoundment with no external catchment into TSF3 Cell F.

7.7.5 Existing regulatory controls

The following Existing Licence conditions are already in place to manage the risk of stormwater contamination:

- Existing Licence Condition W3 which required stormwater to be diverted away from areas adjacent to TSFs to minimise the threat of accidental loss of stored matter due to flooding or erosion.
- Existing Licence Condition W4 requires the maintenance of perimeter drains downstream of the TSF intended primarily for the collection and recovery of seepage or materials from a low level breach of the embankments; but which will also serve to collect potentially contaminated stormwater. This will be updated to include reference to the pipeline corridor drain, which is the equivalent structure in the TSF3 Cell F design.

7.7.6 Consequence

If stormwater contamination occurs, then the Delegated Officer has determined that there could be low level, on site impacts to vegetation. Therefore, the Delegated Officer considers the consequence of stormwater contamination to be **minor.**

7.7.7 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of stormwater contamination, causing impact to vegetation will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of this Risk Event to be **unlikely.**

7.7.8 Overall rating of stormwater contamination

The Delegated Officer has compared the consequence and likelihood ratings described above

with the risk rating matrix (Table 10) and determined that the overall rating for the risk of stormwater contamination, causing impact to vegetation is **medium.**

7.8 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 13 below. Controls are described further in section 8.

Table 13: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1	TSF3 Cell F tailings delivery or return water pipeline failure causing discharge	Discharge of tailings slurry or return water from pipeline failure	Direct discharge to land; possible vegetation impact through direct contact or contamination and mounding of groundwater.	Automatic leak and flow rate detection system, shut off valves, regular inspections, regular maintenance, pipelines buried or bunded	Minor consequence Unlikely **Medium risk**	Acceptable subject to proponent controls conditioned / outcomes based controls
2	Seepage from TSF3 Cell F or new return water pond (RWP)	Tailings liquor seeping from TSF3 Cell F or RWP	Seepage through or under containment structures, causing groundwater contamination and mounding; may impact vegetation by intrusion into root zone	TSF embankment - compaction of base; material selection and compaction of embankment; underdrainage system and cut-off key; management procedures to minimise decant pond size. RWP - HDPE geomembrane liner	Minor consequence Unlikely **Medium risk**	Acceptable subject to proponent controls conditioned / outcomes based controls
3	Overtopping of TSF3 Cell F, or RWP	Tailings liquor from TSF3 Cell F, or RWP	Direct discharge onto vegetation	Design - freeboard, stormwater management, gravity fed central decant tower Leinster Nickel Operation Tailings Management Master Plan includes use of freeboard markers, routine inspections (at	Moderate consequence Unlikely **Medium risk**	Acceptable subject to proponent controls conditioned / outcomes based controls

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
				least every 12 hours), regular maintenance, and minimising size of decant pond.		
4	Contaminated stormwater	Stormwater runoff coming into contact with tailings slurry or liquor	Contaminated stormwater washing downstream. Impacts to downstream soil, vegetation and water receptors	Stormwater diversion away from TSF and RWP	Minor consequence Unlikely **Medium risk**	Acceptable subject to proponent controls conditioned / outcomes based controls

8. Additional regulatory controls

8.1 Works Approval controls for emissions during operation

The Delegated Officer considers that the infrastructure listed in Table 4 contains sufficient design controls for the risks identified above. These will be conditioned in the Issued Works Approval.

8.2 Amend required to L4612 prior to commissioning of TSF3 Cell F

On completion of stage 1a, and prior to commissioning of TSF3 Cell F, the Works Approval Holder will need to apply for an amendment to licence L4612/1989/11. As well as updating the premises boundary and descriptions, the following conditions (and any others then deemed appropriate) will be considered:

- Existing condition W4 will be updated to include reference to the pipeline corridor drain for TSF3 Cell E, which is equivalent to the perimeter drains referred to in this condition
- Existing conditions W5 and W6a will require updating to remove decommissioned monitoring and recovery bores; and add new bores installed under this Issued Works Approval.

9. Determination of Works Approval conditions

The conditions in the issued Works Approval in Attachment 1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 14 provides a summary of the conditions to be applied to this works approval.

Table 14: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment 1, 2, 3 and 4	These conditions are valid, risk-based and contain appropriate controls.
Emissions 5	This condition is valid, risk-based and consistent with the EP Act.
Record-keeping 6 and 7	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the Works Approval under the EP Act.

10. Applicant's comments

The Applicant was provided with the draft Decision Report and draft issued Works Approval on 14 November 2019. The Applicant provided comments which are summarised, along with DWER's response, in Appendix 2.

11. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that the Issued Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Tim Gentle
Manager Resource Industries
REGULATORY SERVICES
Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
•	Licence L4612/1989/11 – Nickel West Leinster Operations	L4612/1989/11	accessed at www.der.wa.gov.au
•	NiW works approval application form NLN TSF Cell F 2019	NiW, 2019a	DWER record A1812138
•	NLN TSF Cell F - Supplementary Information Final 01082019	NiW, 2019b	DWER record A1812145
•	Appendix D Cell F Design Report	NiW, 2019c	DWER record A1812146
•	Berry K (2017) Nickel West Leinster Assessment of Groundwater Characteristics, April 2017.	Berry, 2017	DWER record A1435498 (Appendix 2)
•	Nickel West Leinster 2018/2019 Annual Environmental Report for L4612/1989/11 and L6606/1995/9	AER, 2019	DWER record DWERDT219464
•	Nickel West Leinster 2017/2018 Annual Environmental Report for L4612/1989/11 and L6606/1995/9	AER, 2018	DWER record A1734084
•	Leinster Nickel Operation Tailings Management Master Plan Part 1 - Description of existing facilities	NiW, 2019d	Appendix E of DWER Record A1798341
•	Leinster Nickel Operation Tailings Management Master Plan Part 2 - TSF Operating Manual	NiW, 2019e	Appendix E of DWER Record A1798341
•	Leinster Nickel Operation Tailings Management Master Plan Part 3 - Tailings Storage Water Management Plan	NiW, 2019f	Appendix E of DWER Record A1798341
•	Leinster Nickel Operation Tailings Management Master Plan Part 4 – Tailings Storage Facility Monitoring Plan	NiW, 2019g	Appendix E of DWER Record A1798341
•	Leinster Nickel Mine: Dam Safety Review of Tailings Storage Facilities, Golder Associates Pty Ltd	Golder, 2018	DWER record A1764265

•	ANCOLD (2012). *Australian National Commission on Large Dams, Guidelines on Tailings Dams, Planning, Design, Construction, Operation and Closure*, May 2012.	ANCOLD, 2012	Available at http://www.dmp.wa.gov.au/Safety/Guidance-about-tailings-storage-6556.aspx.
•	DMP (2013), *Code of practice: tailings storage facilities in Western Australia*	DMP, 2013	Available at http://www.dmp.wa.gov.au/Documents/Safety/MSH_COP_TailingsStorageFacilities.pdf
•	DMP (2015), Guide to the preparation of a design report for tailings storage facilities (TSFs)	DMP, 2015	Available at http://www.dmp.wa.gov.au/Documents/Safety/MSH_G_TSFs_PreparationDesignReport.pdf
•	Email Correspondence: RE: [Confidential] Works Approval Application - Nickel West Leinster TSF Cell F (Stacey Cook: 19 August 2019)	Cook, 2019a	DWER Record A1815979
•	Email Correspondence: Technical clarification - seepage interception (Stacey Cook: 15 October 2019)	Cook, 2019b	DWER Record A1833696
•	Email Correspondence: Technical clarification – puddle flange (Stacey Cook: 9 October 2019)	Cook, 2019c	DWER Record A1830752
•	Email Correspondence: Perimeter drains and RWP bypass from toe drain (Stacey Cook: 5 November 2019)	Cook, 2019d	DWER Record A1840058
•	Perimeter drains and RWP bypass from toe drain		
•	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER, 2015a	accessed at www.dwer.wa.gov.au
•	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER, 2015b	
•	DER, August 2016. *Guidance Statement: Licence duration.* Department of Environment Regulation, Perth.	DER, 2016a	

•	DER, November 2016. *Guidance Statement: Environmental Siting.* Department of Environment Regulation, Perth.	DER, 2016b	
•	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER, 2017	
•	DWER, June 2019. *Guideline: Decision Making*. Department of Water and Environmental Regulation, Perth.	DWER, 2019	

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Applicant comments on the Draft Works Approval

Condition[1]	Summary of Licence Holder comment	DWER response
-	Update tenement list due to grant of special purpose leases	Changes accepted
2	Correction of stage numbering (administrative)	Corrected
2	'Add on completion of 1a the Holder will submit an application to amend L4612 to reflect the new PP boundary and relevant conditions (ref decision report S8.2)'	Not required as a Works Approval condition. However yes, a licence amendment will be required to authorise deposition into Cell F, and this may be submitted with or any time after the compliance documentation for stage 1a.
3	Request additional condition (consistent with previous works approvals) allowing changes that to not increase risks to public health, public amenity of the environment. (requires renumbering of subsequent conditions)	• Requested condition inserted as condition 2 • Condition 4 added requiring the Works Approval Holder to notify the CEO of details of changes • Subsequent conditions renumbered
Table 2	• Stage numbering lower case (several instances) • Clarified 'Cell F' to 'TSF 3 Cell F' (several instances) • Corrected 'Will be commissioned in stage 1B' to 'Will be commissioned prior to the operation of stage 1b' • Return water pond moved from Stage 1a to Stage 1b, and add that it will be operational prior to decommissioning of the existing return water pond (not necessarily by the end of stage 1b construction)	Changes accepted
Table 2	• 'In general accordance with designs approved under the Nickel (Agnew) Agreement Act 1974 (WA).' (multiple occurrences) • Piezometer Figure provided	• 'Installation of piezometers consistent with designs approved under the Mines Safety and Inspection Act 1994 (approval pending for ID 82020)' – Corrected to most appropriate legislation for assessing piezometer location • Piezometer Figure not added as it has not yet been approved by DMIRS.

Condition[1]	Summary of Licence Holder comment	DWER response
	Requested 'lined with 2mm thick HDPE geomembrane' changed to 'lined with 2mm thick HDPE geomembrane or equivalent. Return water pond to be operational prior to the decommissioning of the existing return water pond to the north of TSF3 Cell AB.'	• 'lined with at least 2mm thick HDPE geomembrane' (discussed with Stacey Cook 26/11/19; wanted flexibility to go thicker if required) • Second sentence added as requested
	Requested final crest height changed from 10537.8m to 10540m.	Elaborated to give flexibility for final stages, as per design report A1812146. Does not change the risk assessment. 'Stage 8 will either be a 2.8m raise giving a final crest height of RL 10537.8m; or two 2.5m raises giving a final crest height of RL 10540m.'
Figure 2	• Caption: Clarified 'Cell F' to 'TSF 3 Cell F' • Updated Figure 2 provided showing newly granted general purpose leases	Changes accepted
Table 5	• Caption: Clarified 'Cell F' to 'TSF 3 Cell F'	Changes accepted

[1] Condition numbers reference conditions in the draft documents sent. This does not correlate with numbering in the applicant's response, due to insertion of an additional condition 3, or the final numbering due to the insertion of conditions 2 and 4.

Applicant comments on the Draft Decision Report

Section	Summary of Licence Holder comment	DWER response
Throughout	• Clarify 'Cell F' to 'TSF3 Cell F' • Change stage numbering 1a and 1b to lower case	Changes accepted
-	Update tenement list due to grant of special purpose leases	Changes accepted
2	Section reworded to reflect that the general purpose leases have now been granted.	Changes accepted
3	Minor corrections to background; updated Figure 1 showing the newly granted general purpose leases.	Changes accepted
4.1	Text updated to include new general purpose leases	Changes accepted
4.2	• Minor corrections and administrative changes to 'Operational aspects' • The final design crest elevation changed to RL 10540m.	Changes accepted. For crest elevation, see comments within this table for changes to Table 2 of the Works Approval.
4.3	• The final design crest elevation changed to RL 10540m.	Changes accepted. See comments within this table for changes to Table 2 of the Works Approval.
Table 4	• Map provided of proposed groundwater monitoring and recovery bores	• 'Groundwater monitoring bores and groundwater recovery bores' added to Table 4: Authorised Works (Schedule 2 of Works Approval) • Bore map provided added to Schedule 2 of Works Approval
	• 'In <u>general</u> accordance with designs approved under the Nickel (Agnew) Agreement Act 1974 (WA).' (multiple occurrences) • Piezometer Figure provided	• 'Installation of piezometers consistent with designs approved under the Mines Safety and Inspection Act 1994 (approval pending for ID 82020)' – Corrected to most appropriate legislation for assessing piezometer location • Piezometer Figure not added as it has not yet been approved by DMIRS.
	Return water pond moved from Stage 1a to Stage 1b, and add that it will be operational prior to decommissioning of the existing return water pond (not necessarily by the end of stage 1b construction)	Change accepted
Table 5	• Update to include approval of the Additional Proposal for the B11	Changes accepted

Section	Summary of Licence Holder comment	DWER response
	development, including TSF3 Cell F. • Correction and update to clearing permit status • Update to general purpose tenements under the Mining Act	
Table 6	W5314/2012/1 added	Change accepted
6.1	Minor corrections to receptor locations	Changes accepted
7.4	Clarify inspection frequency of tailings and decant lines to 'at least every 12 hours during operations'	Change accepted
7.5.4	Cut-off key under eastern section of Stage 1b, as well as all of Stage 1a.	Change accepted
7.6.4	Applicant confirmed accuracy of catchment statement.	No further action required.
8.2	Grammatical error identified	Reworded
Table 14	Update numbering due to added condition 3	Numbering updated due to added condition 2 and 4.

Attachment 1: Issued Works Approval W6280