Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval

Part V Division 3 of the *Environmental Protection Act 1986*

Works Approval Number	W6941/2024/1
Applicant	Fenix Beebyn Pty Ltd
ACN	671 632 321
File number	DER2024/000235
Premises	Beebyn-W11 Project Legal description - Mining Lease M51/869 and Miscellaneous Lease L20/92 WELD RANGE WA 6640 As defined by the premises map in Schedule 1
Date of report	27 November 2024
Decision	Works approval granted

Sonya Poor
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SENIOR ENVIRONMENTAL OFFICER, INDUSTRY REGULATION

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

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and time-limited operation of the premises. As a result of this assessment, works approval W6941/2024/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary and overview of premises

On 24 May 2024, Fenix Beebyn Pty Ltd (the applicant) applied to DWER for a works approval under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application relates to assembly and operation of a semi-mobile crushing and screening plant (Category 5) and construction and installation of mine dewatering infrastructure and equipment (Category 6) at the Beebyn-W11 Project (the premises). The premises is approximately 54 km north of Cue. A summary of respective design capacities is listed below:

- Category 5: Processing or beneficiation of metallic or non-metallic ore, design capacity 2,000,000 tonnes per annum (tpa) / production capacity estimated at 1,500,000 tpa; and
- Category 6: Mine dewatering, design capacity of 520,000 tpa,

under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6941/2024/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6941/2024/1.

Time-limited operations will occur under this works approval. Once construction works, compliance certification and DWER sign-off has been completed, the operational aspects from the works approval will be transitioned onto a Licence via a separate licence application.

2.2.1 Overview of the premises

The premises will be mined for high grade iron ore from the Beebyn-W11 iron ore deposit (the ore deposit). The site has not been previously mined and currently the only existing infrastructure within the premises boundary are 11 exploration bores installed during 2008 hydrogeological investigations. The surrounding stations are stocked with either sheep or cattle. Feral goats are also present in the area with numbers claimed to have increased over the past decade.

Supporting facilities such as a wastewater treatment plant and landfill are not required to be constructed for the premises. Domestic waste from the operation is collected on site and disposed of at the Cue Landfill under an agreement with the Shire of Cue. Work staff will operate on a fly in, fly-out roster and will commute to the Iron Ridge Project accommodation village currently operated by the applicant under Licence L9422/2024/1 which is 20 km west of the premises.

The applicant estimates a three-year mine life at a steady rate of 1.5 million tpa (Mtpa), totalling 3.9 Mt of high-grade iron ore over the life of mine. The ore will be accessed by an open pit (the pit) 130 m in depth from ground level. A run-of-mine (ROM) will be constructed at the surface

about 1.6 km to the southwest of the pit for trucks to stockpile raw ore. A separate long-term stockpile area about 360 m southwest of the pit will be constructed to store processed ore longer term. Processed ore will be transported by truck to Geraldton Port for export.

The iron ore deposit sits below the water table (29.6 m below ground level (mbgl)) within a low yielding fractured rock aquifer.

2.2.2 Overview of crushing and screening activities

Stockpiled raw ore (ore) will be processed by a semi-mobile crushing and screening plant located on the ROM pad. The plant will be a modular system linked with conveyor belts. The modules will be comprised of a primary crushing unit (jaw crusher), a secondary crushing unit (cone crusher or impactor) and a screening circuit. Crushing and screening operations will occur in a closed loop where ore may only exit the crushing and screening circuits once it has become either a lump or a fine product. Lump products will be nominally between 8 mm and 40 mm while fines will be less than 8 mm. The expected ratio of lump and fines products are 40:60.

A front-end loader will feed the jaw crusher with ore which will crush the ore to approximately 150 mm. A scalping screen may be installed ahead of the primary crusher to allow sized ore to bypass it. Crushed ore will then move on to the secondary crusher and screening circuit for further processing and may continue to recirculate to the secondary crusher until the material meets one of the two product specifications.

Processed ore will pass to one of two elevated stackers for deposition onto the respective lump or fines product stockpiles. Each of the lump and fines product stockpiles will be sampled for confirmation of compliance with the specifications, and analysis of its chemical composition.

The plant will be operated on a 24 hour per day, 7 days per week basis with daily, weekly and monthly schedule maintenance breaks.

2.2.3 Overview of mine dewatering activities

The ore deposit extends 90 m below the existing water table; therefore, mine dewatering is required to facilitate safe access of mining operations. Dewatering activities will occur from both the surface and in pit as detailed below, with dewatering water being discharged to a water storage dam where it will be stored until required for dust suppression at the premises:

- Dewatering from the surface will consist of the use of three production bores (PB1, PB2 and PB3) located around the edge of the W11 mine pit as shown in Figure 1. These bores will draw down the water table and keep it below the advancement of the pit floor. The combined rate of 10 litres per second (L/s) is required to achieve the drawdown suitable for mining operations.
- In-pit dewatering will be supported by sumps capturing in-pit flows. The daily operating dewatering rate is anticipated to be between 6 Ls and 12 L/s.

The receiving water storage dam is located about 1.1 km south-east of the pit, therefore is close enough for water to be transported by pipeline. The production water pipeline will be constructed with PN10 high density polyethylene (HDPE) with a diameter of 110 mm and will be connected by butt-welding. Secondary containment in the form of V drains will be constructed along the entire dewatering pipeline route sufficient to contain the flow in a 110 mm line for 24 hours at 12 L/s.

Mine water will be stored at the dam until it is collected and distributed by water cart for dust suppression at the Minesite area, ROM pad and crushing and screening plant. All potable water for the premises will be transported from Iron Ridge (approximately 20 km away), which has an existing reverse osmosis (RO) plant.

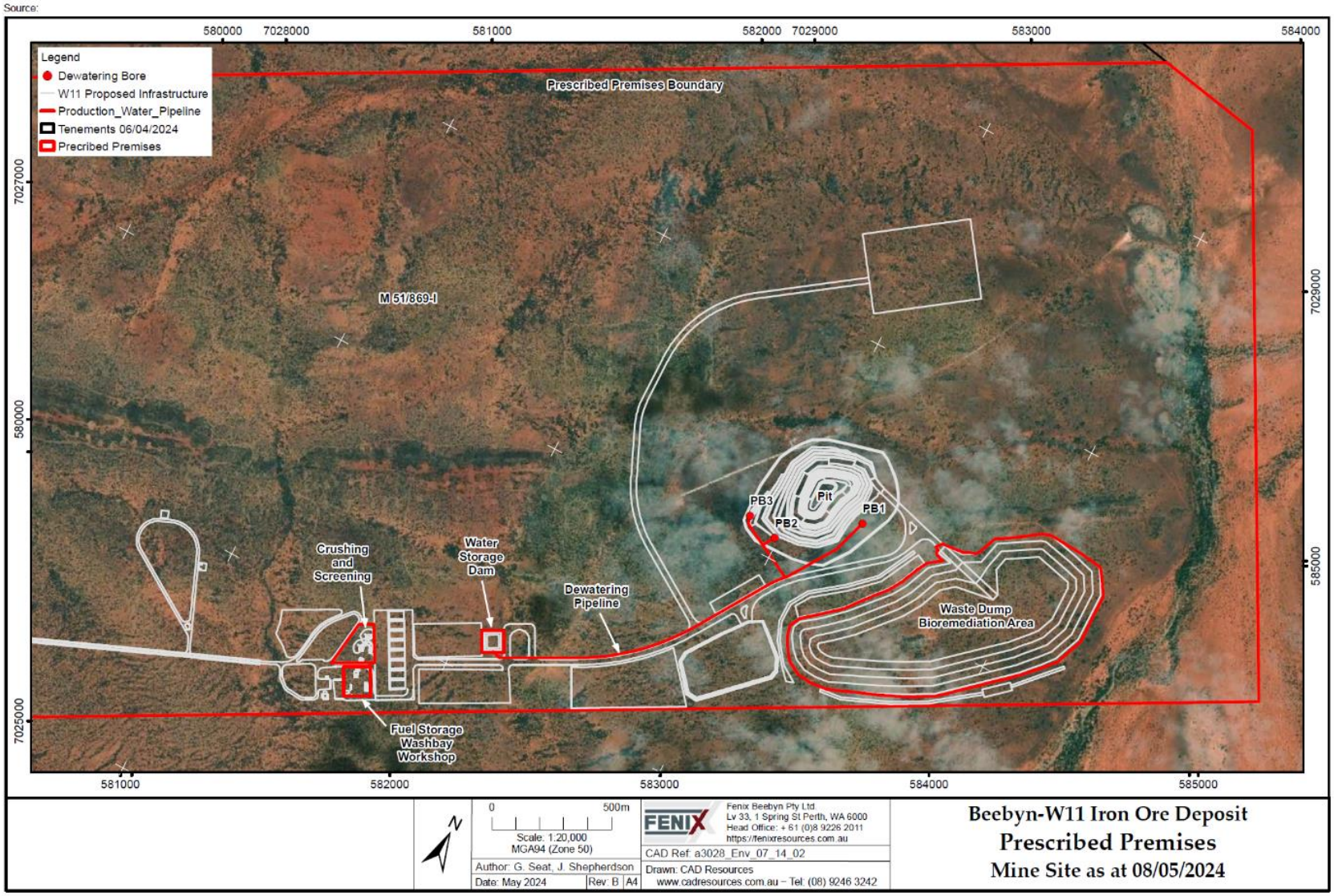

Figure 1: Location of dewatering infrastructure and dewatering bores

Approximately 520,000 tpa of water will be abstracted at an average rate of up to about 10 L/s (~864 kilolitres (kL) per day) over the 3 years. Dewatering rates are expected to be greatest in year 1 and will decrease with time and depth. Approximate annual abstraction rates are shown in Table 1 below.

Table 1: Approximate annual abstraction rates

	Base case	Sensitivity 1	Sensitivity 2	Within pit material
Year 1 (mainly above WT)	~10+	~10+		0.04
Year 2	~9	~10	~7	0.1
Year 3	5	7	3	0.03
Average	~7	~10	~5	
	~0.2 GL/a	~0.3 GL/a	~0.16 GL/a	~0.2 GL (over life of operation)

An estimated water balance from dewatering activities is shown below in Table 2.

Table 2: An estimated water balance from dewatering activities

Year	Demand (kL)					Input (kL)			
	Annual Evaporation	Water Cart	Site Usage Non Potable (offices & W/shop)	Crushing Plant	Total	Dewatering of Groundwater Inflows	Dewatering of Mining Activities	Annual rainfall	Total
1	52,467	182,500	2,920	6,936	244,823	210,240	3,652	34,799	248,691
2	104,935	365,000	5,840	13,872	489,647	441,504	7,304	69,597	518,405
3	104,935	365,000	5,840	13,872	489,647	441,504	7,304	69,597	518,405

2.2.4 Water storage dam

The applicant proposes to construct the water storage dam in a relatively central location near the south-eastern premises boundary between the ROM, Workshop, other facilities and the pit.

The water storage dam will be constructed to the dimensions shown in Table 3.

Table 3: Water storage dam dimensions (Fenix Beebyn Pty Ltd 2024b)

Parameter	Dimensions
Length	78 m
Width	72 m
Internal Batter Angle	1:3
Batter Slope Distance	8.8 m
Design Depth	2.8 m
Total Top of Wall Width	3 m
Total capacity	11,800 m^3

The dam will be constructed with a 1.5 mm HDPE liner. The liner will be installed and secured around the crest of the dam before pipework is installed to contain raw water. The spillway will be located away from any access roads and will only be used to direct overflow out of the dam in an emergency, such as an extreme rainfall event. A minimum 500 mm operational freeboard will be adopted to manage potential overtopping events.

Water that is collected from the workshop area and vehicle washdown pads will be treated in an oily water separator before being directed to the water storage dam and used for dust suppression.

2.2.5 Characteristics of mine dewater

Five production bores and six long term monitoring bores were installed during a feasibility study in 2008 and 2009, of which the locations of the exploration bores are shown in Figure 2 below. Water sampling for standing water levels and groundwater quality data was conducted during the feasibility study. Analysis of those samples and recent samples obtained on 09 August 2024 indicated that groundwater is fresh to slightly brackish and neutral to alkaline. Standing water levels at the premises are between 22.1 mbgl and 49.6 mbgl. Depth to groundwater and basic water quality data for the remaining bores further away from the pit (and within the premises) are shown below in Table 4.

The results of the baseline water sampling of four existing bores surrounding the W11 Pit are shown below in

Table 5 and have been compared to the drinking water trigger values for livestock within the Australian and New Zealand guidelines for fresh and marine water quality (ANZECC & ARMCANZ (2000)). A review and comparison of the groundwater quality data taken from the feasibility study in 2008/2009 and the recent groundwater sampling in 2024, indicates that some of the analytes that were sampled in 2024 are now above the recommended Livestock drinking water guidelines. It is likely these results are attributed to natural variation in the groundwater from over the last 15 years. Noting that mine dewater will be stored in the water storage dam prior to being distributed via dust suppression on site, it is not likely to be accessible by livestock given any pools of water that are created due to dust suppression would evaporate rapidly due to the very hot, dry climate in the region. In addition, the livestock stations are located a significant distance from the mining operations therefore the livestock are not likely to be impacted.

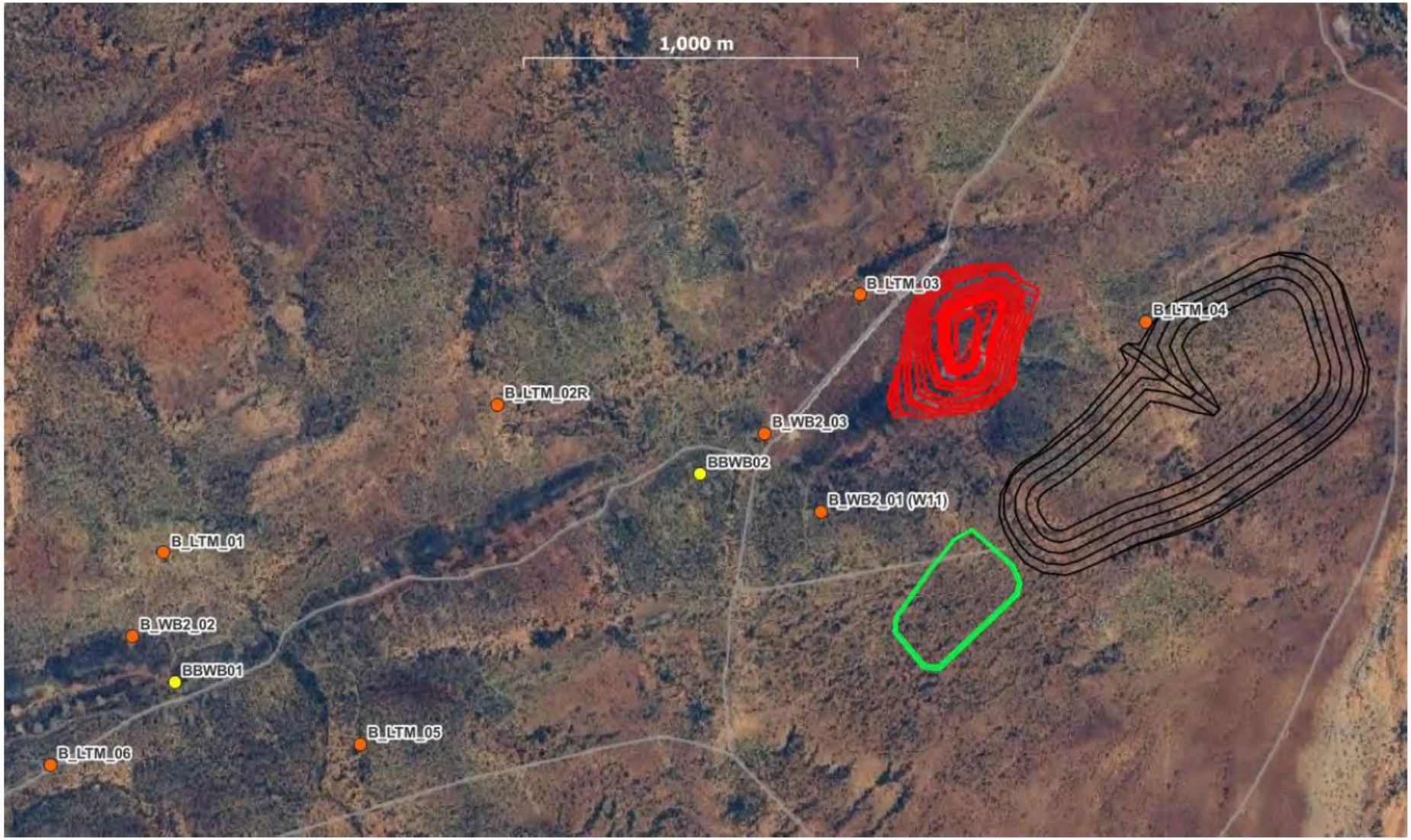

Figure 2: Locations of the exploration bores near W11 Pit (shown in red; prefeasibility study bores in yellow; feasibility study bores (2009) in orange)

Table 4: Groundwater and basic water quality data for the exploration bores away from the W11 Pit at the Premises

Year sampled	Bore ID	Water level (mbtoc)	pH	Salinity (mg/L)
Feasibility study				
2009	B_WB2_01 (W11)	29.6	8.6	1,400
2024	B_WB2_02	49.6	7.3	1,857
	B_WB2_03	35.6	7.3	1,243
Prefeasibility study bores				
2009	BBWB01	35.2	-	-
2024	BBWB02	49.6	7.3	1,857
Long term monitoring bores				
2024	B_LTM_01	37.7	-	-
	B_LTM_02R	33.1	-	-
	B_LTM_03	25.8	7.6	1,244
	B_LTM_04	22.1	7.4	1,,204
	B_LTM_05	22.7	-	-
	B_LTM_06	32.7	-	-

Table 5: Groundwater quality at the W11 Pit at the premises

Analyte	Unit	B_WB2_02	B_WB2_03	B_LTM_03	B_LTM_04	Livestock drinking water trigger value
Date Sampled		09/08/2024	09/08/2024	09/08/2024	09/08/2024	-
Acidity	pH	7.8	7.9	8	7.9	>6 to <9
Electrical Conductivity	µS/cm	1,800	1,300	1,200	1,300	5,970.15
Total Dissolved Solids	mg/L	1,100	730	740	750	4,000
Total Hardness as $CaCO_3$		360	320	250	260	-
Carbonate, CO_3		<1	<1	<1	<1	-
Bicarbonate, HCO_3		340	400	300	270	-
Chloride, Cl		300	190	180	190	-
Sulphate, SO_4		190	73	76	79	500
Nitrate, NO_3		12	<0.05	13	13	100
Sodium, Na		230	150	150	150	-
Potassium, K		12	9.7	11	13	-
Calcium, Ca		45	45	39	36	1,000

Analyte	Unit	B_WB2_02	B_WB2_03	B_LTM_03	B_LTM_04	Livestock drinking water trigger value
Magnesium, Mg		59	52	37	40	Not toxic
Soluble Iron, Fe		6	290	5	<5	Not toxic
Fluoride, F		0.3	0.2	0.3	0.3	2
Aluminium, Al		<5	<5	<5	<5	5.6
Arsenic, As		**<0.5**	**1.5**	**4.8**	**<0.5**	0.025
Manganese, Mn		**310**	**1300**	<1	<1	10
Lead, Pb		<0.5	<0.5	<0.5	<0.5	0.1
Cadmium, Cd		**<0.05**	**<0.05**	**<0.05**	**<0.05**	0.01
Copper, Cu		0.7	<0.5	<0.5	<0.5	1
Antimony, Sb		<1	<1	<1	<1	-
Mercury, Hg		<0.00005	<0.00005	<0.00005	<0.00005	0.002
Boron, B		1400	830	940	920	5
Barium, Ba		19	110	19	19	-
Cobalt, Co		1.3	1.6	<0.5	<0.5	1
Chromium, Cr		<0.5	<0.5	**1.8**	**7.5**	1
Molybdenum, Mo		**1.7**	**1**	**1.4**	**2.2**	0.01
Nickel, Ni		**1**	**2**	**3**	<1	1
Phosphorous, P		0.04	0.19	0.05	0.04	-
Selenium, Se		**8**	**<1**	**3**	**3**	0.02
Silicon, SiO_2		20	26	46	50	-
Thallium, Tl		<0.5	<0.5	<0.5	<0.5	-
Zinc, Zn		**65**	16	**20**	18	20

Note: Shaded and bold values are above recommended Livestock drinking water guideline

2.2.6 Bioremediation facility

A bioremediation facility comprised initially of two cells is proposed to be constructed on the waste dump. These cells will be on a pad 20 m^2 demarcated by 0.5 m walls.

Cells will be progressively filled from the back of the cell with soil contaminated with hydrocarbons to 0.3 m. The soil will then be levelled and loosened (scarification). Hydrocarbon-consuming bacteria will then be added along with the periodic application of water and further scarification during the treatment process until the following target hydrocarbon levels are met:

- C6 – C9 2,800 mg/kg
- C16 – C35 450 mg/kg

The treatment target are derived from the Class I Landfill criteria listed in *Landfill Waste Classification and Waste Definitions 1996* (as amended 2019). Once target levels are met, soil may be removed from the cell for disposal within the waste dump.

2.2.7 Perimeter drainage

The applicant proposes to install diversion drains and containment infrastructure (e.g. bunding and sumps) to ensure contaminated stormwater runoff from the plant area is collected within drains and directed to the water storage dam. Runoff from dust suppression to roads and hardstand areas will be directed to perimeter drainage (diversion drains) and containment sumps.

2.3 Other Approvals

2.3.1 Mining Proposal

A Mining Proposal is currently under assessment with the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS). The applicant should ensure that the Mining Proposal is approved prior to works assessed under this decision report commencing.

2.3.2 Native Vegetation Clearing Permit

DWER notes that a Native Vegetation Clearing Permit (NVCP) is currently under assessment with DEMIRS. The applicant should ensure that the NVCP is approved prior to works assessed under this decision report commencing.

2.3.3 Groundwater Licence

Under section 5C of the *Rights in Water and Irrigation Act 1914*, groundwater Licence GWL165387(5) was granted on 1 June 2017 until 31 May 2027. This licence provides the applicant with an annual entitlement of 200,000 kL of water from East Murchison fractured rock including tenement M51/869 for the purposes of dust suppression for earthworks and construction purposes, exploratory drilling operations and mining camp purposes.

The applicant has stated that an application for increase to 500,000 kL has been submitted and is anticipated to be approved prior to the operation reaching full production. L20/92 will be added to the groundwater licence (Fenix Beebyn Pty Ltd 2024b).

The applicant should ensure that the groundwater licence for dewatering purposes is approved prior to time limited operations assessed under this decision report commencing.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

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.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this decision report are detailed in Table 6 below. Table 6 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 6: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Dust	Movement of construction vehicles on unsealed roads Construction and installation of the semi-mobile crushing plant, water storage dam, pipelines, bunding, perimeter drainage and ancillary facilities Operation of the semi-mobile crushing plant Stockpiling of iron ore product	Air / windborne pathway	• Dust suppression using water carts fitted with dribble bars will be in operation continuously during construction, on unsealed roads, on the ROM, transport roads and other open areas to minimise dust generation; • Dust suppression throughout the crushing and screening plant will be managed with water misting sprays at suitable locations within the plant (generally conveyor belt loading and discharge points); • Conveyor belt loading points will be fitted with skirting seals and dust box covers as required; • Conveyor belt head pulleys will be fitted with head chutes as required; • Addition of dust suppression products (i.e. polymer additives) will be considered for long term stockpiles and exposed surfaces in the event the site goes into care and maintenance; • Short term stockpiles will be managed using water carts; and stockpile height will be 8 m at the maximum; • Monitoring of dust emissions from the premises will be predominately by regular visual inspection; and • Vegetation and flora monitoring will include observations of dust present on foliage.

Emission	Sources	Potential pathways	Proposed controls
Hydrocarbons	Refuelling construction vehicles Refuelling the diesel generator for the modular semi-mobile crushing plant	Spills direct to land causing contaminated overland runoff Migration via soil to groundwater	• Infrastructure constructed in locations to avoid drainage lines; • Drainage and containment infrastructure constructed to control runoff from hardstand areas, roads and other cleared surfaces; • Ensure waste oil and hydrocarbon contaminated wastes (filters, rags, hydrocarbon absorbent materials) are stored in appropriate containers and removed from site by a licensed service provider for reprocessing or disposal at an appropriate facility; • Ensure hydrocarbons and chemicals are appropriately stored and spills are immediately addressed to prevent surface runoff carrying contaminants downstream; • Diesel will be stored in bulk tanks at the workshop; • Storage tanks are self-bunded; • Fuel transfer points (refuelling of vehicles and fill points for the bulk tanks) will be located on impervious aprons. Aprons will be constructed with provision for collecting and recovering spills and/or rain water; • Mobile refuelling and basic servicing of heavy equipment will be undertaken in the field by a service truck; • Spill kits maintained on site at refuelling locations and on service trucks; • Ensure washdown from hardstand areas (e.g. workshop area floors and vehicle washdown pads) is directed to an oily water separator for treatment. Sludge from the washdown pad is removed from the settling sump for treatment in the bioremediation area; • Weekly visual inspections of fuel storage area; • Weekly visual inspection of bioremediation facility to ensure all non-biodegradable rags, absorbent pads and other rubbish to removed and transported to an appropriately Licenced facility; • Provide appropriate spill response kits and training for site personnel; and • Maintain a register of stored substances

Emission	Sources	Potential pathways	Proposed controls
			and storage locations.
Leachate contaminated with hydrocarbons	Operation of the bioremediation facility	Spills direct to land causing contaminated overland runoff Migration via soil to groundwater	• Constructed over an area of no more than 20 m x 20 m; • Constructed on a flat area not subject to flooding or surface water infiltration; • Constructed at least 10 m above the groundwater table; • Constructed on at least 300 mm of compacted clay material; • Constructed with a 500 mm impermeable bund on all three sides of the cell to separate external runoff from the cell; • Constructed of a drive over impermeable bund on the fourth side of the cell capable of containing leachate; • All non-biodegradable rags, absorbent pads and other rubbish to be removed to an appropriately Licensed facility; and • Ensure material is deposited to a maximum depth of 300 mm, spread evenly and scarified to promote aerobic activity.
Fresh to brackish dewater	Failure of the water storage dam Failure of the dewatering pipelines Dust suppression	Overtopping or dam wall failure, leaks and bursts causing overland runoff Leaks migrating via land to groundwater	• Infrastructure constructed in locations to avoid drainage lines; • Construct appropriate drainage and containment infrastructure to control runoff from hardstand areas, roads and other cleared surfaces; • Construction of v-drains along entire dewatering pipeline, sufficient to contain the flow in a 110 mm line for 24 hours at 12 L/s; • Pipeline to be PN10 HDPE lined with 110 mm diameter; • Daily visual inspection for the integrity of the water storage dam; • Dewatering pipelines to be inspected daily to ensure pipework is contained within V drains and check for damage, ruptures and/or leaks; • Daily visual inspections of below ground sumps and twice daily inspections during periods of high rainfall; • Install culverts at road embankments where necessary to provide continuity of surface water flows;

Emission	Sources	Potential pathways	Proposed controls
			• Runoff from dust suppression to roads and hardstand areas will be directed to perimeter drainage (diversion drains) and containment sumps; • Ensuring groundwater is not discharged directly to vegetation; and • Minimise the potential for salt build up in the soil by not over-watering roads and hardstand areas.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 7 below and Figure 3, Figure 4 and Figure 5 provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

Table 7: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	**Distance from prescribed activity**
Beebyn Station homestead	Beebyn Station boundary overlaps the majority of the premises boundary, including all proposed mining activities and access. The crushing and screening plant area and water storage dam are approximately 11.85 km and 12 km north west of the Beebyn Station homestead respectively. **Ruled out due to distance from premises activities.**
Glen Station homestead	Glen Station homestead is 9.9 km south west of the premises boundary to the access track and approximately 24.8 km and 25.5 km to the crushing and screening plant area and water storage dam respectfully. **Ruled out due to distance from premises activities.**
Environmental receptors	**Distance from prescribed activity**
Aboriginal Heritage Sites	Numerous sites are located within 1 km of the crushing and screening plant area and water storage dam. The layout of the proposed activities avoid direct disturbance of the identified sites.
Ephemeral creek lines	Beebyn Creek is an ephemeral creek located along the eastern border of the premises boundary. Minor creek lines flow to the west and south of the premises into Beebyn Creek. All of these drainage lines are part of the broader Beebyn Creek catchment which after rainfall flows south through Beebyn Gap. An unmapped ephemeral creekline is located approximately 350 m west of the crushing and screening plant area.
Priority	The Weld Range vegetation complexes (banded ironstone formation) overlaps the

Ecological Communities (PEC) Priority 1 - Weld Range vegetation complexes (banded ironstone formation)	premises boundary. The PEC boundary is immediately adjacent to the crushing and screening plant area and water storage dam. Mulga Woodland on Hill Slope overlaps 91.6% of the premises area. This community is dominated by *Acacia pruinocarpa* trees and *Acacia aneura* shrublands over on sandy or stony clay loam on hill slopes. This woodland provides suitable habitat to support the Priority 3 (*Biodiversity Conservation Act 2016*) northern shield-backed trapdoor spider. This habitat is considered widespread in the Weld Range area. Most disturbance associated with the project will occur in this habitat type; therefore, impact to a localised area will result from the proposed development.
Priority flora	Fifteen species of priority flora (P1, P3 and P4) are present within the premises boundary between 800 m and 1 km north of the crushing and screening plant area. Specimens of Priority 4 *Acacia speckii* are located between the crushing and screening plant area and water storage dam locations. One record of a Priority 3 flora species *Prostanthera petrophila* is located directly adjacent to the dewatering pipeline.
Priority fauna	Two species of Priority fauna recorded in the project area: • P3 - Northern shield-backed trapdoor spider (*Idiosoma clypeatum*); and • P4 - Long-tailed dunnart (*Antechinomys longicaudata*).
East Murchison Groundwater Area	The Premises (immediately south of Weld Range) is located within the East Murchison groundwater area. Groundwater at Weld Range occurs at relatively shallow depths (typically 5 – 50 mbgl) beneath the alluvial plain and occurs within the bedrock sequence that forms Weld Range. Within the project area of the premises, three bores constructed for water abstraction encountered the water table between 29.6 m and 49.7 mbgl. The groundwater is fresh to slightly brackish in the Banded Iron Formation (BIF) and shallow alluvial aquifers and is highly saline in alluvium and the palaeochannel aquifer west and south of the project area (Ecotec (WA) Pty Ltd 2024). Aquifers in the Weld Range region are characterised by alluvium and colluvium with a tertiary palaeochannel passing through the Weld Range. The BIF strata which include the Beebyn-W11 deposit are commonly fractured, jointed and rock cavities, and constitute aquifers of moderate to high permeability. Other non-BIF granitic and greenstone basement rocks are generally of low permeability, including the dolerite associated with the BIF. The groundwater is recharged by the infiltration of rainfall and streamflow following high rainfall events. Groundwater flows in a north to southeast direction through the Weld Range and discharges into Lake Austin or a smaller temporary lake to the north.
Livestock drinking wells	The nearest recorded wells are Wilgie Mia and Yallon Wells, approximately 5 km to the south and south-south-east respectively. **Ruled out due to distance.**
Domestic bores	Limestone bore 1.6 km northeast. Groundwater here is 8.58 mbgl/490.42 mAHD, pH 7.3, salinity 1,794 mg/L. **The remaining seven bores within a 10 km radius are more than 5 km away from the W11 Pit and are unlikely to be impacted from mine dewatering activities due to distance.**

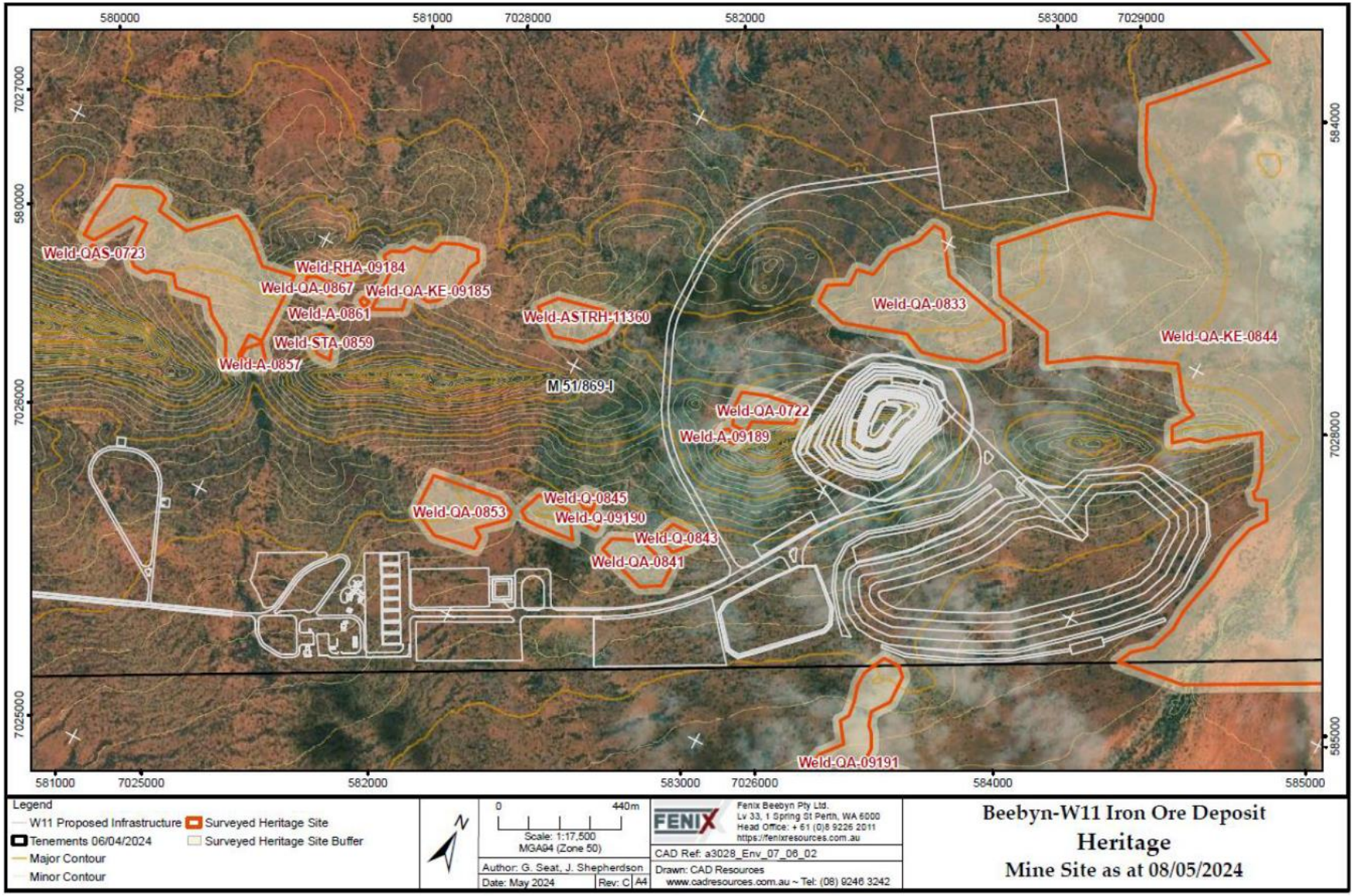

Figure 3: Distance to sensitive receptors – Aboriginal Heritage Sites

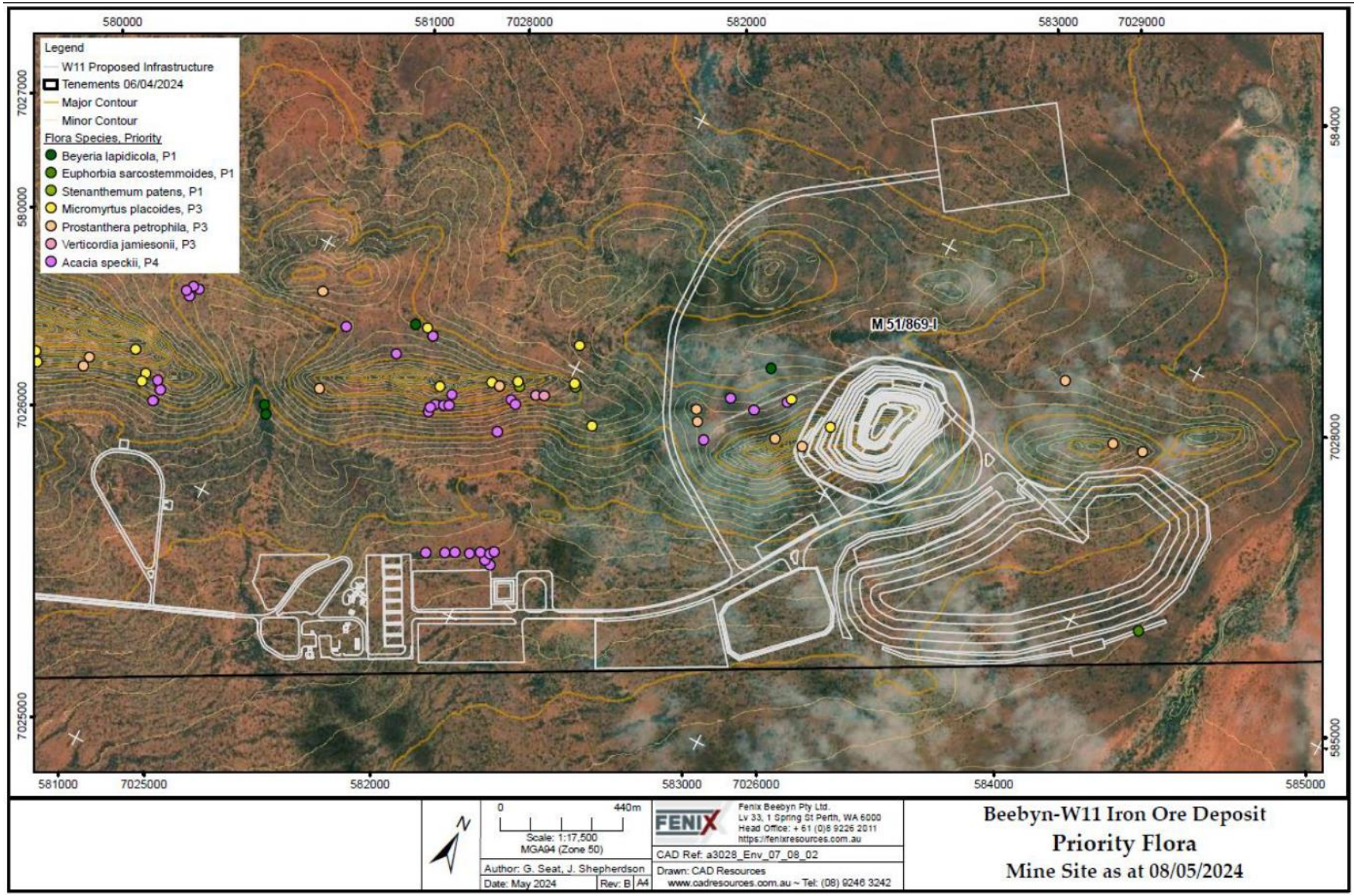

Figure 4: Distance to sensitive receptors - Priority flora

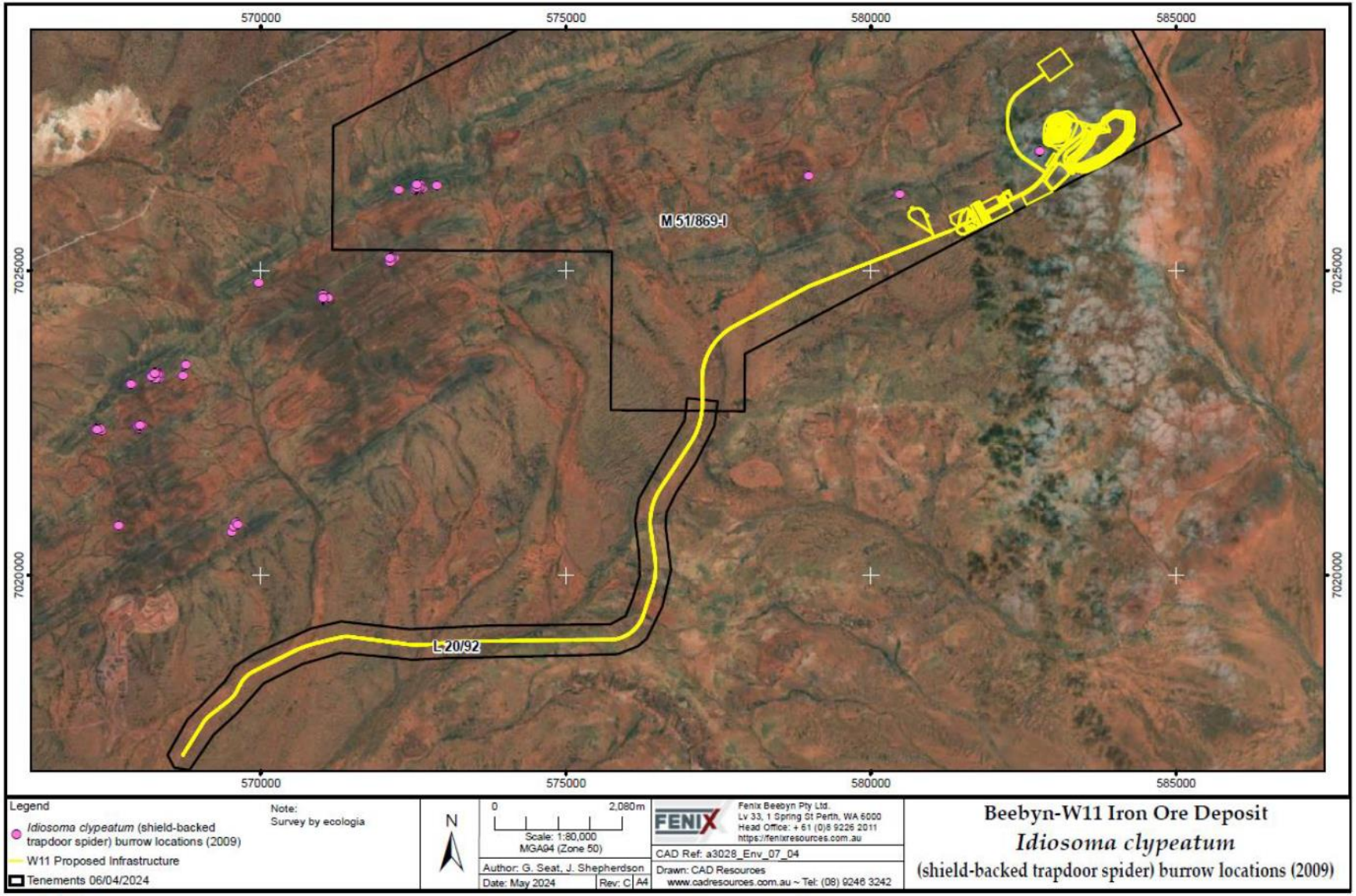

Figure 5: Distance to sensitive receptors - Priority fauna

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 8.

Works approval W6941/2024/1 that accompanies this decision report authorises construction and time-limited operations (TLO). The conditions in the issued works approval, as outlined in Table 8 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises i.e. category 5 and 6 activities. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

Table 8: Risk assessment of potential emissions and discharges from the premises during construction and operation

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Category 5: Processing or beneficiation of metallic or non-metallic ore and Category 6: Mine dewatering								
Movement of construction vehicles on unsealed roads Construction and installation of the semi-mobile crushing plant, water storage dam, pipelines, bunding, perimeter drainage and ancillary facilities	Dust	**Pathway:** Air / windborne pathway **Impact:** Ecosystem disturbance and impacts to adjacent remnant vegetation, conservation significant flora and fauna species and PEC through dust deposition	Aboriginal Heritage Sites Ephemeral creek lines PEC - Weld Range vegetation complexes Priority flora Priority fauna	Refer to section 3.1	C = Minor L = Possible **Medium Risk**	Yes	Condition 1 (Table 1): Design and Construction/installation requirements for semi-mobile crushing and screening plant Condition 2: Submission of an Environmental Compliance Report	Minimal dust emissions may be generated from site preparation works including earthworks/clearing activities and the installation of the crushing and screening plant, stormwater management infrastructure and transportation roads during the construction period. The Delegated Officer considers the controls proposed by the applicant sufficient to the control the impacts of dust associated with the construction works on sensitive receptors.
Refuelling construction vehicles and diesel generator for the semi-mobile crushing plant	Spills/leaks of hydrocarbons	**Pathway:** Overland runoff during high rainfall events. **Impact:** Overland flow following a spill or leak event may impact on surface water bodies and on native vegetation representative of a PEC and containing priority flora through contamination if not properly contained.	Ephemeral creek lines PEC - Weld Range vegetation complexes Priority flora	Refer to section 3.1	C = Slight L = Possible **Low Risk**	Yes	Condition 1 (Table 1): Design and Construction/installation requirements for Fuel Storage and Washbay Workshop	Minimal hydrocarbon emissions are expected on site during construction activities (spills / leaks from vehicles and machinery) due to the short-term duration of construction phase (3 months). It is unlikely for hydrocarbon emissions to have an impact on offsite native vegetation due to the applicant's proposed controls. Therefore, no additional regulatory controls are required. Spills and leaks of hydrocarbons can be regulated under the *Environmental Protection (Unauthorised Discharges) Regulations 2004.*
Operation (including Time limited operations)								
Category 5: Processing or beneficiation of metallic or non-metallic ore								

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Operation of semi-mobile crushing and screening plant Unloading, loading and stockpiling of material Vehicle movements	Dust	**Pathway:** Air /windborne pathway **Impact:** Ecosystem disturbance and impacts to adjacent remnant vegetation, conservation significant flora and fauna species, and a PEC through dust deposition smothering vegetation.	Aboriginal Heritage Sites Ephemeral creek lines Native vegetation representative of a PEC - Weld Range vegetation complexes Priority flora Priority fauna	Refer to section 3.1	C = Moderate L = Unlikely **Medium Risk**	Yes	Condition 1 (Table 1): Design and Construction/installation requirements for crushing and screening plant **Condition 6 (Table 2)**: TLO requirements for crushing and screening plant Condition 12: Submission of TLO report Condition 13: TLO reporting requirement for crushing and screening plant with associated equipment	As described under Section 3.1.2 of this report, the Prescribed Premises is located within and adjacent to remnant native vegetation that is representative of the Weld Range vegetation complex PEC, which contains large populations of priority flora taxa and habitat for conservation significant fauna species that have been recorded in the area through surveys. In addition, the Premises is located approximately 1 km from an Aboriginal Heritage Site. The Delegated Officer has taken into consideration the applicant's proposed controls for dust suppression which will reduce the risk of dust emissions impacting upon sensitive environmental receptors located adjacent to the primary activity (crushing and screening of ore). Noting the close proximity of environmental receptors to the primary activity, the Delegated Officer has conditioned the applicant's controls within the works approval including visual inspections of dust present on foliage of vegetation and vegetation and flora monitoring during TLO. The Delegated Officer has included the requirement in the works approval to undertake weekly visual inspections and to inspect species health. If dust management controls are not preventing dust emissions from the primary activities (crushing and screening of iron ore) from being deposited on foliage of vegetation and impacts to species health is identified during visual inspections, the works approval holder must apply further controls for dust management. Where further controls are still not

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								preventing dust from the primary activities from impacting upon sensitive receptors, operations are required to cease. These additional regulatory controls will be conditioned on the works approval to reduce the likelihood of receptors being impacted.
	Sediment laden stormwater	**Pathway:** Overland and stockpile runoff during high rainfall events. **Impacts:** Increase of suspended solids into the environment causing ecosystem disturbance and impacts to surface water quality of nearby waterbodies. Reduced quality of native vegetation representative of the PEC and impact upon conservation significant flora.			C = Possible L = Slight **Low Risk**	No	Condition 1 (Table 1): Design and Construction/installation requirements for stormwater management system **Condition 6 (Table 2)**: TLO requirements for storm water management system. Condition 12: Submission of TLO report Condition 13: TLO reporting requirement for stormwater management system.	Noting the close proximity of the ephemeral creekline to the operation, there is a risk of sedimentation/stormwater runoff from the ROM pad, process plant and stockpile area during a rainfall event entering the surface water body. The requirement to ensure perimeter drainage and earthen bunding for containing contaminated stormwater is maintained during operation has been conditioned on the works approval to control sediment laden stormwater. A requirement to regularly inspect the collection sump to remove excess sediment and prevent overflowing during operation has also been included in the works approval.
Refuelling diesel generator for semi-mobile crushing plant	Hydrocarbon contaminated wastewater	**Pathway:** Overland runoff during high rainfall events. **Impact:** Overland flow following a spill or leak event may	Ephemeral creek lines Native vegetation representative of a PEC - Weld	Refer to section 3.1	C = Minor L = Unlikely **Medium Risk**	No	**Condition 1 (Table 1)**: Design and Construction/installation requirements for Fuel Storage and Washbay Workshop	Unintended spillages or leakage of hydrocarbons and chemicals from vehicle and equipment use, refuelling and storage on site have the potential to enter and contaminate the nearby ephemeral creekline located close to the Fuel Storage and Washbay

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		impact on surface water bodies and on native vegetation representative of a PEC and containing priority flora through contamination if not properly contained.	Range vegetation complexes Priority flora Conservation significant fauna				**Condition 6 (Table 2)**: TLO requirements for Fuel Storage and Washbay Workshop Condition 12: Submission of TLO report Condition 13: TLO reporting requirement for Storage and Washbay Workshop	Workship during high rainfall events. Onsite impacts to native vegetation representative of a PEC and containing priority flora habitat may also occur during rainfall events. Noting the above, the Delegated Officer has included the design/installation requirement to install an alarm system on the oily water separator to warn of failure and for any hydrocarbon contaminated water taken from the Fuel Storage and Washbay Workshop area needs to be treated by the oily water separator before being discharged to the water storage dam. These additional regulatory controls should address any potential hydrocarbon impacts.
Operation of the bioremediation facility	Leachate contaminated with hydrocarbons	**Pathway:** Overland runoff during high rainfall events. **Impact:** Overland flow following a spill or leak event may impact on surface water bodies and on native vegetation representative of a PEC, priority flora and conservation significant fauna through contamination if not properly contained.	Ephemeral creek lines Native vegetation representative of a PEC - Weld Range vegetation complexes Priority flora Conservation significant fauna	Refer to section 3.1	C = Slight L = Rare **Low Risk**	Yes	Condition 1 (Table 1): Design and Construction/installation requirements for the Bioremediation facility Condition 6 (Table 2): TLO requirements for the Bioremediation facility **Condition 7 (Table 3):** Authorised discharge point for hydrocarbon contaminated soil Condition 12: Submission of TLO report Condition 13: TLO reporting requirement for Storage and Washbay Workshop	Recent baseline groundwater sampling of monitoring bore B_LTM_04 that is located directly adjacent to the bioremediation facility indicated depth to groundwater to be 22.1 m. The Delegated Officer has determined that the likelihood of receptors being impacted by hydrocarbon leachate is rare given the significant distance to groundwater and in consideration of the applicants proposed controls which have been conditioned on the works approval. Condition 7 (Table 3) has been included as an additional regulatory control to specify the discharge points that are authorised at the Premises on the Works Approval during TLO.
Category 6: Mine Dewatering								

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Storage of mine dewater and treated hydrocarbon contaminated water at the water storage dam	Fresh to brackish dewater potentially containing trace levels of total recoverable hydrocarbons (TRH)	**Pathway:** Overtopping or dam wall failure **Impact:** Direct discharge onto native vegetation representative of a PEC, priority flora and conservation significant fauna through contamination.	Aboriginal Heritage Sites Ephemeral creek lines Native vegetation representative of a PEC - Weld Range vegetation complexes Priority flora Priority fauna	Refer to section 3.1	C = Minor L = Unlikely **Medium Risk**	No	**Condition 1 (Table 1):** Design and Construction/installation requirements for the Water Storage Dam **Condition 6 (Table 2):** TLO requirements for the Water Storage Dam **Condition 7 (Table 3):** Authorised discharge point for mine dewater **Condition 8 (Table 4):** Dewater discharge monitoring of dewatering volume Condition 12: Submission of TLO report Condition 13: TLO reporting requirement for Water Storage Dam	Condition 1 (Table 1): a requirement to install a volumetric flow meter on the outlet pipe has been included on the works approval to measure the volume of water from the pond being discharged to the environment via dust suppression. Condition 7 (Table 3) has been included as an additional regulatory control to specify the discharge points that are authorised at the Premises on the Works Approval during TLO. This is to ensure the Works Approval reflects what category 6 activities are authorised during operation at the Premises. Condition 8 (Table 4) has been included as a regulatory control on the works approval to monitor the volume of mine dewater being discharged to the water storage dam during operations. The applicant is also required to undertake quarterly discharge monitoring at the water storage pond to determine the quality of water being used for dust suppression during operation. The parameters that were determined to be elevated above the Livestock drinking water values in the baseline sampling and TRH have been targeted for groundwater quality monitoring. This requirement may be removed if the monitoring during TLO under this works approval indicates TRH and the concentrations of the other parameters are low.

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Operation of dewatering pipelines to Water Storage Dam		**Pathway:** Rupture of pipeline **Impact:** Direct discharge of mine dewater onto native vegetation representative of a PEC, priority flora and conservation significant fauna through contamination.	Aboriginal Heritage Sites Ephemeral creek lines Native vegetation representative of a PEC - Weld Range vegetation complexes Priority flora Priority fauna	Refer to section 3.1	C = Minor L = Unlikely **Medium Risk**	No	**<u>Condition 1 (Table 1)</u>:** Design and Construction/installation requirements for the dewatering pipelines Condition 6 (Table 2): TLO requirements for the Water Storage Dam Condition 12: Submission of TLO report Condition 13: TLO reporting requirement for Water Storage Dam	As there are sensitive receptors in close proximity to the dewatering pipeline that have the potential to be impacted in the event of a ruptured pipeline, the Delegated Officer has conditioned the works approval to include the requirement that pipelines must be fitted with a telemetry system and/or automatic cut outs in the event of pipe failure. This requirement will mitigate the risk of mine water discharge impacting upon nearby receptors in the event of a pipeline failure.
Dust suppression		Overland runoff	Aboriginal Heritage Sites Ephemeral creek lines Native vegetation representative of a PEC - Weld Range vegetation complexes Priority flora Priority fauna	Refer to section 3.1	C = Slight L = Rare **Low Risk**	Yes	<u>Condition 1 (Table 1)</u>: Design and Construction/installation requirements for the water trucks used for dust suppression.	The Delegated Officer notes the controls proposed by the applicant are adequate to address the risk associated with dust suppression of mine dewater on the premises during TLO. The Delegated Officer also notes however that dribble bars minimise spray drift. A condition has been included within Condition 1 (Table 1) of the Works Approval to prevent overspray potentially impacting vegetation.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **<u>Bold and underline text</u>** depicts additional regulatory controls imposed by department.

4. Consultation

Table 9 provides a summary of the consultation undertaken by the department.

Table 9: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 01 July 2024	No comments received.	N/A
The Shire of Cue were advised of the proposal on 25 June 2024	No comments received.	N/A
Wajarri Yamaji Aboriginal Corporation were advised of the proposal on 03 July 2024.	No comments received.	N/A
Viper Holdings Pty Ltd were posted the proposal on 24 June 2024.	No comments received.	N/A
Applicant was provided with draft documents on 30 September 2024.	On 04 November 2024, the applicant provided responses (Fenix Beebyn Pty Ltd 2024b) to the department's request for further information within the draft package. The applicant did not provide any comments on the drafts documents.	Documents updated accordingly to incorporate the applicant's responses.

5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. ANZECC & ARMCANZ (2000) Australian and New Zealand guidelines for fresh and marine water quality. Australian and New Zealand Environment and Conservation Council, Agriculture and Resource Management Council of Australia and New Zealand.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2019, Landfill Waste Classification and Waste Definitions 1996 (as amended 2019), Perth, Western Australia.
4. DWER 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
5. DWER 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.
6. Ecotec (WA) Pty Ltd 2024, *W11 Project 2024, Works Approval Application Supporting Information – Appendices*, prepared on behalf of Ecotec (WA) Pty Ltd on behalf of Fenix Beebyn Pty Ltd, Perth, Western Australia, DWER Reference: A2281952.
7. Ecotec (WA) Pty Ltd 2024a, *W11 Project 2024, Works Approval Application – Attachment 6A – Emissions and Discharges*, prepared on behalf of Ecotec (WA) Pty Ltd on behalf of Fenix Beebyn Pty Ltd, Perth, Western Australia, DWER Reference: A2281949.
8. Fenix Beebyn Pty Ltd 2024, *Response to DWER's request for further information*, dated 09 August 2024, DWER Reference: A2301451.
9. Fenix Beebyn Pty Ltd 2024a, *Response to DWER's request for further information*, dated 03 September 2024, DWER Reference: A2308676.
10. Fenix Beebyn Pty Ltd 2024b, *RE: Application for a Works Approval W6941/2024/1 – Draft Instrument and Decision Report – EOT to 04/11/24*, dated 04 November 2024, DWER Reference: DWERDT1036782.