Big Bell Gold Operations Pty Ltd
(ACN 090 642 809)
Meekatharra Gold Operations

Supporting Document
Works Approval And Amendment L4496/1986/11

September 2024

Company	Big Bell Gold Operations Pty Ltd (100% owned by Westgold Resources Ltd) ACN 090 642 809
Mining Tenements (Mineral Field 20 and 51)	G51/9, L51/18, L20/75,L51/51, M20/12, M20/45,M20/68, M20/70, M20/71,M20/73,M20/77,M20/107, M20/214, M20/219, M20/249, M20/421,M51/6,M15/12 M51/31,M51/33, M51/35, M51/39, M51/53, M51/62, M51/75, M51/92, M51/96, M51/132, M51/190, M51/199, M51/200, M51/203, M51/209, M51/211, M51/233, M51/236, M51/237, M51/254, M51/320, M51/321, M51/374, M51/393, M51/437, M51/438, M51/439, M51/440, M51/459, M51/483, M51/485, M51/486, M51/491, M51/492, M51/493, M51/494, M51/495, M51/504, M51/523, M51/524, M51/539, M51/569, M51/572, M51/575, M51/581, M51/654, M51/668, M51/669, M51/670, M51/671, M51/672, M51/757, M51/762, M51/784, M51/788, M51/793, M51/794, M51/795, M51/819, M51/820, M51/824 and M51/834
Mining Area	Meekatharra Gold Operations
Company Contact Details	Registered office: [redacted]

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1. INTRODUCTION

1.1 Overview

Big Bell Gold Operations Pty Ltd (BBGO), a wholly-owned subsidiary of Westgold Resources Limited, operates the Meekatharra Gold Operations (MGO) comprising the Paddy's Flat, Yaloginda, Nannine, and Reedy mining areas. This document outlines BBGO's application to the Department of Water and Environment Regulation (DWER) for a work approval to establish a new in-pit tailings storage facility (TSF) named the Great Northern Highway In-pit TSF (GNHTSF), construct a paste plant at the Bluebird Mine, and dispose of up to 1,000 tyres annually, enclosed by waste rock, within the South Junction Pit.

The facility will be located within the Prescribed Premises Boundary as defined in the *Environmental Protection Act 1986* (EP Act) Licence L4496/1988/11.

1.2 Licensee and Occupier

All correspondence should be forwarded by post or email to the contact details in Table 1.

[redacted]

1.3 Instrument History

Operations at MGO resumed in September 2013, necessitating the re-issuance of EP Act licence L4496/1988/11. The licence authorises the annual processing or beneficiation of up to 2.5 million tonnes of metallic or non-metallic ore material (Category 5), mine dewatering infrastructure up to 5.95 million tonnes (Category 6), a 3,000-tonne inert landfill (Category 63) and a 1,000-tonne putrescible landfill (Category 64). Additionally, the licence encompasses power generation with a 21-megawatt and a 15.2-megawatt facility (Categories 52 and 84, respectively), along with a sewage treatment facility designed to process 150 cubic metres of wastewater daily (Category 54). An overview of previous licence amendments can be found in Table 2.

Table 2: Instrument History

Instrument	Issued	Description
L4496/1988/11	26/09/2013	Licence re-issue.
L4496/1988/11	7/08/2014	Licence transfer.
L4496/1988/11	21/01/2016	Licence amendment to include categories 6 and 63, updated to v2.9 format.
L4496/1988/11	12/05/2016	Licence amendment for the construction and operation of the Bluebird East Pit as an in-pit tailings storage facility (TSF).
L4496/1988/11	29/04/2016	This notice was given in accordance with section 59B(9) of the Environmental Protection Act 1986 to the new expiry date of the licence.

Instrument	Issued	Description
L4496/1988/11	23/05/2017	Amendment Notice 1: Licence holder-initiated amendment and relates to the dewatering of the pit lake and groundwater at the Aladdin Pit with the dewatering effluent being discharged to Lake Annean, and the inclusion of ten additional mining tenements to the Premises description to identify the additional prescribed activities. Also, standard REFIRE format licence condition 1.2.1 was removed from the licence
L4496/1988/11	28/03/2018	Amendment Notice 2: Use the Surprise Pit for the disposal of tailings material generated at the Premises. Conditions 1.3.1, 1.3.3 and 3.4.1 of the Licence for the containment infrastructure, freeboard and ambient groundwater monitoring requirements respectively, have been amended to include the Surprise in-pit TSF. Condition 1.3.7 is amended to include the construction requirements for the Surprise in-pit TSF. Condition 4.3.1 is amended to include the construction notification requirements for the Surprise in-pit TSF. Construction of a new Class II landfill to replace the existing landfill and dewater the Five Mile Well pit.
L4496/1988/11	11/12/2018	Amendment Notice 3: Licence Holder initiated amendment seeking approval to add additional tyre burial locations in Schedule 1 Maps, increase category 63 approved throughput and two new inert landfills, dewater the Five Mile Well pit and the removal of the following tenements from the boundary; M51/209, M51/455 M51/781, E51/1484 and some administrative changes. Thirty-three tenements were added to the licence.
L4496/1988/11	24/07/2019	Amendment 4: Licence Holder initiated amendment seeking approval for additional category 6 activities associated with the Kurara and Boomerang resources, to add an additional tyre disposal area and to add mining tenement L51/51 and M51/92 (added previously).
L4496/1988/11	28/07/2020	DWER initiated licence amendment to review and consolidate issued amendment notices 1, 2, 3 and 4 into the licence. During this amalgamation of amendment notices no additional Department of Water and Environmental Regulation L4496/1988/11 (Date of latest update: 23 June 2023) 4 Reference number Date Summary of changes risk assessment of the premises was undertaken by DWER.
L4496/1988/11	15/12/2020	Licence amended to include dewatering of the Maid Marion pit with discharge of 130,000 tpa of dewatering effluent to an onsite ephemeral creek.
L4496/1988/11	16/04/2021	Licence amendment to include dewatering of Caledonian, Caledonian Splay, Golden Shamrock, Nannine Reef and the Three Sisters mine pits.
L4496/1988/11	26/08/2022	Licence amendment for the construction and operation of: - A new dewatering discharge location into Lake Annean (Baileys Island discharge point). - Two new additional wastewater treatment ponds to increase the capacity at the existing waste water treatment plant. - A new inert/putrescible landfill on the South Junction/Ascot Waste Rock Dump. - Expansion of the existing inert landfills at the Surprise WRD and Paddy's Flat.
L4496/1988/11	23/12/2022	Licence amended to: - Include category 52 (Electric power generation) to account for the existing electric power generating facilities at the Premises. - Construct and operate a Hybrid Power Generation Facility which consists of the following: • Nine (9) Caterpillar 3512 Gas Powered Generators and two (2) Cummins Dual Fuel KTA50 Continuous Dual Fuel Generators for a combined output of 15.2 MW. • 13.1 megawatt (MW) photovoltaic solar array. • 5 MW battery storage system. • Two (2) 370,000 L LNG storage vessels.
L4496/1988/11	23/06/2023	Licence amendment for: • Dewatering of South Junction Pit into Romsey Pit and Mystery Pit; • Removal of construction requirements in Table 7 for infrastructure constructed and compliance reports received;

Instrument	Issued	Description
		• Extension to the existing expiry date of 30/09/2023 to 30/09/2033; • Condition numbering updated; and • Administrative changes.

1.4 Location, Tenure and Site Layout Plans

MGO is located approximately 700 kilometers (km) northeast of Perth and near the town of Meekatharra, within the Shire of Meekatharra. Situated in Murchison region of Western Australia, the MGO encompasses the mining areas of Paddy's Flat, Yaloginda, Nannine, and Reedy (Figure 1). An overview of the MGO is provided in Figure 2.

Table 3: Details of Mining Tenure Listed on L4496/1988/11

Tenement	Area (ha)	Holder	Granted	Expiry
G51/9	33.64	Big Bell Gold Operations Pty Ltd	10/04/1986	22/09/2027
L20/75	9.38	Big Bell Gold Operations Pty Ltd	27/03/2017	26/03/2038
L51/18	0.84	Big Bell Gold Operations Pty Ltd	26/02/1985	25/07/2026
L51/51	16.30	Big Bell Gold Operations Pty Ltd	21/11/1998	20/11/2028
L51/78	75.00	Big Bell Gold Operations Pty Ltd	24/02/2000	23/02/2042
L51/79	19.00	Big Bell Gold Operations Pty Ltd	15/03/2001	14/03/2043
M20/12	969.80	Big Bell Gold Operations Pty Ltd	14/04/1984	17/04/2026
M20/45	988.80	Big Bell Gold Operations Pty Ltd	24/08/1986	25/08/2028
M20/68	717.25	Big Bell Gold Operations Pty Ltd	18/07/1988	17/07/2030
M20/70	789.50	Big Bell Gold Operations Pty Ltd	18/07/1988	17/07/2030
M20/71	996.60	Big Bell Gold Operations Pty Ltd	18/07/1988	17/07/2030
M20/73	693.45	Big Bell Gold Operations Pty Ltd	18/07/1988	17/07/2030
M20/77	770.20	Big Bell Gold Operations Pty Ltd	08/02/1988	07/02/2030
M20/107	709.10	Big Bell Gold Operations Pty Ltd	02/10/1988	09/10/2030
M20/214	468.70	Big Bell Gold Operations Pty Ltd	02/09/1991	01/09/2033
M20/219	8.94	Big Bell Gold Operations Pty Ltd	02/09/1991	01/09/2033
M20/249	916.00	Big Bell Gold Operations Pty Ltd	02/02/1993	01/02/2035
M20/421	692.20	Big Bell Gold Operations Pty Ltd	22/11/2012	21/11/2033
M51/6	40.40	Big Bell Gold Operations Pty Ltd	29/12/1982	28/12/2024
M51/12	8.45	Big Bell Gold Operations Pty Ltd	29/03/1983	28/03/2025
M51/31	262.80	Big Bell Gold Operations Pty Ltd	26/07/1984	25/07/2026
M51/33	25.03	Big Bell Gold Operations Pty Ltd	5/09/1984	4/09/2026
M51/35	8.90	Big Bell Gold Operations Pty Ltd	09/09/1984	06/09/2026
M51/39	15.81	Big Bell Gold Operations Pty Ltd	23/10/1984	22/10/2026
M51/53	197.40	Big Bell Gold Operations Pty Ltd	19/08/1985	18/08/2027
M51/62	14.67	Big Bell Gold Operations Pty Ltd	23/09/1985	22/09/2027
M51/75	55.32	Big Bell Gold Operations Pty Ltd	18/03/1986	17/03/2028
M51/92	343.55	Big Bell Gold Operations Pty Ltd	25/07/1986	24/07/2028
M51/96	9.71	Big Bell Gold Operations Pty Ltd	19/12/1986	18/12/2028
M51/132	867.55	Big Bell Gold Operations Pty Ltd	25/09/1987	24/09/2029
M51/190	491.15	Big Bell Gold Operations Pty Ltd	06/05/1988	05/05/2030

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Tenement	Area (ha)	Holder	Granted	Expiry
M51/199	203.05	Big Bell Gold Operations Pty Ltd	19/05/1988	18/05/2030
M51/200	817.70	Big Bell Gold Operations Pty Ltd	19/05/1988	18/05/2030
M51/203	87.57	Big Bell Gold Operations Pty Ltd	12/07/1988	11/07/2030
M51/209	117.40	Big Bell Gold Operations Pty Ltd	08/08/1988	07/08/2030
M51/211	782.05	Big Bell Gold Operations Pty Ltd	30/08/1988	29/08/2030
M51/233	841.85	Big Bell Gold Operations Pty Ltd	22/09/1988	21/09/2030
M51/236	991.85	Big Bell Gold Operations Pty Ltd	22/09/1988	21/09/2030
M51/237	998.00	Big Bell Gold Operations Pty Ltd	22/09/1988	21/09/2030
M51/254	924.35	Big Bell Gold Operations Pty Ltd	17/01/1989	16/01/2031
M51/320	7.70	Big Bell Gold Operations Pty Ltd	03/08/1989	02/08/2031
M51/321	3.05	Big Bell Gold Operations Pty Ltd	25/08/1989	24/08/2031
M51/374	202.60	Big Bell Gold Operations Pty Ltd	11/09/1990	10/09/2032
M51/393	703.95	Big Bell Gold Operations Pty Ltd	04/11/1991	03/11/2033
M51/437	936.67	Big Bell Gold Operations Pty Ltd	10/08/1993	09/08/2035
M51/438	794.35	Big Bell Gold Operations Pty Ltd	10/08/1993	09/08/2035
M51/439	750.25	Big Bell Gold Operations Pty Ltd	10/08/1993	09/08/2035
M51/440	823.30	Big Bell Gold Operations Pty Ltd	10/08/1993	09/08/2035
M51/459	932.20	Big Bell Gold Operations Pty Ltd	05/02/1993	04/02/2035
M51/483	878.10	Big Bell Gold Operations Pty Ltd	19/02/2013	81/02/2034
M51/485	9.7125	Big Bell Gold Operations Pty Ltd	03/11/1993	02/11/2035
M51/486	663.30	Big Bell Gold Operations Pty Ltd	09/11/1993	08/11/2035
M51/491	749.55	Big Bell Gold Operations Pty Ltd	08/03/1994	07/03/2036
M51/492	999.05	Big Bell Gold Operations Pty Ltd	02/02/1994	01/02/2036
M51/493	951.20	Big Bell Gold Operations Pty Ltd	02/02/1994	01/02/2036
M51/494	994.35	Big Bell Gold Operations Pty Ltd	02/02/1994	01/02/2036
M51/495	792.20	Big Bell Gold Operations Pty Ltd	02/02/1994	01/02/2036
M51/504	181.90	Big Bell Gold Operations Pty Ltd	31/05/1994	31/08/2036
M51/523	513.15	Big Bell Gold Operations Pty Ltd	23/12/1994	22/12/2036
M51/524	85.03	Big Bell Gold Operations Pty Ltd	23/12/1994	22/12/2036
M51/539	4.91	Big Bell Gold Operations Pty Ltd	26/07/1995	25/07/2037
M51/569	8.95	Big Bell Gold Operations Pty Ltd	17/10/2012	16/10/2033
M51/572	836.80	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/575	787.00	Big Bell Gold Operations Pty Ltd	17/10/2012	16/10/2033
M51/581	6.00	Big Bell Gold Operations Pty Ltd	17/10/2012	16/10/2033
M51/654	172.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/668	695.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/669	695.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/670	695.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/671	794.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/672	825.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/757	568.40	Big Bell Gold Operations Pty Ltd	22/11/2012	21/11/2033

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Tenement	Area (ha)	Holder	Granted	Expiry
M51/762	845.10	Big Bell Gold Operations Pty Ltd	28/09/2010	27/09/2031
M51/784	233.25	Big Bell Gold Operations Pty Ltd	19/10/2012	18/10/2033
M51/788	836.00	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/793	4.86	Big Bell Gold Operations Pty Ltd	11/12/2000	10/12/2042
M51/794	18.65	Big Bell Gold Operations Pty Ltd	11/12/2000	10/12/2042
M51/795	9.71	Big Bell Gold Operations Pty Ltd	11/12/2000	10/12/2042
M51/819	1.50	Big Bell Gold Operations Pty Ltd	17/06/2002	6/06/2023
M51/820	9.71	Big Bell Gold Operations Pty Ltd	17/06/2002	16/06/2023
M51/824	228.40	Big Bell Gold Operations Pty Ltd	05/06/2013	04/06/2034
M51/834	93.11	Big Bell Gold Operations Pty Ltd	19/10/2012	18/10/2033

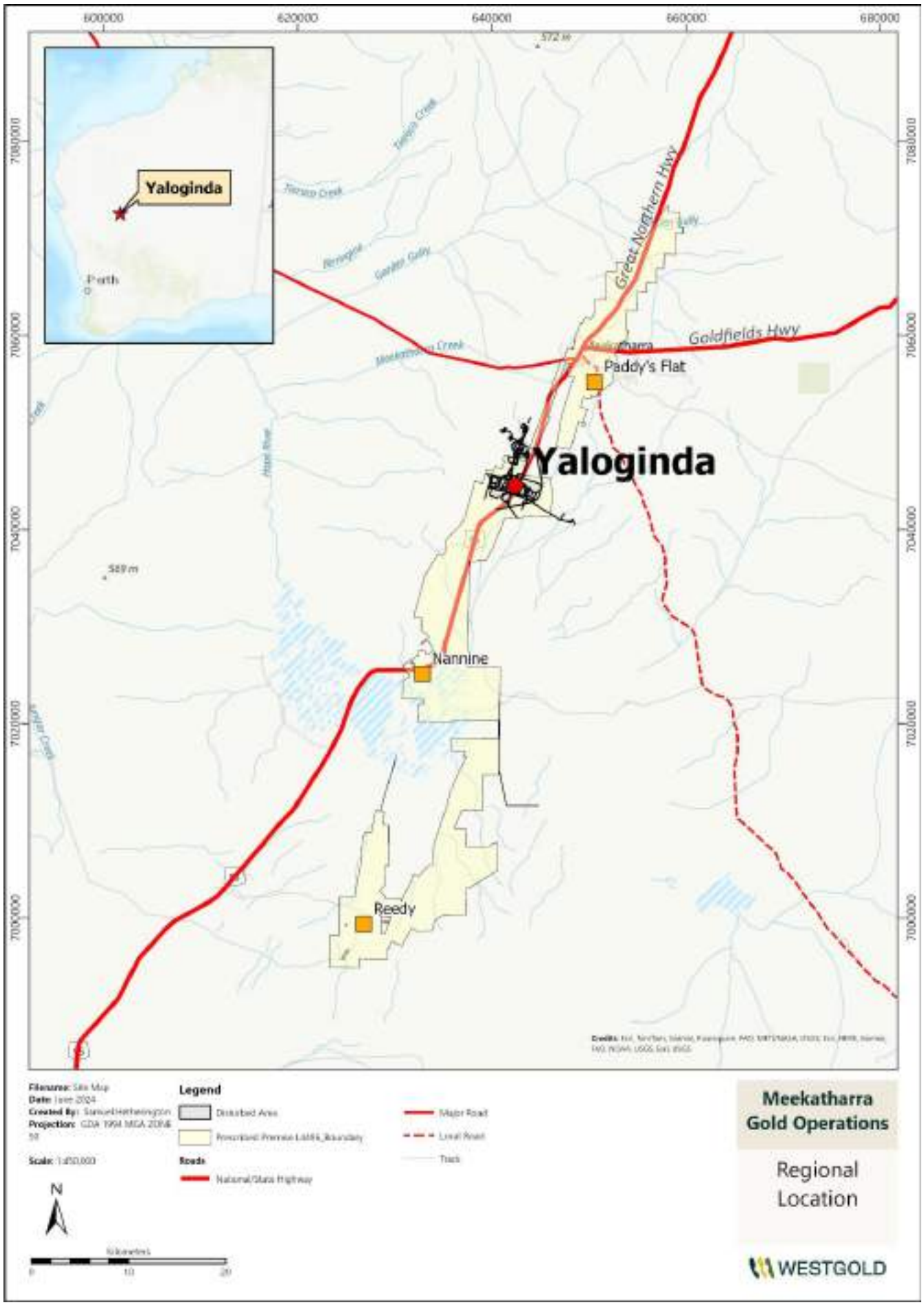

Figure 1: Yaloginda L4496 Prescribed Premises Regional Location

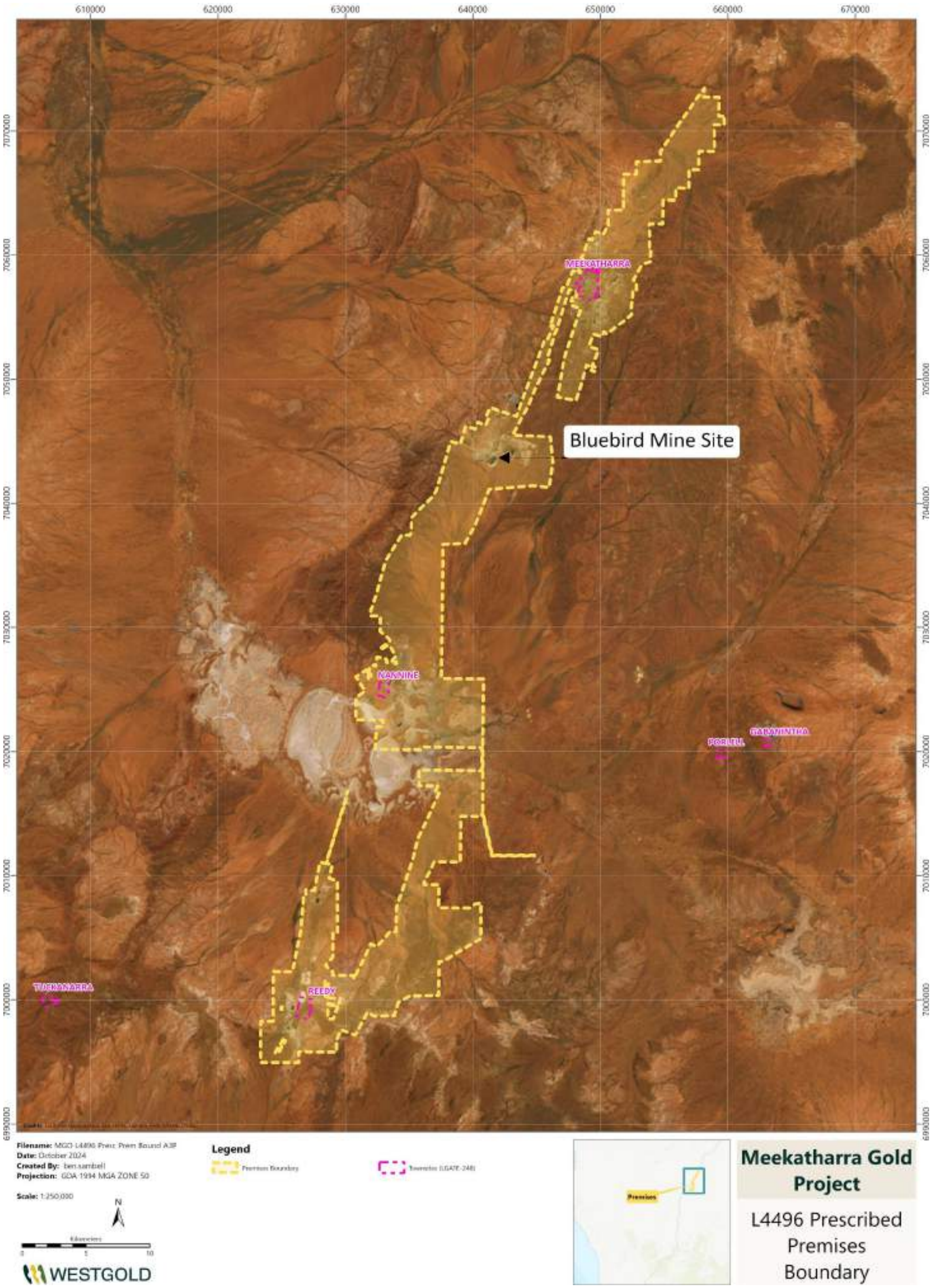

Figure 2: Prescribed Premise Map

2. PRESCRIBED PREMISE ACTIVITIES

The currently approved and proposed prescribed premises activities for this works approval application and subsequent L84496/1988/11 amendment application are listed in Table 4.

Table 4: Approved and Proposed Prescribed Premises Activities

Category Number	Category Description	Approved Premises Production or Design Capacity	Proposed Premises Production or Design Capacity	Proposed Amendment
5	Processing or beneficiation of metallic or non-metallic ore	2,500,000 tonnes per annual period	2,950,000 tonnes per annual period	Addition of GNHTSF construction activities, discharge location and operation of associated supporting infrastructure. Addition of dry paste plant that will produce cement to be used underground to improve safety & stability
6	Mine dewatering	5,953,000 tonnes per annual period	5,953,000 tonnes per annual period	No change requested.
52	Electric Power generation	21 MW in aggregate	21 MW in aggregate	No change requested.
54	Sewage Facility	150 cubic metres per day	150 cubic metres per day	No change requested.
64	Class I Inert Landfill site	3,000 tonnes per annual period	3,000 tonnes per annual period	No change requested
84	Electric power generation	15.2 MW in aggregate	15.2 MW in aggregate	No change requested

2.1 Category 5: Processing or Beneficiation of Ore

2.1.1 Great Northern Highway In-Pit TSF

BBGO seeks approval to construct an in-pit tailings storage facility (GNHTSF) within the existing Great Northern Highway (GNH) pit, located on mining tenement M51/491 in the Yaloginda mining area. This facility will complement the existing, active Bluebird East TSF (BETSF).

The proposed GNHTSF will optimise the use of the existing GNH pit, which is adjacent to the BETSF, and partially separated by a mid-pit saddle. Current approvals permit tailings placement within the BETSF up to the saddle's height. By combining the two pits, the tailings storage capacity for the site can be significantly increased while minimising the overall footprint. This approach offers several advantages, including:

- Reduced need for additional land disturbance.
- Improved water recovery compared to traditional above-ground storage.
- Lower construction costs than building a new, above-ground facility.
- Reduced operational and closure risks compared to above-ground options.

The BETSF is expected to reach its maximum permitted height of 428.5 mAHD by December 2024. As a result, it will become necessary to utilise the GNH pit for ongoing tailings storage. To optimise storage capacity, it is proposed to fill the GNH pit to a height of 429.0 mAHD, which is the level of the saddle between the two pits. Once this level is reached, the GNHTSF will be combined with the BETSF, and then filled with tailings to

a combined maximum height of 464.5 mAHD, which is 5 m below the pit crest. This approach is outlined in Appendix B.

A geotechnical assessment of the GNH pit's west wall indicates that tailings placement will enhance wall stability. Tailings will be transported via an existing pipeline and released into the pit via a series of spigots. Supernatant water will be managed through a decant system. Two additional monitoring bores will be installed around the perimeter of the facility to monitor performance.

Tailings test work, encompassing particle size distribution (PSD), hydrometer, and oedometer (consolidation) testing, was conducted as part of the design report for the BETSF by Coffey in 2016. The tailings were classified as sandy silt with favourable consolidation characteristics. Given the anticipated similarity in tailings properties for the GNHTSF, the findings from Coffey's 2016 investigations are applicable to the GNHTSF design. The estimated tailings density is 1.4 t/m^3.

2.1.1 Bluebird Paste Plant

BBGO proposes constructing and operating a mobile paste plant at the Bluebird mine site. This facility, as outlined in Figure 3 and Figure 4, will produce a cement-tailings slurry for injection into the Bluebird underground mine, enhancing mine stability and safety.

Tailings will be sourced from the Bluebird North TSF. These tailings will be transported to a dedicated area adjacent to the paste plant. Viability testing (Appendix D) has confirmed the tailings' suitability for paste fill production. The plant itself is engineered to mix dry tailings with Minecem, or cement and water, creating a slurry that meets the requirements for underground injection. The plant's production capacity is estimated at 1,000 m^3 of slurry per shift, or 100 m^3 per hour, amounting to approximately 370,000 m^3 or 450,000 tonnes of paste fill annually.

The paste plant will require an average of 100,000 kilolitres (kL) of water per year, with a peak demand of 150,000 kL in year eight. Water will be sourced from the existing dewatering circuit. BBGO holds a water abstraction entitlement of 6,250,000 kL (GWL156252(13)).

The paste plant will consist of a control room, laboratory, crib room, binder silos, wet binder dosing equipment, paste mixer, paste hopper, tailings feed hopper, conveyor, and compressor (Figure 4).

By utilising tailings material from the Bluebird North TSF and converting it into a stabilising agent for the mine's underground workings, the surface footprint of the legacy Bluebird North TSF will be reduced the operational life of the underground mine will be increased.

Figure 3 Proposed Bluebird Paste Plant & GNHIPTSF

Figure 4: Bluebird Paste Plant Design

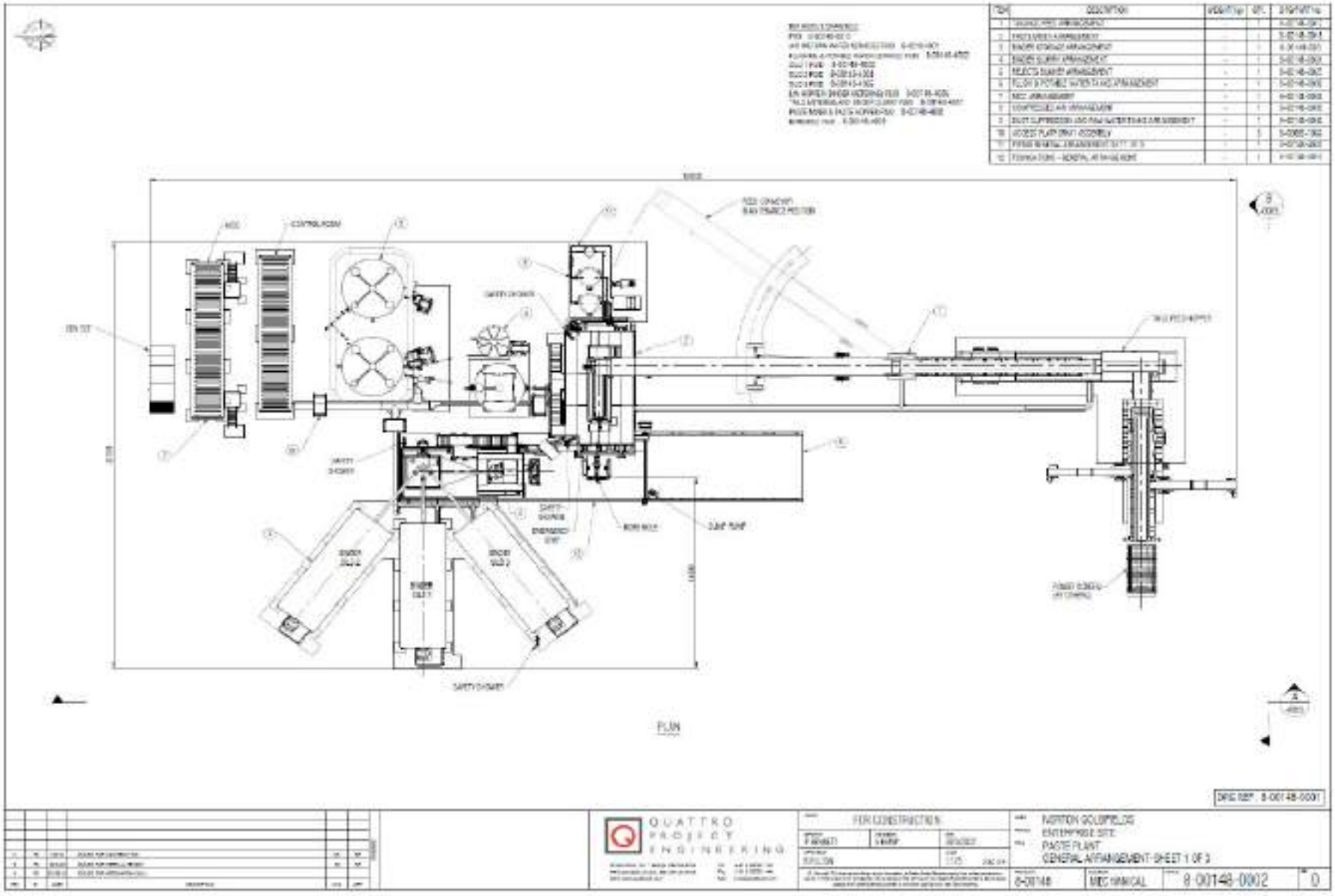

Figure 5: Bluebird Paste Plant Design Plans

3. OTHER APPROVALS

3.1 Mining Act 1978

The most recent Yaloginda Mining Proposal and Mine Closure Plan (Reg ID 117227) for MGO, which included the Bluebird underground project, was approved on 24 March 2023.

To accommodate the construction and operation of the GNHTSF, BBGO is preparing a revised Mining Proposal and Mine Closure Plan. This revised plan will be submitted to the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) for approval in August 2024.

3.2 Environmental Protection Act 1986 (Native Vegetation Clearing)

No vegetation clearing is proposed as part of this application. All proposed infrastructure will be confined to existing disturbed areas within the mining lease and disturbance envelope, minimising environmental impacts and preserving native vegetation.

3.3 Rights in Water and Irrigation Act 1914

BBGO holds a water licence (GWL 156252(13)) under the *Rights in Water and Irrigation Act 1914*, authorising the combined abstraction of up to 6,250,000 kL of water annually from pits and production bores within the Yaloginda, Paddy's Flat and Nannine Project areas, including the Great Northern Highway Pit.

The return water from the GNHTSF will not be considered part of the total groundwater abstraction volume because the solution is in a closed recycling system. Some localised groundwater seepage is anticipated. To manage this, a monitoring program will be implemented using proposed monitoring bores, and appropriate water return controls will be established.

3.4 Local Government

No approvals are required from the Shire of Meekatharra to undertake the proposed activities. The project is entirely located within a granted mining lease and will comply with all state and federal environmental and mining regulations.

4. STAKEHOLDER ENGAGMENT

A register of Yaloginda Stakeholder engagement is presented in Appendix A.

Table 5 Yaloginda Stakeholder

Stakeholder	Key Personnel	Primary Interests
State Government		
Department of Mines, Industry Regulation and Safety	Environmental Officers/Inspectors Regional Safety Inspector Team Leaders and Managers	Mining exploration Clearing of native vegetation Proposals to mine Mine closure planning Rehabilitation of mining disturbance Mine safety
Department of Water and Environmental Regulation (DWER) – Contaminated Sites, Water, Clearing Division	Environmental Officers and Managers	Contaminated sites Surface and groundwater management Groundwater abstraction

		licensing Clearing of native vegetation
Department of Biodiversity Conservation and Attractions (DBCA)	Environmental Officers and Managers	Conservation of flora and fauna Rehabilitation / revegetation planning
Department of Planning, Lands and Heritage	Regional Aboriginal Affairs Liaison Officer.	Protection of Aboriginal heritage sites
Main Roads Western Australia	Main Roads Officer.	Great Northern Highway
Local Government		
Shire of Meekatharra	President, CEO, Community Development Services Manager, Shire Officer.	Compatibility with current land use planning, use of shire managed roads, final land uses
Non-Government Organisations/Groups		
Local Aboriginal Groups and Native Title Claimants	Wajarri Yamatji and Yugunga-Nya People	Protection of Aboriginal heritage sites, final land uses
Adjacent Landowners	Annean and Polelle Pastoral Stations	Compatibility with current and proposed land uses
Local Suppliers / Businesses	Various	Effects to the community post-mining
General Public / Community	Meekatharra and surrounding communities	Public access and tourism

4.1.1 Key Stakeholders

BBGO has identified key stakeholders regarding the Yaloginda project key stakeholders are listed in Table 5. Direct Stakeholders are invited to six-monthly community forums held by WGX Managing Director & MGO General Manager with support from Environmental and Community Managers department . These forums are a opportunity for community members to raise any concerns directly to BBGO management. These forums also provide a opportunity for BBGO to discuss and update community members aspects of the mining operations these include:

- Operational overviews including mining, processing and transportation of ore,
- Future infrastructure requirements,
- Employment opportunities
- Mine Closure Plans; and
- Future Environmental Approvals

Any issues or queries or concerns raised by the community are documented and investigated by the relevant BBGO staff members. Community forums are held on a six-monthly basis, the initial forum held in Meekatharra was on and Tuesday 9 April 2024 with the next community forum scheduled for 15 October 2024.

Table 6: Yaloginda Direct Stakeholders

Director Stakeholders (Organisations)	Primary Interest
Yulella Meekatharra	[redacted]
Mission Meekatharra	[redacted]

Director Stakeholders (Organisations)	Primary Interest
Meekatharra Shire	[redacted]
Meekatharra Police	
Meekatharra high school	
Mid West Development Commission	
Stephen Michael Foundation Meekatharra	
Sherwood and Yoothapina Pastoral Stations	
Annean and Polelle Pastoral	

5. SENSITIVE RECEPTORS

The nearest town to the Yaloginda project is Meekatharra, situated 12 km north along the Great Northern Highway. Given the project's remote location, the confinement of proposed infrastructure to previously disturbed areas, and the relatively small scale of operations, no adverse impacts on sensitive receptors are anticipated. A detailed map illustrating the location of all nearby sensitive receptors within the prescribed premise boundary is provided in Figure 6.

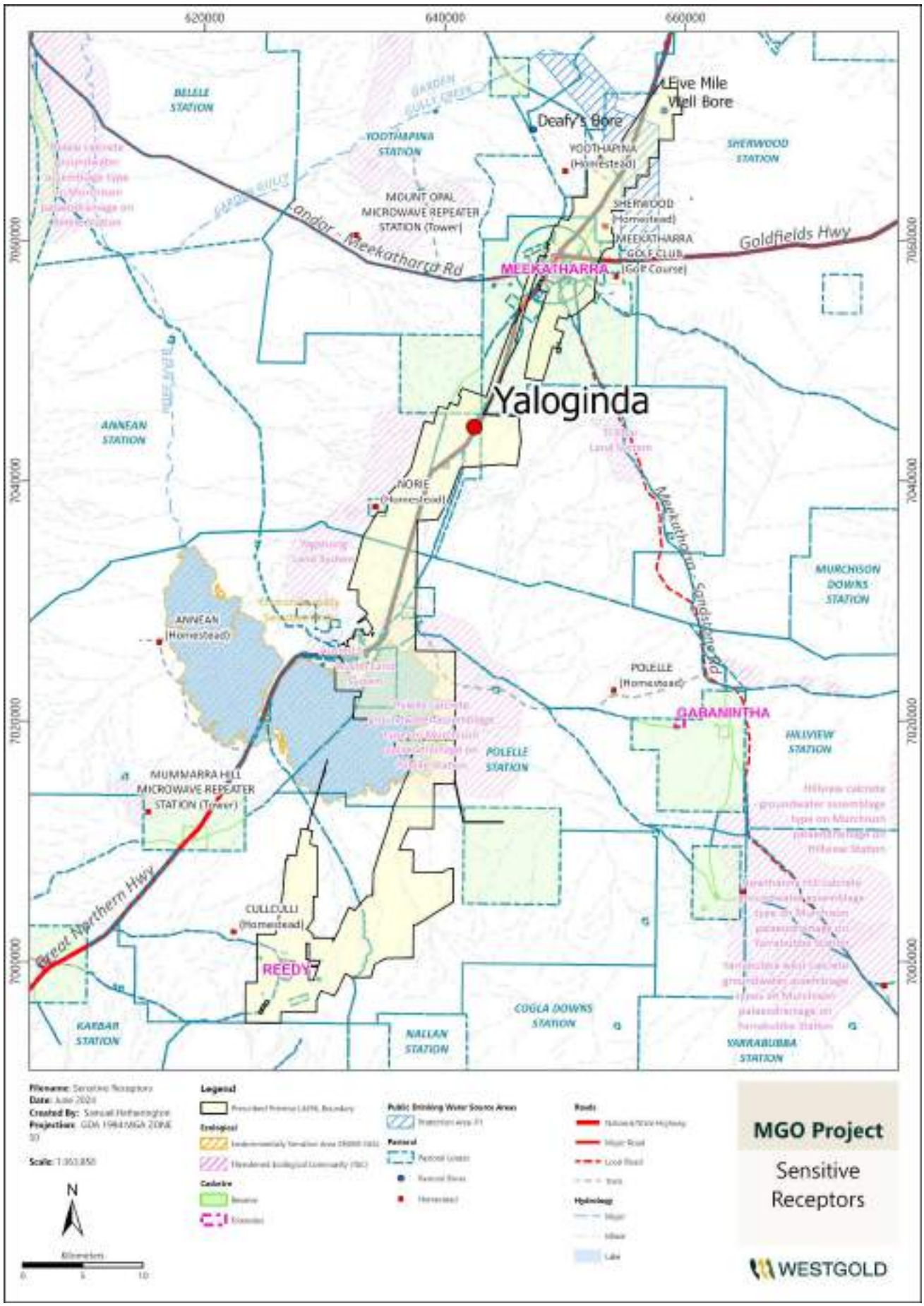

Figure 6: Sensitive Receptors

6. EXISTING ENVIRONMENT

6.1 Hydrogeology

Aquifers in the Yaloginda area are generally located in weathered horizons, shears and quartzose rocks in the greenstone belts and locally in alluvial deposits. Fractured rock aquifers in the region are typically brackish, inhomogeneous, anisotropic, and irregular in dimension, with properties influenced by lithology and structural deformation complexity. The bedrock aquifer yields the highest amounts of water at the base of the weathering profile in the lower saprolite and saprock . The regional water table ranges in depth from about 5 m to 45 m below ground level and is broadly consistent with topography. Regional groundwater flow is south towards Lake Annean (Rockwater, 1994).

The thickness of weathering profiles varies across the different mine areas, ranging from a few metres to more than 80 m in the saprolite zone. Crosscutting vertical dykes and faults are known to deliver groundwater flow towards the main mineralisation shear zones. Overall, the fractured rock aquifers have low groundwater storage with inflows related to the interception of recharge or throughflow from regional aquifer systems. The surrounding ultramafic- Archean bedrock is typically fresh and of low permeability (Rockwater, 1994).

Local groundwater also occurs within thin (up to 20 m thick) superficial deposits of alluvium and colluvium in and around drainage lines. Recharge is episodic and occurs via direct infiltration following significant rainfall events.

The main aquifers in the GNH pit are disconnected mineralised zones of ferruginous quartz-carbonate altered rocks as in the neighboring Bluebird East and Bassetts West pits, which have also been used to store tailings. Monitoring data from these sites have indicated minimal impact on groundwater, with circum-neutral pH, low WAD cyanide levels, low salinity and minimal metal concentrations. To further assess groundwater conditions, two additional monitoring bores will be installed on the southern side of the GNH pit (Rockwater, 2015).

6.1.1 Process Solution Chemistry

A chemical analysis of the current tailings process solution water quality at the Bluebird processing plant revealed the following characteristics:

- Alkaline pH
- Brackish Total Dissolved Solids
- High heavy metal content

These water quality results are typical for tailings analysis and are expected to be similar in the GNHTSF. A detailed chemical analysis of the process solution is provided in Table 5 and Appendix D.

Table 7: Tailings Solution Water Quality

Parameter	Units	Laboratory Result (23/04/24)
pH	pH	9.6
Conductivity @ 25C	µS/cm	15000
Total Dissolved Solids (TDS)	mg/L	9700
Chloride	mg/L	4200
Sulfate	mg/L	1900
Hexavalent Chromium	mg/L	<0.01
Calcium	mg/L	740
Magnesium	mg/L	6.1
Sodium	mg/L	2400
Potassium	mg/L	120
Hardness	mg/L	1900
Arsenic	mg/L	2.2
Antimony	mg/L	2.3
Boron	mg/L	0.61
Cadmium	mg/L	0.0021
Chromium	mg/L	<0.02
Cobalt	mg/L	2.0
Copper	mg/L	27
Iron	mg/L	15
Lead	mg/L	<0.02
Manganese	mg/L	<0.02
Nickel	mg/L	52
Selenium	mg/L	0.058
Thallium	mg/L	<0.02
Zinc	mg/L	1.7
Mercury	mg/L	0.22
Total Cyanide	mg/L	100
Weak Acid Dissociable Cyanide	mg/L	100

6.1.2 Bluebird East TSF Long-term Groundwater Monitoring Results

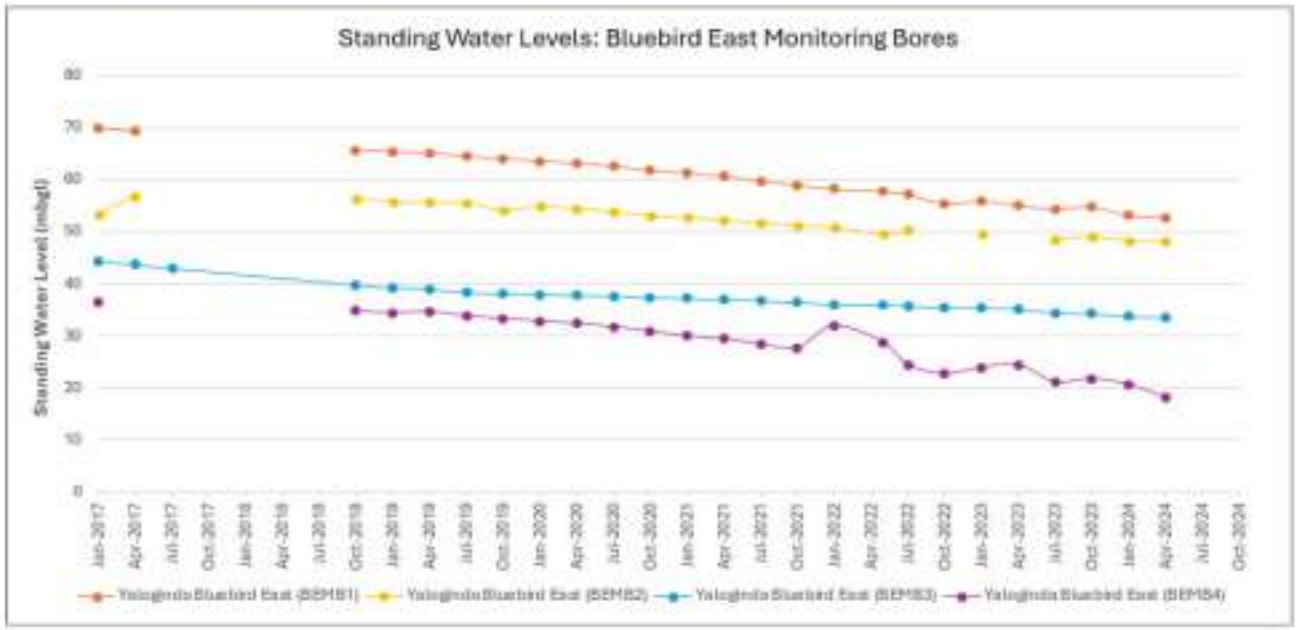

Figure 7: Bluebird East TSF Monitoring Bores SWL

Table 8: Bluebird East TSF Monitoring Bore Groundwater Quality

Statistic		Mean	Minimum	Maximum	Mann-Kendall (Statistic)	Mann-Kendall (Text)
pH (Lab) (units)	BEMB1	7.86	7.18	8.4	76	Probably Increasing (91.79%)
	BEMB2	7.80	7.14	8.3	47	No Trend (85.67%)
	BEMB3	7.90	7.18	8.2	-51	Probably Decreasing (94.09%)
	BEMB4	8.05	7.43	8.40	-44	Probably Decreasing (91.73%)
Total Dissolved Solids (mg/L)	BEMB1	1108.08	780	4100	9	No Trend (59.04%)
	BEMB2	1140.17	1000	1500	-1	No Trend (50.00%)
	BEMB3	913.24	840	1500	-33	Probably Decreasing (93.82%)
	BEMB4	1521.34	1300.00	4000.00	-53	Decreasing (96.76%)
Arsenic (Dissolved) as As (mg/L)	BEMB1	0.01	0.008	0.045	-459	Decreasing (100.00%)
	BEMB2	0.01	0.001	0.061	78	Probably Increasing (91.90%)
	BEMB3	0.00	0.001	0.004	-30	Stable (67.62%)
	BEMB4	0.01	0.00	0.05	-269	Decreasing (100.00%)
Cadmium (Dissolved) as Cd (mg/L)	BEMB1	0.00	0.0001	0.002	N/a	Unable to be determined
	BEMB2	0.00	0.0001	0.002	N/a	Unable to be determined
	BEMB3	0.00	0.0001	0.002	N/a	Unable to be determined
	BEMB4	0.00	0.00	0.00	N/a	Unable to be determined
Chromium (Dissolved) as Cr (mg/L)	BEMB1	0.05	0.02	0.34	-33	Probably Decreasing (93.82%)
	BEMB2	0.22	0.01	0.42	-29	Probably Decreasing (94.71%)
	BEMB3	0.16	0.087	0.2	-33	Probably Decreasing (93.82%)
	BEMB4	0.00	0.00	0.04	-32	Probably Decreasing (93.76%)
Copper (Dissolved) as Cu (mg/L)	BEMB1	0.00	0.001	0.01	N/a	Unable to be determined
	BEMB2	0.00	0.001	0.036	N/a	Unable to be determined
	BEMB3	0.00	0.001	0.01	N/a	Unable to be determined
	BEMB4	0.00	0.00	0.01	N/a	Unable to be determined
Lead (Dissolved) as Pb (mg/L)	BEMB1	0.00	0.001	0.01	33	No Trend (73.71%)
	BEMB2	0.00	0.001	0.03	76	Probably Increasing (93.56%)
	BEMB3	0.00	0.001	0.01	-19	No Trend (67.43%)
	BEMB4	0.13	0.00	4.60	87	Increasing (96.93%)
Mercury (Dissolved) as Hg (mg/L)	BEMB1	0.00	0.00005	0.0005	N/a	Unable to be determined
	BEMB2	0.00	0.00005	0.0002	N/a	Unable to be determined
	BEMB3	0.00	0.00005	0.0004	N/a	Unable to be determined
	BEMB4	0.00	0.00	0.00	N/a	Unable to be determined
Nickel (Dissolved)	BEMB1	0.01	0.001	0.039	-3	Stable (51.68%)
	BEMB2	0.03	0.001	0.39	48	No Trend (84.26%)

Statistic		Mean	Minimum	Maximum	Mann-Kendall (Statistic)	Mann-Kendall (Text)
as Ni (mg/L)	BEMB3	0.00	0.001	0.01	-64	Decreasing (98.52%)
	BEMB4	0.00	0.00	0.01	-61	Decreasing (98.34%)
Selenium (Dissolved) as Se (mg/L)	BEMB1	0.00	0.001	0.006	N/a	Unable to be determined
	BEMB2	0.00	0.001	0.006	N/a	Unable to be determined
	BEMB3	0.00	0.001	0.004	N/a	Unable to be determined
	BEMB4	0.00	0.00	0.01	N/a	Unable to be determined
Zinc (Dissolved) as Zn (mg/L)	BEMB1	0.01	0.005	0.053	-64	Decreasing (96.41%)
	BEMB2	0.01	0.005	0.032	-57	Decreasing (99.00%)
	BEMB3	0.01	0.005	0.064	-92	Decreasing (99.53%)
	BEMB4	0.01	0.01	0.02	-63	Decreasing (98.62%)
Cyanide (WAD) (mg/L)	BEMB1	0.00	0.004	0.015	389	Increasing (100.00%)
	BEMB2	0.01	0.004	0.038	88	Probably Increasing (94.03%)
	BEMB3	0.00	0.004	0.005	9	No Trend (54.40%)
	BEMB4	0.00	0.00	0.01	-118	Decreasing (99.70%)

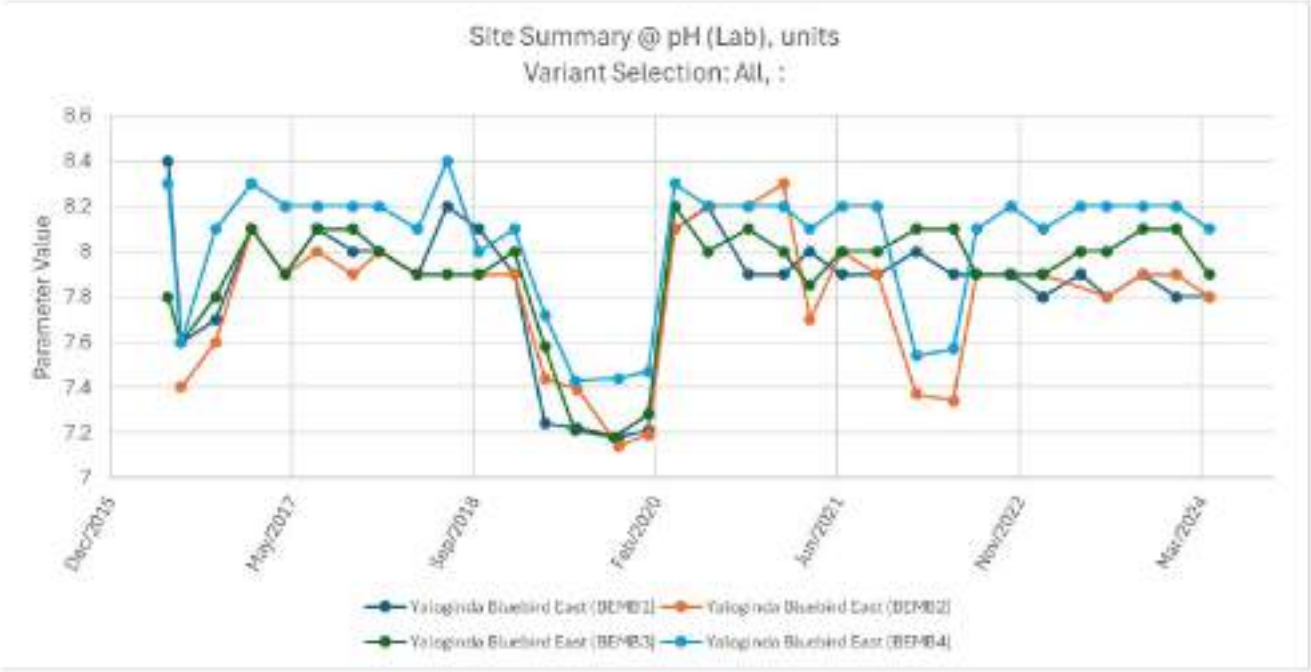

Figure 8: Bluebird East pH

Figure 9: Bluebird East Total Dissolved Solids

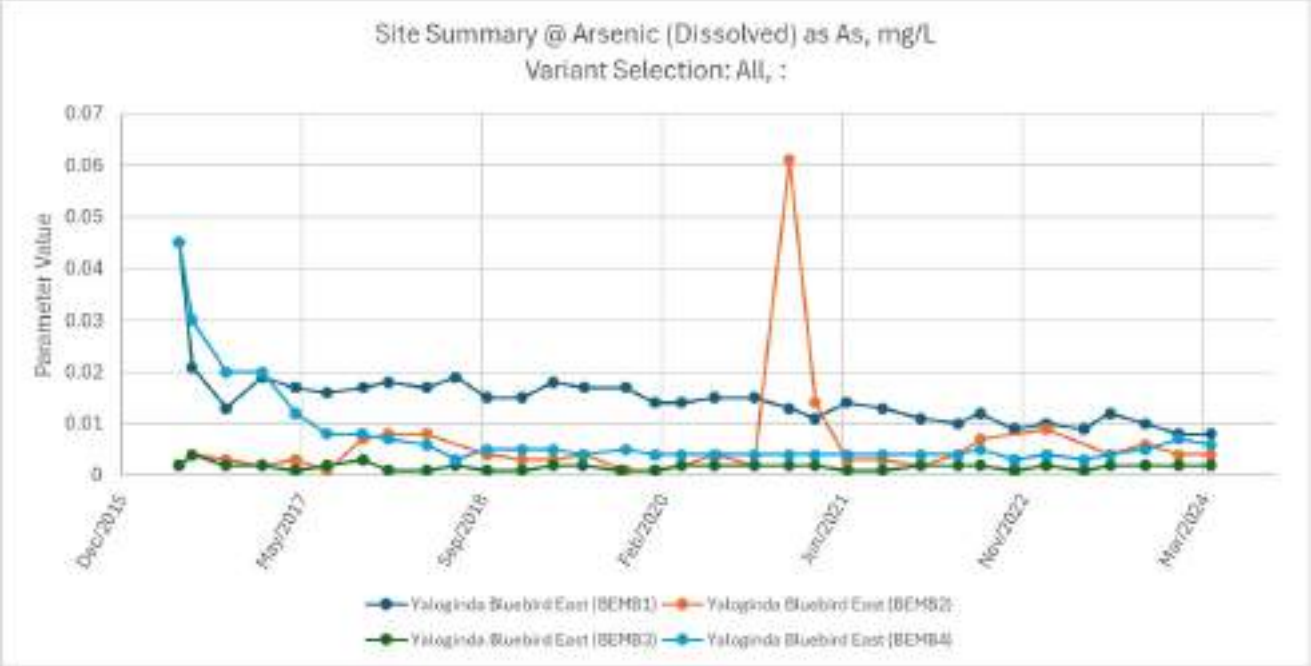

Figure 10: Bluebird East Arsenic (Dissolved)

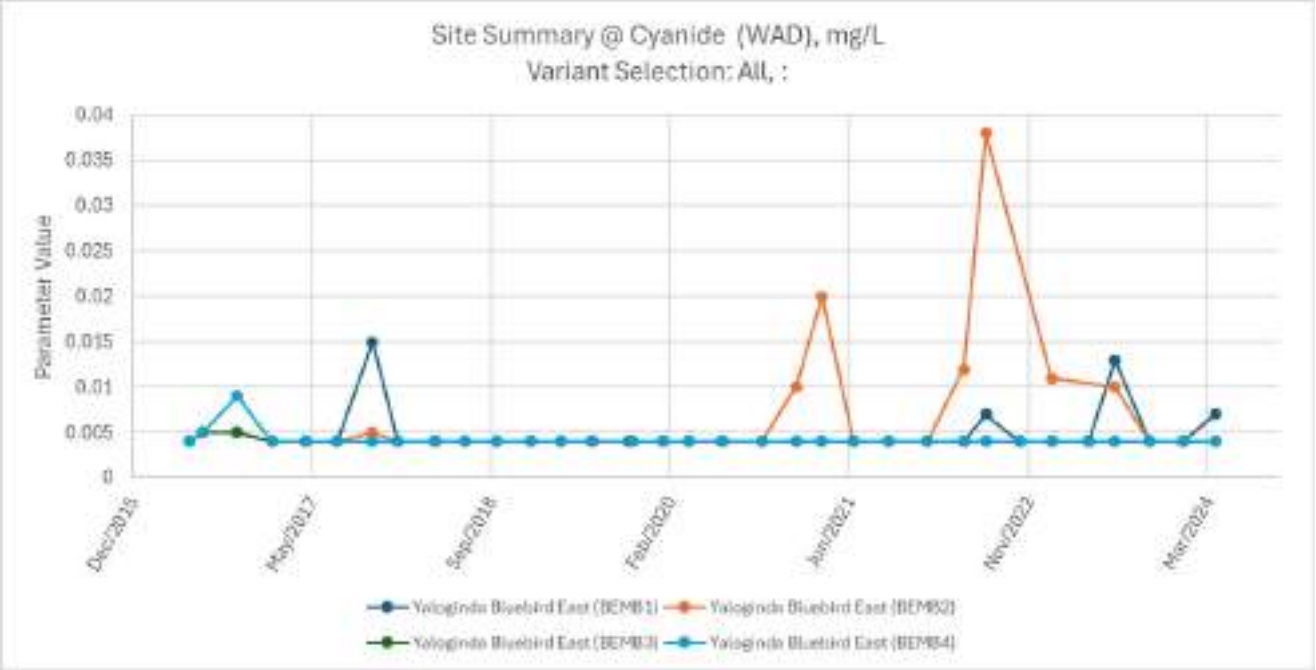

Figure 11: Bluebird East WAD Cyanide

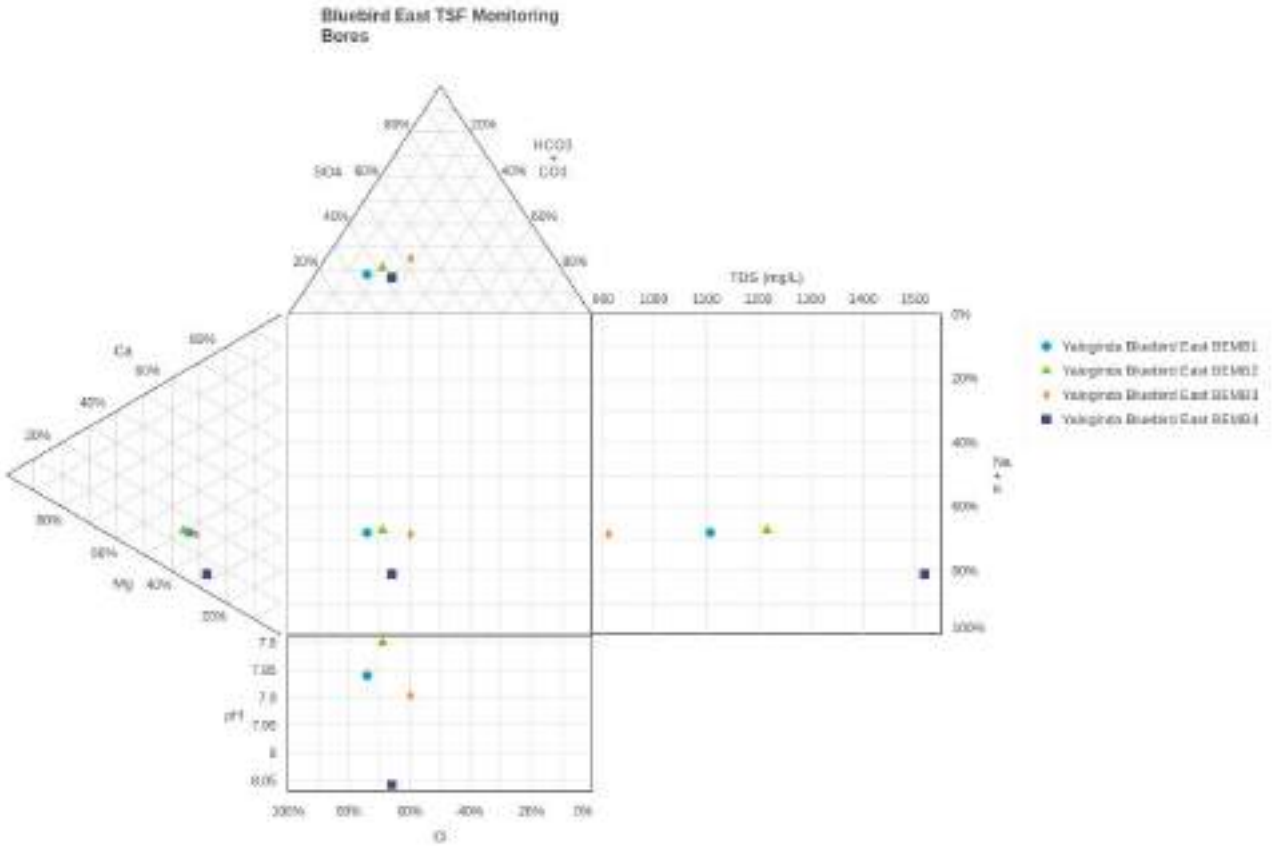

Figure 12: Bluebird East TSF Monitoring Bores Durov Diagram

6.1.3 Local Groundwater Quality

A chemical analysis was conducted for the current local groundwater quality at the Great Northern Highway Pit. The ground water has the following attributes.

- Alkaline pH
- Sodium chloride type
- Total Dissolved Solids of the solution is classified as weakly saline.
- Low Metal concentrations
- High Nitrate concentrations

A sample from the Great Northern Highway Pit was last taken on 10 January 2024. A detailed chemical analysis of the groundwater is provided in Table 6 and Appendix D.

Table 9: Great Northern Highway Pit Water Quality

Parameter	Units	Laboratory Result (10/01/24)
Chloride	mg/L	2000
Sulfate	mg/L	920
Calcium	mg/L	230
Magnesium	mg/L	490
Fluoride	mg/L	0.2
Nitrite Nitrogen, NO_2 as N	mg/L	<0.05
Nitrate Nitrogen, NO_3 as N	mg/L	0.89
Sodium	mg/L	750
Potassium	mg/L	38
Silicon	mg/L	20
Lead	mg/L	<0.001
Dissolved solids (TDS)	mg/L	4800
pH (Field)	pH	8.5
Conductivity @ 25 C	µS/cm	7300
Hardness	mg/L	2600
Aluminum	mg/L	<0.005
Arsenic	mg/L	0.34
Cadmium	mg/L	<0.0001
Chromium	mg/L	0.006
Copper	mg/L	<0.001
Nickel	mg/L	0.004
Lead	mg/L	<0.001
Zinc	mg/L	<0.005
Mercury	mg/L	<0.00005
Selenium	mg/L	0.021
Total Cyanide	mg/L	<0.004
Weak Acid Dissociable Cyanide (WADCN)	mg/L	<0.004

6.1.4 Potential Groundwater Impacts

If tailings levels exceed the pre-mining groundwater level (approximately 455 m AHD), there is a potential for limited seepage into surrounding groundwater, primarily down hydraulic gradient to the south. However, the rates of seepage would be expected to be low and restricted by the sealing of pores and fractures by the tailings, with minimal impacts on groundwater quality and levels (Rockwater, 2024).

The nearest potential receptor is the 12 Mile Well, located 2 km south of the GNH pit. The well's current status is unknown, but the installed monitoring bores will track groundwater levels and quality. No known groundwater-dependent ecosystems are present in the area (Rockwater, 2024).

7. HYDROLOGY

7.1.1 Environmental Values and Beneficial Users of Surface Water

No known beneficial users of surface water exist within the immediate vicinity of the GNHTSF. While nearby pastoral leases support cattle, these animals rely solely on groundwater accessed through bores and wells, none of which are within vicinity of the GNH Pit.

Lake Annean, situated approximately 20 km from the GNH Pit, is identified as an Environmentally Sensitive Area (ESA) due to its ecological significance. Listed in the Directory of Important Wetlands in Australia, the lake provides critical foraging and breeding habitat for numerous migratory and marine bird species, as well as other waterbirds (Figure 6).

7.1.2 Flooding Characteristics.

A 2019 surface water assessment by Rockwater (Appendix C) identified peak flood levels and potential impacts within the Bluebird Mining Area. The primary drainage pathways are the north and west branches of 12 Mile Creek, flowing southward into Lake Annean. Nearby pits (Maranui, Surprise, Romsey, and Mystery) act as flood retention basins, mitigating prolonged and deep inundation of upstream areas for up to 1-in-50-year flood events (Figure 7). The GNHTSF will not affect existing mine site hydrology or downstream surface water flows. Its continuous perimeter safety bund will prevent surface runoff from entering the pit.

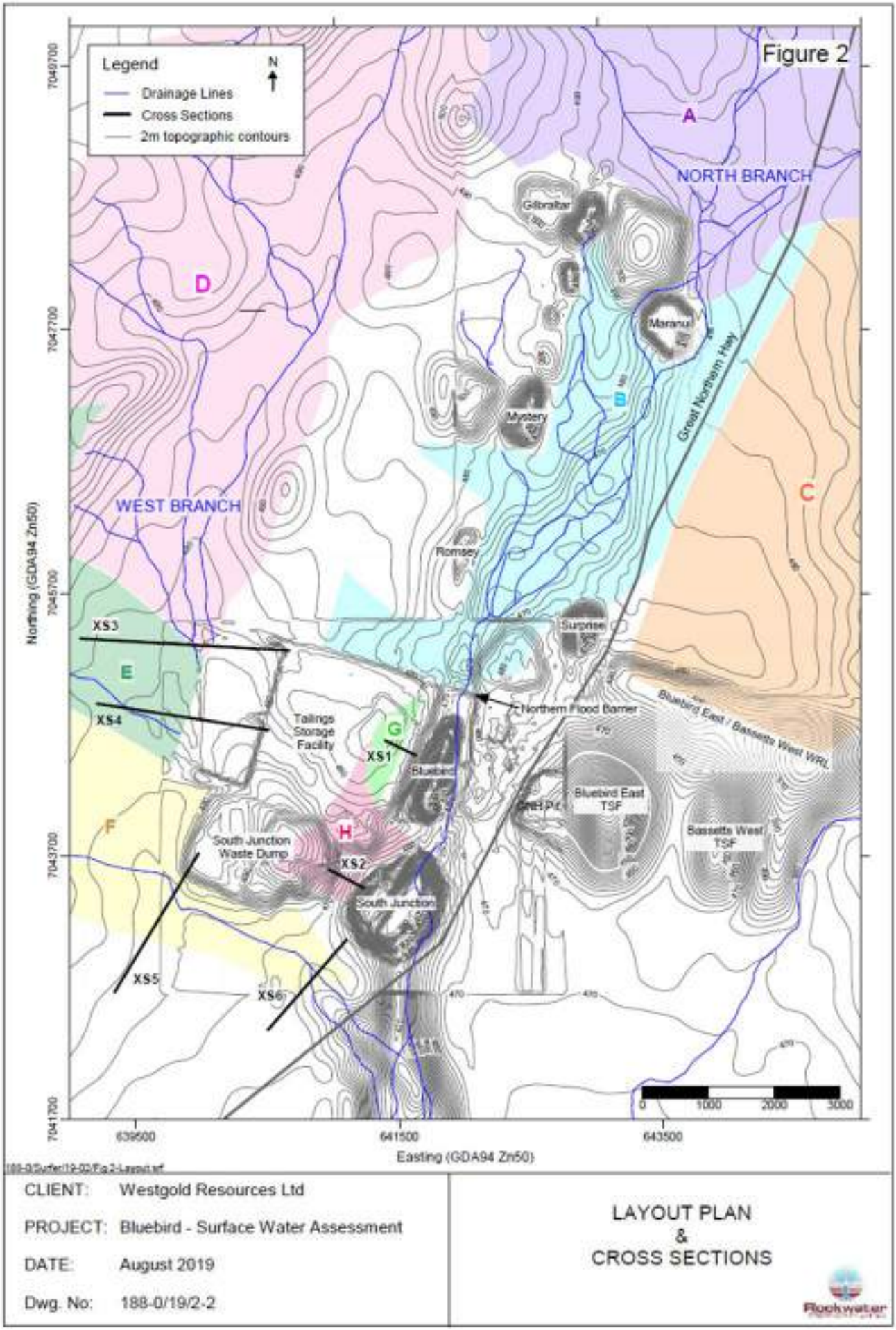

Figure 13: Surface Water Characteristics

7.2 Flora and Fauna

No vegetation clearing is required for the GNHTSF, Bluebird Paste Plant or South Junction Tyre Disposal facilities. All infrastructure will be within the existing mining disturbance footprint. A literature review was undertaken to identify flora species, vegetation communities, and fauna species present near the project area, as summarised in Table 7.

Table 10: Flora and Fauna Literature Review

Report Title	Summary of key results
GNH Pit Dewatering Fauna Desktop Assessment Outback Ecology (2013)	• Three broad fauna habitat types were identified within the study area: Drainage Line (1,913 ha), Mixed Shrubland on Sandy Plain (3,341 ha), and Open Sandy Plain (88 ha). These habitats are common to the Murchison IBRA region and offer limited preferred habitat features (i.e. sheltered and mesic microhabitats, such as the south-west facing aspect of slopes, trees, boulders and rock piles, as well as deep gorges, natural springs and fire refuges). As such, these habitats were not considered regionally significant for fauna. • Of the 13 terrestrial vertebrate species of conservation significance that potentially occur in the Study Area, four species are likely to occur, three species possibly occur, and the remaining six species are unlikely to occur. Of the conservation significant fauna that may occur in the Study Area, none are likely to be solely reliant on habitat patches within the Study Area, and the impacts of mining activities on terrestrial species of conservation significance are likely to be negligible.
Great Northern Highway Pit Dewatering project vegetation Condition Assessment Outback Ecology (2013)	• Vegetation can be broadly described as Tall Open Shrubland to Shrubland (or occasionally Sparse Shrubland) of Mulga species (typically dominated by Acacia aneura and A. craspedocarpa) over Acacia tetragonophylla and scattered shrubs of Eremophila spp. (typically E. galeata, occasionally E. platycalyx) over an Open Tussock Grassland of Aristida contorta with occasional patches where Eriachne flaccida becomes dominant on wash plains of hardpan clay, with rills, gutters and channels. • A total of 22 flora species were recorded. No vegetation within the Study Area was considered to be equivalent to any PEC or TEC. No significant flora was identified within the Study area. The condition of vegetation in the Study Area ranged from 'Completely Degraded' to 'Very Good to Excellent', with 57% of the area classified as 'Very Good'.
Paddy's Flat Haul Road Corridor Flora & Vegetation and Fauna Survey – Western Ecological, 2022	• A total of 94 flora taxa including 90 native and four weeds were recorded. A total of 30 fauna species were recorded during the field survey. • No threatened or priority flora were recorded within the survey area; however, there may be potential for E. retropila to occur in the extended area. • No fauna species of conservation significance were recorded, and all fauna species recorded are considered relatively common and widespread.

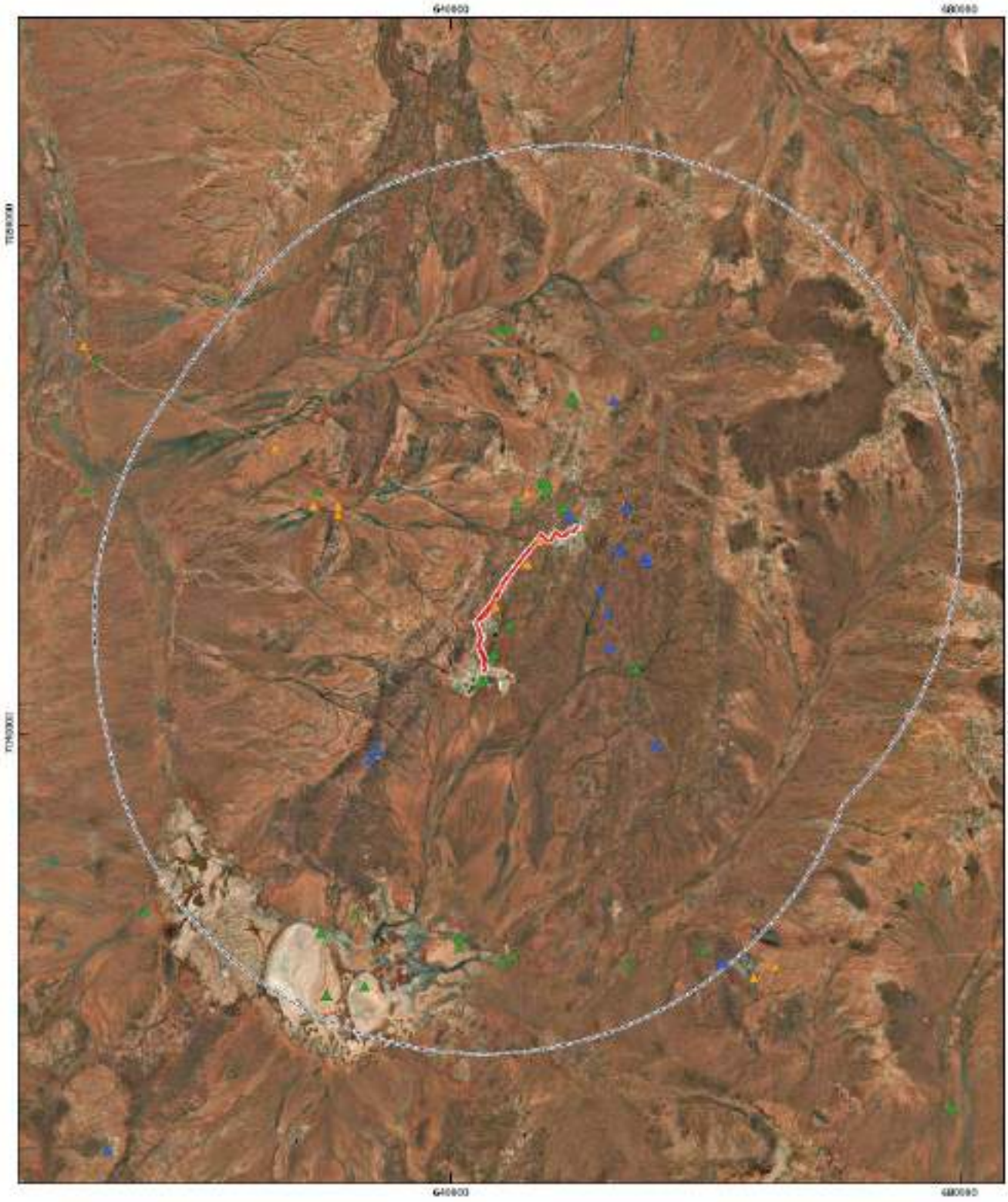

Figure 14: Threatened and Priority Flora (DBCA records)

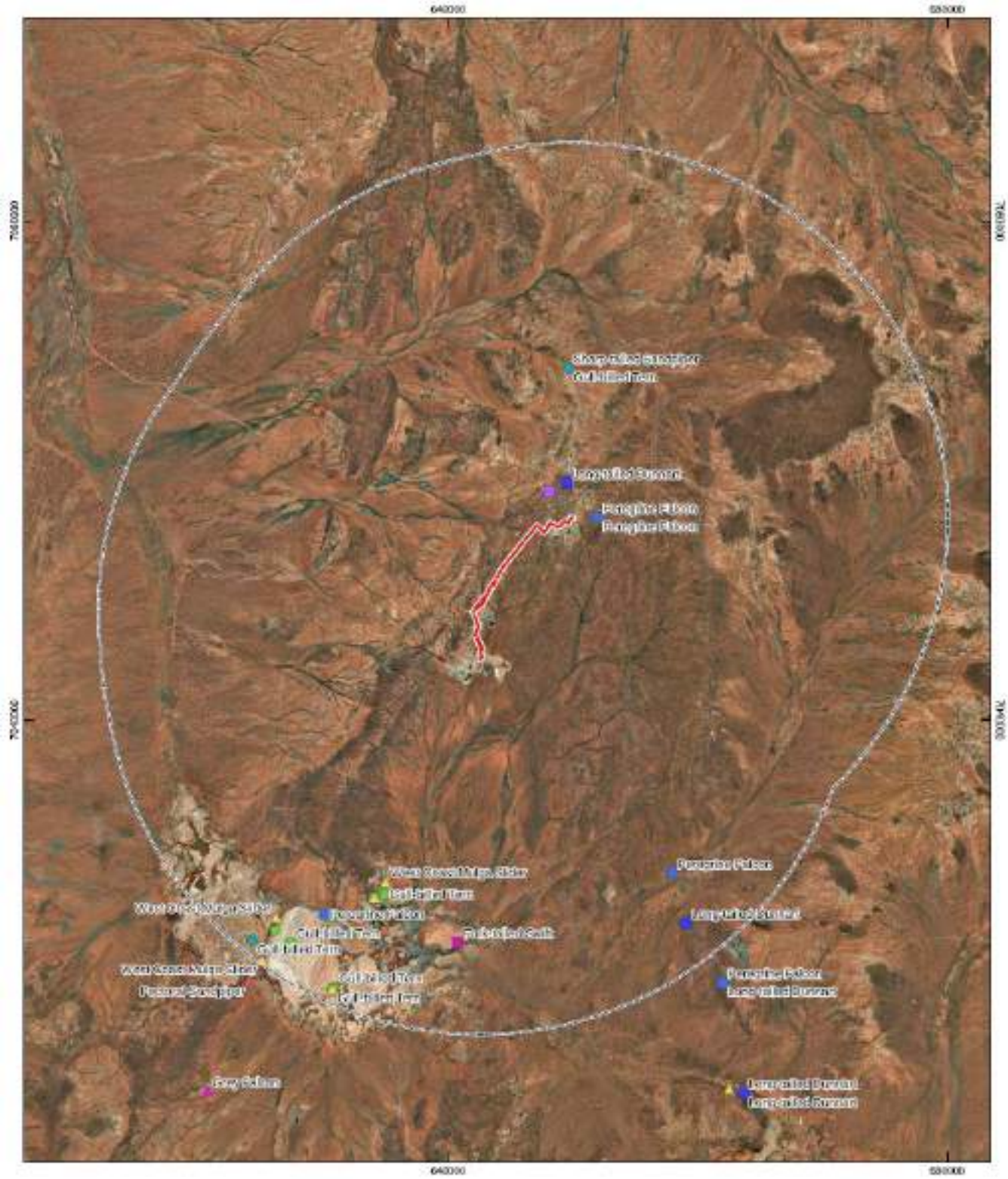

Figure 9- DBCA Threatened Fauna Records (DBCA records)

Figure 15: DBCA Threatened Fauna Records (DBCA records)

8. ENVIRONMENTAL IMPACTS AND MANAGEMENT

8.1 Great Northern Highway TSF

8.1.1 Design Features

A detailed design for the GNHTSF was provided by Tetra Tech Coffey in 2024 (Appendix B). The facility will be constructed in stages, initially filling the GNH pit with tailings deposited to form a beach against the west wall. A spigot will be located on the lower half of the slope nearest the highway where weathering is most pronounced. The GNHTSF and Bluebird East TSF will operate independently until the tailings are filled to the saddle between the pits, creating a larger combined TSF with significantly increased capacity.

As an in-pit facility, the GNHTSF requires minimal construction and uses a single spigot for tailings consolidation. Supernatant water will be recycled to the processing plant. The facility adheres to ANCOLD 2019 standards.

8.1.2 Seepage Control Features and Investigation

GNHTSF incorporates a decant return line to recover approximately 76.7% of slurry water (supernatant) for recycling within the processing plant. No additional seepage control measures are planned for the facility.

A hydrogeological assessment determined that the site features low permeability rock formations interspersed with permeable zones. While a low-level risk of groundwater seepage exists if tailings exceed the pre-mining water level (455 m AHD), the self-sealing properties of the tailings are expected to mitigate potential impacts on groundwater quality and levels (Rockwater, 2024).

The nearest potential receptor for seepage is the 12 Mile Well, located approximately 2 km south of the GNH pit. The well's current condition is unknown. No identified Groundwater Dependent Ecosystems are present in the vicinity.

8.1.3 Freeboard

The GNHTSF is designed to manage water inflows from two primary sources: supernatant from the tailings slurry and rainfall runoff. To mitigate the potential impacts of rainfall events, the facility has been engineered to temporarily store the volume associated with a 1:100-year, 72-hour storm event.

Design parameters for the GNHIPTSF were established based on a ‘Medium – Category 2’ hazard rating and the following guidelines:

- DEMIRS (2015a): The facility must be capable of temporarily storing rainfall from a 1:100-year, 72-hour storm event, with a minimum pit wall freeboard of 0.5 m.
- ANCOLD (2019): The facility must be capable of temporarily storing rainfall from a 1:100-year, 72-hour storm event, plus wave run-up from a 1:10-year AEP wind event, with an additional 0.5 m of pit wall freeboard.

Effective operational controls and continuous water removal are essential for maintaining adequate freeboard within the facility. The tailings surface allows for temporary stormwater storage above the normal operating pond level. This level is maintained at a maximum of 464.5 m AHD, which is 5 m below the minimum pit crest level of 469.5 m AHD (Figure 9).

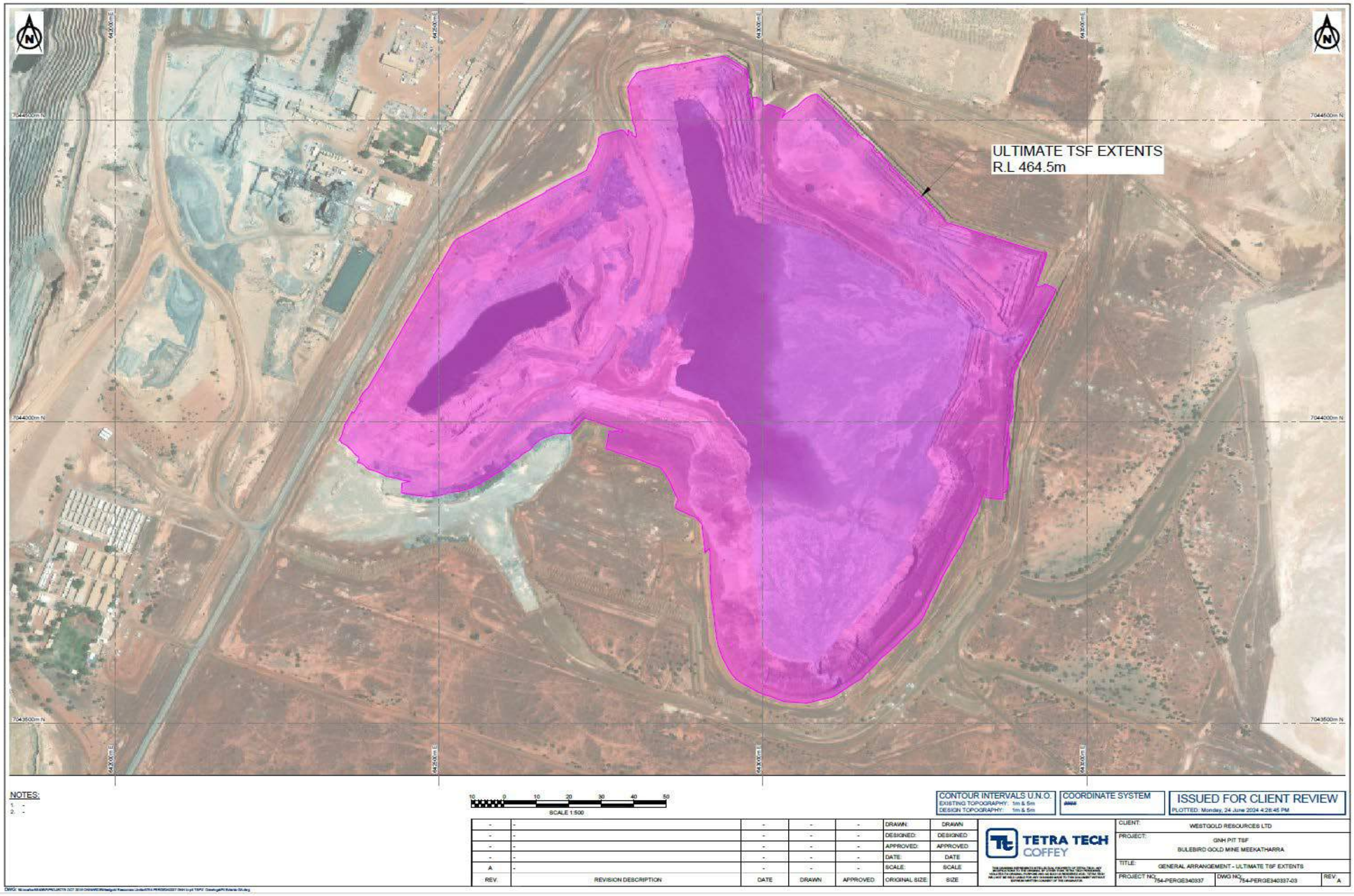

Figure 16: GNHTSF/BETSF Extent

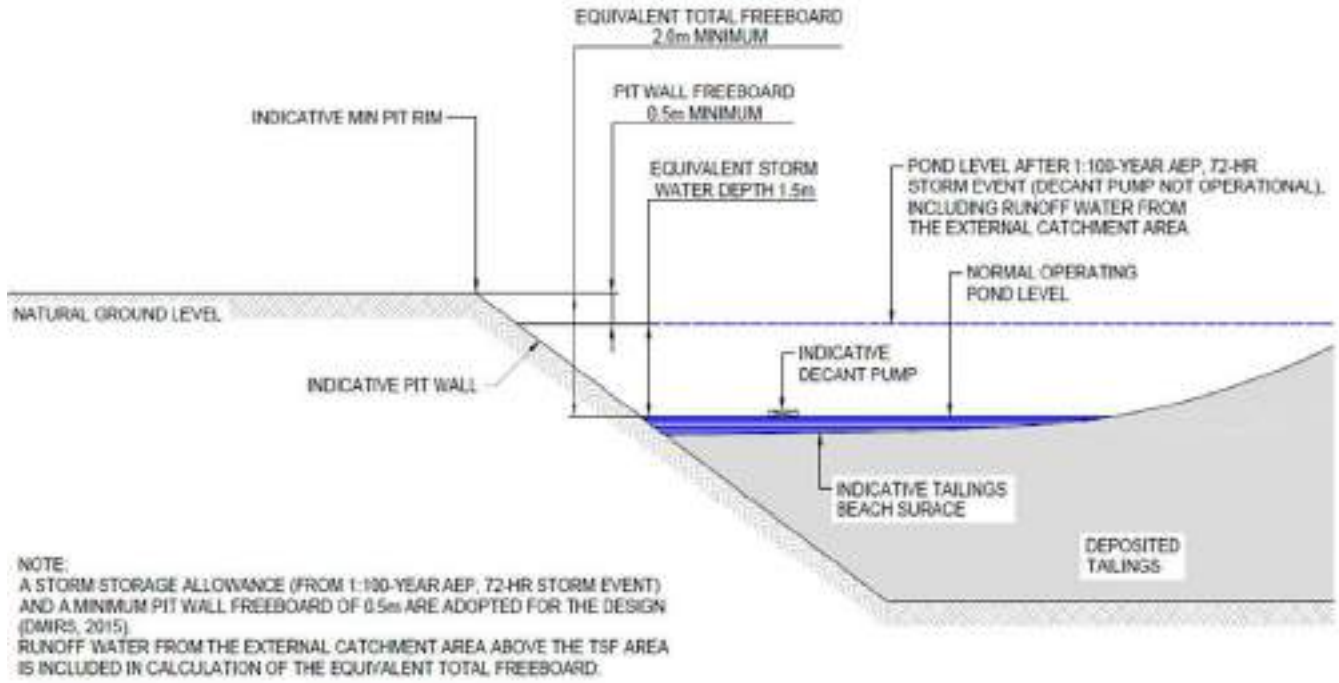

Figure 17: GNHTSF Freeboard

8.1.4 Dust Control

To mitigate dust generation during construction activities, a water cart will be on-site to suppress dust and prevent its dispersion into the surrounding environment. This measure safeguards both air quality and the health of construction personnel.

While dust generation from the tailings beaches is considered unlikely due to the saline nature of the tailings and the potential formation of a stabilising crust (Tetra Tech Coffey, 2024), proactive management measures will be implemented to prevent dust issues during periods of inactivity. This may involve implementing measures to maintain moisture levels on the tailings beaches.

8.1.5 Tailings Deposition Infrastructure

Tailings will be transported from the processing plant to the GNHTSF via a large-diameter HDPE pipeline. A spur line will connect the main pipeline to the GNHTSF. The tailings discharge point, located at the end of the pipeline, will extend a minimum of 5 m over the pit rim to facilitate tailings deposition onto the west wall, forming a tailings beach. Regular monitoring of the spigot location will be undertaken to detect and address any potential erosion. To prevent pipe blockages, tailings pipelines will be flushed with return water when deposition is halted or the spigot is relocated.

Tailings pipelines will be inspected at least once per shift. All pipelines will be contained within bunds to prevent potential spills. Given the sensitivity of HDPE pipelines to temperature fluctuations, the regular inspections will identify and address any leaks or failures promptly. Immediate reporting of pipeline issues to relevant personnel will be required, followed by the completion of an incident report. The placement of infrastructure is detailed in Figure 10 and included in Appendix B.

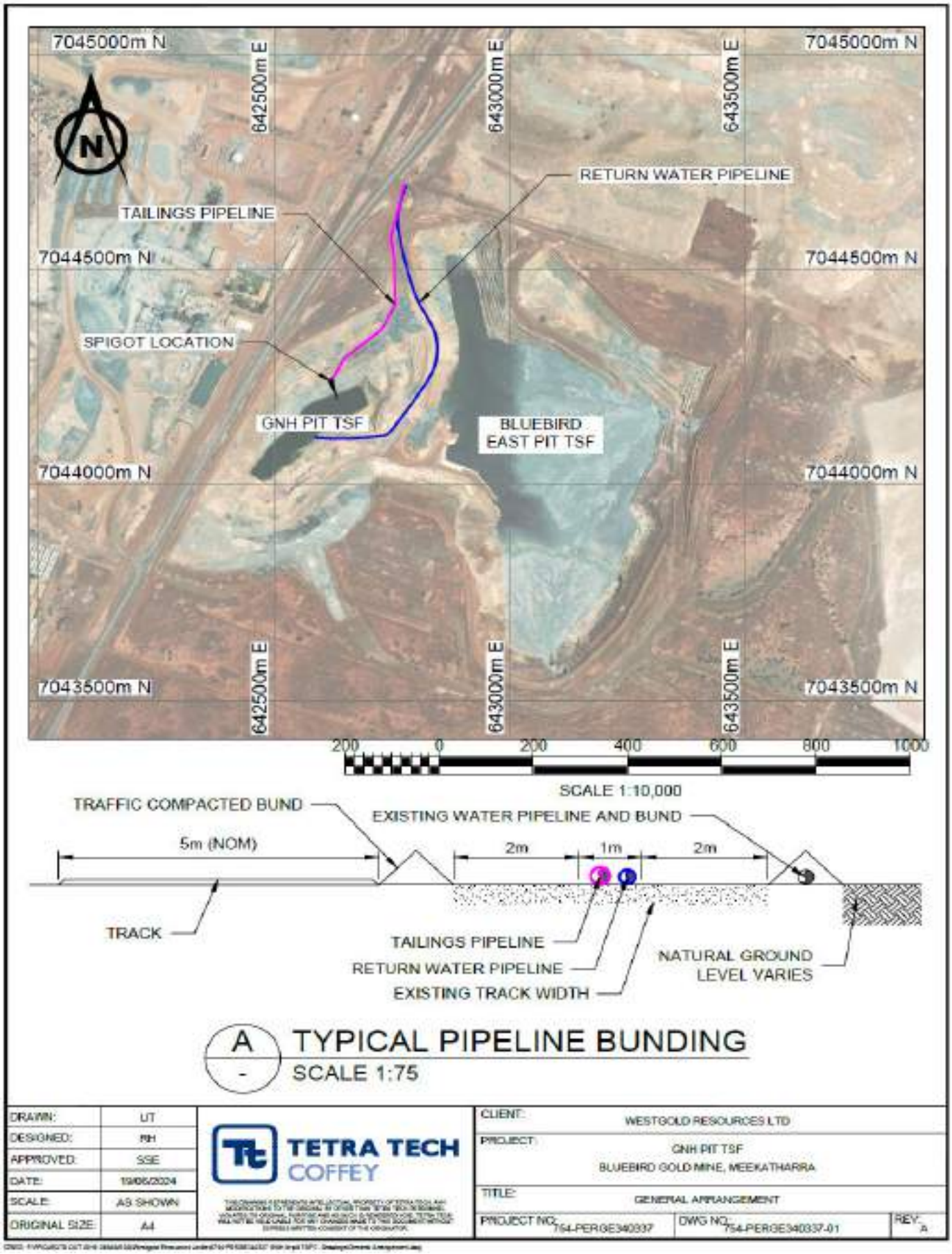

Figure 18: Infrastructure Placement

8.1.6 Decant System

Surface water will initially be removed from the GNHTSF by a decant pump deployed from the pit central ramp from the northern wall of the pit. Return water will be pumped directly to the process plant for reuse. The decant pump will be stationed on a mobile trailer and moved up the ramp as tailings and water levels rise. Access for pump maintenance will utilise existing ramps. (Tetra Tech Coffey, 2024).

8.1.7 Monitoring

Groundwater levels and quality surrounding the GNHTSF will be closely monitored through a network of six monitoring bores (Table 8). Additionally, high-resolution surveys using an unmanned aerial vehicle (UAV) will be conducted to capture detailed surface data of the TSF.

Daily shift inspections will be conducted to monitor the following:

- Tailings delivery and return water pipelines, pumps, and valves for signs of leakage or wear.
- Active tailings discharge to ensure adherence to operational procedures, equipment functionality, and expected beach profile development.
- Decant tower, decant pump operation, safety equipment, supernatant pond levels, and areas.
- Freeboard and perimeter embankments.
- Presence of fauna on the TSF.

The stability of the western wall of the Great Northern Highway pit will be assessed periodically by a specialist external contractor. This monitoring program includes data collection from prisms and inclinometers, as well as visual inspections.

Table 11: Proposed GNHTSF Monitoring Locations

Monitoring Bore	Eastings	Northing
PWD1	642283	7044058
PWD2	642550	7044215
PWD3	642390	7044212
BEMB4	642775	7044183
GNHMB1	642450	7043890
GNHMB2	642560	7043950

Table 12: Proposed GNHTSF Monitoring Program

Monitoring Point Reference	Parameter	Limit	Units	Averaging Period	Frequency
PWD1, PWD2, PWD3, BEMB4, GNHMB1, GNHMB2	Zinc	None specified	mg/L	Spot Sample	Quarterly
	Selenium				
	Nickel				
	Mercury				
	Lead				
	Copper				
	Chromium				
	Cadmium				
	Arsenic				
	TDS				
	pH[1]		pH units		
	SWL		mbgl		Monthly
Note 1: In-field non-NATA accredited analysis permitted					

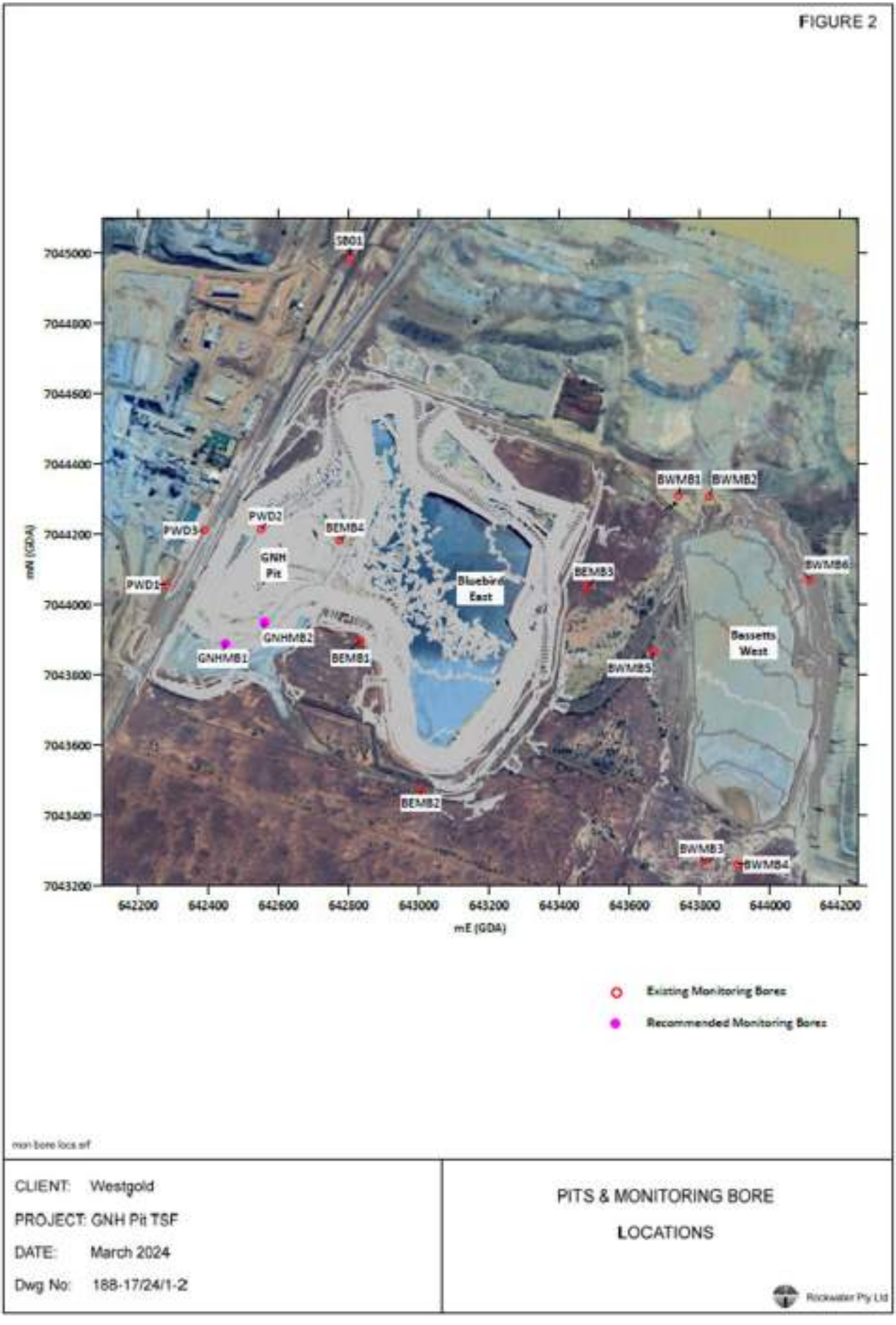

Figure 19: GNHTSF Monitoring Bore Locations

8.1.8 Bluebird Paste Plant Emissions Management

Potential emissions and discharges associated with commissioning and operation of the Bluebird Paste Plant and proposed controls are summarised in Table 13.

8.1.9 Project Cost Estimates

Projects cost estimates (Table 14) are derived from recent construction of the Big Bell Paste Plant at Westgold Resources Limited's Cue Gold Operations and known industry project costs.

Table 13: Project Construction Cost Estimate

	Component	Detail	[redacted]
Bluebird Paste Plant	Tailings Study	Bluebird Tailings Test Work	
	Procurement of Paste Plant	Rental of paste plant equipment	
	Paste Plant Earth works	Preparation for paste plant pad & ROM	
	Paste Hole	Drilling paste hole infrastructure to underground	
	Road construction	Road construction Bluebird TSF to Paste Plant	
	Paste Plant Mobilisation	Placement of mobile paste plant infrastructure	
		Total Cos	
Great Northern Highway In-pit TSF (GNHIPTSF)	GNHPTSF Spigot Installation	New HDPE spigot line to GNHTSF	
	HDPE installation	Machine hire poly welder	
	HDPE Contractor Hire	Poly welders labour	
	Anchor points	Installation of anchor points GNH spigot	
	Earthmoving	Installation of bunding and V-drains	
	Consultancy Reports	GNH Technical Reports TSF Design Pit Wall Assessment GNH Hydrological Assessment	
	Drilling monitoring bores	Installation and earthworks associated GNH monitoring bores	
		Total Cos	
		Total Cos	

8.1.10 Construction and Commissioning Timelines

Timelines for construction and commissioning of both Projects are provided onFigure 20 and Figure 21.

Table 14: Potential Emissions and Proposed Controls, Bluebird Paste Plant

Emission	Source	Potential pathways	Proposed Controls
Construction			
Dust	Construction of Paste Plant Installation of containment bunding GNHPTSF tails line Vehicle movements	Air / windborne pathway	A water truck will be used during construction earthworks if the soil is dry or if the roads are liable to generate dust. It is used to wet down stockpiles and internal roads as required. Vehicle speeds will be restricted. Visual dust monitoring. Restriction of activities during high winds.
Noise	Construction of Paste Plant	Nil	No specific controls proposed. Onsite construction is minimal as equipment is a mobile facility.
Commissioning / Operation			
Dust	Reclamation of tailings for Bluebird TSF cells 1-4 for paste production Storage and handling of dry tailings at the paste plant run-of-mine (ROM) Handling and storage of dry flocculant at the paste plant	Air / windborne pathway	Dust minimisation measures will be implemented for the Bluebird Paste Plant, adjacent ROM pads, roads and hardstand areas. including use of a water cart. Installation of dust suppression systems. Sprayers and sprinklers (from water carts) will be used during the handling and storage of dry tailings. Visual dust monitoring. Restriction of activities during high winds. Concrete binder will be delivered and stored with a silo with an enclosed discharge system. Flocculant will be stored and weighed within a container shed.
Spill and leaks (hydrocarbons/ reagents from paste plant infrastructure	Storage and handling of the paste plant reagents	Direct discharge / overland runoff	Paste plant chemicals and hydrocarbon storage designed and constructed in accordance with Australian Standards AS1940 and AS1692. All reagents will be housed within bunded areas that comply with Australian Standards. Adherence to Hydrocarbon and Chemical Management Procedure (SOP022). Paste Plant will be equipped with spill kits. All spills contained, controlled and cleaned up immediately. All contaminated soil is transported to the bioremediation pad.
Spills and leaks of tailings from pipeline	Transport of wet tailings to the paste plant from the processing plant via pipelines	Direct discharge / overland runoff	Pipelines will incorporate leak detection technology. Pipelines placed within a containment trench or suitably bunded easement capable of containing any spill with appropriately designed catch pits or sumps. Pipelines will be inspected daily for integrity during operations.
Sediment laden / contaminated stormwater	Flooding of paste plant and dry tailings storage area from significant rainfall events.	Direct discharge / overland runoff	The base of the dry tailings storage area will be enclosed with a perimeter bund to prevent run-off from leaving the area. Surface water infrastructure will be constructed where required to direct surface water away from work areas. This may include bunding, culverts, drainage lines or collection sumps. Work areas will be graded as required to ensure any contaminated stormwater or runoff is directed away from work activity areas and directed to a designated collection area and reused or treated accordingly if disposed. The proposed surface water management infrastructure will be designed to 1 in 100-year rainfall events.
Noise	Operation of paste plant Movement of machinery/vehicles	Air / windborne pathway	Equipment will comply with Australian Standard noise limits.
Light	Operation of paste plant Movement of machinery/vehicles	Nil	Lights will be strategically placed and designed to shine towards plant operations and minimise light spill to the environment.

Figure 20: Bluebird Paste Plant Construction and Commissioning Timeline

Works Name	Duration (Days)	Start	Finish	Nov-24	Dec-24	Jan-25
Paste Plant Earthworks	10	1/11/2024	10/11/2024			
Prepare Pipeline Corridor	7	1/11/2024	7/11/2024			
Prepare Paste Plant Hardstand	5	7/11/2024	12/11/2024			
Prepare Tailings Storage Hardstand	5	12/11/2024	17/11/2024			
Install Tailings Storage Hardstand	5	17/11/2024	22/11/2024			
Paste Plant Construction	7	22/11/2024	28/11/2024			
Install foundations and bunding	10	28/11/2024	8/12/2024			
Install paste plant infrastructure	10	8/12/2021	18/12/2024			
Commission paste plant	7	18/12/2024	25/12/2024			
Commission Pipeline Infrastructure	7	25/12/2024	25/12/2024			
Commission Paste Plant	7	25/12/2024	25/12/2024			
Project Completion	0					

Figure 21: GNHINPTSF 8.1.10 Construction and Commissioning Timeline

Works Name	Duration (Days)	Start	Finish	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
GNH In-Pit TSF Preparation	30	1/08/2024	30/08/2024					
Clear Pipeline Conidors	5	1/08/2024	5/08/2024					
Clear and Prepare GNH In-Pit TSF Spigot Locations	10	1/09/2024	10/09/2024					
Install GNH In-Pit TSF Infrastructure	60	10/09/2024	8/12/2024					
Construct Pipleline Bunding	20	30/09/2024	20/10/2024					
Install Tailings Pipeline	30	30/09/2024	30/10/2024					
Install Decant Return Pipelines	25	10/10/2024	4/11/2024					
Install Tailings and Decant Return Pumps	30	30/11/2024	30/12/2024					
Install Pipleline Telemetry	45	15/11/2024	29/12/2025					
Commision GNH In-Pit TSF	60	30/10/2024	29/12/2025					
Commision Pipelines	30	30/10/2024	30/11/2024					
Commision Pumps	15	31/11/2024	15/12/2025					
Commision Telemetry	15	15/12/2024	30/12/12025					
Commence time Limited Operations								

9. RISK ASSESSMENT

The risk assessment criteria is based on the DEMIRS risk assessment guidance, this guidance is shown in Table 10, Table 11 and Table 12. A risk assessment for this license amendment is included below in Table 13.

Table 15: Likelihood Categories

Level	Descriptor	Expected Frequency	Description	Probability
1	Rare	Once in 15 years	Highly unlikely, but it may occur in exceptional circumstances	0 – 10%
2	Unlikely	At least once in 10 years	Not expected, but there's a slight possibility it may occur at some time	11 – 40%
3	Possible	At least once in 3 years	The event might occur at some time as there is a history of infrequent occurrences of similar issues with similar projects/ activities	41 – 60%
4	Likely	At least once per year	There is a strong possibility the event will occur as there is a history of frequent occurrence with similar projects/activities	61 – 90%
5	Almost certain	More than once per year	The event is expected to occur at some time as there is a history of continuous occurrence with similar projects / activities	91 – 100%

Table 16: Consequence Categories

Environmental Factor	Insignificant (A)	Minor (B)	Moderate (C)	Major (D)	Severe (E)
Biodiversity	None or insignificant impact to ecosystem component (physical, chemical or biological) expected with no effect on ecosystem function	Moderate to minor impact to ecosystem component (physical, chemical or biological) Minor off-site impacts at a local scale	Minor and short-term impact to high value or sensitive ecosystem expected Off-site impacts at a local scale	Long-term impact to significant high value or sensitive ecosystem expected Long-term impact on a wide scale Adverse impact to a listed species expected	Irreversible impact to significant high value or sensitive ecosystem expected Irreversible and significant impact on a wide scale Total loss of a threatened species expected
Water Resources	Low impact to isolated area without affecting any use of the water.	Contained low impact with negligible effect on the use of the water.	Uncontained impact that will materially affect the use of the water, but able to be rectified in short-term.	Extensive hazardous impact requiring long-term rectification	Uncontained hazardous impact with residual effect
Land Degradation	Negligible impact to isolated area.	Contained low impact, not impacting on any environmental value.	Uncontained impact, able to be rectified in short-term without causing pollution or contamination	Extensive hazardous impact requiring long-term rectification	Uncontained hazardous impact with residual effect
Air Quality	No detectable impact	Contained low impact not impacting on any environmental value.	Uncontained impact that will materially affect an environmental value, but able to be rectified in short-term.	Extensive hazardous impact on an environmental value requiring long-term rectification	Uncontained hazardous impact with residual effect

Environmental Factor	Insignificant (A)	Minor (B)	Moderate (C)	Major (D)	Severe (E)
Mine Closure	Site is safe, stable a non-polluting and post mining land use is not adversely affected	The site is safe, all major landforms are stable, and any stability or pollution issues are contained and require no residual management. Post-mining land use is not adversely affected.	The site is safe, and any stability or pollution issues require minor, ongoing maintenance by end land-user	The site cannot be considered safe, stable or non-polluting without long-term management or intervention. Agreed end land-use cannot proceed without ongoing management.	The site is unsafe, unstable and/ or causing pollution or contamination that will cause an ongoing residual affect. The post mining land use cannot be achieved.

Table 17: Risk Assessment Matrix

	Insignificant (A)	Minor (B)	Moderate (C)	Major (D)	Severe (E)
Rare (1)	Low	Low	Low	Moderate	Moderate
Unlikely (2)	Low	Low	Moderate	Moderate	High
Possible (3)	Low	Moderate	Moderate	High	High
Likely (4)	Low	Moderate	High	Extreme	Extreme
Almost certain (5)	Low	High	High	Extreme	Extreme

Table 18: Risk Assessment

Risk Event						Consequence Rating	Likelihood Rating	Risk	Reasoning for Risk Rating
Sources/Activities	Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impacts	Controls				
Category 5: Processing or beneficiation of metallic or non-metallic ore									
Great Northern Highway TSF									
Construction of GNHTSF Infrastructure	Dust	Native vegetation in the vicinity of GNHTSF Infrastructure	Particulate matter (fugitive dust).	Dust deposition on native vegetation species can potentially lead to poor vegetation health.	If local wind speeds are conducive to elevated dusting, construction works will be paused until conditions improve.	Insignificant	Rare	Low	Sufficient controls are in place to minimise dust emissions.
Transfer of tailings to GNHTSF	Tailings	Soil and native vegetation in the vicinity of GNHTSF	Direct discharge to ground causing contamination of surface water runoff.	Reduced quality or contamination of soil, sediment, and surface water.	Provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections.	Moderate	Unlikely	Low	The proposed controls in this licence amendment as considered industry standard and similar to those applied at the operating Bluebird East TSF facility, which has proven to manage the potential risk appropriately.
Storage of tailings material in GNHTSF	Seepage of leachate	Groundwater and groundwater dependent ecosystems	Infiltration through soils to groundwater causing degradation of groundwater quality.	Reduced quality or contamination of soil, sediment, and surface water.	Ongoing quarterly sampling at the PWD1 to PWD3, BEMB4 GNHMB1 and GNHMB2 monitoring bores for the parameters outlined in Table 13 of the licence.	Moderate	Unlikely	Moderate	
		Native vegetation in the vicinity of TSF3	Increasing groundwater levels due to seepage can cause impacts to the health and survival of vegetation (waterlogging / increased salt concentrations).	The vegetation around GNHTSF may be sensitive to elevated concentrations of sulphate and TDS if the water table reaches the vegetation root zone (approximately 8 mbgl).		Moderate	Unlikely	Moderate	
	Tailings	Soil, surface water and native vegetation in the vicinity of GNH TSF	Overtopping of GNHTSF resulting in direct discharge to ground causing contamination.	Contamination of land and water	Ongoing survey controls and monitoring to ensure that a minimum top of embankment freeboard to contain a 1 in 100-year rainfall event over 72 hours is maintained.	Moderate	Rare	Low	
	Wall failure of GNHTSF	Localised ground subsidence - Great Northern Highway	Method of tailings placement is not carefully managed, affecting west wall stability.	Public safety	Ensure tailings are deposited in a manner that supports the stability of the west wall. Conduct annual visual and inclinometer surveys to assess the stability of the west wall. Implement monthly prism monitoring of the west wall to track its movement and deformation. Conduct periodic geotechnical inspections to evaluate the overall stability and integrity of the west wall. Monitor the supernatant water level in the TSF on a quarterly basis to ensure it remains within acceptable limits.	Severe	Rare	Moderate	Weathered zone on GNHTSF is minimal. Subsidence zones can be managed.
Bluebird Paste Plant									
Mobile equipment movements (e.g. light vehicles, heavy equipment, and diesel generator) during construction and installation of the Bluebird Paste Plant	Dust	Native Vegetation	Air/windborne	Dust deposition on native vegetation species can potentially lead to poor vegetation health.	Limit activities to minimise dust generation on cleared areas. Reduce vehicle movements during periods of high wind events. Use water carts for dust suppression as required. Construction period expected to be short-term. Visual monitoring for dust during construction and maintenance activities.	Minor	Unlikely	Low	Construction period will be short. Plant location is central to the operations and separate from vegetation.
Loading, transport and stockpiling of tailings from Bluebird North TSF	Dust	Native Vegetation	Air/windborne	Dust deposition on native vegetation species can potentially lead to poor vegetation health.	Limit activities to minimise dust generation on cleared areas. Reduce vehicle movements during periods of high wind events.	Insignificant	Unlikely	Low	Dust emissions will attenuate as Bluebird North TSF is mined deeper

Risk Event						Consequence Rating	Likelihood Rating	Risk	Reasoning for Risk Rating
Sources/Activities	Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impacts	Controls				
				Reduced ephemeral surface water quality	Use water carts for dust suppression as required. Dust will attenuate as the TSF is mined deeper. Visual monitoring for dust during construction and maintenance activities.				
Release of cement reagents, production water or final paste product from the Bluebird Paste Plant	Localised spillage	Native vegetation Surface water bodies	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality.	Smothering of native vegetation from cement reagent or paste product. Reduced ephemeral surface water quality.	Earthen windrows on ROM installed around paste plant to divert uncontaminated stormwater away from the area. Paste spills will be contained but the pit hardstand, abandonment bund or pit itself. No practical pathway for discharge to the environment. Spill control equipment to be made available and maintained at the paste plant.	Minor	Rare	Low	All discharges will be contained within the footprint of the paste plant, pit hardstand or pit footprint. Any discharges will be cleaned up as they occur. Lond term contaminated sites assessment will be undertaken at closure.
Additional consumption of water in paste manufacturing process resulting in depleted groundwater resource	Groundwater	Groundwater	Groundwater depletion	Water used in paste fill process depletes natural groundwater.	Water consumption of the paste plant is to be monitored as part of the Yaloginda water balance. Monitoring of regional groundwater will continue. Water used is to be from existing mine dewatering operations.	Minor	Rare	Low	Yaloginda groundwater abstraction is transferred through Romsey/South Junction & Mystery pits reinjecting into the local groundwater system.

10. REFERENCES

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