



Works approval number W6458/2020/1

Works approval holder Iluka Resources Limited
ACN 008 675 018
Level 17
Registered business address 240 St Georges Terrace
PERTH, WA 6000
DWER file number DER2020/000485

Duration 16/02/2021 to 15/02/2024

Date of amendment 13 May 2022

Premises details Eneabba Mineral Sands Mine
Brand Highway
ENEABBA WA 6518
Legal description -
State Agreement Mining Lease 267SA

Prescribed premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>)	Assessed production / design capacity
Category 8 Mineral sands mining or processing	300,000 tonnes per annum

This works approval as amended is granted to the works approval holder, subject to the attached conditions, on 13 May 2022, by:

**MANAGER, RESOURCE INDUSTRIES
REGULATORY SERVICES**

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

Works approval history

Date	Reference number	Summary of changes
16/02/2021	W6458/2020/1	Works approval granted
19/03/2021	W6458/2020/1	Works approval amended to correct typographical errors
13/05/2022	W6458/2020/1	Works approval amended

Interpretation

In this works approval:

- (a) the words 'including', 'includes' and 'include' in conditions mean "including but not limited to", and similar, as appropriate;
- (b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
- (c) where tables are used in a condition, each row in a table constitutes a separate condition;
- (d) any reference to an Australian or other standard, guideline, or code of practice in this works approval:
 - (i) if dated, refers to that particular version; and
 - (ii) if not dated, refers to the latest version and therefore may be subject to change over time;
- (e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and
- (f) unless specified otherwise, all definitions are in accordance with the EP Act.

NOTE: This works approval requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this works approval.

Works approval conditions

The works approval holder must ensure that the following conditions are complied with:

Construction phase

Infrastructure and equipment

1. The works approval holder must construct and/or install the infrastructure and/or equipment listed in Table 1 in accordance with;
 - (a) the corresponding design, construction / installation requirements; and
 - (b) at the corresponding infrastructure location.as set out in Table 1

Table 1 Design and construction / installation requirements

	Infrastructure and/or equipment	Design, construction / installation requirements	Infrastructure location
1.	Plant 2 general	<u>Design, construction/installation</u> <ul style="list-style-type: none">• Perimeter bund around site to prevent stormwater runoff• Stormwater runoff with potential to contain Naturally Occurring Radioactive Materials (NORM) will be recovered via sumps and returned to process circuit• Internally draining floor slope of processing plant towards sumps which pump water back to process water dam or recycle in process circuit• Sumps to recover all process and runoff water within its catchment• One washdown bay• Any conveyors that are outside of the protective buildings will be covered to prevent loss of material• Bunded storage tank area• The container storage and local area will be compacted with suitable material to withstand the weight of the storage containers and mobile equipment.• A process water tank will be installed within the plant area with a capacity of 150 m3	Figure 1 (Upgrade project area) and Figure 2
2.	Constant Density (CD) storage tanks	<ul style="list-style-type: none">• Maximum of 5 CDs with storage capacity < 300t each	Figure 2
3.	Flotation and filtration circuit	<ul style="list-style-type: none">• Located on concrete or sealed hardstand, and immediate areas are bitumised.	Figure 1 (Flotation plant)

	Infrastructure and/or equipment	Design, construction / installation requirements	Infrastructure location
			Figure 2 (Flotation circuit)
4.	Wet gravity circuit	<ul style="list-style-type: none"> Throughput of <40t/hr 	Figure 1 Figure 2
5.	Packaging plant	<ul style="list-style-type: none"> Fully enclosed to minimise runoff Located on concrete or sealed hardstand, and immediate areas are bitumised 	Figure 1
6.	Transfer pipelines	<ul style="list-style-type: none"> Tailings pipeline placed in earthen bund and equipped with automatic controls, including cut-outs in the event of a leak or pipe failure Process water pipelines (Feed ore/slurry) placed in earthen bund and equipped with automatic controls, including cut-outs in the event of a leak or pipe failure Process water pipeline will have an inline pH monitor and a pH modifier to maintain process water dam at a pH ≥ 7. 	Figure 1
7.	Process water dam	<ul style="list-style-type: none"> The West Dam will be re-purposed as the Process water dam Capacity of 280ML Water levels maintained at least 1.0m below the top of the wall Designed to withstand 1:100 year event and 72 hr rainfall event 	Figure 3
8.	Sumps	<ul style="list-style-type: none"> Designed to contain and recover all process and runoff water within its catchment 	Figure 1

2. The works approval holder must design, construct, and install groundwater monitoring wells in accordance with the requirements specified in Table 2.

Table 2: Infrastructure requirements – groundwater monitoring wells

Infrastructure	Design, construction, and installation requirements	Monitoring well location(s)	Timeframe
Minimum of 2 additional groundwater monitoring well(s) upstream and downstream	<p><u>Well design and construction:</u> Designed and constructed in accordance with <i>ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores</i>. Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination¹. Where temporary/seasonal perched features are present, wells must be nested, and the perched features individually screened.</p> <p><u>Logging of borehole:</u> Soil samples must be collected and logged during the installation of the monitoring wells. A record of the geology encountered during drilling must be described and classified in accordance with the Australian Standard Geotechnical Site Investigations AS1726. Any observations of staining / odours or other indications of contamination must be included in the bore log.</p> <p><u>Well construction log:</u> Well construction details must be documented within a well construction log to demonstrate compliance with <i>ASTM D5092/D5092M-16</i>. The construction logs shall include elevations of the top of casing position to be used as the reference point for water-level measurements, and the elevations of the ground surface protective installations.</p> <p><u>Well development:</u> All installed monitoring wells must be developed after drilling to remove fine sand, silt, clay and any drilling mud residues from around the well screen to ensure the hydraulic functioning of the well. A detailed record should be kept of well development activities and included in the well construction log.</p> <p><u>Installation survey:</u> the vertical (top of casing) and horizontal position of each monitoring well must be surveyed and subsequently mapped by a suitably qualified surveyor.</p> <p><u>Well network map:</u> a well location map (using aerial image overlay) must be prepared and include the location of all monitoring wells in the monitoring network and their respective identification numbers.</p>	Upstream and downstream, location to be determined	Must be constructed, developed (purged), and determined to be operational prior to the commencement of environmental commissioning activities under condition 5
Two groundwater monitoring bores (one shallow and one deep) directly west of the Process Water Dam.	<p><u>Well design and construction:</u> Designed and constructed in accordance with <i>ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores</i>. Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination¹. At each bore site, the shallow bores should be installed into the perched watertable and the deep bores into the regional watertable. Bores should be positioned close to the down gradient side of the PWD or TSF towards the middle of down gradient side. This is to ensure that both the perched and regional watertable will be intersected.</p>	Refer to Figure 5	Must be constructed, developed (purged), and determined to be operational prior to the commencement of environmental commissioning activities under condition 5
Two groundwater monitoring bores (one shallow and one deep) located directly west of the East Tails Dam.			

Infrastructure	Design, construction, and installation requirements	Monitoring well location(s)	Timeframe
Two groundwater monitoring bores (one shallow and one deep) located directly west of the Yellow Dam.	<p><u>Logging of borehole:</u> Soil samples must be collected and logged during the installation of the monitoring wells.</p> <p>A record of the geology encountered during drilling must be described and classified in accordance with the Australian Standard Geotechnical Site Investigations AS1726.</p> <p>Any observations of staining / odours or other indications of contamination must be included in the bore log.</p> <p><u>Well construction log:</u> Well construction details must be documented within a well construction log to demonstrate compliance with <i>ASTM D5092/D5092M-16</i>. The construction logs shall include elevations of the top of casing position to be used as the reference point for water-level measurements, and the elevations of the ground surface protective installations.</p> <p><u>Well development:</u> All installed monitoring wells must be developed after drilling to remove fine sand, silt, clay and any drilling mud residues from around the well screen to ensure the hydraulic functioning of the well. A detailed record should be kept of well development activities and included in the well construction log.</p> <p><u>Installation survey:</u> the vertical (top of casing) and horizontal position of each monitoring well must be surveyed and subsequently mapped by a suitably qualified surveyor.</p> <p><u>Well network map:</u> a well location map (using aerial image overlay) must be prepared and include the location of all monitoring wells in the monitoring network and their respective identification numbers.</p>		

Note 1: refer to Section 8 of *Schedule B2 of the Assessment of Site Contamination NEPM* for guidance on well screen depth and length.

Compliance reporting

3. The works approval holder must within 30 calendar days of an item of infrastructure or equipment required by conditions 1 and 2 being constructed and/or installed:
 - (a) undertake an audit of their compliance with the requirements of condition 1; and
 - (b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.
4. The Environmental Compliance Report required by condition 3, must include as a minimum the following:
 - (a) certification by an independent suitably qualified engineer that the items of infrastructure or component(s) thereof, as specified in conditions 1 and 0 have been constructed in accordance with the relevant requirements specified in conditions 1 and 2;
 - (b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in conditions 1 and 2; and
 - (c) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Environmental commissioning phase

Environmental commissioning requirements and emission limits

5. The works approval holder may only commence environmental commissioning of an item of infrastructure listed in condition 6 once the Environmental Compliance Report has been submitted for that item of infrastructure in accordance with condition 3 of this works approval.
6. The works approval holder must ensure that any environmental commissioning activities undertaken for an item of infrastructure specified in Table 3 are only carried out:
 - (a) in accordance with the corresponding commissioning requirements; and
 - (b) for the corresponding authorised commissioning duration.

Table 3: Environmental commissioning requirements

Infrastructure	Commissioning requirements	Authorised commissioning duration
Plant 2 (Figure 2)	<ul style="list-style-type: none">• Pre-commissioning: static checks on unpowered equipment• Dry commissioning: test operation of 'empty' equipment• Wet commissioning: test operations with water• Mineral commissioning: test operations with reagents, ore, tailings or water	For a period not exceeding 180 calendar days in aggregate.

7. The works approval holder must submit to the CEO an Environmental Commissioning Report within 30 calendar days of the completion date of environmental commissioning for each item of infrastructure specified in Table 3.
8. The works approval holder must ensure the Environmental Commissioning Report required by condition 7 of this works approval includes the following:
 - (a) a summary of the environmental commissioning activities undertaken, including timeframes and amount of material processed;
 - (b) the ambient concentrations monitoring results recorded in accordance with condition 17;
 - (c) a summary of the environmental performance of each item of infrastructure or equipment as constructed or installed, which at minimum includes records detailing the:
 - (i) environmental commissioning of plant 2,
 - (ii) testing the plant 2; and
 - (iii) commissioning of the process control system;
 - (d) a review of the works approval holder's performance and compliance against the conditions of this works approval; and
 - (e) where they have not been met, measures proposed to meet the manufacturer's design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Time limited operations phase

Commencement and duration

9. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 1
- (a) where the item of infrastructure is not authorised to undertake environmental commissioning, the Environmental Compliance Report as required by condition 3 has been submitted by the works approval holder for that item of infrastructure; and
 - (b) where the item of infrastructure is authorised to undertake environmental commissioning under condition 6, the Environmental Commissioning Report for that item of infrastructure as required by condition 7 has been submitted by the works approval holder.
10. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 11 for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 9 for that item of infrastructure.

Time limited operations requirements

11. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 4 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 4.

Table 4: Infrastructure and equipment requirements during time limited operations

	Site infrastructure and equipment	Operational requirement	Infrastructure location
1.	Plant 2 general	<ul style="list-style-type: none">Mineral sands concentrate (~90 % monazite content) bagged wet onsite and stored in containers prior to off site transport;Heavy mineral concentrate (~35 % zircon, ~50 % ilmenite) and sand/clay tailings stockpile contained in concrete bunker containment area with runoff drained and recirculated into process circuit;Process up to 300 ktpa of South Secondary Concentrator Middlings (SSC Mids);Deposition of clay/sands tailings into existing mined out voids;Water cart for dust suppression;Traffic management plan and restricted speeds (average 5 product trucks/day);Site inspections following heavy rainfall events;Daily inspections of pipelines whilst operating;Clay/sand tailings deposited after reduction in moisture level; andDaily inspections of bulk chemical storage.	Figure 1 (Upgrade project area) and Figure 2

	Site infrastructure and equipment	Operational requirement	Infrastructure location
2.	Constant Density (CD) storage tanks	N/A	Figure 2
3.	Flotation and filtration circuit	N/A	Figure 1 (Flotation plant) Figure 2 (Flotation circuit)
4.	Wet gravity circuit	N/A	Figure 1 Figure 2
5.	Packaging plant	N/A	Figure 1
6.	Process water dam	<ul style="list-style-type: none"> West Dam mine void will be used to store water for Plant 2 Maintain of minimum 500 mm freeboard Daily inspections 	Figure 1
7.	Sumps	N/A	Figure 1
8.	Sand/clay tailings disposal areas	<ul style="list-style-type: none"> East Dam to be the primary mine-void for disposal of tailings Yellow Dam and the North Gas Pit may also be utilised as alternative tailings disposal voids in the future. Water levels to be maintained at least 1.0 m below the tops of the pit wall in mine void disposal areas Daily inspections 	Figure 2

12. The works approval holder must take remedial actions if process water quality entering the process water dam, as measured in accordance with condition 19, is recorded at a pH <7 at the inflow sampling location in Table 5, based on three or more consecutive daily measurements.
13. The works approval holder must ensure that the remedial actions specified within condition 12 include at least one of the following:
- dosing with lime slurry or similar (acid neutralisation); or
 - an aeration system within the process water dam; or
 - an alternative remedial action approved in writing by the CEO.

Compliance reporting

14. The works approval holder must submit to the CEO a report on the time limited operations within 30 calendar days of the completion date of time limited operations or 60 calendar days before the expiration date of the works approval, whichever is the sooner.

15. The works approval holder must ensure the report required by condition 14 includes the following:
- (a) a summary of the time limited operations, including timeframes and amount of material processed;
 - (b) a summary of monitoring results obtained during time limited operations under conditions 16, 17 and 18;
 - (c) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable);
 - (d) a review of performance and compliance against the conditions of the works approval and the Environmental Commissioning Report; and
 - (e) where the manufacturer's design specifications and the conditions of this works approval have not been met, what measures will the works approval holder take to meet them, and what timeframes will be required to implement those measures.

Monitoring

16. The works approval holder must undertake monitoring of the process water dam for the parameters listed in Table 5, in the corresponding units, over the corresponding averaging period and at the corresponding frequency set out in Table 5.

Table 5: Monitoring of process water quality

Monitoring location ¹	Parameter	Unit s	Averaging period	Frequency
Inflow into Process Water Dam	pH	-	Spot sample (in field)	Daily
	Total acidity	mg/L	Spot sample (laboratory)	Monthly
	Total alkalinity (as CaCO ₃)	mg/L	Spot sample (in-field or laboratory)	
	Dissolved oxygen	µS/cm	Spot sample (in-field)	Weekly
	Electrical conductivity			
	Temperature			
Process Water Dam ¹ (Refer to Figure 4)	pH	-	Spot sample (in field)	Daily
	Total acidity	mg/L	Spot sample (laboratory)	Monthly
	Total alkalinity (as CaCO ₃)	mg/L	Spot sample (in-field or laboratory)	
	Dissolved oxygen	µS/cm	Spot sample (in-field)	Weekly
	Electrical conductivity			
	Temperature			

Note 1: The spatial distribution of sampling locations, and sampling depth at each location, must be sufficient to demonstrate the variation in both a horizontal and vertical direction across the entire process water dam.

17. The works approval holder must monitor the groundwater
- (a) prior to commencing commissioning activities;
 - (b) during commissioning activities as set out in condition 6
 - (c) during time limited operations as set out in condition 9

for concentrations of the identified parameters in accordance with Table 6

Table 6: Monitoring of ambient concentrations during environmental commissioning and time limited operations

Monitoring well location	Parameter ³	Unit	Frequency	Averaging period	Method
EM90, EM91, EM78, EM83 and EM84,	Standing water level (SWL) ^{1,2}	mAHD	Condition 17(a) At least one campaign	Spot sample	AS/NZS 5667.1 AS/NZS 5667.11
	pH ¹	-			
	Electrical conductivity (EC) @ 25°C ¹	µS/cm	Condition 17(b) every two months 17(c) every two months		
	Major ions: bicarbonate, calcium, carbonate, chloride, magnesium, potassium, sodium, sulfate, total dissolved solids ¹	mg/L			
	Metals and metalloids: aluminium, arsenic, cadmium, chromium (as CrVI and total Cr), cobalt, copper, iron, mercury, nickel, radium, radon, selenium, thallium, uranium, vanadium, zinc				
Groundwater Monitoring bores as set out in condition 2 (Figure 5)	Standing water level (SWL) ^{1,2}	mAHD	Quarterly ⁴	Spot sample	AS/NZS 5667.1; AS/NZS 5667.11
	pH ¹	pH units			
	Electrical conductivity (EC) @ 25°C ¹	µS/cm			
	Total dissolved solids ¹ (TDS)	Mg/L			
	Temperature				
	Major ions: alkalinity, bicarbonate, calcium, carbonate, chloride, magnesium, potassium, sodium, sulfate, total dissolved solids ¹	mg/L	Quarterly ⁴		
	Metals and metalloids: aluminium, arsenic, boron, cadmium, chromium (as CrVI and total Cr), cobalt, copper, iron, manganese, mercury, nickel, selenium, thallium, uranium, vanadium, zinc	µg/L			
	Ammonia, nitrate, nitrite, Total Kjeldahl Nitrogen [TKN], Total Phosphorus and Orthophosphate [as PO4])	mg/L			

Note 1: In-field, non-NATA accredited analysis permitted.

Note 2: SWL to be determined prior to the collection of other samples

Note 3: Level of detection is required to be sufficient to enable a comparison with the Australian and New Zealand Guidelines for Fresh & Marine Water Quality (ANZ 2018).

Note 4: Quarterly monitoring is undertaken at least 70 days apart.

18. The works approval holder must undertake the monitoring in Table 7 according to the specifications in that table.

Table 7: Bird monitoring requirements

Monitoring point	Parameter	Frequency	Averaging period ²	Method
Process Water Dam	Number and species (if able to be identified at time of inspection) of bird interacting ¹ with the Process Water Dam	Daily	Spot sample	Visual inspection

Note 1: 'Interacting' means birds that are in contact with the pond water (eating, drinking, swimming, or foraging etc.)

Note 2: denotes minimum averaging period, however anecdotal sightings of any birds interacting with the pond should also be recorded where possible.

19. The works approval holder must record the results of all monitoring activity required by conditions 16, 17 and 18.

Records and reporting (general)

20. The works approval holder must record the following information in relation to complaints received by the works approval holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:
- (a) the name and contact details of the complainant, (if provided);
 - (b) the time and date of the complaint;
 - (c) the complete details of the complaint and any other concerns or other issues raised; and
 - (d) the complete details and dates of any action taken by the works approval holder to investigate or respond to any complaint.
21. The works approval holder must maintain accurate and auditable books including the following records, information, reports, and data required by this works approval:
- (a) the works conducted in accordance with condition 1
 - (b) any maintenance of infrastructure that is performed in the course of complying with condition 1
 - (c) monitoring programmes undertaken in accordance with conditions 16, 17 and 18 and
 - (d) complaints received under condition 20.
22. The books specified under condition 21 must:
- (a) be legible;
 - (b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;
 - (c) be retained by the works approval holder for the duration of the works approval; and
 - (d) be available to be produced to an inspector or the CEO as required.

Definitions

In this works approval, the terms in Table 8 have the meanings defined.

Table 8: Definitions

Term	Definition
ANZG 2018	Means the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 <i>Water Quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.</i>
AS/NZS 5667.11	means the Australian Standard AS/NZS 5667.12 <i>Water quality - Sampling - Guidance on sampling of groundwaters.</i>
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V Division 3 of the EP Act.
discharge	has the same meaning given to that term under the EP Act.
emission	has the same meaning given to that term under the EP Act.
environmental commissioning	means the sequence of activities to be undertaken to test equipment integrity and operation, or to determine the environmental performance, of equipment and infrastructure to establish or test a steady state operation and confirm design specifications.
Environmental Commissioning Report	means a report on any commissioning activities that have taken place and a demonstration that they have concluded, with focus on emissions and discharges, waste containment, and other environmental factors.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
EP Act	<i>Environmental Protection Act 1986</i> (WA).
EP Regulations	<i>Environmental Protection Regulations 1987</i> (WA).

Term	Definition
ANZG 2018	Means the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
monthly period	means a one-month period commencing from the first day of a month until the last day of the same month
premises	the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map Figure 1 in Schedule 1 to this works approval.
prescribed premises	has the same meaning given to that term under the EP Act.
Suitably qualified engineer	means a person who: <ol style="list-style-type: none"> 1. holds a Bachelor of Engineering recognised by the Australian Institute of Engineers; and 2. has a minimum of five years of experience working in a relevant field of engineering.
time limited operations	refers to the operation of the infrastructure and equipment identified under this works approval that is authorised for that purpose, subject to the relevant conditions.
works approval	refers to this document, which evidences the grant of the works approval by the CEO under section 54 of the EP Act, subject to the conditions.
works approval holder	refers to the occupier of the premises being the person to whom this works approval has been granted, as specified at the front of this works approval.

END OF CONDITIONS

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in the map below (Figure 1).

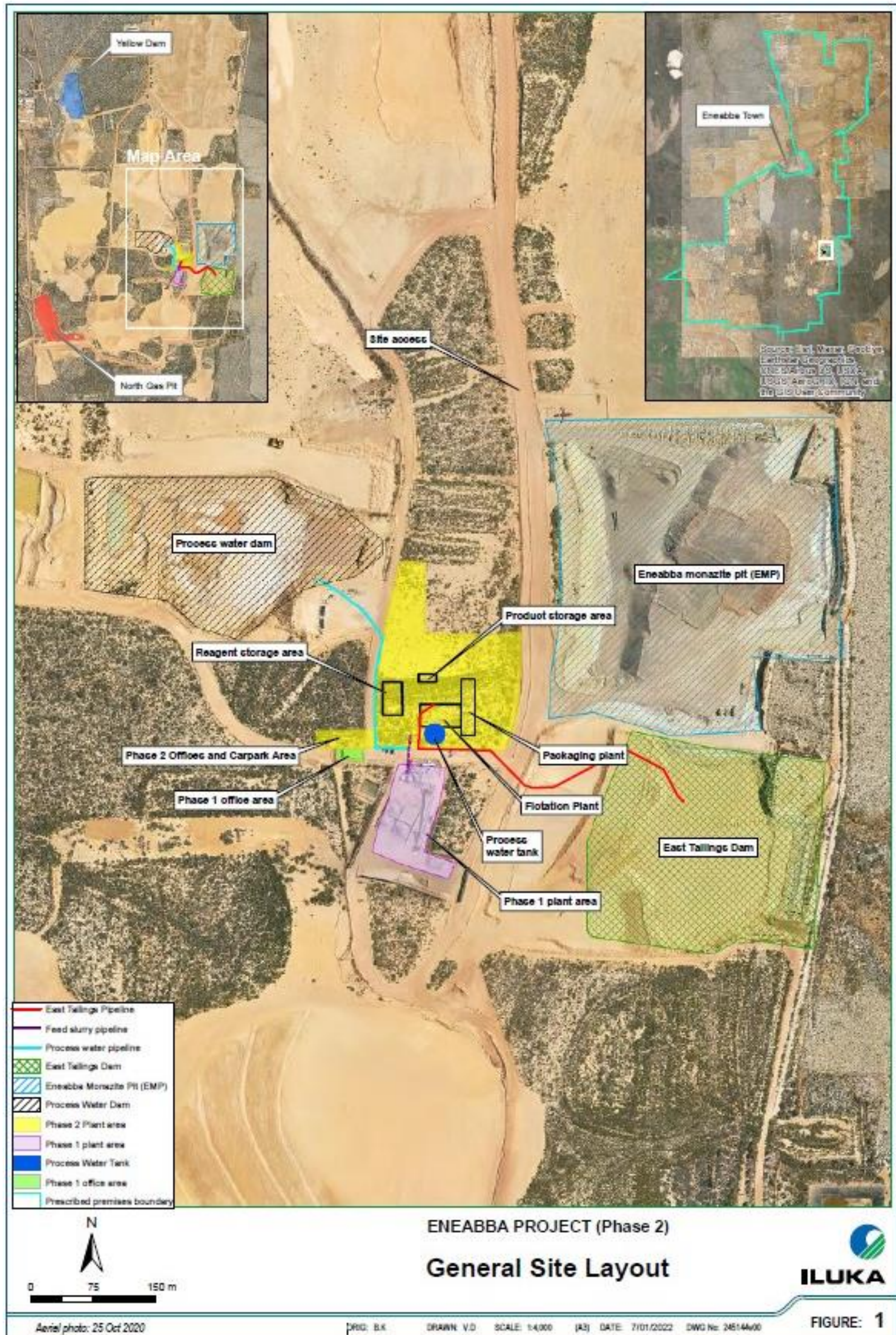


Figure 1 Map of the boundary of the prescribed premises (Phase 2 highlighted in yellow)

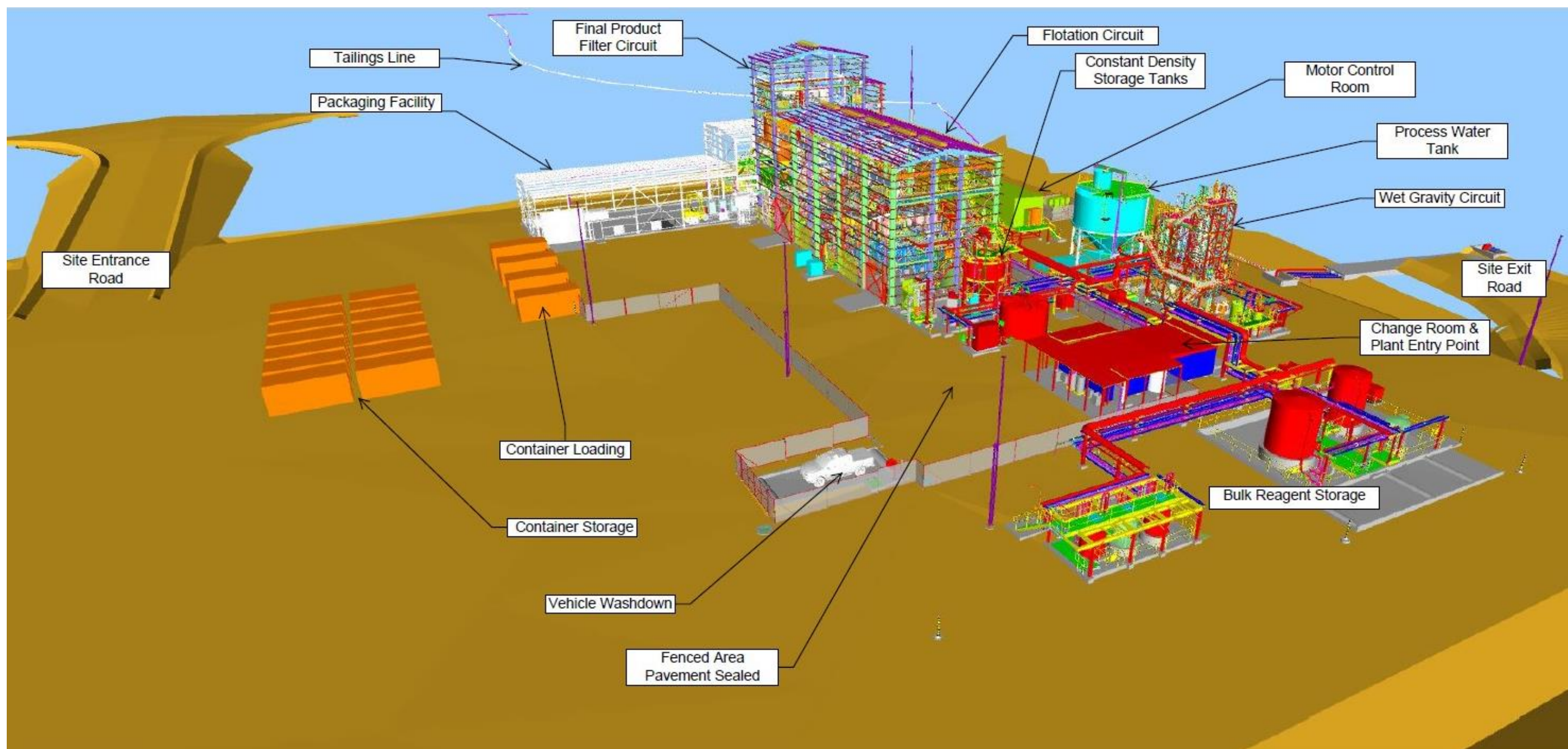


Figure 2 Plant 2 infrastructure layout

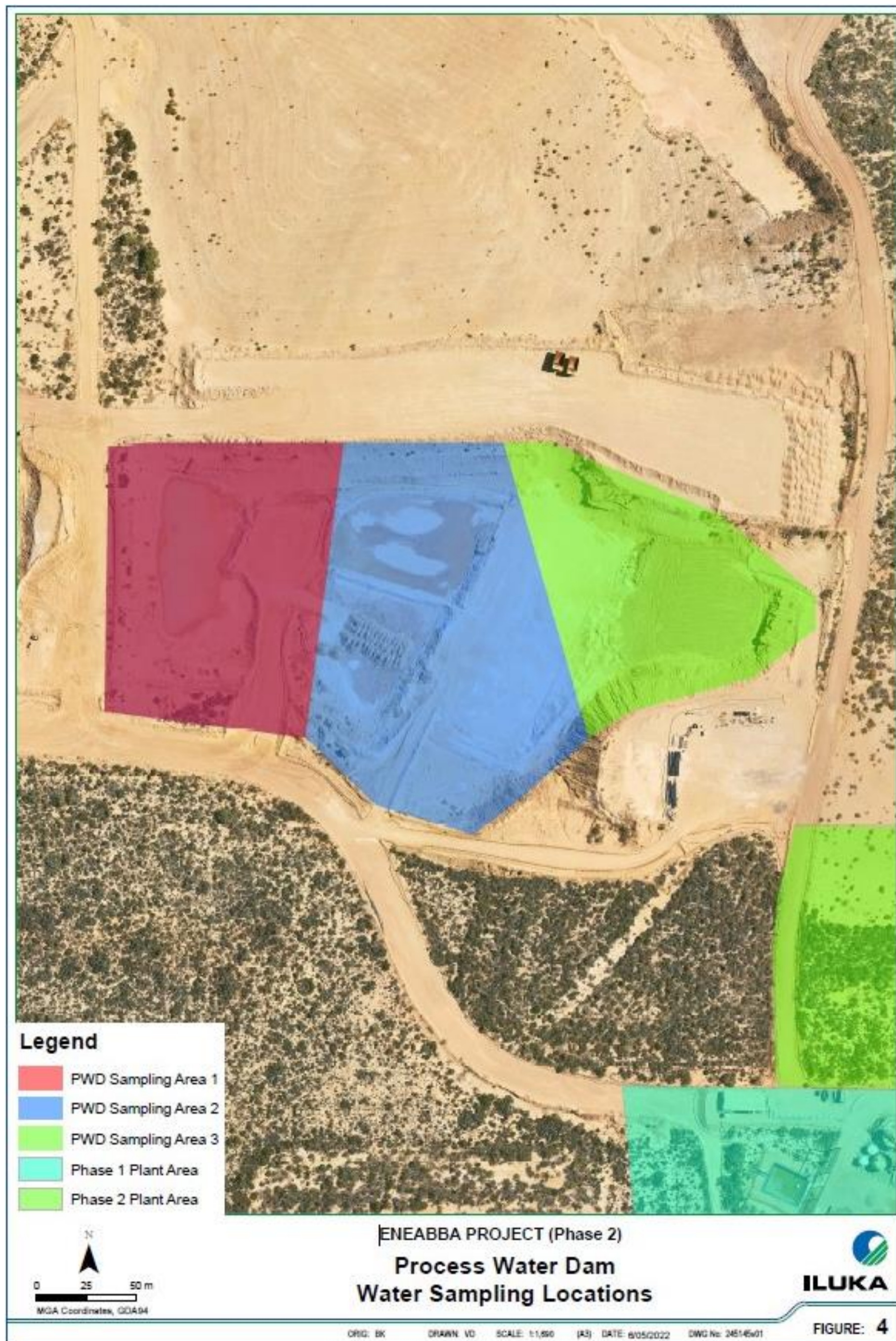


Figure 4: Process Water Dam sampling locations

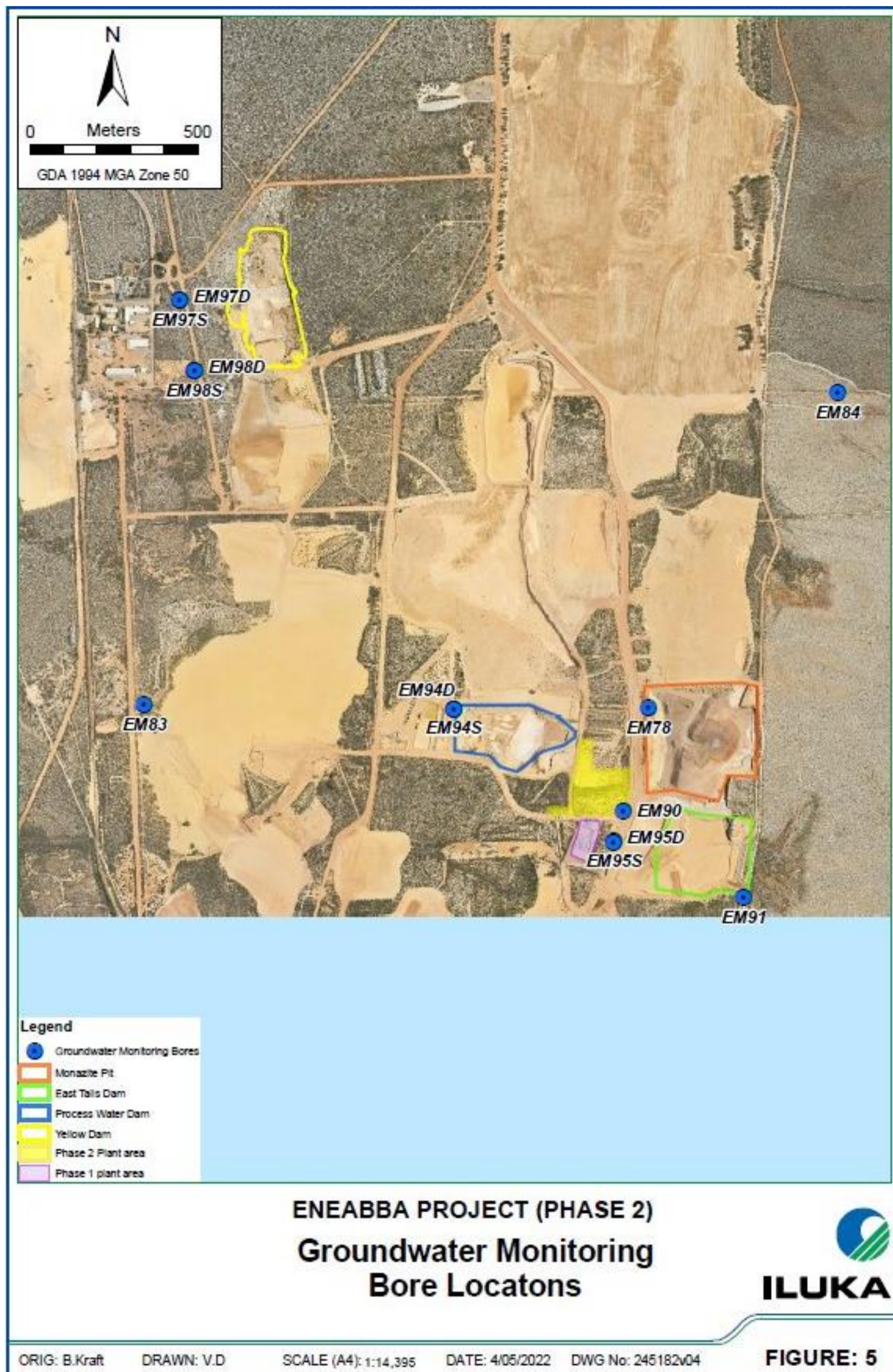


Figure 5: Groundwater Monitoring Bore locations