Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6468/2020/1
Works approval holder	Newcrest Operations Limited
ACN	009 221 505
Registered business address	600 St Kilda Road, Melbourne VIC 3004
DWER file number	DER2020/000499
Duration	25/03/2021 to 24/03/2024
Date of issue	25/03/2021
Date of amendment	15 November 2021
Premises details	Havieron Project East Pilbara, WA Legal description - Mining lease M45/1287 As defined by the coordinates in Schedule 2 of the Works Approval

Prescribed premises category description **(Schedule 1, *Environmental Protection Regulations 1987*)**	**Assessed design capacity**
Category 6: Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore	1,550,000 tonnes per year

This amended works approval is granted to the works approval holder, subject to the attached conditions, on 15 November 2021, by:

Melanie Bruckberger
Digitally signed by Melanie Bruckberger
Date: 2021.11.15 12:38:21 +08'00'

Melanie Bruckberger

A/MANAGER – RESOURCE INDUSTRIES

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

Works approval history

Date	Reference number	Summary of changes
25/03/2021	W6468/2020/1	Works approval granted.
15/11/21	W6468/2020/1	Works approval amendment to allow minor changes to cell construction specifications, capacity and freeboard.

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

Critical Containment Infrastructure and equipment

1. The works approval holder must construct the critical containment infrastructure:

(a) in accordance with the corresponding design and construction requirements; and

(b) at the corresponding infrastructure location; and

(c) within the corresponding timeframe,

as set out in Table 1.

Table 1: Critical containment infrastructure design and construction requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
1.	Evaporation Ponds – General Requirements	• 1x Raw water cell and 3x Hypersaline water cells to be constructed as per the design dimensions depicted in Schedule 3 • Overflow spillways to be constructed to allow a cascading design • Cells to be lined with 1.5mm thickness HDPE with hydraulic conductivity of at least 1 x 10^{-9} m/s and with a sandy clay liner cushion of minimum thickness of 150mm • To be constructed with a containment capacity equivalent to capture runoff from 1% Annual Exceedance Probability, 72 hour rainfall event. • Crest of embankment to be graded inwards to drain water into pond • Side slope of the embarkments to be 1(V):3(H)	Schedule 1, Figure 2 Schedule 3, Figures 3 and 4	Raw water cell 1 and Hypersaline Cell 1 to be constructed prior to time-limited operation.
2.	Raw Water Cell 1	• To be constructed to hold a maximum volume of 98,000m^3 • Approximate External crest RL 249.66; Approximate Base RL 246.96, TWL RL 248.86 (with 0.8m freeboard) with maximum total height 2700mm • Spillway at TWL RL as required	Schedule 3, Figures 3 and 4	To be constructed prior to time-limited operation.
3.	Hypersaline Water Cell 1	• To be constructed to hold a maximum volume of 24,120m^3 • Approximate External crest RL 248.6 Approximate Base RL 247.40, Approximate TWL RL 247.80(with minimum 0.8m freeboard) with maximum	Schedule 3, Figures 3 and 4	To be constructed prior to time-limited operation.

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		total height 1200mm • Spillway at TWL RL as required		
4.	Hypersaline Water Cell 2	• To be constructed to hold a maximum volume of 20,030m^3 • Approximate External crest RL 248.10; Approximate Base RL 246.80, Approximate TWL RL 247.30 (with 1m freeboard) with maximum total height 1300mm • Spillway at TWL RL as required	Schedule 3, Figures 3 and 4	-
5.	Hypersaline Water Cell 3	• To be constructed to hold a volume of 53,030m^3 • Approximate External crest RL 247.03; Approximate Base RL 245.78, Approximate TWL RL 246.23 (with 1m freeboard) with maximum total height 1250mm • Spillway at TWL RL as required	Schedule 3, Figures 3 and 4	-

2. The works approval holder shall immediately recover, or remove and dispose of, spills of environmentally hazardous materials including fuel, oil, or other hydrocarbons, whether inside or outside an engineered containment system.

Infrastructure and equipment

3. The works approval holder must construct and/or install the infrastructure and/or equipment:

(a) in accordance with the corresponding design and construction / installation requirements; and

(b) at the corresponding infrastructure location; and

(c) within the corresponding timeframe,

as set out in Table 2.

Table 2: Design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
1.	Dewatering Pipelines	• To be constructed of HDPE pipeline • Flow meters to be installed on dewatering pipelines from the box-cut to the evaporation ponds • must be located within a V drain of sufficient capacity to completely contain any spills from pipeline leakage or	Dewatering pipeline as shown in Schedule 1, Figure 1	Prior to commencement of time-limited operation

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		breach for a period equal to the time between routine inspections.		
2.	Stormwater Management system	• Stormwater diversion bunds to be constructed to divert surface water flows around the construction area • Suitable pond mitigation measures to be constructed where required, around the base of evaporation ponds embankment to avoid stormwater ponding • must take all reasonable and practicable measures to prevent stormwater run-off becoming contaminated by the activities and operations undertaken at the premises.	Within prescribed premises	N/A
3.	Water Cart	Available at all times at the premises during construction phase to suppress dust generated via earthworks, construction of the evaporation ponds, and vehicle and machinery movements.	Within the prescribed premises depicted in Schedule 1, Figure 1	N/A

Construction of Groundwater Monitoring Wells

4. The works approval holder must design, construct, and install groundwater monitoring wells in accordance with the requirements specified in Table 3.

Table 3: Groundwater monitoring well construction requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
1.	Monitoring Bores	<u>Well design and construction:</u> • To be designed and constructed in accordance with ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores. • Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination. Where temporary/seasonal perched features are present, wells must be nested, and the perched features individually screened. <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	Monitoring bores as shown in Schedule 1, Figure 1	Must be constructed, developed, and determined to be operational prior to the commencement of time-limited operation

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
		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. <u>Well construction log:</u> • Well construction details must be documented within a well construction log to demonstrate compliance with ASTM D5092/D5092M-16. 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. <u>Well development:</u> • 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. <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. <u>Well network map:</u> • a well location map (using aerial image overlay) must be prepared and include the location of the monitoring and their respective identification numbers.		

Baseline Groundwater Monitoring

5. The works approval holder must undertake baseline ambient groundwater monitoring in accordance with Table 4 once the monitoring wells required by condition 4 have been constructed.

6. All sample analysis must be undertaken by laboratories with current accreditation from the National Association of Testing Authorities (NATA) for the relevant parameters, unless otherwise specified, in Table 4.

Table 4: Groundwater monitoring of ambient concentrations

Monitoring well location	Parameter	Unit	Frequency	Method
Groundwater monitoring wells HAEPMB01, HAEPMB02 as depicted in Schedule 1, Figure 1	Standing water level[1]	mgbl	One off Sample	Spot sample, in accordance with AS/NZS 5667.11.
	pH[1]	pH unit		
	Electrical conductivity[1]	µcm/S		
	Total dissolved solids	mg/L		
	Total Hardness (as $CaCO_3$)			
	Total Alkalinity (as $CaCO_3$)			
	Calcium, Magnesium, Sodium, Potassium, Ammonia, Phosphate, Carbonate, Sulphate, Nitrate, Silica, Aluminium, Iron and Manganese			

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

Compliance reporting (critical containment infrastructure)

7. The works approval holder must within 30 calendar days of the Critical Containment Infrastructure identified by condition1 being constructed:

(a) undertake an audit of their compliance with the requirements of condition 1; and

(b) prepare and submit to the CEO a Critical Containment Infrastructure Report on that compliance.

8. The Critical Containment Infrastructure Report required by condition 7, must include as a minimum the following:

(a) certification by a geotechnical engineer or civil engineer that the items of critical containment infrastructure or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

(b) as constructed plans and a detailed site plan showing the location and dimensions for each item of critical containment infrastructure or component thereof, as specified in condition 1; and

(c) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Compliance Reporting (non-critical containment infrastructure)

9. The works approval holder must within 30 calendar days of an item of infrastructure required by condition 3 being constructed and/or installed:

(a) undertake an audit of their compliance with the requirements of condition 3; and

(b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.

10. The Environmental Compliance Report required by condition 9, must include as a minimum the following:

(a) certification by a qualified engineer that the items of infrastructure or component(s) thereof, as specified in condition 3, have been constructed in accordance with the relevant requirements specified in condition 3;

(b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 3; and

(c) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Compliance Reporting (Monitoring Wells)

11. The works approval holder must within 30 calendar days of the monitoring wells being constructed, submit to the CEO a well construction report and baseline groundwater monitoring data evidencing compliance with the requirements of conditions 4 to 6.

Environmental Commissioning Phase

12. The works approval holder may only commence environmental commissioning of an item of infrastructure listed in condition 13 once the Environmental Compliance Report has been submitted for that item of infrastructure in accordance with conditions 7 and 9 of this works approval.

13. Any environmental commissioning activities undertaken for an item of infrastructure specified in Table 5 may only be carried out:

(a) in accordance with the corresponding commissioning requirements; and

(b) for the corresponding authorised commissioning duration.

Table 5: Environmental commissioning requirements

Infrastructure	Commissioning requirements	Authorised commissioning duration
Dewatering Pipelines	• Pipelines to be hydrotested • All flow meters to be calibrated	For a period not exceeding 60 calendar days in aggregate.

Environmental Commissioning Report

14. 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 5.

15. The works approval holder must ensure the Environmental Commissioning Report required by condition 14 of this works approval includes the following:

(a) a summary of the environmental performance of each item of infrastructure or equipment as constructed or installed (as applicable), which at minimum includes records detailing the (for example):

(i) hydro-testing of dewatering pipelines;

(iii) calibration of flow meters; and

(iv) testing the system

(b) a review of the works approval holder's performance and compliance against the conditions of this works approval; and

(c) 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

16. The works approval holder may only commence time limited operations for an item of critical containment infrastructure identified in condition 1:

(a) where the infrastructure does require commissioning, the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 7 has been submitted to the CEO; and

(b) where the CEO has notified the works approval holder that the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 7 meets the requirements of that condition.

17. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 3:

(a) where the item of infrastructure is not authorised to undertake environmental commissioning, the Environmental Compliance Report as required by condition 9 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 conditions 12 and 13, the Environmental Commissioning Report for that item of infrastructure as required by condition 14 has been submitted by the works approval holder.

18. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 19 (as applicable):

(a) for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 16 or 17 for that item of infrastructure; or

(b) until such time as a licence for that item of infrastructure is granted in accordance with Part V of the *Environmental Protection Act 1986*.

Time limited operations requirements and emission limits

19. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 6 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 6.

Table 6: Infrastructure and equipment requirements during time limited operations

	Site infrastructure and equipment	Operational requirement	Infrastructure location
1.	Evaporation ponds (Raw water and Hypersaline water cells)	• A minimum 0.8m meter total freeboard (including and allowance for a 1% AEP 72-hour rain event) to be maintained within each cell at all times.	Figure 1 in Schedule 1
2.	Dewatering Pipelines	• Sufficient secondary containment to be maintained to completely contain any spills from pipeline leakage or breach for a period equal to the time between routine inspections.	Figure 1 in Schedule 1
3.	Stormwater management system	• Stormwater is to be managed so contaminated or potentially contaminated stormwater is captured to prevent release into the environment.	N/A

20. During time limited operations, the works approval holder must conduct visual inspections of the infrastructure specified in Table 7.

Table 7: Inspections of infrastructure

	Site infrastructure and equipment	Operational requirement	Infrastructure location
1.	Evaporation ponds (Raw water and Hypersaline water cells)	• Weekly embankment inspections to be carried out • Daily freeboard inspections to be carried out when evaporation ponds operate at maximum freeboard to confirm required freeboard capacity is available.	Figure 1 in Schedule 1
2.	Dewatering Pipelines	• Daily visual inspection to be carried out to ensure integrity of the pipelines.	Figure 1 in Schedule 1

Monitoring during time limited operations

21. The works approval holder must conduct a groundwater monitoring programme in accordance with the requirements specified in Table 8 and record the results of all monitoring activity conducted under that programme.

22. All sample analysis must be undertaken by laboratories with current accreditation from the National Association of Testing Authorities (NATA) for the relevant parameters, unless otherwise specified in Table 8.

Table 8: Ambient Groundwater Monitoring

Monitoring well location	Parameter	Unit	Frequency	Method
Groundwater monitoring wells HAEPMB01, HAEPMB02 as	Standing water level[1]	mbgl	Monthly[1]	Spot sample, in accordance with AS/NZS 5667.11.
	pH[1]	pH unit		
	Electrical conductivity[1]	µcm/S		

Monitoring well location	Parameter	Unit	Frequency	Method
depicted in Schedule 1, Figure 1	Total dissolved solids	mg/L	Annually	
	Total Hardness (as $CaCO_3$)			
	Total Alkalinity (as $CaCO_3$)			
	Calcium, Magnesium, Sodium, Potassium, Ammonia, Phosphate, Carbonate, Sulphate, Nitrate, Silica, Aluminium, Iron and Manganese			

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

23. The works approval holder must undertake monitoring of the water balance for Raw Water Cell 1 and Hypersaline Water Cell 1 each monthly during the time limited operations, and as a minimum record the following information:

(a) Site rainfall;

(b) Evaporation rate;

(c) Volume of water discharge into the ponds;

(d) Consumption of mine dewater for any mine operation activities such as dust suppression; and

(e) Calculated seepage loss.

Time-limited Operation Compliance reporting

24. 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 30 calendar days before the expiration date of the works approval, whichever is the sooner.

25. The works approval holder must ensure the report required by condition 24 includes the following:

(a) a summary of the time limited operations, including timeframes and amount of water discharged into the evaporation ponds;

(b) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable), which includes records detailing the:

(i) Inspection results obtained in accordance with condition 20;
(ii) groundwater monitoring conducted in line with the groundwater monitoring program in condition 23; and
(iii) water balance for Raw Water Cell 1 and Hypersaline Water Cell 1 for the duration of time limited operations in accordance with condition 23.

(c) a review of performance and compliance against the conditions of the works approval; and

(d) where the 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

Records and reporting (general)

26. 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.

27. 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 conditions 1 and 3;

(b) any maintenance of infrastructure that is performed in the course of complying with conditions 1, 3 and 4;

(c) monitoring programmes undertaken in accordance with conditions 22 and 23; and

(d) complaints received under condition 26.

28. The books specified under condition 27 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 9 have the meanings defined.

Table 9: Definitions

Term	Definition
AEP	means Annual Exceedance Probability
ARI	means Average Recurrence Interval
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 Water Quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.
annual period	a 12 month period commencing from 1 March until 28 February of the immediately following year.
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 *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
condition	a condition to which this works approval is subject under section 62 of the EP Act.
critical containment infrastructure	means the items of infrastructure listed in condition 1.
Critical Containment Infrastructure Report	means a report to satisfy the CEO that works of critical containment infrastructure have been constructed in accordance with the works approval.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V Division 3 of the EP Act.
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

Term	Definition
	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	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
HDPE	High Density Polyethylene
mbgl	means metres below ground level
monthly period	means a one-month period commencing from day 1 of a month until final day of the same month.
premises	the premises to which this licence applies, as specified at the front of this Works Approval 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.
RL	means Relative Level (m)
Suitably qualified geotechnical or civil engineer	means a person who; (a) holds a relevant tertiary academic qualification related to geotechnical or civil engineering; and (b) has a minimum of three years of experience working in the field of geotechnical and or civil 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).

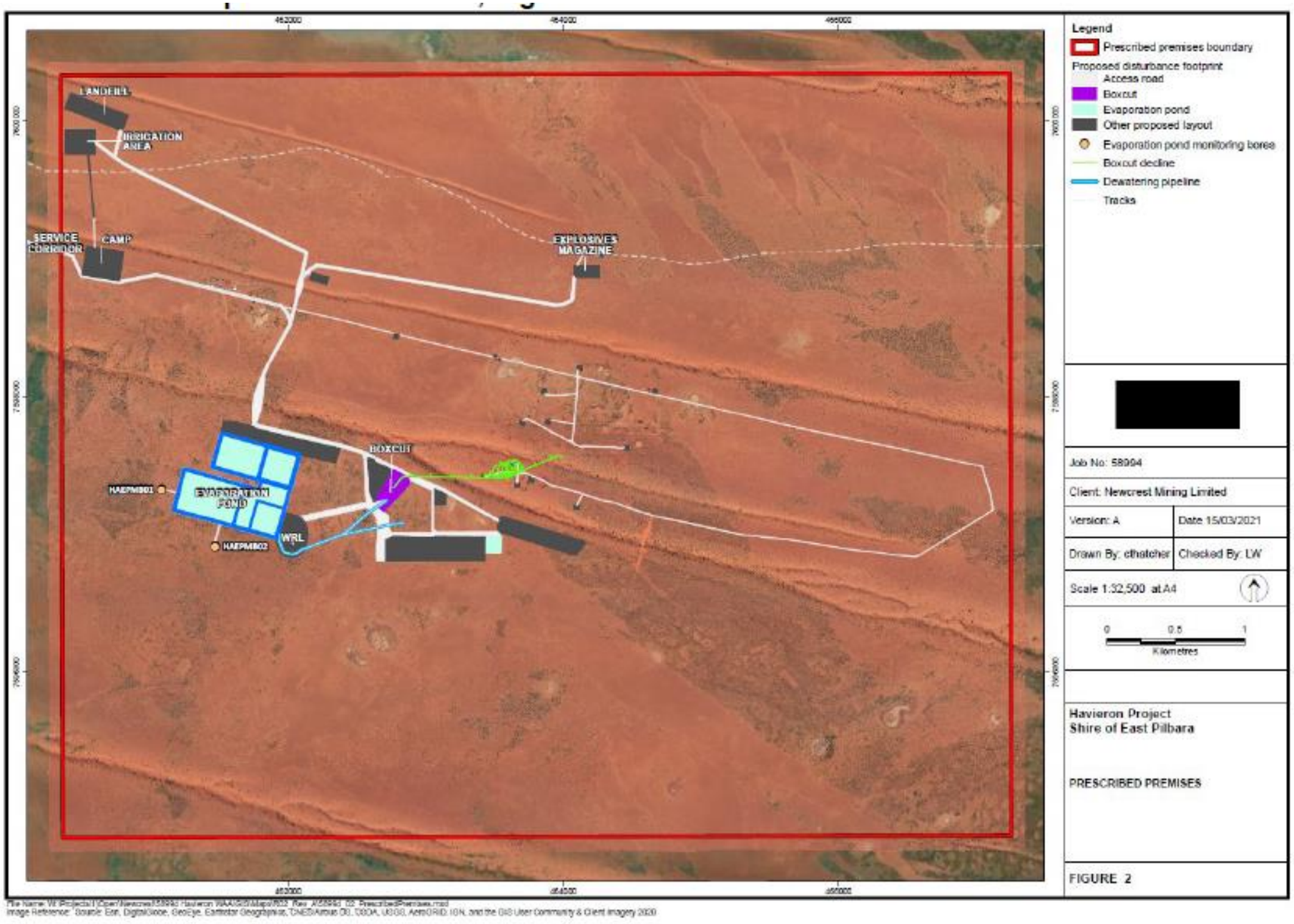

Figure 1: Map of the boundary of the prescribed premises

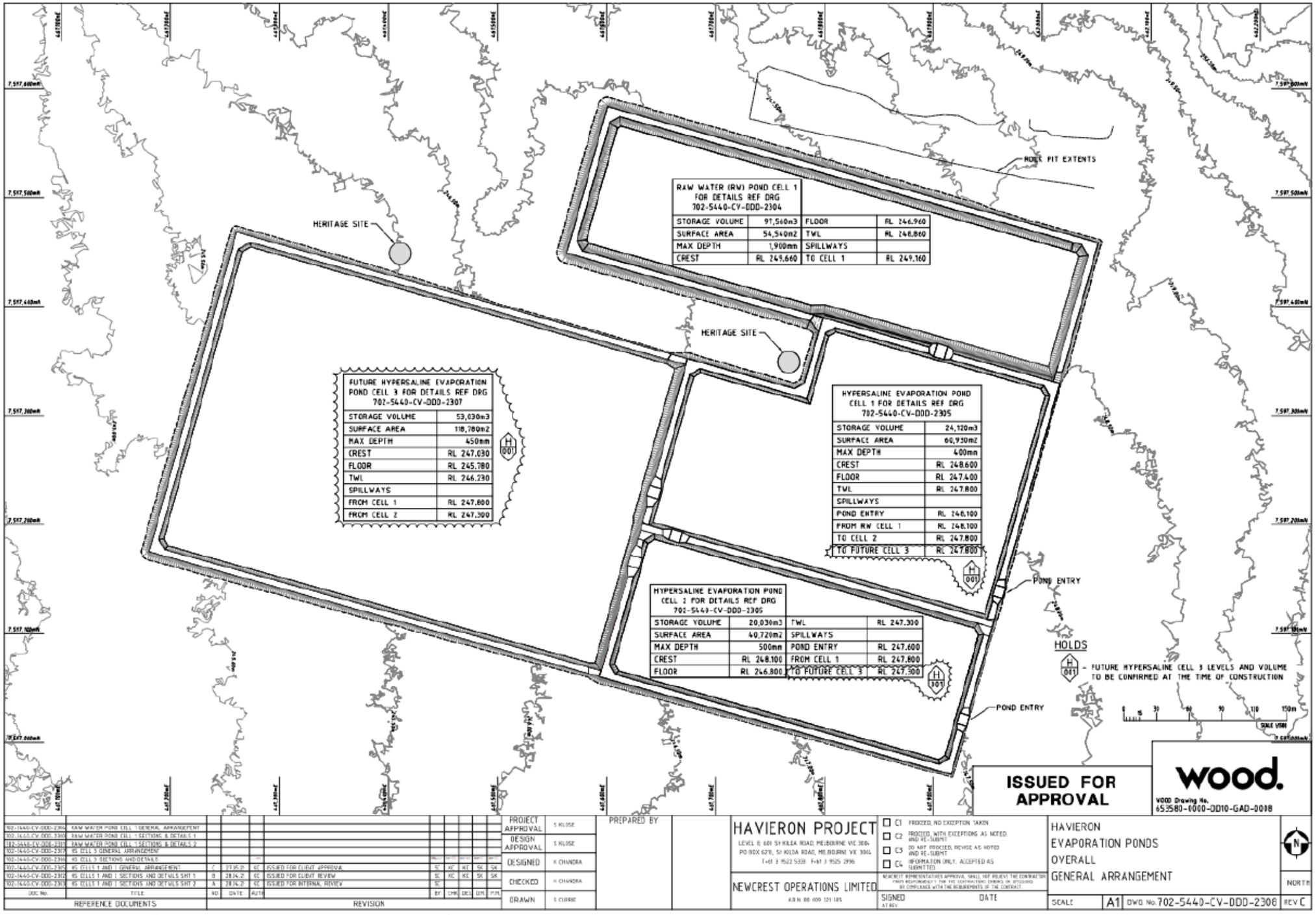

Figure 2: Evaporation Ponds Layout

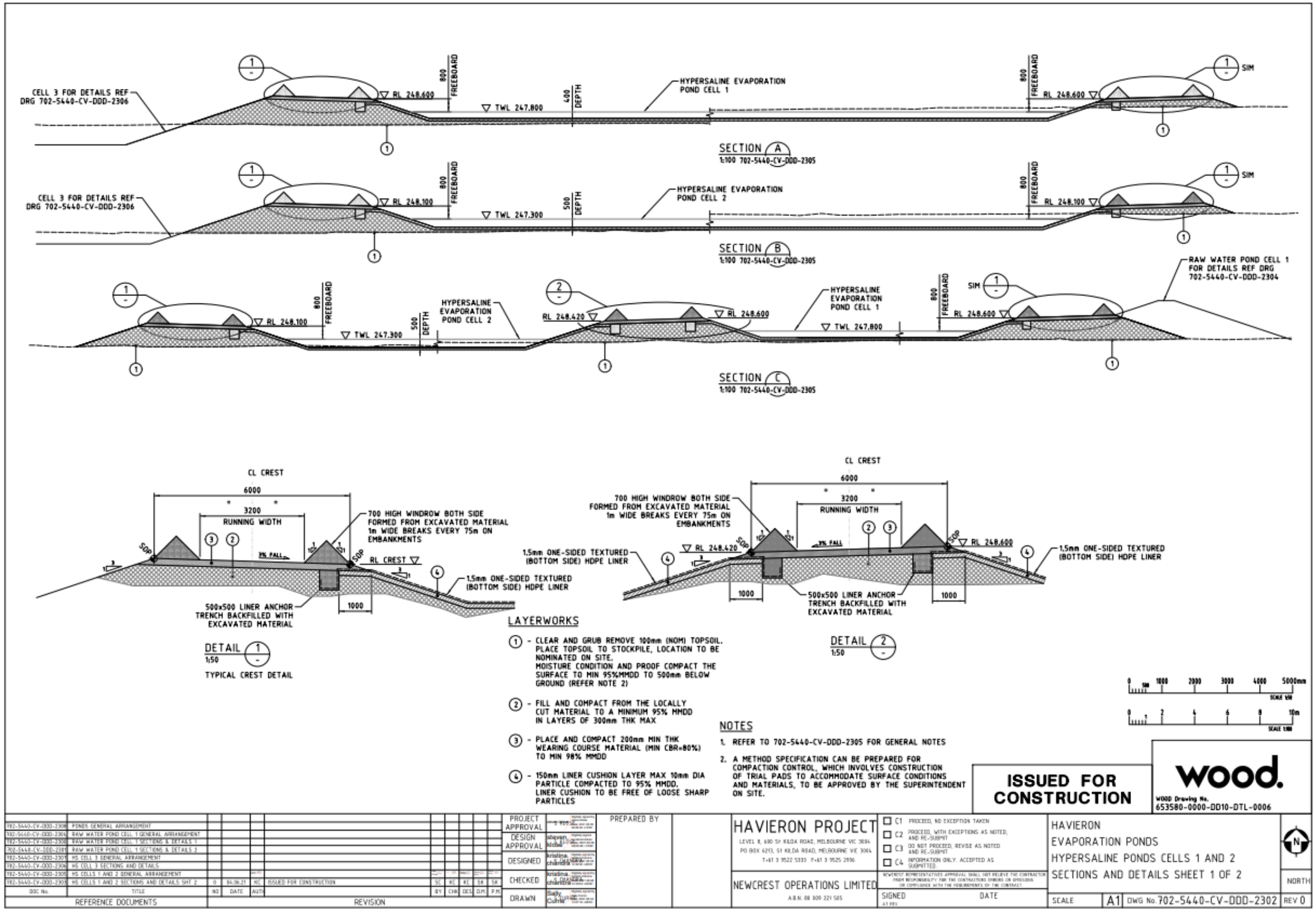

Figure 3: Raw Water Pond cross sections

Schedule 2: Premises boundary

The premises boundary is defined by the coordinates in Table 10.

Table 10: Premises boundary coordinates

Point	Easting	Northing
1	460349.14	7600326.58
2	467244.99	7600344.76
3	467256.31	7594810.58
4	460362.83	7594794.98