Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works Approval Number	W6051/2017/1
Works Approval Holder	Pilgangoora Operations Pty Ltd
ACN	616 560 395
Registered business address	Level 2, 146 Colin Street WEST PERTH WA 6005
DWER File Number	DER2017/000317
Duration	28/09/2017 to 27/09/2025
Date of amendment	22/08/2024
Premises details	Pilgangoora Lithium-Tantalum Project Mining Tenement M45/1256 and L45/417 MARBLE BAR WA 6760 As depicted in Schedule 1.

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed production / design capacity**
Category 5: Processing or beneficiation of metallic or non-metallic ore	5,000,000 tonnes per annum
Category 12: Screening etc. of material	525,000 tonnes per annum
Category 31: Chemical manufacturing	5,000 tonnes per annum
Category 52: Electric power generation	36 MWe
Category 54: Sewage facility	325 m^3/day
Category 64: Class II putrescible landfill site	20,000 tonnes per annum
Category 70: Screening etc. of material	1,000,000 tonnes per annum
Category 73: Bulk storage of chemicals etc.	1,476 kL (diesel fuel) 560m^3 (trailer mounted CNG) 560 kL (chemical storage) 1,572 kL (fixed LNG)

This amended Works Approval is granted to the Works Approval Holder, subject to the attached conditions, on 22/08/2024, by:

Jarrod Abrahams
Digitally signed by Jarrod Abrahams
Date: 2024.08.22 14:00:29 +08'00'

MANAGER, RESOURCE INDUSTRIES

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

Works approval history

Instrument	Issue Date	Description
W6051/2017/1	28/09/2017	Issue of original works approval for construction of the following: • Category 5: max. 2 mtpa capacity Processing Plant including Tailings Management Facility (TMF) Cell 2, Stage 1 only to 189.3m RL and tailings pipeline infrastructure; • Category 52: 15.7 MW (plus 2.2 MW standby) capacity Power Station; • Category 64: 100 tpa capacity putrescible and inert landfill facility; • Category 70: Crushing and Screening Facility, limited to 50, 000 tpa during construction; • Category 73: 1,036 m^3 in aggregate Bulk fuel and chemical storage; and • Category 85: 50 m^3/day throughput Wastewater Treatment Plant (WWTP).
W6051/2017/1	06/11/2017	Amendment 1 – DWER - initiated amendment of previous Condition 6 to authorise the commissioning of the Process Plant and Power Station for a period no longer than 2 months
W6051/2017/1	27/06/2018	Amendment 2 – comprising: Approval to construct: • TMF 1 Stage 1, Cell 1 in stages to max 189.3 mRL • TMF2 Stage 1, Cell 2 in stages to max 189.3 mRL • Increase in WWTP throughput (to 125m^3/day) and irrigation field expansion; • Construction of a putrescible landfill within the West Waste Dump; • Mobile crushing and screening plant (max. capacity 1,000,000tpa) for ore production; and Amendment to: • Change Prescribed Premises Category 5 to allow for the increased processing throughput of 1,000,000tpa to max. 3,000,000tpa. • Change Prescribed Premises Category 85 to Category 54 to allow for the increased throughput and discharge from the WWTP • Alteration of the location of the Category 52 power station and Category 73 fuel farm locations • Extension of the Prescribed Premises boundary to include L45/417
W6051/2017/1	16/10/2018	Transfer from Pilbara Minerals Limited (PML) to Pilgangoora Operations Pty Ltd (POPL) On 6 August 2018, Pilbara Minerals Limited implemented an internal restructure with assets (mining tenements, contracts, plant, equipment, permits and licenses) relating to the Pilgangoora Lithium-Tantalum Project transferred to Pilgangoora Operations Pty Ltd

Instrument	Issue Date	Description
W6051/2017/1	25/02/2019	Amendment 3 - Extension of commissioning periods in previous Condition 8 and Condition 9 for the Processing Plant, Power Station, Landfill, Mobile Crushing and Screening Plants, Bulk Diesel Fuel Facility, TMF Cells and WWTP. Authorised under Amendment Notice 3.
W6051/2017/1	18/10/2019	Amendment 4 – includes the following amendments: Stage 1 minor modifications include: • modifying the proposed design capacity of the process plant sediment pond; • removal of PWB004 and PWB005 groundwater monitoring bores; • reusing RO brine water for dust suppression; and • modifying the frequency of TMF groundwater monitoring bores. Stage 2 approval to construct: • second ore processing train alongside the existing approved train, which increases category 5 throughput from 2 Mtpa to 5 Mpta; • additional generator sets and replacement of existing sets at the Power Station resulting in category 52 production capacity of maximum 32.5 MWe • additional fuel and chemical storage facilities increase category 73 up to 1,476 kL (fuel) and 60 kL (chemical storage); and • addition of a temporary 150 m^3/day Wastewater Treatment Plant alongside the existing WWTP with an increase category 54 up to 275m^3/day. It also incorporates the following: • Update of the construction, commissioning and time limited operations conditions as per DWER's *Guideline: Industry Regulation Guide to Licensing June 2019*; and • Removal of previous conditions 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19 and 20 as this information has been provided and/or commissioning periods for this infrastructure is now completed and is operated under the Licence L9056/2017/1.
W6051/2017/1	04/08/2023	Amendment of the works approval expiry date from 27/09/2022 to 27/09/2025.
W6051/2017/1	27/11/2023	Amendment to works approval for the following: • Addition of high-intensity magnetic separation circuit; • Relocation of approved (yet to be constructed) stage 2 tailings thickener; • Addition of 5 ML process water pond; • Relocation and expansion of approved (yet to be constructed) stage 2 reagent storage yard; • Expansion of the existing west sediment trap;

Instrument	Issue Date	Description
		• Expansion of the existing spodumene handling pad and relocation / expansion of the existing associated sediment traps; • Expansion of the onsite power station generation capacity; • Addition of a trucked LNG storage facility; and • Addition of the Mid-stream Demonstration Research and Development (R&D) Plant.
W6051/2017/1	22/08/2024	Amendment to works approval for the following: • Construction of a 50 m^3 per day waste water treatment plant and an accompanying 1.8 ha spray field; • Relocate and reuse an existing crushing and screening plant to produce 525,000 tonnes per annum of construction materials (road base) for use at the Premises; and • Extend the Time Limited Operations period for the Stage 2 Temporary Construction WWTP and Stage 2 Temporary Construction WWTP Spray Irrigation Area.

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

Construction phase

Infrastructure and equipment

1. The works approval holder must:

(a) construct and/or install the infrastructure and/or equipment;

(b) in accordance with the corresponding design and construction / installation requirements as set out in Schedule 2, Table 7; and

(c) at the corresponding infrastructure location as defined in Schedule 2, Table 8.

Compliance reporting

2. The works approval holder must within 60 calendar days of the infrastructure and/or equipment required by Condition 1 being constructed:

(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.

3. The Environmental Compliance Report required by Condition 2, must include as a minimum the following:

(a) certification by a suitably qualified and experienced person that each item of 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 for each item of infrastructure or component of infrastructure 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.

Environmental commissioning phase

Environmental commissioning requirements and emission limits

4. The works approval holder may only commence environmental commissioning of the infrastructure listed in Table 1 once the Environmental Compliance Report has been submitted in accordance with condition 2 of this works approval.

5. Any environmental commissioning activities undertaken for an item of infrastructure specified in Table 1 may only be carried out:

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

(b) for the corresponding authorised commissioning duration.

Table 1: Environmental commissioning requirements

Infrastructure	Authorised commissioning duration	Commissioning requirements
Pilgan Processing Plant WWTP and Spray Field	180 calendar days (combined total for 3 sequenced commissioning phases; (1) Dry testing; (2) Wet testing; and (3) Ramp up to stable operation.)	As specified in Condition 6 of this Works Approval.

Monitoring during environmental commissioning

6. The works approval holder must monitor emissions during environmental commissioning in accordance with Table 2.

Table 2: Emissions and discharge monitoring during environmental commissioning

Discharge point / Monitoring location	Parameter	Target	Frequency	Averaging Period	Method
Discharge point: Pilgan Processing Plant WWTP Spray Field as shown in Schedule 2: Site Plans, Figure 17 Monitoring location: Effluent pipeline from Final Effluent Tank	Volume	-	Continuous (Phase 3 commissioning period)	-	Flow metering device
	pH[1]	≥6.5, ≤8.5	Monthly (Phase 3 commissioning period)	Spot Sample	AS/NZS 5667.1 AS/NZS 5667.10
	Biochemical Oxygen Demand (mg/L)	20 mg/L			
	Total Suspended Solids (mg/L)	-			
	Total Nitrogen (mg/L)	30 mg/L			
	Total Phosphorus (mg/L)	8 mg/L			
	Chlorine Residual (mg/L)	≥0.5 mg/L, ≤2.0 mg/L			
	E.coli (cfu/100mL)	<1000cfu/100mL			

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

7. The works approval holder must record the results of all monitoring activity required by Condition 6, Table 2 during environmental commissioning.

8. The works approval holder must submit to the CEO an Environmental Commissioning Report within 30 calendar days of the completion date of environmental commissioning.

9. The works approval holder must ensure the Environmental Commissioning Report required by Condition 8 of this works approval includes at minimum the following:

   (a) a summary of the commissioning activities undertaken, including timeframes and amount of influent processed;

   (b) a summary of results obtained during commissioning under Condition 6, Table 2;

   (c) a summary of the environmental performance of all plant and equipment as installed, which at minimum includes records detailing the:

      (i) commissioning of the systems; and

      (ii) testing the systems;

   (d) a review of performance against the works approval; and

   (e) where they have not been met, measures proposed to meet the manufacturer's design specification and conditions of this works approval, together with timescales for implementing the proposed measures.

Time limited operations phase

Commencement and duration

10. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 1, Table 7:

   (a) where the item of infrastructure is not authorised to undertake environmental commissioning, the Environmental Compliance Report as required by condition 2 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 4, the Environmental Commissioning Report for that item of infrastructure as required by condition 8 has been submitted by the works approval holder.

11. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 1 (as applicable):

   (a) for a period not exceeding 180[1] calendar days from the day the works approval holder meets the requirements of condition 10 (as applicable) 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*, if one is granted before the end of the period specified in condition 11(a).

   Note 1: The works approval holder may exceed 180 calendar days when conducting time limited operations at the Mobile Crushing and Screening Plant (for construction), Stage 2 Temporary Construction WWTP and Stage 2 Temporary Construction WWTP Spray Irrigation Area, but must not exceed more than 270 calendar days.

Time limited operations requirements and emission limits

12. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 3 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 3.

Table 3: Infrastructure and equipment requirements during time limited operations

Site infrastructure and equipment	Operational requirement	Infrastructure location
P1000 Infrastructure		
High-intensity magnetic separation circuit	Use and maintenance of controls as per Condition 1, Table 7	Schedule 2: Site Plans, Figure 12
Tailings thickener relocation	Use and maintenance of controls as per Condition 1, Table 7	Schedule 2: Site Plans, Figure 12
Additional 5 ML Process Water Pond	Use and maintenance of controls as per Condition 1, Table 7	Schedule 2: Site Plans, Figure 12
Reagent Storage relocation and expansion	Use and maintenance of controls as per Condition 1, Table 7 All strong acid and base storage areas include pH monitoring of sumps to alert operators to reagent spillages	Schedule 2: Site Plans, Figure 12
Sediment pond expansion and site drainage improvements	Use and maintenance of controls as per Condition 1, Table 7 Effective 4.5 hour retention time for the structure in a 1% AEP event	Schedule 2: Site Plans, Figure 12
Concentrate handling pad expansion	Use and maintenance of controls as per Condition 1, Table 7 Regular removal of loose material from the engineered surface (cement stabilized pads) to be retained and extended across the new footprint	Schedule 2: Site Plans, Figure 12
Power Station Expansion	Use and maintenance of controls as per Condition 1, Table 7 Spill kits are located at various locations including diesel store, reagents store and plant maintenance areas to enable quick response to leaks and minor spills of hydrocarbons and chemicals Fully enclosed metal storage bin for used oil contaminated parts which are collected for disposal offsite The power station engine hall to have gas detectors installed as necessary to detect leakage and alarm / shut-down the facility	Schedule 2: Site Plans, Figure 12
LNG unload and storage	Spill kits are located at various locations	Schedule 2: Site Plans,

Site infrastructure and equipment	Operational requirement	Infrastructure location
	including diesel store, reagents store and plant maintenance areas to enable quick response to leaks and minor spills of hydrocarbons and chemicals The LNG storage facility to have gas detectors installed as necessary to detect leakage and alarm / shut-down the facility	Figure 12
Mid-Stream Demonstration Plant		
Pyrometallurgical Processing: • Rotary Dryer; • Thermal Oxidiser; • Calix Flash Calciner; and • Acid Roast.	Use and maintenance of controls as per Condition 1, Table 7 Latent moisture in the spodumene concentrate (~15% by weight) mitigates generation of excessive dust in the operation when it is transferred by the side-tipper truck onto the concrete pad	Schedule 2: Site Plans, Figure 12
Hydometallurgical Processing: • Water Leach; • Primary Filter; • Impurity Removal; • Precipitation; and • Product Filter.	Use and maintenance of controls as per Condition 1, Table 7	Schedule 2: Site Plans, Figure 12
Product Drying and Packaging	Use and maintenance of controls as per Condition 1, Table 7 Packing circuit located inside closed storage shed Re-collected product to be manually collected and re-bagged The product bagging area will be positively pressurised and ventilated with filtered external air – keeping outdoor particulates out of the bagging area. This pressurised air will spill to the product storage area through filtered louver panels and will be regularly inspected, cleaned and replaced Run-off from the facility roof catchment will be directed to a nearby drain arrangement to the south of the facility Mechanical dry re-collection of any spilled material (a significant advantage due to the very low water solubility of the final product) Should external spillage occur during the loading operation, similarly a dry clean-up strategy will be employed, with the re-collected material transferred via bobcat back to the plant for re-processing	Schedule 2: Site Plans, Figure 12

Site infrastructure and equipment	Operational requirement	Infrastructure location
Reagent and Water Services	Use and maintenance of controls as per Condition 1, Table 7 Stored within the final product storage shed	Schedule 2: Site Plans, Figure 12
Pilgan Processing Plant WWTP		
WWTP	Use and maintenance of controls as per Condition 1, Table 7.	Schedule 2: Site Plans, Figure 3
Spray Irrigation area		
Stage 2 Temporary Construction WWTP		
WWTP	Use and maintenance of controls as per Condition 1, Table 7	Schedule 2: Site Plans, Figure 3
Spray Irrigation area		Schedule 2: Site Plans, Figure 3 and Figure 9
Mobile Crushing and Screening Plant		
Mobile Crushing and Screening Plant (for construction)	Use and maintenance of controls as per Condition 1, Table 7.	Schedule 2: Site Plans, Figure 3 and Figure 10

13. During time limited operations, the works approval holder must ensure that the emission from the discharge point listed in Table 4 do not exceed the corresponding limits when monitored in accordance with condition 14.

Table 4: Emissions and discharges limits during time limited operations

Discharge point	Discharge point height	Parameter	Limit
Thermal Oxidiser stack	20 metres above ground level	NO_x	<350 mg/m^3
		TSP	<50 mg/m^3
		PM_{10}	<50 mg/m^3
Acid Roast Scrubber stack	20 metres above ground level	SO_3	<100 mg/m^3
		H_2SO_4	<100 mg/m^3
		TSP	<50 mg/m^3
		PM_{10}	<50 mg/m^3

Monitoring during time limited operations

14. The works approval holder must monitor emissions during time limited operations in accordance with the requirements set out in Table 5.

Table 5: Emissions and discharges monitoring during time limited operations

Discharging point	Monitoring location	Parameter	Frequency	Averaging Period	Unit[1]	Method[2,3]
Temporary Construction WWTP Spray Irrigation Area Site Map as shown in Figure 9	Effluent pipeline from Final Effluent Tank	Volume	Continuous	Annual	m^3	Flow metering device
		Biochemical Oxygen Demand	Quarterly	Spot sample	mg/L	AS/NZS 5667.1 AS/NZS 5667.10
		Total Suspended Solids	Quarterly	Spot sample	mg/L	
		Total Nitrogen	Quarterly	Spot sample	mg/L	
Pilgan Processing Plant WWTP Spray Field area as shown in Schedule 2: Site Plans, Figure 17		Total Phosphorus	Quarterly	Spot sample	mg/L	
		Chlorine Residual	Quarterly	Spot sample	mg/L	
		pH	Quarterly	Spot sample	pH units	
		E.coli	Quarterly	Spot sample	cfu/100mL	
Mid-Stream Demonstration Plant	Thermal Oxidiser stack	TSP	Two separate sample events separated by at least one week within the first three months of emissions through the discharge point	60 minutes	mg/m^3 m^3/s	USEPA Method 5 or 17
		PM_{10}				USEPA Method 210A
		NO_x				USEPA Method 7E
		CO				USEPA Method 10B
		Flow rate			m^3/s	USEPA Method 2
	Acid Roast Scrubber stack	TSP	Two separate sample events separated by at least one week within the first three months of emissions through the discharge point	60 minutes	mg/m^3 m^3/s	USEPA Method 5 or 17
		PM_{10}				USEPA Method 201A
		SO_3				USEPA Method 8
		H_2SO_4				USEPA Method 8
		Flow rate			m^3/s	USEPA Method 2

Note 1: All units are referenced to STP dry

Note 2: Duplication sample runs conducted consecutively on the sampling day
Note 3: Where any USEPA method refers to USEPA Method 1 for the sampling plane, this must be read as referral to AS 4323.1

15. The works approval holder must record the results of all the monitoring activity required by condition 14.

Compliance reporting

16. The works approval holder must submit to the CEO a report on the time limited operations within 60 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.

17. The works approval holder must ensure the report required by Condition 16 of this works approval includes the following:

(a) a summary of the time limited operations, including timeframes and the amount of material processed;

(b) a summary of monitoring parameter results obtained during time limited operations under condition 14;

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

(i) Spodumene processed; and

(ii) Lithium Phosphate produced;

(d) a review of operational performance and compliance against the conditions of the works approval and the Environmental Commissioning Report; and

(e) where the manufacture'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.

Records and reporting (general)

18. 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 of 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.

19. 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 condition 6 and 14; and

(d) complaints received under condition 18.

20. The books specified under condition 19 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.

21. The works approval holder must ensure all water samples collected in accordance with condition 6 and condition 14 are analysed by a laboratory with current NATA accreditation for the parameters being measured, unless otherwise indicated in the relevant table.

Notification

22. The works approval holder must, within 7 days of becoming aware of any non-compliance with conditions of this works approval, notify the CEO in writing of that non-compliance and include in that notification the following information:

(a) which condition was not complied with;

(b) the time and date when the non-compliance occurred;

(c) if any environmental impact occurred as a result of the non-compliance and if so what that impact is and where the impact occurred;

(d) the details and result of any investigation undertaken into the cause of the noncompliance;

(e) what action has been taken and the date on which it was taken to prevent the non-compliance occurring again; and

(f) what action will be taken and the date by which it will be taken to prevent the non-compliance occurring again.

Definitions

In this works approval, the terms in Table 6 have the meanings defined.

Table 6: Definitions

Term	Definition
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	means a condition to which this Works Approval is subject under s.62 of the EP Act.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
Discharge	has the same meaning given to that term under the EP Act.
DWER	Department of Water and Environmental Regulation.
Emission	has the same meaning given to that term under the EP Act.
environmental commissioning	means a period of time to allow for stabilisation and optimisation of the process following input of raw materials under operation conditions (including emissions) on the works approval for the limited period of operations requested.
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 Works have been constructed in accordance with the works approval.
EP Act	means the *Environmental Protection Act 1986* (WA).
EP Regulations	means the *Environmental Protection Regulations 1987* (WA).
Inspector	means an inspector appointed by the CEO in accordance with s.88 of the EP Act.
LNG	Liquified Natural Gas
m^3	metres cubed
mtpa	million tonnes per annum
NATA	National Association of Testing Authorities, Australia.
Pollution	has the same meaning given to that term under the EP Act.

Term	Definition
Premises	refers to the premises to which this Works Approval applies, as specified at the front of this Works Approval and as shown on the map in Schedule 1 to this Works Approval.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Spot sample	means a discrete sample representative at the time and place at which the sample is taken.
time limited operations	refers to the limited operation of the primary activities described in Schedule 3 of this works approval, at locations shown in Table 8 in Schedule 3 of this works approval, subject to the conditions, whilst a licence application is being assessed.
TMF	Tailings Management Facility.
TMF 1	Tailings Management Facility Cell 1
TMF 1 Stage 1A	Tailings Management Facility Cell 1, Stage 1A to final RL of 185.3 m
TMF 1 Stage 1B	Tailings Management Facility Cell 1, Stage 1B to final RL of 189.3 m
TMF 2	Tailings Management Facility Cell 2
TMF 2 Stage 1A	Tailings Management Facility Cell 2, Stage 1A to final RL of 185.3 m
TMF 2 Stage 1B	Tailings Management Facility Cell 2, Stage 1B to final RL of 189.3 m
tpa	tonnes per annum
Waste	has the same meaning given to that term under the EP Act.
WWTP	Wastewater Treatment Plant
Works	refers to the Works described in Schedule 2, at the locations shown in Schedule 1 of this Works Approval to be carried out at the Premises, subject to the Conditions.
Works Approval	refers to this document, which evidences the grant of the works approval by the CEO under s.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.

Schedule 1: Maps

Premises Map

The Premises is shown in the map below.

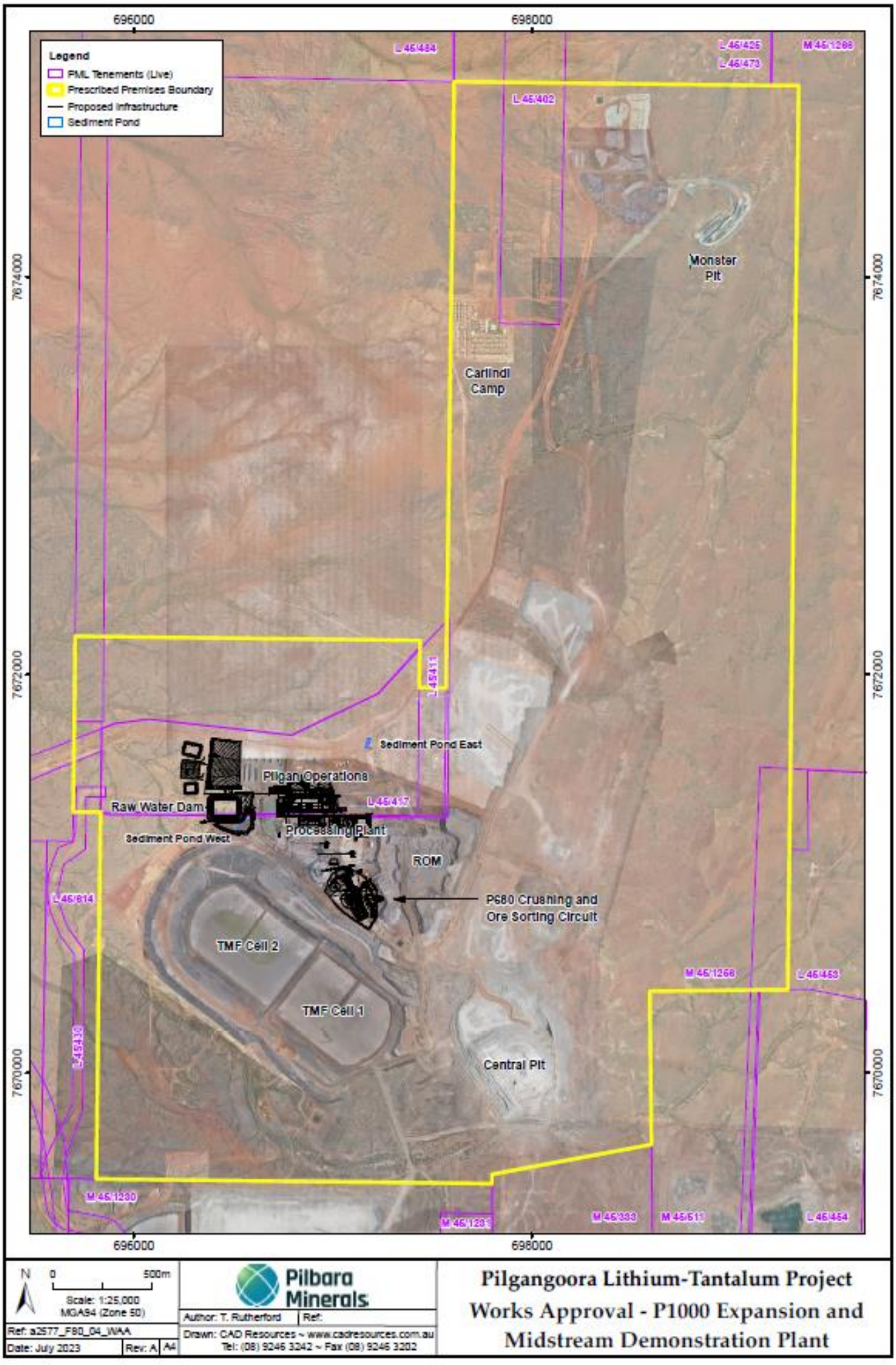


Figure 1: Prescribed Premises Boundary

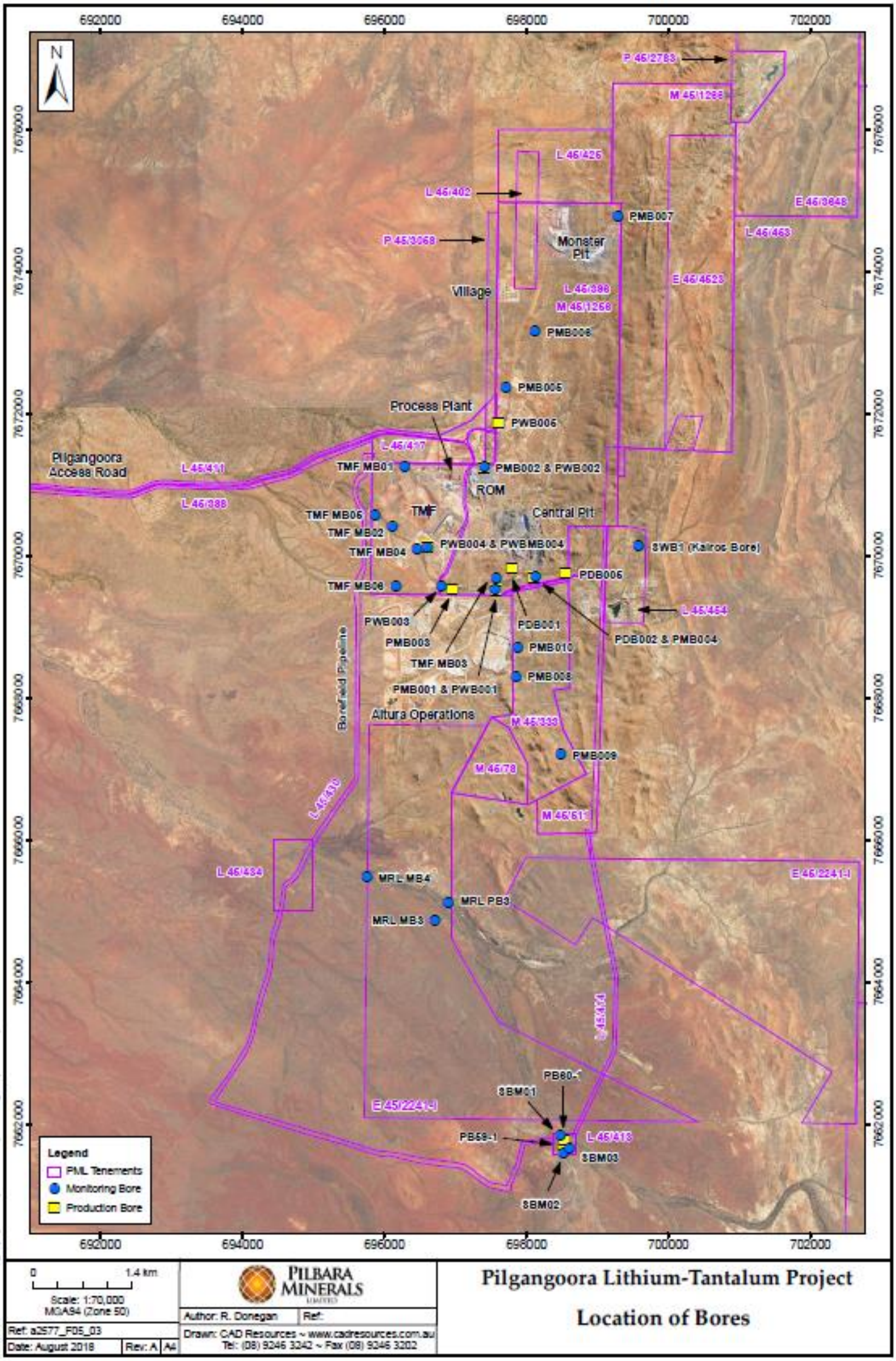


Figure 2: Ambient Groundwater Monitoring Bores

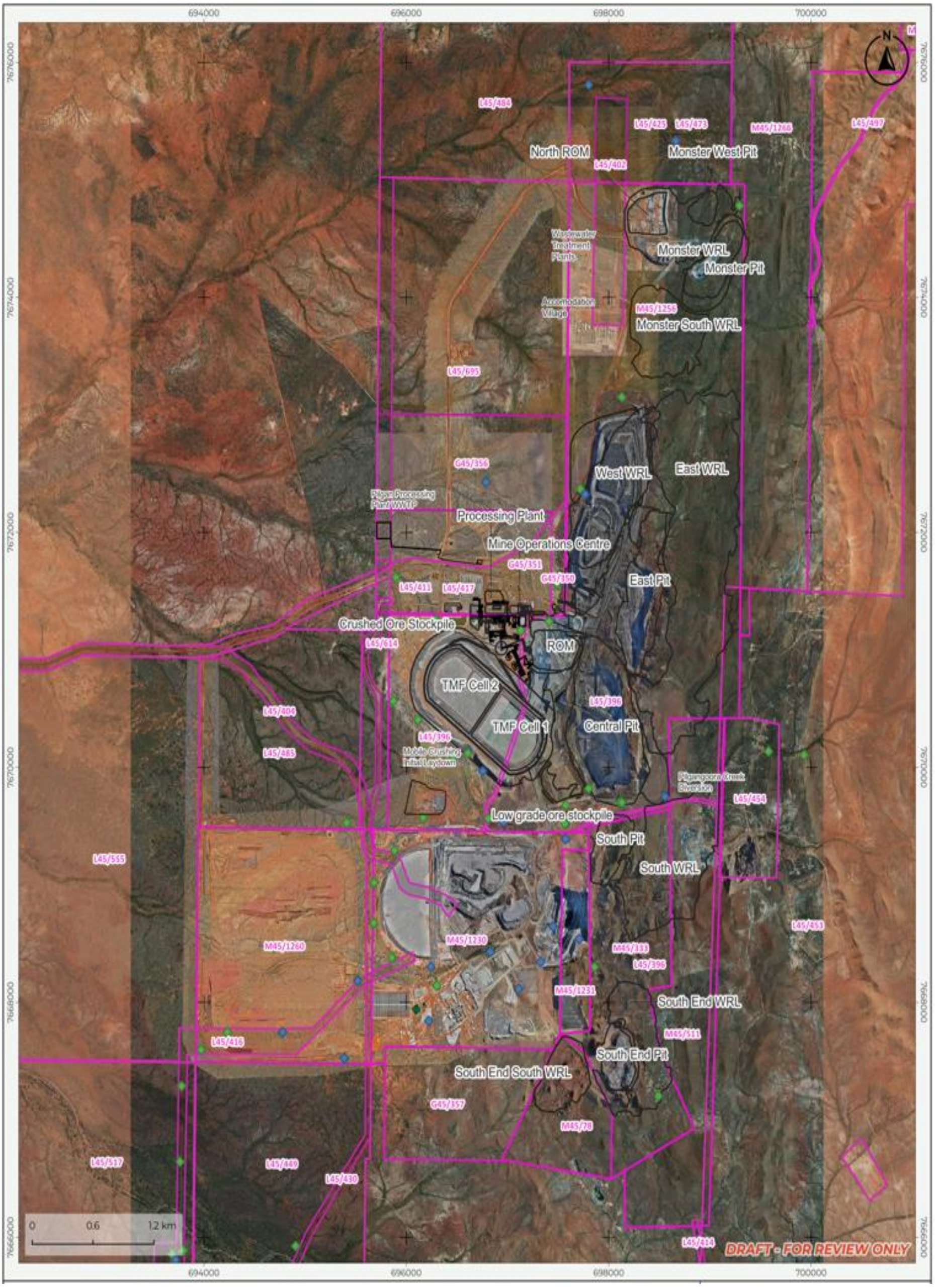


Figure 3: Key Infrastructure Site Layout

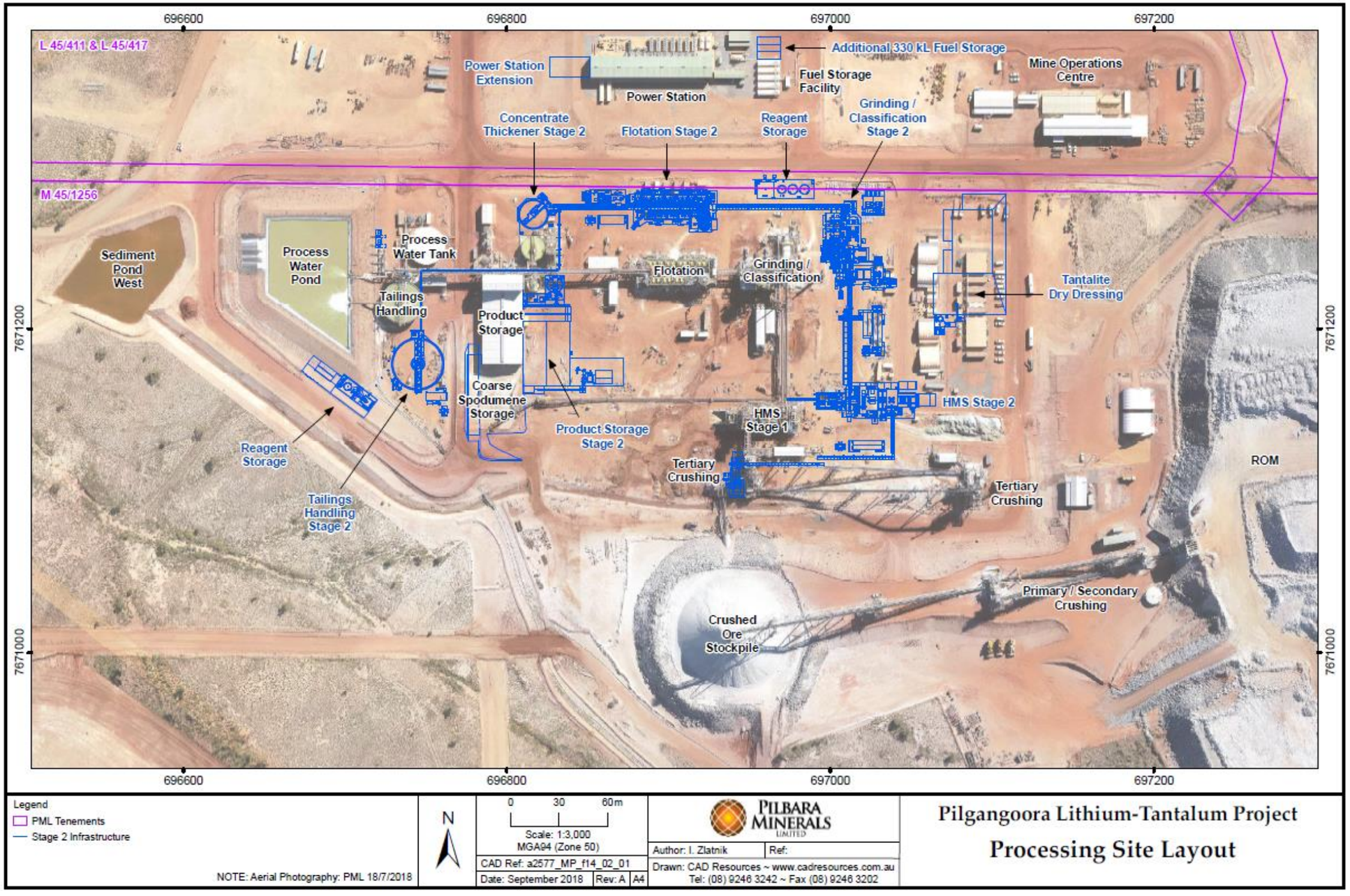


Figure 4: General Arrangement Plant Layout

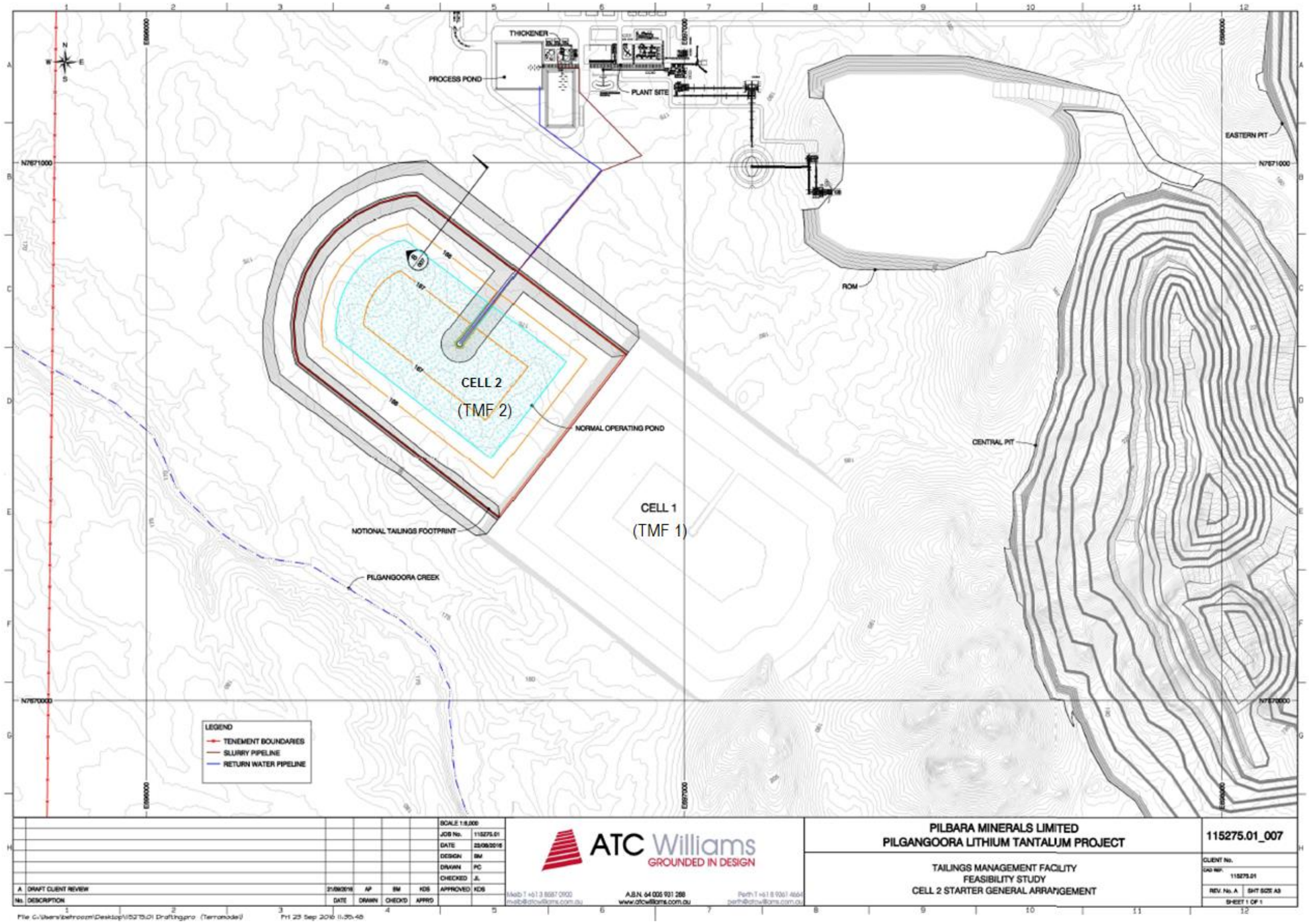
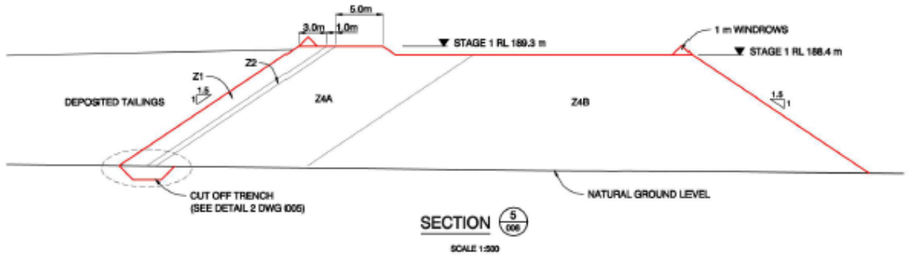
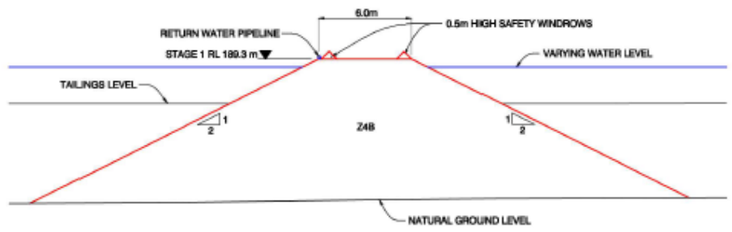


Figure 5: TMF general arrangement



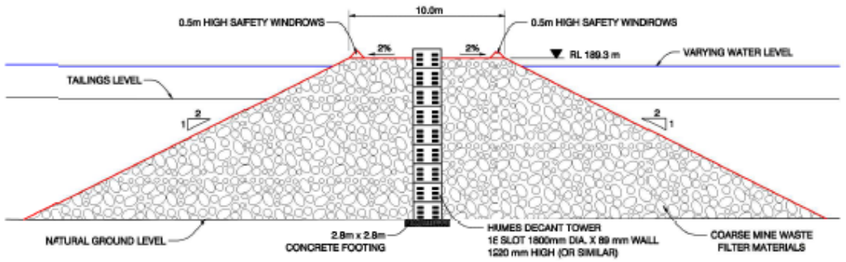
SECTION 5 / 006

SCALE 1:500



SECTION 6 / 006

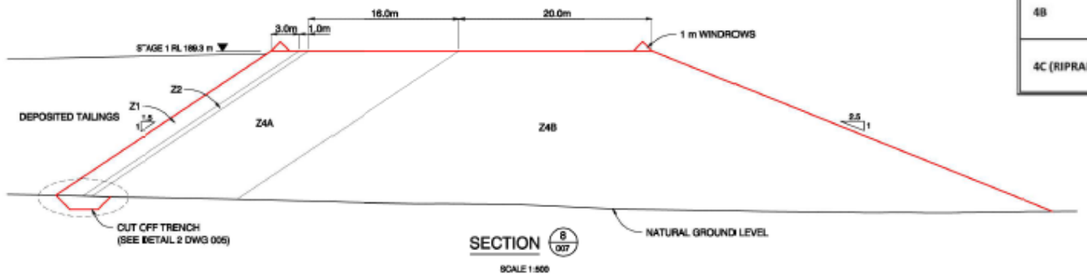
SCALE 1:300



SECTION 7 / 006

SCALE 1:300

CONSTRUCTION MATERIAL DESCRIPTION			
ZONE	MATERIAL	SOURCE	PLACEMENT AND COMPACTION
1	CLAYEY SAND	BORROW AREA	PLACE IN LAYERS 300mm MAX THICKNESS, COMPACT TO NOT LESS THAN 95% SMDD, MOISTURE CONTENT TO BE OMC-2% TO OMC+2%
1A	TAILINGS - SANDY SILT (ML)	SUITABLE DEPOSITED TAILINGS	COMPACTED LAYER THICKNESS NOT GREATER THAN 250mm, MOISTURE CONTENT OMC-3% TO OMC+3% 95% SMDD
1B	TAILINGS - SANDY SILT (ML)	SUITABLE DEPOSITED TAILINGS	MAXIMUM THICKNESS 0.5m TRUCK ROLLES - MINIMUM 4 PASSESS WITH A 8 TONNE ROLLER
2	SANDY FILTER	ALLUVIAL WASTE DUMP	PLACE IN LAYERS 300mm MAX THICKNESS, COMPACT TO NOT LESS THAN 90% SMDD, MOISTURE CONTENT TO BE OMC-2% TO OMC+2%
4A	MINE SPOIL	OPEN CUT OPERATION	MAXIMUM THICKNESS 0.5m IMPACT ROLLER (DETAILS TO BE ADVISED)
4B	MINE WASTE ROCK	OPEN CUT OPERATION	END TIP AND SPREAD TO 2.0m LAYERS, COMPACTION NOT REQUIRED
4C (RIPRAP)	SELECTED MINE WASTE ROCK	OPEN CUT OPERATION	LOOSE PLACEMENT



SECTION 8 / 007

SCALE 1:500

SCALE AS SHOWN
JOB No. 115275.01
DATE 21/09/2016
DESIGN SM
DRAWN AP
CHECKED JL
APPROVED KDS

A DRAFT CLIENT REVIEW 21/09/2016 AP SM KDS

No. DESCRIPTION DATE DRAWN CHECKD APPRD

ATC Williams
GROUNDED IN DESIGN

Melb T +61 3 8587 0900
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PILBARA MINERALS LIMITED
PILGANGOORA LITHIUM TANTALUM PROJECT

TAILINGS MANAGEMENT FACILITY
FEASIBILITY STUDY
CELL 1 AND CELL 2 STAGE 1 (STARTER) SECTIONS AND DETAILS

115275.01_008

CLIENT No.

CAD REF. 115275.01

REV. No. A SHT SIZE A3

SHEET 1 OF 1

File G:\Synergy\Projects\115\115275 Pilgangoora Project (Pilbara Minerals)\01 - Options Study\Terramodel\115275.01 Drafting.pro (Terramodel)

Tue 27 Sep 2016 14:15:54

Figure 6: TMF embankment, decant system and cut off trench detail

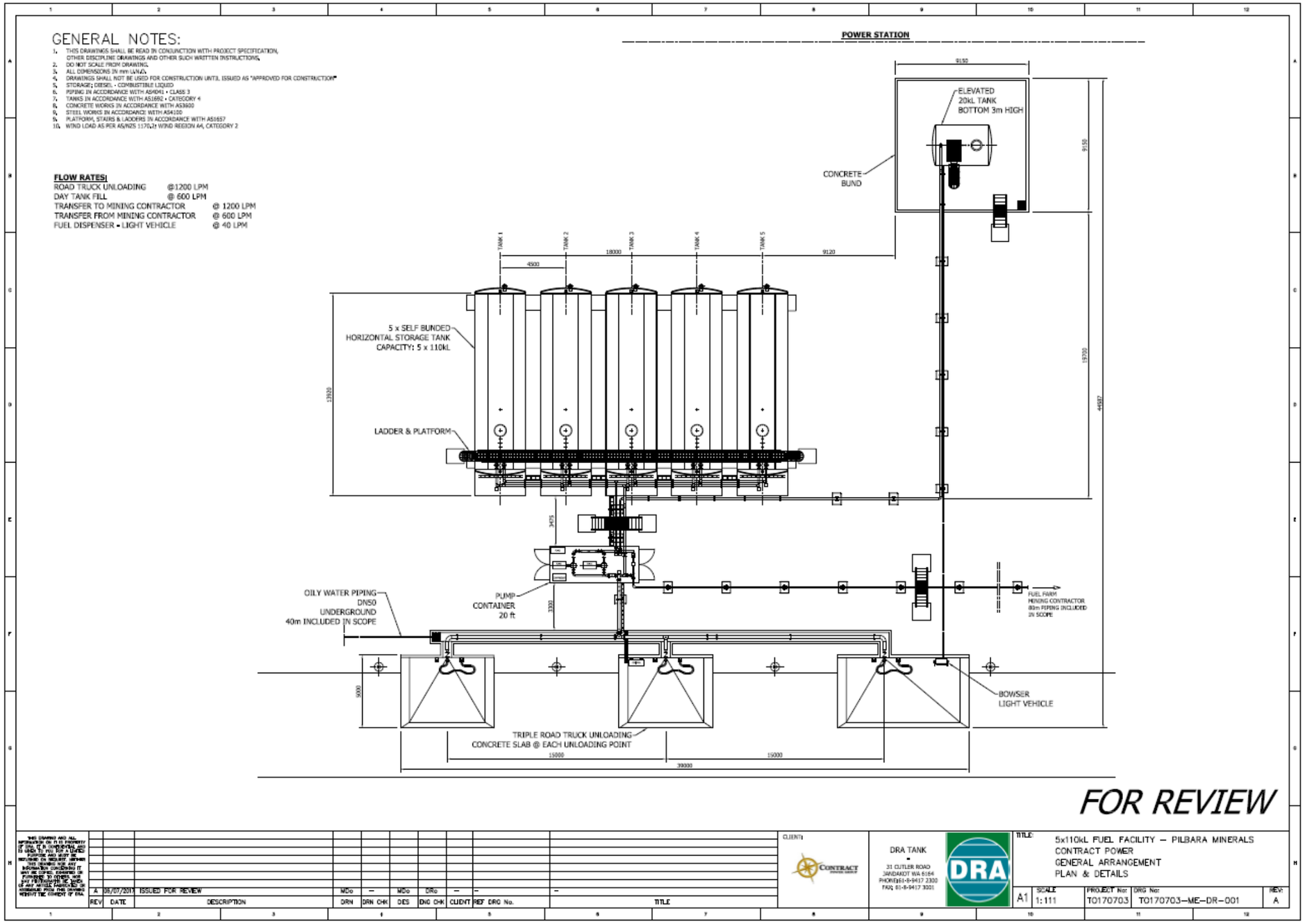

Figure 7: Fuel farm configuration 1

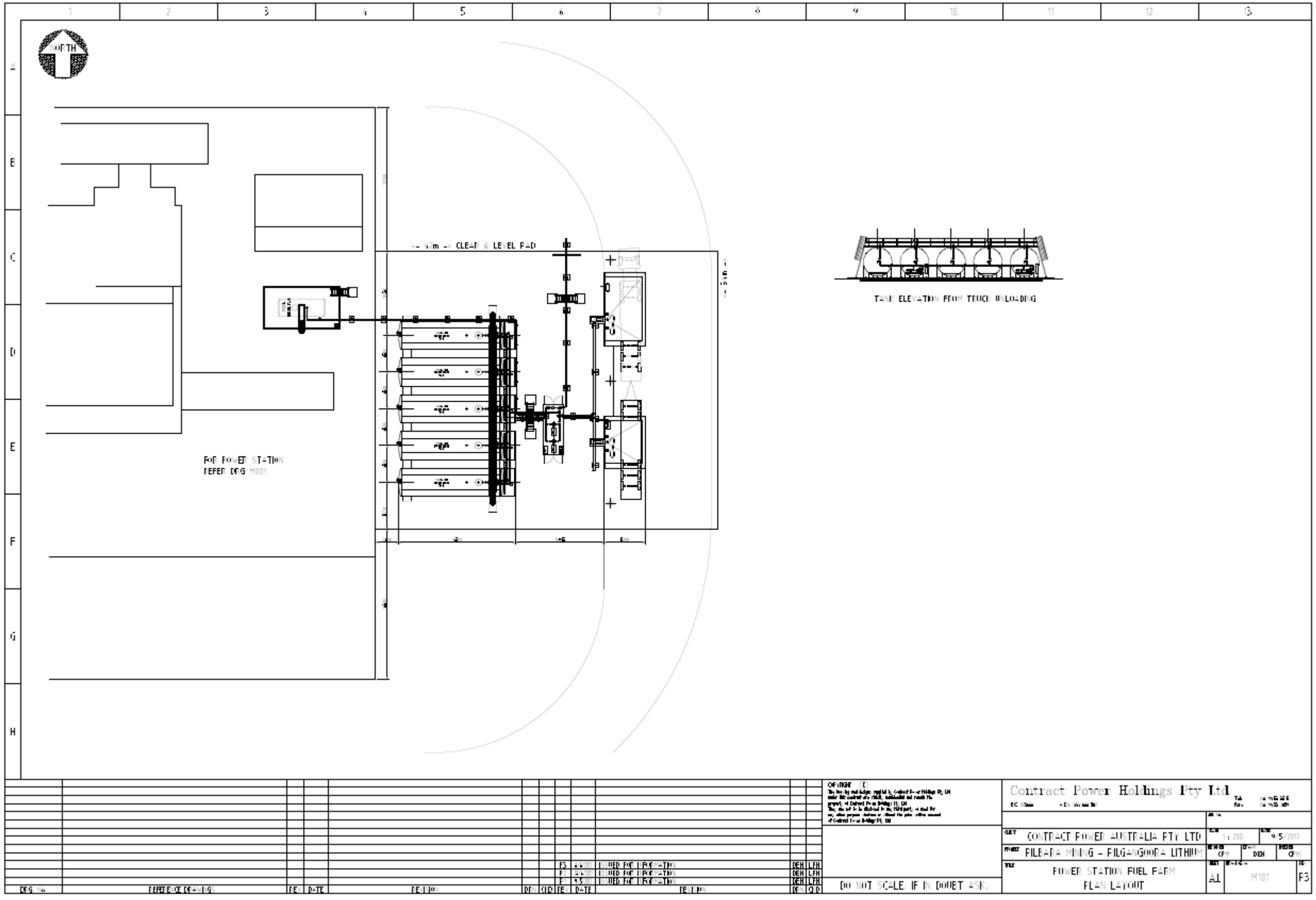

Figure 8: Fuel farm configuration 2

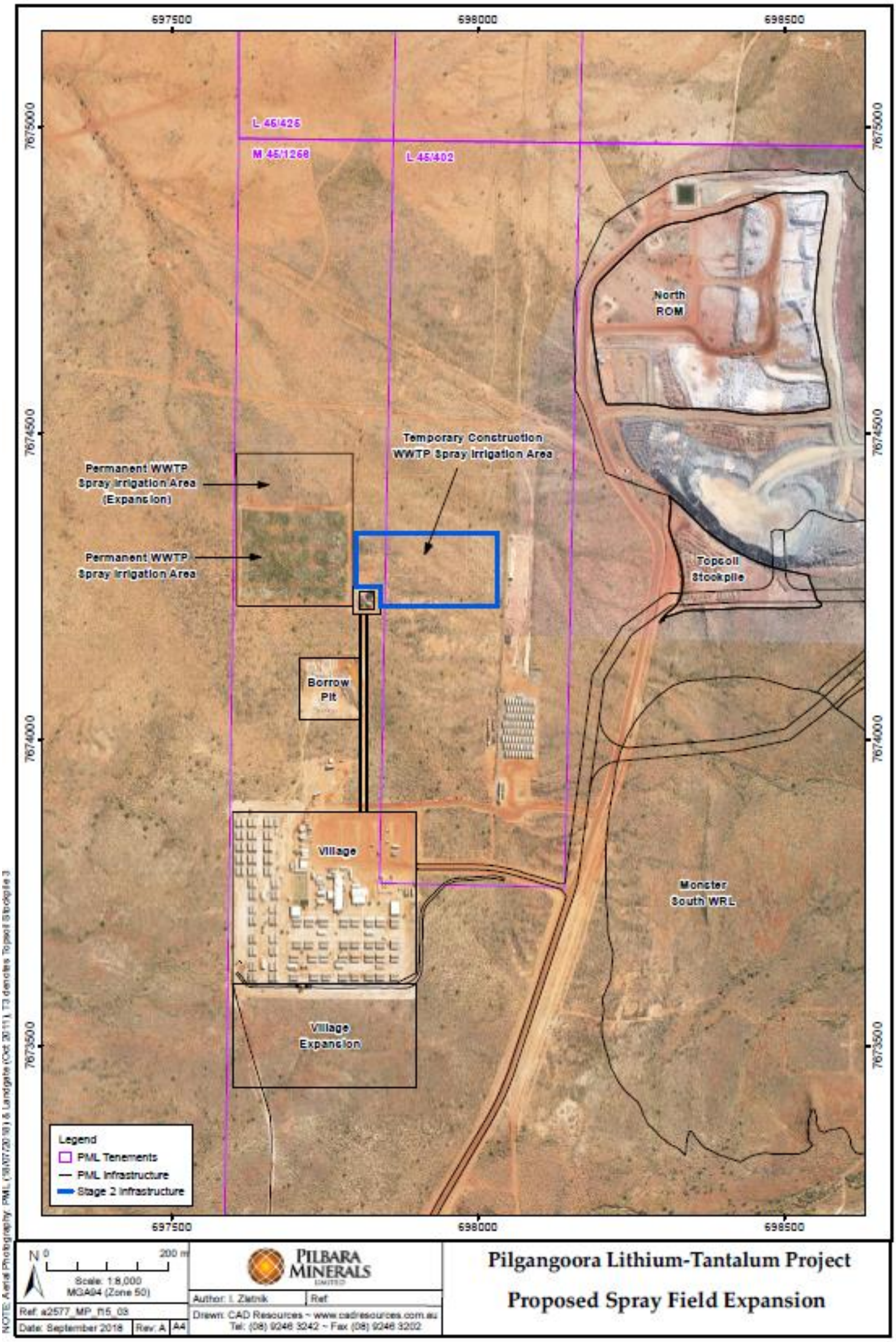

Figure 9: Camp and Wastewater Treatment Plant Layout within M45/1256 with Proposed Spray Field Expansion

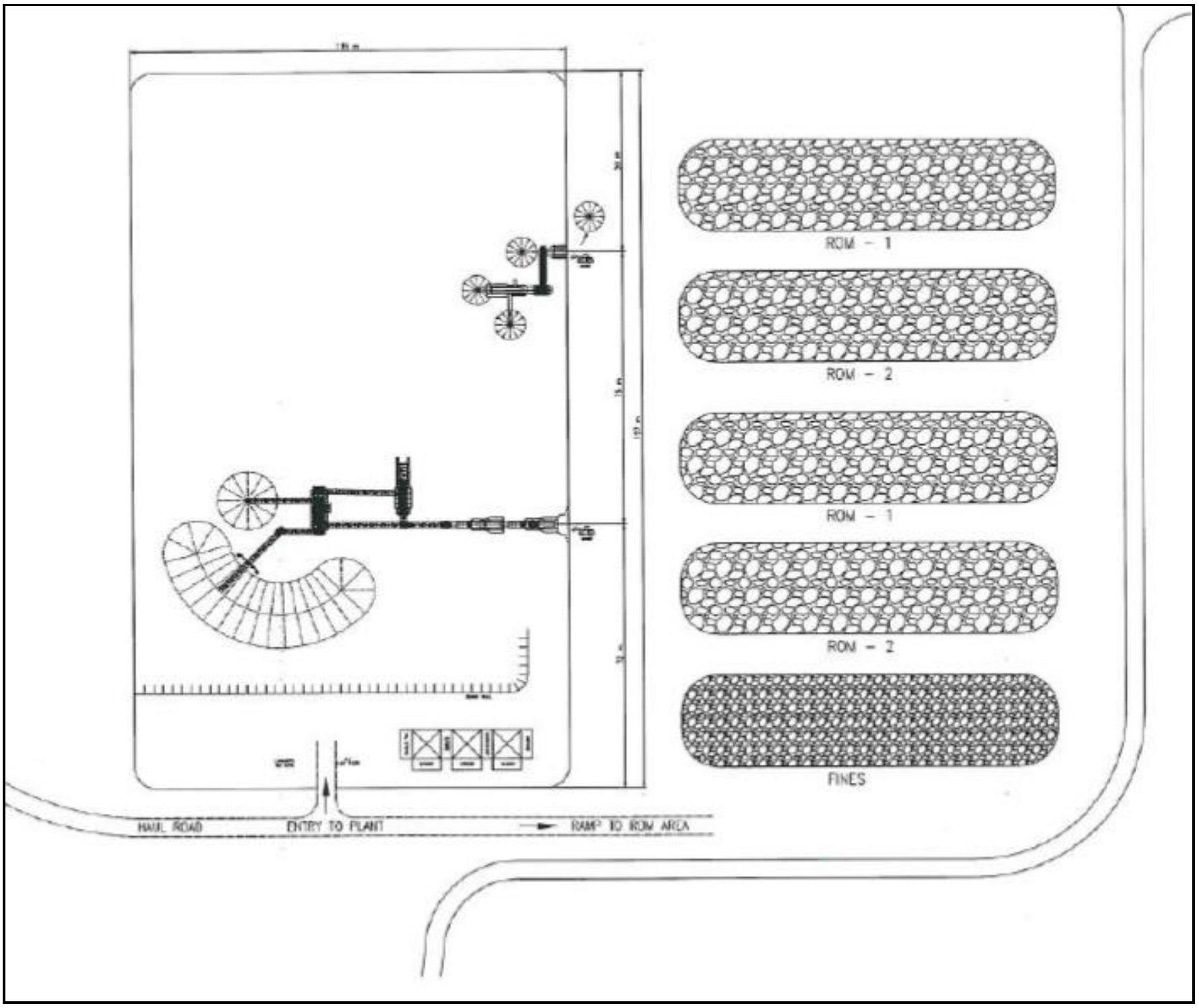

Figure 10: Initial mobile crushing and screening plant layout (for construction)

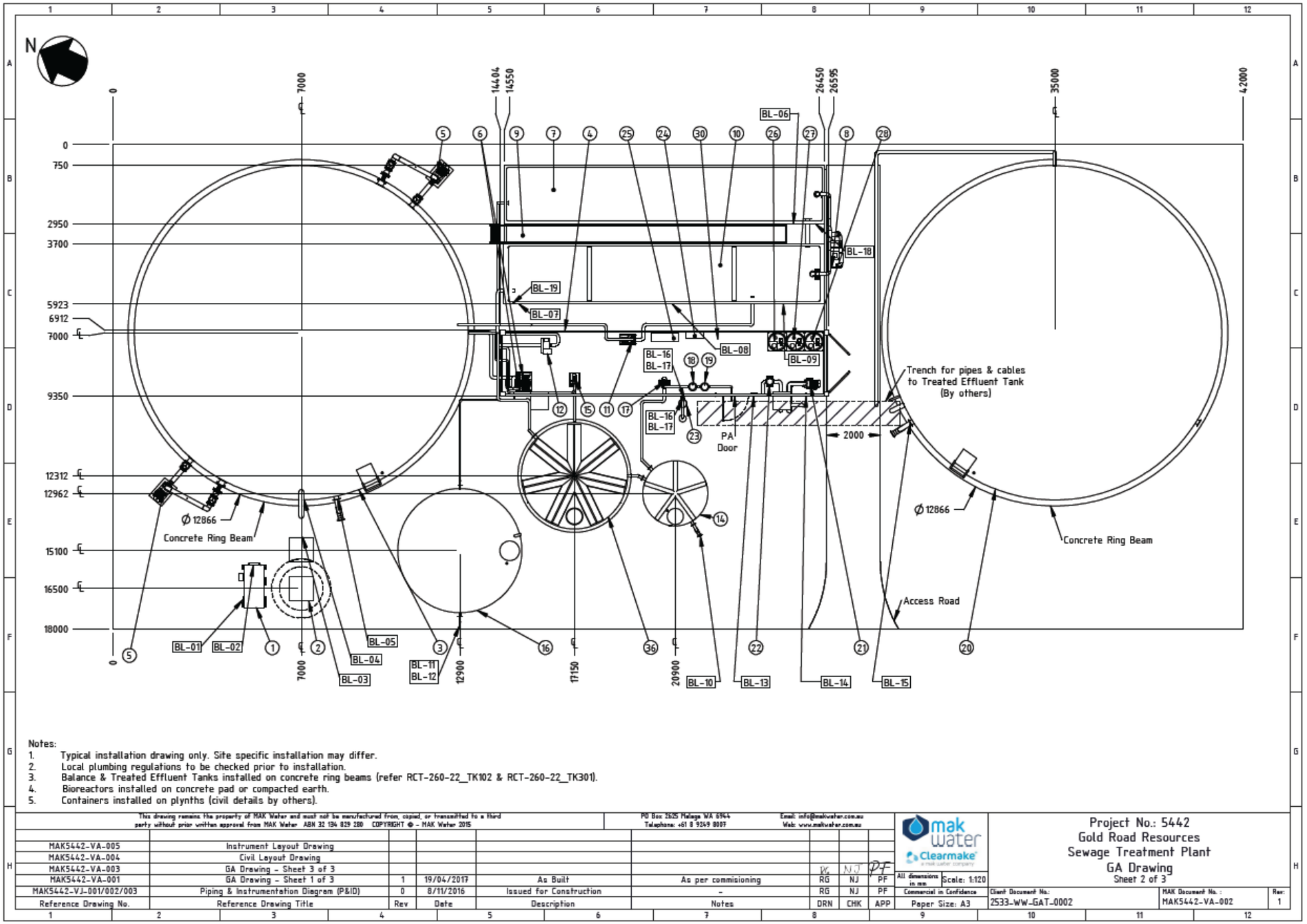

Figure 11: Stage 2 Temporary Construction Wastewater Treatment Plant

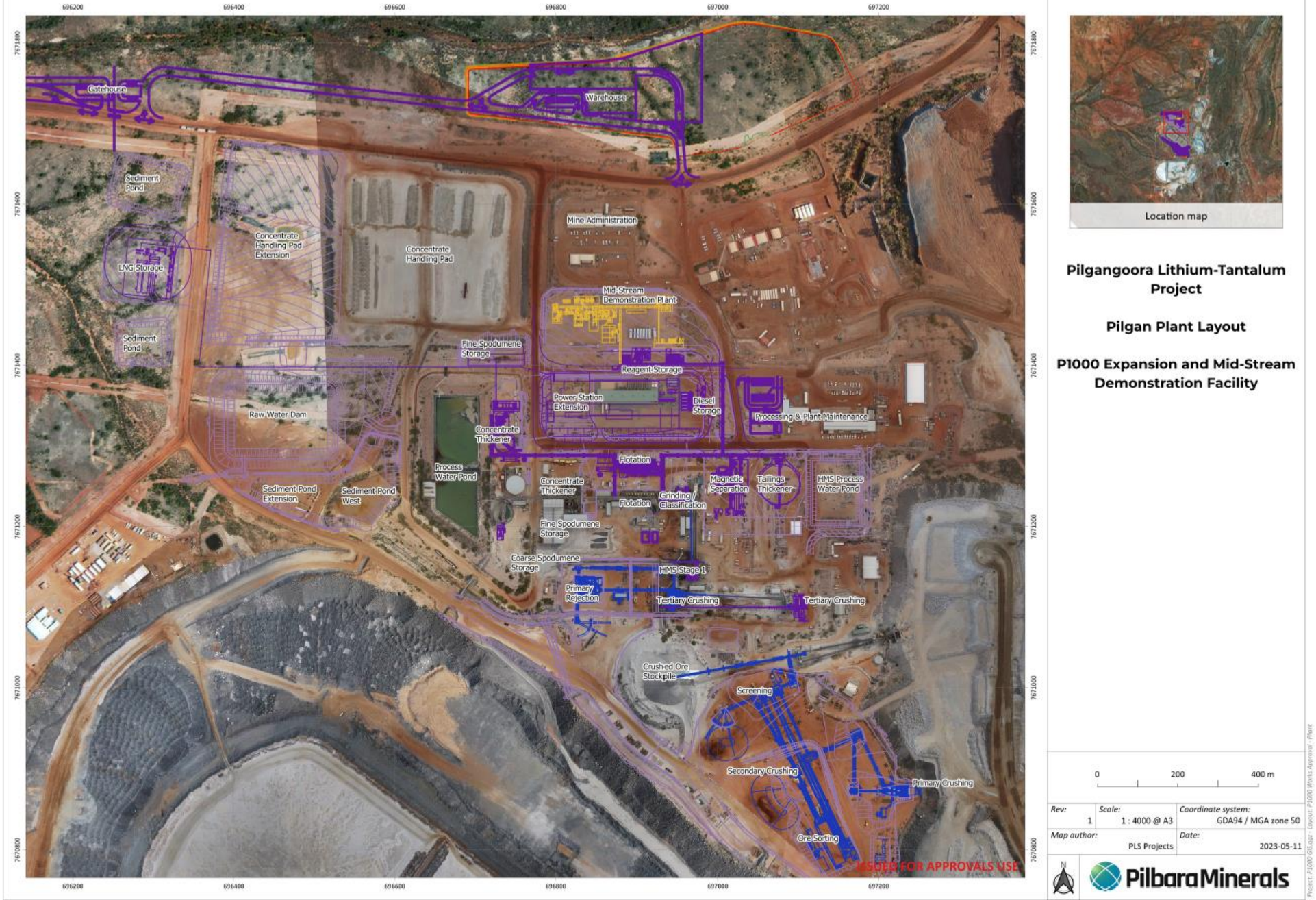

Figure 12: P1000 Expansion and Mid-Stream Demonstration Facility

Figure 13: Mid-Stream Demonstration Plant Site Plan

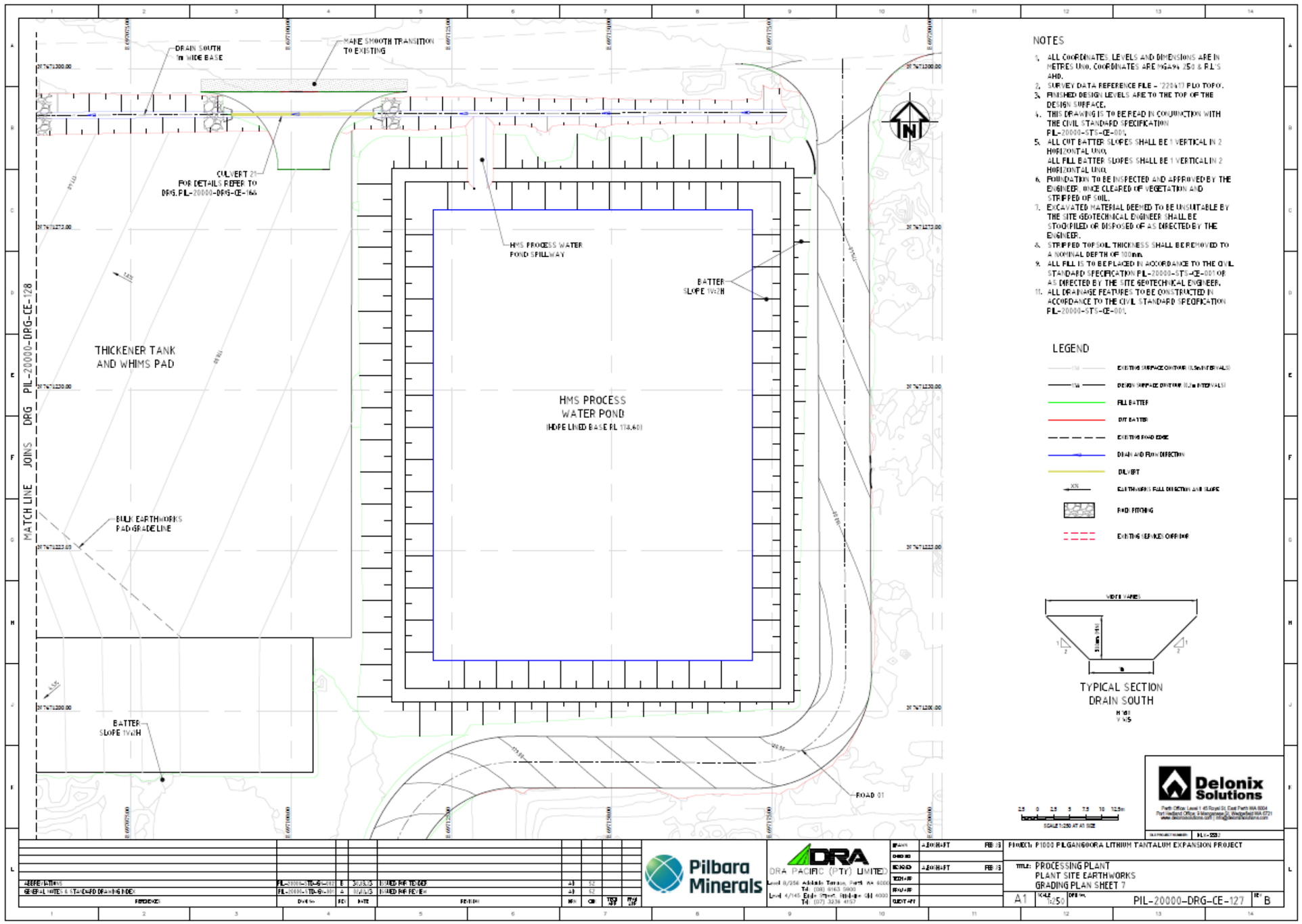

Figure 14: Process Water Pond

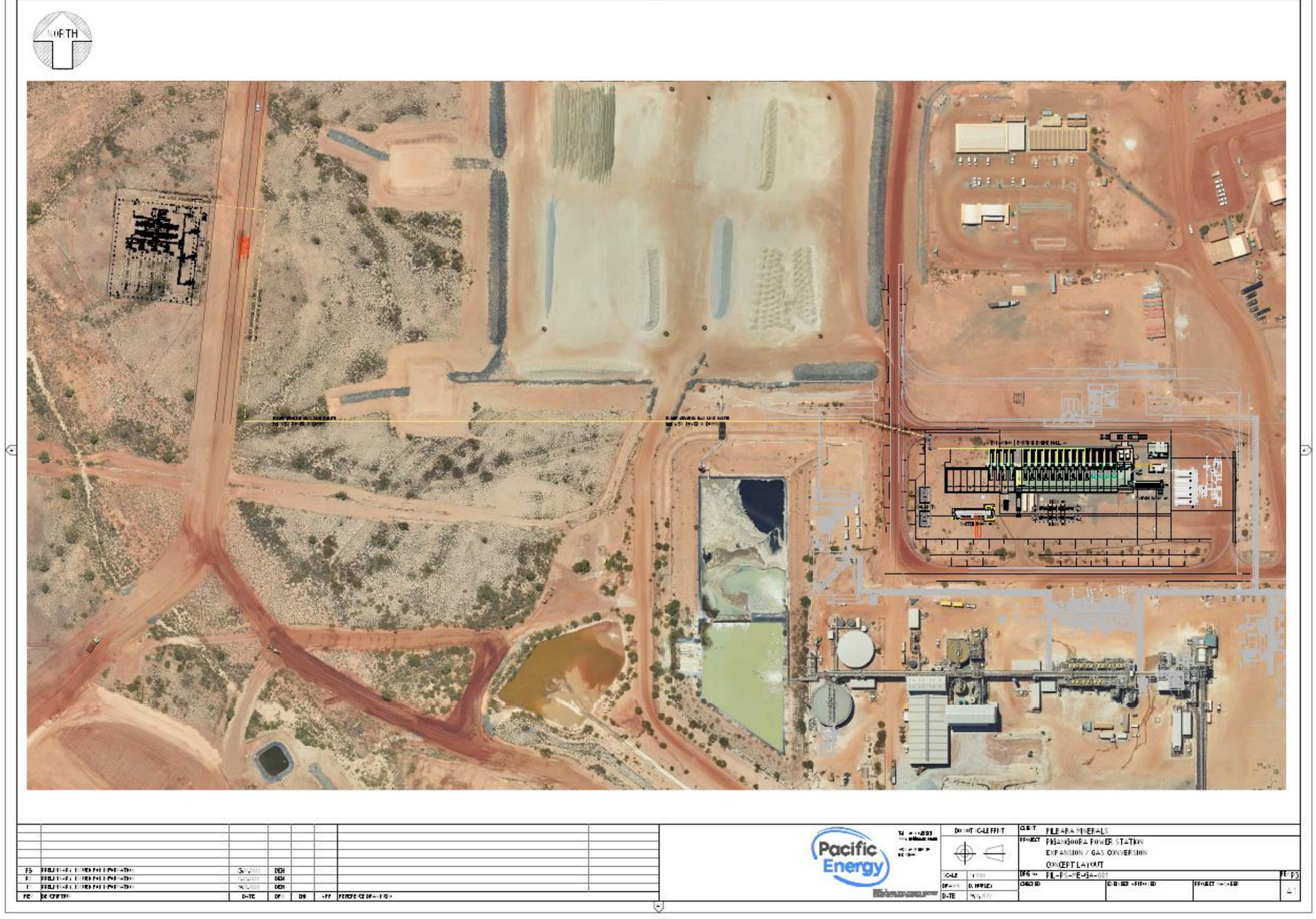

Figure 15: Power Station Expansion

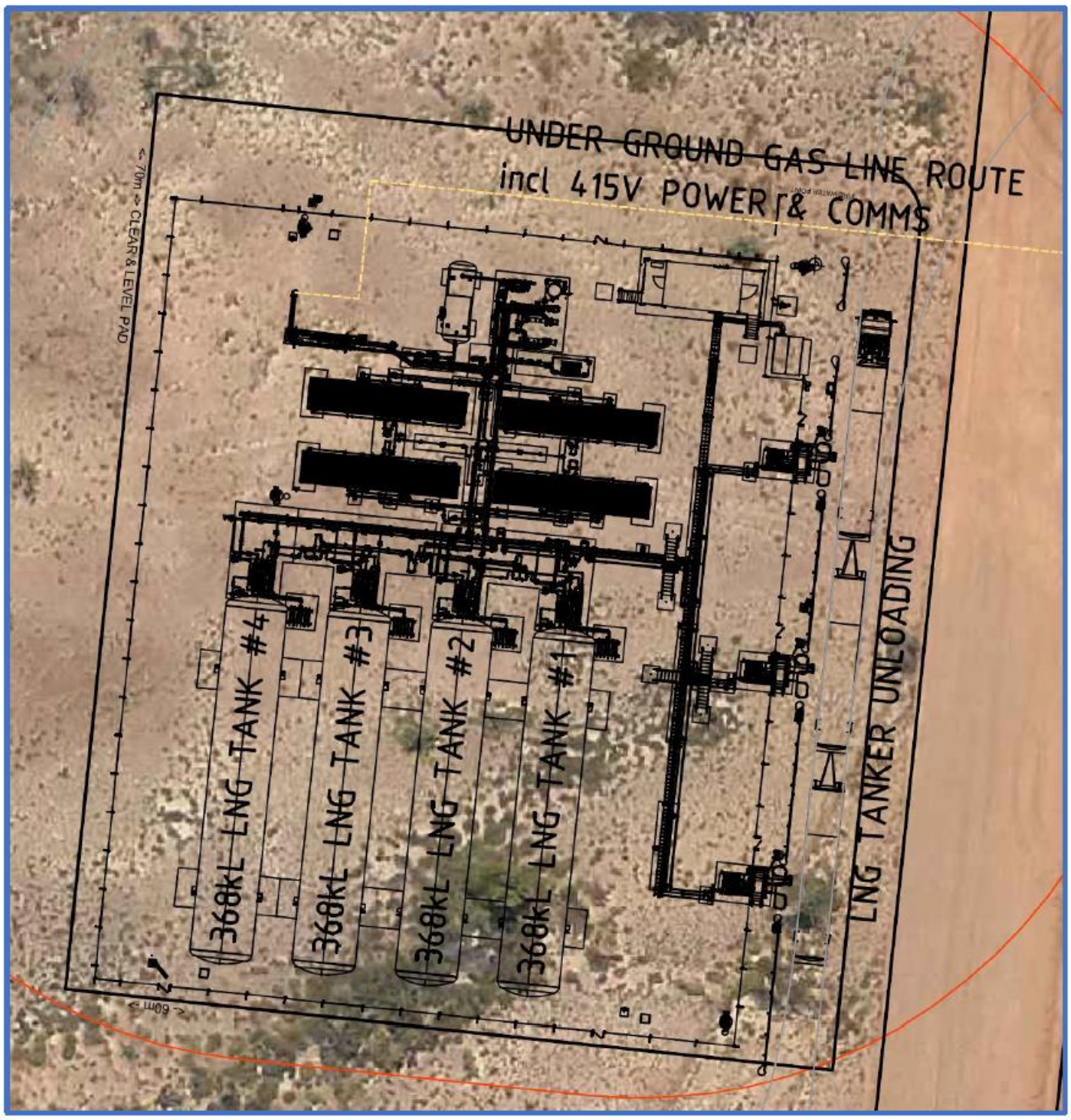

Figure 16: Power Station LNG Storage Facility

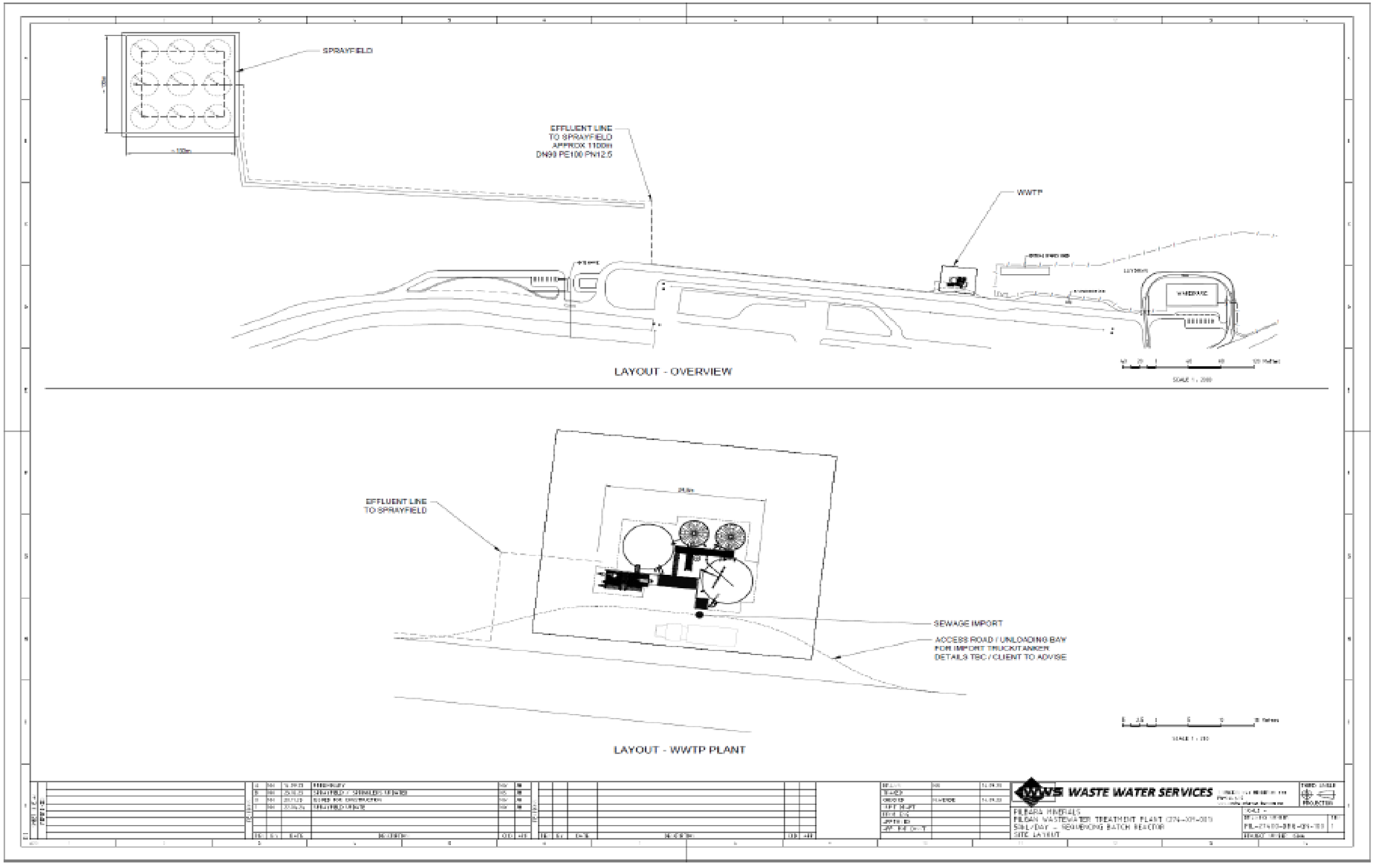

Figure 17: Pilgan Processing Plant WWTP and Spray Field Layout

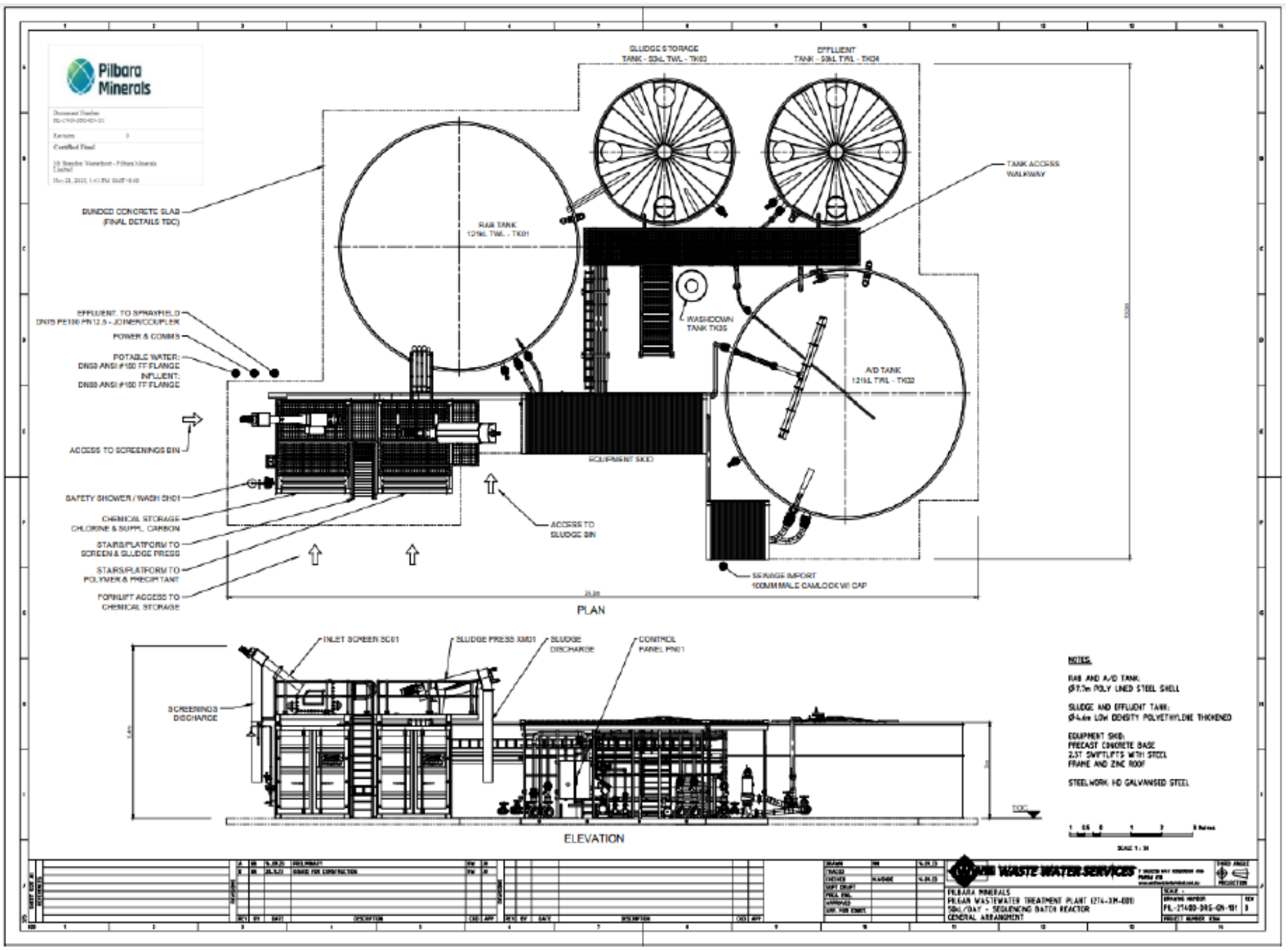

Figure 18: Pilgan Processing Plant WWTP General Arrangement

Schedule 2: Works

Infrastructure and equipment

Infrastructure and equipment which are required to be built are listed in Table 7 as specified by Condition 1.

Table 7: Design and construction / installation requirements

<table>
<tr><th></th><th>Column 1</th><th>Column 2</th></tr>
<tr><th></th><th>Infrastructure/ Equipment</th><th>Requirements (design and construction)</th></tr>
<tr><td colspan="3">Stage 1</td></tr>
<tr><td>1</td><td>Stage 1 WWTP Spray Irrigation Area (expansion)</td><td>• Irrigation area boundary coordinates (expansion):<table><tr><td>Easting</td><td>Northing</td></tr><tr><td>697606.00 m E</td><td>7674377.00 m S</td></tr><tr><td>697795.00 m E</td><td>7674377.00 m S</td></tr><tr><td>697606.00 mE</td><td>7674467.00 mS</td></tr><tr><td>697795.00 m E</td><td>7674467.00 m S</td></tr></table>• 18 irrigation sprinklers;
• Irrigation field to maintain a minimum separation distance of 100 m to all drainage lines/watercourses;
• Stock exclusion fence comprising star picket, 3 strand wire and corner strainer posts surrounding entire irrigation area;
• Internal berm installed inside the fence line from excess soil to prevent surface water runoff from the irrigation area;
• Constructed so that there is no spray drift or runoff crossing the Premises boundary during operation; and
• Extension area of 1.69 ha.</td></tr>
<tr><td>2</td><td>Mobile crushing and screening plant (for operations)</td><td>• Installed with a maximum crushing and screening capacity of 1,000,000tpa throughput
• Equipped with a functioning dust suppression system
• The mobile crushing plant must be contained so no contaminated runoff (any waste listed in Environmental protection (Unauthorised Discharges) Regulations 2004) is discharged to any drainage line or watercourse
• Construction of a sump to be located at a topographic low point within the mobile crushing and screening area to capture all stormwater and plant-runoff within the mobile crushing and screening area.
• Earthworks around the plant to be graded to ensure all clean stormwater from the surrounding areas is diverted around the mobile crushing and screening area</td></tr>
<tr><td colspan="3">Stage 2</td></tr>
<tr><td>3</td><td>Stage 2 Bulk Fuel Storage</td><td>• A total of 440 kilolitre (kL) (m^3) diesel storage capacity comprising:
o 110 kL (3 x 110 kL) self-bunded diesel tanks for mining fleet, stored at the mining contractors yard; and
o 110 kL (1 x 110 kL) self-bunded diesel tank added to the existing fuel farm; and
• 330 kL (3 x 110kL) self-bunded diesel tanks for the Power Station.</td></tr>
<tr><td>4</td><td>Stage 2 diesel generators at power station</td><td>• 7 x 2500 kVA generators giving a capacity of 17,500 kVA, increasing total power output to 32.5 MW; and
• The trailer-mounted self-contained gas supply will be increased from 350 m^3 to 560 m^3 to ensure that all generators have an 18-hour supply of gas.</td></tr>
<tr><td>5</td><td>Stage 2 Processing Plant</td><td>• Capable of processing 3 Million tonnes per annum (Mtpa);
• Primary/Secondary/Tertiary crushers;
• Wet screener;
• Two stages of Dense Media Separation;
• Wet spiral concentrators;
• Four vibrating feeders;
• High Pressure Grinding Roll;
• Stage 1 Feed Preparation Screener;
• Four Stage 1 Cyclones;
• Grinding Mill;
• One Stage 2 Cyclone;
• Wet spiral concentrators;
• Cleaner spirals;
• Low intensity magnetic separator;
• Rougher wet shaking tables;</td></tr>
</table>

<table>
<tr><th></th><th>Column 1</th><th>Column 2</th></tr>
<tr><td></td><td>Infrastructure/ Equipment</td><td>Requirements (design and construction)</td></tr>
<tr><td></td><td></td><td>• Primary hydrocyclones;
• Flotation circuit;
• Tailings thickener;
• Ball mill;
• Spodumene concentrate thickener;
• Pressure filter;
• Tantalite dressing facility;
• Spray/ sprinkler systems in crushing circuit;
• Plant to be constructed on a concrete pad and concrete bunded with a containment capacity equivalent to 110% of the capacity of largest tank;
• Electric sump pumps installed in the concrete flooring to collect and pump any spilled material back into the process stream;
• Pipelines fitted with pressure transmitters at both ends of pipelines with alarms to indicate variation in flow pressure;
• Isotainers, mixing tanks and storage tanks will be located on a concrete bunded area with plinths within the Processing Plant area; and
• Spray/sprinkler systems installed at the crusher conveyor transfer points.</td></tr>
<tr><td>6</td><td>Stage 2 Temporary Construction WWTP</td><td>• 1 x Sequence Batch Reactor (SBR) with less than 150 m^3/day treatment capacity;
• 1 x 200 kL Balance tank fitted with high level alarm wired to visual strobe light and sounder to alert of overflows;
• 1 x 200 kL Treated effluent / Irrigation tank fitted with high level alarm;
• 1 x 50 kL sludge thickening tank;
• WWTP containerized with external tanks;
• Flow meters to be installed at influent inlet point and effluent egress point;
• The WWTP will be constructed to meet the following water quality emission standards:
o Biochemical Oxygen Demand <20 mg/L;
o Total Suspended Solids <30 mg/L;
o Total Nitrogen <30 mg/L;
o Total Phosphorus <7.5 mg/L;
o Chlorine Residual >0.2-2 mg/L;
o pH 6.5-8.5; and
o E.coli <1,000 cfu/100 mL;
• Stock exclusion fence surrounding entire WWTP facility; and
• Wastewater from the Stage 2 WWTP to the new 2.63 ha irrigation area and the existing 3.04 ha irrigation area.</td></tr>
<tr><td>7</td><td>Stage 2 Temporary Construction WWTP Spray Irrigation Area</td><td>• Stock exclusion fence comprising star picket, 3 strand wire and corner strainer posts surrounding entire irrigation area;
• Internal berm installed inside the fence line from excess soil to prevent surface water runoff from the irrigation area;
• Operational pipework constructed using HDPE with minimum pressure rating (PN) of 12.5;
• Total minimum spray area of 2.63 hectares;
• Minimum of 26 irrigation sprinklers; and
• Irrigation area boundary coordinates:
<table>
<tr><th>Easting</th><th>Northing</th></tr>
<tr><td>697800,</td><td>7674337</td></tr>
<tr><td>698031,</td><td>7674337</td></tr>
<tr><td>698031</td><td>7674218</td></tr>
<tr><td>697842</td><td>7674218</td></tr>
<tr><td>697842</td><td>7674250</td></tr>
<tr><td>697800</td><td>7674250</td></tr>
</table></td></tr>
<tr><td colspan="3">Pilgan P1000 expansion project</td></tr>
<tr><td>8</td><td>High-intensity magnetic separation circuit</td><td>• Circuit contained within a bunded structure, sized in excess of 110% of the largest held capacity complete with sump pumps for material recovery to process in the event of spillage.</td></tr>
<tr><td>9</td><td>Tailings thickener relocation</td><td>• Situated within a catchment bund sized to 110% capacity of the thickener with sump pumps for material recovery back to the process plant, in the event of spillage.</td></tr>
</table>

	Column 1	Column 2
	Infrastructure/ Equipment	**Requirements (design and construction)**
10	Additional 5 ML Process Water Pond	• Level monitoring to the control system; • Engineered overflow spillway to site catchment drainage; • Bunding of the discharge process water pumps; • HDPE liner; and • Fencing.
11	Reagent Storage relocation and expansion	• Continuous concrete tanker unloading slab, segregating each reagent type by roll-over bunding; and • Each reagent storage facility is contained within individual bunded areas sized to 110% of the largest held capacity with local sump pumps to manage rainfall and removal of spillage.
12	Sediment pond expansion and site drainage improvements	• Sediment Pond Expansion 35,800 m^3 storage capacity; and • 10% AEP, 24 hour storm event has been adopted as a practicable engineering sizing criterion for run-off catchment capacity of processing area sediment structures.
13	Concentrate handling pad expansion	• Existing dust controls including windrows.
14	Power Station Expansion	• Addition of three generators, increasing the Power Station capacity by 3.5 MWe up to 36 MWe; • Battery Energy Storage System (BESS) to allow a future large solar PV array to be supported; • Sediment ponds are located at a topographic low points within the processing and support infrastructure area to capture all stormwater and plant-runoff; • Facility contained so no contaminated runoff to be discharged into any drainage line or watercourse; • Drainage at the power station units will be graded such that spills and surface water flow enters a triple oil/water interceptor; • Oily water separator, with oil from the separation process stored in a 1,000 L tank prior to disposal offsite; • Waste oil tanks self-contained double skin design within concrete aprons; • Reduction in overall CO_2e emission intensity due to change of fuel source; and • Engine hall contains the proposed power station expansion, acoustically isolating the power generation noise from personnel.
15	LNG unload and storage	• Four 368 kL cryogenic LNG storage tanks with a further 100 kL allowance for road train delivery and the gasification plant will be installed to AS3961/2017 *The storage and handling of liquefied natural gas*; • Sediment ponds are located at a topographic low points within the processing and support infrastructure area to capture all stormwater and plant-runoff; and • Facility contained so no contaminated runoff to be discharged into any drainage line or watercourse.
Midstream Demonstration Plant		
16	Pyrometallurgical Processing: • Rotary Dryer; • Thermal Oxidizer; • Calix Flash Calciner; and • Acid Roast.	• Acid Roast is contained within a suitable acid protected bund with appropriate dilution and sump arrangement to remove spillage to the plant tailings discharge; • Other Pyrometallurgical plant will be on a concrete pad; • Covered conveyor between concrete pad and Rotary Dryer; • 20 m above ground level stack with suitable sample ports for gas analysis and emissions reporting at Thermal Oxidiser; • Calix Flash Calciner is designed to be a zero emissions unit; • Transfer of material to and from the calciner is via sealed pneumatic conveying with high-temperature dust collectors; • Acid roast kiln has a system for scrubbing acid vapour process off-gas from the acid roast kiln – Venturi scrubber, Entrainment separator and Wet electrostatic precipitator; • Acid vapor generation within the Acid Roast unit is captured

<table>
<tr><th></th><th>Column 1</th><th>Column 2</th></tr>
<tr><td></td><td>Infrastructure/ Equipment</td><td>Requirements (design and construction)</td></tr>
<tr><td></td><td></td><td>by an integrated scrubber unit, outputting a water vapor stream only; and
• Emissions from the Thermal Oxidiser and Acid Roaster Scrubber meet the limits in Condition 13, Table 4.</td></tr>
<tr><td>17</td><td>Hydrometallurgical Processing:
• Water Leach;
• Primary Filter;
• Impurity Removal;
• Precipitation; and
• Product Filter.</td><td>• Entire circuit is contained within concrete bunded areas sized at 110% of the largest held tank in each subsection of the circuit;
• Within Water Leach, all processing occurs in sealed agitated tanks;
• pH adjustment occurs in sealed tanks; and
• Ion exchange in closed vessels.</td></tr>
<tr><td>18</td><td>Product Drying and Packaging</td><td>• Packing circuit located inside a closed storage shed;
• Bulk storage bags are placed on pallets and plastic-wrapped;
• Fully enclosed with roller doors and personnel access doors;
• Product storage area fitted with a ridge line vent or similar as means of thermal heat load ventilation; and
• Location of the facility (and entire Mid-Stream R&D Demonstration Facility) lies within the overall Pilgan processing facility site catchment and surface water management design, reporting to an engineered sediment catchment structure.</td></tr>
<tr><td>19</td><td>Reagent and Water Services</td><td>• Reagents at stored within the final product storage shed; and
• Raw water is stored within 4 x 25,000 L storage tanks outside the facility.</td></tr>
<tr><td colspan="3">Mobile Crushing and Screening Plant</td></tr>
<tr><td>20</td><td>Mobile crushing and screening plant (for construction)</td><td>• Capable of processing up to 525,000 tonnes per annum to produce construction materials for use at the Premises;
• Fitted with dust suppression water sprayers designed to minimise dust emissions; and
• Windrows constructed around the facility hardstand area to collect and direct stormwater into a sump for filtering, before redirecting to a sediment pond outside the facility.</td></tr>
<tr><td colspan="3">Pilgan Processing Plant Waste Water Treatment Plant</td></tr>
<tr><td>21</td><td>Waste Water Treatment Plant (WWTP)</td><td>• General arrangement as per Schedule 1, Figure 18;
• Constructed on a bunded concrete pad;
• WWTP containerised with external tanks;
• Sequence Batch Reactor (SBR) with capacity to treat up to 50 m^3/day ;
• Balance tank fitted with high level alarm wired to visual strobe light and sounder to alert of overflows;
• Treated effluent / Irrigation tank fitted with high level alarm;
• Flow meters installed at influent inlet point and effluent egress point;
• Treatment plant to meet the following water quality emission standards:
- Biochemical Oxygen Demand <20 mg/L;
- Total Suspended Solids <30 mg/L;
- Total Nitrogen <30 mg/L;
- Total Phosphorus <8.0 mg/L;
- Chlorine Residual >0.2-2 mg/L;
- pH 6.5-8.5; and
- E.coli <1,000 cfu/100 mL;
• Stock exclusion fence surrounding entire facility; and
• Treated wastewater directed to a 1.8 ha spray irrigation area.</td></tr>
<tr><td>22</td><td>Spray Irrigation Area</td><td>• Irrigation area boundary coordinates:<table><tr><td>Easting</td><td>Northing</td></tr></table></td></tr>
</table>

<table>
<tr><td></td><td>Column 1</td><td>Column 2</td></tr>
<tr><td></td><td>Infrastructure/ Equipment</td><td>Requirements (design and construction)</td></tr>
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<tr><td>695711</td><td>7672082</td></tr>
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<tr><td>695711</td><td>7671949</td></tr>
</table>

Minimum spray field area 1.8 ha in size;
Minimum 300 mm high windrow installed around spray field;
Stock exclusion fence installed around the irrigation area; and
Treated effluent irrigated to the spray field through a minimum of 9 sprinklers.

</td></tr>
</table>

At the time of assessment, Emissions and Discharges from the Works listed in Table 8 were considered in the determination of the risk and related Conditions for the Works Approval.

Table 8: Authorised works - construction

Works	Specifications/ Drawings
TMF 2	Schedule 1: Figure 1, Figure 3, Figure 5, Figure 6
All ore processing activities (Stage 2)	Schedule 2: Figure 1, Figure 3, Figure 4
Hydrocarbons and chemical storage areas (Stage 2)	Schedule 1: Figure 1, Figure 3, Figure 4, Figure 7, Figure 8
Power Station (Stage 2 expansion)	Schedule 1: Figure 4, Figure 15
WWTP Spray Fields (Stage 1 expansion and Stage 2)	Schedule 1: Figure 3, Figure 9
Mobile crushing and screening plant (for construction)	Schedule 1: Figure 3, Figure 10
Stage 2 Temporary Construction WWTP	Schedule 1: Figure 3, Figure 11
P1000 Expansion and High-Intensity Magnetic Separation Circuit	Schedule 1: Figure 12
Process Water Pond	Schedule 1: Figure 14
Trucked LNG Storage Facility	Schedule 1: Figure 16
Mid-Stream Demonstration Plant	Schedule 1: Figure 12, Figure 13
Pilgan Processing Plant WWTP and Spray Fields	Schedule 1: Figure 3, Figure 17