Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W2899/2025/1
Works approval holder	Shire of Leonora
Registered business address	16 Tower Street Leonora WA 6438
DWER file number	INS-0002899
Duration	02/04/2025 to 01/04/2030
Date of issue	2 April 2025
Premises details	Shire of Leonora Refuse Site Lot 528 Laverton – Leonora Road Leonora WA Legal description - Reserve 31924 Lot 528 on Deposited Plan 417101 Certificate of Title Volume LR3175 Folio 319 As defined by the coordinates in Schedule 2

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed design capacity**
Category 61: Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	4,643 tonnes per annual period

This works approval is granted to the works approval holder, subject to the attached conditions, on 2 April 2025, by:

Abbie Crawford

Digitally signed by Abbie Crawford
Date: 2025.04.02 07:52:08 +08'00'

Abbie Crawford
MANAGER, WASTE INDUSTRIES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Works approval history

Date	Reference number	Summary of changes
2/04/25	W2899/2025/1	Works approval granted.

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:

(a) construct the critical containment infrastructure;

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

(c) at the corresponding infrastructure location;

as set out in Table 1.

Table 1: Critical containment infrastructure design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location
1.	New secondary lined evaporation pond	The evaporation pond must be: • Constructed to the specifications depicted in Figures 2, 3 and 4 in Schedule 1; • Constructed to be 61 m in length, 51 m wide and 2 m deep; • constructed free of leaks and defects • All pipes to be laid in accordance with manufacturers specifications; and • Pipes to be free of defects.	Schedule 1 Figure 2, 3 and 4
2.	Subgrade preparation	The following site preparation works must be undertaken: • excavation must be carried out to shape and level the entire pond footprint including embankments, sumps and base; • Fill material must be free from boulders and cobbles greater than 75mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious material; • Fill material must be placed, levelled and compacted to not less than 95% of the Standard Maximum Modified Dry Density and Optimum Moisture Content (OMC) of -3% to +3%; • The subsoil layer must be compacted with a minimum of 8 passes of a vibrating smooth drum roller of minimum static weight of 12 tonnes to provide a smooth surface; • The maximum deviation from a 2.4 m straight edge placed in any position of the surface of the pond floor or batter slopes must not exceed 50 mm;	Schedule 1 Figure 3 and 4

	Infrastructure	Design and construction / installation requirements	Infrastructure location
		• Anchor trenches must be excavated to the shapes and in the locations indicated on the Figures 2, 3 and 4 in Schedule 1.	
3.	Subsoil drainage	• Sub-soil drains must be constructed in the locations and to the cross-sectional shapes and dimensions as shown on the figure 2 and 4 • The excavation must have vertical sides throughout where the excavation is up to 1.5m deep. • Trenches must be graded to have reasonably smooth side and bottom faces to prevent bridge cavities or damage from protruding/sharp objects to the geotextile lining. • The minimum grade of subsoil drainage must be 0.5%.	Schedule 1 Figure 2 and 4
		The geotextile lining: • must be a non-woven fabric consisting of long chain synthetic polymer fibres, composed of at least 95% by mass of polyester or polyolefins (polypropylene, polyethylene), bonded by needle punching, heat or chemical bonding processes or combinations thereof; • Must be placed in the excavated trench to cover the bottom and sides of the trench, with sufficient free fabric to wrap around the completed drain; • Must conform to the shape of the trench with minimal wrinkles, folds or air voids between fabric and trench, but not stretched on the soil; • The minimum overlap in longitudinal direction along the trench must be 300mm; and • Filter aggregate bedding must be placed on the geotextile to the depth indicated on the Figure 4	Schedule 1 Figure 2
		Filter aggregate: • Must consist of hard, durable, clean gravel or crushed rock, and shall be free from organic material, clay or other deleterious substances; and • The maximum particle size must be no more than 26.5 mm.	
		Slotted pipe; • Must be nominal 100 mm outside diameter; • Drainage pipes and associated fittings and jointing procedures must be complied in accordance with the requirements of AS 2439.1; and • Filter aggregate must be placed over the slotted pipe to the depth shown on Figure 4 and tamped to a level profile.	

	Infrastructure	Design and construction / installation requirements	Infrastructure location
		• Geotextile must be wrapped over the top of the aggregate layer with 300 mm overlap.	
4.	Geosynthetic clay liner (GCL)	• Must not be installed in the presence of water; • Must be installed in a manner to prevent damage to the GCL and prevent wrinkles in the liner layer; • A minimum side overlay between panels must be 300 mm; • The GCL must be covered with a geomembrane, which must be deployed over the GCL within 24 hours and must be deployed concurrently with GCL; • A patch of the GCL must be placed over any damaged areas with a minimum overlay over the adjoining area of 500mm; • The outer 200 mm circumference of the patch must be joined to the main GCL by heat bonding to the parent GCL; and • Temporary securing of the liner within the trench must be carried out using sandbags or by partial filling with approved compacted backfill.	Schedule 1 Figure 4
5.	Geomembrane (HDPE)	• Must consist of 1.5 mm thick High-Density Polyethylene (HDPE) to achieve <1 x 10^{-9} m/sec; • Must not be installed in the presence of water; and • Must be installed in a manner to prevent damage to the HDPE and prevent wrinkles in the liner layer.	Schedule 1 Figure 4

Construction quality assurance requirements

2. The works approval holder must undertake construction quality assurance (CQA) testing for the HDPE liner material installed within secondary pond in accordance with the specifications outlined in Table 2.

Table 2: HDPE Liner Design, Construction and Quality Assurance Specifications

Property		Units	Value	Test	Testing Frequency
Thickness (minimum, average)		mm	1.5	ASTM D5994	per roll
Density (minimum average)		g/cm^3	>0.940	ASTM D1505/D792	One sample every 10,000m², or every 10 rolls delivered to site, whichever is the greatest number of tests
Tensile properties	Break strength	N/mm	>37	ASTM D6693 Type IV	

Property		Units	Value	Test	Testing Frequency
	Yield strength	N/mm	>22	ASTM D6693 Type IV	
	Yield elongation	%	12	ASTM D6693 Type IV	
	Break elongation	%	>600	ASTM D6693 Type IV	
Tear resistance (min. ave.)		N	>187	ASTM D1004	
Puncture resistance (min. ave.)		N	>500	ASTM D4833	
Carbon black content (range)		%	2.0 – 3.0	ASTM D1603 or ASTM D4218	
Carbon black dispersion		Rating	90% Cat 1 or 2, rest Cat 3	ASTM D5596	
Stress crack resistance		Hr	>500	ASTM D5397	One sample every 20,000m², or resin type or manufacturing run
Oxidative Induction Time (OIT) Standard OIT or		Minutes	>100 >400	ASTM D3895 ASTM D5885	
Start-up test weld	Welding equipment	N/A	N/A	N/A	Checked daily at start of works, and whenever the welding equipment is shut-off for more than one hour. Also after significant changes in weather conditions.
	Weld conditions	N/A	N/A	N/A	Test weld strips will be required whenever personnel or equipment are changed and/or wide temperature fluctuations are experienced.
Destructive weld testing	On-Site, hand tensiometer in peel and shear	N/A	N/A	ASTM D6392	Every weld

Property		Units	Value	Test	Testing Frequency
	Off-Site — weld seam strength in peel and shear				Every 300m (fusion weld) Every 220m (extrusion weld)
Non - destructive weld testing		N/A	N/A	Air pressure test, ASTM D5820 Vacuum test, ASTM D5641	All seams over full length
Visual Inspection of geomembrane	Tears, punctures, abrasions, cracks, indentations, thin spots or other faults in the material	N/A	N/A	N/A	Every roll
Thickness of geomembrane	Onsite	N/A	N/A	N/A	Five per 200m, 40m apart, taken at the edge of the sheet

Critical Containment Infrastructure Report

3. The works approval holder must within 60 calendar days of the Critical Containment Infrastructure identified 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 a Critical Containment Infrastructure Report on that compliance.

4. The Critical Containment Infrastructure Report required by condition 3 must include as a minimum the following:

(a) certification by a suitably qualified civil or geotechnical engineer (or equivalent) that the items 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 showing each item of critical containment infrastructure or component thereof, as specified in condition 1;

(c) photographic evidence of the installation of the infrastructure;

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

5. The Critical Containment Infrastructure Report required by Condition 3 must be accompanied by a Construction Quality Assurance Validation Report that:

(a) is written and certified by a suitably qualified civil or geotechnical engineer (or equivalent);

(b) assesses test results against the relevant minimum values specified in condition 2;

(c) documents all repairs to subgrade and resulting from non-destructive weld testing;

(d) certifies that the constructed infrastructure is free of fault of defect, built to the design specification and fit for the intended purpose; and

(e) includes copies of drawings, inspections, monitoring, and testing results required by the corresponding Specifications referenced in condition and 1 and 2.

Time limited operations phase

Commencement and duration

6. The works approval holder may only commence time limited operations for an item of critical containment infrastructure identified in condition 8 when at least 30 business days have passed after the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 4 and the Construction Quality Assurance Validation Report required by condition 5 have been submitted to the CEO.

7. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 8:

(a) for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 8 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 7(a).

Time limited operations requirements

8. 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 operation

	Site infrastructure and equipment	**Operational requirement**
1	Secondary lined evaporation pond	• A minimum top of embankment freeboard of 500 mm is maintained; • HDPE liner maintained to achieve permeability of 1 x 10^{-9} m/sec; and • Maintain the pond and associated pipework to be free of leaks and defects.

9. The works approval holder must only accept onto the premises waste of a waste type, which does not exceed the corresponding rate at which waste is received, and which meets the corresponding acceptance specification set out in Table 4

Table 4: Types of waste authorised to be accepted onto the premises

Waste type	Waste code	Quantity limit	specification
Septage wastes (Sewage) – domestic wastes from apparatus for the treatment of sewage	K210	4,643 tonnes per annual period	Liquid waste receipt in tankers. Discharged to primary treatment pond.
Waste from grease traps	K110		
Vegetable and food processing waste	K200		
Sewage	K210		Liquid waste receipt in tankers from Water Corporation

Monitoring during time limited operations

10. The works approval holder must undertake the monitoring outlined in Table 5 during time limited operations

Table 5: Emissions and discharge monitoring during time limited operation

Input/output	Parameter	Unit	Averaging period	Frequency
Liquid waste discharged to new pond	Volumetric flow rate (cumulative)	Tonnes or m^3/week	Monthly	Quarterly

Compliance reporting

11. 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.

12. The works approval holder must ensure the report required by condition 11 includes the following:

(a) a summary of monitoring results obtained during time limited operations under condition 10;

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

(c) 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.

Records and reporting (general)

13. 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.

14. 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 8;

(c) monitoring programmes undertaken in accordance with condition 12; and

(d) complaints received under condition 13.

15. The books specified under condition 14 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 6 have the meanings defined.

Table 6: Definitions

Term	Definition
annual period	a 12 month period commencing from 1 January until 31 December of the same year.
AS 2439.1	means Australian standard for “Perforated plastics drainage and effluent pipe and fittings”
ASTM D5994	means ‘Standard Test Method for Measuring Core Thickness of Textured Geomembranes”
ASTM D1505	means “Standard Test Method for Density of Plastics by the Density-Gradient Technique”
ASTM D792	means “Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement”
ASTM D6693 Type IV	means “Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes”
ASTM D1004	means “Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting”
ASTM D4833	means “Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products”
ASTM D1603	means “Standard Test Method for Carbon Black Content in Olefin Plastics”
ASTM D4218	means “Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique”
ASTM D5596	means “Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics”
ASTM D5397	means “Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test”
ASTM D3895	means “Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry”
ASTM D5885	means “Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry”

Term	Definition
ASTM D6392	means “Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods”
ASTM D5820	means “Standard Practice for Pressurized Air Channel Evaluation of Dual-Seamed Geomembranes”
ASTM D5641	means “Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber”
ASTM D5092/D5092M-16	means “Standard Practice for Design and Installation of Groundwater Monitoring Wells”
AS1726	Means “Australian Standard Geotechnical Site Investigations”
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
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.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
premises	the premises to which this works approval 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.

Term	Definition
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.
waste	has the same meaning given to that term under the EP Act.
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).

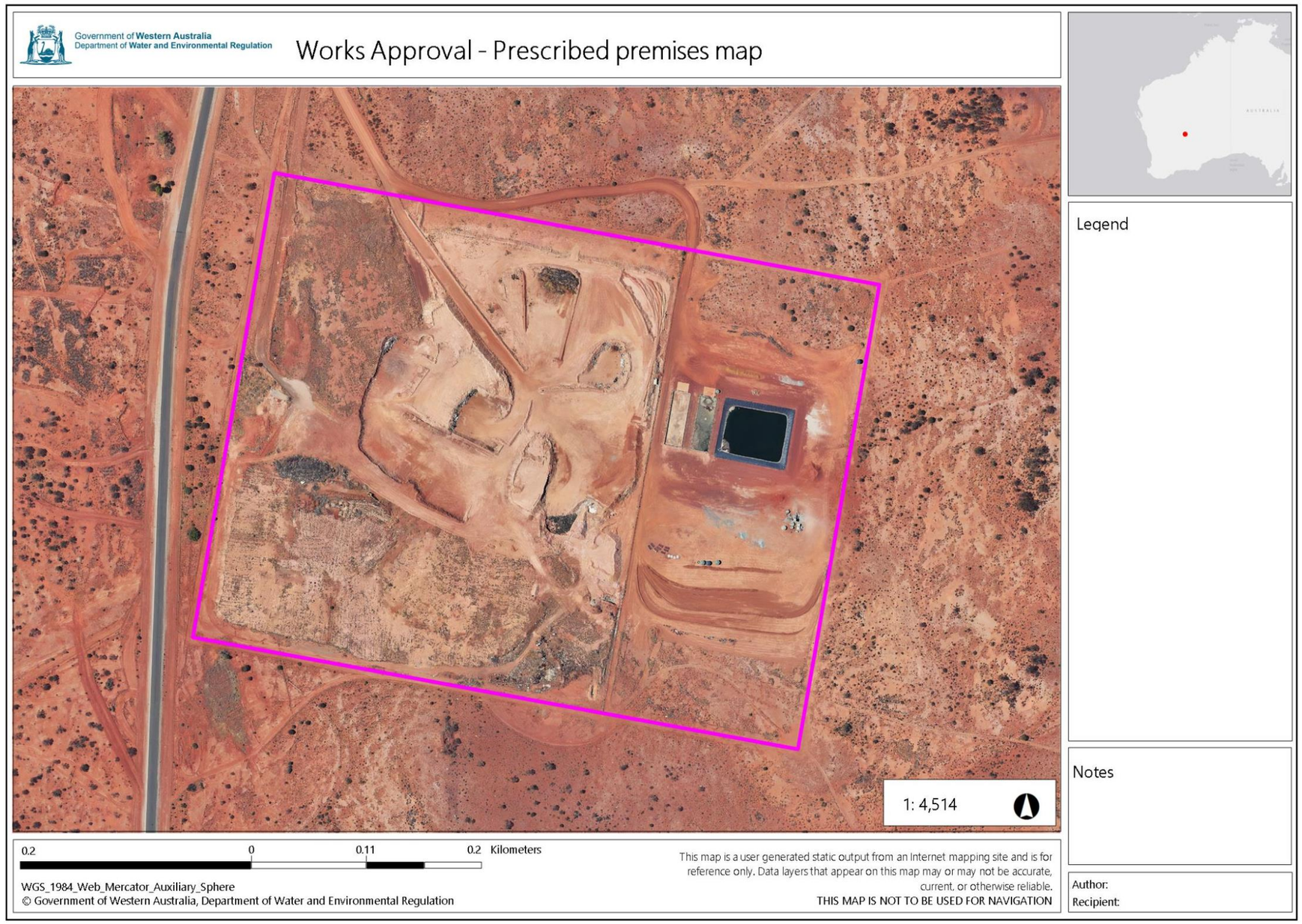


Figure 1: Map of the boundary of the prescribed premises

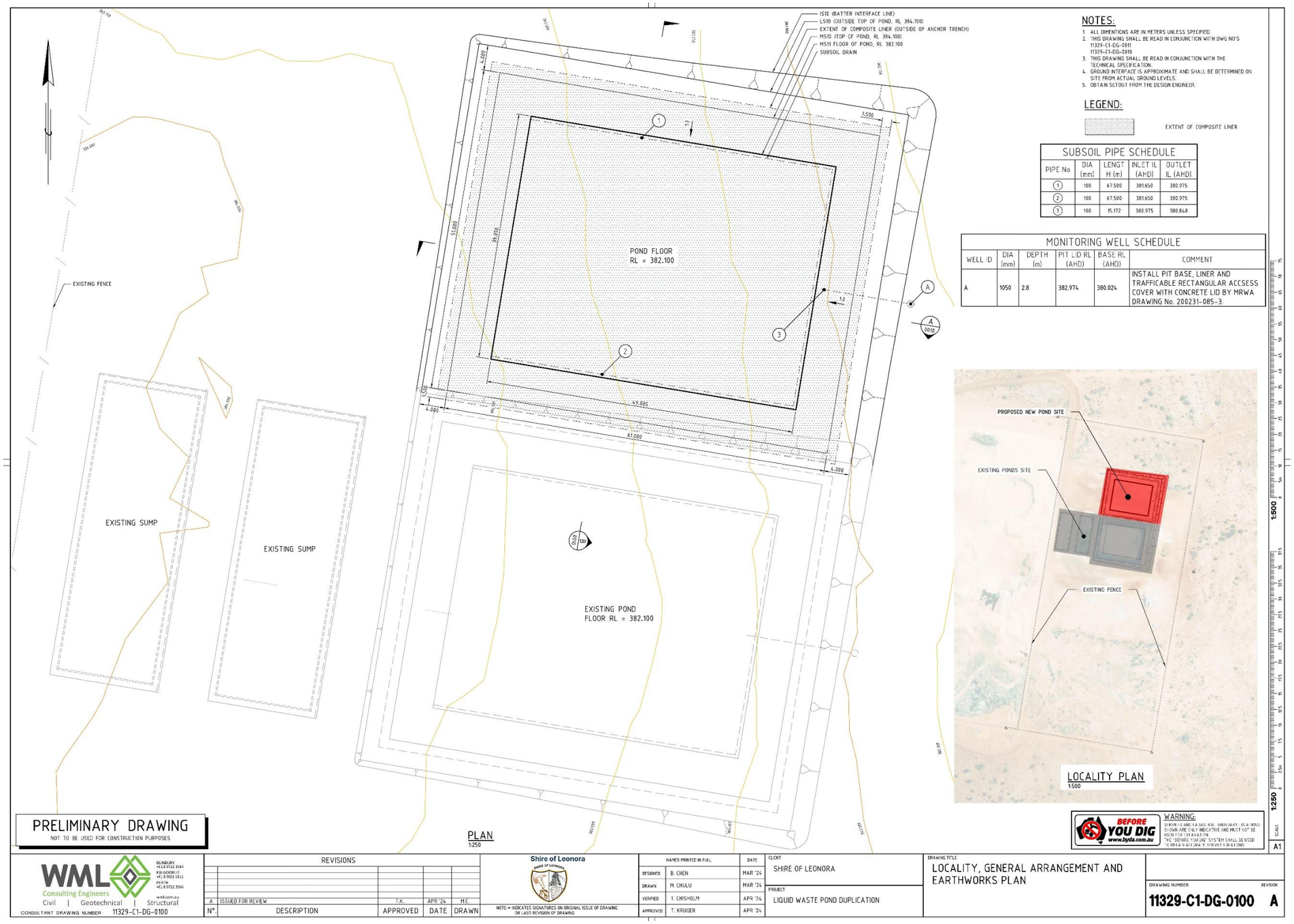


Figure 2: proposed layout of the new pond and monitoring well

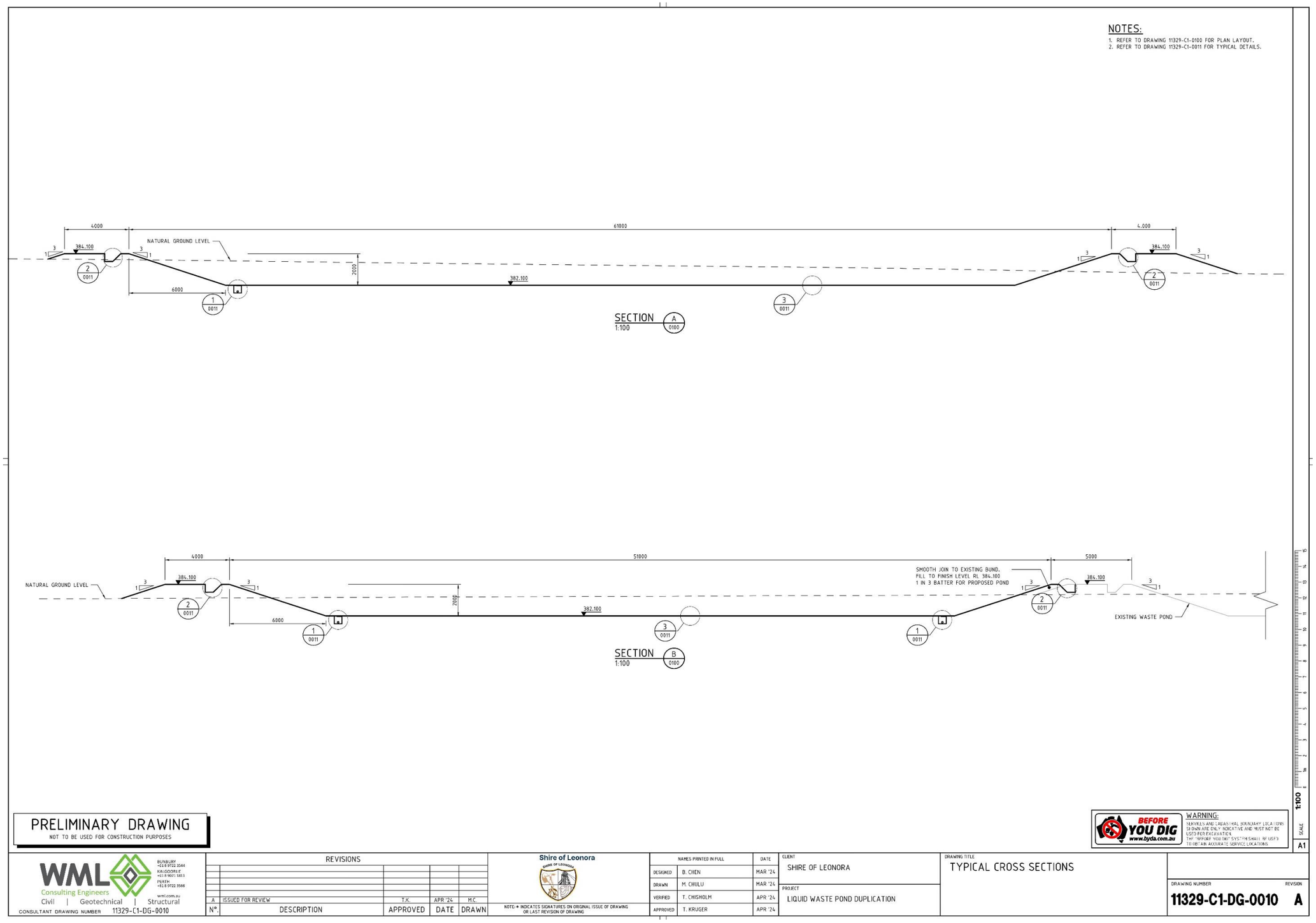
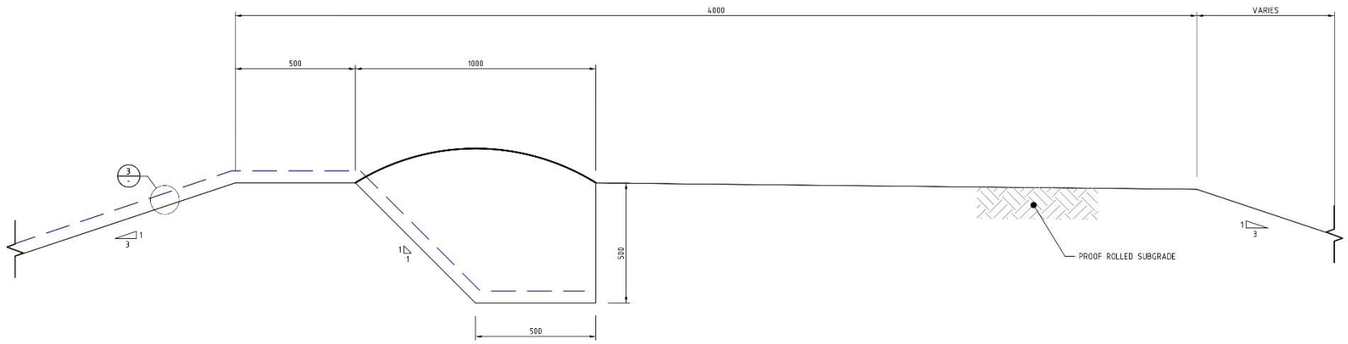


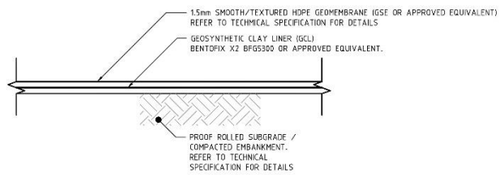
Figure 3: Cross section of the new pond

NOTES:
1. REFER TO DRAWING 11329-C1-0100 FOR PLAN LAYOUT.
2. REFER TO DRAWING 11329-C1-0010 FOR TYPICAL CROSS SECTIONS.



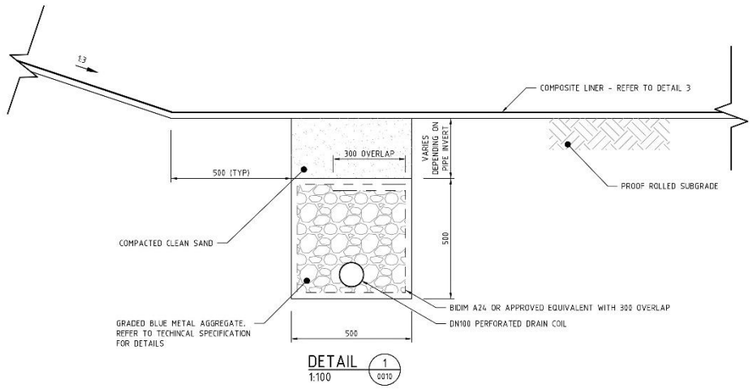
DETAIL 2 / 0010 — 1:100

TYPICAL ANCHOR TRENCH DETAILS



DETAIL 3 / 0010 — 1:100

TYPICAL COMPOSITE LINER CROSS SECTION



DETAIL 1 / 0010 — 1:100

TYPICAL SUBSOIL DRAIN LOCATION AND DETAIL

PRELIMINARY DRAWING
NOT TO BE USED FOR CONSTRUCTION PURPOSES

BEFORE YOU DIG www.byda.com.au

WARNING:
SERVICES AND CADASTRAL BOUNDARY LOCATIONS SHOWN ARE ONLY INDICATIVE AND MUST NOT BE USED FOR EXCAVATION.
THE 'BEFORE YOU DIG' SYSTEM SHALL BE USED TO OBTAIN ACCURATE SERVICE LOCATIONS

SCALE 1:100 A1

WML Consulting Engineers
BUNBURY +61 8 9722 2644
KALGOORLIE +61 8 9021 1811
PERTH +61 8 9277 9568
wml.com.au
Civil | Geotechnical | Structural
CONSULTANT DRAWING NUMBER 11329-C1-DG-0011

REVISIONS				
N°	DESCRIPTION	APPROVED	DATE	DRAWN
A	ISSUED FOR REVIEW	T.K.	APR '24	M.C.

Shire of Leonora
NOTE: * INDICATES SIGNATURES ON ORIGINAL ISSUE OF DRAWING OR LAST REVISION OF DRAWING

NAMES PRINTED IN FULL		DATE
DESIGNED	B. CHEN	MAR '24
DRAWN	M. CHULU	MAR '24
VERIFIED	T. CHISHOLM	APR '24
APPROVED	T. KRUGER	APR '24

CLIENT: SHIRE OF LEONORA
PROJECT: LIQUID WASTE POND DUPLICATION
DRAWING TITLE: TYPICAL DETAILS
DRAWING NUMBER: 11329-C1-DG-0011
REVISION: A

Figure 4: Layout of the site and subgrade preparation

Schedule 2: Premises boundary

The corners of the premises boundary are the coordinates listed in Table 7.

Table 7: Premises boundary coordinates (GDA2020)

	Easting	Northing	Zone
1.	924857.13435	6796178.97976	50
2.	925381.64104	6796063.64427	50
3.	925296.93102	6795672.24540	50
4.	924773.45173	6795786.49504	50