Government of Western Australia
Department of Water and Environmental Regulation

Licence

Licence number	L7413/1998/10
Licence holder	Cretta Pty Ltd
ACN	008 870 166
Registered business address	35 Hay Street SUBIACO, WA 6008
DWER file number	DER6824/1
Duration	24/02/2025 to 23/02/2045
Date of issue	20/02/2024
Premises details	Howard Park Wines 137 Fifty-One Road COWARAMUP 6284 Legal description - Lots 22 and 23 on Plan 98345 As defined by the premises map attached to the issued licence

Prescribed premises category description (Schedule 1, ***Environmental Protection Regulations 1987***)	**Assessed production capacity**
Category 25: Alcoholic beverage manufacturing: Premises on which alcoholic beverage is manufactured and from which liquid waste is or is to be discharge onto land or into water.	No more than 3,200 kilolitres of wine per annual period.

This licence is granted to the licence holder, subject to the attached conditions, on 20 February 2025, by:

Caron Goodbourn

Digitally signed by Caron Goodbourn
Date: 2025.02.20 08:29:59 +08'00'

Manager, Process Industries

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

Licence history

Date	Reference number	Summary of changes
21/12/1999	W134/98/1	New premises Works Approval
13/3/2000	L06630/1	New Licence
21/3/2001	L7431	Licence re-issue
24/10/2001	L7431/2	Administrative amendment
20/3/2002	L7431/3	Licence re-issue
9/4/2002	L7431/3	Administrative amendment
27/1/2003	W3755/1998/1	Wastewater treatment system upgrade
24/3/2003	L7413/4	Licence re-issued (administrative renewal)
23/2/2004	L7413/5	
24/2/2005	L7413/1998/6	
24/2/2008	L7413/1998/7	
24/2/2011	L7413/1998/8	
20/02/2014	L7413/1998/9	
18/12/2014	L7413/1998/9	Licence re-issue and converted to new template
28/01/2016	L7413/1998/9	Amend administrative error and update to new template
29/01/2024	L7413/1998/9	Department initiated amendment to extend expiry date by 12 months to allow more time for the renewal application to be processed.
20/02/2025	L7413/1998/10	Licence re-issued. Includes a full review and format update.

Interpretation

In this licence:

(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 licence:

(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 licence requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this licence.

Licence conditions

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

Infrastructure and equipment

1. The licence holder must ensure that the site infrastructure and equipment listed in Table 1 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 1.

Table 1: Infrastructure and equipment requirements

Item	Site infrastructure and equipment	Operational requirement	Infrastructure location, Schedule 1: Maps.
Winery			
1	Enclosed winery building: Consisting of an enclosed winery building on a concrete hardstand draining to 4 wastewater collection sumps. .	(a) All plant and equipment used for the production and bottling of wine (excluding water tanks) must be operated within the winery building. (b) All wastewater produced from beverage production operations must be directed to one of 4 concrete collection sumps and to the WWTP. (c) Stormwater must be prevented from accessing the wastewater stream and collection sumps.	Shown in Figure 1 as: i. Winery
2	Outdoor tank area: Consisting of wine storage tanks on a concrete hardstand.	(a) All spillages and wastewater must be contained and drained to the WWTP. (b) Stormwater must be prevented from accessing the wastewater stream and hardstand area.	Shown in Figure 1 as: i. Outdoor storage
Wastewater treatment and storage			
3	Wastewater treatment plant (WWTP) consists of: i. 5 kL fibreglass primary receival tank with sump pump ii. 5 kL concrete storage sump with a pump and solids screen	(a) All measures must be taken including but not limited to the use of high-level alarms, regular inspections and high-level markers to ensure that wastewater tanks and sumps do not overtop. (b) Settled solids in the primary settling tanks (PS1, PS2 and PS3) must be periodically removed to maximise treatment capacity. (c) The treated wastewater tank and clarifier	Shown in Figure 1 as: i. WWTP Figure 3 as: i. FM1/SP1

Item	Site infrastructure and equipment	Operational requirement	Infrastructure location, Schedule 1: Maps.
	iii. 20 kL fibreglass primary settling tank (PS1) iv. 2x 50 kL polyethylene primary settling tanks (PS2 and PS3) v. 170 kL concrete untreated storage tank vi. 2x 210 kL lined steel untreated storage tanks vii. 4x 50 kL polyethylene untreated storage tanks viii. Control shed with pumps and two blowers ix. 170 kL concrete batch reactor aeration tank (SBR1) x. 340 kL concrete batch reactor aeration tank (SBR2) xi. 2x 20 kL fibreglass waste activated sludge aeration tanks xii. Stainless-steel clarifier tank (7 kL) xiii. 5 kL fibreglass thicken sludge tank xiv. Flow meter (FM1) xv. Sample tap (SP1)	must have working high level float switches that can prevent overtopping. (d) Sampling tap (SP1) must be maintained at the outlet of the WWTP capable of collecting wastewater for the purpose of sampling (e) A volumetric flow meter (FM1) must be maintained at the outlet of the WWTP to enable the cumulative volume of wastewater discharged to the land application area (L1, L2, L3) and the evaporation pond to be accurately measured.	
4	<u>Treated wastewater storage consisting of:</u> i. 20 kL fibreglass treated wastewater tank ii. 3 ML evaporation pond (approximately 64m x 32 m x 1.5m) constructed with an in-situ a clay liner with a permeability of 3.28×10^{-9}.	(a) A minimum freeboard of 300 mm must be maintained in the evaporation pond (b) Must accept all treated wastewater from the WWTP during the months May to August (inclusive). (c) The evaporation pond must be emptied of sediments once sediments have accumulated to 20 mm (from the base of the pond) of sediments. (d) Solid sediments removed from the evaporation pond must be taken to the marc pad or to an off-site waste disposal facility that is lawfully able to accept the pond sediment waste (e) A pump must be maintained at the evaporation pond to enable wastewater to be	Shown in Figures 1, 2 and 3 as: i. Evaporation pond.

Item	Site infrastructure and equipment	Operational requirement	Infrastructure location, Schedule 1: Maps.
		pumped back to the WWTP to prevent overfilling. (f) Only treated wastewater must be pumped into the evaporation pond.	
Solids treatment			
5	Marc storage pad consisting of a bunded clay lined hardstand and leachate sump connected via a pipe to convey leachate the WWTP	(a) Only organic solid wastes (grape marc, WWTP sludge and dewatered evaporation pond sediments) may be stored on the marc pad. (b) All leachate generated on the marc pad must be directed into the leachate sump for transfer into the WWTP. (c) Bunding around the marc pad and leachate sump must be maintained to divert and prevent stormwater from entering the pad area and sump. (d) Organic solid waste stabilised on the marc pad may be spread on the premises vineyards in areas that are not within 50 metres from any defined watercourse, wetland or premises boundary. (e) All organic solid wastes being stored and stabilized, must only be held within the marc pad hardstand.	Shown in Figure 1 and 2 as: i. Marc storage
Irrigation of wastewater to land application area			
6	<u>1.15 ha land application area (L1, L2, L3) consisting of:</u> i. Planted blue gums. ii. Irrigation pipe and valves including 23 irrigation stations. iii. Sprinklers and flood irrigation	(a) Only treated wastewater that has passed through flowmeter (FM1) may be irrigated to the land application area (L1, L2, L3). (b) Irrigation must not be undertaken during, or 24 hours immediately after a rainfall event of over 10 mm. (c) Irrigation must not occur between the months of May to August (inclusive). (d) Irrigation must only occur on a rotational basis ensuring that areas are not irrigated for at least 23 hours between applications. (e) The land application area must be visually inspected on a daily basis during vintage and post vintage when irrigation is occurring to ensure that irrigation does not occur onto areas that are visibly waterlogged. (f) Bunding in the land application area is maintained to prevent surface runoff of wastewater or contaminated stormwater from leaving the land application area. (g) Gypsum must evenly be applied across the land application area annually in order to manage dispersive soils.	Shown in Figure 2 as: i. Land application area (L1, L2, L3). ii. Irrigation pipeline. ii. FM1/SP1

Installation of monitoring wells

2. The licence holder must design and install groundwater monitoring wells in accordance with the requirements specified in Table 2.

Table 2: Infrastructure requirements – groundwater monitoring wells

Infrastructure	Design, construction, and installation requirements	Monitoring well location (s)	Timeframe
Groundwater monitoring well(s) Once installed, GW1, GW2, GW3.	<u>Well design and construction:</u> Designed and constructed in accordance with *ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores*. Well must be constructed with a screened interval from 500 mm below the surface to above the laterite formation and positioned to be capable of detecting seasonal perched groundwater flow and leaching from the premises. See Schedule 3, Figure 4 for generic installation requirements.	As depicted in Schedule 1,Figure 3: Map of groundwater monitoring well locations labelled as GW1, GW2, GW3.	Must be constructed, developed (purged), and determined to be operational by no later than 90 calendar days from the date of issue of this licence.
	<u>Logging of borehole:</u> Soil samples must be collected and logged during the installation of the monitoring wells. A record of the geology encountered during drilling must be described and classified in accordance with the Australian Standard Geotechnical Site Investigations AS1726. Any observations of staining / odours or other indications of contamination must be included in the bore log.		
	<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, screen positions and the elevations of the ground surface protective installations.		
	<u>Well development:</u> All installed monitoring wells must be developed after drilling to remove fine sand, silt, clay, and any drilling mud residues from around the well screen to ensure the hydraulic functioning of the well. A detailed record should be kept of well development activities and included in the well construction log.		
	<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 all monitoring wells in the monitoring network and their respective identification numbers.		

3. The licence holder must within 30 days of the groundwater monitoring wells, required by condition 2, being constructed, submit to the CEO a well construction report

evidencing compliance with the requirements of condition 2.

4. The report required by condition 3 must:

(a) be certified by the driller that each item of infrastructure or equipment specified in Table 2 meets the corresponding specifications and at the locations set out in Table 2 and has been constructed with no material defects; and

(b) be signed by a person authorised to represent the licence holder and contains the printed name and position of that person within the company.

Emissions and discharges

Irrigated wastewater limits

5. The licence holder must ensure that emissions from the discharge point listed in Table 3 for the corresponding parameter do not exceed the corresponding limit when monitored in accordance with condition 8.

Table 3: Irrigated wastewater limits

Discharge point	Parameter	Limit value (including units)	Sampling
Land application area (L1 - 3) as shown in Schedule 1 Figure 2	pH	Between 5.5 and 8.5	Spot sample
	Electrical conductivity	Less than or equal 2.9 dS/m	
	SAR:EC	Within the "stable soil structure" range depicted in Schedule 4, Figure 5	
	Total nitrogen	160 kg/ha/annual period	Annual loading (see Schedule 2)
	Total phosphorus	40 kg/ha/annual period	
	Biological oxygen demand	1500 kg/ha/month	Monthly loading (See Schedule 2)

Hydraulic loading

6. The licence holder must ensure that the irrigation of wastewater to the land application areas does not exceed the limits specified in Table 4

Table 4: Irrigated wastewater hydraulic loading limits.

Discharge point	Month	Maximum treated wastewater application limit (kL)
Land application area (L1 - 3) as shown in Schedule 1 Figure 2.	January	3525
	February	2145
	March	2235
	April	1215
	May to August (inclusive)	0
	September	1100

	October	1160
	November	2690
	December	3310

7. The licence holder must submit a land application area (L1 – 3) tree coppicing plan to the CEO by 31 August 2025. The tree coppicing plan must include the following:

a) the frequency of coppicing rotation (years) and when during the year the coppicing will occur;

b) how coppiced biomass is removed from the land application area, processed and disposed of or reused; and

c) how the coppiced biomass will be weighed and recorded.

Monitoring

Monitoring of emissions to land

8. The licence holder must monitor emissions in accordance with the requirements specified in Table 5 and record the results of all such monitoring.

Table 5: Emissions and discharges monitoring

Discharge point	Monitoring location	Parameter	Units	Frequency	Averaging period	Method
FM1 – outflow from irrigation tank to land application area as shown in Schedule 1 Figure 3 as FM1/SP1	Wastewater sampling point SP1 and flow meter FM1 - outlet from the wastewater treatment system to the land application area (As shown in Schedule 1 Figure 3 as FM1/SP1)	Volumetric flow rate (cumulative) recorded as to the evaporation pond or to each of the land application areas L1, L2 and L3.	L/day	Continuous when discharging	Monthly	N/A
		pH[1]	-	Monthly while irrigating	Spot sample	AS/NZS 5667.1 and AS/NZS 5667.10
		Electrical conductivity[1]	dS/m			
		Total nitrogen	mg/L			
		Total phosphorus				
		Total dissolved solids				
		Total suspended solids				
		Potassium				
		Biological oxygen demand (BOD)				
		Sodium adsorption ratio (SAR)[2]	-	Twice yearly in February	-	

Discharge point	Monitoring location	Parameter	Units	Frequency	Averaging period	Method
				and July		

[1]In field non-NATA accredited analysis permitted for pH and electrical conductivity.

[2]The licence holder may submit the following parameters to a non-NATA accredited laboratory as approved by the CEO.

Monitoring of ambient soil

9. The licence holder must monitor soil during for concentrations of the identified parameters in accordance with Table 6**:** and record the result of all such monitoring.

Table 6: Monitoring of ambient soil concentrations

Monitoring location L1 as shown in Schedule 1, Figure 3	Parameter	Unit	Frequency
Land application area[1] S1, S2 and S3(A or B)S: Surface composite sample, comprising of samples collected from 0 - 20 cm. S1, S2 and S3 (A or B)D: Deep composite sample comprising of samples collected from each major soil horizon between 20 - 50 cm.	pH	-	Once every two years in January. [2]
	Electrical Conductivity	dS/m	
	Total nitrogen	mg/kg	
	Total available nitrogen		
	Total phosphorus		
	Total available phosphorous (Colwell method)		
	Total Dissolved Salts (TDS)		
	Potassium[2]		
	Sodium[2]		
	Magnesium[2]		
	Calcium		
	Phosphorus retention index (PRI)	-	
	Exchangeable sodium percentage	%	

[1]The licence holder must not consecutively sample from points A and B and must alternate as per the sampling frequency,

[2]The licence holder may submit the following parameters to a non-NATA accredited laboratory as approved by the CEO.

Monitoring of ambient groundwater

10. Once installed the licence holder must monitor groundwater for concentrations of parameters in accordance with Table 7 and record the results of all such monitoring.

Table 7: Monitoring of ambient groundwater concentrations

Monitoring well location	Parameter	Units	Frequency[2]	Averaging period	Sampling method
GW1, GW2, GW3 – shown in Figure 2, Schedule 1.	Standing water level	mbgl	Quarterly (March, June, September,	Spot sample	In-field measurement
	pH[1]	-			AS5667.1

	Electrical conductivity[1]	dS/m	and December)		AS5667.11
	Total nitrogen	mg/L			
	Ammonium nitrogen				
	Total phosphorous				
	Total dissolved solids (TDS)				

[1]In field non-NATA accredited analysis permitted.

[2]If sampling occurs and the bore is dry the applicant must re-attempt sampling, if still dry then this is to be recorded.

11. The licence holder must ensure that:

(a) all wastewater sampling is conducted in accordance with AS/NZS 5667.10;

(b) all soil sampling is conducted in accordance with AS 4482.1 and AS4482.2; and

(c) all groundwater sampling is conducted in accordance with AS5667.1 AS5667.11

(d) unless specified, all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured.

12. The licence holder must ensure that monitoring is undertaken in each monthly period such that there are at least 15 days between the days on which samples are taken in successive months.

Records and reporting

13. The licence holder must record the following information in relation to complaints received by the licence 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 licence holder to investigate or respond to any complaint.

14. The licence holder must:

(a) undertake an audit of their compliance with the conditions of this licence during the preceding annual period; and

(b) prepare and submit to the CEO by no later than the **1 September** after the end of that annual period an Annual Audit Compliance Report in the approved form.

15. The licence holder must maintain accurate and auditable books including the following records, information, reports, and data required by this licence:

(a) any maintenance of infrastructure that is performed in the course of complying with condition 1 of this licence;

(b) monitoring programmes undertaken in accordance with conditions 8 and 9 of this licence; and

(c) complaints received under condition 13 of this licence.

16. The licence holder must, within 48 hours of becoming aware of any discharge of wastewater (leaks or spills) from any wastewater containment infrastructure, sump, marc pad or pipeline and breach of any specified limit in the licence must notify the CEO in writing and include in that notification the following information:

(a) the time and date when the discharge or limit breach occurred;

(b) if any environmental impact occurred because of the discharge or limit breach and if so, what that impact is and where the impact occurred, and

(c) the details and result of any investigation undertaken into the cause of the discharge or limit breach.

(d) future measures to be taken in order to prevent another discharge or limit breach.

17. The licence holder must submit to the CEO by no later than **1 September** after the end of each annual period, an Annual Environmental Report for that annual period for the conditions listed in Table 8, and which provides information in accordance with the corresponding requirement set out in Table 8.

Table 8: Annual environmental report

Condition or table	Requirement
1	(a) The volumes (kL) of wine produced each annual period (b) The location and amount of stabilised solid organic waste applied to land on the premises in m^3/ha. (c) Amount (tonnes/m^3) of solid organic waste l removed off site each annual period and where the waste was disposed to.
5 or **Error! R eference source not found.**	(d) Wastewater monitoring data in tabulated and graphical form that includes the sample date compared to the discharge limits. If limits have been exceeded an explanation of why and what actions will be taken to ensure limits are met in the future. (e) Present monthly and annual tabulated loadings of nitrogen, phosphorus and BOD applied to the land application (L1) using the Nutrient Loading Spreadsheet in Schedule 2.
8	(f) Monthly volume (m^3 or kL) of treated wastewater applied to each individual land application area (L1, L2 and L3). (g) Wastewater monitoring data in tabulated and graphical form including the sampling date. (h) An assessment and interpretation of the data including comparison to historical trends and loading limits (minimum of 5 years). (i) Copies of all laboratory sample analysis reports.
9	(j) Soil monitoring data in tabulated and graphical form including the sampling date. (k) An assessment and interpretation of the data including comparison to historical trends (minimum of 5 years). (l) Copies of all laboratory sample analysis reports.

Condition or table	Requirement
13	(m) A summary of complaints recorded for the annual period.
14	(n) A summary of compliance against each licence condition.
16	(o) A summary of all spills and the results of each investigation undertaken.

Definitions

In this licence, the terms in Table 9 have the meanings defined.

Table 9: Definitions

Term	Definition
ACN	Australian Company Number
Annual Audit Compliance Report (AACR)	means a report submitted in a format approved by the CEO (relevant guidelines and template available on the Department's website).
annual period	a 12-month period commencing from 01 July until 30 June
AS/NZS 4482.1-2005	means the Australian Standard AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil – Non-volatile and semi-volatile compounds
AS/NZS 4482.2-1999	means the Australian Standard AS 4482.2-1999 Guide to the sampling and investigation of potentially contaminated soil – Volatile substances
AS/NZS 5667.1	means the current version of Australian / New Zealand Standard AS/NZS 5667.1 *Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*
AS/NZS 5667.10	means the current version of Australian / New Zealand Standard AS/NZS 5667.10 *Water Quality – Sampling, Part 10: Guidance on sampling of wastewaters*
averaging period	means the time over which a limit is measured, or a monitoring result is obtained.
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer of the Department. "submit to / notify the CEO" (or similar), means either: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 or: info@dwer.wa.gov.au
discharge	has the same meaning given to that term under the EP Act.

Term	Definition
dS/m	deciseimens per metre.
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)
freeboard	means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point.
hardstand	means a surface with a permeability of 10^{-9} metres/second or less.
kL	kilolitres
licence	refers to this document, which evidences the grant of a licence by the CEO under section 57 of the EP Act, subject to the specified conditions contained within.
licence holder	refers to the occupier of the premises, being the person specified on the front of the licence as the person to whom this licence has been granted.
marc	means grape material (mainly skin, pulp and seeds) which is left over after grape crushing and pressing.
monthly period	means a one-month period commencing from the first day of a month until the last day of the same month.
NATA	means the (Australian) National Association of Testing Authorities
NATA accredited	means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis
premises	refers to the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map Figure 1 in Schedule 1 to this licence.
prescribed premises	has the same meaning given to that term under the EP Act.
spill	a release of a substance that could result in environmental harm.
spot sample	means a discrete sample representative at the time and place at which the sample is taken.
treated wastewater	means winery wastewater that has undergone treatment by screening, settling and aeration via the WWTP infrastructure specified in Table 1.
waste	has the same meaning given to that term under the EP Act.

END OF CONDITIONS

Schedule 1: Maps

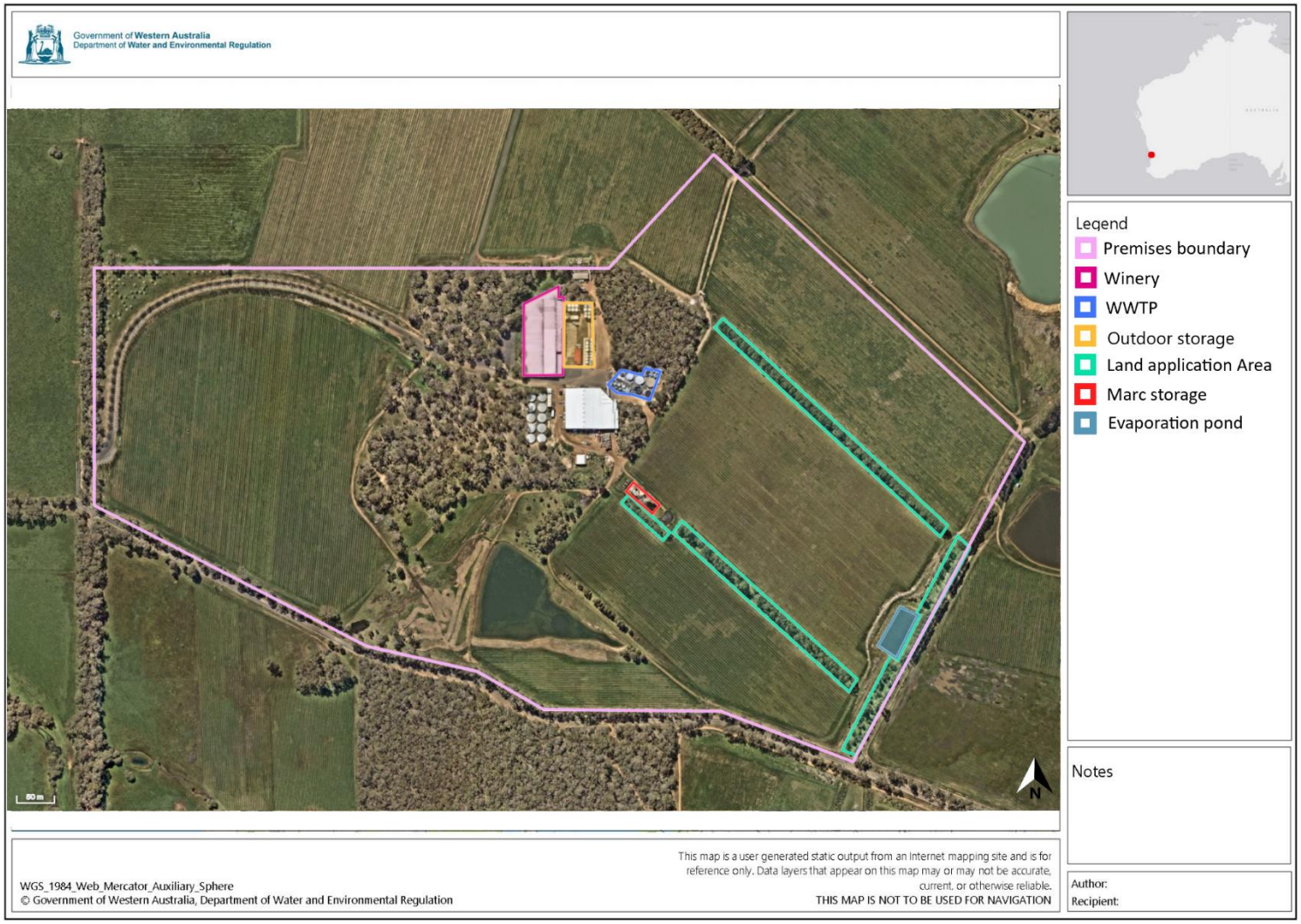

Figure 1: Map of the boundary of the premises (pink line).

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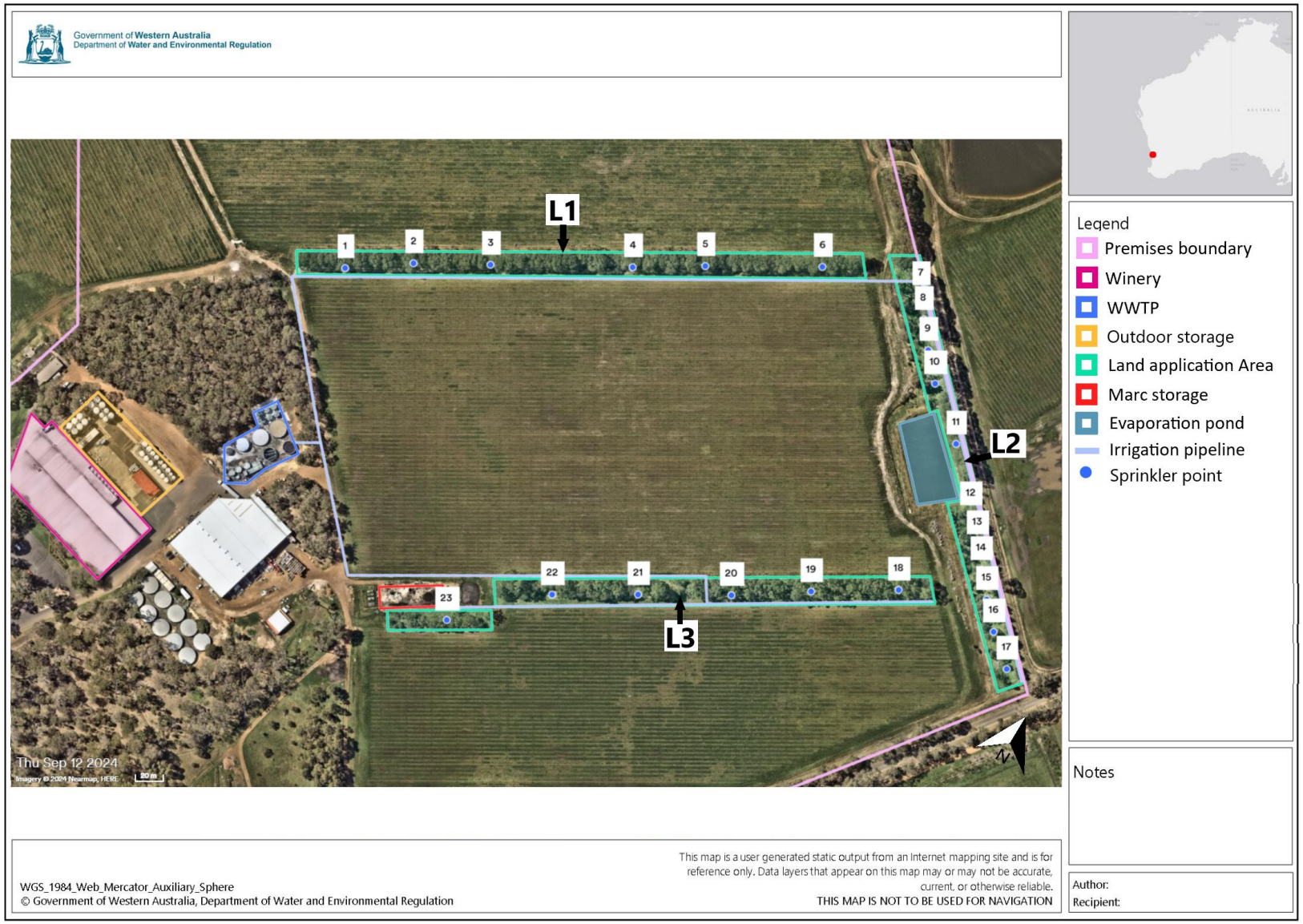

Figure 2: Map of land application areas (L1, L2 and L3) and sprinkler locations (1 – 23).

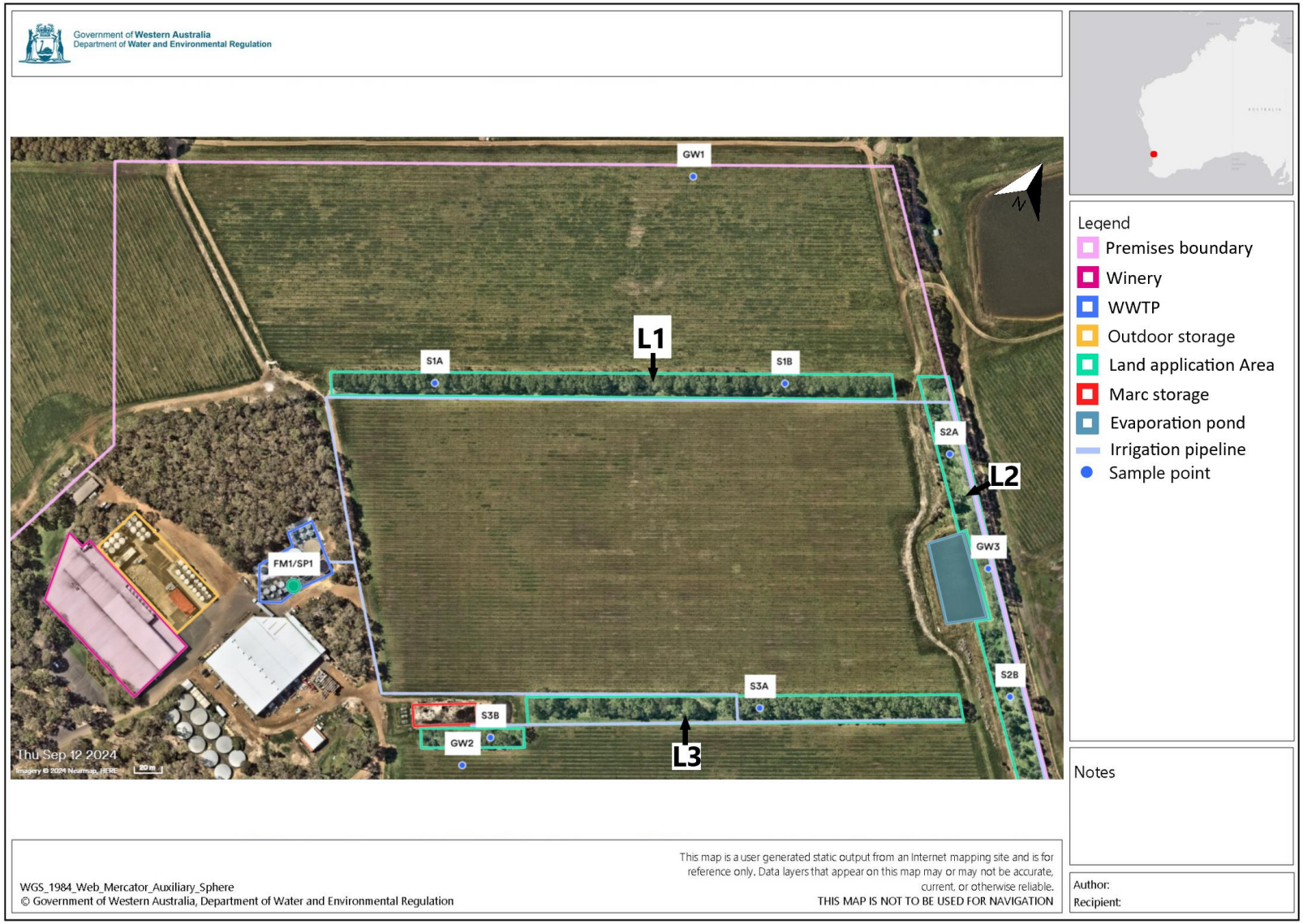

Figure 3: Groundwater (GW1-3), soil (S1-3A/B) and treated wastewater (FM1/SP1) monitoring sample points.

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Schedule 2: Nutrient loading calculator

Irrigation areas[1]: size, volume irrigated, irrigation days				Annual period (as defined by your licence)[2]												Volume irrigated during annual period (kL)[3]
	Size (ha)			January	February	March	April	May	June	July	August	September	October	November	December	
EXAMPLE irrigation area:	*25*	*volume irrigated*	*kL*	*20,000*	*20,000*	*18,000*	*15,000*	*0*	*0*	*0*	*0*	*15,000*	*18,000*	*20,000*	*25,000*	*151,000*
		days of irrigation	*days/month*	*29*	*28*	*30*	*25*	*0*	*0*	*0*	*0*	*20*	*25*	*30*	*27*	
Irrigation Area 1:		volume irrigated	kL													
		days of irrigation	days/month													
Irrigation Area 2:		volume irrigated	kL													
		days of irrigation	days/month													
Irrigation Area 3:		volume irrigated	kL													
		days of irrigation	days/month													
Wastewater quality[4]	*EXAMPLE sampling date:*			*20/01/2022*	*15/02/2022*	*17/03/2022*	*19/04/2022*	*12/05/2022*	*12/06/2022*	*9/07/2022*	*15/08/2022*	*12/09/2022*	*15/10/2022*	*13/11/2022*	*7/12/2022*	
	EXAMPLE total nitrogen	*mg/L*		*13.2*	*21.3*	*17.6*	*19.2*	*42.4*	*25.1*	*30.4*	*40.3*	*34.8*	*38.7*	*44.6*	*47.3*	
	EXAMPLE BOD	*mg/L*		*4.8*	*12.1*	*6.1*	*4.9*	*4.8*	*4.1*	*3.3*	*5.2*	*4.4*	*5.2*	*5.1*	*7.5*	
	Sampling date:															
	For wineries to indicate sampling period:[5]															
	Total nitrogen	mg/L														
	Total phosphorus	mg/L														
	Biochemical oxygen demand	mg/L														

Nutrient and BOD loadings[6]			January	February	March	April	May	June	July	August	September	October	November	December	kg/ha/annual period[7]
EXAMPLE total nitrogen loadings			*10.6*	*17.0*	*12.7*	*11.5*					*20.9*	*27.9*	*35.7*	*47.3*	*183.5*
EXAMPLE BOD loadings		*kg/ha/month*	*3.8*	*9.7*	*4.4*	*2.9*					*2.6*	*3.7*	*4.1*	*7.5*	*38.8*
		kg/ha/day	*0.13*	*0.35*	*0.15*	*0.12*					*0.13*	*0.15*	*0.14*	*0.28*	
Irrigation Area 1	Total nitrogen	kg/ha/month													
	Total phosphorus	kg/ha/month													
	Biochemical oxygen demand	kg/ha/month													
		kg/ha/day													
Irrigation Area 2	Total nitrogen	kg/ha/month													
	Total phosphorus	kg/ha/month													
	Biochemical oxygen demand	kg/ha/month													
		kg/ha/day													
Irrigation Area 3	Total nitrogen	kg/ha/month													
	Total phosphorus	kg/ha/month													
	Biochemical oxygen demand	kg/ha/month													
		kg/ha/day													

Licence limits[8]				
		kg/ha/annual period	kg/ha/month	kg/ha/day
Irrigation area 1	TN			
	TP			
	BOD			
Irrigation area 2	TN			
	TP			
	BOD			
Irrigation area 3	TN			
	TP			
	BOD			

Explanatory notes and calculations:

White cells should be filled in where applicable. Pale yellow cells will calculate automatically.

NOTE 1 - Where there is irrigation to more than 3 areas, additional copies of this sheet should be completed.

NOTE 2 - This sheet should be completed for your annual period as defined by your licence. *E.g. If your annual period is from 1 October to the 30 September in the following year, for the 2022-2023 annual period, you should include data from January - September 2023, and October - December 2022.*
NOTE 3 - Volume irrigated during the annual period (kL), for each irrigation area is the sum of the monthly volumes irrigated to that area. *E.g. For the example shown: Volume irrigated during annual period = 20,000 (Jan) + 20,000 (Feb) + 18,000 (Mar) + 15,000 (Apr) + 15,000 (Sep) + 18,000 (Oct) + 20,000 (Nov) + 25,000 (Dec) = 151,000 kL. Noting that for the example there was no irrigation during the months of May, June, July or August.*
NOTE 4 - The sampling and analysis of your wastewater quality should be undertaken in accordance with your licence conditions. For sampling less often than monthly, i.e. quarterly, 6-monthly, or annually: for months where no sampling is required, wastewater quality should be taken to be equivalent to the most recent sample taken. *E.g. Quarterly sampling during Feb, May, Aug and Nov - total nitrogen concentrations were analysed to be 7, 11, 8 and 13 mg/L respectively in the wastewater. For March and April, as February was the most recent sample taken, total nitrogen concentration is estimated to be 7 mg/L. Similarly, for June and July, as May was the most recent sample, total nitrogen concentration is estimated to be 11 mg/L. There will be no sampling date associated with non-sampling months.* If your licence requires you to monitor loading rates for additional parameters (e.g. inorganic nitrogen, reactive phosphorus etc.) additional copies of this sheet should be completed for the additional parameters.
NOTE 5 - For wineries to indicate sampling period - this row is only required to be completed if your licence condition specifies a sampling period e.g. pre-vinatge, peak vintage, late vintage, post vintage, non-vintage. Indicate which sampling date corresponds with which period.
NOTE 6 - Parameter loading (TN, TP or BOD) each month per hectare for each irrigation area (kg/ha/month): monthly concentration of parameter (TN, TP or BOD) in mg/L * monthly volume of wastewater irrigated to irrigation area (kL) ÷ 1000 size of irrigation area *E.g. Using the example shown, for total nitrogen for January: 13.2 mg/L * 20,000 kL / 1,000 = 264 kg/month. 264 / 25 ha = 10.6 kg/ha/month (for January).* Loading of parameter (BOD) each day per hectare for each irrigation area (kg/ha/day): BOD loading (kg/ha/month) ÷ number of days of irrigation during that month. *E.g. Using the example shown, for BOD for October: 3.7 kg/ha/month / 25 days of irrigation during October = 0.15 kg/ha/day (for October)*
NOTE 7 - To calculate annual loading of parameter (TN, TP or BOD) per hectare (kg/ha/annual period): sum of monthly loadings (kg/ha/month). You should calculate an annual loading (kg/ha/annual period) for each relevant parameter for each irrigation area. *E.g. Using the example shown, for total nitrogen: 10.6 (Jan) + 17 (Feb) + 12.7 (Mar) + 11.5 (Apr) + 20.9 (Sep) + 27.9 (Oct) + 35.7 (Nov) + 47.3 (Dec) kg/ha/month = 183.5 kg/ha/annual period*
NOTE 8 - Relevant licence limits to be entered. Where TN = total nitrogen, TP = total phosphorus, and BOD = biochemical oxygen demand. Once applicable licence limits have been entered, the calculated loadings will become red text if they exceed the relevant limit.

Note: Licence holders can request a digital Excel spreadsheet (with in-built formulas) on request.

Send all requests to info@dwer.wa.gov.au

Attention: Process Industries and quote the licence number.

Schedule 3: Monitoring well design

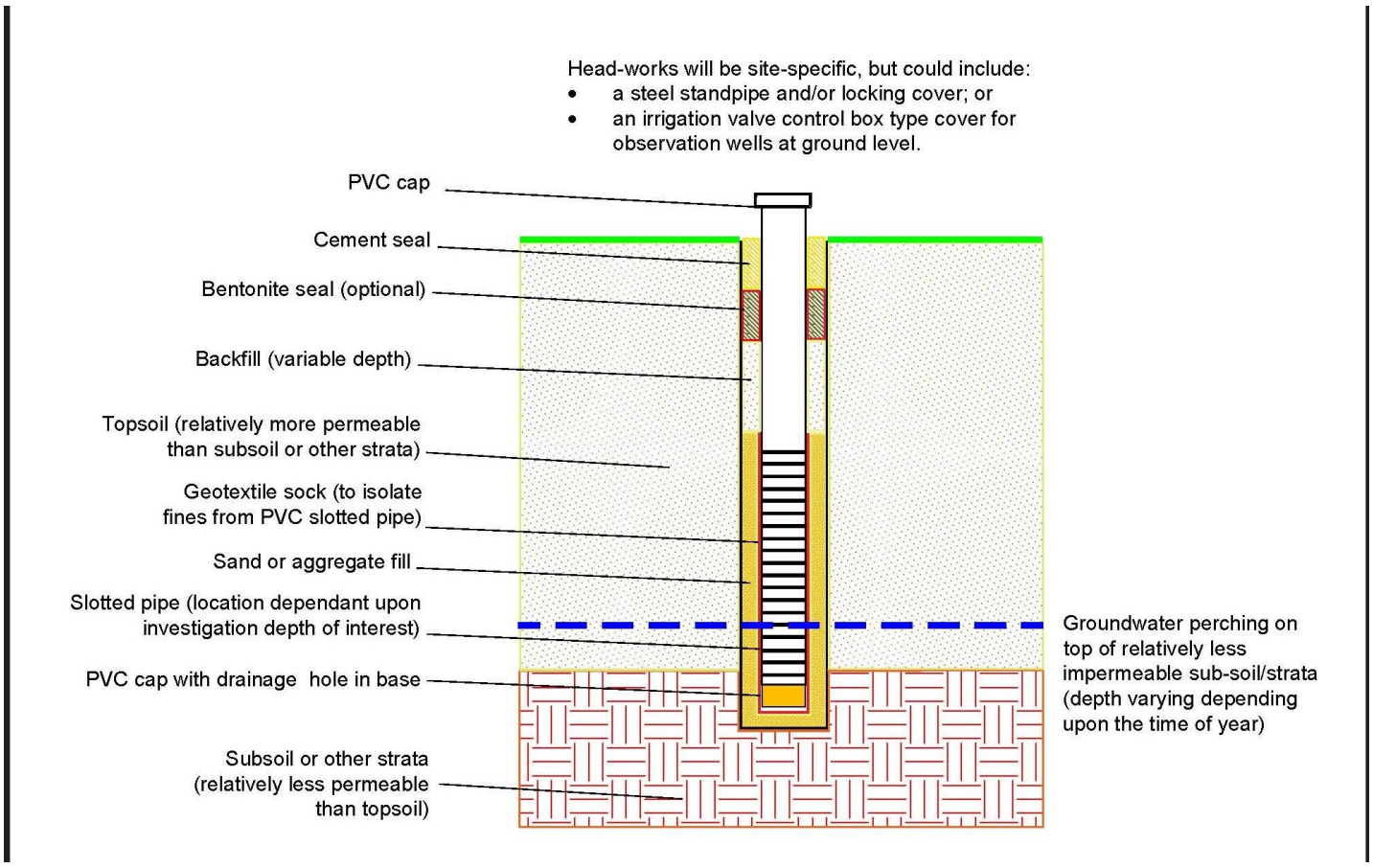

Figure 4: Monitoring well installation requirements.

Schedule 4: SAR:EC relationship graph

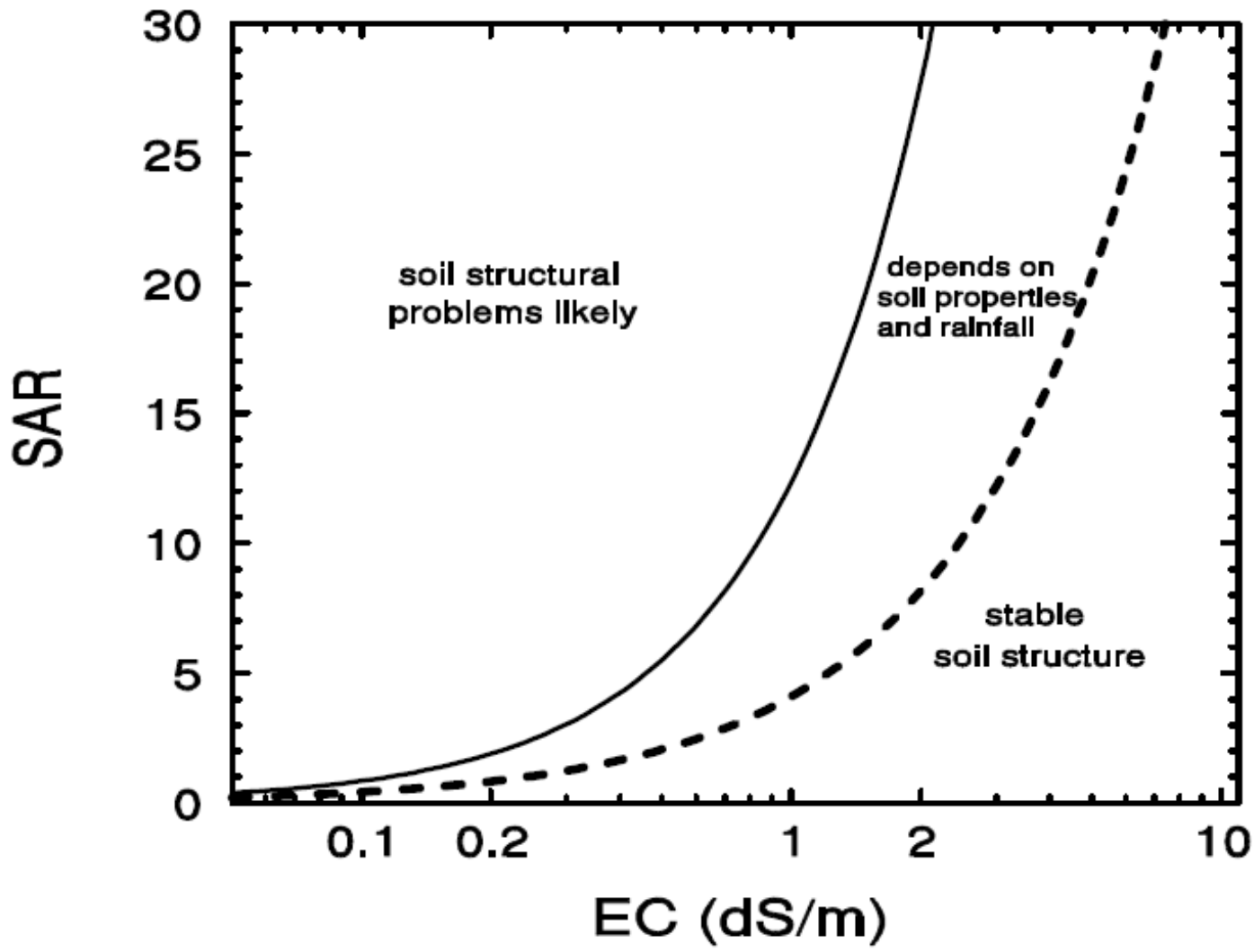

Figure 5: Relationship between Sodium Adsorption Ratio (SAR) and Electrical conductivity (EC) of irrigation water for prediction of soil structural stability (ANZECC, 2000).