Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works Approval Number	W6175/2018/1
Works Approval Holder	TMC Witchcliffe Pty Ltd
ACN	632 933 263
Registered business address	GCM Group 563 Hay Street DAGLISH WA 6008
File Number	DER2018/001493 and INS-0002190
Duration	10/09/2019 to 09/09/2025
Date of issue	10/09/2019
Date of amendment	31/03/2025
Prescribed Premises	Category 54 – Sewage facility
Premises	Witchcliffe Eco Village WWTF 10437 Bussell Highway WITCHCLIFFE WA 6286 As defined by the coordinates in Schedule 1

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed production / design capacity**
Category 54 - Sewage facility: premises – (a) on which sewage is treated (excluding septic); or (b) from which treated sewage is discharged onto land or into waters	160 m^3 per day

This Works Approval is granted to the Works Approval Holder, subject to the following conditions, on 31 March 2025, by:

Digitally signed by Koby Anderson
Date: 2025.03.31 16:15:05 +08'00'

A/MANAGER WASTE INDUSTRIES

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

Definitions and interpretation

Definitions

In this Works Approval, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
Assessment of Site Contamination NEPM	means the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended from time to time.
AS1726	means the Australian Standard AS1762 *Geotechnical site investigations*, as amended from time to time.
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 *Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples.*
AS/NZS 5667.10	means the Australian Standard AS/NZS 5667.10 *Sampling – Guidance on sampling of wastewaters.*
AS/NZS 5667.11	means the Australian Standard AS/NZS 5667.11 *Water Quality – Sampling – Guidance on sampling of groundwaters.*
ASTM D5092/D5092M-16	means the ASTM international standard for *Standard practice for design and installation of groundwater monitoring wells (Designation: ASTM D5092/D5092M-16)*, as amended from time to time.
Australian Soil and Land Survey Field Handbook	means the document titled *Australian soil and Land Survey Field Hand Book* (March 2009) published by CSIRO Publishing.
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 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
Commissioning	means the process of operation and testing that verifies the works and all relevant systems, plant, machinery and equipment have been installed and are performing in accordance with the design specification set out in the Works Approval application.
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.

Term	Definition
Department Request	means a request for Books or other sources of information to be produced, made by an Inspector or the CEO to the Works Approval Holder in writing and sent to the Works Approval's address for notifications, as described at the front of this Works Approval, in relation to: (a) compliance with the EP Act or this Works Approval; (b) the Books or other sources of information maintained in accordance with this Works Approval; or (c) the Books or other sources of information relating to Emissions from the Premises.
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.
EP Act	means the *Environmental Protection Act 1986* (WA).
EP Regulations	means the *Environmental Protection Regulations 1987* (WA).
GDA	Geocentric Datum of Australia
Inspector	means an inspector appointed by the CEO in accordance with s.88 of the EP Act.
MBBR	means Moving bed bioreactor.
MMDD	means Maximum Modified Dry Density.
NSW DEC, 2003	refers to the technical guidance document "Use of Effluent for Irrigation" published by the Department of Environment Conservation (NSW) in 2003.
Pollution	has the same meaning given to that term under the EP Act.
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.
Quarterly	means the 4 inclusive periods from 1 July to 30 September, 1 October to 31 December and in the following year, 1 January to 31 March and 1 April to 30 June; quarterly monitoring must be undertaken at least 45 days apart.
Reportable Event	means an exceedance above the target limit specified in Column 5 of Table 3.
SG	means Specific Gravity.
septage	wastewater sourced from domestic septic tank waste streams.

Term	Definition
Spot sample	means a discrete sample representative at the time and place at which the sample is taken.
Stages 1, 2, 3 and 4.	means the staged works as defined in Schedule 2.
Tankered wastewater	Septage brought to site by a truck with storage tank that is appropriated authorised to store that waste.
Waste	has the same meaning given to that term under the EP Act.
Works	refers to the Works described in Schedule 2 and 4, 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.
WWTF	Wastewater treatment facility.

Interpretation

In this Works Approval:

(a) the words ‘including’, ‘includes’ and ‘include’ will be read as if followed by the words ‘without limitation’;

(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 means the version of the standard, guideline or code of practice in force at the time of granting of this Works Approval and includes any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the Works Approval; and

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act.

Conditions

Infrastructure and equipment

1. The Works Approval Holder must install and undertake the Works for the infrastructure and equipment:

(a) specified in Column 1;

(b) to the requirements specified in Column 2; and

(c) at the location specified in Column 3

of Schedule 2.

2. The Works Approval Holder must not depart from the requirements specified in Column 2 of Schedule 2 except:

(a) where such departure does not increase risks to public health, public amenity or the environment; and

(b) all other Conditions in this Works Approval are still satisfied.

3. Subject to Condition 1, within 30 days of the completion of each stage of the Works specified in Column 1 of Schedule 2, the Works Approval Holder must provide to the CEO a report/engineering/building certification from a suitably qualified professional confirming each item of infrastructure or component of infrastructure specified in Column 1 of Schedule 2 has been constructed with no material defects and to the requirements specified in Column 2.

4. Where a departure from the requirements specified in Column 2 of Schedule 2 occurs and is of a type allowed by Condition 2, the Works Approval Holder must provide to the CEO a description of, and explanation for, the departure along with the certification required by Condition 2(b).

5. The groundwater monitoring wells specified under Condition 1, must be constructed, developed (purged) and determined to be operational within six months from the date of this granted Works Approval.

6. The Works Approval Holder must within 60 days of the groundwater monitoring wells being constructed, submit to the CEO, a well construction report which assesses compliance with the requirements of Condition 1 (Construction of groundwater monitoring wells).

Dust management

7. The Works Approval Holder must ensure that no visible dust generated from the Works identified in Table 10 crosses the boundary of the Premises.

Soil suitability validation testing

8. The Works Approval Holder must obtain the services of a qualified soil-scientist to undertake soil validation testing in accordance with the methodologies indicated in the *Australian Soil and Land Survey Field Handbook* to demonstrate the soil materials beneath the irrigation area have suitable physical and chemical properties to enable wastewater to be discharged to land on an on-going sustainable basis.

9. The Soil validation testing required under Condition 8 must:

(a) be carried out using test-pits that are excavated to a depth of at least two metres or refusal on hardpan layers or bedrock;

(b) identify the following physical properties;

(i) soil texture and structure;
(ii) topsoil depth;
(iii) depth to drainage or root impeding layers;
(iv) infiltration rates for key horizons; and
(v) soil water holding capacities.

(c) assess the following parameters:

(i) electrical conductivity;
(ii) pH (in a calcium chloride solution)
(iii) exchangeable sodium percentage;
(iv) saturated hydraulic conductivity;
(v) effective cation exchange;
(vi) the Emerson aggregate test; and
(vii) the phosphorous sorption capacity

10. The Works Approval must within six months of Works Approval granting, provide a report to the CEO of the findings of the Soil validation testing required under Conditions 8 and 9 including specific measures that will be implemented to manage any sites classified as having “severe” limitations as determined by reference to Figure 1 below.

Property	Limitation			Restrictive Feature
	Nil or Slight	Moderate	Severe[1]	
Exchangeable sodium percentage (0–40 cm)	0–5	5–10[2]	> 10	structural degradation and waterlogging
Exchangeable sodium percentage (40–100 cm)	< 10	>10	–	structural degradation and waterlogging
Salinity measured as electrical conductivity (EC_e) (dS/m at 0–70 cm)	< 2	2–4	> 4[3]	excess salt may restrict plant growth
Salinity measured as electrical conductivity (EC_e) (dS/m at 70–100 cm)	< 4	4–8	> 8[3]	excess salt may restrict plant growth, potential seasonal groundwater rise
Depth to top of seasonal high water table (metres)	> 3[4]	0.5–3[4]	< 0.5	poor aeration, restricts plant growth, risk to groundwater[5]
Depth to bedrock or hardpan (metres)	> 1	0.5–1	< 0.5	restricts plant growth, excess runoff, waterlogging
Saturated hydraulic conductivity (Ks, mm/h, 0-100 cm)	20–80	5–20[6] or >80[6]	<5	excess runoff, waterlogging, poor infiltration
Available water capacity (AWC, mm/m)	> 100	< 100 [6]	–	little plant-available water in reserve, risk to groundwater
Soil pH_{CaCl_2} (surface layer)	> 6–7.5	3.5[7]–6.0 > 7.5	< 3.5	reduces optimum plant growth
Effective cation exchange capacity (ECEC, cmol (+)/kg, average 0–40 cm)	> 15	3–15[8]	< 3	unable to hold plant nutrients
Emerson aggregate test (0–100cm)	4, 5, 6, 7, 8	2, 3	1	Poor structure
Phosphorus (P) sorption (kg/ha at total 0–100 cm)	high[9]	moderate[9]	Low	unable to immobilise any excess phosphorus

Source: Based on Hardie and Hird (1998), See also NSW Department of Primary Industries (2004)

Notes:

1. Sites with these properties are unlikely to be suitable for irrigation of some or all effluent products.
2. Application of gypsum or lime may be required to maintain long-term site sustainability.
3. Some high EC soils containing calcium 'salts' are not necessarily considered 'severe'.
4. Where unable to excavate to 3m, local knowledge and absence of indications of water table to the depth of sampling (1m) should be used.
5. Criteria are set primarily for assessing site suitability for plant growth. Presence of a shallow soil water table may indicate soil conditions that favour movement of nutrients and contaminants into groundwater. In such cases, careful consideration should be given to quality and potential impacts on groundwater (see 2.6 Groundwater).
6. Careful irrigation scheduling and good irrigation practices will be required to maintain site sustainability.
7. Soil pH may need to be increased to improve plant growth. Where effluent is alkaline or lime is available, opportunities exist to raise pH. If acid sulfate soil is present, site-specific specialist advice should be obtained.
8. Soil may become more sodic with effluent irrigation. In some cases, however, this soil property may be ameliorated with addition of a calcium source.
9. Soils with medium to high phosphorus sorption capacity can adsorb excess phosphorus not taken up by plants. The effectiveness of this depends not only on the sorption capacity but also, the depth and permeability of the soil.

Figure 1: Influence of soil parameters on the suitability of a soil profile for long-term irrigation with wastewater (from the New South Wales Department of Environment and Conservation Environmental Guideline *Use of Effluent by Irrigation*, 2003).

Commissioning

11. The Works Approval Holder must notify the CEO in writing one week prior to the commencement of Commissioning of each stage of the works.

12. Commissioning must not exceed a period of twelve months from the date of commencement of Commissioning for Stage 1 and three months from the date of commencement of Commissioning for Stages 2, 3 and 4.

13. Tankered wastewater may be brought to the Premises for commissioning purposes within the following limits:

(a) maximum of three loads accepted per day;

(b) loads accepted a maximum of five days per week and not on Sundays;

(c) maximum acceptance period of 48 weeks total; and

(d) a cumulative limit of 30kL per day of tankered wastewater brought to site.

14. The Works Approval Holder must ensure that during Commissioning no treated wastewater is discharged to the irrigation area.

15. The Works Approval Holder must ensure that during Commissioning, solids screened from tankered wastewater be disposed of to a suitably licensed facility.

16. The Works Approval Holder must undertake process monitoring during Commissioning:

(a) at the locations specified in Column 1;

(b) for the parameters specified in Column 2;

(c) at the frequency specified in Column 4;

(d) using the methods specified in Columns 5 and 7; and

(e) meet the limits specified in Column 6

of Table 2:

Table 2: Commissioning monitoring requirements

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Emission point reference	**Parameter**	**Units**	**Frequency**	**Limit**	**Averaging period**	**Method**
Truck receival point flow meter	Volume of wastewater filtrate from trucks	Litres per day	Daily	As per Condition 13	As per Condition 13	Flow meter reading
Inlet Screen bin	Volume of material screened from tankered wastewater	litres	Per rubbish bin disposal	n/a	n/a	n/a
Treated storage tank/s	Wastewater flow	kL/day	Continuous	160	Cumulative daily	Mag-flow meter
	Total suspended solids (TSS)	mg/L	Weekly	<30	Spot sample	AS/NZS 5667:10

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Emission point reference	**Parameter**	**Units**	**Frequency**	**Limit**	**Averaging period**	**Method**
	Biochemical Oxygen Demand (BOD)	mg/L	Weekly	<20		
	Total Nitrogen (TN)	mg/L	Weekly	<20		
	Total Phosphorous (TP)	mg/L	Weekly	<5		
	*pH	-	Weekly	6.5 – 8.5		
	E.coli	cfu/100mL	Weekly	<100		

*in-situ sampling and recording permitted

17. The Works Approval Holder must provide to the CEO a commissioning report within one month of the completion of the Commissioning for each MBBR including:

(a) a summary of monitoring results recorded against Condition 16;

(b) a list of any original monitoring reports submitted to the Works Approval Holder from third parties for the commissioning period;

(c) a summary of the environmental performance of the plant as installed, against the design specification set out in Condition 1;

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

(e) where they have not been met, measures proposed to meet the design specification and/or works approval conditions, together with timescales for implementing the proposed measures.

Baseline groundwater monitoring

18. The Works Approval Holder must, within two months of completing construction of the groundwater monitoring bores required under Condition 1, commence baseline groundwater monitoring in accordance with the requirements specified in Schedule 3.

19. The Works Approval Holder must adhere to the field quality assurance and quality control procedures specified in Schedule 3 for the monitoring required by Condition 18.

20. All sample analysis must be undertaken by laboratories with current NATA accreditation for the parameters specified unless otherwise specified in Schedule 3.

Time limited operations phase

Commencement and duration

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

(a) where the report/engineering/building certification as required by condition 3, has been submitted by the works approval holder for that item of infrastructure; and

(b) where the item of infrastructure is authorised to undertake environmental commissioning, the Environmental Commissioning Report for that item of infrastructure as required by condition 17 has been submitted by the works approval holder.

22. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 1:

(a) for a period not exceeding the expiry date of this works approval; 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 22(a).

Waste acceptance during time limited operations

23. 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 3.

Table 3: Types of waste authorised to be accepted onto the Premises

Waste type	Quantity limit	Acceptance specification
Sewage and septage waste from external domestic sources	160kL/day	Tankered into the premises and discharged via the WWTF Receiving Sump

Disposal of treated wastewater via irrigation

24. The works approval holder must ensure that the emissions specified in, are discharged only from the corresponding discharge point and only at the corresponding discharge point location.

Table 4: Authorised emission points

Emission	Discharge point	Discharge point location
Treated wastewater	Stage 1, Stage 2 and Stage 3 Irrigation Areas	As shown in Schedule 1: Irrigation Area and Groundwater Monitoring Bore Site Plan

25. The works approval holder must ensure treated wastewater is discharged to land only at the locations specified in Table 5, in accordance with the corresponding discharge (via irrigation) requirements.

Table 5: Authorised discharge of treated wastewater via irrigation

Discharge point	Discharge (via irrigation) requirements
Stage 1, Stage 2 and Stage 3 Irrigation Areas	• Irrigated wastewater must be applied at a maximum rate of 5.33 mm per hour • There must be no pooling of irrigated water • The irrigation system must be maintained in good working order and ensure an even irrigation pattern • Excess treated wastewater must be discharged to the treated wastewater storage tank where it will then be discharged to the storage dam • Treated wastewater from the storage dam must be passed through a filtration unit prior to irrigation • Irrigation must be via drip irrigators • Irrigated wastewater must only be applied to the irrigation field • Irrigated wastewater must be applied at a depth of no more than 10 mm per day

26. The works approval holder must ensure that when irrigating treated wastewater from the discharge point(s) that:

(a) only treated wastewater from the recycled water storage tanks and storage dam is irrigated;

(b) no irrigation generated runoff, spray drift or discharge occurs beyond the boundary of the irrigation area(s);

(c) irrigation does not occur on land that is waterlogged;

(d) irrigation is not undertaken when rainfall is imminent, during, or immediately after a rainfall event;

(e) wastewater is evenly distributed over the irrigation area, and that no ponding or pooling occurs;

(f) no soil erosion occurs;

(g) vegetative cover is maintained over the irrigation area;

(h) irrigation does not occur over leach drains or areas receiving stormwater drainage;

(i) there are weekly visual inspections made of the irrigation area; and

(j) no livestock is permitted to graze the irrigation area.

27. The works approval holder must ensure that treated wastewater is only discharged via irrigation to the specified discharge point(s) in accordance with the limits specified in Table 6.

Table 6: Irrigation emission limits

Discharge point	Parameter	Concentration limit	Loading limit
Stage 1, Stage 2 and Stage 3 Irrigation Areas	Wastewater flow	160 kL/day	N/A
	Total suspended solids	<30 mg/L	N/A

Discharge point	Parameter	Concentration limit	Loading limit
	Biochemical oxygen demand	<20 mg/L	N/A
	Total Nitrogen	<20 mg/L	210 kg/ha/yr
	Total Phosphorus	<5 mg/L	45 kg/ha/yr
	pH	6.5 – 8.5	N/A
	E. coli	<100 cfu/100mL	N/A

28. The works approval holder must ensure that solids screened from tankered wastewater during time limited operations are disposed of to a suitably licensed facility.

29. The works approval holder must undertake emissions and discharge monitoring during time limited operations:

(a) from each emission point;

(b) for the corresponding parameter;

(c) in the corresponding unit;

(d) at the corresponding frequency; and

(e) for the corresponding averaging period;

as set out in Table 7.

Table 7: Emissions and discharge monitoring during time limited operations

Emission point reference	Parameter	Units	Frequency	Averaging period
Truck receival point flow meter	Volume of wastewater filtrate from trucks	L/day	Daily	Daily
Inlet Screen bin	Volume of material screened from tankered wastewater	Tonnes	Per disposal	Not applicable
Treated storage tank/s	Wastewater flow	kL/day	Continuous	Cumulative daily
	Total suspended solids	mg/L	Weekly	Spot sample
	Biochemical Oxygen Demand	mg/L	Weekly	
	Total Nitrogen	mg/L	Weekly	
	Total Phosphorous	mg/L	Weekly	
	pH[1]	-	Weekly	
	E. coli	cfu/100mL	Weekly	

Emission point reference	Parameter	Units	Frequency	Averaging period
Irrigation area flow meter(s)	Volumetric flow rate	m^3/day	Continuous	Daily

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

30. The works approval holder must record the results of all monitoring activity required by condition 29.

Compliance reporting

31. The works approval holder must submit to the CEO a report on the time limited operations 30 calendar days before the expiration date of the works approval.

32. The works approval holder must ensure the report required by condition 31 includes the following:

(a) a summary of the time limited operations, including timeframes and volume of wastewater processed;

(b) a summary of monitoring results obtained during time limited operations under condition 29;

(c) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable);

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

(e) where the manufacturer's design specifications and the conditions of this works approval have not been met, what measures will the works approval holder take to meet them, and what timeframes will be required to implement those measures; and

(f) a summary of groundwater monitoring undertaken in accordance with condition 18.

Record-keeping

33. The Works Approval Holder must maintain accurate Books including information, reports and data in relation to the Works and the Books must:

(a) be legible;

(b) if amended, be amended in such a ways that the original and subsequent amendments remain legible or are capable of retrieval;

(c) be retained for at least 3 years from the date the Books were made;

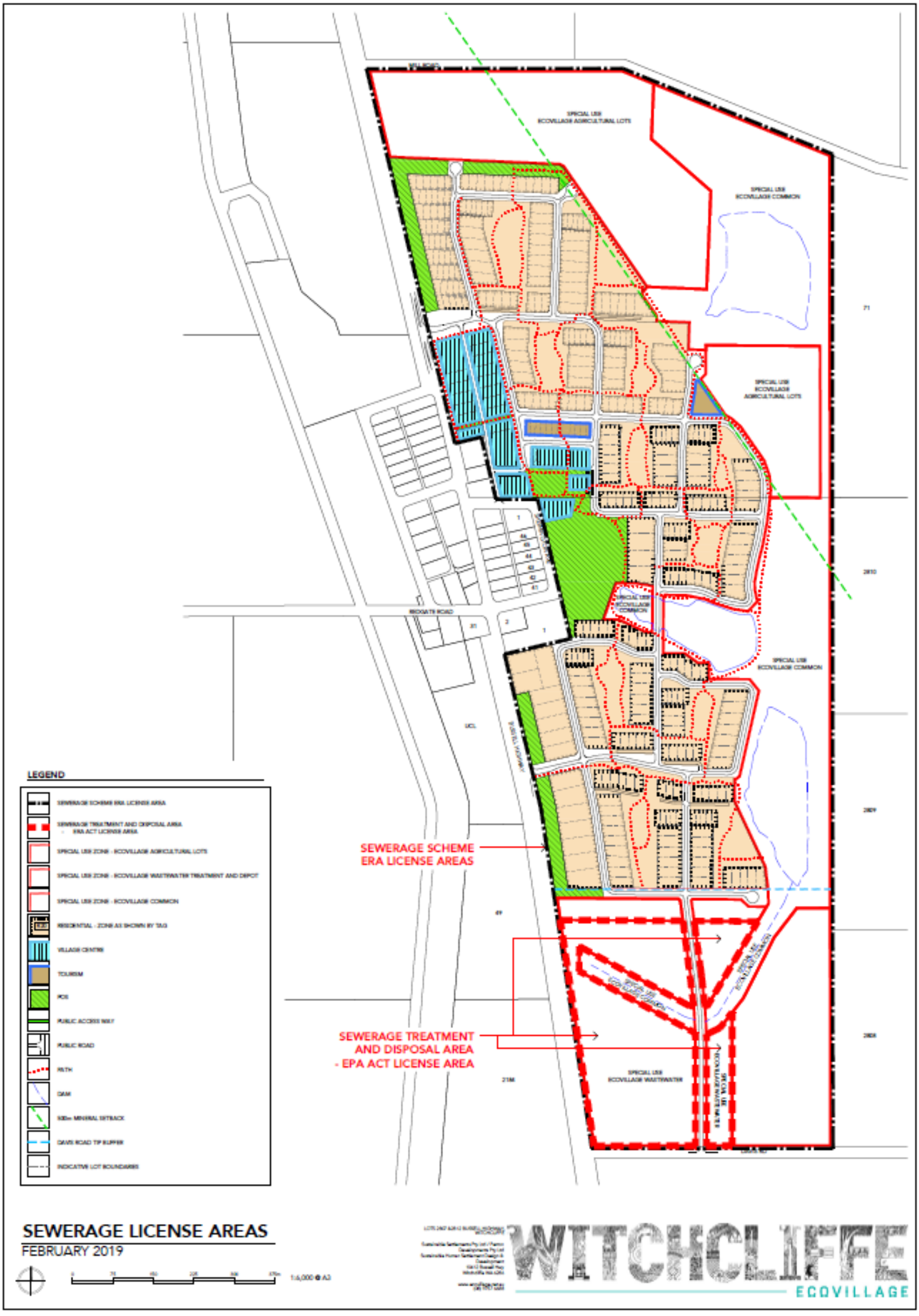
(d) be available to be produced to an Inspector or the CEO.

34. The Works Approval Holder must comply with a Department Request within 14 days from the date of the Department Request or such other period as agreed to by the Inspector or the CEO.

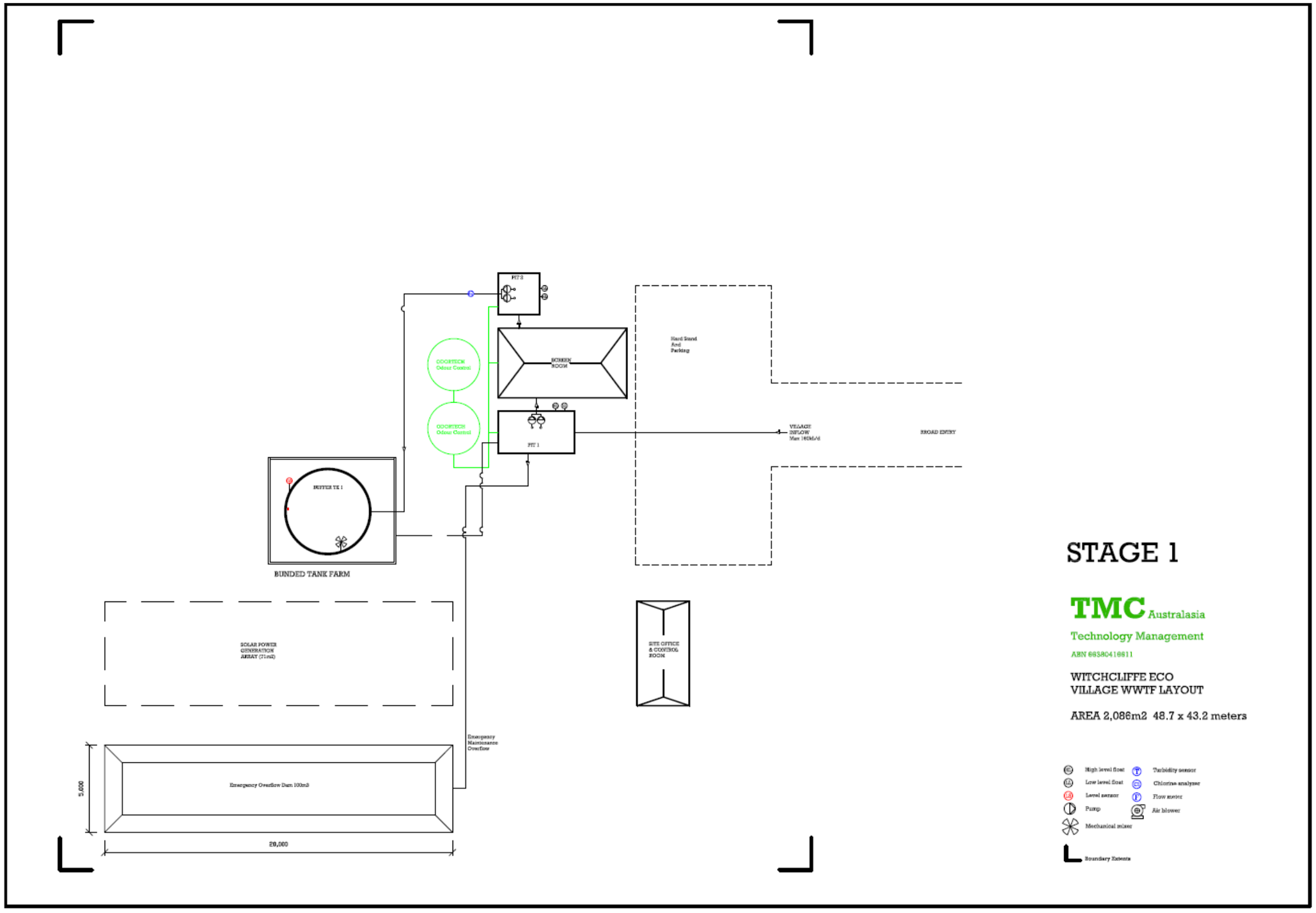
Schedule 1: Maps

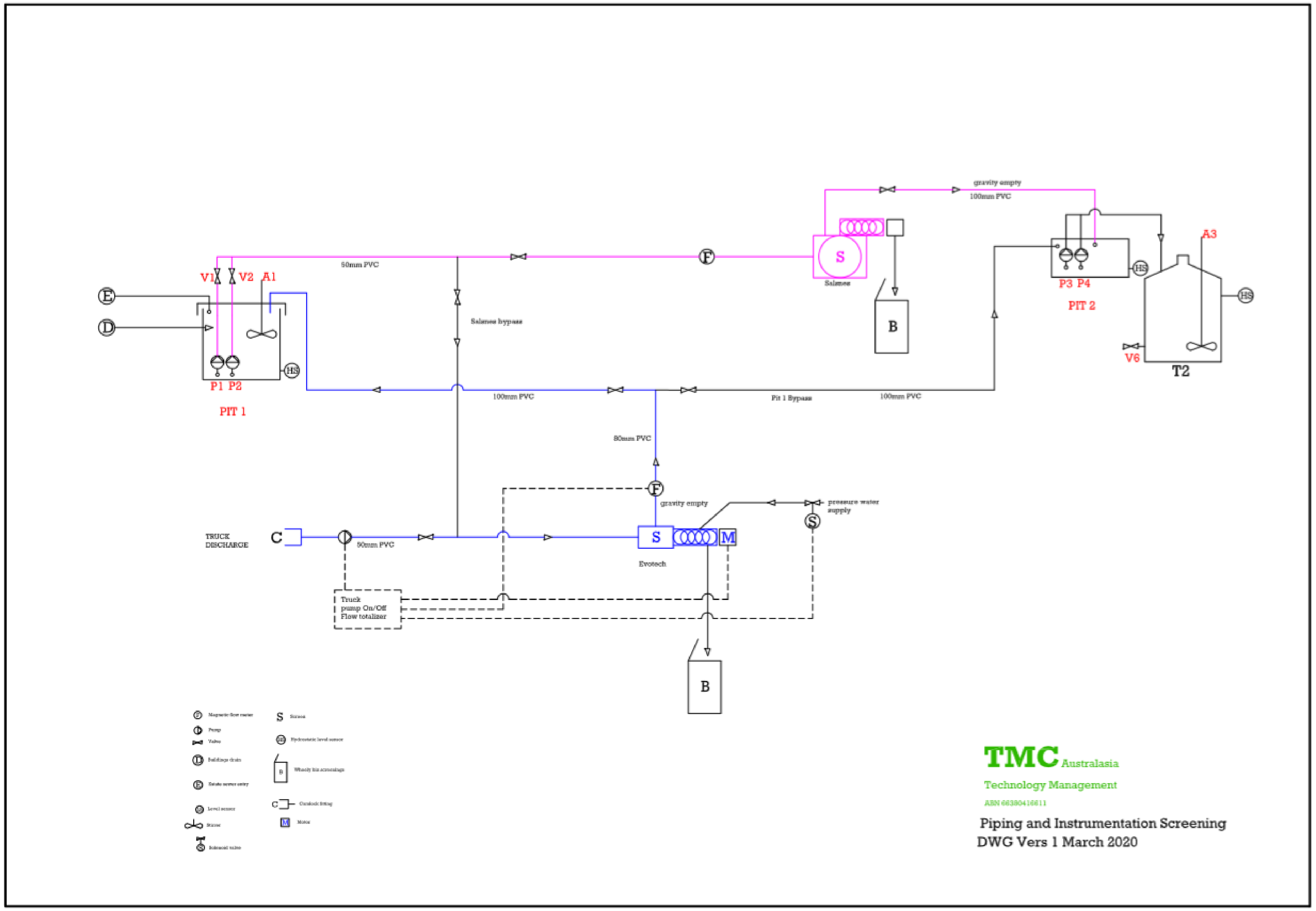
Premises map

The Premises are shown in the map below. The bold dashed red line indicates the Premises boundary.



Stage 1 Site Plan





50mm PVC
V1
V2
A1
E
D
P1 P2
HS
PIT 1
Salnes bypass
100mm PVC
Pit 1 Bypass
100mm PVC
80mm PVC
gravity empty
100mm PVC
S
Salnes
B
P3 P4
PIT 2
A3
HS
V6
T2
TRUCK
DISCHARGE
C
50mm PVC
F
gravity empty
pressure water
supply
S
M
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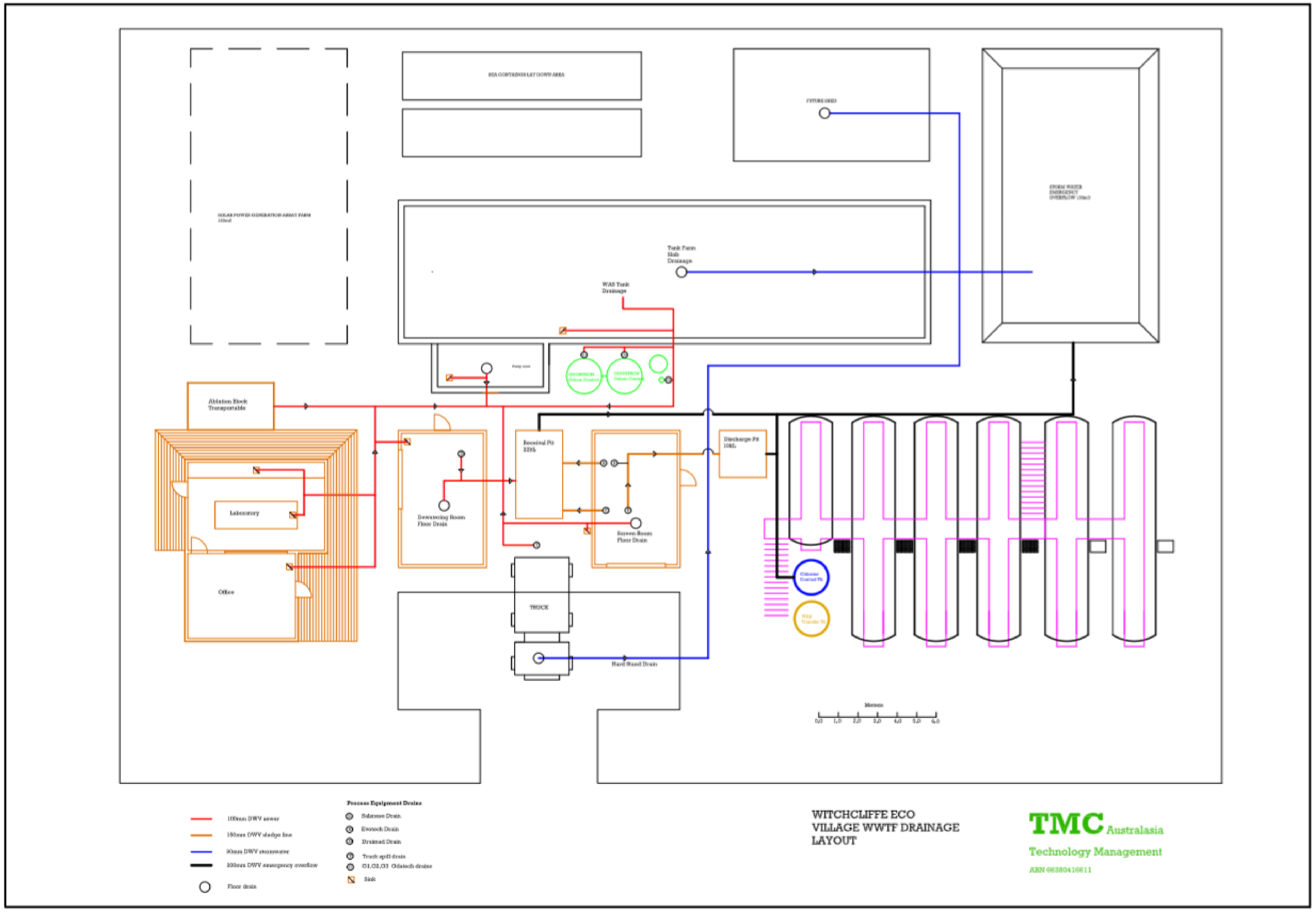
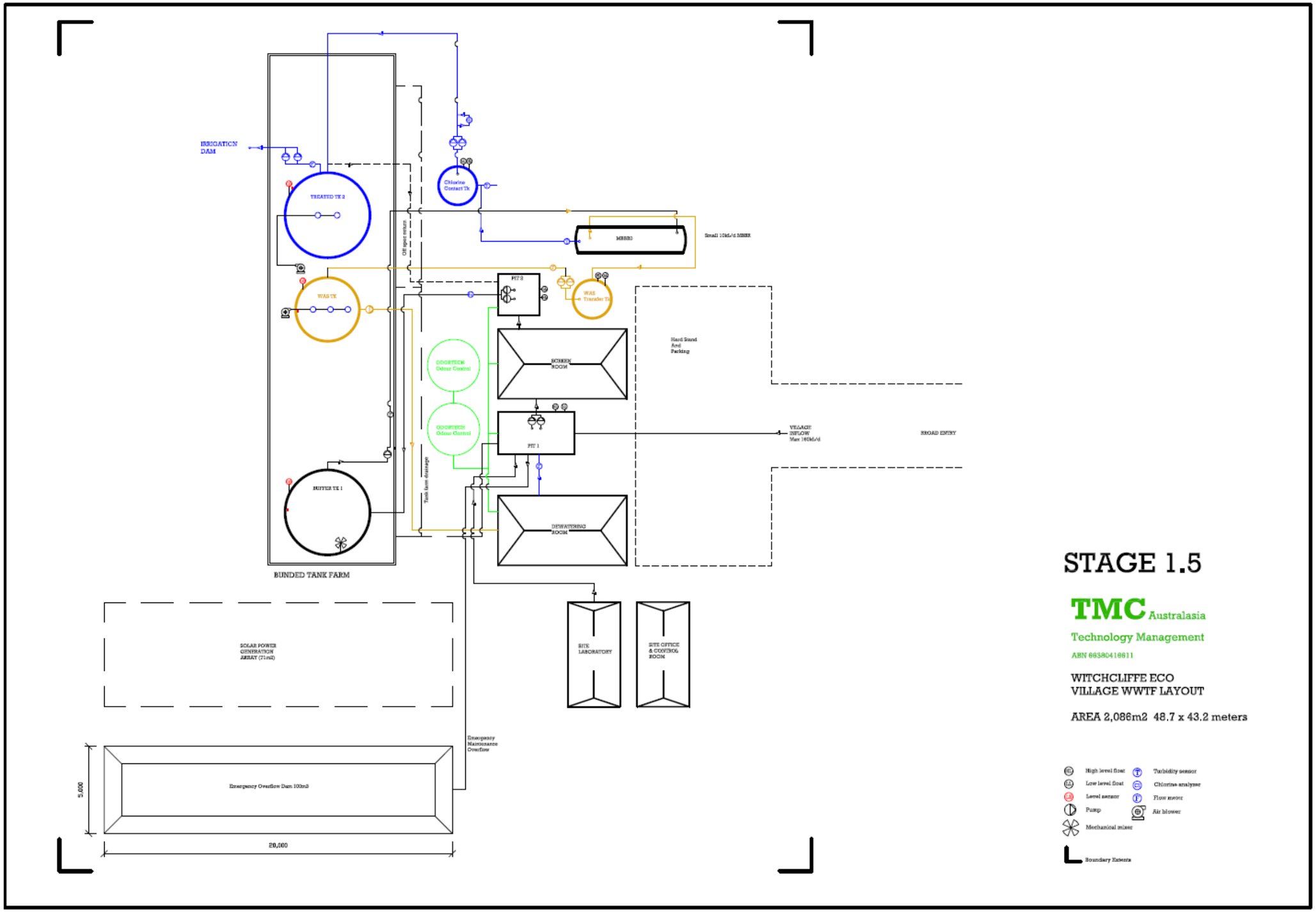
Truck
pump On/Off
Flow totalizer
B
TMC Australasia
Technology Management
Piping and Instrumentation Screening
DWG Vers 1 March 2020

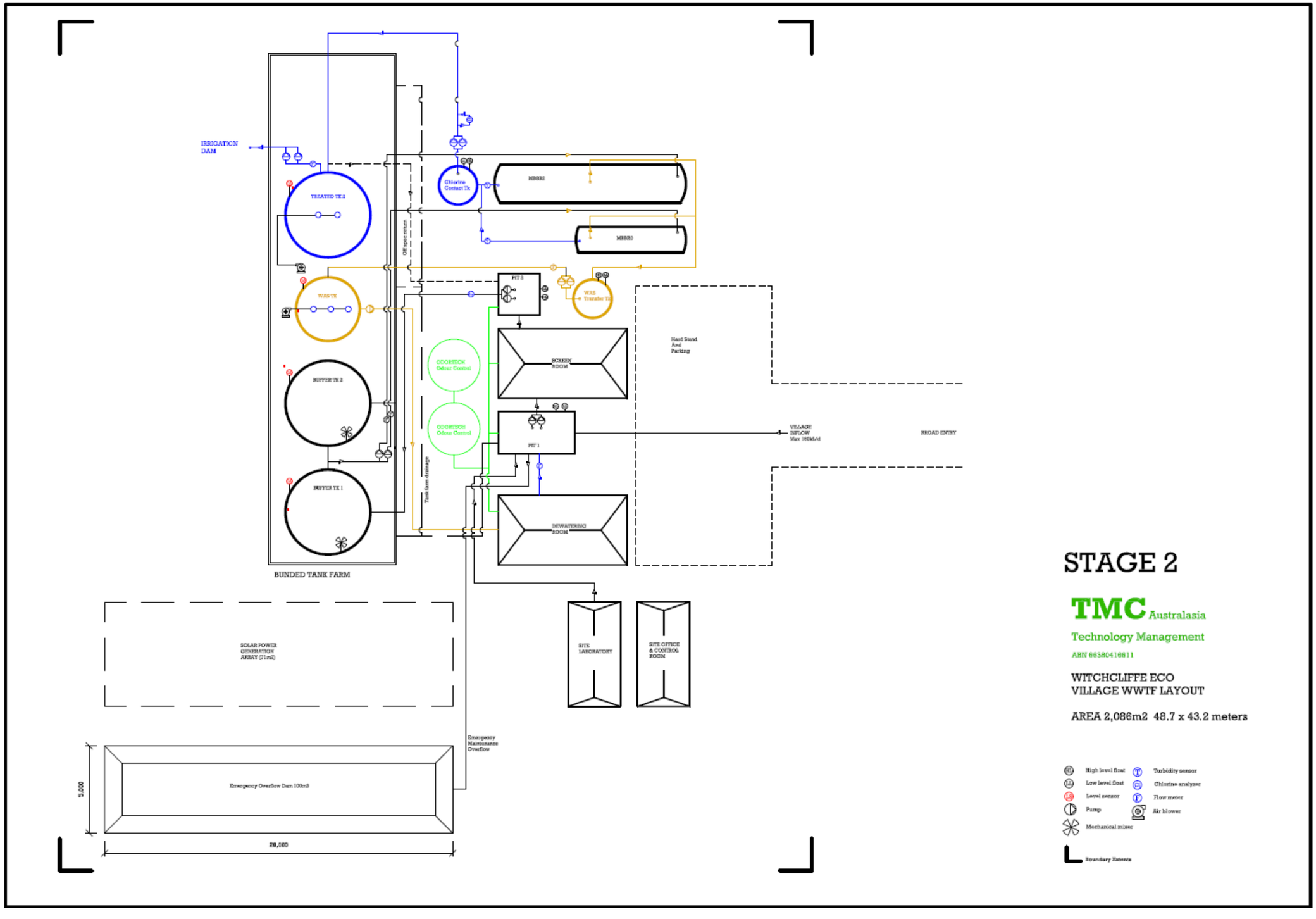


Ablution Block Transportable
Laboratory
Office
Dewatering Room Floor Drain
Screen Room Floor Drain
Tank Farm Slab Drainage
WAS Tank Drainage
TRUCK
Hard Stand Drain
Metres
100mm DWV sewer
150mm DWV sludge line
90mm DWV stormwater
200mm DWV emergency overflow
Floor drain
Process Equipment Drains
Truck spill drain
Sink
WITCHCLIFFE ECO VILLAGE WWTF DRAINAGE LAYOUT
TMC Australasia
Technology Management

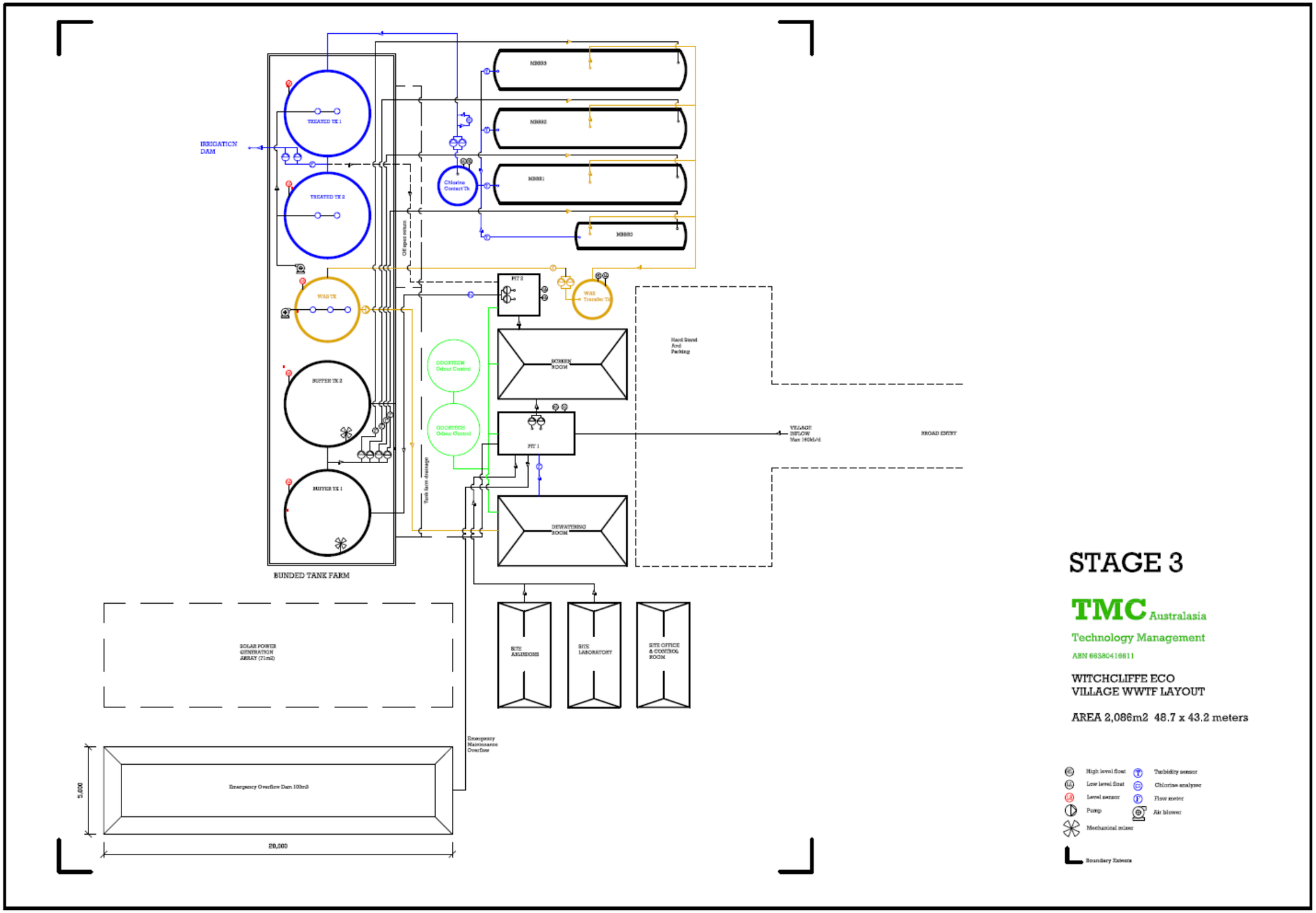
Stage 1.5 Site Plan



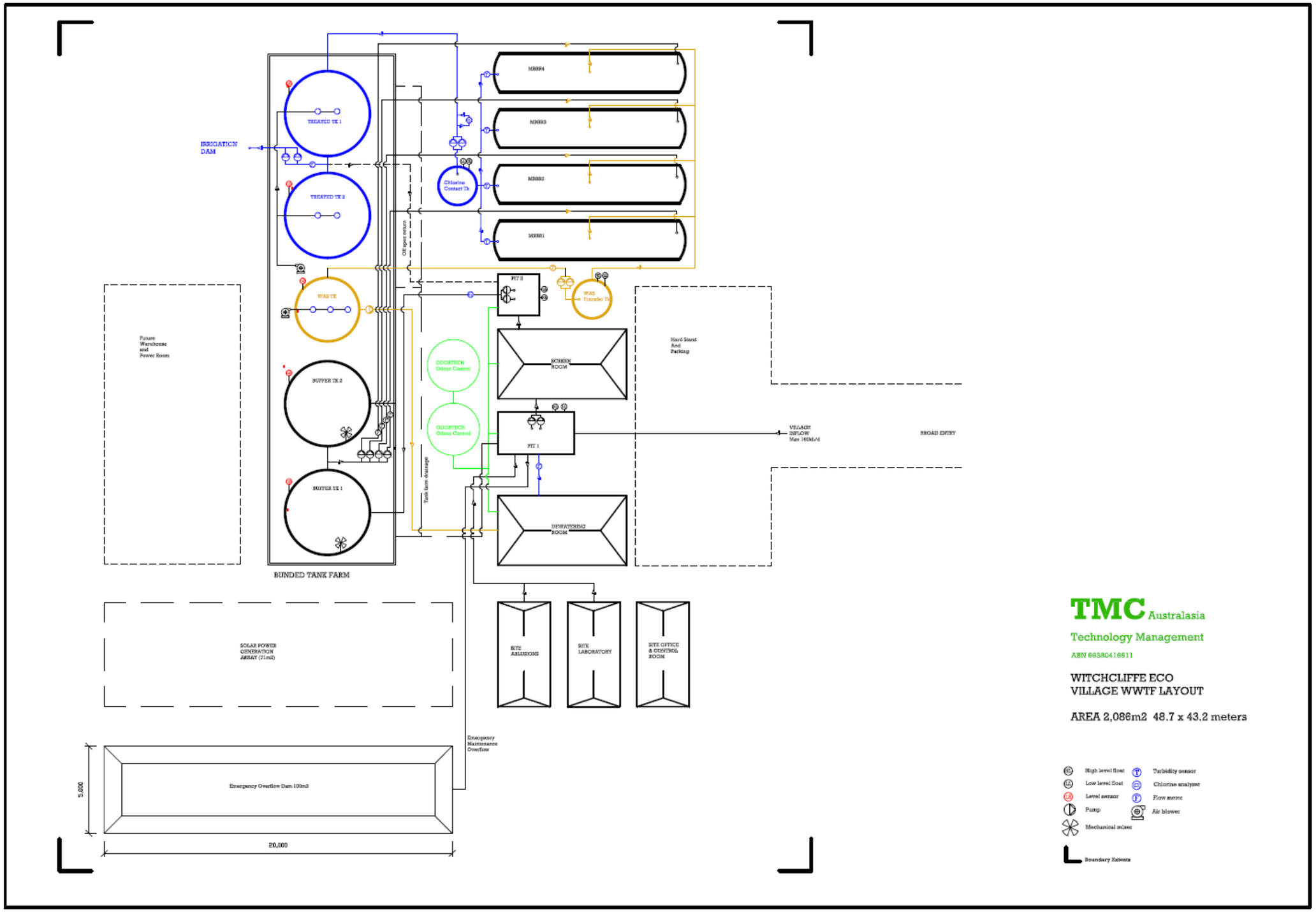
Stage 2 Site Plan



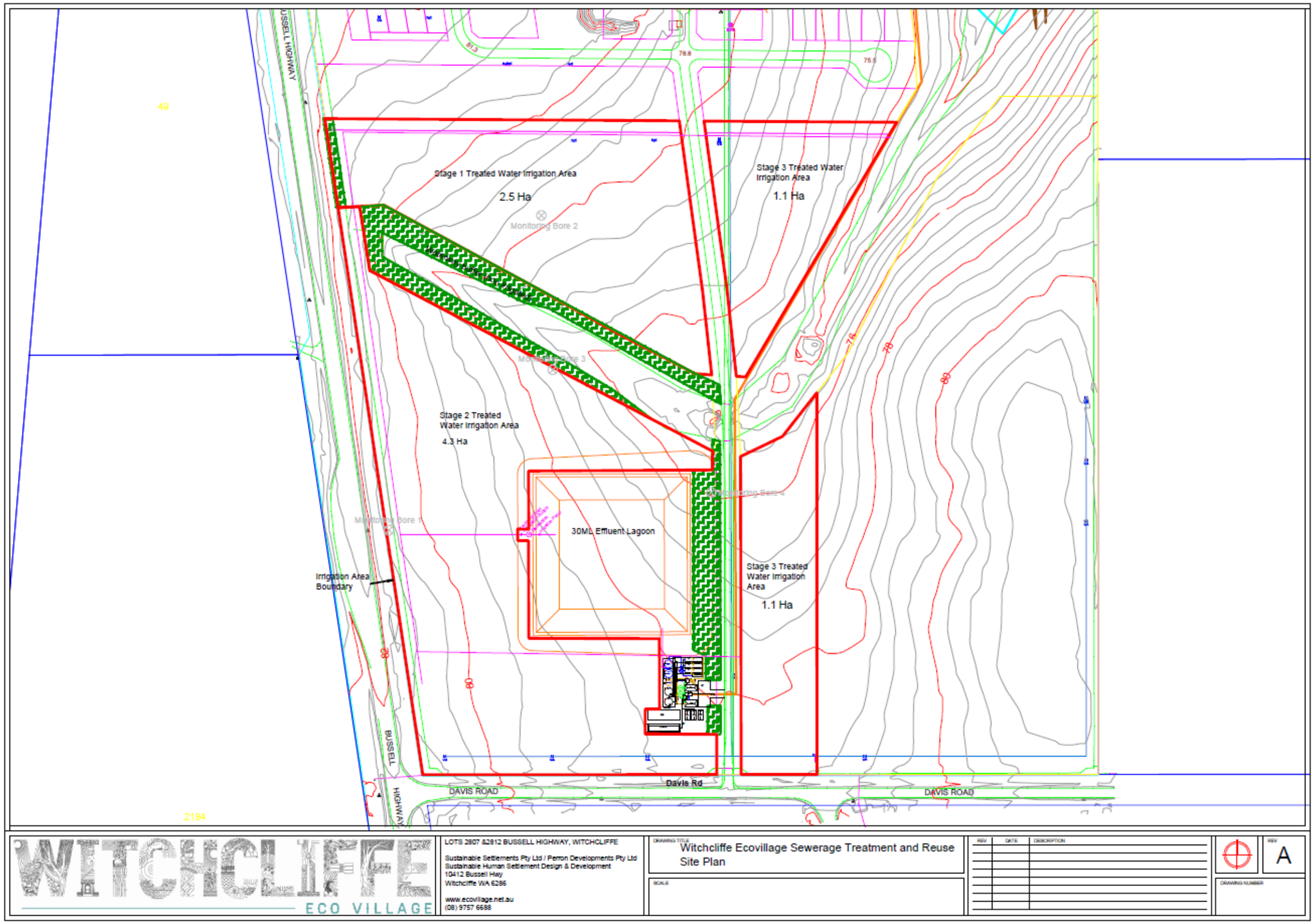
Stage 3 Site Plan



Stage 4 Site Plan



Irrigation Area and Groundwater Monitoring Bore Site Plan



Premises boundary

The Premises boundary is defined by the coordinates in Table 8.

Table 8: Premises boundary coordinates (GDA 1994 Zone 50)

Easting	Northing
324731	6232787
325147	6232795
325140	6232323
324813	6232319

Schedule 2: Infrastructure and requirements

Column 1	Column 2	Column 3
Infrastructure/ Equipment	**Requirements (design and construction)**	**Site plan reference**
Groundwater monitoring wells		
Construction of groundwater monitoring wells	Well design and construction: designed and constructed according to ASTM D5092/D5092M-16; Standard practice for design and installation of groundwater monitoring wells. Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination[1]. Where temporary/seasonal perched features are present, wells must be nested and the perched features individually screened. Logging of borehole: soil samples must be collected and logged during the installation of the monitoring wells; a record of the geology encountered during drilling should be described and classified in accordance with the Australian Standard Geotechnical site investigations AS 1726. Any observations of staining/odours or other indications of contamination must be included in the bore log. Installation survey: the vertical (top of casing) and horizontal position of each monitoring well must be surveyed and subsequently mapped by a suitably qualified surveyor. Well construction log: Well construction details must be documented within a well construction log to demonstrate compliance with ASTM D5092/D5092M-16. The construction logs shall include elevations of the top of casing position to be used as the reference point for water-level measurements, and the elevations of the ground surface protective installations. Well network map: 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.	Monitoring bore 1, Monitoring bore 2, Monitoring bore 3 and Monitoring bore 4 as shown in Irrigation Area and Groundwater Monitoring Bore Site Plan in Schedule 1
Stage 1		
Hardstand	150mm thick gravel basecourse compacted to minimum 98% MMDD unless otherwise specified on the design/site plans.	Hardstand and parking as shown in Stage 1 Site Plan in Schedule 1
WWTF Receiving Sump	22kL capacity prefabricated engineered concrete tank with duty and standby effluent pumps.	Pit 1 as shown in Stage 1 Site Plan in Schedule 1

Column 1	Column 2	Column 3
Infrastructure/ Equipment	**Requirements (design and construction)**	**Site plan reference**
Inlet Screens	• Consisting of a Salsnese filter that combines solids separation, sludge thickening and dewatering in one process • Including a secondary 3mm basket screw screen to screen tankered wastewater and to be a secondary screen where the primary Salsnese filter is offline for maintenance or repair • Longapac bagging system to contain screenings from commissioning tankered wastewater • 240L bin to contain tankered wastewater screening materials prior to appropriate disposal. To be bunded to prevent liquid waste leakage. • Fully automatic designed for primary treatment in municipal applications, made to meet European Council Directive 91/271/EEC (May 21st 1991) regarding urban wastewater treatment • Connection pipe for ventilation • Level indication and alarm notification of inlet screen high level (blockage).	Screen Room as shown in Stage 1 Site Plan in Schedule 1
Tankered wastewater Truck Receival Point (for use in commissioning stage only)	• Dry mount vortex pump including security lock, camlock fitting, vacuum hatch, and magnetic flow meter, and connection to SCADA controls to allow tankered wastewater to pump from truck to Inlet Screens. • Facilities to flush truck connection line with WWTF reclaimed water prior to truck disconnection. • Drain at truck offload point to drain spills to receival sump.	Screen Room as shown in Stage 1 Site Plan in Schedule 1 Piping and Instrumentation Screening Plan in Schedule 1 Witchcliffe Drainage Layout in Schedule 1
Biofiltration Odour Scrubber	• Designed to treat foul air from the Inlet Screens and the Flow Balance Tank/s.	Odourtech Odour Control (x2) as shown in Stage 1 Site Plan in Schedule 1
Transfer Pit	• 11kL capacity below-ground concrete transfer pit • Fitted with duty and standby effluent pumps.	Pit 2 as shown in Stage 1 Site Plan in Schedule 1
Bunded Tank Farm	• Tank floor to be constructed of reinforced concrete with rammed earth walls/bunding providing capacity for 238.5kL or greater • Graded to allow drainage back to the WWTF Receiving Sump.	Bunded Tank Farm as shown in Stage 1 Site Plan in Schedule 1

Column 1	Column 2	Column 3
Infrastructure/ Equipment	**Requirements (design and construction)**	**Site plan reference**
Flow Balance Tank 1 (FBT)	• 60kL above-ground reinforced fibre glass tank (expandable to 2x60kL) • Constructed and designed to hold liquid with a specific gravity of 1.5 • Bioreactor feed pumps installed duty • Mixer installed duty only to keep the solids in suspension and prevent 'short-circuiting' within the FBT • Level indication and alarm notification of FBT high level • Fitted with odour control and internal mixing to limit sludge settlement • Located within the Bunded Tank Farm • Connection for tanker pump out within bunded area.	Buffer Tk 1 as shown in Stage 1 Site Plan in Schedule 1
Emergency overflow dam	• $100m^3$ capacity • Constructed of clay with a permeability of $1x10^{-9}m/s$.	Emergency overflow dam $100m^3$ as shown in Stage 1 Site Plan in Schedule 1
Chemical storage and dosing area/s	• Tanks along with chemical dosing pumps to be located within separate bunded areas.	Dewatering Room and Screening Room as shown in Stage 1 Site Plan in Schedule 1
Site fencing	• The WWTF site and treated water storage lagoon to be fenced with a minimum of 2m high chainmesh fence • The effluent irrigation area is fenced with 0.9m high rural fencing.	N/A
MBBR Package Plant 0	• Small 10kL/d MBBR • Consisting of control system and blower array • Operational signals and alarms relayed to the SCADA central control.	MBBR0 as shown in Stage 1.5 Site Plan in Schedule 1
Waste Aerated Sludge Tank	• Minimum 23kL reinforced above-ground fibre glass tank capable of holding material of Specific Gravity (SG) 1.5 • Fitted with aeration to maintain biological activity pre-dewatering.	WAS TK as shown in Stage 1.5 Site Plan in Schedule 1
Chlorine Contact Tank	• Consisting of a free chlorine analyser • Primary disinfection via solid trichloride cyanuric acid tablets which dissolve to achieve 0.5-1mg/L free chloride • Allowance to "top-up" chlorine in the stored treated water tanks on a needs basis via injection of 12.5% liquid chlorine • Capable of treating treated wastewater to	Chlorine Contact Tk as shown in Stage 1.5 Site Plan in Schedule 1

Column 1	Column 2	Column 3
Infrastructure/ Equipment	**Requirements (design and construction)**	**Site plan reference**
	the limits specified in Column 5 of Table 3 • Minimum 9.9kL capacity glass fibre reinforced plastic water storage tank.	
Recycled Water Storage Tank	• 60kL volume reinforced fibre glass tank • Constructed and designed to hold liquid with a specific gravity of 1.5 • Fitted with level indication.	Treated Tk 2 as shown in Stage 1.5 Site Plan in Schedule 1
Dewatering system	• DRAIMAD dewatering unit and associated equipment capable of dewatering sludge generated from the WWTF • Dewatering unit to be fitted with sludge detection level sensors.	Dewatering Room as shown in Stage 1.5 Site Plan in Schedule 1
Wet Weather Storage Dam	• 1.5mm HDPE lined dam or 300mm thick compacted clay liner achieving a permeability of $<1x10^{-9}$ m/s • Minimum 30ML capacity • Fitted with irrigation pumps and filtration system to supply irrigation field • Filtration system capable of polishing the water to remove any solids or algae from the storage dam prior to returning to the recycled storage tank for irrigation as required.	30 ML Effluent Lagoon as shown in Stage 1.5 Site Plan in Schedule 1
Irrigation system and irrigation areas	The irrigation system and irrigation area must be designed and constructed so as to meet the following specification: • Combined total irrigation area of at least 8.4ha in size • Include an automated weather station capable of monitoring wind direction, wind speed, temperature, humidity and rainfall to provide real-time data to assist with irrigation programming • Soil moisture sensors • Irrigation flow rate data logging The irrigation area may be progressively developed as water is available for irrigation.	Irrigation Area and Groundwater Monitoring Bore Site Plan in Schedule 1
Stage 2		
MBBR Package Plant	• 40kL bioreactor train increasing the capacity • Consisting of control system and blower array • Operational signals and alarms relayed to the SCADA central control.	MBBR2 as shown in Stage 2 Site Plan in Schedule 1

Column 1	Column 2	Column 3
Infrastructure/ Equipment	**Requirements (design and construction)**	**Site plan reference**
FBT 2	• 60kL above-ground reinforced fibre glass tank • Constructed and designed to hold liquid with a specific gravity of 1.5 • Bioreactor feed pumps installed duty • Mixer installed duty only to keep the solids in suspension and prevent 'short-circuiting' within the FBT • Level indication and alarm notification of FBT high level • Fitted with odour control • Located within the Bunded Tank Farm • Connection for tanker pump out within bunded area.	Buffer Tk 2 as shown in Stage 2 Site Plan in Schedule 1
Stage 3		
MBBR Package Plants	• 40kL bioreactor train increasing capacity of the Premises to 120kL/day • Consisting of control system and blower array • Operational signals and alarms relayed to the SCADA central control.	MBBR3 and MBBR2 as shown in Stage 3 Site Plan in Schedule 1
Recycled Water Storage Tank	• 60kL volume reinforced fibre glass tank • Constructed and designed to hold liquid with a specific gravity of 1.5 • Fitted with level indication.	Treated Tk 1 as shown in Stage 3 Site Plan in Schedule 1
Stage 4		
1x MBBR Package Plant	• 40kL bioreactor train increasing capacity of the Premises to 160kL/day • Consisting of control system and blower array • Operational signals and alarms relayed to the SCADA central control.	MBBR4 as shown in Stage 4 Site Plan in Schedule 1

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

Schedule 3: Groundwater monitoring requirements

The Works Approval Holder must monitor the locations specified in Column 1 for the parameters specified in Column 2 of Table 9, at the frequency specified in Column 5, and in accordance with the method specified in Column 6, of Table 9.

Table 9: Ambient groundwater monitoring table

Column 1 Location	Column 2 Parameter	Column 3 Units	Column 4 Averaging period	Column 5 Frequency	Column 6 Method
• Monitoring bore 1; • Monitoring bore 2; • Monitoring bore 3; and • Monitoring bore 4 as indicated on the Irrigation Area and Groundwater Monitoring Bore Site Plan in Schedule 1.	Standing water level[1]	m(AHD) and m(BGL)	Spot sample	One-off sampling event under the works approval - within two months of completing construction of the groundwater monitoring bores required under Condition 1	AS 5667.11:1998
	pH[1]	pH units			
	Electrical conductivity[1]	µS / cm			
	Total Dissolved Solids (TDS)	mg/L			
	Total Nitrogen	mg/L			
	Nitrate as Nitrogen	mg/L			
	Total Phosphorus	mg/L			
	Escherichia coli	Cfu/100ml			

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

Quality assurance and quality control requirements

The Works Approval Holder must adhere to the following field quality assurance and quality control procedures as specified in Schedule B2 of the Assessment of Site Contamination NEPM and must include as a minimum:

- decontamination procedures for the cleaning of tools and sampling equipment before sampling and between samples;
- field instrument calibration for instruments used on site;
- blind replicate samples and rinsate blanks must be collected in the field and sent to the primary laboratory to determine the precision of the field sampling and laboratory analytical program;
- completed field monitoring sheets/ sampling logs for each sample collected, showing time, location, initials of sampler, sampling method, field analysis results, duplicate type/location (if relevant), and site observations and weather conditions; and
- chain-of-custody documentation must be completed which details the following information: site identification; the sampler; nature of the sample; collection time and date; analyses to be performed; sample preservation method; departure time from site; dispatch courier(s); and arrival time at the laboratory.

Schedule 4: Works

At the time of assessment, Emissions and Discharges from the Works listed in Table 10 were considered in the determination of the risk and related Conditions for the Works Approval.

Table 10: Authorised Works

Works	Specifications/Drawings
Construction of WWTF	Premises Map, Stage 1 Site Plan, Stage 1.5 Site Plan, Stage 2 Site Plan, Stage 3 Site Plan and Stage 4 Site Plan.
Installation of groundwater monitoring bores and baseline ambient groundwater monitoring	Irrigation Area and Groundwater Monitoring Bore Site Plan.
Construction of irrigation areas	Premises Map and Irrigation Area and Groundwater Monitoring Bore Site Plan.
Commissioning of WWTF and irrigation areas	Commissioning and validation period following completion of controls for the WWTF.

Site layout

The infrastructure and equipment are set out on the Premises in accordance with the site layout specified on the Premises maps in Schedule 1.