Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6913/2024/1
Works approval holder	BGC (Australia) Pty Ltd
ACN	005 736 005
Registered business address	Ground Floor 67 Walters Drive OSBORNE PARK WA 6017
DWER file number	DER2024/000069
Duration	26/02/2025 to 25/02/2028
Date of issue	26/02/2025
Premises details	Midland Brick Caversham Legal description - Part of Lot 2984 on Plan 202244 Certificate of Title: Volume 1099, Folio 219; and Part of Lot 2985 on Plan 202244 Certificate of Title: Volume 2022, Folio 32 As defined by the Premises Map in Schedule 1

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed design capacity**
Category 13: Crushing of building material	110,000 tonnes per year
Category 61A: Solid waste facility	110,000 tonnes per year
Category 77: Concrete batching or cement products manufacturing	360,000 tonnes per year

This works approval is granted to the works approval holder, subject to the attached conditions, on 26 February 2025, by:

Lauren Edmands
Digitally signed by Lauren Edmands
Date: 2025.02.26 09:05:33 +08'00'

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

Works approval history

Date	Reference number	Summary of changes
26/02/2025	W6913/2024/1	New works approval granted for prescribed premises Categories 13, 61A, and 77

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 and/or install the infrastructure and/or equipment;

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

(c) at the corresponding infrastructure location.

Table 1: Design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location
1.	Raw Material Bins	• The height of the bunker walls is to be 3m approximately • Enclosed on two sides	Shown in Schedule 1, Figure 2
2.	TAS Material Storage	TAS storage to be installed under cover on the concrete hardstand	
3.	Raw Material Silos	• Vibrating air cleaning system to be installed with approximately 23 m^2 of surface area; • A level indicator with an audible high-level alarm which sounds if cement reaches 0.6 m below the inlet to the silo's air cleaning system; and • A pressure gauge is to be fitted in the silo.	
4.	Mobile Block-Laying Machine	• Exhaust mufflers to be fitted on equipment; and • Acoustic panels to be installed. • Sound power level not to exceed 105 dB	
5.	Concrete Batching Plant	Mixing plant feed hoppers must be enclosed or fitted with wind shields, water sprays or a dust extraction system designed to prevent escape of visible dust.	
6.	Concrete Crushing Plant	• The concrete batching plant must be established on a paved area, or on an area that has been treated with water and surfactants to minimize dust; and • Dust covers to be fitted on belt conveyors and discharge points to minimize dust. • Reclaimed concrete crushing plant (vibrating feeder, jaw crusher, cone crusher, vibrating screen, belt conveyors)	

	Infrastructure	Design and construction / installation requirements	Infrastructure location
7.	Stormwater Management Infrastructure	• A swale drain to be constructed along the western edge of the ring road; • A 1800mm pit to be installed in Drainage Basin 1 to provide a controlled overflow point; • Planting out of suitable native species at the overflow and outfall points of Basin 1 to reduce erosion from large rain events. Planting of sedges and grasses in Basin 1 to assist in nutrient filtration; • An oil/sediment interceptor system consisting of three interconnected pits will be installed upstream at each of the outlets discharging into Basin 3; • Geofabric to be installed at Basin 1 outfall and overflow points.	Shown in Schedule 1, Figure 2 and Figures 3, 4 and 5
8.	Noise barrier	• Must be a minimum height of 1.8 m; • Must span the southern end of the hardstand area.	Shown in Schedule 1, Figure 2
9.	Dust monitors	• Must install a minimum of two air quality monitors[1; 2] for measuring PM_{10}; • Must install a minimum of one high volume sampler for measuring respirable crystalline silica (RCS) and the filter must not contain any silica in its material; • Must install a minimum of two dust depositional gauges; • Installed in accordance with AS/NZS 3580.1.1: *Methods for the sampling and analysis of ambient air – Guide to siting air monitoring equipment*. • Must be installed and operational within 30 days of the date this works approval is granted.	To be determined by works approval holder: • one BAM/TEOM monitor and one depositional gauge must be situated on the northern boundary; the other BAM/TEOM monitor and depositional gauge must be situated on the southern boundary. • One high volume sampler must be situated on the southern boundary. • all monitors must be situated in proximity of wind direction towards closest human receptors.

Note 1: The works approval holder shall install either Beta Attenuation Mass (BAM) monitors or Tapered Element Oscillating Microbalance (TEOM) monitors.
Note 2: Monitors installed on the premises must be the same make/model as each other.

2. The works approval holder must use water carts and/or sprinklers to manage dust lift-off from active construction areas to protect the environment by preventing dust emissions that may cause pollution or environmental harm.

3. The works approval holder must only undertake construction activities between the hours of 0700 to 1900 Monday to Saturday, and 0900 to 1700 on Sundays and Public Holidays.

Compliance reporting

4. The works approval holder must within 30 calendar days of an item of infrastructure or equipment required by condition 1 being constructed and/or installed:

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

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

5. The Environmental Compliance Report required by condition 4, must include as a minimum the following:

(a) certification by a third-party crushing/screening plant operator that the screening plant or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

(b) certification by a third-party concrete batch plant operator/installer that the concrete batch plant or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

(c) as constructed/installed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 1; and

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

Time limited operations phase

Commencement and duration

6. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 1 where the Environmental Compliance Report as required by condition 4 has been submitted by the works approval holder for that item of infrastructure.

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

(a) for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 4 for that item of infrastructure; or

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

Time limited operations requirements

8. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 2 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 2.

Table 2: Infrastructure and equipment requirements during time limited operations

Item	Site infrastructure and equipment	Operational requirements	Infrastructure location
1.	Raw Material Bins	• Material stored in storage bins will not exceed the height of the bunker walls; • Reclaimed and crushed concrete will be stockpiled undercover in designated areas in the existing shed; and • All material bins must be undercover.	As shown in Schedule 1, Figure 2
2.	TAS Storage	• TAS material must be maintained at 10 - 20% moisture level to prevent dust generation; and • Any leachate escaping outside of storage bins must be immediately contained and collected.	As shown in Schedule 1, Figure 2
3.	Raw Material Silos	Any blocked or damaged filters, or filters with excessive build of dust, will be cleaned, repaired or replaced as soon as practicable.	
4.	Mobile Block-Laying Machine	• All equipment will be maintained in good working order. • Dust mitigation must be in use at all times when in operation. • Fitted with exhaust mufflers.	
5.	Concrete Batching Plant		
6.	Concrete Crushing Plant	• Located undercover in existing covered shed. • All equipment will be maintained in good working order. • Plant dust mitigation must be in use at all times when in operation. • Fitted with exhaust mufflers.	

7.	Stormwater Management Infrastructure	• Stormwater and surface water from the yard area drain to the basins located northwest of the main operations via drains and swales;
		• Swales and drainage channels are to be maintained regularly using the following measures:
		  ○ Cleaning out the drains to remove sediment to ensure that drainage channels are operated efficiently;
		  ○ Removal of other waste and obstructions from the swales and/or
			As shown in Schedule 1, Figure 3

Item	Site infrastructure and equipment	Operational requirements	Infrastructure location
	Stormwater Management Infrastructure continued	drains and basins • Native species planted at the outfall points of Basin 1 are to be monitored to ensure that vegetation health is maintained and to monitor for weeds; • Oil/water interceptor pit shall be maintained in accordance to manufacture specifications; • Visual inspections every 24 hours when in operation to ensure drainage network is functioning properly; • Visual inspection every 24 hours of basins and swales for hydrocarbons. If hydrocarbons are identified, skimmers must be to used to remove hydrocarbons from the surface of the basin; • Sediment to be removed from basins and swales as required; • Maintain 0.5m minimum freeboard above the 1 in 100 year ARI (1% AEP) river flood levels.	
8.	Water Cart	• Must be filled and in operational capacity each day prior to the commencement of crushing/screening operations. • Fitted with exhaust mufflers.	Within the Prescribed Premises boundary depicted in Schedule 1, Figure 1
9.	Sweeper Truck	• Sweeper truck must be used weekly to remove dust and sediment on the pad and ring road. • Fitted with exhaust mufflers.	Within the Prescribed Premises boundary depicted in Schedule 1, Figure 1
10.	Sprinkler system	To be installed around hardstand area with sufficient cover to wet down hardstand area	As shown in Schedule 1, Figure 2
11.	Dust monitors (BAM or TEOM)	Operated in accordance with AS/NZS 3580.1.1:2007 *Methods for the sampling and analysis of ambient air – Guide to siting air monitoring equipment.*	In accordance with Table 1
12	High volume sampler	Operated in accordance with AS/NZS 3580.1.1:2007 *Methods for the sampling and analysis of ambient air – Guide to siting air monitoring equipment.*	In accordance with Table 1

9. The works approval holder must manage dust generation at the premises by:

(a) wetting down exposed roads, stockpiles and operational areas with a water truck when required to mitigate dust lift-off;

(b) limiting all vehicle traffic within the premises to speeds of less than 15 km/hr; and

(c) ceasing dust-generating activities during strong wind conditions.

10. The works approval holder shall only operate the concrete batching plant, crushing and screening plant, and block forming plant between the hours of 0700 to 1900 Monday to Saturday, and 0900 to 1700 on Sundays and Public Holidays.

11. The works approval holder must not accept any raw material onto the premises where it contains, or is suspected to contain, visible asbestos or ACM.

12. The works approval holder must ensure that all mobile equipment and vehicles are fitted with non-tonal reversing alarms.

13. The works approval holder shall immediately recover, or remove and dispose of, spills of hazardous materials (liquid or solid) such as fuel, oil, or other hydrocarbons, as well as spills of sediment or concrete slurry, whether inside or outside an engineered containment system. Where material is required to be disposed offsite it must be taken to an appropriately authorised facility.

Monitoring during time limited operations

Noise monitoring

14. Within 30 days of the time-limited operations phase commencing, the works approval holder must retain the services of a person qualified and experienced in the area of environmental noise assessment and, who by their qualifications and experience, is eligible to hold membership of the Australian Acoustical Society or the Australian Association of Acoustical Consultants to:

a) Investigate and verify the nature and extent of noise emissions from the premises;

b) assess in accordance with the methodology required in the *Environmental Protection (Noise) Regulations 1997*, the compliance of the noise emissions from the primary activities, against the relevant assigned levels specified in those Regulations; and

c) compile and submit to the works approval holder within 2 months of the commencement of the time-limited operations phase of this works approval and a report in accordance with condition 15.

15. A report prepared pursuant to condition 14(c) is to include:

a) a description of the methods used for monitoring and/or modelling of noise emissions from the premises;

b) details and the results of the verification study undertaken pursuant to condition 14(a);

c) details and results of the assessment of the noise emissions from the premises, against the relevant assigned levels in the *Environmental Protection (Noise) Regulations 1997* undertaken pursuant to condition 14(b); and

d) an assessment of noise levels against the most recent previous noise assessment.

16. The works approval holder must submit to the CEO the report prepared pursuant to condition 14(c) within 14 days of receiving it.

17. Where an assessment pursuant to condition 14(b) indicates that noise emissions do not comply with the relevant assigned levels in the *Environmental Protection (Noise) Regulations 1997*, the works approval holder must:

a) within 60 days of receiving an assessment report pursuant to condition 14(c) prepare a plan to ensure the undertaking of the licensed activity will no longer lead to any contravention of *the Environmental Protection (Noise) Regulations 1997*; and

b) provide to the CEO a copy of the plan prepared pursuant to condition 17(a) within 30 days of its preparation.

Air quality monitoring

18. The works approval holder must monitor air emissions during time limited operations in accordance with Table 3.

Table 3: Air emissions monitoring during time limited operations

Monitoring location	Parameter	Averaging Period	Units	Frequency	Sampling Method	Analysis Method
In accordance with Table 1	Particulates as PM_{10}	10 minutes to 1 hour	$\mu g/m^3$	Continuous	AS/NZS 3580.9.8 (for TEOM) or AS/NZS 3580.9.11 (for BAM)	By NATA accredited lab
	Deposited dust	Monthly	g/m^2/ month	Continuous	AS/NZS 3580.10.1	
	Silica dust	24 hours	$\mu g/m^3$	Every sixth day from Midnight to Midnight	(AS/NZS 3580.9.6)	X-Ray Diffraction (XRD) By NATA accredited lab

Note 1: All sample analysis must be undertaken by laboratories with current accreditation from the National Association of Testing Authorities (NATA) for the relevant parameter.

19. The works approval holder must monitor and record the ambient meteorological conditions at the premises in accordance with the requirements specified in Table 4 and record the results of all such monitoring.

Table 4: Monitoring of ambient meteorological conditions

Monitoring location	Parameter	Units	Height	Frequency	Averaging Period	Method
Meteorological Station (Premises)	Wind Speed	m/s	10m	Continuous	5 minutes	AS/NZS 3580.14
	Wind Direction	degrees				

Stormwater and surface water monitoring

20. The works approval holder must monitor stormwater and surface water quality during time limited operations in accordance with Table 5.

Table 5: stormwater and surface water monitoring during time limited operations

Monitoring location	Parameter	Averaging Period	Units	Frequency	Method
Stormwater Within in each stormwater basin (depicted in Schedule 1, Figure 2) **Surface water** One upstream location within Bennet Brook One downstream location within Bennet Brook	pH[1]	Composite sample	-	Quarterly for the first 12 months; then every six months (June and December)	In accordance with Condition 20
	Temperature[1]		degrees Celsius		
	Turbidity		NTU		
	Total suspended solids		mg/L		
	Total dissolved solids				
	Dissolved oxygen				
Within in each stormwater basin (depicted in Schedule 1, Figure 2) 1 upstream location within Bennet Brook 1 downstream location within Bennet Brook	Nitrate	Composite sample			
	Nitrite				
	Total nitrogen				
	Total phosphorus				
	Ferrous iron				
	Sulphide				
	Ammonia				
	Chloride				
	Fluoride				
	BTEX				
	Heavy metals: • Arsenic • Cadmium • Chromium • Copper • Lead • Mercury • Nickel • Zinc				

Monitoring location	Parameter	Averaging Period	Units	Frequency	Method
Within in each stormwater basin (depicted in Schedule 1, Figure 2) 1 upstream location within Bennet Brook 1 downstream location within Bennet Brook	Total recoverable hydrocarbons	Composite sample	mg/L	Quarterly for the first 12 months; then every six months (June and December)	In accordance with Condition 20
	Oil and grease				
	Alkalinity		mg/L (as $CaCO_3$)		
	Acidity				
	Net acidity (acidity – alkalinity)				

Note 1: For all parameters listed in Table 5 except for pH and temperature the sample analysis must be undertaken by laboratories with current accreditation from the National Association of Testing Authorities (NATA) for the relevant parameters, unless otherwise specified in

Note 2: In-field non-NATA accredited analysis permitted

21. The works approval holder must ensure that:

(a) all water samples are collected and preserved in accordance with AS/NZS 5667.1;

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

(c) all surface water sampling is conducted in accordance with AS/NZS 5667.4, AS/NZS 5667.6 and AS/NZS 5667.9, as relevant;

(d) laboratory sample must be analysed using the appropriate limit of reporting as to allow comparison with relevant environmental guidelines; and

(e) all sample analysis must be undertaken by laboratories with current NATA accreditation for the relevant parameters, unless otherwise specified in this Licence.

Compliance reporting

22. 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 90 calendar days before the expiration date of the works approval, whichever is the sooner.

23. The works approval holder must ensure the report required by condition 22 includes the following:

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

(b) a tabulated and graphical summary of dust monitoring results obtained during time limited operations under condition 18, with results explained in consideration of the meteorological monitoring required by condition 19;

(c) a tabulated and graphical summary of stormwater and surface water monitoring results obtained during time limited operations under condition 20;

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

(i) Raw material bins;

(ii) TAS Storage;

(iii) Raw Material Storage;

(iv) Block Machine;

(v) Concrete Batching Plant;

(vi) Concrete Crushing Plant; and

(vii) Stormwater Management.

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

(f) 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)

24. 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.

25. 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) monitoring programmes undertaken in accordance with conditions 14, 18, 19 and 20; and

(c) complaints received under condition 24.

26. The books specified under condition 25 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 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACM	asbestos containing material
annual period	a 12 month period commencing from 1 January until 31 December of that same year.
AS/NZS 3580.9.6	means AS 3580.9.6: Methods for sampling and analysis of ambient air, Method 9.6: Determination of suspended particulate matter—PM10 high volume sampler with size selective inlet—Gravimetric method
AS/NZS 3580.9.8	means AS 3580.9.8: Methods for sampling and analysis of ambient air, Method 9.8: Determination of suspended particulate matter — PM10 continuous direct mass method using a tapered element oscillating microbalance analyser
AS/NZS 3580.9.11	means AS 3580.9.11: Methods for sampling and analysis of ambient air, Method 9.11: Determination of suspended particulate matter — PM10 beta attenuation monitors
AS/NZS 3580.14	means AS 3580.14: Methods for sampling and analysis of ambient air Part 14: Meteorological monitoring for ambient air quality monitoring applications
AS/NZS 3580.10.1	means AS 3580.10.1: Methods for sampling and analysis of ambient air Method 10.1: Determination of particulate matter—Deposited matter—Gravimetric method
AS/NZS 5667.1	means AS 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 5667.6	means AS 5667.6: Water quality—Sampling Part 6: Guidance on sampling of rivers and streams
AS/NZS 5667.9	means AS 5667.9: Water quality—Sampling, Part 9: Guidance on sampling from marine waters
AS/NZS 5667.10	means AS 5667.10: Water quality—Sampling, Part 10: Guidance on sampling of waste waters
books	has the same meaning given to that term under the EP Act.
BTEX	means benzene, toluene, ethylbenzene and xylene.

Term	Definition
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
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V Division 3 of the EP Act.
discharge	has the same meaning given to that term under the EP Act.
emission	has the same meaning given to that term under the EP Act.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
monthly period	means a one-month period commencing from the first day of a month until the last day of that same month.
premises	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 works approval.
prescribed premises	has the same meaning given to that term under the EP Act.
solid waste	solid means a material that: • has an angle of repose of greater than 5 degrees; and • does not contain, or is not comprised of, any free liquids; and • does not contain, or is not comprised of, any liquids that are capable of being released when the waste is transported; • does not become free flowing at or below 60 degrees Celsius or when it is transported; and • is generally capable of being moved by a spade at normal temperatures (i.e. is spadeable).

Term	Definition
suitably qualified person	means a person who: • holds a relevant tertiary academic qualification in Mine Engineering and/or Civil Engineering; and • has a minimum of five years of experience working in the relevant area/field of expertise.
Tianqi Alumino-Silicate (TAS)	TAS (also known as delithiated β (beta)-spodumene [DBS]) is a by-product of the lithium hydroxide monohydrate (LHM) manufacturing process. The LHM process involves calcining spodumene, subjecting it to acid roast, leaching the resulting lithium sulphate and performing a solids/liquids separation to collect the run-of-plant TAS by-product.
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).

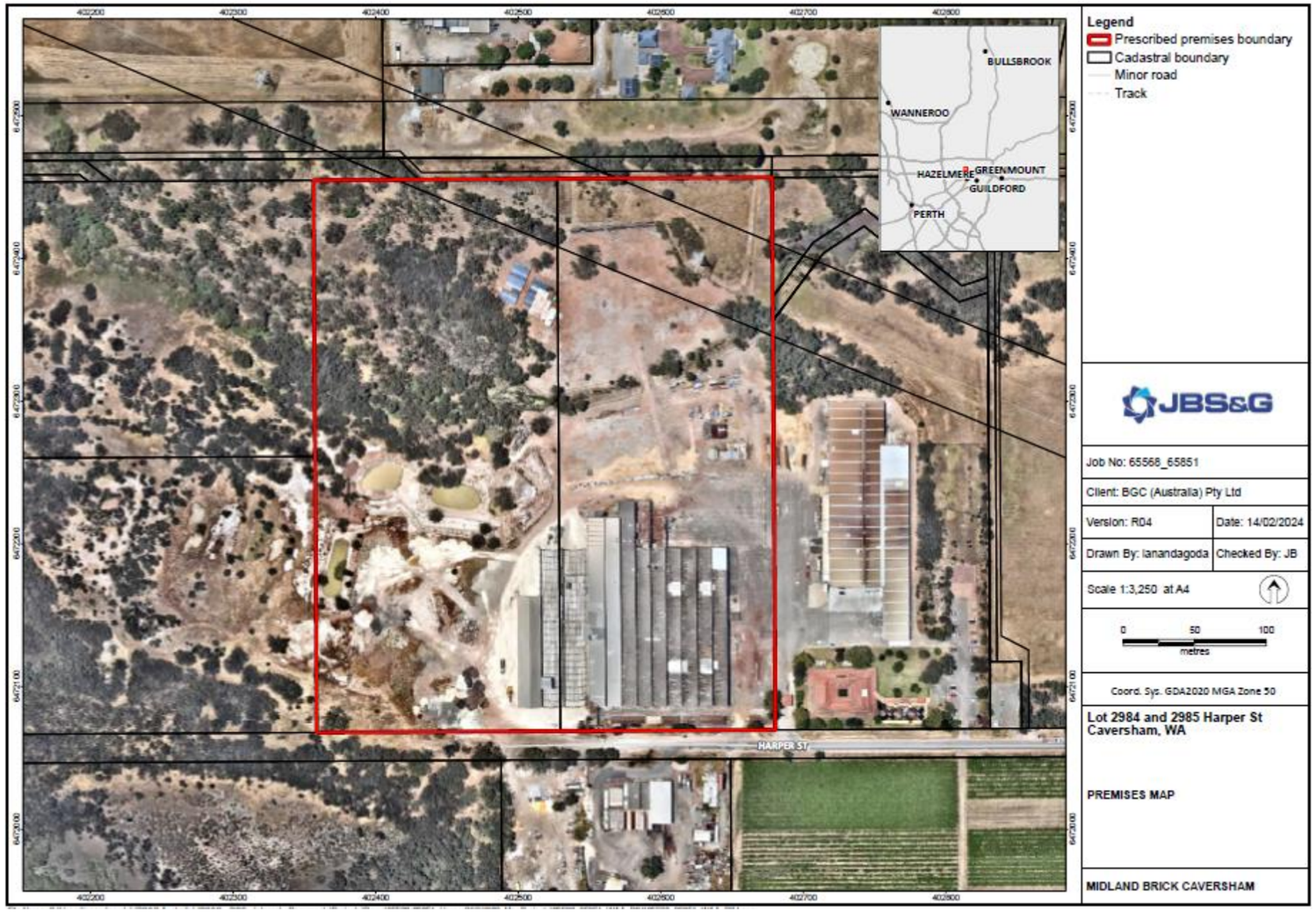


Figure 1: Map of the boundary of the prescribed premises

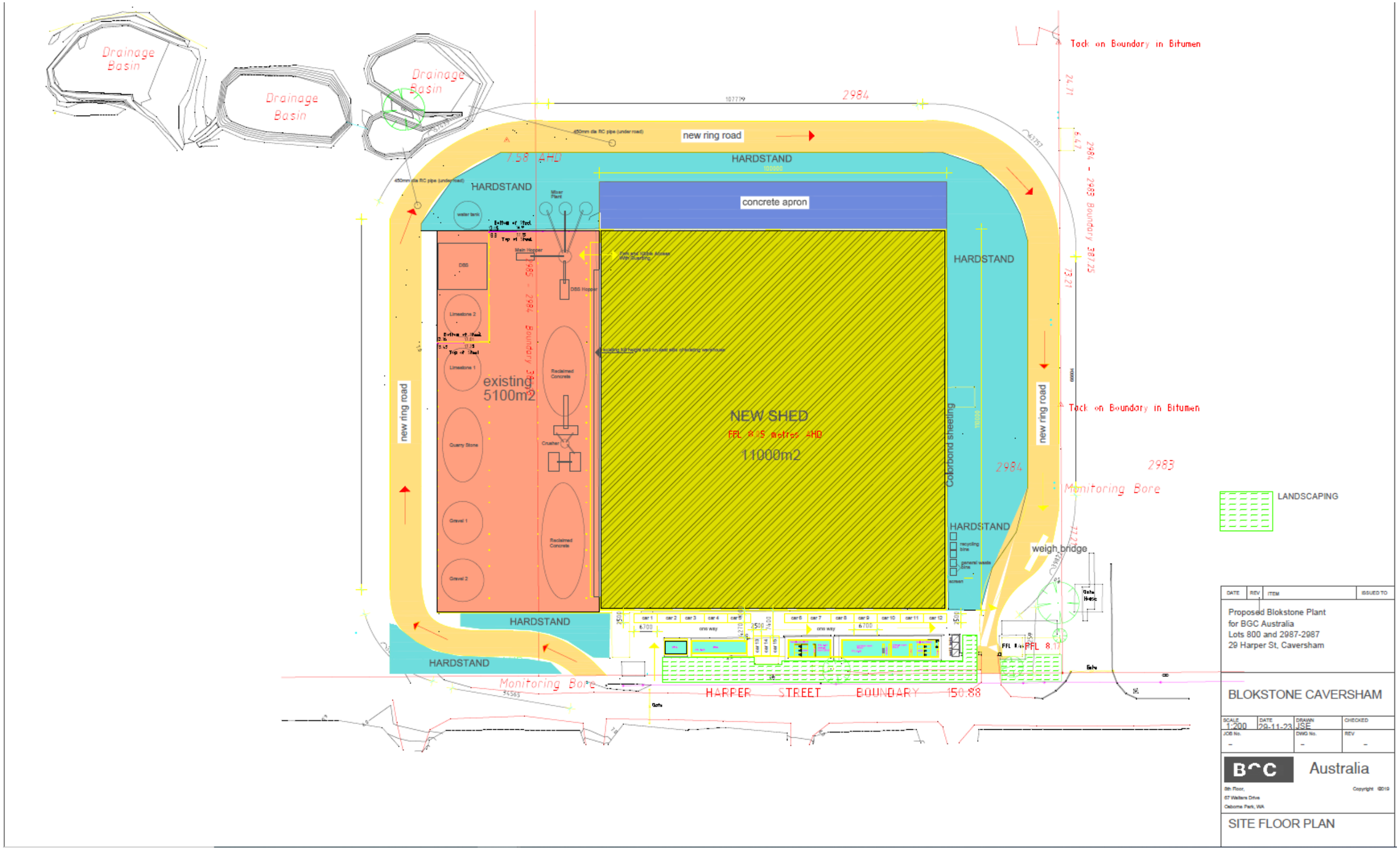
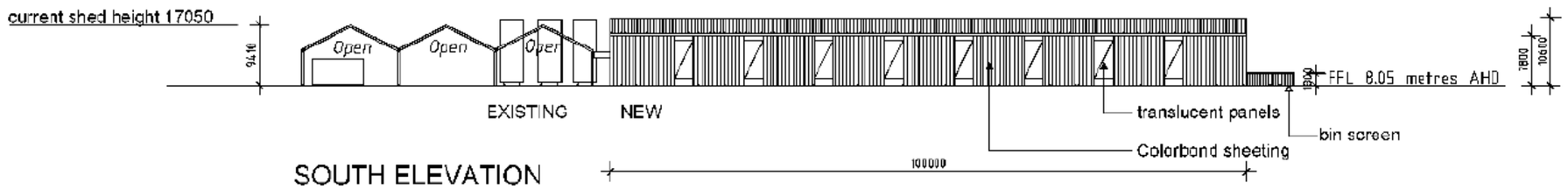
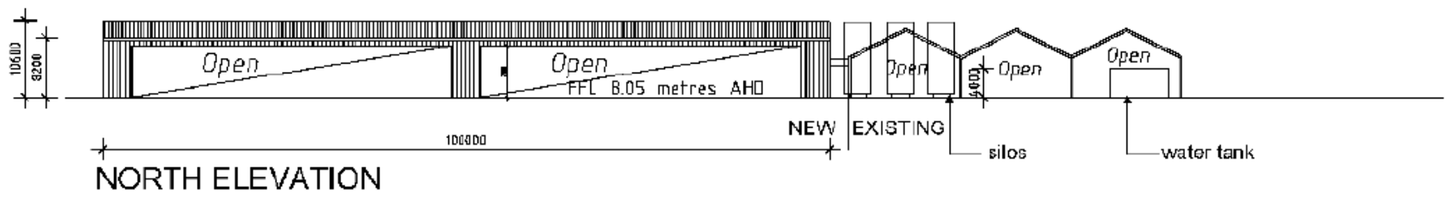


Figure 2: Infrastructure layout of the prescribed premises

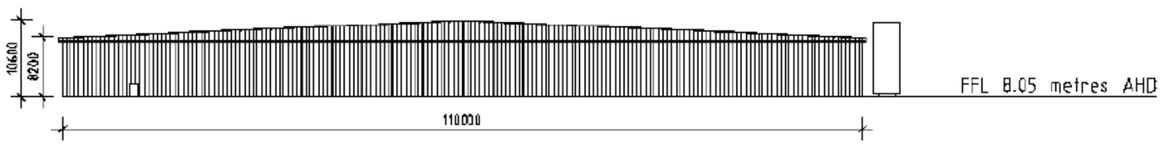
NOTE. CLEAR INTERNAL HEIGHT OF 7M REQUIRED



SOUTH ELEVATION

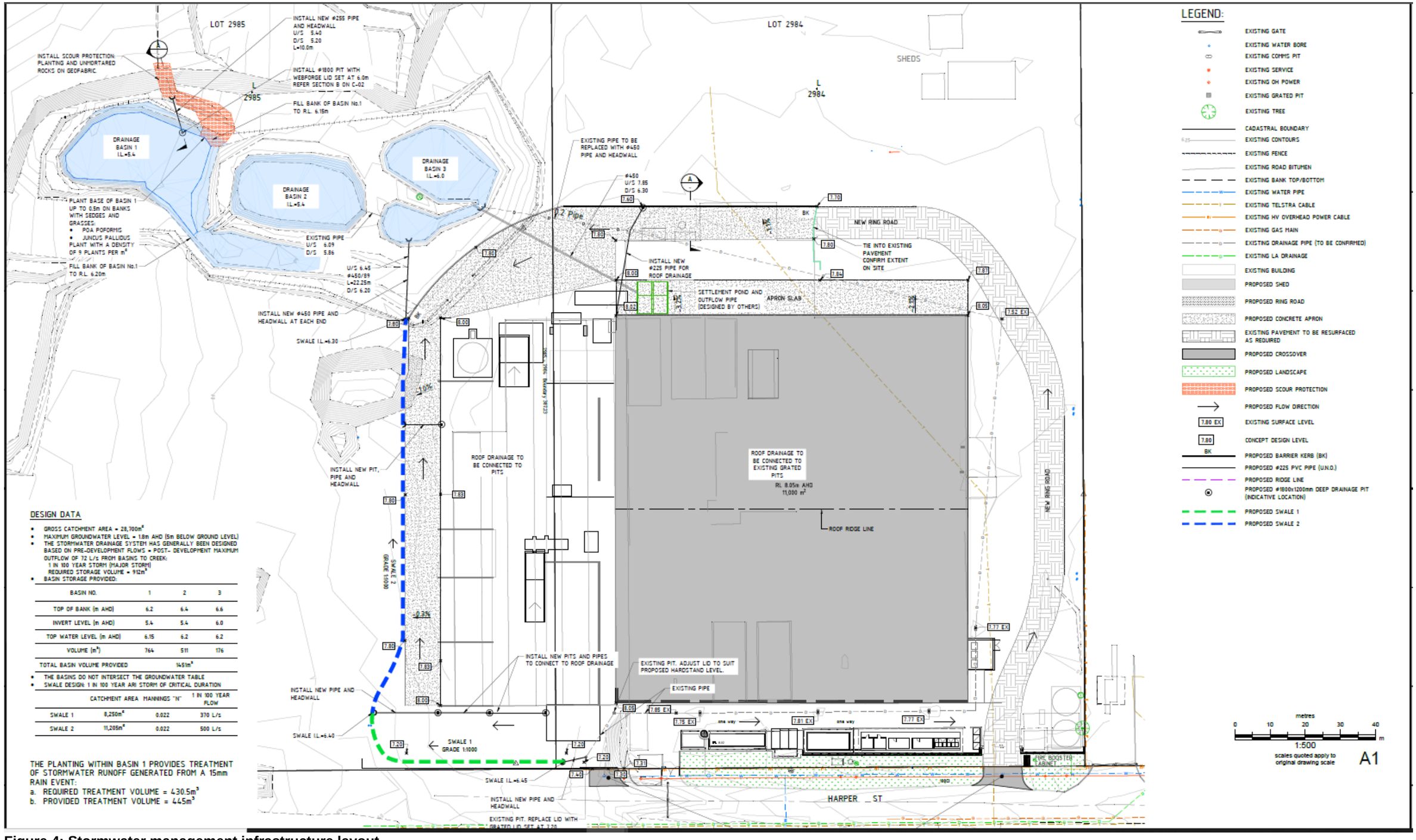


NORTH ELEVATION



EAST ELEVATION

Figure 3: Overview of shed layout



DESIGN DATA

- GROSS CATCHMENT AREA = 28,700m²
- MAXIMUM GROUNDWATER LEVEL = 1.8m AHD (5m BELOW GROUND LEVEL)
- THE STORMWATER DRAINAGE SYSTEM HAS GENERALLY BEEN DESIGNED BASED ON PRE-DEVELOPMENT FLOWS = POST- DEVELOPMENT MAXIMUM OUTFLOW OF 72 L/s FROM BASINS TO CREEK:
  1 IN 100 YEAR STORM (MAJOR STORM)
  REQUIRED STORAGE VOLUME = 912m³
- BASIN STORAGE PROVIDED:

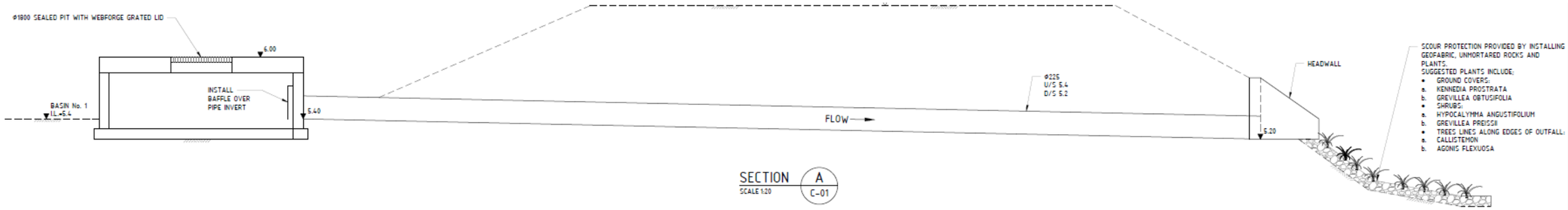
BASIN NO.	1	2	3
TOP OF BANK (m AHD)	6.2	6.4	6.6
INVERT LEVEL (m AHD)	5.4	5.4	6.0
TOP WATER LEVEL (m AHD)	6.15	6.2	6.2
VOLUME (m³)	764	511	176
TOTAL BASIN VOLUME PROVIDED	1451m³		

- THE BASINS DO NOT INTERSECT THE GROUNDWATER TABLE
- SWALE DESIGN: 1 IN 100 YEAR ARI STORM OF CRITICAL DURATION

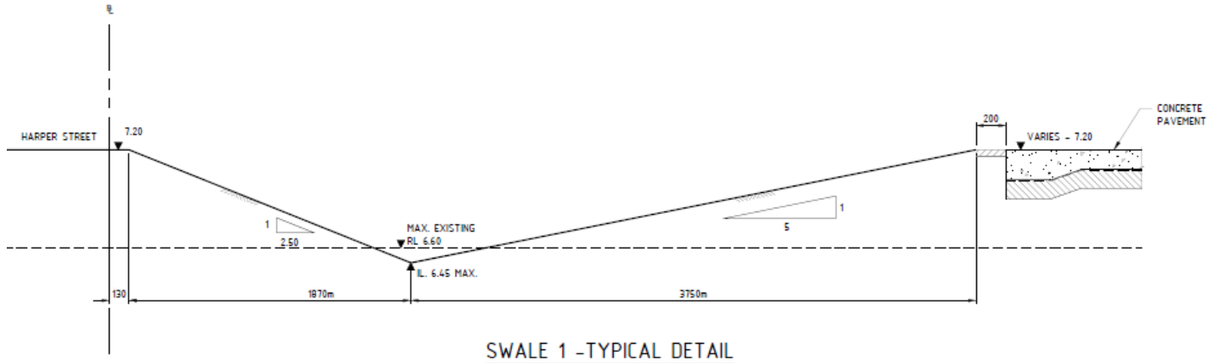
	CATCHMENT AREA	MANNINGS "N"	1 IN 100 YEAR FLOW
SWALE 1	8,250m²	0.022	370 L/s
SWALE 2	11,205m²	0.022	500 L/s

THE PLANTING WITHIN BASIN 1 PROVIDES TREATMENT OF STORMWATER RUNOFF GENERATED FROM A 15mm RAIN EVENT:
a. REQUIRED TREATMENT VOLUME = 430.5m³
b. PROVIDED TREATMENT VOLUME = 445m³

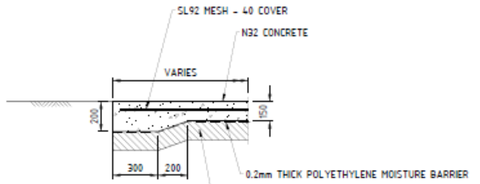
Figure 4: Stormwater management infrastructure layout



SECTION A
SCALE 1:20
C-01

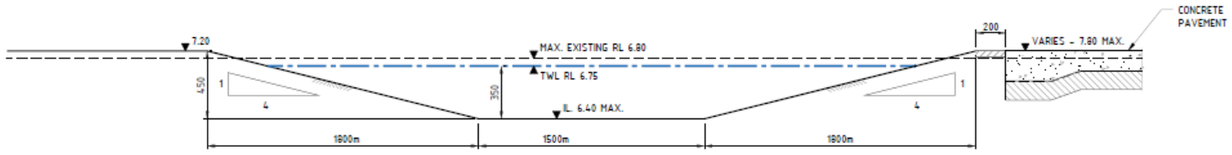


SWALE 1 -TYPICAL DETAIL
(FACING DOWNSTREAM)
SCALE 1:20



TYPICAL CONCRETE PAVEMENT DETAIL

SECTION B
SCALE 1:20
C-02



SWALE 2 -TYPICAL DETAIL
(FACING DOWNSTREAM)
SCALE 1:20

Figure 5: Stormwater Infrastructure - Swales