

Concept Water Cycle Management Study

1551 Joadja Road, Joadja, NSW



Draft Report

P2108462JR02V01

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Prepared for Fresh Hope Communities

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1 Introduction

1.1 Overview and Scope of Assessment

This concept water cycle management study is prepared by Martens and Associates (**MA**) to support a development application for a proposed staged eco-tourism resort at 1551 Joadja Road, Joadja, NSW (the **Site**). The Site is located within the Wingecarribee Shire Council (**WSC**) Local Government Area.

The scope of this water cycle management study includes:

1. Identification of relevant stormwater management objectives.
2. Provision of preliminary stormwater quantity and quality methodology, modelling and results demonstrating compliance of conceptual stormwater treatment train with stormwater management objectives for Stage 1 and the Masterplan.
3. Recommendations for conceptual design of the watercourse crossing on Lot 2 DP 861816.
4. Recommendations for water cycle management and sediment and erosion control design in accordance with relevant regulatory requirements.

This report relies on and should be read in conjunction with the following reports and plans:

1. Onsite wastewater management assessment (MA reference P2108462JR04V01, December 2023).
2. Architectural layout provided by Breathe Architects dated 17 April 2024.
3. Civil engineering plans (MA reference P2108462PS01, April 2024).
4. Site survey provided by LandTeam dated March 2023.

1.2 Proposed Development

The proposed development is an ecotourist facility (see concept layout Appendix E). The proposal includes a variety of Community Villages, for both short term stay and day trips. It includes:

1. Arrivals Village consisting of arrival building and parking areas.
2. Community 1 consisting of a refurbished homestead building and cabins.
3. Community 2 consisting of an amenities building and glamping.

1.3 Site Description

A Site description is provided in Table 1.

Table 1: Site description.

Item	Description
Address	1551 Joadja Road, Joadja, NSW.
Lot / DP	Lot 157/158/181 DP 751276 and Lot 202 DP 861816.
Site Area	Approximately 324 ha.
Local Government Area (LGA)	Wingecarribee Shire Council.
Current Land Use	Rural.
Current Zoning	E3 Environmental Management.
Site Description	The site contains a homestead with pool, sheds, riverside cottage, rural pastures, site accesses and dense bushland.
Services	Site is connected to reticulated electricity.
Adjacent Environment	Bangadilly National Park lies to the south. Joadja Road is located adjacent to the eastern boundary and Jacks Valley Road is adjacent to the northern boundary.
Site Elevation and Topography	Site elevations range from approximately 470 mAHD in the north west adjacent to the Wingecarribee River to approximately 660 mAHD in the east along the ridgeline north of Schotts Creek. In the vicinity of the development, site topography is characterised by two, approximately parallel, running ridgelines aligned south east / north west, on which the existing homestead, access road and associated infrastructure is located. A broad south east / north west running valley separates these two ridgelines. Site slopes range from 0 - >20%, being generally flatter along the top of ridgelines and valley bases, increasing on side slopes.
Site Drainage	The Wingecarribee River runs from south to north adjacent to the western Site boundary. Schotts Creek and several unnamed tributaries of Schotts Creek drain the southern portion of the Site in a generally westwards direction to the Wingecarribee River. Several drainage depressions and mapped watercourses are located in the northern part of the Site draining generally either northwards to Joadja Creek or westwards to the Wingecarribee River. The Site contains several embankment dams varying in capacity (estimated between approximately 0.2 to approximately 3 ML).
Soils and Geology	Soil profiles were investigated through excavation of ten boreholes. Soils were characterised as silty sandy loams. Review of the Wollongong 1:250,000 Geological Series Sheet determined the development area to be underlain by Carboniferous granites and siltstones, shales and sandstones of the Berry Formation.

1.4 Relevant Legislation and Guidelines

This report is prepared in accordance with the following legislative instruments, standards and guidelines:

1. *Environmental Planning and Assessment Act 1979* (NSW) (**EP&A Act**).

2. *State Environmental Planning Policy (Biodiversity and Conservation) 2021 (SEPP B&C).*
3. *WSC (2010) Wingecarribee Local Environmental Plan (WLEP).*
4. *WSC (2021) Rural Lands Development Control Plan (WRLDGP).*
5. *WSC (2021) Development Design Specification: D09 Stormwater Drainage Design.*
6. *Water NSW (2023) Developments in the Sydney Drinking Water Catchment – Water Quality Information Requirements.*
7. *Water NSW (2023) Using MUSIC in Sydney Drinking Water Catchment: A WaterNSW Current Recommended Practice February 2023 (MUSIC Guidelines).*
8. *WaterNSW (2022) Neutral or Beneficial Effect on Water Quality Assessment Guideline 2022 (NorBE Guidelines).*

2 Stormwater Quantity Assessment

2.1 Council Requirements

Stormwater quantity management requirements have been discussed with Council during a pre development application meeting which occurred on 13/12/2022. Specifically, Council noted that engineering details are required demonstrating that stormwater disposal from the development must comply with Section A9.8 of the WSC (2021) *Rural Lands Development Control Plan*.

Proposed discharge of site stormwater shall be to existing drainage depressions within the site via appropriately designed discharge controls (to be designed at detailed design stage). Review of Section A9.8 of the WSC (2021) *Rural Lands Development Control Plan* determined that stormwater disposal to existing drainage depressions is not specifically referred to as an acceptable solution to stormwater discharge. However, the proposed solution is considered to be an acceptable solution as it will not adversely impact any Council / private drainage infrastructure downstream of the discharge points.

Review of the Council's Engineering Specification D09 – Stormwater Drainage (Design) notes that onsite detention of stormwater (OSD) may be required as part of any development. However, the objectives of providing OSD is to minimise impacts of increased site stormwater runoff on downstream properties and capacity of existing drainage infrastructure. Review of aerial photographs of the Wingecarribee River downstream of the site shows that there is no formal drainage infrastructure located on the river between the site and the confluence of the Wingecarribee and Wollondilly Rivers approximately 10 km downstream of the site.

2.2 Culvert Sizing

The proposed site access road crosses one significant drainage depression within the works area. This crossing will require a new culvert to be designed. Review of the WRDLC shows that, as internal site drainage for a proposed commercial development, all access road culverts will be required to convey the 10% Annual Exceedance Probability (AEP) peak catchment flow and that the minimum culvert size is 450 mm x 450 mm for concrete box culverts.

Preliminary analysis of the 10% AEP catchment discharge for the site access crossing determined a peak flow rate of approximately 1.4 m³/s. A culvert capable of discharging this rate will be required to be designed at construction certificate stage of the development.

Site access drainage will otherwise consist of grassed drainage swales and table drains, with appropriately sized outlet measures (e.g. energy dissipation and sediment erosion control such as level spreaders). Where additional piped crossings are required, these shall need to be designed at construction certificate stage of the development. Existing culverts under the site access are to be retained.

Review of the site layout indicates that an additional piped crossing, likely of the order of 225 – 300 mm diameter, may be required to direct flows from the glamping area of Community 2 to the stormwater treatment system for the Arrivals Village (Section 3) under the proposed access to the wastewater treatment system. Alternatively, this crossing may be designed as a shallow causeway.

2.3 Watercourse Crossing

The Site contains a named watercourse (Schotts Creek) with an existing access road crossing. This access road crossing is proposed to be upgraded in conjunction with the proposed development to ensure flood free access in all flooding events up to and including the peak 1% AEP flood (refer to Flood Assessment, MA reference P2108462JR01V02, December 2023).

Preliminary design of this structure is provided on the engineering plans (MA reference P2108462PS01 – D204, March 2024). This demonstrates that the proposed bridge provides flood free access, including a 0.5 m freeboard, during the peak 1% AEP flood event for the Schotts Creek catchment.

3 Stormwater Quality Assessment

3.1 Water Quality Objectives

The site is located within Sydney's drinking water catchment. In accordance with Section 3.26 of the *EP&A Act* and Part 6.5 of SEPP B&C, Council as the consent authority must refuse consent to development in the Sydney drinking water catchment unless they are satisfied that the development provides a neutral or beneficial effect (NorBE) on water quality of site stormwater discharges.

The NorBE guidelines define NorBE as being satisfied if the development:

1. Has no identifiable potential impact on water quality;
2. Contains any water quality impact on the development site, preventing it from reaching any receiving watercourse, waterbody or drainage depression on the site; or,
3. Transfers any water quality impact outside the site to be treated and disposed of in accordance with consent authority requirements.

Specifically, the NorBE guidelines and MUSIC guidelines require the following criteria to be met:

1. Mean annual post development pollutant loads for Total Suspended Solids (**TSS**), Total Phosphorus (**TP**) and Total Nitrogen (**TN**) are to be 10% less than the pre development mean annual pollutant loads.
2. Mean annual post development pollutant loads for gross pollutants must be equal to or less than pre development mean annual pollutant loads.
3. Post development site stormwater discharge pollutant concentrations for TP and TN must be equal to or less than pre development concentrations for between the 50th and 98th percentiles over the modelling period for when runoff occurs.

Additionally, Water Sensitive Urban Design (WSUD) controls given in Section A5.3 of WRLDCP require that post development water quality measures must achieve the following water quality discharge targets:

1. 85% reduction in average annual TSS load.
2. 65% reduction in average annual TP load.
3. 45% reduction in average annual TN load.
4. 90% reduction in average annual gross pollutant load.

3.2 Water Quality Modelling Methodology

3.2.1 Overview

The Model for Urban Stormwater Improvement Conceptualisation (**MUSIC**) version 6.3 was used to develop and evaluate the proposed development water quality treatment measures in accordance with the NorBE guidelines and MUSIC guidelines. This included modelling both existing and developed site conditions.

A schematic showing the MUSIC modelling setup is provided in Attachment A.

3.2.2 Approach

An iterative approach has been used for the post development model to determine appropriate stormwater quality treatment measures and sizing to ensure NorBE is achieved.

Several assumptions were made in the modelling as follows:

1. All roofs, site accesses (vehicular and pedestrian), parking areas and passing bays were assumed to be 100% impervious.
2. Existing conditions catchments were assumed to be untreated.
3. Glamping area roofs and pathways were assumed to be redirected to the proposed bioretention basin located west and downslope of the Arrivals building.
4. The Arrivals building, Community 1 main building and cabins and Community 2 building are all assumed to have rainwater tanks for purposes of potable water supply.
5. Potable water reuse demand for rainwater tanks is based on calculated wastewater generation rates (MA reference P2108462JR04V01, December 2023). The water reuse demand rates were assumed to be 40% of the calculated average daily wastewater generation rate to account for variable site occupancy rates.
6. Site access roads, passing bays and the Community 1 access driveway to the main building are all assumed to drain to roadside swales / buffer strips.
7. Future community area requirements are determined based on the modelling results for Stage 1, and provided as an indicative sizing per catchment surface type and area.

3.2.3 Climate Data

Climate data was sourced from the available WaterNSW MUSIC climate file for Zone 3 of the Sydney drinking water catchment. The data consists of a 6 minute rainfall pluviography for the period from 1997 to 2001 and average monthly potential evapotranspiration.

3.2.4 Input Parameters

Input parameters for source and treatment nodes are consistent with the MUSIC guidelines and are provided in Attachment B.

3.2.5 Catchments

Catchments have been determined based on available site survey and aerial photographs for existing conditions and the proposed development layout for proposed conditions. Catchments have only considered areas proposed to be developed in Stage 1. Existing development not proposed to be amended has been excluded from modelling as no changes to water quality of runoff from these areas are expected. Model catchments are summarised in Attachment C and depicted in Attachment A.

3.3 Concept Stormwater Treatment Train

The stormwater treatment strategy for the site focuses on a combination of capture and potable reuse of roof runoff and source control using centralised stormwater treatment measures. Proposed stormwater quality improvement devices (SQIDs) to be used are detailed in the following sections.

3.3.1 Rainwater Tanks

MUSIC modelling has determined that each of the Arrivals building, Community 1 building and Community 2 building requires a rainwater tank of 100 kL for purposes of rainwater capture and potable reuse. Each Community 1 cabin requires a rainwater tank of 2 kL for potable reuse.

3.3.2 Bioremediation Basins and Raingardens

A bioremediation basin with a minimum filter area of 170 m² is proposed to be located to the west and downslope of the Arrivals building. This treatment measure is sized to accept flows from the upslope Arrivals Village (including rainwater tank overflows) and glamping area roofs and pedestrian pathways from the Community 2 area. The bioremediation basin shall replace the existing farm dam located to the west and downslope of the Arrivals building.

Additionally, a raingarden with a minimum filter area of 30 m² is proposed to be located downslope of Community 1 cabins and will treat flows from Community 1 pathways and overflows from cabin rainwater tanks. Alternatively, a number of raingardens may be used provided they have a minimum total filter area of 30 m².

Bioremediation basins and raingardens use a combination of filtration, biological uptake of nutrients, infiltration, evapotranspiration and detention of flows.

3.3.3 Wetland

A constructed wetland with a minimum surface area of 339 m² is proposed to be located to the north and downslope of the Community 2 building. This wetland shall consist of the existing farm dam located downslope of the Community 2 building, converted to provide a water quality function. Given that the existing farm dam is located 'online' to

the drainage depression located east of the Community 2 building, the conversion process may also require reconstruction of the wetland as an 'offline' structure to allow natural catchment flows from upslope to bypass the new wetland whilst also affording separation of the treatment wetland from the receiving environment as per NorBE guidelines requirements.

Constructed wetlands simulate natural wetland processes and use a combination of filtration, biological processes, evapotranspiration and detention to treat stormwater.

3.3.4 Swales

Grassed drainage swales are proposed to be located adjacent to site accesses, parking areas and footpaths to accept flows from these surfaces. Swales use a combination of filtration and biological nutrient reduction to treat stormwater.

3.3.5 Buffers

Grassed buffers are proposed to be located adjacent to site accesses and bus parking areas where provision of a grassed swale is not feasible due to site slope, topography or other constraints. Grassed buffers are vegetated areas which use filtration to reduce sediment and gross pollutant loads. Buffers are typically not used as a nutrient reduction treatment measure.

3.3.6 Future Masterplan Areas

For future development areas, it is proposed that the following general stormwater treatment train measures are to be used based on developed catchment surface type:

1. Future roof areas will be directed to rainwater tanks for the purposes of runoff capture and reuse. It is likely that future Community rainwater tanks will require a similar capacity to that calculated for Communities 1 and 2 and the Arrivals Village (i.e. 100 kL). This would require confirmation at detailed design stage for each future Community.
2. Future community areas may incorporate a bioremediation basin or wetland, depending on opportunities for converting existing farm dam structures and / or availability of area for such stormwater treatment structures. Alternatively, 'raingarden' style bioremediation treatment measures may be included as part of the stormwater quality treatment train.
3. Access road areas to future development areas, future parking and footpaths will be directed to grassed drainage swales for treatment prior to discharge. Where swales are not feasible, a grassed buffer is to be provided.

3.4 Water Quality Modelling Results

MUSIC modelling results are assessed against the above NorBE criteria in the NorBE guidelines and WSUD water quality objectives in the WRLDCP.

3.4.1 NorBE Assessment

Results of the MUSIC model show that the proposed stormwater treatment measures achieve the minimum NorBE assessment objectives in terms of annual pollutant loads and cumulative frequency pollutant concentrations. Model results are represented in Table 2 and Figures Figure 1 and Figure 2 (Attachment D – MUSIC Results).

Table 2: Summary of MUSIC modelling results and NorBE criteria.

Pollutant	Annual Pollutant Load (kg/year)			
	Existing Conditions	Existing Conditions less 10%	Proposed Conditions	NorBE Satisfied (Y/N)
TSS	3,510	3,159	1,050	Y
TP	2.54	2.29	1.25	Y
TN	14.4	13.0	12.0	Y
Gross pollutants	70.9	63.8	26.1	Y

3.4.2 WSUD Water Quality Targets

Results of the MUSIC model show that the proposed stormwater treatment measures achieve the WUSD water quality post development pollution retention targets given in the WRDLC. Model results are summarised in Table 3.

Table 3: Summary of MUSIC modelling results against WSUD water quality targets in WRDLC.

Pollutant	Target retention efficiency (%)	Retention efficiency (%)	Satisfies objective (Y/N)
TSS	85.0	86.8	Y
TP	65.0	72.1	Y
TN	45.0	53.6	Y
Gross pollutants	90.0	91.0	Y

3.4.3 Future Masterplan Areas Conceptual Sizing

Based on the MUSIC modelling results for Stage 1, an estimate of the required water quality treatment structures for future development stages is provided in Table 4. These are based on development catchment type and are provided as an area / volume per contributing m² of development catchment.

Table 4: Summary of likely stormwater quality treatment size requirements per contributing m² of development catchment.

Treatment measure	Catchment Type		
	Roof	Access road / parking	Footpath
Rainwater tank	Approx 0.1 kL / m ²	n/a	n/a
Bioremediation basin / raingarden	Approx 0.06 m ² / m ²	Approx 0.05 m ² / m ²	Approx 0.15 m ² / m ²

Treatment measure	Catchment Type		
	Roof	Access road / parking	Footpath
Wetland	Approx 0.8 m ² / m ²	Approx 0.2 m ² / m ²	Approx 0.6 m ² / m ²
Swale	n/a	Approx 0.04 m / m ²	Approx 0.24 m / m ²
Buffer	n/a	Approx 0.25 m ² / m ²	n/a

3.5 Conclusions

Results of the MUSIC model demonstrate that the objectives of both the NorBE guidelines and WRLDCP are achieved for all pollutant parameters. Proposed SQIDs are sized to ensure compliance with NorBE and WSUD water quality objectives.

4 Water Cycle Management Recommendations

4.1 Stormwater Quality Treatment Train

The following minimum treatment train will be required for the Arrivals area, Community 1, Community 2 and the site access road:

Arrivals Area:

1. All roofwater generated by the Arrivals building is to be directed to a rainwater tank with a minimum capacity of 100 kL.
2. Runoff from car parking areas, car park access, site accesses and footpaths adjacent to the Arrivals building and overflows from the Arrivals building rainwater tank are to be directed via a series of grassed swales to a new bioremediation basin with a minimum filter area of 170 m².
3. New bioremediation basin is to be built in the location of the existing farm dam downslope of and to the west of the Arrivals building. Existing dam embankment and outlet are to be used where feasible.
4. Runoff from proposed bus parking areas is to be directed to a grassed buffer area downslope of the parking area.

Community 1:

1. All roofwater generated by the Community 1 building is to be directed to a rainwater tank with a minimum capacity of 100 kL.
2. All roofwater generated by Community 1 cabins is to be directed to individual rainwater tanks located adjacent to cabins. Each rainwater tank is to have a minimum capacity of 2 kL.
3. Runoff from cabin rainwater tanks and Community 1 footpaths is to be directed to a new raingarden or series of raingardens with a minimum filter area of 30 m².
4. Runoff from the Community 1 access turning area and outdoor gather space and pool areas is to be directed to a series of grassed swales.
5. Community 1 service driveway is to drain to a grassed buffer area prior located downslope of and adjacent to the driveway.

Community 2:

1. All roofwater generated by the Community 2 building is to be directed to a rainwater tank with a minimum capacity of 100 kL.
2. All roofwater generated by Community 2 glamping area roofs is to be directed via a grassed swale / overland flow path to the proposed bioremediation basin located to the west and downslope of the Arrivals building.

3. Runoff from the Community 2 access turning area, access and footpaths around the Community 2 building are to be directed via grassed swales to a new wetland located to the north of the Community 2 building.
4. New Community 2 wetland is to use existing farm dam embankment and outlet where feasible. Upslope flows from the drainage depression are to be bypassed around the new wetland through minor earthworks (detailed design at construction certificate stage).

Future Development Areas:

1. All roofwater generated by future Community Areas is to be directed to a rainwater tank. Capacity is to be determined at concept design stage.
2. Runoff from future Community Area accesses, turning areas, footpaths and parking is to be directed to grassed swales (or buffers where grassed swales are not feasible) and / or a bioremediation basin or raingarden depending on availability of area and / or existing farm dams downslope of the future Community Area. Alternatively, runoff may be treated by a constructed wetland.

4.2 Stormwater Quantity Management

Stormwater quantity management shall consist largely of site access table drains, grassed swales and overland flow paths. A new culvert crossing, capable of discharging approximately 1.4 m³/s will be required to be designed for the site access road where it crosses the existing drainage depression to the north of the Community 2 building.

A new bridge is proposed to provide flood free access in the 1% AEP peak flood for the access road crossing of Schotts Creek. Preliminary design details are provided on the Engineering Design Plans (MA reference P2108462PS01 – D204, March 2024).

All other pipes, piped crossings and stormwater outlet structures will require detailed design at construction certificate stage of the development.

4.3 Concept Sediment and Erosion Control

A sediment and erosion control plan in accordance with NSW Landcom (2004) guidelines and WaterNSW (2022) guidelines will be required detailing sediment and erosion control measures to be implemented prior to commencement of site works.

Sediment and erosion control measures will likely include the following components and general requirements:

1. **Sediment control fencing.** All disturbed area will have sediment fences installed downslope to prevent movement of sediments to downstream receiving environments. Fences will be supported by star pickets and straw bales as required.
2. **Check dams.** Where slopes exceed 5%, check dams consisting of straw bales supported by star pickets or dumped and shaped rock are to be installed to

reduce velocity of runoff from disturbed areas. Check dam location and spacing will need to be confirmed at construction certificate stage.

3. **Upslope diversion bunds.** Where appropriate, runoff from areas upslope of disturbed areas will be diverted around works areas by surface diversion bunds.
4. **Works area delineation fences.** Works areas are to be delineated with barrier fencing to prevent access to undisturbed areas. Fences shall be moved progressively as works advance.
5. **Stockpiles, fuel and equipment / plant storage areas.** All materials stockpiles, fuel and equipment / plant storage areas shall be located on relatively flat areas, outside of 1% AEP flood extents and are to be protected from upslope runoff by diversion bunds. A downslope bund is to be included on all stockpiles and fuel storage areas, with the bunded area to have a minimum volume equal to not less than 120% of the volume of stored material / fuel.
6. **Vegetation protection.** Vegetation not proposed to be removed as part of the works is to be protected during the works. All sediment and erosion control measures are to be located to minimise impacts on existing vegetation.
7. **Dust suppression.** Site works may include periodic dust suppression during construction of site accesses and passing bays and on exposed soil areas.
8. **Temporary roofwater dispersion.** Roofwater from temporary structures (e.g. control shed, portable toilets, etc.) is to be directed to temporary dispersion measures consisting of dumped rip rap and designed to spread flows before discharge to downslope areas. Discharges are to be directed away from stockpiles and storage areas where feasible.
9. **Maximum disturbed area.** Maximum active construction area should comply with an approved construction management plan (to be completed at construction certificate stage of the development).
10. **Rehabilitation.** Disturbed site areas are to be progressively rehabilitated as works proceed. This will include reestablishment of vegetation in accordance with an approved landscaping plan (to be completed at construction certificate stage of the development).
11. **Operation and Maintenance.** Sediment and erosion control measures will need to be maintained during site construction works until all disturbed areas are rehabilitated. Appropriate monitoring and maintenance, including periodic removal of accumulated sediments from sediment and erosion controls will be required.
12. **Reporting and Auditing.** A sediment and erosion control register is to be kept on site during construction works. This register will include details of any pollution incident (e.g. fuel spill, sediment release, etc.) including date, nature of incident and measures undertaken to remediate the incident and follow up

actions required. The register should be made available for inspection by Council and other consent / regulatory authorities as necessary.

5 References

Environmental Planning and Assessment Act 1979 (NSW).

State Environmental Planning Policy (Biodiversity and Conservation) 2021 (NSW).

Landcom (2004) *Managing Urban Stormwater: Soils and Construction.*

Wingecarribee Shire Council (2021) *Development Design Specification: D09 Stormwater Drainage Design.*

Wingecarribee Shire Council (2021) *Rural Lands Development Control Plan (WRLCDP).*

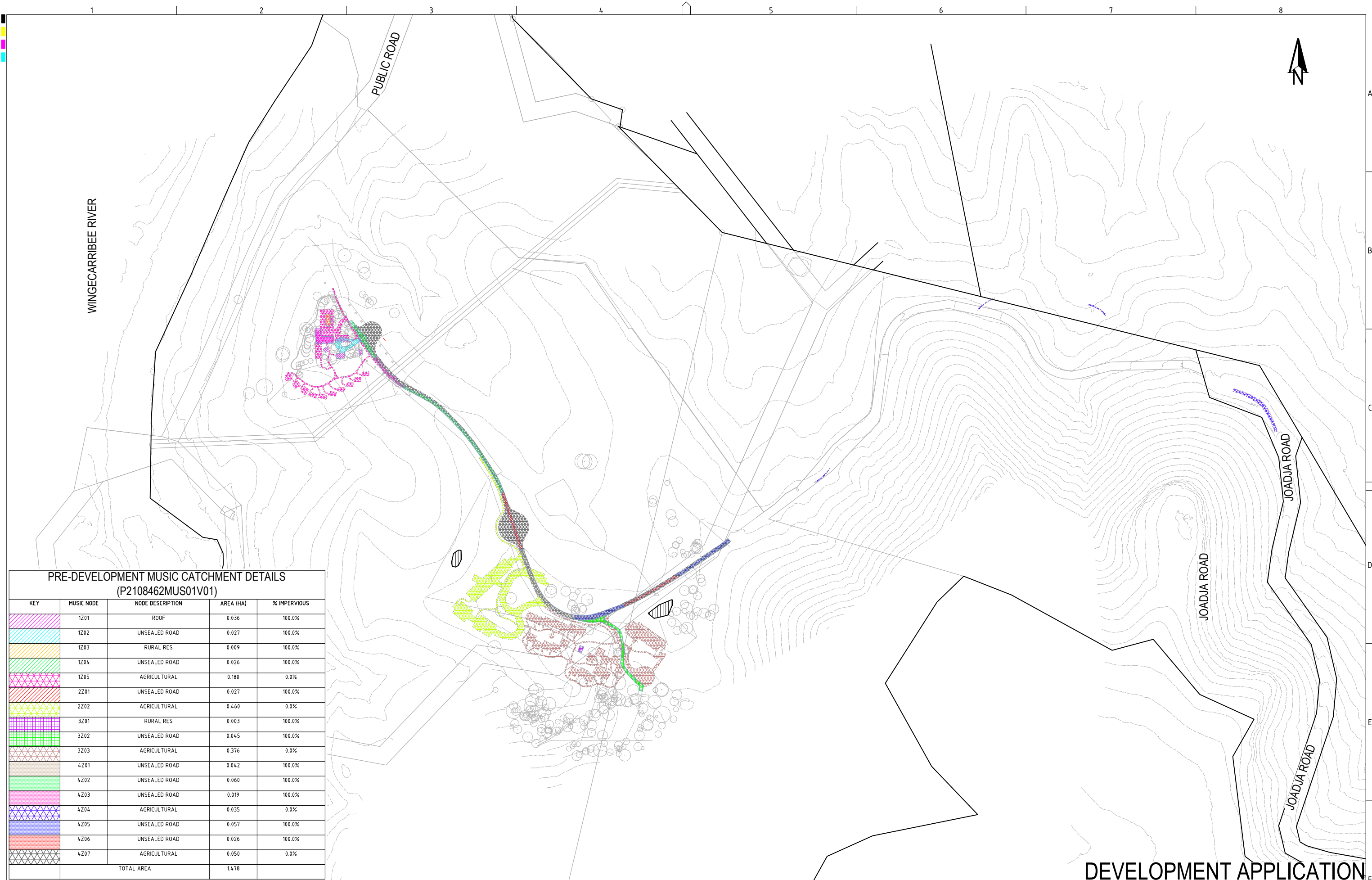
Wingecarribee Shire Council (2010) *Wingecarribee Local Environmental Plan (WLEP).*

Water NSW (2023) *Developments in the Sydney Drinking Water Catchment – Water Quality Information Requirements.*

WaterNSW (2022) *Neutral or Beneficial Effect on Water Quality Assessment Guideline 2022.*

Water NSW (2023) *Using MUSIC in Sydney Drinking Water Catchment: A WaterNSW Current Recommended Practice February 2023.*

Attachment A – Site Plans



PRE-DEVELOPMENT MUSIC CATCHMENT DETAILS (P2108462MUS01V01)				
KEY	MUSIC NODE	NODE DESCRIPTION	AREA (HA)	% IMPERVIOUS
	1Z01	ROOF	0.036	100.0%
	1Z02	UNSEALED ROAD	0.027	100.0%
	1Z03	RURAL RES	0.009	100.0%
	1Z04	UNSEALED ROAD	0.026	100.0%
	1Z05	AGRICULTURAL	0.180	0.0%
	2Z01	UNSEALED ROAD	0.027	100.0%
	2Z02	AGRICULTURAL	0.460	0.0%
	3Z01	RURAL RES	0.003	100.0%
	3Z02	UNSEALED ROAD	0.045	100.0%
	3Z03	AGRICULTURAL	0.376	0.0%
	4Z01	UNSEALED ROAD	0.042	100.0%
	4Z02	UNSEALED ROAD	0.060	100.0%
	4Z03	UNSEALED ROAD	0.019	100.0%
	4Z04	AGRICULTURAL	0.035	0.0%
	4Z05	UNSEALED ROAD	0.057	100.0%
	4Z06	UNSEALED ROAD	0.026	100.0%
	4Z07	AGRICULTURAL	0.050	0.0%
TOTAL AREA			14.78	

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	MINOR AMENDMENTS	19/04/2024	NP	MD	TH	TH
B	MINOR AMENDMENTS	05/04/2024	NP	MD		
A	INITIAL RELEASE	21/02/2024	NP	MD		

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METRES	

GRID	DATUM	PROJECT MANAGER	CLIENT
MGA	mAHD	TH	PURE PROJECTS
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PROJECT NAME/PLANSET TITLE	ECO-TOURISM RESORT DEVELOPMENT
CONCEPT CIVIL DESIGN - STAGE 1 & MASTER PLAN	
1551 JOADJA ROAD, JOADJA, NSW GREENSTEAD VALLEY, NSW	
LOT 59/DP751248	

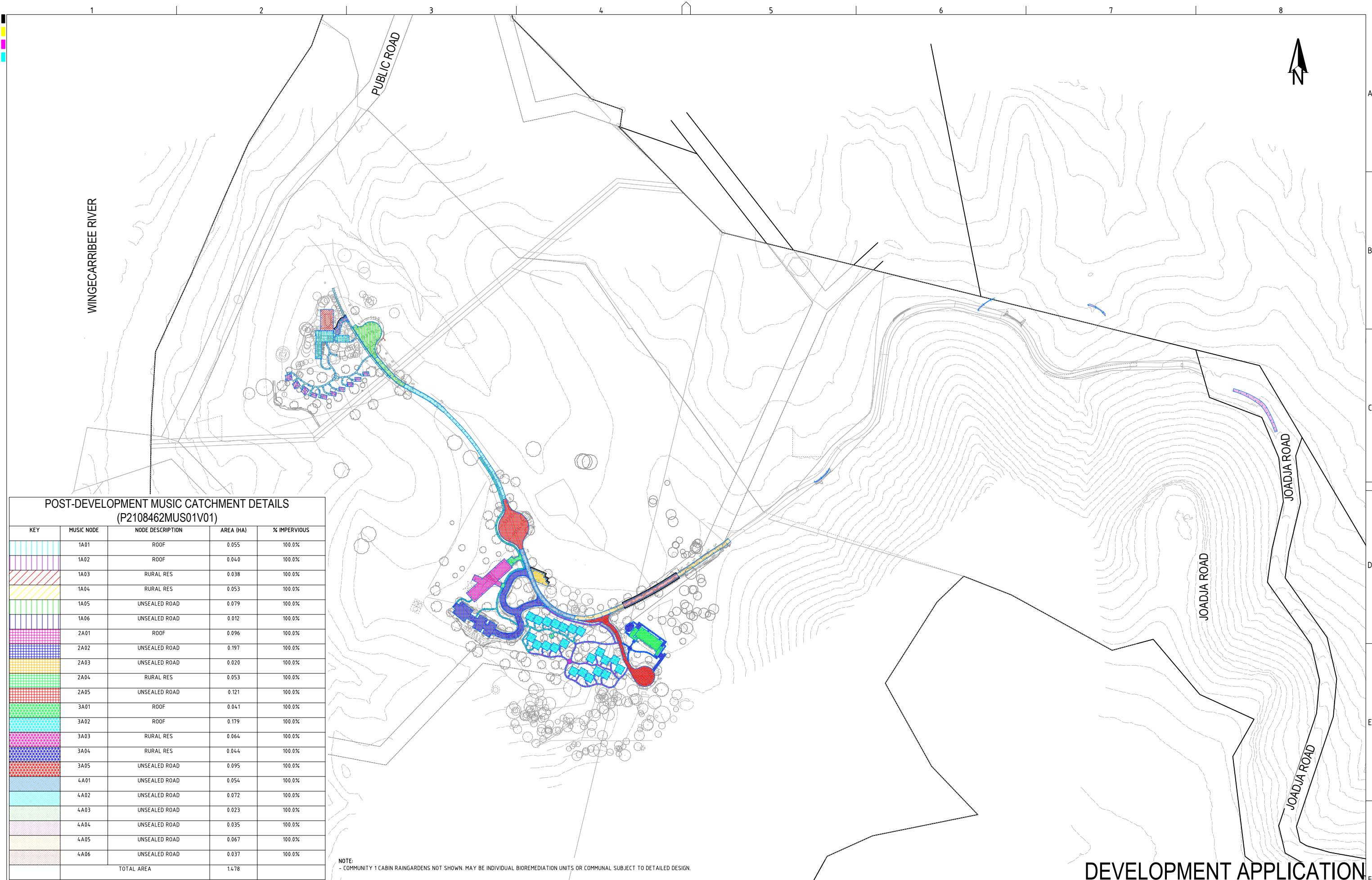


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DRAWING TITLE				
PRE-DEVELOPMENT WATER QUALITY CATCHMENT PLAN				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108462	PS01	R05	PS01-E700	C

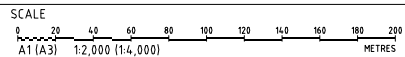
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POST-DEVELOPMENT MUSIC CATCHMENT DETAILS (P2108462MUS01V01)				
KEY	MUSIC NODE	NODE DESCRIPTION	AREA (HA)	% IMPERVIOUS
	1A01	ROOF	0.055	100.0%
	1A02	ROOF	0.040	100.0%
	1A03	RURAL RES	0.038	100.0%
	1A04	RURAL RES	0.053	100.0%
	1A05	UNSEALED ROAD	0.079	100.0%
	1A06	UNSEALED ROAD	0.012	100.0%
	2A01	ROOF	0.096	100.0%
	2A02	UNSEALED ROAD	0.197	100.0%
	2A03	UNSEALED ROAD	0.020	100.0%
	2A04	RURAL RES	0.053	100.0%
	2A05	UNSEALED ROAD	0.121	100.0%
	3A01	ROOF	0.041	100.0%
	3A02	ROOF	0.179	100.0%
	3A03	RURAL RES	0.064	100.0%
	3A04	RURAL RES	0.044	100.0%
	3A05	UNSEALED ROAD	0.095	100.0%
	4A01	UNSEALED ROAD	0.054	100.0%
	4A02	UNSEALED ROAD	0.072	100.0%
	4A03	UNSEALED ROAD	0.023	100.0%
	4A04	UNSEALED ROAD	0.035	100.0%
	4A05	UNSEALED ROAD	0.067	100.0%
	4A06	UNSEALED ROAD	0.037	100.0%
TOTAL AREA			14.78	

NOTE:
- COMMUNITY 1 CABIN RAINGARDENS NOT SHOWN. MAY BE INDIVIDUAL BIOREMEDIATION UNITS OR COMMUNAL SUBJECT TO DETAILED DESIGN.

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
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C	ARCHITECTURAL AMENDMENTS	12/04/2024	NP	MD		
B	MINOR AMENDMENTS	05/04/2024	NP	MD		
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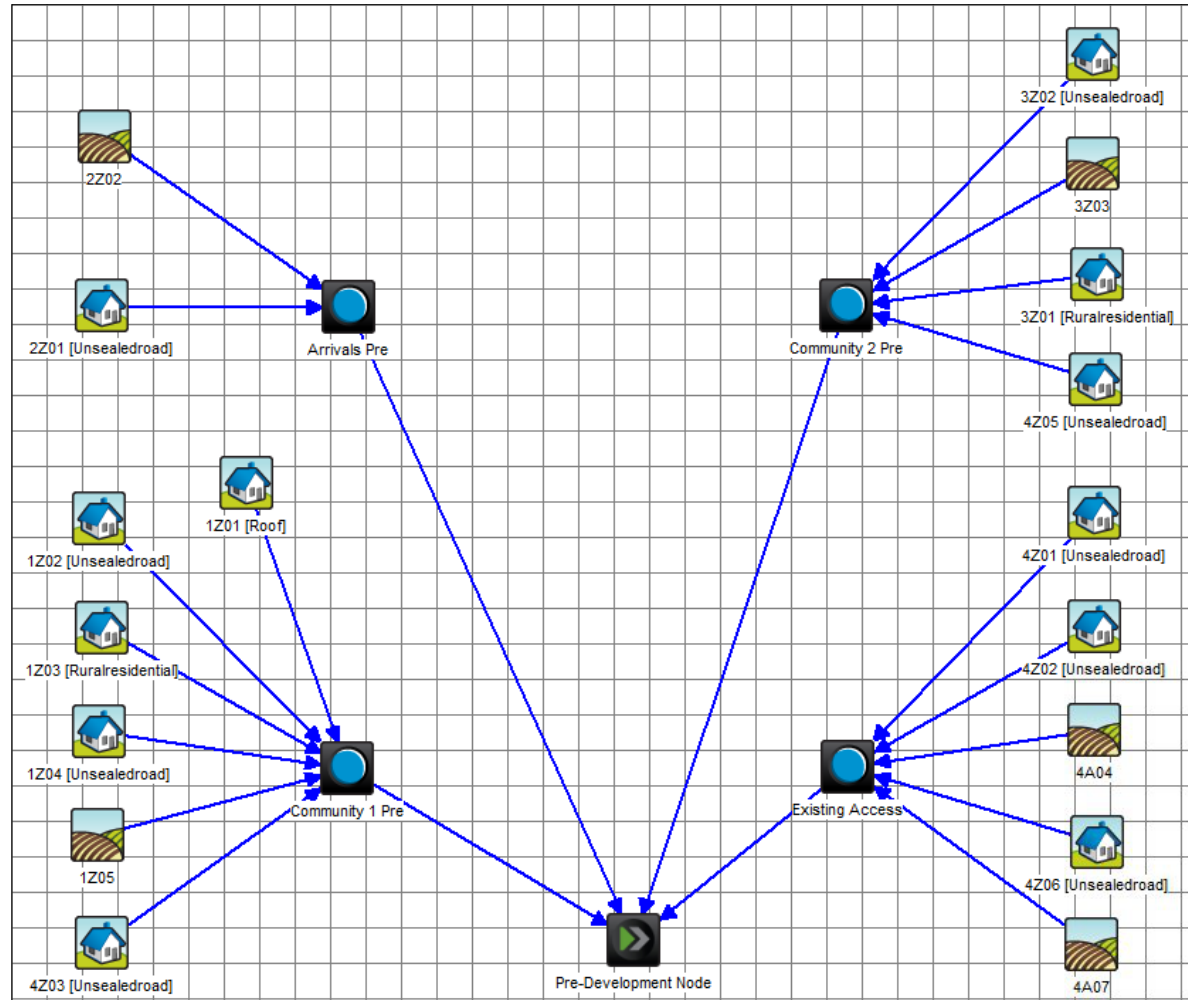
PROJECT NAME/PLANSET TITLE	
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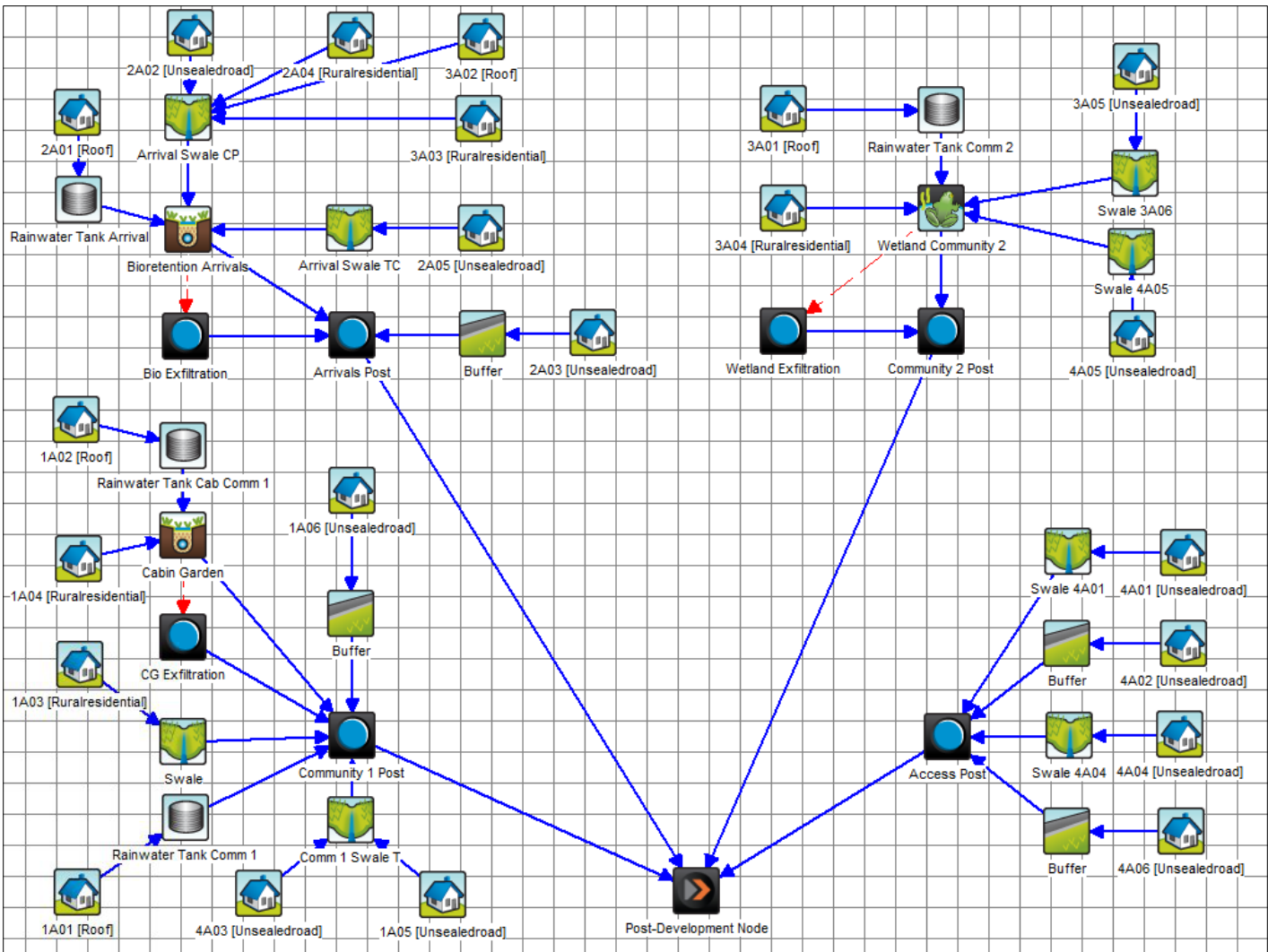
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DRAWING TITLE				
POST-DEVELOPMENT WATER QUALITY CATCHMENT PLAN				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108462	PS01	R05	PS01-E701	D

DEVELOPMENT APPLICATION



PRE-DEVELOPMENT MUSIC CATCHMENT LAYOUT (P2108462MUS01V01)



POST-DEVELOPMENT MUSIC CATCHMENT LAYOUT (P2108462MUS01V01)

Mean Annual Loads - Pre-Development Node	
	Inflow
Flow (ML/yr)	5.32
Total Suspended Solids (kg/yr)	3.51E3
Total Phosphorus (kg/yr)	2.54
Total Nitrogen (kg/yr)	14.4
Gross Pollutants (kg/yr)	70.9

PRE-DEVELOPMENT MUSIC CATCHMENT RESULTS (P2108462MUS01V01)

Mean Annual Loads - Post-Development Node	
	Inflow
Flow (ML/yr)	9.75
Total Suspended Solids (kg/yr)	1.05E3
Total Phosphorus (kg/yr)	1.25
Total Nitrogen (kg/yr)	12.0
Gross Pollutants (kg/yr)	26.1

POST-DEVELOPMENT MUSIC CATCHMENT RESULTS (P2108462MUS01V01)

Treatment Train Effectiveness - Post-Development Node			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	11.2	9.75	13.3
Total Suspended Solids (kg/yr)	7970	1050	86.8
Total Phosphorus (kg/yr)	4.47	1.25	72.1
Total Nitrogen (kg/yr)	25.9	12	53.6
Gross Pollutants (kg/yr)	291	26.1	91

COUNCIL RURAL LANDS DCP ANALYSES (P2108462MUS01V01)

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A	INITIAL RELEASE	21/02/2024	NP	MD			

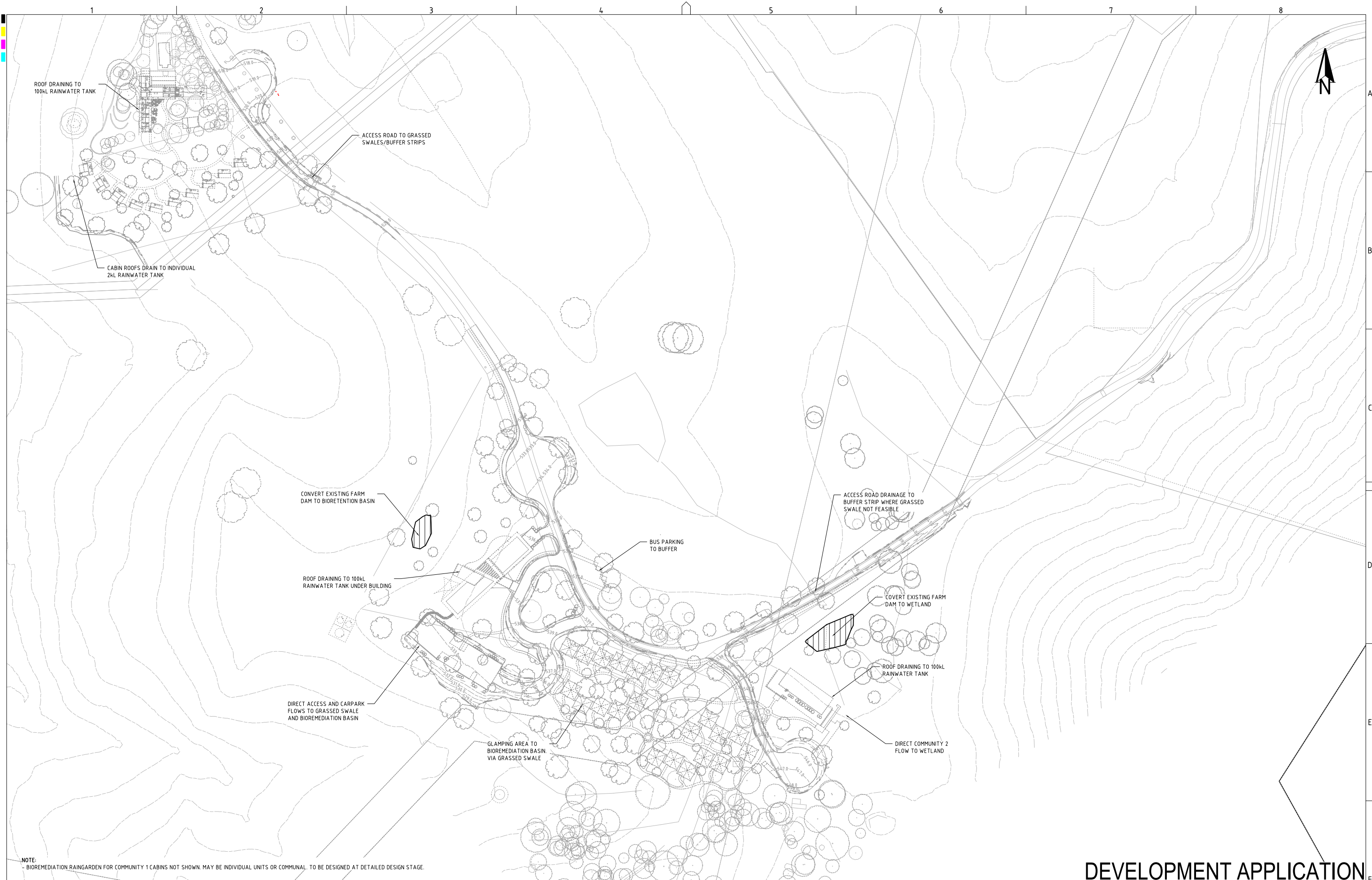
GRID	DATUM	PROJECT MANAGER	CLIENT
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PROJECT NAME/PLANSET TITLE
ECO-TOURISM RESORT DEVELOPMENT
CONCEPT CIVIL DESIGN - STAGE 1 & MASTER PLAN
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LOT 59/DP751248

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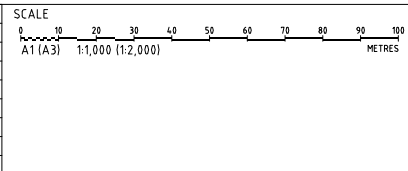
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DRAWING TITLE				
WATER QUALITY LAYOUT, DETAILS AND RESULTS				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108462	PS01	R05	PS01-E702	B



NOTE:
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B	ARCHITECTURAL AMENDMENTS	12/04/2024	NP	MD		
A	INITIAL RELEASE	05/04/2024	NP	MD		



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PROJECT NAME/PLANSET TITLE
ECO-TOURISM RESORT DEVELOPMENT CONCEPT CIVIL DESIGN - STAGE 1 & MASTER PLAN
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DRAWING TITLE				
CONCEPT STORMWATER MANAGEMENT LAYOUT				
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108462	PS01	R05	PS01-E710	C

DRAWING ID: P2108462-PS01-R05-E710

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A1 / A3 LANDSCAPE (A1LC_02.0.0)

Attachment B – MUSIC Model Parameter Summary

Table 5: Summary of MUSIC modelling parameters.

Element	Factor	Input	Source
Setup	Climate file	WaterNSW Zone 3 (1997 – 2001).	WaterNSW.
Source Nodes	Rainfall threshold	Based on surface type specified in Table 4.3.	MUSIC guidelines.
	Soil storage and field capacity and runoff parameters	Based on site subsurface investigations and Tables 4.4 and 4.5.	MUSIC guidelines.
	Base & stormflow pollutant concentration properties	As per Tables 4.6 & 4.7 and adopted land use per catchment (Table 6 and Table 7).	MUSIC guidelines.
	Estimation method	Stochastically generated.	MUSIC guidelines.
Rainwater Tank	Low flow bypass (m ³ /s)	0	MUSIC guidelines.
	High flow bypass (m ³ /s)	0.01	MUSIC guidelines.
	Volume below overflow (kL)	100 for Arrivals, Community 1 and Community 2 buildings. 2 kL/cabin for Community 1 cabins.	By design.
	Surface area (m ²)	20 per tank for Arrivals, Community 1 and Community 2 buildings. 1 per tank for Community 1 cabins.	By design.
	Overflow pipe diameter (mm)	90 for each tank.	By design.
	Reuse	2 kL/ day for Arrivals building. 3 kL/day for Community 1 building. 0.4 kL/day for Community 1 cabins. 7 kL/day for Community 2 building.	Estimated wastewater generation rates in Onsite Wastewater Management Assessment (MA reference P2108462JR04V01, December 2023).
Swale	Length (m)	Varies between 10 – 70.	By design.
	Bed slope (%)	Varies between 1.0 – 10.0.	By design.
	Base width (m)	0.0	By design.
	Top width (m)	1.8	By design.
	Depth (m)	0.3	By design.
	Vegetation height	0.1	By design.
	Exfiltration rate (mm/hr)	0.0	By design.
Buffer	Percentage of upstream area buffered (%)	50.0	By design.
	Buffer area (% of upstream impervious area)	50.0	By design.
	Exfiltration rate (mm/hr)	0.0	By design.

Element	Factor	Input	Source
Bioretention	Low flow bypass (m3/s)	0	MUSIC guidelines.
	High flow bypass (m3/s)	0.1	Set to ensure all flows drain to bioretention.
	Extended detention depth (m)	0.15 (Community 1 raingarden) 0.60 (Arrivals village bioremediation basin)	MUSIC guidelines.
	Surface area (m²)	30 (Community 1 raingarden combined) 170 (Arrivals village bioremediation basin)	By design.
	Filter area (m²)	30 (Community 1 raingarden) 170 (Arrivals village bioremediation basin)	By design.
	Unlined filter media (m)	0.1	By design.
	Saturated hydraulic conductivity (mm/hr)	90	MUSIC guidelines for sandy loam soils, halved to simulate lessening of saturated hydraulic conductivity over design life of basin.
	Filter depth (m)	0.5	By design.
	TN content of filter media (mg/kg)	400	MUSIC guidelines.
	Orthophosphate content of filter media (mg/kg)	40	MUSIC guidelines.
	Exfiltration rate (mm/hr)	90	MUSIC guidelines for sandy loam soils, halved to simulate lessening of saturated hydraulic conductivity over design life of basin. Exfiltration included in output via secondary drainage links.
	Lined base	No	By design, all water is treated.
	Vegetation properties	Vegetated with effective nutrient plants	By design.
	Overflow weir width	2.0 m	By design.
	Underdrain present	Yes	By design.
	Submerged zone	No	By design.
Wetland	Low flow bypass (m3/s)	0	MUSIC guidelines.
	High flow bypass (m3/s)	100	Set to ensure all flows drain to wetland.
	Inlet pond volume (m3)	30.0	By design.

Element	Factor	Input	Source
	Surface area (m ²)	339	By design.
	Extended detention depth (m)	0.50	By design.
	Permanent pool volume (m ³)	100	By design.
	Initial volume (m ³)	50	By design.
	Exfiltration rate (mm/hr)	90	MUSIC guidelines for sandy loam soils, halved to simulate lessening of saturated hydraulic conductivity over design life of basin. Exfiltration included in output via secondary drainage links.
	Evaporative loss as % of potential evapotranspiration	125	MUSIC guidelines.
	Equivalent pipe diameter (mm)	100	By design.
	Overflow weir width (m)	2.0	By design.

Attachment C – MUSIC Model Catchments

Table 6: Summary of MUSIC model catchments (Existing conditions).

Catchment ID	Impervious area (m ²)	MUSIC land use adopted	Comment
1Z01	361.2	Roof.	Existing Community 1 homestead.
1Z02	272.4	Unsealed road.	Existing Community 1 homestead driveway.
1Z03	87.4	Rural residential.	Existing Community 1 homestead pool area.
1Z04	258.6	Unsealed road.	Existing Community 1 vehicle turning area.
1Z05	1,799.1	Agricultural.	Balance of post development Community 1 development not presently developed.
2Z01	271.8	Unsealed road.	Existing Arrivals Village access.
2Z02	4,604.3	Agricultural.	Balance of post development Arrivals Village development not presently developed.
3Z01	33.9	Rural residential.	Existing Community 2 concrete slab.
3Z02	449.6	Unsealed road.	Existing Community 2 access driveway.
3Z03	3,759.7	Agricultural.	Balance of post development Community 2 development not presently developed.
4Z01	415.8	Unsealed road.	Existing access adjacent to Arrivals Village.
4Z02	599.9	Unsealed road.	Existing access to Community 1 – eastern portion.
4Z03	192.3	Unsealed road.	Existing access to Community 1 – western portion.
4Z04	353.0	Agricultural.	Existing access works areas proposed to be passing bays.
4Z05	567.8	Unsealed road.	Existing access works area north of Community 2.
4Z06	260.7	Unsealed road.	Existing access works area.
4Z07	495.7	Agricultural.	Balance of post development access works area not presently developed.

Table 7 Summary of MUSIC model catchments (Post development conditions).

Catchment ID	Impervious area (m ²)	MUSIC land use adopted	Comment
1A01	552.6	Roof.	Community 1 building roof.
1A02	400.3	Roof.	Community 1 cabin roofs.
1A03	382.3	Rural residential.	Community 1 outdoor gather and pool areas.
1A04	534.0	Rural residential.	Community 1 pedestrian pathways.
1A05	786.2	Unsealed road.	Community 1 vehicle turning circle and access road.
1A06	123.3	Unsealed road.	Community 1 driveway to building.
2A01	964.7	Roof.	Arrivals Village building roof.
2A02	1,974.6	Unsealed road.	Arrivals Village car park and access to car park.
2A03	203.4	Unsealed road.	Arrivals Village bus parking area.
2A04	526.8	Rural residential.	Arrivals Village pedestrian pathways.
2A05	1,206.6	Unsealed road.	Arrivals Village turning circle and access road.
3A01	414.7	Roof.	Community 2 building roof.
3A02	1,793.2	Roof.	Community 2 glamping roofs.
3A03	644.4	Rural residential.	Community 2 pedestrian pathways draining to bioremediation basin west of Arrivals building.
3A04	442.6	Rural residential.	Community 2 pedestrian pathways draining to wetland.
3A05	948.3	Unsealed road.	Community 2 turning circle and access road.
4A01	539.7	Unsealed road.	Proposed access north of Arrivals Village bypassing wetland and bioremediation basin.
4A02	722.4	Unsealed road.	Proposed access to Community 1 – eastern portion.
4A03	234.4	Unsealed road.	Proposed access to Community 1 – western portion.
4A04	353.0	Unsealed road.	Proposed access passing bays.
4A05	670.7	Unsealed road.	Proposed access draining to wetland.
4A06	365.0	Unsealed road.	Proposed access north of Community 2 bypassing wetland.

Attachment D – MUSIC Results

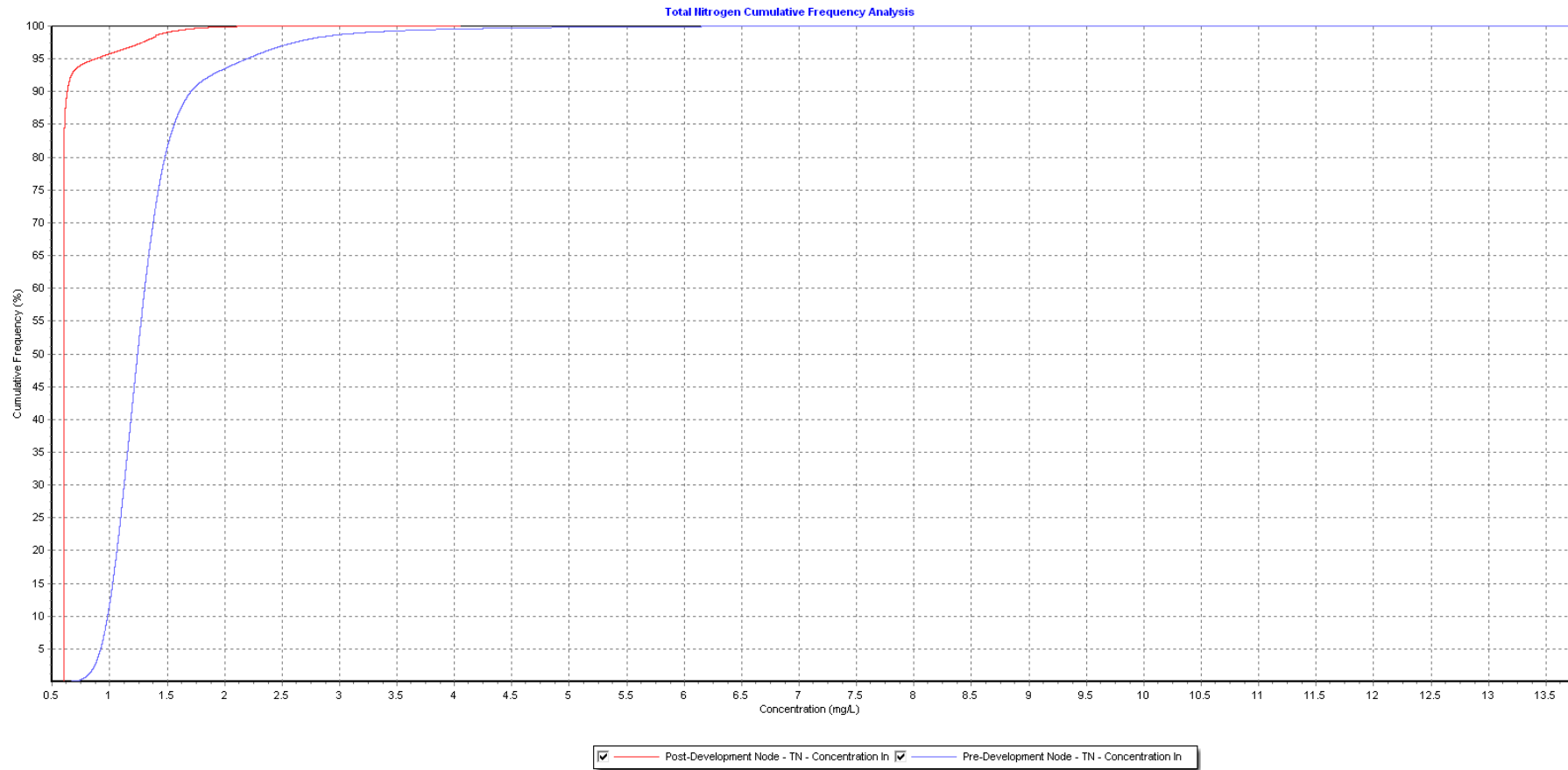


Figure 1: Cumulative frequency curves of total nitrogen concentration for existing and developed conditions.

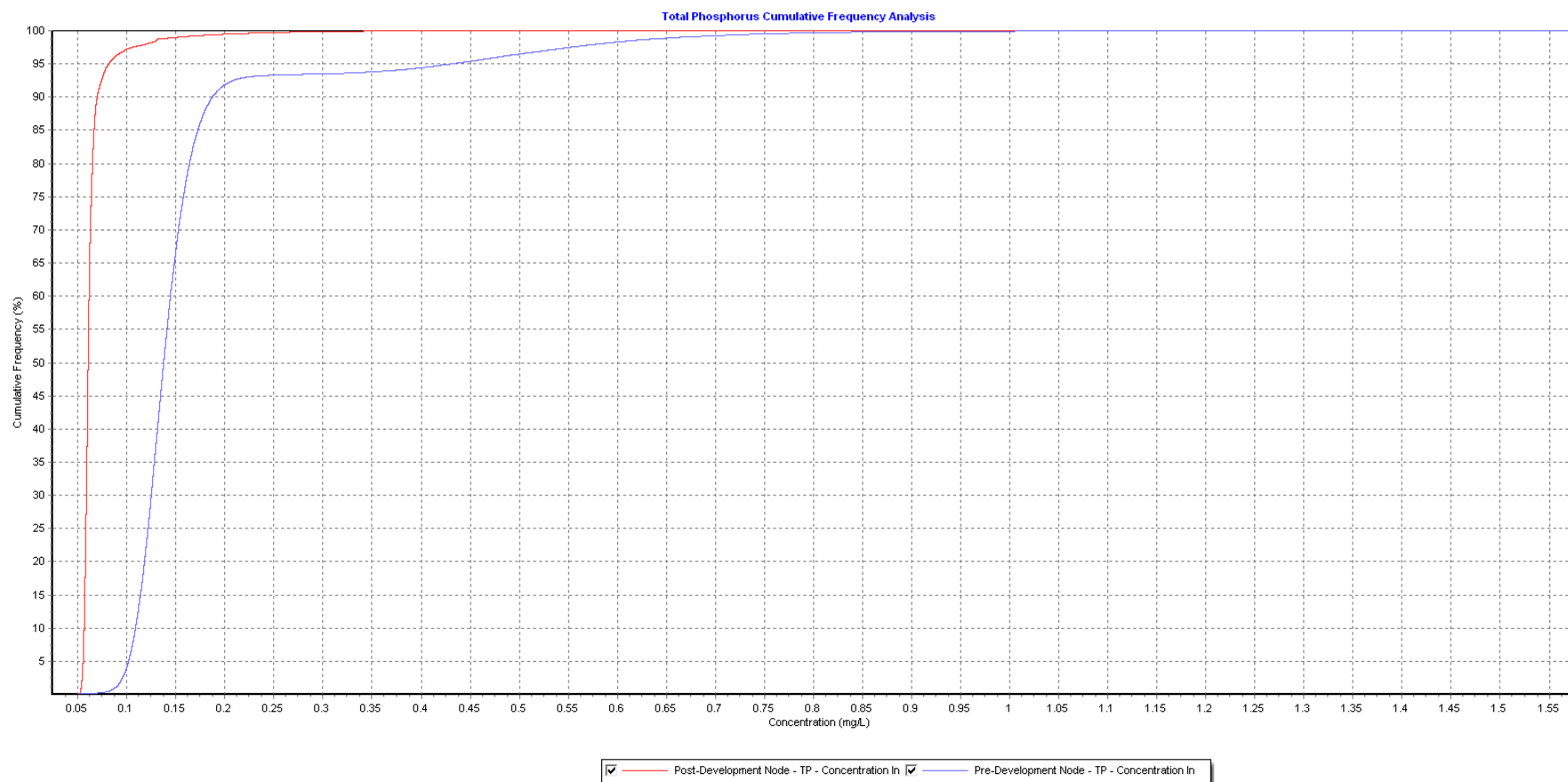
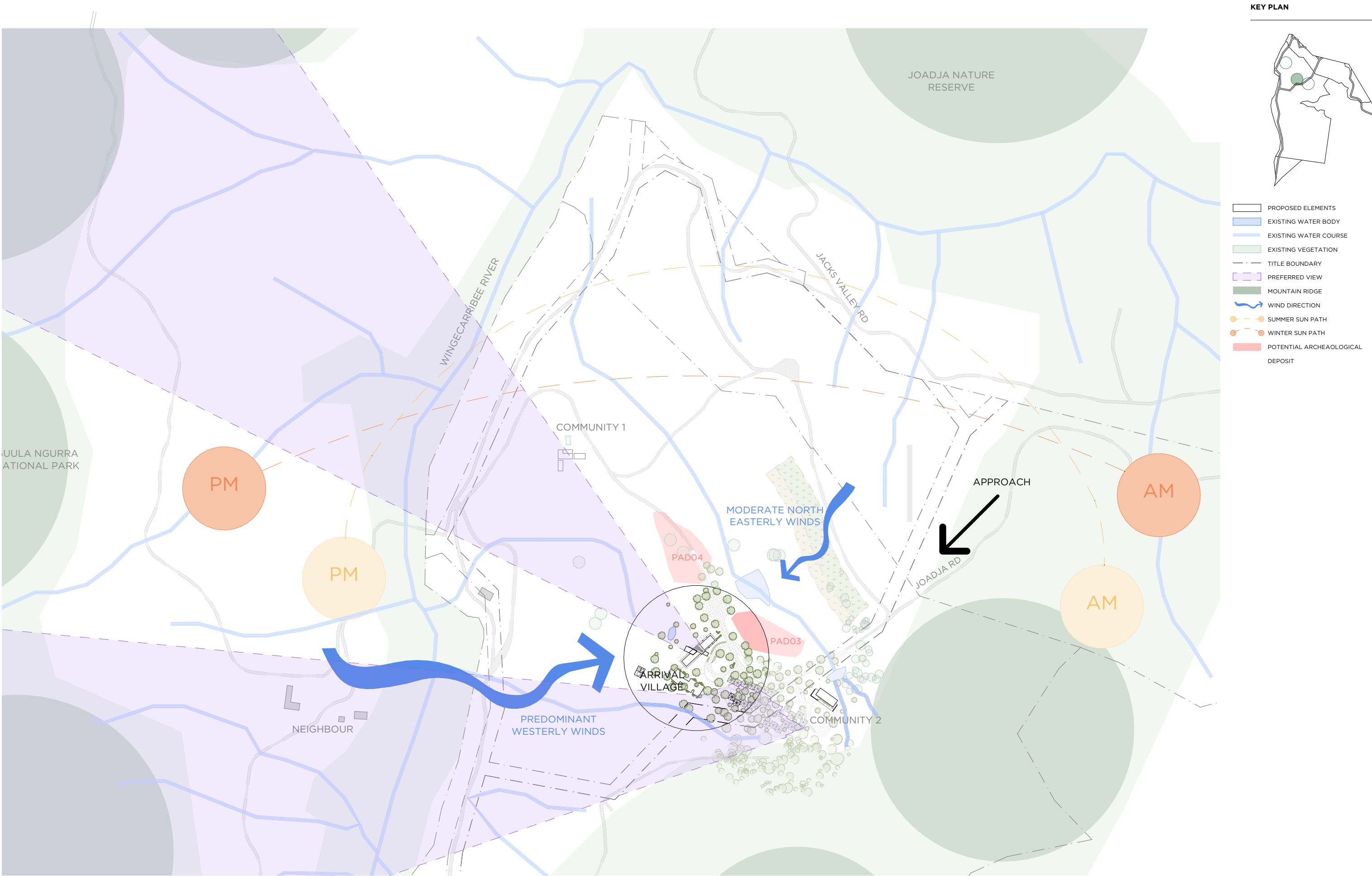


Figure 2: Cumulative frequency curves of total phosphorus concentration for existing and developed conditions.

Attachment E – Architectural Plans



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REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
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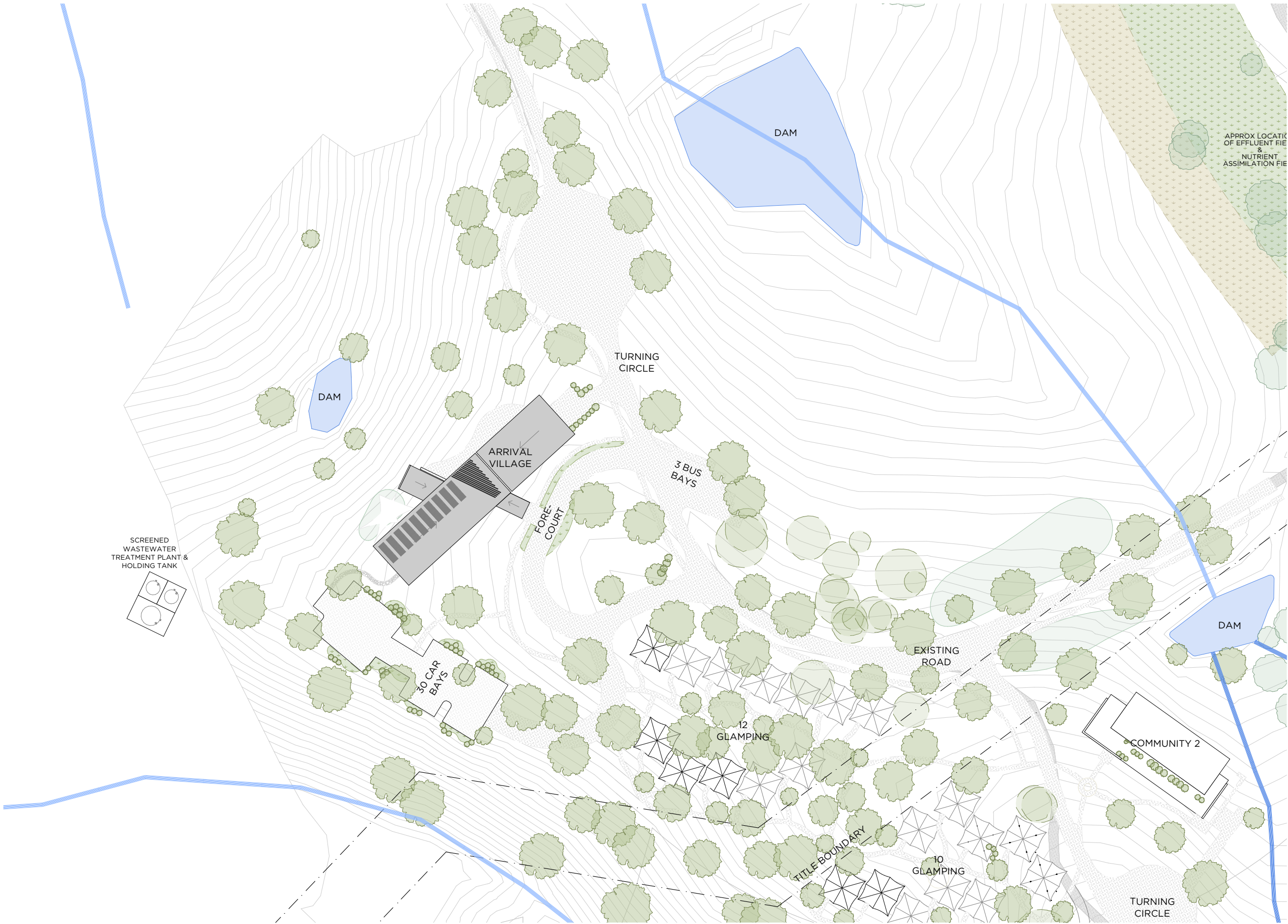


PROJECT
GREENSTEAD JOADJA

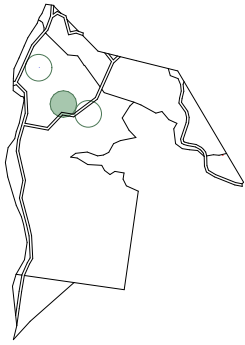
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LOCATION PLAN

DRAWING

DA1-01



KEY PLAN



- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- TITLE BOUNDARY
- EXISTING ROAD
- ACCOMMODATION CLEARANCE ZONE
- PROPOSED PATH

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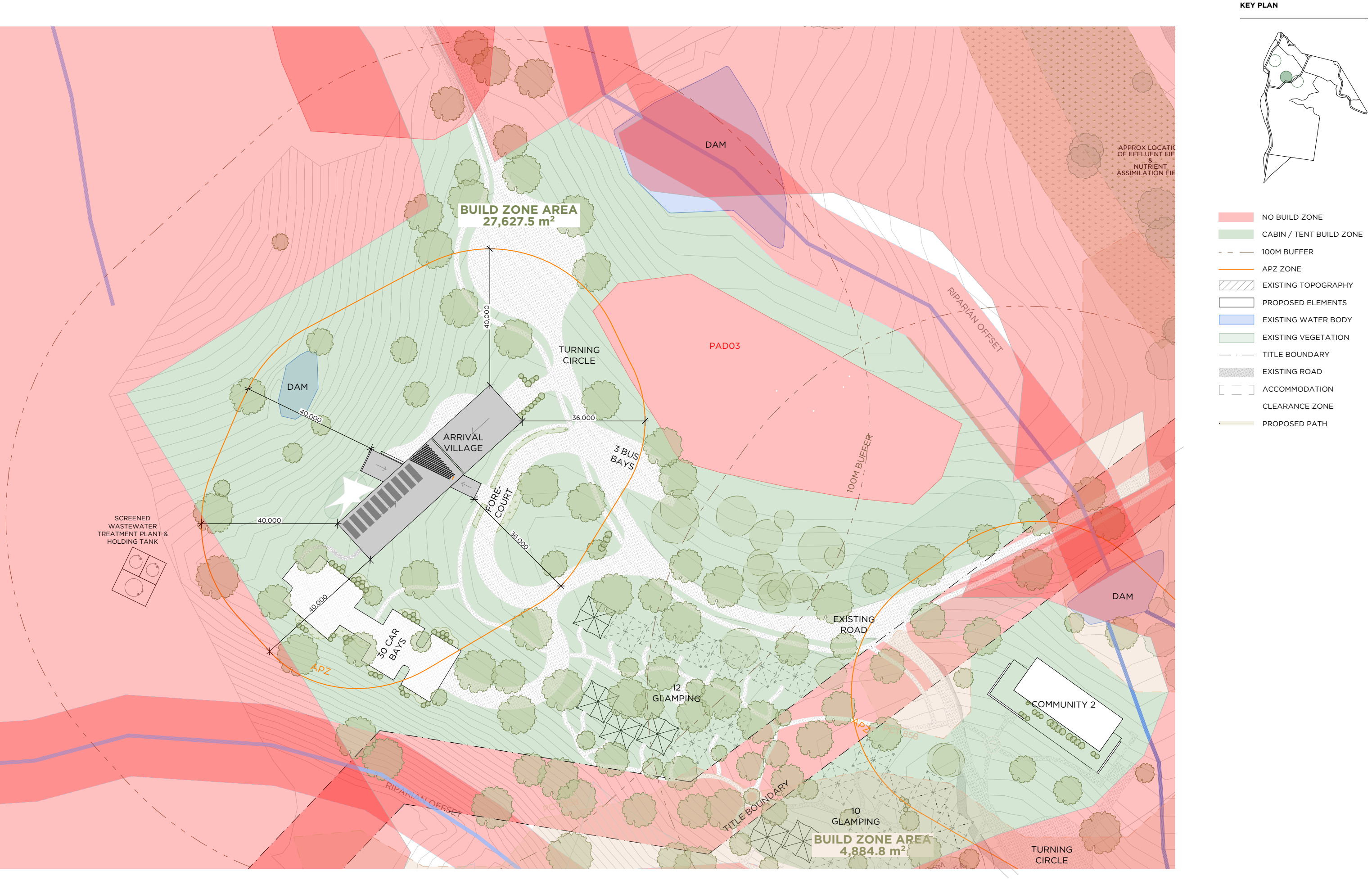
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PROJECT GREENSTEAD JOADJA

DRAWING TITLE SITE PLAN

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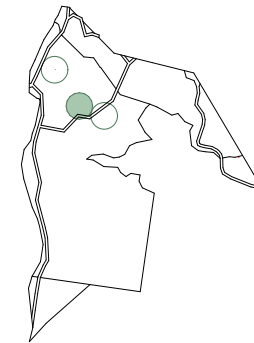
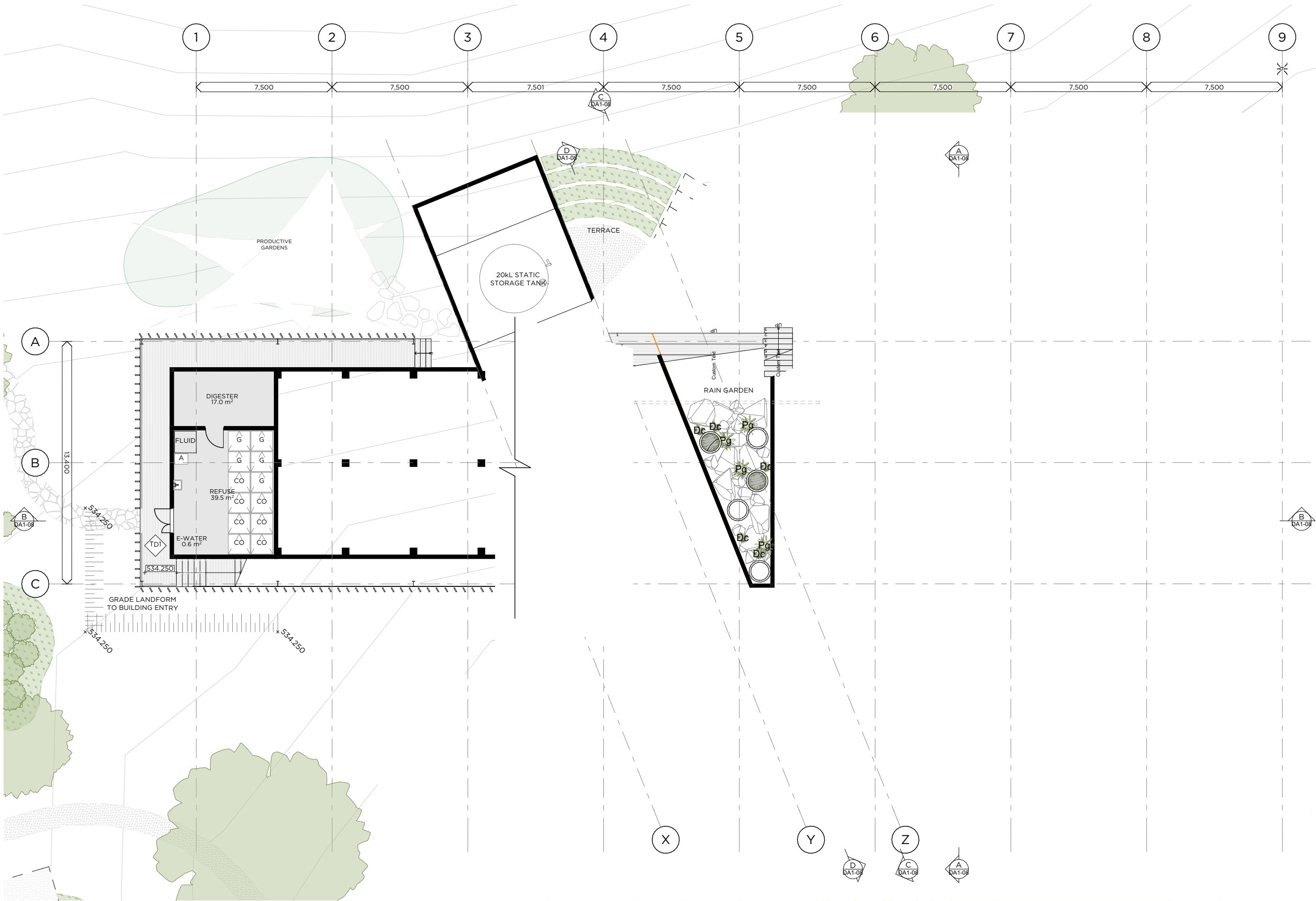
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01
JOB
1938
PLOT DATE
12/03/2024
ARCHITECT
JM
CAD
AA
SCALE
@ A3

PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
SITE PLAN - NO BUILD

DRAWING

DA1-02



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GA PLAN LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- # MATERIAL TAG

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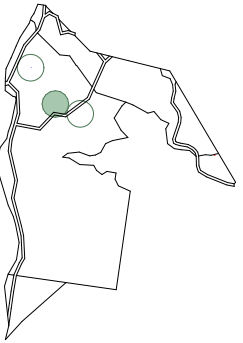


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
ARRIVAL VILLAGE - ENTRY BUILDING - LOWER GROUND

DRAWING

DA1-04

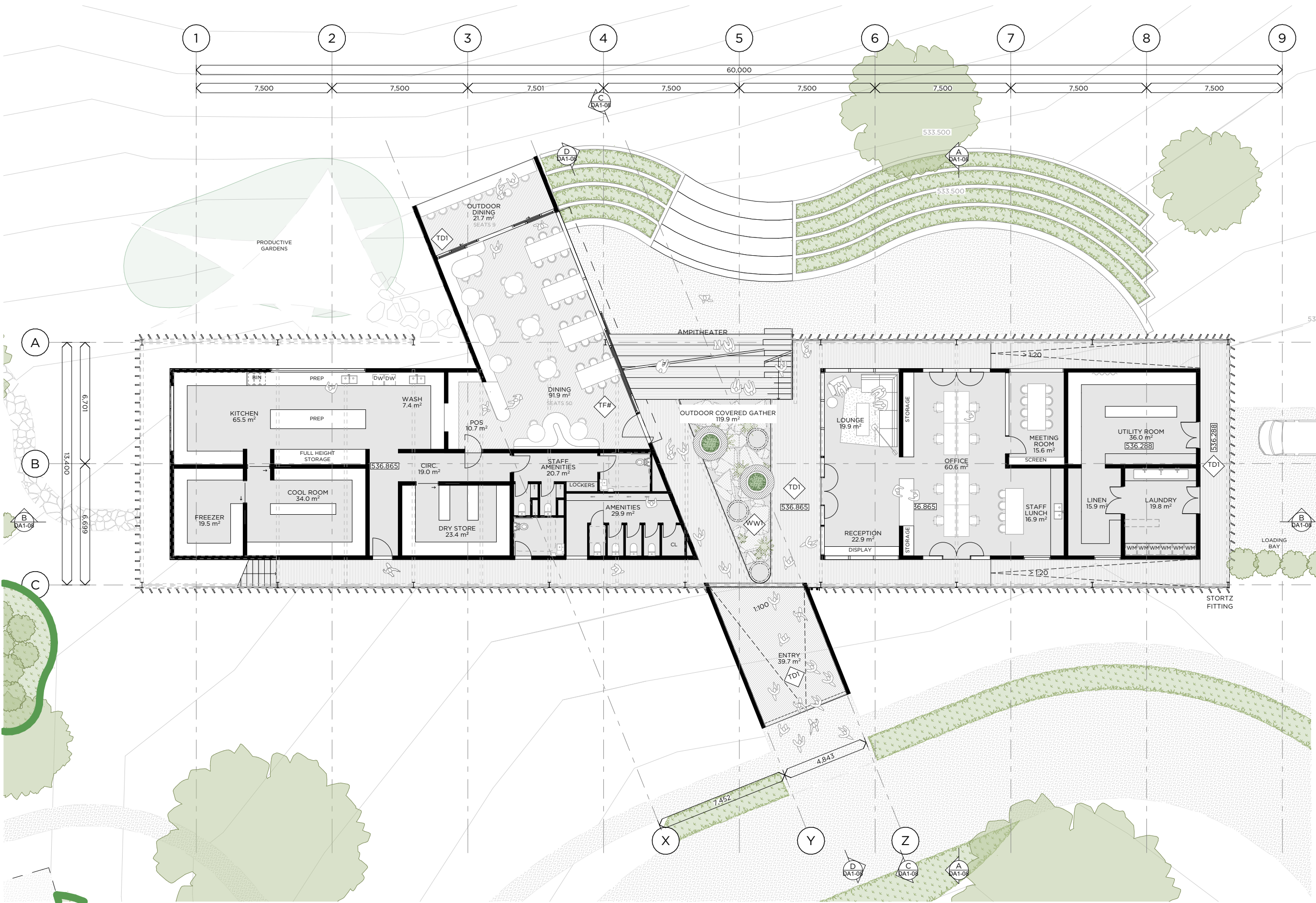


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- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
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- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- # MATERIAL TAG

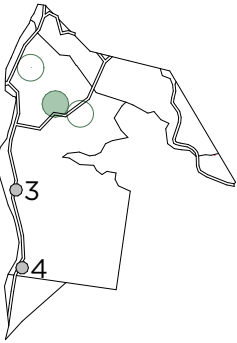
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01 COMMENTS
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12/03/2024

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1938 PLOT DATE
12/03/2024 ARCHITECT
JM CAD
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GREENSTEAD JOADJADRAWING TITLE
ARRIVAL VILLAGE - ENTRY BUILDING - GA PLAN

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DA1-05

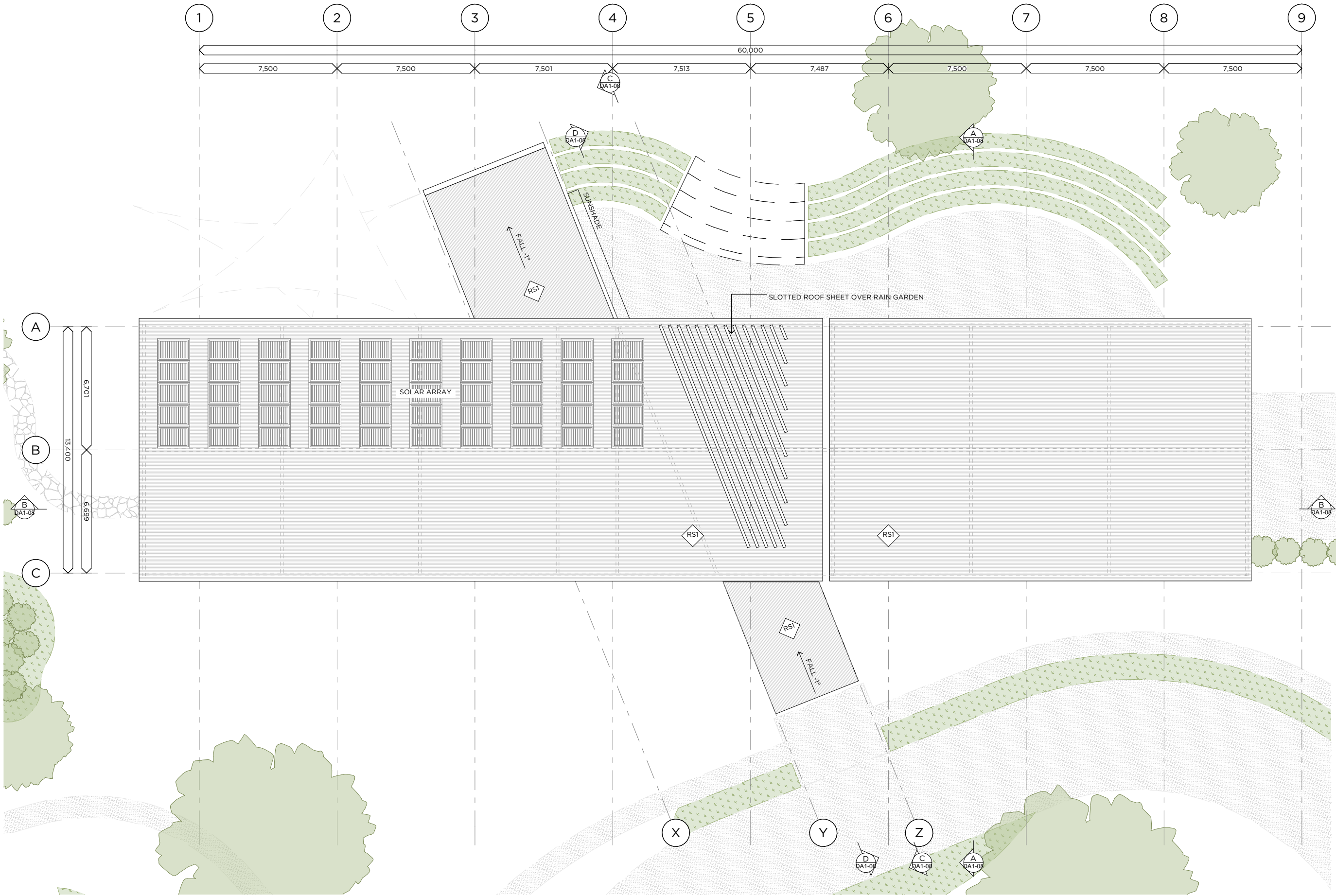


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- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- # MATERIAL TAG



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01 DA SUBMISSION

DATE
12/03/2024

DEVELOPMENT APPLICATION

REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 12/03/2024 JM AA 1:200 @ A3

PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
ARRIVAL VILLAGE - ENTRY BUILDING - ROOF PLAN

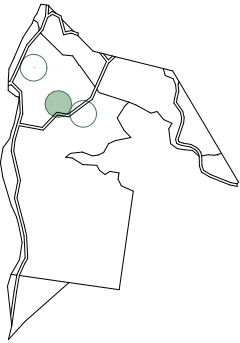
DRAWING

DA1-06

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CHECK ALL DIMENSIONS PRIOR TO COMMENCEMENT OF WORK. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DOCUMENTS, CONSULTANTS DOCUMENTS AND SPECIFICATIONS. SEEK CLARIFICATION OF INCONSISTENCIES / CONFLICTS FROM ARCHITECT. FIGURED DIMENSIONS TAKE PRECEDENCE. DO NOT SCALE DRAWINGS.

FILE PATH: BIMcloud: VADER - BIMcloud Basic for Archicad 24/1938_Joadja/1938_Arrival Village



Material Schedule

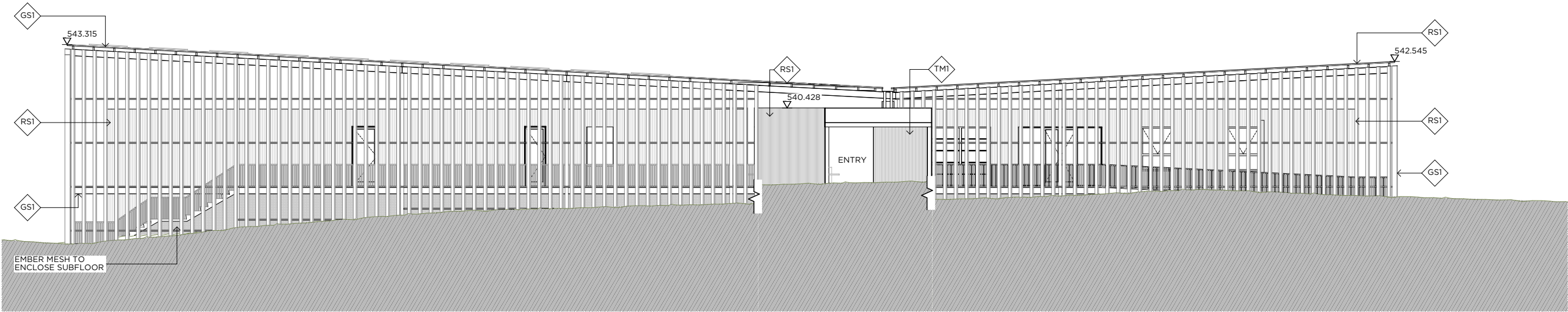
BR1	EXISTING BRICK WALL
GS1	GALVANISED STEEL CLADDING
TC1	TIMBER CLADDING

ELEVATIONS & SECTIONS NOTES

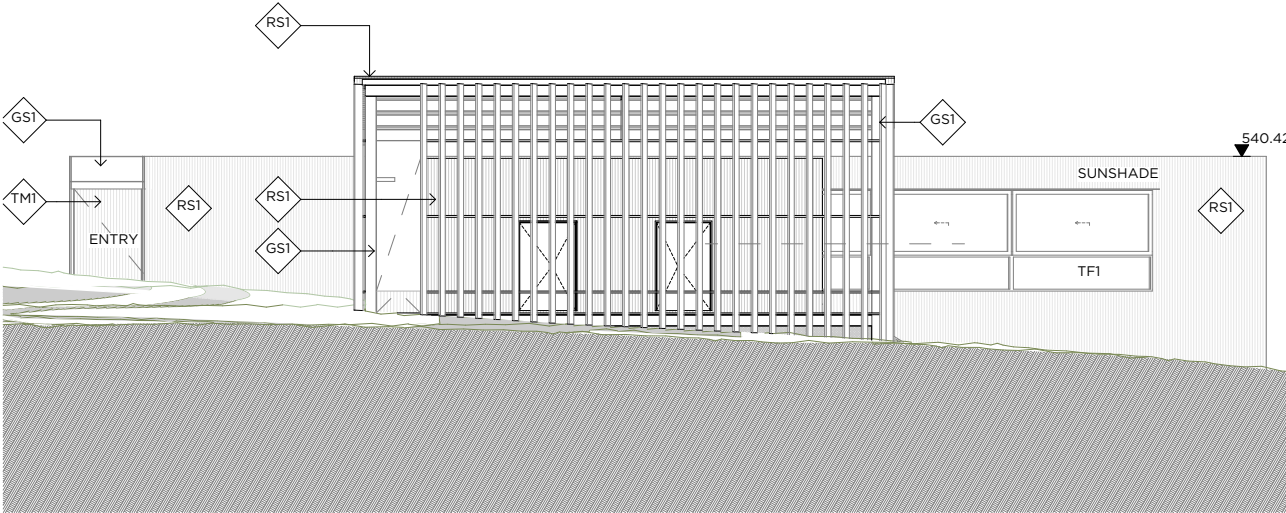
- DO NOT SCALE DRAWINGS. DRAWINGS NOT FOR CONSTRUCTION.
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ELEVATIONS & SECTIONS LEGEND

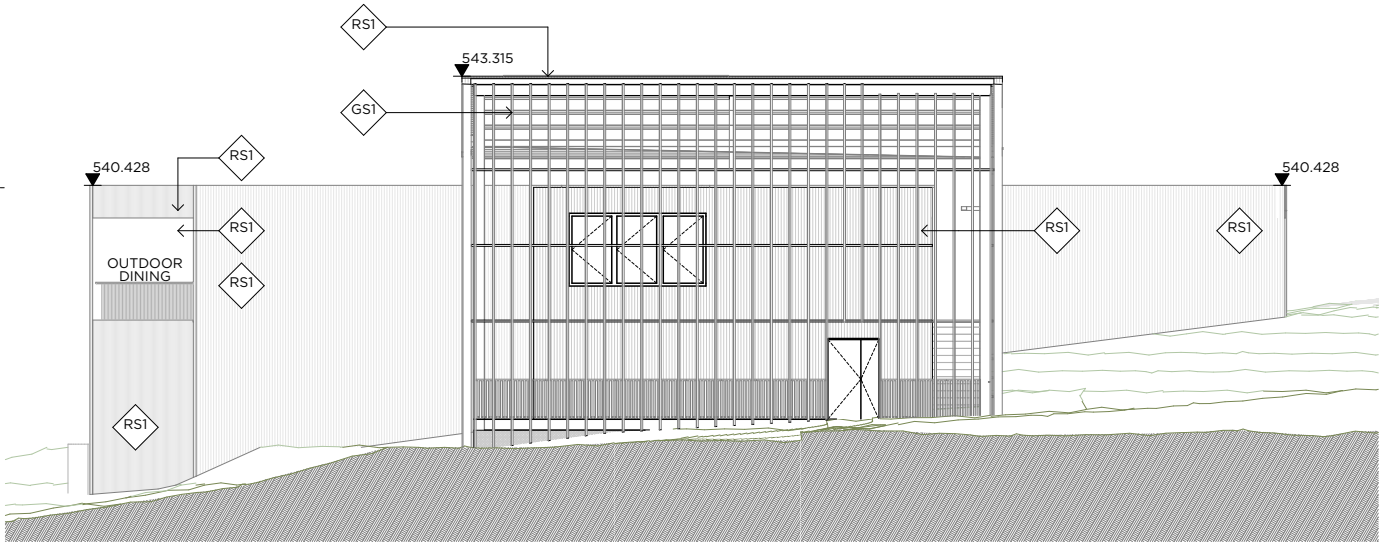
XX.XX	ELEVATION TO AHD
DIMENSION	STATIC DIMENSION
---	TITLE BOUNDARY
##	MATERIAL TAG



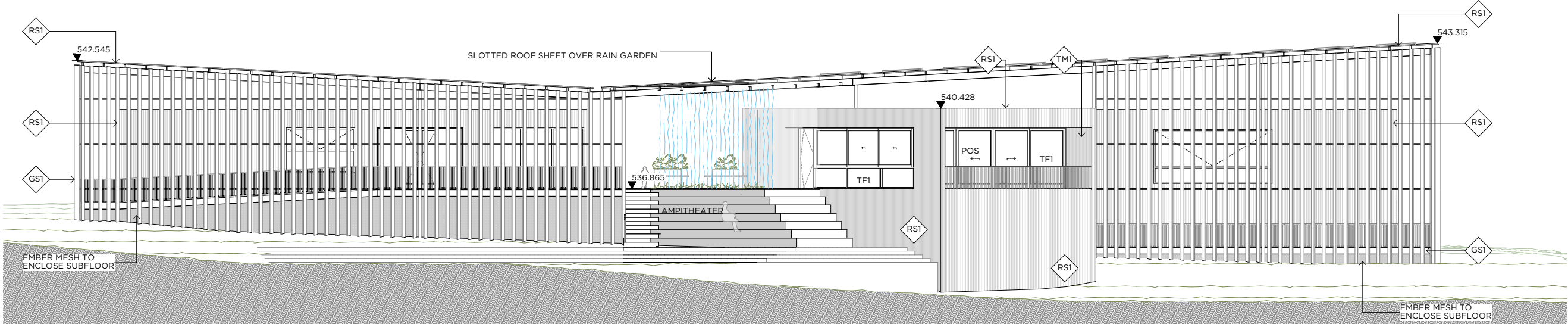
1 Arrival Village - East Elevation
1:200



2 Arrival Village - North Elevation
1:200



3 Arrival Village - South Elevation
1:200



4 Arrival Village - West Elevation
1:200

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DATE
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DEVELOPMENT APPLICATION

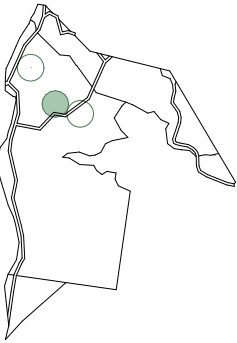
REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 12/03/2024 JM AA 1:200, 1:125 @ A3

PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
ARRIVAL VILLAGE - ENTRY BUILDING - ELEVATIONS

DRAWING

DA1-07

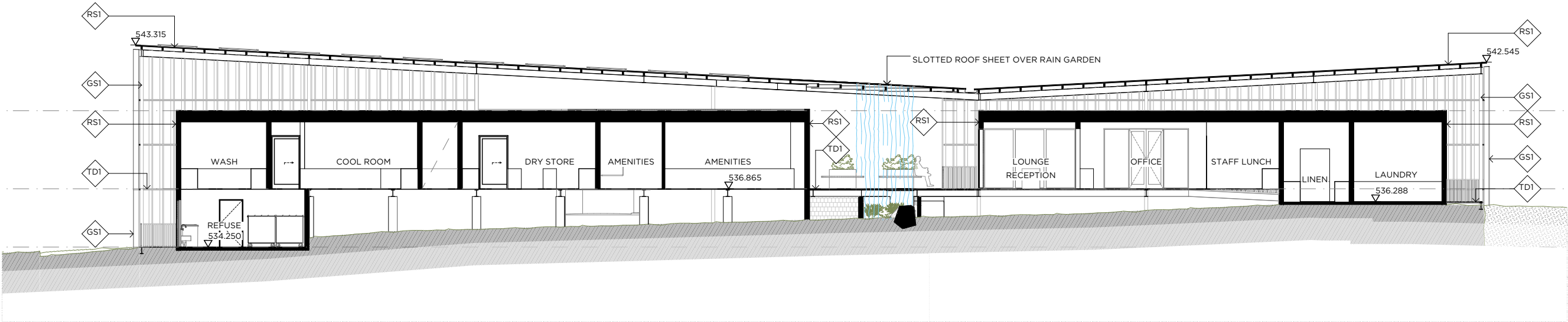


ELEVATIONS & SECTIONS NOTES

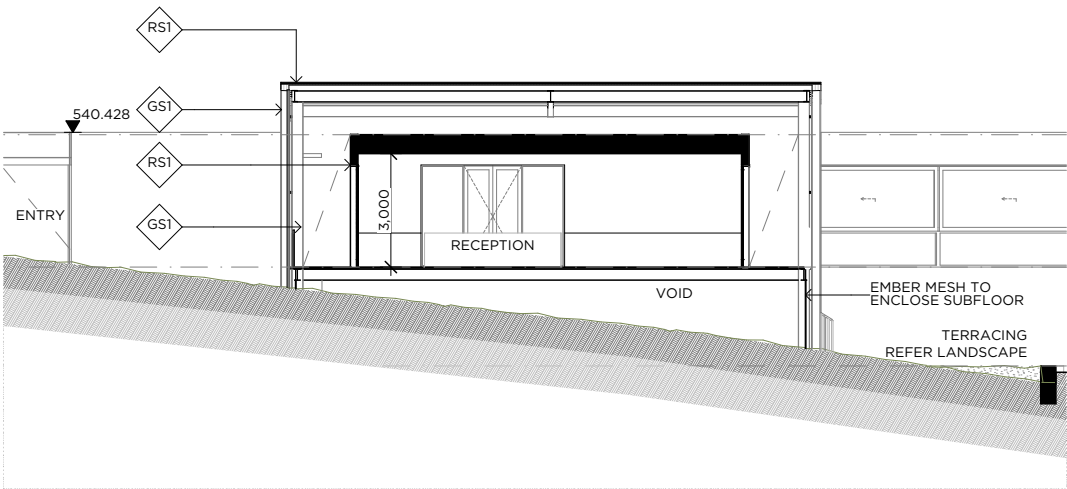
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ELEVATIONS & SECTIONS LEGEND

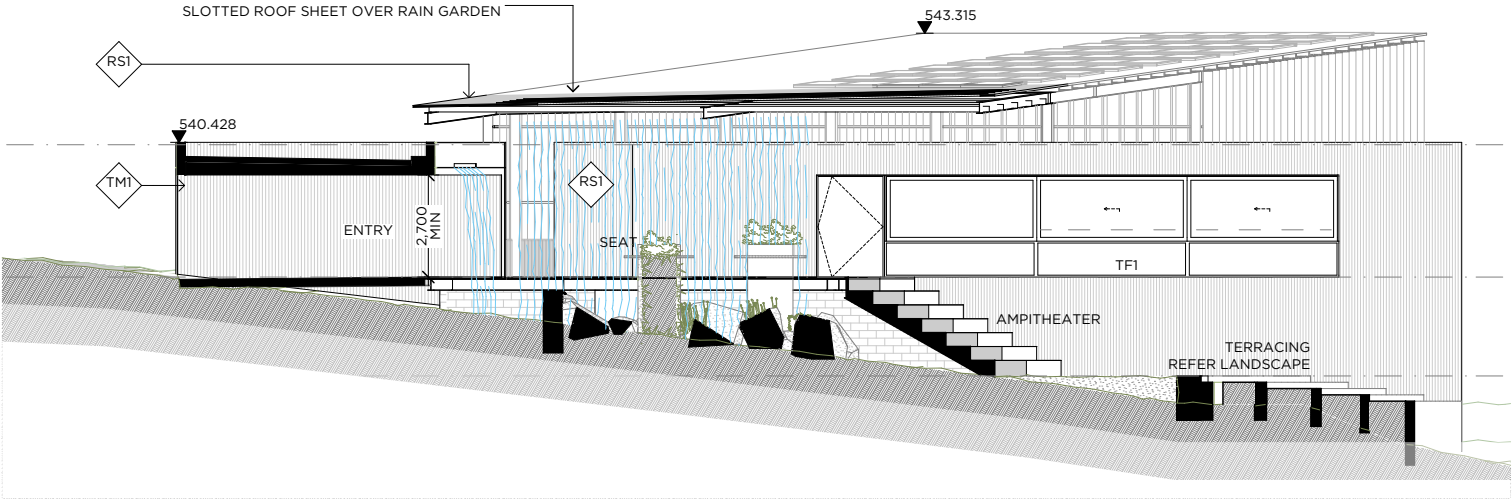
- XX.XX ELEVATION TO AHD
- STATIC DIMENSION
- TITLE BOUNDARY
- ## MATERIAL TAG



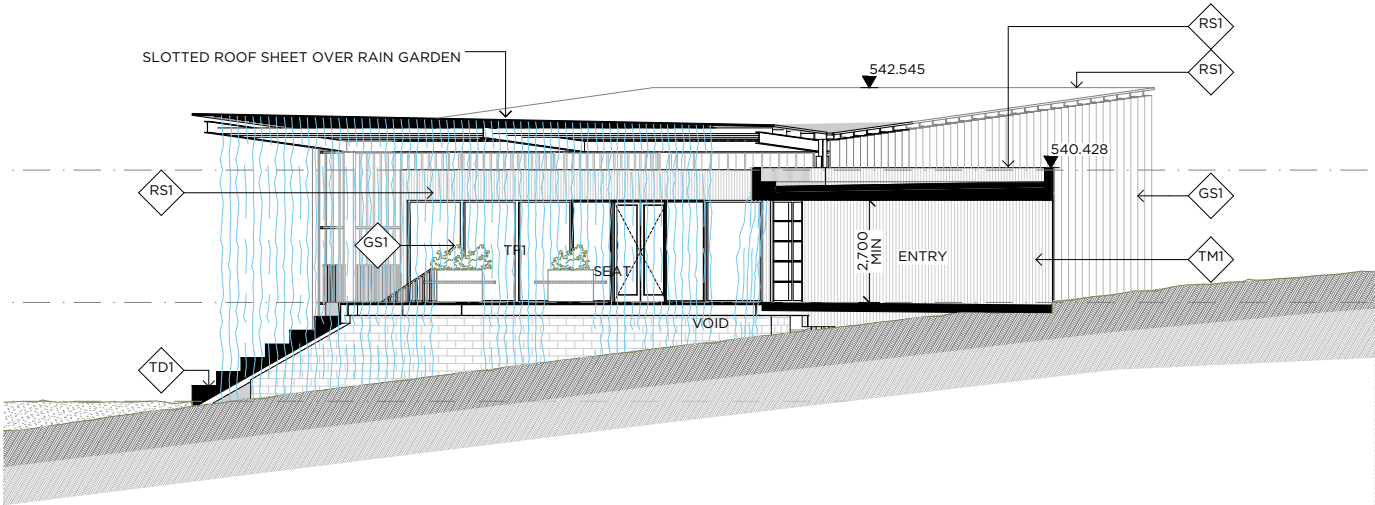
1 Arrival Village - Section A
1:200



2 Arrival Village - Section B
1:200



3 Arrival Village - Section C
1:200



4 Arrival Village - Section D
1:200

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DEVELOPMENT APPLICATION

REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 12/03/2024 JM AA 1:200 @ A3

PROJECT
GREENSTEAD JOADJA

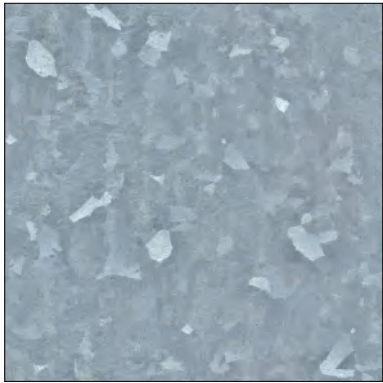
DRAWING TITLE
ARRIVAL VILLAGE - ENTRY BUILDING - SECTIONS

DRAWING

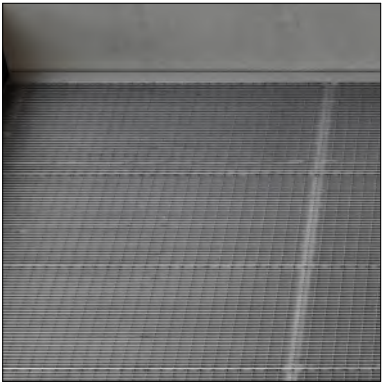
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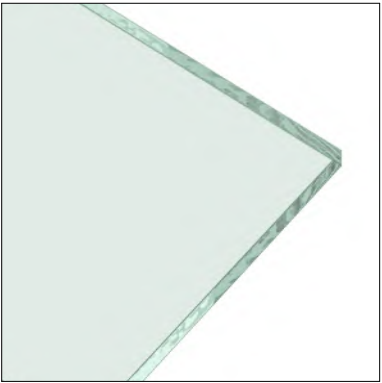
RS1
PROFILED METAL
CLADDING
ZINCALUME



GS1
GALVANISED STEEL



WM1
GALVANISED STEEL
MESH



GL1
CLEAR GLAZING



TF1
TIMBER
WINDOW/DOOR
FRAMES



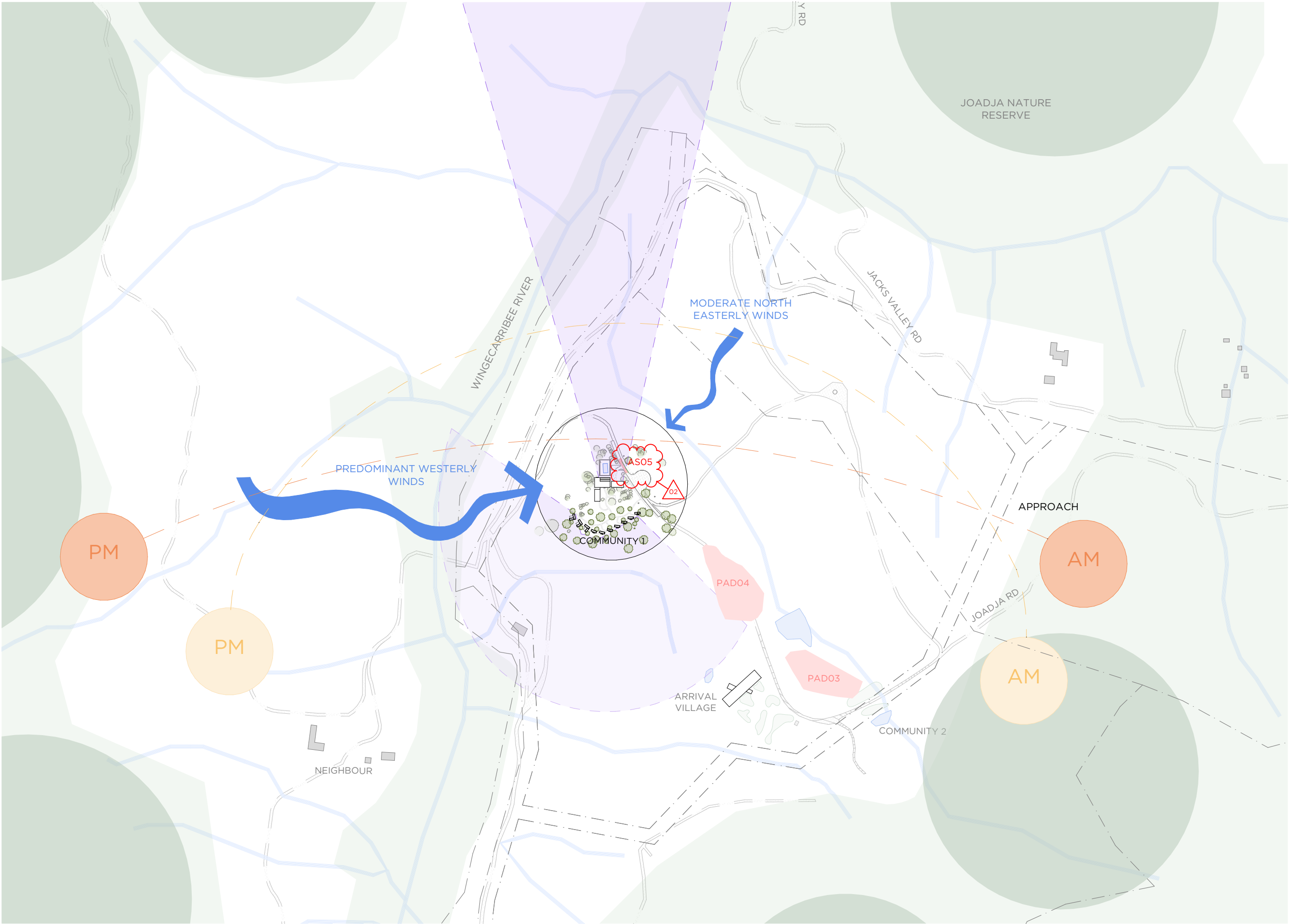
TD1
TIMBER DECKING



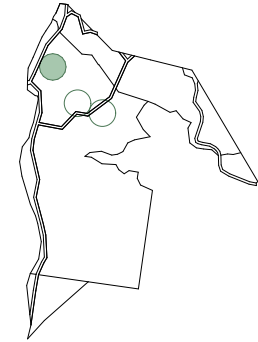
TM1
VERTICAL TIMBER
CLADDING



RW1
RETAINING WALL TO
LANDSCAPE
ARCHITECT'S DETAIL



KEY PLAN



- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING WATER COURSE
- EXISTING VEGETATION
- TITLE BOUNDARY
- PREFERRED VIEW
- MOUNTAIN RIDGE
- WIND DIRECTION
- SUMMER SUN PATH
- WINTER SUN PATH
- POTENTIAL ARCHEAOLOGICAL DEPOSIT

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REV	COMMENTS	DATE
01	DA SUBMISSION	12/03/2024
02	DA REVISIONS	17/04/2024
AS05 COORDINATED		

DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	17/04/2024	JM	AA	@ A3

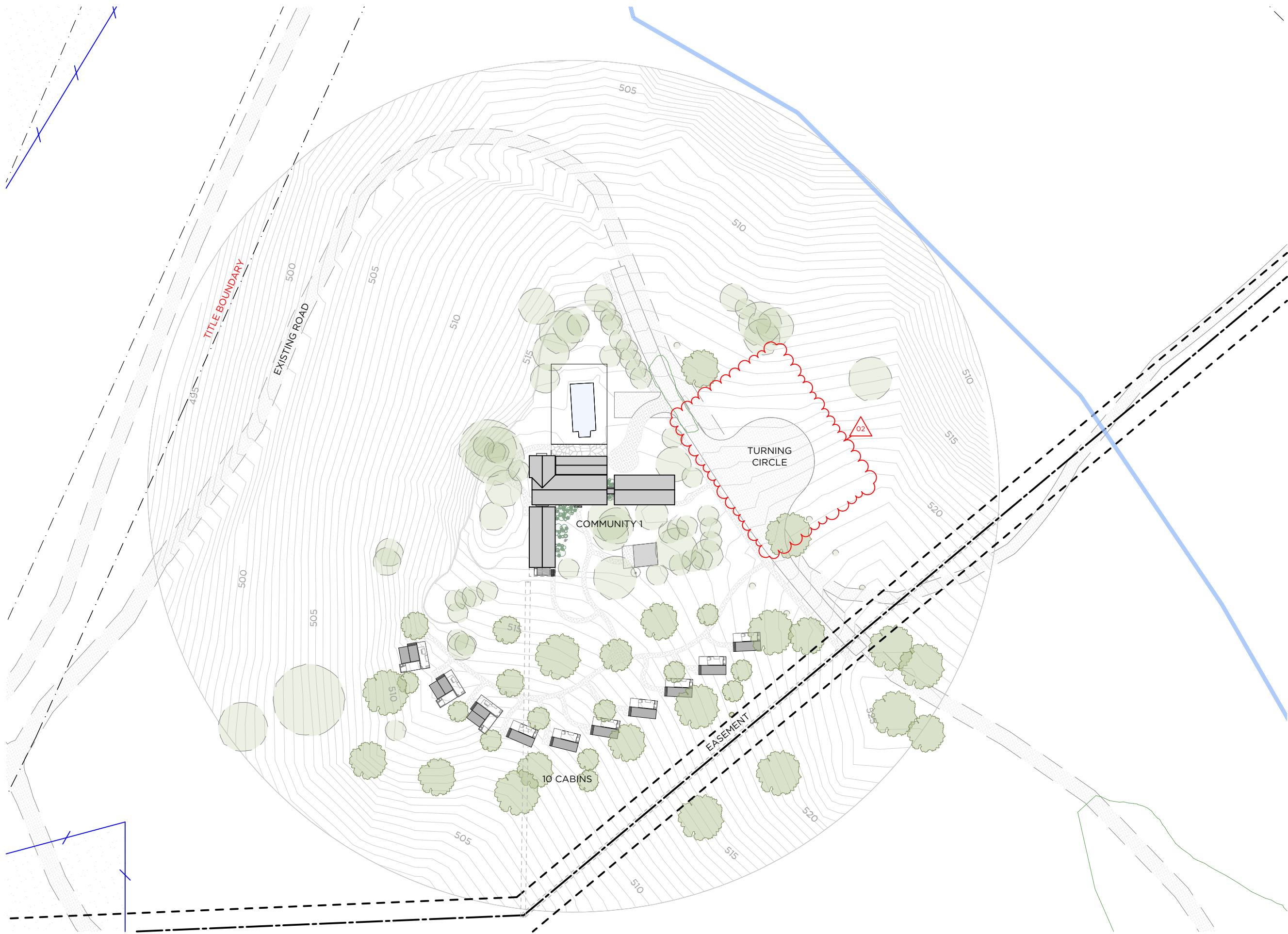


PROJECT
GREENSTEAD JOADJA

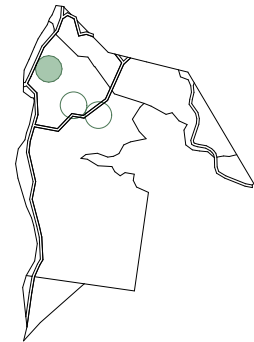
DRAWING TITLE
LOCATION PLAN

DRAWING

DA2-01



KEY PLAN



- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- TITLE BOUNDARY
- EXISTING ROAD
- ACCOMMODATION CLEARANCE
- ZONE
- PROPOSED PATH

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REV	COMMENTS	DATE
01	DA SUBMISSION	12/03/2024
02	DA REVISIONS	17/04/2024
GENERAL AMENDMENTS		

DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
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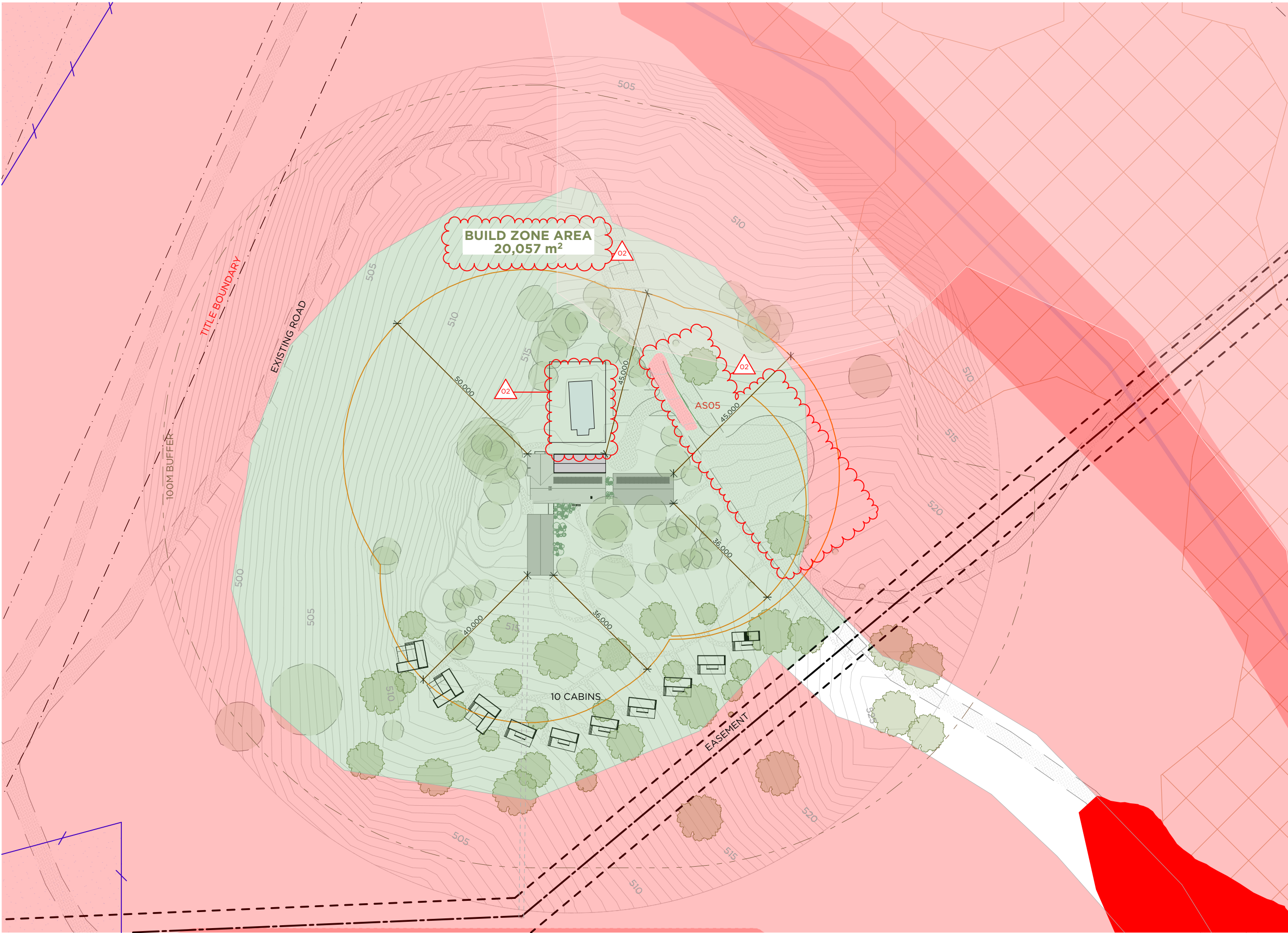


PROJECT
GREENSTEAD JOADJA

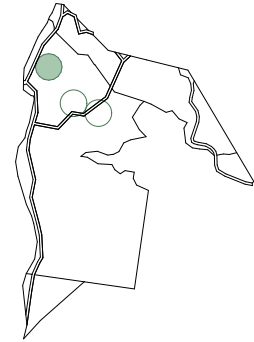
DRAWING TITLE
SITE PLAN

DRAWING

DA2-02



KEY PLAN



- NO BUILD ZONE
- BUILD ZONE
- 100M BUFFER
- APZ ZONE
- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- TITLE BOUNDARY
- EXISTING ROAD
- ACCOMMODATION CLEARANCE ZONE
- PROPOSED PATH

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REV	COMMENTS	DATE
01	DA SUBMISSION	12/03/2024
02	DA REVISIONS AS05 COORDINATED GENERAL AMENDMENTS	17/04/2024

DEVELOPMENT APPLICATION

REVISION 02	JOB 1938	PLOT DATE 17/04/2024	ARCHITECT JM	CAD AA	SCALE @ A3
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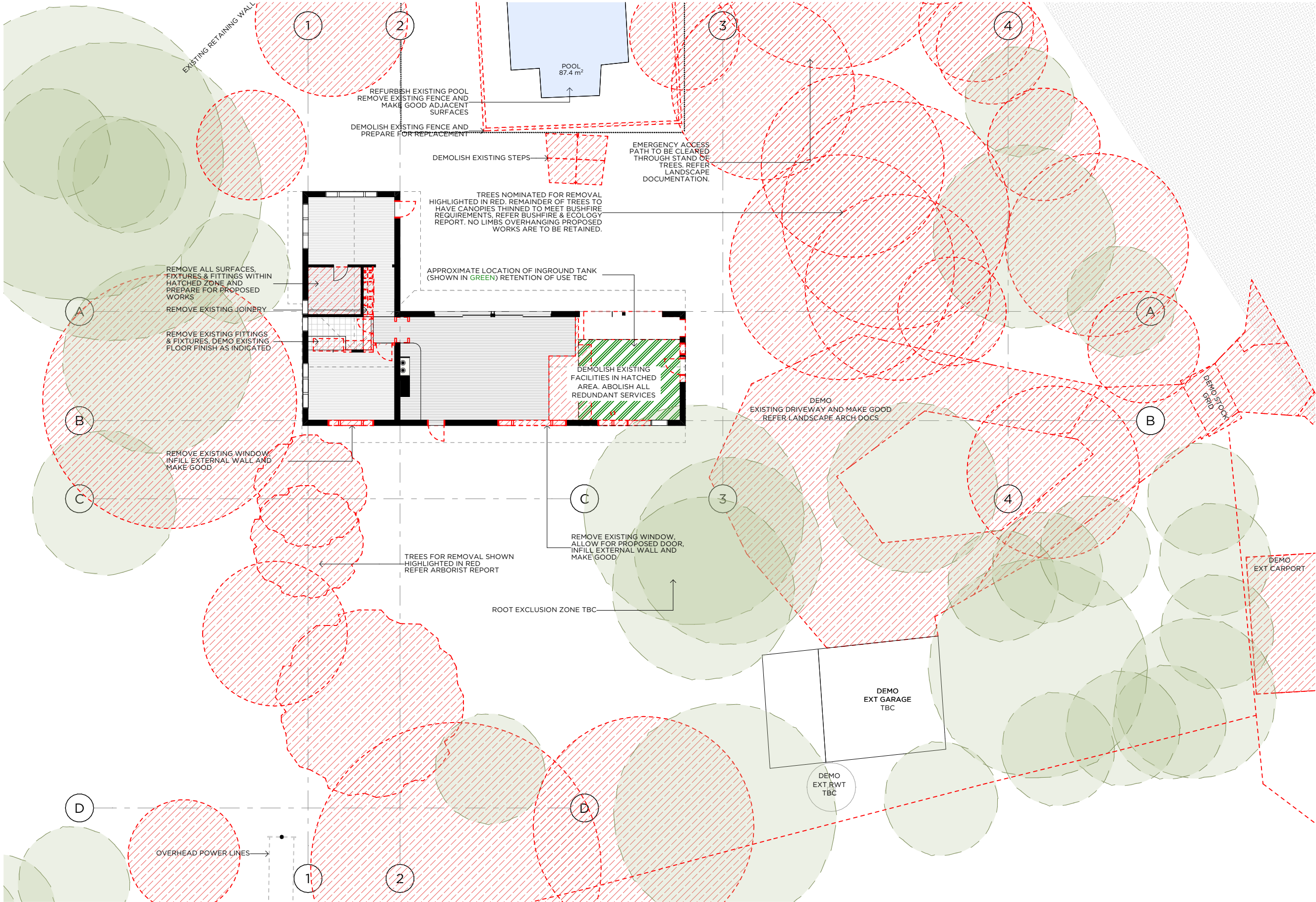


PROJECT
GREENSTEAD JOADJA

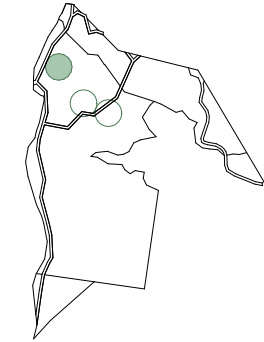
DRAWING TITLE
SITE PLAN - NO BUILD

DRAWING

DA2-03



KEY PLAN



DEMOLITION NOTES

- 1. DO NOT SCALE DRAWINGS. DRAWINGS NOT FOR CONSTRUCTION.
- 2. AMENDED DRAWINGS SHALL SUPERSEED ALL PREVIOUS DRAWINGS.
- 3. HAZARDOUS MATERIALS TO BE TREATED IN ACCORDANCE WITH EPA REQUIREMENTS.
- 4. ALL ASSURANCES TO BE MADE TO PROTECT THE INTEGRITY OF VEGETATION AND PROPERTY ADJACENT TO THE WORKS AREA.
- 5. EXISTING RL'S TAKEN FROM SITE SURVEY PREPARED BY JCA LAND CONSULTANTS TO EXTENT OF SURVEY COVERAGE. CONTRACTOR TO CONFIRM LEVELS ON SITE.

DEMOLITION LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- DEMOLISHED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- TITLE BOUNDARY
- EASEMENT
- DIMENSION
- STATIC DIMENSION

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12/03/2024

DEVELOPMENT APPLICATION

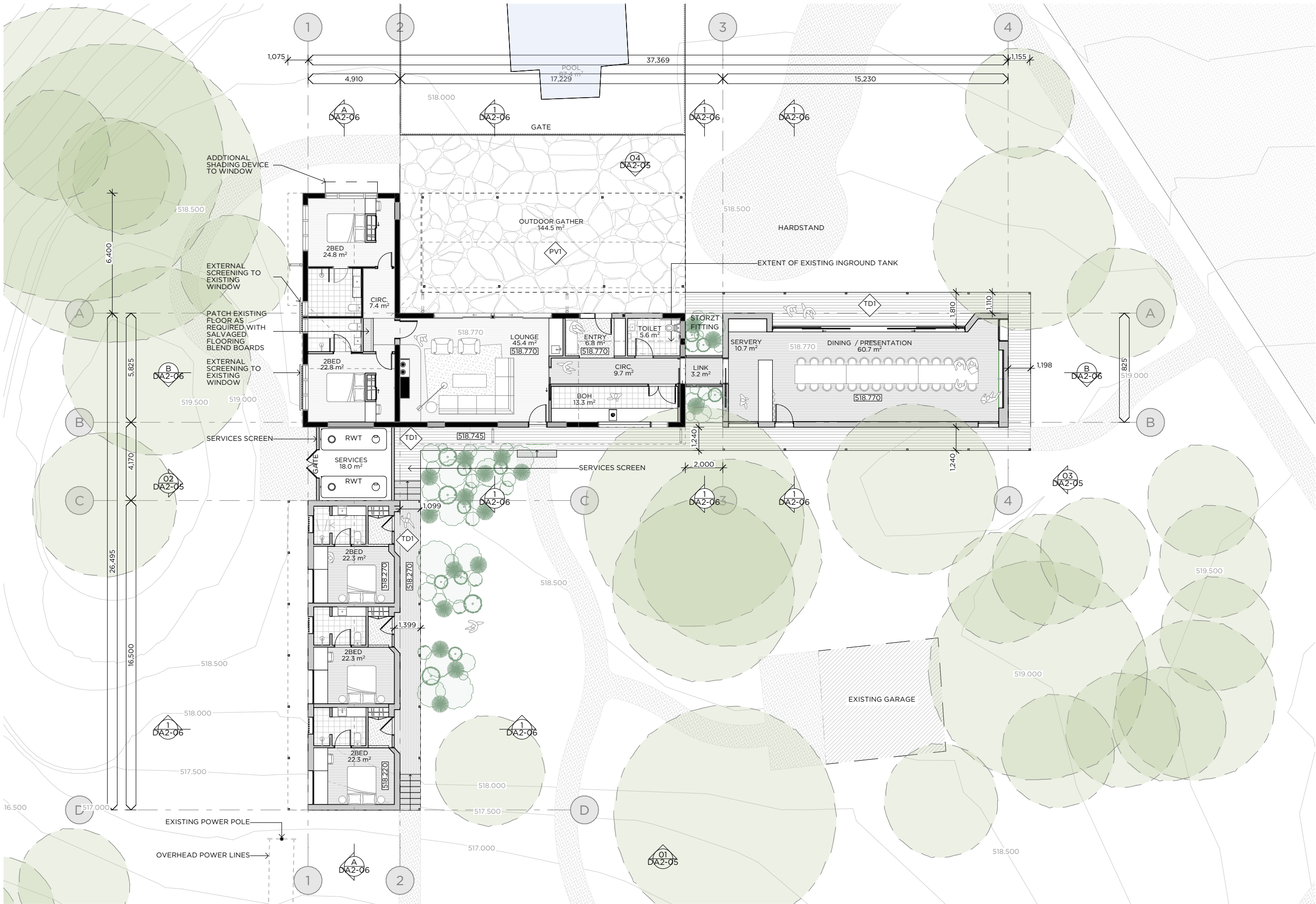
REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 17/04/2024 JM AA @ A3

PROJECT
GREENSTEAD JOADJA

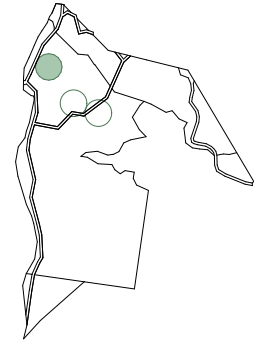
DRAWING TITLE
COMMUNITY 1 - REFUGE BUILDING - DEMOLITION PLAN

DRAWING

DA2-02



KEY PLAN



GA PLAN NOTES

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GA PLAN LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- # MATERIAL TAG

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DATE
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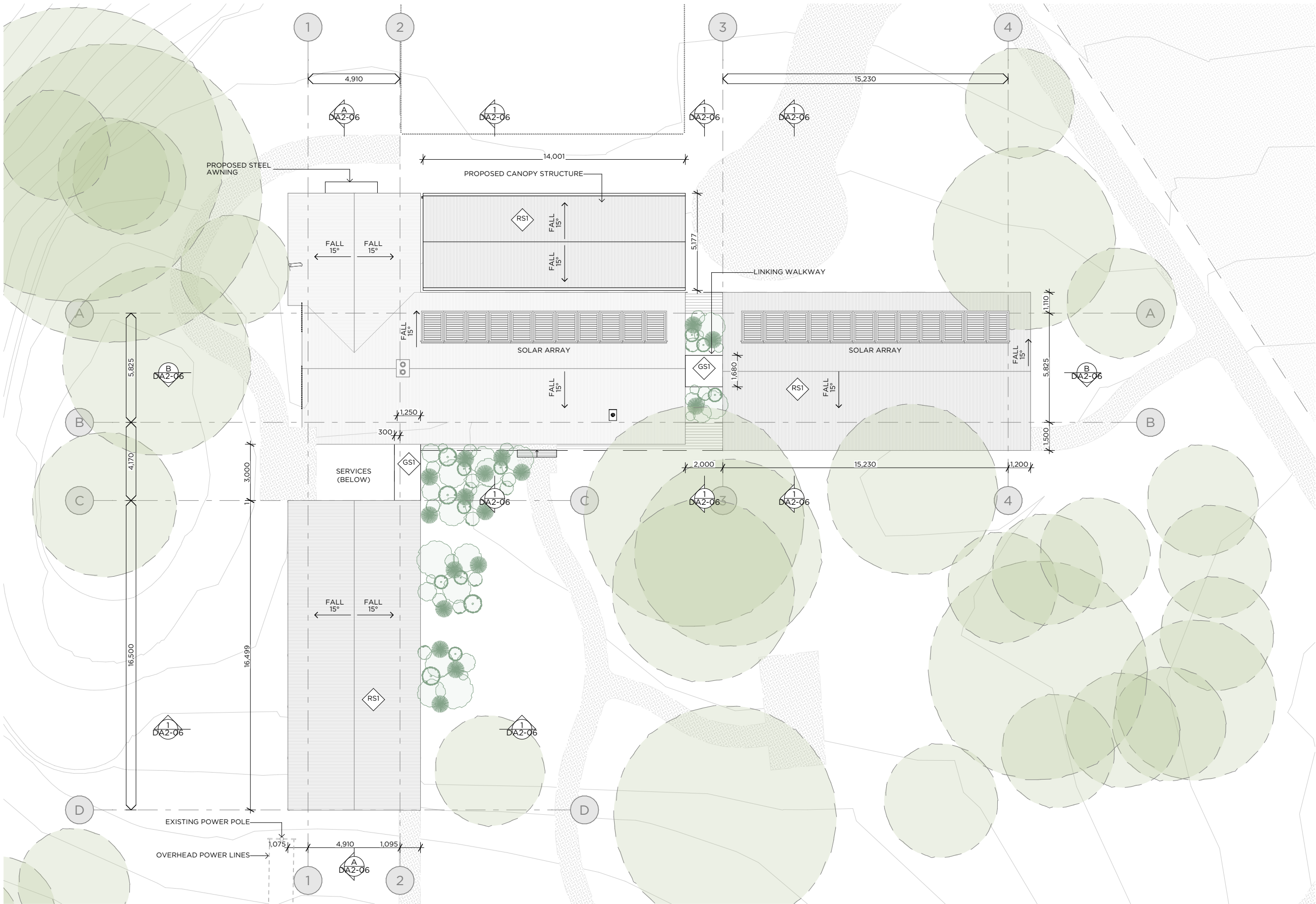
REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 17/04/2024 JM AA 1:200 @ A3

PROJECT
GREENSTEAD JOADJA

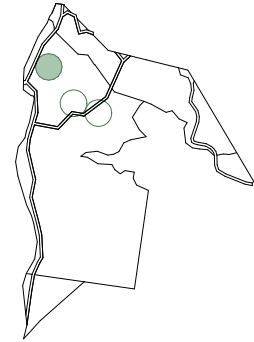
DRAWING TITLE
COMMUNITY 1 - REFUGE BUILDING - GA PLAN

DRAWING

DA2-03



KEY PLAN



GA PLAN NOTES

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GA PLAN LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- # MATERIAL TAG

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DEVELOPMENT APPLICATION

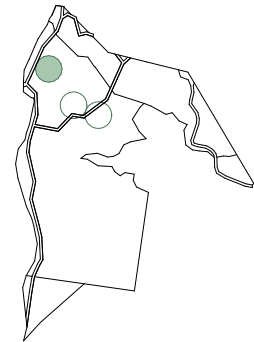
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01 1938 17/04/2024 JM AA @ A3

PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
COMMUNITY 1 - REFUGE BUILDING - ROOF PLAN

DRAWING

DA2-04

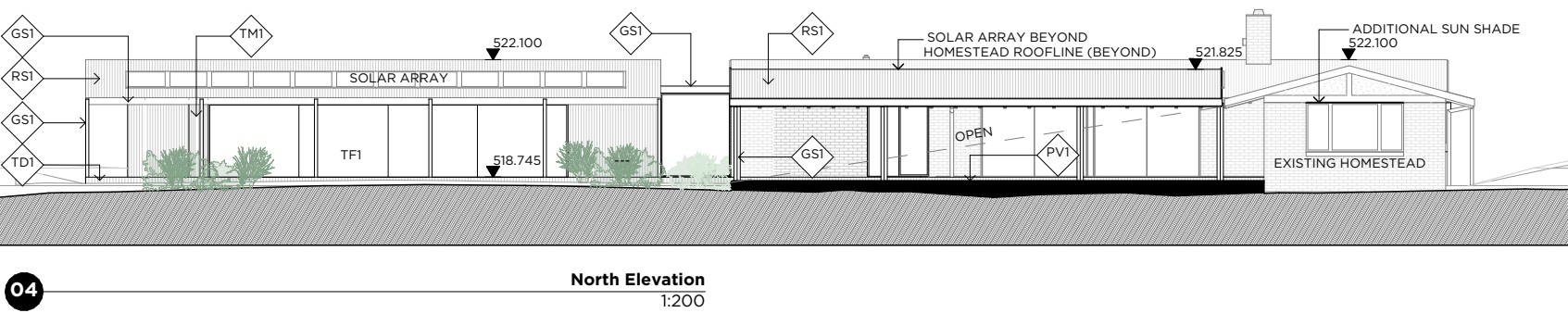
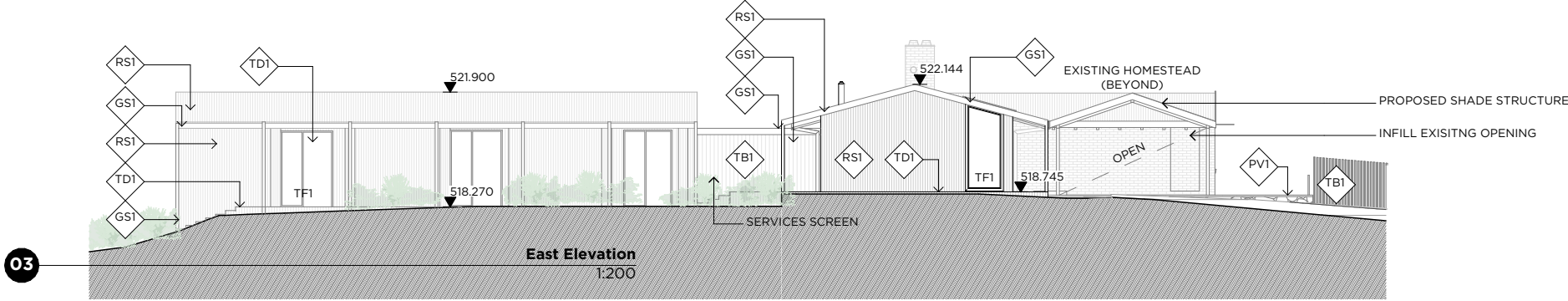
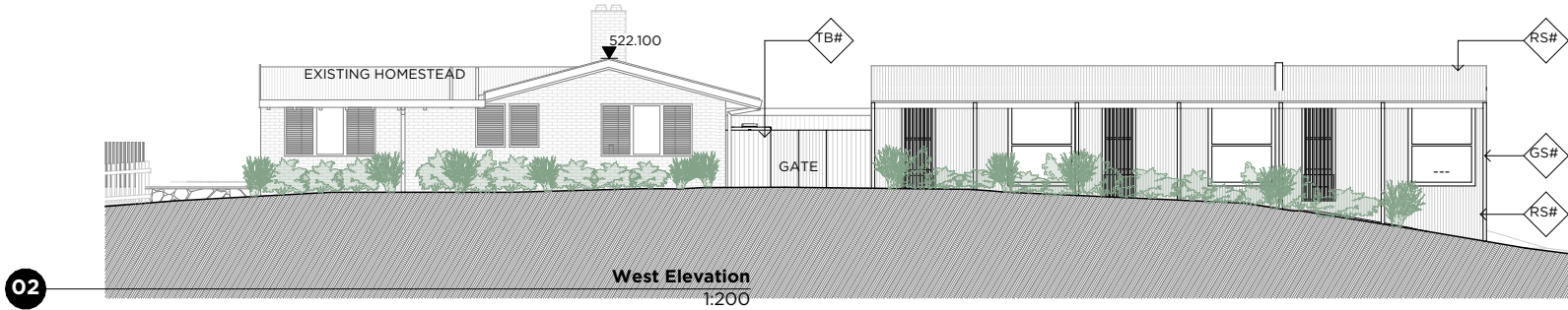
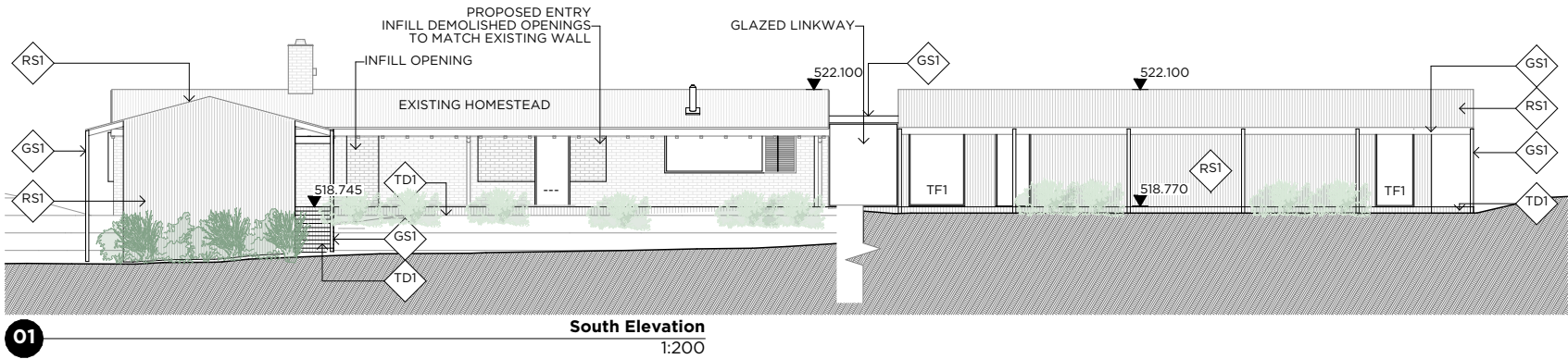


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ELEVATIONS & SECTIONS LEGEND

- X.XX ELEVATION TO AHD
- DIMENSION STATIC DIMENSION
- TITLE BOUNDARY
- ## MATERIAL TAG



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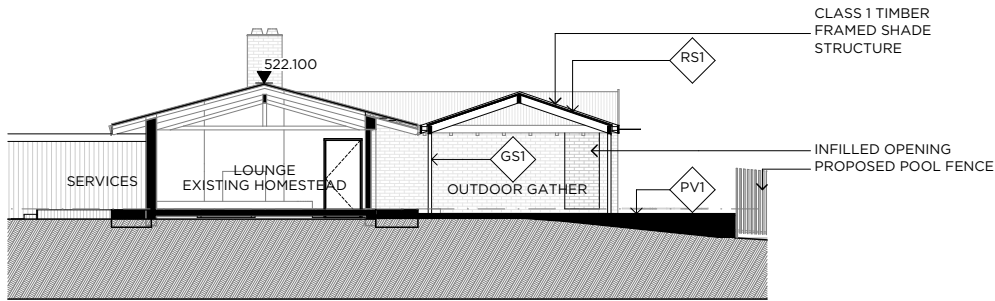
REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 17/04/2024 JM AA 1:200 @ A3

PROJECT
GREENSTEAD JOADJA

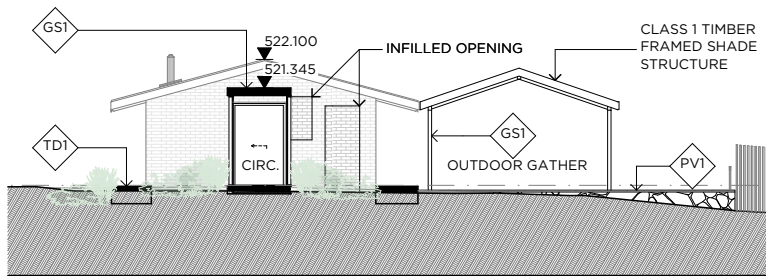
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COMMUNITY 1 - REFUGE BUILDING - ELEVATIONS

DRAWING

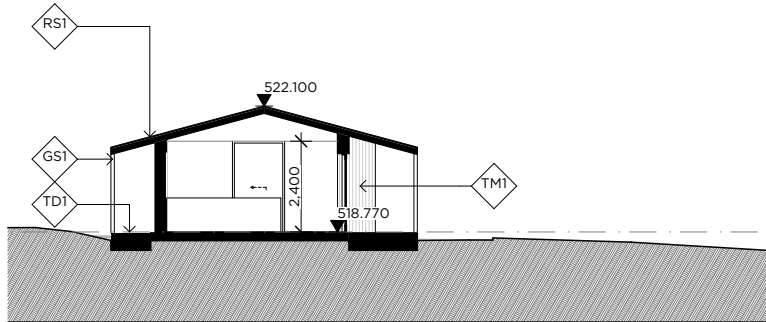
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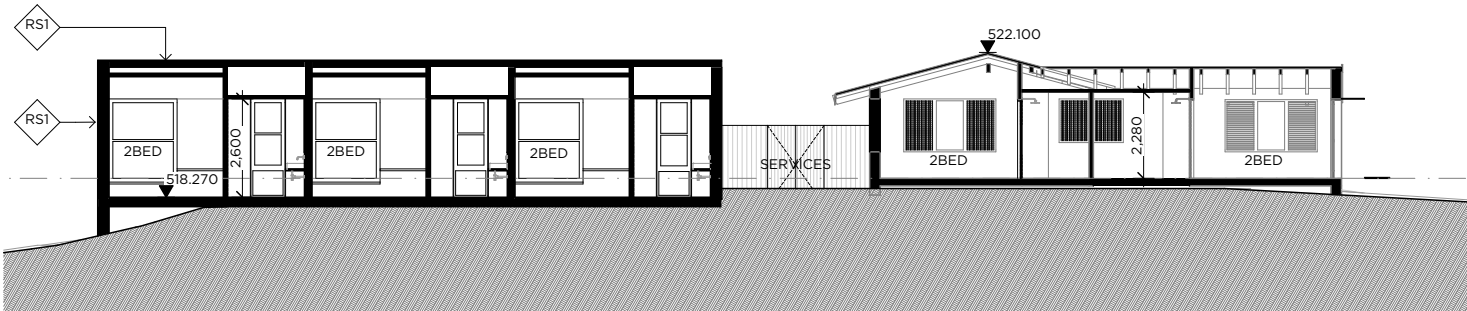
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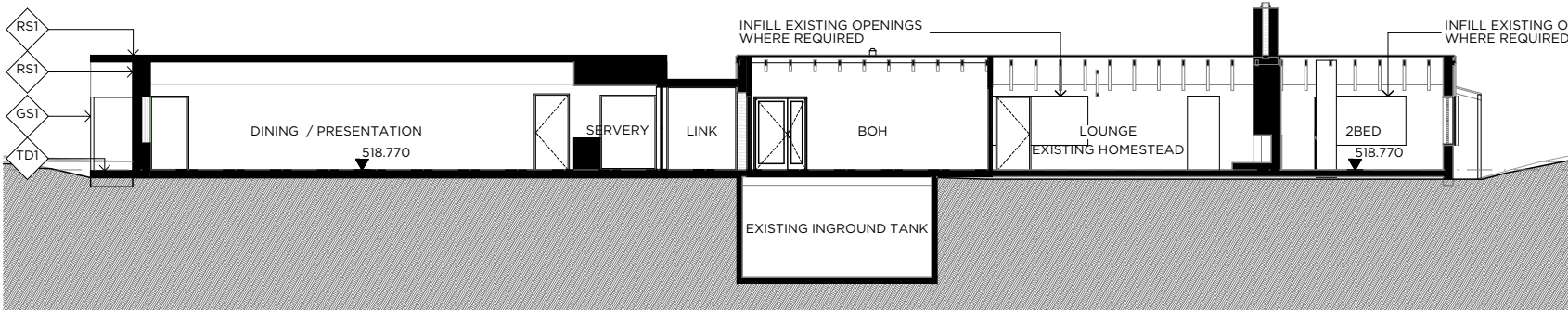
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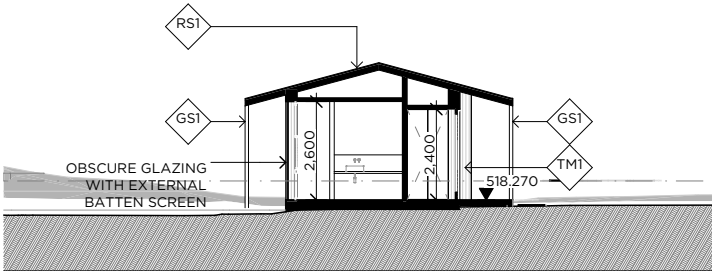
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A Community 1 - Section A
1:200

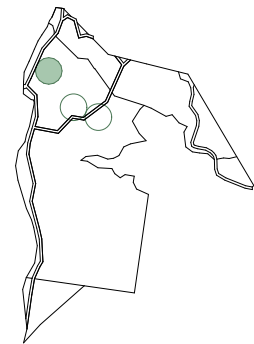


B Community 1 - Section B
1:200



1 Section F
1:200

KEY PLAN



ELEVATIONS & SECTIONS NOTES

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ELEVATIONS & SECTIONS LEGEND

- ELEVATION TO AHD
- STATIC DIMENSION
- TITLE BOUNDARY
- MATERIAL TAG

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REVISION JOB PLOT DATE ARCHITECT CAD SCALE
01 1938 17/04/2024 JM AA @ A3

PROJECT
GREENSTEAD JOADJA

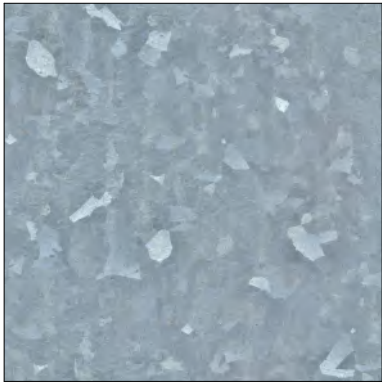
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COMMUNITY 1 - REFUGE BUILDING - SECTIONS

DRAWING

DA2-06



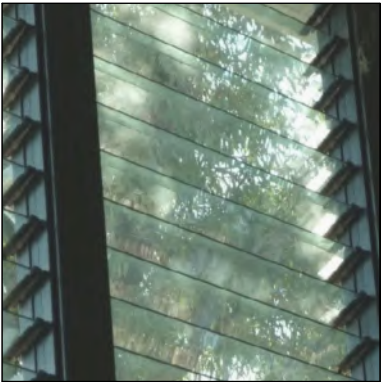
RS1
PROFILED METAL
CLADDING
ZINCALUME



GS1
GALVANISED STEEL



PV1
CRAZY PAVING



LV1
GLAZED LOUVRES



TD1
TIMBER DECKING



TF1
TIMBER
WINDOW/DOOR
FRAMES



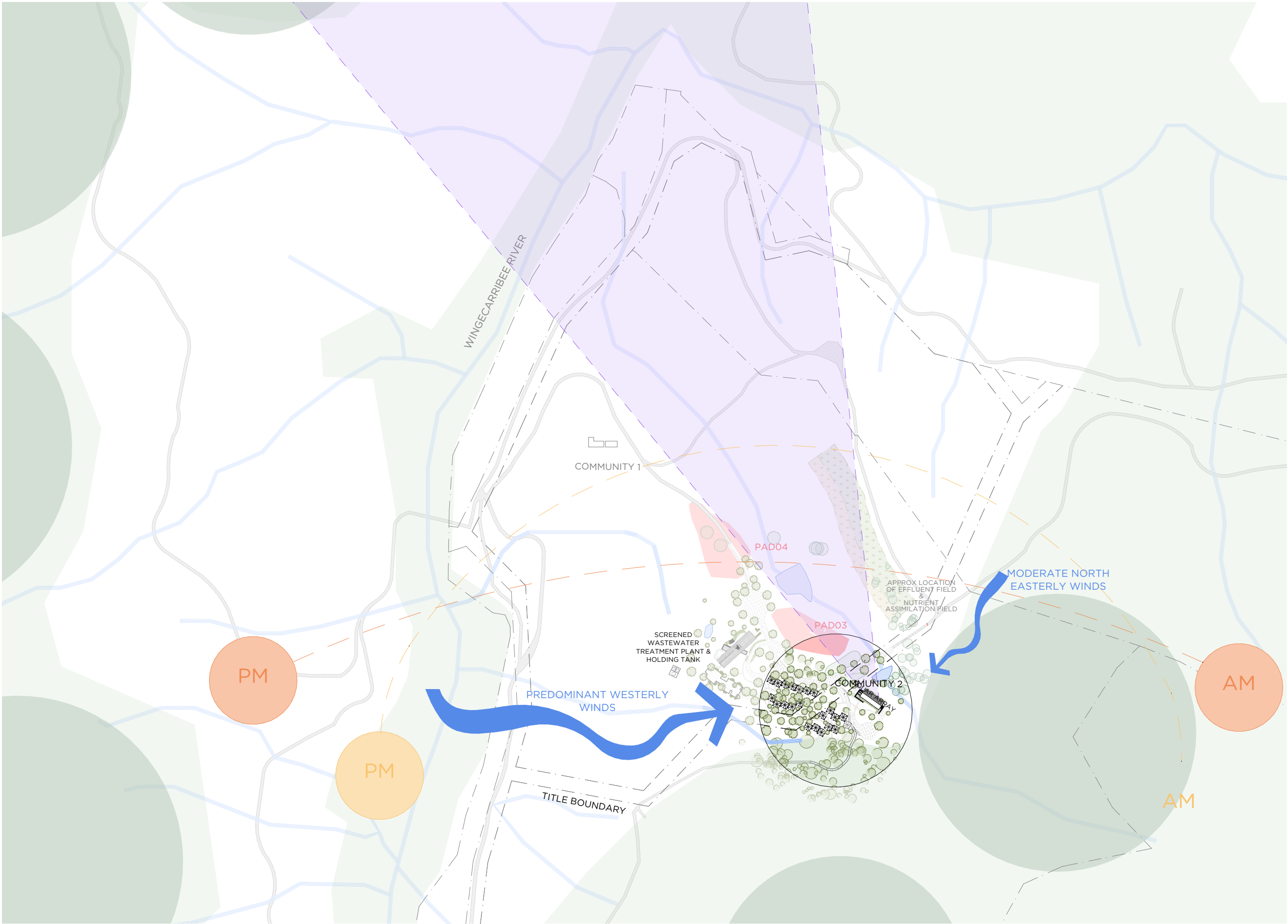
TB1
TIMBER BATTENS



TM1
VERTICAL TIMBER
CLADDING



RW1
RETAINING WALL TO
LANDSCAPE
ARCHITECT'S DETAIL



- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING WATER COURSE
- EXISTING VEGETATION
- TITLE BOUNDARY
- PREFERRED VIEW
- MOUNTAIN RIDGE
- WIND DIRECTION
- SUMMER SUN PATH
- WINTER SUN PATH
- POTENTIAL ARCHEAOLOGICAL DEPOSIT

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REV	COMMENTS	DATE
01	GENERAL AMENDMENTS	21/09/2023
02	DA SUBMISSION	12/03/2024

DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	12/03/2024	JM	AA	@ A3

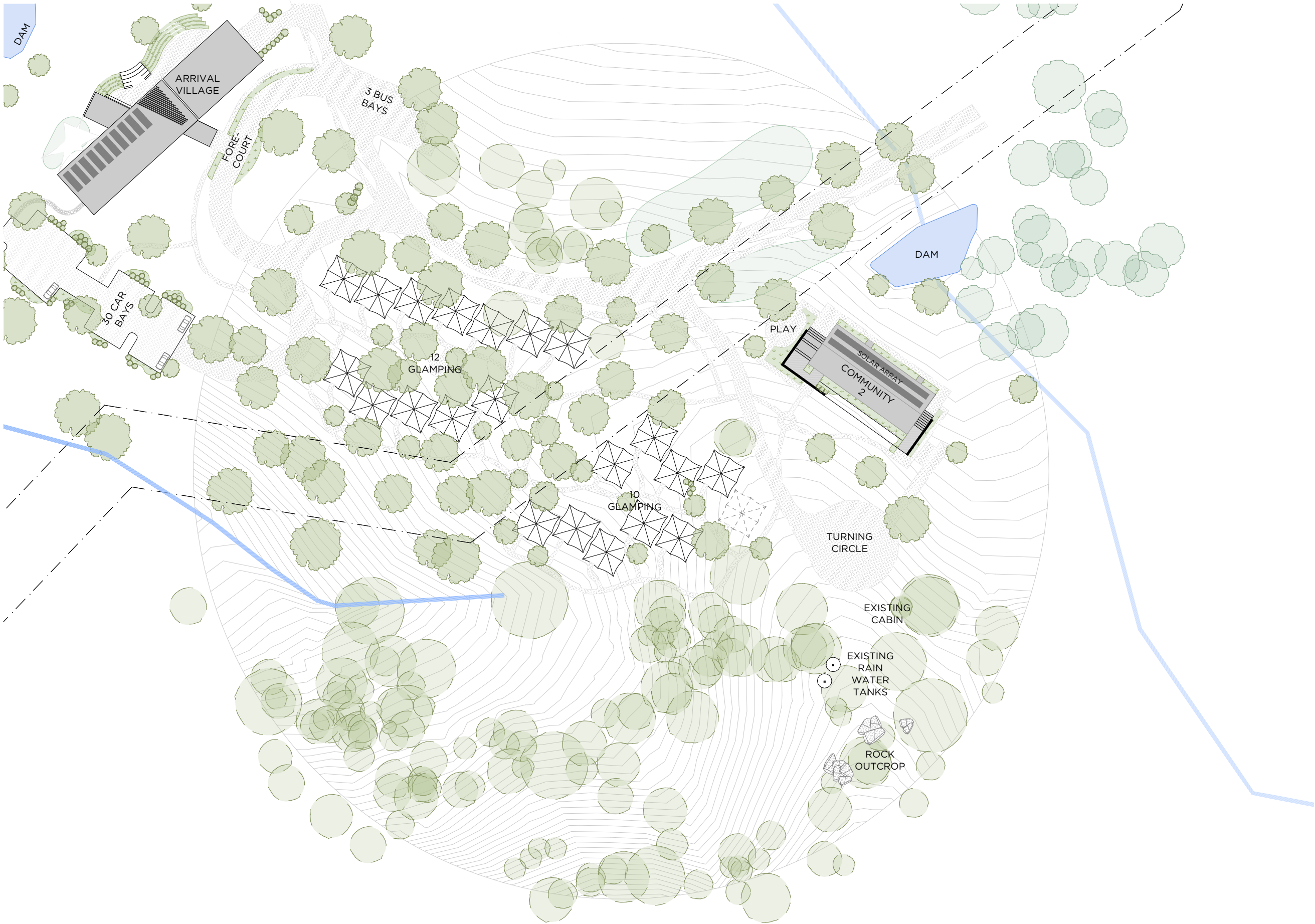


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
LOCATION PLAN

DRAWING

DA3-01



- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- TITLE BOUNDARY
- EXISTING ROAD
- ACCOMMODATION CLEARANCE ZONE
- PROPOSED PATH

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REV	COMMENTS	DATE
01	GENERAL AMENDMENTS	21/09/2023
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DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	12/03/2024	JM	AA	@ A3

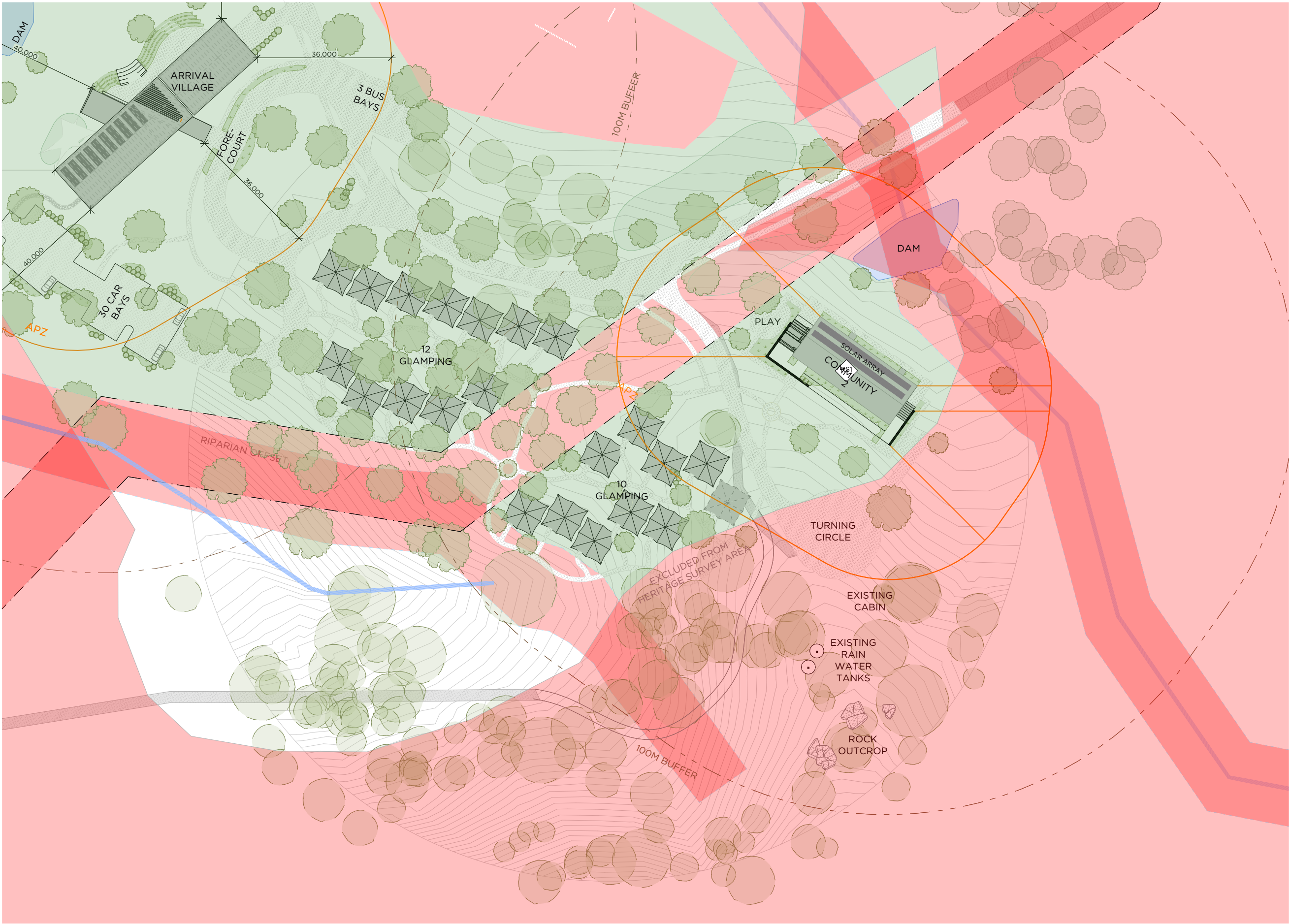


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
SITE

DRAWING

DA3-02



- NO BUILD ZONE
- CABIN / TENT BUILD ZONE
- 100M BUFFER
- APZ ZONE
- EXISTING TOPOGRAPHY
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- TITLE BOUNDARY
- EXISTING ROAD
- ACCOMMODATION
- CLEARANCE ZONE
- PROPOSED PATH

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REV	COMMENTS	DATE
01	GENERAL AMENDMENTS	21/09/2023
02	DA SUBMISSION	12/03/2024

DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	12/03/2024	JM	AA	@ A3

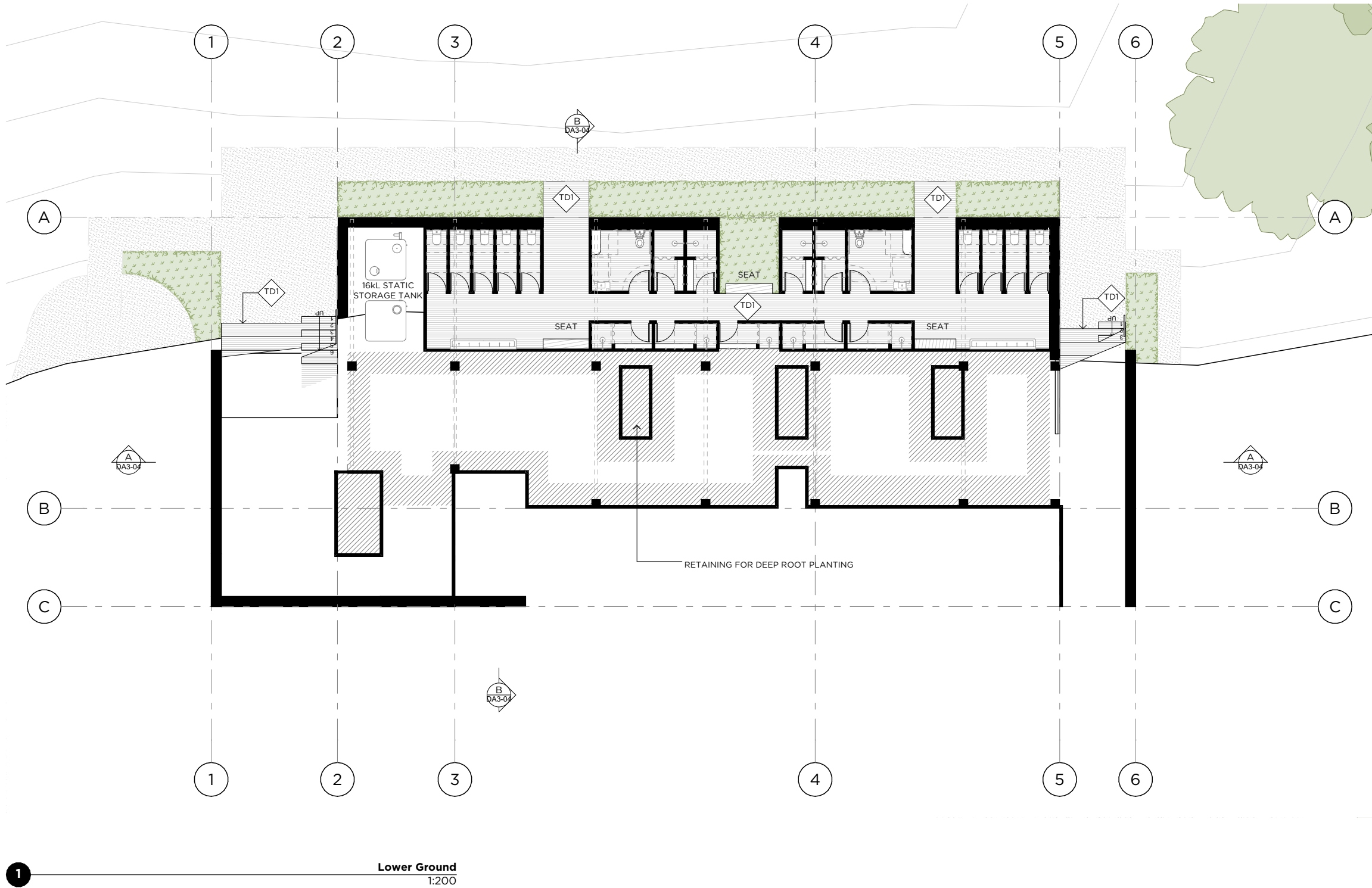


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
SITE PLAN - NO BUILD

DRAWING

DA03



GA PLAN NOTES

- DO NOT SCALE DRAWINGS. DRAWINGS NOT FOR CONSTRUCTION.
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GA PLAN LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- MATERIAL TAG

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REV	COMMENTS
01	GENERAL AMENDMENTS
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12/03/2024

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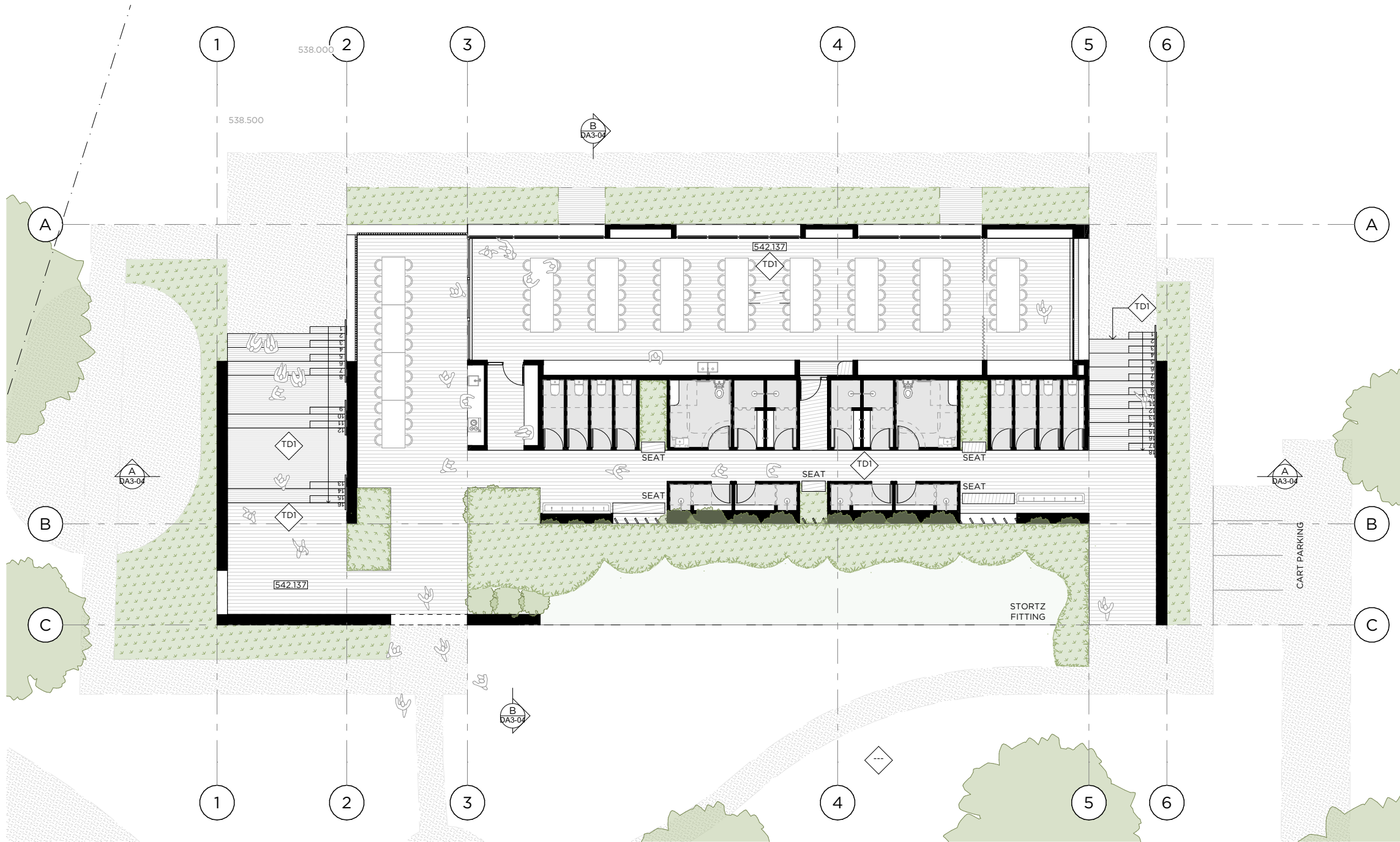
REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	12/03/2024	JM	AA	@ A3

PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
COMMUNITY 2 - REFUGE BUILDING - LOWER GROUND

DRAWING

DA3-02A



GA PLAN NOTES

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GA PLAN LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- STATIC DIMENSION
- DOWNPIPE
- MATERIAL TAG

1

Community 2 - Ground
1:200

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12/03/2024

DEVELOPMENT APPLICATION

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02	1938	12/03/2024	JM	AA	@ A3

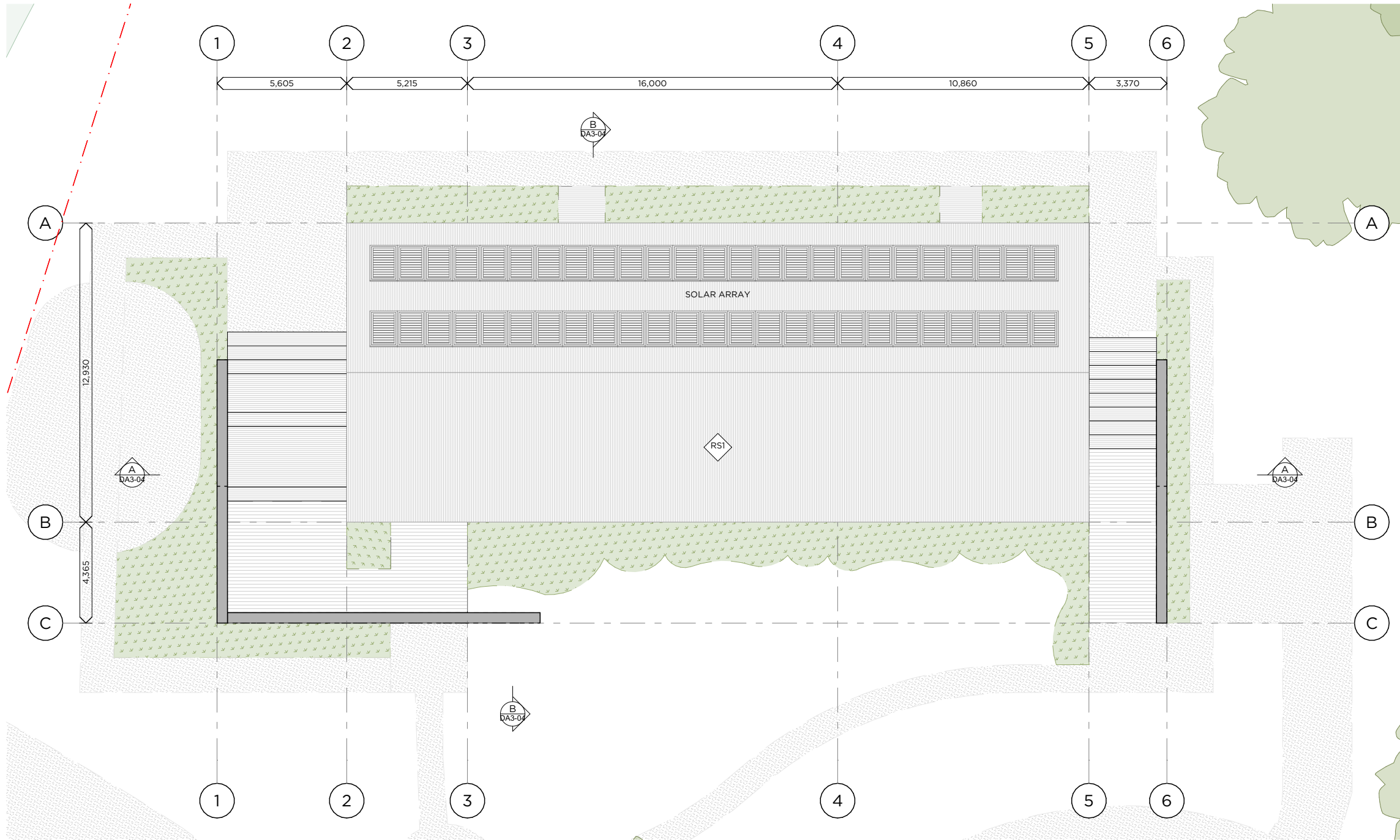


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
COMMUNITY 2 - REFUGE BUILDING - GA PLAN

DRAWING

DA3-02



GA PLAN NOTES

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GA PLAN LEGEND

- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- DIMENSION
- STATIC DIMENSION
- DP DOWNPIPE
- MATERIAL TAG

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DEVELOPMENT APPLICATION

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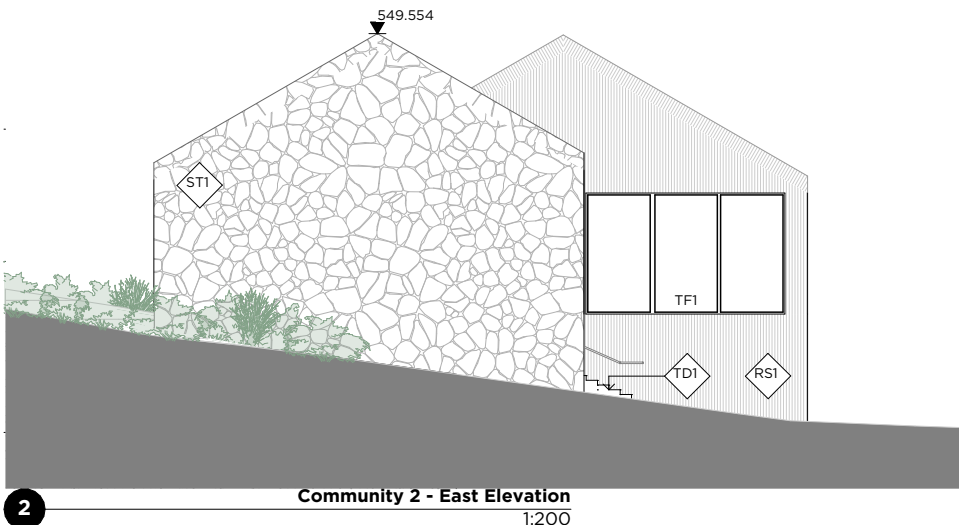
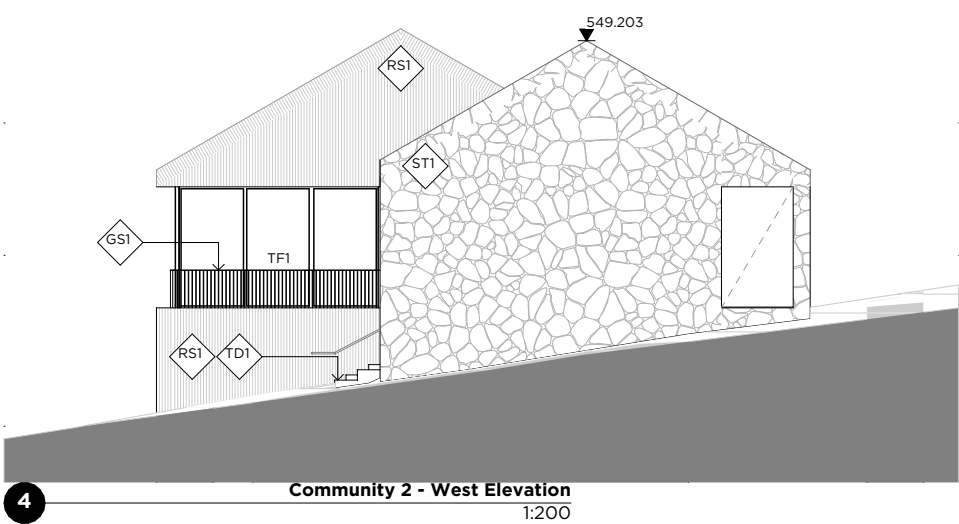
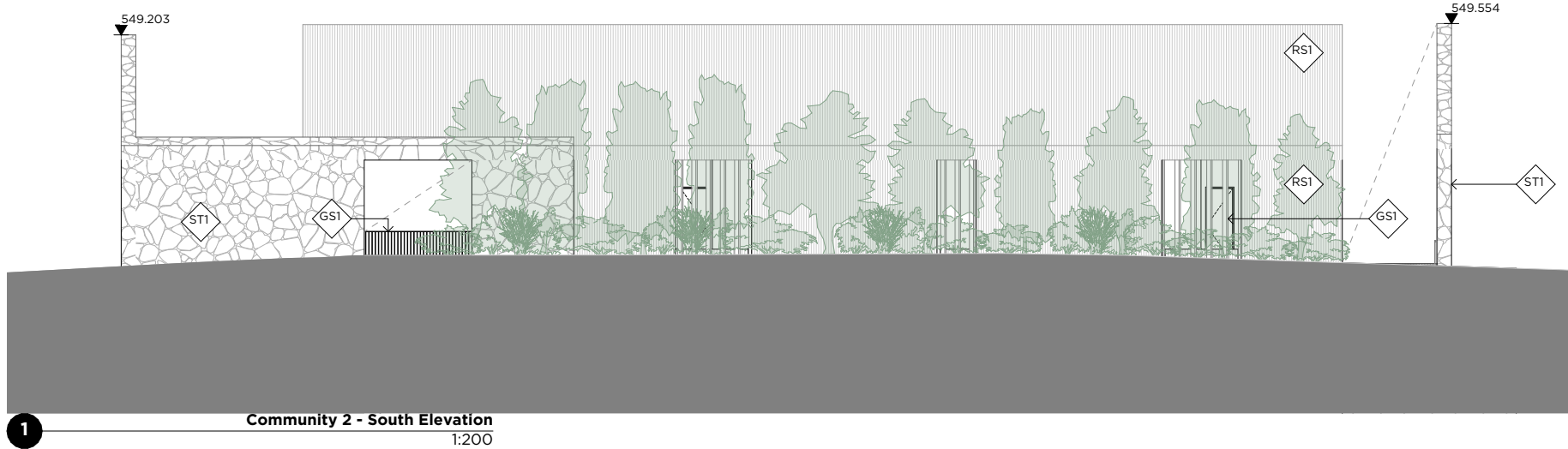


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
COMMUNITY 2 - REFUGE BUILDING - ROOF PLAN

DRAWING

DA3-03



ELEVATIONS & SECTIONS NOTES

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ELEVATIONS & SECTIONS LEGEND

- XXXX
V ELEVATION TO AHD
- DIMENSION
/ / STATIC DIMENSION
- TITLE BOUNDARY
- ## MATERIAL TAG

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REV	COMMENTS	DATE
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DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
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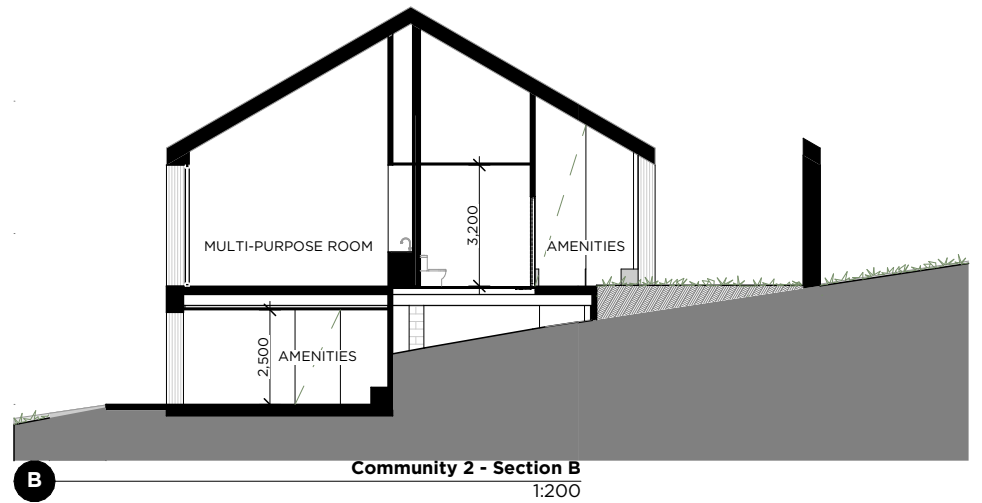
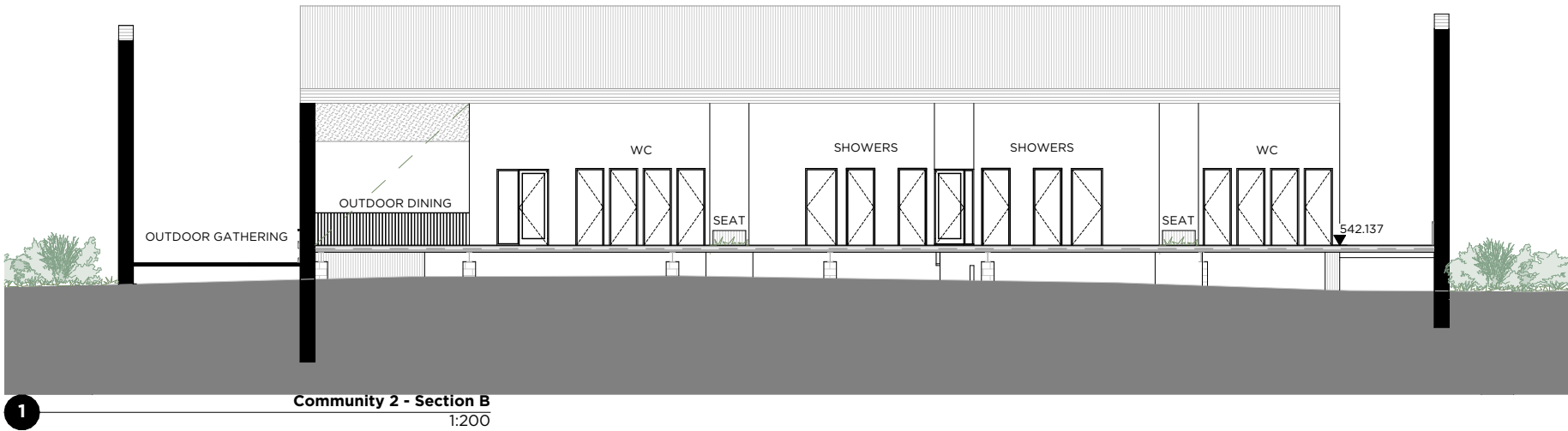


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
COMMUNITY 2 - REFUGE BUILDING - ELEVATIONS

DRAWING

DA3-04



ELEVATIONS & SECTIONS NOTES

1. DO NOT SCALE DRAWINGS. DRAWINGS NOT FOR CONSTRUCTION.
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ELEVATIONS & SECTIONS LEGEND

- XX.XX ELEVATION TO AHD
- DIMENSION STATIC DIMENSION
- TITLE BOUNDARY
- ## MATERIAL TAG

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REV	COMMENTS	DATE
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REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	12/03/2024	JM	AA	@ A3



PROJECT
GREENSTEAD JOADJA

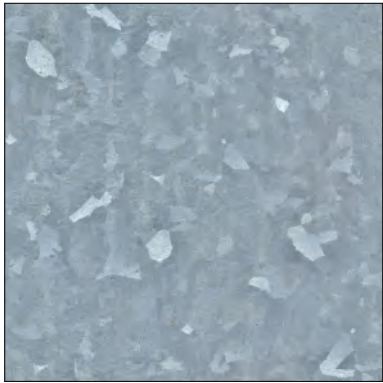
DRAWING TITLE
COMMUNITY 2 - REFUGE BUILDING - SECTIONS

DRAWING

DA3-06



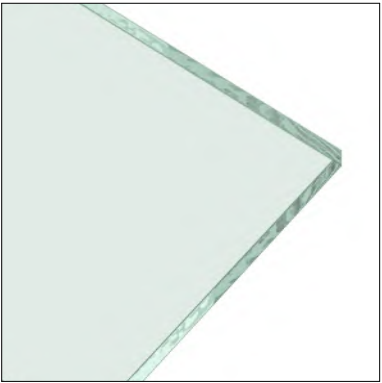
RS1
PROFILED METAL
CLADDING
ZINCALUME



GS1
GALVANISED STEEL



CO1
CONCRETE



GL1
CLEAR GLAZING



TF1
TIMBER
WINDOW/DOOR
FRAMES



TD1
TIMBER DECKING



TM1
VERTICAL TIMBER
CLADDING



ST1
STONEWORK

REV	COMMENTS	DATE
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DEVELOPMENT APPLICATION

REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
02	1938	12/03/2024	JM	AA	@ A3

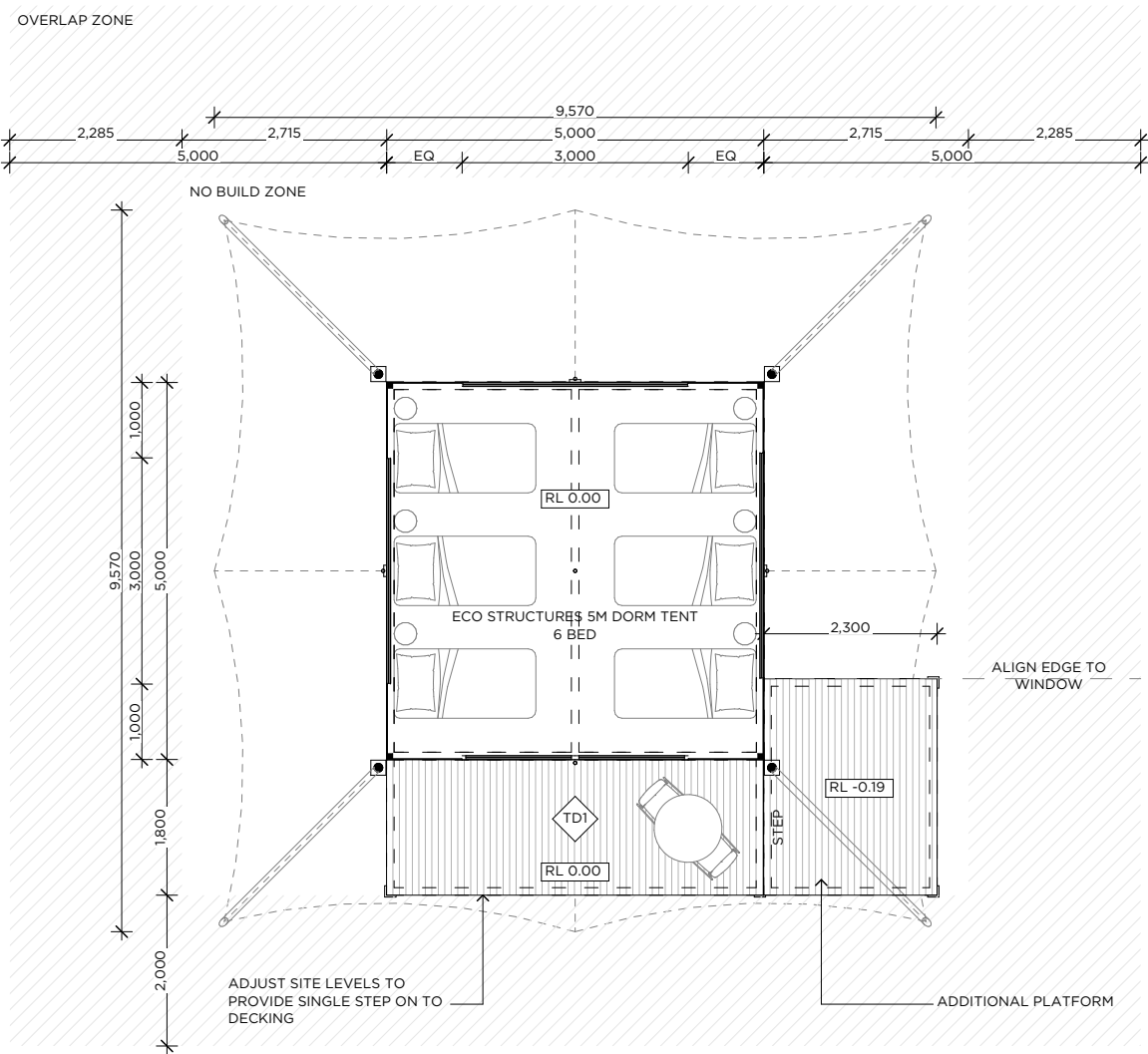


PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
COMMUNITY 2 - REFUGE BUILDING - MATERIAL PALETTE

DRAWING

DA3-05



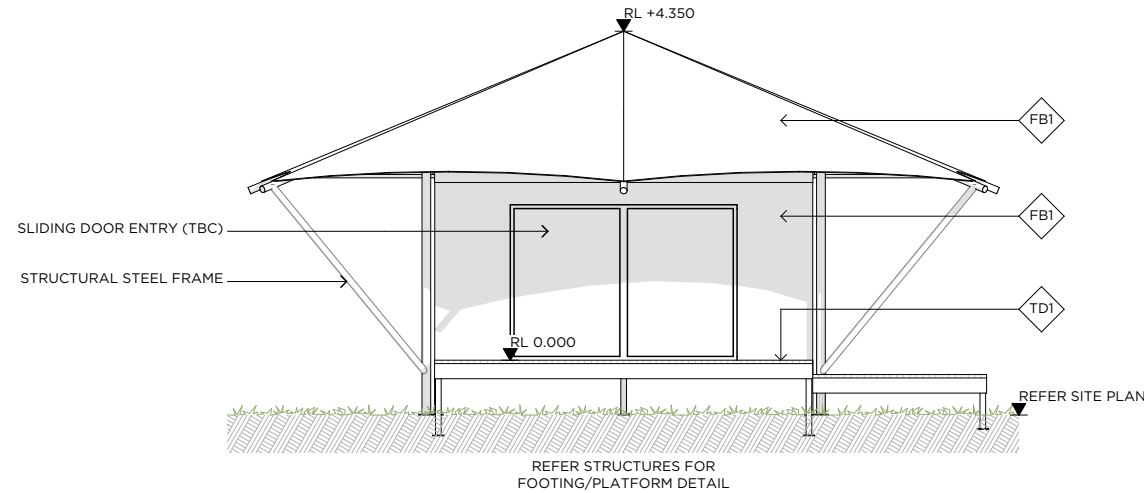
PLANS, ELEVATIONS & SECTIONS NOTES

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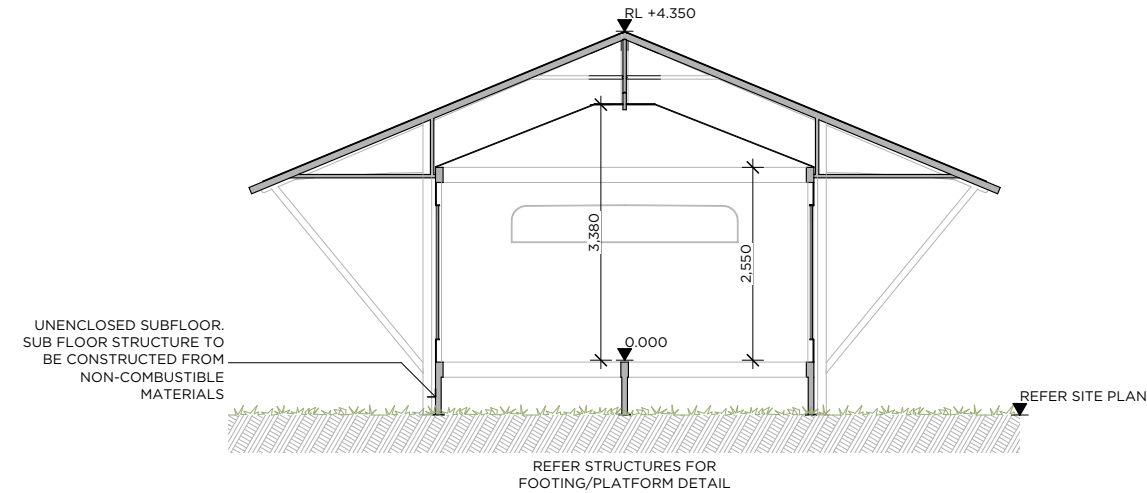
PLANS, ELEVATIONS & SECTIONS LEGEND

- XX.XX ELEVATION TO AHD
- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- STATIC DIMENSION
- DP DOWNPIPE
- ## MATERIAL TAG

1 GLAMPING TENT - GA PLAN
1:100

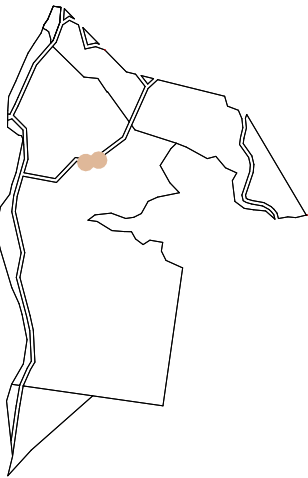


1 GLAMPING TENT - ELEVATION
1:100



1 GLAMPING TENT - SECTION
1:100

KEY PLAN



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REV COMMENTS
01 Updates to Landscape
04 DA SUBMISSION

DATE
27/10/2023

DEVELOPMENT APPLICATION

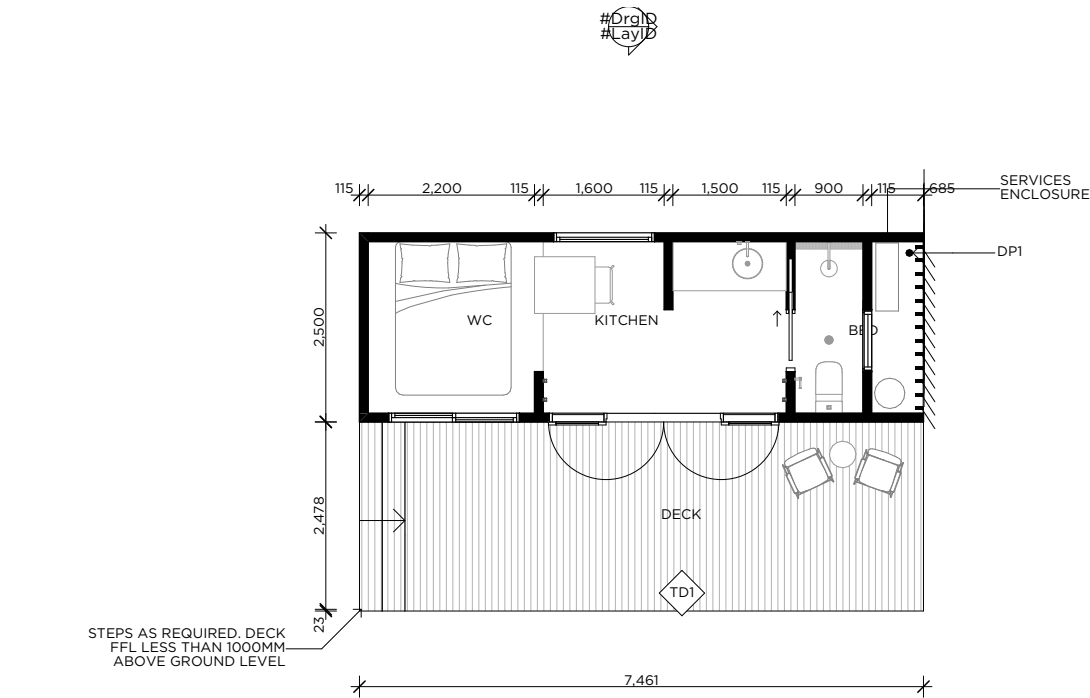
REVISION JOB PLOT DATE ARCHITECT CAD SCALE
04 1938 12/03/2024 JM AA @ A3

PROJECT
GREENSTEAD JOADJA

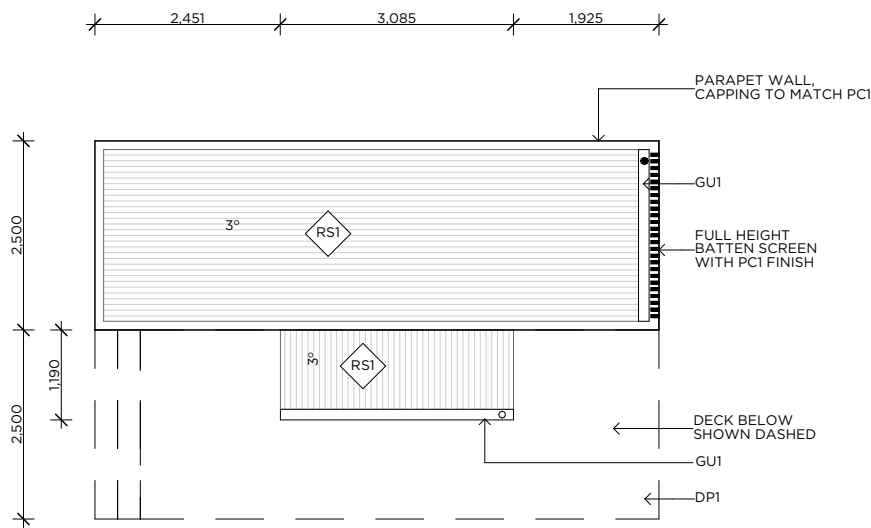
DRAWING TITLE
GLAMPING TENT - PLANS, ELEVATIONS + SECTIONS

DRAWING

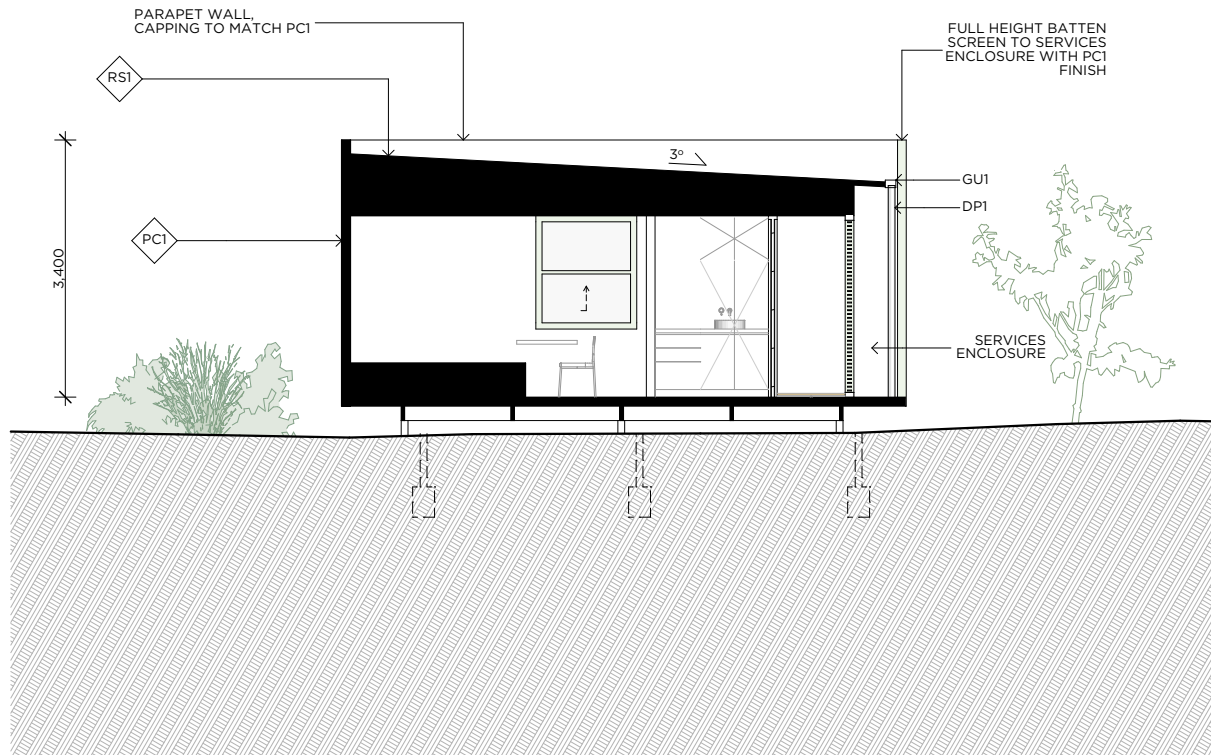
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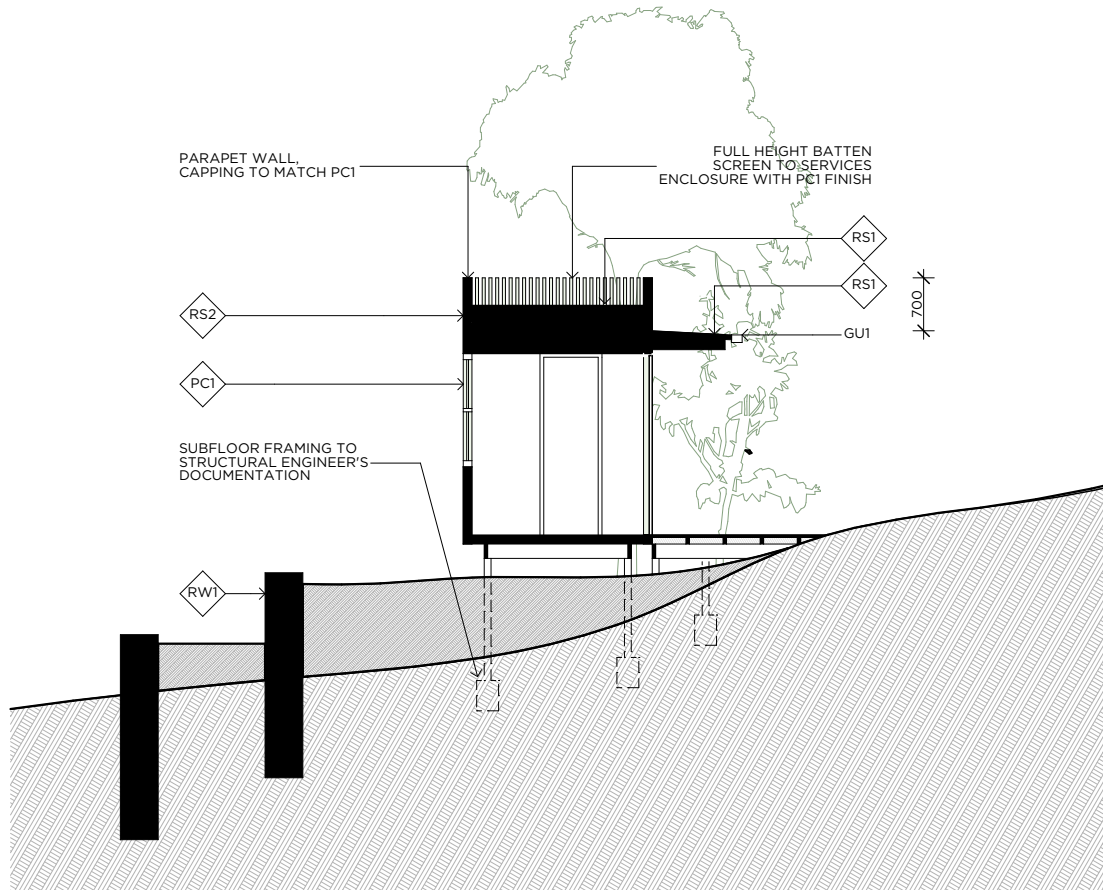
1 CABIN TYPE 1 - GA PLAN
1:100



2 CABIN TYPE 1 - ROOF PLAN
1:100

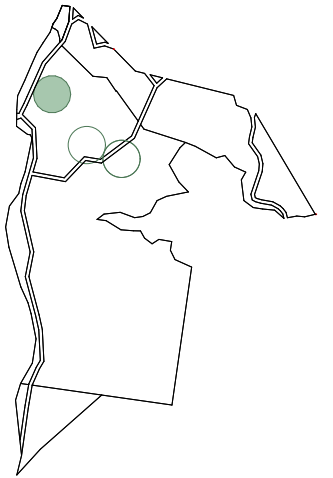


3 CABIN TYPE 1 - SECTION A
1:100



4 CABIN TYPE 1 - SECTION B
1:100

KEY PLAN



PLANS, ELEVATIONS & SECTIONS NOTES

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PLANS, ELEVATIONS & SECTIONS LEGEND

XX.XX	ELEVATION TO AHD
RL 50.78	RELATIVE LEVEL, REFER SURVEY
	EXISTING ELEMENTS
	PROPOSED ELEMENTS
	EXISTING WATER BODY
	EXISTING VEGETATION
	PROPOSED VEGETATION
	TITLE BOUNDARY
	STATIC DIMENSION
DP	DOWNPIPE
##	MATERIAL TAG

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REV	COMMENTS
02	Issue to Civil and Landscape
03	Updates to Landscape
04	DA SUBMISSION

DATE
03/10/2023
27/10/2023

DEVELOPMENT APPLICATION

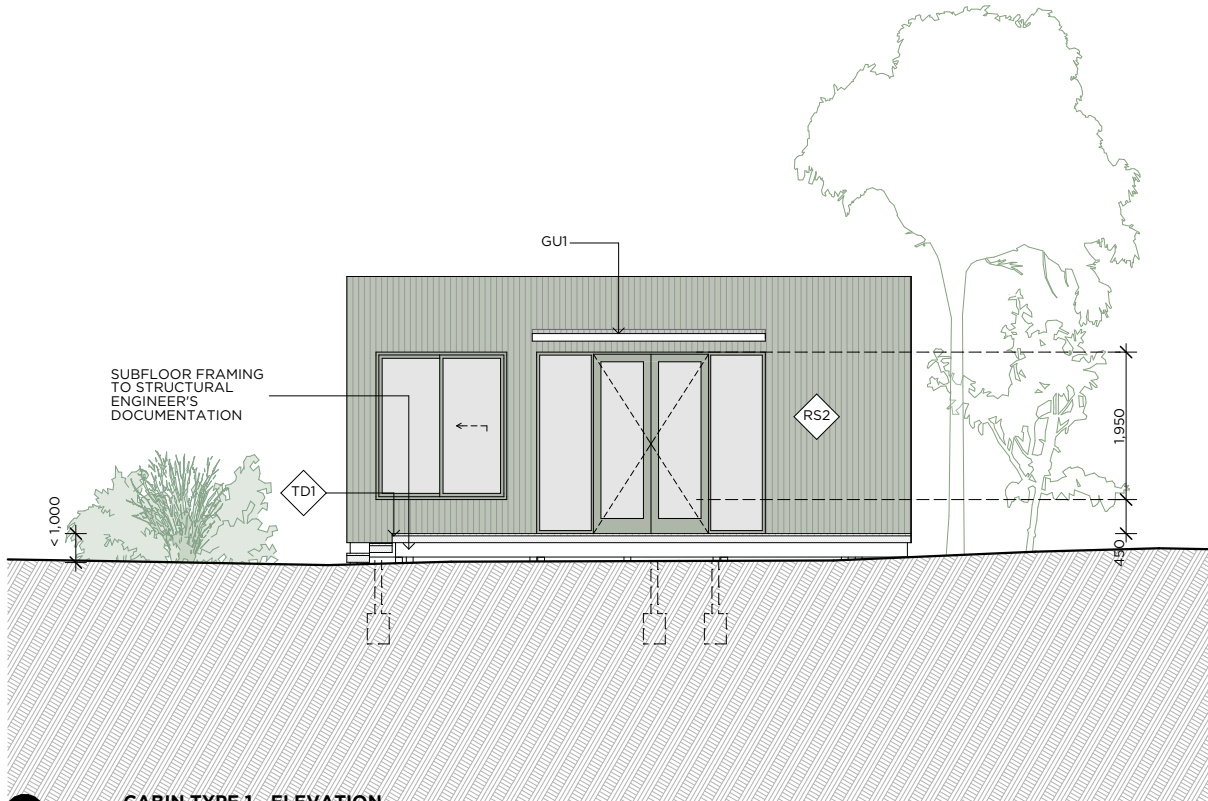
REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
04	1938	12/03/2024	JM	AA	@ A3

PROJECT
GREENSTEAD JOADJA

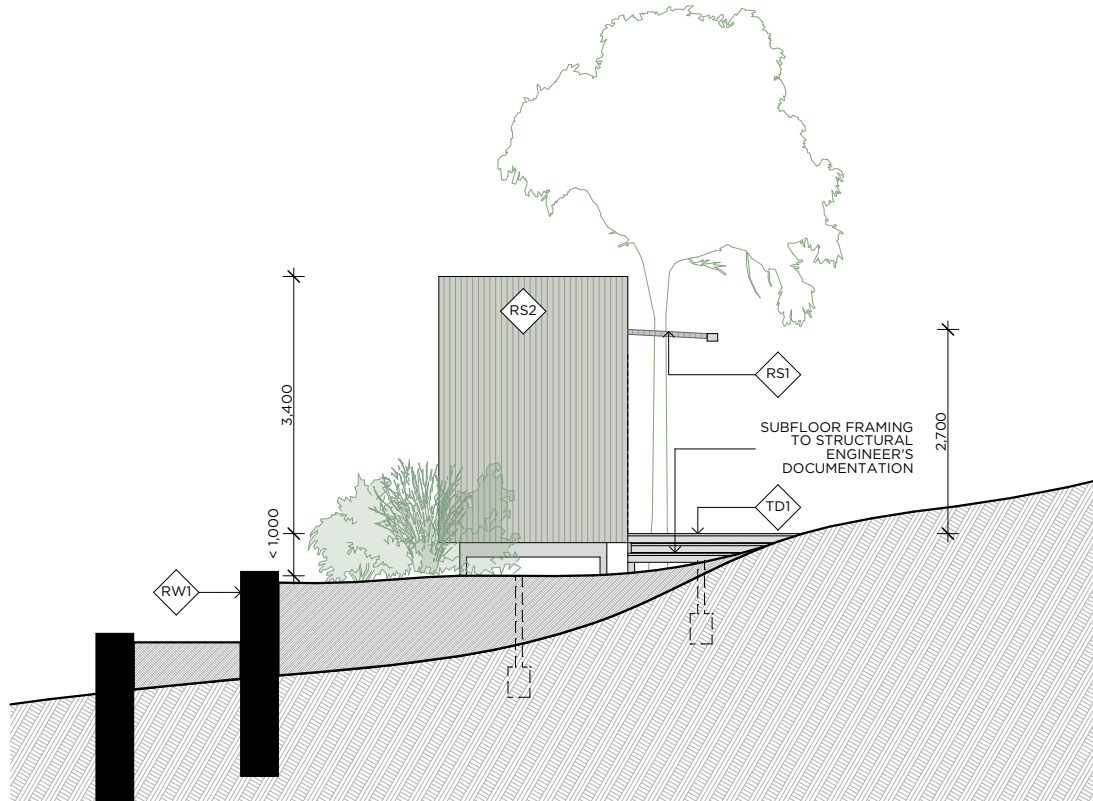
DRAWING TITLE
CABIN TYPE 1 - PLANS + SECTIONS

DRAWING

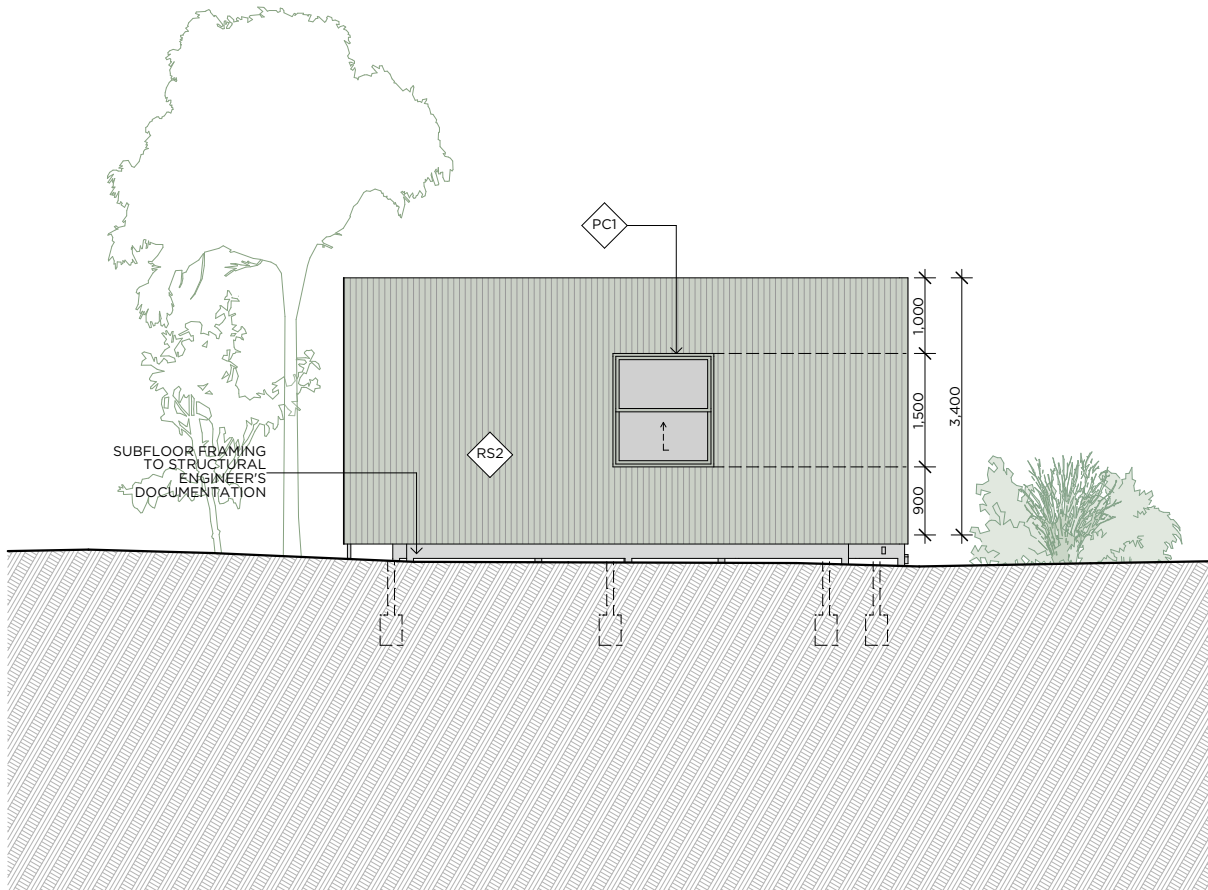
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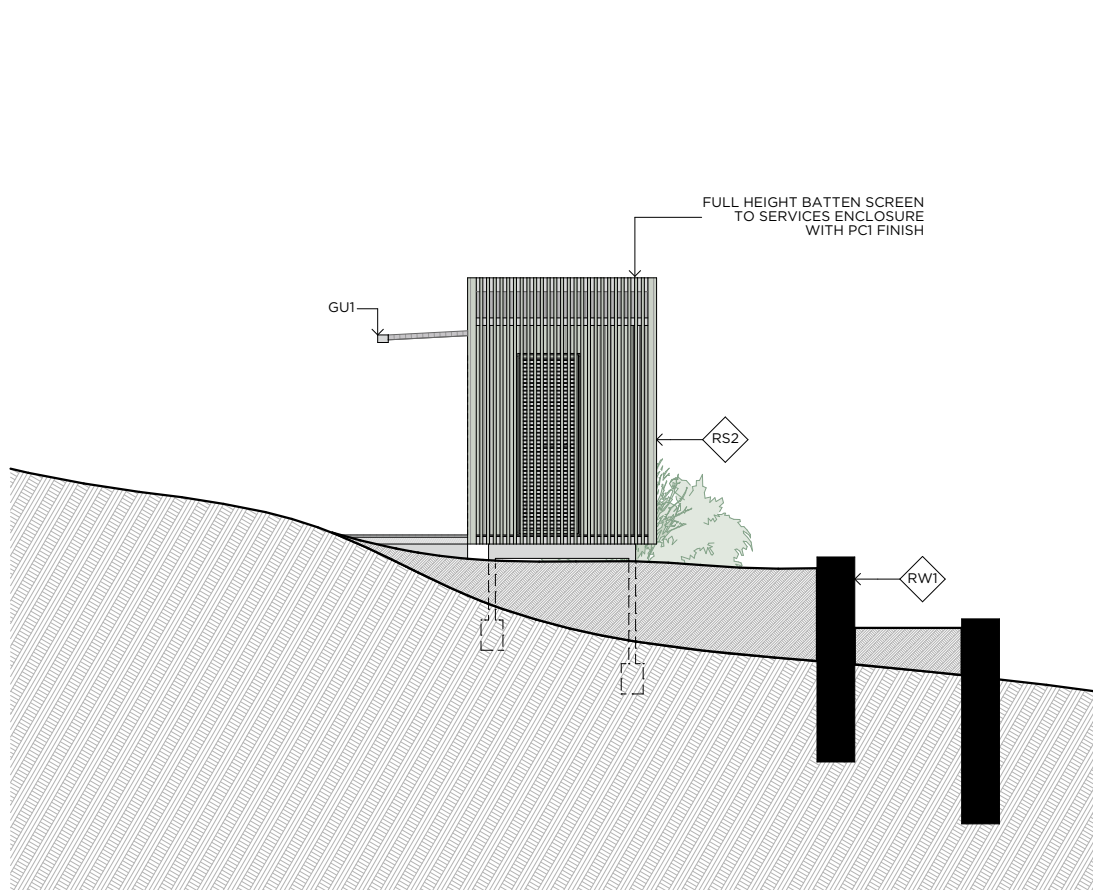
1 CABIN TYPE 1 - ELEVATION
1:100



2 CABIN TYPE 1 - ELEVATION
1:100

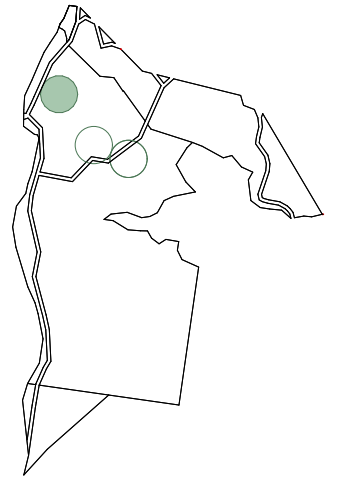


3 CABIN TYPE 1 - ELEVATION
1:100



4 CABIN TYPE 1 - ELEVATION
1:100

KEY PLAN



PLANS, ELEVATIONS & SECTIONS NOTES

1. DO NOT SCALE DRAWINGS. DRAWINGS NOT FOR CONSTRUCTION.
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- XX.XX ELEVATION TO AHD
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- EXISTING WATER BODY
- EXISTING VEGETATION
- PROPOSED VEGETATION
- TITLE BOUNDARY
- STATIC DIMENSION
- DOWNPIPE
- MATERIAL TAG

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DEVELOPMENT APPLICATION

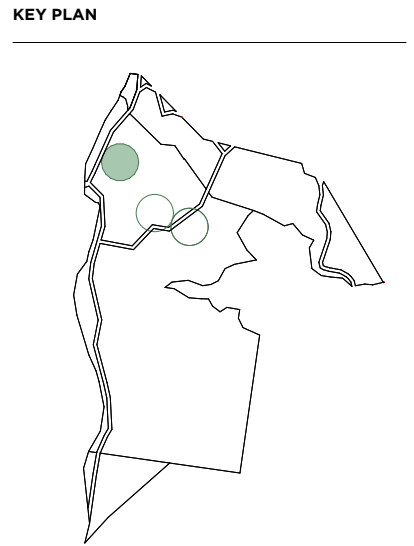
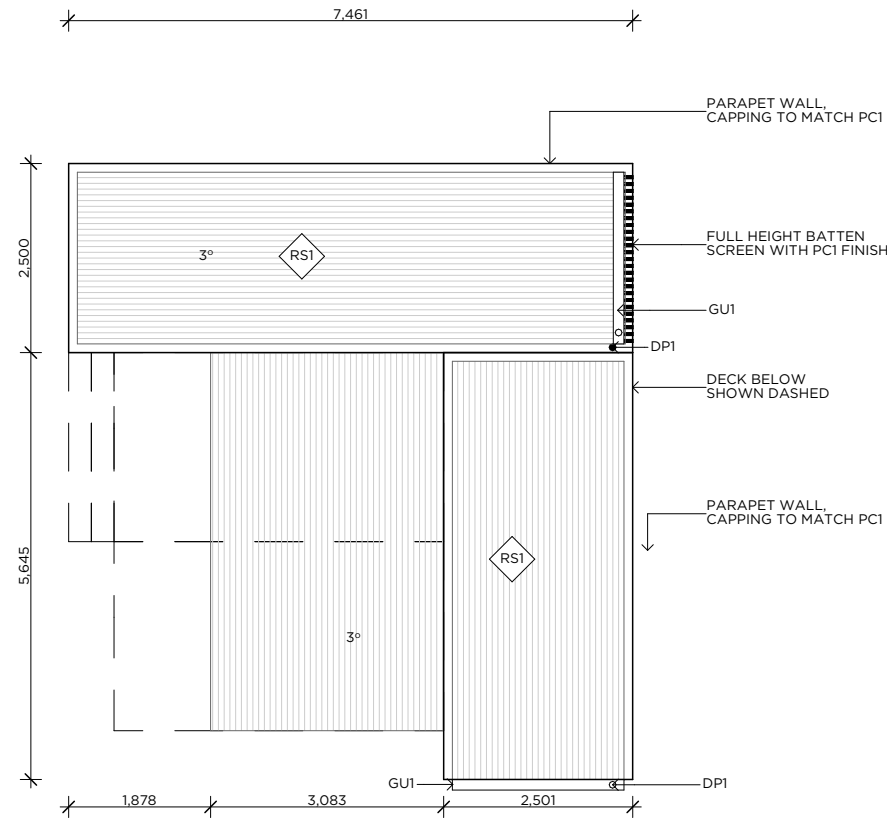
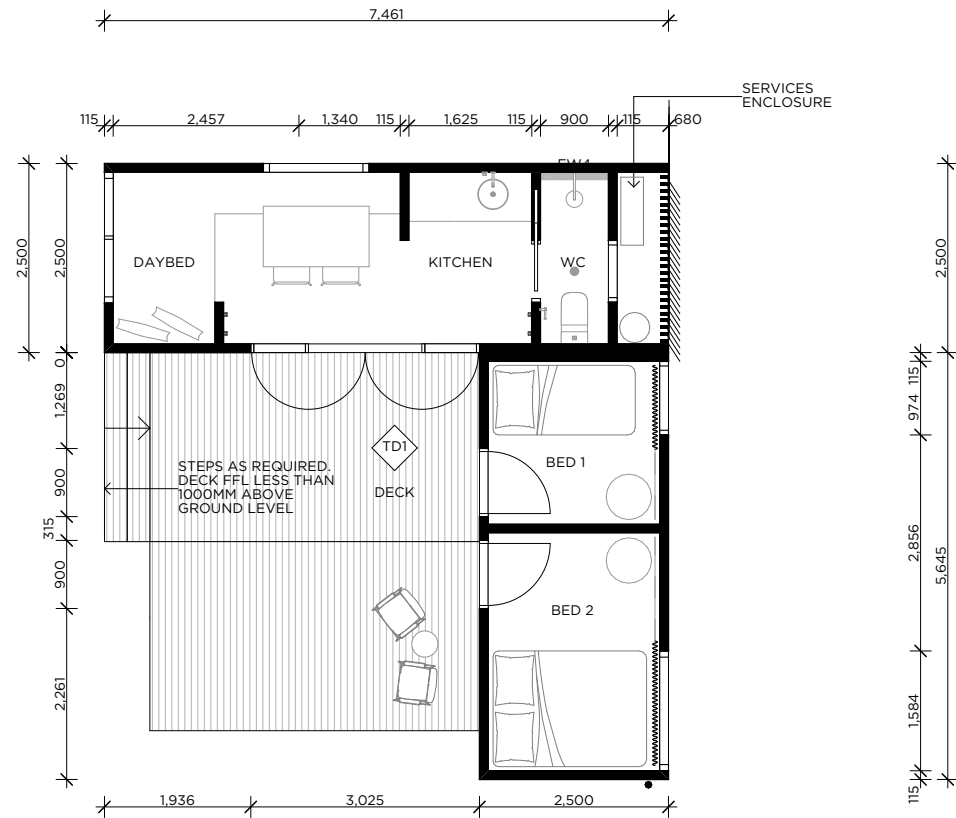
REVISION	JOB	PLOT DATE	ARCHITECT	CAD	SCALE
04	1938	12/03/2024	JM	AA	@ A3

PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
CABIN TYPE 1 - ELEVATIONS

DRAWING

DA025

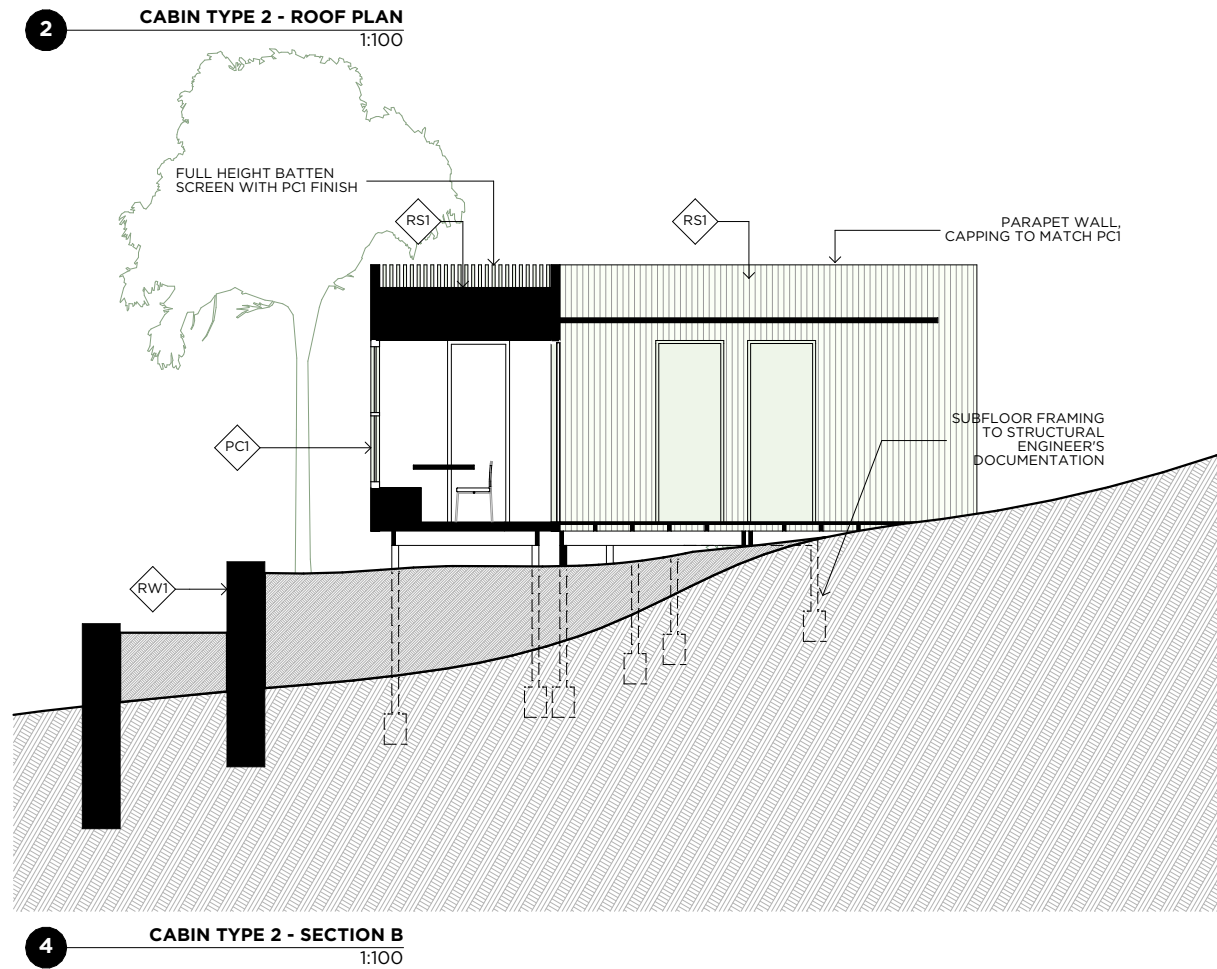
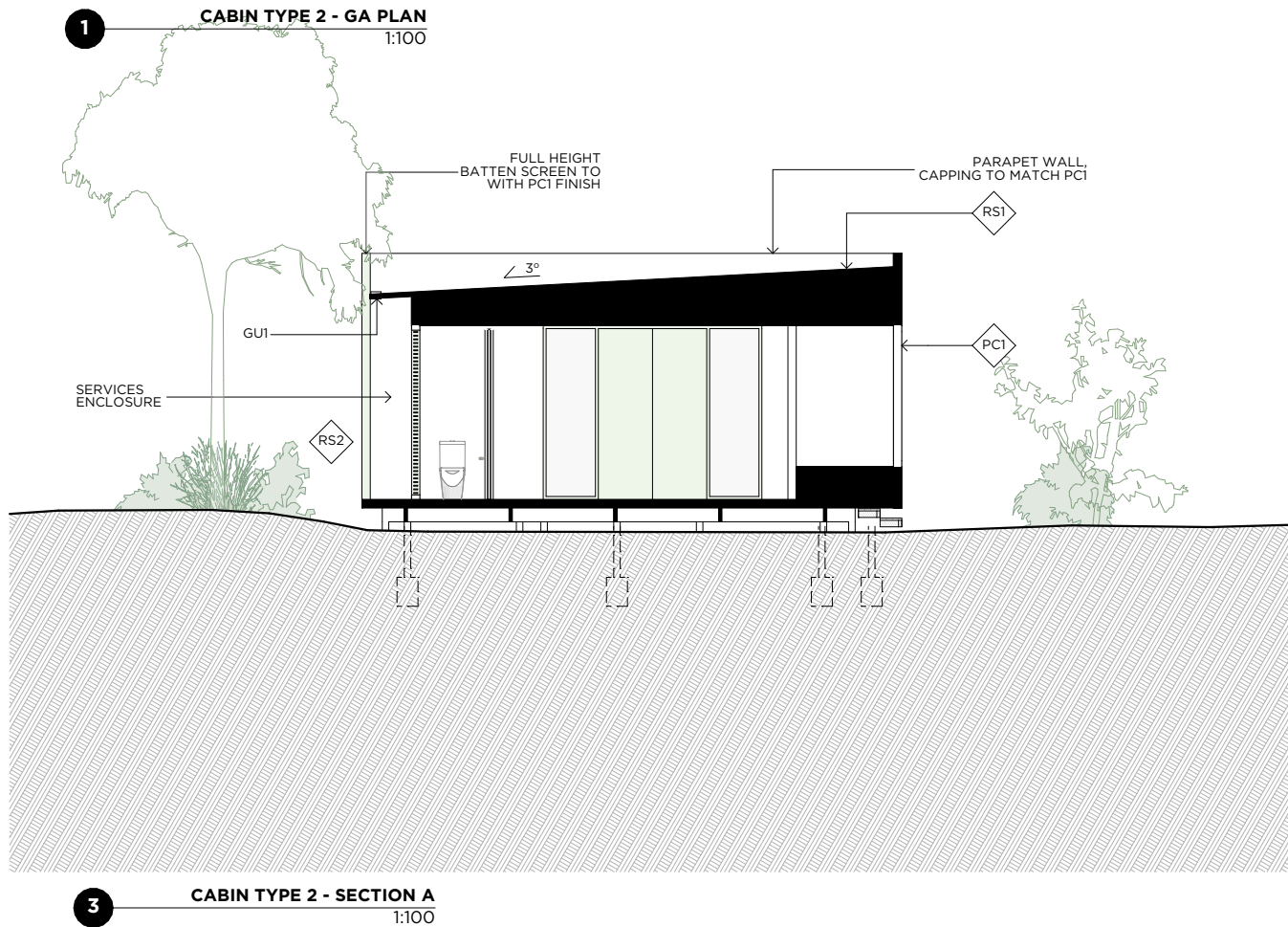


PLANS, ELEVATIONS & SECTIONS NOTES

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PLANS, ELEVATIONS & SECTIONS LEGEND

- XX.XX ELEVATION TO AHD
- RL 50.78 RELATIVE LEVEL, REFER SURVEY
- EXISTING ELEMENTS
- PROPOSED ELEMENTS
- EXISTING WATER BODY
- EXISTING VEGETATION
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- TITLE BOUNDARY
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DEVELOPMENT APPLICATION

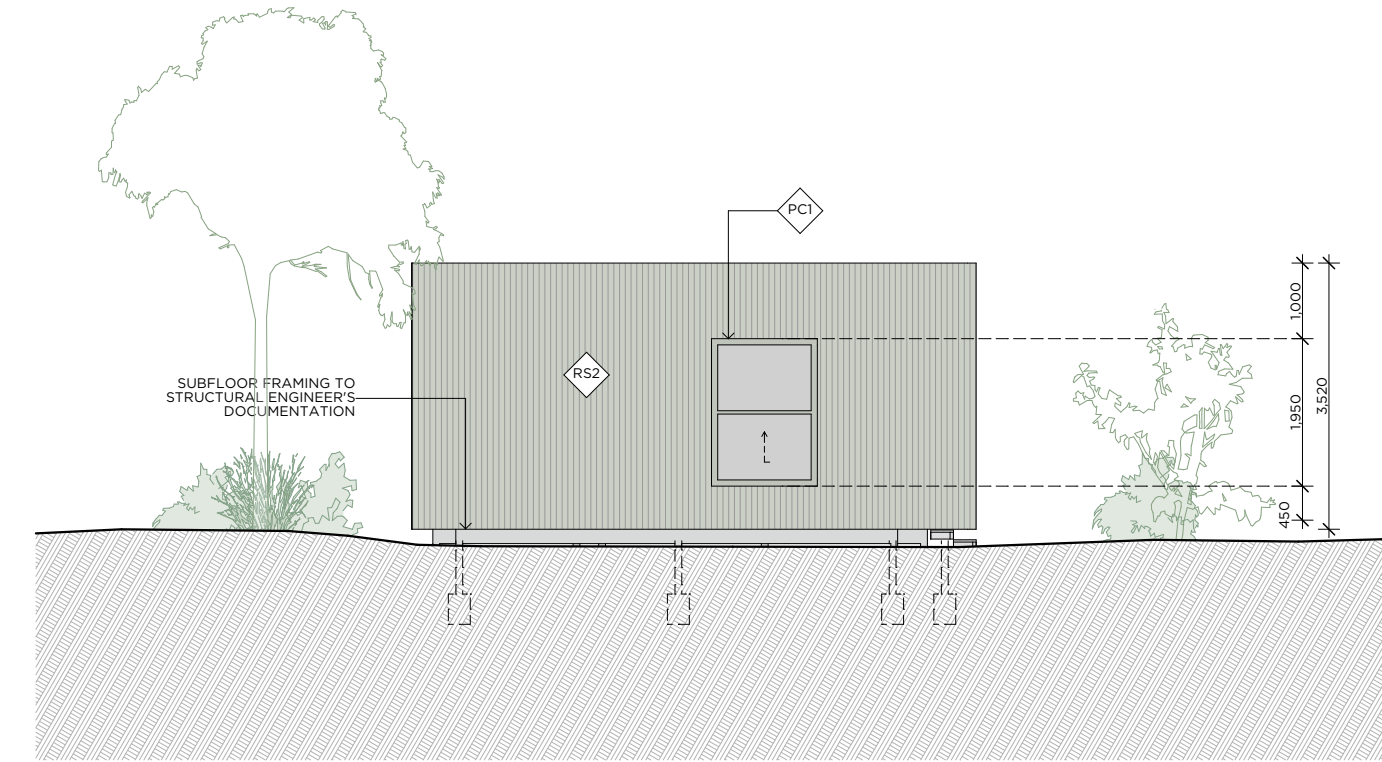
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PROJECT
GREENSTEAD JOADJA

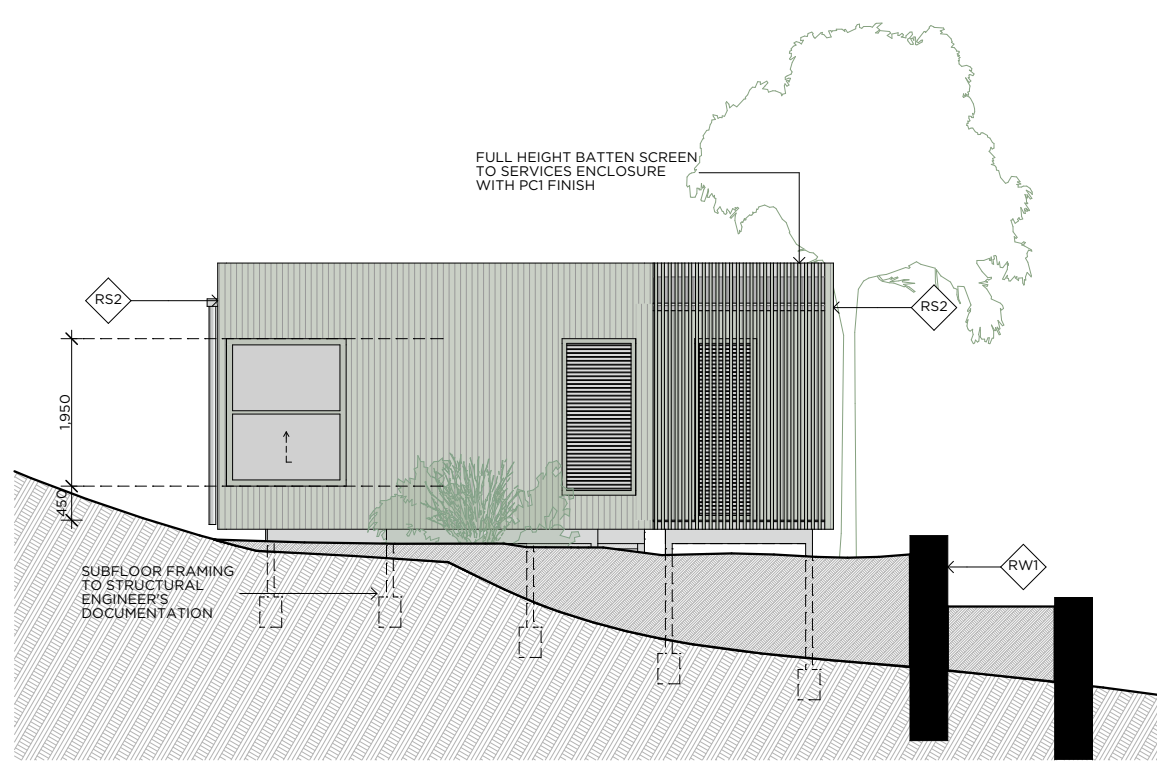
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CABIN TYPE 2 - PLANS + SECTIONS

DRAWING

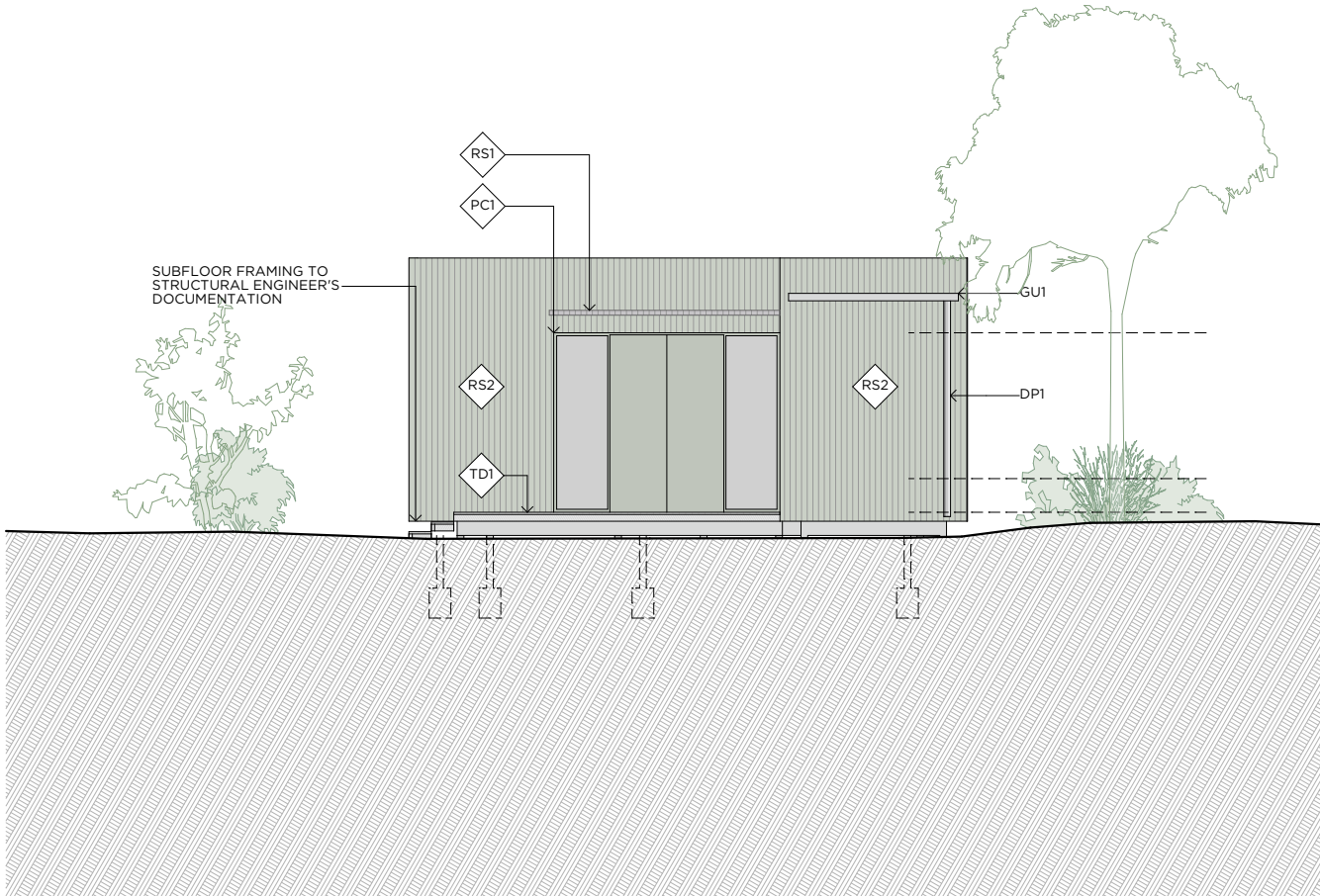
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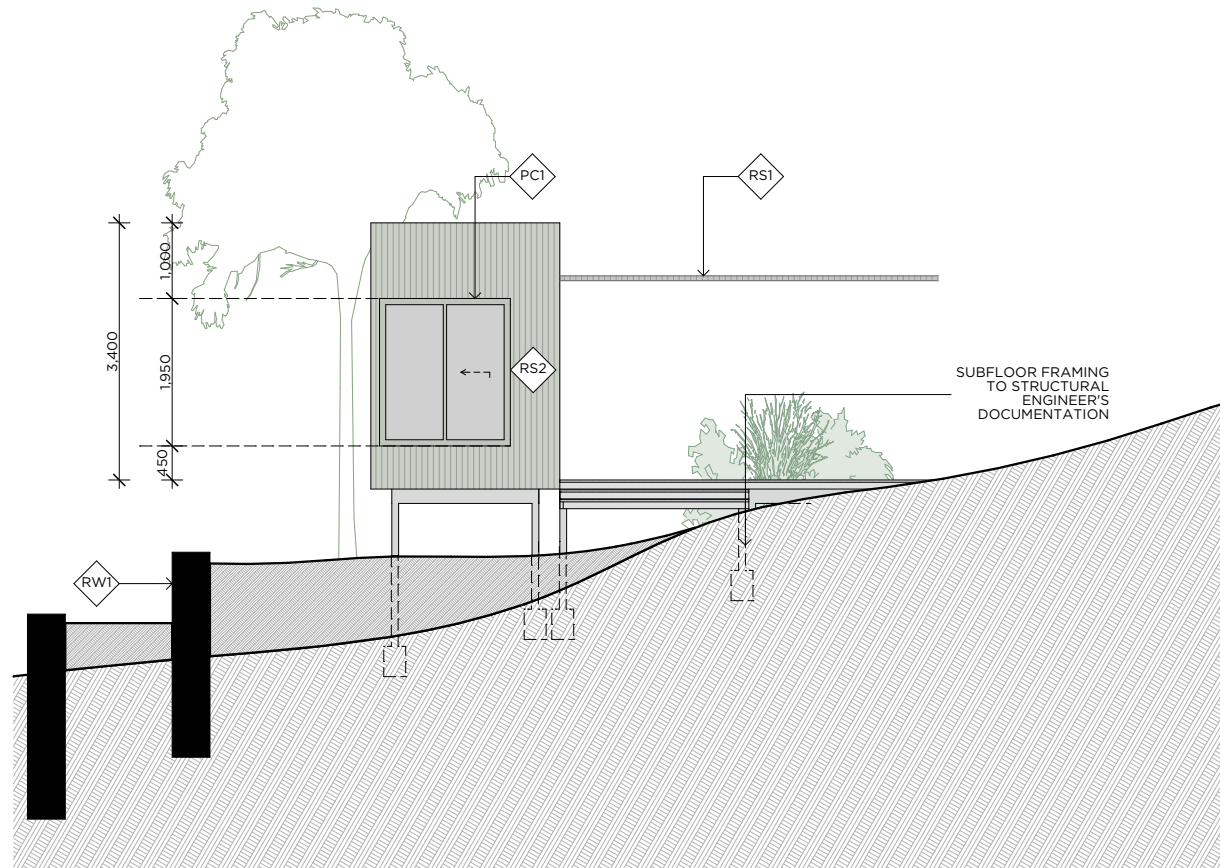
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1:100



2 CABIN TYPE 2 - ELEVATION
1:100

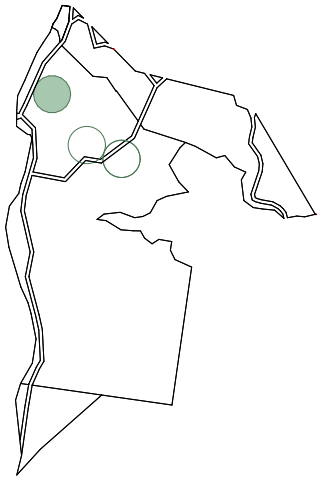


3 CABIN TYPE 2 - ELEVATION
1:100



4 CABIN TYPE 2 - ELEVATION
1:100

KEY PLAN



PLANS, ELEVATIONS & SECTIONS NOTES

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- XX.XX ELEVATION TO AHD
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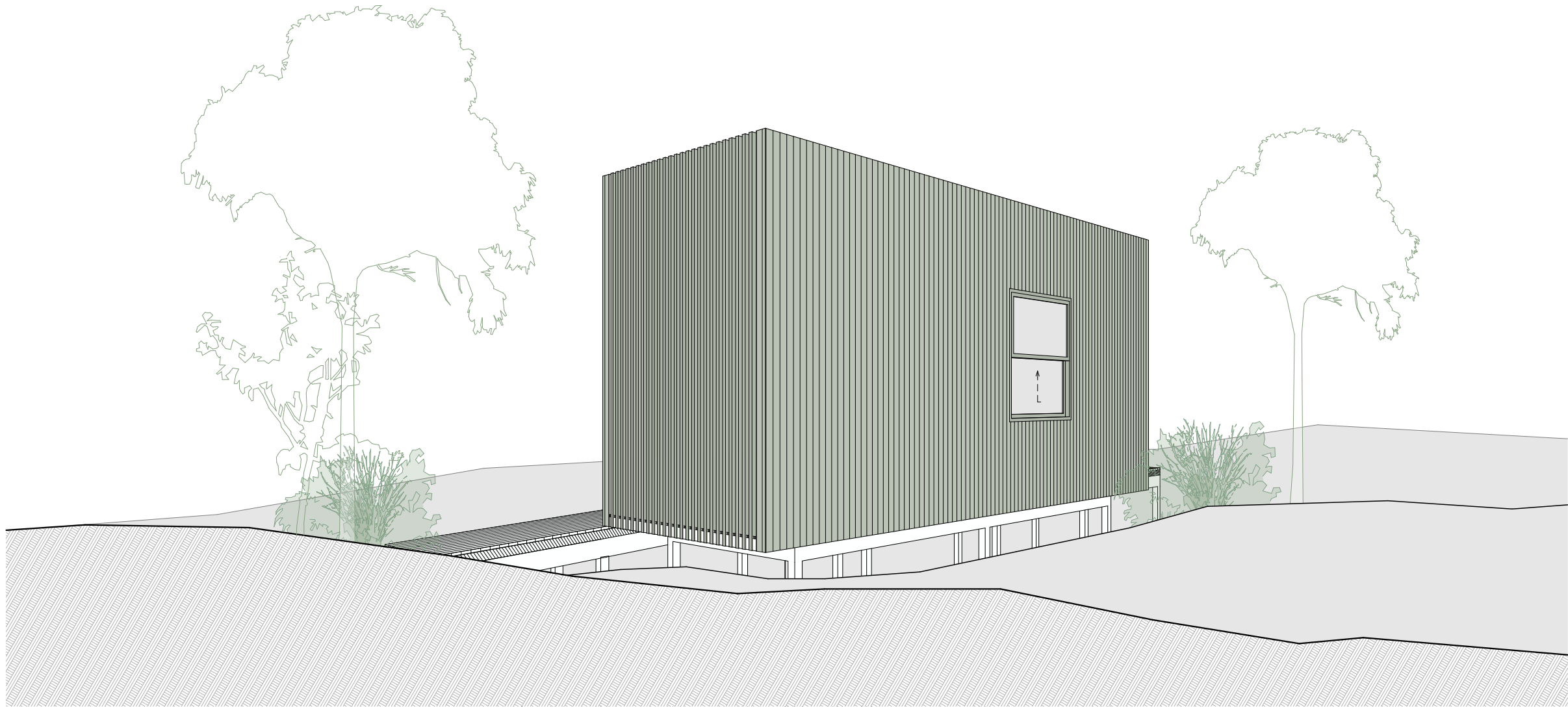
REVISION JOB PLOT DATE ARCHITECT CAD SCALE
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PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
CABIN TYPE 2 - ELEVATIONS

DRAWING

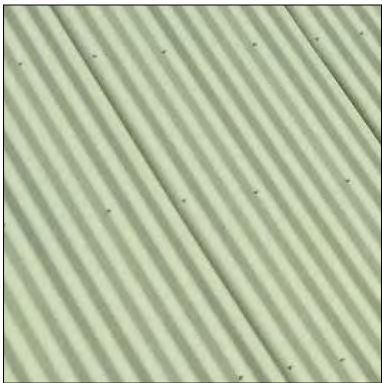
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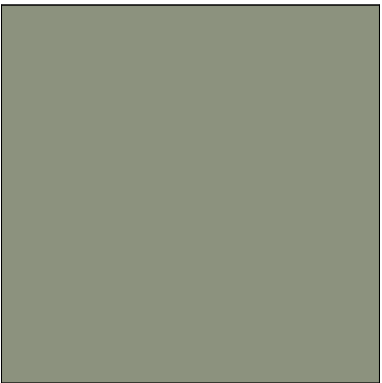
FB1
CANVAS FABRIC



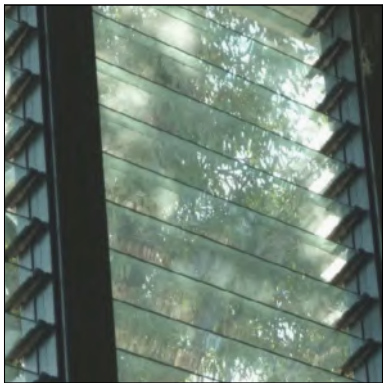
RS1
ROOF SHEET,
ZINCALUME



RS2
METAL CLADDING
'PALE EUCALYPT'



PC1
POWDERCOAT
'PALE EUCALYPT'



LV1
GLAZED LOUVRES



TD1
TIMBER DECKING



RW1
RETAINING WALL TO
LANDSCAPE
ARCHITECT'S DETAIL

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PROJECT
GREENSTEAD JOADJA

DRAWING TITLE
CABINS AND TENT PLATFORMS - MATERIAL PALETTE

DRAWING

DA026