

Stormwater Management Report

Proposed Residential Development

6-10 Auster Street, Redland Bay
Lots 3-5 on RP75327

For 12 Auster Street Pty Ltd

5 April 2019

Ref: B18-082



A QUALITY ASSURED COMPANY

CERTIFIED QUALITY ASSURANCE – ISO AS/NZS 9001, 4801 & 14001

**PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL**

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▼
SUNSHINE COAST
Suite 2, Norval Corporate Centre
13 Norval Court
Maroochydore QLD 4558

P: 0431 803 337 F: 07 5646 5857

PO Box 2016
Fortitude Valley BC, QLD 4006

E: sunshinecoast@westerapartners.com.au

▼
BRISBANE
Level 2, 33 Longland Street
Newstead QLD 4006

P: 07 3852 4333 F: 07 5646 5857

PO Box 2016
Fortitude Valley BC, QLD 4006

E: brisbane@westerapartners.com.au

▼
GOLD COAST
Level 3, 17 Welch Street
Southport QLD 4215

P: 07 5571 1599 F: 07 5646 5857

PO Box 6138
Southport Mail Centre 9726

E: goldcoast@westerapartners.com.au

▼
NORTHERN NSW
11 Sailfish Way
Kingscliff NSW 2487

P: 02 6674 8047 F: 07 5646 5857

PO Box 1131
Kingscliff NSW 2487

E: nsw@westerapartners.com.au

DOCUMENT INFORMATION

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Westera Partners Ref: B18-082

Westera Partners Contact:

James Crabb Phone: 3852 4333
Email: jamesc@westerapartners.com.au

Sam Ide Email: sami@westerapartners.com.au

Certified for Issue by:

Samuel Ide RPEQ 12231

5 April 2019

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A	J. Crabb	S. Ide	05.04.19

This report has been prepared for 12 Auster Street Pty Ltd for the purpose of accompanying a development application to Economic Development Queensland (EDQ). This report must only be used by 12 Auster Street Pty Ltd for this purpose and must not be used or relied upon by any other person for any other purpose.

The assessment, conclusions or recommendations in this report are based on conditions encountered and information received at the time of preparing the report and may not be relied upon as site conditions or operations vary over time.

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1 INTRODUCTION

Westera Partners Pty Ltd was commissioned by 12 Auster Street Pty Ltd to prepare a Stormwater Management Report for a proposed residential development at 6-12 Auster Street, Redland Bay.

The development involves the construction of a multi-residential apartment building (29 units) including associated basement carpark and landscape areas.

The development site is located in the Weinam Creek Priority Development Area (PDA) and as such is subject to assessment via Economic Development Queensland (EDQ). This report documents how stormwater runoff will be managed on site in accordance with EDQ's and Redland City Council's (RCC's) requirements.

2 SITE DESCRIPTION

2.1 Location and Land Use

The proposed development site is located at 6-10 Auster Street, Redland Bay; formally known as Lots 2-5 on RP75327. The site is approximately 0.365Ha in area and is currently occupied by a commercial warehouse, residential dwelling and boat sheds.

The property is bound by Auster Street to the south, residential properties to the east, the Marina/Moreton Bay to the north and the mouth of Weinam Creek to the west. The southern portion of the site from the building lines falls towards Auster Street at an average grade of approximately 0.8% and the northern portion of the site falls towards the Marina at an average grade of approximately 1%.

Refer to Figure 1 for an indicative site location and Appendix C for detailed site survey information.



Figure 1 – Indicative Site Location (Google Earth, 2018)

2.1 Lawful point of discharge

Stormwater drainage for the proposed development shall ensure no adverse impact to upstream, downstream or adjoining properties. The lawful point of discharge for the development is considered to be the Marina north of the site.

The piped discharge to the Marina shall comply with QUDM2017 for piped tidal outlets. The outlet level is proposed to discharge at approximately the base of the existing wall along the Marina, i.e. approx. RL0.90. This level complies with the guidelines outlined in QUDM2017 and also ensure the outlet is not discharging too far above the existing ground level that could result in erosion. To prevent intrusion of salt water and sediment, a non-return valve shall be incorporated within the stormwater system. The most suitable location is considered to be on the outlet of a proposed maintenance structure within the development and downstream of the proprietary treatment device. This ensures the valve is not subject to debris or vandalism in the Marina and facilitates ease of access for maintenance. The valve also has the benefit of protecting the treatment performance and durability of the proprietary treatment devices. Refer to Figure 2 below for an extract from the preliminary services plan for the indicative stormwater concept and Appendix B for further information.

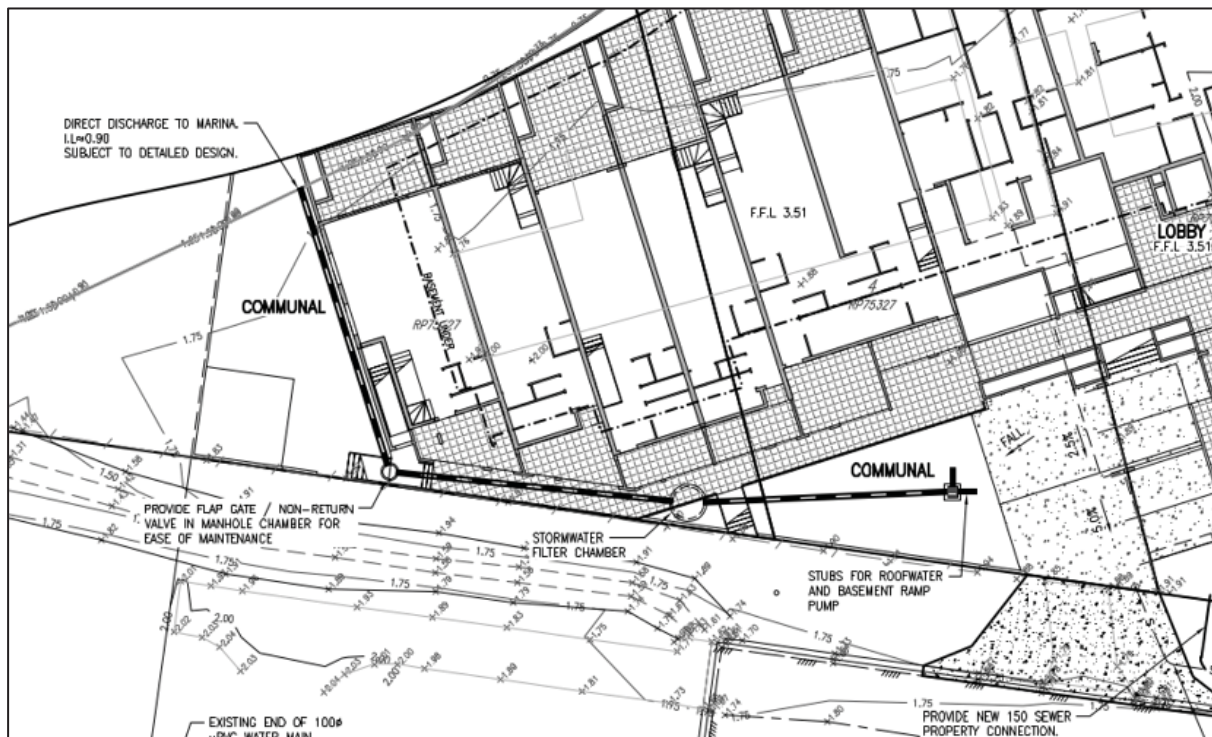


Figure 2 – Stormwater discharge concept.

2.2 Flooding

The property is impacted by Creek and Storm Tide flooding. Refer to separate flood risk assessment by Stormwater Consulting for information regarding flooding characteristics and management procedures. The proposed basement threshold is RL3.21mAHD, which is the 2100 year planning horizon stormtide level. The proposed minimum habitable floor level is RL3.51mAHD (3.21m+300mm freeboard).

3 STORMWATER QUANTITY MANAGEMENT

The stormwater quantity analysis of the existing and developed site conditions has been undertaken with reference to the requirements and procedure outlined by:

- Queensland Urban Drainage Manual (QUDM)
- Australian Rainfall and Runoff Volumes 1 & 2 (Aust R&R)

The following section of the report discusses the proposed development's impact on peak stormwater runoff and total runoff volume from the site and compares the existing site condition to ensure a no worsening effect to downstream land.

3.1 Hydrologic Modelling

The hydraulic and hydrologic modelling software package XPSTORM was used to model the pre-developed and post-developed flow conditions for the site. XPSTORM provides a simulation of the natural runoff processes and the hydraulic performance of stormwater infrastructure. A 1D hydrologic model was developed incorporating the TUFLOW engine. The TUFLOW engine accurately represents site specific topography, defining flow paths, discharge, storage, and variation in flow direction in addition to modelling flood hazard.

A number of storm durations ranging from 10 minutes to 120 minutes were simulated for return periods ranging from the 63% AEP event up to the 1% AEP event for the pre-developed and post-developed model.

Rainfall data was obtained from the ARR 2016 data hub. The ensemble of storms for each duration was simulated for the pre-developed model and the median storm for each duration & ARI was determined utilising the ensemble statistics utility. The resultant storms were utilised as the design storms for each EY/AEP for both the pre and post developed models. The Laurenson method was utilised to calculate runoff hydrographs with the following losses:

- Pervious areas – initial and continuing losses of 15mm and 1.6mm respectively.
- Impervious areas – initial and continuing losses of 2mm and 0mm respectively

3.2 Catchment Summary

Pre-Developed Site

The existing site consists of a commercial warehouse, residential dwelling and boat sheds. Stormwater runoff falls north to the marina at an average grade of approximately 1%.

The existing site area is approximately 0.365Ha. The total impervious area was calculated to be approximately 0.070Ha which equates to 19% fraction impervious ($f_i=0.19$).

Post-Developed Site

The development involves the construction of a multi-residential apartment building (29 units) including associated basement carpark and landscape areas. Runoff from the development is proposed to discharge directly to the Marina.

The catchment area remains unchanged at approximately 0.365Ha. The total impervious area was calculated to be approximately 0.278Ha which equates to 76% fraction impervious ($f_i=0.76$).

3.3 XP Results for Pre-Developed and Post-Developed Sites

The median peak flow rates from the site for were determined in accordance with the above methodology. These flows are outlined in Tables 1-3 below.

Table 1 - Pre-Developed Flow Rates

EY/AEP	Critical Duration (min)	Median Storm Pattern	Peak Flow Rate (L/s)
63%	60	1	39
0.5EY	60	5	54
0.2EY	60	10	80
10%	30	4	101
5%	30	4	119
2%	25	4	144
1%	25	4	162

Table 2 - Post-Developed Flow Rates

EY/AEP	Critical Duration (min)	Median Storm Pattern	Peak Flow Rate (L/s)
63%	10	7	87
0.5EY	10	7	111
0.2EY	10	7	141
10%	15	10	161
5%	15	10	189
2%	15	2	220
1%	15	2	244

Table 3 - Difference in Peak Flow Rates

EY/AEP	Peak Flow Rate (L/s)		
	Pre-Developed	Post-Developed	Difference
63%	39	93	48
0.5EY	54	119	57
0.2EY	80	151	61
10%	101	168	60
5%	119	171	70
2%	144	205	76
1%	162	256	82

As shown in Table 3, the peak flow rate of stormwater runoff has increased as a result of the increase in impervious area for the post-developed case. Detention is not considered to be required to ensure no worsening of peak flows off site as stormwater runoff is proposed to discharge directly to the Marina.

4 STORMWATER QUALITY MANAGEMENT

4.1 Operational Phase

The proposed development must address the State Planning Policy (July 2017) as the development site area exceeds 2500m². The development shall ensure that environmental values of receiving waters downstream of the development are maintained or enhanced during the construction and operation of the development in accordance with State Legislation and Local Government requirements. The stormwater quality management proposed for this portion of the development are required to achieve

the following pollutant load reduction objectives in accordance with SPP (July 2017) requirements for south-east Queensland:

- ≥ 80 % reduction in total suspended solids load (TSS)
- ≥ 60 % reduction in total phosphorus load (TP)
- ≥ 45 % reduction in total nitrogen load (TN)
- ≥ 90 % reduction in gross pollutant load

Pollutants typically generated during the operational phase of the development include:

- Litter/gross pollutants;
- Sediment;
- Nutrients (N & P);
- Hydrocarbons (oils and grease); and
- Heavy metals.

In order to meet these pollutant reduction targets, stormwater treatment measures are required. These treatment measures are detailed in the attached stormwater management drawings in Appendix B and are summarised as follows:

- A minimum of 4 x Ocean Protect EnviroPod Series filter baskets – gross pollutant filter baskets shall be installed in field inlets to act as a primary treatment device for the removal of TSS, nutrients and hydrocarbons.
- The building roofwater shall drain towards Auster Street and be collected and treated through the proprietary device such as Ocean Protect StormFilters or Jellyfish (or equivalent) along with the ground pavement areas prior to final discharge to the Marina. Discharge to Auster Street is not suitable due to the constrained depth available which impacts treatment options.

Stormwater quality modelling has been carried out using MUSIC to determine the required infrastructure needed to meet the Water Quality Objectives (WQOs) above based on an Ocean Protect product.

4.1.1 MUSIC Model

MUSIC modelling for this development was carried out using MUSIC version 6.3. The developed site catchment details from the MUSIC model are outlined in Table 4 below.

Table 4 - Developed Site MUSIC Catchment Details

Catchment	Area (m ²)	% Effective Impervious
Roof Areas to SW360 Filter Cartridges	1975m ²	100
Hardstand areas to SW360 Filter Cartridges	805m ²	100
Landscape to SW360 Filter Cartridges	583m ²	0
Bypass catchment	281m ²	0

The layout for the music model, including the treatment train effectiveness is detailed in Figure 3.

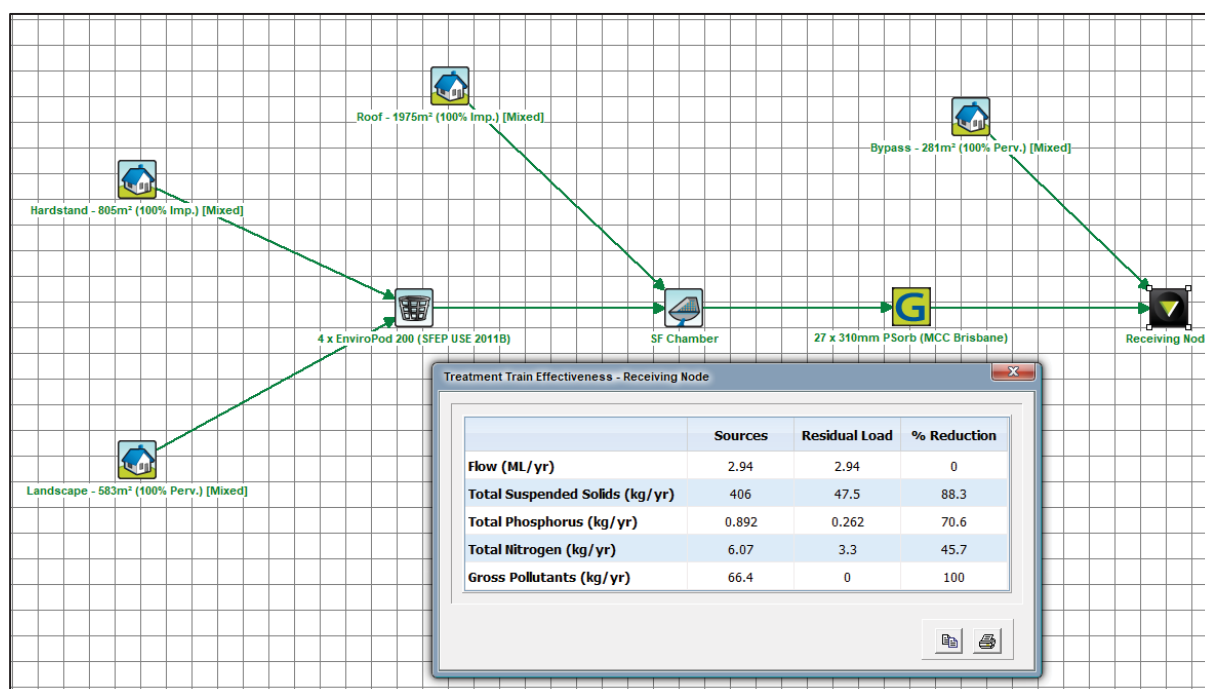


Figure 3 - MUSIC Layout and Treatment Effectiveness for Developed Site

The developed site treatment train effectiveness is also outlined in Table 5 below.

Table 5 - Treatment train effectiveness.

Modelled Parameters	Source nodes	Residual load	% Reduction
Flow (ML/yr)	2.94	2.94	0
Total Suspended Solids (kg/yr)	406	47.5	88.3
Total Phosphorus (kg/yr)	0.892	0.262	70.6
Total Nitrogen (kg/yr)	6.07	3.3	45.7
Gross Pollutants (kg/yr)	66.4	0	100

Based on the MUSIC modelling results in Table 5 above, the proposed treatment train achieves the required pollutant load reduction objectives for all pollutants. The proposed stormwater treatment measures are therefore considered adequate for the development. It is noted that RCC's Stormwater Infrastructure Plan for Weinam Creek was based on utilizing proprietary devices which is consistent with the treatment proposal for the site. The size and configuration of stormwater quality treatment devices shall be confirmed at detailed design to ensure the WQOs are met depending on the final treatment method adopted.

4.2 Construction Phase

Management of stormwater runoff during construction and the implementation of an erosion & sediment control program is necessary to avoid impacts to receiving waters from pollutants typically generated during the construction phase. Typical pollutants are described in Table 4 below.

Table 6 – Pollutants Typically Generated During the Construction Phase

Pollutant	Sources
Litter (Gross Pollutants)	Paper, construction packaging, food packaging, cement bags.
Sediment	Unprotected exposed soils and stockpiles during earthworks and building.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment.
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash waters.
pH altering substances	Acid sulphate soils, cement slurry and wash waters.

In addition to the degradation of receiving waters, impacts of inadequate erosion and sediment control downstream from the site include:

- traffic safety problems;
- blocked drains;
- local flooding problems;
- aesthetic pollution of drainage paths; and
- damage to local ecosystems.

4.2.1 Design Objectives

Management of stormwater runoff during construction should be undertaken in accordance with Appendix 2 of the SPP (July 2017). The SPP outlines the design objectives for construction phase stormwater management. These are presented in Table 7, Table 8 and Table 9.

Table 7 – SPP Appendix 2: Part 1 Construction Phase – Stormwater Management Design Objectives

Issue	Desired Outcomes
Drainage Control	1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works (part 2). 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3).
Erosion Control	1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall.

Issue	Desired Outcomes
	3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation.
Sediment Control	1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 metres must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).
Litter, Hydrocarbons and other contaminants	1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities.
Waterway Stability and flood flow management	1. Where measures are required to meet post-construction waterway stability objectives, these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP).

Table 8 – SPP Appendix 2: Part 2 Construction Phase – Stormwater Management Design Objectives for Temporary Drainage Works

Temporary Drainage Works	Anticipated Operation Design Life and Minimum Design Storm Event		
	<12 Months	12-24 Months	>24 Months
Drainage Structure	1 in 2 year ARI/39% AEP	1 in 5 year ARI/18% AEP	1 in 10 year ARI/10% AEP
Where located immediately up-slope of an occupied property that would be adversely affected by the failure or overtopping of the structure	1 in 10 year ARI/10% AEP		
Culvert Crossing	1 in 1 year ARI/63% AEP		

Table 9 – SPP Appendix 2: Part 3 Construction Phase – Stormwater Management Design Objectives for Emergency Spillways on Temporary Sediment Basins

Drainage Structure	Anticipated Operation Design Life and Minimum Design Storm Event		
	<3 Months	3-12 Months	>12 Months
Emergency spillways on temporary sediment basins	1 in 10 year ARI/10% AEP	1 in 20 year ARI/5% AEP	1 in 50 year ARI/2% AEP

Best practice erosion and sediment controls must be installed to minimise the discharge of sediment laden runoff during construction and to achieve the objectives outlined in Tables 15-17. This is discussed in the following section.

4.2.2 Erosion and Sediment Control

The proposed development received an erosion hazard score of 15 on the International Erosion Control Association (IECA) erosion hazard assessment form. An erosion and sediment control plan shall be prepared at the detailed design phase in accordance with IECA 2008 best practice documentation to ensure the impacts of erosion, turbidity and sedimentation from construction activities will be managed appropriately. Erosion and sediment control plans are based on three sets of control measures:

- drainage control;
- erosion control; and
- Sediment control.

These control measures must be continually maintained in an effective operational condition and amended as required to minimise environmental harm. Sediment disposal from site is to occur to the satisfaction of RCC.

The expected erosion and sediment control methodology is outlined below.

Pre-strip (prior to bulk earthworks) phase

- Install sediment fence along the line of the existing revetment wall
- Install silt curtains as required for an demolition works in close proximity to the waterway
- Install construction entry/exit
- Install perimeter sediment fence.

Bulk earthworks phase

- Utilize basement excavation for sediment control
- Incorporate a dewatering management plan. No water is to be pumped into the stormwater system or creek without treatment to achieve required pollutant concentrations. The erosion and sediment control plan prepared as part of the detailed design shall include required dewatering pollutant concentration requirements.
- Maintain erosion and sediment control devices as required to suit construction sequencing.

Defects in erosion and sediment control devices, such as sediment fences, are to be inspected and documented. Upon Inspection, the contractor is to determine whether the device should be replaced or repaired. Documentation is to include how the damage was caused and what measures can be

implemented to reduce the possibility of repeat occurrences. Any damage to either permanent or temporary water quality control structures or devices is to be immediately rectified at the contractor's expense.

The effectiveness of the erosion and sediment control devices can be monitored by visual audits. All ESC measures are to be inspected:

- at least daily (when work is occurring on site) or weekly (when work is not occurring on site);
- within 24 hours of expected rain; and
- within 18 hours of a rainfall event (i.e. an event of sufficient intensity and duration to mobilise sediment on site).

Drainage paths are to be inspected to ensure the sediment fences are not being bypassed as a result of soil erosion.

Sediment laden runoff shall be prevented from entering neighbouring properties. This shall be achieved by landscaping disturbed areas immediately and prior to a rainfall event.

4.3 Maintenance and Monitoring Requirements

Periodic maintenance and monitoring of stormwater devices proposed in this report is crucial to ensure effective operation and design life.

Inspect field inlet grates, pits and underground pipes for blockage or damage at least 6 monthly or after significant rainfall event. The filter baskets shall be inspected and maintained preferably by the manufacturer to avoid damage to units and to ensure adequate cleaning and record keeping. For the first 12 months routine inspections of filter baskets shall be carried out monthly with routine clean out at alternate months. Results of the initial 12 months maintenance program shall be used to determine future maintenance intervals. Refer manufactures maintenance and monitoring methodology for specific details.

Maintenance of ESC measures must occur in accordance with Table 8.

Table 10 - ESC maintenance requirements.

ESC Measure	Maintenance Trigger	Timeframe for Completion of Maintenance
Sediment basins	When settled sediment exceeds the volume of the sediment storage zone	Within 7 days of the inspection.
Other ESC measures	The capacity of ESC measures falls below 75%.	By the end of the day.

Sediment accumulation on ESC devices is to be removed and disposed of to the satisfaction of RCC.

5 CONCLUSION

This SWMP outlines how stormwater runoff from the site will be managed in order to not adversely impact the receiving environment.

Stormwater runoff from the site shall be directed to the Marina either directly or via the existing swale in Auster Street. For this reason, stormwater detention is not considered to be required.

Stormwater quality will be managed on site by the installation of Ocean Protect *EnviroPod* filter baskets (or equivalent) within field inlet pits and proprietary treatment devices such as Ocean Protect StormFilters or Jellyfish (or equivalent) shall be provided for final treatment prior to site discharge. Preliminary MUSIC modelling has been carried out which confirms the WQO's can be achieved utilising this treatment train. The size and configuration of stormwater quality treatment devices shall be confirmed at detailed design to ensure the WQOs are met. It is noted that Redland City Council's Stormwater Infrastructure Plan for Weinam Creek was based on utilizing proprietary devices which is consistent with the treatment proposal for the site.

By implementing the proposed stormwater management system, and providing adequate maintenance, the downstream environment and neighbouring properties will not experience any adverse deterioration of water quality as a result of the proposed development.

6 APPENDICES

6.1 Appendix A – Erosion Hazard Assessment (IECA)

Erosion Hazard Assessment Form

Condition	Points	Score	Trigger value
AVERAGE SLOPE OF DISTURBANCE AREA [1] - not more than 3% [3% . 33H:1V] - more than 3% but not more than 5% [5% = 20H:1V] - more than 5% but not more than 10% [10% = 10H:1V] - more than 10% but not more than 15% [15% . 6.7H:1V] - more than 15%	0 1 2 4 6	0	4
SOIL CLASSIFICATION GROUP (AS1726) [2] - GW, GP, GM, GC - SW, SP, OL, OH - SM, SC, MH, CH - ML, CL, or if <i>imported fill</i> is used, or if soils are untested	0 1 2 3	3	
EMERSON (DISPERSION) CLASS NUMBER [3] - Class 4, 6, 7, or 8 - Class 5 - Class 3, (default value if soils are untested) - Class 1 or 2	0 2 4 6	4	6
DURATION OF SOIL DISTURBANCE [4] - not more than 1 month - more than 1 month but not more than 4 months - more than 4 months but not more than 6 months - more than 6 months	0 2 4 6	4	6
AREA OF DISTURBANCE [5] - not more than 1000 m² - more than 1000 m² but not more than 5000 m² - more than 5000 m² but not more than 1 ha - more than 1 ha but not more than 4 ha - more than 4 ha	0 1 2 4 6	1	4
WATERWAY DISTURBANCE [6] - No disturbance to a watercourse, open drain or channel - Involves disturbance to a constructed open drain or channel - Involves disturbance to a natural watercourse	0 1 2	0	2
REHABILITATION METHOD [7] Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method). - not more than 1% - more than 1% but not more than 5% - more than 5% but not more than 10% - more than 10%	0 1 2 4	0	
RECEIVING WATERS [8] - Saline waters only - Freshwater body (e.g. creek or freshwater lake or river)	0 2	0	
SUBSOIL EXPOSURE [9] - No subsoil exposure except of service trenches - Subsoils are likely to be exposed	0 2	2	
EXTERNAL CATCHMENTS [10] - No external catchment - External catchment diverted around the soil disturbance - External catchment not diverted around the soil disturbance	0 1 2	0	
ROAD CONSTRUCTION [11] - No road construction - Involves road construction works	0 2	0	
pH OF SOILS TO BE REVEGETATED [12] - more than pH 5.5 but less than pH 8 - other pH values, or if soils are untested	0 1	1	
Total Score ^[13]		15	

Explanatory notes

Requirements: Specific issues or actions required by the proponent.

Warnings: Issues that should be considered by the proponent.

Comments: General information relating to the topic.

[1] **REQUIREMENTS:**

For sites with an average slope of proposed land disturbance greater than 10%, a preliminary ESCP must be submitted to the regulatory authority for approval during planning negotiations.

Proponents must demonstrate that adequate erosion and sediment control measures can be implemented on-site to effectively protect downstream environmental values.

If site or financial constraints suggest that it is not reasonable or practicable for the prescribed water quality objectives to be achieved for the proposal, then the proponent must demonstrate that alternative designs or construction techniques (e.g. pole homes, suspended slab) cannot reasonably be implemented on the site.

WARNINGS:

Steep sites usually require more stringent drainage and erosion controls than flatter grade sites.

COMMENTS:

The steeper the land, the greater the need for adequate drainage controls to prevent soil and mulch from being washed from the site.

[2] **REQUIREMENTS:**

If the actual soil K-factor is known from soil testing, then the Score shall be determined from Table 1.

If a preliminary ESCP is required during planning negotiations, then it must be demonstrated that adequate space is available for the construction and operation of any major sediment traps, including the provision for any sediment basins and their associated embankments and spillways. It must also be demonstrated that all reasonable and practicable measures can be taken to divert the maximum quantity of sediment-laden runoff (up to the specified design storm) to these sediment traps throughout the construction phase and until the contributing catchment is adequately stabilised against erosion.

WARNINGS:

The higher the point score, the greater the need to protect the soil from raindrop impact and thus the greater the need for effective erosion control measures. A point score of 2 or greater will require a greater emphasis to be placed on revegetation techniques that do not expose the soil to direct rainfall contact during vegetation establishment, e.g. turfing and *Hydromulching*.

COMMENTS:

Table 2 provides an *indication* of soil conditions likely to be associated with a particular Soil group based on a statistical analysis of soil testing across NSW. This table provides only an initial estimate of the likely soil conditions.

The left-hand-side of the table provides an indication of the type of sediment basin that will be required (Type C, F or D). The right-hand-side of the table provides an indication of the likely erodibility of the soil based on the Revised Universal Soil Loss Equation (RUSLE) K-factor.

Table 3 provides some general comments on the erosion potential of the various soil groups.

Table 1 – Score if soil K-factor is known

	RUSLE soil erodibility K-factor			
	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
Score	0	1	2	3

Table 2 – Statistical analysis of NSW soil data ^[1]

Unified Soil Class System	Likely sediment basin classification (%)			Probable soil erodibility K-factor (%) ^[2]			
	Dry	Wet		Low	Moderate	High	Very High
	Type C	Type F	Type D	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
GM	30	58	12	12	51	26	12
GC	42	33	25	13	71	17	0
SW	40	48	12	49	39	12	0
SP	53	32	15	76	18	5	1
SM	21	67	12	26	48	25	1
SC	26	50	24	16	64	18	2
ML	5	63	32	4	35	45	16
CL	9	51	39	12	56	19	13
OL	2	80	18	34	61	5	1
MH	12	41	48	15	19	41	25
CH	5	44	51	39	43	11	7

Notes: [1] Analysis of soil data presented in Landcom (2004).

[2] Soil erodibility based on Revised Universal Soil Loss Equation (RUSLE) K-factor.

Unified Soil Classification System (USCS)

- GW Well graded gravels, gravel-sand mixtures, little or no fines
- GP Poorly graded gravels, gravel-sand mixture, little or no fines
- GM Silty gravels, poorly graded gravel-sand-silt mixtures
- GC Clayey gravels, poorly graded gravel-sand-clay mixtures
- SW Well graded sands, gravelly sands, little or no fines
- SP Poorly graded sands, gravelly sands, little or no fines
- SM Silty sands, poorly graded sand-silt mixtures
- SC Clayey sands, poorly graded sand-clay mixtures
- ML Inorganic silts & very fine sands, rock flour, silty or clayey fine sands with slight plasticity
- CL Inorganic clays, low-medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
- OL Organic silts and organic silt-clays of low plasticity
- MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
- CH Inorganic clays of high plasticity, fat clays
- OH Organic clays of medium to high plasticity

Table 3 – Typical properties of various soil groups^[1]

Soil Groups	Typical properties ^[2]
GW, GP	Low erodibility potential.
GM, GC	- Low to medium erodibility potential. - May create turbid runoff if disturbed as a result of the release of silt and clay particles.
SW, SP	Low to medium erodibility potential.
SM, SC	- Medium erodibility potential. - May create turbid runoff if disturbed as a result of the release of silt and clay particles.
MH, CH	- Highly variable (low to high) erodibility potential. - Will generally create turbid runoff if disturbed.
ML, CL	- High erodibility potential. - Tendency to be dispersive. - May create some turbidity in runoff if disturbed.

Note: [1] After Soil Services & NSW DLWC (1998).

[2] Any soil can represent a high erosion risk if the binding clays or silts are unstable.

Table 4 provides **general** guidelines on the suitability of various soil groups to various engineering applications.

Table 4 – Engineering suitability based on Unified Soil Classification^[1]

Unified Soil Class	USC Group	Embankments		Fill	Slope stability	Untreated roads
		Water retaining	Non water retaining			
Well graded gravels	GW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded gravel	GP	Unsuitable	Average	Excellent	Average	Unsuitable
Silty gravels	GM	Unsuitable	Average	Good	Average	Average
Clayey gravels	GC	Suitable	Average	Good	Average	Excellent
Well graded sands	SW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded sands	SP	Unsuitable	Average	Good	Average	Unsuitable
Silty sands	SM	Suitable ^[2]	Average	Average	Average	Poor
Clayey sands	SC	Suitable	Average	Average	Average	Good
Inorganic silts	ML	Unsuitable	Poor	Average	Poor	Unsuitable
Inorganic clays	CL	Suitable ^[2]	Good	Average	Good	Poor
Organic silts	OL	Unsuitable	Unsuitable	Poor	Unsuitable	Unsuitable
Inorganic silts	MH	Unsuitable	Poor	Poor	Poor	Unsuitable
Inorganic clays	CH	Suitable ^[2]	Average	Unsuitable	Average	Unsuitable
Organic clays	OH	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable
Highly organic soils	Pt	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable

Notes: [1] Modified from Hazelton & Murphy (1992)

[2] Suitable only after modifications to soil such as compaction and/or erosion protection

- [3] If the soils have not been tested for Emerson Class, then adopt a score of 4.

REQUIREMENTS:

Works proposed on sites containing Emerson Class 1 or 2 soils have a very high pollution potential and must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

WARNINGS:

Class 3 and 5 soils disturbed by cut and fill operations or construction traffic are highly likely to discolour stormwater (i.e. cause turbid runoff). Chemical stabilisation will likely be required if these soils are placed immediately adjacent to a retaining wall. Any disturbed Class 1, 2, 3 and 5 soils that are to be revegetated must be covered with a non-dispersive topsoil as soon as possible (unless otherwise agreed by the regulatory authority).

Class 1 and 2 soils are highly likely to discolour (pollute) stormwater if exposed to rainfall or flowing water. Treatment of these soils with gypsum (or other suitable substance) will most likely be required. These soils should not be placed directly behind a retaining wall unless it has been adequately treated (stabilised) or covered with a non-dispersible soil.

- [4] The duration of disturbance refers to the total duration of soil exposure to rainfall up until a time when there is at least 70% coverage of all areas of soil.

REQUIREMENTS:

All land developments with an expected soil disturbance period greater than 6 months must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

COMMENTS:

Construction periods greater than 3 months will generally experience at least some significant storm events, independent of the time of year that the construction (soil disturbance) occurs.

- [5] **REQUIREMENTS:**

Development proposals with an expected soil disturbance in excess of 1ha must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

The area of disturbance refers to the total area of soil exposed to rainfall or dust-producing winds either as a result of:

- (a) the removal of ground cover vegetation, mulch or sealed surfaces;
- (b) past land management practices;
- (c) natural conditions.

WARNINGS:

A *Sediment Basin* will usually be required if the disturbed area exceeds 0.25ha (2500m²) within any sub-catchment (i.e. land flowing to one outlet point).

COMMENTS:

For soil disturbances greater than 0.25ha, the revegetation phase should be staged to minimise the duration for which soils are exposed to wind, rain and concentrated runoff.

[6] REQUIREMENTS:

All developments that involve earthworks or construction within a natural watercourse (whether that watercourse is in a natural or modified condition) must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

Permits and/or licences may be required from the State Government, including possible submission of the ESCP to the relevant Government department.

[7] REQUIREMENTS:

No areas of soil disturbance shall be left exposed to rainfall or dust-producing winds at the end of a development without an adequate degree of protection and/or an appropriate action plan for the establishment of at least 70% cover.

COMMENTS:

Grass seeding without the application of a light mulch cover is considered the least favourable revegetation technique. A light mulch cover is required to protect the soil from raindrop impact, excessive temperature fluctuations, and the loss of essential soil moisture.

[8] COMMENTS:

All receiving waters can be adversely affected by unnatural quantities of sediment-laden runoff. Freshwater ecosystems are generally more susceptible to ecological harm resulting from the inflow of fine or dispersible clays than saline water bodies. The further inland a land disturbance is, the greater the potential for the released sediment to cause environmental harm as this sediment travels towards the coast.

For the purpose of this clause it is assumed that all sediment-laden runoff will eventually flow into saline waters. Thus, sediment-laden discharges that flow first into freshwater are likely to adversely affect both fresh and saline water bodies and are therefore considered potentially more damaging to the environment.

This clause does **not** imply that sediment-laden runoff will not cause harm to saline waters.

[9] COMMENTS:

This clause refers to subsoils exposed during the construction phase either as a result of past land practices or proposed construction activities. The exposure of subsoils resulting from the excavation of minor service trenches should not be considered.

[10] WARNINGS:

The greater the extent of external catchment, the greater the need to divert up-slope stormwater runoff around any soil disturbance.

COMMENTS:

The ability to separate "clean" (i.e. external catchment) stormwater runoff from "dirty" site runoff can have a significant effect on the size, efficiency and cost of the temporary drainage, erosion, and sediment control measures.

[11] REQUIREMENTS:

Permission must be obtained from the owner of a road reserve before placing any erosion and sediment control measures within the road reserve.

WARNINGS:

Few sediment control techniques work efficiently when placed on a road and/or around roadside stormwater inlets. Great care must be taken if sediment control measures are located on a public roadway, specifically:

- safety issues relating to road users;
- the risk of causing flooding on the road or within private property.

The construction of roads (whether temporary or permanent) will usually modify the flow path of stormwater runoff. This can affect how “dirty” site runoff is directed to the sediment control measures.

COMMENTS:

“On-road” sediment control devices are at best viewed as secondary or supplementary sediment control measures. Only in special cases and/or on very small projects (e.g. kerb and channel replacement) might these controls be considered as the “primary” sediment control measure.

[12] WARNINGS:

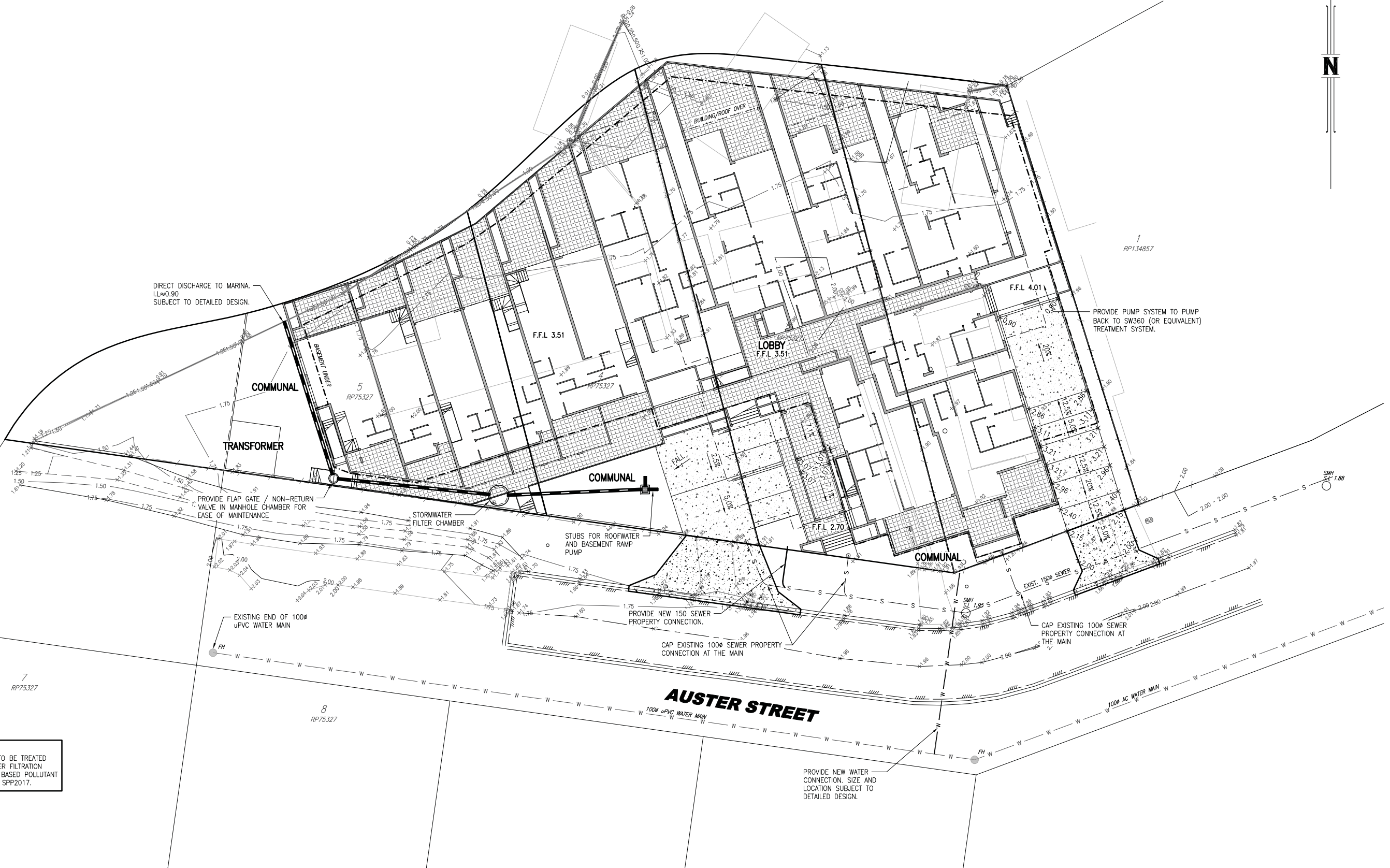
Soils with a pH less than 5.5 or greater than 8 will usually require treatment in order to achieve satisfactory revegetation. Soils with a pH of less than 5 (whether naturally acidic or in acid sulfate soil areas) may also limit the choice of chemical flocculants (e.g. Alum) for use in the flocculation of *Sediment Basins*.

[13] REQUIREMENTS:

A preliminary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.

6.2 Appendix B – Engineering Drawing

WEINAM CREEK



NOTE:
ROOF AND GROUND STORMWATER TO BE TREATED THROUGH PROPRIETARY STORMWATER FILTRATION SYSTEM TO ACHIEVE TARGET LOAD BASED POLLUTANT REDUCTIONS IN ACCORDANCE WITH SPP2017.

PRELIMINARY SERVICES PLAN

SCALE 1:200
(A1 SIZE)

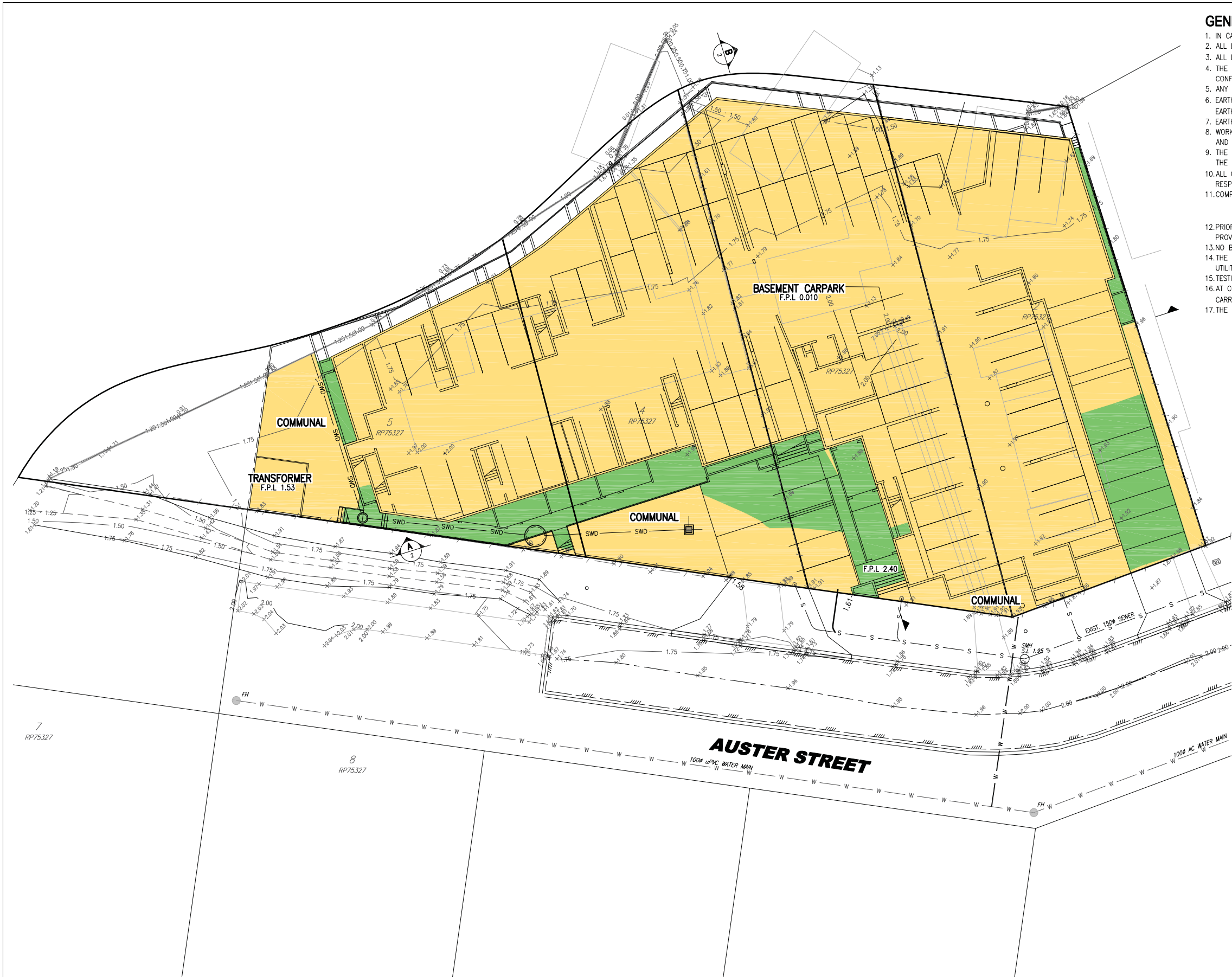
**PRELIMINARY
NOT FOR CONSTRUCTION**

No.	DATE	REVISIONS
B	18.01.2019	CLIENT NAME AMENDED
A	11.01.2019	UPDATED ARCHITECTURAL BASE & STORMWATER

SHEET	PRELIMINARY SERVICES PLAN
PROJECT	PROPOSED RESIDENTIAL DEVELOPMENT
LOCATION	LOTS 2-5 ON RP75327 10 AUSTER STREET, REDLAND BAY
CLIENT	12 AUSTER STREET PTY LTD

APPROVED	
DESIGNED	J.M.H
DRAWN	J.S
DATE DRAWN	MAY 2018
FILE NAME	SERVICES.dwg

SHEET NUMBER	1 OF 1
REVISION	B
PROJECT NUMBER	B18/082P



GENERAL NOTES

1. IN CASE OF DOUBT – ASK!
2. ALL LEVELS TO AHD, DIMENSIONS IN METERS U.N.O
3. ALL LIAISON WITH LOCAL, STATE & STATUTORY AUTHORITIES IS THE CONTRACTOR’S RESPONSIBILITY.
4. THE LOCATION OF EXISTING SERVICES IS FOR CONTRACTOR’S INFORMATION ONLY, THE LOCATION OF SERVICES WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
5. ANY DAMAGE CAUSED TO THE EXISTING SERVICE WILL BE MADE GOOD AT THE CONTRACTORS EXPENSE.
6. EARTHWORKS PROCEDURES ARE TO BE CARRIED OUT IN ACCORDANCE WITH AS 3798 – 2007 “GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS”.
7. EARTHWORKS OPERATIONS ARE TO BE CARRIED OUT IN GENERAL ACCORDANCE WITH THE GEOTECHNICAL REPORT.
8. WORKS NOT SPECIFICALLY REFERRED TO, ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE GENERAL DRAWINGS AND SPECIFICATIONS OF THE LOCAL AUTHORITY.
9. THE CONTRACTOR IS TO ALLOW FOR ALL FEES AND HAULAGE COSTS ASSOCIATED WITH DISPOSAL OF MATERIAL FROM THE SITE.
10. ALL COSTS ASSOCIATED WITH NOISE AND DUST SUPPRESSION FOR SITE WORKS ARE DEEMED THE CONTRACTOR’S RESPONSIBILITY.
11. COMPACTION STANDARDS
 - “MODIFIED” TO AS 1289 TEST 5.2.1
 - “STANDARD” TO AS 1289 TEST 5.1.1
12. PRIOR TO COMMENCEMENT OF WORKS THE CONTRACTOR WILL PROVIDE SCOUR AND EROSION PROTECTION INCLUDING PROVISION OF SILT TRAPS AND FENCES TO MINIMISE DEPOSITION OF MATERIAL DOWNSTREAM OF THE PROPERTY.
13. NO BLASTING WILL BE PERMITTED.
14. THE LOCATION OF THE SITE SHEDS, SITE OFFICE AND AMENITIES BUILDING WILL BE LOCATED TO SUIT TEMPORARY UTILITY SERVICES OR AS AGREED WITH THE MANAGER.
15. TESTING FREQUENCY AS 3798 – 2007 SECTION 8.0 OR AS APPROVED BY THE GEOTECHNICAL ENGINEER.
16. AT COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL ARRANGE FOR AN INDEPENDENT LICENSED SURVEYOR TO CARRY OUT A “WORKS AS CONSTRUCTED” SURVEY AND SUBMIT THE DETAIL PLAN TO THE MANAGER.
17. THE LOCATION OF TEMPORARY STOCKPILES DURING CONSTRUCTION IS TO BE AGREED WITH THE MANAGER.

EARTHWORKS SUMMARY

AREA OF CUT – 2751m²
VOLUME OF CUT – 4297m³
AREA OF FILL – 394m²
VOLUME OF FILL – 320m³

THE EARTHWORKS VOLUMES SHOWN ARE INDICATIVE NETT FIGURES ONLY BETWEEN EXISTING SURFACE LEVEL AND FINISHED EARTHWORKS LEVEL AND DO NOT ALLOW FOR DEMOLITION WORKS, STRIPPING OF TOPSOIL, UNSUITABLE MATERIAL AND VEGETATION OR COMPACTION LOSSES.

PAVEMENT LEVELS SHOWN ARE 250mm BELOW F.S.L
BUILDING PAD LEVELS SHOWN ARE 300mm BELOW F.S.L
LANDSCAPING LEVELS SHOWN ARE 100mm BELOW F.S.L

EARTHWORKS LEVELS MAY BE ADJUSTED TO SUIT FFL’S AND CONCRETE THICKNESS BASED ON STRUCTURAL DESIGN AS APPROVED BY SUPERINTENDENT.

AREA OF FILL – AREA OF CUT –

NOTE:
TEMPORARY EXCAVATIONS ARE TO BE SUPERVISED BY A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER.

ALL RETAINING WALLS LOCATED WITHIN THE SITE TO STABILISE CUT ARE TO BE WHOLLY WITHIN THE PROPERTY BOUNDARY INCLUDING ALL ASSOCIATED FOOTINGS AND SUB-SOIL DRAINAGE.

CONTRACTOR TO USE EXCAVATION TECHNIQUE THAT WILL PREVENT SUBSIDANCE WITHIN NEIGHBOURING PROPERTIES IN ACCORDANCE WITH GEOTECHNICAL ENGINEERS REPORT AND ADVICE ON SITE.

LEGEND

	ASPHALTIC PAVEMENT		STORMWATER NUMBER
	REINFORCED CONCRETE PAVEMENT		WATER RETICULATION U.P.V.C.
	PROPOSED SEWER MANHOLE		WATER RETICULATION D.I.C.L.
	EXISTING SEWER MANHOLE		WATER RETICULATION CONDUIT
	EXISTING SEWER		GATE VALVE
	SEWER MANHOLE NUMBER		FIRE HYDRANT
	ON GRADE GULLY PIT		WATER METER
	SAG GULLY PIT		DUAL OUTLET HYDRANT
	600 x 600 FIELD INLET		SWABBING FIRE HYDRANT
	900 x 600 FIELD INLET		WATER SERVICE FITTING
	1050 DIA FIELD INLET		TELEPHONE
	STORMWATER LINE		ELECTRICITY
	STORMWATER HEADWALL		EDGE OF BITUMEN
			FENCE

EARTHWORKS PLAN

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(A1 SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION

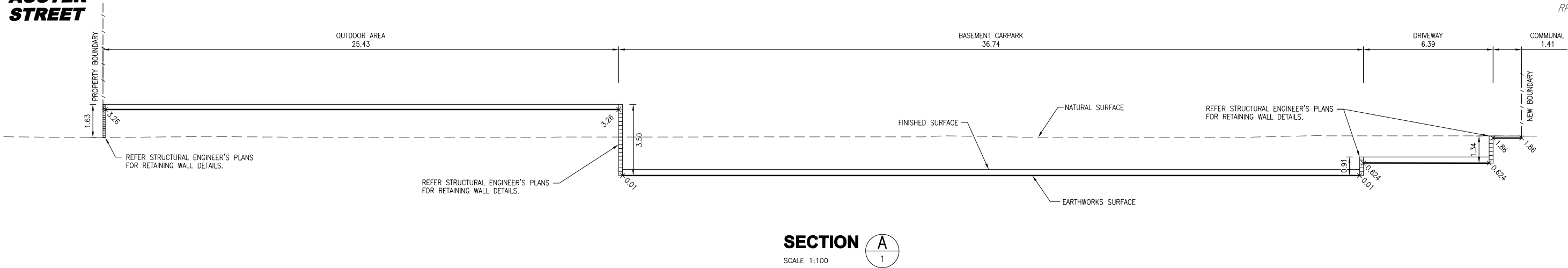
No.	DATE	REVISIONS
A	18.01.2019	CLIENT NAME AMENDED

SHEET	EARTHWORKS PLAN
PROJECT	PROPOSED RESIDENTIAL DEVELOPMENT
LOCATION	LOTS 2-5 ON RP75327 10 AUSTER STREET, REDLAND BAY
CLIENT	12 AUSTER STREET PTY LTD

APPROVED	DESIGNED J.M.H.	SHEET NUMBER
	DRAWN D.C.H.	1 OF 2
	DATE DRAWN JAN 2019	REVISION A
	FILE NAME EARTHWSK.dwg	PROJECT NUMBER B18/082 E

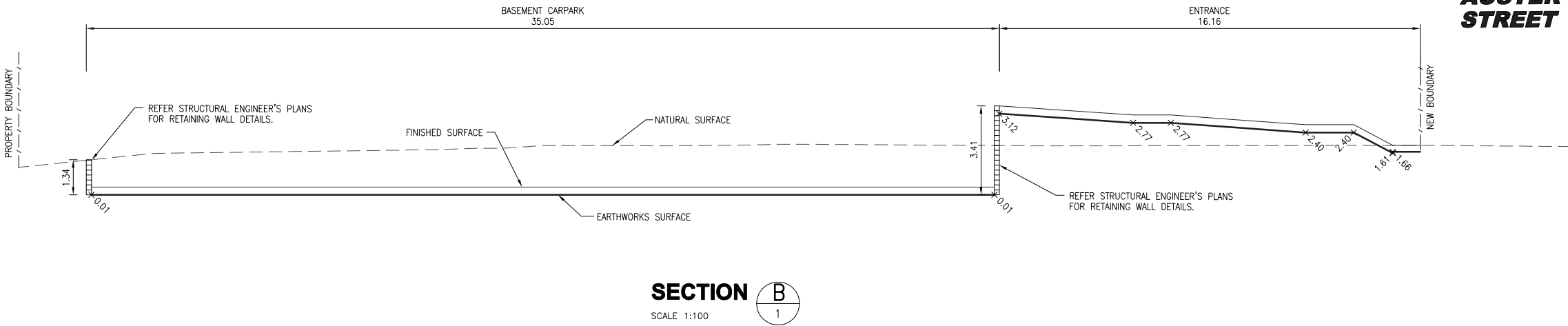
AUSTER STREET

1
RP134857



WEINAM CREEK

AUSTER STREET



NOTE:
TEMPORARY EXCAVATIONS ARE TO BE SUPERVISED
BY A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER.

ALL RETAINING WALLS LOCATED WITHIN THE SITE
TO STABILISE CUT ARE TO BE WHOLLY WITHIN THE
PROPERTY BOUNDARY INCLUDING ALL ASSOCIATED
FOOTINGS AND SUB-SOIL DRAINAGE.

CONTRACTOR TO USE EXCAVATION TECHNIQUE THAT
WILL PREVENT SUBSIDANCE WITHIN NEIGHBOURING
PROPERTIES IN ACCORDANCE WITH GEOTECHNICAL
ENGINEERS REPORT AND ADVICE ON SITE.

PRELIMINARY
NOT FOR CONSTRUCTION

WESTERA PARTNERS
STRUCTURAL+CIVIL+ENVIRONMENTAL ENGINEERS
www.westerapartners.com.au | ABN 52 097 417 975

SUNSHINE COAST
Suite 2, Norval Corporate Centre,
13 Norval Ct, Maroochydore
T 07 5571 1599 | F 07 5571 1330
E goldcoast@westerapartners.com.au

BRISBANE
Level 2 Limestone,
33 Longland St, Newstead
T 07 3852 4333 | F 07 3852 4777
E brisbane@westerapartners.com.au

GOLD COAST
Level 3
17 Welch St, Southport
T 07 5571 1599 | F 07 5571 1330
E goldcoast@westerapartners.com.au

NORTHERN NSW
11 Saltfish Way, Kingscliff
T 02 6674 8047 | F 02 6674 8049
E nsw@westerapartners.com.au

SURVEYOR
JDA CONSULTANTS PTY LTD
(07) 3252 3777

DATUM
AHD
PSM 120561
RL 1.906

No.	DATE	REVISIONS
A	18.01.2019	CLIENT NAME AMENDED

SHEET	EARTHWORKS SECTIONS
PROJECT	PROPOSED RESIDENTIAL DEVELOPMENT
LOCATION	LOTS 2-5 ON RP75327 10 AUSTER STREET, REDLAND BAY
CLIENT	12 AUSTER STREET PTY LTD

APPROVED	DESIGNED J.M.H.	SHEET NUMBER
	DRAWN D.C.H.	2 OF 2
	DATE DRAWN JAN 2019	REVISION A
	FILE NAME EARTHWSK.dwg	PROJECT NUMBER B18/082 E

S. IDE RPEQ 12231
For and on behalf of
WESTERA PARTNERS PTY LTD.

6.3 Appendix C – Site Survey & Architectural Drawings

PLANNING SUMMARY	
LOT 2-5 , RP75327	
SITE AREA:	3541 sqm
SITE COVER:	2184 sqm (62%)
GFA:	4772.7m ²
DENSITY (TO BE REVIEWED) <i>comply:</i> 77 apartments per hectare or 1 apartment per 130.3sqm <i>proposed:</i> 93.2 apartments&villas per hectar	
PROPOSED DEVELOPMENT:	
TOTAL: 6 VILLA + 27 UNITS	
- VILLA 6 X 3 BEDROOM - UNITS 1 x 2 BEDROOM 13 X 3 BEDROOM 12 X 3 BEDROOM + MEDIA 1 X 4 BEDROOM + MEDIA	
CARPARKS	
TOTAL CARS PROVIDED : 73	
RESIDENTS CARPARKS = 66 CARS (12 VILLA + 54 UNITS)	
VISITOR CARPARKS = 6 CARS	
TOTAL LANDSCAPING: 638m ² 18% EXCLUDING BALCONIES + TILED TERRACES	
LANDSCAPE	
ON PODIUM:	358 m ²
DEEP PLANTING:	280 m ²
TOTAL:	638 m ²
COMMON REC AREA: 227m ² (NGL) + 102m ² (GF) + 38m ² (ROOF TCE) = 367m ²	

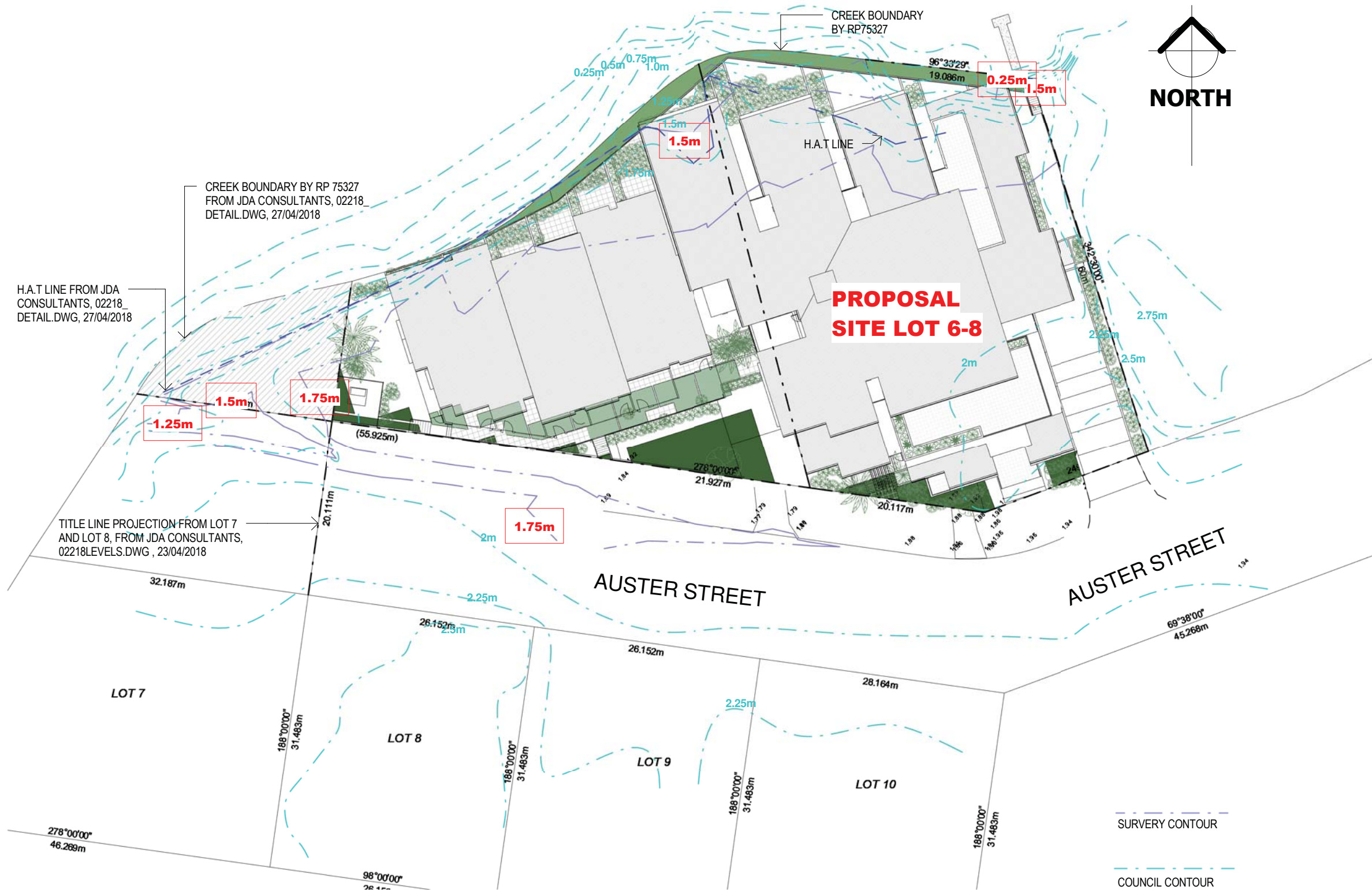
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SITE PROPOSED

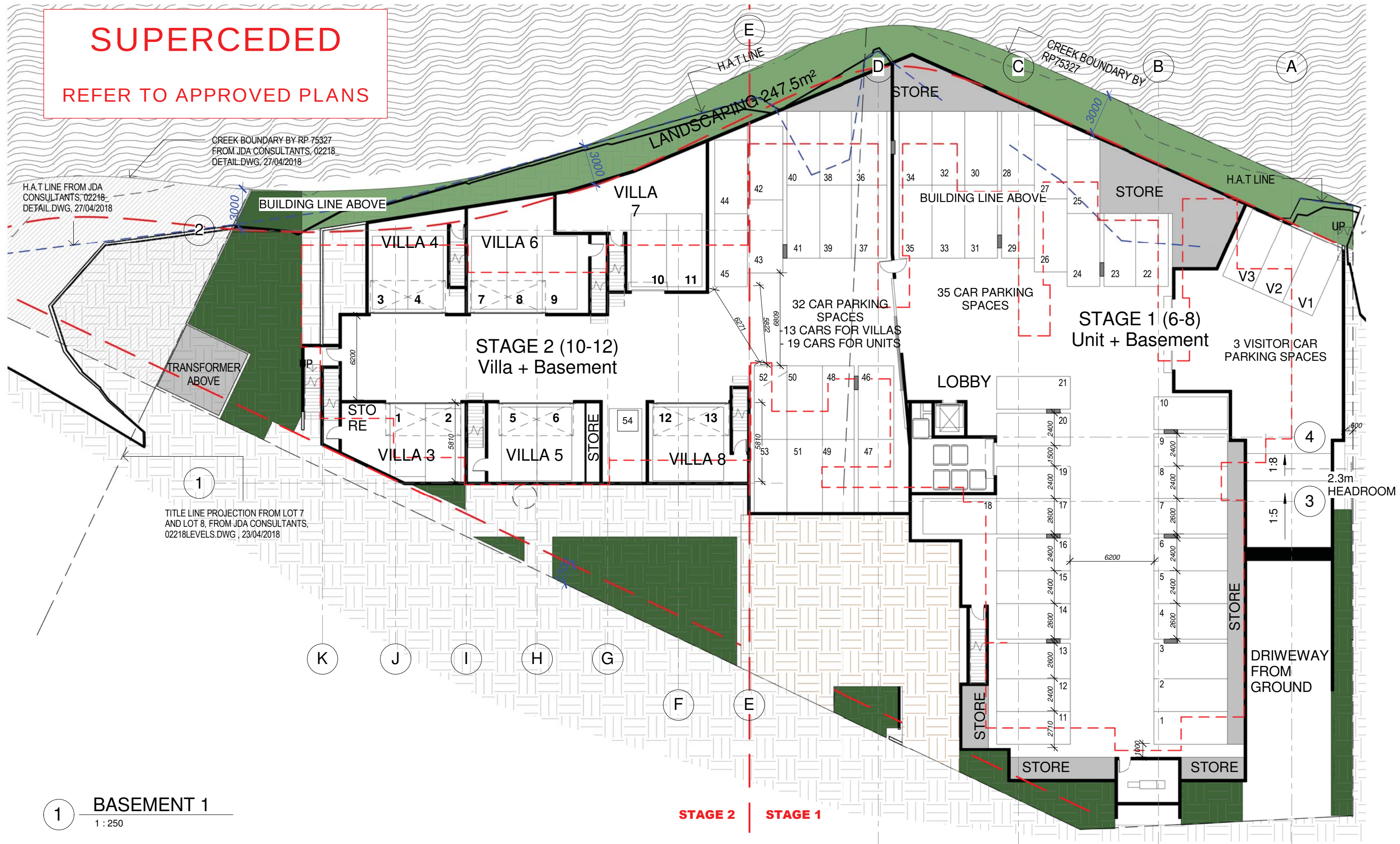
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SUPERCEDED

REFER TO APPROVED PLANS



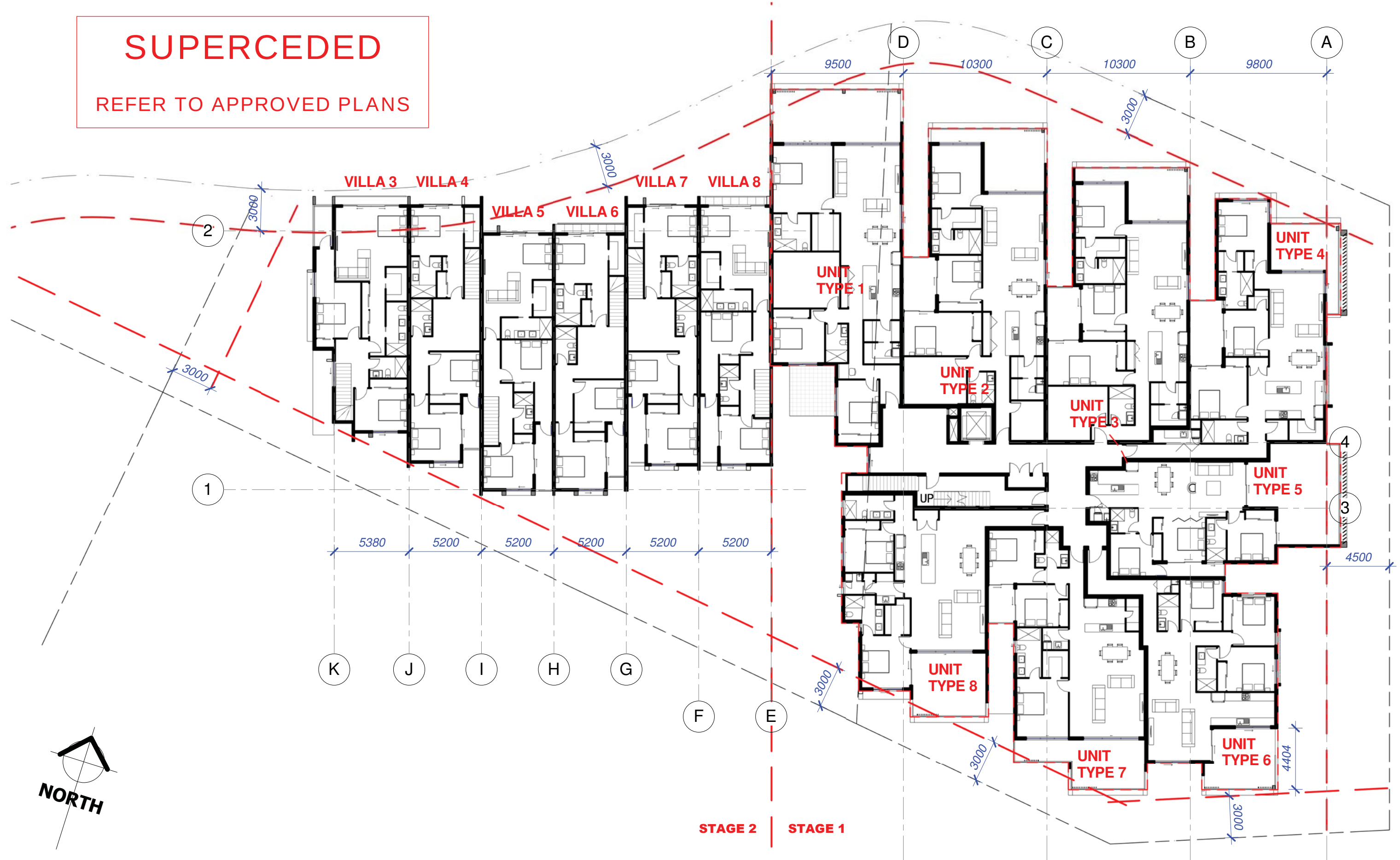
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#	DESCRIPTION	DATE	DWG NO.	SCALE	REVISION	ADDRESS		DRAWN BY		MP, EO		
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B	REV B	1/11/2018										
			ISSUE DA - RFI		ISSUE DATE 04-10-2018		CLIENT CONTRAST CONSTRUCTION		CHECKED BY MJ		These drawings are the copyright of THINKTANK Architects and are not to be reproduced in any way without the consent of THINKTANK Architects \\TTFPS01\CompanyData\THINK TANK\CONTRAST 6-12 AUSTER STREET\3. LATEST REVIT FILE\2018-12-05 CONTRAST - 12-10 AUSTER ST, REDLAND E2018-12-07 4:42:11 PM	



1 BASEMENT 1
1 : 250

REVISION HISTORY			DRAWING NAME			PROJECT	59-17	ARCHITECT	ACN:110893493 Level 1 - 70 Bay Terrace, WYNNUM QLD 4178 P.O. BOX 5129 MANLY QLD 4179 E-MAIL: queries@ttarchitects.com.au TELEPHONE: (07)3348 3727 FASCIMILE: (07)3396 1719 MOBILE: 0412 087 196 thinktankarchitects www.thinktankarchitects.com.au
#	DESCRIPTION	DATE	BASEMENT FLOOR PLAN			UNIT APARTMENT	MICHAEL JULLYAN		
A	REV A	31/10/2018	DWG NO.	SCALE	REVISION	ADDRESS	DRAWN BY		
C	VILLA 7&8 SHIFT BACK, DELETE VILLA 1, MOVE TRANSF., NEW UNIT ON LEV 3, ADJUST EASTERN SETBACK	30/11/2018	A100	1 : 250 @ A3	C	6-12 AUSTER STREET	MP, EO		
			ISSUE		ISSUE DATE	CLIENT	CHECKED BY		
			DA - RFI		04-10-2018	CONTRAST CONSTRUCTION	MJ	These drawings are the copyright of THINKTANK Architects and are not to be reproduced in any way without the consent of THINKTANK Architects \\TFPS01\CompanyData\THINK TANK\CONTRAST 6-12 AUSTER STREET\3. LATEST REVIT FILE\2018-12-05 CONTRAST - 12-10 AUSTER ST, REDLAND E2018-12-07 4:42:12 PM	

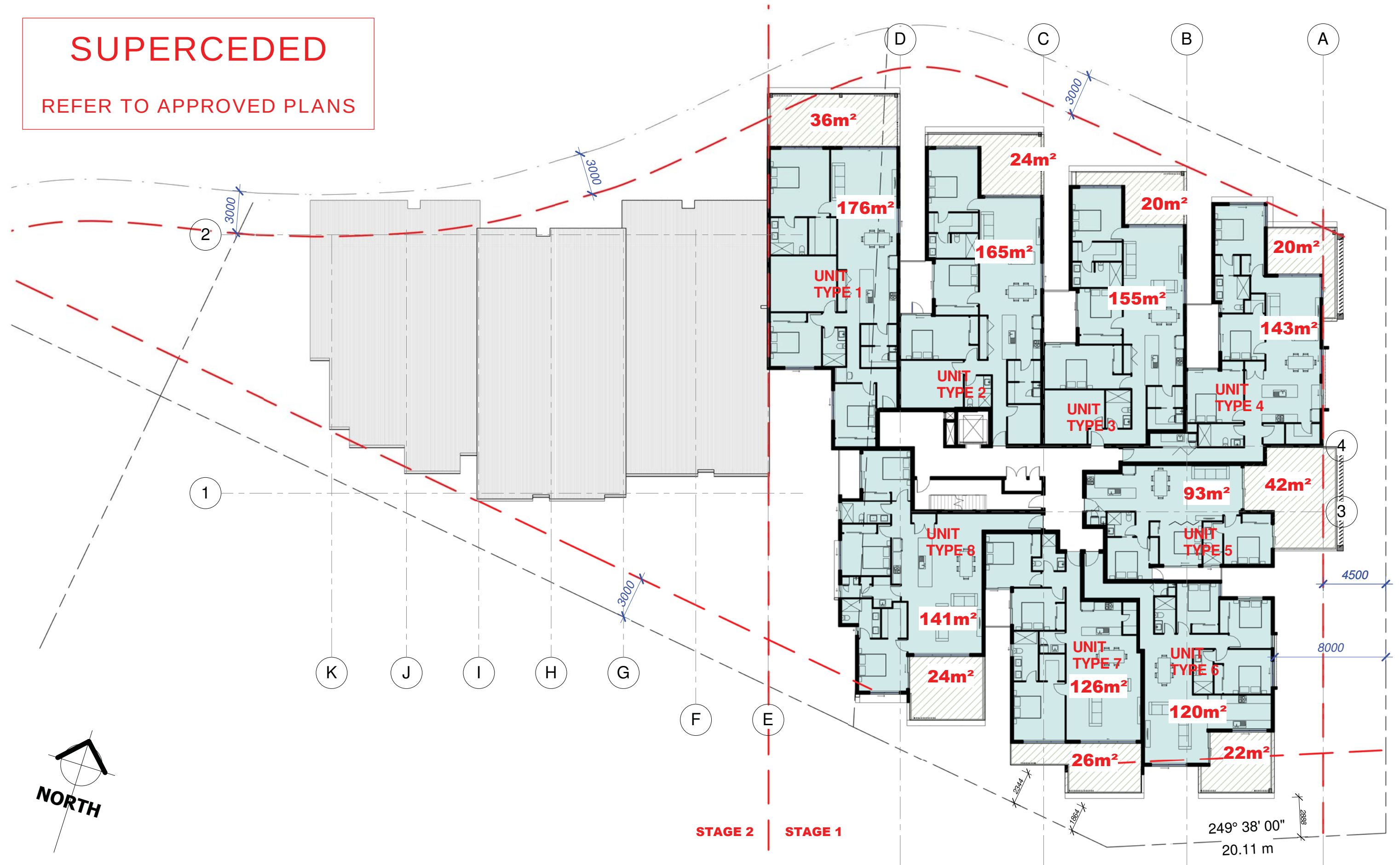
REFER TO APPROVED PLANS



REVISION HISTORY			DRAWING NAME LEVEL-1 FLOOR PLAN			PROJECT UNIT APARTMENT		59-17	ARCHITECT MICHAEL JULLYAN		ACN:110893493 Level 1 - 70 Bay Terrace, WYNNUM QLD 4178 P.O. BOX 5129 MANLY QLD 4179 E-MAIL: queries@tarchitects.com.au TELEPHONE: (07)3348 3727 FASCIMILE: (07)3396 1719 MOBILE: 0412 087 196		
#	DESCRIPTION	DATE	DWG NO.	SCALE	REVISION	ADDRESS		DRAWN BY		These drawings are the copyright of THINKTANK Architects and are not to be reproduced in any way without the consent of THINKTANK Architects \\TFPS01\CompanyData\THINK TANK\CONTRAST 6-12 AUSTER STREET\3. LATEST REVIT FILE\2018-12-05 CONTRAST - 12-10 AUSTER ST, REDLAND E2018-12-07 4:42:15 PM			
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			DA - RFI		04-10-2018		CONTRAST CONSTRUCTION		MJ				

SUPERCEDED

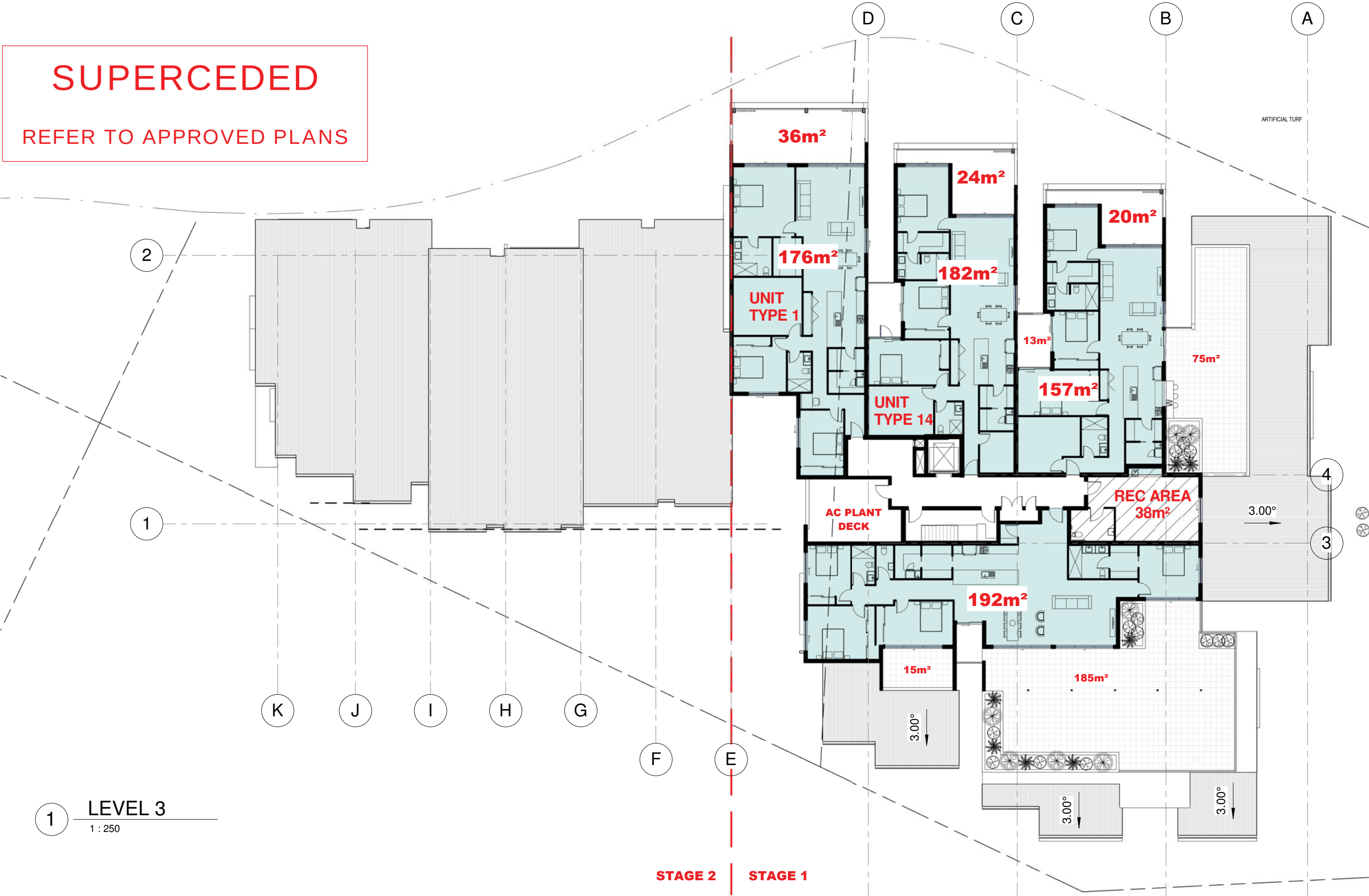
REFER TO APPROVED PLANS



REVISION HISTORY			DRAWING NAME LEVEL 2 FLOOR PLAN			PROJECT UNIT APARTMENT		59-17		ARCHITECT MICHAEL JULLYAN		ACN:110893493 Level 1 - 70 Bay Terrace, WYNNUM QLD 4178 P.O. BOX 5129 MANLY QLD 4179 E-MAIL: queries@ttarchitects.com.au TELEPHONE: (07)3348 3727 FASCIMILE: (07)3396 1719 MOBILE: 0412 087 196				
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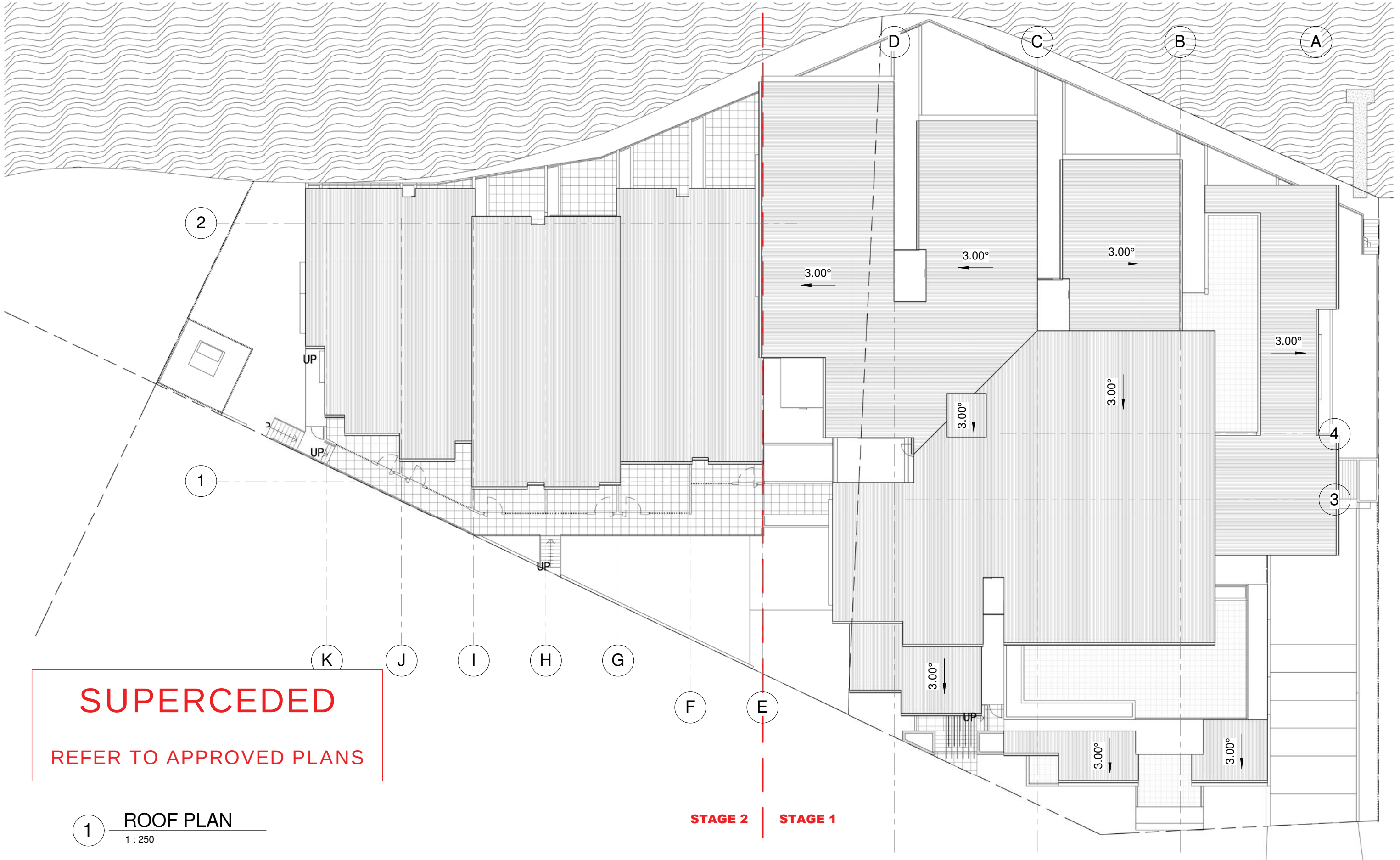
SUPERCEDED

REFER TO APPROVED PLANS



1 LEVEL 3
1 : 250

REVISION HISTORY			DRAWING NAME LEVEL 3 PLAN			PROJECT UNIT APARTMENT		59-17	ARCHITECT MICHAEL JULLYAN		ACN:110893493 Level 1 - 70 Bay Terrace, WYNNUM QLD 4178 P.O. BOX 5129 MANLY QLD 4179 E-MAIL: queries@ttarchitects.com.au TELEPHONE: (07)3348 3727 FASCIMILE: (07)3396 1719 MOBILE: 0412 087 196 thinktankarchitects www.thinktankarchitects.com.au
#	DESCRIPTION	DATE	DWG NO.	SCALE	REVISION	ADDRESS		DRAWN BY			
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B	REV B	1/11/2018									
C	VILLA 7&8 SHIFT BACK, DELETE VILLA 1, MOVE TRANSF., NEW UNIT ON LEV 3, ADJUST EASTERN SETBACK	30/11/2018	ISSUE DA - RFI		ISSUE DATE 04-10-2018	CLIENT CONTRAST CONSTRUCTION		CHECKED BY MJ		These drawings are the copyright of THINKTANK Architects and are not to be reproduced in any way without the consent of THINKTANK Architects \\TTFPS01\CompanyData\THINK TANK\CONTRAST 6-12 AUSTER STREET\3. LATEST REVIT FILE:2018-12-05 CONTRAST - 12-10 AUSTER ST, REDLAND E2018-12-07 4:42:17 PM	



REVISION HISTORY			DRAWING NAME ROOF PLAN			PROJECT UNIT APARTMENT		59-17	ARCHITECT MICHAEL JULLYAN		ACN:110893493 Level 1 - 70 Bay Terrace, WYNNUM QLD 4178 P.O. BOX 5129 MANLY QLD 4179 E-MAIL: queries@ttarchitects.com.au TELEPHONE: (07)3348 3727 FASCIMILE: (07)3396 1719 MOBILE: 0412 087 196 thinktankarchitects
#	DESCRIPTION	DATE	DWG NO.	SCALE	REVISION	ADDRESS		DRAWN BY			
A	REV A	31/10/2018	A150	1 : 250 @ A3	A	6-12 AUSTER STREET		MO, EO			
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