

HSA Admin Extension Engineering Infrastructure Report

Project Name: HSA Admin Extension

Project Number: 20-013

Project Address: 19 Cavell St, Wandal

Client: Home Support Association

Client Contact: Scott Matveyeff (SK Drafting)

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ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/24-2020

Dated: 11 June 2020

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1 Introduction

This report has been compiled in support of the Material Change of Use Application applicable to 19 Cavell St, Wandal (Lot 1 & 4 RP604752 & Lot 12 on SP227126) on behalf of the Home Support Association.

The existing lot is zoned as 'Low Density Residential', with the intention of the MCU to be changed to 'Office' use. Extent of works include repurposing existing residential structures for office use, construction of further car parking facilities onsite and general landscaping works.

This report aims to outline the intended engineered approaches to, and by extension compliance with local government planning scheme requirements for;

- Stormwater;
- Sanitary Drainage, and;
- Car Parking.



FIGURE 1 - SITE LOCATION

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2 SEWER RETICULATION

Existing sewer reticulation to the proposed site is a single DN100 UPVC main. Refer to the below for the existing sewer layout.



FIGURE 2 - EXISTING SEWER LAYOUT

An assessment of the existing and proposed sewer loadings for the site has been undertaken in the below:

TABLE 1 - SEWER LOADINGS

		Use Case	Gross Floor	Equivalent	ADWF (L/day)
			Area (m2)	Persons	
Lot 1	Existing	Commercial	205	2.08/100m2	852.8
		Premises		GFA	
	Proposed	Commercial	205	2.08/100m2	852.8
		Premises		GFA	
Lot 4	Existing	Residential	-	2.6	540
	Proposed	Commercial	370	2.08/100m2	1539.2
		Premises		GFA	

As can be seen, Lot 1 remains fundamentally unchanged from it's existing use, while Lot 4 increases in it's Average Dry Weather Flow by approx. 1000L/day or 0.01L/s. From a volumetric flow perspective, this increase is negligible and it is seen that the existing sewer infrastructure will adequately service the proposed development.

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3 Access & Parking

Parking facilities, including access and geometry, has been provided per drawings by SK Drafting in accordance with AS2890.1 *Off Street Parking*.

To support the proposed layout, a swept path analysis of the turning facilities provided are shown below:

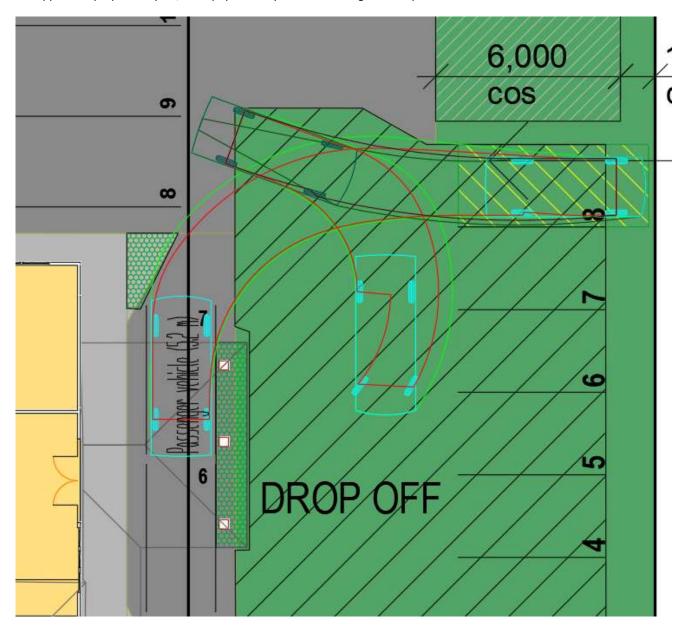


FIGURE 3 - SWEPT PATH ANALYSIS

As can be seen in the above, the turning facilities (utilisation of the current carpark 8 as a turning bay) provides adequate access for a passenger vehicle per Austroads 2013 (5.2m long x 1.94m wide) when parked the drop off zone. Further, the swept path shown doesn't consider the possibility for dry steering, so the proposed path should be considered conservative.

It is recommended that the turning facility be adequately delineated as such so as to ensure its utilisation.

4 STORMWATER MANAGEMENT

Design objectives and methods of assessment have been taken from:

- Capricorn Municipal Development Guidelines (CMDG);
- Queensland Government State Planning Policy;
- Queensland Urban Drainage Manual (QUDM) 2016.

The proposed development strategy involves the extension of the existing structure on 19 Cavell St over the footprint of the existing structure on 6 Haig St. Additionally, concrete paved carparking will be installed on the at 6 Haig St & 13 Cavell St as well as other auxiliary landscaping and footpath works.

The below is a brief outline of the proposed stormwater management strategy:

- 50% of total roof area and 19 Cavell St to be discharged to LPD on Cavell St via rainwater tank;
- 50% of total roof area and 50% of 6 Haig to be discharged to LPD 1 on 6 Haig St;
- 100% of proposed carpark extension on 6 Haig St to be discharged to existing overland flow path through 13 Cavell St;
- 50% of 13 Cavell St proposed carpark to be discharged to existing carpark and ultimately LPD 2 on Haig St (below 6 Haig St);

4.1 Existing (Pre-Development) Case

The current site, pre-development, consists of one office space (19 Cavell St), one residential building (6 Haig St) and an existing carpark (13 Cavell St). Lawful points of discharge have been identified for both sites as shown in the below Figure 4, both discharging directly to the existing kerb, while overland flow is discharged to the back of 6 Haig St through 13 Cavell St.



FIGURE 4 - LAWFUL POINTS OF DISCHARGE

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Document Set ID: 12389639 Version: 1, Version Date: 25/02/2020 Catchments were taken with each LPD and the back boundary set as outlets, with their respective characteristics shown below:

TABLE 2 - PRE-DEVELOPMENT CATCHMENT CHARACTERISTICS

Pre-Development Catchments						
A (LPD on Cavell St	586 m ²	58% Impervious				
B (LPD 1 on Haig St)	295.3 m ²	44% Impervious				
C (Overland Discharge)	461.1 m ²	27% Impervious				
D (LPD 2 on Haig St)	340.4 m ²	87% Impervious				

Peak flows were calculated using the Rational Method as per QUDM 2016, with the result shown below:

TABLE 3 - PRE-DEVELOPMENT PEAK FLOWS

	Pre-Development						
Catchment	Minor Flow (m ³ /s) (AEP 10%)	Major Flow (m ³ /s) (AEP 1%)					
Α	0.026	0.038					
В	0.013	0.019					
С	0.019	0.029					
D	0.016	0.025					

4.2 PROPOSED (POST-DEVELOPMENT) CASE

The proposal involves reconfiguring catchments A and B so as to share 50% of the roofwater between the two, as well as diverting half the flow off the proposed carpark extension on catchment C towards the existing LPD 2 on Haig St (the same discharge point as the existing carpark).

Associated catchment characteristics post-development are shown below:

TABLE 4 - POST-DEVELOPMENT CATCHMENT CHARACTERISTICS

Post-Development Catchments						
1 (LPD on Cavell St)	526.4 m ²	56% Impervious				
2 (LPD 1 on Haig St)	327.9 m ²	72% Impervious				
3 (Overland Discharge)	251.4 m ²	87% Impervious				
4 (LPD 2 on Haig St)	581.9 m ²	86% Impervious				

Peak flows were calculated using the Rational Method as per QUDM 2016, with the result shown below:

TABLE 5 - POST-DEVELOPMENT PEAK FLOWS

	Post-Dev	Post-Development						
Catchment	Minor Flow (m ³ /s) (AEP 10%)	Major Flow (m ³ /s) (AEP 1%)						
1	0.023	0.034						
2	0.015	0.023						
3	0.012	0.018						
4	0.028	0.042						

Comparing pre-development with post-development, the change to the two catchments are shown below:

TABLE 6 - CHANGE TO PEAK FLOWS DUE TO DEVELOPMENT

	Cha	ange
Catchment	Minor Flow (m3/s) (AEP 10%)	Major Flow (m3/s) (AEP 1%)
A/1	-0.003	-0.004
B/2	0.002	0.003
C/3	-0.007	-0.010
D/4	0.012	0.017

As can be seen, there is a decrease to peak flows for catchments A/1 and C/3. Conversely, there is an increase to catchments B/2 and D/4.

In order to provide for an engineered solution to reduce peak flows to match pre-development levels, storage calculations have been carried out for catchments 2 and 4.

The below shows the proposed storage calculations which were used:

TABLE 7 - STORAGE CALCULATIONS

ТОС	Catchment 2 (LPD 1 on Haig St)		Catchment 4 (LPD 2 or Haig St)		
	AEP 10	AEP 1	AEP 10	AEP 1	
Q_Pre (m3/s)	0.012741	0.019112	0.016474	0.024711	
Q_Post (m3/s)	0.015039	0.022558	0.028017	0.042025	
R (unitless)	0.152786	0.152786	0.411988	0.411988	
V_inflow (m3)	6.015533	9.0233	11.20664	16.80997	
Boyd (for r=0.00 to 0.25)	0.919089	1.378633	4.617	6.9255	
Basha (for r=0.25 to 0.45)	0.659534	0.989301	3.712049	5.568074	
Carroll (for r=0.45 to 0.60)	0.432423	0.648635	2.920217	4.380326	
Culp (for r=0.60 to 1.0)	0.399979	0.599968	2.807098	4.210647	
AEP 1 Storage	1.378633	m³	5.568074	m³	

It is recommended that catchment 2 be provided a 1500L min rainwater tank with throttled 50mm outlet connected to the discharge to kerb or grassed area.

As the existing shed (60.5 m²) on catchment 4 accounts for approx. 30% of the addition impervious area (201.5 m²) contributed to the catchment, it is seen that 30% of the required storage can be provided directly to this roof area. A 2000L min rainwater tank with throttled 50mm outlet connected to the kerb or grassed area should be provided. Options for the remaining 3.92m³ of storage could include a pit with low flow outlet, onsite rain garden/s with adequate storage and low flow outlets, or geometric pavement designs facilitating storage within the footprint of the carpark. It is seen that the options proposed should be explored further during the detailed design of the facility and checked for suitability by an appropriately qualified person (hydraulic engineer).

Finally, it is recommended that the overland flow discharging from catchment 3 be collected in a field inlet of min dimensions 450x450 with a single 150dia PVC pipe connecting it into the existing field inlet adjacent the kitchen on 13 Cavell St.

4.3 STORMWATER QUALITY

Stormwater quality has been assessed based on the requirements of the *State Planning Policy – April 2016* under the quality section. It is seen that no water quality improvement devices are required due to the development (1682.8m²) being less than the 2500m² benchmark set for water quality assessment.

5 CONCLUSION

The proposed development for the Home Support Association is seen as being manageable from an engineering point of view. The current strategies for managing sewerage, drainage and access are all feasible within the scope of the recommendations given throughout this report.

Further questions should be directed to the below signed if required.

Yours sincerely,

Scott Thomas

Manager - B. Eng (Civil/Structural) RPEQ 16203

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APPENDIX A - CATCHMENT PLAN



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APPENDIX B — STORMWATER CALCULATIONS

		Pre Dev	elopment	Case			
Catchment ID	Α	LPD on Ca	vell St	Design AE	Р	10	%
TOC	5	min		Catchmen	t Area	0.0586	ha
Rainfall Insensity Table							
		AEP (Lat -23.3674, Long 150.4959)					
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	fi	110 (mm/h	Ev	C10	Cv	I (mm/hr)	Qy (m3/s)
10%	0.58	65.2	1.0		'		0.025517
1%	0.58	65.2	1.0				
	0.00		elopment		0.7.00000		0.000270
Catchment ID	1	·		Design AEP		10	%
тос	5	min		Catchmen	t Area	0.05264	ha
Rainfall Insensity Table							
		А	EP (Lat -23	.3674, Lon	g 150.4959)		
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	fi	110 (mm/h	Fv	C10	Су	I (mm/hr)	Qy (m3/s)
10%	0.56	65.2			•		
1%	0.56	65.2	1.0				

FIGURE 5 - CATCHMENT A/1 CALCS

		Pre Dev	elopment	Case			
Catchment ID	В	LPD on Ha	ig St	Design AE	Р	10	%
TOC	5	min		Catchmen	t Area	0.02953	ha
Rainfall Insensity Table							
		AEP (Lat -23.3674, Long 150.4959)					
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	fi	110 (mm/h	Ev	C10	Су	I (mm/hr)	Qy (m3/s)
10%	0.44	65.2	1.0				0.012741
1%	0.44	65.2	1.0				
170	0.11		elopment		0.770031	300	0.013112
Catchment ID			Design AEP		10	%	
TOC		min		Catchmen		0.03279	ha
Rainfall Insensity Table							
,		Α	EP (Lat -23	.3674, Long	g 150.4959)		
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	fi	110 (mm/h	Fv	C10	Cv	I (mm/hr)	Qy (m3/s)
10%	0.72	65.2	1.0		· '		
1%	0.72	65.2	1.0				0.022558

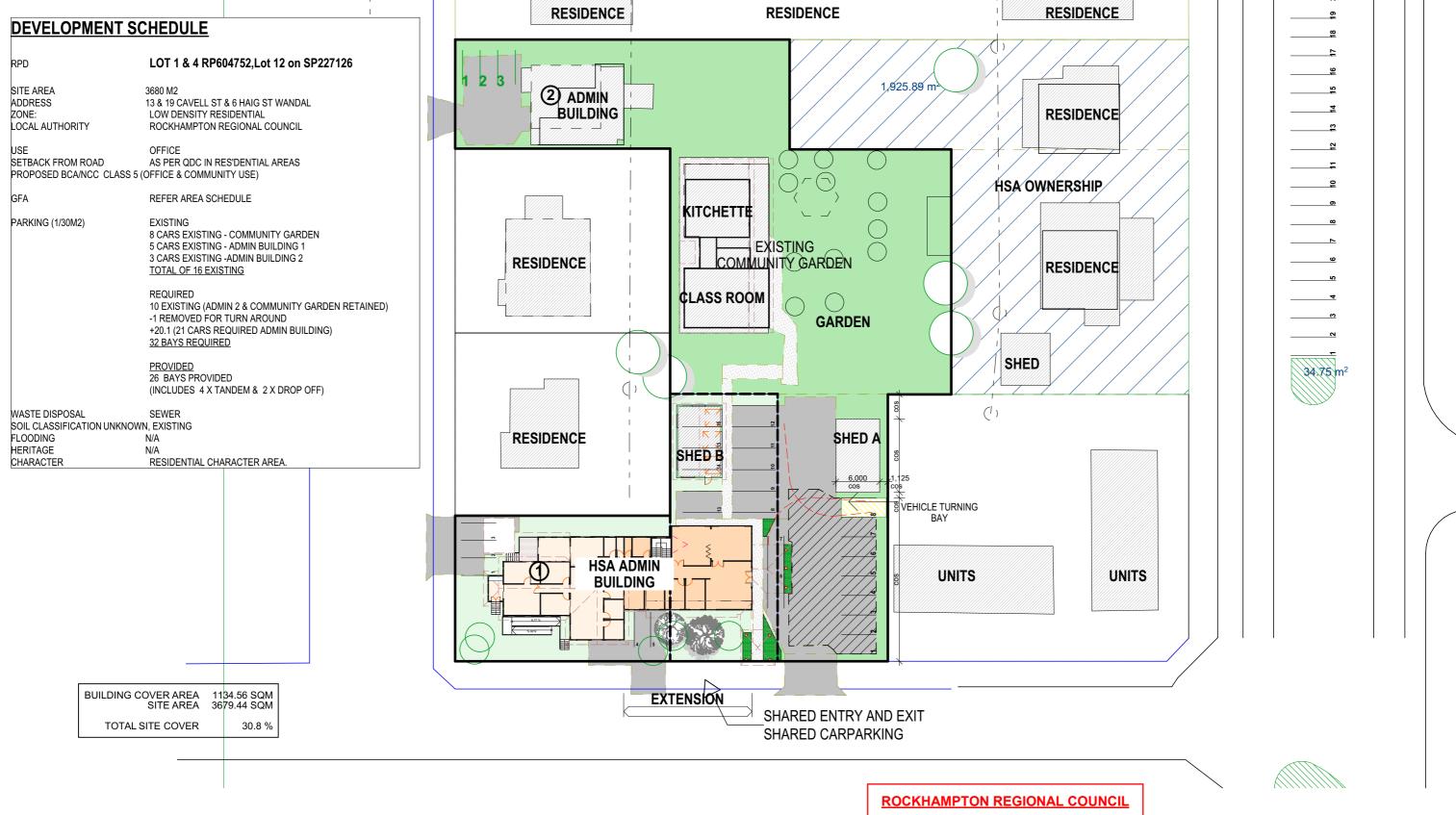
FIGURE 6 - CATCHMENT B/2 CALCS

		Pre Dev	elopment	Case			
Catchment ID	С	Overland	Discharge	Design AE	Р	10	%
TOC	5	min		Catchmen	t Area	0.04611	ha
Rainfall Insensity Table							
		AEP (Lat -23.3674, Long 150.4959)					
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	fi	110 (mm/h	Fy	C10	Су	I (mm/hr)	Qy (m3/s)
10%	0.27	65.2	1.0	0.742726	0.742726	200	0.019026
1%	0.27	65.2	1.0	0.742726	0.742726	300	0.028539
		Post Dev	elopment	Case			
Catchment ID	3	Overland	Discharge	Design AEP		10	%
TOC	5	min		Catchmen	t Area	0.02514	ha
Rainfall Insensity Table							
		А	AEP (Lat -23.3674, Long 150.4959)				
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	c.	1407 "	_	64.0			0 / 0/ 1
	fi	110 (mm/h		C10	Су		Qy (m3/s)
10%	0.87	65.2	1.0				0.00
1%	0.87	65.2	1.0	0.870263	0.870263	300	0.018232

FIGURE 7 - CATCHMENT C/3 CALCS

		Pre Dev	elopment	Case			
Catchment ID	D	LPD on Ha	ig St	Design AE	Р	10	%
TOC	5	min		Catchmen	t Area	0.03404	ha
Rainfall Insensity Table							
		AEP (Lat -23.3674, Long 150.4959)					
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	t:	140 (F	640	0	1. / / !\	0(2/-)
	fi	110 (mm/h		C10	Су		Qy (m3/s)
10%	0.87	65.2		0.871134			0.016474
1%	0.87	65.2	1.0		0.871134	300	0.024711
		Post Dev	elopment	Case			
Catchment ID	4	LPD on Ha	ig St	Design AEP		10	%
TOC	5	min		Catchmen	t Area	0.05819	ha
Rainfall Insensity Table							
		А	EP (Lat -23	.3674, Lon	g 150.4959)		
	63.20%	50%	20%	10%	5%	2%	1%
5 min	115	128	170	200	229	269	300
1 hour	37.2	41.4	55.3	65.2	75.2	88.9	99.9
	fi	110 (mm/h	Fv	C10	Су	I (mm/hr)	Qy (m3/s)
10%	0.86	65.2	1.0		•		
1%	0.86	65.2	1.0				
1%	0.86	05.2	1.0	0.800042	0.800042	300	0.042025

FIGURE 8 - CATCHMENT D/4 CALCS



SITE PLAN 500 SCALE @ A3, 1:500

Project Name

EXTENSION TO COMMUNITY USE BUILDING SKETCH PLANS

Client

HOME SUPPORT ASSOCIATION
13 & 19 CAVELL ST & 6 HAIG ST WANDAL

SKETCH PLANS LOCATION PLAN

SKD 19-033 / SK 102 Issue A 24/02/2020

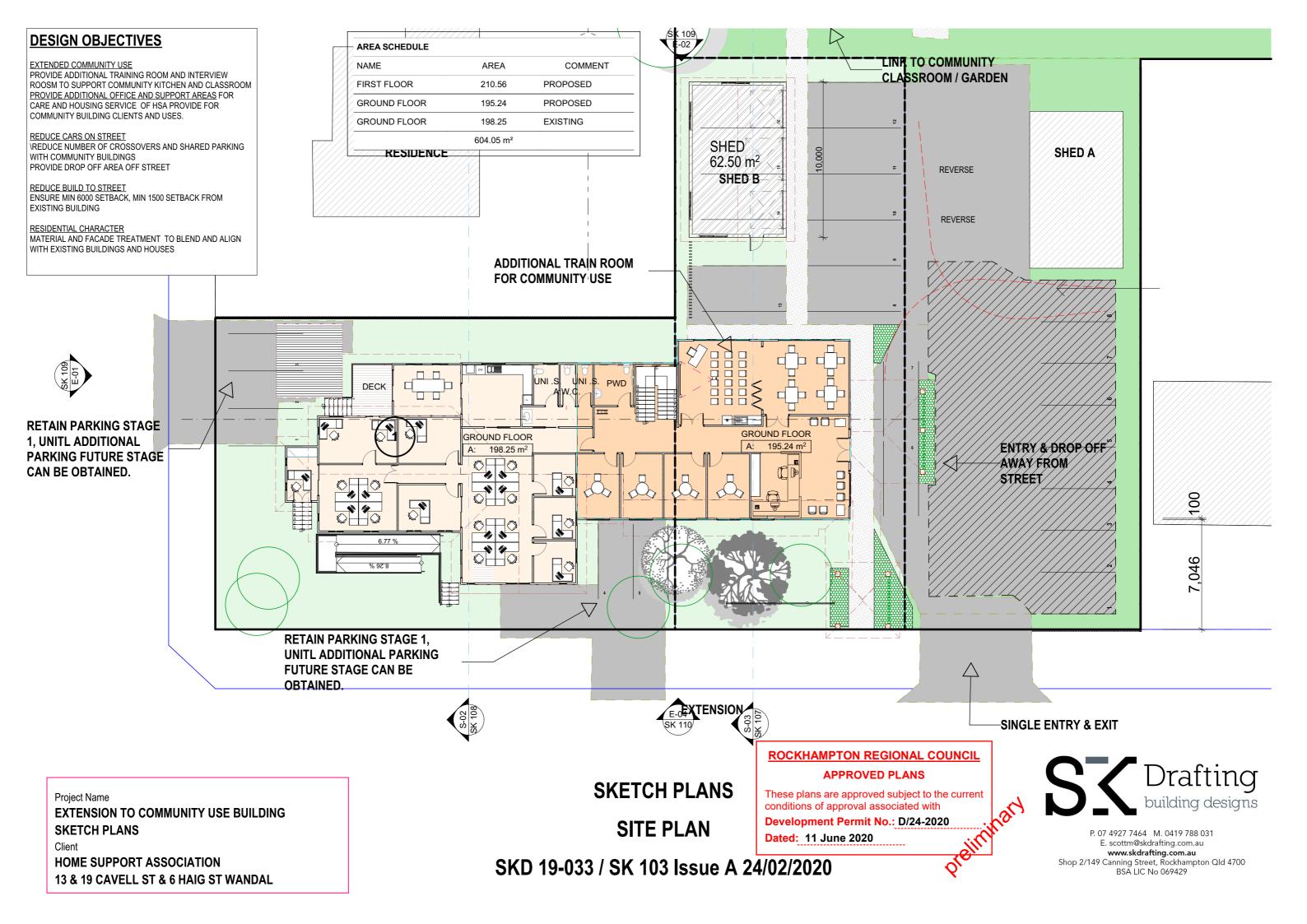
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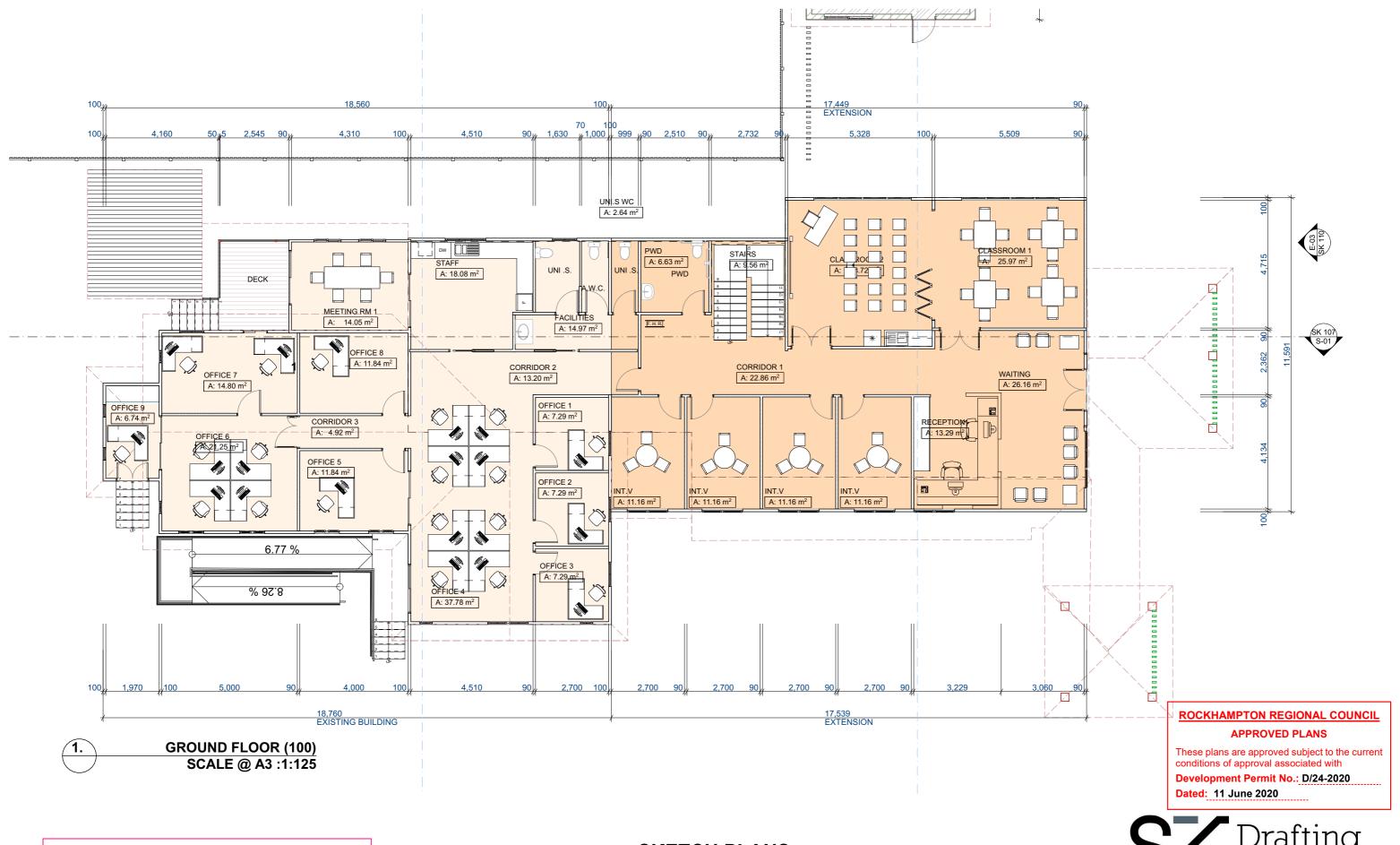
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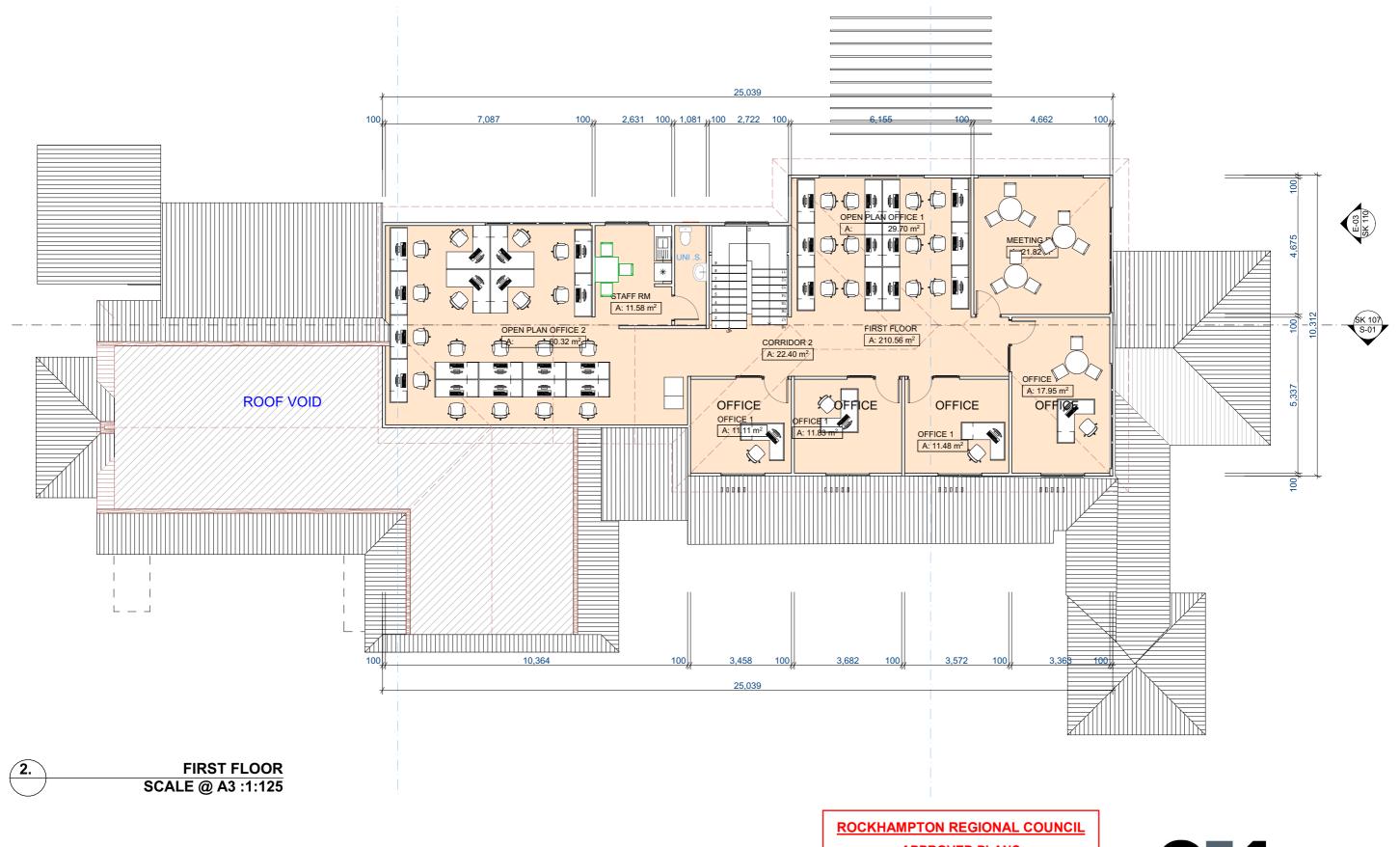
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SKETCH PLANS
GROUND FLOOR PLAN
SKD 19-033 / SK 104 Issue A 24/02/2020



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EXTENSION TO COMMUNITY USE BUILDING SKETCH PLANS

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HOME SUPPORT ASSOCIATION 13 & 19 CAVELL ST & 6 HAIG ST WANDAL **SKETCH PLANS**

FIRST FLOOR PLAN

SKD 19-033 / SK 105 Issue A 24/02/2020

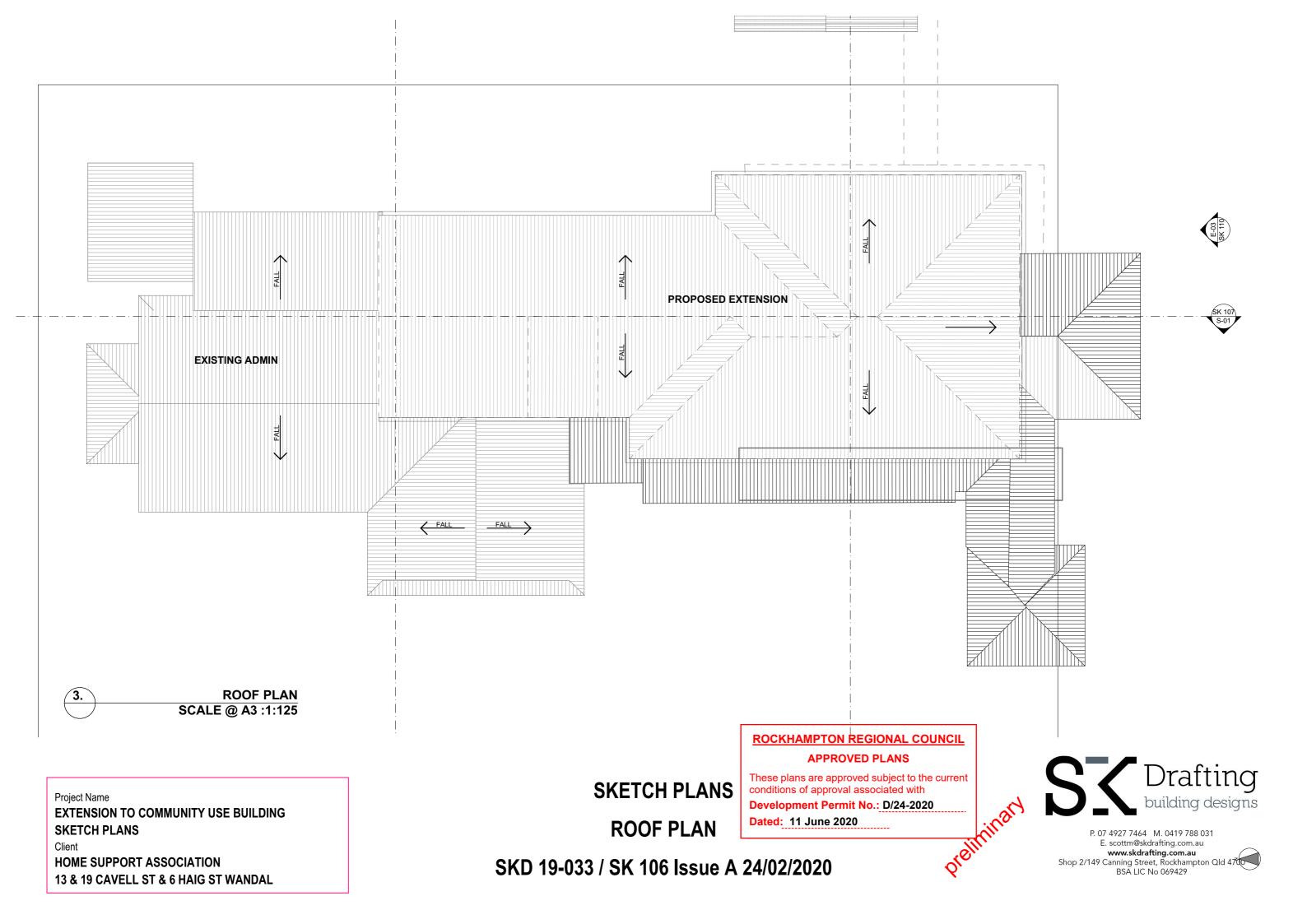
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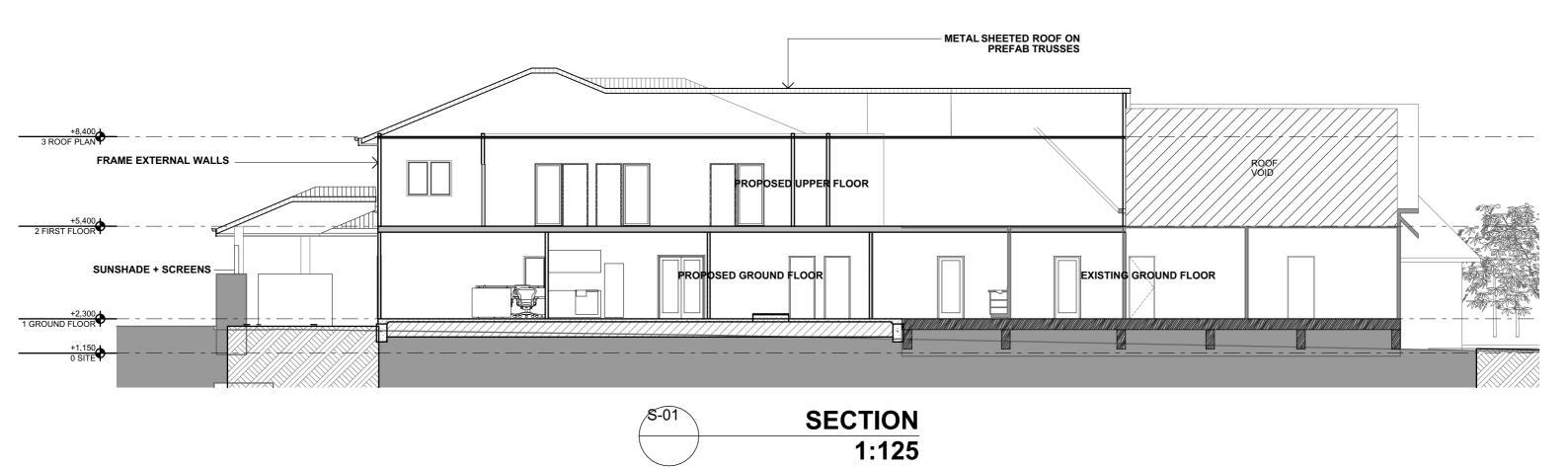
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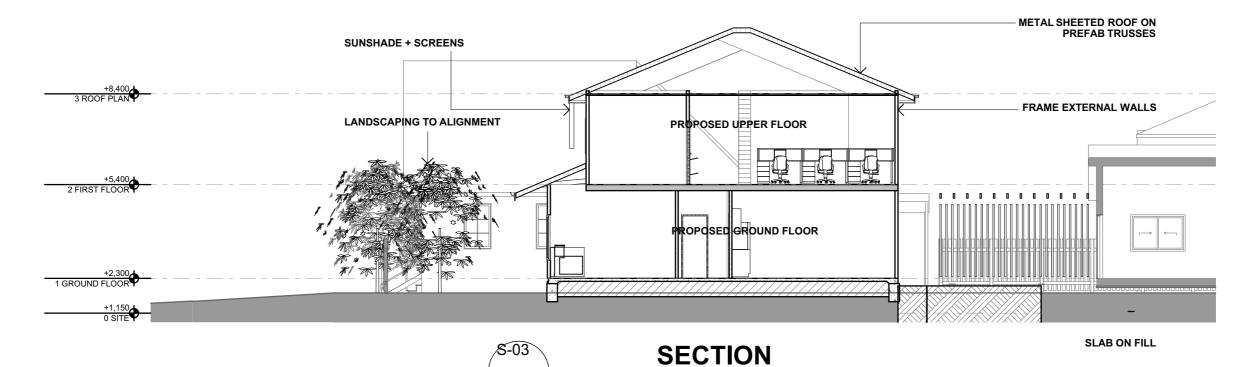
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EXTENSION TO COMMUNITY USE BUILDING SKETCH PLANS

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SKETCH PLANS S-01 SECTION

1:125

SKD 19-033 / SK 107 Issue A 24/02/2020

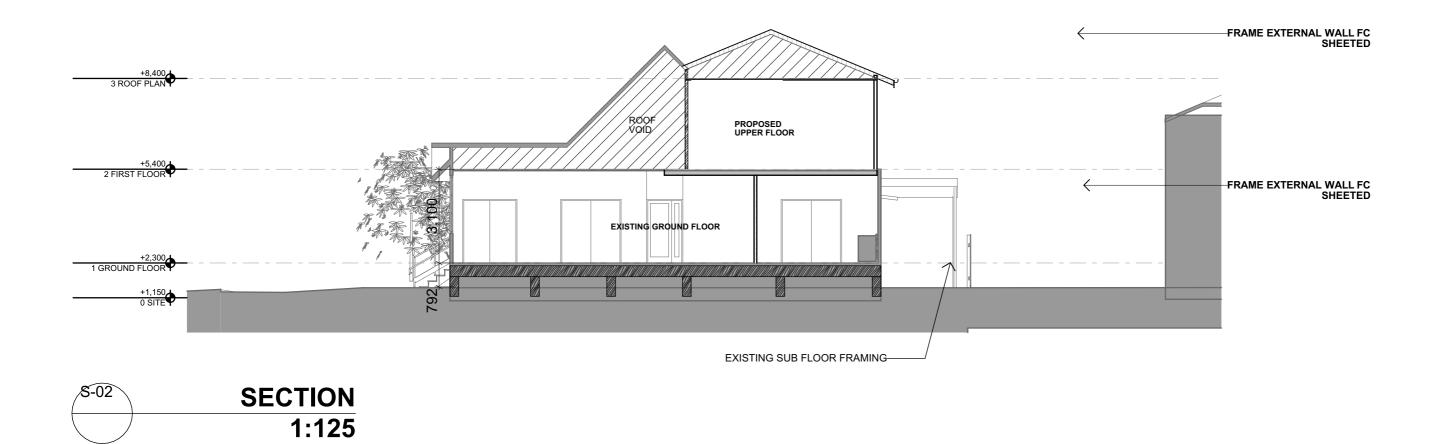
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SKETCH PLANS
S-02 SECTION
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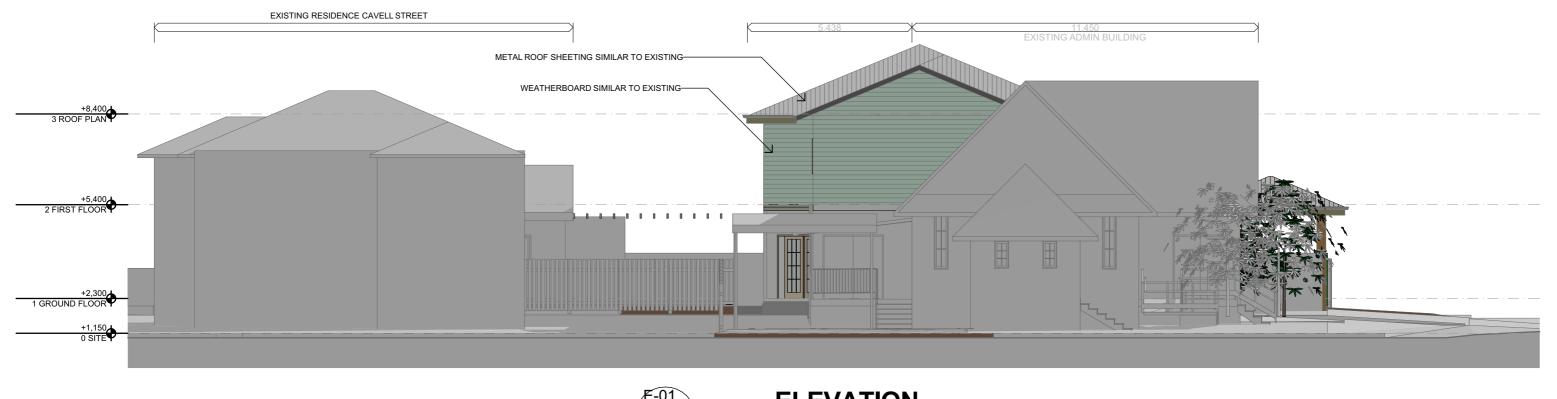
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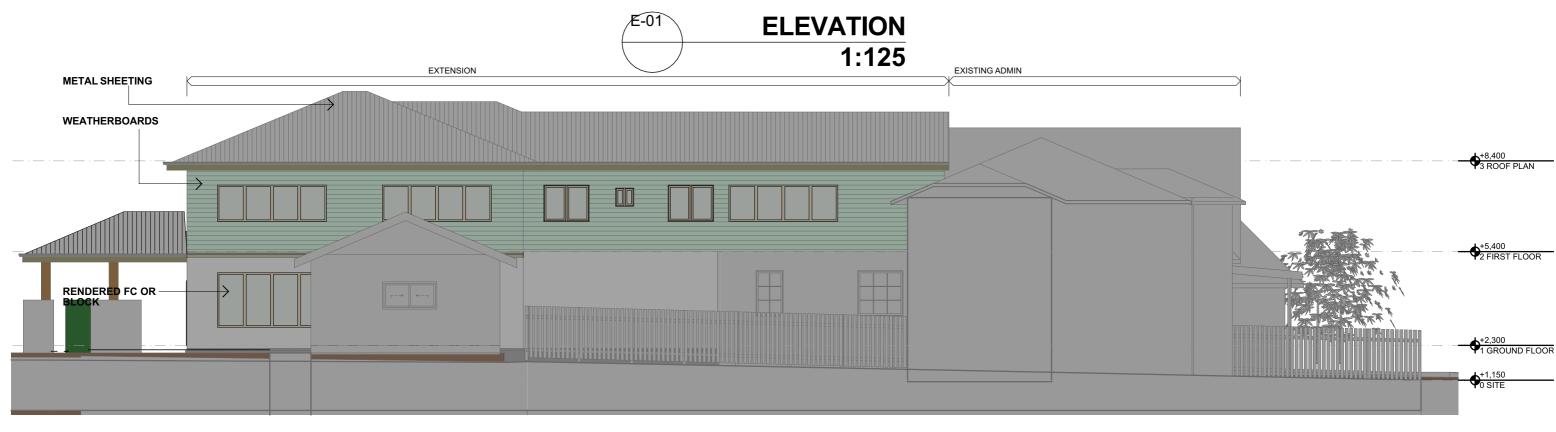
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ELEVATION 1:125

Project Name

EXTENSION TO COMMUNITY USE BUILDING SKETCH PLANS

Client

HOME SUPPORT ASSOCIATION
13 & 19 CAVELL ST & 6 HAIG ST WANDAL

SKETCH PLANS

E-01 NORTH ELEVATION

SKD 19-033 / SK 109 Issue A 24/02/2020

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ELEVATION 1:125



ELEVATION 1:125

Project Name

EXTENSION TO COMMUNITY USE BUILDING SKETCH PLANS

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13 & 19 CAVELL ST & 6 HAIG ST WANDAL

SKETCH PLANS

E-02 EAST ELEVATION

SKD 19-033 / SK 110 Issue A 24/02/2020

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E-04

ELEVATION 1:125

SKETCH PLANS

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THE & WEST ELEVATIONS

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E-03 SOUTH & WEST ELEVATIONS SKD 19-033 / SK 111 Issue A 24/02/2020



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Project Name

EXTENSION TO COMMUNITY USE BUILDING SKETCH PLANS

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