DEVELOPMENT SUMMARY

LOT 31 ON REGISTERED PLAN 605808
SITE AREA: 1,120SQM

AREAS SCHEDULE

FOYERS: 122SQM

UNIT 1
INTERNAL : 119.6SQM (CENTRE OF WALLS)
PATIO : 14.8SQM

UNIT 2
INTERNAL : 119.6SQM (CENTRE OF WALLS)
PATIO : 14.8SQM

UNIT 3
INTERNAL : 119.2SQM (CENTRE OF WALLS)
PATIO : 15.2SQM

UNIT 4
INTERNAL : 119.2SQM (CENTRE OF WALLS)
PATIO : 17.2SQM

UNIT 5
INTERNAL : 119.2SQM (CENTRE OF WALLS)
PATIO : 15.2SQM

UNIT 6
INTERNAL : 119.2SQM (CENTRE OF WALLS)
PATIO : 15.2SQM

OOA STUDIO: 40.8SQM (CENTRE OF WALLS)

MPR: 32.2SQM (CENTRE OF WALLS)

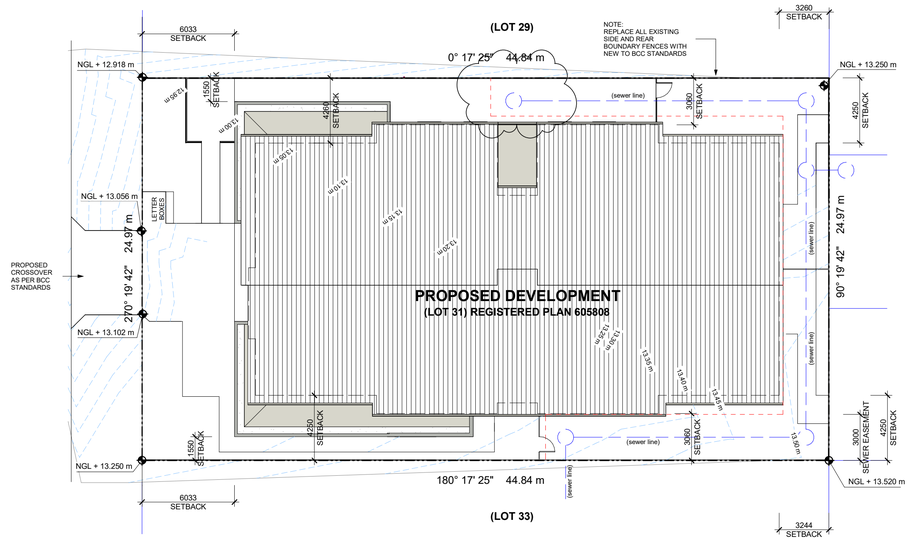
GARAGES: 156.4SQM

TOTAL FLOOR AREA : 1,159.8SQM (INCLUDING BALCONIES AND PATIOS)

(THERAPY POOL / SAUNE AREA: 46.4SQM)

PLOT RATIOS

SITE AREA:	1,120.0SQM	
SITE COVERAGE:	540.0SQM (48.2%)	
OPEN SPACE:	580.0SQM (51.8%)	
COMMUNAL OPEN SPACE:	101.1SQM (9.02%)	
LANDSCAPING:	247.0SQM (22.0%)	
CARPARKING:	TOTAL PARKING SPACES = 6	
	*Includes 1 x Participant Car Space	(3600W x 5400L)
	4 x Standard Car Spaces	(2400W x 4900L)
	1 x Visitor Car Space	(2400W x 4900L)
BINS:	TOTAL BINS = 10No. 240L Bins	
	*Includes 3 x Recycle	
	6 x Waste	
	1 x Green	



SITE PLAN - PROPOSED

scale 1 : 200

SDA STANDARDS - GENERAL NOTES

- ALL EXTERNAL FLOOR FINISHES SHALL HAVE A MINIMUM SLIP RESISTANCE OF P4 OR R11
- ALL INTERNAL FLOOR FINISHES SHALL HAVE A MINIMUM SLIP RESISTANCE OF P3 OR R10
- ALL INTERNAL FLOORING (INCLUDING WET AREAS) SHALL BE FIRM, EVEN AND FEATURE A LEVEL TRANSITION BETWEEN ABUTTING SURFACES OF A MAXIMUM VERTICAL TOLERANCE OF 3MM OR 9MM (PROVIDED THE LIP IS ROUNDED OR BEVELLED).
- ALL INTERNAL DOORWAYS SHALL HAVE A LEVEL (STEP-FREE) TRANSITION AND THRESHOLD (MAXIMUM VERTICAL TOLERANCE OF 5MM VERTICAL OR 5MM BETWEEN ABUTTING SURFACES IS ALLOWABLE PROVIDED THE LIP IS ROUNDED OR BEVELLED).
- DOORWAY CIRCULATION SPACES IN ACCORDANCE WITH AS1428.1 SHALL BE PROVIDED TO ALL DOORWAYS (EXCLUDING EXCLUSIVE STAFF USE AREAS, NON-ACCESSIBLE TOILETS AND STORAGE ROOMS). NOTE: DOOR AUTOMATION CAN BE PROVIDED IN LIEU DOOR CIRCULATION SPACES THAT ARE REQUIRED AS PER AS1428.1 TO THE LATCH SIDE OF THE DOOR.
- PEDESTRIAN ENTRY FROM THE SITE BOUNDARY, AN ACCESS WAY SHALL HAVE:
  - NO STEPS.
  - A LEVEL TRANSITION OF A SURFACE.
  - A MAXIMUM VERTICAL TOLERANCE OF 3MM OR 5MM BETWEEN ABUTTING SURFACES IS PERMITTED AS LONG AS THE LIP IS ROUNDED OR BEVELLED.
  - AN EVEN AND FIRM SURFACE.
  - A CROSSFALL OF NOT MORE THAN 1:40
- 1:20 GRADE IS PERMITTED AS A PART OF THE ACCESSWAY AND WHERE PROVIDED SHALL INCORPORATE THE FOLLOWING:
  - 1200MM LENGTH MID-LANDINGS, IN THE DIRECTION OF TRAVEL (OF THE SAME WIDTH AS WALKWAY WIDTH) PROVIDED EVERY 10M. ADDITIONAL LANDING SIZE SHALL BE PROVIDED AS PER AS1428.1 WHERE A CHANGE IN DIRECTION IS REQUIRED.
  - 1:20 GRADE WALKWAY IS PROVIDED WITH A FIRM AND LEVEL SURFACE WHICH CAN BE A DIFFERENT MATERIAL AT THE SAME LEVEL AND GRADE OF THE WALKWAY, AND EXTEND HORIZONTALLY FOR AN ADDITIONAL MINIMUM OF 600MM, FROM AN ACCESSWAY UNLESS ONE OF THE FOLLOWING IS PROVIDED: KERB, KERB-RAIL AND HANDRAIL OR WALL (MIN 450MM HEIGHT) TO COMPLY WITH THE REQUIREMENTS OF AS1428.1.
  - SLIP RESISTANCE SHALL BE A MINIMUM OF P4 OR R11.
- 1:10 GRADE STEP RAMP IS PERMITTED AS A PART OF THE ACCESSWAY AND WHERE PROVIDED SHALL INCORPORATE THE FOLLOWING:
  - THE MAXIMUM LEVEL CHANGE OR TRANSITION WHICH CAN BE DEALT WITH BY A STEP RAMP IS 190MM AND MAXIMUM LENGTH OF RAMP IS 1900MM
  - ALL FEATURES OF 1:10 STEP RAMP INCLUDING LANDING SIZES, HANDRAILS / KERBRAILS (IF REQUIRED) SHALL COMPLY WITH THE REQUIREMENTS OF AS1428.1.
  - SLIP RESISTANCE SHALL BE A MINIMUM OF P5 OR R12
- WHERE THE LEVEL DIFFERENCE IS OVER 190MM, A MAXIMUM GRADE OF 1:14 RAMP IS PERMITTED AS A PART OF THE ACCESSWAY AND WHERE PROVIDED SHALL INCORPORATE THE FOLLOWING:
  - 1200MM LENGTH LANDINGS, IN THE DIRECTION OF TRAVEL (OF THE SAME WIDTH AS RAMP WIDTH) PROVIDED AT BASE AND TOP OF THE RAMP AND AT MAXIMUM INTERVALS OF 9M. ADDITIONAL LANDING SPACES SHALL BE PROVIDED AT TURNS AND CHANGES IN DIRECTION AS REQUIRED UNDER AS1428.1.
  - ALL FEATURES OF 1:14 RAMPS INCLUDING HANDRAIL PROFILE, HANDRAIL EXTENSIONS AND KERB RAILS SHALL COMPLY WITH THE REQUIREMENTS OF AS1428.1
  - SLIP RESISTANCE SHALL BE A MINIMUM OF P4 OR R11.
- THE MINIMUM CLEAR WIDTH OF AN ACCESSWAY SHALL BE 1200MM MEASURED FROM A NARROWEST PART OF THE ACCESSWAY (FOR EXAMPLE SKIRTING TO SKIRTING). THIS INCLUDES ALL RAMPS WITHIN THE ACCESSWAYS.
- WHERE PROVIDED, THE MINIMUM CLEAR WIDTH OF A CURVED ACCESSWAY SHALL BE A MINIMUM OF 1500MM WITH A MINIMUM RADIUS OF THE CURVATURE AS SPECIFIED UNDER AS1428.1. THE CROSSFALL SHALL BE TOWARDS THE CENTRE OF CURVATURE.
- WHERE A RAMP OR WALKWAY IS PART OF THE ACCESSWAY, LEVEL LANDINGS NO LESS THAN 1200MM X 1200MM, EXCLUSIVE OF THE SWING OF THE DOOR OR GATE THAT OPENS ONTO THEM, SHALL BE PROVIDED. THE LANDING SIZE SHALL INCREASE BASED ON THE REQUIRED GATE / DOOR CIRCULATION SPACES OR CHANGE OF DIRECTION REQUIREMENTS AS PER AS1428.1.
- MINIMUM VERTICAL CLEARANCE ALONG ALL PATHS OF TRAVEL TO BE 2000MM.
- CAR PARKING SPACE, FOR USE OF THE PARTICIPANT, IT SHALL BE PROVIDED WITH:
  - A LEVEL SURFACE WITH A MAXIMUM 1:40 GRADIENT IN ANY DIRECTION.
  - AN EVEN, FIRM AND SLIP-RESISTANT SURFACE OF P4 OR R11
- DWELLING ENTRANCE AND OTHER EXTERNAL DOORWAYS:
  - A LEVEL LANDING AREA OF AT LEAST 1500MM X 1500MM WITH A MAXIMUM 1:40 GRADIENT AND CROSSFALL SHALL BE PROVIDED AT THE LEVEL (STEP-FREE) EXTERNAL ENTRY DOORWAY, ON THE ARRIVAL SIDE OF THE DOOR (I.E. THE EXTERNAL SIDE OF THE DOOR).
  - THE LEVEL LANDING AREA SHALL BE INCREASED TO ACCOMMODATE DOOR CIRCULATION SPACES AS PER AS1428.1
  - ALL DOOR CIRCULATION SPACES (EXCLUDING INTERNAL DOOR CIRCULATION SPACES FOR BEDROOMS) SHALL BE PROVIDED IN ACCORDANCE WITH AS1428.1 TO BOTH SIDES OF THE DOOR.
  - A STEP-FREE DOORWAY THRESHOLD SHALL BE PROVIDED TO AN EXTERNAL ENTRY DOORWAY. WHERE THE THRESHOLD AT AN EXTERNAL ENTRY DOORWAY EXCEEDS 5MM AND IS LESS THAN 35MM, A DOORWAY THRESHOLD RAMP IN ACCORDANCE WITH AS1428.1 SHALL BE PROVIDED WITH A MAXIMUM 1:8 GRADE AS SHOWN IN FIGURE 4.
  - A STEP-FREE DOORWAY THRESHOLD SHALL BE PROVIDED TO EXTERNAL DOORWAYS LEADING TO COMMON OR PRIVATE OPEN SPACES. WHERE THE THRESHOLD AT THE EXTERNAL DOORWAY EXCEEDS 5MM AND IS LESS THAN 35MM, A DOORWAY THRESHOLD RAMP IN ACCORDANCE WITH

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/146-2022

Dated: 27 January 2023

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Figured Dimensions take precedence over Scaled Dimensions.
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revision	revision description	date
A	Preliminary	16/09/2022
B	Town Planning Issue	20/09/2022
C	Town Planning Issue	15/11/2022

project title
MULTI UNIT DEVELOPMENT (SDA COMPLIANT)

address
7 GLENCOE ST, ALLENSTOWN QLD

drawing title
SITE PLAN, NOTE & SCHEDULES

project number	scale @A1	approved
21004	As indicated	

drawing number: TP02
revision: C

Town Planning

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north

LEGEND

RB-1	-	RENDERED AND PAINTED CONCRETE BLOCK COLOUR: 'DULUX' SNOWY MOUNTAINS QUARTER, SW1G3
RB-2	-	RENDERED AND PAINTED CONCRETE BLOCK COLOUR: 'DULUX' SILVER JEWEL, SN486
RBC	-	RENDERED AND PAINTED CONCRETE COLOUR: 'DULUX' SNOWY MOUNTAINS QUARTER, SW1G3
LWC-1	-	JAMES HARDIE 'AXON" WALL CLADDING FIXED TO MANUFACTURER'S REQUIREMENTS. COLOUR: 'DULUX' SNOWY MOUNTAINS QUARTER, SW1G3
ALB	-	'DECOWOOD' ALUMINIUM CLICK-ON DECO BATTENS 32 X 60mm, 20mm SPACINGS, WOOD FINISH ALUMINIUM, COLOUR: NATURAL SNOW GUM
GB	-	ALUMINIUM FRAMED GLASS BALUSTRADE TO COMPLY WITH NCC D2.16 AND D2.17, AND AS1428.1
KLK	-	COLORBOND STEEL LYSAGHT 'KLIP-LOK' ROOF SHEETING, COLOUR: SURFMIST
CRS	-	COLORBOND STEEL LYSAGHT 'CUSTOM ORB' ROOF SHEETING, COLOUR: SURFMIST
THR	-	35mm (H) THRESHOLD RAMP TO COMPLY WITH AS1428.1, FIG.21
CHWR	-	CEILING HOISTS (WINCH) AND RAILS TO COMPLY WITH AS1428.4.1 TO MIN. LOAD CAPACITY 250KG
TGSI	-	TACTILE GROUND SURFACE INDICATORS TO COMPLY WITH AS1428.4.1

ACRYLIC RENDER & PAINTED EAVES:
'DULUX' SNOWY MOUNTAINS QUARTER

ROOFINGS, FLASHINGS, GUTTERING & DOWNPIPES:
'COLOURBOND' SURFMIST

ACRYLIC RENDER FEATURE ACCENTS:
'DULUX' SILVER JEWEL

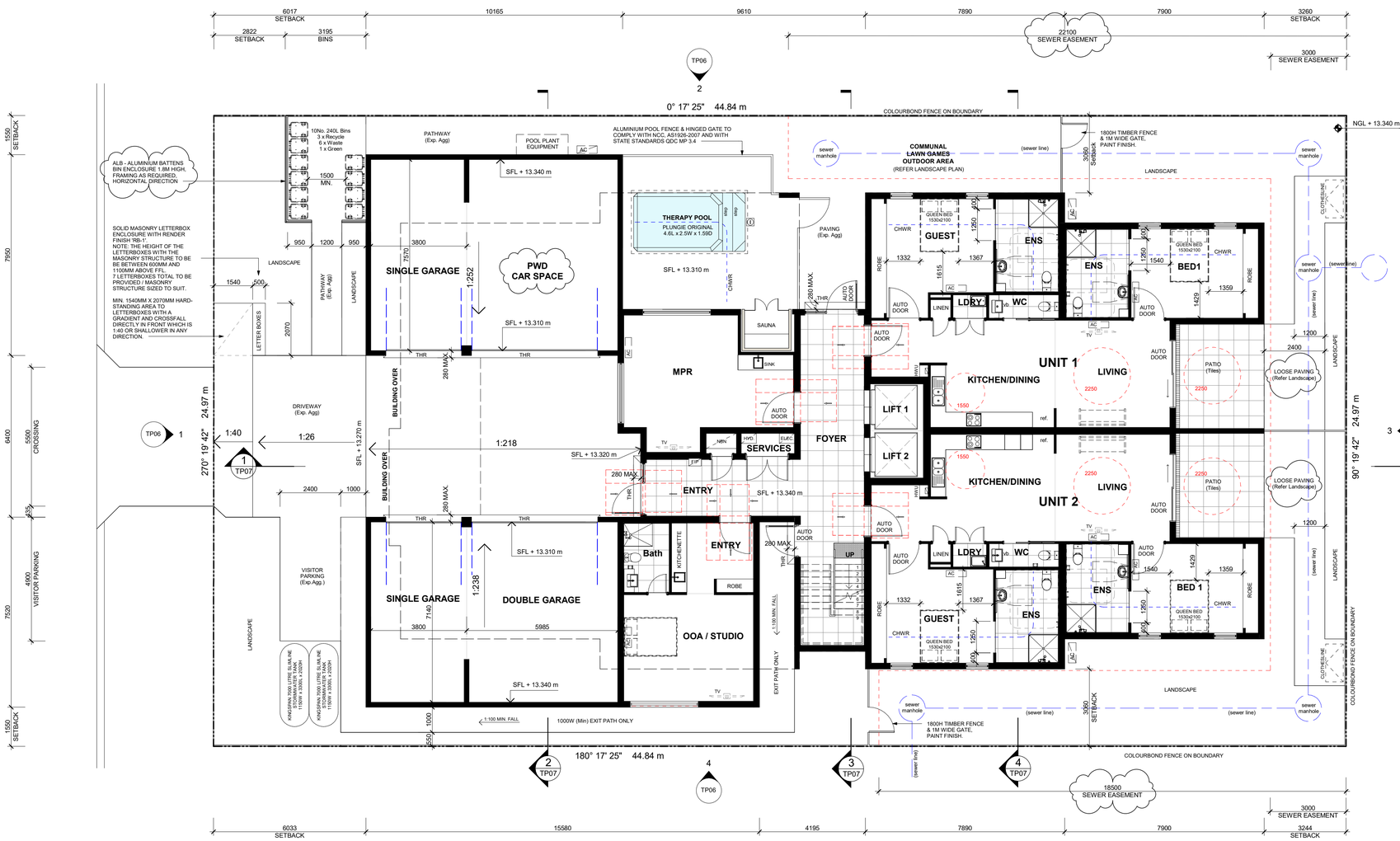
WINDOW & DOOR FRAMES:
'COLOURBOND' SHALE GREY

FEATURE TIMBER LOOK GARAGE DOORS:
'B&D' PANELIFT ICON DOOR, MADRID WOODGRAIN TEXTURE, COLOUR: KNOTWOOD TASSIE OAK ALUMINIUM

FEATURE TIMBER LOOK BATTENS & SCREENING:
'DECOWOOD' ALUMINIUM CLICK-ON DECO BATTENS 32 X 60mm, 20mm SPACINGS, WOOD FINISH ALUMINIUM, COLOUR: NATURAL SNOW GUM

EXTERNAL FINISHES / MATERIALS/ COLOUR PALETTE

GLENCOE STREET



GROUND FLOOR PLAN

scale 1 : 100

ROCKHAMPTON REGIONAL COUNCIL

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revision	revision description	date
A	Preliminary	16/09/2022
B	Town Planning Issue	20/09/2022
C	Town Planning Issue	04/10/2022
D	Town Planning Issue	15/11/2022

Town Planning

project title: MULTI UNIT DEVELOPMENT (SDA COMPLIANT)

address: 7 GLENCOE ST, ALLENSTOWN QLD

drawing title: GROUND FLOOR PLAN

project number: 21004 | scale @A1: 1 : 100 | approved:

drawing number: TP03 | revision: D

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LEGEND

RB-1	-	RENDERED AND PAINTED CONCRETE BLOCK COLOUR: 'DULUX' SNOWY MOUNTAINS QUARTER, SW1G3
RB-2	-	RENDERED AND PAINTED CONCRETE BLOCK COLOUR: 'DULUX' SILVER JEWEL, SN486
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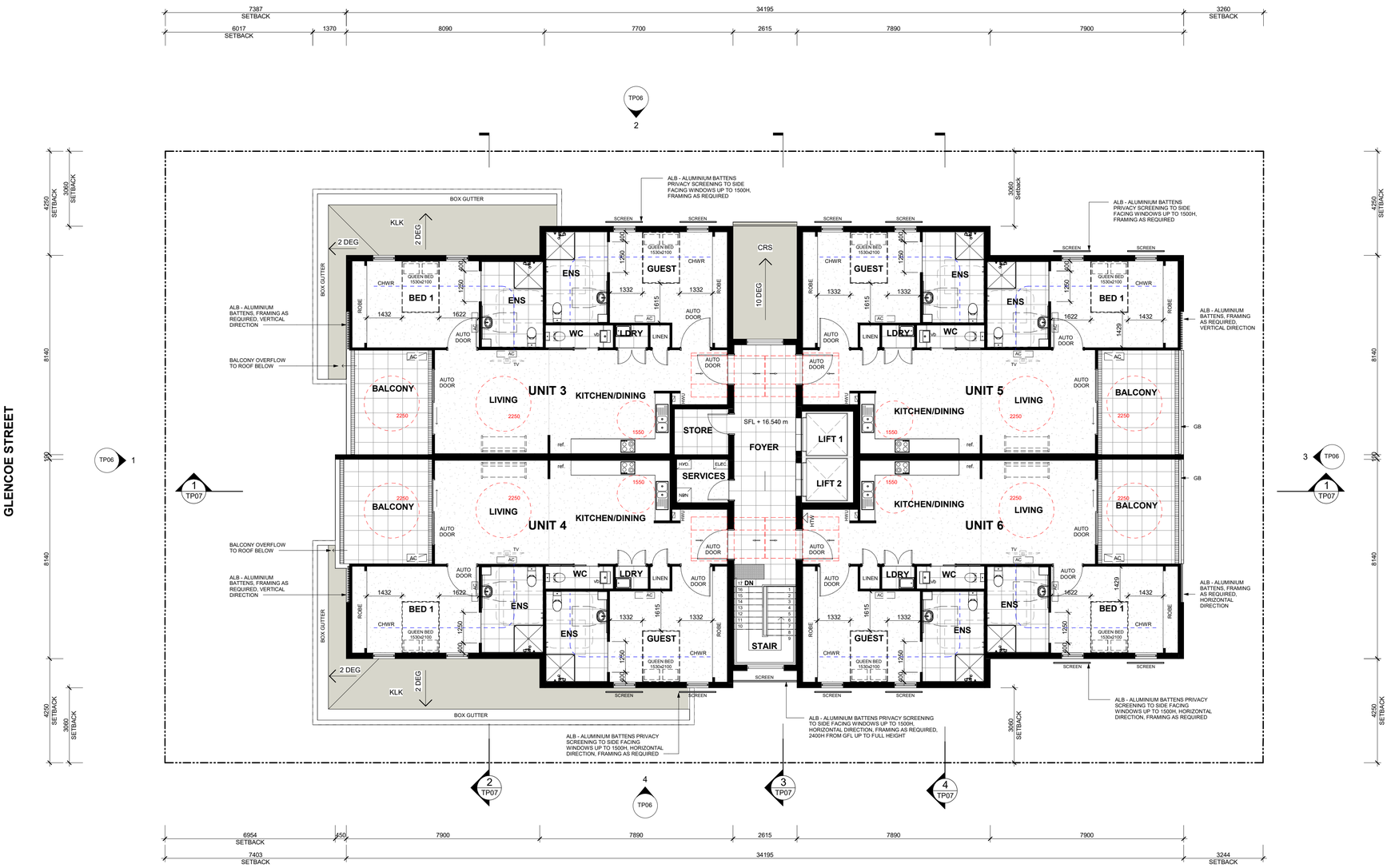
EXTERNAL FINISHES / MATERIALS/ COLOUR PALETTE



UPPER FLOOR PLAN

scale 1 : 100

ROCKHAMPTON REGIONAL COUNCIL

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Dated: 27 January 2023

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revision	revision description	date
A	Preliminary	16/09/2022
B	Town Planning Issue	20/09/2022

Town Planning

project title: MULTI UNIT DEVELOPMENT (SDA COMPLIANT)

drawing title: UPPER FLOOR PLAN

address: 7 GLENCOE ST, ALLENSTOWN QLD

project number: 21004 | scale @A1: 1 : 100 | approved:

drawing number: TP04 | revision: B

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ACRYLIC RENDER & PAINTED EAVES:
'DULUX' SNOWY MOUNTAINS QUARTER

ROOFINGS, FLASHINGS, GUTTERING & DOWNPIPES:
'COLOURBOND' SURFMIST

ACRYLIC RENDER FEATURE ACCENTS:
'DULUX' SILVER JEWEL

WINDOW & DOOR FRAMES:
'COLOURBOND' SHALE GREY

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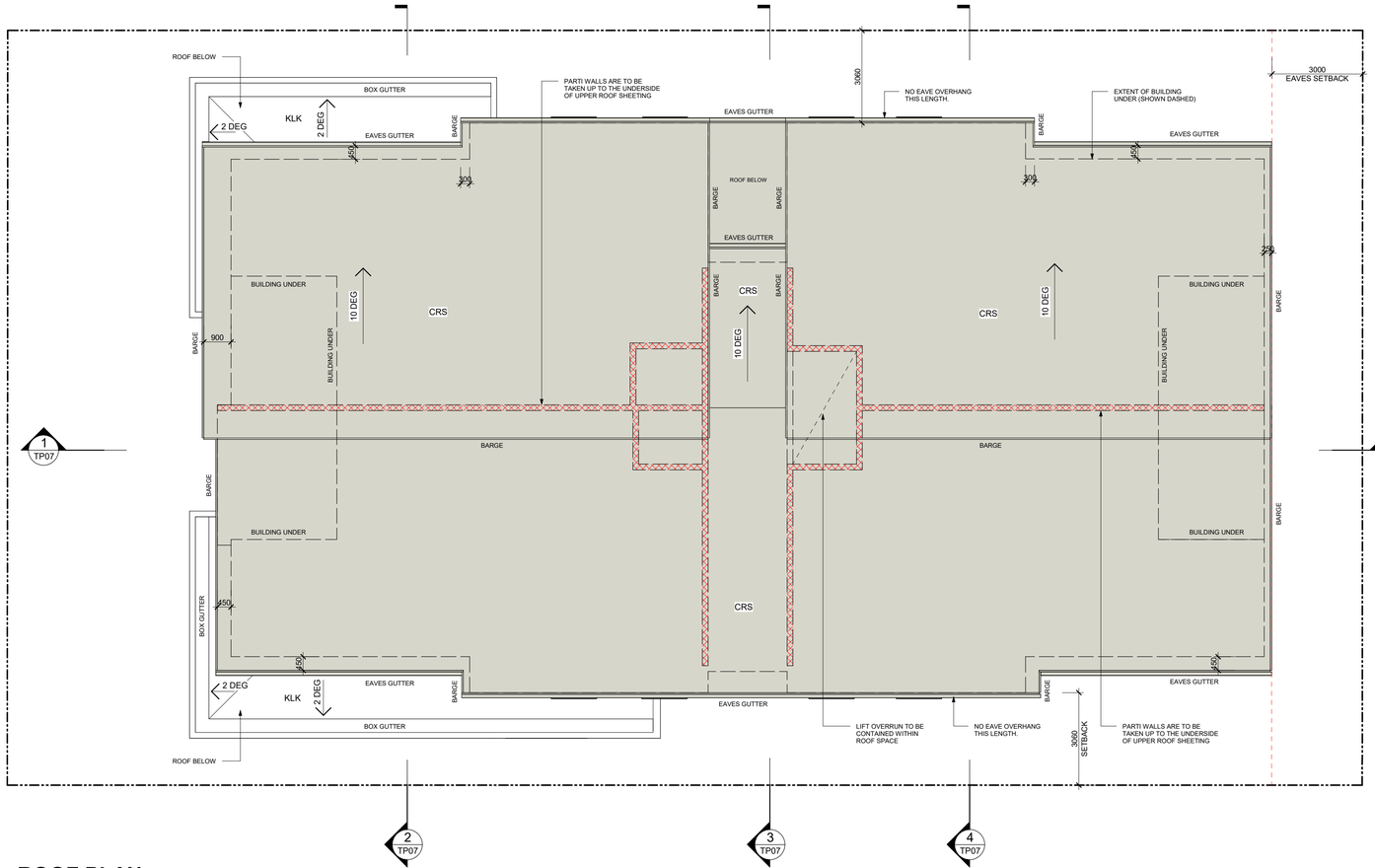
EXTERNAL FINISHES / MATERIALS/ COLOUR PALETTE

GLENCOE STREET



ROOF PLAN

scale 1 : 100

ROCKHAMPTON REGIONAL COUNCIL

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revision	revision description	date
A	Preliminary	16/09/2022
B	Town Planning Issue	20/09/2022

Town Planning

project title: MULTI UNIT DEVELOPMENT (SDA COMPLIANT)

drawing title: ROOF PLAN

address: 7 GLENCOE ST, ALLENSTOWN QLD

project number: 21004 | scale @A1: 1 : 100 | approved:

drawing number: TP05 | revision: B

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north

LEGEND

RB-1	- RENDERED AND PAINTED CONCRETE BLOCK COLOUR: 'DULUX' SNOWY MOUNTAINS QUARTER, SW1G3	THR	- 35mm (H) THRESHOLD RAMP TO COMPLY WITH AS1428.1, FIG.21
RB-2	- RENDERED AND PAINTED CONCRETE BLOCK COLOUR: 'DULUX' SILVER JEWEL, SN4B6	CHWR	- CEILING HOISTS (WINCH) AND RAILS TO COMPLY WITH AS1428.4.1 TO MIN. LOAD CAPACITY 250KG
RBC	- RENDERED AND PAINTED CONCRETE COLOUR: 'DULUX' SNOWY MOUNTAINS QUARTER, SW1G3	TGSI	- TACTILE GROUND SURFACE INDICATORS TO COMPLY WITH AS1428.4.1
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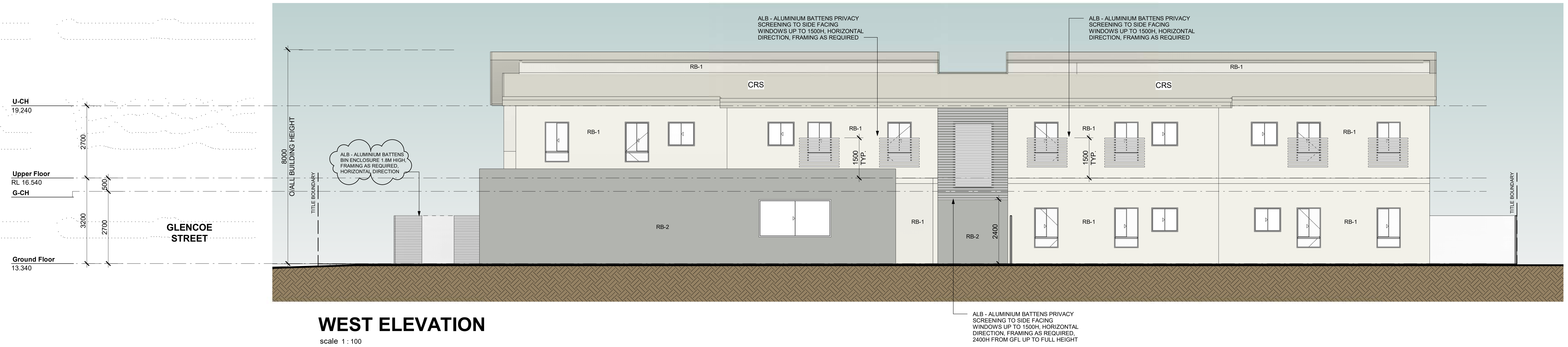
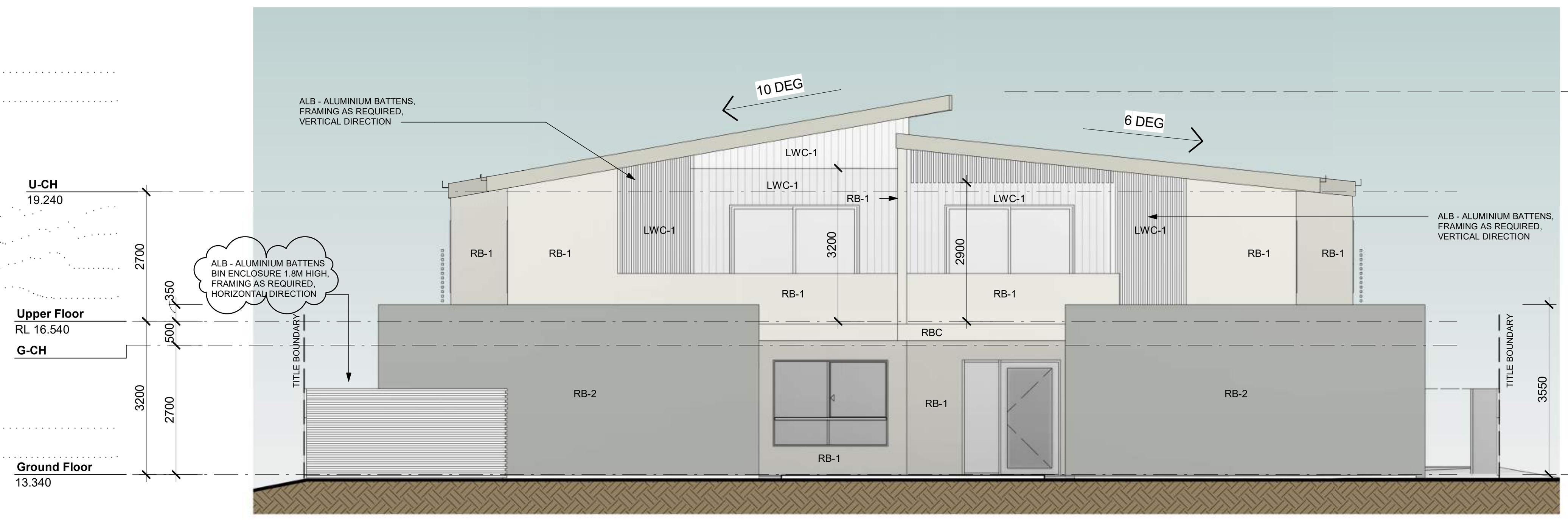
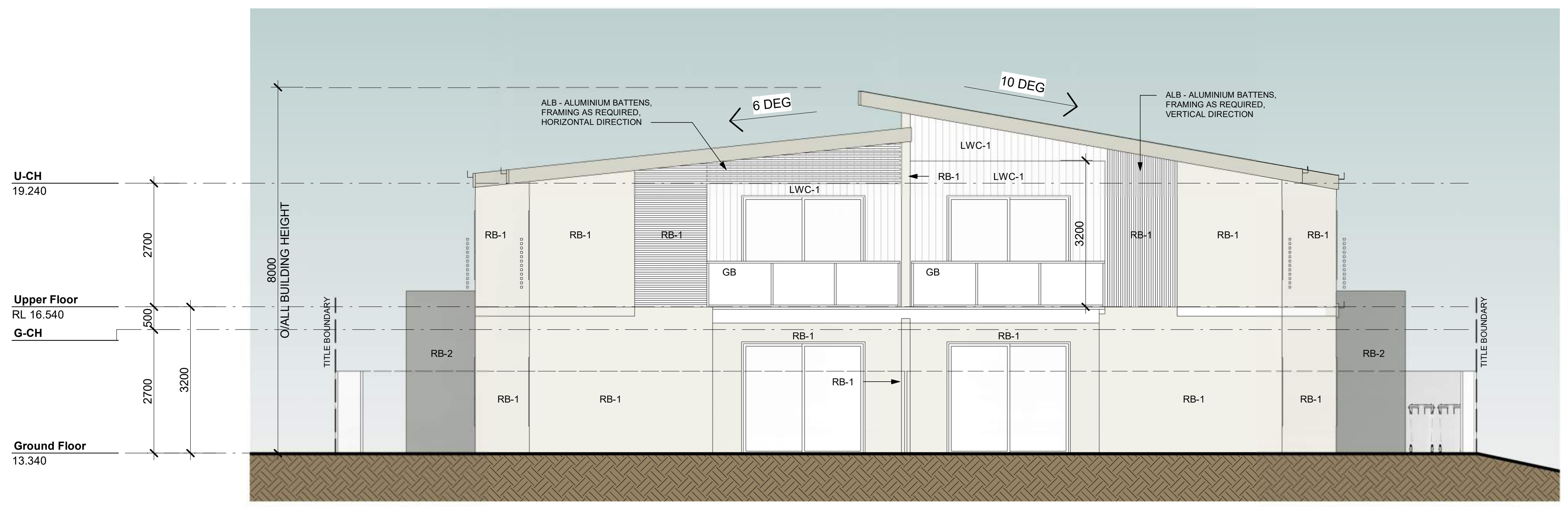


WEST ELEVATION

scale 1 : 100



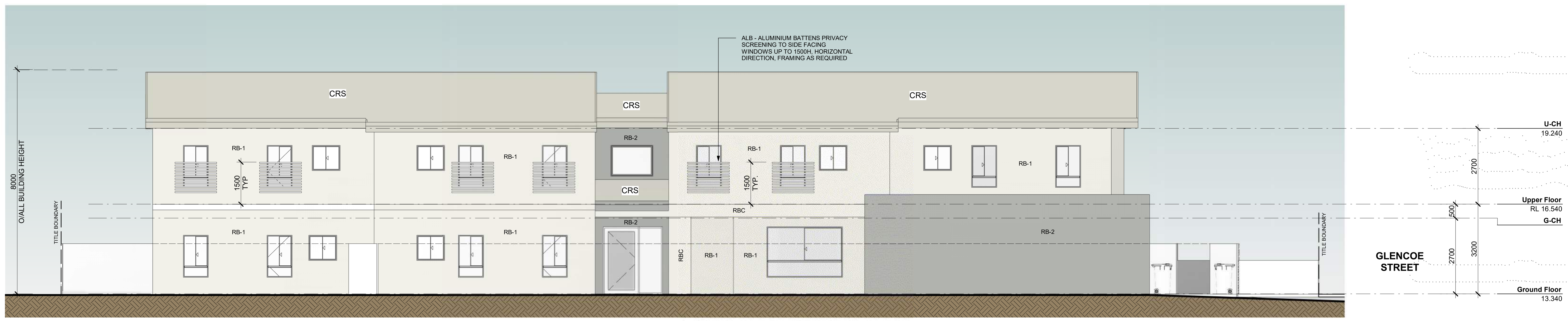


SOUTH ELEVATION

scale 1 : 100

NORTH ELEVATION

scale 1 : 100



EAST ELEVATION

scale 1 : 100

ACRYLIC RENDER & PAINTED EAVES: 'DULUX' SNOWY MOUNTAINS QUARTER

ROOFINGS, FLASHINGS, GUTTERING & DOWNPIPES: 'COLOURBOND' SURFMIST

ACRYLIC RENDER FEATURE ACCENTS: 'DULUX' SILVER JEWEL

WINDOW & DOOR FRAMES: 'COLOURBOND' SHALE GREY

FEATURE TIMBER LOOK GARAGE DOORS: 'B&D' PANELIFT ICON DOOR, MADRID WOODGRAIN TEXTURE, COLOUR: KNOTWOOD TASSIE OAK ALUMINIUM

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EXTERNAL FINISHES / MATERIALS/ COLOUR PALETTE

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A	Preliminary	16/09/2022
B	Town Planning Issue	20/09/2022
C	Town Planning Issue	04/10/2022

project title	MULTI UNIT DEVELOPMENT (SDA COMPLIANT)
drawing title	ELEVATIONS
address	7 GLENCOE ST, ALLENSTOWN QLD
project number	21004
scale @A1	1 : 100
approved	
drawing number	TP06
revision	C

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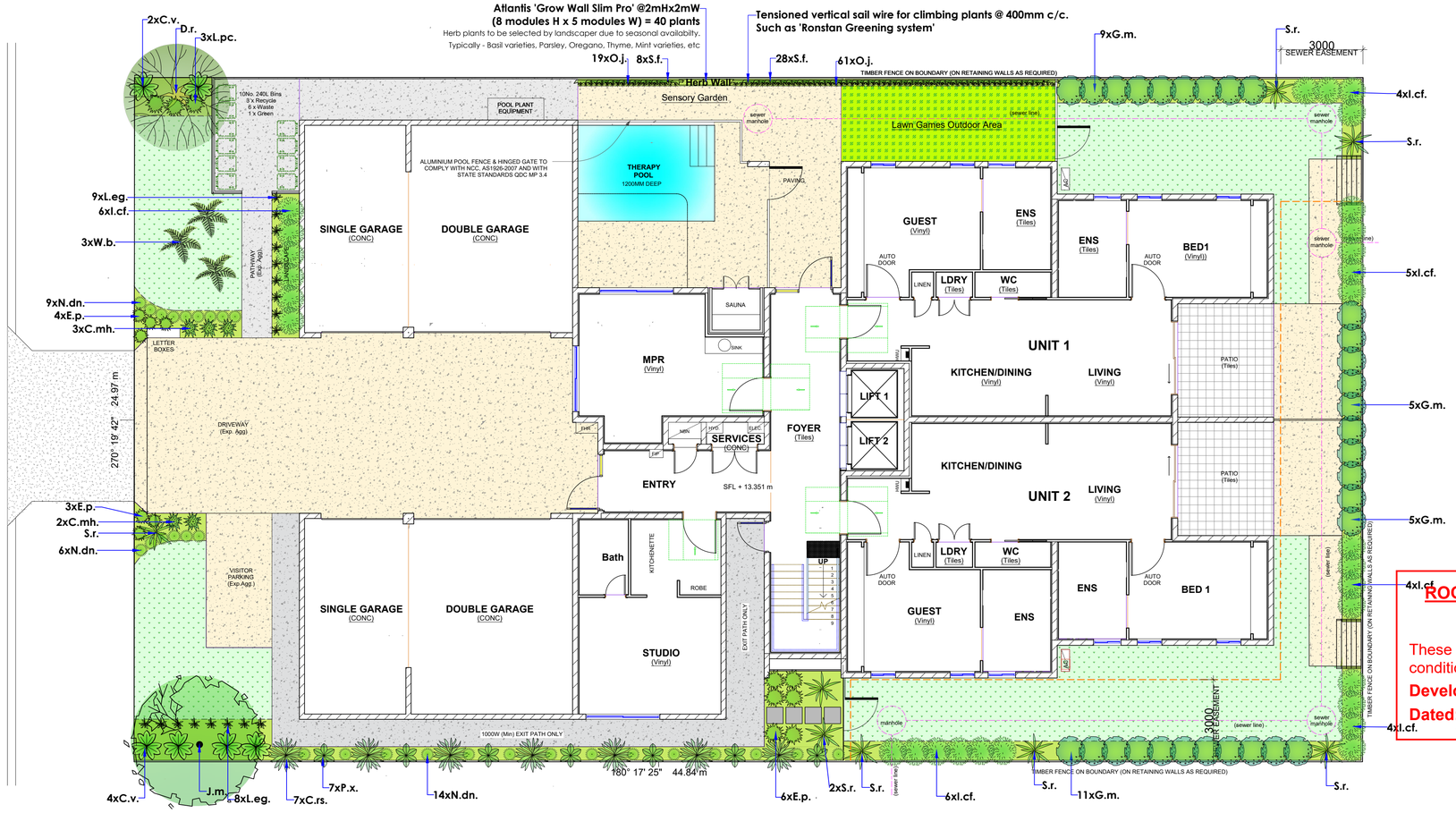
Document Set ID: 39858835
Version: 1, Version Date: 28/11/2022



LEGEND

- PROPOSED MEDIUM EVERGREEN CANOPY TREES
- PROPOSED SMALL EVERGREEN CANOPY TREES
- PROPOSED EVERGREEN SCREENING SHRUBS
- PROPOSED PALM TREES
- PROPOSED SHRUBS & GROUNDCOVERS
- PROPOSED MULCHED GARDEN BEDS
- PROPOSED LAWN
- PROPOSED SYNTHETIC TURF (Short pile synthetic turf for play surfaces ~ 19mm)
- PROPOSED EXPOSED AGGREGATE CONCRETE (Such as 'Boral' 'Sandcastle' mix)
- PROPOSED EXPOSED AGGREGATE CONCRETE (Such as 'Boral' 'Salt & Pepper' mix)
- PROPOSED COLORED CONCRETE PAVERS AS STEPPING STONES. 500x500mm
- PROPOSED FOLD DOWN CLOTHESLINE
- PROPOSED FLEXIBLE ALUMINIUM GARDEN BED EDGING

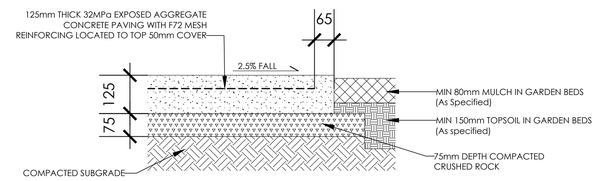
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

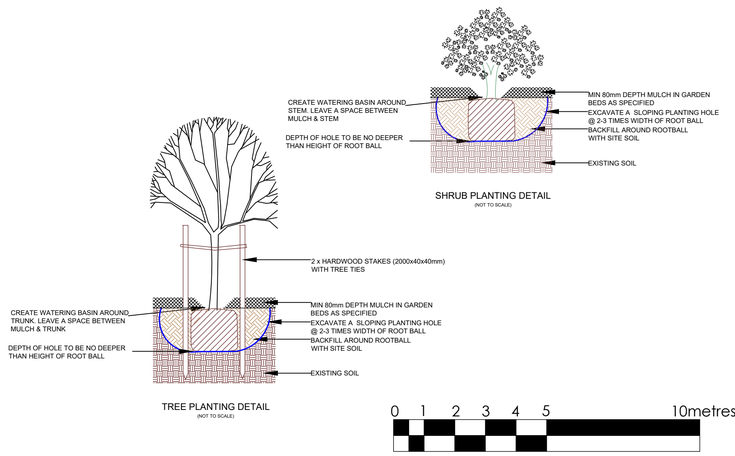
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/146-2022

Dated: 27 January 2023



DETAIL OF EXPOSED AGGREGATE CONCRETE DRIVEWAY
(SCALE 1:10)



0 1 2 3 4 5 10metres

ESTABLISHMENT & MAINTENANCE NOTES

1. The site is to be cleared of all debris and builder's rubble.
2. All weed species on site shall be eradicated.
3. All topsoil suitable for reuse to be stockpiled and protected during the construction phase.Supply & install site topsoil from site stockpile to all planting and grassed areas to a depth of 200mm. If site topsoil is not available, Soils shall be incorporated into garden bed areas. A 5-way 'Landscape Blend' soil mix, or any weed free sandy loam/clay mix with added compost, should be added to a minimum depth of about 200mm.
4. Prior to spreading any top soil the areas for lawn and garden beds shall be ripped to a depth of 200mm, if required.
5. Supply and install 20mm diameter 80mm depth approved fine grade Eucamulch to all garden beds, planting areas and tree watering bowls.
6. Supply and install Tuff Edge 2m Brushed Alloy Aluminium Garden Edge held in place with Aluminium stakes finished flush with path/lawn height. (As per manufacturers installation specifications).
7. Synthetic turf to be 'Short pile synthetic turf' for play surfaces ~ 19mm yarn. To be installed as per manufacturers installation specifications on a permeable base of min depth 100mm of compacted crushed rock and 50mm depth 'Crusher dust'.
8. The Contractor must verify all dimensions on site and immediately report any discrepancies to the Project Manager.
9. The Contractor must verify all plant quantities prior to ordering.
10. All plant species shall be true to type and there should be no alterations or substitutions of nominated species or cultivars without the written consent of the Landscape Architect.
11. All plant stock must be checked by the Contractor and must be healthy and disease free.
12. Slow release fertiliser, suitable for mixed tropical plant species, shall be applied at time of planting in accordance with manufacturer's recommended dose rates and application methods.
13. Planting must be undertaken in accordance with sound horticultural practices, as per the planting details.
14. All plants must be thoroughly hand watered just after planting.
12. An automated 20mm PVC irrigation system to be installed to all garden bed areas. Typically use 'Netafilm Scapeline' 2lph non pressure compensating 13mm 'Trickle Tube' irrigation system @ 300mm centres for garden beds (or similar). Use pressure reducing valves after the solenoids. All lawn areas to have min 120mmH adjustable pop-ups installed. Note: Herb garden to have separate dedicated solenoid control.
13. All lawn areas to be 'Sir-Walter' soft leaf Buffalo instant turf laid in accordance with suppliers specifications on compacted and levelled free draining topsoil as specified. Add lawn starter fertilizer at manufacturers recommended rates at time of laying. Note – 'Sir-Walter' instant turf must be topdressed (@15mm depth) with 'turf sand' at time of laying to stop roots drying out and to provide a level surface.
14. Exposed Aggregate Concrete driveway / paths.
    Please note – Contractor to install flexible joint between garage/house slab and driveway slabs.
    MATERIALS:
    Driveways – Exposed aggregate coloured concrete:
    Aggregate 'Sandcastle' or 'Salt & Pepper' Mix – from 'Boral Rockhampton' (07) 4936 11333
    Concrete: 120mm depth (for driveways) 25MPA concrete fine aggregate mix. 100mm depth for paths.
    Reinforcing: F82 steel mesh located centrally
    Base course: Prepared and compacted sub-base - 75mm compacted depth fine crushed rock
    Joints: 30mm depth saw-cut crack control joints @ 3000mm centres
15. The Landscape Contractor should provide a minimum 13 week establishment maintenance program during which time any dead, dying or diseased plant material is replaced, litter is removed and weeds are eradicated.
16. Regular maintenance must be undertaken to remove weed species and litter, and replace any dead or diseased plants. Tip-prune shrubs regularly to maintain compact growth habit. Cut back flaxes, lilies etc biannually.

GENERAL NOTES

1. The Landscape Contractor must refer to architectural drawings for set-out of all paving, paths & driveways.
2. This plan is intended for soft landscaping and associated landscape materials and must not be used for any other purposes.
3. The Landscape Contractor must verify all dimensions and areas prior to commencing any work or placing any orders for materials.
4. The Landscape Contractor must determine the location of all underground services prior to commencing any work on site and shall be liable for any damage to services or conduits.
5. The Landscape Contractor must immediately report any perceived errors or omissions in the landscape drawings to the Project Manager and Client.
6. Where any conflict occurs between proposed tree locations and infrastructure, such as light poles or powerlines, tree(s) must be relocated or removed.
7. The Landscape Contractor must confirm all plant quantities prior to ordering.
8. Faulkner & Chapman accepts no responsibility for establishment or maintenance of the landscaping proposed on the Landscape Plan.

PLANT SCHEDULE

CODE	*BOTANICAL NAME*	*COMMON NAME*	*HEIGHT X WIDTH*	*POT SIZE*	*QUANTITY*
Trees					
D.r.	*Delonix regia*	*Royal poinciana*	*6-8x6-8m*	*400mm*	*1*
J.m.	*Jacaranda mimosifolia*	*Jacaranda*	*6-8x5-7m*	*300mm*	*1*
Palms					
C.rs.	*Cordyline 'Red Sister"*	*Red cabbage palm cv.*	*2.5x1.2m*	*200mm*	*7*
W.b.	*Wodyetia bifurcata*	*Foxtail palm*	*7-11x2-3m*	*300mm*	*3*
Shrubs & Perennials					
C.v.	*Codlaeum varigated var pitum*	*Croton*	*2x1.5m*	*200mm*	*6*
C.mh.	*Cuphea 'Mad Hatter'White*	*Cuphea*	*0.8x1m*	*140mm*	*5*
E.p.	*Evolvulus pilosus*	*Blue Eyes*	*0.3x1m*	*140mm*	*13*
G.m.	*Gardenia magnifica*	*Gardenia*	*1.5x1m*	*300mm*	*30*
I.cf.	*Ixora 'Coral Fire'*	*Prince of orange cv.*	*1.3x1.2m*	*200mm*	*29*
L.pc.	*Leptospemum 'Pink Cascade'*	*Groundcover tea-tree*	*0.4x1.2m*	*140mm*	*3*
L.eg.	*Liriope 'Evergreen Giant'*	*Giant turf lily*	*0.4x0.4m*	*140mm*	*17*
N.dn.	*Nandina domestica 'Nana'*	*Dwarf sacred bamboo*	*0.5x0.5m*	*140mm*	*29*
O.j.	*Ophiopogon japonicus*	*Mondo grass*	*0.05x0.3m*	*70mm*	*80*
P.x.	*Philodendron 'Xanadu'*	*Philodenedron*	*0.8x1m*	*200mm*	*7*
S.r.	*Strelitzia reginae*	*Bird-of-paradise*	*1.2x1.2m*	*300mm*	*8*
Climbing plants					
S.f.	*Stephanotis floribunda*	*Madagascan Jasmine*	*Climber*	*200mm*	*36*

Rev Description Date By App.

Project Name: Proposed Residential Development, 7 Glencoe Street, Rockhampton

Drawing Title: LANDSCAPE PLAN

Client: Leben Pty Ltd

Designed N.F.
Drawn N.F.
Approved G.C.
Date 05.07.2022

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landscape design
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Landscape Architecture and Horticultural Consultancy
Members of The Australian Institute of landscape Architects, Landscape Industries Association of Victoria

Scale: 1:100 @ A1
Project Ref.: 7GlencoeLP1
Drawing No.: LP01 Rev.: -
Drawing Ref.: C:\USERS\GREGG\ONEDRIVE\LANDSCAPE PLANS 2022\7GLENCOELP1.DWG

Document Set ID: 39543779
Version: 1, Version Date: 09/11/2022

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/146-2022

Dated: 27 January 2023

TRAFFIC IMPACT STATEMENT REPORT
FOR
7 GLENCOE STREET (RESIDENTIAL CARE FACILITY)

OCTOBER 2022

FINAL REPORT

ITE CONSULTING

TRAFFIC AND TRANSPORT ENGINEERS

PREPARED FOR: ***Leben Pty Ltd***	PREPARED BY: ***ITE Consulting*** 4 Coen Street Thornlands Brisbane 4164
Contact Person: Wayne Peters **Tel**: **Email:** wpeters”crestwoodpl.com.au	**Contact Person:** Herman Joubert **Tel:** 0424110122 **Email:** herman@iteconsulting.com.au

ITE CONSULTING REPORT
QUALITY ASSURANCE ISSUE DATA

Report Title:	7 Glencoe Street
Client:	Leben Pty Ltd
Project Team:	Herman Joubert MEng CEng (U.K) CPEng (NZ) RPEQ
Project Name:	7 Glencoe Street
Report Number:	00115
Revision Number	01

Revision History:

Date	Report Status	Written by	Reviewed by
07/07/2022	Draft	Herman Joubert	Herman Joubert
21/10/2022	Final	Herman Joubert	Herman Joubert

Approved by:

21/10/2022

Signed **Date**

Herman Joubert
RPEQ No.: 25899

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1.0 INTRODUCTION AND APPROACH

1.1 Project Overview

ITE Consulting was appointed by Leben Pty Ltd in order to conduct a Traffic Engineering Assessment for a proposed Residential Care Facility (6 units) plus 1 car taker's accommodation at 7 Glencoe Street, Allenstown, formally known as Lot 31 on RP605808. The site locality is provided in Figure 1.1.

Figure 1.1: Site Locality

ITE CONSULTING Project:	Client:	Figure Name:	Figure Number:
7 Glencoe Street TIS	Leben Pty Ltd	Site Locality	1

Source: Nearmap, 2022

The proposed development site currently obtains access from Glencoe Street by means of a single formal residential driveway crossover. On-Street parking is available along both sides of Glencoe Street. Subsequent sections of the traffic assessment will discuss the existing and proposed access arrangement in more detail.

1.2 Proposed Application

The proposed application is for a material change of use consisting of:

Table 1.1 Proposed Development Extents

Parameter	Extent
Units:	6 units plus 1 carer's accommodation
Parking:	6 car parks (1 PWD bay, 1 visitor bays and 4 staff bays)

There is no phasing expected for this development. Car parking is to be provided via at grade enclosed garage parking as well as an unenclosed and obstructed visitor bay. The following legislative summary items applicable to the proposed reconfiguration and traffic engineering elements only are indicated in Table 1.2.

Table 1.2 Legislative Summary

Legislative Summary	
Local Government Authority	Rockhampton Regional Council
Planning Scheme Zone/s	Low-Medium Density Residential
Applicable Planning Scheme Policies	Waste Management Code Access, Parking and Transport Code

1.3 Scope and Context of Report

This report investigates the transport aspects associated with the proposed development. The

scope of the transport aspects investigated includes:

- a review of existing site conditions including an assessment of public transport, pedestrian and cycling networks and connectivity surrounding the development site;
- estimation of development's traffic generation and the distribution and traffic analysis discussion;
- assessment of the development's car parking provision against Rockhampton Regional Council policy requirements
- assessment of the development's on-site car parking geometric layout against Council's Access, Parking and Transport Code and AS2890.1:2004;
- a review of the site's servicing and refuse collection requirements; and
- assessment of the site's access location and form.

1.4 Reference Guides

The following documents have been evaluated in order to formulate the traffic advice within this assessment:

- AS/NZS 2890.1 – 2004 Parking facilities Part 1: Off-street car parking
- AS/NZS 2890.2 – 2002 Part 2: Off-street commercial vehicle facilities
- Road Planning and Design Manual, Chapter 13
- Plans of the proposed development prepared by Mark Ciavarella Design, with a copy of relevant drawings provided in **Appendix A** to this report
- Rockhampton Regional Council online mapping
- Rockhampton Regional Council Planning Scheme

2.0 EXISTING CONDITIONS

2.1 On-Site Uses

The existing use of the site includes a residential dwelling which will be demolished as part of the proposed development.

2.2 Site Surrounding Road Network

Descriptive details regarding the road network surrounding the proposed site are provided in Table 2.1. The table provides information regarding existing geometrical conditions of the road network and associated road links.

Table 2.1 Immediate Site Surrounding Road Network

Road Name	Road Class	Number of Lanes per Direction	Carriageway Single / Dual	Carriageway Width (m)	Posted Speed (km/h)
Glencoe Street	Local Street	1	S	10**	50
Upper Dawson Road	Urban Sub Arterial	1	S	12**	50

Note ** On-street parking is allowed for

2.3 Alternative Transport

2.3.1 Public Transport

There are two bus stops within 120m of the subject site which are serviced by Route 401. Figure 2.1 shows the location of the bus stops within proximity to the subject site.

Figure 2.1: Public Transport Stops

ITE CONSULTING Project:	Client:	Figure Name:	Figure Number:
7 Glencoe Street TIS	Leben Pty Ltd	Bus Stops	2

Source: Queensland Globe (2022)

The desired route to be taken by pedestrians to and from the bus stops is shown in Figure 2.1. Table 2.2 provides a summary of the public transport services operating within proximity to the subject site.

Table 2.2 Public Transport Service Summary

Service	Service	Route	Frequency
401	Bus	From The Range at Blackall Street to Park Avenue, Koongall and return.	18 minutes

Importantly, the proposed development does not trigger the need for new public transport services or the need for modifications to existing services.

2.3.2 Active Transport

The surrounding area is well-serviced by existing pedestrian infrastructure. Figure 2.2 shows the location of pedestrian footpaths in proximity to the subject site.

Figure 2.2: Active Transport Network

ITE CONSULTING Project:	Client:	Figure Name:	Figure Number:
7 Glencoe Street TIS	Leben Pty Ltd	Active Transport	3

Source: Queensland Globe (2021)

Considering the existing pedestrian network, the proposed development does not trigger the need for modifications to existing active transport facilities or trigger the need for new facilities.

3.0 DEVELOPMENT DETAILS

3.1 Development Layout

The proposed site layout plan is attached as **Annexure A**.

4.0 DEVELOPMENT TRAFFIC ESTIMATES

4.1 Project Traffic Generation

Traffic generation for the development was estimated using the Roads and Maritime Services' (RMS) Guide to Traffic Generating Developments (2002) for medium density residential dwellings. A peak hour trip rate of 0.2 trips / unit was utilised. In the selection of the trip rate, consideration was given to the location, unit size and proximity to alternate transport modes. The subject site in its current form consists of a vacant lot and as such

the development generated traffic will entail newly network induced trips. The expected net traffic generation for the development is shown in Table 4.1.

Table 4.1 Peak Hour Trip Generation

Existing / Proposed	Land Use	Quantity	AM Rate	PM Rate	AM Trips	PM Trips
Proposed	Residential Care Facility	6 Units	0.2 trips per unit	0.2 trips per unit	1.2 trips	1.2 trips
Net Traffic Generation (rounded to nearest trip)					2 trips	2 trips

As demonstrated in Table 4.1, the proposed development is estimated to generate in the order of two (2) additional trips during the AM and PM peak hour periods. This trip generation is considered to be negligible from a traffic engineering perspective.

4.2 Impact Assessment

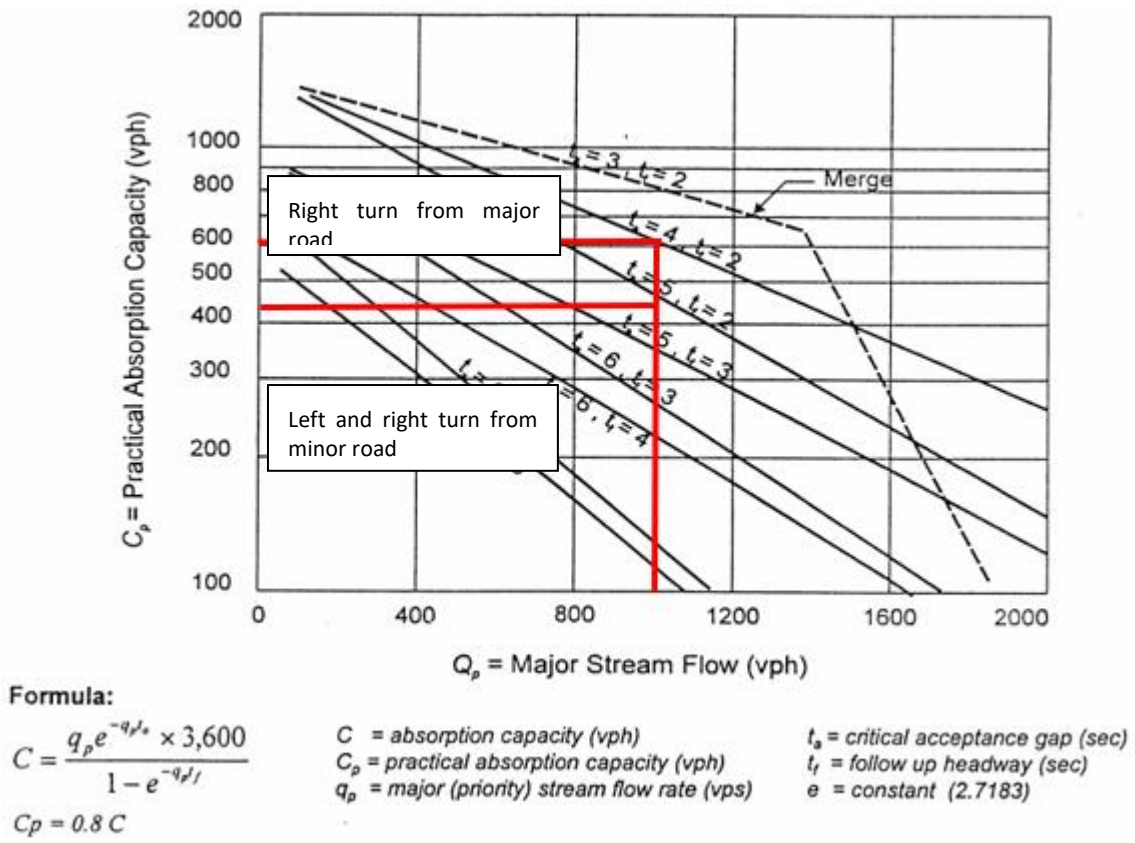
Assuming uniform flow, the additional traffic generation as a result of the development is the equivalent of one (1) vehicle entering or exiting the site every 30 minutes during the peak hour. This trip generation is considered to be negligible from a traffic engineering perspective and is not expected to result in any significant traffic issues that would require mitigation measures or detailed analysis.

4.2.1 Intersection Capacity

Glencoe Street / Upper Dawson Road Intersection

An absorption capacity and delay assessment has been carried out to determine whether the nearest priority-controlled Upper Dawson Road / Glencoe Street intersection would provide sufficient capacity and that the expected generated trips would be compatible with the prominent residential and road network environment. Absorption capacity refers to the number of vehicles that can practically enter a major stream of flow from a minor stream of flow at a priority-controlled intersection during the peak hour. This can be taken from the Road Planning and Design Manual, Chapter 13. An assumption has been made to the existing peak hour traffic volume along Upper Dawson Road. Considering the surrounding residential environment, peak hour traffic volumes along Upper Dawson Road is considered to be 601 – 1000 vehicles/hour based on SC6.15.3.1.1 of the Rockhampton Regional Council Planning Scheme and the urban sub-arterial hierarchy. The assumed 1000 vehicles/hour is therefore considered conservative. The practical absorption capacity is graphically illustrated in Figure 4.1, based on variable non-linear critical gap acceptance and follow up headway time gap requirements.

Figure 4.1: Absorption Capacity



Formula:

$$C = \frac{q_p e^{-q_p t_c/e} \times 3{,}600}{1 - e^{-q_p t_f}}$$

$Cp = 0.8\,C$

C = absorption capacity (vph)
C_p = practical absorption capacity (vph)
q_p = major (priority) stream flow rate (vps)
t_a = critical acceptance gap (sec)
t_f = follow up headway (sec)
e = constant (2.7183)

Source: Road Planning and Design Manual, Chapter 13

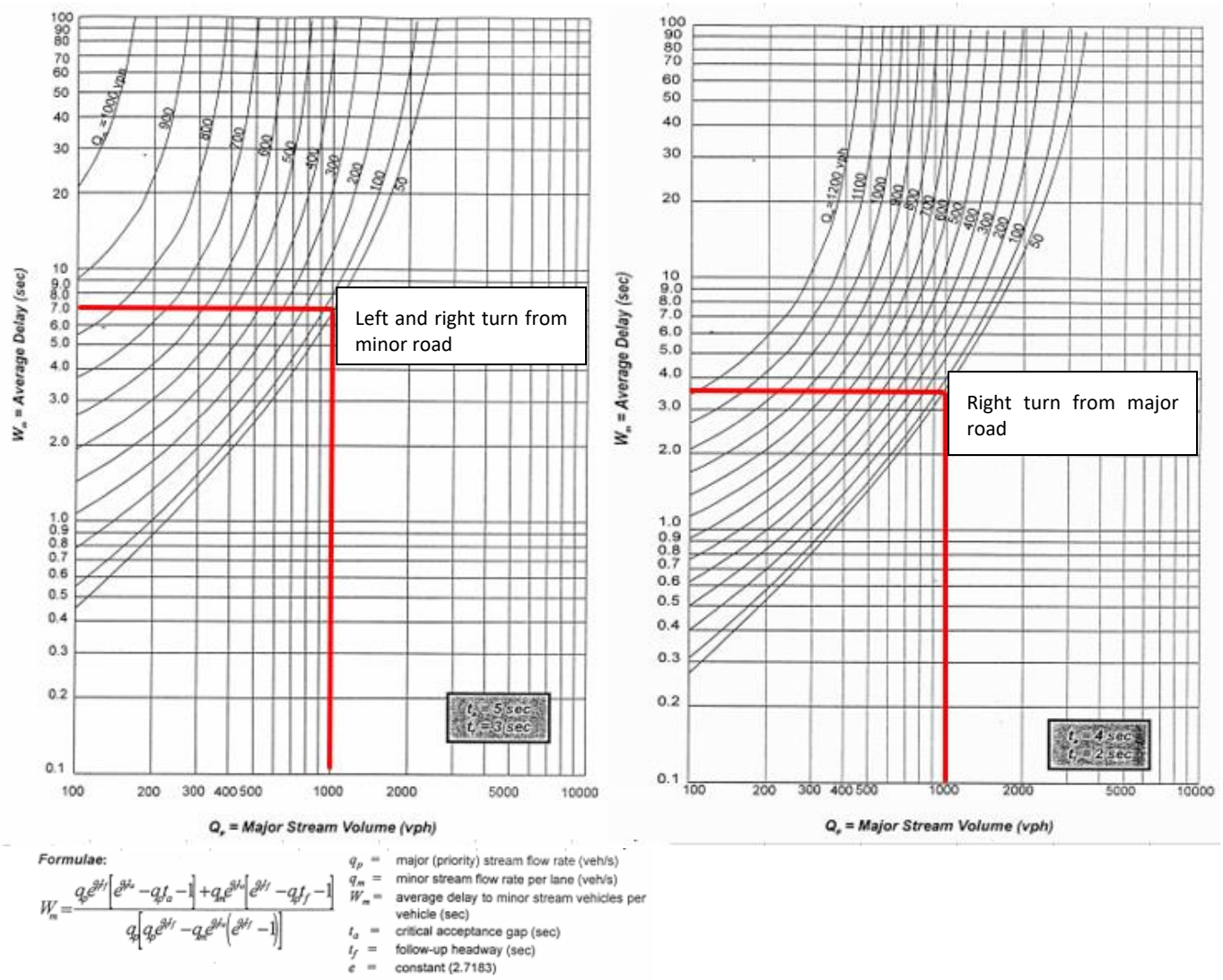
It is considered that sufficient practical absorption capacity will prevail, given the combination between the anticipated generated traffic (2 vehicles/hour during both AM and PM peaks) and through movement traffic along Upper Dawson Road. Theoretically, the traffic generated by the development would be able to enter the major stream flow along Upper Dawson Road even at a major stream flow of more than 2000 vehicles/hour. The analysis indicate that the following absorption capacity is likely to prevail:

- Approximately 600 vehicles/hour can be accommodated by the right turn movement from the major road (Upper Dawson Road)
- Approximately 450 vehicles/hour can be accommodated by the right turn and left turn movements from the minor road (Glencoe Street)

The external access intersection is therefore considered to be compatible with the surrounding environment in terms of allowable road infrastructure capacity (supply) and capability of the road network to absorb additional demand generated by the proposed development. An average vehicle delay assessment has been

carried out with respect to minor road stream vehicles needing to enter the major stream flow of Upper Dawson Road. Figure 4.2 illustrates the results.

Figure 4.2: Average Delay to Minor Stream Vehicles at Unsignalised Intersections



Source: Road Planning and Design Manual, Chapter 13

The analysis indicate that the following average vehicle delay is likely to prevail:

- Approximately 3.5 seconds per vehicle for right turning vehicles from the major road (Upper Dawson Road)
- Approximately 7 seconds per vehicle for both the right turn and left turn vehicles from the minor road (Glencoe Street)

The intersection is anticipated to provide sufficient levels of vehicle delay which is considered acceptable.

5.0 TRAFFIC ASSESSMENT

5.1 Car Parking Arrangements

5.1.1 Car Parking Requirements

Council's Access Transport and Parking Code was used to source parking rates for the development. The parking requirements and supply are presented in Table 5.1.

Table 5.1 Car Parking Supply Assessment

Parking Type	Quantity	Requirements	Required Provision	Proposed to be provided
Residential Care Facility	6 Units	Two (2) spaces per three (3) full time employees; and One (1) space per six (6) beds for visitors	12 employees (8 spaces) 1 visitor space (6 visitor beds proposed)	3 employee spaces 1 visitor space 1 PWD space
Caretaker Accommodation	1 Unit	One (1) covered space	1 covered space	1 covered space
Total			10 spaces	6 bays

The development provides a total of 6 car parking spaces with a requirement to provide a total of 10 parking spaces. The proposed development aims to allow for 2 employees per resident. Although the statutory requirement indicates that 8 spaces should be allowed for with a shortfall of 5 on-site spaces, it must be noted that these employees will not reside permanently on site and will only visit residents at different times of day. It is anticipated that a low likelihood would occur where all employees visit at the same time. Furthermore, it is evident that sufficient on-street parking opportunities occur along Glencoe Street which would be able to accommodate for any shortfall of on-stie employee parking.

A desktop assessment of existing on-street parking capacity has been undertaken to provide additional support that sufficient parking will be available. Capacity of non-demarcated parking along the site frontage has been calculated based on literature research obtained from the "Yogyakarta City Parking Capacity Calculation" as illustrated in Figure 5.1.

Figure 5.1: On-Street Parking Capacity Calculation

Vehicle Types	Angles	Capacities (m^2)
Motorcycles	90°	Length/0.75
Passenger cars	0°	Length/5
	30°	(Length − 0.88)/0.75
	45°	(Length − 1.91)/3.25
	60°	(Length − 1.84)/2.65
	90°	Length/2.3
Buses and trucks	0°	Length/12.5
	60°	Length/3.93

Source: Yogyakarta City Department of Transportation [13].

The available parking supply determined through the calculation process indicated in Figure 5.1 was used to determine relevant occupancy rates. Representative occupancy rates were estimated from aerial images taken from Nearmaps in order to formulate parking supply availability, all within walking distance of the site (50m from the site). Representative parking occupancy rates were calculated by means of:

$$\frac{z}{y} = x\ (occupancy\ level)$$

Where:

X = occupancy rate

Z = occupancy

Y = supply

Results are provided in Table 5.2 which illustrates a time stamped profile of on-street parking utilisation and occupancy rates located within reasonable walking distance of the site.

Table 5.2 On-Street Parking Occupancy

Date	Time Stamp Aerial	Parking Capacity and Occupancy
10/07/2022		Capacity Non-demarcated on-street parking: 190m length and capacity for 38 cars Occupancy Non-demarcated on-street parking: **6.3%** Remaining Capacity 32 cars – It must be noted that trade vehicles associated with existing construction activity on the site takes up some of the existing on-street parking which has been taken into account. Without trade vehicles occupying on-street parking spots, additional capacity would be available.
01/06/2022		Capacity Non-demarcated on-street parking: 190m length and capacity for 38 cars Occupancy Non-demarcated on-street parking: **55%** Remaining Capacity 17 cars – It must be noted that trade vehicles associated with existing construction activity on the site takes up some of the existing on-street parking which has been taken into account. Without trade vehicles occupying on-street parking spots, additional capacity would be available.

22/09/2021		Capacity Non-demarcated on-street parking: 190m length and capacity for 38 cars Occupancy Non-demarcated on-street parking: **57.8%** Remaining Capacity 16 cars
10/07/2021		Capacity Non-demarcated on-street parking: 190m length and capacity for 38 cars Occupancy Non-demarcated on-street parking: **7.8%** Remaining Capacity 35cars

07/05/2021		Capacity Non-demarcated on-street parking: 190m length and capacity for 38 cars Occupancy Non-demarcated on-street parking: **52%** Remaining Capacity 18 cars
29/07/2022		Capacity Non-demarcated on-street parking: 190m length and capacity for 38 cars Occupancy Non-demarcated on-street parking: **10%** Remaining Capacity 34 cars

Based on the time stamped aerial imagery analyses it was found that there would be sufficient on-street parking capacity available to accommodate for employees, should on-site parking not be available. It is considered that sufficient parking is available to cater for the proposed development demand.

5.1.2 Car Parking Layout

A review of the proposed car parking layout against the requirements of the Australian Standard for Off Street Car Parking (AS/NZ 2890.1-2004 and Council's Transport Code) is summarised in Table 5.3.

Table 5.3 Car Park Layout Review

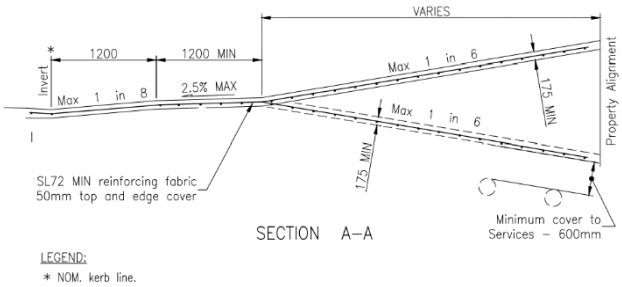
Design Element	Australian Standard	Proposed Provision	Compliant (Yes / No)
Enclosed garages	Min. 3.0m wide doorway per space for a 5.6m wide apron, 2.4m x 5.4m spaces + 0.3m internal clearance where bound by solid wall	Single garage = 3m doorway with 6.4m wide apron Double garage = 5m doorway with 6.4m wide apron	Yes The proposed dimensions are fully compliant with AS2890.1:2004. It is acknowledged that in accordance with AS2890.1:2004 that vehicles can manoeuvre within smaller spaces than swept paths suggest. As the proposed development allows for User Class 1 A parking with low turnover, AS2890.1:2004 indicates that users are prepared to accept some inconvenience when entering or leaving the parking space. However, turn paths (**Appendix B**) illustrate that vehicles will be able to enter and exit within acceptable turn movements.
Visitor Parking	2.4m x 5.4m	2.4m x 5.4m	Yes
SDA / PWD Parking	2.4m plus 2.4m shared area width x 5.4m minimum length. Dimensions are sufficient to accommodate dismounting of wheelchair according to AS/NZS 2890.6:2009 Parking facilities—Off-street parking for people with disabilities. NDIS Design Standard = Minimum dimensions of 3.8m width x 5.4m length	5m x 7.5m garage	Yes
Headroom	2.5m headroom as per AS/NZS 2890.6:2009 Parking facilities—Off-street parking for people with disabilities. NDIS Design Standard = 2.5m	2.7m headroom clearance	Yes
Clearance adjacent to vertical obstructions	0.3m	1m	Yes
Circulating roadway and parking aisle	Circulating road = 5.5m minimum Parking aisle = 6.2m	6.4m	Yes.

As demonstrated in Table 5.3, the on-site parking geometric layout generally complies with the relevant requirements of Australian Standards AS2890.1:2004, AS2890.6:2009 and the NDIS Design Standard.

5.2 Access Assessment

It is proposed that vehicular access for the development will be provided via a 5.5m wide Type A driveway crossover to Glencoe Street. Regarding other key access parameters, the Planning Scheme reverts to 'AS2890.1'. Table 5.4 details the access parameters in accordance with the requirements outlined in 'AS2890.1' and Capricorn Municipal Guidelines, where compliance is not achieved, further information is provided below.

Table 5.4 Driveway Assessment

Design Aspect	Requirement	Proposed Provision	ITE Comment
Driveway Type	Low/Med turnover from minor road = Type A	Type A	Compliant
Crossover Width	5.5m minimum as per AS2890.1:2004 and 6m as per Capricorn Municipal Guidelines	5.5m	Fully compliant with AS2890.1:2004 to allow two-way flow
Driveway Separation	Access driveways are not located within: • twenty–five (25) metres of a signalised road intersection; • twenty (20) metres of an un-signalised road intersection in an industrial or centres zone or ten (10) metres otherwise; and • one (1) metre of any street signage, power poles, street lights, manholes, stormwater gully pits or other Council asset.	Driveway is located >67m from Margaret St / Upper Dawson Rd intersection and >128m from Glencoe / Davis St intersection Driveway is also not located close to any infrastructure	Compliant
Sight Distance	Ideally 83m, minimum 65m as per AS2890.1:2004 Figure 3.2.	Over >69m for the east approach and >125m for the west approach	Compliant
Profile		Will be constructed in accordance with Capricorn Municipal Development Guidelines	Compliant

The proposed development driveway complies with 'AS2890.1' and council's Capricorn Municipal Development Guideline requirements. The design includes a single crossover from Glencoe Street. The crossover shall be provided generally in accordance with Standard Drawing CMDG-R-042A. The alignment of

Glencoe Street is straight, and sightlines are available in excess of the minimum 65m requirement. Figure 5.2 demonstrates the sight distance available along Glencoe Street at the subject site driveway location.

Figure 5.2: Glencoe Street Sight Distance

Source: Google Earth, 2022

5.3 Servicing

5.3.1 Waste Collection

It is proposed that kerbside collection be the preferred collection method. As the total number of units (6 plus 1 caretaker accommodation) is less than 10 units, this is considered in line with the council SC6.20 Waste and Recycling Collection Service policy. The maximum distance to which the bins will be wheeled to kerb will not exceed 25m. The deign allows for an approximate 14m wheeling distance. A summary of the estimated refuse generation along with detailed calculations of bin sizes, collection frequency and storage capacity are shown in Table 5.5. The refuse arrangements have been designed in accordance with SC6.20 Waste and Recycling Collection Service Policy.

Table 5.5 Car Park Layout Review

Type	Waste		Recycling	
Multiple Dwelling Units	120 Litres / unit / week		120 Litres / unit / week	
	120		120	
Use	Quantity	Measure	General Waste (L/Week)	Recycling (L/Week)
Residential Care Facility	6	Units	720	720
Volume per day			103	103

Volume per collection			
Collection and Equipment Details	Kerbside Collections per Week	1	1 (fortnightly)
	Bin size (L)	240	240
	Equipment Quantity required	6	3
	Refuse Collection Room Size (m2)	6.6	
	Kerbside Frontage Required (m)	9	
	Kerbside Frontage Provided (m)	9.5	

Based on SC6.20 Waste and Recycling Collection Service Policy for waste management code, 1x 240L waste bin per unit (collected weekly) and 1x240L recycling bin per two units (collected fortnightly) has been provided. Allowance has also been made for allocating a green 240L bin. This equates to 6 waste bins, 3 recycling bins and 1 green bin (10 bins in total). An available kerbside frontage of 9.5m is available on either side of the driveway, whereas a 6m frontage length would be required to accommodate the bins (1m per bin). It is considered that sufficient frontage length is available to accommodate bins on collection days. On or before each collection day, designated personnel will transfer all bins from the enclosed refuse room to the kerbside for servicing by Council's side-loading Waste Collection Vehicle (WCV). Site management will ensure that occupants store their bins within the dedicated screened area away from view of adjoining dwellings and from private roadways so as to protect the amenity of the development.

6.0 TRAFFIC IMPACT CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

ITE Consulting was appointed by Leben Pty Ltd in order to conduct a Traffic Engineering Assessment for a proposed Residential Care Facility (6 units) plus 1 carer's accommodation at 7 Glencoe Street, Allenstown, formally known as Lot 31 on RP605808. The key findings of the traffic impact assessment for the proposed residential development are summarised as follows:

- As demonstrated in Table 4.1, the proposed development is estimated to generate in the order of two (2) additional trips during the AM and PM peak hour periods. Assuming uniform flow, the additional traffic generation as a result of the development is the equivalent of one (1) vehicle entering or exiting the site every 30 minutes during the peak hour. This trip generation is considered to be negligible from a traffic engineering perspective and is not expected to result in any significant traffic issues that would require mitigation measures or detailed analysis.
- However, an absorption capacity and delay assessment has been carried out to determine whether the nearest priority-controlled Upper Dawson Road / Glencoe Street intersection would provide sufficient capacity and that the expected generated trips would be compatible with the prominent residential and road network environment. It is considered that sufficient practical absorption capacity will prevail, given the combination between the anticipated generated traffic (2 vehicles/hour during both AM and PM peaks) and through movement traffic along Upper Dawson Road. Theoretically, the traffic generated by

the development would be able to enter the major stream flow along Upper Dawson Road even at a major stream flow of more than 2000 vehicles/hour. The intersection is anticipated to provide sufficient levels of vehicle delay which is considered acceptable.

- The proposed development does not trigger the need for new public transport or active transport services or the need for modifications to existing services
- The development provides a total of 6 car parking spaces with a requirement to provide a total of 10 parking spaces. The proposed development aims to allow for 2 employees per resident. Although the statutory requirement indicates that 8 spaces should be allowed for with a shortfall of 5 on-site spaces, it must be noted that these employees will not reside permanently on site and will only visit residents at different times of day. It is anticipated that a low likelihood would occur where all employees visit at the same time. Furthermore, it is evident that sufficient on-street parking opportunities occur along Glencoe Street which would be able to accommodate for any shortfall of on-stie employee parking.
- A desktop assessment of existing on-street parking capacity has been undertaken to provide additional support that sufficient parking will be available. As demonstrated in Table 4.3, the on-site parking geometric layout generally complies with the relevant requirements of Australian Standards AS2890.1:2004, AS2890.6:2009 and the NDIS Design Standard.
- The proposed development driveway complies with 'AS2890.1' and council's Capricorn Municipal Development Guideline requirements. The design includes a single crossover from Glencoe Street. The crossover shall be provided generally in accordance with GCC Standard Drawing CMDG-R-042A. The alignment of Glencoe Street is straight, and sightlines are available in excess of the minimum 65m requirement.
- It is proposed that kerbside collection be the preferred collection method. As the total number of units (6 plus 1 caretaker accommodation) is less than 10 units, this is considered in line with the council SC6.20 Waste and Recycling Collection Service policy. The maximum distance to which the bins will be wheeled to kerb will not exceed 25m. The design allows for an approximate 14m wheeling distance.
- Based on SC6.20 Waste and Recycling Collection Service Policy for waste management code, 1x 240L waste bin per unit (collected weekly) and 1x240L recycling bin per two units (collected fortnightly) has been provided. Allowance has also been made for allocating a green 240L bin. This equates to 6 waste bins, 3 recycling bins and 1 green bin (10 bins in total). An available kerbside frontage of 9.5m is available on either side of the driveway, whereas a 6m frontage length would be required to accommodate the bins (1m per bin). It is considered that sufficient frontage length is available to accommodate bins on collection days. On or before each collection day, designated personnel will transfer all bins from the enclosed refuse room to the kerbside for servicing by Council's side-loading Waste Collection Vehicle (WCV). Site management will ensure that occupants store their bins within the dedicated screened area away from view of adjoining dwellings and from private roadways so as to protect the amenity of the development.

6.2 Recommendation

It is recommended that the proposed development be approved from a Traffic Engineering perspective, subject to the following recommendations made within this Traffic Impact Statement:

- Road access works comprising an all turn movement access driveway will be provided at the permitted access location, generally in accordance with Standard Drawing CMDG-R-042A
- The PWD parking be clearly signed and allocated for ease of wayfinding
- The access is approved for entry and exit movements, with all vehicle movements between the property and the road to be made in the forward direction only.
- Relevant speed restriction signage of 5km/h be placed prior to driveway entry.

APPENDIX

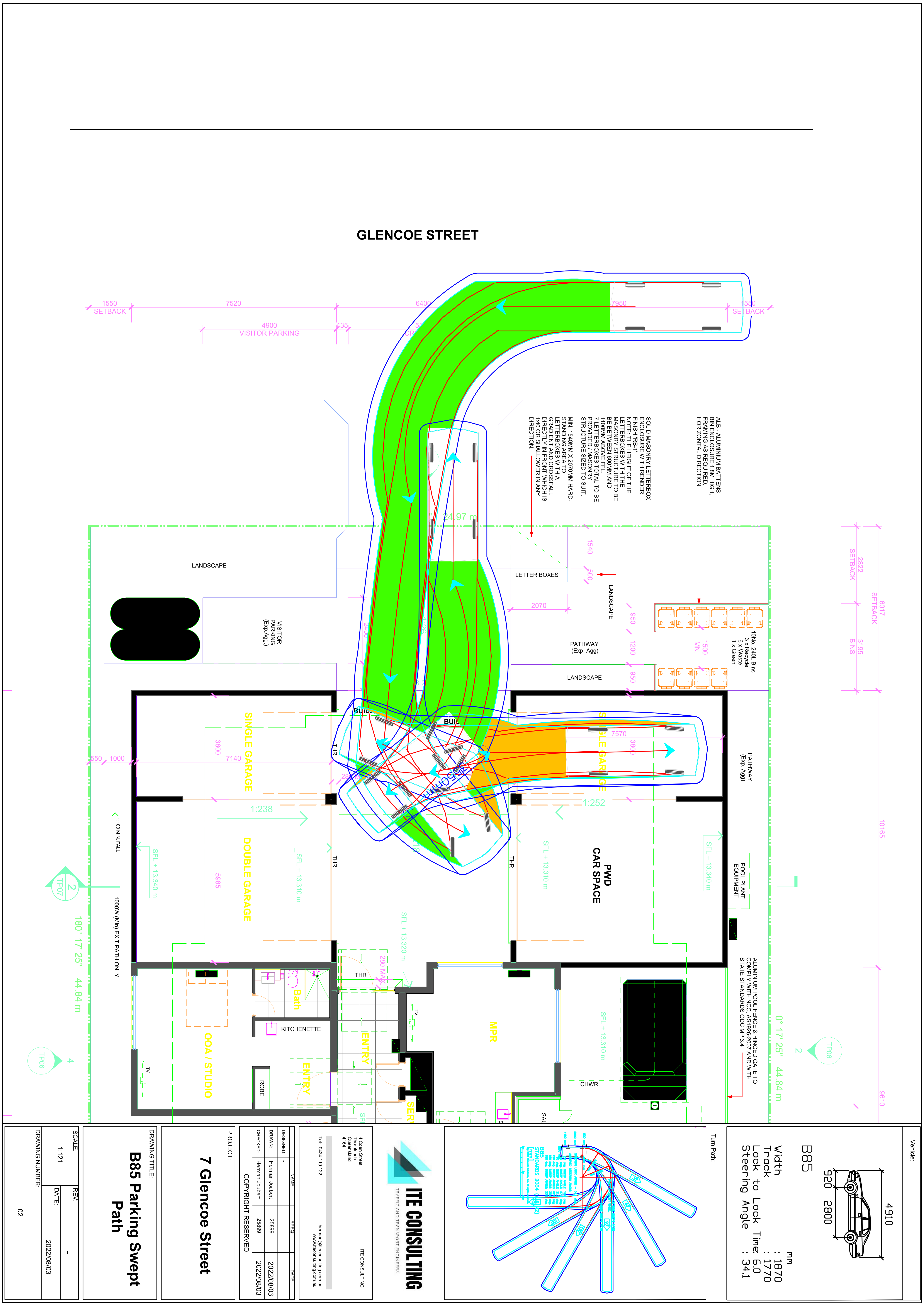
A

Layout Plans

APPENDIX

B

Vehicle Swept Paths



GLENCOE STREET
1550 SETBACK
7520
6400
7950
1550 SETBACK
4900 VISITOR PARKING
435
LANDSCAPE
VISITOR PARKING (Exp. Agg)
LETTER BOXES
2070
LANDSCAPE
PATHWAY (Exp. Agg)
LANDSCAPE
10No. 240L Bins 3 x Recycle 6 x Waste 1 x Green
ALB - ALUMINIUM BATTENS BIN ENCLOSURE 1.8M HIGH, FRAMING AS REQUIRED. HORIZONTAL DIRECTION
SOLID MASONRY LETTERBOX ENCLOSURE WITH RENDER FINISH 'RB-1'. NOTE: THE HEIGHT OF THE LETTERBOXES WITHIN THE MASONRY STRUCTURE TO BE BE BETWEEN 600MM AND 1100MM ABOVE FFL. 7 LETTERBOXES TOTAL TO BE PROVIDED / MASONRY STRUCTURE SIZED TO SUIT.
MIN. 1540MM X 2070MM HARD-STANDING AREA TO LETTERBOXES WITH A GRADIENT AND CROSSFALL DIRECTLY IN FRONT WHICH IS 1:40 OR SHALLOWER IN ANY DIRECTION
2822 SETBACK
6017 SETBACK
3195 BINS
10165
9610
SINGLE GARAGE
7140
3800
1:238
DOUBLE GARAGE
5985
SFL + 13.340 m
SFL + 13.310 m
SFL + 13.320 m
1:100 MIN. FALL
1000W (Min) EXIT PATH ONLY
180° 17' 25" 44.84 m
0° 17' 25" 44.84 m
SINGLE GARAGE
7570
1:252
PWD CAR SPACE
SFL + 13.310 m
SFL + 13.340 m
POOL PLANT EQUIPMENT
PATHWAY (Exp. Agg)
ALUMINIUM POOL FENCE & HINGED GATE TO COMPLY WITH NCC, AS1926.1-2012 AND WITH STATE STANDARDS QDC MP 3.4
THR
BUILD
Bath
KITCHENETTE
ROBE
OOA / STUDIO
ENTRY
MPR
CHWR
TV
TP06
TP07
0.50m
24.97 m
Vehicle:
B85
mm
Width : 1870
Track : 1770
Lock to Lock Time : 6.0
Steering Angle : 34.1
4910
920 2800
Turn Path:
B85 STANDARDS 2004
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Tel: 0424 110 122
herman@iteconsulting.com.au
www.iteconsulting.com.au
ITE CONSULTING
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CHECKED: Herman Joubert 25699 2022/08/03
NAME RPEQ DATE
COPYRIGHT RESERVED
PROJECT:
7 Glencoe Street
DRAWING TITLE:
B85 Parking Swept Path
SCALE: 1:121
REV: -
DATE: 2022/08/03
DRAWING NUMBER: 02

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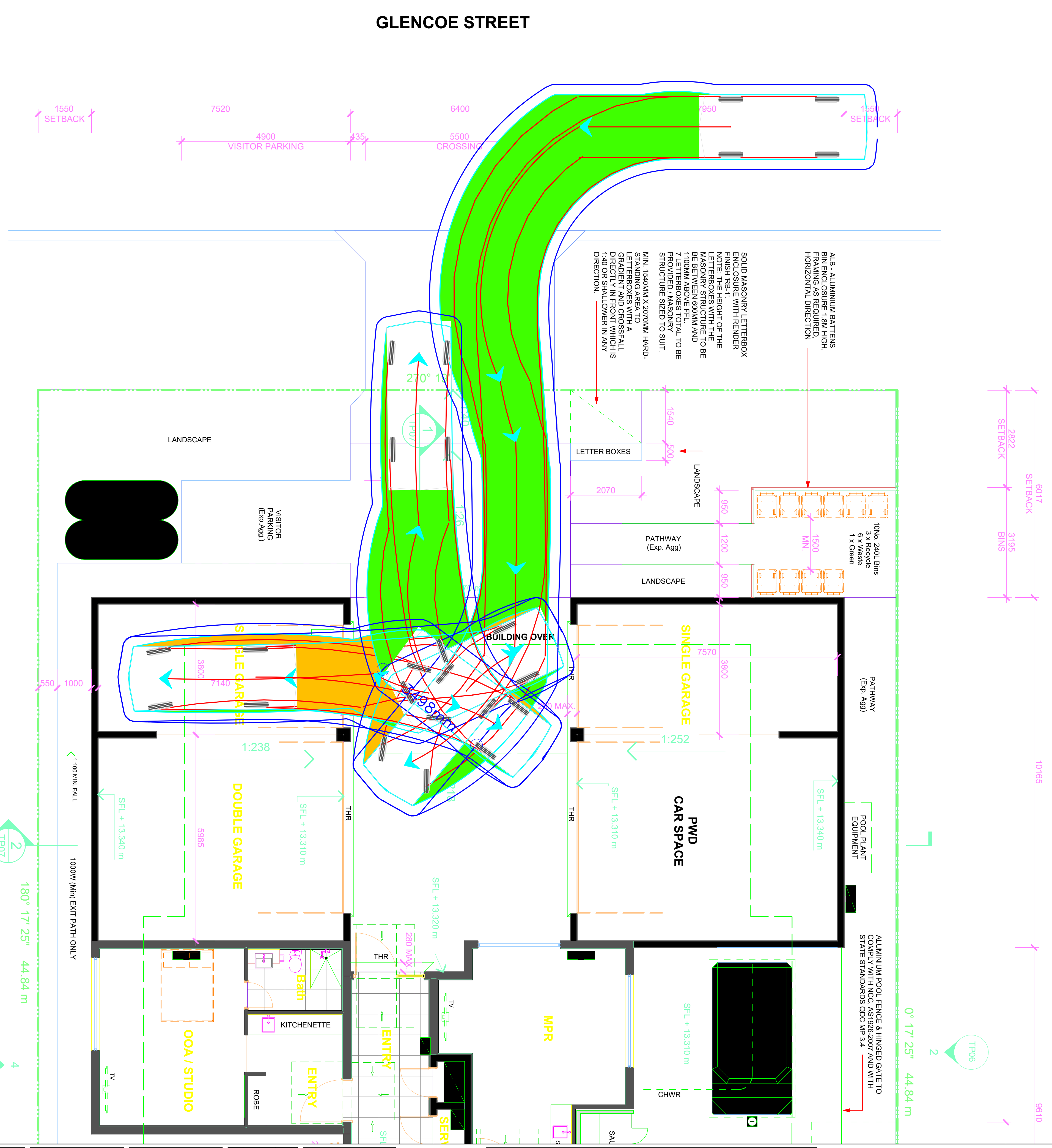

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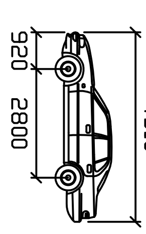
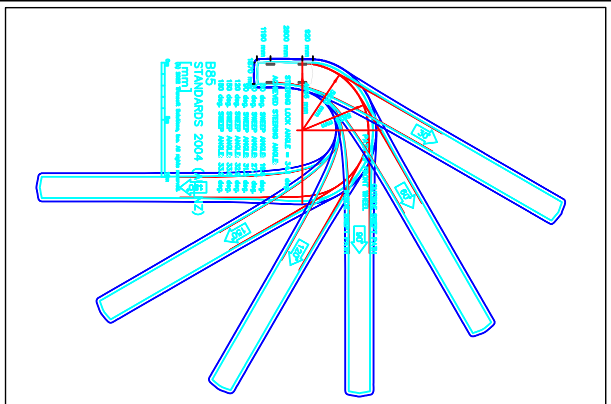


B85

mm

Width : 1870
Track : 1770
Lock to Lock Time : 6.0
Steering Angle : 34.1

Turn Path:



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PROJECT:
7 Glencoe Street

DRAWING TITLE:
B85 Parking Swept Path

SCALE:	REV:
1:121	-
	DATE: 2022/08/03

DRAWING NUMBER:
03

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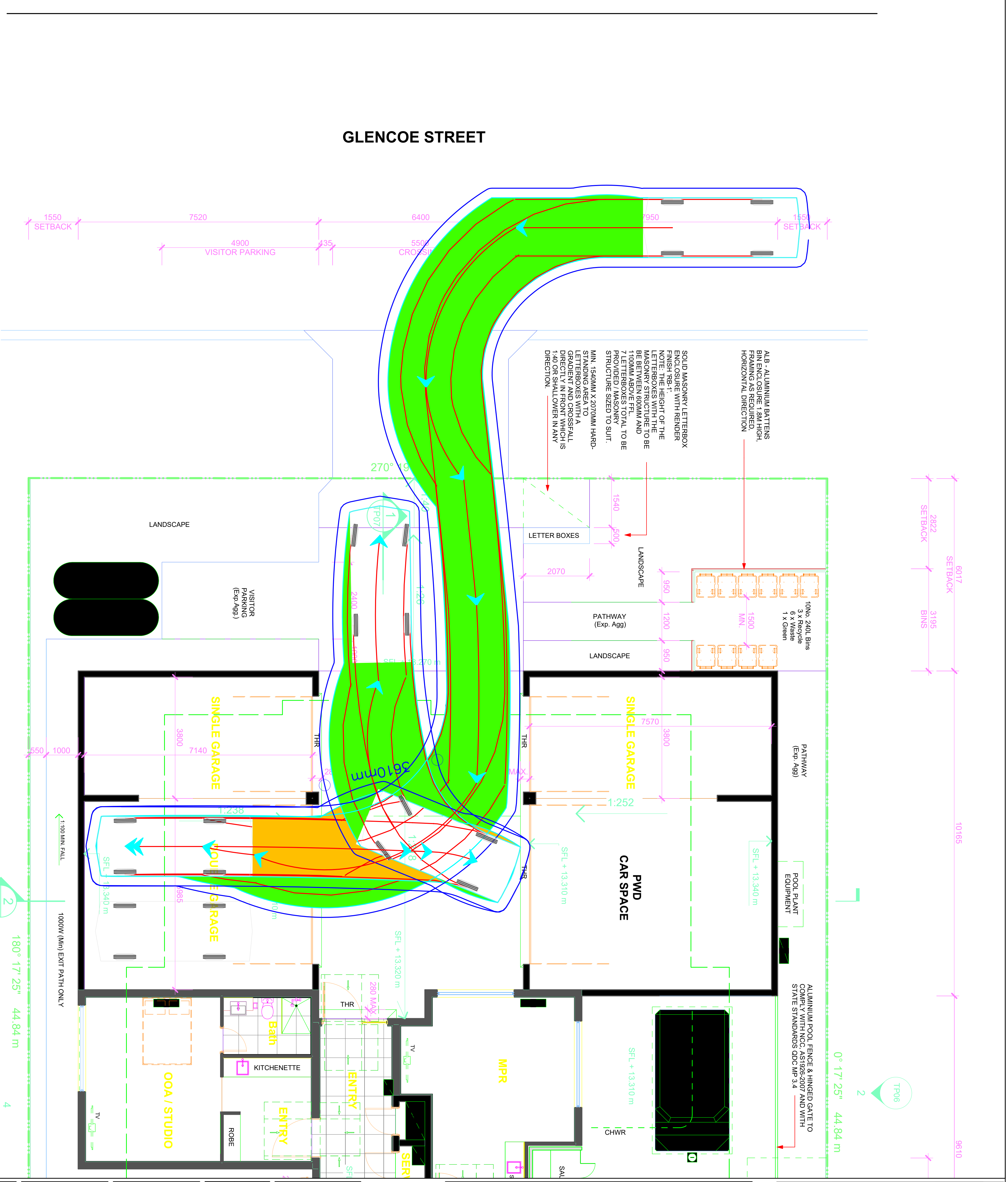

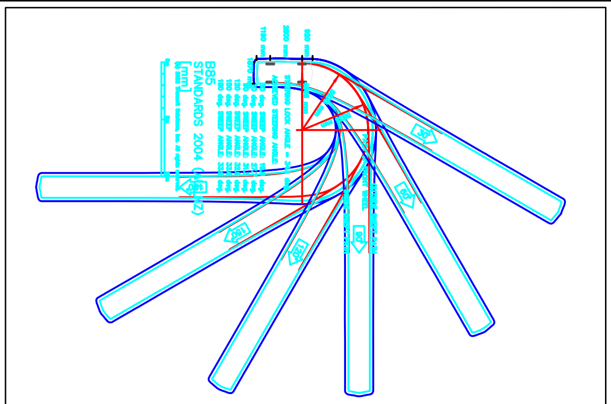

Turn Path:

Vehicle:

B85

	mm
Width	: 1870
Track	: 1770
Lock to Lock Time	: 6.0
Steering Angle	: 34.1

4910 / 920 / 2800

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7 Glencoe Street

DRAWING TITLE:
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REV: -

DATE: 2022/08/03

DRAWING NUMBER: 04

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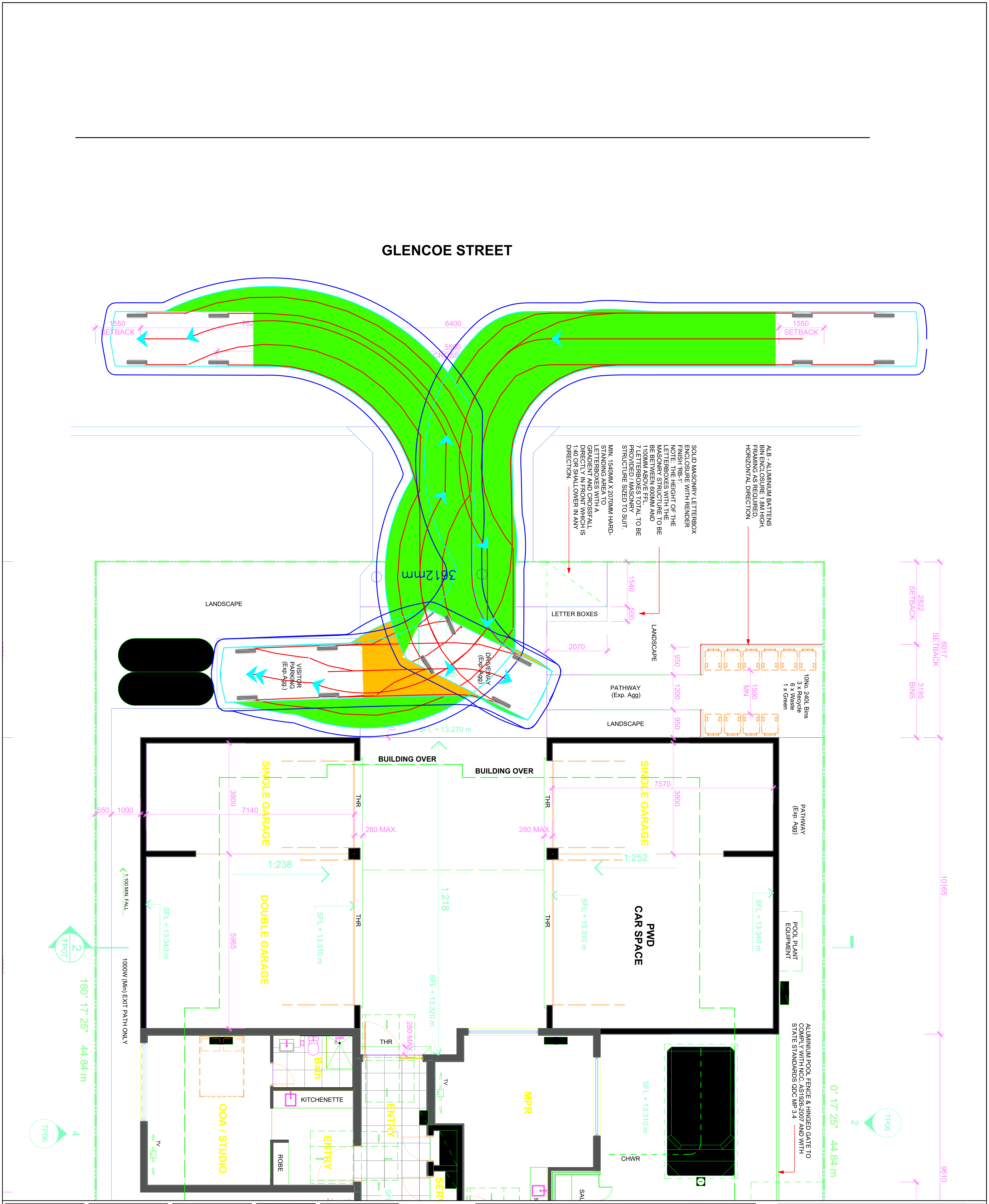

Vehicle:

B85

4910
920 2800

mm
Width : 1870
Track : 1770
Lock to Lock Time : 6.0
Steering Angle : 34.1

Turn Path:

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PROJECT:
7 Glencoe Street

DRAWING TITLE:
B85 Parking Swept Path

SCALE: 1:121
REV: -
DATE: 2022/08/03
DRAWING NUMBER: 01

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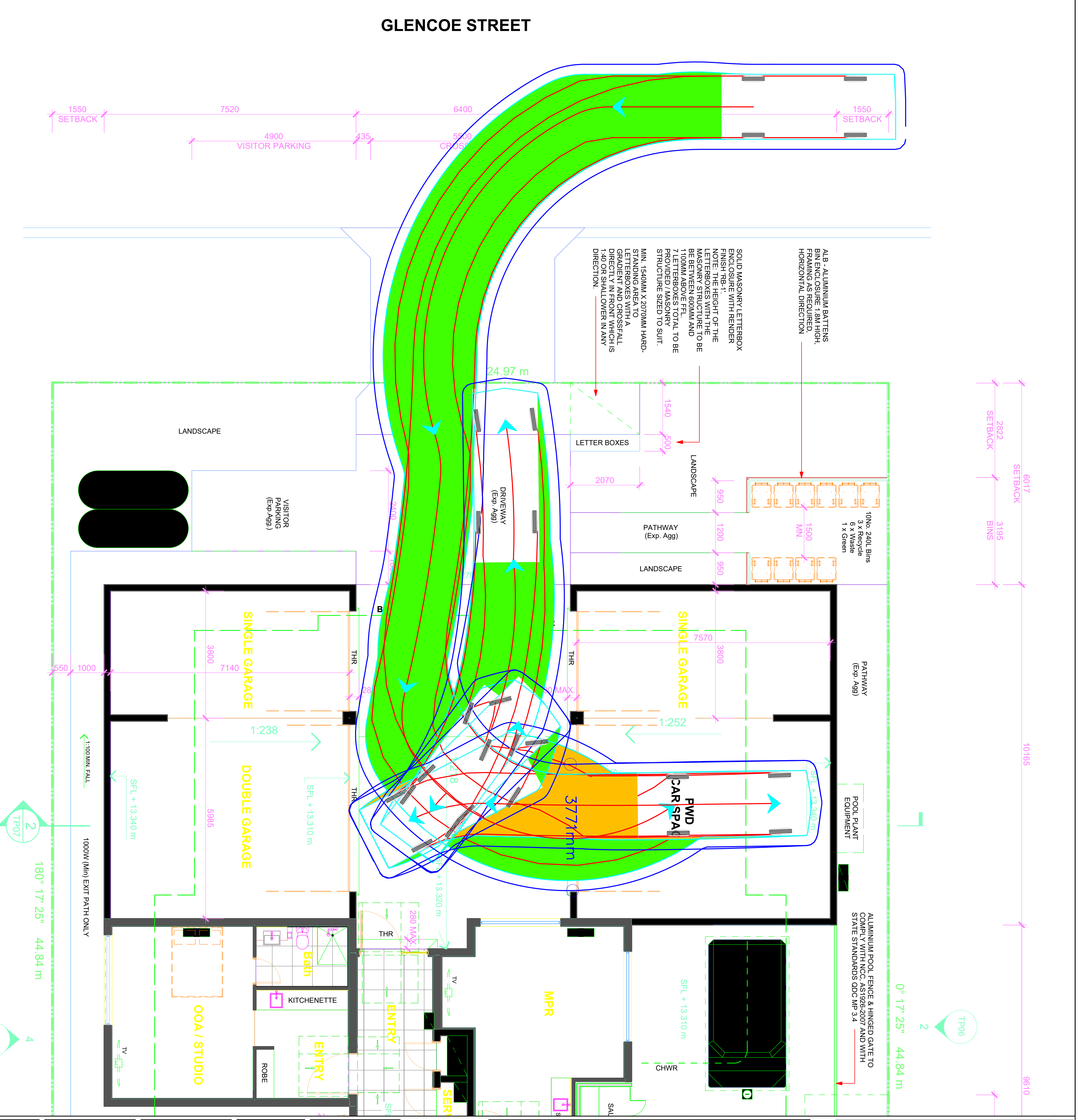

GLENCOE STREET
1550 SETBACK
7520
6400
4900 VISITOR PARKING
435
5500 CROSS
24.97 m
LANDSCAPE
VISITOR PARKING (Exp.Agg)
DRIVEWAY (Exp. Agg)
LETTER BOXES
2070
PATHWAY (Exp. Agg)
LANDSCAPE
10No. 240L Bins 3 x Recycle 6 x Waste 1 x Green
SINGLE GARAGE
DOUBLE GARAGE
1:238
1:252
PWD CAR SPACE
3771mm
POOL PLANT EQUIPMENT
OOA / STUDIO
KITCHENETTE
ROBE
Bath
ENTRY
MPR
CHWR
THR
180° 17' 25" 44.84 m
0° 17' 25" 44.84 m
1000W (Min) EXIT PATH ONLY
ALB - ALUMINIUM BATTENS BIN ENCLOSURE 1.8M HIGH, FRAMING AS REQUIRED. HORIZONTAL DIRECTION
ALUMINIUM POOL FENCE & HINGED GATE TO COMPLY WITH NCC, AS1926-2007 AND WITH STATE STANDARDS QDC MP 3.4

Vehicle:

PASSENGER-VAN

5200
950 3050

mm
Width : 1940
Track : 1840
Lock to Lock Time : 6.0
Steering Angle : 33.6

Turn Path:

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DRAWN:	Herman Joubert	25699	2022/08/03
CHECKED:	Herman Joubert	25699	2022/08/03

PROJECT:

7 Glencoe Street

DRAWING TITLE:

AS2890.6:2009 VAN Swept Path

SCALE: 1:121

REV: -

DATE: 2022/08/03

DRAWING NUMBER: 05

APPENDIX

C

Transport Code Assessment

Access driveways

Table 9.3.1.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Access driveways		
PO1 Access driveways are located to avoid conflicts and designed to operate efficiently and safely, taking into account: 1. the size of the parking area; 2. the volume, frequency and type of vehicle traffic; 3. the need for some land uses (for example hospitals) to accommodate emergency vehicle access; 4. the type of use and the implications on parking and circulation, for example long-term or short-term car parking; 5. frontage road function and conditions; and 6. the capacity and function of the adjoining street system.	**AO1.1** Access driveways are not located within: 1. twenty–five (25) metres of a signalised road intersection; 2. twenty (20) metres of an un-signalised road intersection in an industrial or centres zone or ten (10) metres otherwise; and 3. one (1) metre of any street signage, power poles, street lights, manholes, stormwater gully pits or other Council asset.	**Complies with AO:** Proposed driveway complies with spacing requirements. Refer to body of report for detail.
PO2 Access driveways do not disrupt existing road or footpath infrastructure.	**AO2.1** Access driveways: 1. do not require the modification, relocation or removal of any infrastructure including street trees, fire hydrants, water meters and street signs; 2. do not front a traffic island, speed control device, car parking bay, bus stop or other infrastructure within the road carriageway; 3. must be sealed and to a formed road; 4. are not constructed over an access point to equipment under the control of a regulatory authority, including storm water pits, water meters, hydrants and telephone pits; and 5. are raised or lowered to match the surface level of the driveway, where an access chamber is to be incorporated within the driveway.	
PO3 Access driveways are designed and constructed so as to: 1. enable safe and functional vehicular access from the street to the property; and 2. not cause a change in the level of a footpath.	**AO3.1** Access driveways are constructed in compliance with the Capricorn Municipal Development Guidelines.	
PO4 A driveway does not allow water to pond adjacent to any buildings or cause water to enter a building.	**AO4.1** A driveway has a minimum cross fall of one (1) metre (vertical) to 100 metres	

	(horizontal) away from all adjoining buildings.	

Parking

Table 9.3.1.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Parking		
PO5 Provision is made for on-site vehicle parking: 1. to meet the demand likely to be generated by the development; and 2. to avoid on-street parking where that would adversely impact on the safety or capacity of the road network or unduly impact on local amenity. Editor's note—SC6.6 — Car parking contributions planning scheme policy prescribes circumstances under which an applicant can satisfy PO5.	**AO5.1** AO5.1.1 On-site car parking is provided at the rates set out in Table 9.3.1.3.2 of the access, parking and transport code. OR AO5.1.2 Where a change of use of existing premises is proposed and there is no increase in the gross floor area, the existing number of on-site car parks is retained or increased. **AND** **AO5.2** All parking, loading and manoeuvring facilities for visitors and employees to be located on-site. **AND** **AO5.3** Manoeuvring facilities to be of adequate dimensions to prevent any queuing in a roadway.	**Complies with AO:** Parking rates are as per policy requirements. All parking are located on site. No queueing onto roadway anticipated as all facilities are of adequate dimensions.
PO6 Parking and servicing facilities are designed to meet user requirements.	**AO6.1** Parking spaces, access and manoeuvring facilities, loading facilities and connections to the transport network are sealed and designed in accordance with Australian Standard AS 2890.	**Complies with AO:** All parking spaces and manoeuvring areas are designed in accordance with AS2890
PO7 Sites with more than one (1) road frontage (excluding laneways) gain access only from the lower order road, except if it will introduce traffic generated by a non–residential use into a street that is in a residential zone.	No acceptable outcome is nominated.	NA
PO8 Parking areas are illuminated in a manner that maximises user safety but minimises the impacts on adjoining residents.	**AO8.1** Parking areas for uses that operate at night are illuminated in accordance with the requirements of Australian Standard AS 1158. **AND** **AO8.2** Lighting used in parking areas does not	**NA**

	cause an environmental nuisance and complies with Australian Standard AS 4282.	
PO9 Car parking areas, pathways and other elements of the transport network are designed to enhance public safety by discouraging crime and antisocial behaviour, having regard to: 1. provision of opportunities for casual surveillance; 2. the use of fencing to define public and private spaces, whilst allowing for appropriate sightlines; 3. minimising potential concealment points and assault locations; 4. minimising opportunities for graffiti and other vandalism; and 5. restricting unlawful access to buildings and between buildings.	No acceptable outcome is nominated. Editor's note—Refer to Crime Prevention Through Environmental Design (CPTED) guidelines for Queensland for guidance.	Not assessed.
PO10 Parking and servicing areas are kept accessible and available for their intended use at all times during the normal business hours of the activity.	No acceptable outcome is nominated.	**Complies with PO10**

Transport impact

Table 9.3.1.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Transport impact Editor's note—Applicants should note that the Department of Transport and Main Roads may have additional requirements.		
PO11 Development contributes to the creation of a transport network which is designed to: 1. achieve a high level of permeability and connectivity for all modes of transport, including pedestrians and cyclists, within the development and to the surrounding area; and 2. encourage people to walk, cycle or use public transport to and from the site instead of using a car.	No acceptable outcome is nominated. Editor's note—Refer to SC6.19 – Structure plan planning scheme policy for guidance.	**Complies with PO11** Refer to body of report for detail
PO12 Development is located on roads that are appropriate for the nature of traffic (including vehicles, pedestrians and cyclists) generated, having regard to the safety and efficiency of the transport network.	**AO12.1** Traffic generated by the development is safely accommodated within the design capacity of roads as provided in SC6.15 — Road infrastructure and hierarchy planning scheme policy. **AND** **AO12.2** A road or street does not connect with another road or street that is more than two (2) levels higher or lower in the road hierarchy.	**Complies with AO12.1** Refer to body of report for impact assessment **Complies with AO12.2 and AO12.3** Refer to body of report for details. The proposed driveway will be constructed in accordance with the required Development Guidelines

	AND **AO12.3** The existing infrastructure fronting the proposed development is upgraded in accordance with SC6.15 — Road infrastructure and hierarchy planning scheme policy and Capricorn Municipal Development Guidelines.	
PO13 Where the nature of the development creates a demand, provision is made for set down and pick-up facilities by bus, taxis or private vehicle, which: 1. are safe for pedestrians and vehicles; 2. are conveniently connected to the main component of the development by pedestrian pathway; and 3. provide for pedestrian priority and clear sightlines.	No acceptable outcome is nominated.	NA

Site access

Table 9.3.1.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Site **access**		
PO14 Development does not impact on the safety, operation or function of the road network or system.	**AO14.1** Vehicle manoeuvring into and from the site for all vehicles is designed in accordance with the Australian Standard AS 2890, as updated from time to time. **AND** **AO14.2** No direct property access is gained to a highway, main road, urban arterial or sub arterial road as defined in SC6.15 — Road infrastructure and hierarchy planning scheme policy other than via a service road or a joint access arrangement with other sites. **AND** **AO14.3** Development that generates greater than 100 vehicle movements per day does not gain access to or from an urban access place or urban access streets as defined in SC6.15 — Road infrastructure and hierarchy planning scheme policy.	**Complies with AO14.1, AO14.2 and AO14.3** Refer to body of report for details.
PO15 Development facilitates the orderly provision and upgrading of the transport network or contributes to the	No acceptable outcome is nominated.	

construction of transport network improvements.		
PO16 On-site transport network infrastructure integrates safely and effectively with surrounding networks.	**AO16.1** Intersections, connections and access arrangements are designed in accordance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890.	

Pedestrian and cyclist facilities

Table 9.3.1.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Pedestrian and cyclist facilities		
PO17 Development provides safe and convenient pedestrian and cycle movement to the site and within the site having regard to desire lines, users' needs, safety and legibility.	**AO17.1** Pedestrian and cyclist movement are designed in compliance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890 — Parking facilities.	**Complies with AO17.1** The layout provides for adequate pedestrian connections and internal paths to comply with NDIS guidelines. This includes gradients, pathway widths and landing areas.
PO18 Provision is made for adequate bicycle parking and end of trip facilities, to meet the likely needs of users and encourage cycle travel.	No acceptable outcome is nominated. Editor's note—Provisions are made for parking and end of trip facilities in accordance with the SC6.4 — Bicycle network planning scheme policy.	NA

Servicing

Table 9.3.1.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Servicing		
PO19 Refuse collection vehicles are able to safely access on-site refuse collection facilities.	**AO19.1** Refuse collection areas are provided and designed in accordance with the waste management code and Australian Standard AS 2890.	**Complies with AO19.1** Refer to body of report for details.

APPENDIX

D

Waste Code Assessment

Design of waste storage areas

Table 9.3.7.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Design of waste storage areas		
PO1 For on-site waste collection, waste storage areas are located and designed so that: 1. they are easily accessed and convenient to use; 2. sufficient space is provided for safe entry and exit and servicing by service vehicles without the need for manual handling; 3. sufficient height clearance is provided for the safe operation of both front and side bin lifting operations; 4. they are clear of car parking bays, loading bays and similar areas; and 5. they are clear of footpaths and pedestrian access.	**AO1.1** Waste storage areas are designed and maintained in accordance with SC6.20 — Waste management planning scheme policy.	**Complies with A01.1** Waste storage areas are designed as per SC6.20 – Waste management planning policy. Refer to body of report for details as well as the proposed layout in Annexure A. The bins will be provided in a separate screened area away from residents and out of view of neighbours.

Kerbside waste servicing

Table 9.3.7.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	ITE Comment
Kerbside waste servicing		
PO2 Kerbside collection of waste containers ensures the safety and amenity of road and footpath users.	**AO2.1** Waste bins are located on the footpath so that: 1. bins are located one (1) metre apart from other bins and obstructions; 2. all bins are accommodated within the street frontage of the site; 3. a clear pedestrian access way two (2) metres wide is retained; and 4. bins are capable of being serviced by the collection vehicle travelling forward, without having to reverse the vehicle.	**Complies with A02.1** The frontage consist of sufficient space to accommodate bins along the kerb for collection. A clear pedestrian access way is maintained and the waste vehicle would be able to collect travelling forward.
PO3 Waste storage minimises adverse impacts on adjoining properties.	**AO3.1** Waste storage areas are: 1. integrated with the building design; or 2. set back a minimum of two (2) metres from any boundary; and 3. screened from neighbouring properties and the street by a fence of 1.8 metres minimum height; and 4. not located directly adjoining dwelling units on the site and on neighbouring properties. **AND** **AO3.2** Waste bins are fitted with lids.	**Complies with A03.1** Refer to body of report for details. **Development will comply with AO3.2**
PO4		**Complies with A04.1**

Waste storage areas: 1. have a level area on impermeable, durable materials so that they are easily cleaned; and 2. have adequate clearance between and around waste storage bins to allow for manoeuvring and washing of bins.	No acceptable outcome is nominated.	Refer to body of report for details. Storage area will be level with sufficient width and clearances to allow for washing of bins and bin manoeuvering.

Engineering Report (Including Stormwater Management Plan), 7 Glencoe Street

Arcos Project: 220242

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/146-2022

Dated: 27 January 2023

ARCOS

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arcosgroup.com.au
ABN 51 640 311 842

Attention: Wayne Peters
By Email

23 November 2022
Arcos Project: 220242
Report 01 Rev 1

Engineering Report (Including Stormwater Management Plan)
7 Glencoe Street, Allenstown,
QLD, 4700

Document Control

Version	Date	Details	Prepared	Checked	Approved
0	21/10/22	For Approval	HR	LS	LS
1	23/11/22	Minor amendment - Flooding	LS	LS	LS

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1.0 Introduction

Arcos Unit Group Pty Ltd (Arcos) has been commissioned by LEBEN Pty Ltd to prepare this Engineering Report and preliminary drawings as part of a development application with Rockhampton Regional Council (RRC). The subject site is described as Lot 31 on RP605808 and has an area of 1,118m^2. A site locality plan is presented in **Figure 1**.

FIGURE 1: SITE LOCALITY

This report addresses engineering considerations such as site works, servicing provisions, access, and a site-based stormwater management plan to assess the stormwater quality and quantity requirements.

2.0 Proposed Development

The proposed development includes a six (6) unit residential care facility fronting Glencoe Street with two-storey buildings proposed as shown in Figure 2.

FIGURE 2: PERSPECTIVE 3D RENDER (SOURCE: MARK CIAVARELLA DESIGN)

3.0 Access

3.1 Road & Driveway Type

It is proposed a 5.5m wide development site access be constructed on Glencoe Street to be used for the proposed development.

TABLE 1 – ROAD & DRIVEWAY TYPE

Description	Standard
Glencoe Street	Industrial Access Street (SCC Table SC6.14.2B)
Driveway	Category 2 Access Driveway (AS2890.1)

3.2 Sight Distances

Glencoe Street is a low-speed environment with sufficient sight distance for vehicles exiting the development.

3.3 Vehicle Turn Paths

The vehicle turn paths have been checked to confirm the design vehicle can access and exit all of the car parks (refer Appendix B).

4.0 Earthworks

It is understood that the building pad earthwork levels have been designed above the 1% AEP flood level.

Impacts of proposed earthworks on overland flow conditions will not adversely affect adjacent or downstream properties. Proposed earthworks will not encroach on adjacent properties or affect the function of stormwater catchments external to the site.

All cutting and filling should be carried out in accordance with AS3798:2007 Guidelines on Earthworks for Commercial and Residential Developments. Any site filling will be from site spoil (subject to Geotechnical Investigation), provided it meets the requirements of AS3798 and is placed with controlled compaction.

All construction activities, including Erosion and Sediment Control (ESC) methods, would be managed under the control measures of a Construction Environmental Management Plan (CEMP) for the development site. The CEMP and ESC plans would be prepared for submission with the future application for Operational Works Approval.

5.0 Stormwater Management

5.1 General

The minor storm event is the 39% Annual Exceedance Probability (AEP) event in accordance with Table 7.3.1 of QUDM for the 'urban residential low density' development category.

The minor drainage system consists of the following:

- Field inlet pits and piped drainage;
- Piped roof water connections;
- Surface grading;
- On-site detention/attenuation; and
- On-site quality treatment (alternative measures)

The combined minor/major drainage system shall be designed to cater for the 1% AEP flows in accordance with Table 7.3.2 of QUDM.

5.2 Drainage

Runoff within the subject site is to be captured by the road drainage network. Glencoe Street has minimal stormwater infrastructure with runoff water being collected at inlet pits on Upper Dawson Road (refer Figure 3**)**.

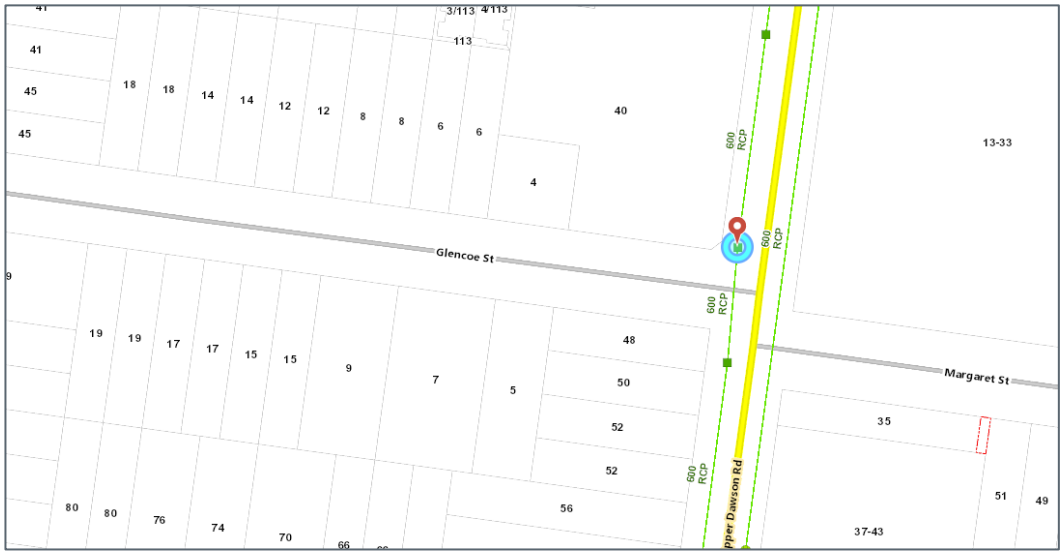

FIGURE 3: EXISTING STORMWATER NETWORK (ROCKHAMPTON REGIONAL COUNCIL)

5.3 Flooding

The proposed development has been identified to contain overland flow from flood water attributed to the Rockhampton Local Creek Catchments. Updated mapping supplied from Rockhampton Regional Council was provided and is included in Appendix D.

Mapping suggests that entire area has flooding up to a depth of approximately 0-300mm across this site and adjacent sites in the area. The flood mapping fidelity does not look to account for buildings with flooding shown over the existing dwellings. Therefore it could be assumed flood waters to encroach on this area generally in a 1% AEP event as modelled but will have to find an appropriate level outside of the built form.

The proposed development is not expected to have major impact on flooding in this area and overland flow can still be maintained as no build to boundary walls have been nominated in the design.

5.4 Lawful Point of Discharge

The lawful Point of Discharge (LPD) for the proposed development is the existing road network on Glencoe Street, with inlets further downstream. This lawful point of discharge is compliant with Section 3.9.1 requirements of QUDM.

5.5 Stormwater Quality Management

The State Planning Policy states that stormwater management design objectives do not apply for premises smaller than 2500m^2. Therefore infrastructure for post-construction phase stormwater quality has been excluded.

5.5.1 Construction Phase

The site's management is important in ensuring water quality standards are achieved during the construction phase. Implementing best practice Erosion and Sediment Control techniques is imperative to managing the runoff quality affected by construction works.

Best practice measures shall be utilised during the construction phase to minimise the potential impacts of the pollutants mentioned above. Detailed Erosion and Sediment Control Management Plans should be developed in conjunction with the Operational Works design prior to construction works commencing in accordance with the International Erosion Control Association (IECA) - "Best Practice Erosion and

Sediment Control (BPESC) document" and overseen by a Certified Professional in Erosion and Sediment Control (CPESC) or Registered Professional Engineer Queensland (RPEQ).

Through their principal contractor, the developer shall be responsible for ensuring that temporary sediment and erosion controls are installed and maintained correctly.

5.5.1.1 Pollutants

The pollutants that would typically be generated during the construction of the proposed development are outlined in **Table 2**.

TABLE 2: TYPICAL CONSTRUCTION PHASE POLLUTANTS

Pollutant	Source
Litter	Paper, construction packaging, food packaging, cement bags, offcuts
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 e.g. from tile works)
Ph Altering Substances	Acid sulphate soils, cement slurry

5.5.1.2 Potential Impacts

Construction activities can have a potential impact on water quality. Removal of vegetation, earthworks and changes to drainage patterns can result in erosion and sediment being washed into waterways. This can impact the physical-chemical parameters of the receiving water, the decline in the health of aquatic ecosystems, and overall aesthetics. The potential impacts on the development site's surrounding receiving waters will be minimised during the construction phase with typical measures outlined below. These measures should be adequately detailed on erosion and sediment control plans as part of the development's Operational Works application.

5.5.1.3 Performance Objectives

The amount of runoff traversing and discharging from the site while under construction should be kept to a minimum. This will restrict soil erosion and mobilisation of sediments and pollutants through and off the site. During the construction phase, stormwater runoff at discharge points shall comply with the objectives detailed in QLD SPP (July 2017).

5.5.1.4 Control Measures

The following are typical treatment measures that should be implemented before the commencement of any construction works. Detailed erosion and sediment control procedures shall be based on the erosion and sediment control plans lodged at the Operational Works phase.

5.5.1.5 Maintenance

Maintenance of erosion and control treatment measures (such as sediment fences) will be undertaken if it is observed that they have not been properly installed or the capacity of the measure falls below 75%.

5.5.1.6 Minimise Disturbance Area

Clearing of land is to be minimised to areas planned to be actively under construction in the near term (e.g. within the next 3-6 months).

5.5.1.7 Stabilise Disturbed Areas

Provide temporary stabilisation of disturbed soils whenever active construction is not occurring on a portion of the site. Provide permanent stabilisation during finish grade and landscape the site.

5.5.1.8 Protect Slopes and Channels

Safely convey runoff from the top of the slope and stabilise temporary and permanent channel crossings as quickly as possible and ensure that increases in runoff velocity caused by the project do not erode the channel.

5.5.1.9 Diversions of Upslope Runoff

Upslope runoff should be diverted away from areas of exposed soil to prevent the contamination of clean runoff. This may be achieved by installing tightly abutting sandbags, creating a 'sandbag perimeter bank' to divert flow.

5.5.1.10 Sediment Fences and Inlet Protection

Delineate site perimeter to prevent disturbing areas outside the project limits. Sediment fences should be installed around the perimeter of works to ensure contaminated runoff is filtered and sediment is trapped before leaving the site. Sandbags or geofabric should also be placed around/over existing stormwater inlets/grates throughout the site to filter any contaminated runoff before entering the existing piped stormwater network.

5.5.1.11 Retain Sediment

Retain sediment-laden waters from disturbed, active areas within the site.

5.5.1.12 Stabilised Vehicle Entry/Exit Point

A stabilised entry/exit point should be constructed to minimise the transport of sediment off-site. All vehicles entering and leaving the site must use this designated entry/exit point.

5.5.1.13 Stockpiles

Stockpile locations should be identified before the commencement of works. Ideally, they should be located in a flat area at least 15m from any water body or stormwater inlet. Sediment fences should be installed downslope of all erodible stockpiles, and upslope protection measures should be used (i.e. sandbags or sediment fence) to divert runoff in the event of rain. At the end of each working day, stockpiles should be covered with geofabric if rain or high winds are forecast.

5.5.1.14 Street Sweeping

Ensure that local roads are swept as required. This will minimise the potential for sediment tracked onto the road to be washed into the stormwater system. If there is a large quantity of sediment being tracked onto the surrounding streets, the stabilised entry/exit point may need to be raked or reinforced with rock treatment to provide more effective sediment removal for vehicles.

5.5.1.15 Erosion Control Matting and Permanent Stabilisation

Exposed areas onsite should be permanently stabilised (i.e. with turf) as the construction works progress. Erosion control matting or mulching should be used as a temporary measure to stabilise exposed areas before permanent stabilisation can be undertaken.

5.5.1.16 Monitoring

Monitoring and recording of the performance of the drainage control devices are to be undertaken in accordance with local government requirements. It is further recommended that the proposed construction works be undertaken during periods of dry weather to reduce the potential for sediment to be transported off-site during construction.

5.6 Stormwater Quantity Management

5.6.1 General

The stormwater quantity requirements were calculated using the rational method validation using the following assumptions:

- Site area of 0.1118 ha;

- Existing case of 38% fraction impervious (fi), based on detail survey & aerial imagery;
- Developed case of 78% fi, based on the development proposal. This is less than the default QUDM development category (0.85)
- Existing and Developed time of concentration of five (5) minutes and five (5) minutes.

TABLE 3: STORM EVENT EXISTIN VS. DEVELOPED

Storm Event (Year)	Existing Case (m^3/s)	Developed Case (m^3/s)	Difference (m^3/s)
63% AEP (1)	0.029	0.032	0.003
39% AEP (5)	0.038	0.042	0.004
18% AEP (5)	0.052	0.058	0.006
10% AEP (10)	0.064	0.071	0.007
5% AEP (20)	0.076	0.085	0.009
2% AEP (50)	0.098	0.109	0.011
1% AEP (100)	0.113	0.123	0.010

5.6.2 WBNM Model Set-Up

Hydrological analysis of the Existing, Developed, and Mitigated cases were modelled using WBNM software. The parameters adopted were generally based on recommendations by Australian Rainfall & Runoff and QUDM. The attached development site layout (refer Appendix A) includes details of the catchment and model node arrangement. The model node parameters are summarised in **Table 4**.

TABLE 4: WBNM CATCHMENT NODES – SUBJECT SITE

Node	Area (ha)	% Impervious	Description
Sub_Ex_01	0.1118	38%	Existing case
	0.1118	**38%**	**Total**
Sub_Dev_Roof	0.0611	100%	Developed/Mitigated case
Sub_Dev_Gnd	0.0489	60%	Developed/ Mitigated case
	0.1118	**78%**	**Total**

Initial Loss (IL) and Continuing Loss (CL) information have been adopted for the WBNM model, and parameters are outlined in **Table 5**. The site-specific ARR data hub information is also included for reference; however, the initial loss value is not to be adopted directly for urban development and, therefore, reduced according to ARR 2019 guidance (20mm-30mm).

TABLE 5: WBNM LOSS PARAMETERS

Surface Type	ARR Data Hub IL (mm)	ARR Data Hub CL (mm/h)	Adopted IL (mm)	Adopted CL (mm/h)
Impervious	-	-	0	0
Pervious	35	1.7	15	2.3

5.6.3 Existing & Developed Case Summary

The modelled discharges were compared with the Rational Method calculations for the existing and developed cases to validate the WBNM model. As outlined in **Table 6**, the modelled discharges

compare well with the Rational Method calculations. The peak discharges were estimated using WBNM using all storm ensembles across 10-minute to 360-minute durations.

TABLE 6: RATIONAL METHOD & WBNM PEAK FLOW SUMMARY

Storm Event (Year)	Rational Method (m^3/s)		WBNM (m^3/s)		WBNM % Difference
	Existing	Developed	Existing	Developed	Existing - Developed
63% AEP (1)	0.029	0.032	0.027	0.033	0.006
39% AEP (2)	0.038	0.042	0.036	0.043	0.007
18% AEP (5)	0.052	0.058	0.046	0.054	0.008
10% AEP (10)	0.064	0.071	0.056	0.066	0.010
5% AEP (20)	0.076	0.085	0.066	0.076	0.010
2% AEP (50)	0.098	0.109	0.076	0.088	0.012
1% AEP (100)	0.113	0.123	0.086	0.098	0.012

It is noted that while it is preferable to calibrate peak flows to within 10%, this is often not achievable for small urban catchments while maintaining reasonable input parameters. The WBNM model peak flows generally agree with Rational Method estimates, and therefore the model is considered conservative.

5.6.4 Mitigated Case

Peak flows for the existing, developed and mitigated critical storm durations are presented in **Table 7**. The mitigated case includes the following measures:

- roof water and driveway impervious contributing to OSD;
- low flow, medium flow and high flow pipe outlet configuration;
- flows beyond tank capacity surcharge through grated access and overland flow discharge

TABLE 7: COMPARISON EXISTING, DEVELOPED, MITIGATED WBNM PEAK FLOWS

Storm Event (Year)	Existing Case (m^3/s)	Developed Case (m^3/s)	Mitigated Case (m^3/s)	Difference (%)
63% AEP (1)	0.027	0.033	0.026	-0.001
39% AEP (2)	0.036	0.043	0.033	-0.003
18% AEP (5)	0.046	0.054	0.042	-0.004
10% AEP (10)	0.056	0.066	0.050	-0.006
5% AEP (20)	0.066	0.076	0.063	-0.003
2% AEP (50)	0.076	0.088	0.085	0.009
1% AEP (100)	0.086	0.098	0.095	0.009
1% AEP (CC)	0.109	0.119	0.119	0.010

The following check area applied to the difference in peak flow for compliance:

a. <= than 2% of the pre-development flow for the same duration-AEP event, OR
b. or 0.5% of the 1 in 100 AEP pre-development peak inflow, OR
c. <= 0.01 m3/s.

Comparisons for non-critical durations have been made, and generally, peak discharges for all storm durations were not increased compared with the corresponding duration-AEP event. The marginal increases shown above were within the tolerance of difference in existing vs mitigated peak flows. Refer to attachment for all AEP-duration checks.

5.6.5 Detention Tank Details

On-site detention is proposed using a precast underground tank as shown in

Table 8, the associated design drawings the attached Stormwater Management Layout. In major storm events and above, the stormwater tank surcharges out of the grated access and overland flow to Glencoe Street. The driveway design grading includes minor ponding in the driveway before overland flows discharge from the site.

TABLE 8: DETENTION TANK DETAILS

Feature	Details
Detention Volume	Min 12kL tank based on modelling Selected 14kL above ground Detention Tanks
Maximum Water Elevation	Minimum tank height 1.4m Exact sizing TBC
Low Flow Outlet	1 x DN100 OUTLET PIPE WITH 20mm ORIFICE PLATE (at tank base)
Medium Flow Outlet	1 x DN100 OUTLET PIPE WITH 40mm ORIFICE PLATE (1.0m above tank base)
High Flow Outlet	1 x DN100 OUTLET PIPE WITH 70mm ORIFICE PLATE (1.4m above tank base)

6.0 Service Provisions

6.1 Water

The site is serviced by a 100mm diameter water reticulation main located within the northern verge of Glencoe Street. Refer to the Hydraulic drawings for meter details.

6.2 Sewer

The site is serviced with a 150mm dia. sewer main within the property via an easement at the rear.

6.3 Communications & Electrical

Details of electrical supply and communication infrastructure and services proposed for the development site are outside the scope of this report. However, we understand that supply to the development can be provided.

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7.0 Conclusion

This Engineering Services Report has been prepared to provide a review and information on the Engineering requirements to support the application for the proposed development at 7 Glencoe St. The following requirements have been reviewed as part of this report:

- Suitable access can be provided off Glencoe Street to access the development;
- Stormwater quantity requirements for drainage discharge can be provided for the site;
- Sewerage reticulation can be connected to the existing network; and
- Water reticulation can be connected to the existing network.

In summary, this report shows that the development site can be adequately serviced and provision made as currently shown and in further detailed design for this development to be in accordance with Council's code requirements.

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LIMITATIONS

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The required detailed design for the service infrastructure will be subject to the conditions (if any), attached to the Development Approval provided by Council and any nominated referral agencies.

The advice given in this document is based upon the assumed conditions and data outlined herein. The relevance and accuracy of advice given are directly affected by variations in the information supplied and open source information relied upon.

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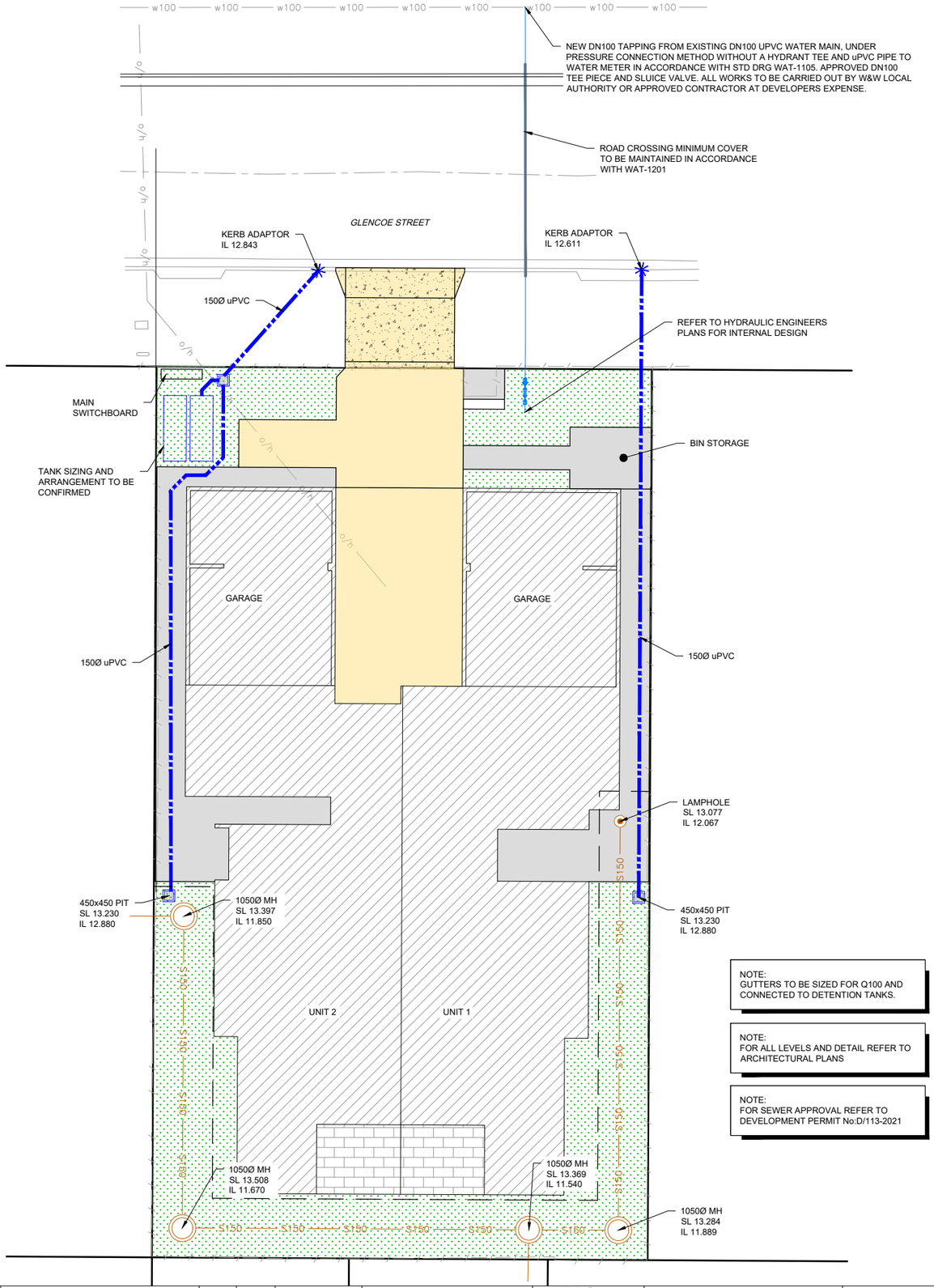
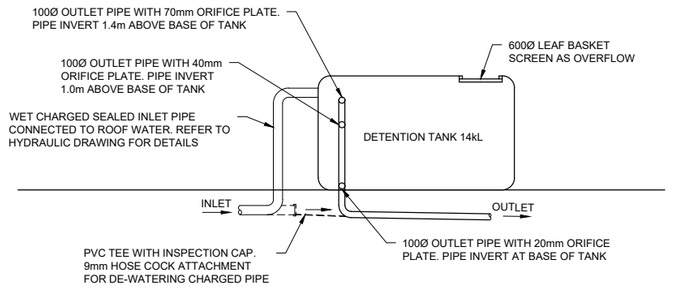
Appendix A – Engineering Drawings



NOTE:
GUTTERS TO BE SIZED FOR Q100 AND CONNECTED TO DETENTION TANKS.

NOTE:
FOR ALL LEVELS AND DETAIL REFER TO ARCHITECTURAL PLANS

NOTE:
FOR SEWER APPROVAL REFER TO DEVELOPMENT PERMIT No:D/113-2021



DETENTION TANK DETAIL

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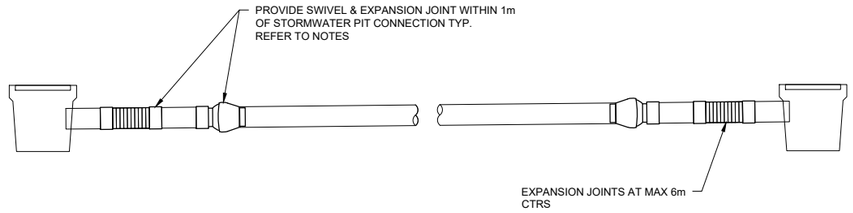

STORMWATER FLEXIBLE EXPANSION JOINT CONNECTION DETAIL

SCALE 1:25

PROPOSED LEGEND

- CONCRETE DRIVEWAY (ROAD RESERVE)
- CONCRETE DRIVEWAY
- FOOTPATH
- COMMUNAL LANDSCAPE
- STORMWATER
- S150 — SEWER BY OTHERS
- EASEMENT

NOTES:

1. DESIGN HAS BEEN PREPARED FOR SPECIALIST DISABILITY ACCOMMODATION AND THE REQUIRED APPROVALS UNDER A BUILDING APPROVAL.
2. DESIGN HAS CONSIDERED LOCAL COUNCIL AND QUEENSLAND STATE LEGISLATION FOR DESIGN REQUIREMENTS AS NOTED THROUGHOUT THE DESIGN.
3. THIS DRAWING HAS BEEN PROVIDED FOR THE REVIEW OF LEVELS AND STORMWATER DRAINAGE ONLY.
4. ON SITE SOIL CLASSIFICATION 'P', PROBLEM SITE, PROVIDE SWIVEL AND EXPANSION JOINTS TO ALL UNDERGROUND STORMWATER PIPES IN ACCORDANCE WITH STD DETAIL.
5. ALL SWIVEL AND EXPANSION JOINTS TO BE 'STORM PLASTICS' OR APPROVED EQUIVALENT.

DOWEL BAR SCHEDULE U.N.O

SLAB THICKNESS (mm)	DIA. (mm)	MIN LENGTH (mm)	MAX SPACING (mm)
125	16	350	300
150	20	400	300
150-200	24	450	300

TABLE IN ACCORDANCE WITH AS3727

CONCRETE DETAILS

	HEAVY DUTY DRIVEWAY CROSSOVER	PATHS	INTERNAL RESIDENTIAL DRIVEWAY	INTERNAL PATHS	INTERNAL BIN PADS
DEPTH (D)	175mm	125mm	125mm	125mm	125mm
CONC. STRENGTH (f'c)	32 MPa	32 MPa	25 MPa	25 MPa	25 MPa
REINF. MESH	SL82	SL72	SL72	SL72	SL72

TABLE IN ACCORDANCE WITH COUNCIL REQUIREMENTS AND AS3727

MESH COVER

TOP	50mm
SIDES	50mm
SIDE (CONTROL JOINT)	75mm (FORMED JOINT) 75mm (WEAKENED PLANE JOINT)

Rev	Revision Description	Date	Approved
C	APPROVAL	21.10.22	LS
B	APPROVAL	30.03.22	LS
A	APPROVAL	11.03.22	LS

North Point

Scale: 0m 3.125 6.25 — A1 1:125

Horiz. Datum: LOCAL
Vert. Datum: AHD
RL Datum

Client: LEBEN PTY LTD

Consultant: ARCOS

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Project: MULTI UNIT DEVELOPMENT (SDA COMPLIANT) 7 GLENCOE STREET, ALLENSTOWN, QLD, 4700

Drawn	JW
Design	JW
Check	GM
Approved	LACHLAN SWANN RPEQ 21223
Approved Date	11.03.22
Signed	

Drawing: DEVELOPMENT SITE PLAN

Project No.: 220242
Drawing No.: DRG-C-00301
Rev No.: C
Status: FOR APPROVAL
Sheet Size: A1

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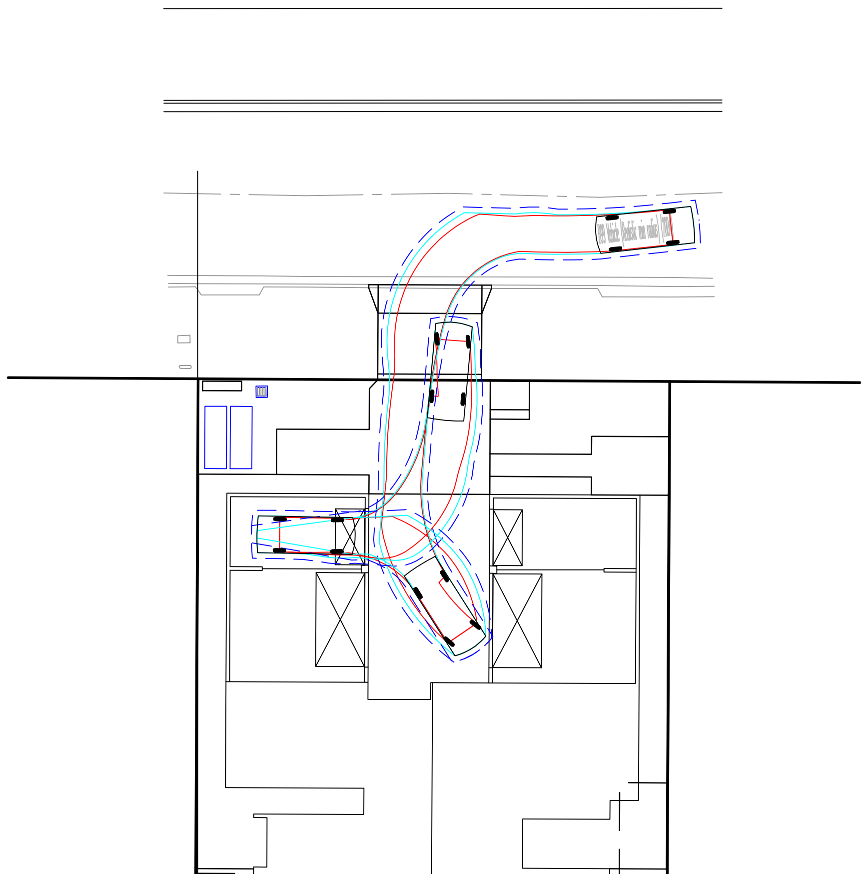
Appendix B – Turn Path Sketches



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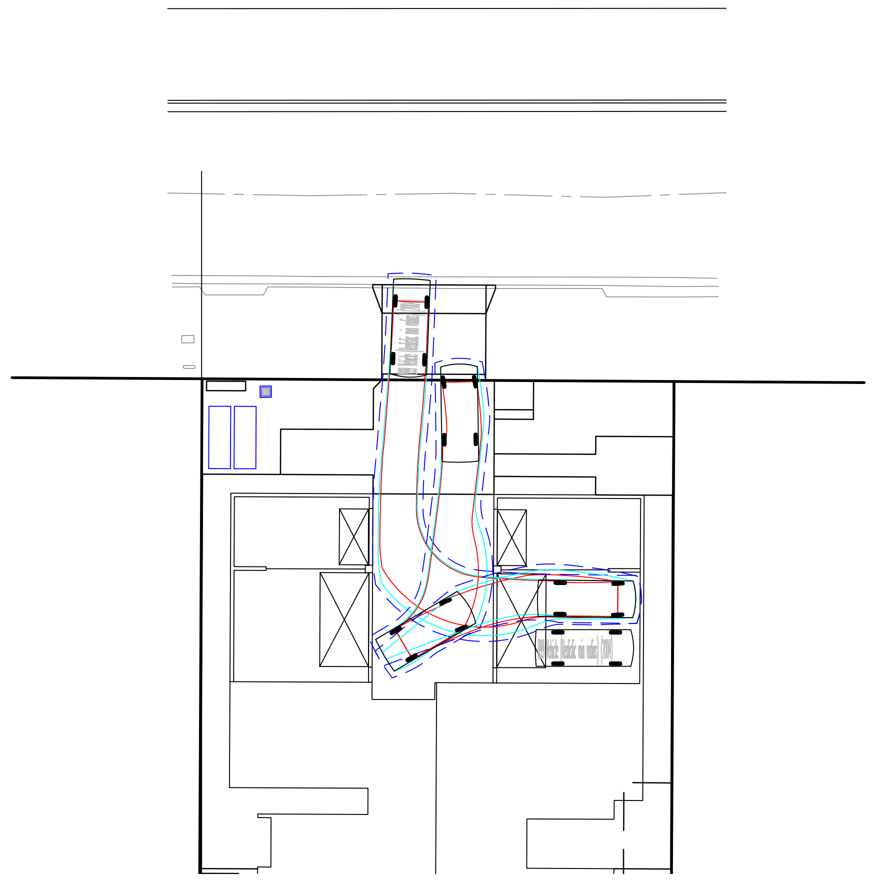

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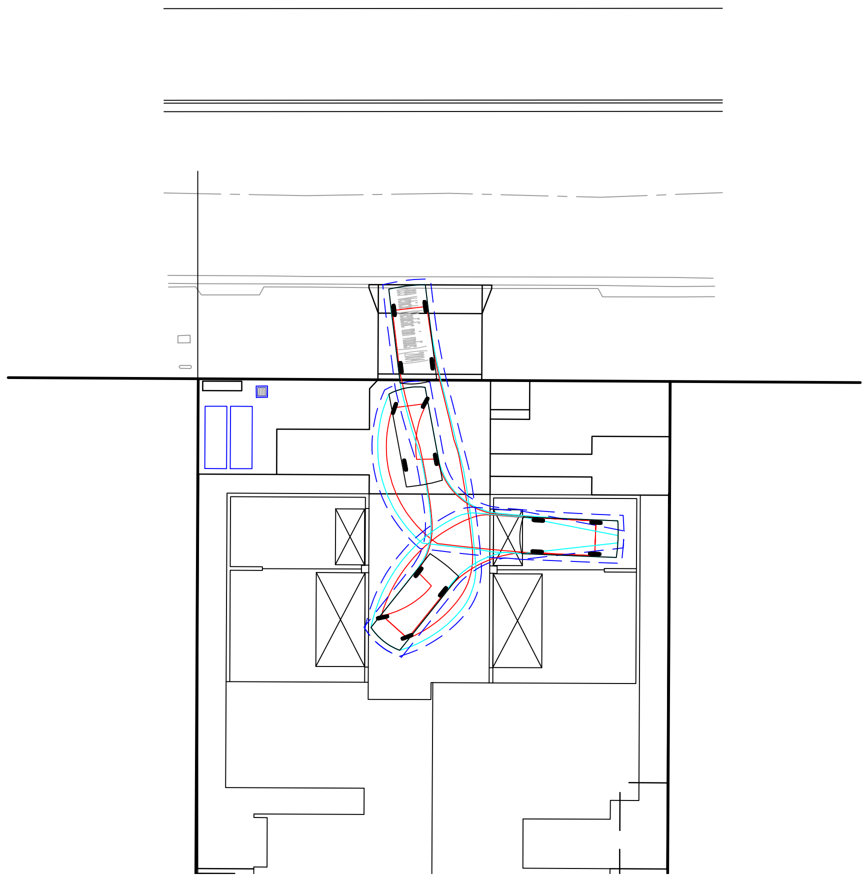
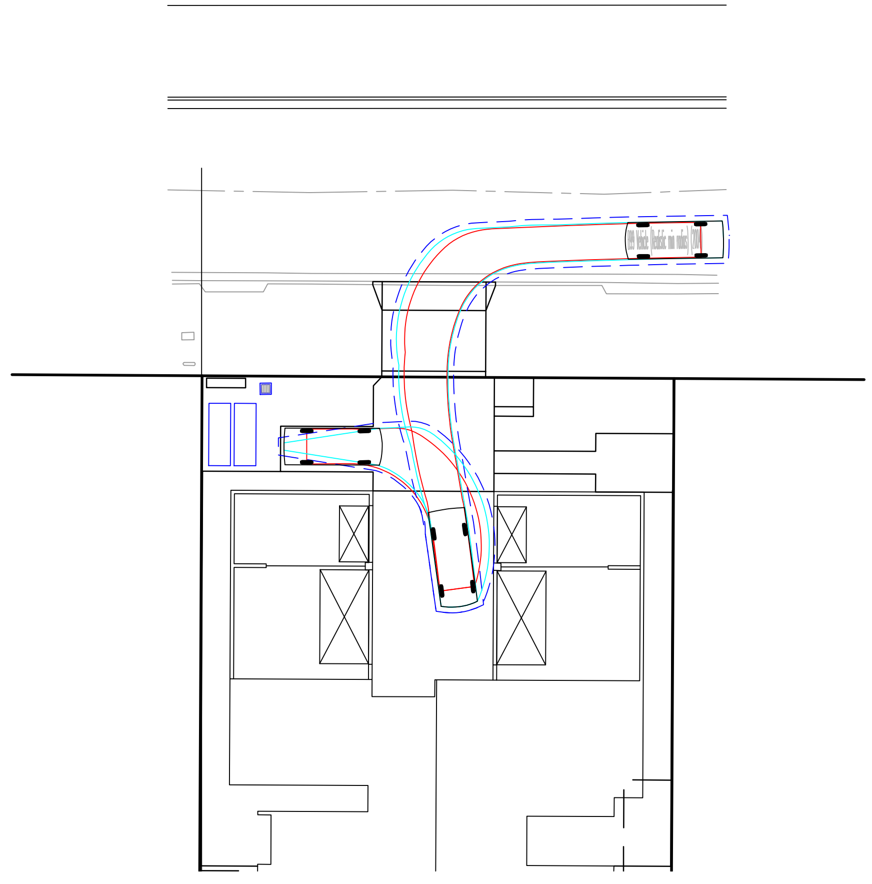


B99 - CARPARK

SCALE 1:200



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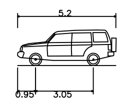

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

Rev	Revision Description	Date	Approved
P1	PRELIMINARY	dd.mm.yy	LS

North Point: N

Scale: 0m 2.5 5 (A1 1:100)

Horiz. Datum: LOCAL
Vert. Datum: AHD
RL Datum

Client: LEBEN PTY LTD

Consultant: ARCOS

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Project: MULTI UNIT DEVELOPMENT (SDA COMPLIANT) 7 GLENCOE STREET, ALLENSTOWN, QLD, 4700

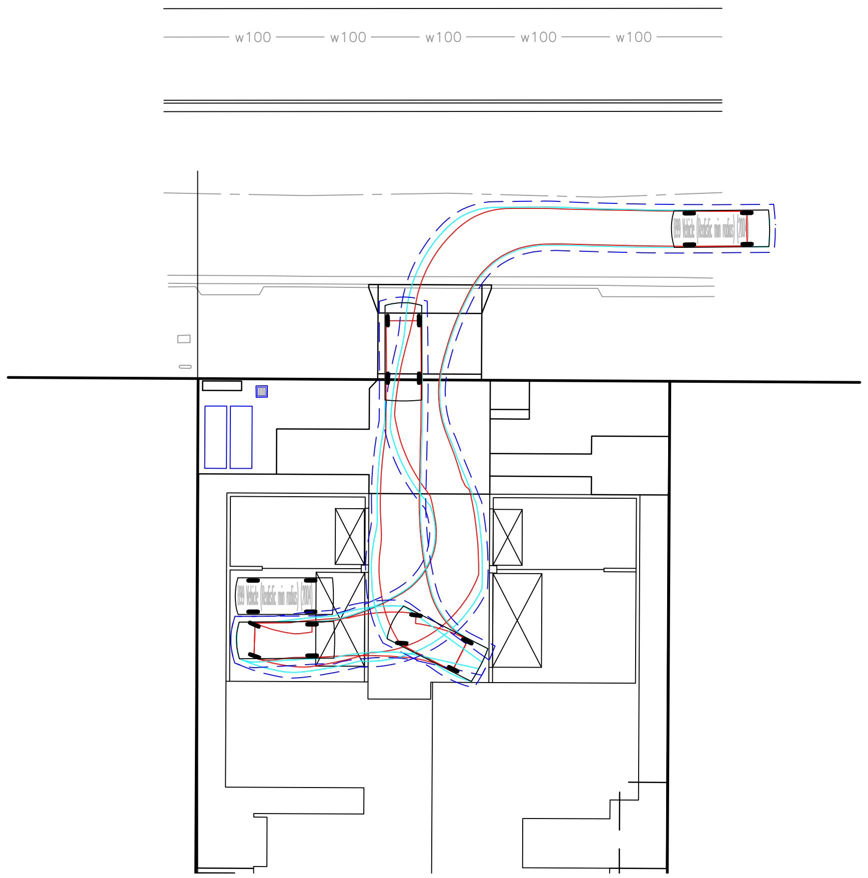
Drawn: JW
Design: JW
Check: GM

Drawing: VEHICLE TRACKING PLAN SHEET 1

Project No.: 220242
Drawing No.: SKT-C-00001
Rev No.: P1

Approved: LACHLAN SWANN, RPEQ 21223
Approved Date: 11.03.22
Signed

Status: FOR APPROVAL
Sheet Size: A1



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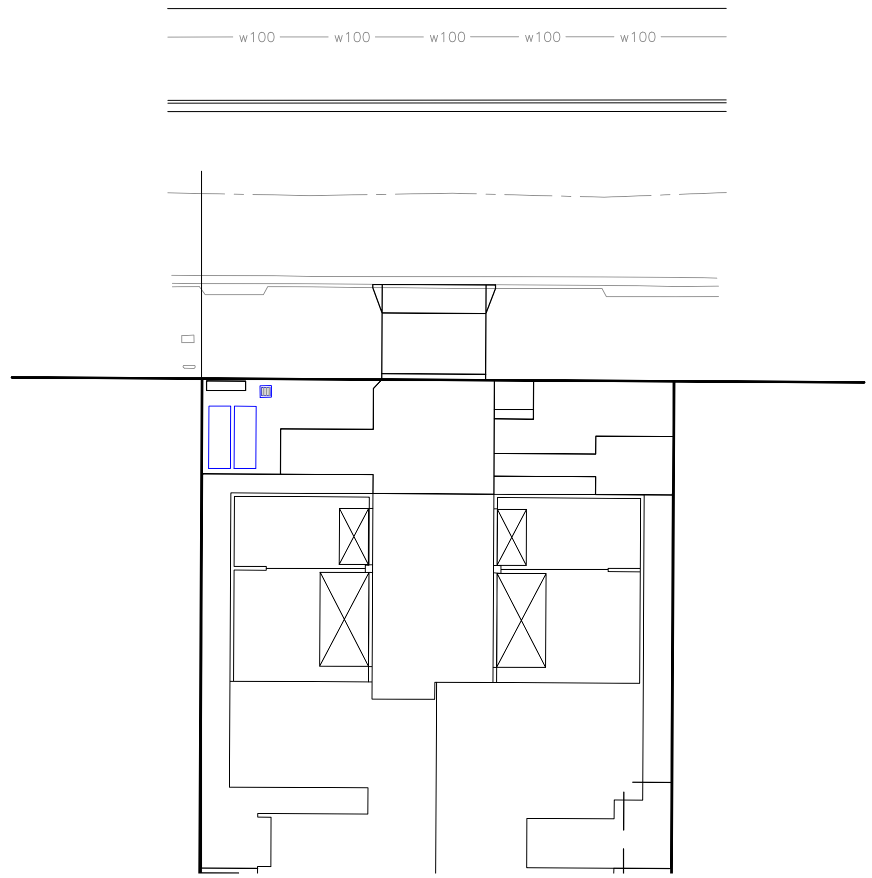
SCALE 1:200



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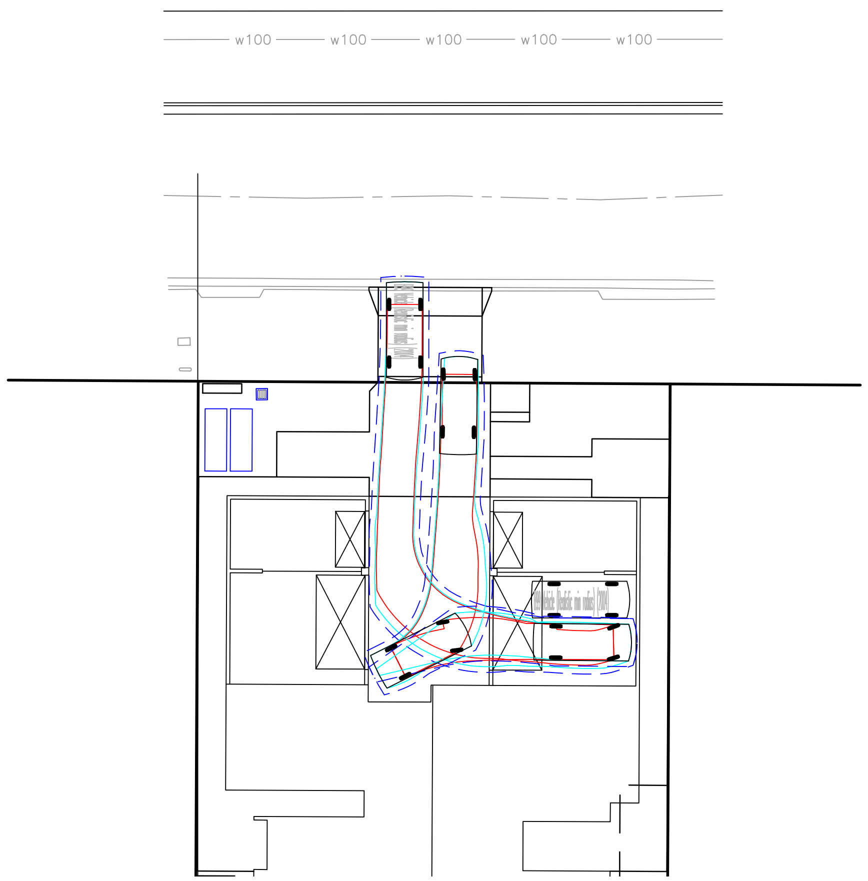

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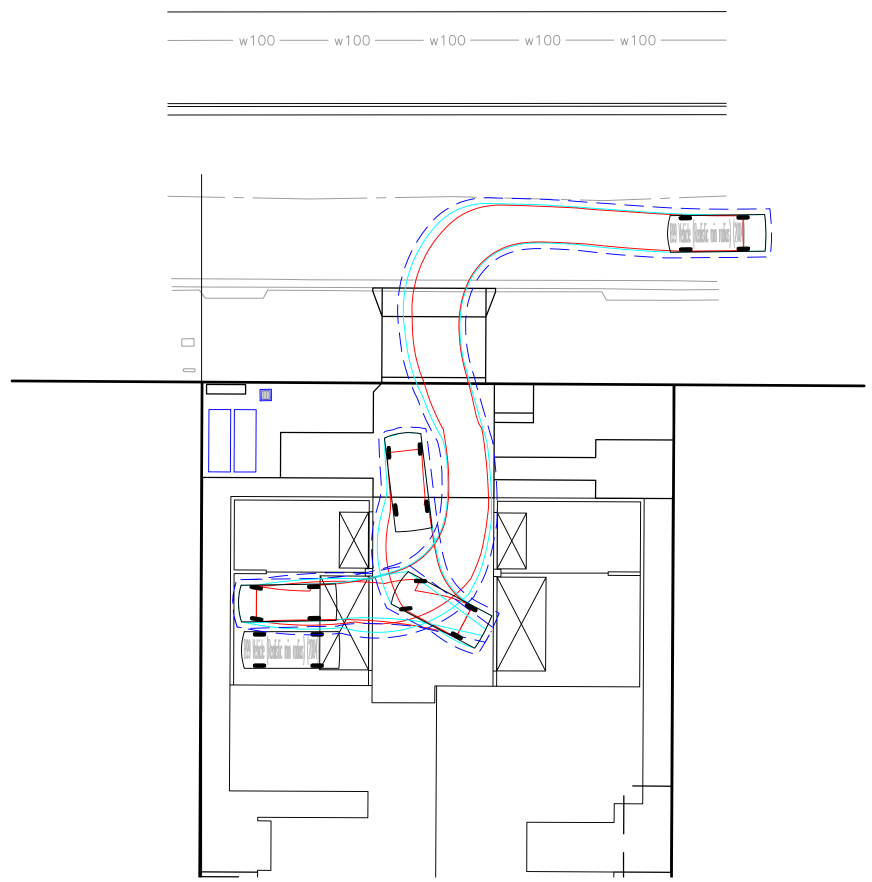

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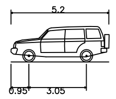

B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

Rev	Revision Description	Date	Approved
P1	PRELIMINARY	dd.mm.yy	LS

North Point: N

Scale: 0m 2.5 5 — A1 1:100

Horiz. Datum: LOCAL
Vert. Datum: AHD
RL Datum

Client: LEBEN PTY LTD

Consultant: ARCOS
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Project: MULTI UNIT DEVELOPMENT (SDA COMPLIANT) 7 GLENCOE STREET, ALLENSTOWN, QLD, 4700

Drawn	JW
Design	JW
Check	GM

Drawing: VEHICLE TRACKING PLAN SHEET 2

Approved: LACHLAN SWANN RPEQ 21223
Approved Date: 11.03.22
Signed

Project No.	Drawing No.	Rev No.
220242	SKT-C-00002	P1

Status: FOR APPROVAL
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Appendix C – Stormwater Calculations

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Project: 220468
Description: 7 Glencoe St, Allenstown
Detention Volume: 12kL

Existing

ARI (year)	AEP (%)	Duration (mins & hrs)												Crit Dur	MAX Q
		10	15	20	25	30	45	60	90	120	180	270	360		
		0.167	0.250	0.333	0.417	0.50	0.75	1.00	1.50	2.00	3.00	4.50	6.00		
1	63.2	0.018	0.024	0.025	0.025	0.027	0.023	0.024	0.022	0.020	0.015	0.016	0.011	30	0.027
2	39	0.031	0.034	0.034	0.034	0.036	0.031	0.032	0.029	0.027	0.020	0.020	0.015	30	0.036
5	18	0.044	0.045	0.044	0.045	0.046	0.040	0.041	0.037	0.036	0.027	0.027	0.020	30	0.046
10	10	0.056	0.054	0.054	0.052	0.053	0.048	0.045	0.040	0.042	0.031	0.028	0.028	10	0.056
20	5	0.066	0.063	0.063	0.060	0.061	0.057	0.053	0.047	0.050	0.036	0.034	0.034	10	0.066
50	2	0.076	0.075	0.070	0.072	0.071	0.066	0.058	0.053	0.049	0.041	0.037	0.040	10	0.076
100	1	0.086	0.084	0.078	0.081	0.079	0.074	0.066	0.060	0.056	0.047	0.043	0.046	10	0.086
100 CC	1 CC	0.109	0.104	0.095	0.098	0.096	0.090	0.081	0.072	0.067	0.056	0.051	0.055	10	0.109
	MAX Q	0.109	0.104	0.095	0.098	0.096	0.090	0.081	0.072	0.067	0.056	0.051	0.055		
	MAX AEP	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC		

Developed

ARI (year)	AEP (%)	Duration (mins & hrs)												Crit Dur	MAX Q
		10	15	20	25	30	45	60	90	120	180	270	360		
		0.167	0.250	0.333	0.417	0.50	0.75	1.00	1.50	2.00	3.00	4.50	6.00		
1	63.2	0.033	0.033	0.032	0.031	0.032	0.027	0.027	0.024	0.024	0.016	0.016	0.012	15	0.033
2	39	0.043	0.043	0.041	0.041	0.041	0.035	0.034	0.030	0.031	0.021	0.020	0.016	10	0.043
5	18	0.054	0.053	0.051	0.051	0.051	0.045	0.044	0.039	0.040	0.027	0.027	0.021	10	0.054
10	10	0.066	0.063	0.059	0.059	0.058	0.053	0.051	0.045	0.045	0.031	0.029	0.029	10	0.066
20	5	0.076	0.073	0.068	0.068	0.067	0.062	0.060	0.053	0.053	0.037	0.034	0.035	10	0.076
50	2	0.088	0.086	0.076	0.076	0.075	0.070	0.063	0.055	0.051	0.042	0.038	0.040	10	0.088
100	1	0.098	0.095	0.084	0.084	0.083	0.078	0.071	0.062	0.057	0.048	0.043	0.046	10	0.098
100 CC	1	0.119	0.116	0.103	0.102	0.101	0.094	0.085	0.075	0.069	0.057	0.052	0.055	10	0.119
	MAX Q	0.119	0.116	0.103	0.102	0.101	0.094	0.085	0.075	0.069	0.057	0.052	0.055		
	MAX AEP	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC		

Mitigated

ARI (year)	AEP (%)	Duration (mins & hrs)												Crit Dur	MAX Q
		10	15	20	25	30	45	60	90	120	180	270	360		
		0.167	0.250	0.333	0.417	0.50	0.75	1.00	1.50	2.00	3.00	4.50	6.00		
1	63.2	0.027	0.027	0.026	0.027	0.027	0.024	0.023	0.022	0.020	0.016	0.016	0.012	30	0.027
2	39	0.034	0.034	0.033	0.034	0.034	0.030	0.029	0.027	0.026	0.021	0.020	0.015	15	0.034
5	18	0.042	0.043	0.042	0.042	0.042	0.037	0.036	0.033	0.032	0.027	0.027	0.021	15	0.043
10	10	0.054	0.053	0.052	0.049	0.049	0.045	0.042	0.037	0.036	0.031	0.028	0.028	10	0.054
20	5	0.067	0.066	0.064	0.060	0.059	0.054	0.049	0.044	0.042	0.036	0.033	0.034	10	0.067
50	2	0.084	0.080	0.072	0.073	0.072	0.066	0.056	0.050	0.043	0.041	0.036	0.040	10	0.084
100	1	0.095	0.091	0.082	0.084	0.082	0.075	0.065	0.059	0.051	0.047	0.042	0.045	10	0.095
100 CC	1 CC	0.119	0.114	0.100	0.102	0.100	0.093	0.084	0.073	0.066	0.057	0.051	0.055	10	0.119
	MAX Q	0.119	0.114	0.100	0.102	0.100	0.093	0.084	0.073	0.066	0.057	0.051	0.055		
	MAX AEP	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC		

Mitgated to Existing Check
(Increase is <= to 0.01m^3/s, OR <= to 0.5% of the 1% AEP Existing peak inflow)

ARI (year)	AEP (%)	Duration (mins & hrs)												MAX Q
		10	15	20	25	30	45	60	90	120	180	270	360	
		0.167	0.250	0.333	0.417	0.50	0.75	1.00	1.50	2.00	3.00	4.50	6.00	
1	63.2	0.009	0.003	0.002	0.001	0.000	0.002	-0.001	0.000	0.000	0.001	0.001	0.001	0.009
2	39	0.003	0.000	-0.001	-0.001	-0.002	-0.001	-0.002	-0.002	-0.002	0.001	0.000	0.001	0.003
5	18	-0.002	-0.002	-0.002	-0.003	-0.004	-0.003	-0.004	-0.003	-0.004	0.000	0.000	0.000	0.000
10	10	-0.002	-0.001	-0.002	-0.002	-0.004	-0.004	-0.003	-0.003	-0.006	0.000	0.000	0.000	0.000
20	5	0.002	0.003	0.001	0.000	-0.002	-0.003	-0.004	-0.003	-0.008	0.000	-0.001	0.000	0.003
50	2	0.007	0.005	0.002	0.001	0.001	-0.001	-0.002	-0.003	-0.006	0.000	-0.001	0.000	0.007
100	1	0.010	0.007	0.005	0.003	0.003	0.001	-0.001	-0.001	-0.005	0.000	-0.001	0.000	0.010
100 CC	1 CC	0.010	0.010	0.005	0.004	0.004	0.003	0.003	0.001	-0.001	0.000	0.000	0.000	0.010
	MAX Q	0.010	0.010	0.005	0.004	0.004	0.003	0.003	0.001	0.000	0.001	0.001	0.001	
	MAX AEP	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	1 CC	63.2	63.2	63.2	63.2	

Mitgated to Existing Check
(Increase is <= to 2% of Existing for same duration-AEP check)

ARI (year)	AEP (%)	Duration (mins & hrs)											
		10	15	20	25	30	45	60	90	120	180	270	360
		0.167	0.250	0.333	0.417	0.50	0.75	1.00	1.50	2.00	3.00	4.50	6.00
1	63.2	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE
2	39	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	FALSE
5	18	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
10	10	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
20	5	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
50	2	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
100	1	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
100	1	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE

Mitgated to Existing Check - Existing (0.5% of Existing 1% AEP)

100	1	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002
100 CC	1 CC	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003

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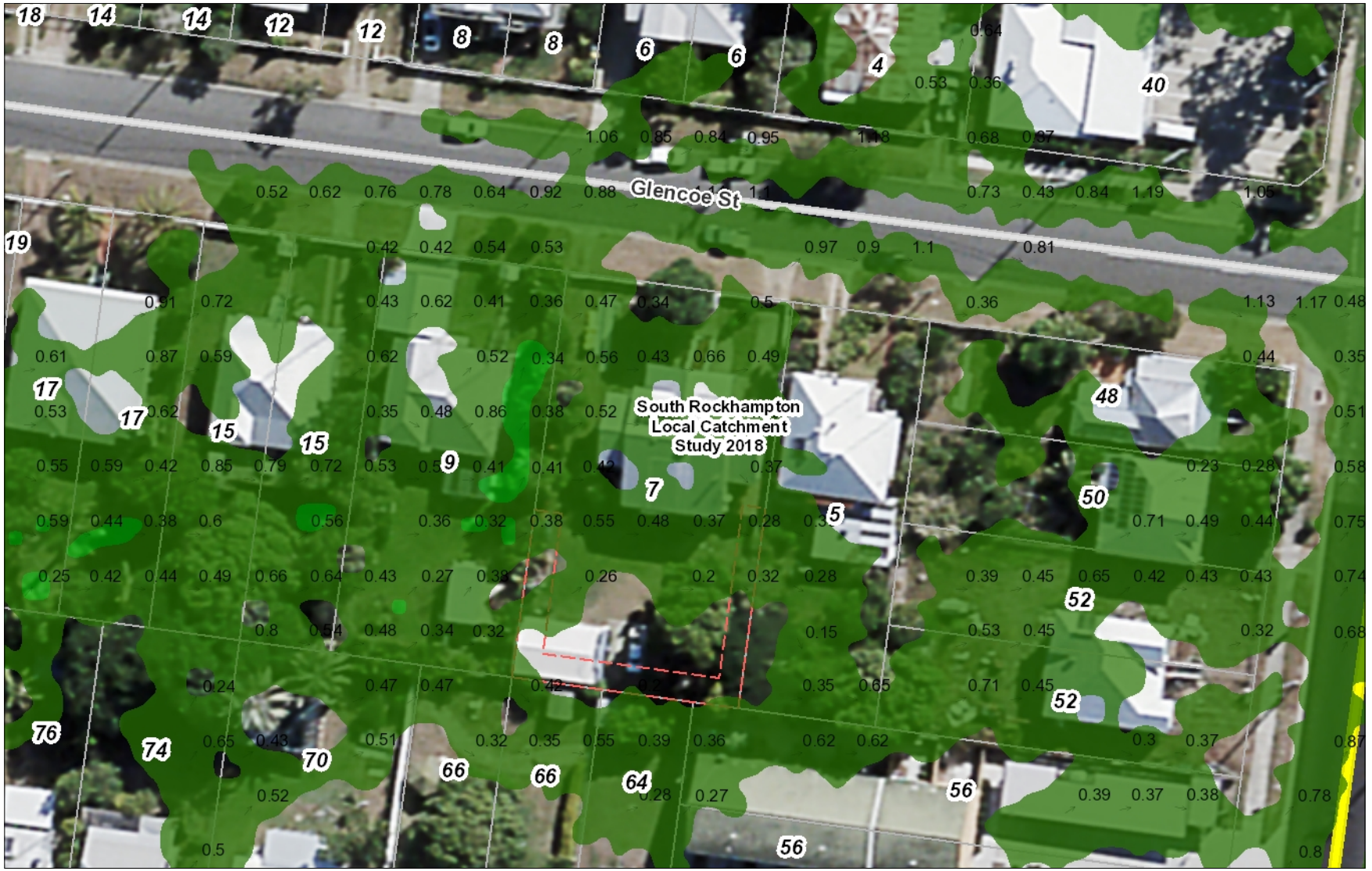
Appendix D – Rockhampton Regional Council Flooding Map

A4 Page scale at 1: 648.36

Printed from GeoCortex on 22/11/2022



Legend

- Rockhampton Local Creek Catchments
- Velocity 1% AEP (100 yr)
- Depth 1% AEP (100 yr)
  - 0-0.3
  - 0.3-0.5
  - 0.5-1.0
  - 1.0-1.5
  - 1.5-2.0
  - 2.0-2.5
  - 2.5-3.0
  - 3.0-3.5
  - 3.5-4.0
  - 4.0-4.5
  - 4.5-5.0
  - >5.0
- Easements
- Property Parcels (Main)
- Roads1
  - Main Roads
  - Major Council Roads
  - Standard Council Ro
  - Access Roads
  - Private Roads
  - Unconstructed
- Ocean
- Rivers
- DCDB Parks
  - National Park
  - Reserves
  - State Forest

GDA2020

Rockhampton Regional Council

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Version: 1, Version Date: 28/11/2022

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Appendix D – Code Assessment

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9.3.6 Stormwater management code

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	
Stormwater management - General		
PO1 Development provides a stormwater management system which achieves the integrated management of stormwater to: a) ensure that flooding impacts do not increase, including upstream or downstream of the development site; b) avoid net worsening of stormwater peak discharges and runoff volumes; c) utilises the use of water sensitive urban design principles; and d) ensure the site maximizes opportunities for capture and reuse. Editor's note—A stormwater management plan may be required to demonstrate compliance with the performance outcome.	**AO1.1** Development provides a stormwater management system which is designed in compliance with SC6.18— Stormwater management planning scheme policy, SC6.10 — Flood hazard planning scheme policy, Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff. **AND** **AO1.2** Stormwater is conveyed to a lawful point of discharge in accordance with the Queensland Urban Drainage Manual.	The stormwater management system has been designed in accordance with QUDM, utilising an on-site detention tank.
PO2 Development provides a stormwater management system which: a) has sufficient capacity to safely convey run-off taking into account increased run-off from impervious surfaces and flooding in local catchments; b) maximises the use of natural waterway corridors and natural channel design principles; and c) efficiently integrates with existing stormwater treatments upstream and downstream.	**AO2.1** Development provides a stormwater management system which is designed in compliance with SC6.18 — Stormwater management planning scheme policy, Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff.	WBNM software has been used to calculate the pre and post development scenarios with detention tank mitigation to ensure that a suitably designed stormwater management system has been provided.
PO3 Development ensures that the location and design of stormwater detention and water quality treatment facilities: a) minimise risk to people and property; b) provide for safe access and maintenance; and c) provide for the safe recreational use of stormwater management features.	**AO3.1** Development provides for stormwater detention and water quality treatment facilities which are located outside of a waterway. **AND** **AO3.2** Development provides for stormwater detention in accordance with SC6.18 — Stormwater management planning scheme policy, Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff. **AND** **AO3.3** Development provides a stormwater quality treatment system which is designed in accordance with State Planning Policy - Water Quality.	The on-site detention tank has been located at the frontage of the property to provide safe access. This detention tank is offset over 6.5m from the back of kerb and out of the clear zone.

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Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Environmental values		
PO4 Development and drainage works including stormwater channels, creek modification works, bridges, culverts and major drains, protect and enhance the environmental values of the waterway corridors and drainage paths and permit terrestrial and aquatic fauna movement. Editor's note—Compliance with the performance outcomes and acceptable outcomes should be demonstrated by the submission of a site-based stormwater management plan for development.	**AO4.1** Development ensures natural waterway corridors and drainage paths are retained. **AND** **AO4.2** Development incorporates the use of natural channel design principles in constructed components to maximise environmental benefits and waterway stability in accordance with the Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff. **AND** **AO4.3** Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in accordance with the Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff.	The development does not impede on any natural waterway corridors with drainage paths retained. Water captured in the pit and pipe system is discharged to Glencoe Street using kerb adaptors.
PO5 Development protects and enhances the environmental and water quality values of waterways, creeks and estuaries within or external to the site. Editor's note—The State Planning Policy - Guideline - Water Quality and Section 9 of the *Environmental Protection Act 1994* define environmental values as 'a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety.'	No acceptable outcome is nominated.	On-site detention nominated to manage peak flow discharge. Water quality requirements do not apply for premises smaller than 2500m^2 as per the State Planning Policy.

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Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Overland flow path tenure		
PO6 All overland flow paths are maintained under tenure arrangements that facilitate efficient infrastructure and enhance environmental sustainability. Editor's note—As a guide, Council prefers that the location of Council owned assets are contained within a road reserve, drainage system is contained within a road reserve, drainage easement, drainage reserve, public reserve, public pathway, park or waterway corridor.	No acceptable outcome is nominated.	Overland flow paths have been maintained at the eastern and western boundaries of the proposed dwelling.

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Detention Systems		
PO7 Detention basins are designed, located and constructed on land solely dedicated for stormwater management.	**AO7.1** Detention basins are designed in accordance with SC6.18 Stormwater management planning scheme policy.	No stormwater infrastructure proposed within road reserve.
PO8 Development ensures that location and design of stormwater detention and water quality treatment: a) minimises risk to people and property; b) provides for safe access and maintenance; and c) minimises ecological impacts to creeks and waterways.	**AO8.1** Development provides a stormwater management system designed in accordance with SC6.10 Flood hazard planning scheme policy and SC6.18 Stormwater management planning scheme policy.	No stormwater infrastructure proposed within road reserve.
PO9 Flood plain storage and function, and detention system functions are maintained. This shall include ensuring that: a) detention system design does not remove floodplain storage; and b) detention systems continue to operate effectively during a major storm event.	No acceptable outcome is nominated.	No stormwater infrastructure proposed within road reserve.
PO10 Detention basins shall not be provided in locations that prevent easy access to or maintenance of the detention basin.	**AO10.1** The location of detention basins are in accordance with SC6.18 Stormwater management planning scheme policy.	No stormwater infrastructure proposed within road reserve.

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Efficiency and whole of life cycle cost		
PO11 Development ensures that there is sufficient site area to accommodate an effective stormwater management system. Editor's note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for development.	No acceptable outcome is nominated.	No stormwater infrastructure proposed within road reserve.
PO12 Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the: a) existing capacity of stormwater infrastructure within and external to the site, and any planned stormwater infrastructure upgrades; b) safe management of stormwater discharge from existing and future upslope development; and c) implications for adjacent and down-slope development.	No acceptable outcome is nominated.	No stormwater infrastructure proposed within road reserve.
PO13 Development provides proposed stormwater infrastructure which: a) remains fit for purpose for the life of the development and maintains full functionality in the design storm event; and b) can be safely accessed and maintained in a cost effective way.	No acceptable outcome is nominated.	No stormwater infrastructure proposed within road reserve.

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Erosion and sediment control		
PO14 Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development site from construction activities, including vegetation clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect: a) the environmental values and water quality objectives of waters; b) waterway hydrology; and c) the maintenance and serviceability of stormwater infrastructure.	**AO14.1** Erosion and sediment control plan is to be designed and implemented in accordance with the Capricorn Municipal Development Guidelines.	Construction phase erosion and sediment control practices followed

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Water quality within catchment areas		
PO15 For development proposals within the Fitzroy River sub-basin, relevant environmental values are recognised and enhanced, and relevant water quality objectives are addressed. Editor's note—Section 3.2 of Queensland Water Quality Guidelines 2009 identifies values for water quality for waters in the Central Coast Queensland region.	**AO15.1** Development complies with the provisions of the State Planning Policy - Guideline - Water Quality. **AND** **AO15.2** Development adjoining the full supply height above the Fitzroy River Barrage includes the provision of an effective buffer that assists in filtering runoff, including: a) a buffer distance of 100 metres to the water supply height of the barrage which excludes cropping or grazing of a low intensity nature; and b) fencing and water troughs installed on the land to prevent encroachment of animals within 100 metres of the full supply height above the barrage.	The development complies with the provisions detailed in the State Planning Policy – Guideline – Water Quality.

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Protecting water quality		
PO16 The development is compatible with the land use constraints of the site for: a) achieving stormwater design objectives; and b) avoiding or minimising the entry of contaminants into, and transport of contaminants in stormwater.	**AO16.1** Development is undertaken in accordance with a stormwater management plan that: 1. incorporates stormwater quality control measures to achieve the design objectives set out in the State Planning Policy – Guideline – Water Quality; 2. provides for achievable stormwater quality treatment measures reflecting land use constraints, such as soil type, landscape features (including landform), nutrient hazardous areas, acid sulfate soil and rainfall erosion potential; and 3. accounts for development type, construction phase, local landscape, climatic conditions and design objectives. Editor's note—A stormwater management plan includes the design, construction, operation, maintenance of the stormwater system. Editor's note—SC6.18 — Stormwater management planning scheme policy provides guidance on preparing a stormwater quality management plan.	Water quality requirements do not apply for premises smaller than 2500m^2 as per the State Planning Policy.

Table 9.3.6.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Protecting water quality in existing natural waterways		
PO17 The waterway is designed for stormwater flow management, stormwater quality management and the following end use purposes: a) amenity including aesthetics, b) landscaping and recreation; c) flood management; d) stormwater harvesting as part of an integrated water cycle management plan; e) as a sustainable aquatic habitat; and f) the protection of water environmental values.	No acceptable outcome is nominated.	Does not apply.
PO18 The waterway is located in a way that is compatible with existing tidal waterways.	**AO18.1** Where the waterway is located adjacent to, or connected to, a tidal waterway by means of a weir, lock, pumping system or similar: a) there is sufficient flushing or a tidal range of more than 0.3 metres; or b) any tidal flow alteration does not adversely impact on the tidal waterway; or c) there is no introduction of salt water into freshwater environments.	Does not apply.
PO19 The construction phase for the waterway is compatible with protecting water environmental values in existing natural waterways.	**AO19.1** Erosion and sediment control measures are incorporated during construction to achieve design objectives set out in State Planning Policy - Guideline - Water Quality. Editor's note—Erosion and sediment control is to be designed and implemented in accordance with the International Erosion Control Association Best Practice Erosion and Sediment Control Guidelines.	Does not apply.
PO20 Stormwater overflows from the waterway do not result in lower water quality objectives in existing natural waterways.	**AO20.1** Stormwater run-off entering non-tidal waterways is pre-treated prior to release in accordance with the guideline design objectives, water quality objectives of local waterways, and any relevant local area stormwater management plan.	Does not apply.

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9.3.6 Water and sewer code

Table 9.3.8.3.1 Development outcomes for assessable development (part)

Performance Outcomes	Acceptable Outcomes	Commentary
Water		
PO1 A water supply is provided that is adequate for the current and future needs of the intended development.	**AO1.1** AO1.1.1 Where within a water supply planning area, the development is connected to Council's reticulated water supply system in accordance with SC6.21 — Water supply infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. Editor's note—Where development is located outside of the water supply planning area to refer to the requirements under the Plumbing Code of Australia.	The proposed dwelling is within the Allenstown Water Supply Planning Area and is to be connected the Council's reticulated water supply using a 100mm connection. The cross road connection has been nominated to be in accordance with STD DRG WAT-1105.
PO2 Reticulated water supply networks ensure that the installation is sustainable and minimises whole of life cycle costs.	**AO2.1** Where within a water supply planning area, water supply systems and connections are designed and constructed in accordance with SC6.21 — Water supply infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. **AND** **AO2.2** Where within a water supply planning area, staged developments are connected to the water supply network and operational prior to the commencement of the use or endorsement of the survey plan.	As per above comment.

Table 9.3.8.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	Commentary
Sewer		
PO3 Sewerage treatment and disposal is provided that is appropriate for the level of demand generated, protects public health and avoids environmental harm.	**AO3.1** Where within a sewer planning area, the development is connected to Council's reticulated waste water system in accordance with SC6.17 — Sewerage infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. Editor's note—Where development is located outside of the sewer planning area to refer to the requirements under the Plumbing Code of Australia.	The proposed dwelling is within the Allenstown Sewer Planning Area and was connected the Council's reticulated waste water system in accordance with the relevant codes. This connection was previously approved by council and completed.
PO4 Reticulated sewer networks ensure that the installation of infrastructure assets is sustainable and minimises whole of life cycle costs.	**AO4.1** Where within a sewer planning area, waste water systems and connections are designed and constructed in accordance with SC6.17 — Sewerage infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines.	All components used for the sewer network connection has been previously approved.

	Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. **AND** **AO4.2** Where within a sewer planning area, staged developments are connected to the waste water network and operational prior to the commencement of the use or endorsement of the survey plan.	

Table 9.3.8.3.1 Development outcomes for assessable development (part)

Performance outcomes	Acceptable outcomes	
Point source waste water management		
PO5 The waste water management plan provides that waste water is managed in accordance with a waste management hierarchy that: 1. avoids waste water discharge to waterways; or 2. minimises waste water discharge to waterways by reuse, recycling, recovery and treatment for disposal to sewer, surface water and groundwater if it is agreed waste water discharge to waterways can not practically and reasonably be avoided.	**AO5.1** A waste water management plan (WWMP) is prepared by a suitably qualified person. The waste water management plan accounts for: 1. waste water type; 2. climatic conditions; 3. water quality objectives; and 4. best practice environmental management.	Not applicable.