CHILD CARE CENTRE DEVELOPMENT

at 28 MAIN STREET, PARK AVENUE, QLD

for POWERCAT DEVELOPMENTS PTY LTD

DOCUMENTATION SCHEDULE

000 SERIES DRAWINGS

1283	CD001	COVER PAGE & LOCALITY PLAN

100 SERIES DRAWINGS

1283	CD101	SITE PLAN - OVERALL
1283	CD102	FLOOR PLAN - EXISTING & DEMOLITION
1283	CD103	FLOOR PLAN - PROPOSED

200 SERIES DRAWINGS

1283	CD201	ELEVATIONS

600 SERIES DRAWINGS

1283	CD601	CHILD CARE CENTRE FLOOR PLAN

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

15 April 2024

DATE

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

Development Permit No.: D/143-2015

Dated: 1 June 2016

LOCALITY PLAN

ISSUE	DESCRIPTION	DRAWN	DATE
PRELIMINARY			
07/02/2024			

SITE INFORMATION

LOT: 1 & 2 ON PLAN: RP607946, RP620251
AREA: 6,312m² PARISH: MURCHISON COUNTY: LIVINGSTONE

BUILDING INFORMATION

CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 9b

GENERAL NOTES

CONTRACTOR TO CONFIRM ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO COMMENCEMENT OF ANY BUILDING WORKS

ALL CONSTRUCTION TO COMPLY WITH THE NATIONAL CONSTRUCTION CODE AND RELEVANT AUSTRALIAN STANDARDS

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E: admin@brdg.com.au

brd GROUP
SUNSHINE COAST BRISBANE
BUILDING DESIGN INTERIOR DESIGN DESIGN MANAGEMENT

Interiors ■ Residential ■ Commercial ■ Planning ■ Hospitality ■ Institutional

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CHILD CARE CENTRE DEVELOPMENT
LOCATION
28 MAIN STREET, PARK AVENUE, QLD
CLIENT
POWERCAT DEVELOPMENTS PTY LTD
TITLE
COVER PAGE & LOCALITY PLAN

DATE	DRAWN
FEBRUARY 2024	LM
SCALE	**CHECKED**
A1: NTS A3: NTS	BC
DRAWING NO.	**REVISION**
1283 - CD001	

ROCKHAMPTON REGIONAL COUNCIL

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15 April 2024

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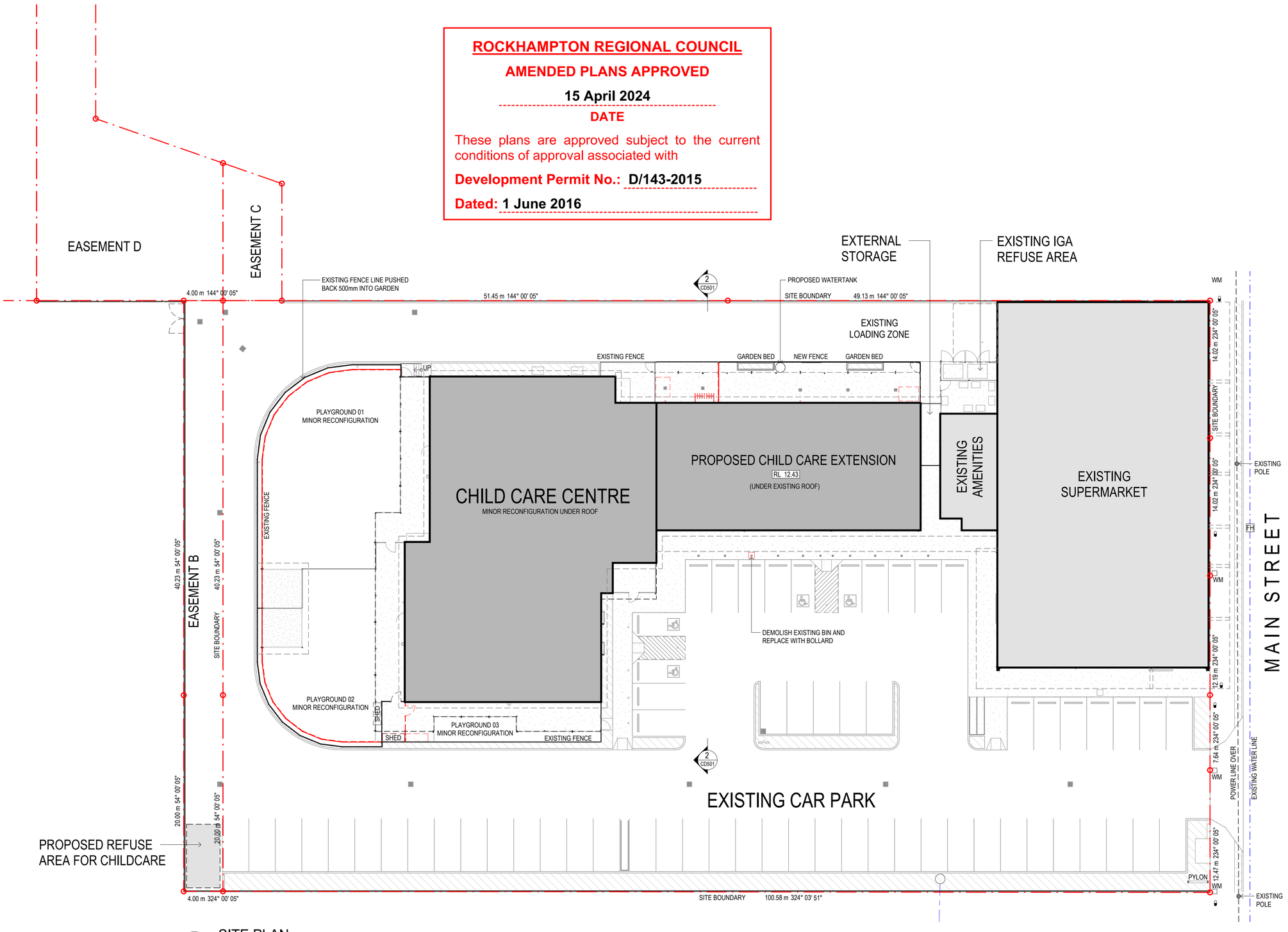
SITE PLAN LEGEND

B	BOLLARD
FEN	FENCE
RL	REDUCED LEVEL
SCR	SCREEN
SHS	STEEL POST
-X	EXISTING

SITE PLAN SYMBOLS

- ADJACENT SURFACES TO BE EQUAL LEVEL - NO STEP
- LANDSCAPING
- E — ELECTRICAL LINE
- S — SEWER LINE
- SW — STORMWATER LINE
- T — COMMUNICATIONS LINE
- W — WATERMAIN LINE



2 SITE PLAN

OVERALL 1 : 200

ISSUE	DESCRIPTION	DRAWN	DATE
	PRELIMINARY 07/02/2024		

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PROJECT

CHILD CARE CENTRE DEVELOPMENT

LOCATION

28 MAIN STREET, PARK AVENUE, QLD

CLIENT

POWERCAT DEVELOPMENTS PTY LTD

TITLE

SITE PLAN - OVERALL

2 1 0 1 2 3 4 5 6
Scale 1:200 (m)

DATE	DRAWN
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SCALE	**CHECKED**
A1: 1:200 A3: 1:400	BC
DRAWING NO.	**REVISION**
1283 - CD101	

ROCKHAMPTON REGIONAL COUNCIL

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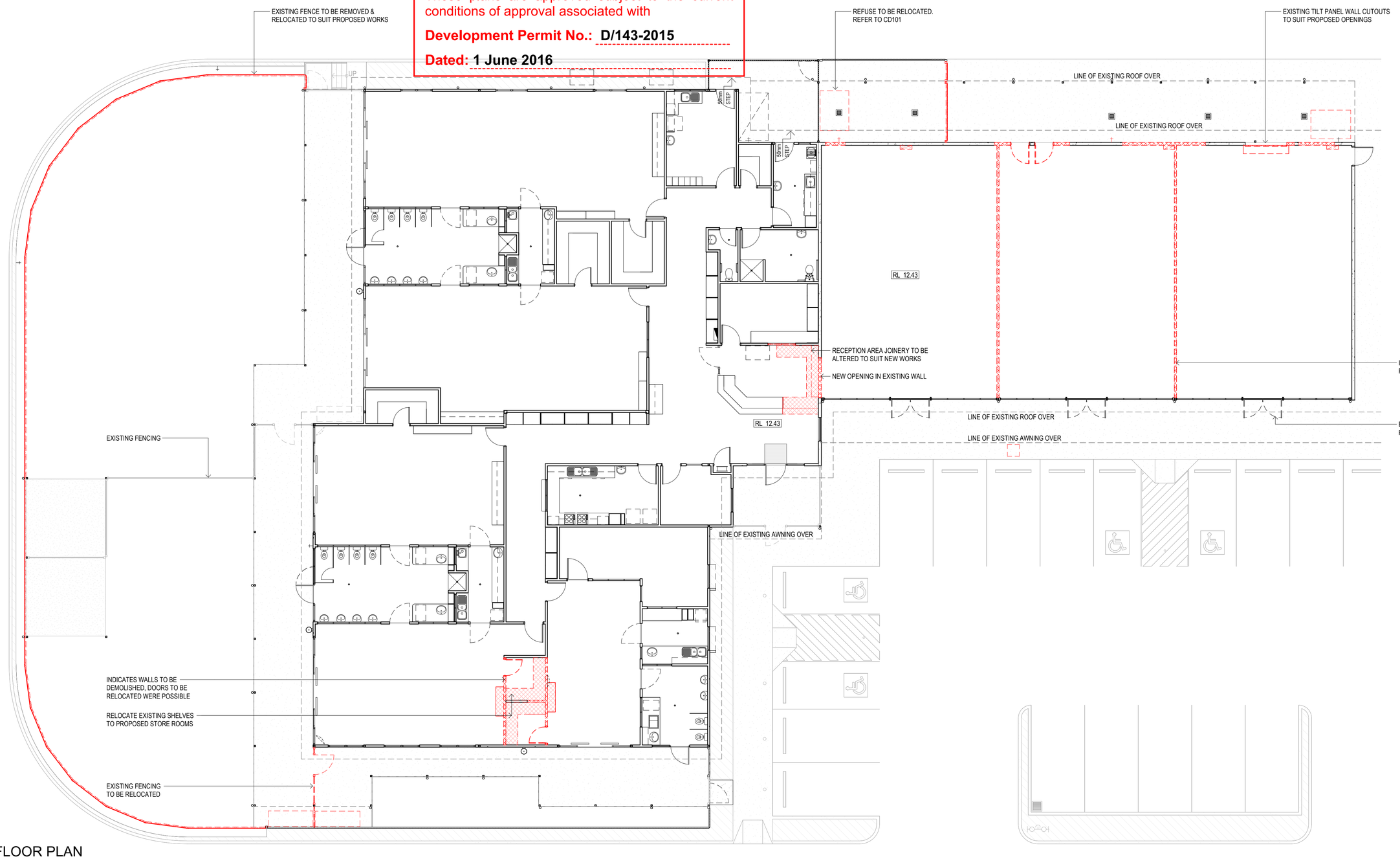

1 FLOOR PLAN

EXISTING & DEMOLITION 1 : 100

ISSUE	DESCRIPTION	DRAWN	DATE

PRELIMINARY
07/02/2024

SITE INFORMATION

LOT: 1 & 2 ON PLAN: RP607946, RP620251
AREA: 6,312m² RP620251
PARISH: MURCHISON COUNTY: LIVINGSTONE

BUILDING INFORMATION

CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 9b

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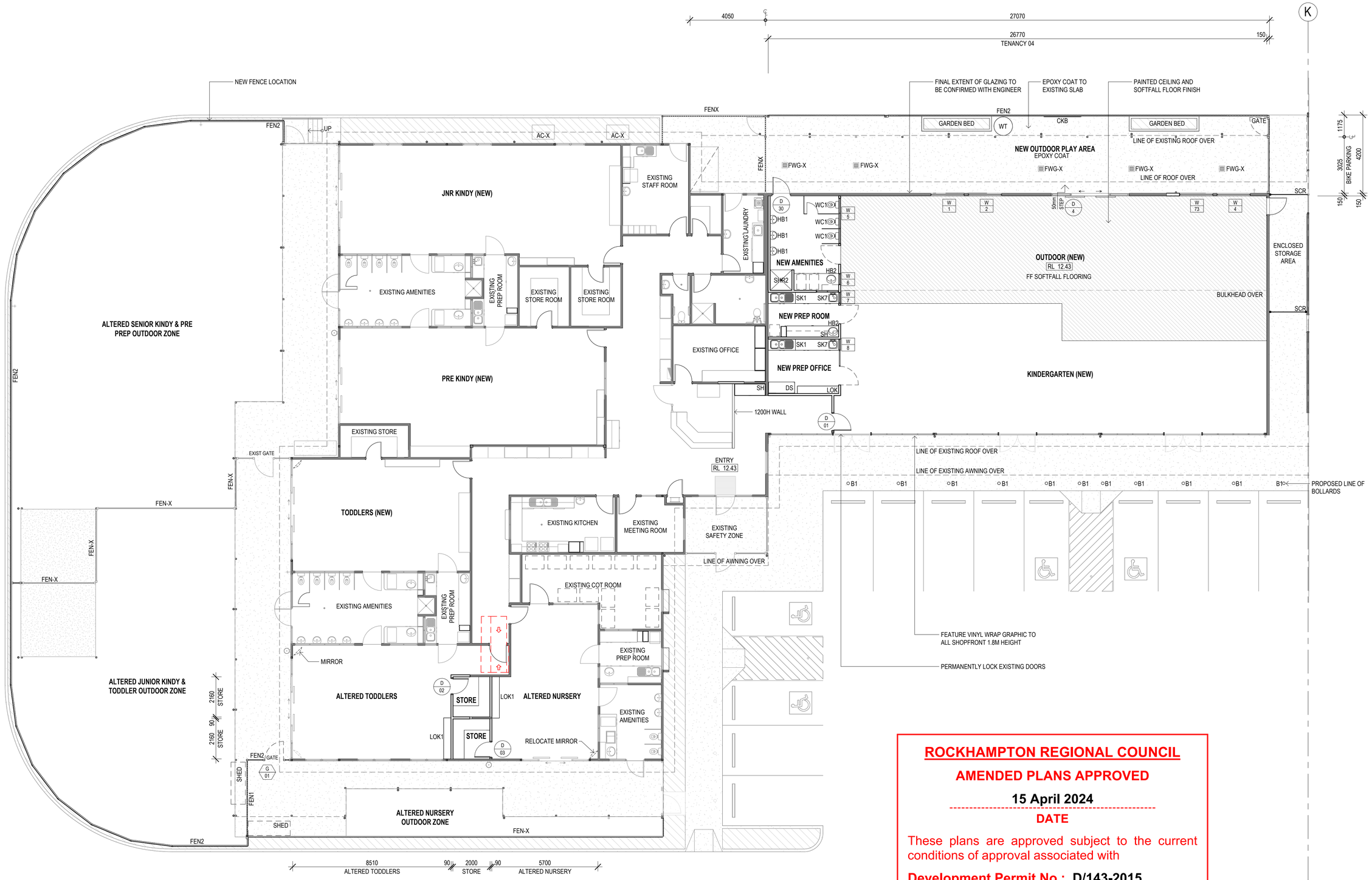
PROJECT
CHILD CARE CENTRE DEVELOPMENT
LOCATION
28 MAIN STREET, PARK AVENUE, QLD
CLIENT
POWERCAT DEVELOPMENTS PTY LTD
TITLE
FLOOR PLAN - EXISTING & DEMOLITION

Scale 1:100 (m)

DATE	DRAWN
FEBRUARY 2024	LM
SCALE	**CHECKED**
A1: 1:100 A3: 1:200	BC
DRAWING NO.	**REVISION**
1283 - CD102	



1 FLOOR PLAN

PROPOSED 1 : 100

FLOOR PLAN LEGEND

AC	AIR CONDITIONER UNIT
B	BOLLARD
BCM	BABY CHANGE MAT
BTH	BABY BATH
BY	BICYCLE PARKING RACK
CKB	CHALKBOARD
DS	DESK
FEN	FENCING
FF	FLOOR FINISH
FW	FLOOR WASTE
FWG	FLOOR WASTE GRATE
HB	HAND BASIN
HC	HOSE COCK
LOK	LOCKER
PR	PRINTER
REF	REFRIGERATOR
RF	RESILIENT FINISH
RL	REDUCED LEVEL
SCR	SCREENING
SK	SINK
SHR	SHOWER
SHS	SQUARE STEEL POST
TBC	TO BE CONFIRMED
TL	TILE
WC	WATER CLOSET
WT	WATER TANK
-X	EXISTING
	EQUAL LEVEL SURFACE

FLOOR PLAN NOTES

CHILD CARE CENTRE

- PROVIDE EXTRA NOGGINGS IN WALLS ABOVE WINDOWS FOR FIXING OF WINDOW FURNISHINGS

CRITICAL DIMENSIONS NOTES

ALL ACCESS TO AND AROUND PUBLICLY ASSESSABLE AREAS AND FACILITIES TO COMPLY WITH BUT NOT LIMITED TOO:

- THE BUILDING CODE OF AUSTRALIA (BCA) AND AS 1428.1 - DESIGN FOR ACCESS & MOBILITY PART GENERAL REQUIREMENTS FOR BUILDING WORK.
- LIGHT SWITCHES - ALL SWITCHES AND CONTROLS ON AN ACCESSIBLE PATH OF TRAVEL SHALL BE INSTALLED AT 900-1100mm ABOVE F.F.L AND A MINIMUM OF 500mm FROM ANY INTERNAL CORNERS. PROVIDE ROCKER ACTION AND TOGGLE SWITCHES TO COMPLY WITH THE BCA AND AS 1428.1
- GPO's - ALL GPO'S ON AN ACCESSIBLE PATH OF TRAVEL SHALL BE INSTALLED AT 600-1000mm ABOVE F.F.L AND A MINIUM OF 500mm FROM ANY INTERNAL CORNERS. PROVIDE ROCKER ACTION AND TOGGLE SWITCHES TO COMPLY WITH THE BCA AND AS 1428.1

CIRCULATION SPACES

PROVIDE CLEAR CIRCULATION SPACE AROUND ALL DOORWAYS IN BOTH DIRECTIONS. DIMENSIONS TO SUIT DIRECTION OF TRAVEL. ARROWS INDICATE THE ANTICIPATED DIRECTION OF TRAVEL APPROACHING THE DOOR OR OPENING

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

15 April 2024

DATE

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Dated: 1 June 2016

ISSUE	DESCRIPTION	DRAWN	DATE

PRELIMINARY
07/02/2024

SITE INFORMATION

LOT: 1 & 2 ON PLAN: RP607946, RP620251
AREA: 6,312m² RP620251
PARISH: MURCHISON COUNTY: LIVINGSTONE

BUILDING INFORMATION

CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 9b

GENERAL NOTES

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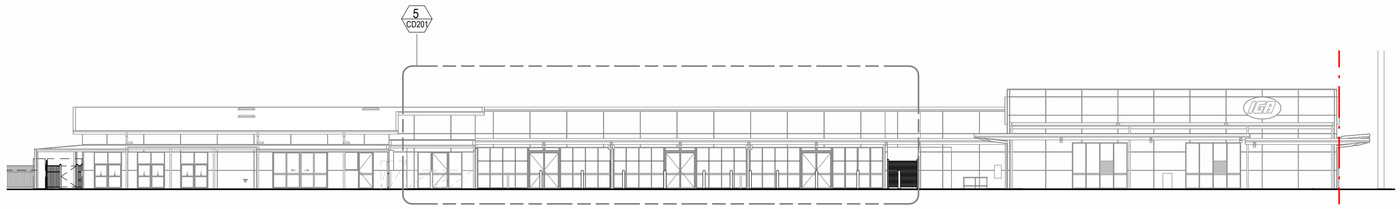
PROJECT
CHILD CARE CENTRE DEVELOPMENT
LOCATION
28 MAIN STREET, PARK AVENUE, QLD
CLIENT
POWERCAT DEVELOPMENTS PTY LTD
TITLE
FLOOR PLAN - PROPOSED

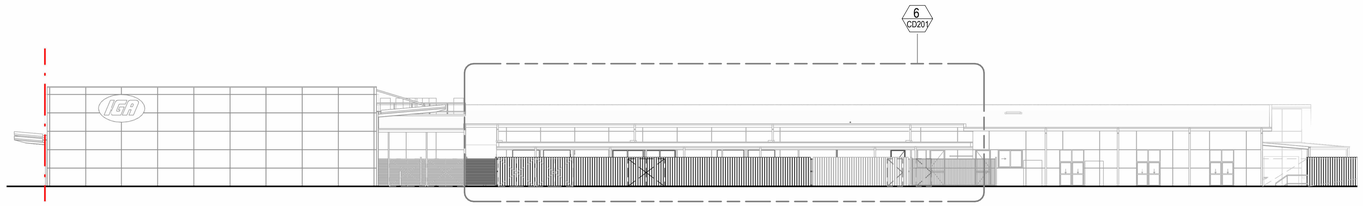
1 0 1 2 3
Scale 1:100 (m)

DATE	DRAWN
FEBRUARY 2024	LM
SCALE	**CHECKED**
A1: 1:100 A3: 1:200	BC
DRAWING NO.	**REVISION**
1283 - CD103	



1 SOUTH WEST ELEVATION

OVERALL 1 : 200



2 NORTH EAST ELEVATION

OVERALL 1 : 200

ELEVATION LEGEND

B	BOLLARD
FEN	FENCE
RL	REDUCED LEVEL
SHED	SHED
SHS	SQUARE STEEL POST

ELEVATION NOTES

- ALL ELEVATION AND SECTION DRAWINGS TO BE READ IN CONJUNCTION WITH DOOR AND WINDOW DRAWINGS
- REFER TO EXTERIOR AND INTERIOR FINISHES SCHEDULES FOR FURTHER INFORMATION ON MATERIAL SELECTIONS AND MATERIAL FINISHES
- ALL CORPORATE SIGNAGE TO BE SUPPLIED AND INSTALLED BY OTHERS.

ROCKHAMPTON REGIONAL COUNCIL

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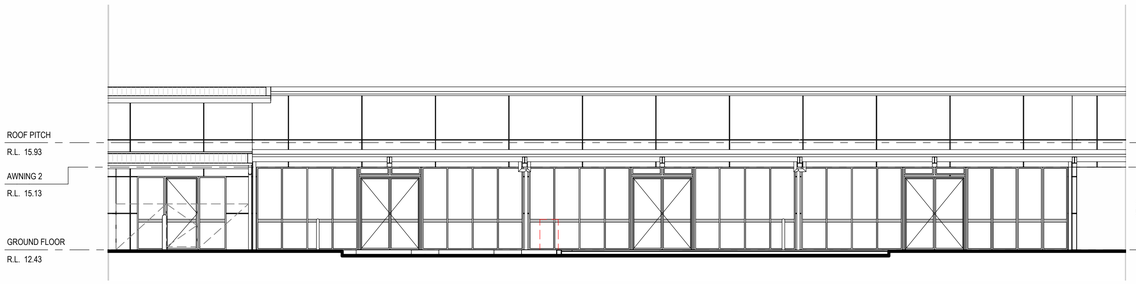
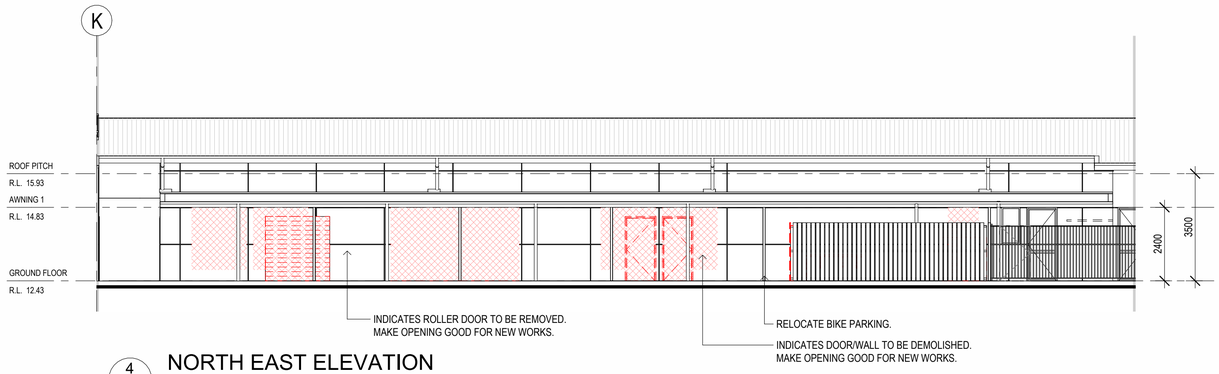


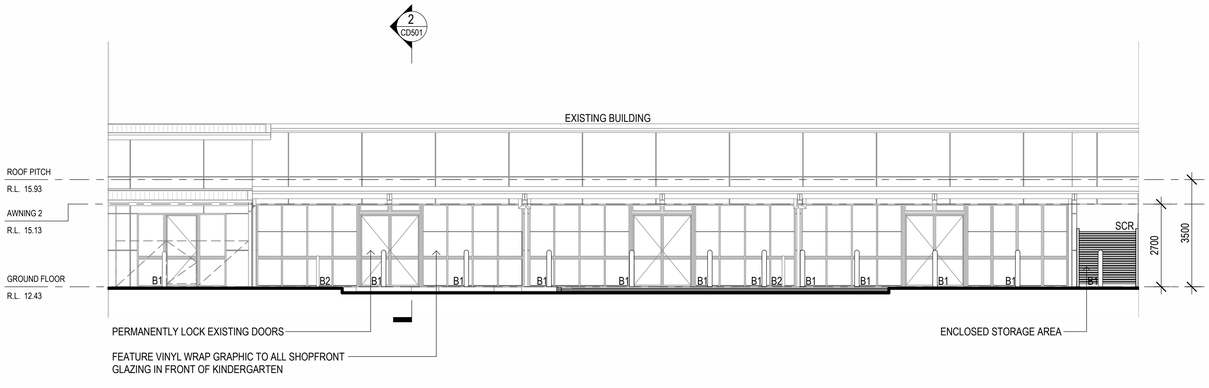
3 SOUTH WEST ELEVATION

EXISTING & DEMOLISHED 1 : 100



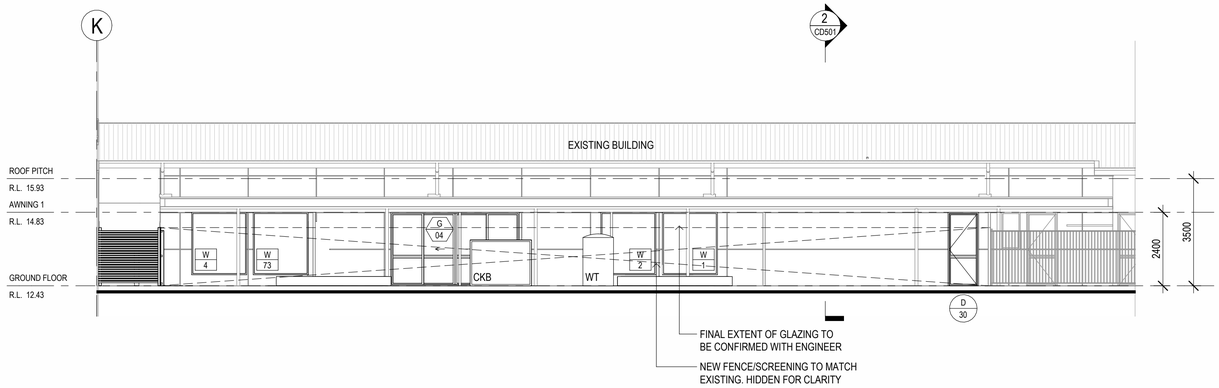
4 NORTH EAST ELEVATION

EXISTING & DEMOLISHED 1 : 100



5 SOUTH WEST ELEVATION

PROPOSED 1 : 100



6 NORTH EAST ELEVATION

PROPOSED 1 : 100

ISSUE	DESCRIPTION	DRAWN	DATE

PRELIMINARY
07/02/2024

SITE INFORMATION

LOT: 1 & 2 ON PLAN: RP607946, RP620251
AREA: 6,312m² RP620251
PARISH: MURCHISON COUNTY: LIVINGSTONE

BUILDING INFORMATION

CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 9b

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PROJECT
CHILD CARE CENTRE DEVELOPMENT
LOCATION
28 MAIN STREET, PARK AVENUE, QLD
CLIENT
POWERCAT DEVELOPMENTS PTY LTD
TITLE
ELEVATIONS

Scale 1:200 (m) 2 1 0 1 2 3 4 5 6
Scale 1:100 (m) 1 0 1 2 3

DATE	DRAWN
FEBRUARY 2024	LM
SCALE	**CHECKED**
A1: AS SHOWN	BC
DRAWING NO.	**REVISION**
1283 - CD201	

ROCKHAMPTON REGIONAL COUNCIL

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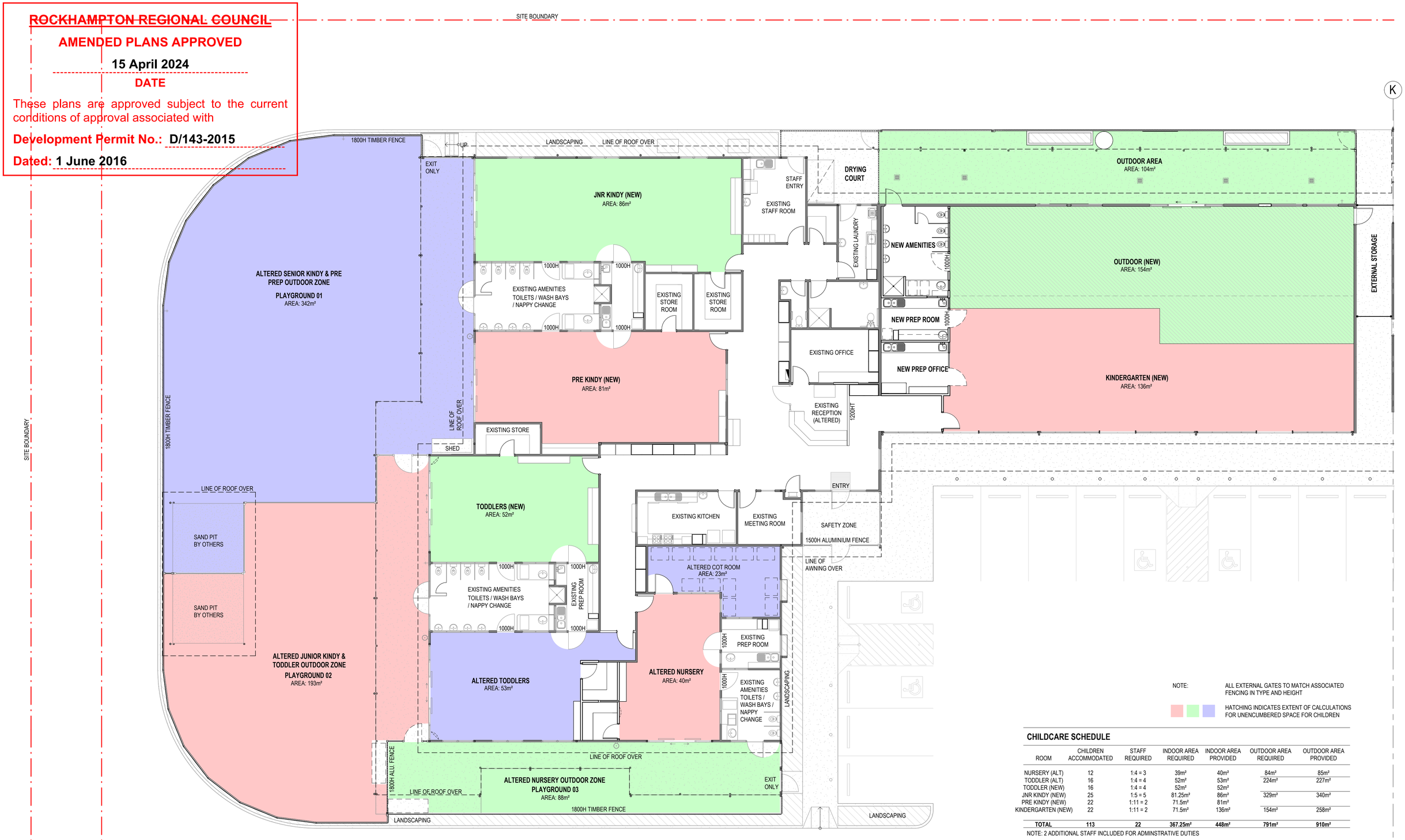

NOTE: ALL EXTERNAL GATES TO MATCH ASSOCIATED FENCING IN TYPE AND HEIGHT

HATCHING INDICATES EXTENT OF CALCULATIONS FOR UNENCUMBERED SPACE FOR CHILDREN

CHILDCARE SCHEDULE

ROOM	CHILDREN ACCOMMODATED	STAFF REQUIRED	INDOOR AREA REQUIRED	INDOOR AREA PROVIDED	OUTDOOR AREA REQUIRED	OUTDOOR AREA PROVIDED
NURSERY (ALT)	12	1:4 = 3	39m²	40m²	84m²	85m²
TODDLER (ALT)	16	1:4 = 4	52m²	53m²	224m²	227m²
TODDLER (NEW)	16	1:4 = 4	52m²	52m²		
JNR KINDY (NEW)	25	1:5 = 5	81.25m²	86m²	329m²	340m²
PRE KINDY (NEW)	22	1:11 = 2	71.5m²	81m²		
KINDERGARTEN (NEW)	22	1:11 = 2	71.5m²	136m²	154m²	258m²
TOTAL	**113**	**22**	**367.25m²**	**448m²**	**791m²**	**910m²**

NOTE: 2 ADDITIONAL STAFF INCLUDED FOR ADMINSTRATIVE DUTIES

1 FLOOR PLAN

CHILD CARE CENTRE 1 : 100

ISSUE	DESCRIPTION	DRAWN	DATE
A	CLIENT ISSUE	LM	05.03.2020

PRELIMINARY
07/02/2024

SITE INFORMATION

LOT: 1 & 2 ON PLAN: RP607946, RP620251
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PARISH: MURCHISON

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TITLE
CHILD CARE CENTRE FLOOR PLAN

Scale 1:100 (m)

DATE	DRAWN
FEBRUARY 2024	LM
SCALE	**CHECKED**
A1: 1:100 A3: 1:200	BC
DRAWING NO.	**REVISION**
1283 - CD601	A

CONTOUR

TRAFFIC ENGINEERING REPORT

Mixed Use Development

28 MAIN STREET, ROCKHAMPTON

ROCKHAMPTON REGIONAL COUNCIL

These plans are approved subject to the current conditions of approval associated with Development Permit No. D/143-2015

Dated: 01·06·2016

Prepared For:

Powercat Developments Pty Ltd

Ref: 1391-TRAF01

20 February 2016

Final Issue Approval			
Date	**Name**	**Signature**	**Document Status**

Revision Record					
Rev	**Date**	**Comments**	**Status**	**Author**	**Reviewer**
A	20/02/2016	Revision A	A	JP	CF

A - Approval	B - Building Approval	C - Construction	P - Preliminary
R - Revision	T - For Tender	X - Information	D-Draft

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Table of Contents

List of Appendices

1 INTRODUCTION

Contour Consulting Engineers Pty Ltd (Contour) have been commissioned to prepare a Traffic Engineering Report, for a proposed mixed use development (proposed development) of an existing vacant site located at 28 Main Street, Park Avenue, Rockhampton. The real property descriptions are Lot 1 on RP607946, Lot 2 on RP 607946, Lot 1 on RP620251, Lot 2 on RP620251 & Lot 2 on RP617448.

The subject site is located at 28 Main Street, approximately 100m South-West of the Main St/Haynes Street intersection. Refer Figure 1-1 for further details on site locality.

Site plans prepared by brd Group are presented in Appendix A. **Refer Drawing No's** 0649 SD150 to 0649 SD160.

An Information Request was issued for this development by Rockhampton Regional Council, dated 18 November 2015. It was requested that a Traffic Impact Assessment be provided to assess the traffic impacts of the proposed child care and health care centre uses. The proposed development also includes 900m2 of retail area, which is understood to be a reduction to the retail area proposed in previous development applications for the site. As such, traffic impacts have been assessed for the proposed development as a whole, taking into account all proposed uses at the site, including the current proposed retail area.

Figure 1-1: Site Locality Map

2 EXISTING SITE DETAILS

2.1 GENERAL

The subject site is located at 28 Main Street, Park Avenue, Rockhampton and encompasses the following properties:

- Lot 1 on RP607946
- Lot 2 on RP 607946
- Lot 1 on RP620251
- Lot 2 on RP620251
- Lot 2 on RP617448

The site is located within the Neighbourhood Centre Zone of the Rockhampton Regional Council Planning Scheme. The subject site covers a combined area of 6069m2.

The existing site is currently undeveloped. The neighbouring property to the east contains the recently redeveloped Park Avenue Hotel Motel. Neighbouring properties to the north and east generally comprise residential lots.

2.2 EXISTING ROAD NETWORK

Main Street is classified as a 'Major Urban Collector' under the Rockhampton Region Planning Scheme. Additionally, Main Street is considered a 'Major Urban Onroad Route' for cycling. Main Street is a two lane, two way street with a sealed formation width of approximately 12.5m. On street cycle lanes and parking are provided on both sides of the road. Pedestrian footpaths are provided within the Main Street verge, on both sides of the road.

Figure 2-1: Streetview Image of Main Street adjacent to the Subject Site (Source: Google Earth)

The intersection of Main St/Hayne St is a signalised intersection located approximately 100m north east of the subject site. This intersection also contains signalised pedestrian crossing facilities. Haynes Street is a two way, two lane road, and is classified as a 'Minor Urban Collector'.

Figure 2-2: Streetview Image of Haynes Street approaching signalised intersection with Main Street (Source: Google Earth)

The intersection of Main St/Glenmore Rd is an unsignalised intersection located approximately 250m south west of the subject site. Glenmore Road is a two way, two lane road, and is classified as an 'Urban Sub-Arterial'.

Figure 2-3: Streetview Image of Main Street approaching intersection with Glenmore Road (Source: Google Earth)

2.3 EXISTING TRAFFIC VOLUMES

Austraffic undertook a manual traffic survey in 2010. Traffic counts were obtained for the Main St/Haynes St intersection, and the Main St/Glenmore Rd intersection. Raw traffic survey data was included in the Traffic Impact Assessment Report by McCormick Rankin Cagney, dated 16 August 2011, prepared for the current approved development at the site. Based on the traffic survey data, it was concluded that peak hour traffic occurred during 3pm and 4pm. Peak hour traffic volumes were extracted from the Austraffic survey data, and are presented in Figure 2-4 below.

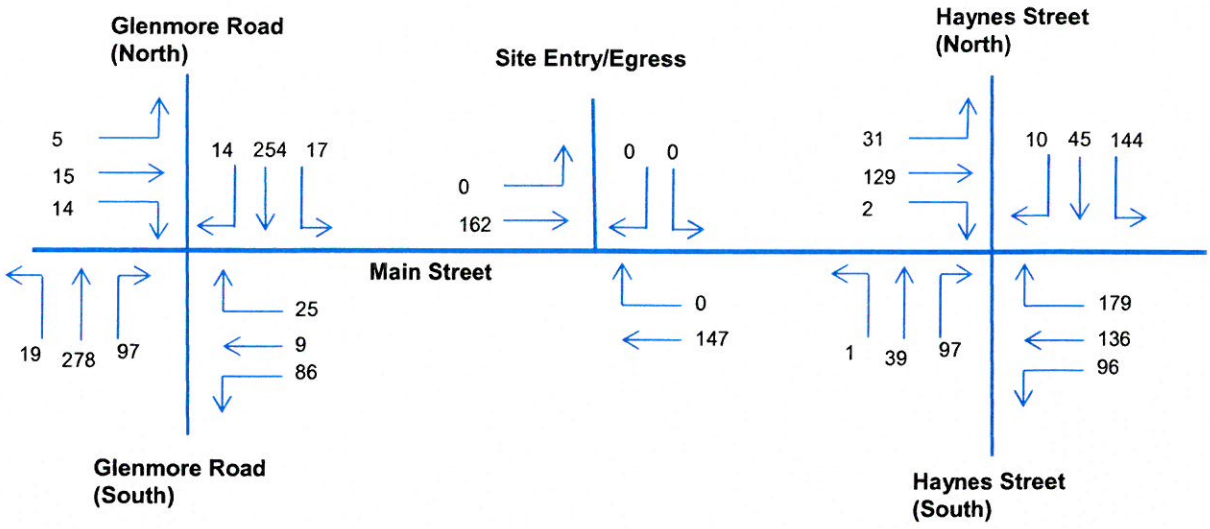

Figure 2-4: 2010 Surveyed Traffic Volumes, PM Peak Hour

The RTA's 'Guide to Traffic Generating Developments' notes that peak hour for retail developments occurs in the pm. It is generally accepted that the pm peak for retail developments is significantly greater than the am peak. Given that the majority of traffic generation is attributed to the retail component of the site, the pm peak is considered to represent the 'worst case', and as such, traffic analyses have been undertaken for the pm peak period.

3 PROPOSED DEVELOPMENT

3.1 GENERAL

A detailed description of the development proposal is included in the Planning Assessment Report provided by Project Urban.

The proposal is for a mixed use development of the subject site. The development will ultimately include two retail tenancies, a medical tenancy and also a child care centre with car parking provided on site. The proposed development includes the following:

Ground Level Parking – 62 parking spaces

Retail Tenancy's – 900m2

Medical Tenancy – 250m2

Child Care Centre –725 m2

Amenities- 84m2

3.2 PROPOSED ACCESS

It is proposed that two way vehicle access will be gained from Main Street, near the south-western boundary of the subject site. Service vehicles, waste collection vehicles and staff will be provided access through the two way vehicle access from Haynes Street with a proposed driveway to be built to allow service and waste collection vehicles to access the loading area to the rear of the retail tenancies. It also means that generally, service vehicles will be isolated from public vehicles.

Refer to the Site Plan in Appendix A which shows the proposed driveway access locations.

4 TRIP GENERATION AND DISTRIBUTION

4.1 TRIP GENERATION

Based on the uses at the proposed development, traffic generation has been estimated generally as outlined in Table 4-1 below.

Table 4-1: Development Generated Peak Hour Traffic

Land Use	Quantity	Peak rate	Source	Peak Traffic Volume
Retail	900 m2	12.5 trips per 100m2	RTA Guide	113 vph
Medical Suites/Offices	250 m2	13 trips per 100m2	RTA Guide	33 vph
Child Care	387 m2	0.8 trips per child	RTA Guide	60 vph

Based on the table above, the total peak hour traffic volume generated by the proposed development is calculated to be 206 vehicles per hour. This is based on peak hours for the different land uses aligning, which is unlikely. Traffic generation from the retail component of the proposed development contributes the highest number of trips.

It is noted that traffic generated by the proposed development will be comprised of the following:

- New trips – Trips that otherwise would not be made on the network if the development did not proceed
- Diverted drop in trips – Drivers that divert from an existing trip to visit the proposed development
- Undiverted drop in trips - Drivers that drop in to visit the development, from an existing trip on roads that immediately abut the proposed development.

The TMR Guidelines for Assessment of Road Impacts of Development (GARID) includes an indication for the percentage segmentation of traffic generation for shopping centres (retail). It notes that shopping centres <3000m2 generate 50% new trips, 32% diverted drop in trips and 18% undiverted drop in trips. This means that from the estimated 113 retail generated trips, 50% of these trips are variations of existing trips, where vehicles making these trips are already utilising the local road network.

It is noted that the uses at the site are intended to be complementary whereby people will likely make use of multiple services (i.e. doctor, shopping, child care drop off/pick up) in a single visit to the development.

Additionally, it is unlikely that peak hours for the different uses at the site will be simultaneous. Rather, the peak hours for the different uses are likely to be staggered.

Based on the above, it is considered that the peak hour traffic volumes outlined in Table 4-1 are conservative.

The development currently approved for the site comprises 1,950m2 of retail with a corresponding traffic generation of 244vph. It is important to note that the traffic generated by the subject proposal is less than that of the currently approved development.

4.2 TRIP DISTRIBUTION

Traffic splits for retail developments are generally 50/50 during afternoon peak hour periods. This split has conservatively been applied to traffic generated from all uses at the proposed development.

Directional splits utilised in the previous Traffic Impact Assessment Report by McCormick Rankin Cagney have been reviewed and are generally considered appropriate. Directional splits are listed in Table 4-2 below.

Table 4-2: Development Generated Traffic – Trip Distribution

New/Diverted Trips	
Direction To/From	**% of Generated Traffic**
Mains Street (East of Haynes Street)	25%
Haynes Street (North of Mains Street)	30%
Haynes Street (South of Mains Street)	5%
Glenmore Street (North of Mains Street)	10%
Glenmore Street (South of Mains Street)	25%
Mains Street (West of Glenmore Street)	5%
Drop in Trips	
Direction of Travel	**% of Generated Traffic**
Mains Street – North east direction of travel	60%
Mains Street – South west direction of travel	40%

Based on the assumptions in Table 4-2 above, and the peak hour volumes estimated in Section 4.1, peak hour development generated trips are shown in Figure 4-2 below.

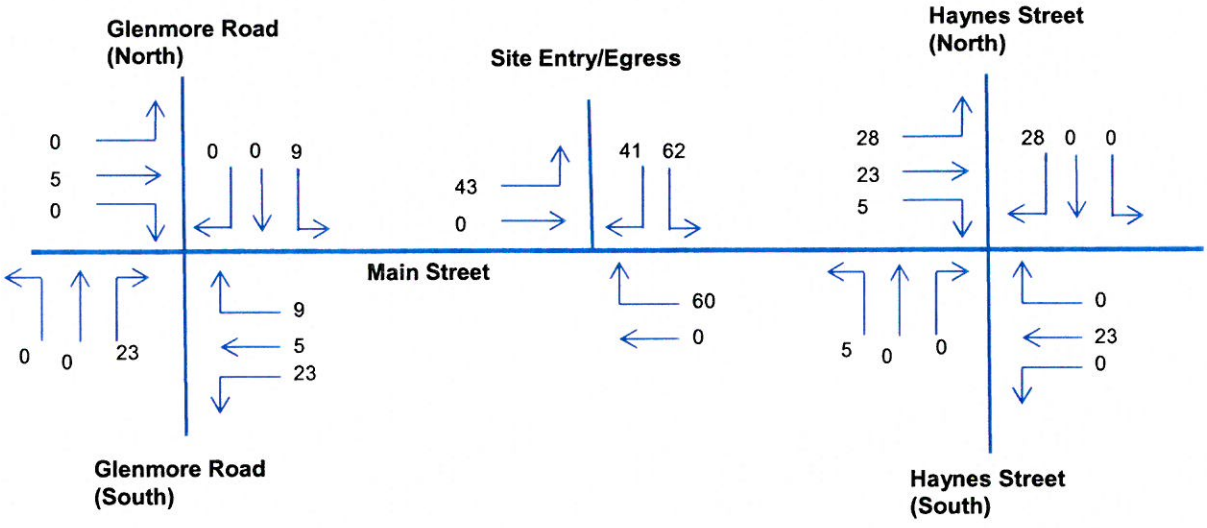

Figure 4-2: Development Generated Peak Hour Traffic Volumes

5 INTERSECTION TRAFFIC VOLUMES

5.1 PRE-DEVELOPMENT TRAFFIC

As mentioned previously, manual traffic surveys were undertaken at nearby intersections in 2010 by Austraffic, as part of the previous Traffic Assessment undertaken by McCormick Rankin Cagney. Refer Section 2.3 of this report for further details of 2010 surveyed traffic volumes.

A growth rate of 3%, compounding annually, has been applied to the surveyed traffic volumes from 2010, to estimate 2016 and 2026 pre-development peak hour traffic volumes. This growth rate is in line with previous advice provided by Council, and is generally supported by suggested growth rates outlined in TMR's Road Planning and Design Manual

Estimated pre-development pm peak hour traffic volumes for 2016 and 2026 are outlined in Figures 5-1 and 5-2 below.

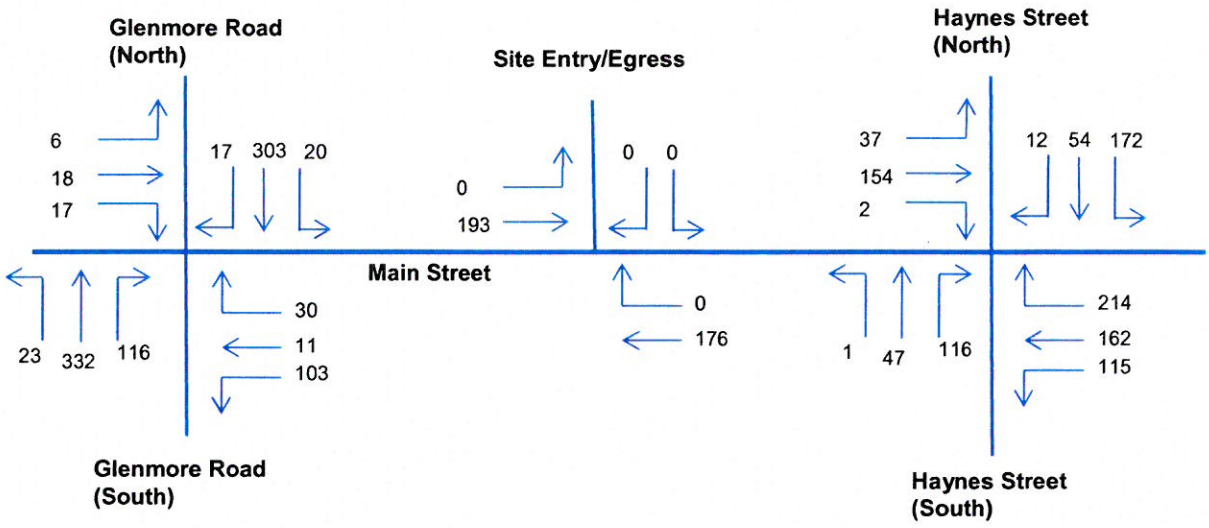

Figure 5-1: Pre-development PM Peak Hour Traffic Volumes – 2016

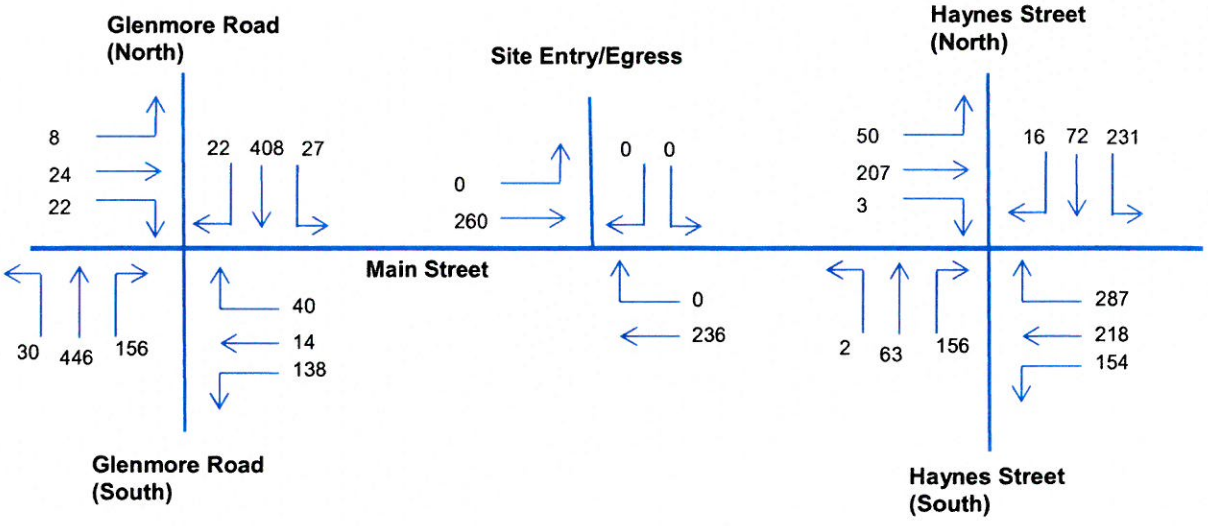

Figure 5-1: Pre-development PM Peak Hour Traffic Volumes – 2026

5.1 POST-DEVELOPMENT TRAFFIC

Post development traffic has been determined based on combining the development generated traffic outlined in Figure 4-2, with pre-development traffic volumes outlined in Figures 5-1 and 5-2. Estimated post-development pm peak hour traffic volumes for 2016 and 2026 are outlined in Figures 5-3 and 5-4 below.

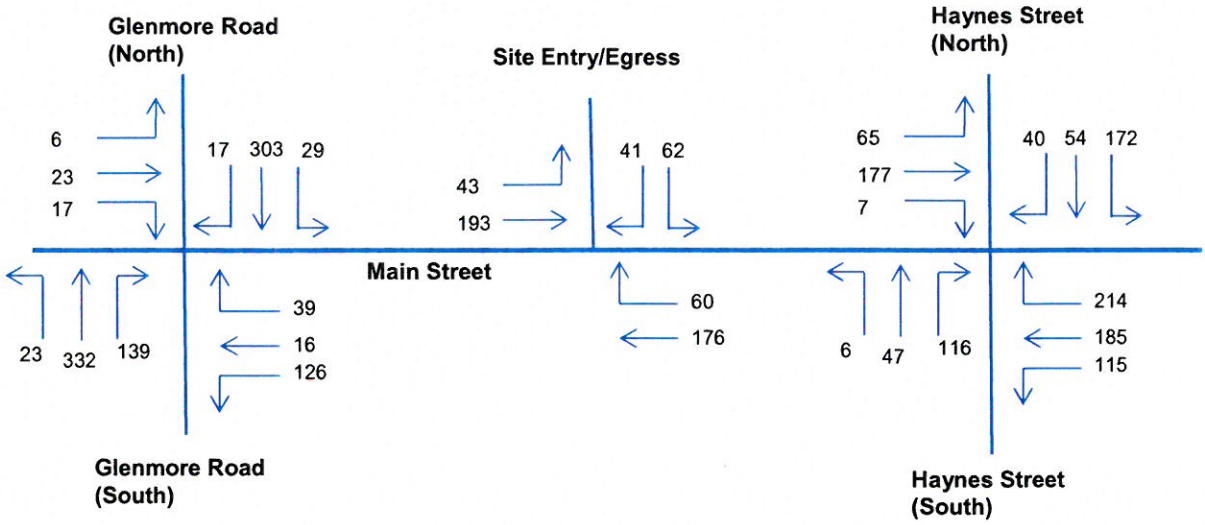

Figure 5-3: Post-development PM Peak Hour Traffic Volumes – 2016

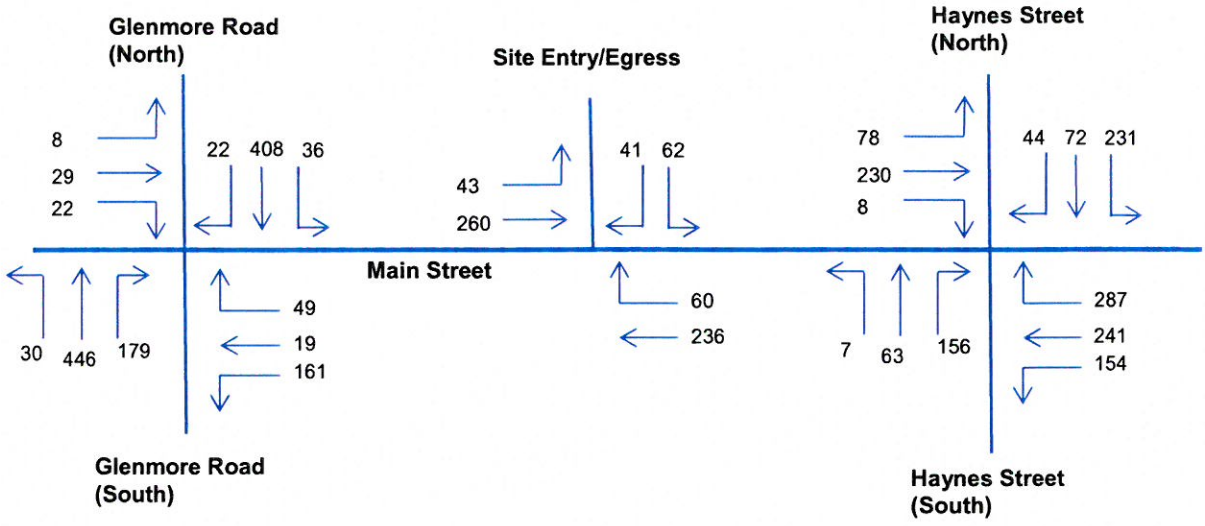

Figure 5-4: Post-development PM Peak Hour Traffic Volumes – 2026

6 INTERSECTION CAPACITY

Intersections have been assessed using SIDRA Intersection 6.1. SIDRA analyses have been undertaken for the 2026 post-development PM peak hour scenarios, which represent the highest traffic volumes. SIDRA movement summary outputs for each intersection are included in Appendix B.

TMR's 'Guidelines for Assessment of Road Impacts of Development' notes the following limits for acceptable operation:

- Degree of saturation of less than 0.9 for signalised intersection, and less than 0.85 for priority junctions.
- LOS E considered the limit of acceptable urban area operation and remedial works would be needed if LOS F would otherwise result

6.1 MAIN STREET/HAYNES ST INTERSECTION

The Main St/Haynes St intersection has been modelled with short right turn lanes for the east and west approaching legs (as per TTM RFI Response dated 14 December 2011 relevant to the current approved development). This is considered appropriate as the approaching carriageways at these intersection legs are over 6m wide. No standing areas apply at the east and west approaching legs for distances of 20m and 30m respectively. This enables vehicles making through or left turn movements, to bypass vehicles waiting to make a right turn. This provides some capacity for queuing of vehicles turning right. The SIDRA generated layout is shown in Figure 6-1 below.

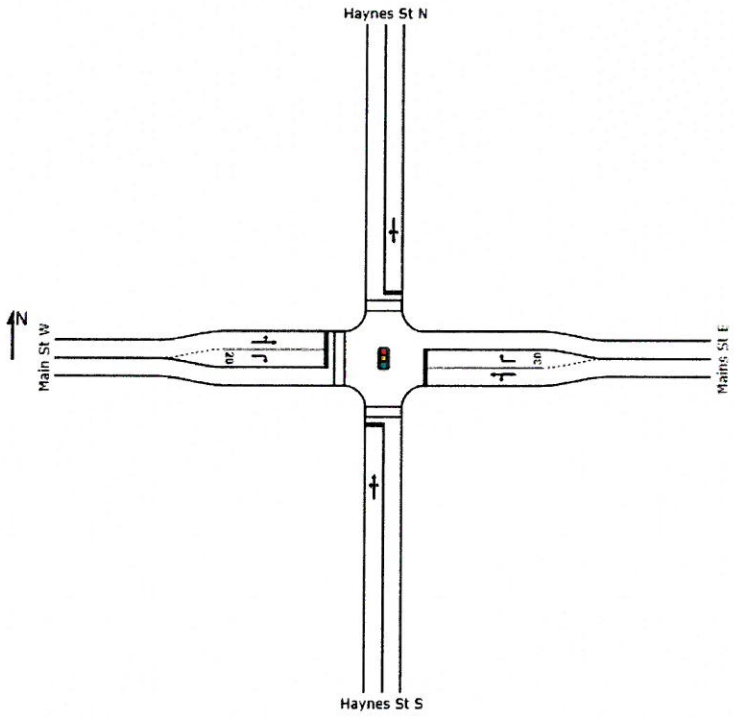

Figure 6-1: SIDRA Generated Intersection Layout – Main St/Haynes St

SIDRA movement summaries for the 2026 pre and post developed scenarios are included in Appendix B. Based on SIDRA results, it is considered that the Main St/Haynes St intersection will operate within acceptable limits and that the proposed development will have a minor impact on the operation of the intersection. The East approaching leg achieves average peak hour queue lengths of approximately 45m.

Queue lengths are therefore not anticipated to impact the existing school car park access located east of the intersection.

6.2 MAIN STREET/SITE ACCESS INTERSECTION

The site access intersection has been modelled as a T intersection with no turning lanes. The SIDRA generated layout is shown in Figure 6-2 below.

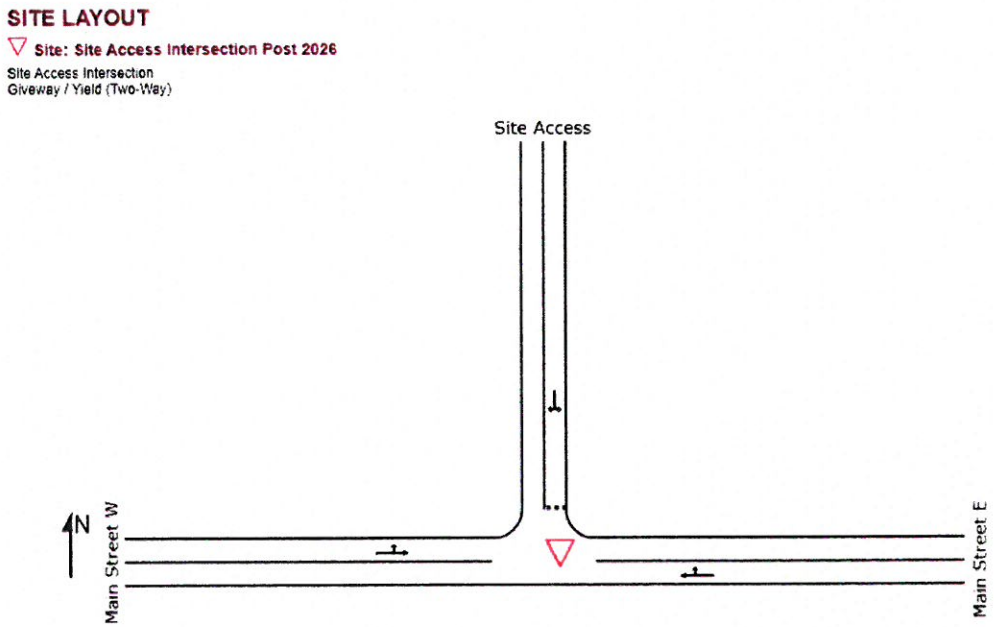

Figure 6-2: SIDRA Generated Intersection Layout – Site Access Intersection

The SIDRA movement summary for the 2026 post developed scenario is included in Appendix B. Based on SIDRA results, it is considered that the Site Access Intersection will operate efficiently, with minimal delays expected. Average queue lengths for all intersection legs are less than one vehicle. As part of their information request, Council have outlined a requirement for 2 car queuing length within the property. Based on the SIDRA results, an internal queue length of 2 vehicles will be more than adequate.

6.3 MAIN STREET / GLENMORE ST INTERSECTION

The Main St/Haynes St intersection has been modelled with a short left turn lane for the east approaching leg. This is considered appropriate as the approaching carriageway at this intersection leg is over 6m wide. Existing linemarking prevents on-street parking on this approach for an approximate length of 15m. This enables vehicles making a left turn movement, to bypass vehicles waiting to make a through or right turn movement. The SIDRA generated layout is shown in Figure 6-3 below.

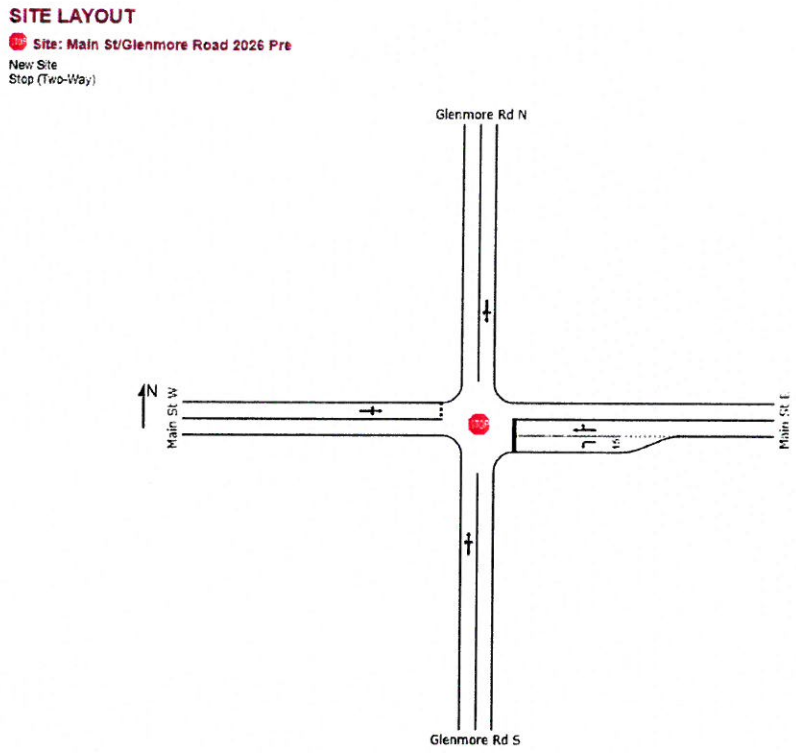

Figure 6-3: SIDRA Generated Intersection Layout – Main St/Glenmore Rd

SIDRA movement summaries for the 2026 pre and post developed scenarios are included in Appendix B. Based on SIDRA results, it is considered that the Main St/Haynes St intersection will generally operate within acceptable limits and that the proposed development will have a minor impact on the operation of the intersection. Importantly, a Level of Service of A is maintained for priority through traffic on Glenmore Road. Additionally, the northbound Glenmore Rd carriageway is considered wide enough to enable through traffic to bypass vehicles making a right turn, therefore it is considered that the intersection will likely operate with additional efficiency than what is shown in the modelling.

7 PROPOSED ACCESS

A 7m wide commercial driveway is proposed on Main Street, to provide two way access to the proposed development. The proposed driveway width is considered suitable and matches proposed internal aisle widths. This driveway will provide access for patrons and staff. The alignment of Main Street at the proposed access location is relatively flat and straight, and affords adequate sight lines for entering and exiting vehicles.

Access for Service Vehicles will be from Glenmore Street, via an access easement through the neighbouring hotel site. An existing driveway crossover is located at the proposed access point from Haynes Street. Refer Figure 7-1 below showing the existing access point at this location. Ample sight distance is available at this location.

Figure 7-1: Existing Crossover at Service Vehicle Access – Haynes Street

Design details of the proposed accesses will be confirmed during future detailed design, in conjunction with an application for Operational Works. Driveways will be required to generally comply with the requirements of the Capricorn Municipal Development Guidelines.

8 PEDESTRIAN FACILITIES

8.1 EXTERNAL PEDESTRIAN FACILITIES

Existing footpaths are located within the verges of Main Street.

Pedestrian crossing points are located approximately 120m to both the North and South of the proposed development at the signalised intersection of Main Street/Haynes Street and at the pedestrian crossing located at the Main Street/Renshaw Street intersection. These crossing points allow for pedestrians travelling from either direction of Main Street to cross at a safe point to reach the proposed development.

8.2 INTERNAL PEDESTRIAN FACILITIES

The design of the proposed development allows for pedestrian entry along the Main Street frontage of the development. A covered pathway provides direct access from Main Street, to all tenancies. Pedestrian access to the rear and eastern sides of the development is discouraged to prevent public access to service vehicle/delivery areas.

9 INTERNAL LAYOUT AND PARKING

9.1 PARKING SPACES

The Rockhampton Region Planning Scheme (2015) Access, Parking and Mobility Code, Table 9.4.1.3.2 prescribes car parking requirements for developments. Table 9-1 below outlines parking requirements for the proposed development, based on parking rates outlined in the aforementioned Planning Scheme document. It also tabulates parking requirements from the previous Rockhampton City Plan 2005.

Table 9-1: Car Parking Requirements

Land Use	Quantity	Rockhampton Region Planning Scheme		Rockhampton City Plan 2005		Proposed Parks
		Parking Rates	Parks Required	Parking Rates	Parks Required	
Child Care Centre	13 staff + 75 Children	1 per full time employee + 1 per (6) children	26	1 per full time employee + 1 per (10) children	21	21
Medical Tenancy	250 m2	1 space per 25m2 + 1 space for special use vehicles + 1 space for emergency ambulance	12	1 space per 50m2 + 2 ambulance spaces	7	5
Retail Tenancy	900 m2	1 space per 25m2	36	1 space per 25m2	36	36
Total			**74**		**64**	**62**

Based on the current layout provided by brd Group, the proposed development includes a total of 62 parking spaces, distributed as follows:

- 45 regular car parking spaces
- 4 parking spaces for people with a disability
- 13 staff parking spaces

It is noted that the proposed parking supply does not comply with the Rockhampton Region Planning Scheme parking requirements. The proposed parking supply however does generally comply with the Rockhampton City Plan 2005, with the exception of the requirement for ambulance spaces.

Some relaxation in parking requirements is considered relevant due in part to the proposed uses at the development. It is anticipated that much of the patronage to the proposed development will be by people who are undertaking a short trip to drop their children to child care or a short trip to visit the supermarket or doctor. The major Stockland shopping centre is located a short distance down the road where people are likely to get the full retail experience, whereas this proposed development is designed for convenience. It is therefore not unreasonable to imply that many people will walk rather than drive, and those who drive will not be there for a prolonged period of time, resulting in a fast turnover of parking spaces. This is supported by the NSW Roads and Traffic Authority's "Guide to Traffic Generating Developments" which notes that average length of stay for child care centres was surveyed to be 6.8 minutes.

Additionally, the uses at the proposed site are intended to be complementary. Many trips to the proposed development will be multi-purpose, whereby people are likely to attend the medical facilities and make use of the retail, or undertake a doctor's visit or shopping whilst dropping children at the childcare facilities.

Peak demand for the different uses at the site is also unlikely to align. Patronage to the medical facilities will likely be steady throughout weekday standard working hours. Child care peak times are likely to be before and after traditional business hours as parents are likely to drop off and pick up their children before and after work. Peak trading times for the supermarket are likely to be during the afternoon.

It is also noted that on-street parking is available on Main Street. Space for approximately 4 vehicles will be available along the subject site frontage.

Based on the above, it is considered that the shortfall of parking spaces is justified, and that the proposed parking supply will generally achieve the performance requirement of the Council's Access, Parking and Mobility Code. Additionally, the parking generally complies with the requirements of the previous Rockhampton City Plan 2005, under which previous development proposals for the site have been approved.

9.2 PARKING FOR PEOPLE WITH A DISABILITY

The Building Code of Australia prescribes minimum number of car parking spaces that should be provided for persons with a disability. The proportion of spaces varies according to land use however; in general, the rate equates to 1-2% of total spaces.

The proposed development nominates provision for 4 spaces for persons with a disability. A higher number of spaces have been provided in consideration of the proposed medical facility. It is considered that these spaces can also be utilised by ambulance vehicles when required. The spaces are conveniently located in close proximity to the proposed medical facility.

9.3 BICYCLE PARKING

The Rockhampton Region Planning Scheme (2015) Bicycle Network Planning Scheme Policy, SC 6.4.7 prescribes bicycle facility requirements for developments. Table 9-1 below outlines bicycle parking requirements for the proposed development, based on parking rates outlined in the aforementioned Planning Scheme document.

Table 9-1: Bicycle Parking Requirements

Land Use	Bicycle Parking Rates (Rockhampton Region Planning Scheme)	Required Employee Parking Spaces (Class 1)	Required Visitor or Shopper Parking Spaces (Class 3)
Retail Tenancy (900m2)	1 per 300m2 GFA for Employees 1 per 500m2 for Visitors/Shoppers	3	2
Medical Tenancy (250m2)	1 per 400m2 GFA for Employees 1 per 200m2 GFA for Visitors	1	1
Childcare Centre (725m2)	None Specified	-	-
Total		**4**	**3**

The development proposes a total of 8 parking spaces for bicycles. Employee bicycle lockers are proposed to be located at the rear of the medical tenancy. A bicycle rail/rack for shoppers and visitors is proposed to be located at the front of the medical tenancy, adjacent to the childcare centre.

It is considered that the proposed bicycle parking supply exceeds relevant Council Planning Scheme requirements.

9.4 PARKING LAYOUT

The proposed parking layout incorporates aisles with rows of car parks aligned at 90 degrees to the aisles. The proposed parking layout is shown in the Development Layout Plan, presented in Appendix A.

Classification of proposed parking facilities generally align with User Class 3 and 3A, as per AS2890.1. The proposed car parking layout generally complies with the minimum requirements applicable to these user classes, as summarised below:

- Minimum car park dimensions of 2.6m width, 5.4m length
- Minimum aisle width of 5.8m

In order to provide adequate queuing within the site, and as outlined in Council's information request, it is recommended that parking spaces 1 and 2, and 34 to 38, be classified as "Staff Parking Only". There will be very little turnover for staff spaces, therefore this will effectively provide on-site queuing distance for approximately 2 cars, thereby reducing the likelihood of queuing on Main Street.

9.5 SERVICE VEHICLES

The proposed development will need to cater for the following large service vehicles

- Semi-Trailer (articulated vehicle (AV)) for deliveries
- Heavy Rigid Vehicle (HRV) for deliveries
- Waste Collection Vehicle (WCV)

Design of the internal access is to ensure that these vehicles can safely access and manoeuvre within the site. Service vehicles will enter and exit the site from a proposed access off Haynes Street. This access runs through the neighbouring hotel site and as a result, an access easement will be required. The proposed access arrangement will minimise interaction between service vehicles and patrons.

Turning path (swept path) diagrams have been prepared for the site, which shows manoeuvring for an articulated vehicle and a HRV. Refer Contour Plan No. 1391-SK001, presented in Appendix C. This plan shows that the design service vehicles are able to enter the site, reverse into the loading zone/refuse area and drive out of the site in forward gear.

10 PUBLIC TRANSPORT

Existing bus stops within close proximity to the proposed development site are nominated as follows:

- Route 401 (towards Glenmore Schools)- Main Street near Farrell Street – approximately 200 m from the proposed development entrance
- Route 401 (towards The Range via City Centre)- Main Street near Haynes Street (Hail n Ride)- approximately 90m from proposed development entrance
- Route 401 (towards The Range via City Centre) – Glenmore Road near Highway Street- approximately 400m from proposed development entrance

Existing bus stops are shown in Figure 10-1 below.

Figure 10-1: Existing Bus Stop Locations

The nearest bus stop on Main Street is serviced by Sunbus Route 401, which links Glenmore to The Range via the City Centre. Buses depart from this location at varying intervals - 30 minute intervals during morning and afternoon peak periods and 60 minute intervals for the rest of the day. On a Saturday, route 401 also operates primarily during the morning in both directions with a headway of 1 hour experienced between busses. Route 401 also links up with other bus services at various stops along the trip to enable commuters access to different areas of the city via public transport.

The existing bus stops are considered to be within walking distance from the proposed development and the services available from Main Street provide coverage in both directions. Main St crossing points are provided near the Main St/Renshaw St intersection and at the Main St/Haynes St intersection, providing safe pedestrian access to the existing public transport facilities.

11 CONCLUSION

This report has provided an assessment of the transport and traffic impacts of the proposed mixed use development at 28 Main Street, Rockhampton. Based on the findings of this report, the following summary points are noted.

- A two way entry/egress is proposed on Main Street, as the main access point for patrons and staff.
- An entry for service vehicles, staff and delivery vehicles is proposed on Haynes Street, which will provide vehicle access to external ground level areas.
- It is considered that acceptable sight distances are available for the proposed site access points.
- It is estimated that 206 vehicles per hour may be generated by the proposed development. It is noted that the estimated traffic generated by the subject proposal is less than that of the currently approved development.
- Intersection analyses have been undertaken using SIDRA, for the Main St/Haynes St, Site Access, and Main St/Glenmore Rd intersections. Based on these analyses, it is considered that the impacted intersections will generally operate within acceptable limits and that the proposed development will have a minor impact on the operations of the intersections.
- The proposed development includes 62 parking spaces. As per Section 9.1, it is considered that the shortfall of parking spaces is justified, and that the proposed parking supply will generally achieve the performance requirement of the Council's Access, Parking and Mobility Code.
- The proposed development is considered to be adequately serviced by existing pedestrian and public transport facilities
- Overall, it is considered that no external road upgrades are required for this proposed development.

The information and sketches included within this report have been prepared for inclusion in a preliminary development application. The information and drawings are conceptual only and may be subject to change during preparation of future detailed design.

12 LIMITATIONS AND CLOSURE

This report has been prepared by Contour Consulting Engineers Pty Ltd, under the direction of a Registered Professional Engineer of Queensland. This report has been tailored to investigate issues in the context of the proposal and at the area of interest, being; 28 Main Street, Park Avenue, Rockhampton. The information contained in this report is not to be used outside of the subject area.

We consider that this report accurately reflects the conditions of the area of interest, at the time the study was undertaken. The results of this study should be reviewed if conditions or the proposal change in the future.

This report is only to be used in full and may not be used to support objectives other than those set out herein, except where written approval, with comments, are provided by Contour Consulting Engineers Pty Ltd.

Contour Consulting Engineers Pty Ltd accepts no responsibility for the accuracy of information supplied to them by second and third parties.

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Appendix A. Architectural Plans

PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE

at MAIN STREET, ROCKHAMPTON

for POWERCAT

ARCHITECTURAL DRAWING SCHEDULE

DRAWINGS

0649 SD150	COVER PAGE / LOCALITY PLAN
0649 SD151	SITE PLAN
0649 SD152	FLOOR PLAN - RETAIL
0649 SD153	FLOOR PLAN - CHILDCARE & MEDICAL
0649 SD154	ROOF PLAN - RETAIL
0649 SD155	ROOF PLAN - CHILDCARE
0649 SD156	PYLON SIGN DETAILS
0649 SD157	ELEVATIONS - RETAIL
0649 SD158	ELEVATIONS - CHILDCARE & MEDICAL
0649 SD159	PERSPECTIVE VIEWS - RETAIL
0649 SD160	PERSPECTIVE VIEWS - CHILDCARE & MEDICAL

DEVELOPMENT SCHEDULE

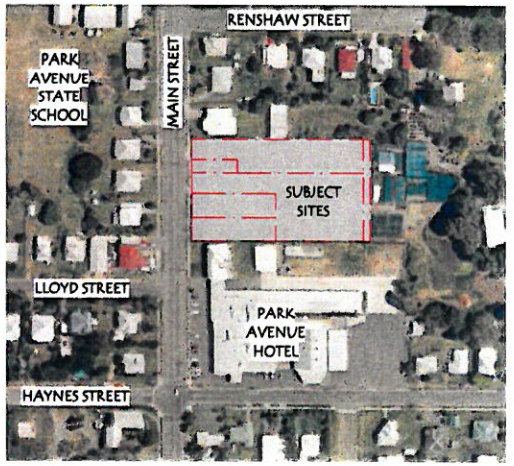
EXISTING SITE AREA:	6,306m²
No. STOREYS:	1
MAXIMUM ALLOWABLE HEIGHT:	10.0m or 2 Storeys
	PROPOSED
SITE COVER:	1,956m² (31.05%)
LANDSCAPING	
GARDENS:	401m² (6.36%)
OUTDOOR PLAY AREAS:	412m² (6.53%)
OVERALL:	813m² (12.89%)
DRIVEWAY:	2,826m² (44.81%)
PATHWAYS:	638m² (10.12%)
MISCELLANEOUS AREAS:	75m² (1.16%)
AREA BREAKDOWN	
RETAIL TENANCY 1	800m²
RETAIL TENANCY 2	100m²
MEDICAL TENANCY	250m²
CHILDCARE CENTRE	725m²
COVERED VERANDAH	164m²
AMENITIES	84m²

CARPARKING	RATE	REQUIRED	PROVIDED
RETAIL TENANCY	1:25	36	36
MEDICAL TENANCY	1:50	5	5
CHILDCARE - CHILDREN	1:10	8	8
- STAFF	1:1	13	13
TOTAL		62 SPACES	62 SPACES
BICYCLE PARKING - 1 PER 250m²		8	8

CHILDCARE SCHEDULE

	CHILDREN ACCOMMODATED	STAFF RATIO REQUIRED	INDOOR AREA REQUIRED (3.25m² / CHILD)	INDOOR AREA PROVIDED	OUTDOOR AREA REQUIRED (7m² / CHILD)	OUTDOOR AREA PROVIDED
NURSERY	9	1:4 + 2	38m²	99m²	63m²	70m²
TODDLER	9	1:4 + 2	38m²	99m²	63m²	202m²
JUNIOR KINDY	15	1:5 + 2	48.75m²	99m²	105m²	
SENIOR KINDY	22	1:11 + 2	71.5m²	82m²	154m²	522m²
PREP	22	1:11 + 2	71.5m²	88m²	154m²	
TOTAL	75	13	248.75m²	308m²	525m²	600m²

NOTE: 2 ADDITIONAL STAFF ARE INCLUDED FOR ADMIN DUTIES



LOCALITY PLAN 1:1500

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

CONTRACTOR TO CONFIRM ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK

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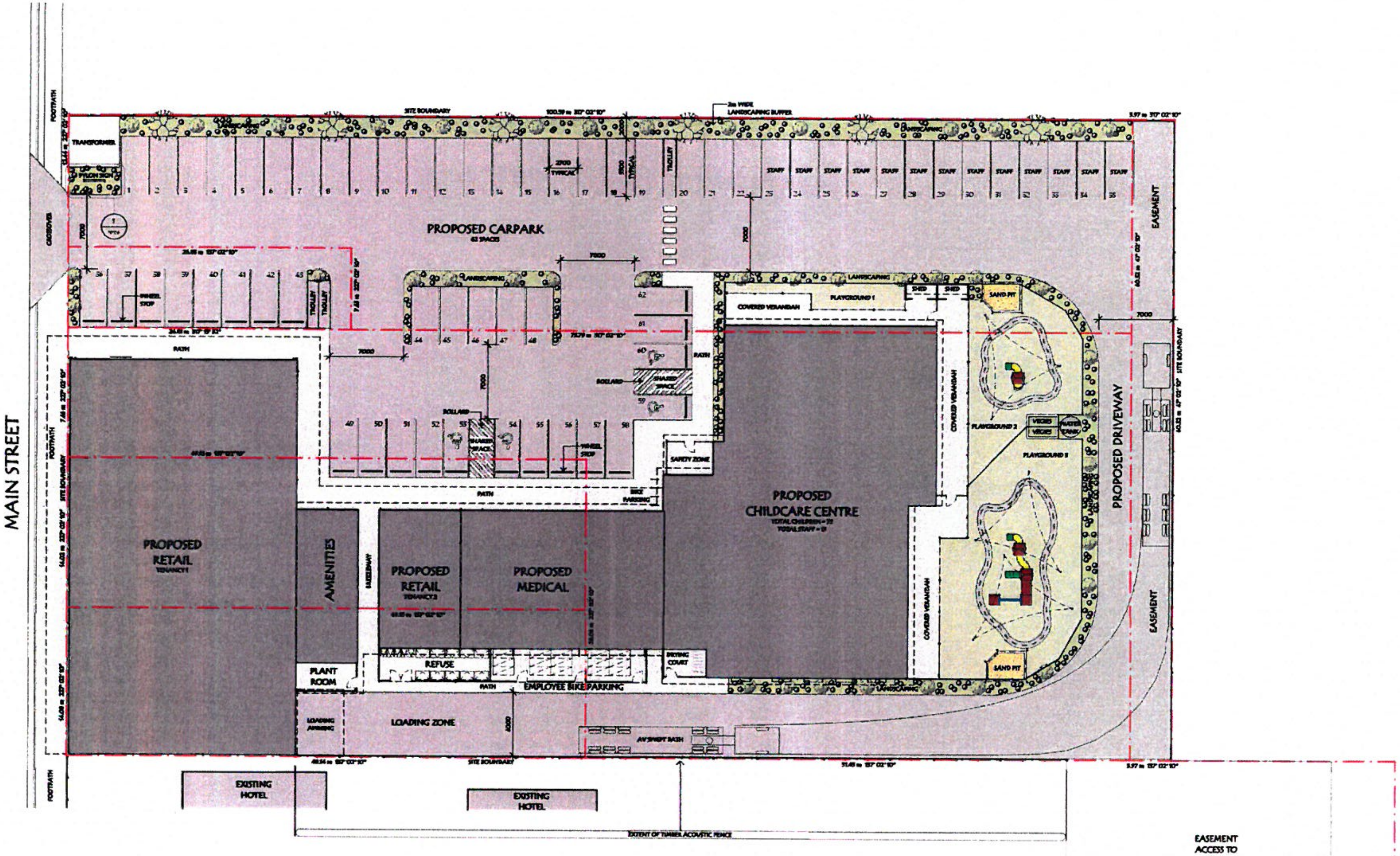
PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE
LOCATION
MAIN STREET, ROCKHAMPTON
CLIENT
POWERCAT
TITLE
COVER PAGE / LOCALITY PLAN

date:	drawn:
AUGUST 2015	CMB
scale:	checked:
A1: 1:1500 A3: 1:3000	BC
drawing no:	revision:
0649 SD150	A



SITE PLAN

1:200

PROPERTY INFORMATION

1:1000

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION

LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION

CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

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LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
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TITLE
SITE PLAN

date:	drawn:
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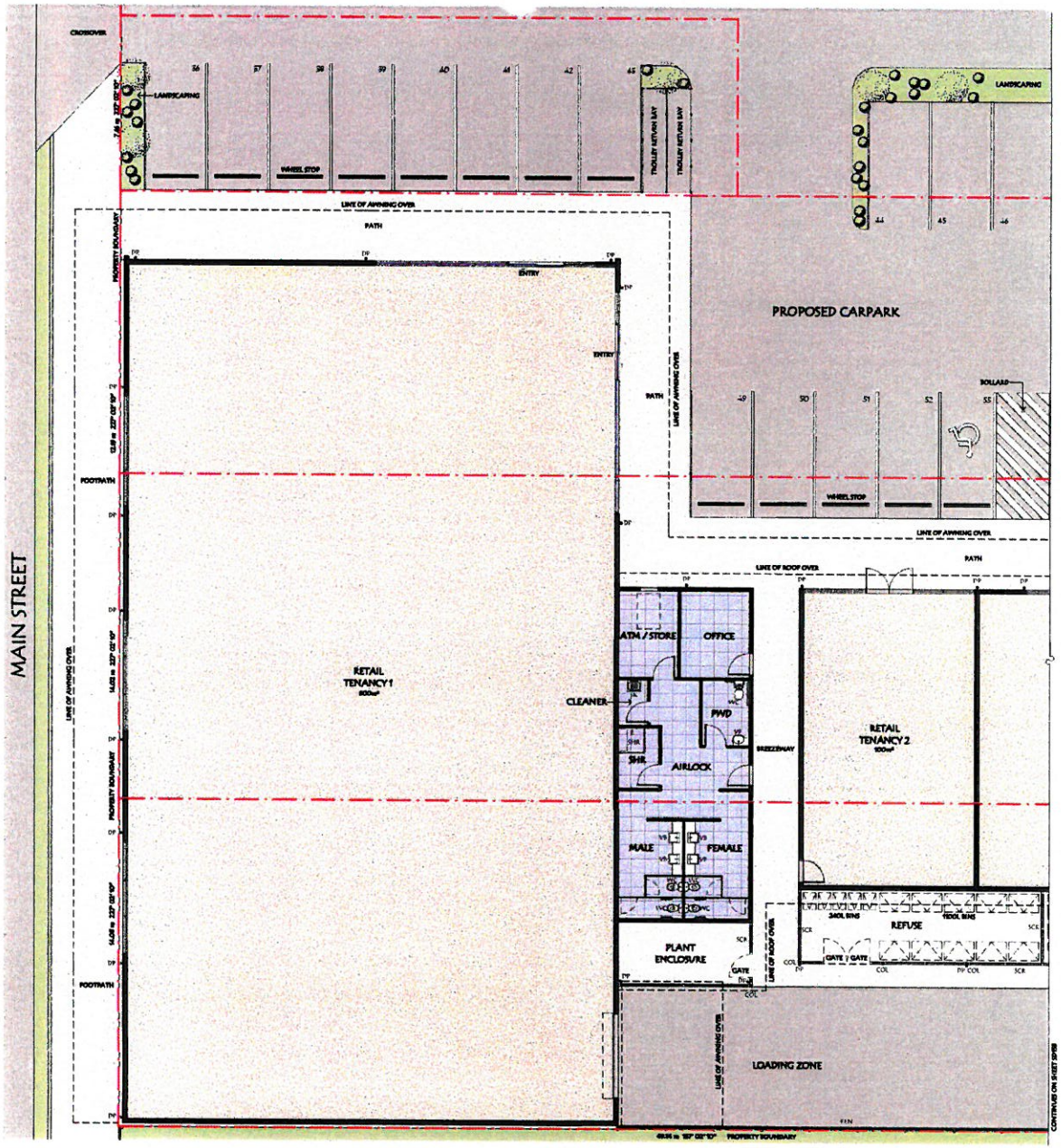

FLOOR PLAN

LAYOUT PLAN - RETAIL 1 : 100

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION

LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION

CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

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LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
POWERCAT

TITLE
FLOOR PLAN - RETAIL

date:	drawn:
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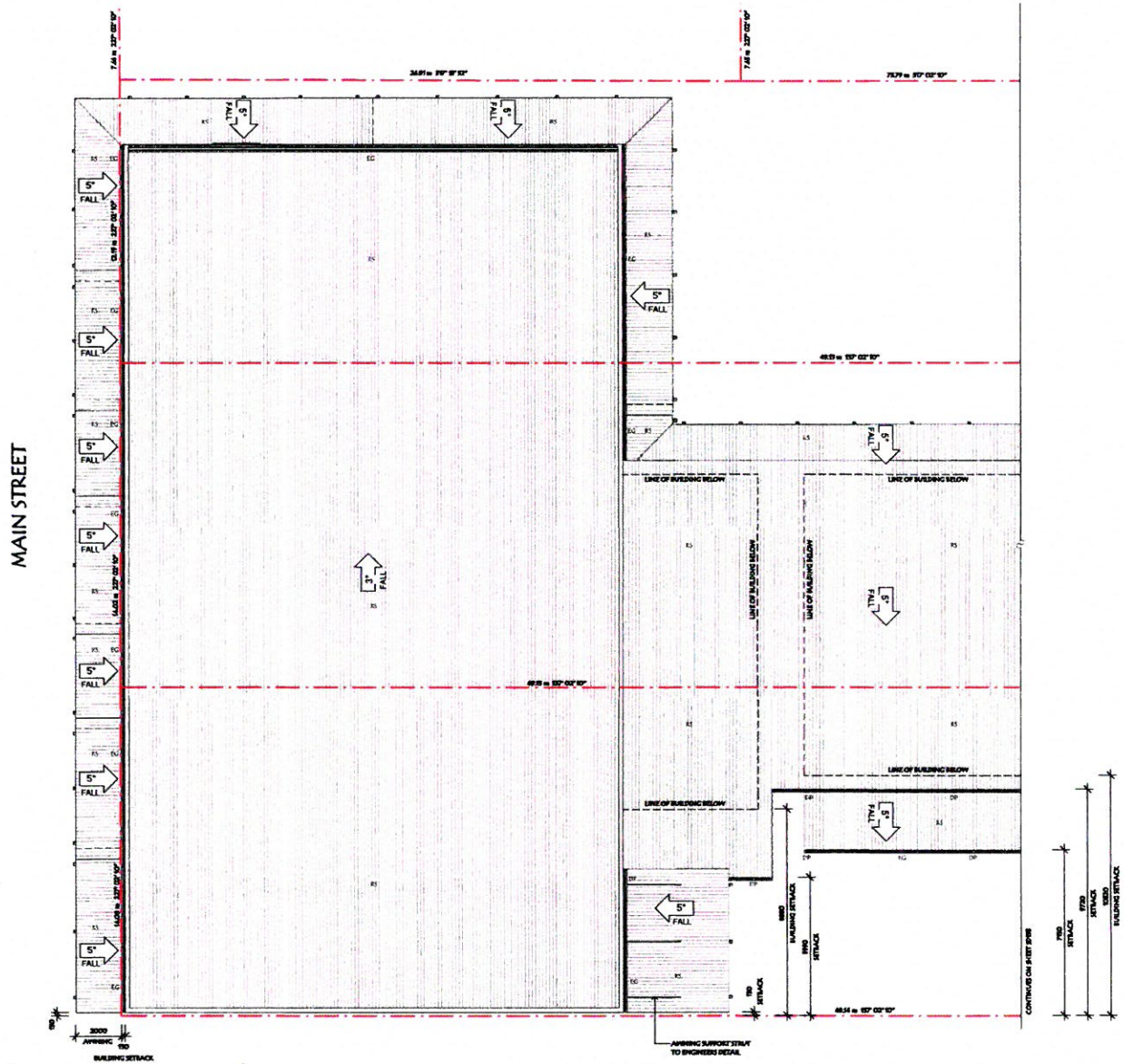
A1: 1:100 A3: 1:200	BC
drawing no:	revision:
0649 SD152	A

LEGEND

COL	COLUMN
DP	DOWNPIPE
FEN	FENCE
SCR	SCREEN
SHR	SHOWER
SK	SINK
VB	VANITY BASIN
WC	WATER CLOSET

Scale 1:200 (m)

Scale 1:100 (m)



ROOF PLAN

RETAIL 1 : 100

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION

LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION

CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

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LOCATION
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TITLE
ROOF PLAN - RETAIL

date:	drawn:
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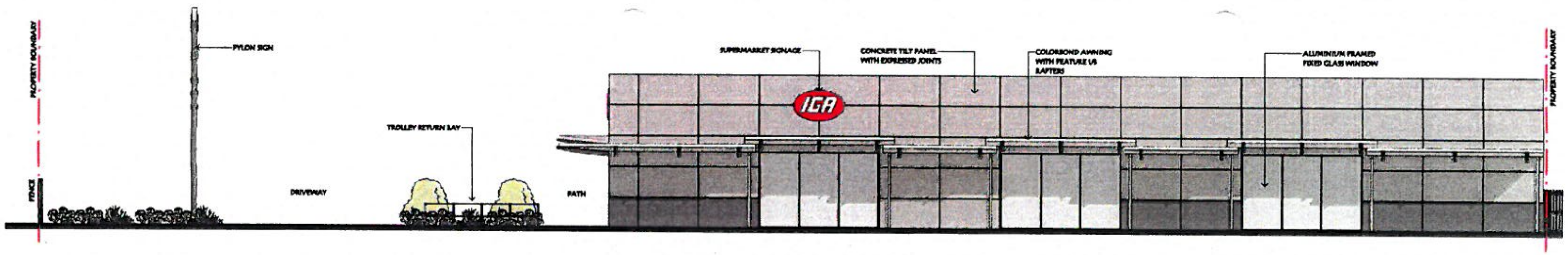
0649 SD154	A

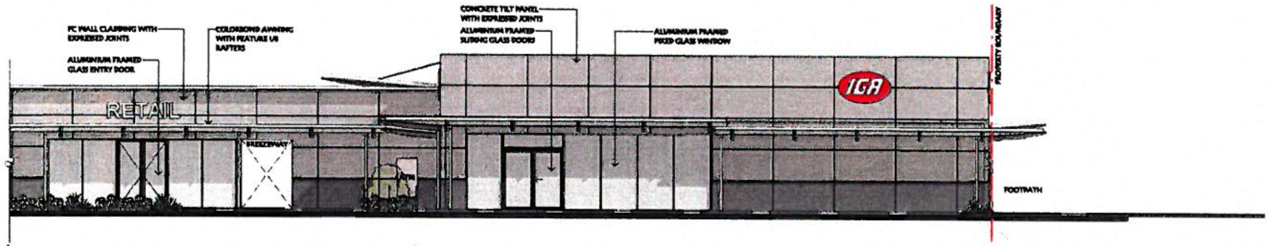
LEGEND
DP DOWNPIPE
EG EAVES GUTTER
RS ROOF SHEETING

Scale 1:200 (m)

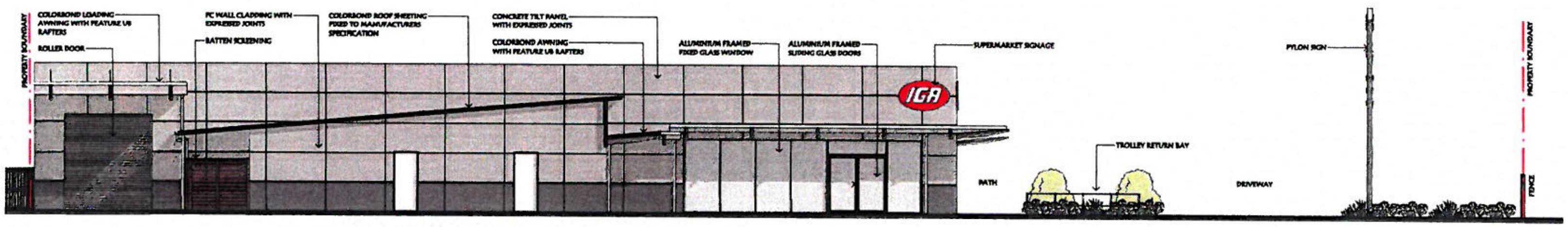
Scale 1:100 (m)



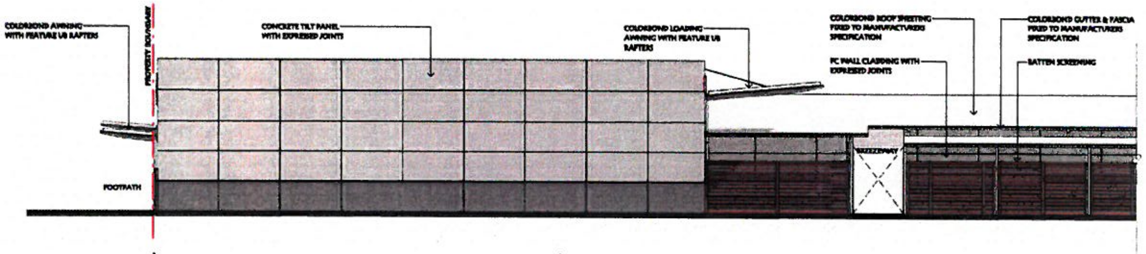
ELEVATION
RETAIL - SOUTH-EAST 1:100



ELEVATION
RETAIL - SOUTH-WEST 1:100



ELEVATION
RETAIL - NORTH-WEST 1:100



ELEVATION
RETAIL - NORTH-EAST 1:100

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION

LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION

CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

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CLIENT
POWERCAT

TITLE
ELEVATIONS - RETAIL

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A1: 1:100 A3: 1:200	BC
drawing no:	**revision:**
0649 SD157	A

Scale 1:200 (m)
Scale 1:100 (m)

PERSPECTIVE VIEW
RETAIL

PERSPECTIVE VIEW
RETAIL

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES
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PROJECT
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LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
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TITLE
PERSPECTIVE VIEWS - RETAIL

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AUGUST 2015	CMB
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A1: NTS A3: NTS	BC
drawing no:	revision:
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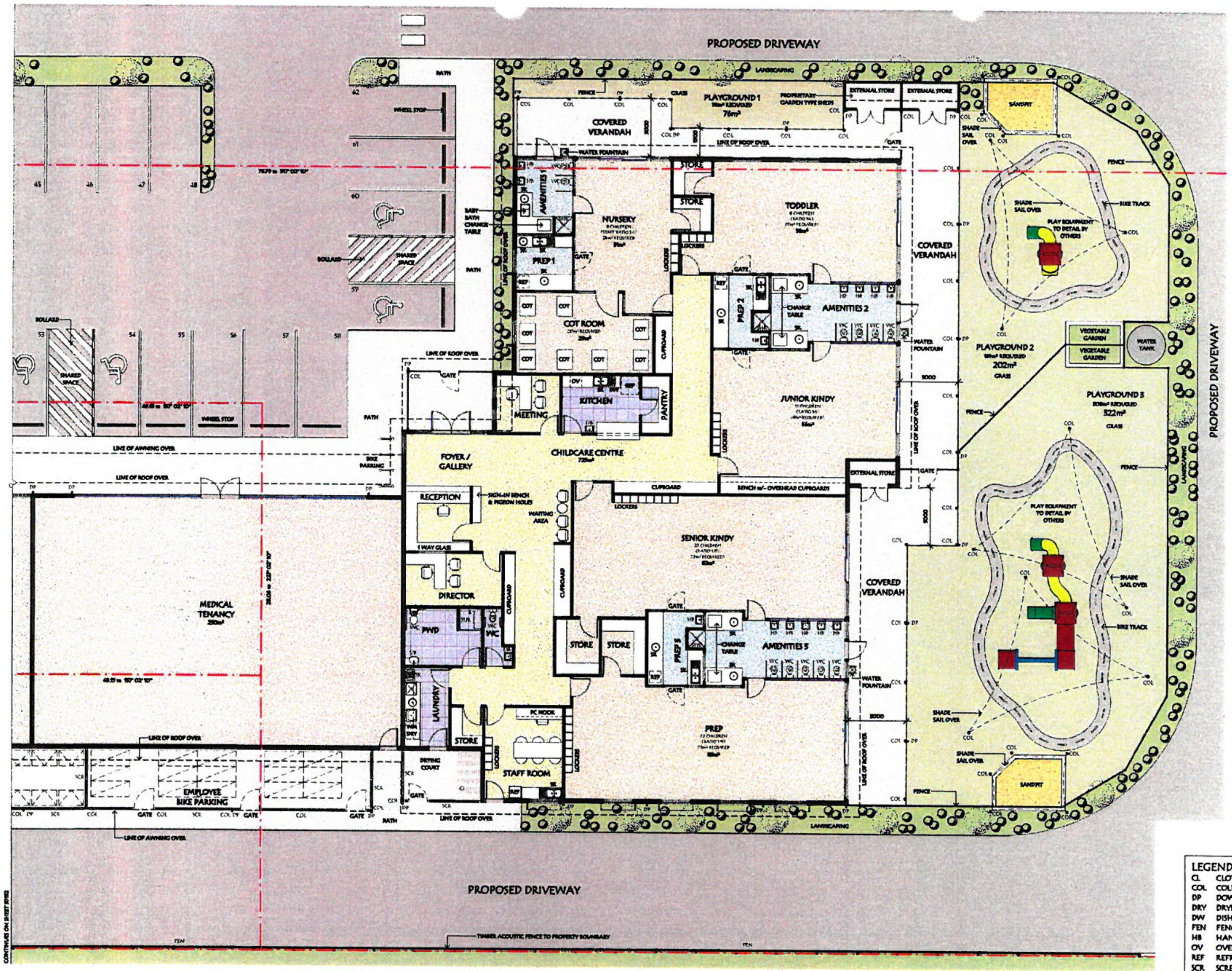

FLOOR PLAN

LAYOUT PLAN - CHILDCARE & MEDICAL 1 : 100

LEGEND

CL	CLOTHES LINE
COL	COLUMN
DP	DOWNPIPE
DRY	DRYER
DW	DISH WASHER
FEN	FENCE
HB	HAND BASIN
OV	OVEN
REF	REFRIGERATOR
SCR	SCREEN
SHR	SHOWER
SK	SINK
VB	VANITY BASIN
WC	WATER CLOSET
WM	WASHING MACHINE

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION

LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION

CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

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LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
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TITLE
FLOOR PLAN - CHILDCARE & MEDICAL

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AUGUST 2015	CMB
scale: A1: 1:100 A3: 1:200	checked: BC
drawing no: 0649 SD153	revision: A

Appendix B. SIDRA Outputs

MOVEMENT SUMMARY

Site: Main St/Haynes St 2026 Pre-development

Main St/Haynes St
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Haynes St S											
1	L2	2	5.0	0.828	24.0	LOS C	4.2	31.0	1.00	1.03	42.9
2	T1	66	5.0	0.828	18.4	LOS B	4.2	31.0	1.00	1.03	43.9
3	R2	164	5.0	0.828	23.9	LOS C	4.2	31.0	1.00	1.03	42.8
Approach		233	5.0	0.828	22.4	LOS C	4.2	31.0	1.00	1.03	43.1
East: Mains St E											
4	L2	162	5.0	0.629	15.8	LOS B	5.3	38.9	0.89	0.82	48.5
5	T1	229	5.0	0.629	10.2	LOS B	5.3	38.9	0.89	0.82	49.8
6	R2	302	5.0	0.788	21.3	LOS C	5.2	38.0	0.99	0.99	43.1
Approach		694	5.0	0.788	16.3	LOS B	5.3	38.9	0.94	0.89	46.3
North: Haynes St N											
7	L2	243	5.0	0.700	18.4	LOS B	5.1	37.6	0.95	0.90	45.7
8	T1	76	5.0	0.700	12.8	LOS B	5.1	37.6	0.95	0.90	46.8
9	R2	17	5.0	0.700	18.4	LOS B	5.1	37.6	0.95	0.90	45.6
Approach		336	5.0	0.700	17.2	LOS B	5.1	37.6	0.95	0.90	45.9
West: Main St W											
10	L2	53	5.0	0.430	14.5	LOS B	3.3	23.9	0.82	0.70	50.1
11	T1	218	5.0	0.430	8.9	LOS A	3.3	23.9	0.82	0.70	51.5
12	R2	3	5.0	0.010	17.3	LOS B	0.0	0.3	0.85	0.62	45.2
Approach		274	5.0	0.430	10.1	LOS B	3.3	23.9	0.82	0.70	51.2
All Vehicles		**1536**	**5.0**	**0.828**	**16.3**	**LOS B**	**5.3**	**38.9**	**0.93**	**0.88**	**46.5**

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
P3	North Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
P4	West Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
All Pedestrians		**158**	**9.6**	**LOS A**			**0.80**	**0.80**

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: Main St/Haynes St 2026 Post-development

Main St/Haynes St
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Haynes St S											
1	L2	7	5.0	0.853	25.1	LOS C	4.5	32.8	1.00	1.07	42.3
2	T1	66	5.0	0.853	19.5	LOS B	4.5	32.8	1.00	1.07	43.3
3	R2	164	5.0	0.853	25.1	LOS C	4.5	32.8	1.00	1.07	42.2
Approach		238	5.0	0.853	23.5	LOS C	4.5	32.8	1.00	1.07	42.5
East: Mains St E											
4	L2	162	5.0	0.667	16.3	LOS B	5.9	42.9	0.91	0.85	48.2
5	T1	254	5.0	0.667	10.7	LOS B	5.9	42.9	0.91	0.85	49.5
6	R2	302	5.0	0.864	25.1	LOS C	5.8	42.3	1.00	1.10	41.2
Approach		718	5.0	0.864	18.0	LOS B	5.9	42.9	0.95	0.95	45.4
North: Haynes St N											
7	L2	243	5.0	0.781	20.4	LOS C	6.1	44.7	0.98	0.99	44.5
8	T1	76	5.0	0.781	14.8	LOS B	6.1	44.7	0.98	0.99	45.6
9	R2	46	5.0	0.781	20.3	LOS C	6.1	44.7	0.98	0.99	44.4
Approach		365	5.0	0.781	19.2	LOS B	6.1	44.7	0.98	0.99	44.8
West: Main St W											
10	L2	82	5.0	0.517	14.8	LOS B	4.1	29.7	0.85	0.74	49.7
11	T1	242	5.0	0.517	9.2	LOS A	4.1	29.7	0.85	0.74	51.1
12	R2	8	5.0	0.028	17.5	LOS B	0.1	0.8	0.86	0.66	45.1
Approach		333	5.0	0.517	10.8	LOS B	4.1	29.7	0.85	0.73	50.5
All Vehicles		**1654**	**5.0**	**0.864**	**17.6**	**LOS B**	**6.1**	**44.7**	**0.94**	**0.93**	**45.8**

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
P3	North Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
P4	West Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
All Pedestrians		**158**	**9.6**	**LOS A**			**0.80**	**0.80**

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

▽ Site: Site Access Intersection 2026 Post-development

Site Access Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Main Street E											
5	T1	248	0.0	0.175	0.4	LOS A	0.5	3.7	0.20	0.13	57.0
6	R2	63	0.0	0.175	6.7	LOS A	0.5	3.7	0.20	0.13	42.0
Approach		312	0.0	0.175	1.7	NA	0.5	3.7	0.20	0.13	55.7
North: Site Access											
7	L2	65	0.0	0.111	0.9	LOS A	0.4	2.8	0.39	0.30	19.1
9	R2	43	0.0	0.111	3.0	LOS A	0.4	2.8	0.39	0.30	35.2
Approach		108	0.0	0.111	1.7	LOS A	0.4	2.8	0.39	0.30	27.5
West: Main Street W											
10	L2	45	0.0	0.163	5.6	LOS A	0.0	0.0	0.00	0.08	45.9
11	T1	274	0.0	0.163	0.0	LOS A	0.0	0.0	0.00	0.08	58.7
Approach		319	0.0	0.163	0.8	NA	0.0	0.0	0.00	0.08	56.7
All Vehicles		**739**	**0.0**	**0.175**	**1.3**	**NA**	**0.5**	**3.7**	**0.14**	**0.13**	**51.4**

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Main St/Glenmore Road 2026 Pre-development

New Site
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Glenmore Rd S											
1	L2	30	5.0	0.393	8.4	LOS A	2.4	17.5	0.39	0.20	55.0
2	T1	446	5.0	0.393	1.4	LOS A	2.4	17.5	0.39	0.20	56.7
3	R2	156	5.0	0.393	8.6	LOS A	2.4	17.5	0.39	0.20	54.9
Approach		632	5.0	0.393	3.5	NA	2.4	17.5	0.39	0.20	56.2
East: Main St E											
4	L2	138	5.0	0.156	10.5	LOS B	0.6	4.5	0.49	0.93	50.6
5	T1	14	5.0	0.260	23.5	LOS C	0.9	6.3	0.84	1.03	41.9
6	R2	40	5.0	0.260	26.5	LOS D	0.9	6.3	0.84	1.03	41.8
Approach		192	5.0	0.260	14.8	LOS B	0.9	6.3	0.59	0.96	47.8
North: Glenmore Rd N											
7	L2	27	5.0	0.250	7.1	LOS A	0.4	2.6	0.10	0.06	57.2
8	T1	408	5.0	0.250	0.2	LOS A	0.4	2.6	0.10	0.06	59.0
9	R2	22	5.0	0.250	8.2	LOS A	0.4	2.6	0.10	0.06	56.6
Approach		457	5.0	0.250	1.0	NA	0.4	2.6	0.10	0.06	58.8
West: Main St W											
10	L2	8	5.0	0.186	7.6	LOS A	0.6	4.3	0.77	0.89	46.0
11	T1	24	5.0	0.186	14.5	LOS B	0.6	4.3	0.77	0.89	46.2
12	R2	22	5.0	0.186	21.8	LOS C	0.6	4.3	0.77	0.89	45.7
Approach		54	5.0	0.186	16.5	LOS C	0.6	4.3	0.77	0.89	46.0
All Vehicles		**1335**	**5.0**	**0.393**	**4.8**	**NA**	**2.4**	**17.5**	**0.33**	**0.29**	**55.1**

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Main St/Glenmore Road 2026 Post-development

New Site
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Glenmore Rd S											
1	L2	30	5.0	0.416	8.7	LOS A	2.8	20.7	0.43	0.23	54.7
2	T1	446	5.0	0.416	1.7	LOS A	2.8	20.7	0.43	0.23	56.3
3	R2	179	5.0	0.416	8.8	LOS A	2.8	20.7	0.43	0.23	54.5
Approach		655	5.0	0.416	4.0	NA	2.8	20.7	0.43	0.23	55.7
East: Main St E											
4	L2	161	5.0	0.182	10.6	LOS B	0.7	5.4	0.50	0.94	50.6
5	T1	19	5.0	0.348	26.2	LOS D	1.2	8.8	0.87	1.05	40.5
6	R2	49	5.0	0.348	29.7	LOS D	1.2	8.8	0.87	1.05	40.4
Approach		229	5.0	0.348	16.0	LOS C	1.2	8.8	0.61	0.97	47.1
North: Glenmore Rd N											
7	L2	36	5.0	0.255	6.9	LOS A	0.4	2.6	0.10	0.07	57.1
8	T1	408	5.0	0.255	0.2	LOS A	0.4	2.6	0.10	0.07	58.9
9	R2	22	5.0	0.255	8.2	LOS A	0.4	2.6	0.10	0.07	56.5
Approach		466	5.0	0.255	1.1	NA	0.4	2.6	0.10	0.07	58.6
West: Main St W											
10	L2	8	5.0	0.217	8.0	LOS A	0.7	5.2	0.79	0.91	45.3
11	T1	29	5.0	0.217	15.8	LOS C	0.7	5.2	0.79	0.91	45.4
12	R2	22	5.0	0.217	24.1	LOS C	0.7	5.2	0.79	0.91	44.9
Approach		59	5.0	0.217	17.8	LOS C	0.7	5.2	0.79	0.91	45.2
All Vehicles		**1409**	**5.0**	**0.416**	**5.6**	**NA**	**2.8**	**20.7**	**0.36**	**0.32**	**54.5**

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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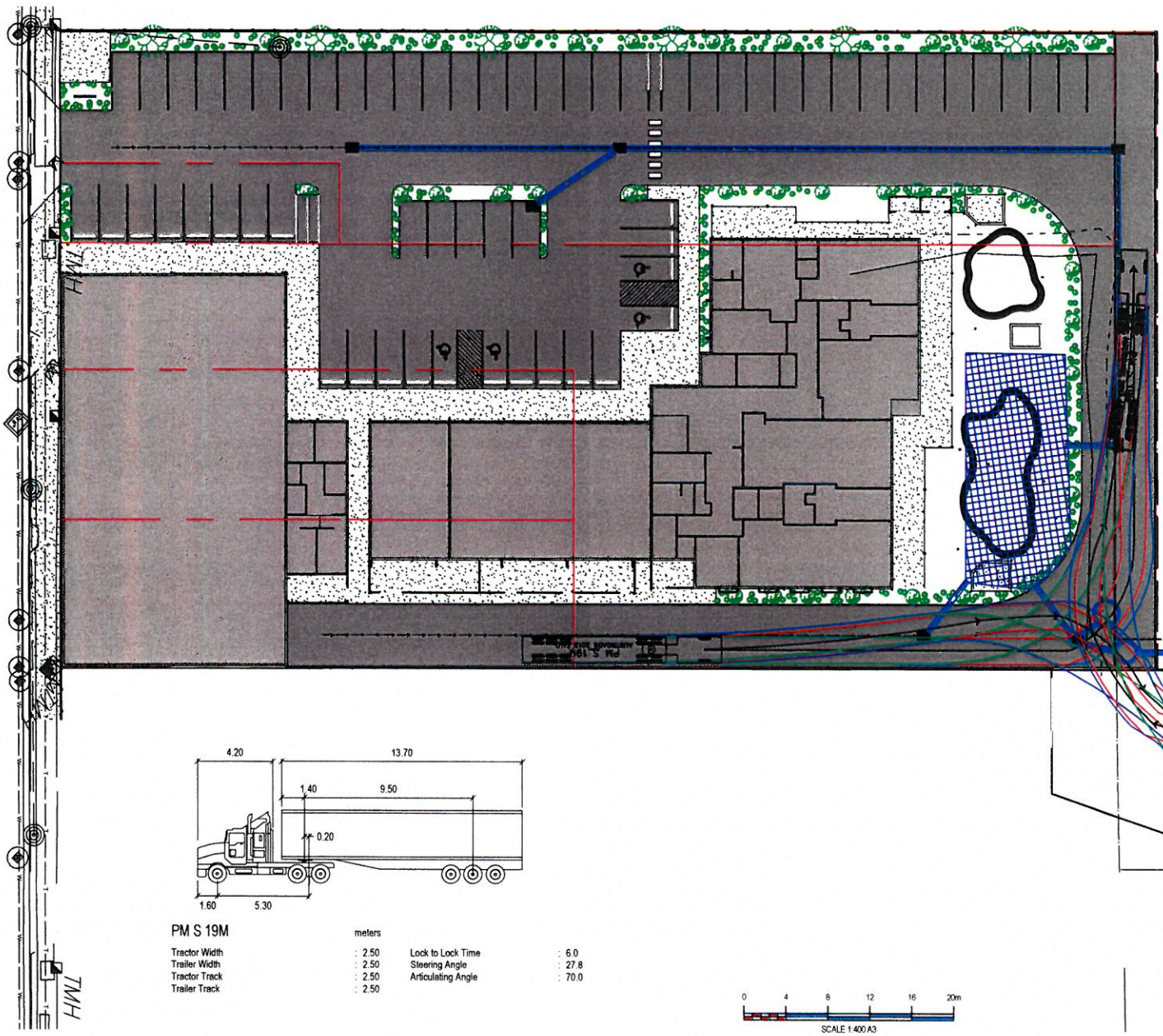
Appendix C. Service Vehicle Swept Path Diagram



PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

SCALE 1:400 A3

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PLAN DETAILS:

Designed:	ARC
Drawn:	ARC
Checked:	CDF
Datum:	AHD
Date:	2018

PLAN AMENDMENTS:

Rev	Date	Comment	Altered	Checked

RETAIL, MEDICAL & CHILDCARE CENTRE
28 MAIN STREET, PARK AVENUE
FOR POWERCAT

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PLAN TITLE:
TURNING TEMPLATE PLAN

NOT FOR CONSTRUCTION

PLAN No: **1391-SK01** REVISION: -

FILE LOCATION: J:\CIVIL\1391 28 MAIN STREET, ROCKHAMPTON\DESIGN - CIVIL\ACAD\C-1391-SK01.DWG

SHEET: 1 OF 1

CONTOUR

STORMWATER MANAGEMENT PLAN

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D/143-2015
Dated: 01.06.2016

PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE

28 MAIN STREET, ROCKHAMPTON

Prepared For:

Powercat Development Pty Ltd.

Ref: 1391 – SWMP01

(11 January 2016)

Final Issue Approval			
Date	**Name**	**Signature**	**Document Status**
11/01/2016	Brett Thomson (RPEQ NO.6068)		Preliminary Issue

Revision Record					
Rev	**Date**	**Comments**	**Status**	**Author**	**Reviewer**
01	11/01/2016	Preliminary Issue	A	ARC	CDF

A - Approval	B - Building Approval	C - Construction	P - Preliminary
R - Revision	T - For Tender	X - Information	D-Draft

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List of Appendices

1 INTRODUCTION

This Stormwater Management Plan has been commissioned by Powercat Development Pty Ltd (Powercat) and forms part of a Material Change of Use application for submission to Rockhampton Regional Council (RRC). The subject site consists of land parcels, described as Lot 1 on RP607946, Lot 2 on RP607946, Lot 1 on RP620251, Lot 2 on RP620251 and Lot 2 on RP617448, Parish of Murchison, County of Livingstone.

The land has a physical address of 28 Main Street, Park Avenue, Rockhampton. A locality sketch is shown below.

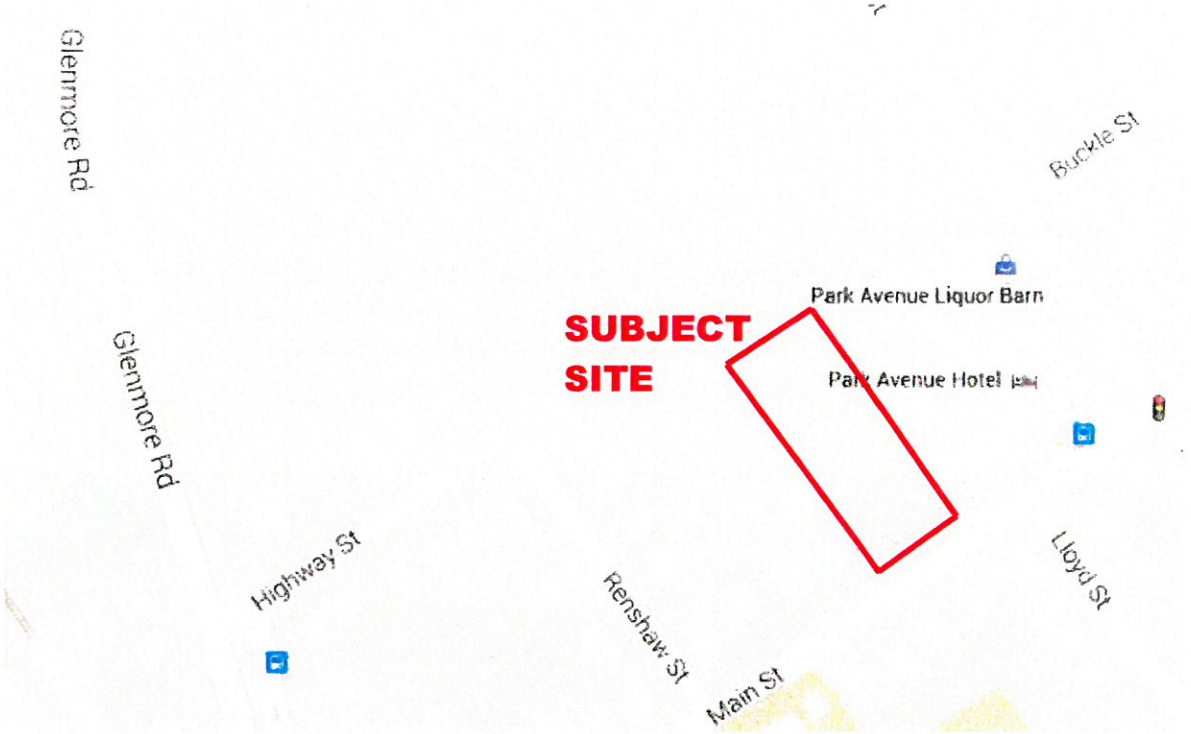


Figure 1-1 Site Locality (Accessed from Google Maps 08.01.2016)

This report describes existing site features, and proposes preliminary stormwater design parameters for the development of the subject site. The report has been compiled considering the specifics of the site and the development including, consultation with associated consultants, previous development applications to Rockhampton Regional Council, review of available Dial Before You Dig data for existing infrastructure, site survey and **compliance review of Council's codes and policies**.

Contour understands that the proposed development is being submitted to council as two separate applications (retail and childcare). This report is a holistic report and covers both proposed uses and applications.

Hydrologic and hydraulic analyses have been undertaken to determine the preliminary infrastructure requirements for the site. The purpose of these analyses is to investigate how stormwater can be effectively managed on site and to ensure that the proposed development does not cause an actionable nuisance. Response to council's stormwater management code is provided in Appendix E.

1.1 SITE CONTEXT

The subject site is approximately 6,233m^2 in area, and is essentially rectangle in shape; being approximately 56 metres east to west, and 100 metres south to north. The site is adjacent to the existing Park Avenue Hotel Motel which is located on the corner of Main Street and Haynes Street, Park Avenue. To the north and west of the proposed development are existing homes.

The existing topography of the subject site is generally flat with approximate RLs ranging between 12.0m and 10.8m AHD. Stormwater from the lot generally sheet flows in a north westerly direction into Easement B on SP223545. The stormwater then flows into the existing dam located on Lot 7 on RP606730 to the north through Easement A on RP886441. There are no existing dwellings on the proposed site and is currently covered in grass.

Detailed field survey of the subject site has been completed by Hoffmann Surveyors, Rockhampton

There are existing easements to the north and to the north east of the proposed development which are in favour of Council. It is understood that these easements are associated with access and stormwater easements.

With regard to local services, extracts from a recent Dial Before You Dig search are included as part of this report in Appendix D. More detailed commentary on these services is provided later in this report.

1.2 PROPOSAL DETAILS

The client, Powercat, is proposing to utilise 5 existing lots (as detailed above), and develop these parcels of land into a Retail, Medical and Childcare Centre. The new proposed centre is to contain approximately 62 car parking spaces, loading zones, employee bike parking and landscaping areas.

The current development proposal is represented by the Architectural drawings by BRD Group within Appendix A of this report.

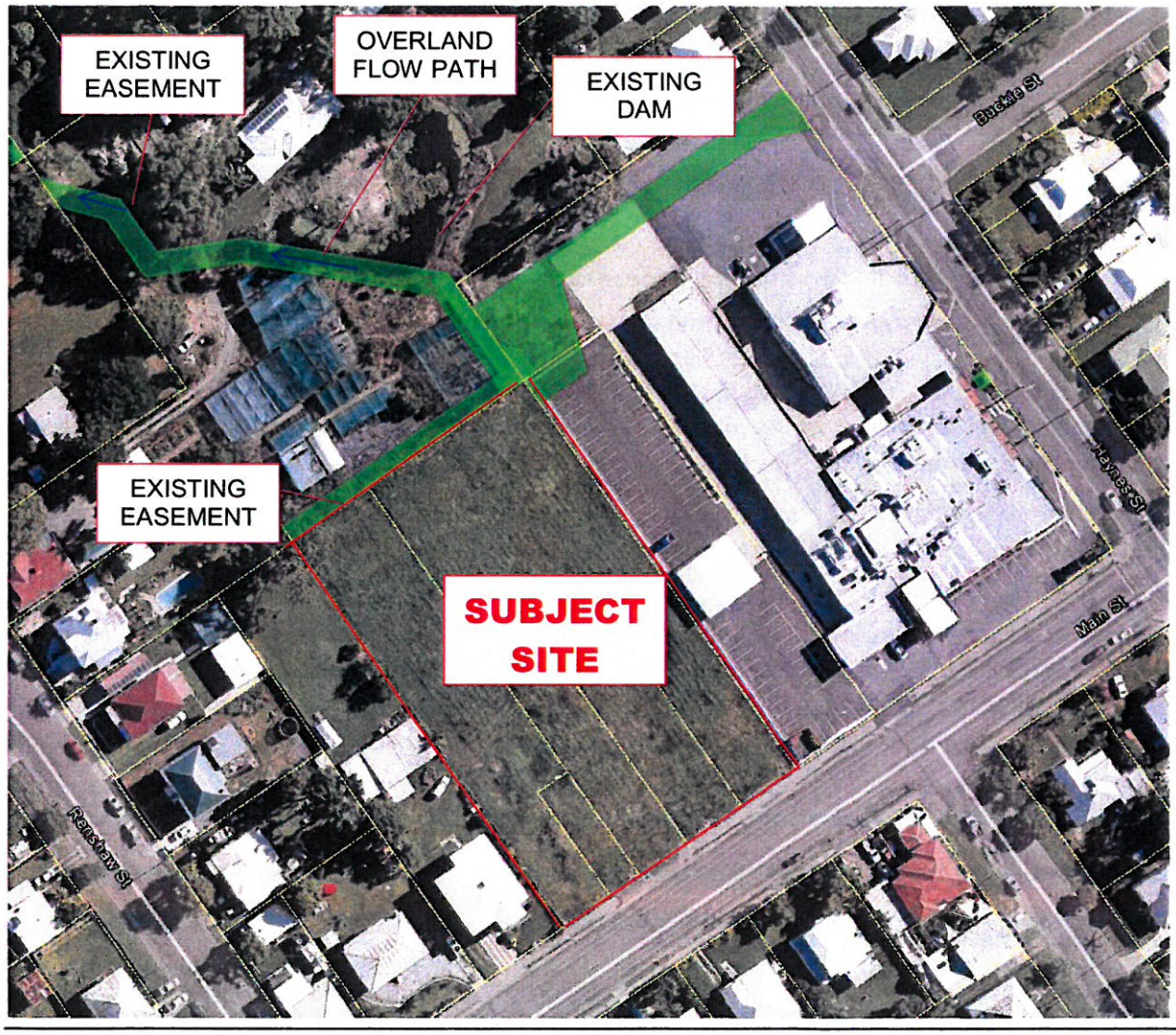


Figure 1-2 Aerial Photo (Accessed from Google Earth 11.01.2016)

Figure 1-3 Aerial Photo looking at overall Catchment and discharge point (Accessed from Google Earth 11.01.2016)

1.3 SITE FLOODING

A Flood Check of the site was conducted using the Rockhampton Regional Councils Planning Scheme 2015 overlay mapping system. The Flood hazard mapping shows that the proposed site is not subject to impacts from floodplain flooding or any Fitzroy River flooding.

The following figure below shows the flooding overlay map for the proposed site.

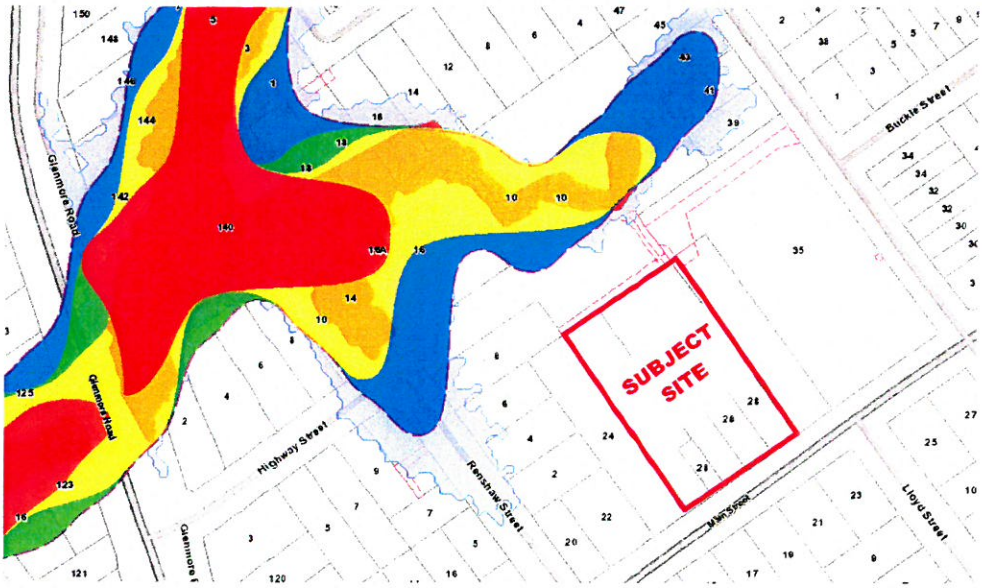


Figure 1-4 Rockhampton Regional Planning Scheme Maps - Flood Overlay (Accessed 11.01.2016)

2 DRAINAGE

2.1 GENERAL

The proposed design generally complies with the requirements of the Queensland Urban Drainage Manual (QUDM), Council's Planning Scheme and any other relevant codes or guidelines.

2.2 DRAINAGE

A conceptual stormwater drainage infrastructure layout is shown on Contour plans 1391-SW1 and 1391-SW2, presented in Appendix A. Design of the overall drainage system generally complies with the Major/Minor drainage requirements as per QUDM.

The recommended minor storm design event is the 10 year ARI based on central business and commercial use in accordance with Table 7.3.1 of QUDM. It is proposed that the minor storm design event (10 year ARI) will be collected and conveyed to the legal point of discharge. The minor drainage system is to be designed in accordance with QUDM and generally consist of Field Inlets or Kerb Gully Pits installed to collect surface runoff from roads, car parks, pathways and other non-roofed areas, plus additional pipe linkages to capture roof-water drainage from buildings. It is proposed that there will be no roof-water harvesting and re-use as part of this development.

The combined minor/major drainage system will be designed to cater for the 100 year ARI flows in accordance with table 7.3.2 of QUDM. Generally the major drainage system will consist of overland flow (Q100-Q10 piped) controlled within road corridors of the development to ensure acceptable freeboard to the respective premises.

2.3 LEGAL POINT OF DISCHARGE

Contour understands that the subject site has an existing approval for a retail development (D/278-2011). The previous approval has established a legal point of discharge within the rear adjoining allotment (7/RP606730) and easement (B/SP223545). It is understood that the previously approved legal point of discharge and arrangement will serve as the legal point of discharge for this development.

It is proposed to discharge stormwater into the existing dam to the north of the site. Generally stormwater will discharge as piped drainage or as sheet flow. Some minor works may be required within the easement area to minimise nuisance and direct flows to the existing dam.

It is considered that discharging stormwater, in the manner described above will not cause an actionable nuisance. As such it is considered that a lawful point of discharge has been established in accordance with the QUDM Section 3.4.

3 WATER QUANTITY MANAGEMENT

3.1 STORMWATER QUANTITY MANAGEMENT STRATEGY

This section outlines the water quantity analysis undertaken to determine the preliminary stormwater infrastructure requirements Stormwater Quantity Management Strategy

On-site detention storage can readily be provided for the proposed development via number of methods including;

- Underground detention tank/s
- On pavement detention; and
- Bioretention/detention basins

Indicative stormwater quantity mitigation measures are outlined on Contour Plans 1391-SW01 and 1391-SW02 in Appendix B. Detailed design stages will confirm the ultimate stormwater quantity mitigation measures and configuration.

The constrained nature of the proposed development layout does not make allowances for adequate capture or direction of major storm flows to the proposed water quantity mitigation measures. As such the minor storm discharges (10year ARI) have been adopted as the discharges captured and mitigated by the proposed detention measures. Major flows have been assumed to bypass the proposed mitigation measures. This has been reflected in the water quantity modelling.

3.2 INTERNAL CATCHMENT CHARACTERISTICS

For the purposes of determining preliminary water quantity mitigation infrastructure the site has been considered as a single catchment. Fraction Impervious values have been calculated based on development proposal plans. Catchment details, across the subject site are detailed in Table 3-1 and Table 3-2 for the pre and post developed catchment respectively. A sketch of the conceptual earthworks levels can be found in Appendix B.

Table 3-1 Catchment areas and fractions impervious, pre-developed case

	Pre-developed
Impervious Area, ha	0.00
Pervious Area, ha	0.6233
Fraction Impervious	0%
Total Area, ha	0.6233

Table 3-2 Catchment areas and fractions impervious, post-developed case

	Post-developed
Impervious Area, ha	0.5420
Pervious Area, ha	0.0813
Fraction Impervious	87%
Total Area, ha	0.6233

An initial and continuing loss model has been adopted for XP-RAFTS model. Parameters have generally been based on recommendations set out within Australian Rainfall and Runoff (ARR) and outlined in Table 3-3 below. Within the model, pervious and impervious areas were split into sub-catchment areas based on the fraction impervious.

Table 3-3 Loss Parameters

Losses	Initial	Continuing
Pervious	20	2.5
Impervious	1.5	0

3.3 RUNOFF-ROUTING MODELLING

Hydrological analysis of the pre and post development conditions was modelled using XP-RAFTS runoff routing software. The parameters adopted were generally based on recommendations in Australian Rainfall and Runoff and the Queensland Urban Drainage Manual.

The modelled discharges were compared with the Rational Method calculations for the pre-developed case to validate the XP-RAFTS model. As outlined in Table 3-4 modelled site discharge compares well with the discharges calculated by the Rational Method. The peak discharges, which were estimated using XP-RAFTS, were adopted for the hydraulic modelling.

Table 3-4 Summary of Peak Discharges, pre-developed case

	Peak Discharges (Rational Method), m^3/s	Peak Discharges (XP-RAFTS), m^3/s
2 Year ARI	0.076	0.073
5 Year ARI	0.110	0.124
10 Year ARI	0.133	0.153
20 Year ARI	0.162	0.186
50 Year ARI	0.212	0.219
100 Year ARI	0.249	0.258

The post-developed unmitigated catchment modelling results are summarised in Table 3-5.

Table 3-5 Summary of Peak Discharges for post-developed (Unmitigated) case

	Peak Discharges (XPRAFTS), m^3/s
2 Year ARI	0.195
5 Year ARI	0.256
10 Year ARI	0.292
20 Year ARI	0.340
50 Year ARI	0.380
100 Year ARI	0.428

3.4 DETENTION BASIN DETAILS

As previously noted, the development proposal includes a detention Tank as a stormwater quantity mitigation measure. The underground tank is situated under the proposed childcare centre playground. The details of the proposed detention basins are outlined in Table 3-6. These details have been determined based on the hydrologic and hydraulic analyses undertaken as part of this report. These requirements may be reviewed during detailed design stages.

Table 3-6 Detention Tank Details

Features	Detention Tank
Detention Volume(m^3)	245 m^3
Low Flow orifice(mm)	230
High flow weir, height above basin invert(m)	1
High flow weir, length(m)	1
Depth of Tank(m)	1.2m

3.5 XP-RAFTS RESULTS

Critical duration design storm peak flows for the pre and post developed cases are presented in Table 3-7 below. The post developed case includes the proposed detention tanks.

Table 3-7 Peak Discharge Results

Catchment	Site	
	Pre-developed Discharge(m^3/s)	Post-developed (mitigated) Discharge(m^3/s)
2 year ARI	0.073	0.056
5 year ARI	0.124	0.066
10 year ARI	0.153	0.085
20 year ARI	0.186	0.146
50 year ARI	0.219	0.202
100 year ARI	0.258	0.245

It is noted that comparisons for other non-critical durations have been made and generally peak design discharges for all storm durations were not increased when compared with the corresponding duration, pre-developed case.

It is acknowledged that the proposed play area includes shade sail structures. Detailed design stages may incorporate the proposed support structures as part of the detention tank infrastructure.

4 WATER QUALITY MANAGEMENT

4.1 GENERAL

This assessment identifies issues relating to storm water runoff quality and assesses possible methods of treatment if required. The aim of this section of the report is to determine practical approaches to achieving stormwater quality objectives of the SPP and councils planning scheme.

The objectives for stormwater quality management are outlined in

- Rockhampton Regional Council Planning Scheme 2015, Scheme 6.19 – Stormwater Management Planning Scheme Policy
- Capricorn Municipal Development Guidelines – D5 Stormwater Drainage Design.
- Urban stormwater – Queensland best practice environmental management guidelines 2009 Technical note: Derivation of Design Objectives

To meet these objectives, it is proposed to incorporate a tertiary stormwater quality treatment device before discharging from the proposed site. The tertiary treatment device proposed is a Humes Jelly Fish treatment system. The stormwater run-off from the driveway, roof and landscaping area will enter this system and be treated before entering the proposed detention tank.

The proposed stormwater quality treatment devices are outlined on Contour Drawings 1391-SW1 in Appendix B. These treatment devices are conceptual in nature and are subject to change during future detailed design stages of the project and subsequent operational works approval.

4.1.1 Construction Phase – Design Objectives

In accordance with the State Planning Policy (SPP) Appendix C, the proposed development has been planned, designed, constructed and operated to manage stormwater from the site to maintain and support the environmental value surrounding the development. The table below outlines the design objectives required for this site during the construction phase.

Table 4-1 Construction Phase – Design Objectives

Issue		Source
Drainage control	Temporary Drainage Works	1. Design life and design storm for temporary drainage works: • **Disturbed area open for <12 months** – 1 in 2-year ARI event • **Disturbed area open for 12-24 months** – 1 in 5-year ARI event • **Disturbed area open for >24 months** – 1 in 10-year ARI event 2. Design capacity excludes minimum 150 mm freeboard 3. Temporary culvert crossing—minimum 1 in 1-year ARI hydraulic capacity
Erosion control	Erosion control measures	1. Minimise exposure of disturbed soils at any time 2. Divert water run-off from undisturbed areas around disturbed areas 3. Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods 4. Implement erosion control methods corresponding to identified erosion risk rating

Sediment control	Sediment control measures Design storm for sediment control basins Sediment basin dewatering	1. Determine appropriate sediment control measures using: • potential soil loss rate, or • monthly erosivity, or • average monthly rainfall 2. Collect and drain stormwater from disturbed soils to sediment basin for design storm event: • design storm for sediment basin sizing is 80th% five-day event or similar 3. Site discharge during sediment basin dewatering: • TSS < 50 mg/L TSS, and • Turbidity not >10% receiving waters turbidity, and • pH 6.5–8.5
Water quality	Litter and other waste, hydrocarbons and other contaminants	1. Avoid wind-blown litter; remove gross pollutants 2. Ensure there is no visible oil or grease sheen on released waters 3. Dispose of waste containing contaminants at authorised facilities
Waterway stability and flood flow management	Changes to the natural waterway hydraulics and hydrology	Refer Constructed Wetland Design Report by Contour dated November 2015 for details of proposed changes to the existing waterway. Refer also Preliminary Hydraulic Assessment by Contour Dated November 2015 for details of hydraulics and hydrology.

4.1.2 Post Construction Phase – Design Objectives

Table 3-2 below outlines the design objectives for the Post Construction or operational phase of the development.

Table 4-2 Post Construction Phase – Design Objectives

Climatic Region	Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)	Gross Pollutants (>5mm)
Central Queensland (South)	85%	60%	45%	90%

4.2 SOURCE NODES

For the purposes of stormwater quality assessment the site was broken down into various catchments based on the site topography, surface types and land use. Reference should be made to Appendix B, for details of the stormwater quality catchments.

The intent of the water quality treatment measures is to achieve the required load reduction targets for areas of the site prior to discharging to the existing easement.

Table 4-3 below shows the areas assigned to each source node.

Table 4-3 MUSIC Mode Catchment Areas

		Catchment
Area	Fraction Impervious (%)	A(ha)
Roof	100	0.196
Road	100	0.346
Ground Level	0	0.081
Total Area		0.623

4.3 MUSIC MODEL

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) version 6.1 was used to determine the required stormwater treatment devices to achieve the requirements of the SPP.

A model schematic is shown on Figure 4-1.

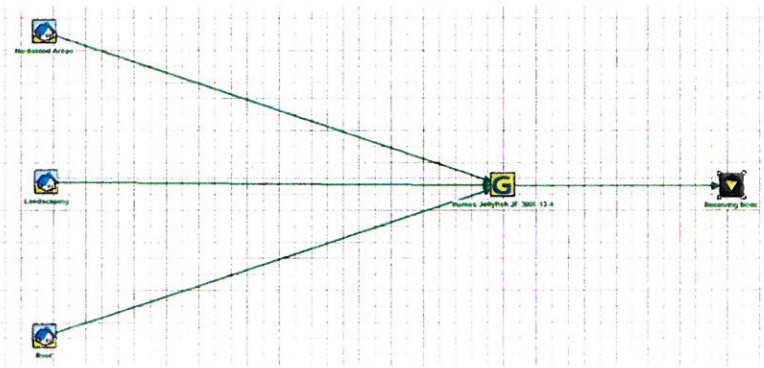


Figure 4-1 MUSIC Model Schematic

The rainfall and evapotranspiration data series, which were observed at the Rockhampton Aero Station over a 10 year period from 1 January 1980 to 31 December 1989, were used in accordance with the MUSIC Modelling Guidelines.

Key treatment node input parameters are outlined in Table 4-4 MUSIC Humes Jelly Fish Treatment Node.

Table 4-4 MUSIC Humes Jelly Fish Treatment Node

Catchment Parameters
Humes JellyFish
1 Humes JellyFish (JF-3000-13-3). Treatment node provided by Humes in accordance with their third party and peer reviewed field data.

4.4 MODELLING RESULTS

Table 4.4 below shows the pollutant reductions achieved by the proposed treatment train. It can be seen that the treatment train reaches the required reductions of Gross Pollutants, Total Suspended Solids, Total Phosphorus and Total Nitrogen outlined in the State Planning Policy 2014 and councils planning scheme.

Table 4-5 Summary of MUSIC Modelling Results

	Pollutant Removal Efficiency, %			
	Total Suspended Solids (TSS)	Total Phosphorus (TP)	Total Nitrogen (TN)	Gross Pollutants
Developed, mitigated catchment.	**85%**	**62.3%**	**52.1%**	**97.8%**
Water Quality Objectives.	85%	60%	45%	90%

5 SUMMARY

It is proposed that the existing properties at 28 Main Street, Park Avenue be redeveloped to create a retail, medical and childcare centre. The property is properly described as Lot 1 on RP607946, Lot 2 on RP607946, Lot 1 on RP620251, Lot 2 on RP620251 and Lot 2 on RP617448

The preliminary stormwater infrastructure requirements for the project have been determined and are presented on drawings in Appendix B.

The proposed stormwater infrastructure discharges to the existing easement and directly to the existing dam on Lot 7 on RP606730 in accordance with previous council approvals. It is proposed that an on-site stormwater detention system be constructed to meet the pre-development discharge flows from the proposed development. This on-site detention system must hold 240kL of stormwater with a low flow piped outlet and a high flow weir outlet.

A water quality treatment device called Humes Jelly Fish (model JF-3000-13-3) is to be utilised to ensure the water quality objectives are met for Central Queensland (South). The configuration of this system has been shown on drawing 1391-SW1.

We consider the analyses contained within this report for proposed stormwater infrastructure, demonstrates that stormwater can effectively be managed onsite.

6 QUALIFICATIONS

This report has been prepared, by Contour Consulting Engineers Pty Ltd, under the direction of a Registered Professional Engineer of Queensland, to document the process undertaken to determine the preliminary stormwater infrastructure requirements for the proposed Retail, Medical & Childcare centre at 28 Main Street, Rockhampton.

This report is only to be used in full, and may not be used to support objectives other than those set out herein, except where written approval is provided by Contour Consulting Engineers

Appendix A. Architectural Plans

PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE

at MAIN STREET, ROCKHAMPTON

for POWERCAT

ARCHITECTURAL DRAWING SCHEDULE

DRAWINGS

0649 SD150	COVER PAGE / LOCALITY PLAN
0649 SD151	SITE PLAN
0649 SD152	FLOOR PLAN - RETAIL
0649 SD153	FLOOR PLAN - CHILDCARE & MEDICAL
0649 SD154	ROOF PLAN - RETAIL
0649 SD155	ROOF PLAN - CHILDCARE
0649 SD156	PYLON SIGN DETAILS
0649 SD157	ELEVATIONS - RETAIL
0649 SD158	ELEVATIONS - CHILDCARE & MEDICAL
0649 SD159	PERSPECTIVE VIEWS - RETAIL
0649 SD160	PERSPECTIVE VIEWS - CHILDCARE & MEDICAL

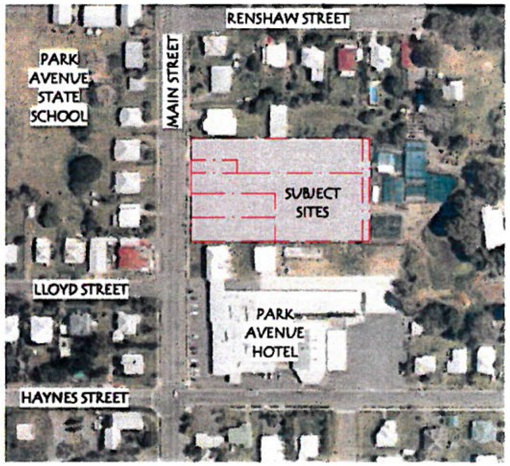
DEVELOPMENT SCHEDULE

EXISTING SITE AREA			6,306m²
No. STOREYS			1
MAXIMUM ALLOWABLE HEIGHT			10.0m or 2 Storeys
			PROPOSED
SITE COVER:			1,956m² (31.05%)
LANDSCAPING			
GARDENS:			401m² (6.36%)
OUTDOOR PLAY AREAS:			412m² (6.53%)
OVERALL:			813m² (12.89%)
DRIVEWAY:			2,826m² (44.81%)
PATHWAYS:			638m² (10.12%)
MISCELLANEOUS AREAS			73m² (1.16%)
AREA BREAKDOWN			
RETAIL TENANCY 1			800m²
RETAIL TENANCY 2			100m²
MEDICAL TENANCY			250m²
CHILDCARE CENTRE			725m²
COVERED VERANDAH			164m²
AMENITIES			84m²
CARPARKING	RATE	REQUIRED	PROVIDED
RETAIL TENANCY	1:25	36	36
MEDICAL TENANCY	1:50	5	5
CHILDCARE - CHILDREN	1:10	8	8
- STAFF	1:1	13	13
TOTAL		62 SPACES	62 SPACES
BICYCLE PARKING - 1 PER. 250m²		8	8

CHILDCARE SCHEDULE

	CHILDREN ACCOMMODATED	STAFF RATIO REQUIRED	INDOOR AREA REQUIRED (3.25m² / CHILD)	INDOOR AREA PROVIDED	OUTDOOR AREA REQUIRED (7m² / CHILD)	OUTDOOR AREA PROVIDED
NURSERY	8	1:4 = 2	26m²	59m²	56m²	78m²
TODDLER	8	1:4 = 2	26m²	54m²	56m²	202m²
JUNIOR KINDY	15	1:5 = 3	48.75m²	54m²	105m²	
SENIOR KINDY	22	1:11 = 2	71.5m²	82m²	154m²	322m²
PREP	22	1:11 = 2	71.5m²	58m²	154m²	
TOTAL	75	13	248.75m²	308m²	525m²	600m²

NOTE: 2 ADDITIONAL STAFF ARE INCLUDED FOR ADMIN DUTIES



LOCALITY PLAN

1 : 1500

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES
CONTRACTOR TO CONFIRM ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK
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PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE
LOCATION
MAIN STREET, ROCKHAMPTON
CLIENT
POWERCAT
TITLE
COVER PAGE / LOCALITY PLAN

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AUGUST 2015	CMB
scale:	**checked:**
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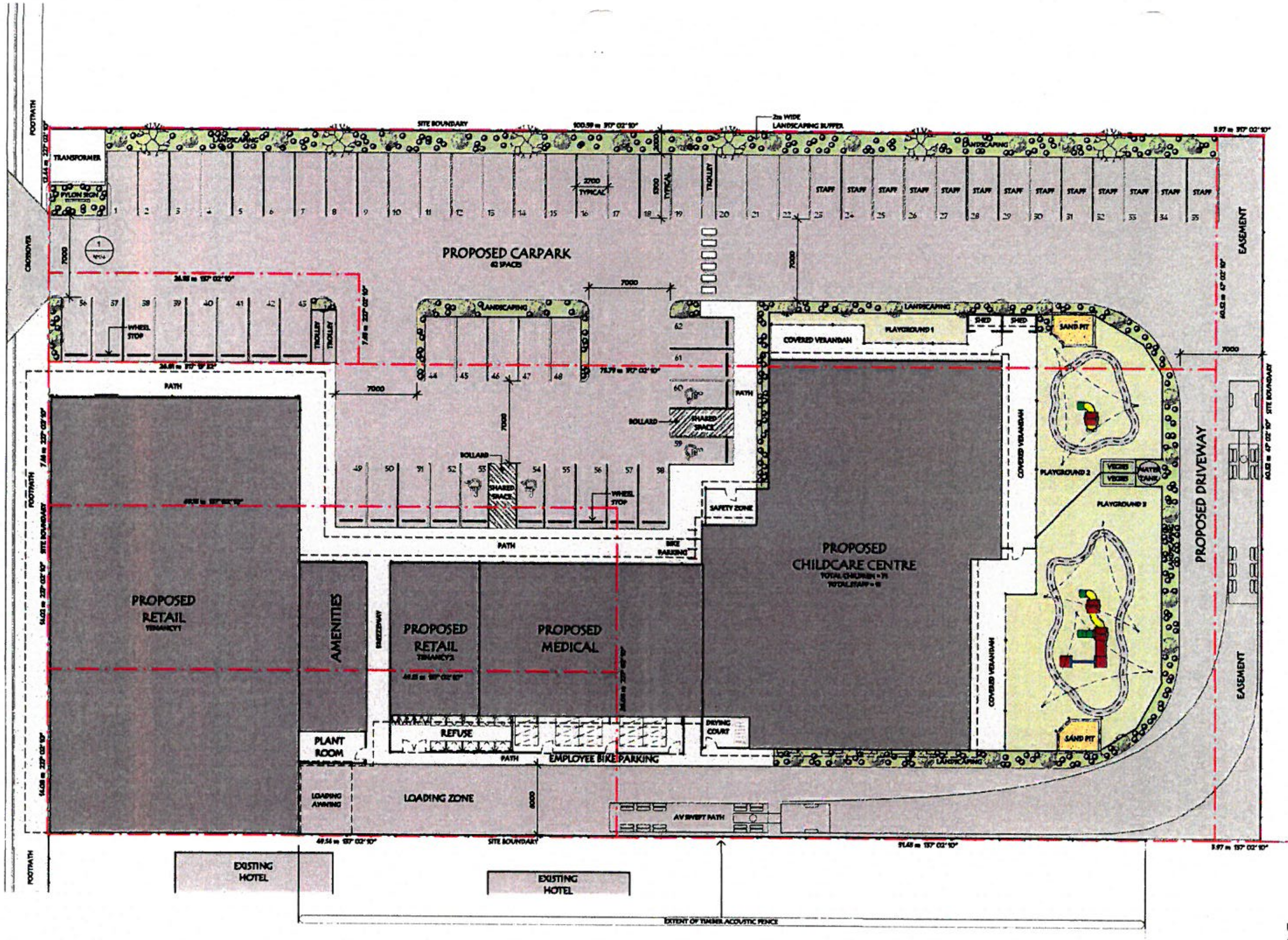
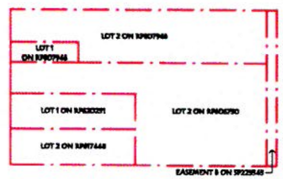
drawing no:	**revision:**
0649 SD150	A



SITE PLAN
1:200



PROPERTY INFORMATION
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A	DA ISSUE		13/10/15

SITE INFORMATION
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ON PLAN: RP607946, RP620251
PARISH: MURCHISON
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AREA: 6,312m²

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PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE
LOCATION
MAIN STREET, ROCKHAMPTON
CLIENT
POWERCAT
TITLE
SITE PLAN

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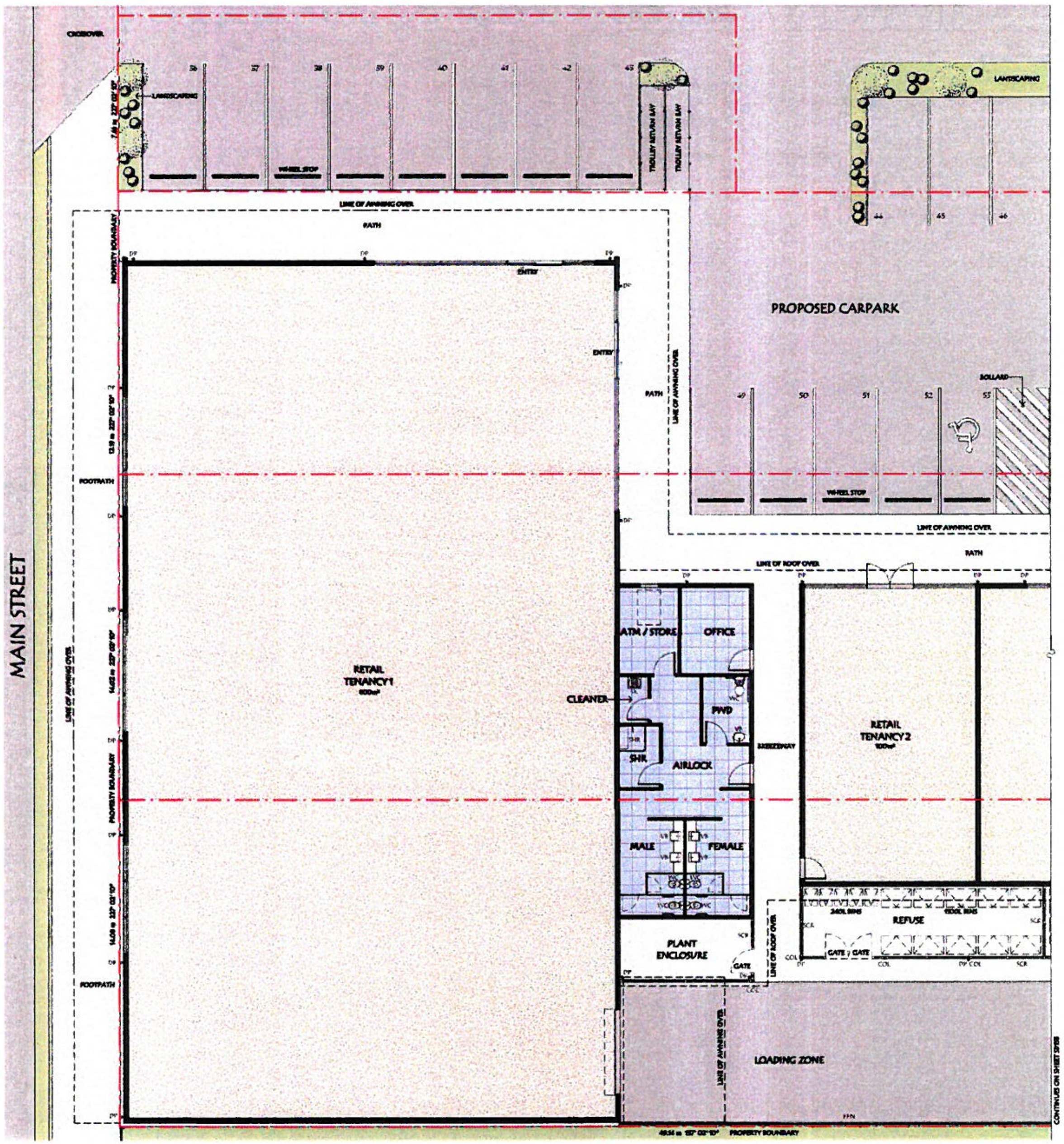

FLOOR PLAN

LAYOUT PLAN - RETAIL 1:100

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 6, 9b

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LEGEND
COL COLUMN
DP DOWNPIPE
FEN FENCE
SCR SCREEN
SHR SHOWER
SK SINK
VB VANITY BASIN
WC WATER CLOSET

PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE
LOCATION
MAIN STREET, ROCKHAMPTON
CLIENT
POWERCAT
TITLE
FLOOR PLAN - RETAIL

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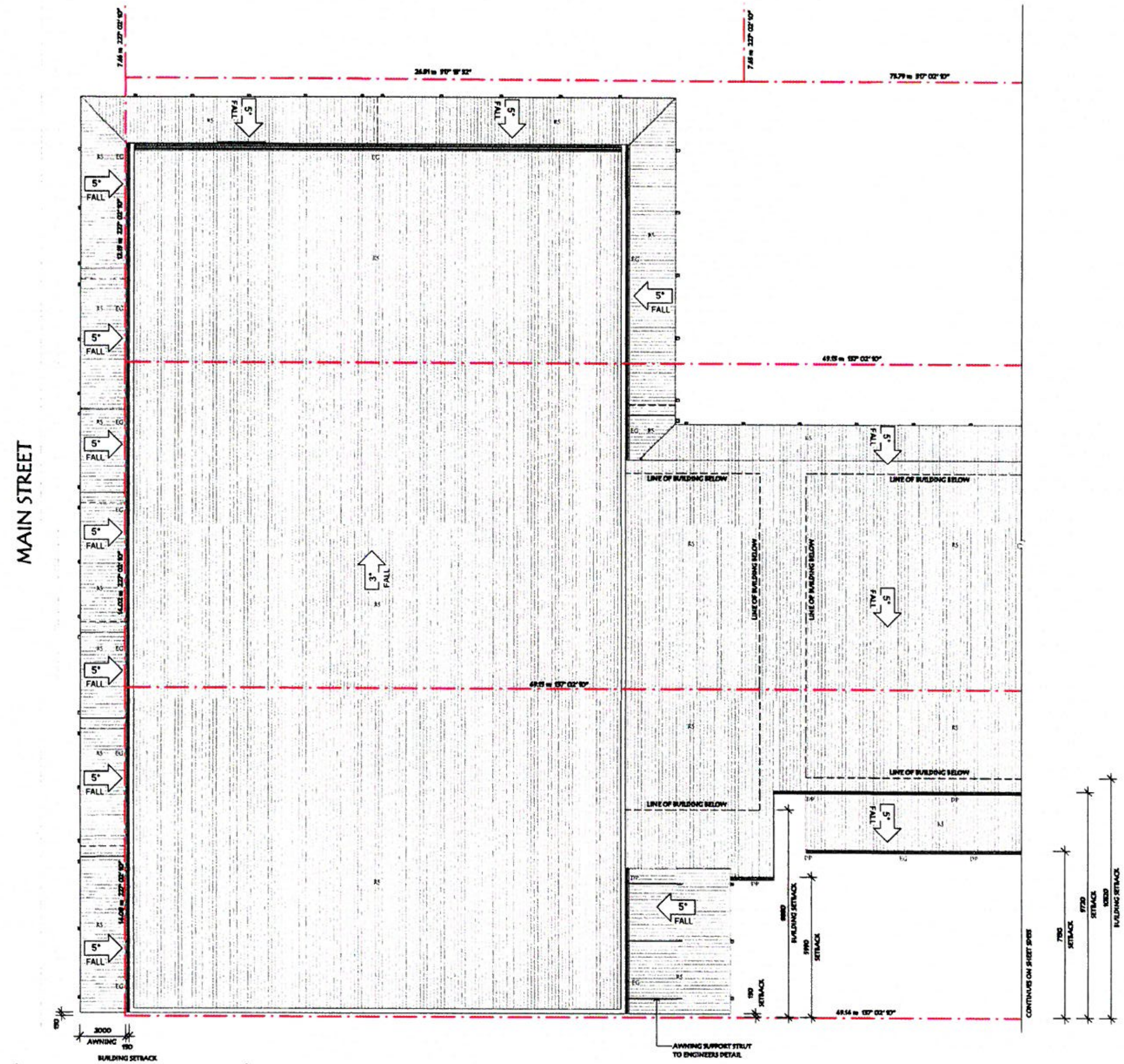
drawing no: 0649 SD152
revision: A



ROOF PLAN
RETAIL 1:100

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 6, 9b

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LEGEND
DP DOWNPIPE
EG EAVES GUTTER
RS ROOF SHEETING

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LOCATION
MAIN STREET, ROCKHAMPTON
CLIENT
POWERCAT
TITLE
ROOF PLAN - RETAIL

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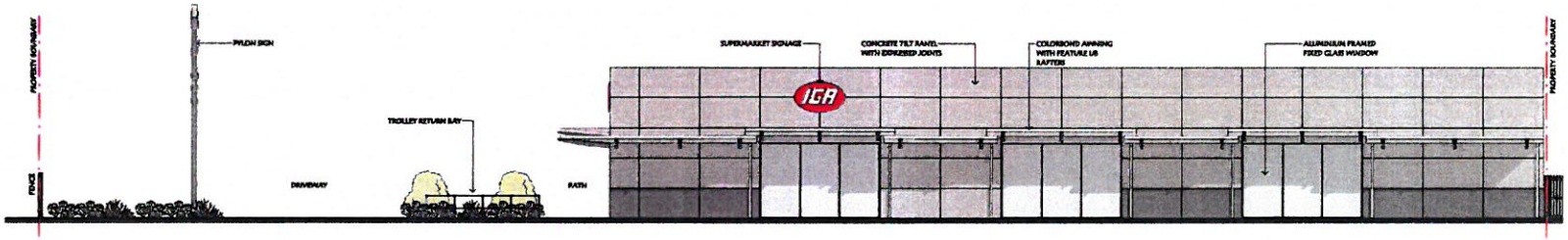
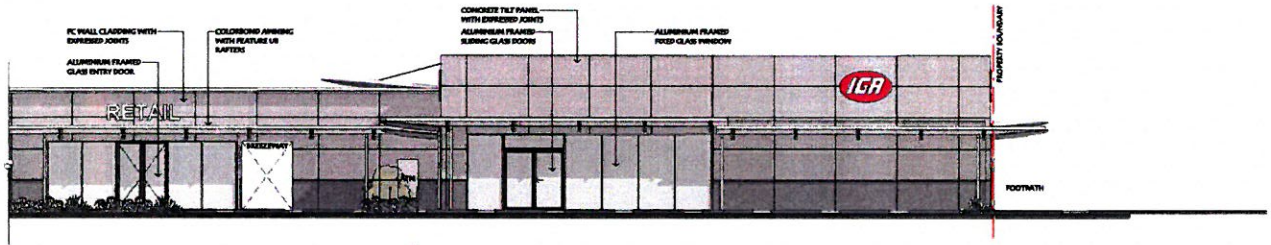


ELEVATION
RETAIL - SOUTH-EAST 1 : 100



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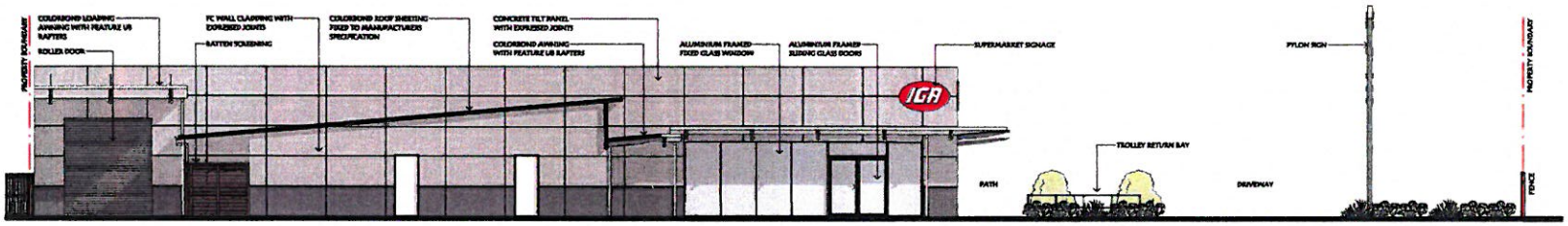

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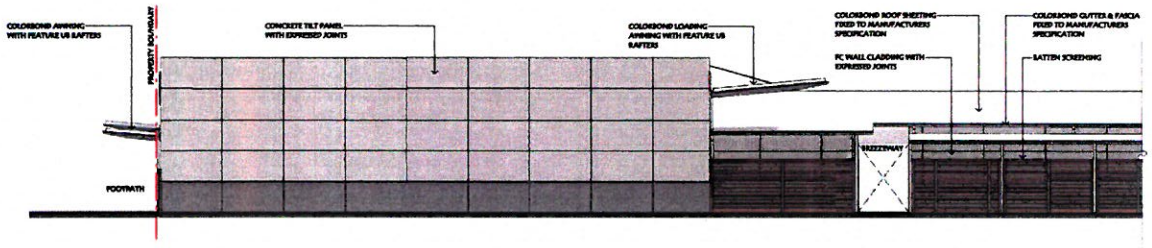

ELEVATION
RETAIL - NORTH-EAST 1 : 100

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
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COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
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POWERCAT
TITLE
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0649 SD157	A

PERSPECTIVE VIEW
RETAIL

PERSPECTIVE VIEW
RETAIL

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PERSPECTIVE VIEWS - RETAIL

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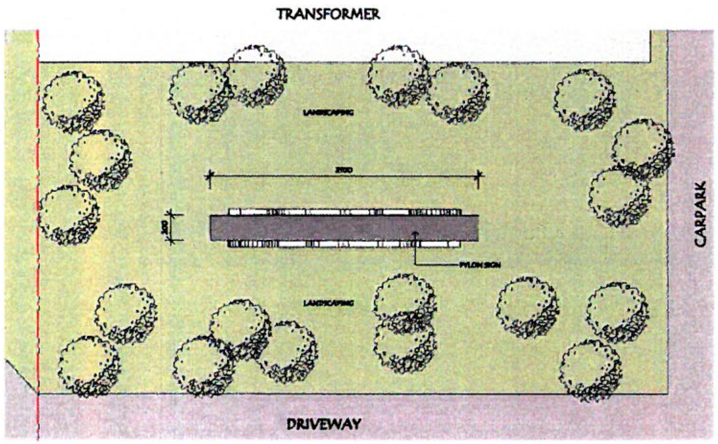
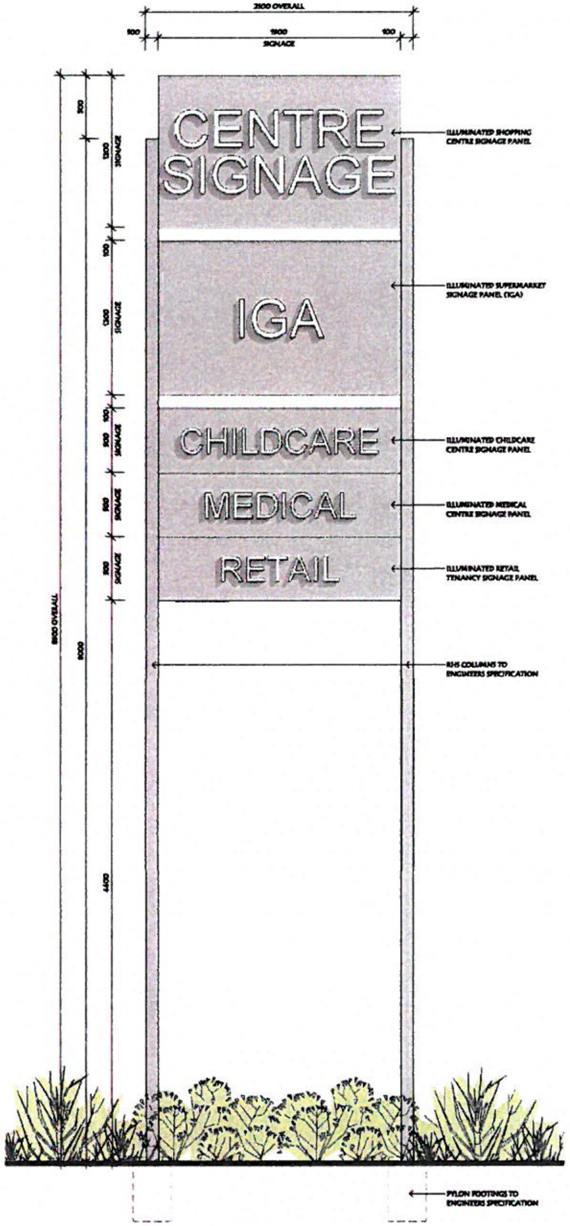


PYLON SIGN DETAIL
LAYOUT PLAN 1:20



ELEVATION
FRONT / REAR 1:20

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
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POWERCAT
TITLE
PYLON SIGN DETAILS

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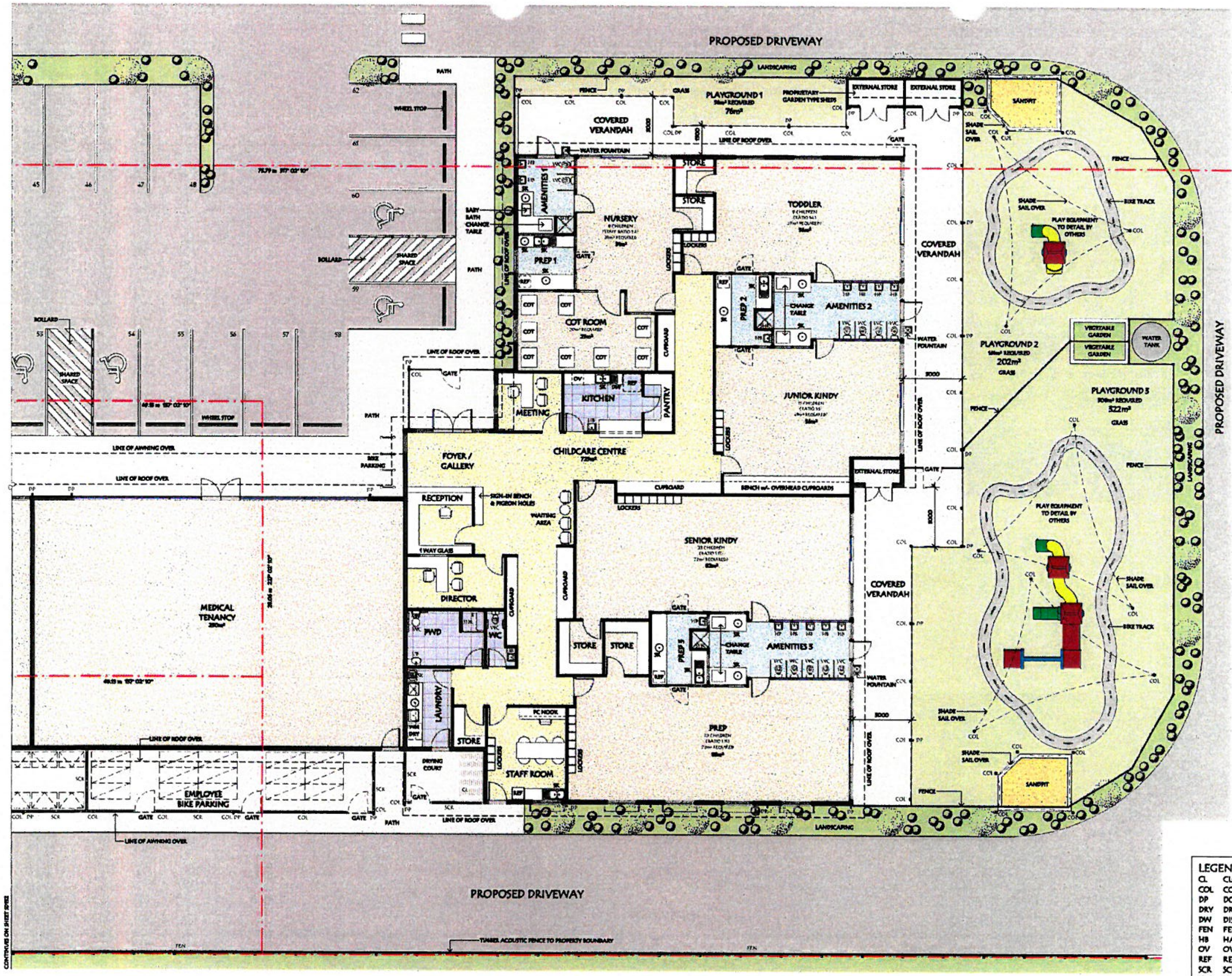

FLOOR PLAN

LAYOUT PLAN – CHILDCARE & MEDICAL 1:100

LEGEND	
CL	CLOTHES LINE
COL	COLUMN
DP	DOWNPIPE
DRY	DRYER
DW	DISH WASHER
FEN	FENCE
HB	HAND BASIN
OV	OVEN
REF	REFRIGERATOR
SCR	SCREEN
SHR	SHOWER
SK	SINK
VB	VANITY BASIN
WC	WATER CLOSET
WM	WASHING MACHINE

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION

LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION

CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES

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PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE

LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
POWERCAT

TITLE
FLOOR PLAN - CHILDCARE & MEDICAL

date:	drawn:
AUGUST 2015	CMB
scale: A1: 1:100 A3: 1:200	checked: BC
drawing no: 0649 SD153	revision: A

PERSPECTIVE VIEW
CHILDCARE & MEDICAL

PERSPECTIVE VIEW
CHILDCARE & MEDICAL

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C

BUILDING CLASSIFICATION: 6, 9b

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PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE

LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
POWERCAT

TITLE
PERSPECTIVE VIEWS - CHILDCARE & MEDICAL

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AUGUST 2015	CMB
scale:	checked:
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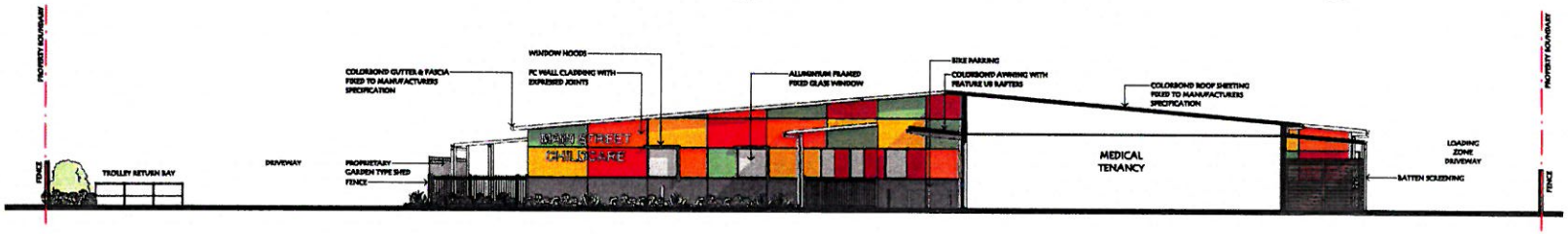
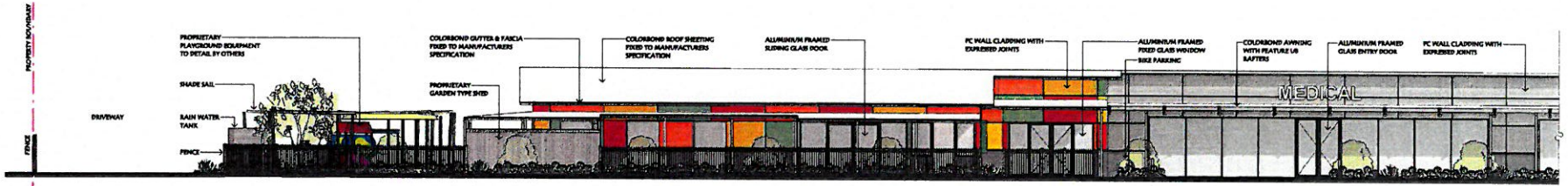
drawing no:	revision:
0649 SD160	A



ELEVATION
CHILDCARE & MEDICAL - SOUTH-EAST 1 : 100



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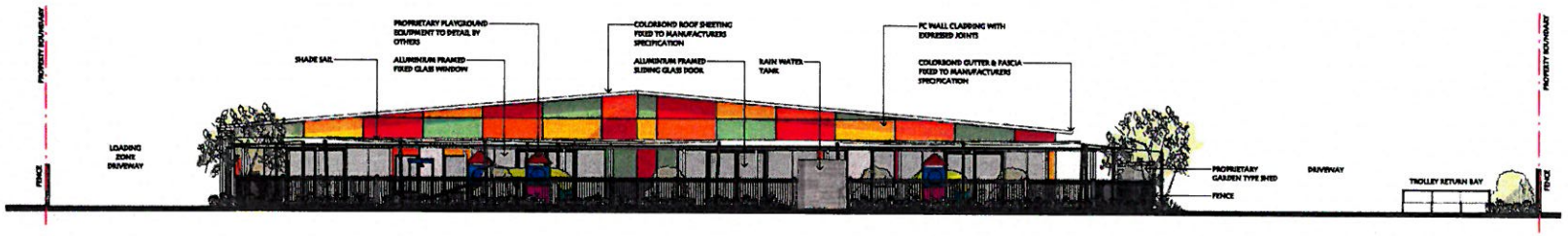

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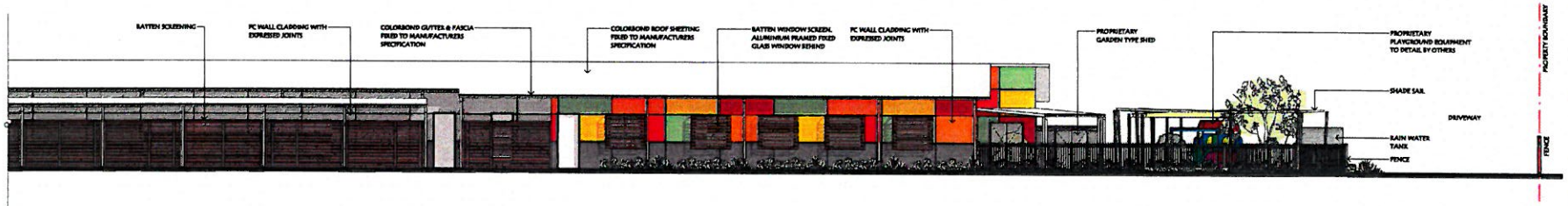

ELEVATION
CHILDCARE & MEDICAL - NORTH-EAST 1 : 100

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Scale 1:200 (m)

1 0 1 2 3
Scale 1:100 (m)

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
BUILDING CLASSIFICATION: 6, 9b

GENERAL NOTES
CONTRACTOR TO CONFIRM ALL DIMENSIONS AND LEVELS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK
DO NOT SCALE OFF DRAWINGS
FIGURED DIMENSIONS TAKE PREFERENCE OVER SCALE READINGS
ALL CONSTRUCTION TO COMPLY WITH THE BUILDING CODE OF AUSTRALIA AND RELEVANT AUSTRALIAN STANDARDS
ALL GLAZING TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS
REFER TO CONSULTING ENGINEERS DRAWINGS FOR ALL CIVIL, STRUCTURAL, MECHANICAL, HYDRAULIC & ELECTRICAL DETAILS

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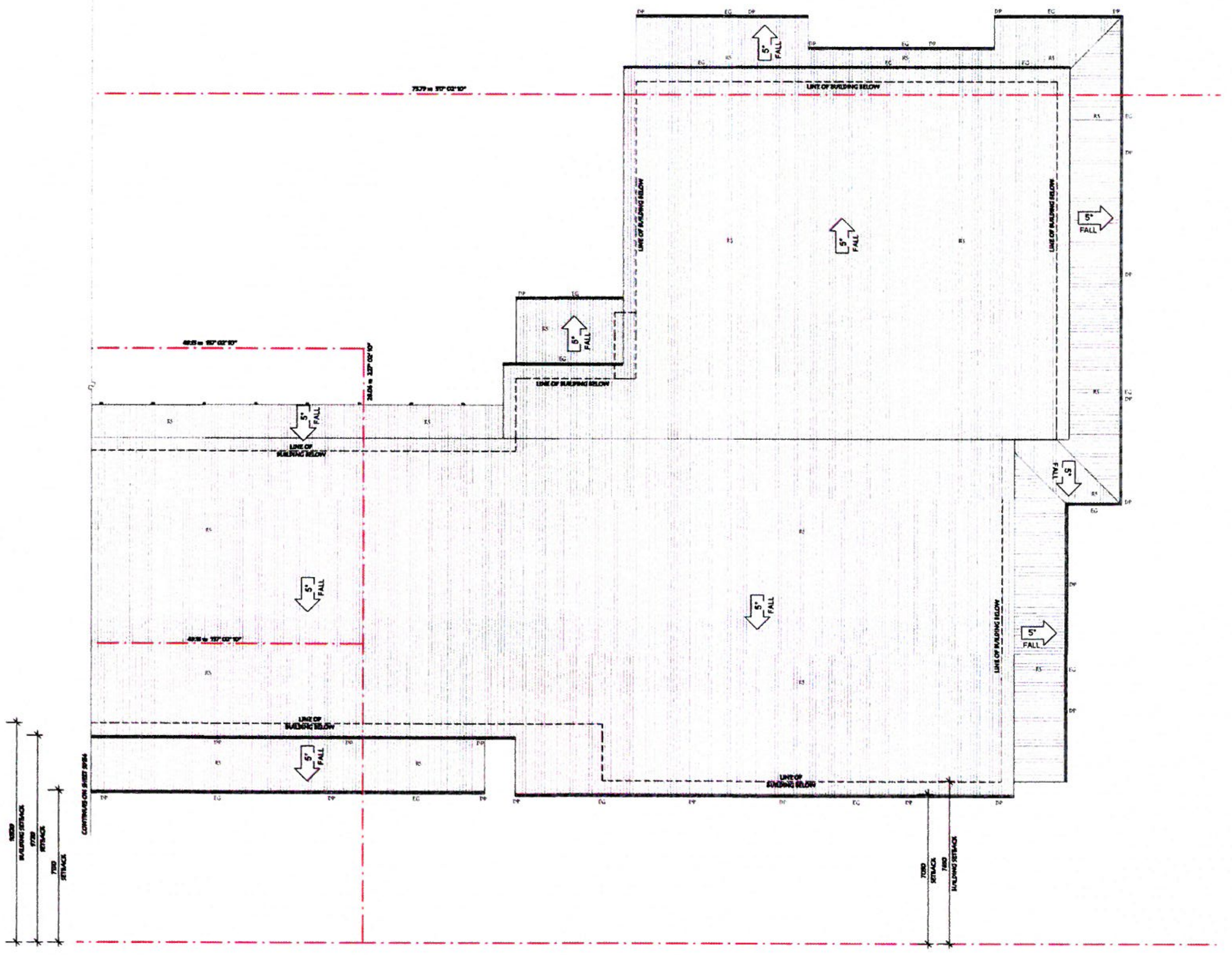
PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE
LOCATION
MAIN STREET, ROCKHAMPTON
CLIENT
POWERCAT
TITLE
ELEVATIONS - CHILDCARE & MEDICAL

date:	drawn:
AUGUST 2015	CMB
scale:	checked:
A1: 1:100 A3: 1:200	BC
drawing no:	revision:
0649 SD158	A



ROOF PLAN
CHILDCARE & MEDICAL 1 : 100

LEGEND
DP DOWNPIPE
EG EAVES GUTTER
RS ROOF SHEETING

ISSUE	DESCRIPTION	DRAWN	DATE
A	DA ISSUE		13/10/15

SITE INFORMATION
LOT: 1 & 2
ON PLAN: RP607946, RP620251
PARISH: MURCHISON
COUNTY: LIVINGSTONE
AREA: 6,312m²

BUILDING INFORMATION
CONSTRUCTION TYPE: C
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PROJECT
PROPOSED RETAIL, MEDICAL & CHILDCARE CENTRE

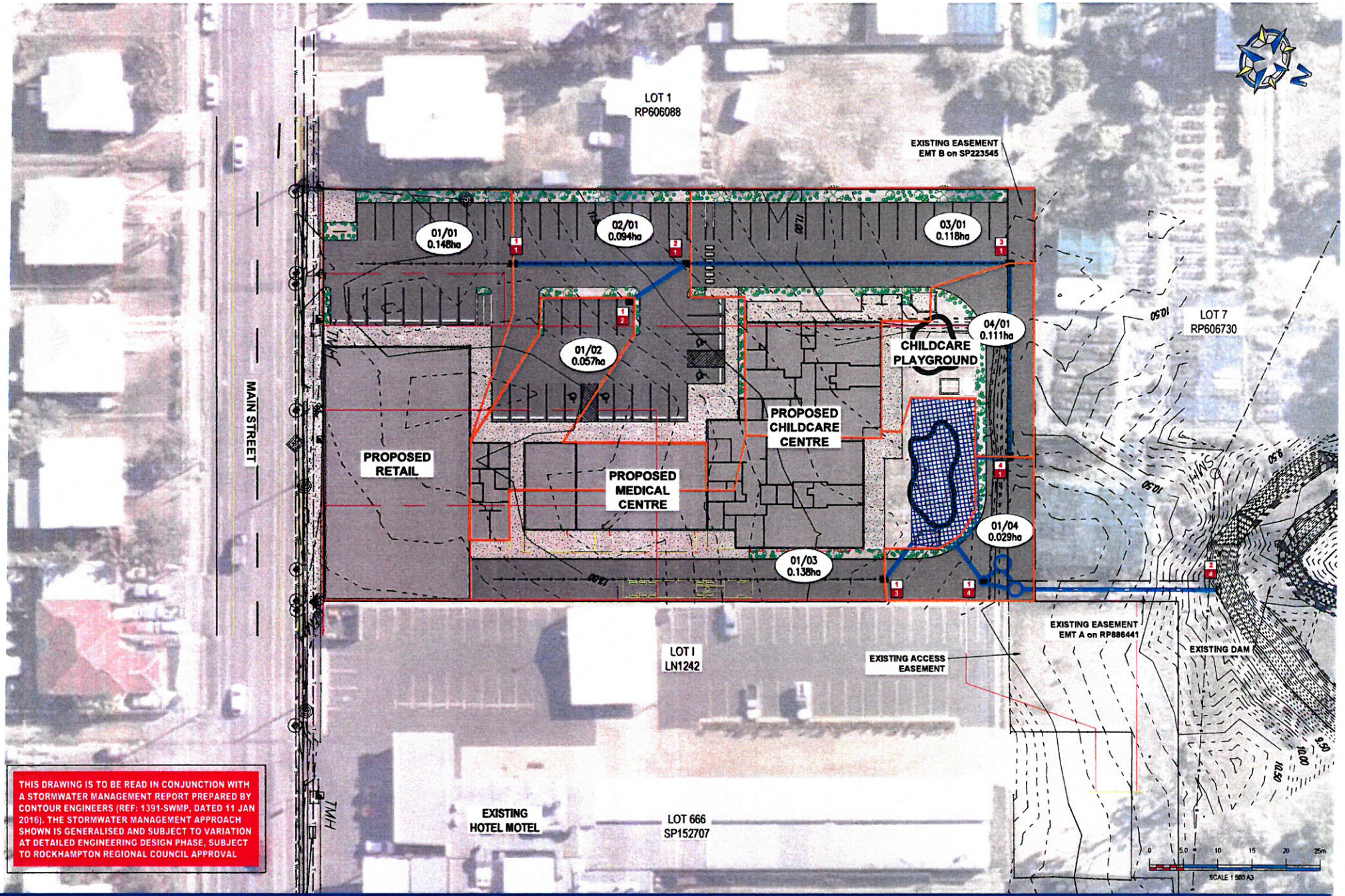
LOCATION
MAIN STREET, ROCKHAMPTON

CLIENT
POWERCAT

TITLE
ROOF PLAN - CHILDCARE

date:	drawn:
AUGUST 2015	CMB
scale: A1: 1:100 A3: 1:200	checked: BC
drawing no: 0649 SD155	revision: A

Appendix B. Contour Stormwater Plan



THIS DRAWING IS TO BE READ IN CONJUNCTION WITH A STORMWATER MANAGEMENT REPORT PREPARED BY CONTOUR ENGINEERS (REF: 1391-SWMP, DATED 11 JAN 2016). THE STORMWATER MANAGEMENT APPROACH SHOWN IS GENERALISED AND SUBJECT TO VARIATION AT DETAILED ENGINEERING DESIGN PHASE, SUBJECT TO ROCKHAMPTON REGIONAL COUNCIL APPROVAL

CONTOUR
Consulting Engineers
A.B.N. 62 117 061 659
PO Box 474, Buddina 4575, Qld
6 Innovation Parkway, Kawana Waters 4575, Qld
Ph. (07) 5493 9777 Fax (07) 5493 6866
Website: www.ContourCE.com.au

PLAN DETAILS:

Designed:	ARC
Drawn:	ARC
Checked:	CDF
Datum:	AHD
Date:	2016

Director: BRETT THOMSON (RPEQ 6058)
(FOR & ON BEHALF OF CONTOUR CE PTY LTD)

PLAN AMENDMENTS:

Rev	Date	Comment	Altered	Checked

RETAIL, MEDICAL & CHILDCARE CENTRE
28 MAIN STREET, PARK AVENUE
FOR POWERCAT

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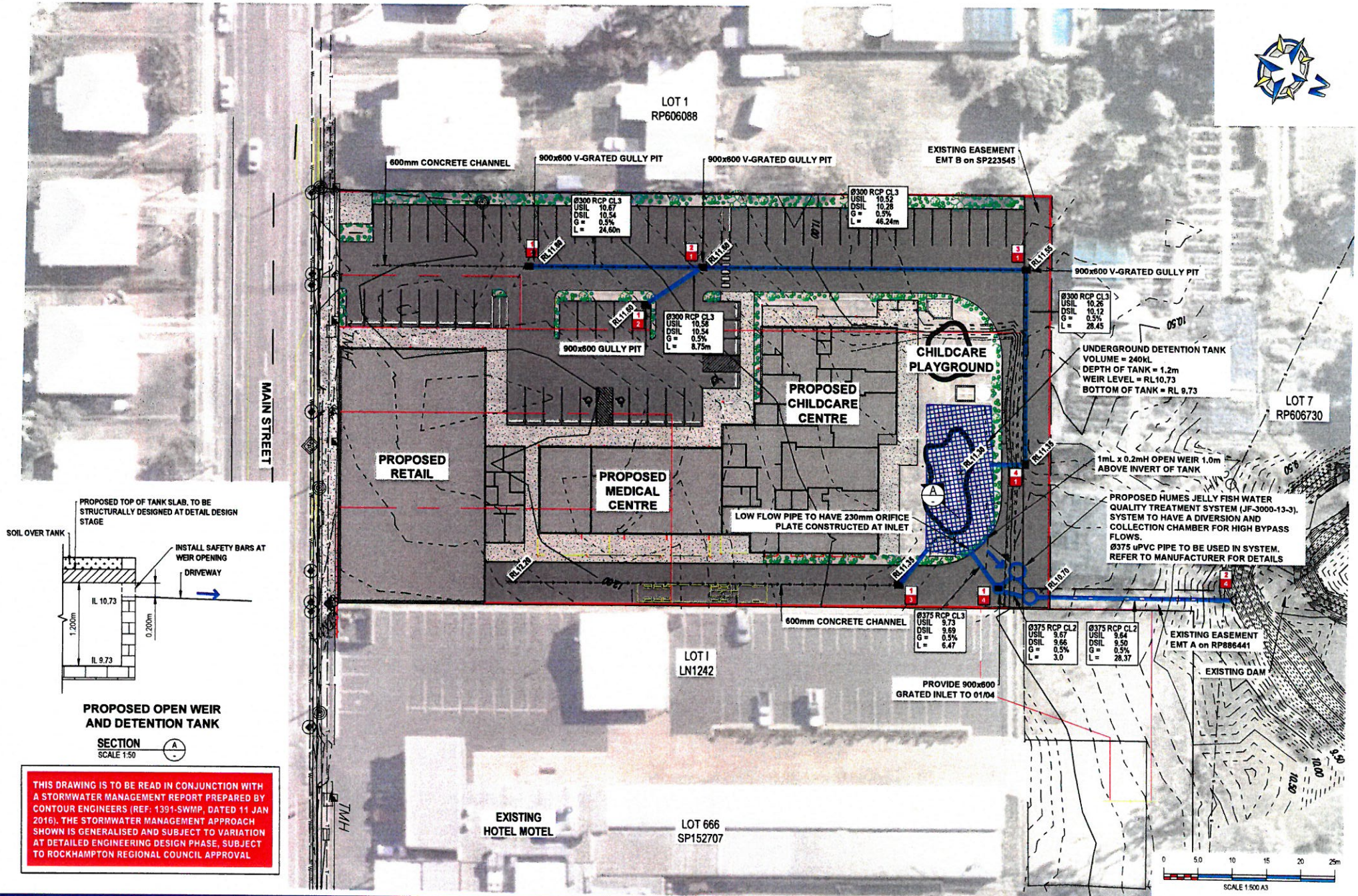
PLAN TITLE:

STORMWATER MANAGEMENT PLAN
SITE CATCHMENT PLAN

NOT FOR CONSTRUCTION

PLAN No: 1391-SW2 REVISION: 1 SHEET: 1 OF 1

FILE LOCATION: J:\CEN\1391 28 MAIN STREET, ROCKHAMPTON\DESIGN - CIVIL\ACAD\1391-SW1.DWG



PROPOSED OPEN WEIR AND DETENTION TANK

SECTION A
SCALE 1:50

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH A STORMWATER MANAGEMENT REPORT PREPARED BY CONTOUR ENGINEERS (REF: 1391-SWMP, DATED 11 JAN 2016). THE STORMWATER MANAGEMENT APPROACH SHOWN IS GENERALISED AND SUBJECT TO VARIATION AT DETAILED ENGINEERING DESIGN PHASE, SUBJECT TO ROCKHAMPTON REGIONAL COUNCIL APPROVAL

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PLAN DETAILS:

Designed:	ARC
Drawn:	ARC
Checked:	CDF
Datum:	AHD
Date:	2016

Director BRETT THOMSON (RPEQ 6068) FOR & ON BEHALF OF CONTOUR CE PTY LTD

PLAN AMENDMENTS:

Rev	Date	Comment	Altered	Checked

RETAIL, MEDICAL & CHILDCARE CENTRE 28 MAIN STREET, PARK AVENUE FOR POWERCAT

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PLAN TITLE:

STORMWATER MANAGEMENT PLAN
STORMWATER LAYOUT

NOT FOR CONSTRUCTION

PLAN No: 1391-SW1 REVISION: 1 SHEET: 1 OF 1

FILE LOCATION: J:\CIVIL\1391 28 MAIN STREET, ROCKHAMPTON\DESIGN - CIVIL\CAD\1391-SW1.DWG

Appendix C. State Planning Policy – Water Quality

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Plan to avoid/minimise new impacts		
PO1 The development is planned and designed considering the land use constraints of the site for achieving stormwater design objectives.	**AO1.1** A site stormwater quality management plan (SQMP) is prepared, and: a. is consistent with any local area stormwater management planning, and b. provides for achievable stormwater quality treatment measures meeting design objectives listed below in Table A (construction phase) and Table B (post construction phase), or current best practice environmental management, reflecting land use constraints, such as: • erosive, dispersive and/or saline soil types • landscape features (including landform) • acid sulfate soil and management of nutrients of concern • rainfall erosivity.	WQO are met by incorporating treatment device into the proposed development
PO2 Development does not discharge wastewater to a waterway or off site unless demonstrated to be best practice environmental management for that site.	**AO2.1** A wastewater management plan (WWMP) is prepared by a suitably qualified person and addresses: a. wastewater type, and b. climatic conditions, and c. water quality objectives (WQOs), and d. best-practice environmental management, and **AO2.2** The WWMP provides that wastewater is managed in accordance with a waste management hierarchy that: a. avoids wastewater discharges to waterways, or b. if wastewater discharge to waterways cannot practicably be avoided, minimises wastewater discharge to waterways by re-use, recycling, recovery and treatment for disposal to sewer, surface water and groundwater.	N/A N/A
PO3 Any non-tidal artificial waterway is located in a way that is compatible with the land use constraints of the site for protecting water environmental values in existing natural waterways.	**AO3.1** If the proposed development involves a non-tidal artificial waterway: a. environmental values in downstream waterways are protected, and b. any groundwater recharge areas are not affected, and c. the location of the waterway incorporates low lying areas of a catchment connected to an existing waterway, and d. existing areas of ponded water are included, and	N/A

	AO3.2 Non-tidal artificial waterways are located: a. outside natural wetlands and any associated buffer areas, and b. to minimise disturbing soils or sediments, and c. to avoid altering the natural hydrologic regime in acid sulfate soil and nutrient hazardous areas.	N/A
PO4 Any non-tidal artificial waterway is located in a way that is compatible with existing tidal waterways.	**AO4.1** Where a non-tidal artificial waterway is located adjacent to, or is 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 >0.3 m, 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.	N/A
Design to avoid/minimise new impacts		
PO5 Any non-tidal artificial waterway is not designed only for stormwater flow management or stormwater quality management.	**AO5.1** Any non-tidal artificial waterway is designed and managed for any of the following end-use purposes: a. amenity including aesthetics, landscaping and recreation, or b. flood management, or c. stormwater harvesting as part of an integrated water cycle management plan, or d. aquatic habitat, and **AO5.2** The end-use purpose of any non-tidal artificial waterway is designed and operated in a way that protects water environmental values.	N/A N/A

PO6 Construction activities for the development avoid or minimise adverse impacts on stormwater quality.	**AO6.1** An erosion and sediment control plan (ESCP) demonstrates that release of sediment-laden stormwater is avoided for the nominated design storm, and minimised when the nominated design storm is exceeded, by addressing design objectives listed below in Table A (construction phase) or local equivalent, for: a. drainage control, and b. erosion control, and c. sediment control, and d. water quality outcomes, and	An erosion and sediment control plan (ESCP) will be prepared as part of a future detailed design phases.
	AO6.2 Erosion and sediment control practices (including any proprietary erosion and sediment control products) are designed, installed, constructed, operated, monitored and maintained, and any other erosion and sediment control practices are carried out in accordance with local conditions and appropriate recommendations from a suitably qualified person, or	N/A
	AO6.3 The ESCP demonstrates how stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to Acceptable Outcome AO6.1.	N/A
PO7 Operational activities for the development avoid or minimises changes to waterway hydrology from adverse impacts of altered stormwater quality and flow.	**AO7.1** Development incorporates stormwater flow control measures to achieve the design objectives set out below in Table A (construction phase) and Table B (post construction phase). Both the construction and operational phases for the development comply with design objectives in Table A (construction phase), and Table B (post construction phase), or current best practice environmental management, including management of frequent flows, peak flows, and construction phase hydrological impacts.	An erosion and sediment control plan (ESCP) and detail design, will be prepared as part of a future detailed design phases.
PO8 Any treatment and disposal of waste water to a waterway accounts for: • the applicable water quality objectives for the receiving waters, and • adverse impact on ecosystem health or receiving waters,	**AO8.1** See AO2.1	N/A

and • in waters mapped as being of high ecological value, the adverse impacts of such releases and their offset.		
PO9 Wastewater discharge to a non-tidal artificial waterway is managed in a way that maintains ecological processes, riparian vegetation, waterway integrity, and downstream ecosystem health.	**AO9.1** Wastewater discharge to non-tidal artificial waterways is managed to avoid or minimise the release of nutrients of concern so as to minimise the occurrence, frequency and intensity of coastal algal blooms, and **AO9.2** Development in coastal catchments avoids or minimises and appropriately manages soil disturbance or altering natural hydrology, and *Editor's note: Compliance with this outcome may be demonstrated by following the management advice in the guideline: Implementing Policies and Plans for Managing Nutrients of Concern for Coastal Algal Blooms in Queensland by the Department of Environment and Heritage Protection.* **AO9.3** Development in coastal catchments: a. avoids lowering groundwater levels where potential or actual acid sulfate soils are present, and b. manages wastewaters so that: (i) the pH of any wastewater discharged is maintained between 6.5 and 8.5 to avoid mobilisation of acid, iron, aluminium, and metals, and (ii) holding times of neutralised wastewaters ensures the flocculation and removal of any dissolved iron prior to release, and (iii) visible iron floc is not present in any discharge, and (iv) precipitated iron floc is contained and disposed of, and (v) wastewater and precipitates that cannot be contained and treated for discharge on site are removed and disposed of through trade waste or another lawful method.	N/A N/A N/A

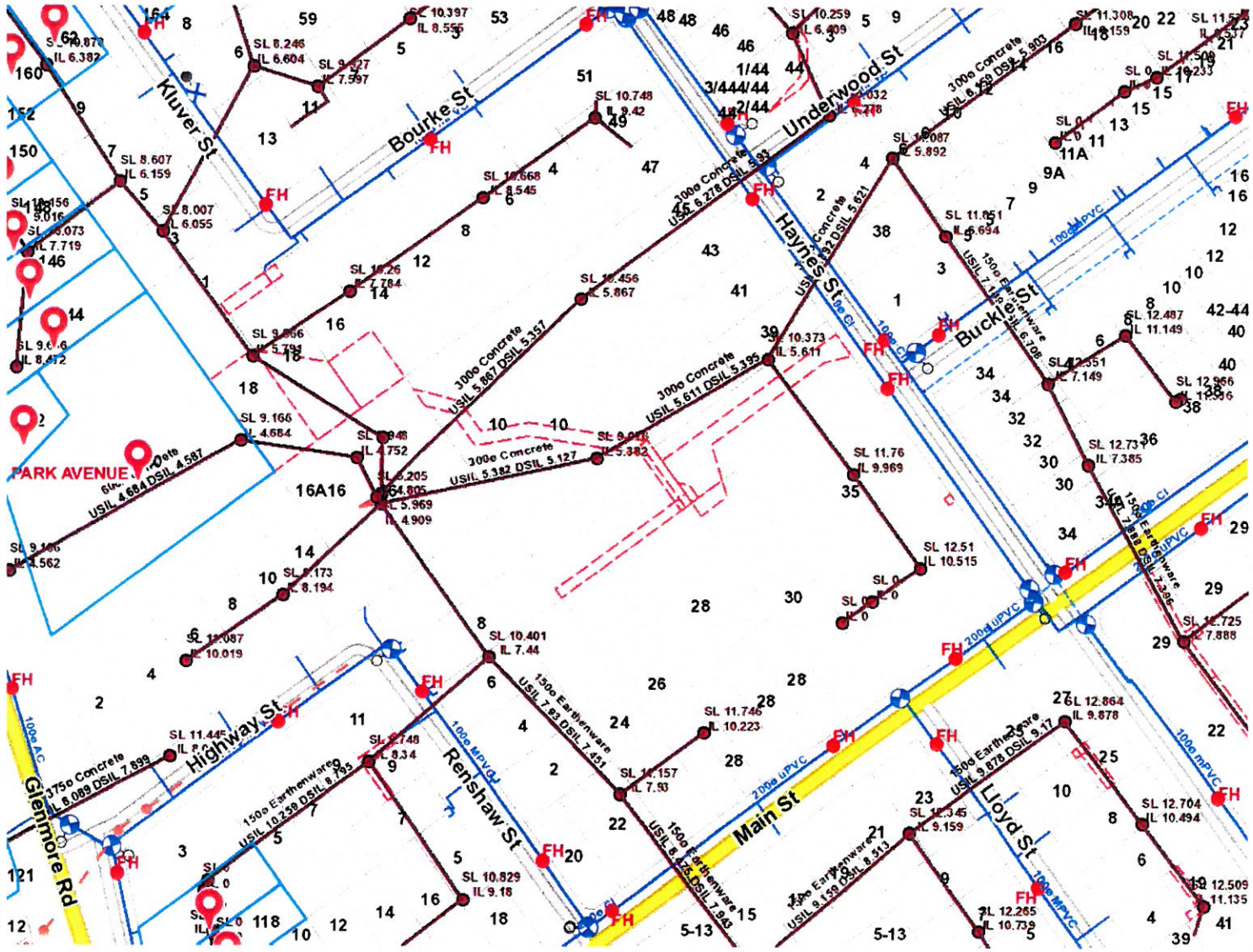
PO10 Any non-tidal artificial waterway is managed and operated by suitably qualified persons to achieve water quality objectives in natural waterways.	**AO10.1** Any non-tidal artificial waterway is designed, constructed and managed under the responsibility of a suitably qualified registered professional engineer, Queensland (RPEQ) with specific experience in establishing and managing artificial waterways, and **AO10.2** Monitoring and maintenance programs adaptively manage water quality in any non-tidal artificial waterway to achieve relevant water-quality objectives downstream of the waterway, and **AO10.3** Aquatic weeds are managed in any non-tidal artificial waterway to achieve a low percentage of coverage of the water surface area (less than 10%). Pests and vectors (such as mosquitoes) are managed through avoiding stagnant water areas, providing for native fish predators, and any other best practices for monitoring and treating pests, and **AO10.4** Any non-tidal artificial waterway is managed and operated by a responsible entity under agreement for the life of the waterway. The responsible entity is to implement a deed of agreement for the management and operation of the waterway that: a. identifies the waterway, and b. states a period of responsibility for the entity, and c. states a process for any transfer of responsibility for the waterway, and d. states required actions under the agreement for monitoring the water quality of the waterway and receiving waters, and e. states required actions under the agreement for maintaining the waterway to achieve the outcomes of this code and any relevant conditions of a development approval, and f. identifies funding sources for the above, including bonds, headworks charges or levies.	N/A N/A N/A, N/A

Appendix D. Dial Before You Dig

DBYD Number: 10121092

Sequence Number: 50058694

Glenmore Road Park Avenue QLD 4701



DBYD - RRC Sewer and Water Infrastructure Services

Legend - Water and Private Water

Legend - Sewer and Private Sewer

NOTE: Dial Before You Dig maps DO NOT contain stormwater infrastructure.

If you require a map showing stormwater data, please email GIS@rrc.qld.gov.au and request an Enchanced Feature Map for stormwater.

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A4 Page scale at 1: 2,218.68

GDA_1994_MGA_Zone_56

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Rockhampton Regional Council

Appendix E. Council Stormwater Management Code

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section A — If for a material change of use, reconfiguring a lot, operational work or building work		
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; and (c) maximise the use of water sensitive urban design principles. Editor's note—A site-based 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 SC6.19 — Stormwater management planning scheme policy, Queensland Urban Drainage Manual, Capricorn Municipal Design Guidelines and Australian Rainfall and Runoff. AND AO1.2 Development ensures that the location of the stormwater drainage system is contained within a road reserve, drainage easement, public reserve, public pathway, park or waterway corridor. AND AO1.3 Stormwater is conveyed to a lawful point of discharge in accordance with the Queensland Urban Drainage Manual. AND AO1.4 Development minimises large impervious areas and maximises opportunities for capture and reuse.	Detailed Stormwater design generally complies with QUDM, AR&R along with Capricorn Municipal Design Guidelines N/A private infrastructure Complies, Stormwater is discharged to a legal point of discharge. Refer to report for details Design optimises opportunities to capture all runoff and discharge in a non-worsening matter.
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;	AO2.1 Development provides a stormwater conveyance system which is designed to safely convey flows associated with all internal and external contributing catchment(s).	Preliminary Stormwater infrastructure is shown on Contour Plans. Detailed design stages will confirm the capacity of the conveyance systems.

(b) maximises the use of natural waterway corridors and natural channel design principles; and (c) efficiently integrates with existing stormwater treatments upstream and downstream.		
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; (c) minimise ecological impacts to creeks and waterways; and (d) 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 Queensland Urban Drainage Manual, Capricorn Municipal Design 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.	Onsite detention and water quality measures are located at just prior to the legal point of discharge for the site. These are in the form of an Underground Detention tank and a Humes JellyFish treatment device. Detention tanks for Stormwater have been designed to generally comply with QUDM Section 5 along with AR&R and Capricorn Municipal Design Guidelines Stormwater Quality has been designed in accordance with the Water by Design- MUSIC Modelling Guidelines as set out in the State Planning Policy- Water Quality

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section A — If for a material change of use, reconfiguring a lot, operational work or building work		
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	AO4.1 Development ensures natural waterway corridors and drainage paths are retained. AND AO4.2	No Natural waterways or paths have been altered with in the proposed development. NA no natural channels are

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.	Development incorporates the use of natural channel design principles in constructed components to maximise environmental benefits and waterway stability. AND AO4.3 Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in compliance with the Queensland Urban Drainage Manual, Capricorn Municipal Design Guidelines and Australian Rainfall and Runoff.	proposed. Development features a detention basin which reduces the flow rate at the outlet of the stromwater. This minimises scour in accordance with QUDM, AR&R along with Capricorn Muncipal Design Guidelines
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.	Development protects the environmental and water quality values by filtering out TSS, TP & TN which helps to protect the surrounding waterways.

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section A — If for a material change of use, reconfiguring a lot, operational work or building work		
Stormwater flowpath tenure		
PO6 All overland stormwater flow paths are maintained under tenure arrangements that facilitate efficient infrastructure and enhance environmental sustainability.	No acceptable outcome is nominated.	All overland flow paths are maintained under tenure agreements as a part of this development. In line with previous approvals.

Editor's note—As a guide, Council prefers easements over an overland stormwater flow path where it is reasonable to assume that the property owner will maintain the area in a manner that is consistent with the balance of the parent lot. For overland stormwater flow paths where it would not be reasonable, or it would be impractical for the property owner to maintain the area of the easement consistent with the surrounding lot(s), Council prefers the area of the flow path to be dedicated as freehold tenure in favour of Council.		

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section A — If for a material change of use, reconfiguring a lot, operational work or building work		
Efficiency and whole of life cycle cost		
PO7 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.	The proposed development ensures there is adequate space on site to incorporate an effective Stormwater management plan that generally complies with requirements set out in QUDM.
PO8 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	No acceptable outcome is nominated.	The proposed development provides an orderly plan of the storm water infrastructure which deals with infrastructure upgrades, safe management of discharge and implications for adjacent development

from existing and future upslope development; and (c) implications for adjacent and down-slope development.		
PO9 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.	The development Stormwater uses a cost effective JellyFish which can be cleaned efficiently along with fit for purpose infrastructure

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section A — If for a material change of use, reconfiguring a lot, operational work or building work		
Erosion and sediment control		
PO10 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	AO10.1 Water sensitive urban design and erosion and sediment control measures are implemented in accordance with the State Planning Policy - Guideline - Water Quality. AO10.2 Unnecessary disturbance to soil, waterways or drainage channels is avoided and all soil surfaces remain effectively stabilised against erosion during construction and in the long-term. AO10.3 Erosion and sediment control plans and measures are implemented during land disturbing activities to achieve the protection of environmental values of waters and the function of stormwater infrastructure.	WSUD and Erosion control measures are implement in accordance with State Planning Policy- Water Quality Un necessary disturbance to soil, waterways and drainage has been avoided in the proposed development along with erosion and sediment control procedures to be incorporated in the detailed design stage. Erosion and sediment control procedures will protect the environmental values of waters and function of the Stormwater infrastructure

and serviceability of stormwater infrastructure.		

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section B — Additional criteria which apply to: (a) material change of use for an urban purpose which involves greater than 2500 square metres of land or six (6) or more dwellings: (b) reconfiguring a lot for an urban purpose which: (i) would result in six (6) or more residential lots: or (ii) provides for six (6) or more dwellings: or (iii) involves greater than 2,500 swuare metres of land and results in an increased number of lots: and (c) operational work for an urban purpose which involves disturbing greater that 2,500 square metres of land.		
Water Quality		
PO11 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. AO11.1 Development complies with the provisions of the State Planning Policy - Guideline - Water Quality.	AO11.1 Development complies with the provisions of the State Planning Policy - Guideline - Water Quality. AO11.2 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 fencing and water troughs installed on the land to prevent encroachment of animals within 100 metres of the full supply height above the barrage	Proposed development complies with provisions of State Planning Policy- Guideline- Water Quality

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section B — Additional criteria which apply to: (a) material change of use for an urban purpose which involves greater than 2500 square metres of land or six (6) or more dwellings: (b) reconfiguring a lot for an urban purpose which: (i) would result in six (6) or more residential lots: or (ii) provides for six (6) or more dwellings: or (iii) involves greater than 2,500 swuare metres of land and results in an increased number of lots: and (c) operational work for an urban purpose which involves disturbing greater that 2,500 square metres of land.		
Protecting Water Quality		
PO12 The development is compatible with the land use constraints of the site for; (a) achieving stormwater design objectives; and avoiding or minimising the entry of contaminants into, and transport of contaminants in stormwater.	AO12.1 Development is undertaken in accordance with a site based stormwater management plan that: (a) is consistent with the State Planning Policy - Guideline - Water Quality; (b) 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 (c) accounts for development type, construction phase, local landscape, climatic conditions and design objectives. Editor's note—SC6.19 — Stormwater management planning scheme policy provides guidance on preparing a stormwater quality management plan.	The proposed development ensures there is an effective Stormwater management plan that generally complies with requirements set out in the State Planning Policy and provides achievable quality treatment measures.
PO13 Construction activities for the development avoid or minimise adverse impacts on stormwater quality.	AO13.1 Development is undertaken in accordance with a site based erosion and sediment control plan that demonstrates the release of sediment laden stormwater is avoided for the nominated design storm, and minimised when the nominated design storm is exceeded. AND AO13.2	Development will be taken out in accordance with measures set out in the Erosion and Sediment Control practices

	Erosion and sediment control practices, including any proprietary erosion and sediment control products, are designed, installed, constructed, operated, monitored and maintained, and any other erosion and sediment control practices are carried out, in accordance with local conditions and appropriate recommendations.	Erosion and Sediment control procedures to be followed to standard
PO14 Construction and operation activities for the development avoid or minimise changes to waterway hydrology from adverse impacts of altered stormwater quality and flow.	AO14.1 Development incorporates stormwater flow control measures to achieve at least the design objectives set out in the State Planning Policy - Guideline - Water Quality. AND AO14.2 Both the construction and operational phases for the development comply with the advice and design objectives in the State Planning Policy - Guideline - Water Quality including management of frequent flows, peak flows and construction phase hydrological impacts.	Develpoment incorporates a detention basin to control flow. Construction Phases to comply with the State Planning Policy

Performance Outcomes (PO)	Acceptable Outcomes (AO)	Response
Section B — Additional criteria which apply to: (a) material change of use for an urban purpose which involves greater than 2500 square metres of land or six (6) or more dwellings: (b) reconfiguring a lot for an urban purpose which: (i) would result in six (6) or more residential lots: or (ii) provides for six (6) or more dwellings: or (iii) involves greater than 2,500 swuare metres of land and results in an increased number of lots: and (c) operational work for an urban purpose which involves disturbing greater that 2,500 square metres of land.		
Protecting Water Quality in existing natural waterways		
PO15 The waterway is not designed only for stormwater flow management or stormwater quality management.	AO15.1 The waterway is designed and managed for any of the following end use purposes: (a) amenity including aesthetics,	Waterway is not disturbed as a non-worsening flow has been achieved

	landscaping and recreation; (b) flood management; (c) stormwater harvesting as part of an integrated water cycle management plan; (d) as a sustainable aquatic habitat; and the protection of water environmental values.	
PO16 The waterway is located in a way that is compatible with existing tidal waterways.	AO16.1 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 there is no introduction of salt water into freshwater environments.	N/A
PO17 The construction phase for the waterway is compatible with protecting water environmental values in existing natural waterways.	AO17.1 Erosion and sediment control measures are incorporated during construction to achieve design objectives set out in Chapter 4 of the State Planning Policy - Guideline - Water.	N/A
PO18 Stormwater overflows from the waterway do not result in lower water quality objectives in existing natural waterways.	AO18.1 Stormwater run-off that may enter the non-tidal waterway is pre-treated in accordance with the guideline design objectives, water quality objectives of local waterways, and any relevant local area stormwater management plan.	N/A