

AREA SCHEDULE

SITE COVER: **36.10%** 903 m² SITE AREA: 2503 m²

GBA CHILDCARE: GROUND LEVEL

OUTDOOR STORE: 18 m² VERANDAHS: 116.23 m²

SERVICES COURTYARD:

18.8m²

693.1 m²

AREA PER PLACE:

BUILD + O.STORE: (711.1m²) 7.5 m^2

BUILD + O.STORE + VERANDAH: (827.3m²) 8.8 m^2

PLAY AREAS:

GROUND LEVEL (INC. VERANDAHS)

749.92m²

CARPARK: 721.15m²

POPULATION: CHILDREN: FULL TIME STAFF:

CAR PARKING REQUIRED: 1 PER 6 PLACES + 1 PER FTE 31

CAR PARKING PROVIDED: (INCLUDES 1 DISABLED) 27

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

17 November 2023

DATE

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

Development Permit No.: D/157-2021

Dated: 3 February 2023

29/09/2023

SITE PLAN



PO box 7404 gold coast mail centre Qld. 9726

BERSERKER CHILDCARE

LE PLACE CREATION 28-32 KIRKELLEN ST BERSERKER QLD 4701 FOR THE IMAGINE EDUCATION LEARNING CENTERS TRUST project no: 21089

dwg no_rev: 21089_DA-100_H

issue date: 29/09/2023

scale: 1:300



ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

17 November 2023

DATE

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

Development Permit No.: D/157-2021

Dated: 3 February 2023

29/09/2023

FLOOR PLAN

australian project management services

PO box 7404 gold coast mail centre Qld. 9726

BERSERKER CHILDCARE

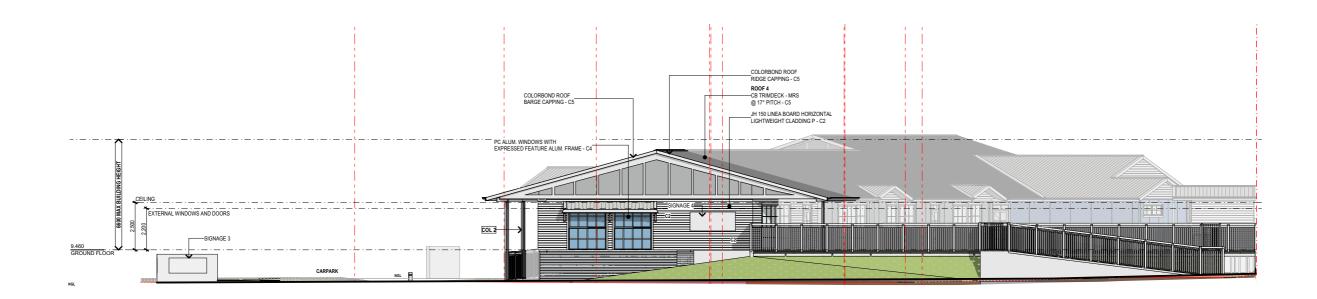
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FOR THE IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089

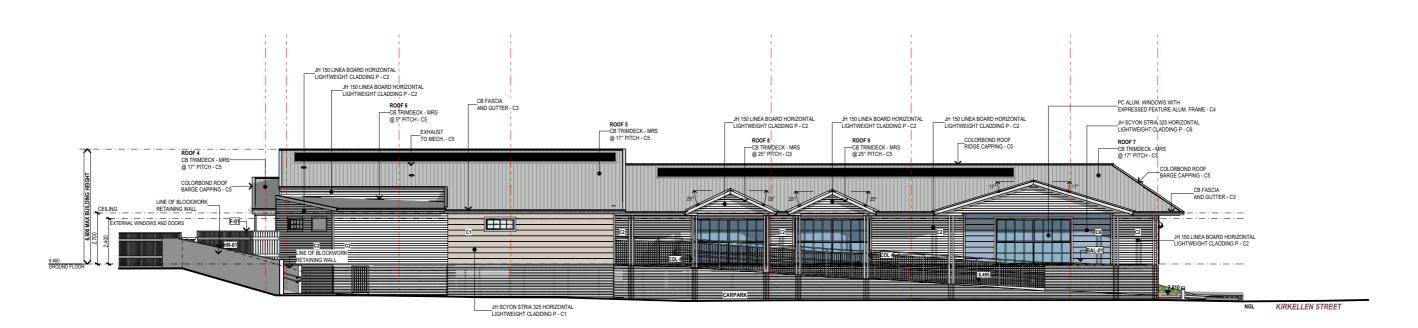
dwg no_rev: 21089_DA-130_G

issue date: 29/09/2023

ycale: 1:250



NORTH ELEVATION 1:200



EAST ELEVATION 1:200

ROCKHAMPTON REGIONAL COUNCIL AMENDED PLANS APPROVED 17 November 2023

DATE

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

Development Permit No.: D/157-2021

Dated: 3 February 2023

29/09/2023 ELEVATIONS 1

australian project management La PLACE CREATION 28-32 KIRKELLEN ST BERSERKER QLD 4701 services

design@australianprojectmanagement.com.au PO box 7404 goldcoastmal.centre Qld. 9726

BERSERKER CHILDCARE

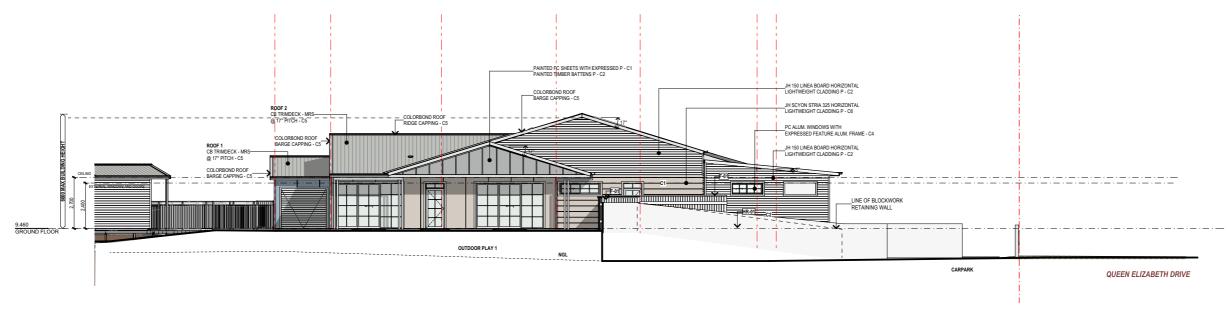
For THE IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089

dwg no_rev: 21089_DA-200_G

issue date: 29/09/2023

scale: 1:200



1 SOUTH ELEVATION 1:200

These plans are agreement to the current conditions of approval subject to the current conditions of approval associated with Development Permit No.: D/157-2021 Dated: 3 February 2023 Dated: 3 February 2023 A 10 MIN OF MAN OF MAN

1 WEST ELEVATION 1:200

29/09/2023

ELEVATIONS 2

australian
project
management
services

www.australianprojectmanagement.com.au
edsign@australianprojectmanagement.com.au
PO box 7404 goldcooxfindalcente Qld. 9726

BERSERKER CHILDCARE

PLACE CREATION 28-32 KIRKELLEN ST BERSERKER QLD 4701

FOR THE IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089

ROCKHAMPTON REGIONAL COUNCIL

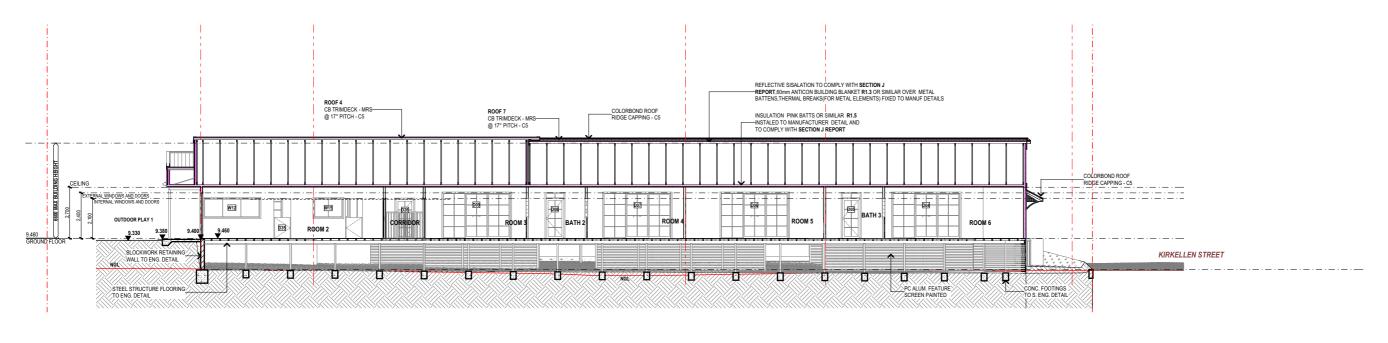
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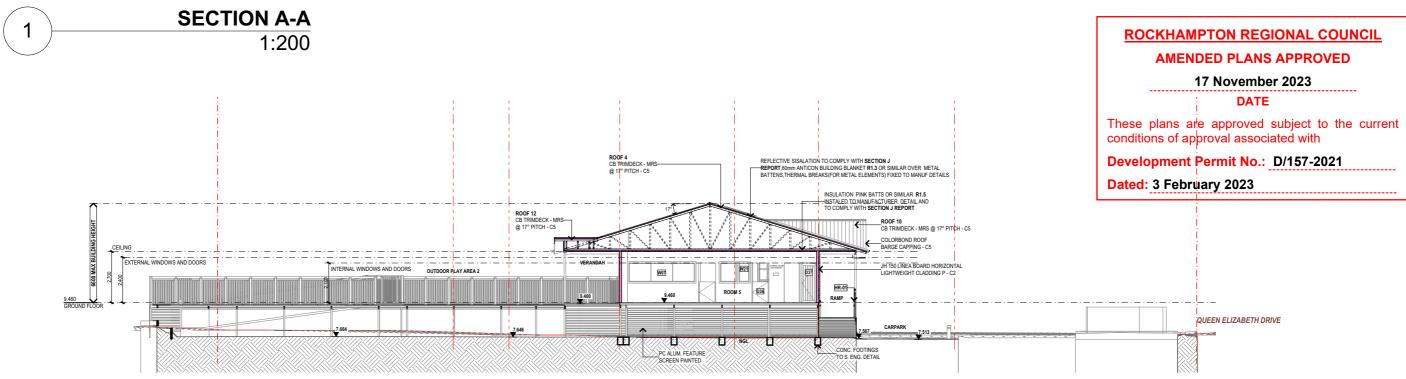
17 November 2023

dwg no_rev: 21089_DA-205_G

issue date: 29/09/2023

scale: 1:200





1 SECTION B-B 1:200

29/09/2023 SECTIONS



PO box 7404 gold coast malicentre Qld. 9726

BERSERKER CHILDCARE

For THE IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089

dwg no_rev: 21089_DA-300_G

issue date: 29/09/2023

scale: 1:200



dulux white on white walls, columns & timber trims C2

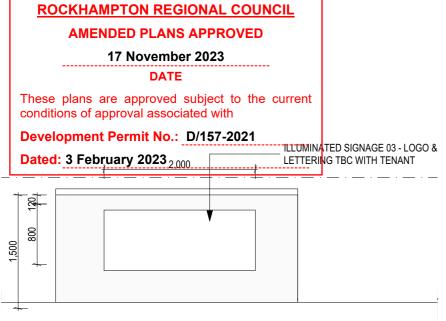


flat white powdercoat windows & doors, fencing C4 colorbond surfmist roof C5

dulux boathouse feature walls C6

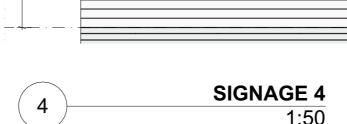
CHILDCARE CENTRE

EXTERNAL COLOUR PALETTE



SIGNAGE 3 3 1:50





ILLUMINATED SIGNAGE 04 - LOGO & LETTERING TBC WITH TENANT **SIGNAGE 5**

ILLUMINATED SIGNAGE 01 - LOGO & LETTERING TBC WITH TENANT

SIGNAGE 1

2,000

SIGNAGE 2

1:50

1:50

ADDRESS

1,700

80

2

LETTERBOX TO POST OFFICE REQUIREMENTS

ILLUMINATED SIGNAGE 02 - LOGO & LETTERING TBC WITH TENANT

ILLUMINATED SIGNAGE 05 - LOGO &

LETTERING TBC WITH TENANT

3mm POWDERCOATED ALUMINIUM

LETTERING SPACED 20mm OFF WALL

2,000

22/09/2023

MATERIAL & SIGNAGE



BERSERKER CHILDCARE

LE PLACE CREATION 28-32 KIRKELLEN ST BERSERKER QLD 4701

FOR THE IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089

dwg no_rev: 21089_DA-400_D

issue date: 22/09/2023

scale: 1:50





ENGINEERING SERVICES REPORT

PROPOSED CHILDCARE CENTRE DEVELOPMENT 28-32 Kirkellen Street, Berserker QLD

ROSALIND CORPORATE PTY LTD

FEBRUARY 2022 REVISION 03

ROCKHAMPTON REGIONAL COUNCIL AMENDED PLANS APPROVED

17 November 2023

DATE

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

Development Permit No.: D/157-2021

Dated: 3 February 2023

Pinnacle Engineering Group ABN: 80 608 431 625

P.O. Box 517 Paradise Point QLD 4216



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In accordance with the requirements of the *Queensland Professional Engineers Act 2002*, this document was prepared under the supervision of, reviewed and approved by the following experienced Registered Professional Engineer of Queensland (RPEQ).

Bogdan Popa (RPEQ No. 12349)

B. Lya_

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Document control

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02	6-October-2021	M. Binger	B. Popa	6-October-2021	Issued for approval
03	14-February-2022	M. Binger	B. Popa	14-February-2022	Response to Council RFI

Distribution of copies

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Author:	Jesse Hardman		
Project manager:	Michael Binger		
Name of organisation:	Pinnacle Engineering Group		
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1 Introduction

Pinnacle Engineering Group (Pinnacle) was engaged by Rosalind Corporate Pty Ltd to undertake the preliminary engineering investigations to provide supporting documentation for the proposed development application for a childcare centre development located at 28-32 Kirkellen Street, Berserker QLD within the local authority of the Rockhampton Regional Council (RRC).

1.1 Scope of Investigation

This report covers the following civil engineering elements associated with the proposed development including:

- Water Supply;
- Sewerage Reticulation;
- · Stormwater Drainage;
- · Bulk Earthworks; and
- Gas, Electrical and Telecommunications.

1.2 Site Description

1.2.1 Site Details and Location

Street Address - 28-32 Kirkellen Street, Berserker QLD 4701

RP Description - Lot 5 and Lot 6 on RP606198 and Lot 12 on RP600705

Site Area - 0.2503 Hectares

Current Zoning - Low-Medium Density Residential

Proposed Use - Childcare Centre

Local Authority - RRC

Refer to Figure 1.1 for site location.

1.2.2 Existing Site Conditions and Topography

A review of the topographic survey has revealed that the subject site generally falls from the western property boundary to the eastern property boundary. The subject site is currently occupied by three detached dwellings within the northern portion of the site, smaller concrete and hardstand areas and significant vegetation within the southwest corner.

Currently, the highest elevation of approximately RL8.35m AHD is reached along the western property boundary of the subject site while the lowest elevation of approximately RL7.40m AHD is reached along the eastern property boundary of the subject site.

The topographic survey is included in Appendix B. Refer to Figure 1.2 for the existing aerial view of the subject site.



1.2.3 Proposed Development

The proposed development will deliver a 94-place childcare centre over the subject site. The proposed childcare centre will provide on-grade car parking and be accessed from Queen Elizabeth Drive to the east of the subject site via a new vehicle cross-over.

Architectural drawings of the proposed development are included within in Appendix A.





Figure 1.1: Map View (Source: Google Maps)



Figure 1.2: Aerial View (Source: www.nearmap.com.au)



2 Water Reticulation

2.1 Existing Infrastructure

A review of the topographic survey and Council records has confirmed the location of existing 100mm diameter cast iron (CI) water mains within the Kirkellen Street and Queen Elizabeth Drive road reserves to the north and east respectively.

The topographic survey is included within Appendix B.

2.2 Development Water Reticulation Demand

The proposed development's water reticulation demands on the existing potable water infrastructure were determined using the methods described in the Capricorn Municipal Development Guidelines: D11 – Water Supply Network Design Guidelines. These demands were used to determine the consumption rates for the proposed development. Potable water demand factors and flow parameters were sourced from Table D11.07.1, to determine the potable water consumption rates for the proposed development, and are published below in Table 2.1.

Table 2.1: Water Demand Factors and Consumption Rates

Design Parameter	Potable Water Factors and Consumption Rates		
Development Type	Childcare centre		
Demand Conversion Rate (EP/student)	0.2 EP/student		
Students	94		
EP	19		
Average Day Flow (AD)	500L/EP/day		
Mean Day Max Month (MDMM) / AD	1.4		
Peak Day (PD) / AD	1.89		
Peak Hour (PH) / PD	0.0833		
PH / AD	0.1575		
AD	9,400L/day or 0.109L/sec		
MDMM	13,160L/day or 0.152L/sec		
PD	17,766L/day or 0.206L/sec		
PH (Maximum)	61.688kL/hour or 0.017L/sec		
Fire Flow	30L/s for 4 hours		
Peak Hour Demand	30.206L/sec		

The proposed development will result in a water demand of 30.206L/sec for the childcare centre and healthcare services respectively. With a maximum velocity of 2.0m/s, in accordance with the Capricorn Municipal Design Guidelines, a water service connection with a minimum internal diameter of 139mm is required for the proposed childcare centre.

We note however that fire flow may be provided by the existing hydrants located within the adjacent Kirkellen Street and Queen Elizabeth Drive road reserves to the north and east respectively. Hydrant coverage shall be confirmed by the hydraulic consultant during the detailed design phase of the project.



2.3 Proposed Water Reticulation Works

The proposed childcare centre will be serviced by the existing 100mm diameter CI water main located within the Kirkellen Street road reserve to the north of the subject site.

It is envisaged that the water reticulation and connection detailed design will be undertaken as part of a future Operational Works application to Council. The internal water reticulation design will be undertaken by a Hydraulic Consultant during the detailed design phase of the project and is subject to a future Plumbing and Drainage application to Council.

A plan detailing the existing and proposed services for the site is included in Appendix C.



3 Sewerage Reticulation

3.1 Existing Infrastructure

A review of the topographic survey and Council records has confirmed that an existing 150mm diameter earthenware sewerage main bisects the subject site running on a west to east alignment. Additionally, an existing 150mm diameter earthenware sewerage main is located within the adjacent properties to the south of the subject site. Both mains cross beneath the Queen Elizabeth Drive road reserve to the east before heading south.

The topographic survey is included within Appendix B.

3.2 Proposed Demand

The proposed development's sewer reticulation demands on the existing sewer infrastructure were determined using the methods described in the Capricorn Municipal Development Guidelines: D12 –Sewerage Network. These demands were used to determine the consumption rates for the proposed development. The sewer demand factors and flow parameters were sourced from Table D12.6.1 to determine the consumption rates for the proposed development, and the results are presented in Table 3.1 below.

Table 3.1: Sewerage Demand Factors and Consumption Rates

Design Parameter	Sewer Factors and Consumption Rates
Development Type	Childcare centre
Demand Conversion Rate (ET/staff & pupil)	0.1 ET/staff & pupil
Students	94
Staff	15
ET	10.9
Average Dry Weather Flow (ADWF)	540L/ET/day
ADWF	5.886kL/day or 0.068L/sec
PDWF (2.5 x ADWF)	14.715kL/day or 0.170L/sec
PWWF (5 x ADWF)	29.430kL/day or 0.341L/sec
Design Flow	0.341L/sec

Based on the above assessment it is envisaged that the proposed development will place a demand of 0.341L/sec during PWWF on the downstream sewerage network. An engineering services plan detailing the existing and proposed sewerage infrastructure is included in Appendix C.

3.3 Proposed Works

It is proposed to connect the development to the existing sewerage main located within subject site, which will be diverted around the location of the proposed childcare centre building.

It is envisaged that the sewerage infrastructure and connection detailed design will be undertaken as a part of a future Operational Works application to Council. The internal sewerage infrastructure will be designed by a Hydraulic Consultant during the detailed design phase of the project and is subject to a future Plumbing and Drainage application to Council.

A plan detailing the existing and proposed services for the site is included in Appendix C.



4 Stormwater Drainage

The strategy and constraints associated with stormwater drainage were assessed as part of a separate investigation by Pinnacle and are not covered in detail within this report. We refer Council to the Site Based Stormwater Management Plan for the subject site prepared by Pinnacle for an in-depth analysis of the prevailing stormwater conditions.

A brief summary of the stormwater drainage elements is provided in the following sections of this report.

4.1 Lawful Point of Discharge

The Lawful Point of Discharge for the subject site is taken as the existing stormwater infrastructure located within the Kirkellen Street road reserve to the north of the subject site.

4.2 Existing Drainage Network

An existing sag gully inlet pit is located within the Kirkellen Street road reserve fronting the subject site. This inlet captures flow from the Kirkellen Street and Queen Elizabeth Drive road reserves prior to conveying the stormwater to the east. An existing field inlet pit and 300mm diameter reinforced concrete pipe (RCP) are located within the property to the south of the site being Lot 1 on RP606939 (57 Queen Elizabeth Drive). Flow captured by this inlet is conveyed to the adjacent gully pit within the Queen Elizabeth Drive before proceeding to the east via a 375mm RCP.

4.3 Proposed Drainage Works

It is intended to discharge stormwater to the Lawful Point of Discharge via piped and overland flow. Detention and quality treatment of stormwater will be provided if required through the use of private infrastructure.

In accordance with QUDM, the minor 10% AEP storm discharge (Q_{10}) will be conveyed to the Lawful Point of Discharge via a piped drainage network with the major 1% AEP storm discharge (Q_{100}) being conveyed by piped and overland flow.

Engineering services layouts detailing the existing and proposed services for the site is included in Appendix C.

4.4 Flood Assessment

Following discussions with Council and a flood search conducted for the current premises, future revisions of the yet to be adopted RRC Planning Scheme will indicate that the subject site is inundated during the 1% AEP storm event from the nearby Fitzroy River. However, the current planning scheme shows that the site is located outside of the mapped flood affected area, and as such was adopted for the flood storage analysis.

We refer Council to the Flood Storage Technical Note for the subject site prepared by Pinnacle for an in-depth analysis of the prevailing flooding conditions.



5 Bulk Earthworks

5.1 Earthworks Design

Earthworks for the site will be designed generally in accordance with the requirements of the RRC Planning Scheme and as appropriate to the regulatory control and the Australian Standard for Earthworks for Commercial and Residential Development (AS3798-2007).

5.2 General Site Earthworks

A soil assessment report shall be prepared by a geotechnical engineer to provide guidance to the treatment of the subject site prior to and during the earthworks excavation and suitability for building foundation construction. It is intended that with minimal site earthworks the proposed layout will be achieved.

The key variables associated with the site's earthworks are the depth and distribution of the existing materials and the strength and depth profile of the substrata material. It is advised that the soil report for the site investigates these key items in depth to ensure that suitable soil treatments, accurate cost estimation and building design can be facilitated.

5.3 Acid Sulphate Soils

A review of Council's Interactive Online Mapping system has identified the subject site as being located outside the mapped Acid Sulphate Soil zone.

Council's acid sulphate soils mapping is included within Appendix E.

5.4 Erosion and Sediment Management

Due to the expected highly erosive soil onsite, erosion protection measures will be incorporated into the construction phase of the project with these measures being designed and documented as a part of the detailed civil works for the site in accordance with industry best practice and IEAust Guidelines.

Ultimately, during the operational phase of the project, the sediment management will be undertaken through the use of soft landscaping to ensure onsite erosion is kept to a minimum.

An erosion and sediment control strategy is provided in the Site Based Stormwater Management Plan for the subject site prepared by Pinnacle.



6 Electrical, Gas and Telecommunications

A DBYD investigation was undertaken to confirm the location of existing electrical, gas and telecommunications services in the vicinity of the site.

The DBYD investigation confirmed the location of telecommunications infrastructure, owned and operated by NBN and Telstra, within the Kirkellen Street and Queen Elizabeth Drive road reserves to the north and east of the subject site respectively.

Overhead powerlines, owned and operated by Ergon Energy, are located within the Kirkellen Street road reserve. Additionally, an underground high voltage electrical cable is located within the Kirkellen Street carriageway fronting the northern boundary of the subject site.

Existing 32mm diameter medium-density polyethylene (MDPE) underground gas mains have been identified within the northern and southern verges of the Kirkellen Street road reserve to the north of the subject site.

It is envisaged that the proposed development will connect to the existing services within the Kirkellen Street road reserve as outlined above. The connections to the electrical and telecommunications networks will be undertaken by specialist consultants during the detailed design phase of the project.

The DBYD data is included in Appendix D with the location of the existing telecommunications, electrical and gas infrastructure shown on the engineering services layouts included in Appendix C.



7 Impacts on Local Infrastructure and Likely Upgrades

The proposed childcare centre development will result in additional loading on the surrounding local infrastructure.

Initial investigations indicate that there is sufficient residual capacity within the surrounding local infrastructure to accommodate the additional demands from the proposed development.

The potential impacts on the local infrastructure and likely upgrades are summarised in Table 7.1 below.

Table 7.1: Local Infrastructure Impacts and Requirements

Infrastructure Type	Authority	Impacts	Connection and/or Upgrade Requirements
Water Reticulation	Fitzroy River Water	Additional water demand due to development	Connect to the existing water main within the Kirkellen Street road reserve located to the north of the subject site.
Sewerage Reticulation	Fitzroy River Water	Additional sewer loadings due to development	Connect to the existing sewerage main within the subject site via a new commercial sewer property connection.
Stormwater	RRC	Additional loading due to development	Discharge all stormwater to the Lawful Point of Discharge being the existing gully pit within the Kirkellen Street road reserve to the north of the subject site.
Telecommunications	Telstra	New connections	New connection to existing telecommunications infrastructure located within the Kirkellen Street road reserve to the north of the subject site.
Electrical	Energex	New connections	New connection to existing electrical infrastructure located within the Kirkellen Street road reserve.
Gas	APA Group	New connections	New connection the existing gas infrastructure located within the Kirkellen Street road reserve.



8 Reference Documentation

Rockhampton Region Planning Scheme Version 2.1 (RRC, 2020)

Capricorn Municipal Development Guidelines (CMDG, 2020)

Water Services Association of Australia, 2014. "Sewerage Code of Australia. WSA 02-2014", Second Edition, Version 3.1

Water Services Association of Australia, 2011. "Water Supply Code of Australia. WSA 03-2011", Second Edition, Version 3.1



Appendix A **Proposed Development Plans**

AREA SCHEDULE		
SITE COVER: SITE COVER: SITE AREA::	35.62% 891.56m ² 2,503.00m ²	
GBA <u>CHILDCARE:</u> GROUND LEVEL:	693.23m²	
OUTDOOR STORE: VERANDAHS: SERVICES COURTYARD:	24.65m² 124.34m² 15.79m²	
AREA PER PLACE: BUILD + O.STORE: (717.88m²) BUILD + O.STORE + VERANDAH: (842.22m²)	7.64m² 8.96m²	
PLAY AREAS: GROUND LEVEL (INC. VERANDAHS)	741.71m²	
CARPARK:	719.02m ²	
POPULATION: CHILDREN: FULL TIME STAFF:	94 15	
CAR PARKING REQUIRED: 1 PER 6 PLACES + 1 PER FTE	31	
CAR PARKING PROVIDED: (INCUDES 1 DISABLED)	27	

MEETS AND BOUNDS ARE TO BE CONFIRMED WITH A DWG/TITLE PLAN

KIRKELLEN STREET





CHILDCARE BERSERKER

28-32 KIRKELLEN ST & 29 EDWIN ST BERSERKER QLD

dwg no_rev: 21089_SK-130_D project no: 21089 1:250 issue date:

FLOOR PLAN

7/09/2021

CONCEPT — NOT FOR CONSTRUCTION —

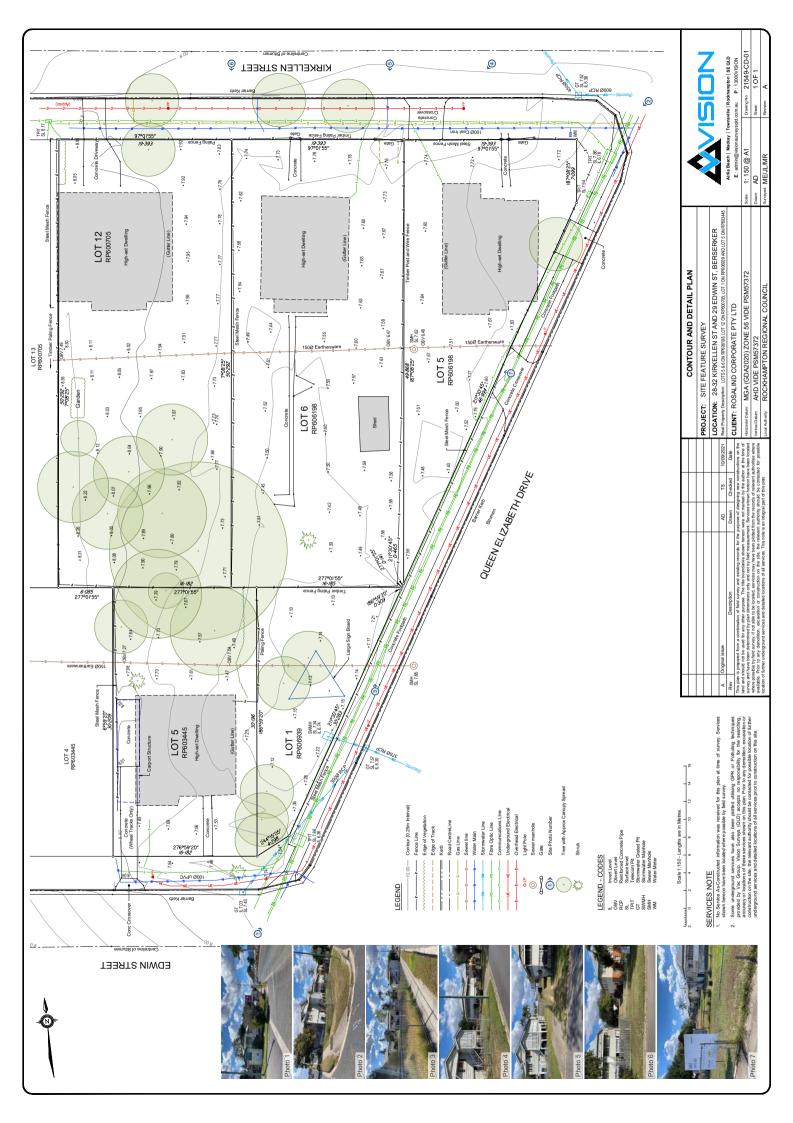
7/09/2021





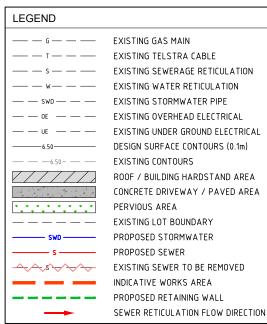


Appendix B **Topographic Survey**





Appendix C **Engineering Layouts**



NOTES

- THE LOCATION OF THE EXISTING SERVICES HAS BEEN PLOTTED FROM SURVEY AND RECORDS AND IS TO BE CONFIRMED PRIOR TO CONSTRUCTION.
- THE FINAL ALIGNMENT AND SIZING OF THE SERVICES INTERNAL TO THE PROPOSED DEVELOPMENT IS PRELIMINARY ONLY AND SUBJECT TO DETAILED DESIGN AND FUTURE OPERATIONAL WORKS APPLICATIONS TO COUNCIL.



The Essential First Step.

UNDERGROUND PUBLIC UTILITY PLANT EXISTS IN THIS VICINITY. THE CONTRACTOR IS ADVISED TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM THE EXACT LOCATION OF PUBLIC UTILIT PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.





MARIE	Α	ISSUED FOR COMMENT	M.G.	23.09.2021	REVIEW	B. POPA
	В	ISSUED FOR APPROVAL	J.H.	06.10.2021	DESIGN	J. HARDMA
INAULL	С	RESPONSE TO COUNCIL RFI	J.H.	14.02.2022	DRAWN	M. GLASSO
ERING GROUP					SCALE	
EKING GROOP						2 1 0 2
SOUTHPORT QLD 4215 POINT QLD 4216)					SCALE	

ROSALIND CORPORATE PTY LTD

CENTRE DEVELOPMENT 28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND LOT 12 ON RP600705)

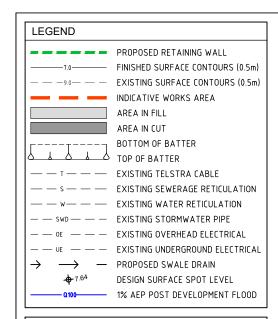
ENGINEERING SERVICES LAYOUT

PRELIMINARY

PEG0884-DA-SK05 C

(PO BOX 517, PARADISE POINT QLD WWW.PINNACLEENG.COM.AU

(SCALE ABOVE DENOTES ORIGINAL SHEET SIZE - A1



CUT & FILL VOLUMES

CUT TO FILL ON LEADS $= 228 \text{ m}^3$ EXPORT TO WASTE FACILITY = 216 m³

NOTE: 10% COMPACTION FACTOR APPLIED

TOPSOIL VOLUMES STRIP, STOCKPILE AND REPLACE = 178 m³ EXPORT OFF SITE

NOTE: BASED ON 100mm TOPSOIL DEPTH

NOTES

- VOLUMES ARE TO SUB-GRADE LEVEL.
 VOLUMES INCLUDE 100mm EXISTING TOPSOIL STRIPPING ALLOWANCE, AND 100mm TOPSOIL REPLACEMENT
- 3. THE LOCATION OF EXISTING SERVICES HAS BEEN PLOTTED FROM RECORDS AND IS TO BE CONFIRMED. THE FINAL ALIGNMENT AND SIZING OF THE SERVICES IS PRELIMINARY ONLY AND SUBJECT TO DETAILED DESIGN AND FUTURE OPERATIONAL WORKS APPLICATIONS TO COUNCIL



The Essential First Step.

UNDERGROUND PUBLIC UTILITY PLANT EXISTS IN THIS VICINITY. THE CONTRACTOR IS ADVISED TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM THE EXACT LOCATION OF PUBLIC UTILITY PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.





LEVEL 1 19 SHORT STREET, SOUTHPORT QLD 4215 (PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU

DESIGN J. HARDMAN 23.09.2021 23.09.2021 SCALE

ROSALIND CORPORATE PTY LTD

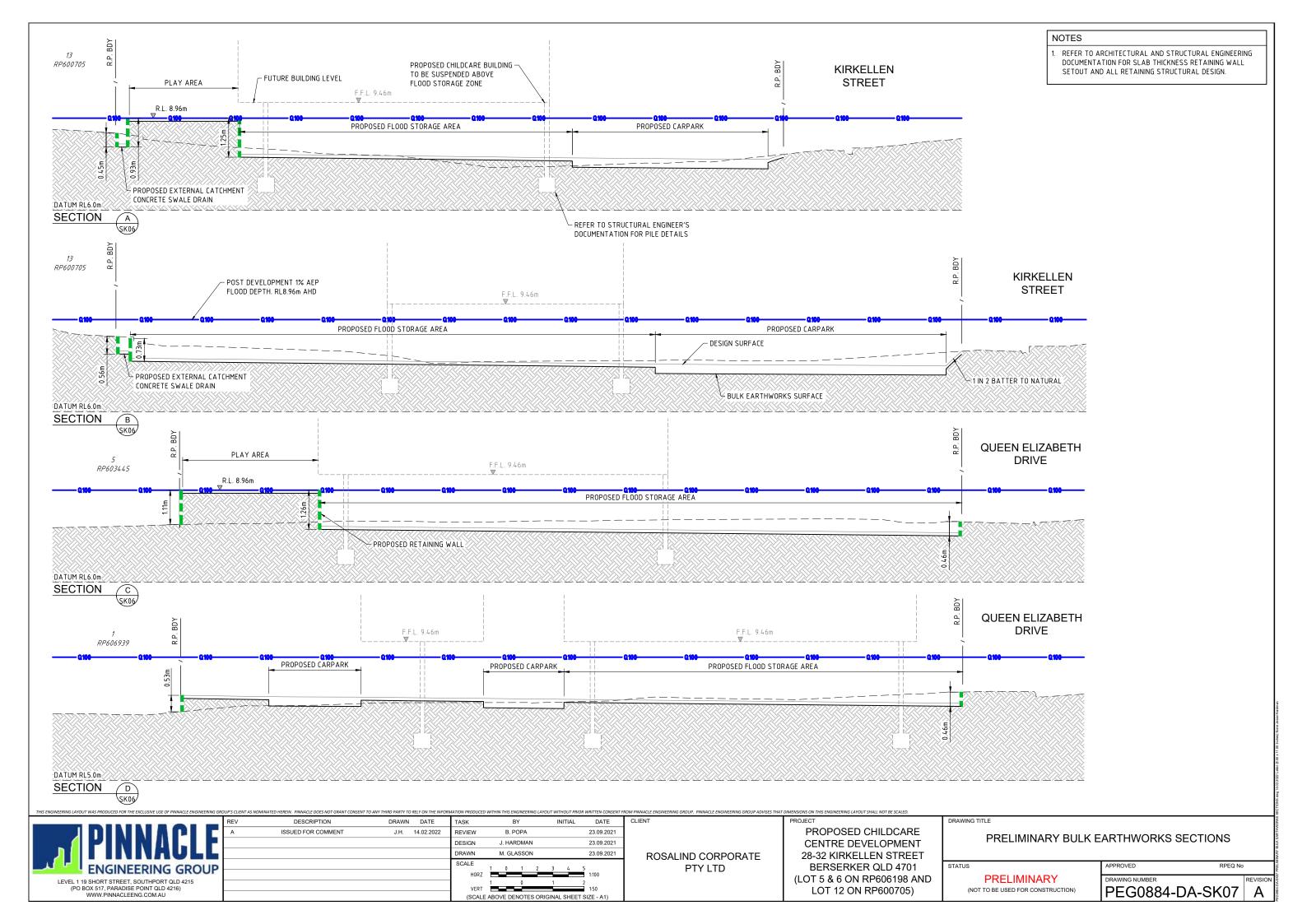
CENTRE DEVELOPMENT 28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND LOT 12 ON RP600705)

PRELIMINARY BULK EARTHWORKS LAYOUT

PRELIMINARY

(NOT TO BE USED FOR CONSTRUCTION)

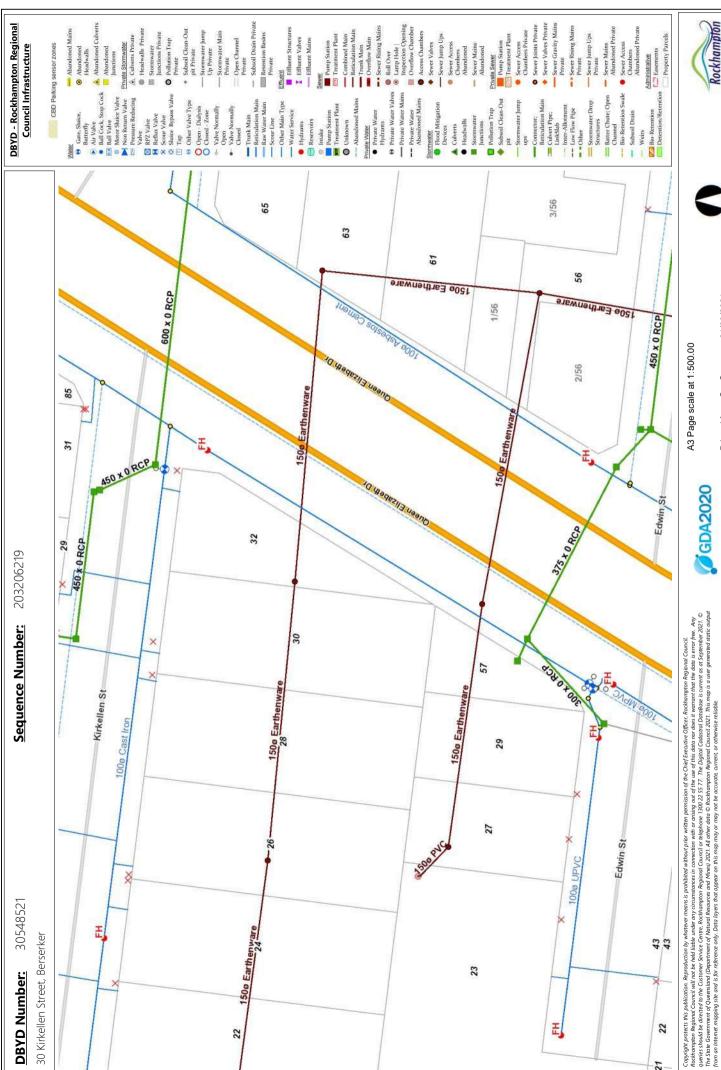
PEG0884-DA-SK06 A





Appendix D

DBYD Data







GDA2020

Printed from GeoCortex on 21/09/2021





To: Jesse Hardman
Phone: Not Supplied
Fax: Not Supplied

Email: jesse@pinnacleeng.com.au

Dial before you dig Job #:	30548521	DIAL DESCRIP
Sequence #	203206224	YOU DIG
Issue Date:	21/09/2021	www.1100.com.au
Location:	30 Kirkellen Street, Berserker, QLD, 4701	WWW.Trod.com.ud

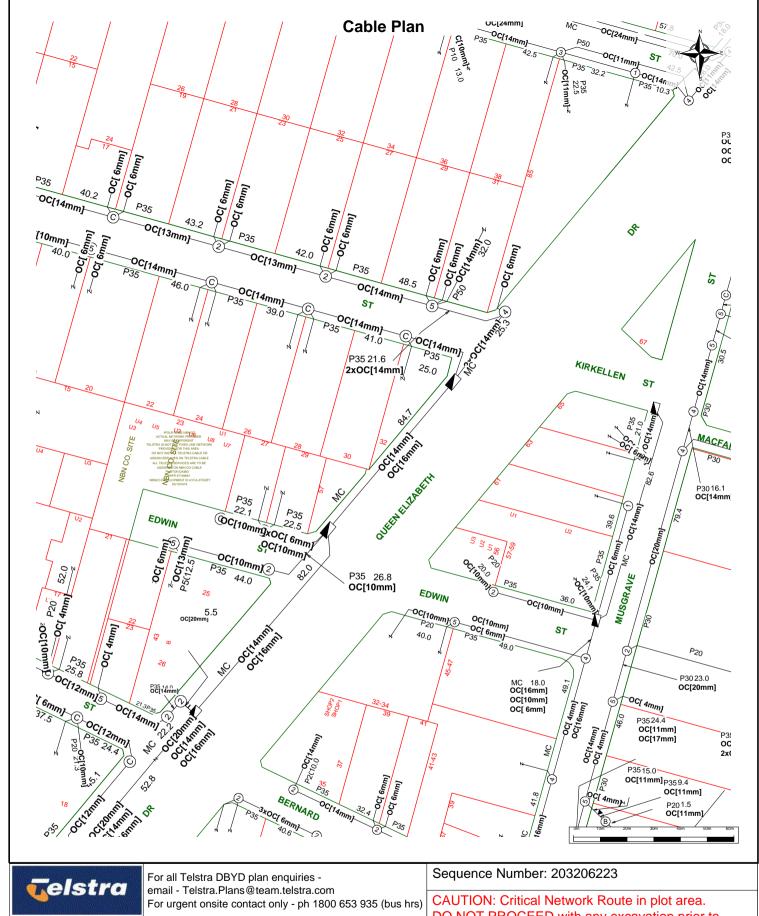
Indicative Plans 1

·+·	LEGEND nbn (6)		
34.	Parcel and the location		
3	Pit with size "5"		
Œ.	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.		
	Manhole		
\otimes	Pillar		
PO - T- 25.0m P40 - 20.0m	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.		
-S 10.0m	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.		
<u>-0</u> —0—	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.		
-0-0-	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.		
-0-0-	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.		
BROADWAY ST	Road and the street name "Broadway ST"		
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m		



Emergency Contacts

You must immediately report any damage to the **nbn**[™] network that you are/become aware of. Notification may be by telephone - 1800 626 329.



TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

Generated On 21/09/2021 12:37:45

CAUTION: Critical Network Route in plot area. DO NOT PROCEED with any excavation prior to seeking advice from Telstra Plan Services on: 1800 653 935

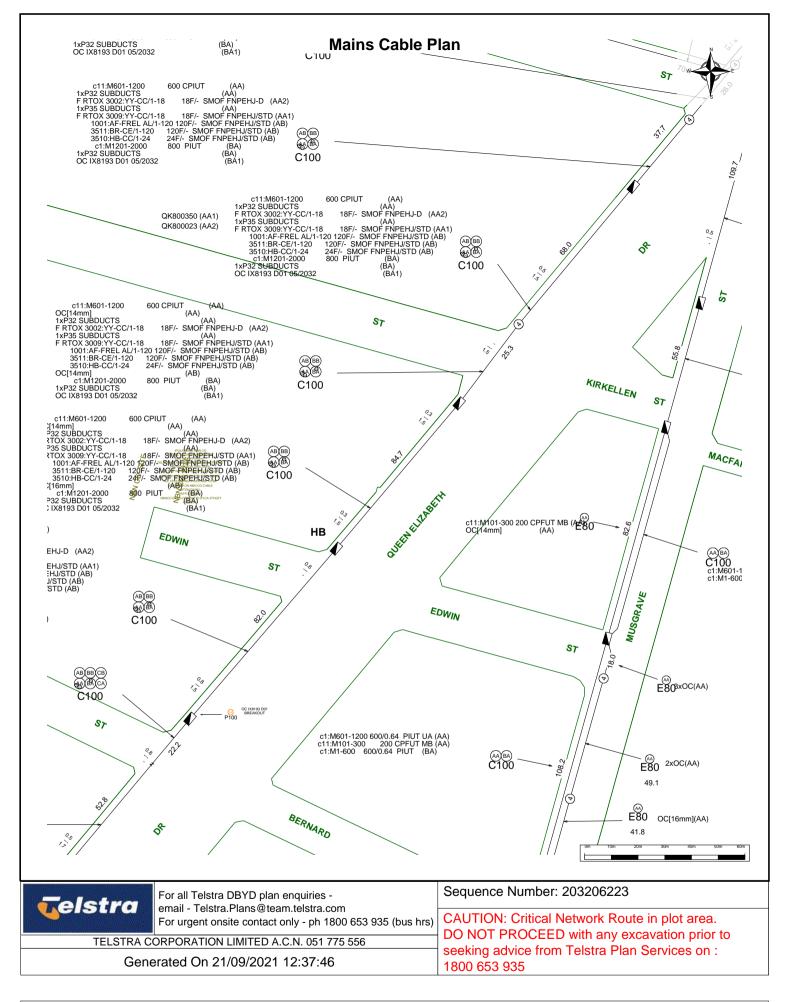
The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.



WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

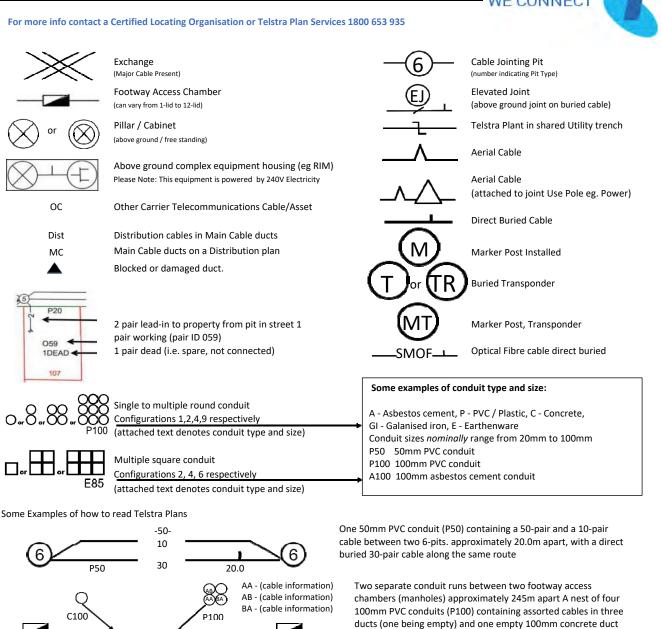
It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.

LEGEND





WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 -Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works. The exact position of Telstra assets can only be validated by physically exposing it. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

245.0

(C100) along



DBYD SYMBOLOGY LEGEND

Ť	Cross Bonding Link Box - Critical
	Disconnect Box - Critical
	Ring Main Unit
	Distribution Pad Substation
Ť	Earth
Ŷ	Remote Earth
M	Cable Marker
0	Handhole
\odot	Manhole
GI	Commercial Industrial Pillar
	Distribution Cabinet
	Link Pillar
	Service Pillar
\blacksquare	Feeder Pillar
0	Pole
⊛	Streetlight Column
	Communication Junction Pillar
8	Communication Pit
\$	Fibre Patch Panel
<u>\$</u>	Pilot Cubicle
	Underground Asset 33kV and above
	Underground Asset below 33kV
9	Underground Conduit with or without cable
	Pit
	Communication Boundary
	Reserve (RE)
	Water Resource (WR)
	Cadastral Parcels
	Planned Jointing Pit – New/Updated
	Planned Jointing Pit - Remove
	Diamand Communication Development New / Hards

Planned Tunnel/Trench/Bore - Remove

A DRVD	₽la	nned Cross Bonding Link Box - New/Updated
DBYD	₽la	nned Cross Bonding Link Box - Remove
SYMBOLOGY	Pla	nned Disconnect Box - New/Updated
eensland LEGEND	Pla	nned Disconnect Box - Remove
	A Pla	nned Distribution Pad Substation – New/Updated
Cross Bonding Link Box - Critical	Pla	nned Distribution Pad Substation - Remove
Disconnect Box - Critical	<u> </u>	nned Distribution Ground Substation – New/Updated
Ring Main Unit	▲ Pla	nned Distribution Ground Substation - Remove
Distribution Pad Substation	Pla	nned Ring Main Unit – New/Updated
Earth	Pla	nned Ring Main Unit - Remove
Remote Earth	- Pla	nned Earth – New/Updated
Cable Marker	₽la	nned Earth - Remove
Handhole	M Pla	nned Cable Marker – New/Updated
Manhole	M Pla	nned Cable Marker - Remove
Commercial Industrial Pillar	Pla	nned Remote Earth – New/Updated
Distribution Cabinet	Pla	nned Remote Earth - Remove
Link Pillar	M Pla	nned Underground Warning Post – New/Updated
Service Pillar	M Pla	nned Underground Warning Post - Remove
Feeder Pillar	Pla	nned Pilot Cubicle – New/Updated
Pole	Pla	nned Pilot Cubicle – Remove
Streetlight Column	Pla	nned Fibre Patch Panel – New/Updated
Communication Junction Pillar	Pla	nned Fibre Patch Panel – Remove
Communication Pit	CI Pla	nned Commercial Industrial Pillar – New/Updated
Fibre Patch Panel	GI Pla	nned Commercial Industrial Pillar – Remove
Pilot Cubicle	Pla	nned Distribution Cabinet – New/Updated
Underground Asset 33kV and above	Pla	nned Distribution Cabinet – Remove
Underground Asset below 33kV	N Pla	nned Link Pillar – New/Updated
Underground Conduit with or without cable	N Pla	nned Link Pillar – Remove
Pit	Pla	nned Service Pillar – New/Updated
Communication Boundary	Pla	anned Service Pillar – Remove
Reserve (RE)	O Pla	nned Pole – New/Updated
Water Resource (WR)	O Pla	nned Pole – Remove
Cadastral Parcels		nned Manhole – New/Updated
		nned Manhole – Remove
Planned Jointing Pit – New/Updated		nned Streetlight Column – New/Updated
Planned Jointing Pit - Remove		nned Streetlight Column – Remove
Planned Communication Boundary – New/Updated	_	nned Handhole – New/Updated
Planned Communication Boundary - Remove	_	nned Handhole – Remove
Planned Tunnel/Trench/Bore - New/Updated		nned Communication Junction Pillar – New/Updated
,,		, , , , , , , , , , , , , , , , , , ,

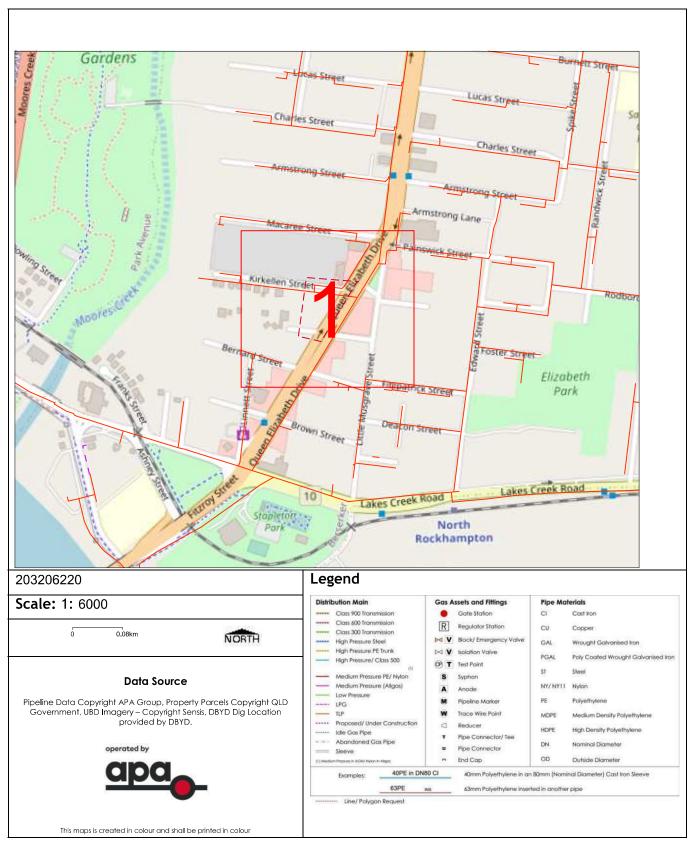
Planned Communication Junction Pillar - Remove



apa_

21/09/2021 SCALE: DO NOT SCALE REF NO: 203206220

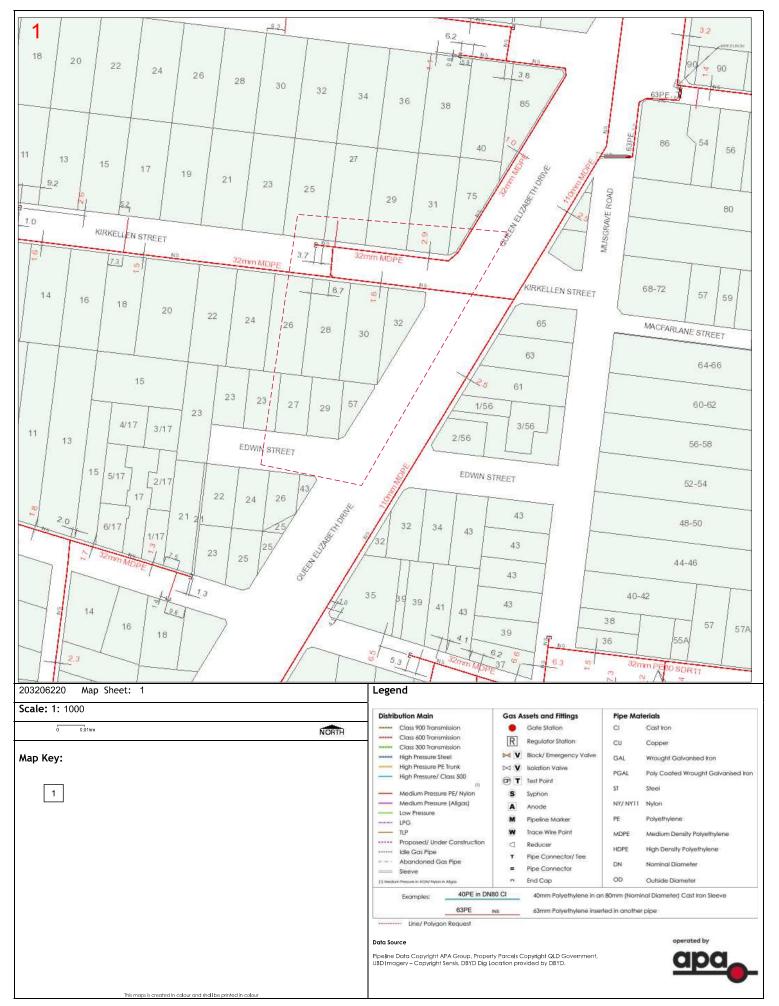
As work on APA underground plant is ongoing any drawing with an issue date of more than one month previous can no longer be considered valid. All persons planning civil works on any site are advised to contact APA to confirm location. All underground gas pipelines are the property of APA & are not to be accessed by unauthorised persons. All care is taken with preparation of the drawings & no responsibility is accepted for errors or omissions.



APA Group does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. APA Group is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map.











Working Around Gas Assets: Duty of Care and Responsibilities

It is illegal to interfere or tamper with gas infrastructure.

Offenders who interfere or tamper with gas infrastructure may be prosecuted under relevant legislation and there are very serious penalties for such offences

"Gas infrastructure" or "infrastructure" in this document refers to any infrastructure or property owned or operated by APA Group including, but not limited to natural gas mains, services and regulator/meter stations or regulator pits.

1. Planning Your Work

a. The constructor must:

- i. Request plans of APA Group infrastructure for a particular location at a reasonable time before construction begins (at least 5 business days);
- ii. Design for minimal impact and ensure protection of APA Group infrastructure, this includes networks managed by APA on behalf of Australian Gas Networks and Allgas; and
- iii. Contact APA Group if their infrastructure is in any way affected by planned construction activities.

2. Before You Start Work

- a. Please Note: You will be responsible to pay for the repair of any damage by you to gas assets.
- b. You must obtain **Dial Before You Dig** (DBYD) documentation before any on-site construction or excavation commences. This document is to be read in conjunction with the Dial Before You Dig plans and other relevant documentation.

 APA Group will provide free site plans if an APA Group infrastructure location request is made to APA on **1800 085 628**
- c. If DBYD documents indicate you will be working within 3m of a high pressure or transmission gas pipeline, you must complete and submit the **Authority to Work Request** provided with your DBYD documentation **five (5) business days** prior to commencing the work. Requests **under** five (5) business days will incur extra charges.
- d. APA Group shall assess your Authority to Work Request and will inform you if a Site Watch is required. A Site Watch involves the presence of an APA representative at site to advise on locating and working around the asset. Where on-site location advice is provided, the constructor is responsible for all hand digging (potholing) to visually locate and expose APA Group infrastructure. Vacuum excavations may only be used if permission is granted by APA and if it is used on high pressure mains Site Watch will be required. Site Watch services are charged at an hourly rate.
- e. The principal contractor for the site must provide APA Group with a written construction methodology for all works impacting or encroaching on APA infrastructure. All construction methodology documents will be reviewed by APA Group prior to the commencement of site works. Construction methodology documents must be submitted as part of an Authority to Work Request (send to permitsqld@apa.com.au).

f. Site Plans

- i. Plans and/or details provided by APA Group through DBYD or otherwise are current for one (1) month from the date of dispatch and should be disposed of by shredding or any other secure disposal method after use.
- ii. APA Group retains copyright in all plans and details provided in connection with any request.
- iii. APA Group plans or other details are provided for the use of the applicant, its servants, employees, contractors and agents, and must not be used for any unauthorised purpose.
- iv. APA Group plans are pipe indication diagrams only and indicate the presence of plant in the general vicinity of the geographical area shown. Exact ground cover and alignments cannot be given with any certainty as such levels can change over time.
- v. APA Group, its servants, employees, or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and/or details so supplied to the applicant/constructor, its servants, employees, contractors and/or agents, and the applicant/constructor agrees to indemnify APA Group against any claim or demand for any such loss or damage.
- vi. The constructor is responsible for all infrastructure damage occasioned to APA Group infrastructure.
- vii. APA Group reserves all rights to recover compensation for loss or damage caused by interference or damage, including consequential loss and damages to its property and gas infrastructure.
- viii. All care is taken in the preparation of location drawings and plans, but NO responsibility is accepted by APA Group for errors or omissions.





3. Working in the Vicinity of a Gas Pipeline

a. Excavation near Gas Mains and Services

PLEASE NOTE: Unless otherwise approved, mechanical excavation is not permitted above, or within 600mm of either side of APA Group infrastructure.

- i. Location of Gas Mains and Services: Examining the DBYD documentation and other plans is not sufficient as reference points may change from the time of installation and recording on documentation. You MUST use appropriately qualified plant locators to accurately locate and prove the position of all assets and then validate these positions prior to commencing work. For all work to be done within 3.0 metres of APA Group infrastructure, the constructor is required to hand dig (pothole) and expose the plant, hence proving its exact location before work can commence. Vacuum excavation can cause failure of some types of gas mains and therefore APA Group must be contacted prior to any vacuum excavation. Please note that new APA Group gas mains generally have a plastic warning tape or lightweight plastic board buried above
- the pipe but this is not the case for older mains or when pipe is laid by means of boring or located in conduit.

 ii. IMPORTANT NOTE: Not all gas services (i.e. pipe from gas main to a gas meter in an individual property) are captured on APA Plans. Gas services shown on plans are indicative only and do not pinpoint the exact location of APA's asset. A gas

service may also cross a road to reach a property. To confirm the presence of a gas service, please contact the APA DBYD number below for further information.

- iii. Installation of Utilities Parallel to Gas Mains and Services: If construction work is being undertaken parallel to APA Group gas mains, then hand digging (potholing) at least every 4 m is required to establish the location of all gas mains. Nominal locations must be confirmed before work can commence. A minimum clearance of 600mm must be maintained from gas mains unless otherwise approved by APA. If an excavation exceeds the depth of the gas mains and it is likely that the covers or bedding material around the pipes will move, approval must be sought from APA Group's Capital Works team.
- iv. Installation of Utilities Across Gas Mains and Services: A minimum clearance of 300mm above and below and APA Group gas mains must be maintained unless otherwise approved by APA. If the width or depth of the excavation is such that the gas mains will be exposed or unsupported, then APA Group must be contacted to determine whether the gas mains should be taken out of service, or whether they need to be protected or supported. Protective cover strips when removed must be replaced under APA Group supervision.
- v. **Exposed Gas mains and Services:** Exposure of APA infrastructure shall be limited to potholing for location purposes. Any other exposure of pipe is not permitted unless expressly approved by APA Group. Exposed gas pipes must be protected by the constructor against the effects of heat by shielding or covering with a suitable material. Heating of exposed plastic pipes is dangerous. If depth of cover is compromised in any way due to works, please contact APA immediately.
- vi. **Heavy machinery Operation over Gas Mains and Services:** Where heavy "Crawler" or "Vibration" type machinery is operated over the top of gas mains, a minimum cover of 750mm to the gas mains must be maintained using load bearing protection whilst the machinery is in operation.
- vii. Directional Drilling Near Gas Mains and Services: When drilling parallel to gas mains, trial holes must be carefully hand dug at least every 4m to prove the actual location of the conduits/pipes before using drilling machinery. Where it is required to drill across the line of gas mains, the actual location of the gas mains must first be proven by the constructor by hand digging. A trench must be excavated one metre from the side of the gas mains where the auger will approach to ensure a minimum clearance of 600mm for gas mains can be maintained unless otherwise approved by APA.
- viii. **Explosives:** Clearances must be obtained from APA Group's Networks Engineering Manager for use of explosives in the vicinity of gas mains. Please contact the APA Group.
- b. Damage Reporting: All damage to conduits and pipes and any other gas infrastructure and property must be reported to APA Group no matter how insignificant the damage appears to be. Even very minor damage to protective coverings can lead to eventual failure through corrosion. All work in the vicinity of damaged infrastructure should cease and the area should be vacated until a clearance to continue work has been obtained from an APA Group officer. Please contact the Emergency number below to report damage.
- c. Solutions and Assistance: If it is determined that APA Group infrastructure is likely to be impacted or encroached upon by planned construction, APA Group must be contacted to arrange for possible engineering solutions. If APA Group relocation or protection works are part of the agreed solution, then payment to APA Group for the cost of this work will be the responsibility of the principal contractor. APA Group will provide an estimated quotation for work on receipt of the order number before work will proceed.
- d. Reinstatement: APA assets affected by third party works as highlighted above are to be reinstated as per APA requirements, potentially including but not limited to; warning tape/marker board, soft bedding/backfill materials, trench dimensions, depth of cover, trace wire for PE mains, compaction requirements, concrete protection, and surface re-instatement.

4. Contacting APA

GAS EMERGENCIES 24 HRS 1800 GAS LEAK (1800 427 532) GAS PLANT RELOCATIONS APA CAPITAL WORKS PH: 07 3215 6709 FAX: 07 3215 6699

TEAM (PERMITS OFFICE)
PH: 07 3215 6644
FAX: 07 3215 6699
permitsgld@apa.com.au

APA GROUP GAS ASSET LOCATIONS

DIAL BEFORE YOU DIG SUPPORT PH: 1800 085 628





HIGH PRESSURE GAS DISTRIBUTION MAINS "AUTHORITY TO WORK" REQUEST

N.B. THIS IS NOT A PERMIT TO WORK

SITE ADDRES	SS:	·····		
SUBURB:			UBD MAP REF:	
DBYD Sequer	nce Number:		Date of DBYD Enquiry	
(Note: Only val	id enquiries will be accepted and the c are valid for one month only. Enqui		equests will affect your permit period. renewed and a new application may l	
BROAD DESC	CRIPTION OF WORK (please pro	ovide any approv	als from APA Group related to the	nese works)
	CARRIED OUT:			
Class 1.	Location			_
01 0	Works crossing a high pressur	e gas mains		
Class 2.	Location	h nuana	agina	П
Class 3.	Works within 3 metres of a high Location	n pressure gas m	nains	
Class 3.	Works involving large excavation	one that would co	ause ground movement	
	vibrations or blasting beyond 3		_	
Class 4.	Location	in or a riight press	oure gas mains	
	Works within 1m of gas service	e or connection to	o industrial gas meter	
DETAILS OF	WORK INVOLVED (Tick Applic	ahle)	-	
Excavation	TOTAL INTO ET ES (TIOK APPRO		Change to surface level	
Service crossi	ng (Gas CONNECTION)		Boring	
Proving (Dial	Before You Dig)		Blasting	
Earthworks			Road Construction/Change?	
Vacuum Exca	vation		Other (give details)	
	rings, Block Plans etc, attached	Yes □	No □	
PROPOSED [DATES AND TIMES	From:	То:	
Excavation	//20	am/pm	// 20	am/pm
Backfill	/ / 20	am/pm	/ 20	am/pm
Insu	urance Cover – Current Level N	lone 🗌 💮 \$5M	□ \$10M □ \$20M □	Other





NOTES

- 1. This Authority to Work applies only to work in the vicinity of the Gas Mains. It does not authorise work near or on the Gas Mains itself
- 2. A minimum of 5 business days must be allowed between receipt by APA Group of this Request and a response. However, more time for notification may be necessary
- 3. For Class 1 and Class 2 classifications, this application must be accompanied by a detailed sequence of events, outlining all aspects of work involved and work is not permitted until an Authority to Work is issued
- 4. For class 1 and 2 Dial Before You Dig, APA Group will arrange for an inspector to be on site as necessary during the work. An inspector must be present at all times for works involving excavation within 1m of the Gas Mains. APA Group will advise the requirement for an inspector for other works within 3m of the Gas Mains
- 5. The applicant is responsible for any damage resulting from the work and all consequential damages and losses arising from such damage and therefore must insure against every liability of the contractor in respect of or arising out of any loss of life, loss of or damage to property of person (both real and personal), arising out of or in any way connected to this permit

Such insurance must be arranged for an indemnity of not less than \$20 Million unless otherwise agreed.
Permit Requested By (print name)
SignatureDate/
Company Name
Phone Email
Requestors PO Number
Site Contact Details: Name
Company / Contractor Responsible for Charges
Company / Contractor Name
Company / Contractor Email
Company / Contractor Phone

Please be advised

Under the Work Health and Safety Act 2011, each work place has an obligation to comply to Workplace Health and Safety Regulations and Codes of Practice.

APA Group brings to your attention Work Health and Safety Regulations 2011, Chapter 4: Hazardous Work. Failure to comply to the above regulation may result in APA Group reporting the non-compliance to Workplace Health and Safety.

Further information can be requested via:
Post: Permit Applications QLD

PO Box 885 Hamilton Central QLD 4007 Phone: (07) 3215 6644 though an application will most likely be required Email: permitsqld@apa.com.au

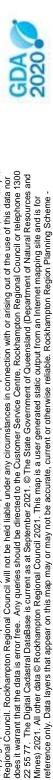


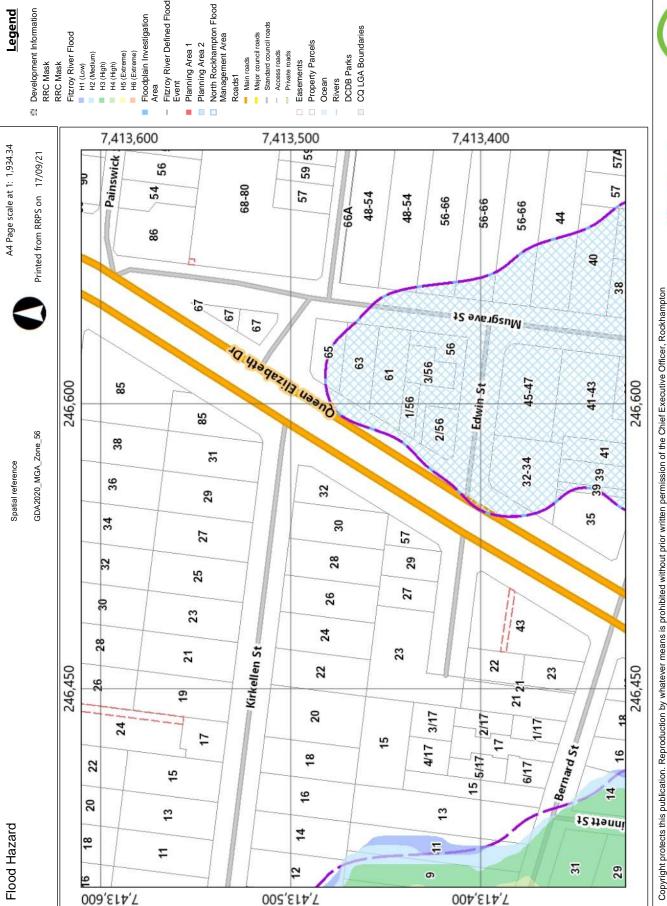
Appendix E RRC Overlays and Codes

















Regional Council. Rockhampton Regional Council will not be held liable under any circumstances in connection with or arising out of the use of this data nor does it warrant that the data is error free. Any queries should be directed to the Customer Service Centre, Rockhampton Regional Council or telephone 1300 226.57. The Digital Cadestral DataBase is current as at September 2021. © The State Government of Queensland (Department of Natural Resources and Miss 2, 2021, It diother data © Rockhampton Regional Council 2021. This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current or otherwise reliable. Rockhampton Region Planning Scheme -

9.3.8 Water and sewer code

9.3.8.1 Application

This code applies to assessing development where the code is identified as applicable in the tables of assessment.

When using this code, reference should be made to section 5.3.2 and, where applicable, section 5.3.3 located in Part 5.

9.3.8.2 Purpose

- The purpose of the water and sewer code is to ensure that development is provided with potable water and sewerage infrastructure in an efficient and sustainable way, which maintains public health. Ξ
 - The purpose of the code will be achieved through the following overall outcomes: Ξ
- development facilitates the efficient provision of water, including infrastructure for supply, treatment, storage and reticulation; (a)
- development facilitates the efficient provision of sewerage infrastructure, including reticulation, treatment, storage and disposal; whole of life cycle costs for water and sewerage infrastructure are minimised; and
- adverse impacts on the environment and the amenity of the locality are avoided and optimal use of water resources is maintained. © ©

9.3.8.3 Specific benchmarks for assessment

Table 9.3.8.3.1 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Assessment
Water		
PO1	A01.1	Complies
A water supply is provided that is adequate for	Where within a water supply planning area, the	
the current and future needs of the intended	development is connected to Council's	
development.	reticulated water supply system in accordance	
	with SCO.21 — water supply lillingstructure planning scheme policy and the Capricorn	
	Municipal Development Guidelines.	
	Editor's note—A network analysis may be required to	
	demonstrate compliance with this acceptable outcome.	
	Editor's note—Where development is located outside of the water	
	supply planning area to refer to the requirements under the	
	Plumbing Code of Australia.	

Performance outcomes	Acceptable outcomes	Assessment
P02	A02.1	N/A
Reticulated water supply networks ensure that the installation is sustainable and minimises whole of life cycle costs.	Where within a water supply planning area, water supply systems and connections are designed and constructed in accordance with SC6.21 — Water supply infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines.	
	Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome.	
	AND	
	MO2.2 Where within a water supply planning area, staged developments are connected to the water supply network and operational prior to the commencement of the use or endorsement of the survey plan.	
Sewer		
Po3 Sewerage treatment and disposal is provided that is appropriate for the level of demand generated, protects public health and avoids environmental harm.	AO3.1 Where within a sewer planning area, the development is connected to Council's reticulated waste water system in accordance with SC6.17 — Sewerage infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines.	Complies
	Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome.	
	Editor's note—Where development is located outside of the sewer planning area to refer to the requirements under the Plumbing Code of Australia.	
P04	A04.1	Complies
Reticulated sewer networks ensure that the installation of infrastructure assets is	Where within a sewer planning area, waste water systems and connections are designed	

Performance outcomes	Acceptable outcomes Assessment	
sustainable and minimises whole of life cycle costs.	rdance with SC6.17 — prdance with SC6.17 — planning scheme nunicipal s.	
	Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome.	
	AND	
	Mo4.2 Where within a sewer planning area, staged developments are connected to the waste water network and operational prior to the commencement of the use or endorsement of the survey plan.	
Point source waste water management		
PO5	A05.1	
The waste water management plan provides that waste water is managed in accordance with a waste management hierarchy that: (a) avoids waste water discharge to waterways; or minimises waste water discharge to waterways by reuse, recycling, recovery and treatment for disposal to sewer, surface water and groundwater if it is agreed waste water discharge to waterways can not practically and reasonably be avoided.	A waste water management plan (WWMMP) is prepared by a suitably qualified person. The waste water management plan accounts for: (a) waste water type; (b) climatic conditions; (c) water quality objectives; and (d) best practice environmental management.	



PINNACLE ENGINEERING GROUP

ABN: 80 608 431 625 Level 1, 19 Short Street, Southport QLD 4215 (PO Box 517, Paradise Point QLD 4216) www.pinnacleeng.com.au





SITE BASED STORMWATER MANAGEMENT PLAN

PROPOSED CHILDCARE CENTRE DEVELOPMENT 28-32 Kirkellen Street, Berserker QLD

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

17 November 2023

DATE

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

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ROSALIND CORPORATE PTY LTD

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1 Introduction

Pinnacle Engineering Group (Pinnacle) was engaged by Rosalind Corporate Pty Ltd to prepare a site based stormwater management plan (SBSMP) and undertake the associated investigations to provide supporting documentation for the proposed development application for a childcare centre development located at 24-32 Kirkellen Street, Berserker QLD within the local authority of the Rockhampton Regional Council (RRC).

1.1 Scope of Investigation

This report addresses the proposed stormwater management strategy for the aforementioned development, including but not limited to the following elements:

- Pre and post development flows for various Annual Exceedance Probability (AEP) / Average Recurrence Interval (ARI) design storm events;
- Nomination of the Lawful Point of Discharge for the subject site;
- Details of the stormwater quantity management strategy;
- Details of the stormwater quality treatment measures to be implemented for the site;
- Maintenance and monitoring strategy; and
- Sediment and erosion control plan.

1.2 Site Description

1.2.1 Site Location and Location

Street Address - 28-32 Kirkellen Street, Berserker QLD 4701

RP Description - Lot 5 and Lot 6 on RP606198 and Lot 12 on RP600705

Site Area - 0.2503 Hectares

Current Zoning - Low-Medium Density Residential

Proposed Use - Childcare Centre

Local Authority - RRC

Refer to Figure 1.1 for the site location.

1.2.2 Existing Site Conditions and Topography

A review of the topographic survey has revealed that the subject site generally falls from the western property boundary to the eastern property boundary. The subject site is currently occupied by three detached dwellings within the northern portion of the site, smaller concrete and hardstand areas and significant vegetation within the southwest corner.

Currently, the highest elevation of approximately RL8.35m AHD is reached along the western property boundary of the subject site while the lowest elevation of approximately RL7.40m AHD is reached along the eastern property boundary of the subject site.

The topographic mapping of the subject site is included in Appendix B. Refer to Figure 1.2 for the existing aerial view of the subject site.



1.2.3 Proposed Development

The proposed development will deliver a 94-place childcare centre over the subject site. The proposed childcare centre will provide on-grade car parking and be accessed from Queen Elizabeth Drive to the east of the subject site via a new vehicle cross-over.

The proposed development layout is included within Appendix A.

1.2.4 Existing Drainage Network

An existing sag gully inlet pit is located within the Kirkellen Street road reserve fronting the subject site. This inlet captures flow from the Kirkellen Street and Queen Elizabeth Drive road reserves prior to conveying the stormwater to the east. An existing field inlet pit and 300mm diameter reinforced concrete pipe (RCP) are located within the property to the south of the site being Lot 1 on RP606939 (57 Queen Elizabeth Drive). Flow captured by this inlet is conveyed to the adjacent gully pit within the Queen Elizabeth Drive before proceeding to the east via a 375mm RCP.

1.2.5 External Catchments

A review of the site topography and Council's interactive online mapping indicates that an existing external catchment discharges through the subject site.

It is proposed to convey the external catchment to the existing discharge location via swale drains and a stormwater pit and pipe system as required.

1.2.6 Flood Assessment

Following discussions with Council and a flood search conducted for the current premises, future revisions of the yet to be adopted RRC Planning Scheme will indicate that the subject site is inundated during the 1% AEP storm event from the nearby Fitzroy River. However, the current planning scheme shows that the site is located outside of the mapped flood affected area, and as such was adopted for the flood storage analysis.

We refer Council to the Flood Storage Technical Note for the subject site prepared by Pinnacle for an in-depth analysis of the prevailing flooding conditions.





Figure 1.1: Map View (Source: Google Maps)



Figure 1.2: Aerial View (Source: Nearmap)



2 Stormwater Quantity Assessment

2.1 Hydrologic Objectives

The hydrologic objectives for the site were established in accordance with the RRC Planning Scheme and QUDM. These objectives include but are not limited to:

- The proposed development shall ensure that all stormwater drainage is directed to the Lawful Point
 of Discharge in accordance with QUDM;
- Minor Drainage System Design for 10% AEP (Q₁₀) storm event;
- Major Drainage System Design for 1% AEP (Q₁₀₀) storm event;
- · No adverse impact on adjoining upstream or downstream properties; and
- No increase in post-development flows, up to and including the 1% AEP (Q₁₀₀) storm event.

2.2 Lawful Point of Discharge

The Lawful Point of Discharge for the subject site is taken as the existing stormwater infrastructure within the Kirkellen Street road reserve to the north of the subject site.

2.3 Stormwater Quantity Analysis

The analysis of the surface water runoff from the site was performed using the non-linear program XP-Rafts.

2.3.1 Temporal Patterns

The design rainfall Intensity Frequency Duration (IFD) data for the storm events up to and including the 1% AEP storm event was derived based on the RRC Planning Scheme and the AR&R.

The design IFD data for the catchment is summarised Figure 2.1 below.

The temporal patterns utilised by the XP-Rafts analysis were derived in accordance with Australian Rainfall and Runoff (AR&R), 2016 edition.



	Annual Exceedance Probability (AEP)						
Duration	63.2%	39.35%	18%	10%	5%	2%	1%
1 <u>min</u>	158	196	239	275	316	372	417
2 min	132	163	200	230	263	308	343
3 <u>min</u>	125	154	189	217	249	291	325
4 <u>min</u>	120	148	181	208	239	280	312
5 <u>min</u>	115	143	174	200	230	270	301
10 <u>min</u>	96.3	119	145	167	192	226	253
15 <u>min</u>	82.3	102	124	143	164	194	217
20 <u>min</u>	71.9	88.8	108	125	144	169	190
25 <u>min</u>	64.0	79.0	96.4	111	128	151	169
30 <u>min</u>	57.7	71.3	87.1	100	116	136	153
45 <u>min</u>	45.0	55.6	68.1	78.7	90.6	107	120
1 hour	37.2	46.0	56.6	65.4	75.5	89.3	100
1.5 hour	28.1	34.8	43.1	50.0	57.8	68.6	77.3
2 hour	22.9	28.4	35.4	41.2	47.8	56.9	64.2
3 hour	17.0	21.3	26.9	31.5	36.7	43.9	49.8
4.5 hour	12.7	16.0	20.5	24.2	28.4	34.3	39.1
6 hour	10.4	13.1	17.0	20.2	23.9	29.1	33.3
9 hour	7.80	9.96	13.2	15.8	19.0	23.3	26.9
12 hour	6.40	8.22	11.0	13.4	16.2	20.1	23.4
18 hour	4.85	6.29	8.66	10.7	13.1	16.5	19.3
24 hour	3.99	5.20	7.28	9.09	11.3	14.3	16.9
30 hour	3.43	4.48	6.35	8.01	10.0	12.8	15.2
36 hour	3.02	3.96	5.67	7.21	9.06	11.7	13.9
48 hour	2.47	3.24	4.71	6.05	7.68	9.96	11.9
72 hour	1.83	2.41	3.56	4.62	5.93	7.75	9.33
96 hour	1.47	1.93	2.85	3.72	4.81	6.30	7.61
120 hour	1.22	1.61	2.37	3.09	4.00	5.25	6.35
144 hour	1.05	1.38	2.02	2.61	3.39	4.45	5.38
168 hour	0.919	1.21	1.75	2.25	2.91	3.82	4.62

Figure 2.1: IFD Data for Berserker, QLD (mm/hr) (Source: BOM)



2.3.2 XP-Rafts Modelling Inputs

Rainfall loss parameters for each sub-catchment were applied using an initial and continuing rainfall loss model. The design loss parameters input into the XP-Rafts model are based on the characteristic values recommended by AR&R and other reputable industry standards.

The loss parameters adopted for this XP-Rafts model are tabulated below.

Table 2.1: Adopted XP-Rafts Initial and Continuing Loss Parameters

Storm Event	Perviou	ıs Areas	Impervio	us Areas
ARI (years)	Initial Loss (mm)	Continuing Loss (mm)	Initial Loss (mm)	Continuing Loss (mm)
2-5	15	2.5	1	0
10-20	10	2.5	1	0
50-100	2.5	2.5	0	0

2.3.3 XP-Rafts Model Validation

The validation of the XP-Rafts model was undertaken through a comparison of the XP-Rafts flow rates to the Rational Method calculations included in Appendix D.

The Rational Method adopted a C_{10} coefficient of runoff of 0.71 for the pre-development catchment, in accordance with Table 4.5.3 from QUDM. As detailed in Table 2.2 the flow calculated using the Rational Method is generally comparable to the results obtained from the XP-Rafts model. We can therefore reasonably adopt the flows generated from the XP-Rafts model.

2.3.4 Critical Duration Analysis

Storm durations ranging from 10-minutes to 360-minutes were simulated within the XP-Rafts model to determine the design flows.

2.3.5 Existing Discharge Points

As outlined in the previous sections of this report the subject site currently discharges over the eastern property boundary before entering the existing stormwater network within the adjacent property to the south of the subject site. It is proposed to discharge alter the discharge location post-development, and directly discharge into the existing stormwater network within the Kirkellen Street road reserve.

2.4 Hydrologic Analysis

2.4.1 Pre-development Case

The results generated from the XP-Rafts model generally indicate that the critical storm duration for the catchment for all AEP flood events is generally the 25-minute storm.

A percentage impervious area of 21% was calculated for the pre-development catchment internal to the site from the satellite imagery sourced from Nearmap. The pre-development catchment discharges for the 10% (Q_{10}) , 5% (Q_{20}) , 2% (Q_{50}) and 1% (Q_{100}) AEP events are detailed in Table 2.2 below.



Table 2.2: Pre-development Catchment Details and Discharges

Catchment	Area	Impervious Area	Average Slope	XP-Rafts Results (m³/s)			Rational Method $(C_{10} = 0.71)$	
(ha)		(ha) (ha)	(ha) (%)	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP
				(Q ₁₀)	(Q ₂₀)	(Q ₅₀)	(Q ₁₀₀)	(Q ₁₀₀)
Α	0.2503	0.0504	1.50%	0.083	0.101	0.122	0.140	0.129
EXT	0.2420	0.0428	4.00%	0.107	0.127	0.159	0.184	-

2.4.2 Post-development Case - Unmitigated

The proposal is to construct a childcare centre and associated on-grade car park and infrastructure over the existing allotment.

A fraction impervious of 0.71 was calculated for the post-development case from the proposed site layouts provided by APMS. For the purposes of this analysis the post-development catchment was further split into sub-catchments, being the respective roof, ground and road areas.

A copy of the proposed development layouts is included in Appendix A with a post-development catchment plan included in Appendix C.

The impervious areas were modelled using the second sub-catchment feature within XP-Rafts. The total impervious area for each catchment is tabulated below. The results of the XP-Rafts post-development analysis indicate that the critical storm duration throughout the catchment is generally the 15-minute storm event.

Table 2.3 summarises the post-developed peak flow rates for the post-development catchment.

Table 2.3: Post-development Catchment Details and Discharges (Unmitigated)

	Total	Average	Impervious			s Results ³ /s)	
Catchment	Area (ha)	Slope (%)	Area (ha)	10% AEP (Q ₁₀)	5% AEP (Q ₂₀)	2% AEP (Q ₅₀)	1% AEP (Q ₁₀₀)
A1 – Roof	0.0709	2.0	0.0709	0.045	0.052	0.061	0.069
A2 – Car Park	0.0721	0.75	0.0721	0.045	0.051	0.060	0.067
A3 – Ground	0.1073	0.75	0.0247	0.019	0.026	0.047	0.055
Site Total	0.2503	-	0.1677	0.109	0.129	0.168	0.191

A comparison of the XP-Rafts results in Tables 2.2 and 2.3 generally shows a decrease in the site total discharge of $0.026m^3/s$, $0.028m^3/s$, $0.046m^3/s$ and $0.051m^3/s$ for the 10% (Q₁₀), 5% (Q₂₀), 2% (Q₅₀) and 1% (Q₁₀₀) AEP storm events. This increase in flows is attributed to the increase in impervious areas across the site during the post-development scenario.

It is proposed to mitigate the increases in discharge through the use of a detention tank which will accept stormwater discharge form the roof, carpark and ground catchments.



2.5 Post Development Stormwater Mitigation Strategy

The following strategy is proposed to mitigate the post-development stormwater discharge to the site's predevelopment discharge rates.

- Attenuation of post-development storm discharge from the site through the use of a detention tank located within the northeast corner of the site, beneath the proposed carpark;
- Discharge the minor 10% AEP (Q₁₀) stormwater runoff to the Lawful Point of Discharge via a piped stormwater network;
- Discharge the major 1% AEP (up to Q₁₀₀) stormwater runoff to the Lawful Point of Discharge via a piped stormwater network and overland flow;
- Direct all stormwater runoff from the roof, carpark and ground catchments to the proposed detention tank via an internal stormwater reticulation networks and overland sheet flow prior to discharge to the Lawful Point of Discharge; and
- Generally, maintain the existing drainage regimes and drainage discharge locations.

2.5.1 **Detention Tank Design**

Table 2.4 details the proposed detention tank characteristics with Table 2.5 detailing the tank storage/height relationship adopted for the XP-rafts analysis.

Table 2.4: Detention Tank Characteristics

Design Parameter	Details
	Low-flow Outlet = 2 x 0.2m diameter orifice outlets
T 10 11 1	Low-flow Outlet Level = at base of tank
Tank Outlets	High-flow Weir = 1.0m wide x 0.1m high
	High-flow Outlet Level = 0.7m above base of tank
	Detention Base Area = 70m ²
Geometry	Volume of 56m ³ at 0.8m deep above base of tank
	10% AEP (Q ₁₀) Peak Outflow = 0.079m ³ /s
	10% AEP (Q ₁₀) Peak Stage = 0.325m
Modelling Summary	1% AEP (Q ₁₀₀) Peak Outflow = 0.111m ³ /s
	1% AEP (Q ₁₀₀) Peak Stage = 0.771m

Table 2.5: Tank Height/Storage Relationship

Tank Height (m)	Tank Storage (m³)	Tank Height (m)	Tank Storage (m³)
0	0	0.5	35.0
0.1	7.0	0.6	42.0
0.2	14.0	0.7	47.0
0.3	21.0	0.8	54.0
0.4	28.0	-	-



2.5.2 Post-development Case - Mitigated

Table 2.6 details the attenuation of the site total peak discharge via the proposed detention tank located within the northeast corner of the site beneath the proposed carpark.

Table 2.6: Post-development Scenario

	` ·	arge to Kirkellen Street	Difference	Difference
Storm Event	Pre (m³/s)	Post (m³/s)	(%)	(m³/s)
10% AEP (Q ₁₀)	0.083	0.079	-4.82%	-0.004
5% AEP (Q ₂₀)	0.101	0.088	-12.87%	-0.013
2% AEP (Q ₅₀)	0.122	0.101	-17.21%	-0.021
1% AEP (Q ₁₀₀)	0.140	0.111	-20.71%	-0.029

The results presented demonstrate that the proposed detention tank successfully attenuates the postdevelopment site discharge to the pre-developed rates.

2.6 External Catchment Conveyance Strategy

As documented in Section 1.2.5, an external catchment upstream of the subject site has been identified. Based on the location of kerb adaptors of properties within the upstream catchment, roofwater runoff will discharge to the road reserve. It is proposed to convey the residual ground catchment of the external catchment to the Lawful Point of Discharge location by constructing swale drains and a stormwater network as required.

Refer to the stormwater management layout plan within Appendix E for details.



3 Stormwater Quality Assessment

3.1 Water Quality Objectives

This water quality analysis for the subject site was undertaken in accordance with the requirements of the RRC Planning Scheme, Healthy Waterways WSUD Technical Design Guidelines for South East Queensland – Version 1 and the Queensland State Planning Policy, July 2017.

The pollutant types and the associated Load Reduction Objectives (LRO) that will be evaluated are as follows:

Table 3.1: LRO Summary

Pollutant Types	Site Water Quality Objective
Total Suspended Solids (TSS)	85% reduction
Total Phosphorous (TP)	60% reduction
Total Nitrogen (TN)	45% reduction
Gross Pollutants (GP)	90% reduction

3.2 Proposed Treatment Strategy

In order to meet the above water quality objectives, a treatment train has been proposed for the proposed development which comprises of a number of individually designed proprietary Ocean Protect treatment devices that collectively contribute to the achievement of the water quality objectives.

3.3 Proposed Treatment Measures

The following water quality treatment measures are proposed for this development.

3.3.1 Ocean Protect Water Quality Treatment Products

The OceanGuard effectively acts as a gross pollutant trap, and is typically located within inlet pits or immediately preceding an inflow pipe into a rainwater or detention tank receiving surface runoff. The system uses a mesh and grated system to capture 'large' pollutants prior to further nutrient and fine particle treatment.

The StormFilter cartridge system is a passive, flow-through stormwater filtration system which consists of a number of filter cartridges containing a variety of filter media. The system works based on the incoming hydraulic grade forcing water up and into the cartridge system which traps and slowly releases the runoff, containing pollutants within the filter. Clean water is then discharged out of the system and into downstream infrastructure.

Figure 3.1 below illustrates a typical filter Ocean Protect StormFilter OceanGuard treatment train configuration. Additional information on Ocean Protect treatment devices is included in Appendix G.



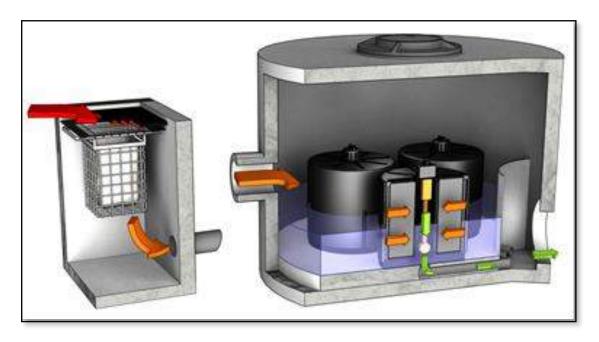


Figure 3.1: Typical Ocean Protect Treatment Train Configuration (Source: Ocean Protect)

3.4 Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Analysis

The proposed stormwater quality treatment train is detailed within Appendix F with additional details of the MUSIC modelling procedure described in the following sections.

3.4.1 Meteorological Data

The meteorological data inputs utilised by MUSIC to simulate catchment hydrology processes includes rainfall data based on different climactic regions (at intervals relevant to the time step being modelled) and average areal potential evapotranspiration (measured in millimetres per day).

The meteorological data adopted for this model was the Rockhampton Aero station 039083 (6-minute time step 1980-1990).

3.4.2 MUSIC Source Nodes

The MUSIC source node properties for a split catchment were obtained from the Healthy Waterways MUSIC Modelling Guidelines for Southeast Queensland and are as follows.

Table 3.2: Pollutant Export Parameter for Split Catchment (Log¹⁰ Values)

		Mean EMC (mg/L)					
Land Use		TSS		TP		TN	
Commercial		Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Dest	Mean	1.30	0.00	-0.89	0.00	0.37	0.00
Roof	Std. Deviation	0.38	0.00	0.34	0.00	0.34	0.00
Decide	Mean	2.43	0.78	-0.30	-0.60	0.37	0.32
Roads	Std. Deviation	0.38	0.39	0.34	0.50	0.34	0.30
	Mean	2.16	0.78	-0.39	-0.60	0.37	0.32
Ground	Std. Deviation	0.38	0.39	0.34	0.50	0.34	0.30



3.5 Performance Assessment

The site was modelled as a number of urban residential source nodes. The MUSIC model parameters were adopted in accordance with the RRC Planning Scheme and are outlined within Table 3.3 below.

Table 3.3: Adopted MUSIC Model Source Node Parameters

Parameter	Value
Source Data	
Rainfall data and modelling period	Rockhampton Aero 039083
Modelling period	1980 – 1989
Model time step	6 Minute
Soil properties (Rainfall runoff parameter)	Commercial
Site Data	
Catchment A – Commercial	A1 – 0.0709 Ha – Roof (100% Impervious)
	A2 – 0.0721 Ha – Road/Driveway (100% Impervious)
	A3 – 0.1073 Ha – Landscaping/Ground (23% Impervious)

Table 3.4: Adopted MUSIC Model Treatment Node Parameters

Parameter	Value
Treatment Devices	
Catchment A – OceanGuard	<u>OceanGuard</u>
Note: All stormwater pits capturing surface flow	Required number = 2 (1 per inlet pit)
must be fitted with an OceanGuard.	High flow bypass = 0.02m ³ /s (0.02m ³ /s per OceanGuard)
Catchment A – StormFilter	StormFilter Chamber High flow bypass = 0.009m³/s
	Storage surface area = 10.0m ²
	Extended detention depth = 0.54m
	Equivalent pipe diameter = 41mm
	StormFilter Cartridge
	Type = 460mm PSorb
	Required number = 5
	High flow bypass = 0.0023m ³ /s

3.6 MUSIC Analysis Results

Table 3.5 summarises the load analysis and reduction achieved by MUSIC using the WSUD strategy outlined above.

Table 3.5: MUSIC Pollutant Load Assessment - Lawful Point of Discharge

System	Parameter	Sources	Residual Load	Reduction (%)
	Total Suspended Solids (kg/yr)	307	30.3	90.1
	Total Phosphorous (kg/yr)	0.669	0.225	66.4
Receiving Node	Total Nitrogen (kg/yr)	4.52	2.49	45.0
	Gross Pollutants (kg/yr)	29.2	0.0	100

As detailed within Table 3.5 above, the LRO of 85% for TSS, 60% for TP, 45% for TN and 90% for GP as described in Section 3.1 were achieved for the post-development scenario.



4 Monitoring and Maintenance Strategy

4.1 Monitoring of Stormwater Quality Treatment Devices

A monitoring program will be established for the stormwater treatment devices as required by Ocean Protect.

Ocean Protect will be responsible for all monitoring activities associated with the operation of the treatment train which will be undertaken under a maintenance agreement between Ocean Protect and the Developer.

4.2 Maintenance of Stormwater Quality Treatment Devices

The ongoing performance of the Ocean Protect treatment devices will be dependent on the regular maintenance conducted.

The maintenance program will be as required by Ocean Protect and will be undertaken as part of maintenance agreement between Ocean Protect and the Developer.



5 Erosion and Sediment Control Strategy

The objective of erosion and sediment management on construction sites is to minimise soil erosion and control silt and/or sediment discharge from the sites through the use of suitable control devices during the four primary phases of the project lifecycle being:

- 1. Pre-construction/Establishment Phase;
- 2. Change to Ground Level Phase;
- 3. Construction Phase; and
- 4. Post-development/Operational Phase.

Sections 5.2 and 5.3 below outline the typical and industry best practice erosion and sediment control measures that will be implemented throughout the life cycle of this project.

5.1 Development Lifecycle Erosion and Sediment Management

5.1.1 Pre-construction/Establishment Phase

Prior to the commencement of construction, during the site establishment phase of the works, the following sediment and erosion control measures will be implemented in order to minimise site disturbance and ensure that water quality is maintained.

- Silt/Sediment fences will be installed around the proposed bulk earthworks site (along the toe of the batter alignment) and any environmentally sensitive areas; and
- A construction vehicle entry/exit shakedown area will be installed and will comprise of a vibratory cattle grid or gravel/rock pad in accordance with the IEAust Guidelines.

5.1.2 Bulk Earthworks/Change to Ground Level Phase

Excavation during the bulk earthworks/change to ground level phase of the project will be staged in a manner that runoff will generally be directed towards sediment and erosion controls established during the preconstruction phase.

As applicable, sediment basins will be constructed within proposed park/open space areas generally in the location of the proposed bio-retention basins to ensure that all sediment runoff is intercepted and treated prior to discharging from site.

5.1.3 Construction Phase

During the construction phase of the project, the following erosion and sediment controls will be implemented to ensure water quality is maintained.

- Sediment fences will be erected at the base of all batters and stockpiles to prevent sediment transportation offsite;
- All sediment and erosion control structures will be maintained and inspected regularly as well as after
 each storm event to ensure the ongoing integrity is maintained. No structure is to accumulate
 sediment above 40% of its capacity; and
- Regular monitoring of water quality will be undertaken to determine the effectiveness of the sediment
 and erosion control measures. Testing may be required and shall be provided to the Local Authority
 on request.



5.1.4 Post-development/Operational Phase

Following the completion of the construction phase of the project and the development reaching 'Practical Completion' and/or 'On-maintenance', a monitoring program will be established for the stormwater treatment devices outlined previously within this report, where applicable. The monitoring program will ensure the ongoing integrity and effectiveness of these stormwater treatment devices following the completion of the construction phase of the project.

5.2 **Dust Suppression and Erosion Control Measures**

The time of disturbance onsite will be kept to a minimum by ensuring that the civil works are undertaken directly following the earthworks phase. Consideration to staging of the works shall be given in order to minimise the area of exposed earthworks at any given time.

Erosion control and dust suppression measures shall be applied to the exposed areas of the site as deemed necessary by the site supervisor in order to prevent the emission of dust from the site.

A number of erosion control measures are available inclusive of but not limited to the following:

- Water spraying (by water truck);
- Dust suppressants;
- · Surface stabilisation; and
- Covering of exposed areas.

5.3 Sediment Control Measures

With reference to the IEAust Guidelines and Current Industry Best Practice, there are three (3) fundamental sediment control principles that have been identified for use during construction:

- Construction Vehicle Shakedown and/or Entry/Exit;
- Sediment Fences; and
- Sediment Barriers.

5.3.1 Construction Vehicle Shakedown and/or Entry/Exit

A dedicated construction vehicle shakedown will be installed at the site's entry/exit point for road and construction vehicles. This construction vehicle shakedown area will be established to facilitate the removal of soil, mud, dust and debris from the tyres of vehicles prior to leaving the construction site. The construction shakedown will comprise of a gravel/rock pad designed or a vibratory grid system constructed and maintained in accordance with the IEAust Guidelines.

The advantages of the vibratory grid system include ease of movement and ability to reuse for several years at different construction sites.

5.3.2 Sediment Fences

Sediment fencing will be established at the bottom of slopes on any exposed earthworks batters where there is an established risk of contaminated water discharging from the site during construction. Sediment fencing may be required at regular spacing down the disturbed slope to limit scour and rutting caused by channelising of stormwater discharge. Sediment fences will be used to protect any temporary stockpile sites as required. Sediment collected from sediment barriers will be regularly removed and either taken offsite as part of the earthworks phase or stockpiled for use during revegetation works.



5.3.3 Sediment Barriers

Sediment barriers will be constructed around all stormwater drainage gully pits and field inlets where contaminated water may enter the existing and proposed stormwater network. The provision of these sediment barriers will facilitate the settlement of sediments prior to entering the downstream stormwater drainage network. Sediment barriers will generally comprise of gravel wrapped in geotextile 'sausage', sediment fences around field inlets or similar approved products.

5.4 Monitoring and Maintenance

The site supervisor will be responsible for the following regular monitoring and maintenance activities during the various phases of the development:

- 1. Inspection of downstream stormwater network as well as sediment and erosion controls will be conducted at the end of each construction day and after each rainfall event greater than 25mm.
- If any established complaints by neighbouring property owners and/or local authority or evidence of water quality deterioration is reported downstream of the works site the following actions are to be taken immediately:
 - a. locate source of stormwater quality deterioration.
 - construct temporary erosion and sediment controls to prevent the continuing short term stormwater quality deterioration.
 - c. repair existing erosion and sediment controls, modify construction procedures or construct additional controls to prevent further deterioration.



6 Conclusions and Recommendations

This report outlines the stormwater management strategy developed to manage potential impacts due to the proposed childcare centre development located at 28-32 Kirkellen Street, Berserker.

Following the investigation, the following stormwater design strategy has been adopted for the site:

- Attenuation of post-development storm discharge from the site through the use of a detention tank located within the northeast corner of the subject site, beneath the proposed carpark;
- Discharge the minor 10% AEP (Q₁₀) stormwater runoff to the Lawful Point of Discharge via a piped stormwater network;
- Discharge the major 1% AEP (up to Q₁₀₀) stormwater runoff to the Lawful Point of Discharge via a piped stormwater network and overland flow;
- Best practice stormwater quality management techniques will be implemented to achieve water quality objectives by directing stormwater runoff from the development to the dual-use stormwater detention and treatment tank for treatment prior to discharging from the site; and
- Implementation of typical erosion and sediment control devices during the four (4) primary phases of the proposed development.

Following the completion of this investigation we can conclude that the development site, with the implementation of the stormwater management strategy outlined in this report, will result in a 'no worsening' effect of the current stormwater discharge conditions upstream or downstream of the site.



7 Reference Documentation

Rockhampton Region Planning Scheme Version 2.1 (RRC, 2020)

Capricorn Municipal Development Guidelines (CMDG, 2020)

Institution of Engineers, Australia (2016) "Australian Rainfall and Runoff - A Guide to Flood Estimation"

Institute of Public Works Engineers Australia (Queensland Division) (2016) "Queensland Urban Drainage Design Manual (QUDM)", Fourth Edition

The State of Queensland: Department of State Development, Infrastructure and Planning, July 2017. State Planning Policy

Water by Design (2018) "MUSIC Modelling Guidelines Version 3.0" - Consultation Draft, November 2018



Appendix A **Proposed Development Plans**

AREA SCHEDULE		
SITE COVER: SITE COVER: SITE AREA::	35.62% 891.56m ² 2,503.00m ²	
GBA <u>CHILDCARE:</u> GROUND LEVEL:	693.23m²	
OUTDOOR STORE: VERANDAHS: SERVICES COURTYARD:	24.65m² 124.34m² 15.79m²	
AREA PER PLACE: BUILD + O.STORE: (717.88m²) BUILD + O.STORE + VERANDAH: (842.22m²)	7.64m² 8.96m²	
PLAY AREAS: GROUND LEVEL (INC. VERANDAHS)	741.71m²	
CARPARK:	719.02m ²	
POPULATION: CHILDREN: FULL TIME STAFF:	94 15	
CAR PARKING REQUIRED: 1 PER 6 PLACES + 1 PER FTE	31	
CAR PARKING PROVIDED: (INCUDES 1 DISABLED)	27	

MEETS AND BOUNDS ARE TO BE CONFIRMED WITH A DWG/TITLE PLAN

KIRKELLEN STREET





CHILDCARE BERSERKER

28-32 KIRKELLEN ST & 29 EDWIN ST BERSERKER QLD

dwg no_rev: 21089_SK-130_D project no: 21089 1:250 issue date:

FLOOR PLAN

7/09/2021

CONCEPT — NOT FOR CONSTRUCTION —

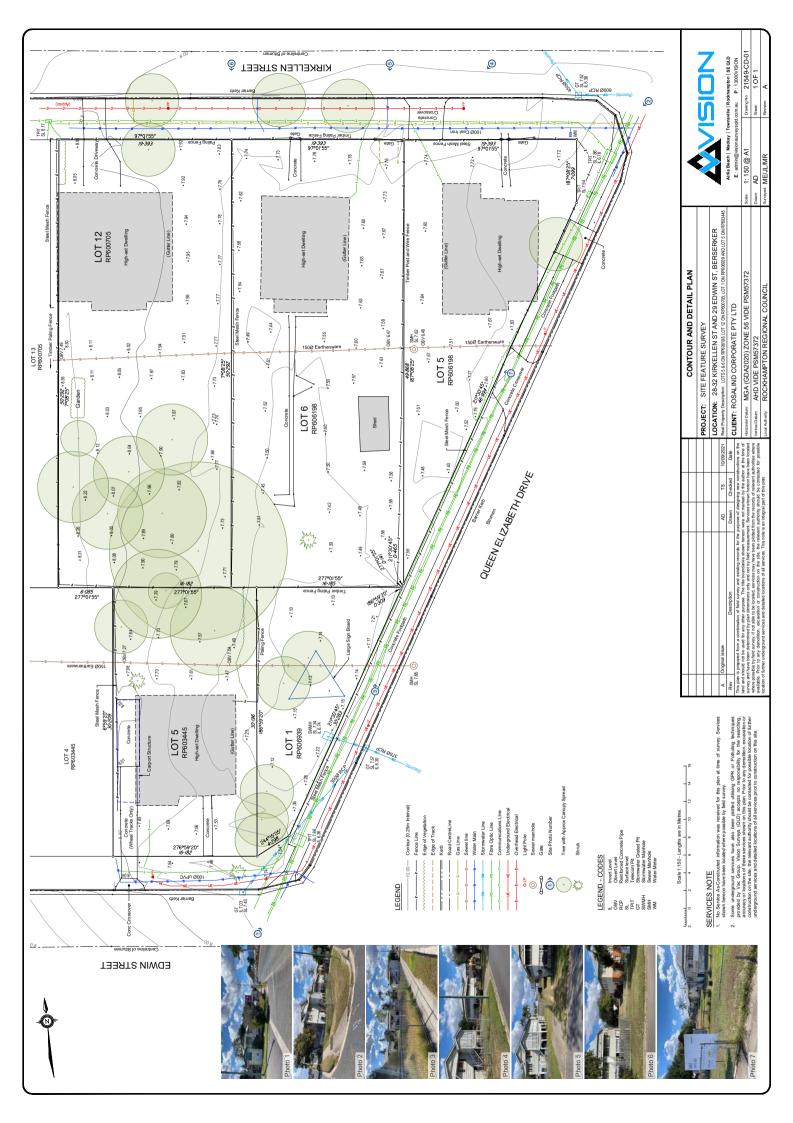
7/09/2021





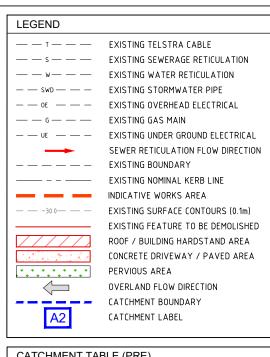


Appendix B **Topographic Data**





Appendix C **Stormwater Catchment Plans**



CATCHMENT TABLE (PRE)

CATCHMENT AREA - A

0.2503 ha

CATCHMENT DATA	Α	EXT
BUILDING / ROOF AREA	0.0424 ha	0.0000 ha
HARDSTAND / DRIVEWAY	0.0080 ha	0.0428 ha
GARDEN / PERVIOUS AREA	0.1999 ha	0.2044 ha
TOTAL IMPERVIOUS AREA	0.0504 ha	0.0428 ha
TOTAL PERVIOUS AREA	0.1999 ha	0.2044 ha

NOTES

- 1. THE LOCATION OF THE EXISTING SERVICES HAS BEEN PLOTTED FROM SURVEY AND RECORDS AND IS TO BE CONFIRMED PRIOR TO CONSTRUCTION.
- HISTORICAL AERIAL PHOTOGRAPHY HAS BEEN USED TO VALIDATE SURVEY DATA AND ESTABLISH PRE-DEVELOPMENT CATCHMENTS.







DESCRIPTION DRAWN DATE DATE ISSUED FOR COMMENT M.G. 23.09.2021 B. POPA 23.09.2021 REVIEW ISSUED FOR APPROVAL J.H. 06.10.2021 DESIGN J. HARDMAN 23.09.2021 J.H. 14.02.2022 RESPONSE TO COUNCIL RF 23.09.2021 SCALE

ROSALIND CORPORATE PTY LTD

PROPOSED CHILDCARE CENTRE DEVELOPMENT 28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND LOT 12 ON RP600705)

PRE DEVELOPMENT CATCHMENT LAYOUT

STATUS

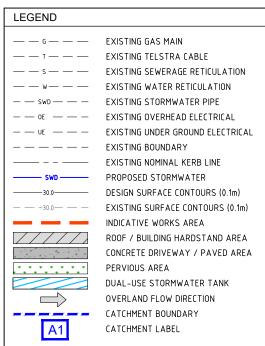
(NOT TO BE USED FOR CONSTRUCTION)

PEG0884-DA-SK01

ANY EXCAVATION OR CONSTRUCTION WORKS.

LEVEL 1 19 SHORT STREET, SOUTHPORT QLD 4215 (PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU

PRELIMINARY



CATCHMENT TABLE (POST)

CATCHMENT AREA – A1 (ROOF/BUILDING)	0.0709 ha
CATCHMENT AREA - A2 (DRIVEWAY/SLAB)	0.0721 ha
CATCHMENT AREA - A3 (GROUND/LANDSCAPING)	0.1073 ha

CATCHMENT DATA	A1	A2	A3	EXT
ROOF / BUILDING AREA	0.0709 ha	N/A	N/A	N/A
DRIVEWAY / ROAD	N/A	0.0721 ha	N/A	0.0428 ha
GROUND / GARDEN	N/A	N/A	0.1073 ha	0.2044 ha
TOTAL IMPERVIOUS AREA	0.0709 ha	0.0721 ha	0.0247 ha	0.0428 ha
TOTAL PERVIOUS AREA	N/A	N/A	0.0826 ha	0.2044 ha

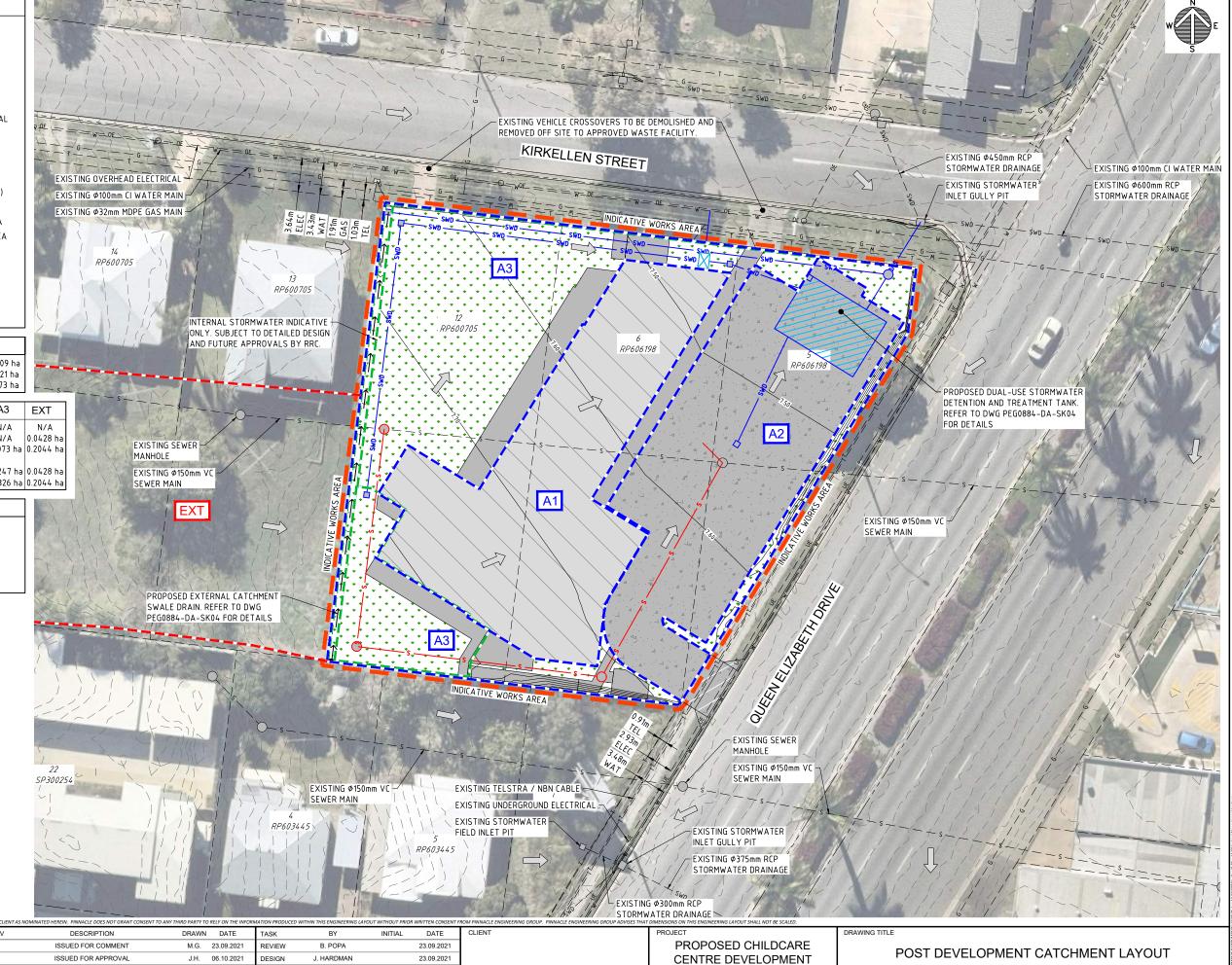
NOTES

- THE LOCATION OF THE EXISTING SERVICES HAS BEEN PLOTTED FROM SURVEY AND RECORDS AND IS TO BE CONFIRMED PRIOR TO CONSTRUCTION.
- 2. THE DETAILED DESIGN OF THE DISCHARGE PIPE WORK IS THE SUBJECT OF THE SEPARATE PLUMBING AND DRAINAGE APPLICATION.



The Essential First Step.

CONTACT THE RELEVANT AUTHORITIES TO CONFIRM THE EXACT LOCATION OF PUBLIC UTILITY PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.





J.H. 14.02.2022 RESPONSE TO COUNCIL RF 23.09.2021 SCALE

ROSALIND CORPORATE PTY LTD

CENTRE DEVELOPMENT 28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND LOT 12 ON RP600705)

STATUS

PRELIMINARY PEG0884-DA-SK02 C (NOT TO BE USED FOR CONSTRUCTION)

LEVEL 1 19 SHORT STREET, SOUTHPORT QLD 4215 (PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU



Appendix D Rational Method Calculations

RATIONAL METHOD CALCULATIONS

Project: PEG0884_28-32 Kirkellen St, Berserker

Date: 22-Sep-21 Designed: J. Hardman

Comments: Catchment A - Pre-development



PARAMETERS VALUE

Catchment Name A
Catchment Size 0.2503 ha

C10 Coefficient of Runoff (QUDM T4.5.3 ($f_i = 0.21$, ${}^1I_{10} = 65.4$))

Total Time of Concentration QUDM Figure 4.4

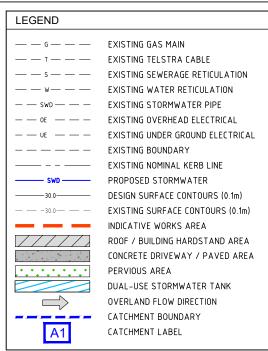
Total time of Conentration (tc) 10.0 mins

Rational Method for Peak Catchment flow Q = 0.00278 x C x I x A

ARI	Rainfall Intensity	Rainfall Depth	Fy	Coefficient of Runoff	Discharge
	(mm/h)	(mm)			(m ³ /s)
3 month					0.019
1	97.10	16.18	0.80	0.57	0.038
2	108.00	18.00	0.85	0.60	0.045
5	144.00	24.00	0.95	0.67	0.068
10	169.00	28.17	1.00	0.71	0.083
20	195.00	32.50	1.05	0.75	0.101
50	229.00	38.17	1.15	0.82	0.130
100	217.00	36.17	1.20	0.85	0.129



Appendix E **Stormwater Management Layout**



CATCHMENT TABLE (POST)

CATCHMENT AREA - A1 (ROOF/BUILDING)	0.0709 ha
CATCHMENT AREA - A2 (DRIVEWAY/SLAB)	0.0721 ha
CATCHMENT AREA - A3 (GROUND/LANDSCAPING)	0.1073 ha

CATCHMENT DATA	A1	A2	A3	EXT
ROOF / BUILDING AREA DRIVEWAY / ROAD GROUND / GARDEN	0.0709 ha N/A N/A	N/A 0.0721 ha N/A		N/A 0.0428 ha 0.2044 ha
TOTAL IMPERVIOUS AREA TOTAL PERVIOUS AREA	0.0709 ha N/A			0.0428 ha 0.2044 ha

NOTES

- THE LOCATION OF THE EXISTING SERVICES HAS BEEN PLOTTED FROM SURVEY AND RECORDS AND IS TO BE CONFIRMED PRIOR TO CONSTRUCTION.
- THE DETAILED DESIGN OF THE DISCHARGE PIPE WORK IS THE SUBJECT OF THE SEPARATE PLUMBING AND DRAINAGE APPLICATION.



The Essential First Step.

UNDERGROUND PUBLIC UTILITY PLANT EXISTS IN THIS VICINITY. THE CONTRACTOR IS ADVISED TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM THE EXACT LOCATION OF PUBLIC UTILITY PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.





DESCRIPTION	DRAWN	DATE	TASK		BY		11	NITIAL
ISSUED FOR COMMENT	M.G.	23.09.2021	REVIEW	В.	POPA			
ISSUED FOR APPROVAL	J.H.	06.10.2021	DESIGN	J. HA	ARDMA	N		
RESPONSE TO COUNCIL RFI	J.H.	14.02.2022	DRAWN	M. G	LASSO	N		
			SCALE					
			CCALE	2 1 0	2	4	6	8

ROSALIND CORPORATE PTY LTD

23.09.2021

SCALE ABOVE DENOTES ORIGINAL SHEET SIZE - A1

PROPOSED CHILDCARE
CENTRE DEVELOPMENT
28-32 KIRKELLEN STREET
BERSERKER QLD 4701
(LOT 5 & 6 ON RP606198 AND
LOT 12 ON RP600705)

STORMWATER MANAGEMENT LAYOUT

STATUS

APPROVED

RPEQ N

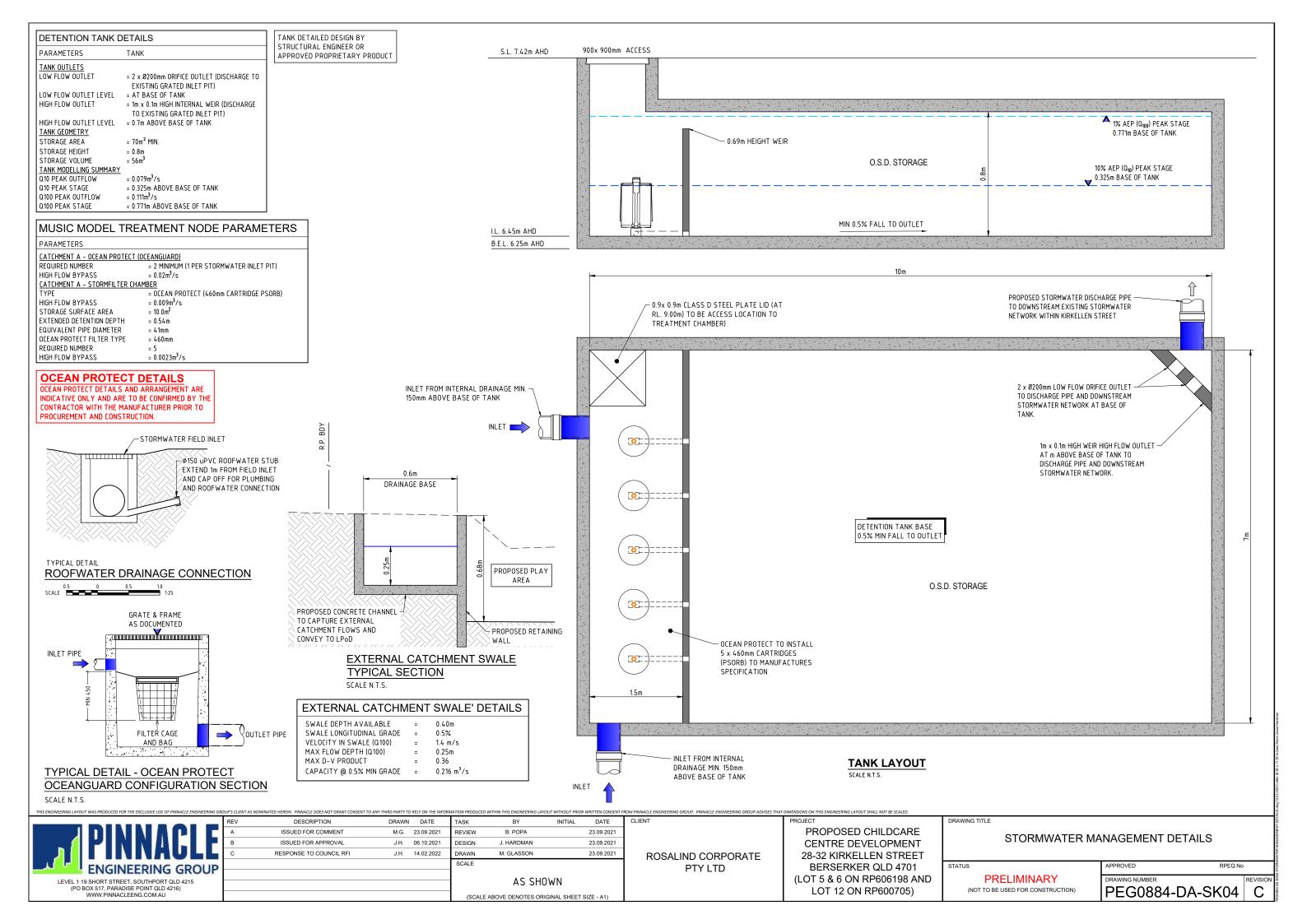
EUSED FOR CONSTRUCTION)

DRAWING NUMBER

PEG0884-DA-SK03

C

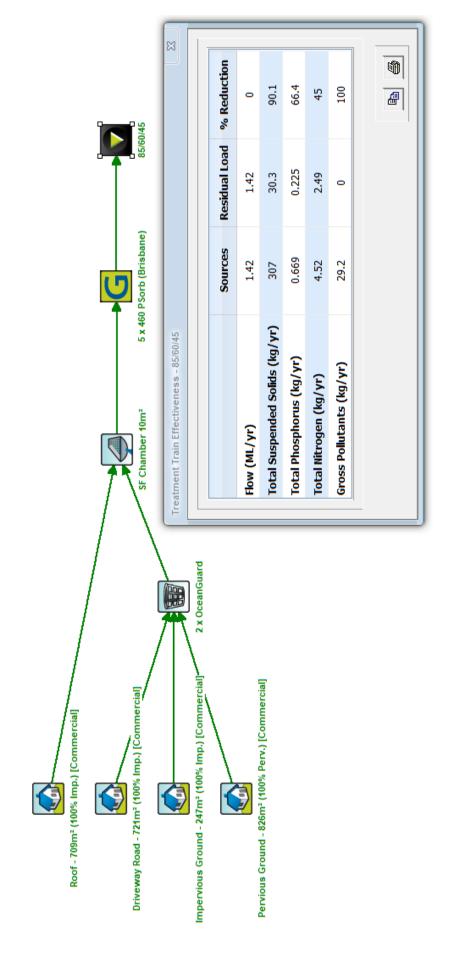
LEVEL 1 19 SHORT STREET, SOUTHPORT QLD 4215 (PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU D PRELIMINARY
(NOT TO BE USED FOR CONSTRUCTION)





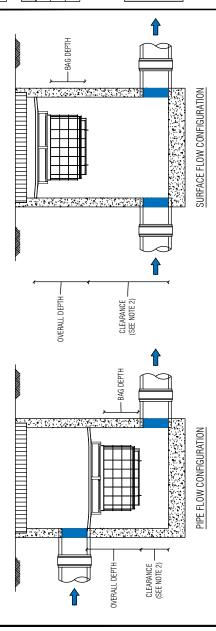
Appendix F MUSIC Model Results

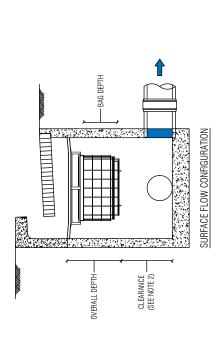


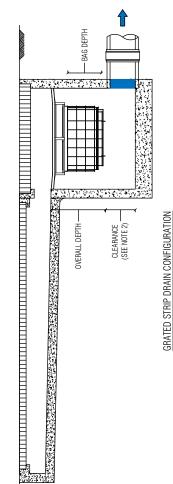




Appendix G Ocean Protect Information

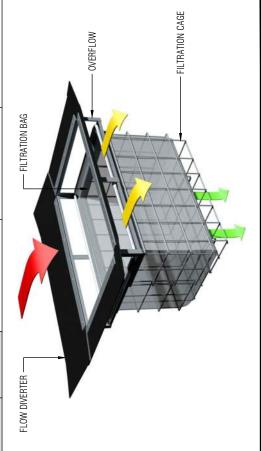






MAXIMUM PIT PLAN DIMENSIONS	450mm x 450mm	600mm x 600mm	1000 ж mm006	1200mm x 1200mm
PLAN ID	S	M	7	XL

OVERALL DEPTH	270	450	700		3			•	
				DEPTH ID	2			•	
BAG DEP	170	300	009		1	•	•	•	•
DEPTH ID	1	2	3			S	M	٦	ТX
							N ID	ا∀٦۵	ł

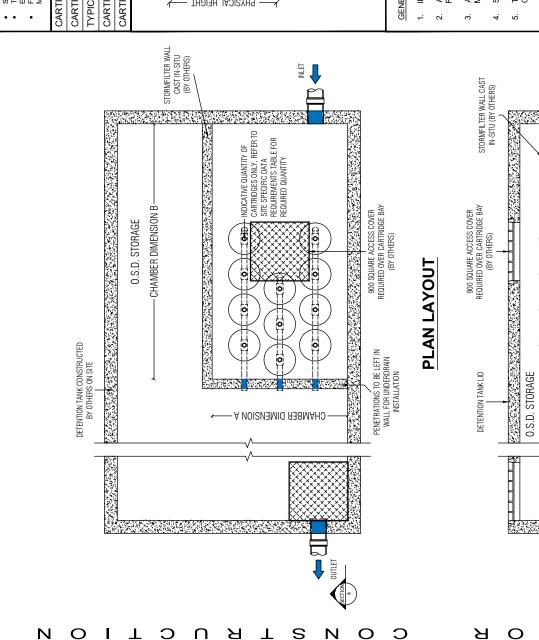


GENERAL NOTES

- 1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
- CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
- OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES: 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
- 4. DRAWINGS NOT TO SCALE.



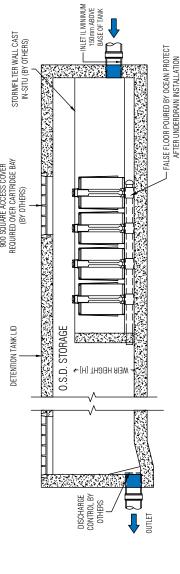
OCEAN PROTECT
OCEANGUARD
TYPCIAL ARRANGEMENTS
SPECIFICATION DRAWING



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STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
 THE STANDARD COMPIGURATION IS SHOWIN ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING FIGURIER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
 FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL.

MEDIA DEPTH SHALL BE 178mm.			
RTRIDGE NAME / SIPHON HEIGHT (mm)	069	460	310
RTRIDGE PHYSICAL HEIGHT (mm)	840	009	009
PICAL WEIR HEIGHT [H] (mm)	920	069	540
RATRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
RTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	6.0	0.46	0.39
1	S DATA	SITE SPECIFIC DATA REQUIREMENTS	SLNE
	STRUCTURE ID		
	NUMBER OF CARTRIDGES REQ'D	TRIDGES REQ'D	
HEIG	SIPHON HEIGHT (310 / 460 / 690)	310 / 460 / 690)	
	MEDIA TYPE (ZPG / PSORB)	/ PSORB)	
	WATER QUALITY FLOW RATE (L/S)	:LOW RATE (L/S)	
	DIMENSION A		
S. S. A. FALSE FLOOR	DIMENSION B		
STORMFILTER CARTRINGE DETAIL	TOTAL CAF TO MATCH	TOTAL CARTRIDGE BAY AREA (A × B) TO MATCH AREA REQUIRED BY MUSIC	r (A x B) Y MUSIC
		REQUIREMENTS	2
CLECK			

GENERAL NOTES

- 1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
- A HIGH FLOW BYPASS ARRANGEMENT OR DISSIPATION STRUCTURE MAY BE REQUIRED TO MINIMISE RE-SUSPENSION OF SOLIDS OR ANY SIGNIFICANT INERTIAL FORCES ON THE CARTRIDGES
- ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS. ω.
- SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER 4
- THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER. 5
- CONCRETE STRUCTURE AND ACCESS COVERS DESIGNED AND PROVIDED BY OTHERS. ACCESS COVERS TO BE A MINIMUM 900 X 900 ABOVE CARTRIDGES. OH&S REGARDING ACCESS COVERS AND TANK ACCESS TO BE ASSESSED BY OTHERS ON SITE. 9
- THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES
- DRAWINGS NOT TO SCALE ω.

INSTALLATION NOTES

UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT

SECTION A

O

N

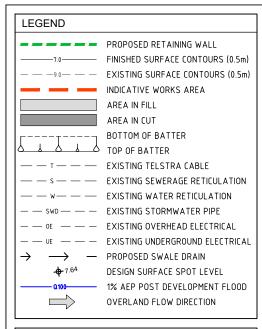


DETENTION TANK ARRANGEMENT STORMFILTER SYSTEM SPECIFICATION DRAWING

OCEAN PROTECT



Appendix H **Preliminary Bulk Earthworks Plans**



CUT & FILL VOLUMES

CUT TO FILL ON LEADS $= 228 \text{ m}^3$ EXPORT TO WASTE FACILITY = 216 m³

NOTE: 10% COMPACTION FACTOR APPLIED

TOPSOIL VOLUMES

STRIP, STOCKPILE AND REPLACE = 178 m³ EXPORT OFF SITE $= 72 \text{ m}^3$

NOTE: BASED ON 100mm TOPSOIL DEPTH

NOTES

- VOLUMES ARE TO SUB-GRADE LEVEL VOLUMES INCLUDE 100mm EXISTING TOPSOIL STRIPPING ALLOWANCE, AND 100mm TOPSOIL REPLACEMENT
- THE LOCATION OF EXISTING SERVICES HAS BEEN PLOTTED FROM RECORDS AND IS TO BE CONFIRMED. THE FINAL ALIGNMENT AND SIZING OF THE SERVICES IS PRELIMINARY ONLY AND SUBJECT TO DETAILED DESIGN AND FUTURE OPERATIONAL WORKS APPLICATIONS TO COUNCIL.



The Essential First Step.

UNDERGROUND PUBLIC UTILITY PLANT EXISTS IN THIS VICINITY. THE CONTRACTOR IS ADVISED TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM THE EXACT LOCATION OF PUBLIC UTILITY PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.





DESIGN J. HARDMAN 23.09.2021 23.09.2021 SCALE

ROSALIND CORPORATE PTY LTD

CENTRE DEVELOPMENT 28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND

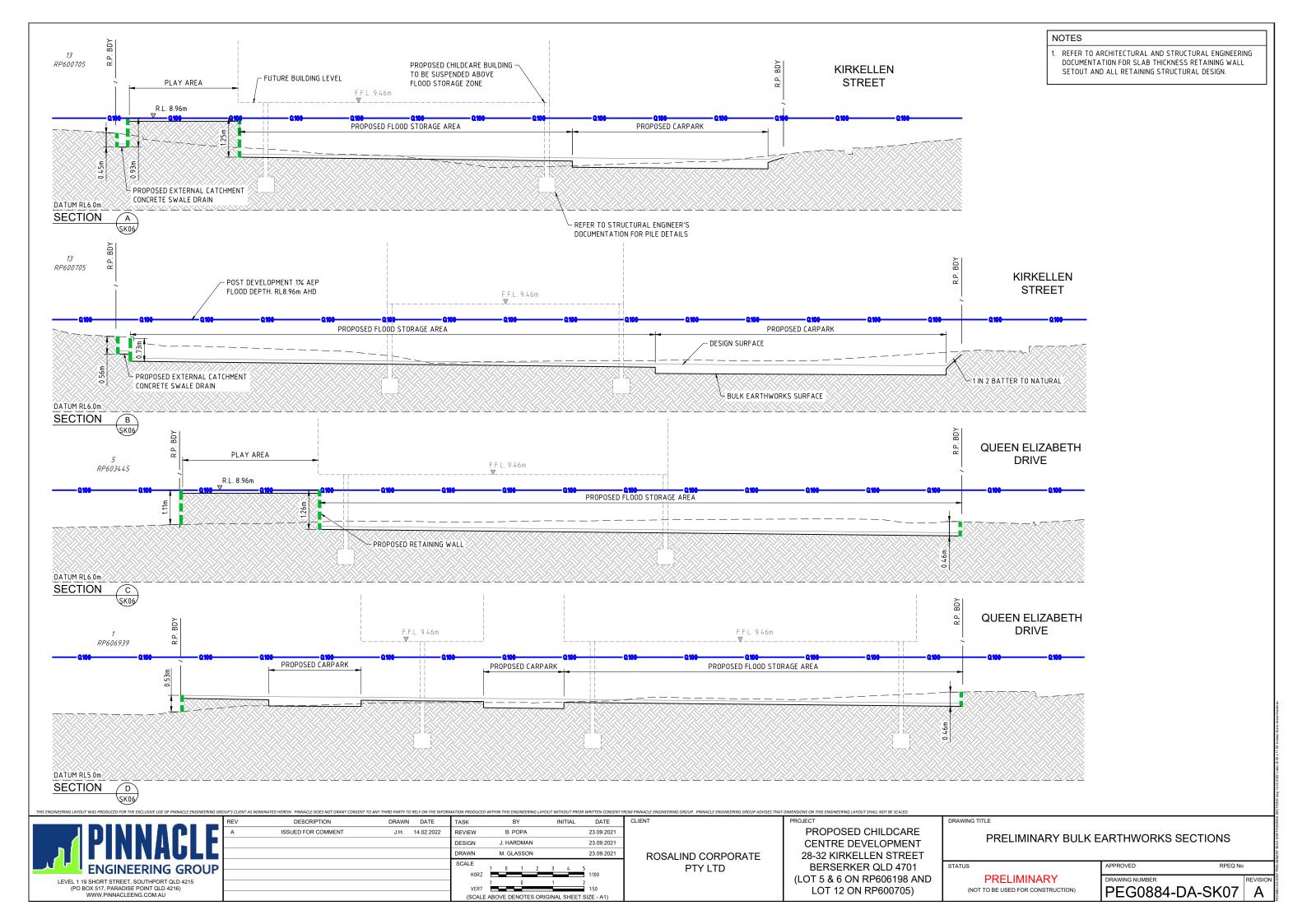
PRELIMINARY BULK EARTHWORKS LAYOUT

STATUS

LOT 12 ON RP600705)

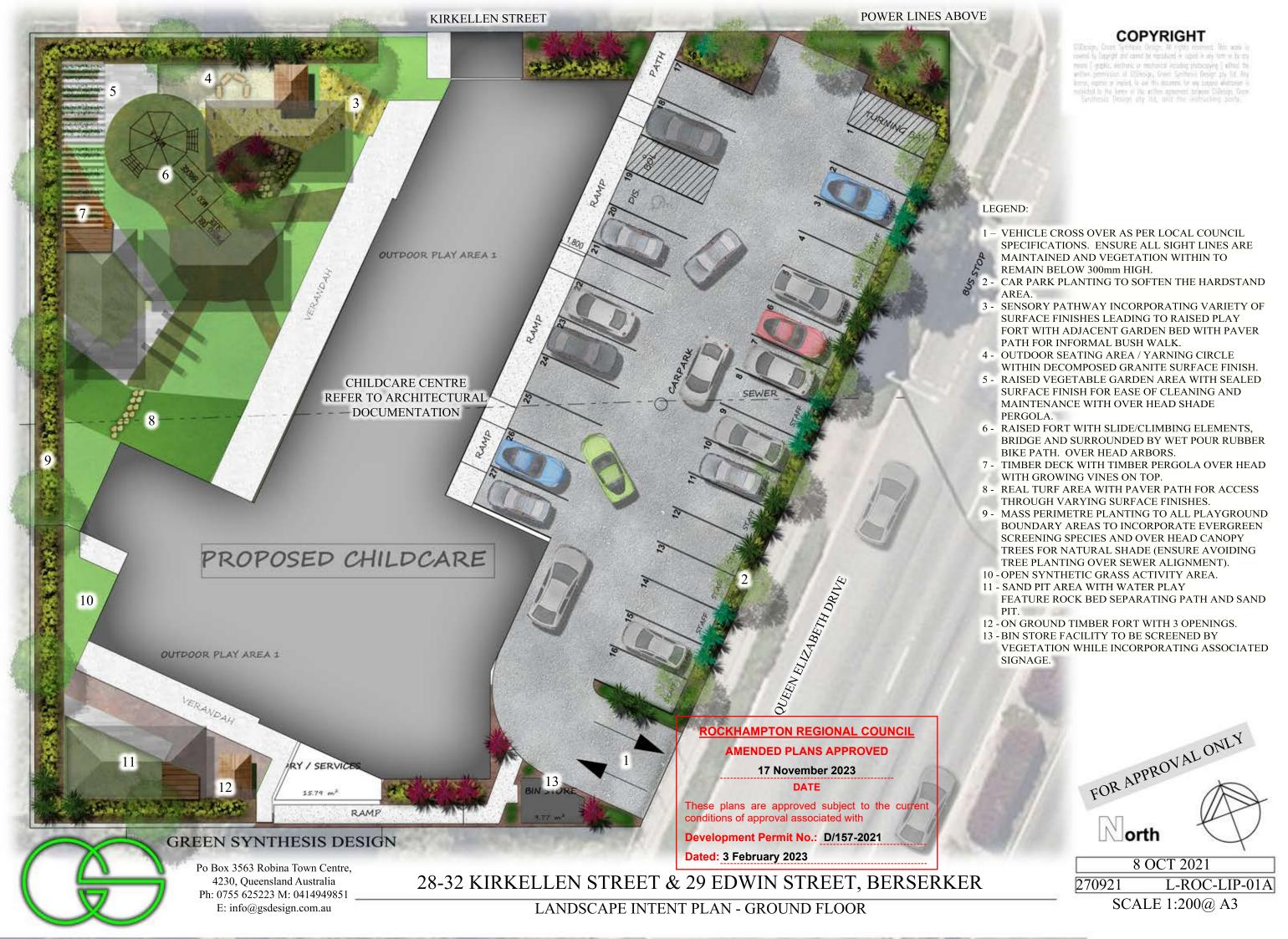
PRELIMINARY (NOT TO BE USED FOR CONSTRUCTION)

PEG0884-DA-SK06





ABN: 80 608 431 625 Level 1, 19 Short Street, Southport QLD 4215 (PO Box 517, Paradise Point QLD 4216) www.pinnacleeng.com.au



RECOMMENDED PLANT SPECIES:

TREES:

- Araucaria heterophylla Norfolk Is pine
- Brachychiton rupestris Bottle tree
- Caesalpinia ferrea Leopard tree
- Cupaniopsis anacardioides Tuckeroo tree
- Cupressus sempervirens Swane's Golden
- Elaeocarpus eumundii Quondong
- Tristaniopsis laurina Luscious
- Waterhousia floribunda Weeping lilli pilly



Araucaria heterophylla



Brachychiton rupestris



Caesalpinia ferrea



Cupaniopsis anacardioides

ROCKHAMPTON REGIONAL COUNCIL AMENDED PLANS APPROVED

17 November 2023

DATE

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

Development Permit No.: D/157-2021

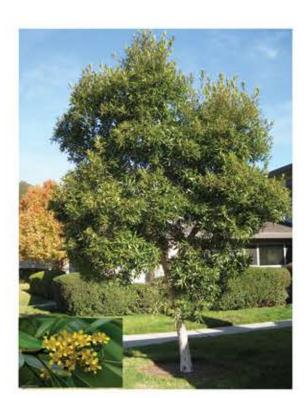
Dated: 3 February 2023



Cupressus sempervirens



Elaeocarpus eumundii



Tristaniopsis laurina



Waterhousea floribunda



GREEN SYNTHESIS DESIGN

Po Box 3563 Robina Town Centre, 4230, Queensland Australia Ph: 0755 625223 M: 0414949851_ E: info@gsdesign.com.au

28-32 KIRKELLEN STREET & 29 EDWIN STREET, BERSERKER

8 OCT 2021 270921 L-ROC-LIP-02A

RECOMMENDED PLANT SPECIES:

Casuarina glauca - Cousin It plant Dracena marginata variegated Gardenia radicans - Dwarf gardenia Liriope muscari - Evergreen giant Liriope variegata - Stripey white Lomandra confertifolia - Cracjer jack Lomandra longifolia - Matt rush Melaleuca linariifolia - claret top Nandina domestica - Sacred bamboo Rhaphiolepis indica snow maiden Scaevola humilis - Purple Fusion Viburnum odoratissimum - Sweet vibrunum









Gardenia radicans

Liriope muscari

ROCKHAMPTON REGIONAL COUNCIL







17 November 2023

AMENDED PLANS APPROVED

DATE

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

Development Permit No.: D/157-2021

Dated: 3 February 2023



Liriope variegata







Nandina domestica

Rhaphiolepis indica

Scaevola humilis

Viburnum odoratissimum



GREEN SYNTHESIS DESIGN

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