

AREA SCHEDULE

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

GBA CHILDCARE: GROUND LEVEL 693.1 m²

OUTDOOR STORE: VERANDAHS: 18 m² 116.23 m² SERVICES COURTYARD: 18.8m²

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)

753.87m²

CARPARK: 721m²

POPULATION: CHILDREN: FULL TIME STAFF:

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

CAR PARKING PROVIDED: (INCLUDES 1 DISABLED)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/157-2021

Dated: 3 February 2023



17/02/2022 SITE PLAN



Version: 1, Version Date: 14/03/2022

BERSERKER CHILDCARE

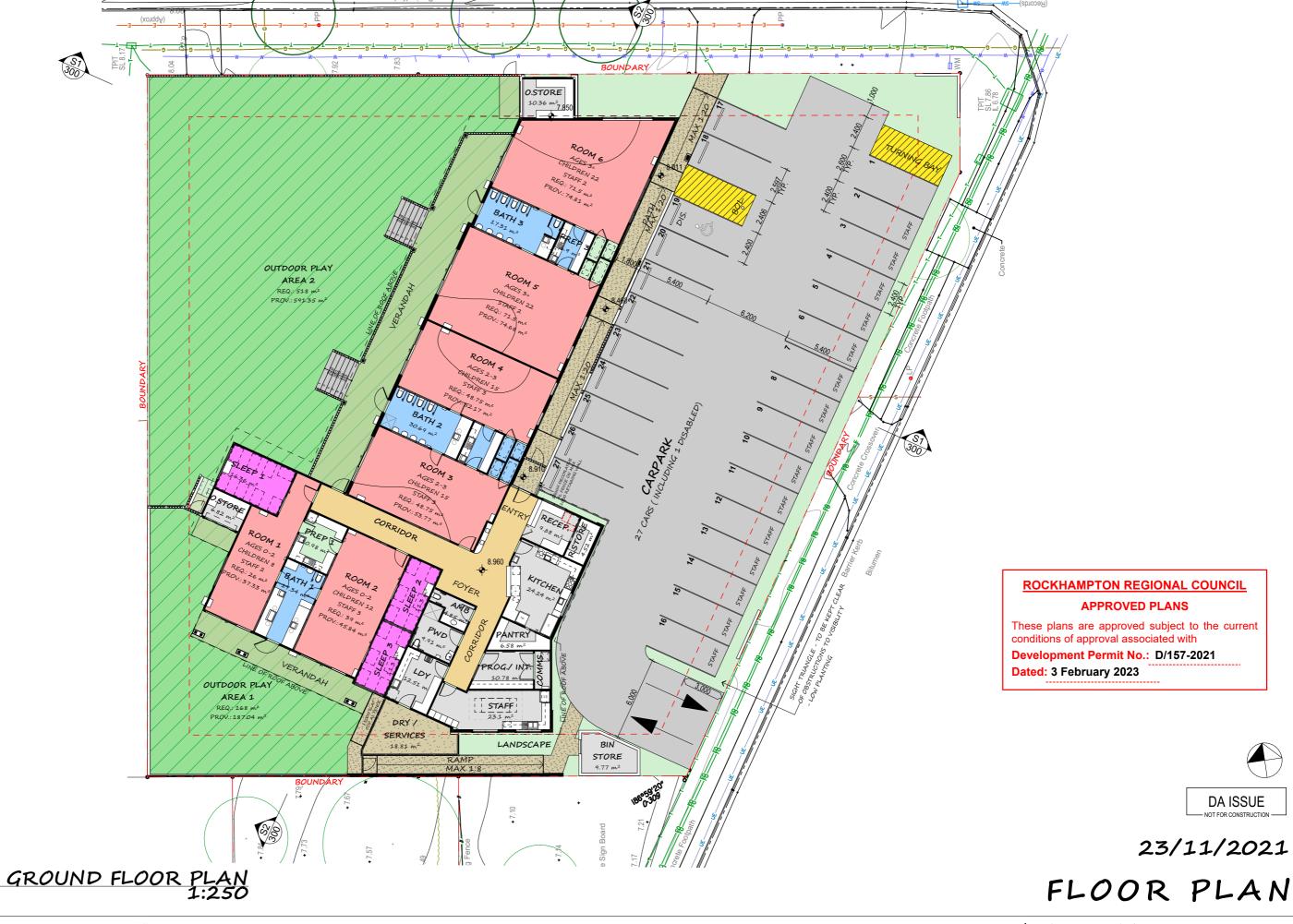
28-32 KIRKELLEN ST BERSERKER QLD 4701 For the IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089

dwg no_rev: 21089_DA-100_D

issue date: 17/02/2022

1:300 scale:





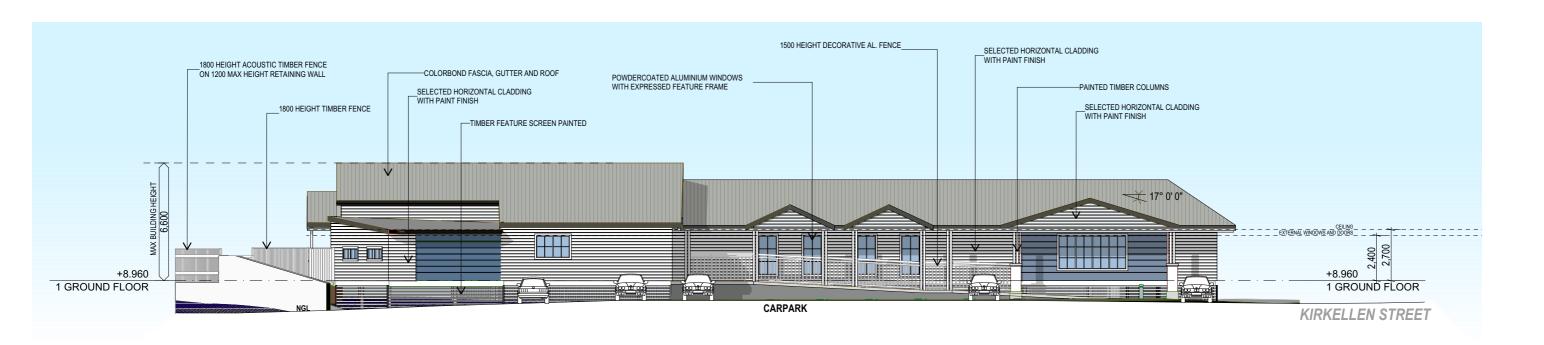


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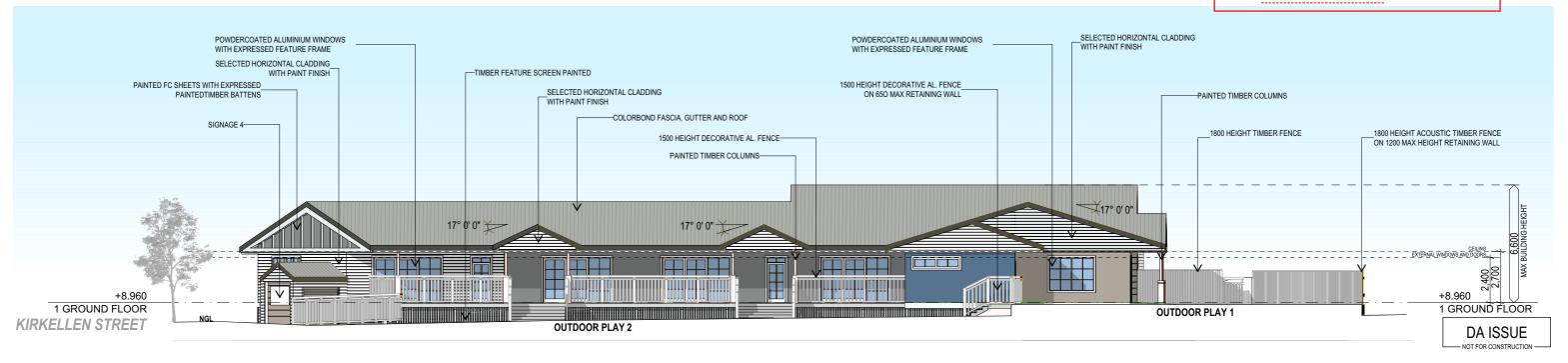
1 EAST ELEVATION 1:200

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2 WEST ELEVATION 1:200

23/11/2021

ELEVATIONS 1



Version: 1, Version Date: 24/11/2021

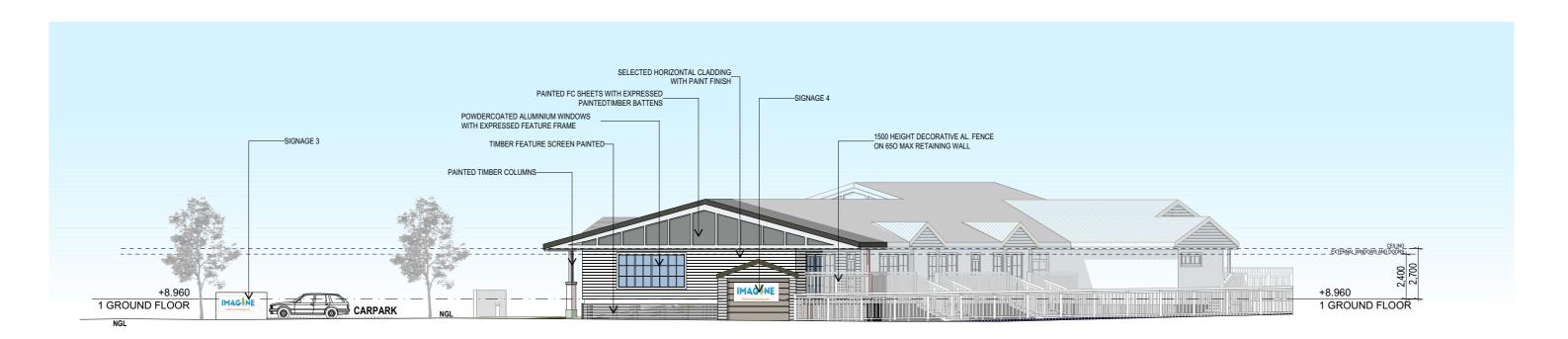
BERSERKER CHILDCARE

28-32 KIRKELLEN ST BERSERKER QLD 4701 For THE IMAGINE EDUCATION LEARNING CENTERS TRUST project no: 21089

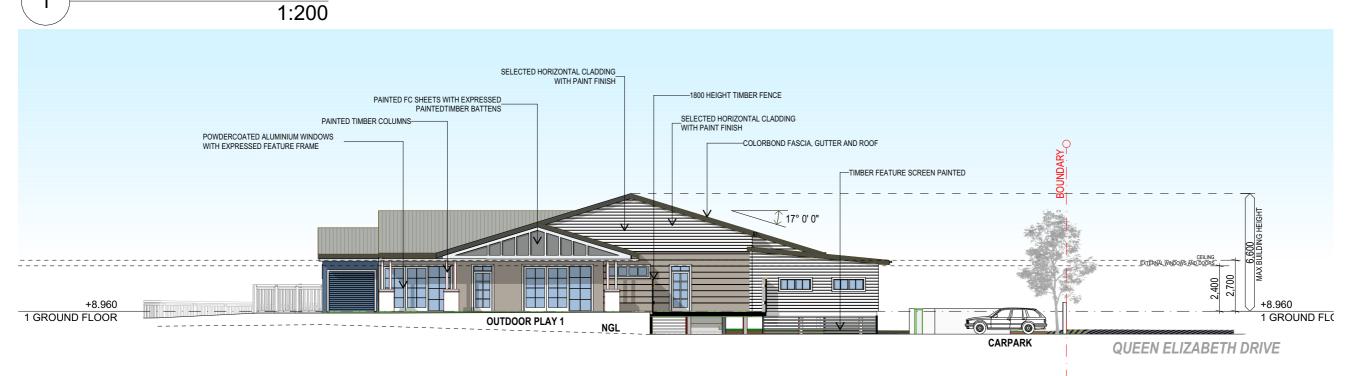
dwg no_rev: 21089_DA-200_C

issue date: 23/11/2021

scale: 1:200



1 NORTH ELEVATION



2 SOUTH ELEVATION 1:200

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DA ISSUE

NOT FOR CONSTRUCTION —

23/11/2021

ELEVATIONS 2



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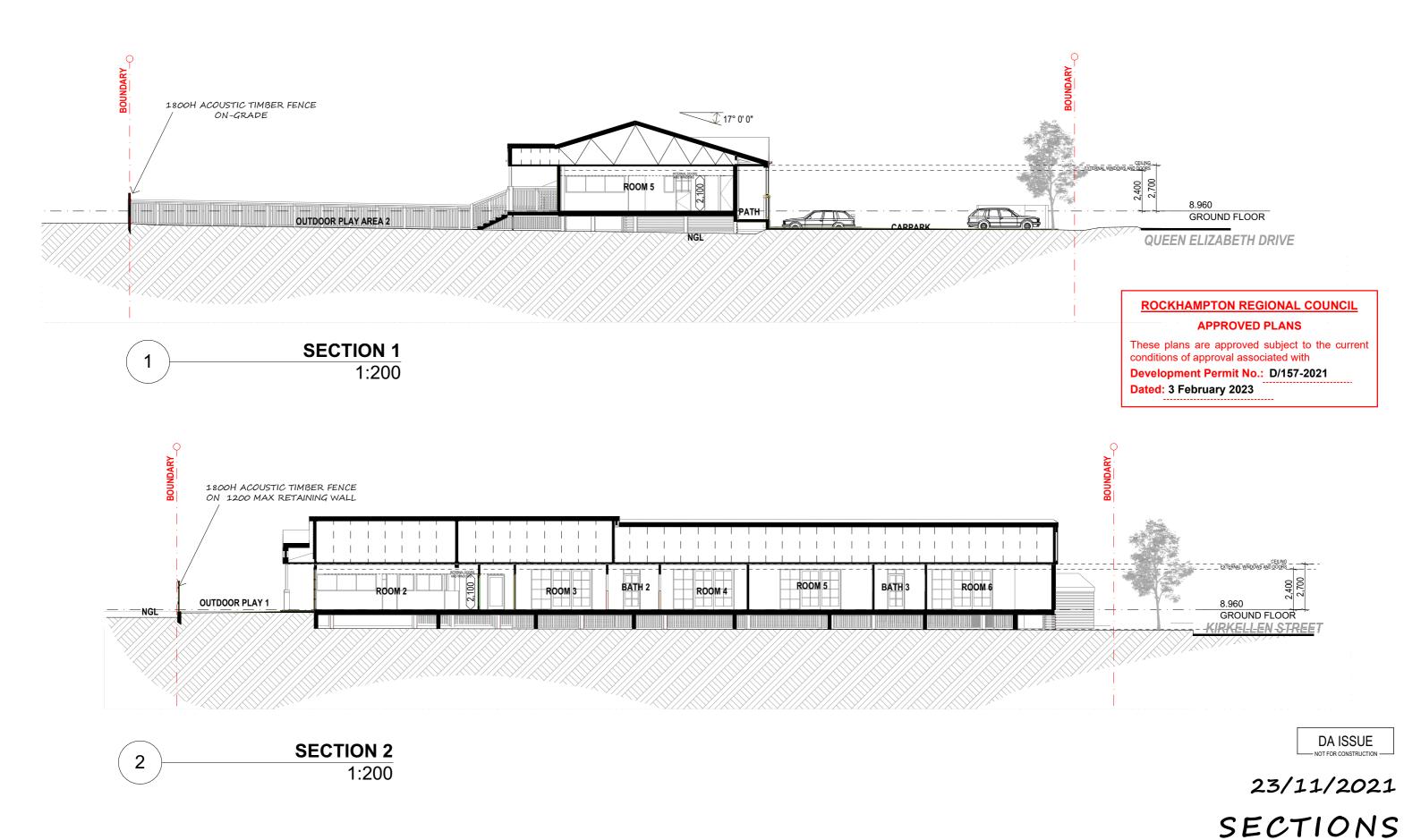
BERSERKER CHILDCARE

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australian project management services BERSE 28-32 KIRKE

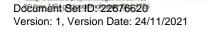
BERSERKER CHILDCARE

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dwg no_rev: 21089_DA-300_C

issue date: 23/11/2021

scale: 1:200





dulux
white on white
walls, columns
& timber trims

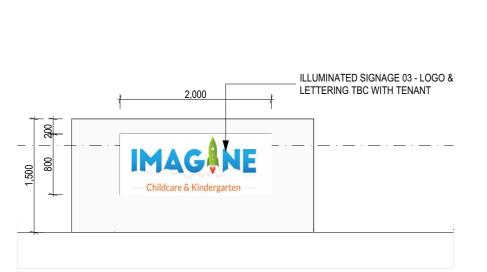


flat white powdercoat windows & doors, fencing C4 colorbond
surfmist
roof

dulux boathouse feature walls

CHILDCARE CENTRE

EXTERNAL COLOUR PALETTE



SIGNAGE 3

1:50



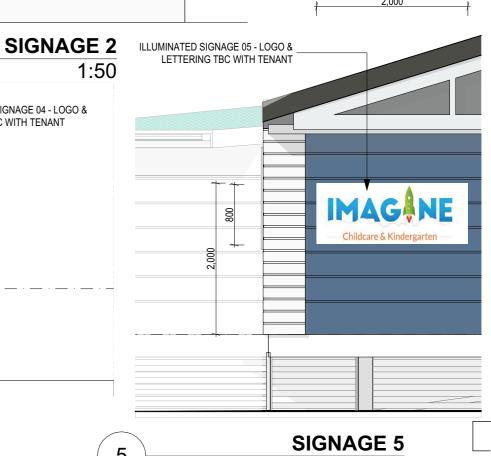
SIGNAGE 4

1:50

2

2,400

80



LETTERBOX TO POST OFFICE REQUIREMENTS

3mm POWDERCOATED ALUMINIUM

ILLUMINATED SIGNAGE 02 - LOGO & CKHAMPTON REGIONAL COUNCIL

Dated: 3 February 2023

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LETTERING SPACED 20mm OFF WALL

ILLUMINATED SIGNAGE 01 - LOGO & LETTERING TBC WITH TENANT

Childcare & Kindergarten

SIGNAGE 1

2,000

Childcare & Kindergarte

1:50

MATERIAL & SIGNAGE



BERSERKER CHILDCARE

project no: 21089

1:50

dwg no_rev: 21089_DA-400_B

DA ISSUE

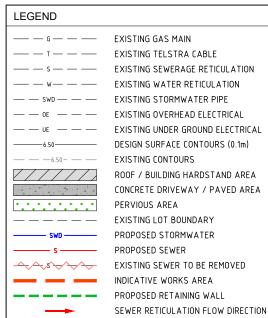
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Document Set ID: 22676620 Version: 1, Version Date: 24/11/2021

3



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.

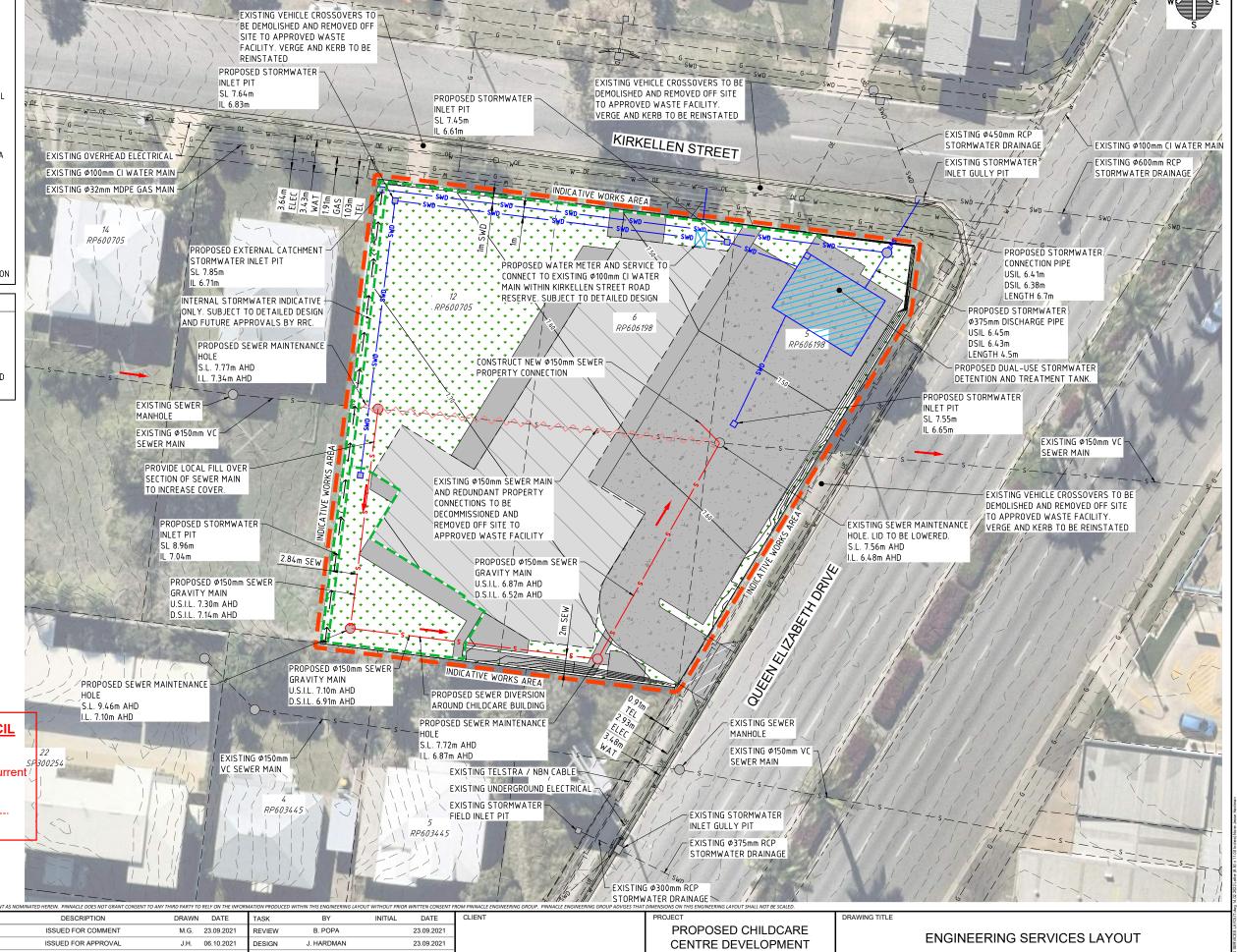
UNDERGROUND PUBLIC UTILITY PLANT EXISTS IN THIS VICINITY. THE CONTRACTOR IS ADVISED TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM THE EXACT LOCATION OF PUBLIC UTILITY PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.

ROCKHAMPTON REGIONAL COUNCIL **APPROVED PLANS**

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Dated: 3 February 2023





(PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU

J.H. 14.02.2022 23.09.2021 SCALE

ROSALIND CORPORATE PTY LTD

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

PEG0884-DA-SK05

PRELIMINARY (NOT TO BE USED FOR CONSTRUCTION)

Version: 1, Version Date: 15/03/2022





SITE BASED STORMWATER MANAGEMENT PLAN

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

ROSALIND CORPORATE PTY LTD

FEBRUARY 2022 REVISION 03

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

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).

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Document Control

Rev	Date issued	Review	Approved	Approved on	Revision type
01	30-September-2021	M. Binger	B. Popa	30-September-2021	Issued for comment
02	6-October-2021	M. Binger	B. Popa	6-October-2021	Issued for approval
03	14-February-2022	M. Binger	В. Рора	14-February-2022	Response to Council RFI

Distribution of Copies

Revision	Quantity	Distribution
01	1.pdf	Rosalind Corporate Pty Ltd
02	1.pdf	Rosalind Corporate Pty Ltd
03	1.pdf	Rosalind Corporate Pty Ltd

Printed:	14 February 2022
Last saved:	14/02/2022 15:22
File name:	P:\Projects\PEG0884_28-32 Kirkellen Street, Berserker\03 Reports\02 SBSMP\220209_PEG0884_28-32 Kirkellen Street, Berserker_SMP_R003.docx
Author:	Jesse Hardman
Project manager:	Michael Binger
Name of organisation:	Pinnacle Engineering Group
Name of project:	28-32 Kirkellen Street, Berserker
Name of document:	220209_PEG0884_28-32 Kirkellen Street, Berserker_SMP_R003.docx
Document version:	REV 03
Project number:	PEG0884



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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.

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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.

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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.

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	Annual Exceedance Probability (AEP)								
Duration	63.2%	39.35%	18%	10%	5%	2%	1%		
1 min	158	196	239	275	316	372	417		
2 <u>min</u>	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	Impervious 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)	(%)	10% AEP	5% AEP	2% AEP	1% AEP	1% AEP
				(Q ₁₀)	(Q_{10}) (Q_{20}) (Q_{50}) (Q_{100})		(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				XP-Rafts Results (m³/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 $0.026 \text{m}^3/\text{s}$, $0.028 \text{m}^3/\text{s}$, $0.046 \text{m}^3/\text{s}$ and $0.051 \text{m}^3/\text{s}$ 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 56m³ 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

Storm Event	Site Total (Discharge to Kirkellen Street existing stormwater network)		Difference	Difference
	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.



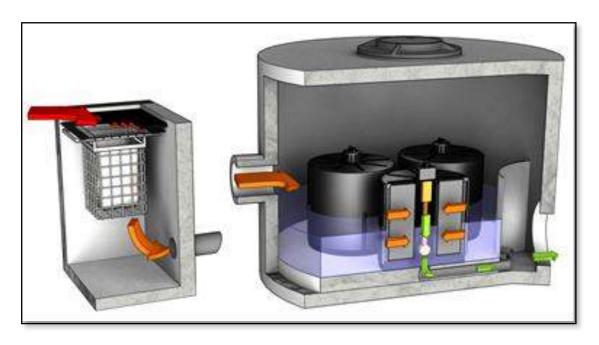


Figure 3.1: Typical Ocean Protect Treatment Train Configuration (Source: Ocean Protect)

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)

Land Use		Mean EMC (mg/L)					
		TSS		TP		TN	
Commercial		Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Roof	Mean	1.30	0.00	-0.89	0.00	0.37	0.00
	Std. Deviation	0.38	0.00	0.34	0.00	0.34	0.00
Roads	Mean	2.43	0.78	-0.30	-0.60	0.37	0.32
	Std. Deviation	0.38	0.39	0.34	0.50	0.34	0.30
Ground	Mean	2.16	0.78	-0.39	-0.60	0.37	0.32
	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 (%)
Receiving Node	Total Suspended Solids (kg/yr)	307	30.3	90.1
	Total Phosphorous (kg/yr)	0.669	0.225	66.4
	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.

28-32 Kirkellen Street, Berserker – Site Based Stormwater Management Plan File Location: 220209_PEG0884_28-32 Kirkellen Street, Berserker_SMP_R003.docx

Page 22 of 33



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"

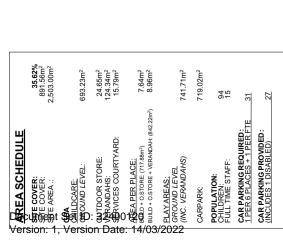
Institute of Public Works Engineers Australia (Queensland Division) (2016) "Queensland Urban Drainage Design Manual (QUDM)", Fourth Edition

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**



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

KIRKELLEN STREET



GROUND FLOOR PLAN 1:250

CHILDCARE BERSERKER

28-32 KIRKELLEN ST & 29 EDWIN ST BERSERKER QLD

FOR THE IMAGINE EDUCATION LEARNING CENTERS TRUST

project no: 21089 issue date: scale:

dwg no_rev: 21089_SK-130_D 7/09/2021



FLOOR PLAN

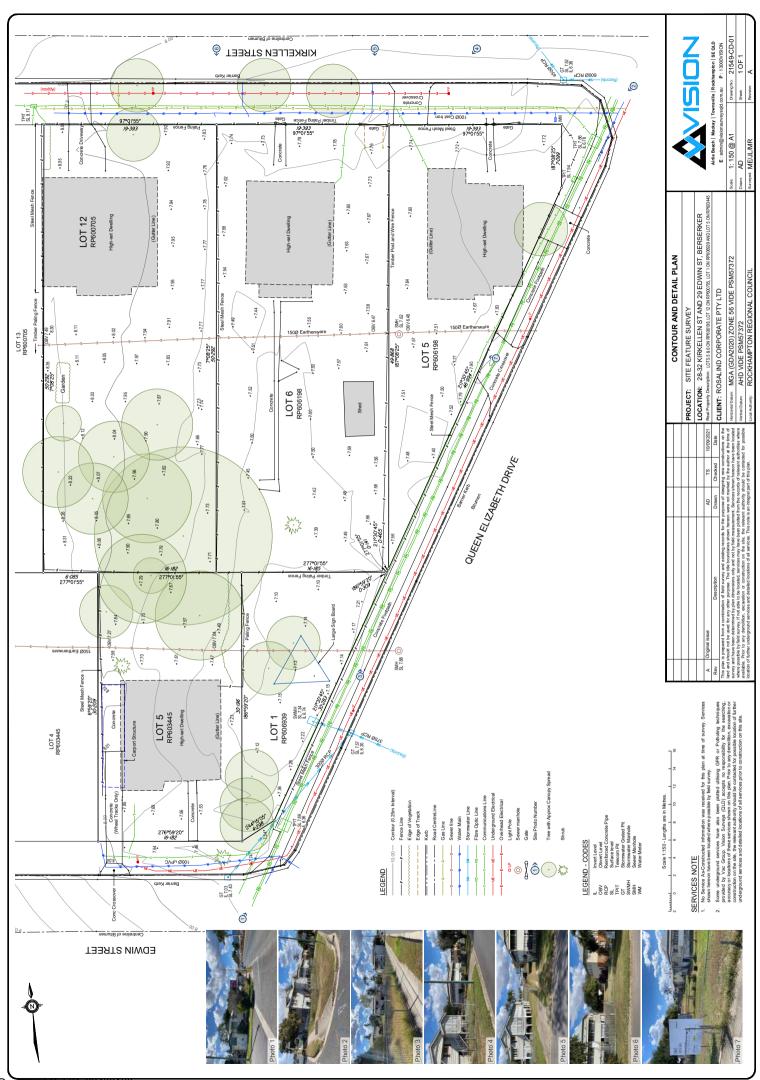
7/09/2021

CONCEPT — NOT FOR CONSTRUCTION —

1:250

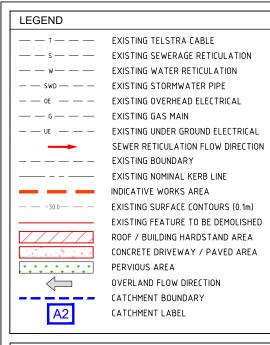


Appendix B **Topographic Data**





Appendix C **Stormwater Catchment Plans**



CATCHMENT TABLE (PRE)

CATCHMENT AREA - A

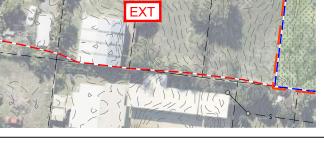
0.2503 ha

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

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





INSET - EXTERNAL CATCHMENT

INFERING GROUP

REV DESCRIPTION DRAWN DATE TASK BY

A ISSUED FOR COMMENT M.G. 23.09.2021 REVIEW B. POPA

B ISSUED FOR APPROVAL J.H. 06.10.2021 DESIGN J. HARDMAN

C RESPONSE TO COUNCIL RFI J.H. 14.02.2022 DRAWN M. GLASSON

SCALE

BY INITIAL DATE
B. POPA 23.09.2021
HARDMAN 23.09.2021
GLASSON 23.09.2021

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)

DRAWING TITLE

PRELIMINARY

(NOT TO BE USED FOR CONSTRUCTION)

PRE DEVELOPMENT CATCHMENT LAYOUT

STATUS

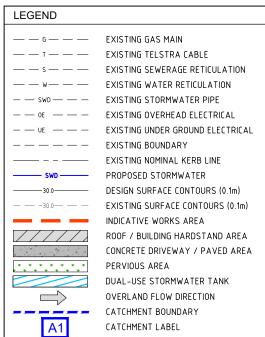
APPROVED

RPEC

PLANT ON SITE PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION OR CONSTRUCTION WORKS.

DRAWING NUMBER
PEG0884-DA-SK01

LEVEL 1 19 SHORT STREET, SOUTHPORT QLD 4215 (PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU Document Set 1D: 32400120



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	ı
					l
TOTAL IMPERVIOUS AREA	0.0709 ha	0.0721 ha	0.0247 ha	0.0428 ha	ı
TOTAL PERVIOUS AREA	N/A	N/A	0.0826 ha	0.2044 ha	ı

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.

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	INITIAL	DATE
	ISSUED FOR COMMENT	M.G.	23.09.2021	REVIEW	B. POPA		23.09.2021
	ISSUED FOR APPROVAL	J.H.	06.10.2021	DESIGN	J. HARDMAN		23.09.2021
	RESPONSE TO COUNCIL RFI	J.H.	14.02.2022	DRAWN	M. GLASSON		23.09.2021
				SCALE			
				CCALE		6 8	10

(SCALE ABOVE DENOTES ORIGINAL SHEET SIZE - A

ROSALIND CORPORATE PTY LTD

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

PRELIMINARY (NOT TO BE USED FOR CONSTRUCTION)

PEG0884-DA-SK02 C



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 ($f_1 = 0.21$, ${}^1I_{10} = 65.4$))

Total Time of Concentration QUDM Figure 4.4

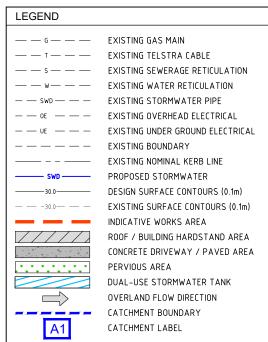
Total time of Conentration (tc) 10.0 mins

Rational Method for Peak Catchment flow $Q = 0.00278 \times C \times I \times A$

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



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	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.
- 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

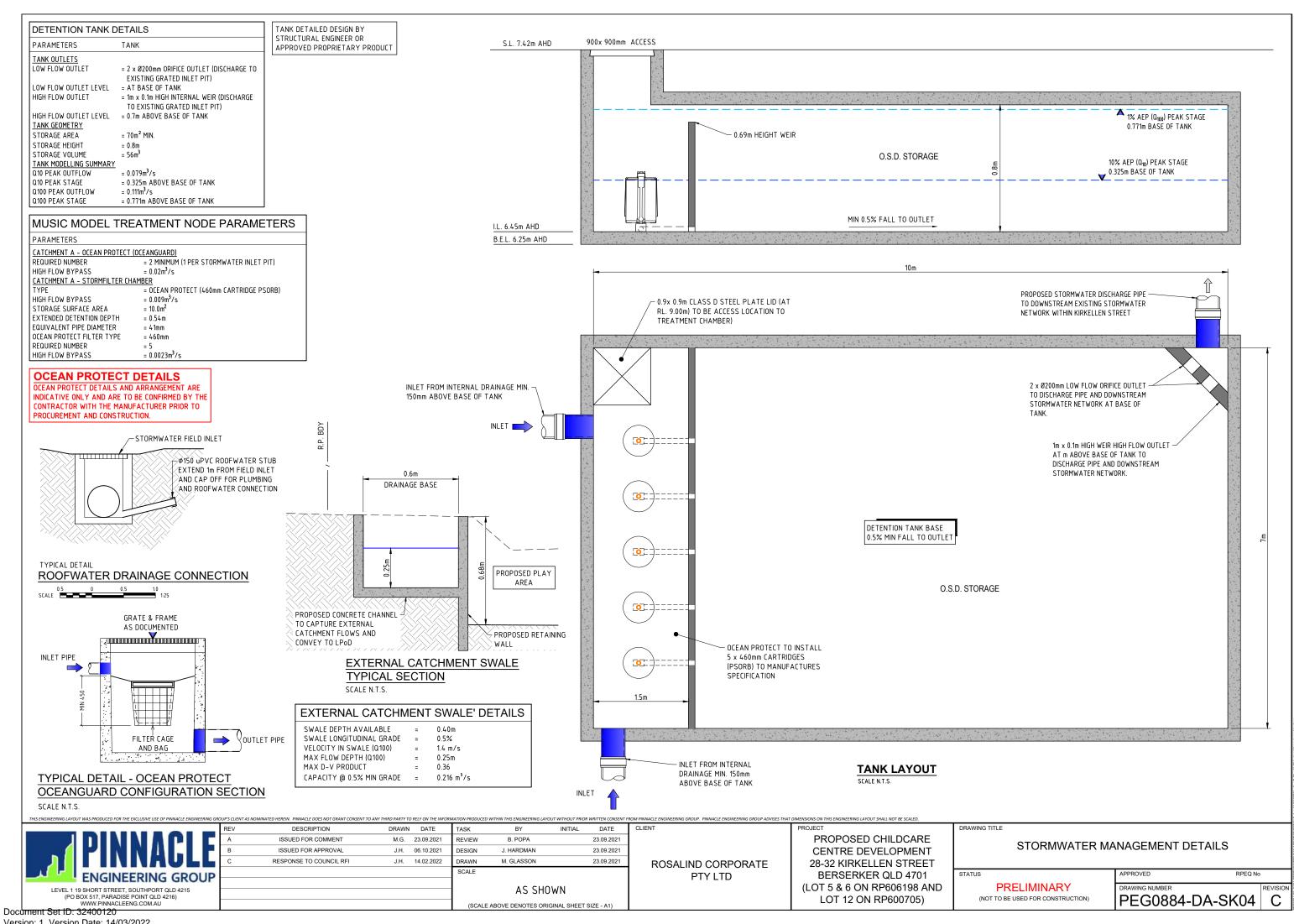
28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND LOT 12 ON RP600705)

PRELIMINARY

(NOT TO BE USED FOR CONSTRUCTION)

PEG0884-DA-SK03 C

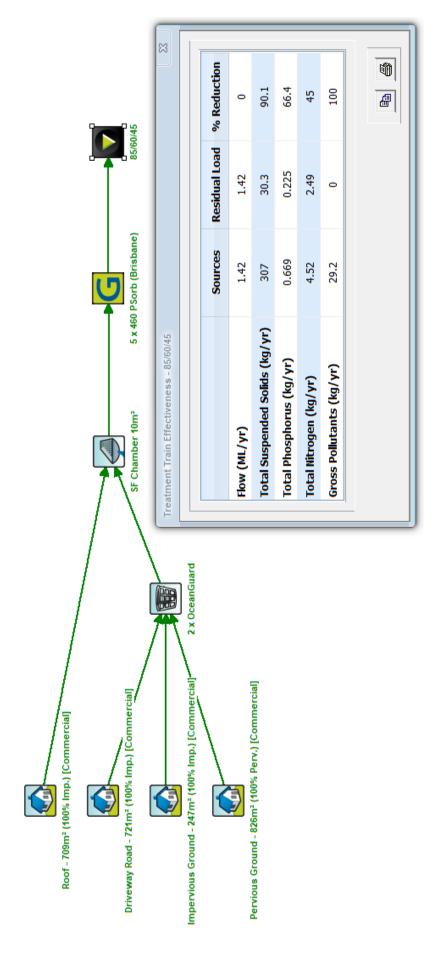
LEVEL 1 19 SHORT STREET, SOUTHPORT QLD 4215 (PO BOX 517, PARADISE POINT QLD 4216) WWW.PINNACLEENG.COM.AU Document Set ID: 32400120





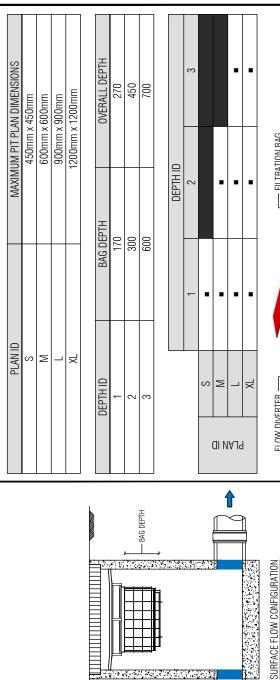
Appendix F MUSIC Model Results







Appendix G Ocean Protect Information



CLEARANCE (SEE NOTE 2)

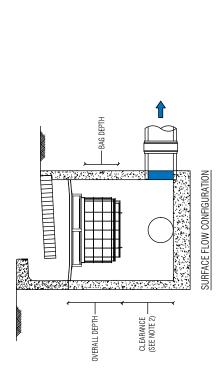
- BAG DEPTH

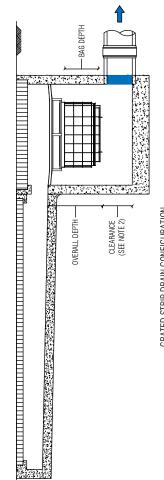
PIPE FLOW CONFIGURATION

CLEARANCE (SEE NOTE 2) ___

OVERALL DEPTH-

OVERALL DEPTH -





GRATED STRIP DRAIN CONFIGURATION

_	BAG DEPTH OVER.	170	300	009	DEPTHID	1 3	•	W	-	XI	FILTRATION BAG OVERFLOW FILTRATION CAGE
	DEPTH ID	1	2	က					¥]q		FLOW DIVERTIER

GENERAL NOTES

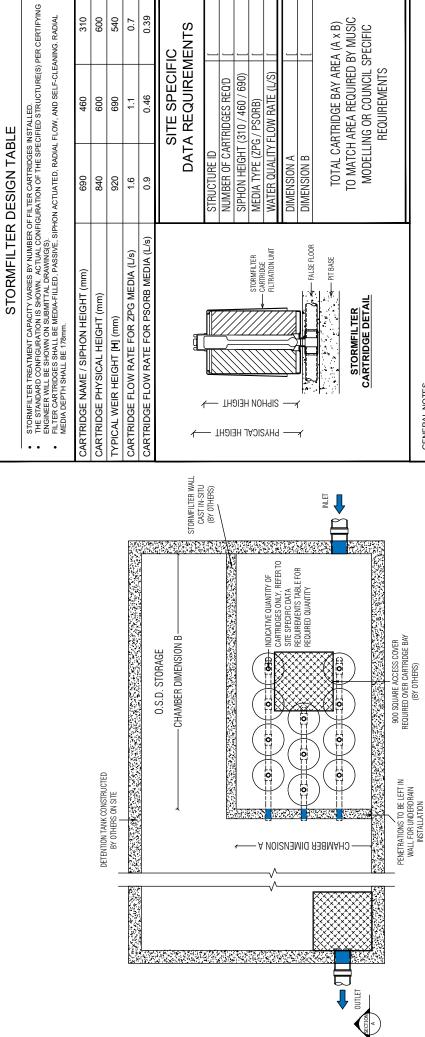
- 1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
- CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT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



TYPCIAL ARRANGEMENTS SPECIFICATION DRAWING OCEANGUARD OCEAN PROTECT

LAST MODIFIED: 15-10-19

Document Set ID: 32400120



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.
- 3. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
- 4. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.

STORMFILTER WALL CAST IN-SITU (BY OTHERS)

900 SQUARE ACCESS COVER REQUIRED OVER CARTRIDGE BAY

DETENTION TANK LID

PLAN LAYOUT

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(BY OTHERS)

0.S.D. STORAGE

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WEIR HEIGHT [H]→

DISCHARGE CONTROL BY

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OUTLET

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- THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.
- 6. 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.

-INLET IL MINIMUM

- 7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES.
- 8. DRAWINGS NOT TO SCALE

INSTALLATION NOTES

FALSE FLOOR POURED BY OCEAN PROTECT AFTER UNDERDRAIN INSTALLATION

1. UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT.



STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING

OCEAN PROTECT

LAST MODIFIED: 07-03-19

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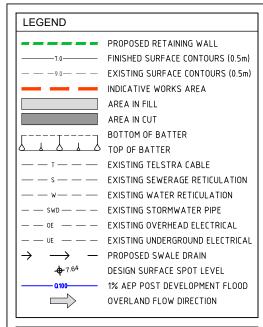
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Appendix H **Preliminary Bulk Earthworks Plans**



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.





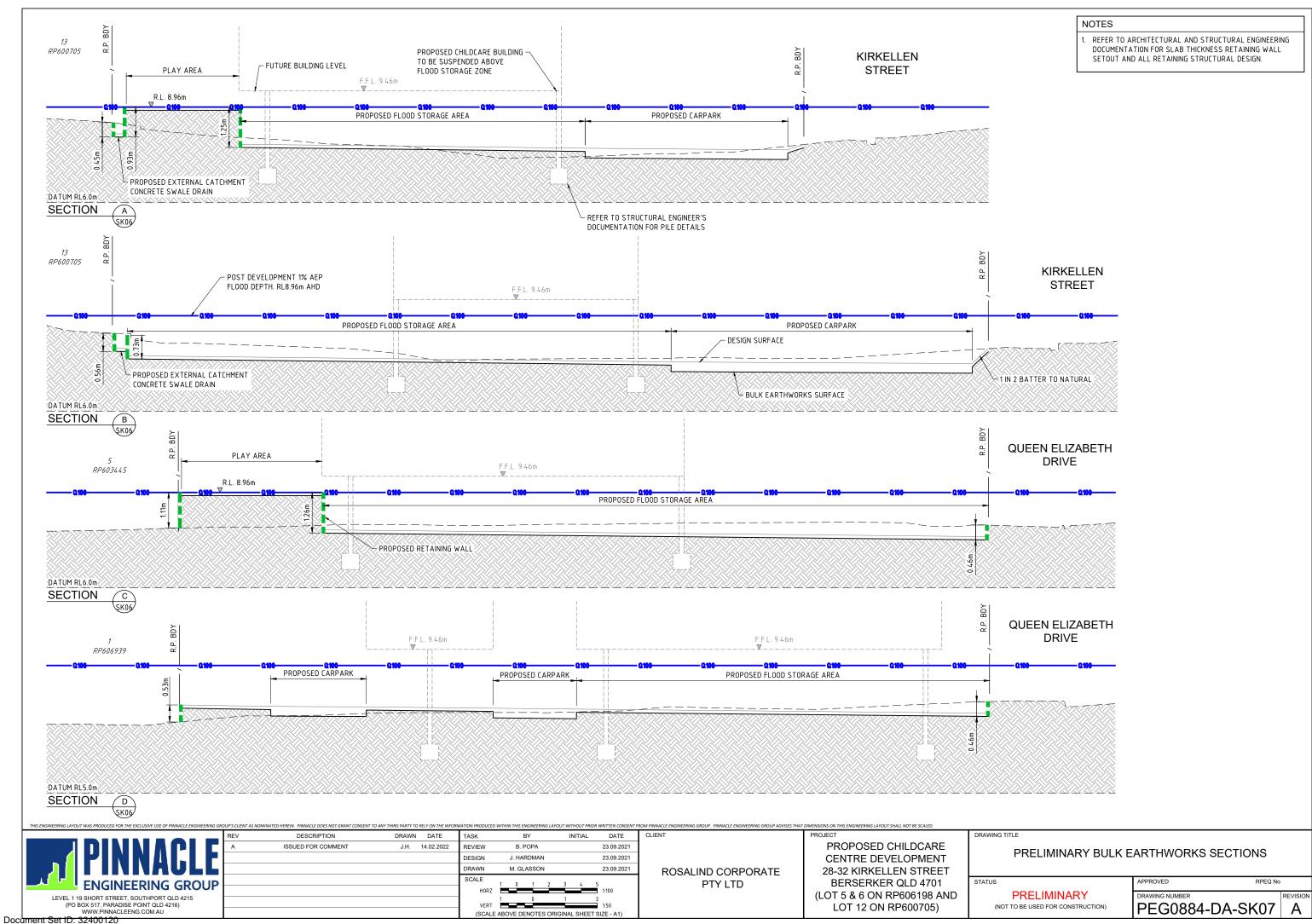
23.09.2021 SCALE

ROSALIND CORPORATE PTY LTD

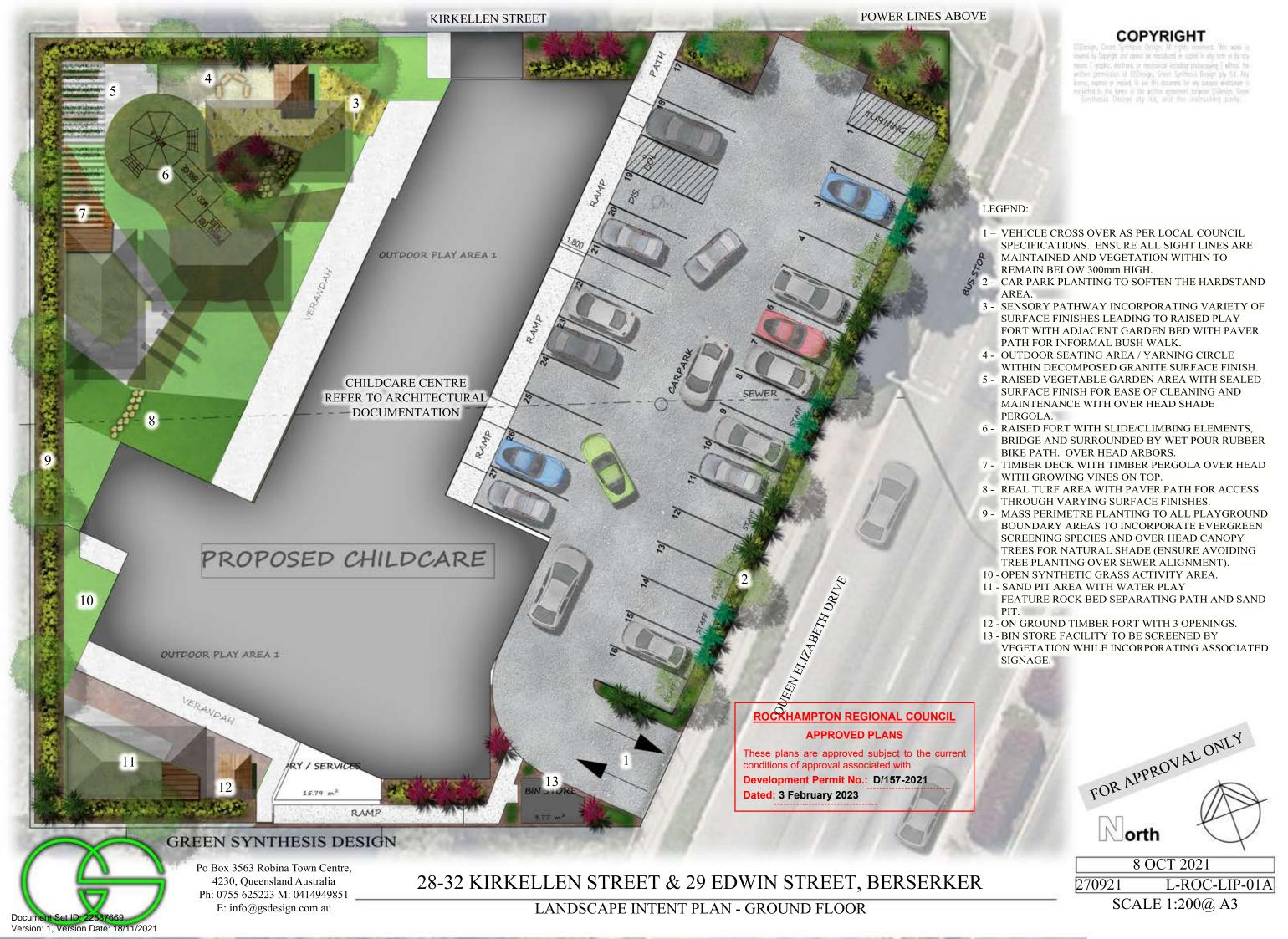
28-32 KIRKELLEN STREET BERSERKER QLD 4701 (LOT 5 & 6 ON RP606198 AND LOT 12 ON RP600705)

STATUS

PRELIMINARY (NOT TO BE USED FOR CONSTRUCTION) PEG0884-DA-SK06







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

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS

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

Development Permit No.: D/157-2021

- Waterhousia floribunda - Weeping lilli pilly



Araucaria heterophylla



Brachychiton rupestris



Caesalpinia ferrea

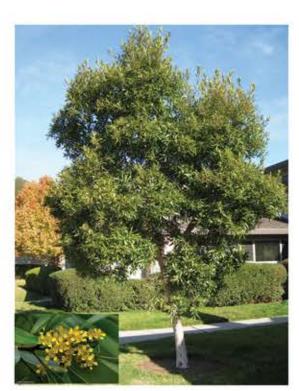


Cupaniopsis anacardioides

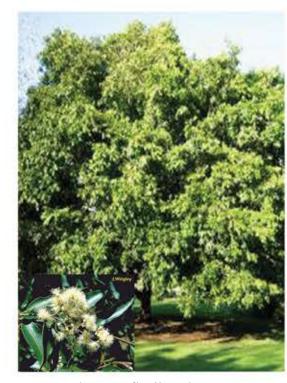
Cupressus sempervirens



Elaeocarpus eumundii



Tristaniopsis laurina



Waterhousea floribunda

GREEN SYNTHESIS DESIGN

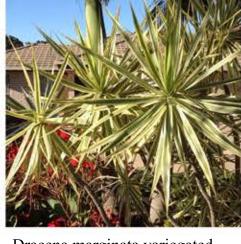
Po Box 3563 Robina Town Centre, 4230, Queensland Australia Ph: 0755 625223 M: 0414949851_ E: info@gsdesign.com.au

Dated: 3 February 2023

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









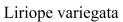
Casuarina glauca

Dracena marginata variegated

Gardenia radicans

Liriope muscari







Lomandra confertifolia rubiginosa



Lomandra longifolia



Melaleuca linariifolia

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

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

Development Permit No.: D/157-2021

Dated: 3 February 2023

Version: 1, Version Date: 18/11/2021



Nandina domestica



Rhaphiolepis indica



Scaevola humilis



Viburnum odoratissimum

GREEN SYNTHESIS DESIGN

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