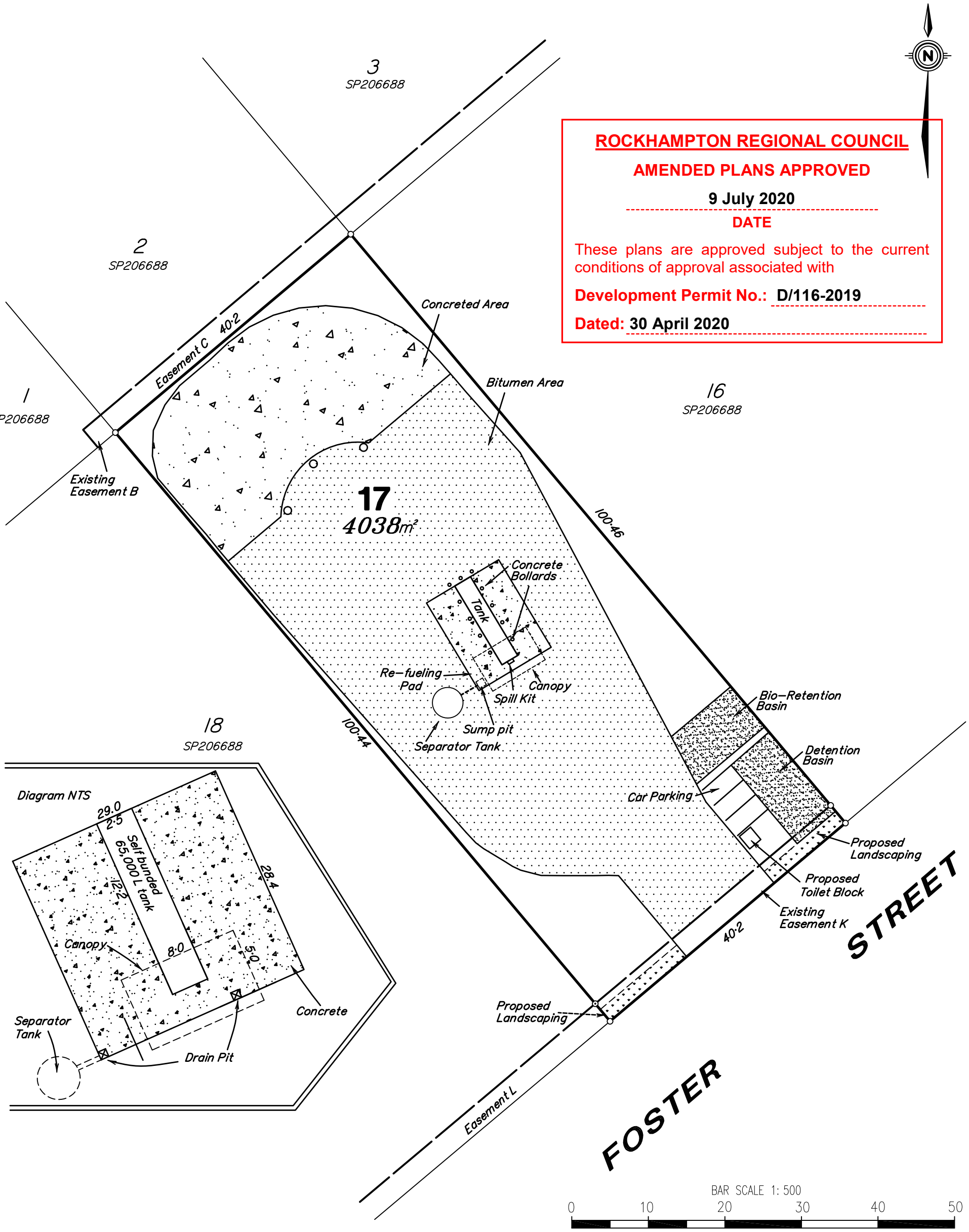

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

9 July 2020

DATE

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

Development Permit No.: D/116-2019

Dated: 30 April 2020

PACIFIC PETROLEUM

SMK CONSULTANTS PTY LTD.

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Ph (07)4671 2445 Fax (07)4671 2561
E'Mail qld@smk.com.au
Moree 39 Frome St Moree 2400
Ph (02)6752 1640 Fax (02)6752 5070

Drawn	TJJ	3/6/20	Checked			FBK		219140

SITE PLAN TO ACCOMPANY AN MCU APPLICATION ON LOT 17 SP206688 157 FOSTER STREET GRACEMERE

A3

SCALE: 1:500

219140-1

DO NOT SCALE FROM DRAWING. IF IN DOUBT: ASK | UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETRES | BEWARE OF 100mm MEASURING ERROR

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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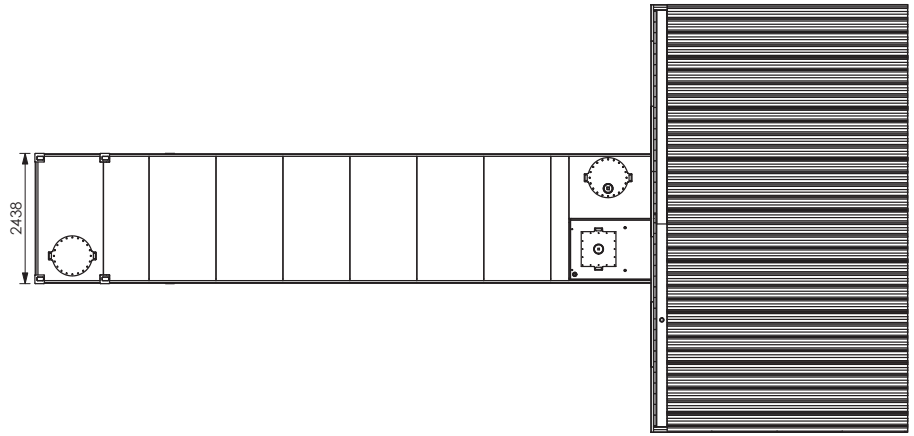
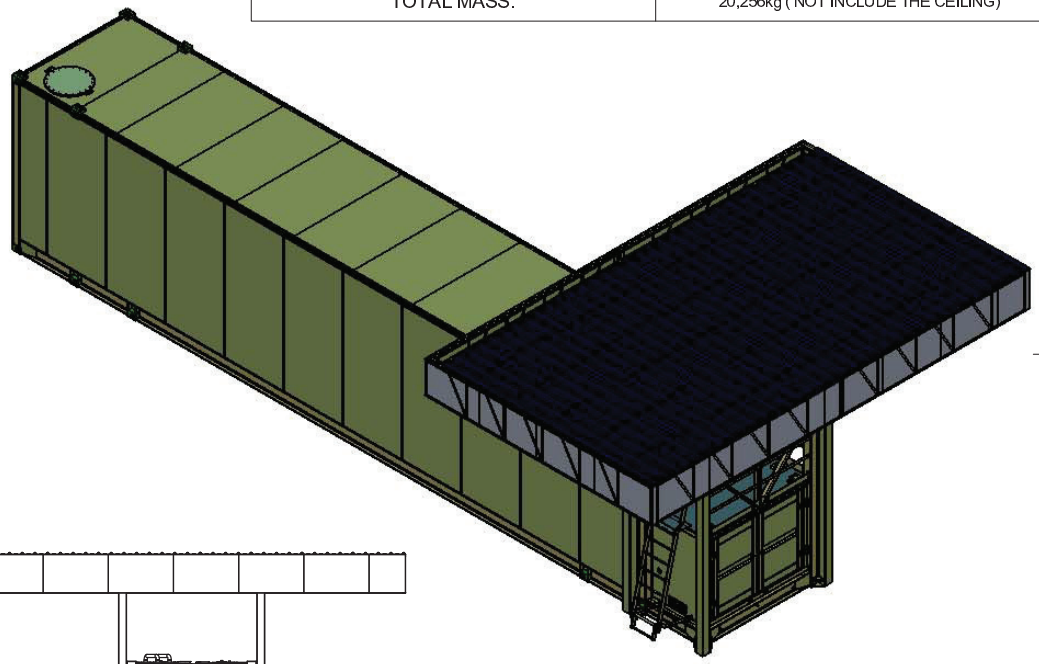
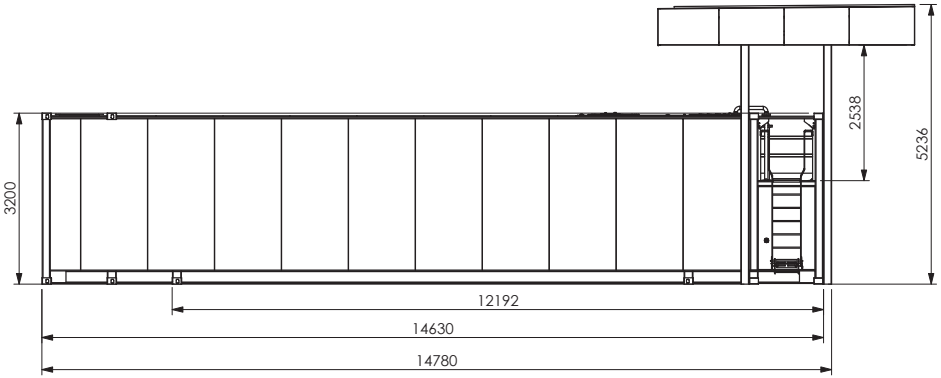
Development Permit No.: D/116-2019

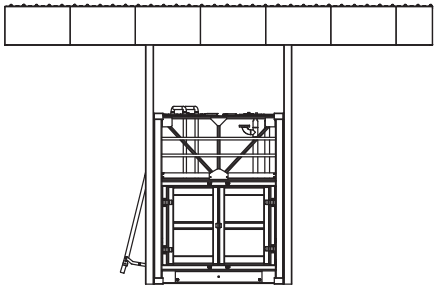
Dated: 30 April 2020

TANK DATA	
TANK CONTENTS:	DIESEL
DESIGNED TO:	AS1940
BUILT TO:	AS1692，CAT.3
CORROSION ALLOW.	0mm
GROSS VOLUME:	81,500L
HYD.TEST PRESSURE:	Gross level+150mm
SAFE FILL LEVEL	73,350L
N.D.T.	5%
TOTAL MASS:	20,256kg (NOT INCLUDE THE CEILING)









THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN		2017/10/16
CHK'D		
APPV'D		

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0.0 = -0.4
0.00 = -0.1

MATERIAL:

WEIGHT: Kg

FES 博睿

DWG NO. / PART NO.: T80-Canopy

JOB NO.:

CLIENT:

TITLE:

SHEET SIZE: A3

REVISION:

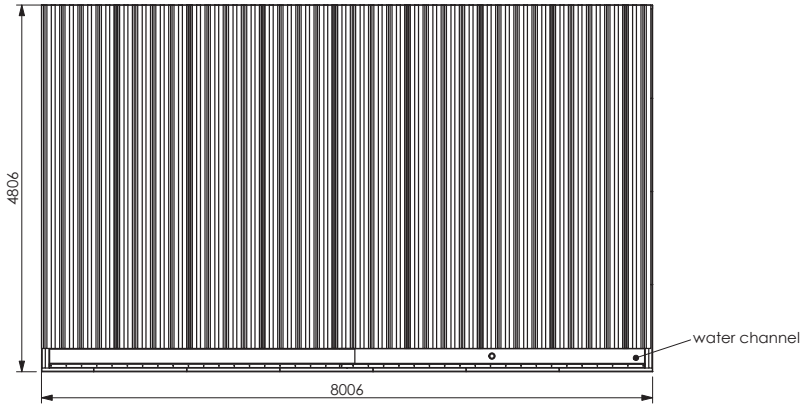
SCALE: N.T.S.

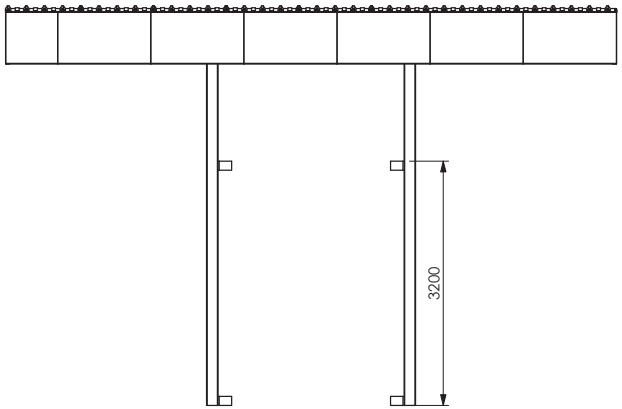
SHEET 1 OF 1

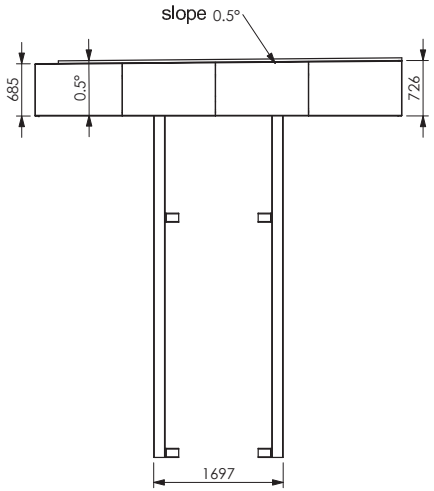
DO NOT SCALE FROM DRAWING. IF IN DOUBT: ASK

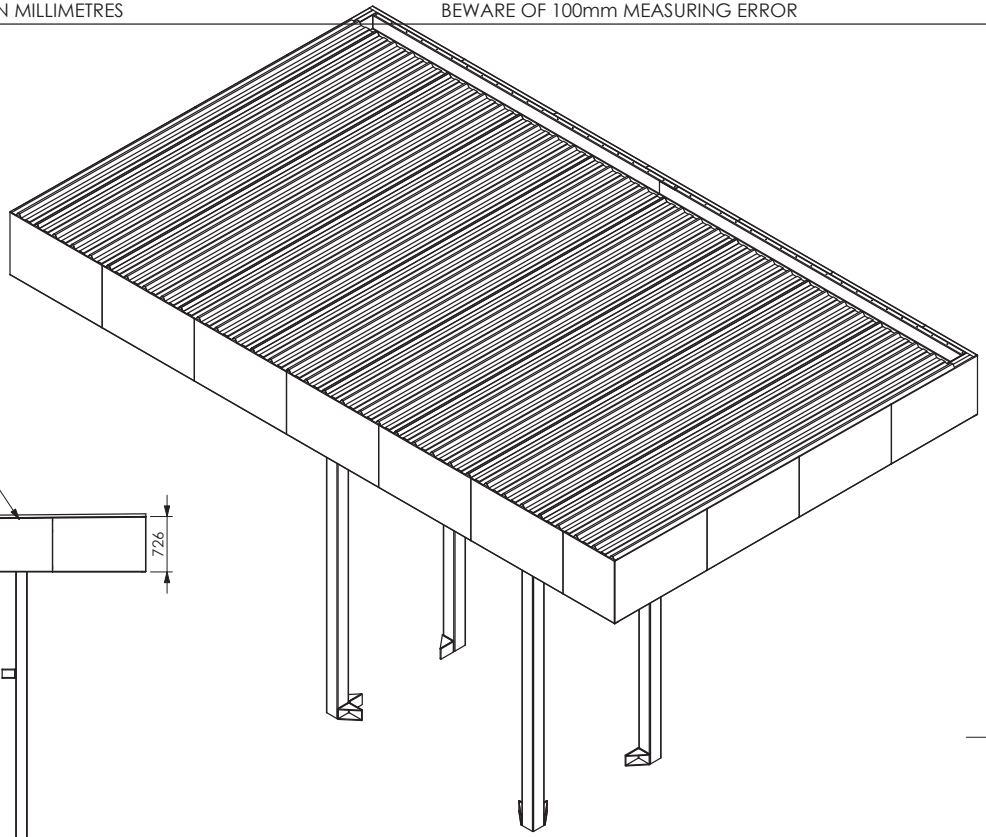
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETRES

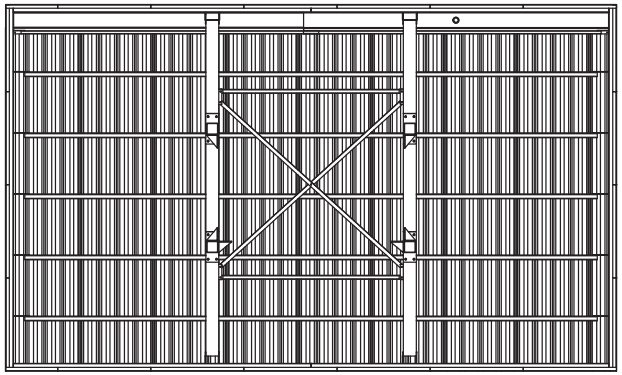
BEWARE OF 100mm MEASURING ERROR











weight：2581kg

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/116-2019

Dated: 30 April 2020

THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN		2017/10/13
CHK'D		
APPV'D		

FINISH:

TOLERANCE U.N.O.
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MATERIAL:

WEIGHT: Kg

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JOB NO.:

CLIENT:

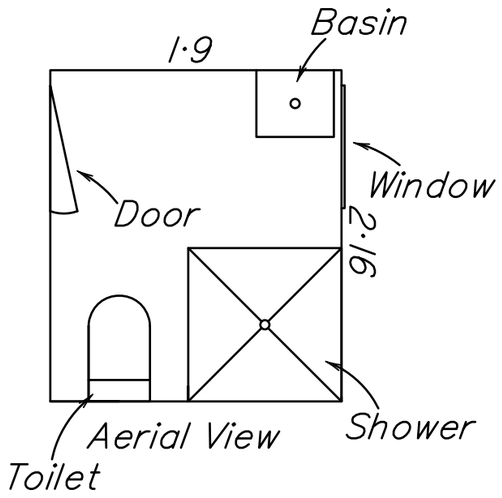
TITLE:

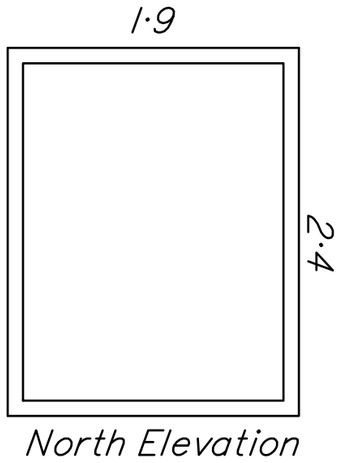
SHEET SIZE: A3

REVISION:

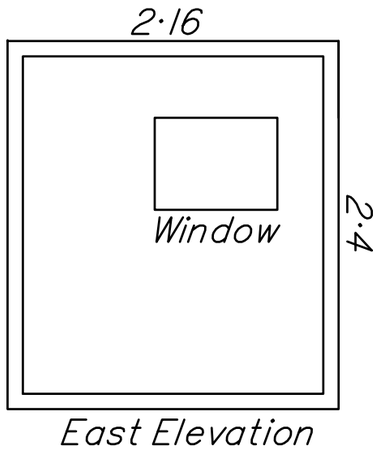
SCALE: N.T.S.

SHEET 1 OF 4

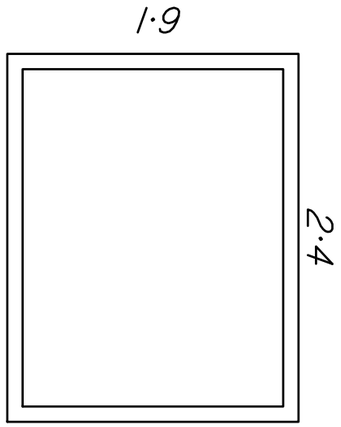




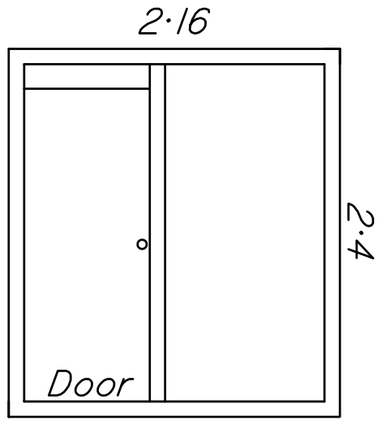
North Elevation



East Elevation



South Elevation



West Elevation

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

9 July 2020

DATE

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

Development Permit No.: **D/116-2019**

Dated: **30 April 2020**

Note:

This plan was prepared for PACIFIC PETROLEUM to accompany a MCU application to the ROCKHAMPTON REGIONAL Council and should not be used for any other purpose, This note is an integral part of this plan

BAR SCALE 1: 40

0 0.8 1.6 2.4 3.2 4

metres

PACIFIC PETROLEUM

SMK CONSULTANTS PTY LTD.

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ELEVATION DRAWINGS OF PROPOSED TOILET BLOCK TO ACCOMPANY MINOR CHANGE APPLICATION D/116-2019 ON LOT 17 ON SP206688

219140

SCALE: 1:40

A3

219140-4

Drawn	TJJ	10/06/20	Checked			FBK	

SMK
CONSULTANTS
Surveying – Irrigation – Environmental
ABN 63 061 919 003

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Ph. 07 4671 2445
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ralpho@smk.com.au
www.smk.com.au
Other offices: Gatton, Brisbane, Miles, Moree

Our Ref: 219023 – TJJ
10/03/2020

The Chief Executive Officer
Rockhampton Regional Council,
PO Box 1860,
ROCKHAMPTON QLD 4700

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/116-2019
Dated: 30 April 2020

Dear Sir,

ENVIRONMENTAL MANAGEMENT AND ACTION PLAN FOR THE MATERIAL CHANGE OF USE – UNMANNED SERVICE STATION

Details	Address	Area	Zoning	Owners	Applicant
Lot 17/ SP206688	157 Foster Street, Gracemere QLD 4702	4038m^2	Medium Impact Industry	Peter James Doyle	SMK Consultants on behalf of Pacific Petroleum

We refer to the above matter and confirm that we act on behalf of Pacific Petroleum the applicant. They have instructed us to prepare the attached application on their behalf. The following information has been provided to support the Development Application D/116-2019 submitted to the Rockhampton Regional Council on the 12th of December 2019 as part of the response to the information request dated 22 January 2020.

The following Environmental Management and Action Plan details the measures and facilities that will be put in place as a part of this proposal to minimize the environmental impacts that the proposed fuel tank would have. The following Plan details prevention buffers, spills and leakage contamination measures and the regularity of site visits and general maintenance of the site from Pacific Petroleum.

PREVENTION BUFFERS

The site will incorporate a number of prevention methods that will be used to avoid potential damage that could be caused by the heavy vehicles. The prevention methods that have been incorporated into this proposal have been included in the amended Proposal Plan 219140-1.

The proposed layout of the lot (as shown in Proposal Plan 219140-1) can act as a prevention method as it not only allows for the convenient movement of vehicles on the site but also means that any heavy vehicles coming into the site will be required to slow down to access the fuel tank.

The proposal will also include bollards surrounding the proposed fuel tank as shown on the amended Proposal Plan 219140-1, these proposed concrete bollards would provide protection from potential impact damage to the tank from heavy vehicles.

The proposed development will comply with Australian Standard 1940:2017 'The storage and handling of flammable and combustible liquids' through a number of different methods and techniques. The site will implement control measures for spillage control, fire protection and warning signs as described below in 'Spills and Leakage Contamination'.

Spills And Leakage Contamination

The proposed unmanned fuel station will utilize a number of different methods to avoid the contamination of the stormwater network and avoid any adverse environmental impacts arising from any spills or leaks that occurred. The proposed fuel tank that would be used for this proposal would be self-bunded.

The proposed design of the site will allow for the control of any spills. The siting of the proposed self-bunded fuel tank will allow for any spills to be directed to the holding tank and avoid contamination of the reticulated sewer system as well as avoid any flow onto neighbouring land. The site design and the proposed fuel tank will not allow for any adverse impacts on the reticulated sewer or stormwater system.

Any spills or leaks that occur will be directed to the proposed holding tank. The proposed holding tank, as shown in the amended Proposal Plan 219140-1, will be used for the purpose of managing potential spills and or leaks, it will be located underground and will be used for the purpose of avoiding environmental impacts and impacts on the reticulated stormwater system.

The proposal would also utilize spill kits on the site as shown on Proposal Plan 219140-1 that will abide by the Australian Standard 1940:2017 – The storage and handling of flammable and combustible liquids.

As stated in the Response to Information Request the 'Holding Tank' will be a 5,200-litre underground squat tank that will be used for the purpose of separating any spills or leaks from neighbouring blocks and the stormwater and sewer networks. All work done in creating and installing the proposed holding tank will be done so in accordance with all current Australian Standards.

As mentioned in the 'Response to Information Request' although the site will be operated 24 hours a day the expected traffic numbers during odd hours will not create significant disturbance nor will it have any adverse impacts on any residential areas.

The proposal will avoid environmental impacts; the proposed fuel tank occurs in an industrial area and the measures that have been indicated in the 'Response to Information Request' and this document will allow for the proposed fuel tank to avoid adverse environmental impacts.

The use of the proposed fuel tank would avoid petrol vapour emissions and would not have considerable impacts on the air quality. The design of the proposed fuel tank would allow for any fuel either being put into the tank or taken from the tank to not have adverse impacts on air quality.

General Maintenance

A member of staff from Pacific Petroleum will visit the site regularly to perform any required maintenance on the site as well as inspecting the tank and the site. The member of staff that visits the site will be able to maintain the site and keep up the general tidiness of the site.

The proposal also includes leak detection monitors on the blind tank that will allow for leaks to be quickly and easily detected and rectified. The proposed leak detection monitor would inform a member of the Pacific Petroleum staff members when there was a leak and would allow for them to either attend the site themselves and monitor and rectify the spill or inform someone close by of the issue.

Conclusion

The information that has been provided in this Environmental Management and Action Plan has been done so in conjunction with the Response to Information Request document in reply to the Rockhampton Regional Council's Information Request dated 22 January 2020. The information provided is in response to the additional pieces of information further requested to assess the application.

We hereby request Council's favourable consideration of the above proposal. Should you have any queries in relation to this matter please contact the writer.

Yours faithfully

T Jobling

Tom Jobling
BURP (UNE)
SMK CONSULTANTS PTY LTD

STORMWATER MANAGEMENT PLAN

157 FOSTER STREET, GRACEMERE

23 March 2020

STORM Water Consulting Pty Ltd
ACN 105 078 377
5/541 Old Cleveland Rd, CAMP HILL QLD 4152
Ph (07) 3398 4992
www.stormw.com.au

Job No: J7329 v1.0

Job Name: 157 Foster Street, Gracemere

Report Name	Date	Report No.
Stormwater Management Plan	23 March 2020	J7329 v1.0

Project Engineer: Jack Hu
BE Civil, MIEAust
E jack@stormw.com.au

Reviewed By: Darren Rogers
BE Civil (Hons), MIE Aust, RPEQ 5016
Director
E darren@stormw.com.au

Table of Contents

1.0 INTRODUCTION

Storm Water Consulting Pty Ltd was commissioned by Tim Millard to prepare a Stormwater Management Plan for the development on 157 Foster Street, Gracemere.

This report has been prepared to address Item 1.7 of the Information Request dated 22 January 2020. Item 1.7 is presented below.

1.7 Stormwater Management and Drainage

Please provide an overall stormwater drainage strategy report for the subject land, prepared and certified by a suitably qualified and experienced Registered Professional Engineer of Queensland (RPEQ).

This strategy must encompass the entire stormwater catchment area contributing to stormwater flows on the subject land. In addition, the strategy must demonstrate how the proposed development complies with the Queensland Urban Drainage Manual and must include, but is not limited to, an assessment of One Percent Annual Exceedance Probability (1% AEP) flows, velocities, proposals for on-site detention, on-site retention, and land dedications/easements in favour of Council required to provide drainage corridors suitable for the conveyance of stormwater flows through the subject land during a 100 year Average Recurrence Interval (ARI) rainfall event. The report must also include all calculations, clearly outline all assumptions, and address the following issues and all other stormwater-related issues relevant to the proposed development on the subject land:

1.7.1 Identification of drainage catchment and sub-catchment areas for the predevelopment and post-development scenarios. Please provide a suitably scaled stormwater master plan showing the stormwater catchment and sub-catchments for each of these scenarios and clearly identify the lawful point(s) of discharge for the subject land that comply with the provisions of the Queensland Urban Drainage Manual;

1.7.2 An assessment of the major and minor rainfall event peak discharges for the predevelopment and post-development scenarios;

1.7.3 Identification and conceptual design of all new drainage systems, and modifications to existing drainage systems, required to appropriately and adequately manage stormwater collection and discharge from the proposed development, and conveyance of major event flows through the subject land, consistent with the provisions of the Queensland Urban Drainage Manual and the Capricorn Municipal Development Guidelines;

1.7.4 Identification and conceptual design of stormwater mitigation works located on the subject land such as on-site detention systems, on-site retention systems, and associated outlet systems, in order to mitigate the impacts of the proposed development on downstream lands and existing upstream and downstream drainage systems. The proposed mitigation works must ensure that the post-development discharge from the subject land does not exceed the predevelopment discharge for all design rainfall events up to and including the One Percent Annual Exceedance Probability (1% AEP) event. In addition, please provide supporting calculations demonstrating the adequacy and suitability of all proposed detention systems, retention systems and outlet systems located within the subject land;

1.7.5 Identification of all areas of the subject land to be provided as dedications/easements in favour of Council for the purpose of conveyance of the One Percent Annual Exceedance Probability (1% AEP) major rainfall event in the post-completion of development scenario. All land proposed as major event flow paths must include a freeboard and access and maintenance provisions consistent with the Queensland Urban Drainage Manual. These

dedication/easement areas must be detailed on a suitably scaled and adequately dimensioned conceptual layout plan; and

1.7.6 Demonstration of how the proposal meets the water quality objectives of the *Queensland Water Quality Guidelines* and the *State Planning Policy*

2.0 SITE CONDITIONS

2.1 Existing Site

The site is situated in an industrial precinct of Gracemere, Rockhampton. The site is bound by Foster Street to the south and by industrial subdivisions in all other directions. A locality plan is presented below.

Figure 2.1 – Locality Plan (Google Maps Overlay)

2.2 Developed Site

An unmanned service station is proposed on the site. A canopy roof is proposed over the fuel outlet location. The vehicle turning areas are proposed to be concrete. The balance area will be landscaped. A concept plan is presented in Appendix A.

3.0 LAWFUL POINT OF DISCHARGE

The existing stormwater pipes are shown on Rockhampton Regional Council's interactive mapping. An extract of the interactive mapping is presented below.

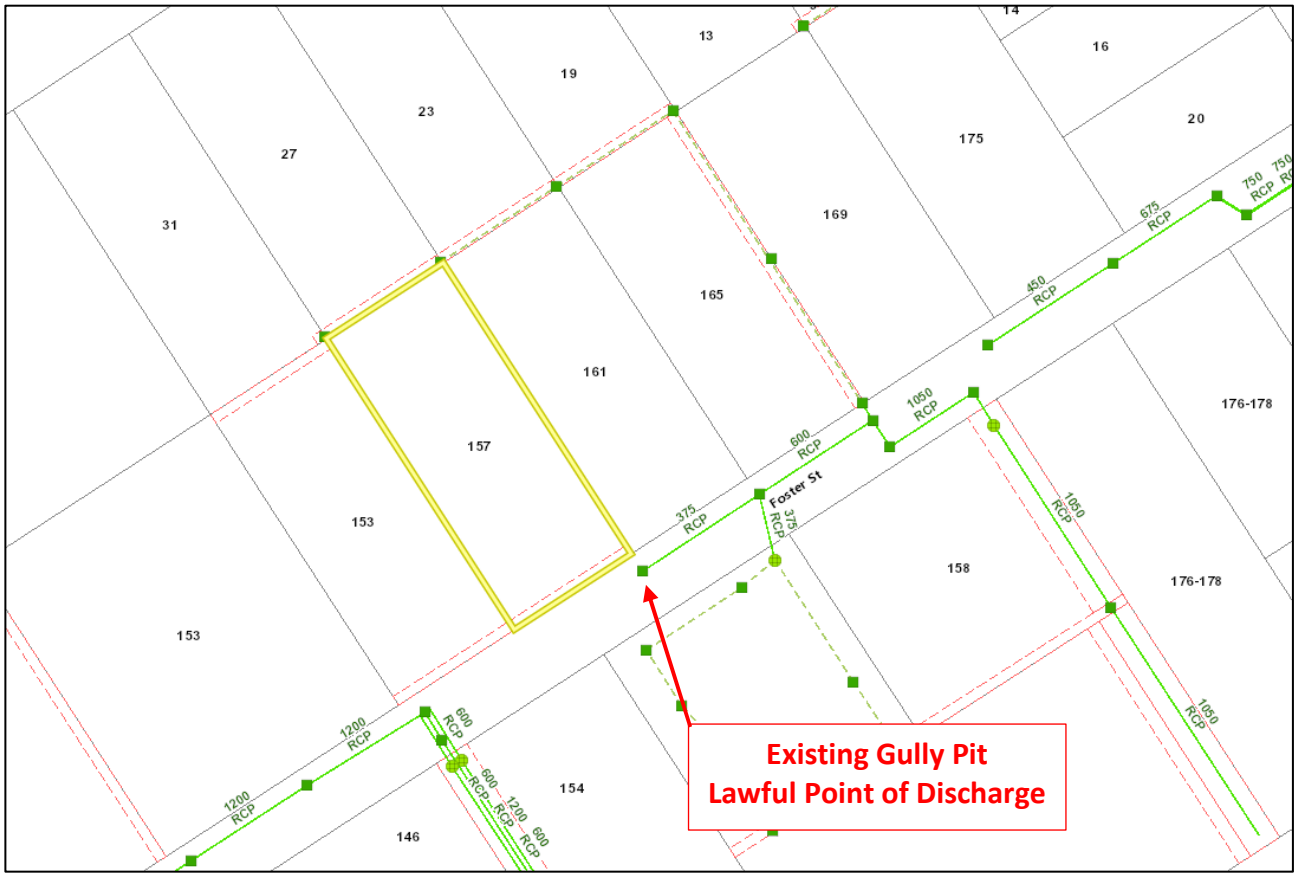


Figure 3.1 – Stormwater Pipe Plan Extract

A gully pit is located on Foster Street near the south-eastern corner of the site. Details of this gully pit were sourced from Council. A 'for construction' plan of the stormwater line was found and this plan is presented in Appendix E.

Runoff from the existing site currently flows onto Foster Street and is conveyed into the existing 375 mm diameter pipe through the existing gully pit. The pipe system conveys flows toward Gracemere Creek located approximately 230 metres south-east of the site. Flows in excess of the pipe capacity travel down Foster Street, where it is collected by another stormwater system, before flowing down Capricorn Street and ultimately into Gracemere Creek.

The development is proposed to maintain the same discharge strategy as the existing site, with the exception that low flows will now be connected directly into the existing gully pit via a new stormwater pipe. The existing gully pit is considered to be the lawful point of discharge for the development, as shown in Figure 3.1 above.

4.0 HYDROLOGIC MODELLING

4.1 Rational Method Calculations

The site is 4040 m² in area. Rational Method calculations were undertaken for the existing and developed site conditions. These calculations have been completed in accordance with the parameters recommended in the Queensland Urban Drainage Manual (QUDM, 2016).

A summary of the calculation parameters is presented in Table 4.1 below. A summary of the resulting flows is presented in Table 4.2 below. Detailed Rational Method calculations are presented in Appendix C.

Table 4.1 – Rational Method Calculation Parameters

Parameter	Pre-Development	Post-Development
Area	0.404 ha	0.404 ha
Time of Concentration	5 mins	5 mins
Runoff Coefficient C10	0.75	0.85

Table 4.2 – Rational Method Calculation Flow Summary

AEP %	Existing Site m³/s	Developed Site m³/s	Increase m³/s
63%	0.077	0.088	0.011
39%	0.092	0.104	0.012
18%	0.136	0.154	0.018
10%	0.168	0.190	0.022
5%	0.202	0.229	0.027
2%	0.260	0.295	0.035
1%	0.303	0.337	0.034

4.2 Existing URBS Model

URBS hydrologic modelling was undertaken to assess hydrologic impacts and to recommend mitigation measures for the proposed development. A schematic of the existing URBS model is presented below.

Figure 4.1 – Existing URBS Model Schematic

The existing site condition was modelled with a fraction impervious of 10%. A comparison of the Rational Method flows and the existing URBS flows is presented in Table 4.3 below. The results show that the URBS flows compare favourably with the Rational Method flows.

Table 4.3 – Comparison of Existing Flows (Rational Method v URBS)

AEP %	Rational Method m^3/s	URBS m^3/s	Difference m^3/s
63%	0.077	0.090	0.013
39%	0.092	0.106	0.014
18%	0.136	0.152	0.016
10%	0.168	0.180	0.012
5%	0.202	0.212	0.010
2%	0.260	0.264	0.004
1%	0.303	0.303	0.000

4.3 Developed (Unmitigated) URBS Model

The existing URBS model was modified to include an increase in fraction impervious from 10% to 66%. A schematic of the developed (unmitigated) URBS model is presented below.

Figure 4.2 – Developed (Unmitigated) URBS Model Schematic

A comparison of the existing URBS flows and the developed (unmitigated) URBS flows is presented in Table 4.4 below. The results below indicate that on-site detention is required to mitigate the increase in peak flows. The following section presents the specifications of the proposed on-site detention and the associated hydrologic modelling results.

Table 4.4 – Comparison of URBS Flows (Ex v Dev)

AEP %	Existing URBS m^3/s	Developed Unmitigated URBS m^3/s	Increase m^3/s
63%	0.090	0.108	0.018
39%	0.106	0.125	0.019
18%	0.152	0.174	0.022
10%	0.180	0.209	0.029
5%	0.212	0.244	0.032
2%	0.264	0.296	0.032
1%	0.303	0.336	0.033

4.4 Developed (Mitigated) URBS Model

The developed (unmitigated) URBS model was modified to include an above-ground detention basin, located toward the south-eastern corner of the site. Table 4.5 below presents a summary of the detention volume modelled.

Table 4.5 – On-Site Detention Specification

Detail	Specification
Volume	48 m³
Surface Area	20 m² at basin invert 118 m² at basin obvert
Depth	0.7 m depth at 1% AEP level within basin Additional freeboard required 0.3 m Total depth 1 m
Outlet Hydraulic Control	• 350 mm dia. orifice opening at IL • 600 mm W x 250 mm H letterbox opening at IL + 0.45 m
Pipe from Hydraulic Control to Existing Gully Pit	1 / 375 mm diameter pipe

The detention volume has been modelled to contain the 1% AEP flow within the basin. A comparison of the existing URBS flows and the developed (mitigated) URBS flows is presented in Table 4.6 below.

Table 4.6 – Comparison of URBS Flows (Ex v Dev1)

AEP %	Existing URBS m³/s	Developed Mitigated URBS m³/s	Increase m³/s
63%	0.090	0.089	-0.001
39%	0.106	0.101	-0.005
18%	0.152	0.144	-0.008
10%	0.180	0.175	-0.005
5%	0.212	0.211	-0.001
2%	0.264	0.263	-0.001
1%	0.303	0.297	-0.006

The results presented above indicate that the proposed detention volume effectively mitigates all AEP events (up to and including the 1% AEP event) to the existing flow rate. The proposed development would therefore not result in a material worsening on downstream properties.

Details of the URBS modelling are presented in Appendix D. A schematic stormwater layout plan is presented in Figure 4.3 below. The site is proposed to be graded towards the proposed bio-retention basin. The runoff from the ground areas of the development will flow directly into the bio-retention basin. The subsoil drainage of the bio-retention basin will be directed to the existing gully pit. The overflow from the bio-retention basin will be directed to the above-ground detention basin. The detention basin will incorporate a pit structure with openings to function as the outlet hydraulic control. A 375 mm diameter pipe will be connected from this pit to the existing gully pit.

Final pipe and pit sizes, levels and locations will be determined during the detailed design stage of the project. A schematic cross section of the proposed stormwater system is presented in Figure 4.4 below.

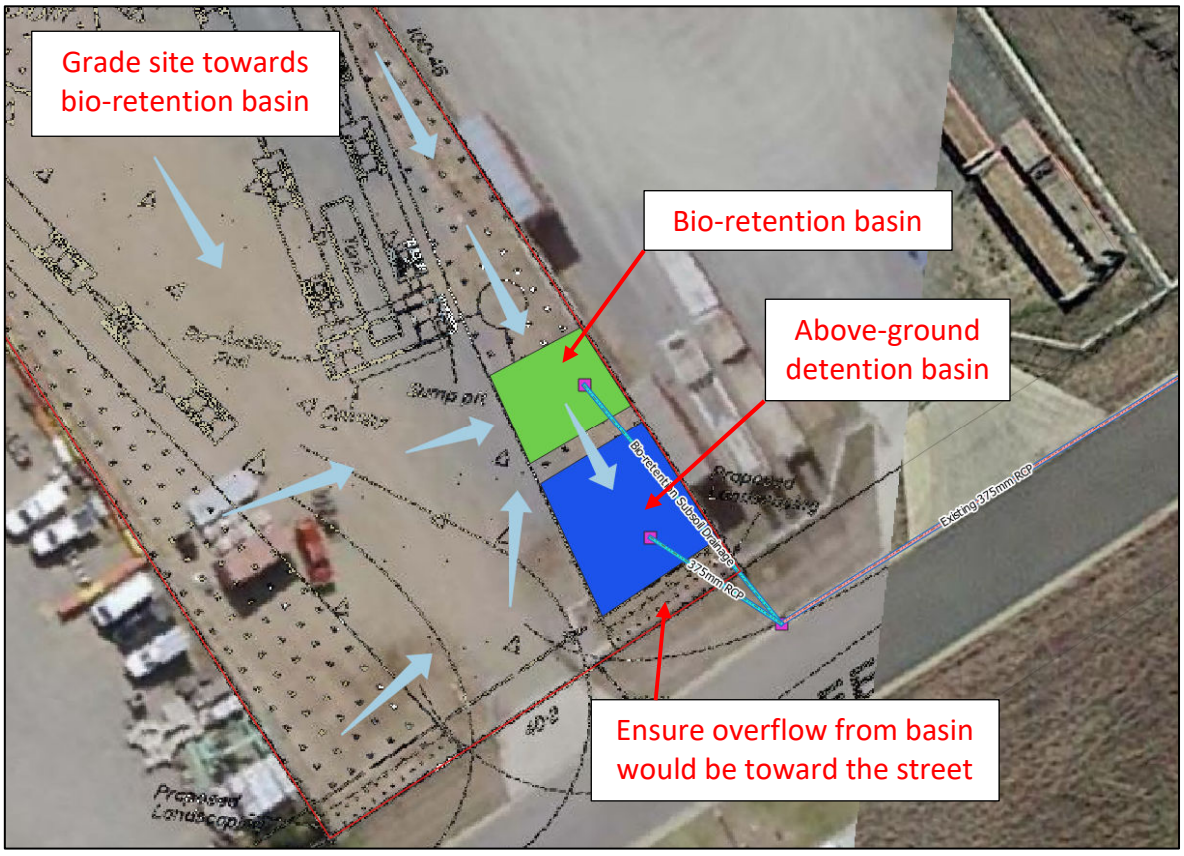


Figure 4.3 – Schematic Stormwater Layout Plan

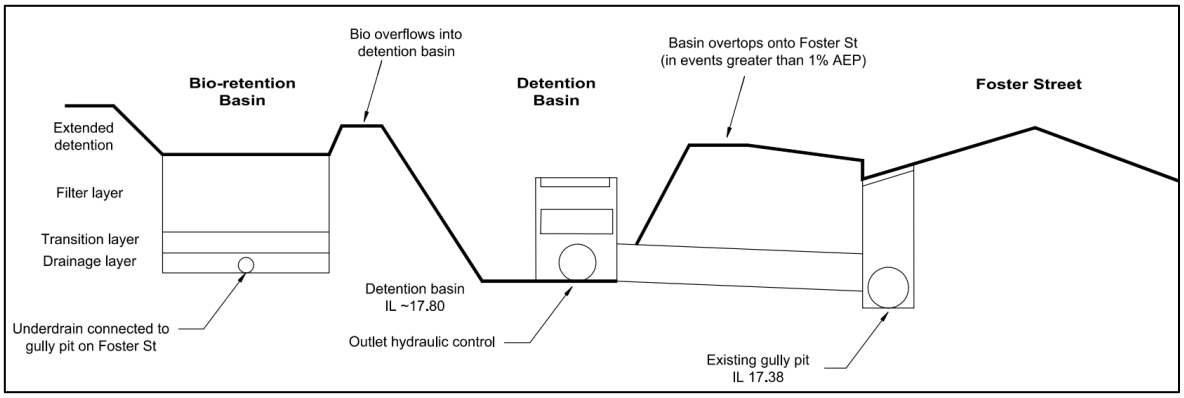


Figure 4.4 – Schematic Stormwater Cross Section

5.0 WATER QUALITY

5.1 State Planning Policy (July 2017)

The State Planning Policy (SPP) sets out the requirements for water quality in the interest of the State. Developments which trigger the requirements summarised in Table 5.1 below would need to meet water quality objectives listed in Table B, Appendix 3 of the SPP.

Table 5.1 – Development Applications affecting Receiving Waters

State Planning Policy Criteria	Application to Development
(1) A material change of use for urban purposes that involves a land area greater than 2500 square metres that: (a) will result in an impervious area greater than 25 per cent of the net developable area, or	Criterion is applicable to development.
(b) will result in six or more dwellings, or	Criterion is NOT applicable to development.
(2) Reconfiguring a lot for urban purposes that involves a land area greater than 2500 square metres and will result in six or more lots, or	Criterion is NOT applicable to development.
(3) Operational works for urban purposes that involve disturbing more than 2500 square metres of land.	Criterion is NOT applicable to development.

The proposed development triggers the SPP, hence water quality objectives indicated in Table B, Appendix 2 of the SPP would need to be met.

5.2 Water Quality – Construction Phase

During the construction phase of a development, the pollutants listed in Table 5.2 are typically generated. Measures are required during the construction phase to manage each of these pollutants. These measures may include but are not limited to; bins and mini-skips, erosion and sediment control measures (discussed below), wash down and spill containment areas, bunds, spill clean-up kits, street sweeping and chemical agents.

Table 5.2 – Pollutants Generated during the Construction Phase

Pollutant	Source
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts
Sediment	Unprotected exposed soils and stockpiles during earthworks and building operations
Hydrocarbons	Fuel and oil spills leaks from construction equipment
Toxic materials	Cement slurry, asphalt primer, solvents, cleaning agents, wash waters (e.g. from tile works)
pH altering substances	Acid sulphate soils, cement slurry and wash waters

5.2.1 Erosion and Sediment Control

During the construction phase of the development, an Erosion and Sediment Control Program (E&SCP) is required to minimise water quality impacts. Such an E&SCP should provide complete and detailed instructions on the following procedures;

- Before construction activities begin, sediment fences should be constructed on the downstream site boundaries and at the base of all proposed soil stockpiles;
- Areas for plant and construction material storage should be designated. Runoff from these areas should be directed to small holding ponds in case of spillages;
- Catch drains at the downstream boundary of construction activities should also be created to ensure that any sediment-laden runoff is contained and directed into a sediment basin and not permitted to flow unmitigated to downstream areas;
- Sediment basins should be constructed at appropriate locations to collect sediment at the downstream ends of the catch drains that convey runoff from exposed areas;
- Site personnel should be educated on the sediment and control measures implemented on site; and
- Following rainfall events greater than 20mm, inspection of silt fences, sedimentation basins and other erosion control measures should be carried out. Where necessary, collected material should be removed and damaged equipment should be replaced immediately.

5.3 Water Quality – Operational Phase

During the operational (post-construction) phase of the proposed development, the following pollutants are typically generated;

- Sediment,
- Litter,
- Faecal coliforms,
- Hydrocarbons,
- Heavy Metals,
- Thermal Pollution,
- Nutrients (N & P) and
- Surfactants.

5.3.1 Water Quality Objectives

Key pollutant levels will be reduced to the levels indicated in Table B, Appendix 2 of the State Planning Policy. The Water Quality Objectives are summarised in Table 5.3 below.

Table 5.3 – Water Quality Objectives for Central Queensland (South)

Parameter	Load-based Reduction
Total Suspended Solids (TSS)	85%
Total Phosphorus (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants > 5mm	90%

Note that the percentage reduction refers to a comparison between the un-mitigated developed site and the mitigated developed site.

6.0 WATER QUALITY MODELLING

A stormwater treatment train is proposed to meet the WQOs stated in Section 5.3.1. The Stormwater Quality Improvement Devices (SQIDs) for the treatment train were selected based on site constraints, opportunities and practicality.

A bio-retention basin is proposed, located towards the south-eastern site corner, to meet water quality objectives. The basin would capture all runoff from the development (excluding the detention-basin land).

6.1 Source Nodes

A MUSIC schematic layout is presented below. The site catchments, their areas and impervious proportions are summarised in Table 6.1.

Table 6.1 – Source Node Fractions Impervious

Source Node	Area	Type	Fraction Impervious
Industrial Roof	0.005 ha	Industrial Roof	100%
Landscape Areas	0.136 ha	Industrial Ground	20%
Concrete Hardstand	0.263 ha	Industrial Road	100%

Rainfall-runoff parameters were assigned to the source nodes in accordance with the Water by Design MUSIC Modelling Guidelines Version 1.0 – 2010 Industrial Use of the site. These parameters are summarised in Table 6.2 below.

Table 6.2 – Rainfall – Runoff Parameters

Parameter		Industrial
Impervious Area Properties	Rainfall threshold (mm/day)	1
Pervious Area Properties	Soil storage capacity (mm)	18
	Initial storage (% of capacity)	10
	Field Capacity (mm)	80
	Infiltration Capacity Coefficient – a	243
	Infiltration Capacity Exponent – b	0.6
Groundwater Properties	Initial depth (mm)	50
	Daily recharge rate (%)	0
	Daily base flow rate (%)	31
	Daily deep seepage rate (%)	0

Pollutant export parameters were assigned according to the Water by Design MUSIC Modelling Guidelines Version 1.0 – 2010. The pollutant export parameters adopted in the MUSIC model are summarised in Table 6.3 below.

Table 6.3 – Pollutant Export Parameters (Industrial)

Source		Log_{10} TSS (mg/L)		Log_{10} TP (mg/L)		Log_{10} TN (mg/L)	
		Base flow	Storm flow	Base flow	Storm flow	Base flow	Storm flow
Roof	Mean	NA	1.30	NA	-0.89	NA	0.25
	Std Dev	NA	0.44	NA	0.36	NA	0.32
Ground	Mean	0.78	2.43	-1.11	-0.30	1.40	0.25
	Std Dev	0.45	0.44	0.48	0.36	0.20	0.32
Road	Mean	0.78	2.43	-1.11	-0.30	1.40	0.25
	Std Dev	0.45	0.44	0.48	0.36	0.20	0.32

6.2 Treatment Node – Gully Baskets

Gully baskets are primary treatment devices which predominantly capture gross pollutants and sediments. Gully baskets are a cost-effective solution for maintaining the efficiency of the bio-retention basin and detention basin.

Gully baskets are proposed to be located in all on-site field inlets and gully pits. A single gully basket was modelled in MUSIC. The input parameters utilised in MUSIC are presented in Table 6.4 and 6.5 below.

Table 6.4 – MUSIC Input Parameters for Gully Baskets

Inlet Properties	GPT
Low Flow Bypass (m^3/s)	0
High Flow Bypass (m^3/s)	0.011 x No. Gully Baskets

Table 6.5 – MUSIC Transfer Functions for Gully Baskets

Transfer Functions	In	Out
Total Suspended Solids (TSS)	0	0
	100	40
Total Nitrogen (TN)	0	0
	50	50
Total Phosphorus (TP)	0	0
	10	10
Gross Pollutants	0	0
	14.8	0

6.2.1 Maintenance

Gully baskets should be checked and emptied once a month or after significant rainfall events.

6.3 Treatment Node – Buffer

The landscape sub-area of the MUSIC model was modelled to go through a buffer prior to entering the bio-retention basin. Buffers are vegetated strips adjacent to drainage lines (i.e. landscaped areas) and are effective in the removal of coarse to medium sized suspended solids. The input parameters utilised in MUSIC are presented in Table 6.6 below.

Table 6.6 – MUSIC Input Parameters for Buffer

Properties	Buffer
Percentage of upstream area buffered	100%
Buffer area (% of upstream impervious area)	50%
Exfiltration rate	0 mm/hr

6.4 Treatment Node – Bio-Retention Basin

A bio-retention basin is proposed at the south-eastern corner of the site. The bio-retention basin has been modelled in MUSIC with the parameters listed in Table 6.7 below.

Table 6.7 – Bio-Retention Basin Parameters

Properties	Bio-Retention Basin
Extended Detention Depth	0.3 m
Surface Area	52 m2 (area at median depth of extended detention)
Seepage Loss	0 mm/hr
Filter Area	36 m2
Filter Depth	0.6 m
Filter median Particle Diameter	0.45 mm
Drainage	Slotted PVC Pipes
Saturated Hydraulic Conductivity	200 mm/hr
Overflow Weir Width	3.6 m

The proposed location of the bio-retention basin is presented in Figure 4.3. A schematic section of the basin is presented in Figure 4.4. The drainage from the bio-retention basin will connect to the existing gully pit. Once the water level within the bio-retention basin reaches the top of the 300 mm extended detention depth, water would flow towards the detention basin to receive peak flow attenuation. The final location of the bio-retention basin and the size, levels and location of the basin drainage would be determined during the detailed design stage of the project.

6.4.1 Maintenance

Maintenance checklist for the bio-retention basin is presented in Appendix F.

6.5 MUSIC Analysis

The quality of stormwater runoff and the impact of the proposed SQIDs were analysed using MUSIC version 6.2 in accordance with the water quality objectives from Table B, Appendix 2 of the State Planning Policy. The MUSIC model was based on the 2000 to 2010 rainfall series for Rockhampton (39083) with 6-minute time steps. The MUSIC model schematic is presented in Figure 6.1 below. The MUSIC modelling results are presented in Table 6.8 below.

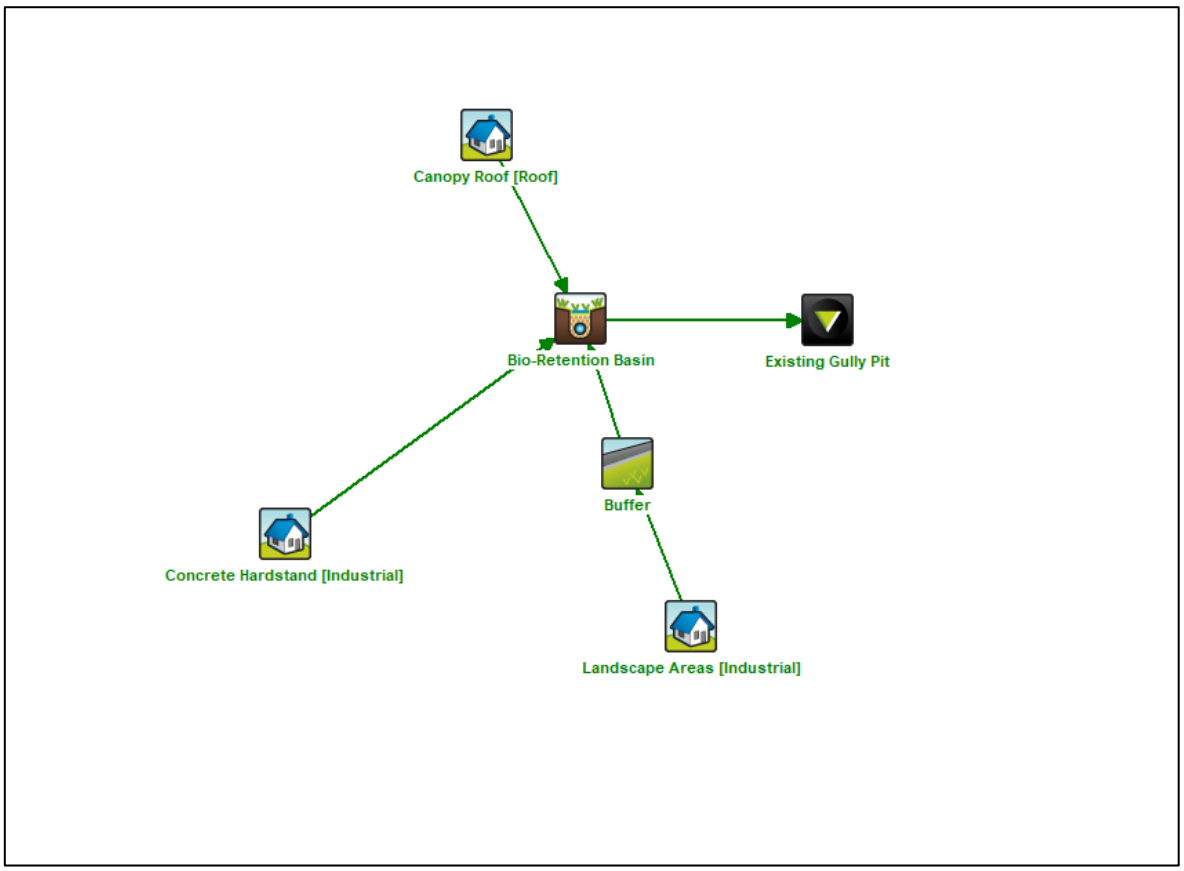


Figure 6.1 – MUSIC Model Schematic

Table 6.8 – MUSIC Model Results

Indicator	Annual Loads (kg/yr)		Reduction	
	Without SQIDs	With SQIDs	Actual	Target
TSS	932	140	85%	85%
TP	1.44	0.32	78%	60%
TN	4.87	2.54	48%	45%
GP	48.1	0	100%	90%

The results above indicate that the required water quality objectives are met for the development.

7.0 CONCLUSIONS

This Stormwater Management Plan was prepared to address Item 1.7 of the Information Request dated 22 January 2020 for the proposed unmanned service station site at 157 Foster Street, Gracemere. Response to Item 1.7 are presented below.

1.7 Stormwater Management and Drainage

Please provide an overall stormwater drainage strategy report for the subject land, prepared and certified by a suitably qualified and experienced Registered Professional Engineer of Queensland (RPEQ).

This strategy must encompass the entire stormwater catchment area contributing to stormwater flows on the subject land. In addition, the strategy must demonstrate how the proposed development complies with the Queensland Urban Drainage Manual and must include, but is not limited to, an assessment of One Percent Annual Exceedance Probability (1% AEP) flows, velocities, proposals for on-site detention, on-site retention, and land dedications/easements in favour of Council required to provide drainage corridors suitable for the conveyance of stormwater flows through the subject land during a 100 year Average Recurrence Interval (ARI) rainfall event. The report must also include all calculations, clearly outline all assumptions, and address the following issues and all other stormwater-related issues relevant to the proposed development on the subject land:

1.7.1 Identification of drainage catchment and sub-catchment areas for the predevelopment and post-development scenarios. Please provide a suitably scaled stormwater master plan showing the stormwater catchment and sub-catchments for each of these scenarios and clearly identify the lawful point(s) of discharge for the subject land that comply with the provisions of the Queensland Urban Drainage Manual;

SWC Response: Refer to Section 4.0 of this report for drainage catchment plans for the existing and developed site. The lawful point of discharge is the existing gully pit on Foster Street near the south-eastern corner of the site (refer to Section 3.0).

1.7.2 An assessment of the major and minor rainfall event peak discharges for the predevelopment and post-development scenarios;

SWC Response: An assessment of the major and minor rainfall event peak discharges under existing and developed conditions is presented in Section 4.0 of this report.

1.7.3 Identification and conceptual design of all new drainage systems, and modifications to existing drainage systems, required to appropriately and adequately manage stormwater collection and discharge from the proposed development, and conveyance of major event flows through the subject land, consistent with the provisions of the Queensland Urban Drainage Manual and the Capricorn Municipal Development Guidelines;

SWC Response: A concept design for the on-site drainage system is presented in Figure 4.3.

1.7.4 Identification and conceptual design of stormwater mitigation works located on the subject land such as on-site detention systems, on-site retention systems, and associated outlet systems, in order to mitigate the impacts of the proposed development on downstream lands and existing upstream and downstream drainage systems. The proposed mitigation works must ensure that the post-development discharge from the subject land does not exceed the predevelopment discharge for all design rainfall events up to and including the One Percent Annual Exceedance Probability (1% AEP) event. In addition, please provide supporting calculations demonstrating the adequacy and suitability of all proposed detention systems, retention systems and outlet systems located within the subject land;

SWC Response: Refer to Section 4.4 of this report for details of the proposed on-site detention system. Refer to Section 6.3 of this report for details of the proposed bio-retention system. Stormwater outlet systems are presented in schematic stormwater layout plan in Figure 4.3. A schematic section plan is presented in Figure 4.4. The URBS hydrologic model results indicate that the proposed on-site detention system effectively mitigates the peak discharges from the development to existing peak discharges, up to and including the 1% AEP storm event.

1.7.5 Identification of all areas of the subject land to be provided as dedications/easements in favour of Council for the purpose of conveyance of the One Percent Annual Exceedance Probability (1% AEP) major rainfall event in the post-completion of development scenario. All land proposed as major event flow paths must include a freeboard and access and maintenance provisions consistent with the Queensland Urban Drainage Manual. These dedication/easement areas must be detailed on a suitably scaled and adequately dimensioned conceptual layout plan; and

SWC Response: All site runoff ultimately ends up in the above-ground detention basin. As such, there would not be a need to provide any dedications or easements for the 1% AEP rainfall event. Flows in excess of the 1% AEP event would flow from the detention basin towards Foster Street.

1.7.6 Demonstration of how the proposal meets the water quality objectives of the *Queensland Water Quality Guidelines* and the *State Planning Policy*

SWC Response: A stormwater treatment train incorporating gully baskets and a bio-retention basin has been proposed to meet the water quality objectives contained within the State Planning Policy. Details regarding the proposed stormwater treatment train are presented in Section 6.0 of this report.

Darren Rogers
BE Civil (Hons), MIE Aust, RPEQ 5016
Director

LIST OF APPENDICIES

APPENDIX A

Development Plans

PACIFIC PETROLEUM

SMK
CONSULTANTS PTY LTD.

Goondiwindi 9 Pratten St Goondiwindi 4390
Ph (07)4671 2445 Fax (07)4671 2561
E'Mail qld@smk.com.au
Moree 39 Frome St Moree 2400
Ph (02)6752 1640 Fax (02)6752 5070

Drawn	TJJ	2/12/19	Checked			FBK		219140

SITE PLAN TO ACCOMPANY
AN MCU APPLICATION ON
LOT 17 SP206688
157 FOSTER STREET GRACEMERE

SCALE: 1:500

A3

219140-1

APPENDIX B

Google Street View Imagery

Image 1 – Foster Street showing existing gully pit in front of site (Dec 2018)

Image 2 – Existing site condition (Dec 2018)

APPENDIX C

Rational Method Calculations

RATIONAL METHOD CALCULATIONS

Table C 1 a

Project: Gracemere — 7329

Location: Point 1 - Total Flow - DS

Comments: Existing Site / Developed Catchment

Time of Concentration

Time of Concentration	5.0 min

Rainfall Data: Rainfall Intensity Frequency Duration data for ROCKHAMPTON

Sub-Areas and Runoff Coefficients

	Area	C10		Areas included in Calculations				Separate c100 > 1.0 and c100 < 1.0					
	ha	Exist	Dev	Condition	Area	C10	C10 x A	C10	C10	C10 x A	C10 x A	Area	Area
Site	0.40	0.75	0.85	Existing	0.40	0.75	0.30	0.75		0.30		0.40	
							Sum			0.30	0.00	0.40	0.00
							Total		0.750		0.303		0.404
							Individual	0.750	0.000	0.303	0.000	0.404	0.000

Discharge Calculations

tc				5.0
C100>1		Average	c10	0.000
			Area (ha)	0.00
C100<1	c10 - 2	Average		0.750
			Area (ha)	0.40

Total Catchment: 0.4 ha

Depth mm	ARI years	Fy	Runoff Coefficients C100>1	Runoff Coefficients C100<1	Rainfall (mm/hr)	Discharge m^3/s 1	Discharge m^3/s 2	Discharge m^3/s Total
10	1	0.80	0.00	0.60	115.08	0.000	0.077	**0.077**
11	2	0.85	0.00	0.64	128.40	0.000	0.092	**0.092**
14	5	0.95	0.00	0.71	170.40	0.000	0.136	**0.136**
17	10	1.00	0.00	0.75	199.20	0.000	0.168	**0.168**
19	20	1.05	0.00	0.79	229.20	0.000	0.202	**0.202**
22	50	1.15	0.00	0.86	268.80	0.000	0.260	**0.260**
25	100	1.20	0.00	0.90	300.00	0.000	0.303	**0.303**
28	200	1.20	0.00	0.90	338.40	0.000	0.342	**0.342**
34	500	1.20	0.00	0.90	405.60	0.000	0.409	**0.409**

Frequent ARI's	Discharge m^3/s	% of Q_1
1mth	0.019	25%
2mth	0.031	40%
3mth	0.039	50%
4mth	0.046	60%
6mth	0.058	75%
9mth	0.070	90%
12mth	0.077	100%

RATIONAL METHOD CALCULATIONS

Table C 1 b

Project: Gracemere — 7329

Location: Point 1 - Total Flow - DS

Comments: Developed Site / Developed Catchment

Time of Concentration

Time of Concentration	5.0 min

Rainfall Data: Rainfall Intensity Frequency Duration data for ROCKHAMPTON

Sub-Areas and Runoff Coefficients

	Area	C10		Areas included in Calculations				Separate c100 > 1.0 and c100 < 1.0					
	ha	Exist	Dev	Condition	Area	C10	C10 x A	C10	C10	C10 x A	C10 x A	Area	Area
Site	0.40	0.75	0.85	Developed	0.40	0.85	0.34		0.85		0.34		0.40
							Sum			0.00	0.34	0.00	0.40
							Total		0.850		0.343		0.404
							Individual	0.000	0.850	0.000	0.343	0.000	0.404

Discharge Calculations

tc				5.0
C100>1		Average	c10	0.850
			Area (ha)	0.40
C100<1	c10 - 2	Average		0.000
			Area (ha)	0.00

Total Catchment: 0.4 ha

Depth mm	ARI years	Fy	Runoff Coefficients C100>1	Runoff Coefficients C100<1	Rainfall (mm/hr)	Discharge m^3/s 1	Discharge m^3/s 2	Discharge m^3/s Total
10	1	0.80	0.68	0.00	115.08	0.088	0.000	**0.088**
11	2	0.85	0.72	0.00	128.40	0.104	0.000	**0.104**
14	5	0.95	0.81	0.00	170.40	0.154	0.000	**0.154**
17	10	1.00	0.85	0.00	199.20	0.190	0.000	**0.190**
19	20	1.05	0.89	0.00	229.20	0.229	0.000	**0.229**
22	50	1.15	0.98	0.00	268.80	0.295	0.000	**0.295**
25	100	1.20	1.00	0.00	300.00	0.337	0.000	**0.337**
28	200	1.25	1.00	0.00	338.40	0.380	0.000	**0.380**
34	500	1.30	1.00	0.00	405.60	0.455	0.000	**0.455**

	Frequent ARI's	Discharge m^3/s	% of Q_1
0.010	1mth	0.022	25%
0.012	2mth	0.035	40%
0.018	3mth	0.044	50%
0.022	4mth	0.053	60%
0.027	6mth	0.066	75%
0.035	9mth	0.079	90%
0.034	12mth	0.088	100%

APPENDIX D

URBS Model Files

7329_Ex.DAT

```
"Index","Area","UL","UD","I"
#1,0.00063,0.50,0.50,0.10
#2,0.00069,0.50,0.50,0.10
#3,0.00067,0.50,0.50,0.10
#4,0.00071,0.50,0.50,0.10
#5,0.00066,0.50,0.50,0.10
#6,0.00069,0.50,0.50,0.10
```

7329_Ex.U

```
Gracemere - Existing
MODEL: Basic
USES: L, U
Default Parameters: alpha=1.20 m=0.8
Catchment File=7329_Ex.dat

Rain    #1      L=0.020
Store.
Rain    #2      L=0.019
Get.
Route thru      #3      L=0.034
Store.
Rain    #3      L=0.020
Store.
Rain    #4      L=0.019
Get.
Get.
Route thru      #5      L=0.034
Store.
Rain    #5      L=0.020
Store.
Rain    #6      L=0.020
Get.
Get.
Print. POINT-1
end of catchment details.
```

7329_Dev.DAT

```
"Index","Area","UL","UD","I"
#1,0.00063,1.00,0.00,0.66
#2,0.00069,1.00,0.00,0.66
#3,0.00067,1.00,0.00,0.66
#4,0.00071,1.00,0.00,0.66
#5,0.00066,1.00,0.00,0.66
#6,0.00069,1.00,0.00,0.66
```

7329_Dev.U

```
Gracemere - Development
MODEL: Basic
USES: L, U
Default Parameters: alpha=1.20 m=0.8
Catchment File=7329_Dev.dat

Rain    #1      L=0.020
Store.
Rain    #2      L=0.019
Get.
Route thru      #3      L=0.034
Store.
Rain    #3      L=0.020
Store.
Rain    #4      L=0.019
Get.
Get.
Route thru      #5      L=0.034
Store.
Rain    #5      L=0.020
Store.
Rain    #6      L=0.020
Get.
Get.
Print. POINT-1
end of catchment details.
```

7329_Dev1.DAT

```
"Index","Area","UL","UD","I"
#1,0.00063,1.00,0.00,0.66
#2,0.00069,1.00,0.00,0.66
#3,0.00067,1.00,0.00,0.66
#4,0.00071,1.00,0.00,0.66
#5,0.00066,1.00,0.00,0.66
#6,0.00069,1.00,0.00,0.66
```

7329_Dev1.U

```
Gracemere - Development1
MODEL: Basic
USES: L, U
Default Parameters: alpha=1.20 m=0.8
Catchment File=7329_Dev1.dat

Rain    #1      L=0.020
Store.
Rain    #2      L=0.019
Get.
Route thru      #3      L=0.034
Store.
Rain    #3      L=0.020
Store.
Rain    #4      L=0.019
Get.
Get.
Route thru      #5      L=0.034
Store.
Rain    #5      L=0.020
Store.
Rain    #6      L=0.020
Get.
Get.
Print. B1-In
DAM ROUTE VBF=0 NUMBER=30
0.000000 0.000000
0.002100 0.005040
0.004200 0.010080
0.006300 0.015120
0.008400 0.020160
0.010500 0.025200
0.012600 0.030240
0.014700 0.039600
0.016800 0.050040
0.018900 0.058680
0.021000 0.072000
0.023100 0.083700
0.025200 0.091800
0.027300 0.102600
0.029400 0.111600
0.031500 0.126000
0.033600 0.138188
0.035700 0.154509
0.037800 0.173520
0.039900 0.194706
0.042000 0.217771
0.044100 0.249713
0.046200 0.277785
0.048300 0.303672
0.051400 0.329084
0.055000 0.355744
0.058600 0.382868
0.062200 0.414320
0.065800 0.466053
0.069400 0.530088
Print. B1-OUT
Print. POINT-1
end of catchment details.
```

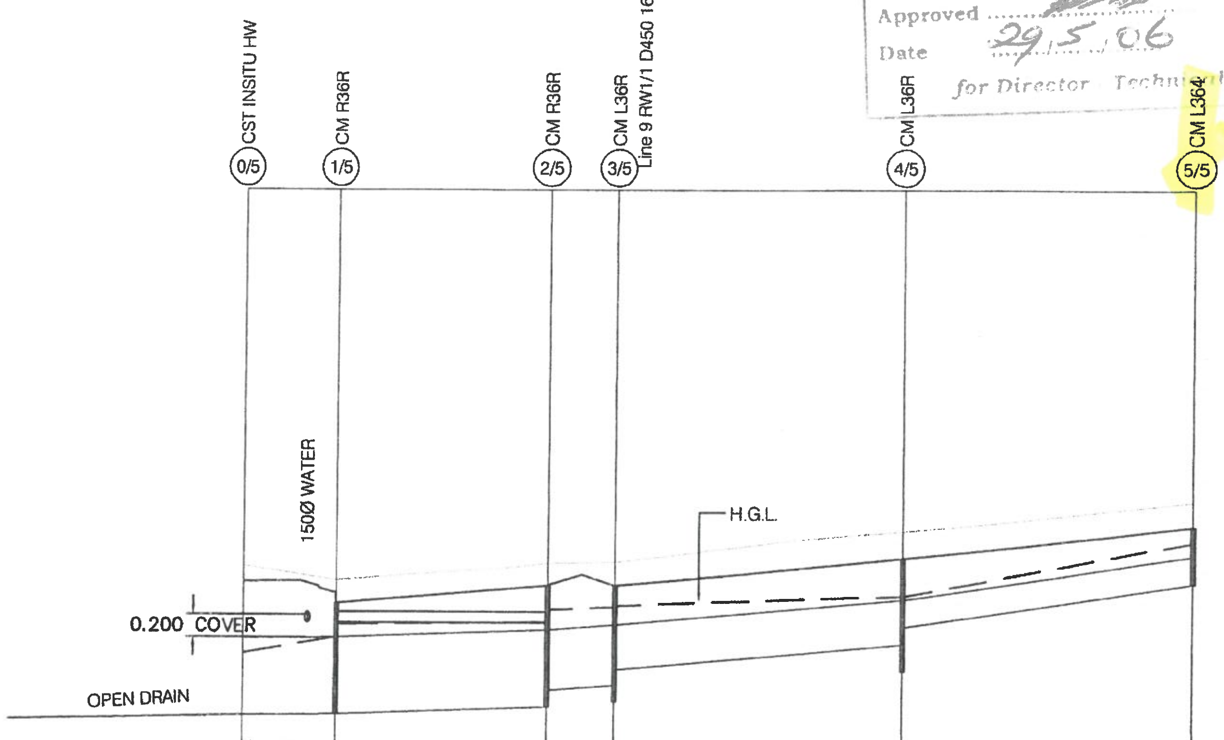
URBS Detention Basin Model Results

AEP	URBS Basin				Discharge		Inundation	
	Inflow	Outflow	Level	Depth	Pipe	Weir	Area	Volume
	m^3/s	m^3/s	m AHD	m	m^3/s	m^3/s	m^2	m^3
6320	0.11	0.09	0.35	0.35	0.09	0.00	69.8	24.4
5000	0.12	0.10	0.39	0.39	0.10	0.00	75.2	27.0
2000	0.17	0.14	0.49	0.49	0.14	0.01	90.0	34.3
1000	0.21	0.18	0.54	0.54	0.15	0.03	97.5	38.0
0500	0.24	0.21	0.59	0.59	0.16	0.05	104.4	41.3
0200	0.30	0.26	0.64	0.64	0.18	0.08	112.0	45.1
0100	0.34	0.30	0.68	0.68	0.19	0.11	117.5	47.8

APPENDIX E

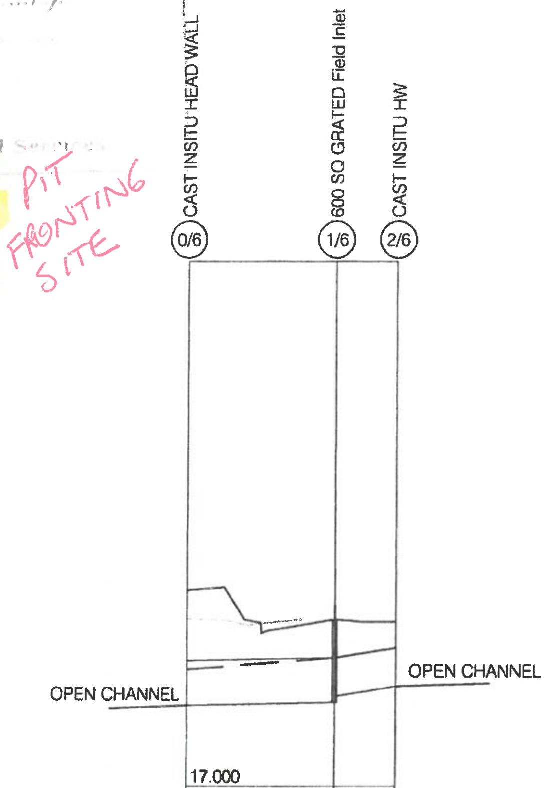
Stormwater Pipe Plans

Fitzroy Shire Council
Plan Approval
Drawing No R1018-01-01-024A
FSC File No AP30 03 619
FSC Drawing No 637
Approved [signature]
Date 29.5.06
for Director Technical Services



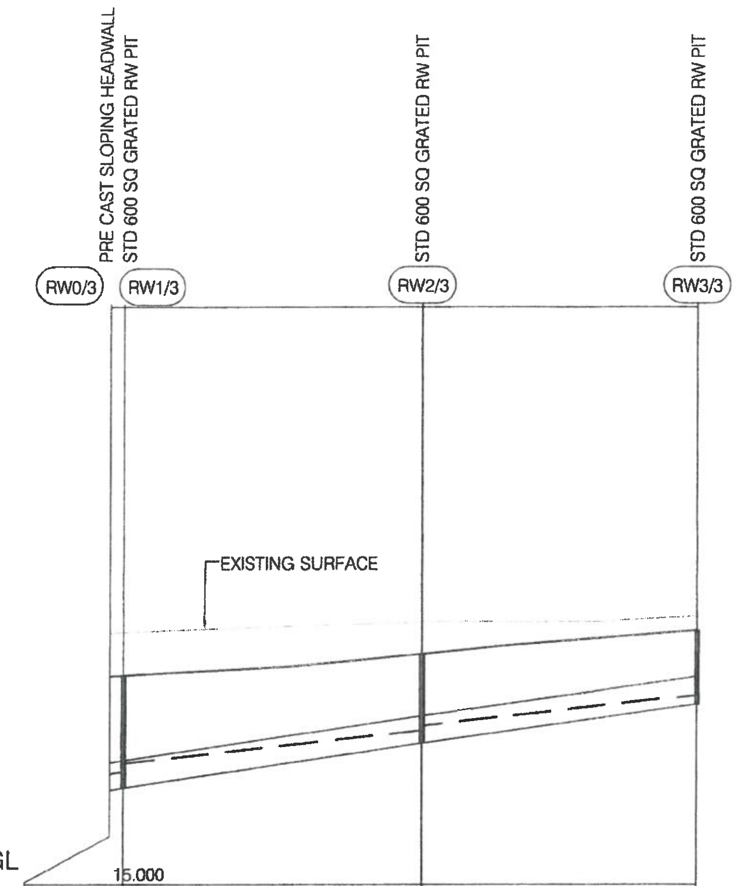
	0/5–1/5	1/5–2/5	2/5–3/5	3/5–4/5	4/5–5/5
HGL	16.429 / 16.652	16.826 / 16.859	17.029 / 17.064	17.082 / 17.213	17.213 / 17.943
Pipe Capacity	997.9	1893.5	1468.7	795.5	364.3
Full Velocity	1.2	1.2	1.9	1.5	2.7
Flow	1059.3	1065.5	1037.5	443.1	293.8
Length	13.082	29.006	9.221	39.542	39.875
Pipe Class	2	2	2	2	2
Pipe Diameter	1050	1050	825	600	375
Grade %	0.100%	0.353%	0.742%	0.864%	1.489%
DEPTH	2.169 / 1.514	1.514 / 1.654	1.429 / 1.361	1.145 / 1.172	0.937 / 0.780
Invert Level	15.589 / 15.602	15.602 / 15.704	15.929 / 15.997	16.212 / 16.554	16.789 / 17.382
Existing Surface	17.618 / 17.425	17.425 / 17.657	17.657 / 17.675	17.675 / 18.092	18.092 / 18.498
Design Surface	17.757 / 17.116	17.116 / 17.358	17.358 / 17.358	17.358 / 17.726	17.726 / 18.162
Chainage	0.000 / 13.082	13.082 / 42.088	42.088 / 51.309	51.309 / 90.851	90.851 / 130.725

LINE 5



	0/6–1/6	1/6–2/6
HGL	18.592 / 18.754	18.754 / 18.892
Pipe Capacity	342.3	843.4
Full Velocity	2.3	1.1
Flow	1321.5	476.0
Length	20.089	8.654
Pipe Class	2	2
Pipe Diameter	2x600	2x525
Grade %	0.200%	1.595%
DEPTH	1.571 / 1.132	1.047 / 0.875
Invert Level	18.104 / 18.144	18.229 / 18.367
Existing Surface	19.282 / 19.267	19.259 / 19.242
Design Surface	19.675 / 19.276	19.276 / 19.242
Chainage	0.000 / 20.089	20.089 / 28.743

LINE 6



	RW0/3–RW1/3	RW1/3–RW2/3	RW2/3–RW3/3
HGL	16.507 / 16.536	16.648 / 17.099	17.163 / 17.578
Pipe Capacity	265.6	265.6	257.8
Full Velocity	1.3	0.9	0.4
Flow	142.5	95.0	47.5
Length	1.936	40.751	37.673
Pipe Class	2	2	2
Pipe Diameter	375	375	375
Grade %	1.500%	1.500%	1.414%
DEPTH	1.550 / 1.532	1.532 / 1.216	1.216 / 1.010
Invert Level	16.284 / 16.313	16.313 / 16.924	16.924 / 17.457
Existing Surface	18.428 / 18.435	18.435 / 18.576	18.576 / 18.651
Design Surface	17.834 / 17.845	17.845 / 18.140	18.140 / 18.467
Chainage	0.000 / 1.936	1.936 / 42.687	42.687 / 80.360

LINE ~~ROOFWATER 3~~ RW3

FOR CONSTRUCTION

Rv.	DATE	REVISIONS	REC.	APPR.
A	03/06	FIRST ISSUE	ACD	CGF

DRAWN: ACD
DESIGNED: ACD
CHECKED: CGF
RECOMMENDED: PROJ. MAN. CGF
APPROVED: PROJ. DIR. STUART DOAK RPEQ 3222
A1 DATUM:
R1018-01-01-22 TO 25 STORM WATER DRAINAGE LONG SECTIONS.dwg

Cardno
Cardno (Qld) Pty Ltd ACN: 051 074 992
1 Aquatic Place, North Rockhampton Q 4701
Ph (07) 4924 7500 Fax (07) 4926 4375
Email: rocky@cardno.com.au

OFFICES: Gold Coast, Brisbane, Sydney, Sunshine Coast, Townsville, Hervey Bay, Rockhampton, Central Coast, Port Moresby, Philippines

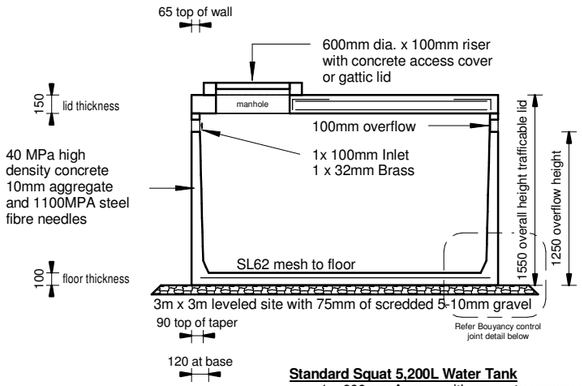
CZISLOWSKI HOLDINGS PTY LTD
27 LOT INDUSTRIAL SUBDIVISION
SOMERSET ROAD, GRACEMERE
STORM WATER LONG SECTION Sh 3 OF 4

DATE: 03/2006
DRAWING No: R1081-01-01-024
Rv: A

APPENDIX F

Stormwater Quality Checklist

BIORETENTION BASIN MAINTENANCE CHECKLIST				
Inspection Frequency:	1 to 6 monthly	Date of Visit:		
Location:				
Description:				
Asset I.D.				
Site Visit by:				
INSPECTION ITEMS:		Y	N	Action Required (details)
Sediment accumulation at inflow points?				
Litter within basin?				
Erosion at inlet or other key structures?				
Traffic damage present?				
Evidence of dumping (e.g. building waste)?				
Vegetation condition satisfactory (density, weeds etc)?				
Watering of vegetation required?				
Replanting required?				
Mowing/slashing required?				
Clogging of drainage points (sediment or debris)?				
Evidence of ponding?				
Damage/vandalism to structures present?				
Surface clogging visible?				
Drainage system inspected?				
Resetting of system required?				
COMMENTS				

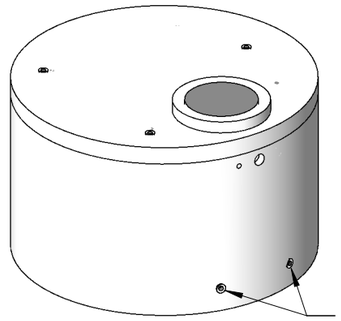


Standard Squat 5,200L Water Tank

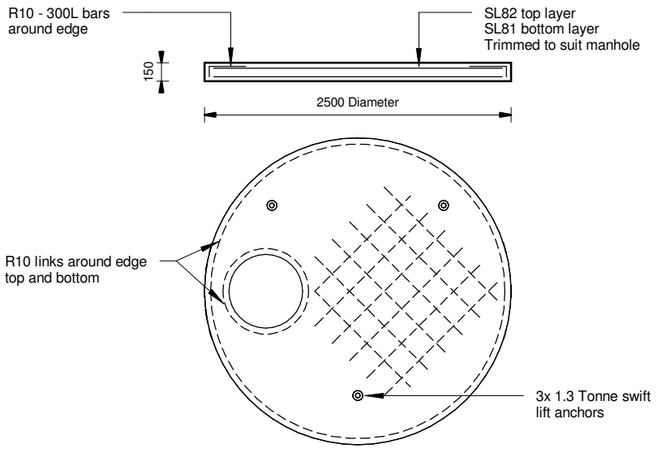
- 1 x 600mm Access with concrete access cover or gattic lid
- 1 x 100mm Overflow @ top of wall
- 1 x 100mm Inlet @ top of wall
- 1 x 32mm female Brass inlet @ top of wall
- Customised fittings by request

TANK DESIGN

1 : 50

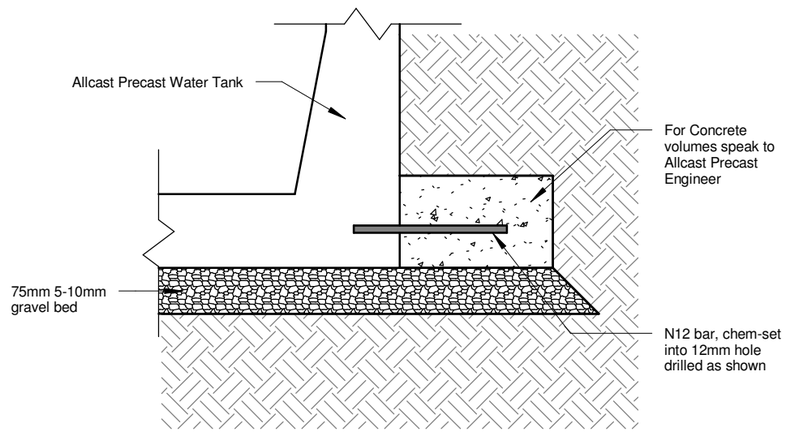


4 x 2.5 Tonne swift lift anchors at base of external wall.
2.5m spreader bar required for lifting



LID DESIGN

1 : 50



Anti-flotation control only required for Tanks in high water table areas or Pump out tanks

BOUYANCY CONTROL JOINT

1 : 10

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/116-2019

Dated: 30 April 2020

1 - GENERAL NOTES

1.1 - These drawings shall be read in conjuction with all other consultant drawings and specifications. Any discrepancies shall be referred to the architect or project manager for a decision before proceeding with the work.
Any decision that inputs on Engineering Design shall be referred to the Engineer for confirmation of design integrity.

1.2 - Dimensions SHALL NOT be obtained by scaling off the drawings.

1.3 - All dimensions shall be checked by Builder prior to commencement of works.

1.4 - Tank Design for exclusive use by Allcast Precast only.

1.5 - Engineering Certification by HR Design. Form is available at time of purchase.

2 - LOADINGS

2.1 - The structural work as shown in these drawings has been designed for the following cases:
(i) Distributed live load of 11kPa
or (ii) Concentrated point load of 20kN.

3 - FOUNDATIONS

3.1 - Foundation material preparation to be in accordance with consulting civil engineer deign and specifications.

3.2 - Tank backfill material to be free draining and placed in accordance with Allcast Precast backfill specifications.

3.3 - Where suitable foundation bearing capacity is not achieved, contact HR Design Engineers for alternative design solution.

4 - REINFORCED CONCRETE

4.1 - All work shall be in accordance with all current Australian Standards as a MINIMUM work standard.

4.2 - Concrete shall have a characteristic compressive strength after 28 days of not less than : 40 MPa.

4.3 - All concrete shall be mechanically vibrated. Vibrator shall not be used to spread concrete.

4.4 - All reinforcement shall be supported on plastic chairs, generally at not greater than 800mm centres in both directions. Bars shall be tied at alternate intersections.

4.5 - Concrete to have a maximum aggregate size of 10mm and water/cement ratio of not greater than 0.65.
The maximum permissible transport time for concrete between batching and placement on site shall be in accordance with the following table.

AMBIENT AIR TEMPERATURE	MAX. BATCHING TO PLACEMENT TIME
10°-24°C	120 minutes
25°-27°C	90 minutes
28°-30°C	60 minutes
31°-33°C	45 minutes
34°-36°C	30 minutes
37°C+	No placement of concrete unless chilled water or ice in mix

4.6 - All reinforcement shall be supplied by a registered manufacturer with an approved and certifier quality assurance program in place. All reinforcement is to comply with the requirements of AS 1302, AS 1303 and AS 1304 as applicable.

4.7 - All reinforcement is to be placed free from oil, grease or other surface coatings which may impair bond to concrete.

4.8 - All reinforcement to be 500 MPa minimum yield unless noted otherwise.

4.9 - Reinforcement shall not be welded without written approval from the Engineer.

ALLCAST PRECAST

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FAX :: (07) 5442 2479
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FACTORY :: 40 Hill St, Woombye Q 4559
WEB :: www.allcastprecast.com.au

5,200 LITRE SQUAT WATER TANK WITH LIGHT TRAFFICABLE LID

GENERAL ARRANGEMENT SHOWN

CUSTOM FITTINGS BY REQUEST