ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

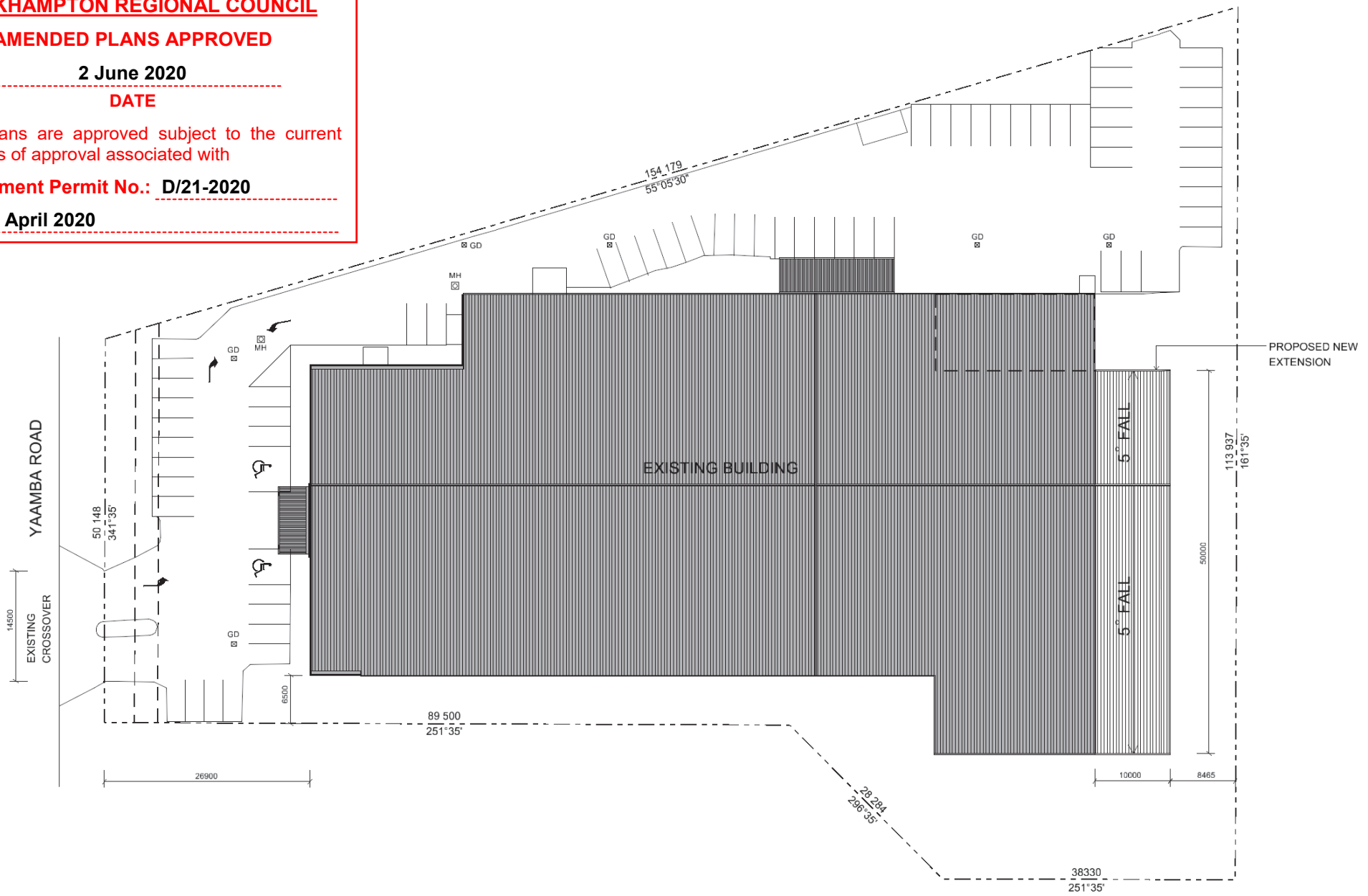
2 June 2020

DATE

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

Development Permit No.: D/21-2020

Dated: 3 April 2020



ISSUE

No.	Date	Description	Chkd
1	21/01/20	DEVELOPMENT APPLICATION	NC
2	05/02/20	DEVELOPMENT APPLICATION	NC

CLIENT: JADEHILL PTY LTD

PROJECT TITLE: AMART - ROCKHAMPTON
530 YAAMBA ROAD,
NORTH ROCKHAMPTON

DRAWING TITLE: PROPOSED SITE PLAN

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North

Project Number	Scale@A3
20103	1:500
Drawing Number	Issue
SK100	2
Drawn	

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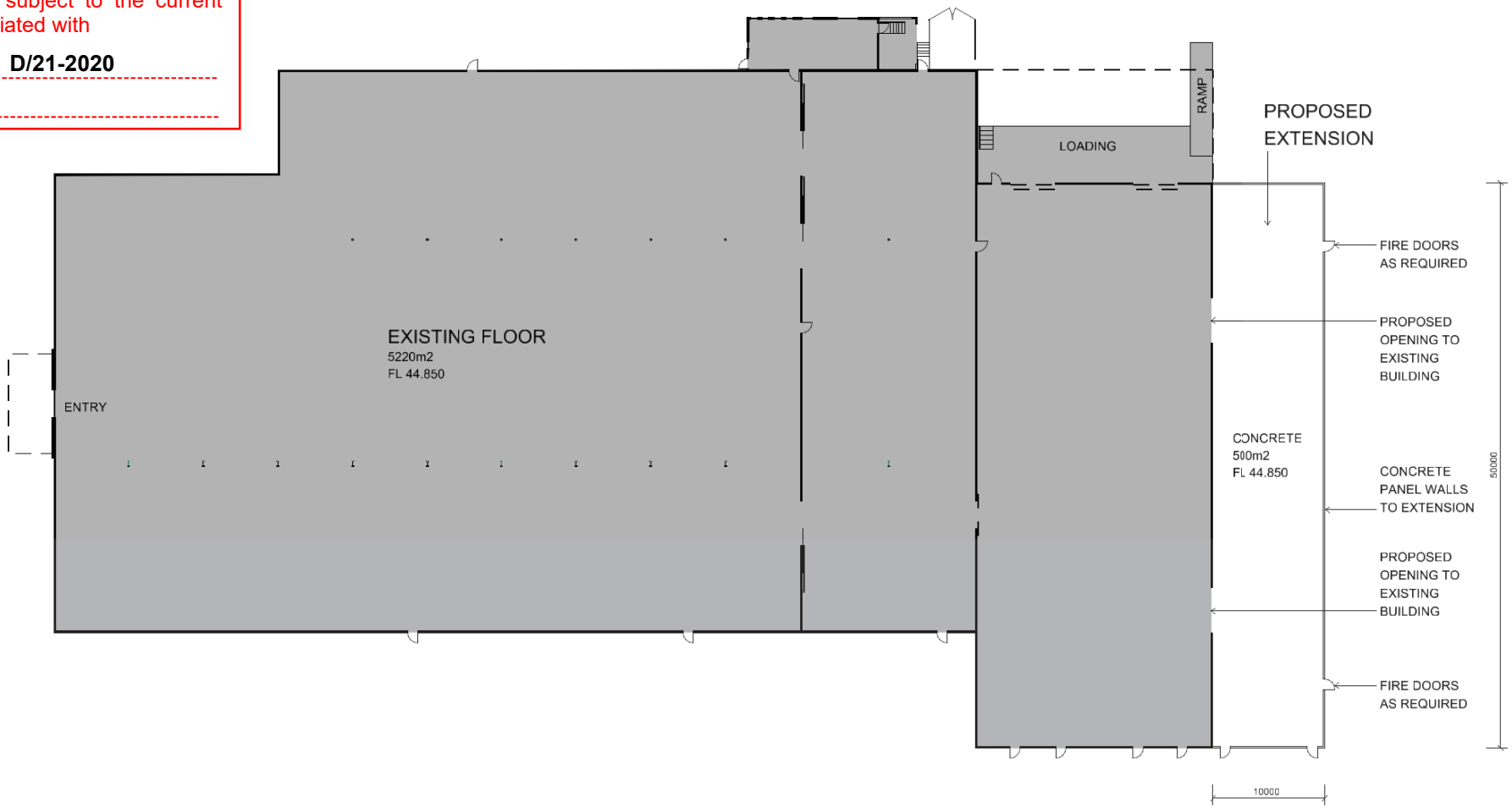

1 / - EXISTING FLOOR PLAN
1:400

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North	Project Number	Scale@A3
	20103	1:400
	Drawing Number	Issue
	SK101	2
	Drawn	

2019

DILEIGH

CIVIL / STRUCTURAL DESIGN & PROJECT MANAGEMENT

ROCKHAMPTON REGIONAL COUNCIL

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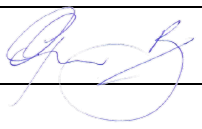
SITE STORMWATER MANAGEMENT REPORT FOR PROPOSED SHOWROOM EXPANSION 530 YAAMBA ROAD, ROCKHAMPTON LOT 13 ON RP619160 FOR JVL INVESTMENT GROUP

Table of Contents

Document Status					
Rev No.	**Author**	**Reviewer**	**Approved For Issue**		
			Name	**Signature**	**Date**
01	A Doherty	G Brown	Glenn Brown		03/02/2020
02	A Doherty	G Brown	Glenn Brown		21/04/2020
03	A Doherty	G Brown	Glenn Brown		05/05/2020

1. Introduction

This report was prepared for JVL Investment Group in support of a proposed development to the subject site at 530 Yaamba Road, Rockhampton currently occupied by Super Amart showroom and warehouse. This report should be read in conjunction with the overall application relating to this project. The proponent is seeking approval to construct a showroom expansion on the existing developed site.

The land subject to this application is described as Lot 13 on RP619160, which has an area of 11634m^2, with frontage to Yaamba Road, Rockhampton.

2. Existing Stormwater Conditions

Lot 13 is currently developed and consists of an existing 5220m2 showroom and warehouse facility with associated concrete access. Stormwater is collected and discharged from site to the adjacent allotment via an existing stormwater network, which outlets to two headwalls situated approximately 40m from the northern boundary. Overland flow not captured by the stormwater inlets is discharged to the front of the site or retained within a shallow basin formed by the access pavement at the loading dock.

We note that the adjacent allotment is undeveloped parkland and appears to act as a natural water course.

Based on the current site conditions, an overall time of concentration (Tc) of 11 minutes has been adopted in accordance with QUDM Figure 4.4, with a C10 value of 0.831 in accordance with QUDM Table 4.5.3. A fraction impervious value of 0.724 has been adopted as per the table below.

Total Site Area	1.1634 ha
Existing Showroom	0.5220 ha
Existing Pavement	0.3210 ha
Total Impervious Area	**0.843 ha**
Fraction Impervious (Total / Site Area)	**0.724**

Utilising a Tc of 11 minutes and the relevant rainfall intensities, the following discharges for a range of events was calculated using a C10 value of 0.831 where Qy=F*Cy*Iy*A for the existing developed site using the actual fraction impervious.

EXISTING SITE TC= 11 min

Development Area 1.1634 ha

	F sq kms	**C** co eff	**I** mm/hr	**A** sq kms	**Q** m3/sec
Q1	0.278	0.6648	92.9	0.01163	0.1997
Q2	0.278	0.7064	103.0	0.01163	0.2353
Q5	0.278	0.7895	137.0	0.01163	0.3498
Q10	0.278	0.8310	161.0	0.01163	0.4327
Q20	0.278	0.8726	185.0	0.01163	0.5221
Q50	0.278	0.9557	218.0	0.01163	0.6738
Q100	0.278	0.9972	244.0	0.01163	0.7869

Fi	0.724	
$^1I_{10}$	65.10	mm/hr
C_{10}	0.831	

From QUDM T4.5.3

The existing underground stormwater system located in Catchment 1 (as shown on plan) will not be impacted by the proposed development. The revised flows based on impervious area and C10 values excluding Catchment 1 are as per the following table.

EXISTING SITE – Discharge to 1/1 TC= 11 min

Development Area 0.7015 ha

	F sq kms	C co eff	I mm/hr	A sq kms	Q m3/sec
Q1	0.278	0.6562	92.9	0.00702	0.1189
Q2	0.278	0.6972	103.0	0.00702	0.1400
Q5	0.278	0.7792	137.0	0.00702	0.2082
Q10	0.278	0.8203	161.0	0.00702	0.2575
Q20	0.278	0.8613	185.0	0.00702	0.3107
Q50	0.278	0.9433	218.0	0.00702	0.4010
Q100	0.278	0.9843	244.0	0.00702	0.4684

Fi	0.681	
$^1I_{10}$	65.10	mm/hr
C_{10}	0.820	

From QUDM T4.5.3

3. Post Developed Flows

The proposed development of the site increases the fraction impervious value from 0.681 to a fraction impervious value of 0.753 as per the table below. Based on this value, a C10 value of 0.842 (From QUDM Table 4.5.3) was adopted.

Impacted Site Area (excluding Catchment 1)	0.7015 ha
Existing Impervious Area	0.4777 ha
Proposed Expansion	0.0500 ha
Total Impervious Area	**0.5277 ha**
Fraction Impervious (Total / Site Area)	**0.753**

The overall time of concentration (Tc) of 11 minutes remains unchanged and was adopted.

Based on these revised figures, the following discharges from site excluding Catchment 1 were calculated:

POST-DEVELOPMENT – Discharge to 1/1 TC= 11 min

Development Area 0.7015 ha

	F sq kms	C co eff	I mm/hr	A sq kms	Q m3/sec
Q1	0.278	0.670	92.9	0.00702	0.1214
Q2	0.278	0.712	103.0	0.00702	0.1430
Q5	0.278	0.796	137.0	0.00702	0.2126
Q10	0.278	0.838	161.0	0.00702	0.2630
Q20	0.278	0.879	185.0	0.00702	0.3173
Q50	0.278	0.963	218.0	0.00702	0.4095
Q100	0.278	1.000	244.0	0.00702	0.4758

Fi	0.753	
$^1I_{10}$	65.10	mm/hr
C_{10}	0.838	

From QUDM T4.5.3

When compared with the existing or current site discharge rate, we note a minor increase in flow for all recurrence intervals. Refer table below:

COMPARING SITE FLOWS			
EVENT ARI	**EXISTING**	**POST-DEVELOPMENT**	**CHANGE**
Q1	0.119	0.121	2.10%
Q2	0.140	0.143	2.10%
Q5	0.208	0.213	2.10%
Q10	0.258	0.263	2.10%
Q20	0.311	0.317	2.10%
Q50	0.401	0.409	2.10%
Q100	0.468	0.476	1.60%

3.1 Discharge Flow Management

It is proposed to install additional stormwater field inlets and uPVC stormwater pipes connected to the existing network to replace the existing infrastructure situated on the eastern side of the showroom, as these will be covered by the proposed expansion. The existing downstream network was determined to have sufficient flow capacity to accommodate the additional captured flows based on AS/NZ3500.3 Figure 5.4.11.2(a) and new pipes have been sized appropriately, as per the table below.

				Equation K3.3.2(1)		Equation 5.4.8			Figure 5.4.11.2(a)	Equation K3.3.2(3)
Catchment	**Roof Area (m2)**	**Paved Area (m2)**	**Pervious Area (m2)**	**Equivalent Impervious Area (m2)**		**Design Flows (L/s)**	**Pipe Diameter (mm)**	**Pipe Gradient (1 in X)**	**Pipe Capacity (L/s)**	**Full-pipe velocity (m/s)**
				Sub-Catchment	**Cumulative**					
7/1 to 6/1	174.8	0	211.4	315.269	315.269	16.201	150	114	25	0.917
6/1 to 5/3	174.8	0	211.4	315.269	630.539	32.403	225	150	60	0.815
5/3 to 4/3	174.8	0	211.4	315.269	945.808	48.604	225	100	70	1.222
4/3 to 3/3	174.8	0	211.4	315.269	1261.077	64.805	300	100	150	0.917
3/3 to 2/3	174.8	0	211.4	315.269	1576.346	81.007	300	100	150	1.146
2/3 to 1/3	174.8	0	211.4	315.269	1891.616	97.208	300	100	150	1.375
1/3 to 3/1	174.8	0	211.4	315.269	2206.885	113.409	300	90	160	1.604
3/1 to 2/1	292.5	677.5	73.5	951.089	3157.974	162.285	300	122	130	2.296
C'ment 2 to 2/1	1559	556	109	2131.827	2131.827	109.552	Total Catchment 2 flows only For calculating 2/1 to 1/1 design flows			
Total 2/1 to 1/1	292.5	677.5	73.5	951.089	6240.890	320.712	375	60	350	2.904

We note that Pipe segment 3/1 to 2/1 has insufficient hydraulic capacity. Given proposed invert levels, the pipe system has spare capacity and is capable of backing up to pit 4/3 before the system will surcharge at pit 3/1. In the event that the system does surcharge, this pit is located within the detention area of the parking facility and flows will ultimately run into the outlet structure without causing any actionable nuisance.

The floor level of the building is minimum 1.0m above the surface level of the detention basin and approximately 0.6m above the top of the pavement at the boundary, so there is no issue with inundation. Should the depth of the water in the basin reach the level of the outside boundary, it will sheet flow across the boundary and flow into the existing water course running adjacent to the site.

Refer D19.262-02 for catchment areas and proposed pipe invert levels.

We note that the total flow from 2/1 to 1/1 of 320L/s compares favourably with the overall catchment discharge noted in Section 3 post development flows of 317L/s, based on pipe flows for the Q20 ARI event.

3.1.1 Roofwater Only Scenario

When considering the effect of flow we also reviewed the scenario where roof water only from the new section discharges to the existing outlet. With roof water only the time of concentration was reduced to 5mins. At this interval the full effects from Catchment 2 and the area abounding the detention basin influence the amount of flow produced however the pervious area from Catchment 1 does not. As a result the overall flows increase slightly compared to the full catchment scenario noted previously however not to the extent that the capacity of the outlet pipe from 2/1 to 1/1 is exceeded.

Catchment Flow (tc = 5mins):	337 L/s
Catchment Flow (tc = 11 mins):	320 L/s
Outlet pipe capacity:	350 L/s

We note that the hydraulic capacity of pipe segment 3/1 to 2/1 is still insufficient for the flow but slightly better than the full catchment scenario. As noted earlier there is some spare capacity in the upstream line and the system will surcharge through pit 3/1 should this capacity be exceeded and the existing detention system will ensure that there is no actionable nuisance generated.

3.1.2 Existing Outlet & Detention

It should be noted that the outlet was observed to contain approximately 125mm of silt. It is recommended that the outlet pipe and headwall be cleaned out to ensure maximum flow capacity and prevent ponding.

As the increase in post development flows are not considered significant, it is not considered practical to install detention tanks or any additional stormwater detention devices.

3.2 Stormwater Quality Management

Due to the pre-developed nature of the site, State Planning Policy Healthy Water has not been is triggered. No other Stormwater Quality Improvement Devices (SQID's) are proposed for this site.

4. Conclusion

The proposed development will not make a significant impact on existing site flows and the downstream existing stormwater network is capable of accommodating the anticipated increase in flows. It is proposed to install additional stormwater inlets and uPVC stormwater pipes to direct flows to the existing network – refer drawings in Appendix A.

Ashleigh Doherty

For and On Behalf of

Dileigh Consulting Engineers Pty Ltd

Appendix A – Stormwater Management Strategy Drawings

POST DEVELOPED - Discharge to 1/1 TC= 11 min

Development Area **0.7015** ha

	F sq kms	C co eff	I mm/hr	A sq kms	Q m3/sec
Q1	0.278	0.670	92.9	0.00702	0.1214
Q2	0.278	0.712	103.0	0.00702	0.1430
Q5	0.278	0.796	137.0	0.00702	0.2126
Q10	0.278	0.838	161.0	0.00702	0.2630
Q20	0.278	0.879	185.0	0.00702	0.3173
Q50	0.278	0.963	218.0	0.00702	0.4095
Q100	0.278	1.000	244.0	0.00702	**0.4758**

Fi	0.753	
$^1I_{10}$	65.10	mm/hr
C_{10}	0.838	

From QUDM T4.5.3

POST-DEVELOPMENT SITE HYDROLOGY

COMPARING FLOWS DISCHARGING TO 1/1			
EVENT ARI	PRE-DEV	POST-DEV	CHANGE
Q1	0.119	0.121	2.10%
Q2	0.140	0.143	2.10%
Q5	0.208	0.213	2.10%
Q10	0.258	0.263	2.10%
Q20	0.311	0.317	2.10%
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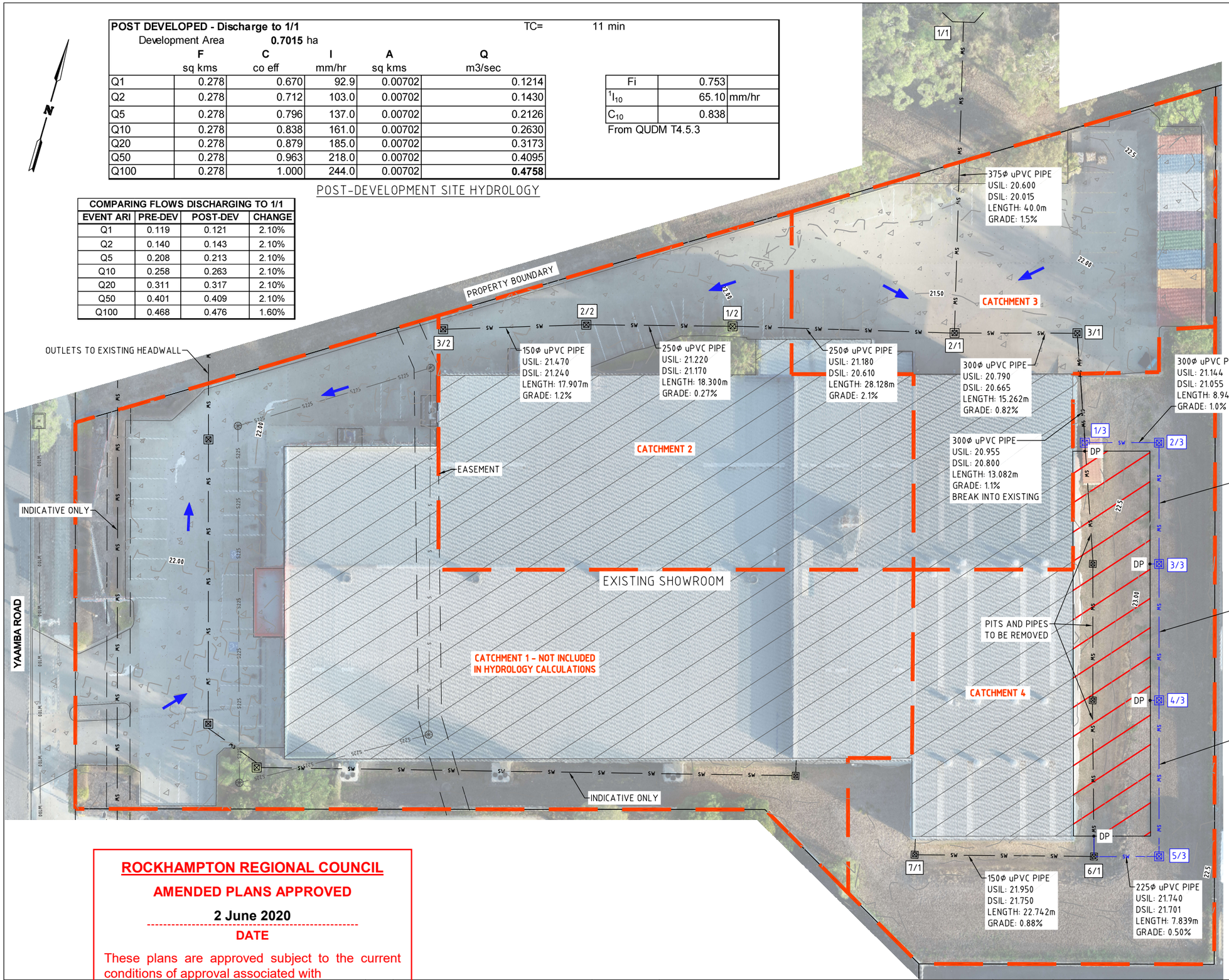

LEGEND

- EXISTING 100ø WATER MAIN AND FIRE HYDRANT
- EXISTING 225ø SEWER MAIN AND ACCESS CHAMBER
- ABANDONED SEWER MAIN
- EXISTING STORMWATER uPVC PIPE (ø AS INDICATED)
- EXISTING 600x600 GRATED FIELD INLET
- EXISTING SURFACE CONTOUR
- OVERLAND FLOW PATH
- CATCHMENT AREAS
- EXISTING CONCRETE ACCESS (3315m²)
- EXISTING ROOF AREA (5220m²)
- PROPOSED ROOF AREA (500m²)
- 7/1 EXISTING STRUCTURE NAME
- 6/3 PROPOSED STRUCTURE NAME

STORMWATER MANAGEMENT NOTES

1. ALL CALCULATIONS CARRIED OUT IN ACCORDANCE WITH THE QUEENSLAND URBAN DRAINAGE MANUAL
2. TIME OF CONCENTRATION TAKEN AS 11 MINUTES FOR OVERLAND FLOW FROM QUDM FIGURE 4.4
3. CATCHMENT 1 NOT RELEVANT TO STORMWATER UPGRADE IN ASSOCIATION WITH PROPOSED EXPANSION
4. EXISTING INVERT LEVELS MEASURED MANUALLY ON-SITE

ROCKHAMPTON REGIONAL COUNCIL

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SCALE 0 2.5 5 7.5 10 1:500

DESCRIPTION

REV	REVISION	DATE
A	FOR APPROVAL	31/01/2020
B	FOR INFORMATION	21/04/2020

DILEIGH
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Approved	GLENN J. BROWN
RPEQ	7682
Sign	
Date	21.04.2020

JVL INVESTMENT GROUP

STORMWATER MANAGEMENT PLAN

530 YAAMBA ROAD, ROCKHAMPTON

PROPOSED SITE PLAN

D19.262-02

SHEET 02 OF 02

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