PRELIMINARY

AMENDMENTS

REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	03-09-2024	MCU APPLICATION ISSUE			

NOTES

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DRAWING LIST

DWG No.	DRAWING NAME	ISSUE
S-01	SITE PLAN - EXISTING AND DEMOLITION	1
S-02	SITE PLAN - PROPOSED	1
S-00	COVER SHEET	1
S-03	PROPOSED LANDSCAPING PLAN	1
S-04	EXISTING SERVICES PLAN	1

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/135-2024

Dated: 1 April 2025

Shop 5/10 Denham St,
Rockhampton,
QLD 4700

PO Box 3371, Red Hill,
North Rockhampton,
QLD 4701

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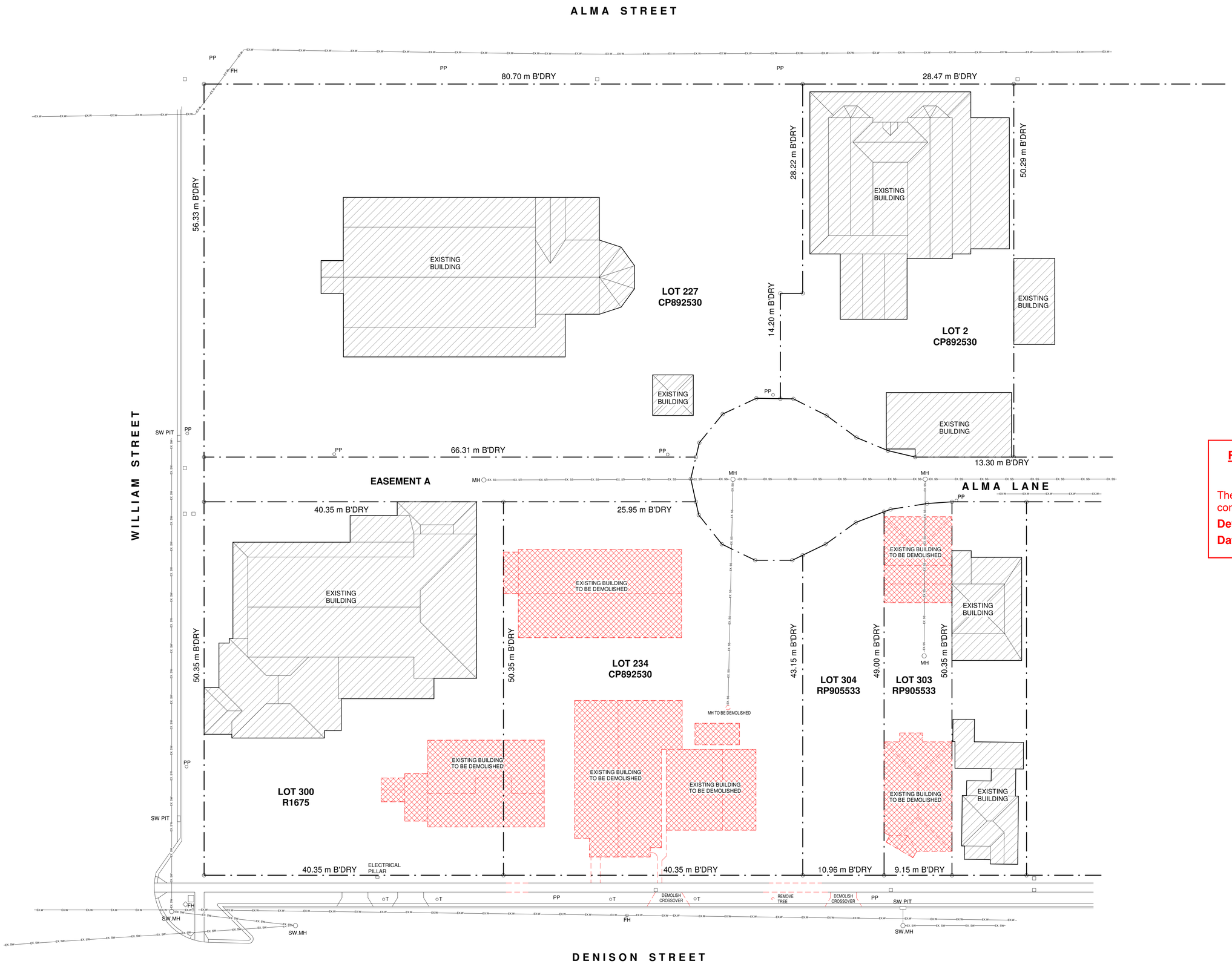
PROJECT:
NEW OFFICES
189 & 197 DENISON STREET
ROCKHAMPTON QLD 4700

24/09/2024 9:08:50 AM

TITLE:
COVER SHEET

		DRAWN BY: EM
DATE: 03-09-2024	SCALE: ON A1	APPROVED BY: Approver
PROJECT NO. 2111-14		
DRAWING NO. S-00		REVISION: 1



SITE PLAN - EXISTING AND DEMOLITION

1 : 250

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REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	03-09-2024	MCU APPLICATION ISSUE			

SERVICES LEGEND

- SEWER (RRC)
- STORMWATER (RRC)
- WATER (RRC)
- UNDERGROUND COMMUNICATIONS
- UNDERGROUND ELECTRICAL (ERGON ENERGY)

PP POWER POLE
FH IN-GROUND FIRE HYDRANT
T EXISTING TREE

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SITE PLAN - EXISTING AND DEMOLITION

DATE:	SCALE:	DRAWN BY:
03-09-2024	As indicated ON A1	EM

PROJECT NO.
2111-14

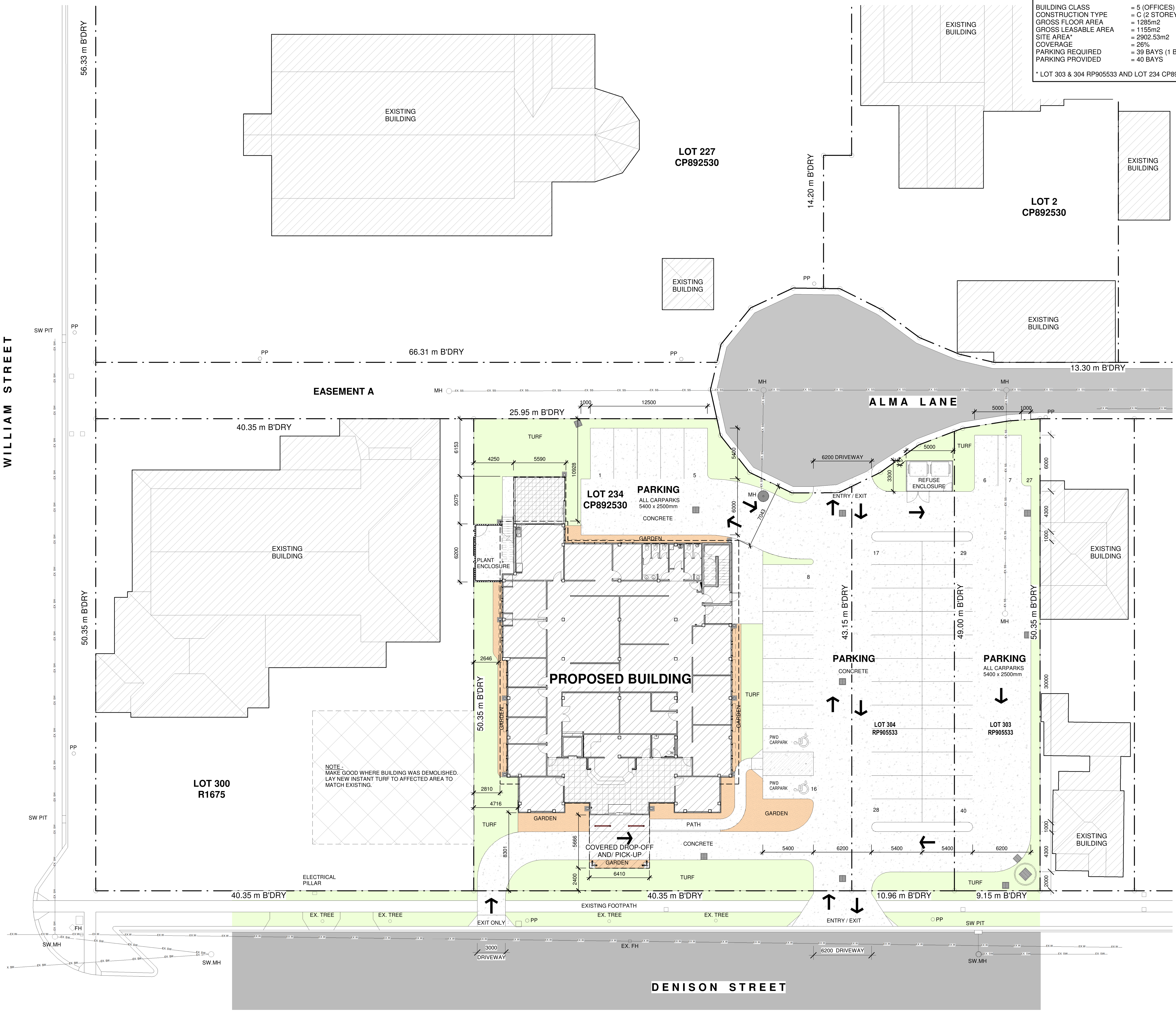
DRAWING NO.
S-01

REVISION:
1

TOWN PLANNING DATA -

BUILDING CLASS	= 5 (OFFICES)
CONSTRUCTION TYPE	= C (2 STOREY CLASS 5)
GROSS FLOOR AREA	= 1285m2
GROSS LEASABLE AREA	= 1155m2
SITE AREA*	= 2902.53m2
COVERAGE	= 26%
PARKING REQUIRED	= 39 BAYS (1 BAY PER 30m2 GLA)
PARKING PROVIDED	= 40 BAYS

* LOT 303 & 304 RP905533 AND LOT 234 CP892530



SITE PLAN - PROPOSED

1 : 200

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1	03-09-2024	MCU APPLICATION ISSUE			

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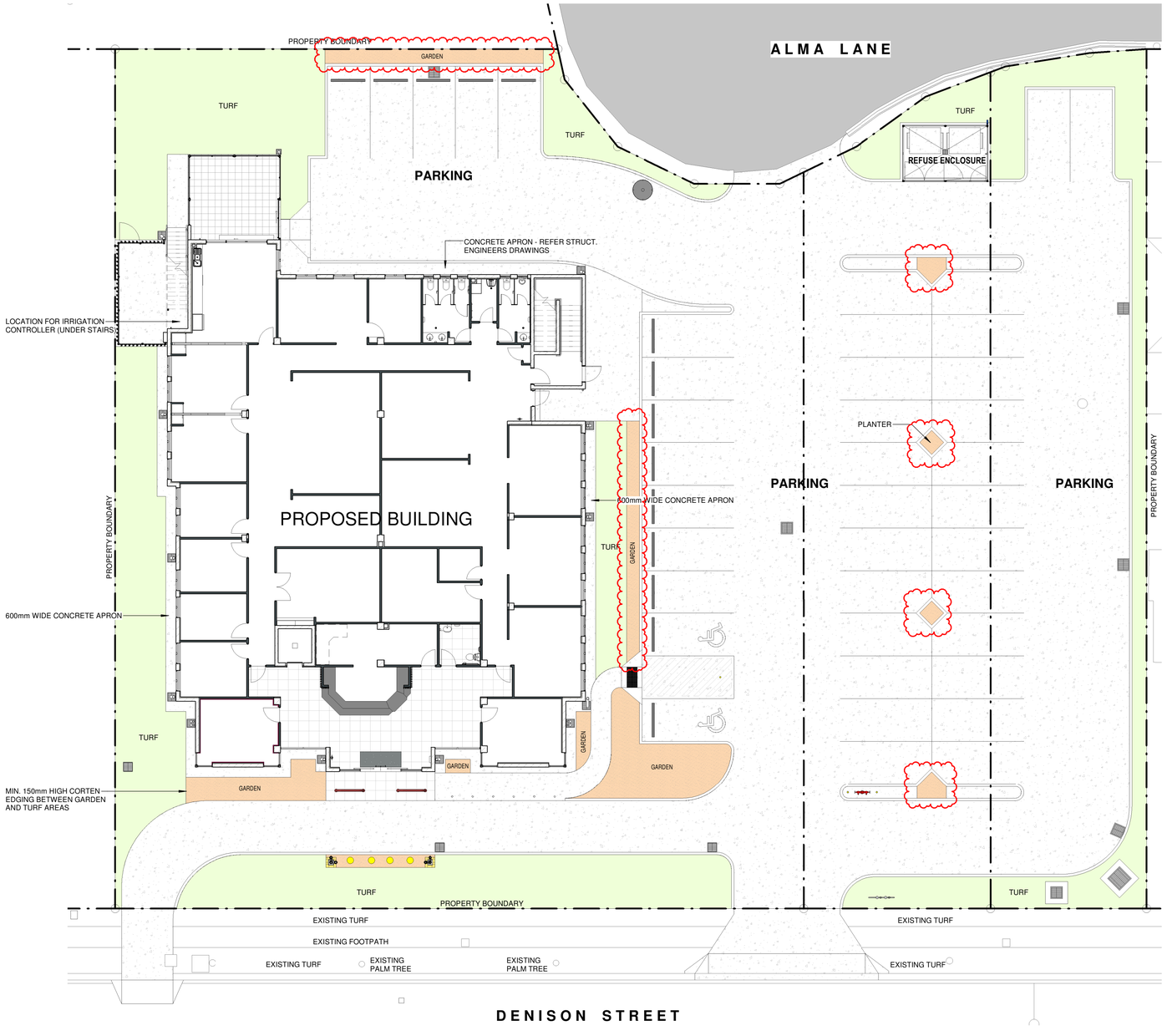
TITLE:
SITE PLAN - PROPOSED

DATE:	SCALE:	DRAWN BY:
03-09-2024	As indicated ON A1	EM

PROJECT NO. 2111-14

DRAWING NO. S-02

REVISION: 1



1 / A1-06 SITE PLAN - LANDSCAPING
1 : 150

LEGEND

- PROPOSED PARKING, CROSSOVERS, FOOTPATHS AND APRONS
- PROPOSED TURF -
  - MINIMUM 100mm TURF UNDERLAY
  - INSTANT, LOCATION SUITABLE, TURF LAID, ROLLED AND WELL WATERED
- GARDEN-
  - MINIMUM 100mm GARDEN BLEND SOIL
  - MINIMUM 75mm HARDWOOD CHIP MULCH
  - SHRUBS AT TWO METER INTERVALS - REFER SELECTION BELOW
  - GROUND COVER AT ONE METER INTERVALS - REFER SELECTION BELOW
  - SHRUB AND GROUND COVER LAYOUT BY PROFESSIONAL BOTANIST
- TREE - LEMON SCENT CONIFER - CUPRESSUS MACROCARPA - MIN. 25cm POT SIZE

SHRUB AND GROUND COVER SELECTION -
- IXORA 'GOLDFIRE' OR SIMILAR
- CUPHEA 'WHITE' OR SIMILAR
- LIRIOPE 'EVERGREEN GIANT' OR SIMILAR
- PENNISETUM 'PURPLE FOUNTAIN GRASS' OR SIMILAR

IRRIGATION -
- PROVIDE SUITABLE AUTOMATED IRRIGATION CONTROLLER/S
- PROVIDE DRIP-FEED RETICULATION TO ALL GARDEN AREAS
- PROVIDE SUITABLE SIZED PVC CONDUITS TO ALL PIPEWORK UNDER CONCRETE SLABS

NOTES

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REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	17-01-2025	PRELIMINARY ISSUE			
2	26-02-2025	AMENDMENTS			
3	05-03-2025	DA COMPLIANCE			

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189 & 197 DENISON STREET
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5/03/2025 12:36:08 PM

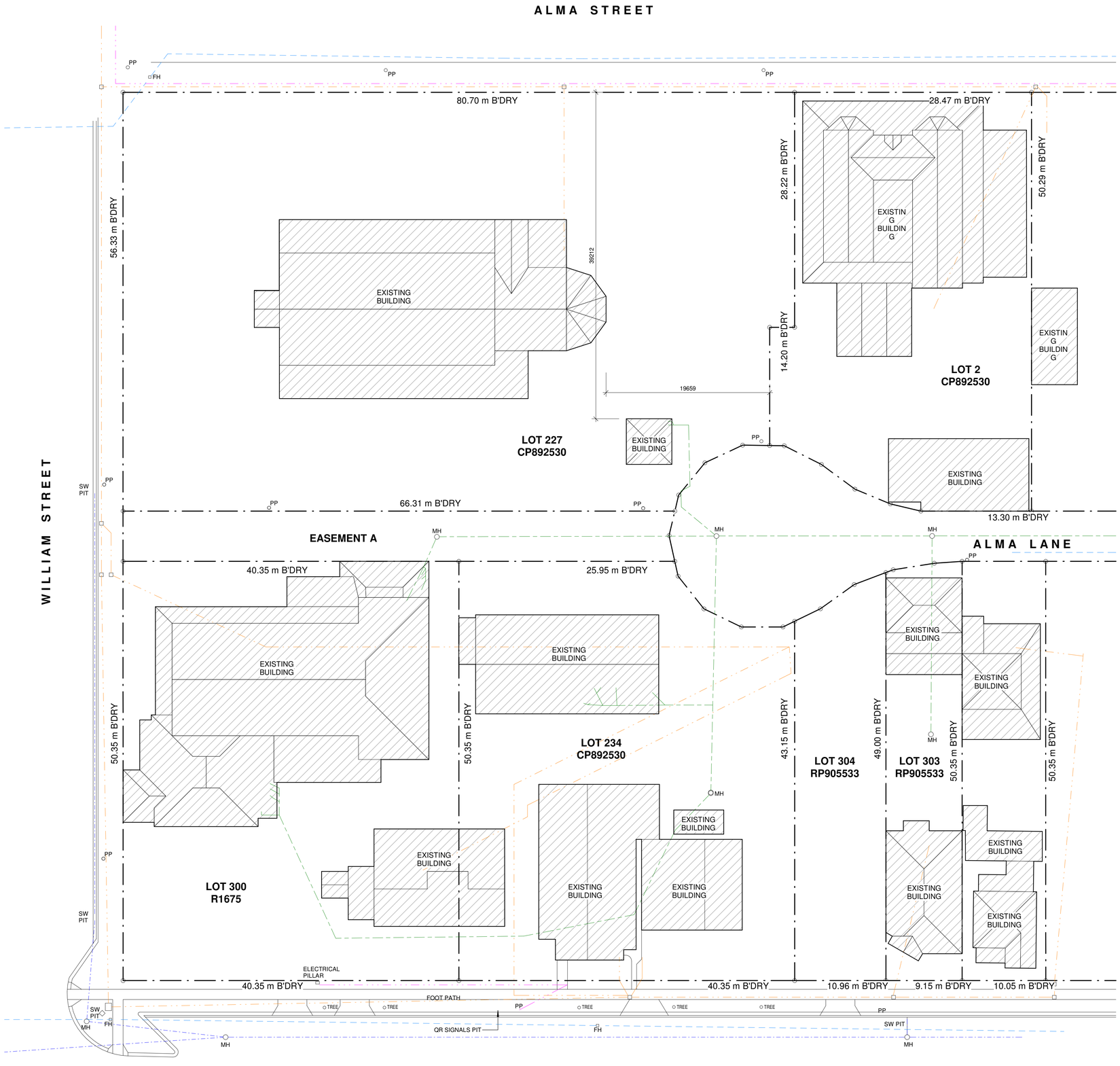
TITLE:
SITE PLAN - LANDSCAPING

DATE:	SCALE:	DRAWN BY:
05-03-2025	As indicated ON A1	EM

PROJECT NO.
2111-14

DRAWING NO.
A1-06

REVISION:
3



SITE PLAN - EXISTING SERVICES

1 : 250

SERVICES LEGEND

- SEWER (RRC)
- STORMWATER (RRC)
- WATER (RRC)
- UNDERGROUND COMMUNICATIONS
- UNDERGROUND ELECTRICAL (ERGON ENERGY)

PP POWER POLE
FH IN-GROUND FIRE HYDRANT
T EXISTING TREE

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REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	03-09-2024	MCU APPLICATION ISSUE			

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TITLE:
EXISTING SERVICES PLAN

DATE:	SCALE:	DRAWN BY:
03-09-2024	As indicated ON A1	Author

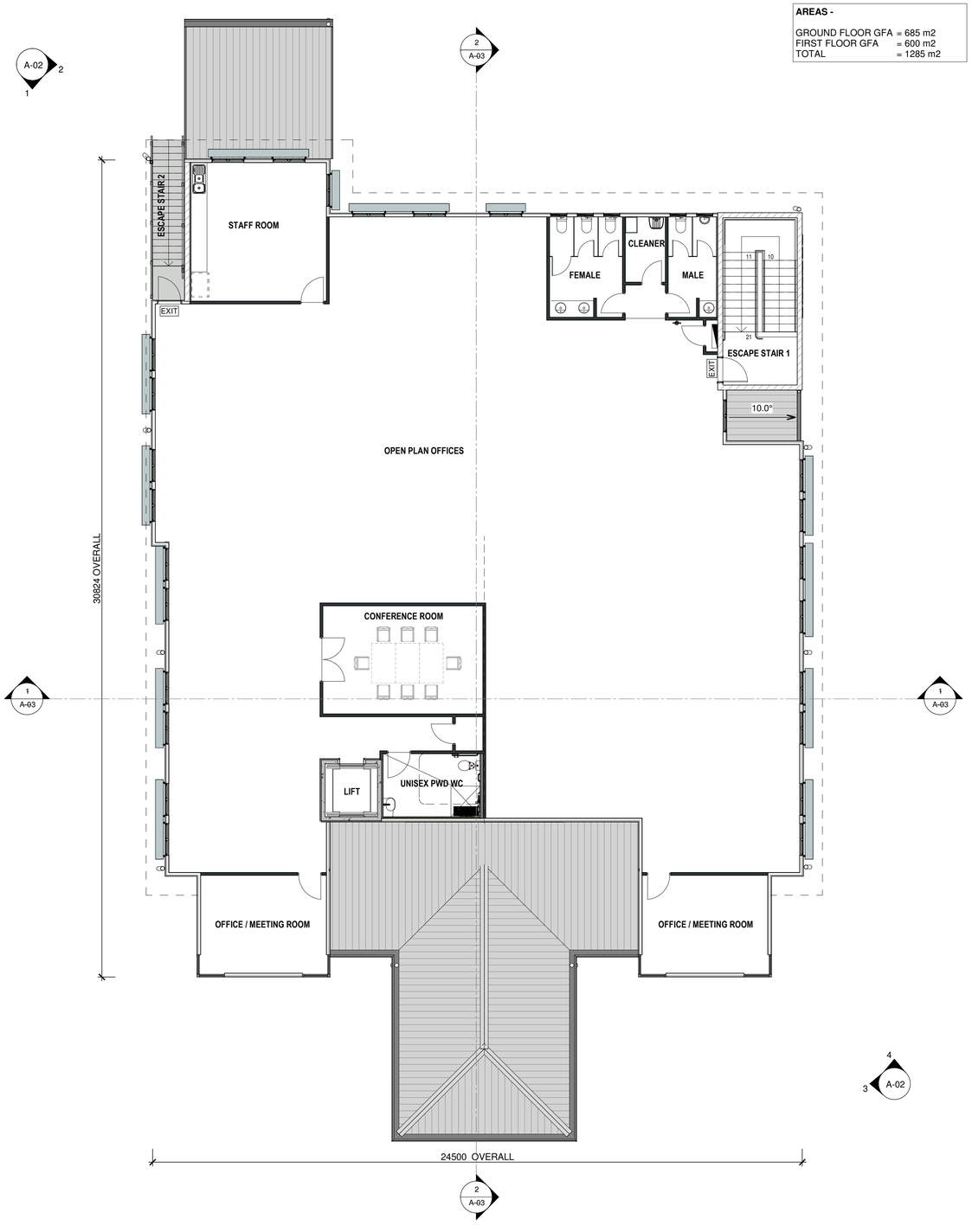
PROJECT NO.
2111-14

DRAWING NO.
S-04

REVISION:
1

PROPOSED GROUND FLOOR PLAN

1 : 100



PROPOSED FIRST FLOOR PLAN

1 : 100

AREAS -

GROUND FLOOR GFA	= 685 m2
FIRST FLOOR GFA	= 600 m2
TOTAL	= 1285 m2

PRELIMINARY

AMENDMENTS

REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	03-09-2024	MCU APPLICATION ISSUE			

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DRAWING LIST

DWG No.	DRAWING NAME	ISSUE
A-01	PROPOSED FLOOR PLANS	1
A-02	EXTERNAL ELEVATIONS	1
A-03	SECTIONS	1

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24/09/2024 9:23:42 AM

TITLE:
PROPOSED FLOOR PLANS

DRAWN BY: **EM**

DATE: **03-09-2024**

SCALE: 1 : 100 ON A1

APPROVED BY: **Approver**

PROJECT NO. **2111-14**

DRAWING NO. **A-01**

REVISION: 1

SOUTH-WEST ELEVATION

1 : 100

SOUTH-EAST ELEVATION

1 : 100

NORTH-EAST ELEVATION

1 : 100

NORTH-WEST ELEVATION

1 : 100

PRELIMINARY

AMENDMENTS

REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	03-09-2024	MCU APPLICATION ISSUE			

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24/09/2024 9:26:56 AM

TITLE:
EXTERNAL ELEVATIONS

DRAWN BY: **EM**

DATE: **03-09-2024**

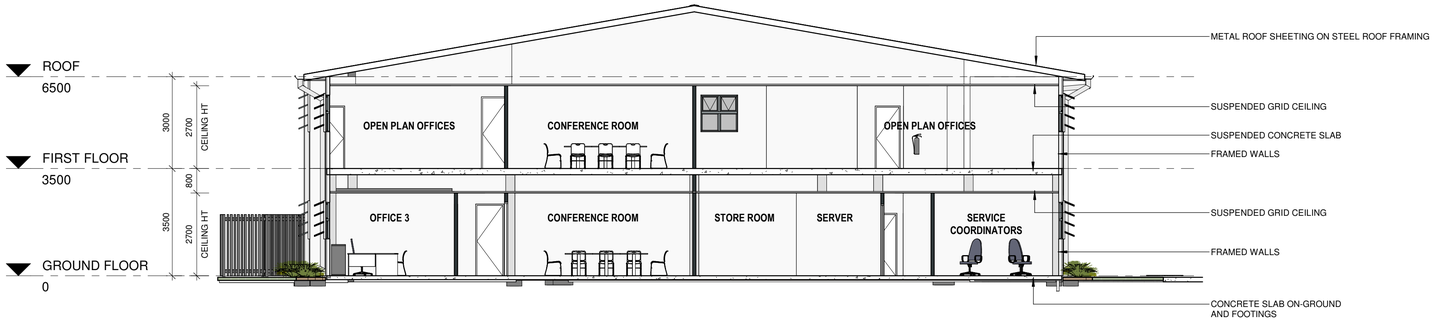
SCALE: 1 : 100 ON A1

APPROVED BY: **Approver**

PROJECT NO. **2111-14**

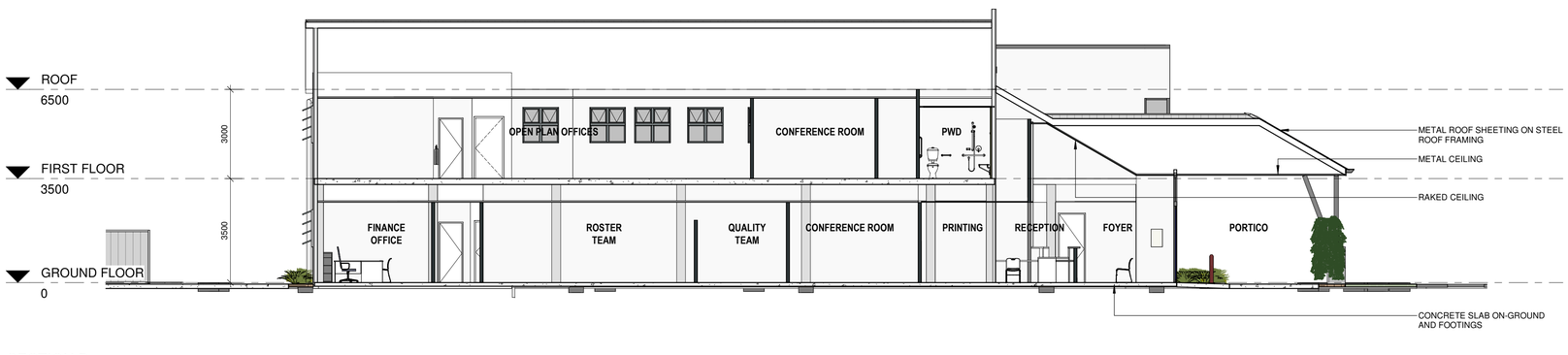
DRAWING NO. **A-02**

REVISION: 1



SECTION A

1 : 100



SECTION B

1 : 100

PRELIMINARY

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TITLE:
SECTIONS

DRAWN BY: **EM**

DATE: **03-09-2024**

SCALE: 1 : 100 ON A1

APPROVED BY: **Approver**

PROJECT NO. **2111-14**

DRAWING NO. **A-03**

REVISION: 1

Janes and Stewart
Structural+Civil
CONSULTANTS

Engineering Infrastructure Report

Access Recreation Office
189 & 197 Denison Street, Rockhampton

Designtek Pty Ltd

24055REP01

Janes and Stewart Structures Pty Ltd

ABN: 30 620 233 025
120 William Street
PO Box 1072
Rockhampton QLD 4700

07 4922 1948
janes.and.stewart@jsstructures.com.au

Janes and Stewart Structural+Civil CONSULTANTS

24055REP01

Revision	Date	Revision Description	Author	Checked	Approval for issue for and on behalf of Janes and Stewart Structures Pty Ltd
A	19 September 2024	For Development Approval	JC	MD	Matthew Dennis RPEQ 24862

Janes and Stewart Structural+Civil CONSULTANTS

Contents

1 Introduction 1
2 Sewer Reticulation 2
2.1 Sewer Loadings 3
3 Water Reticulation 4
3.1 Water Demand 5
4 Access, Traffic Impact and Parking 6
4.1 Road Network 6
4.2 Access and Egress 7
4.3 Traffic Impact Assessment 9
4.4 Parking 10
4.5 Refuse Collection 10
5 Conclusion 10

Appendices

A Proposed Architectural Site Plan
B Proposed Civil Site Plan
C Existing Sanitary Drainage Plans
D Entry & Exit Sight Distance Plan

1 Introduction

Janes and Stewart Structural and Civil consultants has prepared this Engineering Infrastructure Report in support of the Material Change of Use Application on behalf of our client, Designtek. This report relates to the development of a two-storey office building and associated car park infrastructure for Access Recreation, located at 189 & 197 Denison Street, Rockhampton. The development will be constructed over three allotments with the existing buildings on these lots to be demolished. One building which has been built across a property boundary will also be demolished. The real property description of these lands parcels is lot 303 and 304 on RP905533 and lot 234 on CP892530.

This report intends to address the Civil Engineering Infrastructure for the proposed development including sewer reticulation, water reticulation and vehicle access and parking for the project. The report will demonstrate that the development will not negatively impact on existing services, buildings and infrastructure surrounding the subject site through engineered solutions.

The locality of the subject site can be seen in the following illustration and Appendix A details the Proposed Architectural Site Plan.

Figure 1 Locality Image (Image source: QLD Globe)

2 Sewer Reticulation

The existing site currently has access to Rockhampton Regional Council's (RRC) sewerage infrastructure which will be maintained as part of this re-development.

Based on Council's services information, there are currently two 150mm diameter earthenware, gravity sewer mains present, one in lot 303 (197 Denison St) and one in lot 234 (189 Denison St). Both of these connect to the 150mm diameter earthenware gravity sewer main in the Alma Lane road reserve.

Existing sewer access chambers are also in place along these sewer mains, being located both within the lot boundary and in the road reserve. Refer to Appendix C for plans showing sewer drainage reticulation from the existing dwellings to existing council sewerage infrastructure.

The existing sewer layout on the subject site can been seen in the following extract from Rockhampton Regional Council's Geographical Information System (GIS).

Figure 2 Existing Sewer Infrastructure - shown in maroon (Source: RRC Mapping)

Council records show that the sanitary drainage system from the neighbouring lot, lot 300 on R1675, runs under one of the existing dwellings on the subject site and connects to the northernmost access chamber within the subject site. This existing sanitary drain will need to be diverted to avoid crossing through the subject site. This work is to be undertaken as part of a plumbing and drainage application with further discussion and consultation with the adjoining property owner required.

Sanitary drains from lot 1 on RP600895 (199 Denison St) and 2 on RP600895 (170 Alma Lane) also appear to connect to the southernmost access chamber within the subject site. It is anticipated that these existing connections could remain unchanged.

It is proposed that a new sewer access chamber will be installed over the northern, existing 150mm earthenware pipe. This new sewer access chamber would become the point of connection for the new building sanitary drainage to the council-controlled system. The existing sewer pipe upstream of the proposed access chamber will then be redundant. The construction of the new access chamber and new sanitary connection will be subject to a private works quotation for council to undertake these works. All internal sanitary drainage will be documented during the detailed design phases of the project and appropriate approvals sought from Rockhampton Regional Council (RRC). Refer to Appendix B for proposed sewer details.

2.1 Sewer Loadings

The sewer loads have been calculated in accordance with the Capricorn Municipal Development Guidelines (CMDG) – Design Specifications – D12 Sewerage Reticulation. As per table D12.38 – (Typical loadings per development type) from the CMDG, the equivalent tenancies (ET's) were calculated using the rates within this table for a development in a central business district based on the subject sites land area.

The design Average Dry Weather Flow (ADWF) has been based on 540 L/d/ET from the CMDG design specification D12 Table D12.07.01. As per the CMDG sewerage specification, the Peak Dry Weather Flow (PDWF) has been based on 2.5 times the ADWF, and the Wet Weather Flow (WWF) is 5 times the ADWF.

The following table provides a summary of the projected additional sewer loadings from the development:

Table 1 Projected Sewer Loadings

Description	Quantity	Equivalent Tenancy per unit (ET/unit)	Total ET	ADWF	PDWF (2.5 x ADWF)	WWF (5 x ADWF)
Existing Allotments	3 lots	1/lot	4.86	2.62 kL/d 0.030 L/s	6.561kL/d 0.076 L/s	13.122kL/d 0.152L/s
Existing Charity Store	232 m^2 GFA[1]	0.8/100m^2 GFA				
Proposed commercial premises	1,290m^2 GFA[1]	0.8/100m^2 GFA[1]	10.32	5.573 kL/d 0.065 L/s	13.932 kL/d 0.161 L/s	27.864 kL/d 0.323L/s
Difference	-	-	5.46	2.948 kL/d 0.034 L/s	7.371 kL/d 0.085 L/s	14.742 kL/d 0.171 L/s

[1] GFA: Gross Floor Area

As shown in the table above, there is an increase in flow from the proposed development. However, the additional flow from the development is minimal and this is particularly noticeable when comparing the available pipe capacity of a 150mm diameter sewer main at the pipe grade in the subject site being 1.5%. The 2/3 pipe capacity of a 150mm diameter sewer at a 1.5% grade is around 14.6L/s. This means that the additional wet weather flow (WWF) is approximately 1.2% of the available pipe capacity. Therefore, this increase is expected to have a negligible effect upon the Council's existing infrastructure sewer network with no upgrades required with this development.

3 Water Reticulation

Existing Council water infrastructure is located in the vicinity of the subject site within the Denison Street, road reserve. Rockhampton Regional Council's services information has identified that a single 150mm diameter PVC water main water main is located in the road reserve, running along the front of the site on Denison Street.

The following extract from Council's Geographical Information System (GIS) shows the existing water infrastructure in the vicinity of the development site.

Figure 3 Existing Water Infrastructure – Shown in Blue (Source: RRC Mapping)

An existing fire spring hydrant is located on the 150mm diameter water main in front of lot 234 on CP892530 (189 Denison Street). Therefore, with this hydrant in place, we believe adequate fire hydrant coverage to the site is achieved and therefore no upgrades will be required for fire hydrant accessibility as part of the proposed works.

It is proposed that the site will gain water supply from the connection of the existing 150mm diameter reticulation main. Any existing redundant water service connections from the previous residential dwellings should be removed as part of further detailed design phases of the project. It is recommended the existing water meters are removed and only one water meter reinstated to service the proposed office development.

The hydraulics consultant as part of the future design phases will confirm the size of the water connection required. A pressure and flow test may be necessary to determine adequacy of the existing water reticulation main. Any new connection to council water infrastructure will be subject to a private works quotation for council to undertake the connection works.

3.1 Water Demand

The Design Equivalent Persons (EP) rates were adopted from Table D11.32.01 of the Water Supply Network Design Guidelines D11 of the CMDG. The design Average Daily (AD) Consumption of 500 L/EP/d was adopted as per table D11.07.01 of the CMDG with the following peaking factors assigned:

- Mean Day Max Month (MDMM): 1.4 times AD
- Max Day (MD): 1.89 times AD
- Max Hour (MH): 1/12 times MD

Therefore, the following table shows a summary of the additional projected water demand for the proposed office building:

Table 2 Projected Water Demand

	Unit	Equivalent Persons per Unit (EP/Unit)	Equivalent Persons (EP)	Average Daily Consumption (AD)	Mean Day Max Month (MDMM)	Max Day (MD)	Max Hour (MH)
Existing Case	3 lots	3/lot	11.57	5.79 kL/d 0.067 L/s	8.10 kL/d 0.094 L/s	10.93 kL/d 0.127 L/s	0.911 kL/h 0.253 L/s
	232 m^2 GFA	1/90m^2					
Proposed Development	1,290m^2 GFA	1/90m^2 GFA	14.33	7.17 kL/d 0.083 L/s	10.03 kL/d 0.116 L/s	13.54 kL/d 0.157 L/s	1.128 kL/h 0.313 L/s
Difference	-	-	2.76	1.38 kL/d 0.016 L/s	1.93 kL/d 0.022 L/s	2.61 kL/d 0.030 L/s	0.217 kL/h 0.060 L/s

As shown in the table above, the average daily consumption has been projected to increase to an amount of 0.016L/s. This increase is considered negligible when compared to the current catchment that the existing Council water mains service. Therefore, it is proposed that no upgrades will be required to the existing Council reticulated infrastructure associated with this development.

4 Access, Traffic Impact and Parking

4.1 Road Network

The existing road network surrounding the development consists of local government-controlled roads. Therefore, these roads are controlled and maintained by Rockhampton Regional Council. Denison Street mainly services CBD traffic including traffic for nearby facilities such as the Rockhampton Special School. The North Coast Rail line runs centrally along Denison Street, where the rail line is under the jurisdiction of Queensland Rail. Alma Lane only services the commercial buildings between Derby Street and Wiliam Street as well as St Paul's Cathedral. There are no marked car parking spaces accessible from this lane.

Rockhampton Regional Council has identified Denison Street as part of their road hierarchy network as provided in the Rockhampton Regional Planning Scheme 2015 v4.4. The characteristics of the existing road for the frontage of the development site are outlined in the following table:

Table 3 Existing Road Network Summary

Road Name	Denison St	Alma Lane
Jurisdiction	Council Controlled	Council Controlled
Road Hierarchy	Urban Minor Collector[1]	Urban Access Place[1]
Posted Speed	Signed - 50km/h (40km/h during school zone periods for nearby school)	Signed 20km/h
Lane Formation	Divided / two-lane / two-way, railway line central	Undivided two-way, no through road with cul-de-sac
Carriageway Width	~23m	~6m
Reserve Width	~30m	~6m
Kerb and Channel	Yes, both sides	No
Footpath	Yes: ~1.2m wide footpath both sides of road	No
On Street Parking	Yes, parallel both sides of street	No

[1] Road classification as per Rockhampton Regional Planning Scheme 2015 v4.4.

Street images of Denison Street and Alma Lane are shown in the figure below:

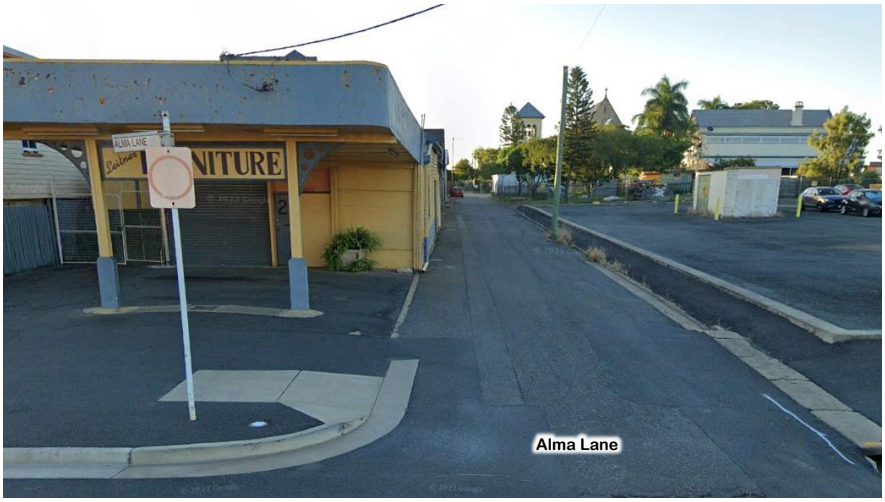

Figure 4 - Street Views (Source Google Street View. Image dates Dec 2022, April 2023 Respectively)

4.2 Access and Egress

The site has frontage and access to both Denison Street & Alma Lane. There is one existing, sealed crossover from Alma Lane and two from Denison Street. It is intended that the existing crossovers will be removed as part of the development works and new crossovers installed as part of the proposed development. A new two-way crossover will be installed to allow access and egress to and from Denison Street to an off street car park. As well as this, a new one-way entry only crossover is proposed off Denison Street for access to a set-down / drop-off facility. Due to the railway infrastructure separating lanes, the accesses from Denison Street will be left turn only from the south bound lane. Egress to Denison Street will also be left turn only to continue on the southbound lane.

A crossover is also proposed on Alma Lane which is intended to be a two-way access. Considering the lower daily traffic on this street compared to Denison Street, it is expected this access will experience much lower traffic volumes than the crossovers on Denison Street. Refer to Appendix D for proposed Access and Egress strategy.

Due to the existing railway and electrical infrastructure in the road reserve near the northern, Denison Street boundary, the available width does not allow a commercial style crossover in accordance with the CMDG to be installed. Therefore, it is intended that the geometry for a residential style corridor be used for this crossover. We believe that this is acceptable as the separation from the Denison Street traffic lane to the crossover, due to the on-street parking lane, allows additional space for vehicles to turn and access the crossover more straight on. The intended traffic utilising the set-down drop-off lane are expected to be very minimal and primarily cater for cars up to and including the B99 standard and the occasional small delivery truck.

The primary vehicle access to the site is intended to be via the new two-way vehicle crossover to Denison Street. The addition of the two-way access to Alma Lane provides the ability for service vehicles including the refuse collection vehicles to enter and exit the site in a forward manner, travelling through the proposed off-street car park.

Sight Distance

An assessment of the proposed primary crossover to Denison Street has been conducted in relation to appropriate sight distance requirements. While parking is allowed on Denison Street there is no marked parking bays except for two at the northern end of the site. For vehicles exiting the site, available stopping sight distance to the north only has been checked for the cross-over due to the exit of the site being left turn only. Refer Appendix D for stopping site distance details.

Section 3.4 of the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised intersections provides guidance on sight distance requirements at property entrances. In particular, for non-domestic accesses (commercial), section 3.4 refers to the requirements of AS2890.1:2004 Parking Facilities Part 1: Off-Street car parking. Part 3.2.4 and Figure 3.2 of AS2890.1:2004 provides recommended sight distance at access driveways for various frontage road speeds. The following table provides a summary of the sight distance requirements for the Denison Street vehicle access to the proposed office building car park:

Table 4 Existing Sight Distance (Denison Street Primary Crossover)

Description	Denison St, North From Primary Crossover	Unit
Decision Time (Desirable Gap)	5.0	s
[1]Operating Speed, V	60	km/h
Sight Distance Required by Figure 3.2 AS2890.1:2004	83	m
Sight Distance Achieved	83+	m

[1] The operating speed has been taken as 10km/h above the signposted speed limit

As shown above, the sight distance can be achieved with the proposed layout and therefore is acceptable in regards to sight distance requirements.

4.3 Traffic Impact Assessment

The proposed development is expected to have a minor increase in vehicles entering and exiting the site daily considering the proposed change of purpose of the site. As aforementioned the design vehicle for the development is the Refuse collection vehicle however the primary vehicles are intended to be cars up to the B99 standard. In the pre-developed case one dwelling has access via Alma Lane, with the other dwellings and charity store obtaining access via Denison Street. For the post-developed case, it is assumed that 90% of vehicle access and egress will be via Denison Street and the remaining 10% will obtain access and egress via Alma Lane. The estimated entry and exit traffic volumes for both the pre-development and post-development case are compared in the table below.

Table 5 - Traffic Generation Summary

Case	Type	Quantity	Generated Daily Traffic/type	Total Daily Traffic - vpd	Daily Traffic - vpd (Denison St)	Daily Traffic – vpd (Alma Lane)
Pre-Development	Dwelling Houses	3/ Denison St 1/ Alma Lane	10/dwelling [1]	79	71	8
	Charity Store	232m^2 GFA	17/100m^2 GFA [2], [3]			
Post-Development	Office	1,290m^2 GFA	10/100m^2 GFA [1]	129	116	13
			Difference	+50	+45	+5

[1] Traffic Generation as per RTA - Guide to Traffic Generating Developments, Version 2.2, October 2002
[2] Traffic Generation as per RMS - Guide to Traffic Generating Developments, TDT 2013/04a, August 2013
[3] Traffic generation data of a Bulk Goods Retail Store has been used for the exiting charity store as this most closely represents the type of store from the data available.

As can be seen in the table above, it is expected that this development will increase traffic generated by 44 vehicles per day. Information provided by Rockhampton Regional Council shows the section of Denison Street, between Derby Street and Stanley Street, has an Annual Average Daily Traffic (AADT) of 1836 vehicles per day (vpd). Considering the daily traffic generated is only expected to increase by 2.45%, the effects of this development are considered negligible.

Furthermore, the Rockhampton Regional Planning Scheme states that Urban Minor Collector roads may have an AADT of up to 3000 vehicles per day. Even with the minor increase in daily traffic, the expected AADT is well below the maximum limit for an Urban Minor Collector as stated in the CMDG. Therefore, no upgrades are proposed to Denison Street with this development.

Similarly, the expected traffic volumes to Alma Lane from the development are estimated to only be slightly higher than that generated from the existing site at only 5 vehicles per day. Therefore, this increased is anticipated to have a negligible impact to Alma Lane and no upgrades are proposed to Alma Lane with this development.

4.4 Parking

It is proposed that an off-street car park will be installed to allow an appropriate quantity of car parks for the proposed development. Rockhampton Region Plannings Scheme (RRPS) requires one space for every 30m^2 of Gross Leasable Floor Area (GLFA) for locations within the principal centre. The GLFA for this development is 1155m^2. As such the calculated number of car parking spaces required for this development is 38.5.
It is proposed that the off-street car park will have 40 spaces, two of which will be accessible parking bays with a suitable shared zone to comply with Australian Standards. Therefore, the proposed car park meets the requirement of the RRPS.

4.5 Refuse Collection

Refuse collection from the proposed office building is intended to be managed by a commercial skip bin service. As mentioned previously the refuse collection vehicle is proposed to enter the site via Denison Street and exit onto Alma Lane.

5 Conclusion

This Civil Engineering Infrastructure Report for the new offices for Access Recreation at 189 & 197 Denison Street, Rockhampton, indicates that there is no negative impact to the existing infrastructure surrounding the site. A workable strategy has been obtained in relation to the water and sewer connections, and access, traffic impact and parking.

Minor alterations in the design may eventuate from future applications, however the fundamentals of the design strategy ensure that service provisions will not pose a serious constraint to development.

If you should have any questions regarding this report, please do not hesitate to contact the office of Janes and Stewart Structures Pty Ltd (07) 4922 1948.

Janes and Stewart
Structural+Civil
CONSULTANTS

Appendix A

Proposed Architectural Site Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP01

Janes and Stewart Structures Pty Ltd

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120 William Street
PO Box 1072
Rockhampton QLD 4700

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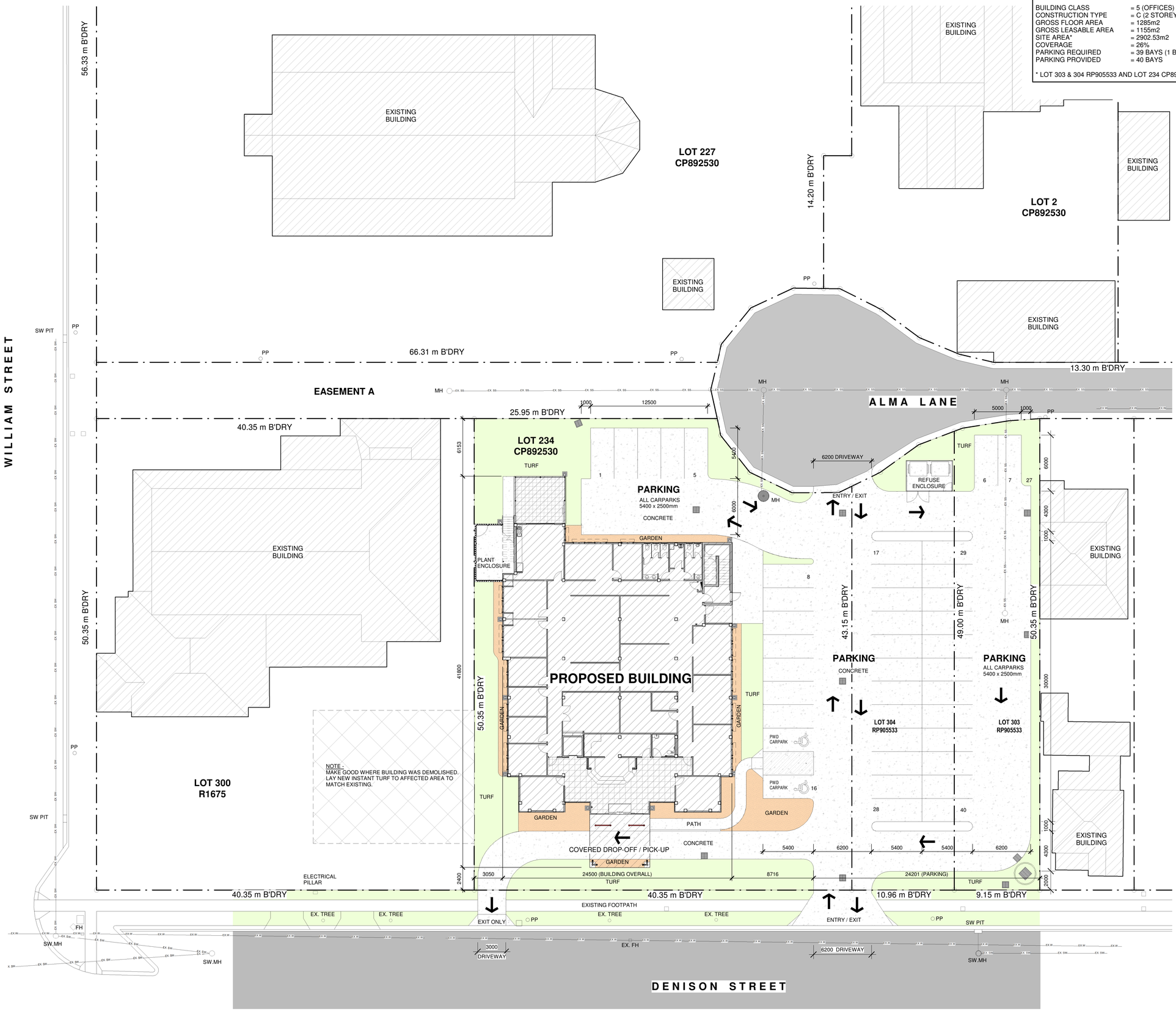

SITE PLAN - PROPOSED

1 : 200

NOTES

VERIFY ALL DIMENSIONS AND CHECK LEVELS ON SITE BEFORE COMMENCING WORK. DO NOT SCALE FROM THE DRAWING. THIS DRAWING IS COPYRIGHT AND REMAINS THE PROPERTY OF THE DESIGNTEK PTY LTD AND SHALL NOT BE REPRODUCED OR COPIED IN ANY FORM OR BY ANY MEANS WITHOUT WRITTEN PERMISSION OF THE DESIGNTEK PTY LTD

AMENDMENTS

REV	DATE	DESCRIPTION	DRN	CKD	STAGE
1	03-09-2024	MCU APPLICATION ISSUE			

PRELIMINARY

Shop 5/10 Denham St,
Rockhampton,
QLD 4700

PO Box 3371, Red Hill,
North Rockhampton,
QLD 4701

designtek

Phone: 0749 222880
Email: mail@designtek.com.au

qbcc BDAQ MEM. NO #0000761

www.designtek.com.au

SITE:

PROJECT:
NEW OFFICES
189 & 197 DENISON STREET
ROCKHAMPTON QLD 4700

CLIENT:
access RECREATION

18/09/2024 1:59:22 PM

TITLE:
SITE PLAN - PROPOSED

DATE:	SCALE:	DRAWN BY:
03-09-2024	As indicated ON A1	EM

PROJECT NO.
2111-14

DRAWING NO.
S-02

REVISION:
1

Janes and Stewart
Structural+Civil
CONSULTANTS

Appendix B

Proposed Civil Site Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP01

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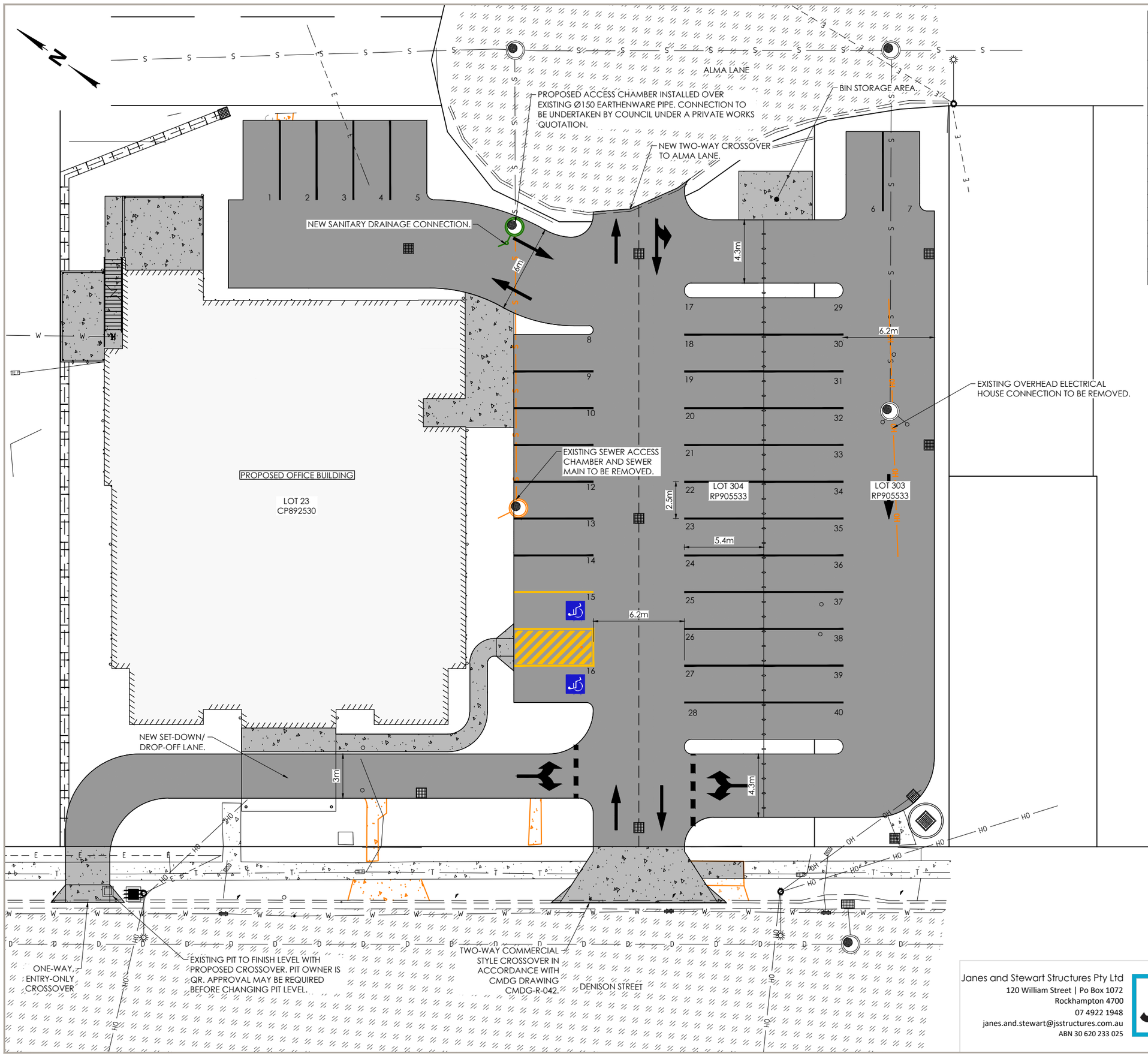

LEGEND

	EXISTING SEAL AREA
	EXISTING CONCRETE AREA
	PROPOSED ASPHALT SEAL AREA
	PROPOSED CONCRETE AREA
	EXISTING LOT BOUNDARY
D	EXISTING STORMWATER DRAINAGE
	EXISTING KERB
	EXISTING BUILDING OUTLINE
OH	EXISTING OVERHEAD ELECTRICAL
E	EXISTING UNDERGROUND ELECTRICAL
S	EXISTING SEWER MAIN & MANHOLE
T	EXISTING TELECOMMUNICATIONS
W	EXISTING WATER MAIN
S	PROPOSED SEWER MAIN & MANHOLE
	PROPOSED PAVEMENT MARKING

ACCESS RECREATION OFFICE

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janes.and.stewart@jsstructures.com.au
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Janes and Stewart
Structural+Civil
CONSULTANTS

SK01[1]

Project Number
24055
Date
27/08/2024

CIVIL SITE PLAN

Janes and Stewart
Structural+Civil
CONSULTANTS

Appendix C

Existing Sanitary Drainage Plans

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP01

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— ROCKHAMPTON REGIONAL COUNCIL —

SANITARY DRAINAGE PLAN

SITE 89 WILLIAM STREET DS SHEET/ SUB-DIVISION DS534

LOT No. 300 R.P. No. R1675 ACAD FILE: 300R1675.dwg

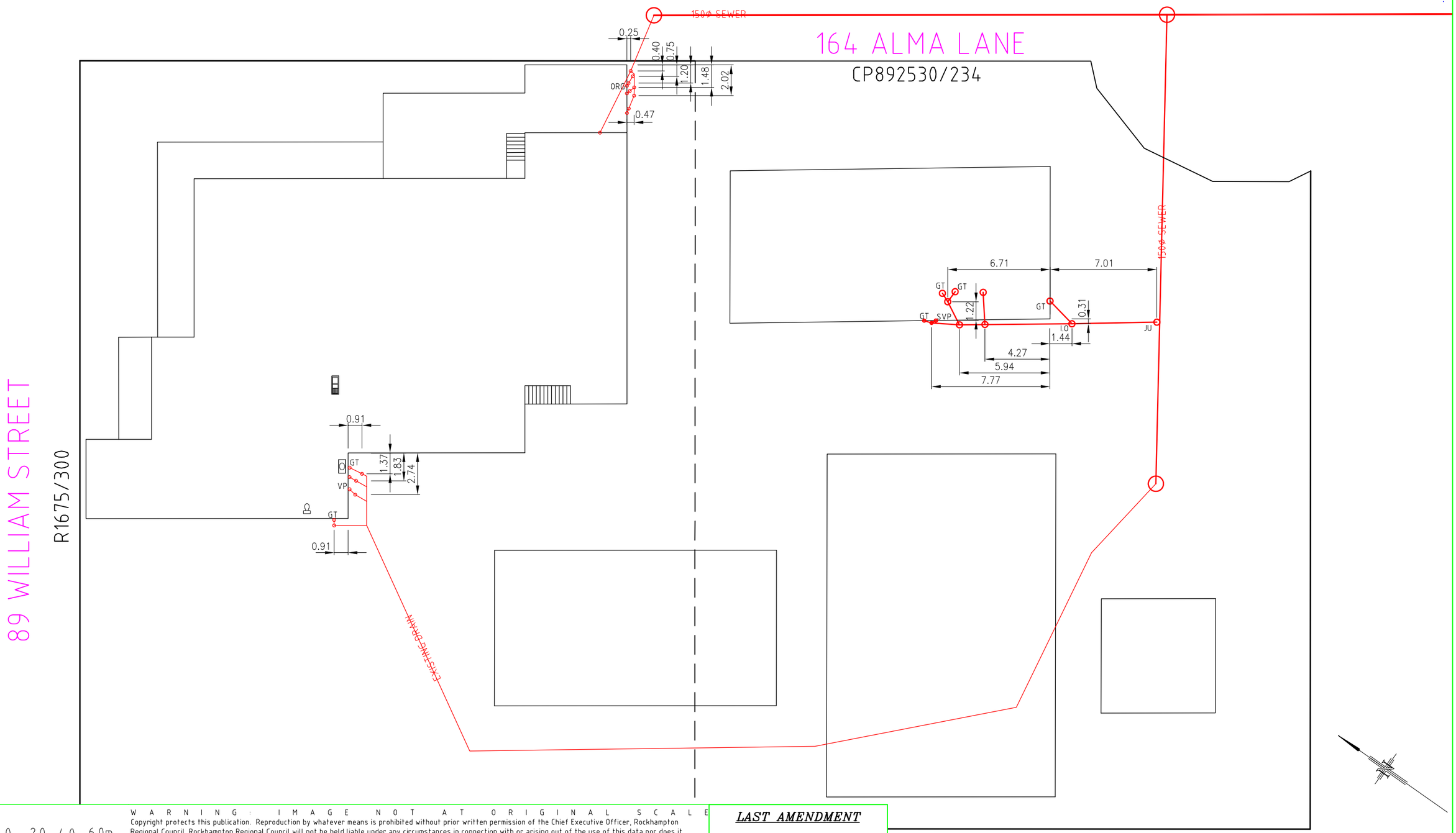
PLUMBING PERMIT No. P423/2015 DRAWN BY: RG

	REFLUX VALVE
D.T.	DISCONNECTOR TRAP
	SWIVEL JOINT
J.U.	JUMP UP
AAV	AIR ADMITTANCE VALVE
O.R.G.	OVERFLOW RELIEF GULLY
	EXPANSION JOINT

REFERENCE

S.P.	SOIL PIPE
V.P.	VENT PIPE
S.V.P.	SOIL VENT PIPE
I.O.	INSPECTION OPENING
F.W.G.	FLOOR WASTE GULLY
I.O.S.	I.O. TO SURFACE

- W.C. PEDESTAL
- BATH
- SHOWER
- HANDBASIN
- KITCHEN SINK
- WASHTUBS
- INDEXING VALVE
- SPRINKLER HEAD



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LAST AMENDMENT

LAST PLOTTED : 10/10/2016

LAST SAVED BY: GLENNR

ROCKHAMPTON CITY COUNCIL – SEWERAGE DEPARTMENT

BUILDING PERMIT No. 4208 D774/06 D775/06 RETICULATION AREA. 5

SEWERAGE HOUSE PLAN NO. S59-13-RA5 LAYOUT PLAN NO. DS. 534

DRAWN BY : RJD
PLOTTED ON : 18-4-02

PLAN OF DRAINAGE

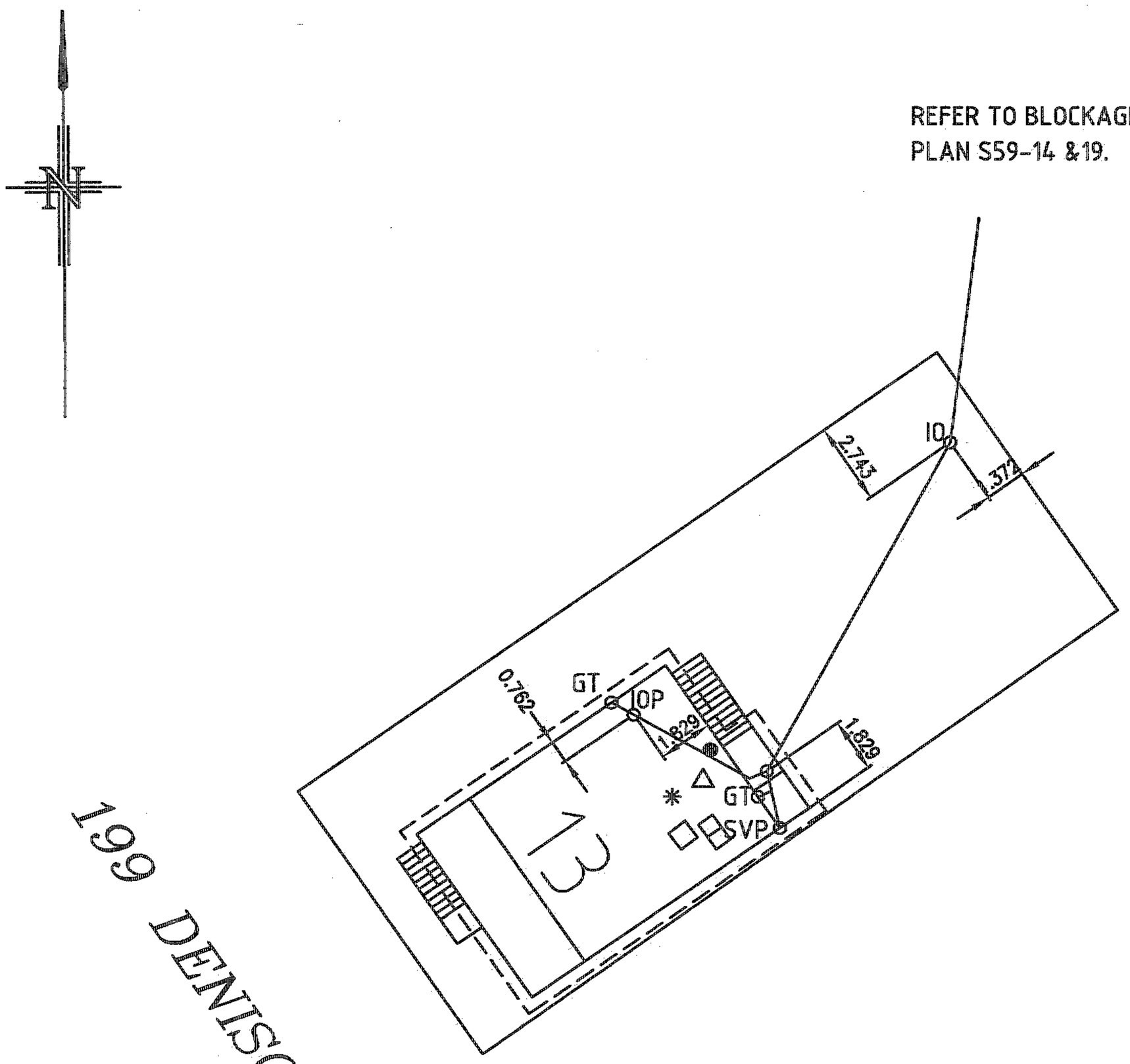
P : NH :
ACAD FILE : s59-13-ra5

FOR R & A.VANDER HOEVEN SITE 199 DENISON STREET

LOT No. 1 R.P. No. 600895 IN S59 SEC POR. R'TON PARISH

REFERENCE

G.D.T.	GULLY DISCONNECTOR TRAP	S.P.	SOIL PIPE	◍	W.C. PEDESTAL
B.I.G.T.	BACK-INLET GULLY TRAP	V.P.	VENT PIPE	○	BATH
J.U.	JUMP UP	S.V.P.	SOIL VENT PIPE	✳	SHOWER
I.C.	INSPECTION CHAMBER	I.O.	INSPECTION OPENING	△	HANDBASIN
O.R.G.	OVERFLOW RELIEF GULLY	F.W.G.	FLOOR WASTE GULLY	□	KITCHEN SINK
P.Y.	PLAIN Y-JUNCTION			□□	WASHTUBS



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NO.13

ROCKHAMPTON CITY COUNCIL – SEWERAGE DEPARTMENT

BUILDING PERMIT No. 5093-4265 RETICULATION AREA. 5

SEWERAGE HOUSE PLAN NO. S59-19-RA5 LAYOUT PLAN NO. DS. 534

DRAWN BY : RJD
PLOTTED ON : 18-4-02

PLAN OF DRAINAGE

P : NH :
ACAD FILE : S59-19-RA5

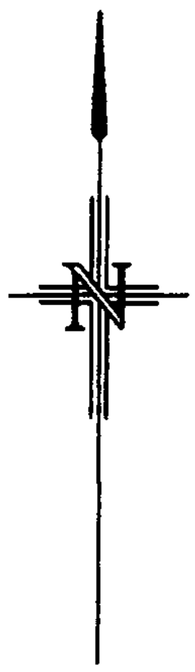
FOR R.CARTHEW SITE 170 ALMA LANE

LOT No. 2 R.P. No. 600895 IN S59 SEC POR. R'TON PARISH

REFERENCE

G.D.T.	GULLY DISCONNECTOR TRAP	S.P.	SOIL PIPE
B.I.G.T.	BACK-INLET GULLY TRAP	V.P.	VENT PIPE
J.U.	JUMP UP	S.V.P.	SOIL VENT PIPE
I.C.	INSPECTION CHAMBER	I.O.	INSPECTION OPENING
O.R.G.	OVERFLOW RELIEF GULLY	F.W.G.	FLOOR WASTE GULLY
P.Y.	PLAIN Y-JUNCTION		

● W.C. PEDESTAL
○ BATH
✱ SHOWER
△ HANDBASIN
□ KITCHEN SINK
⊟ WASHTUBS



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(V) 1.15.6.3
23.774℄
1:60
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A 30.785
32.720
JU
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1.83
6.70
6.10
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REFER TO BLOCKAGE PLAN S59-13.

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NO.19

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Appendix D

Entry & Exit Site Distance Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP01

Janes and Stewart Structures Pty Ltd

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PO Box 1072
Rockhampton QLD 4700

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LEGEND

	EXISTING SEAL AREA
	EXISTING CONCRETE AREA
	PROPOSED ASPHALT SEAL AREA
	PROPOSED CONCRETE AREA
	EXISTING LOT BOUNDARY
	EXISTING KERB
	PROPOSED BUILDING OUTLINE

ACCESS RECREATION OFFICE

0 2.5 10.0m 1:500

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Janes and Stewart
Structural+Civil
CONSULTANTS

SK06[1]

Project Number
24055

Date
27/08/2024

DENISON STREET CROSSOVER SIGHT DISTANCE PLAN

Janes and Stewart
Structural+Civil
CONSULTANTS

Stormwater Management Report

Access Recreation Office
189 & 197 Denison Street, Rockhampton

Designtek Pty Ltd

24055REP02

Janes and Stewart Structures Pty Ltd

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ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: **D/135-2024**

Dated: **1 April 2025**

Janes and Stewart Structural+Civil CONSULTANTS

24055REP02

Revision	Date	Revision Description	Author	Checked	Approval for issue for and on behalf of Janes and Stewart Structures Pty Ltd
A	19 September 2024	For Development Approval	JC	MD	Matthew Dennis RPEQ 24862

Contents

1 Introduction 1
2 Stormwater Quantity 2
2.1 Existing Case 2
2.2 Proposed Development Case 5
2.3 Existing Case vs Proposed Development Comparison 7
3 Stormwater Quality 8
3.1 Pollutants of Concern 8
3.2 Water Quality Objectives 8
3.3 Water Quality Management Strategy 9
3.4 Meteorological and Rainfall Data 9
3.5 Source Nodes 10
3.6 Treatment Nodes 11
3.7 MUSIC Model 11
3.8 MUSIC Modelling Results 12
4. Conclusion 13

Appendices

A Existing Stormwater Catchment Plan
B Proposed Stormwater Catchment Plan
C Stormwater Management Plan
D Stormwater Quality Catchment Plan
E Stormwater Calculations

1 Introduction

Janes and Stewart Structural and Civil consultants have prepared this Stormwater Management Report in support of the Material Change of Use Application on behalf of our client, Designtek Pty Ltd. This report relates to the development of an office building for Access Recreation located at 189 & 197 Denison Street, Rockhampton. The development will also include a new off-street car park facility, pathway links connecting the office to the carpark and associated civil infrastructure. The rest of the site will be landscape or turfed areas. The development will take place over three existing lots with the real property description of these lots being lots 303 and 304 on RP905533 as well as lot 234 on CP892530. The existing buildings on these three allotments are to be demolished to make way for the proposed development.

This report intends to address stormwater drainage relating to the development works including an assessment of stormwater quantity and quality measures.

The locality of the subject site can be seen in the following illustration.

Figure 1 Locality Image (Image source: QLD Globe)

2 Stormwater Quantity

A review has been undertaken for the stormwater management of the development to ensure that no significant adverse impacts occur to adjacent and downstream properties and infrastructure from the proposed office development and to determine if any stormwater mitigation strategies are required as part of the development.

2.1 Existing Case

The existing site intended for this development is currently occupied by existing buildings spread over the three lots. One building on the site of 189 Denison Street currently serves as the Anglicare bargain store whilst the other buildings on the site are considered to be former residences associated with the Anglican church. One building is built over the boundary of the subject site with a neighbouring site. The existing residential dwelling at 197 Denison Street is also intended to be removed. The main characteristics of the site from a stormwater perspective are summarised below:

- The site has 6 existing buildings with grass/vegetation covering the remainder of the site.
- A crown exists through the site running in a similar direction to the streets.
- The site falls towards both Denison St & Alma Lane due to the crown.
- There is an existing stormwater drainage system in the Denison St, road reserve.
- An existing kerb inlet and access chamber is positioned adjacent the southern corner of the subject site on Denison Street which connects to a 1,050mm diameter RCP.
- This pipe connects to two 1,800mm diameter RCP's at Derby St which discharges to the Fitzroy River.
- There is no existing underground stormwater drainage system in Alma Lane.

An overview of the existing council-controlled stormwater system near the development site can be seen below~~.~~:

Figure 2 - Existing Stormwater Infrastructure – Shown in Green (Source: RRC Mapping)

Existing Catchments

The site-based catchments have been determined from a desktop analysis of aerial contours and detailed survey information. Catchment EX-1 falls towards Denison St and to the kerb inlet near the site. Catchment EX-2 falls to Denison St, after the kerb inlet near the site. Catchment EX-3 flows towards Alma Ln and then would continue down to Derby St. Refer to Appendix A for the Existing Site Catchment Plan. The stormwater characteristics of the catchment are shown in the table below including peak flow calculations for minor and major design storms determined using the Rational Method in accordance with the Queensland Urban Drainage Manual (QUDM) 2017:

Table 1 - Existing Catchment Runoff Table

Catchment ID	EX-1	EX-2	EX-3	Unit
Discharge Location	Denison St Kerb Inlet	Denison St	Alma Lane	
Catchment Area	0.2516	0.2012	0.4286	ha
Fraction Impervious	74.9	27.3	59.8	%
Critical Time of Concentration	15[1]	15[1]	15[1]	minutes
Coefficient of Discharge (C10)	0.825	0.663	0.78	-
Minor Design Storm 10% AEP	0.082	0.053	0.132	m^3/s
Major Design Storm 1% AEP	0.149	0.096	0.241	m^3/s

[1] Time of Concentration taken as standard inlet time as per QUDM 4.6.4, Table 4.6.2

Kerb Inlets – Denison St

The kerb inlets in Denison St are CM Pits with both side and grate inlets. The kerb inlet capacity has been calculated from the design chart in Appendix E. The existing capacity for both the minor and major storm event are shown in the table below.

Table 2 - Kerb Capacity Table

Description	2.4m CM Kerb Inlet – 197 Denison St
Incoming Flow (10% AEP)	0.082 m^3/s
Incoming Flow (1% AEP)	0.149 m^3/s
Longitudinal Road Grade	1%
Road Cross Fall	2.5%
Inlet Capacity (10% AEP)	0.060 m^3/s
Inlet Capacity (1% AEP)	0.095 m^3/s

In both the 10% AEP and 1% AEP cases the inflow is larger than the capacity of the kerb inlet. Therefore, flow will bypass the kerb inlet and will continue overland flow down Denison St, towards Derby St.

Pipe Capacity & Surface Flow

Both kerb inlets connect to a 375mm diameter reinforced concrete pipe (RCP). Both of these pipes connect to the same 1,050mm diameter RCP in Denison Street. The full capacity at grade of these pipes and the available capacity during a minor storm event of the 375mm diameter pipes have been calculated and shown in the table below:

Table 3 – Existing Surface Flow Characteristics Table

Description	Minor Storm (10% AEP)	Major Storm (1% AEP)
Pipe	EX. 375mm Pipe – 197 Denison St	Ex. 375mm Pipe – 197 Denison St
Material	RCP	RCP
Grade[1]	1% (Assumed)	1% (Assumed)
Capacity at Grade (no head)	0.190m^3/s	0.190 m^3/s
Inflow (Kerb Inlet)	0.060m^3/s	0.095m^3/s
Available Capacity (EX. Pipe)	0.130m^3/s	0.085m^3/s
Bypass Flow (Kerb Inlet)	0.022m^3/s	0.054m^3/s
Surface Flow (EX-2)	0.053m^3/s	0.096m^3/s
Total Surface Flow	0.075m^3/s	0.150m^3/s

[1] In the absence of existing invert level for the existing stormwater system on Denison St, pipe gradients have been assigned to be the same as the longitudinal road grade.

The 1,050mm diameter RCP is a part of a much larger stormwater network. It is not practical to calculate the entire inflow or reserve capacity of this pipe when the size of the proposed development is much smaller when compared to the size of the catchment for this stormwater network.

In both the major and minor case, the flow into the existing 375mm stormwater pipe is restricted by the capacity of the kerb inlet. Considering the flow generated from catchment EX-1 is larger than the capacity of the kerb inlet, the excess flow will bypass the kerb inlet and continue on Denison St. Stormwater generated in catchment EX-2 will also discharge to the Denison St Road Reserve to the existing kerb and channel.

Road Capacity – Denison Street

Considering the kerb inlet located in Denison St does not have the capacity for the entire flow of catchments EX-1 and EX-2 in the minor and major case. It is expected the remaining flow will be channelled down Denison St. The capacity of the road has been calculated to find the expected depth of flow at the invert of the kerb and channel. Detailed calculations of the road capacity are shown in Appendix E. The table below shows the results of the road capacity:

Table 4 - Existing Road Flow

Description	Value	Unit
1% AEP surface flow [1]	0.150	m^3/s
Flow depth in 1% AEP (eastern kerb line)	82	mm
Maximum approximate half road capacity	1.25	m^3/s
Maximum flow depth before leaving road reserve	200	mm

[1] Surface flow is a combination of flow from EX-1 bypassing the kerb inlet and EX-2.

The road at this point of Denison St still has a significant amount of capacity. The flow at this point would still be contained within the kerb and channel. The road profile has been estimated from aerial contours and a desktop analysis of the critical dimensions of the Denison Street cross section adjacent the site.

2.2 Proposed Development Case

The proposed development consists of a two-storey office building, an off-street car park and pathway links associated. The stormwater drainage strategy for the site is proposed to incorporate a pit & pipe system under the car park, discharging to the existing 375mm diameter reinforced concrete pipe in Denison Street. This internal pit and pipe system is intended to convey surface run-off for the majority of the carpark area. The roofwater drainage for the new office building is also intended to connect to the new internal pit and pipe system. The preliminary pit and pipe network has been sized to convey the minor storm event (10% AEP) to the legal point of discharge, in this case being the Denison Street road reserve and the existing stormwater system contained the road corridor. It should be noted that the internal pit and pipe drainage system is subject to further detailed design and could vary from what is shown in this report. However, the overall intent and discharge arrangement is expected to remain the same as documented in this report.
With the introduction of the new pit and pipe system directly into the existing Council network, it is expected that the surface overland flow to Denision St and Alma Ln will reduce compared to the existing case. The proposed development will reduce the catchment discharging to Alma Lane. This is considered to be of benefit to all parties as Alma Lane does not have sufficient kerbs to channel water over the road and no underground stormwater infrastructure is currently in place within the lane.

The intended Stormwater Management Plan is shown in Appendix C of this report.

Proposed Catchments

The overall proposed catchment boundaries are similar to the existing overall catchments. The proposed development will change the flow path of stormwater slightly so there is a change to the catchment boundaries. The area impervious will also increase as expected with this development. The Proposed Catchment plan is shown in Appendix B and the proposed catchment characteristics are shown below:

Table 5 - Proposed Catchment Runoff Table

Catchment ID	PR-1	PR-2	PR-3	Unit
Discharge Location	Denison St Kerb Inlet [1]	Denison St Kerb Inlet [2]	Alma Lane	
Catchment Area	0.2567	0.2789	0.3458	ha
Fraction Impervious	62.8	82.3	58.3	%
Critical Time of Concentration	15[3]	15[3]	15[3]	minutes
Coefficient of Discharge (C10)	0.788	0.85	0.775	
Minor Design Storm 10% AEP	0.080	0.094	0.106	m^3/s
Major Design Storm 1% AEP	0.146	0.167	0.193	m^3/s

[1] Flow will bypass to Denison St Road Reserve when kerb inlet capacity is exceeded.
[2] Minor Design Storm flow will travel through proposed pit and pipe system. When existing 375mm diameter pipe capacity is exceeded, flow will bypass to Denison St Road Reserve.
[3] Time of Concentration taken as standard inlet time as per QUDM 4.6.4, Table 4.6.2.

Site Pit and Pipe System

The site pit and pipe system is proposed to be installed within the car park area, with allowance for the building roofwater to connect to this system. The system will be within catchment PR-2, and will reduce the surface flow discharging over land towards Denison St.

The site outlet pipe discharging to the existing Council stormwater system is proposed to be a 375mm diameter pipe at a minimum grade of 0.5%, with the capacity of the pipe at this grade is 0.134m3/s. The capacity of this pipe is intended to be sufficient to convey the entire minor storm flow from catchment PR-2. The table below shows the capacity and flow into the existing 375mm pipe as well as the flow bypassing the existing Council stormwater system directly in front of the site:

Table 6 - Proposed Surface Flow Characteristics Table

Description	Minor Storm (10% AEP)	Major Storm (1% AEP)
Pipe	EX. 375mm Pipe – 197 Denison St	Ex. 375mm Pipe – 197 Denison St
Material	RCP	RCP
Grade[1]	1% (Assumed)	1% (Assumed)
Capacity at Grade (no head)	0.190m^3/s	0.190 m^3/s
Inflow (Kerb Inlet)	0.060m^3/s	0.095m^3/s
Inflow (New Pit & Pipe): PR-2	0.094m^3/s	0.094m^3/s [1]
Reserve Capacity (EX. Pipe)	0.036m^3/s	0.001m^3/s
Bypass Flow (Kerb Inlet)	0.020m^3/s	0.124m^3/s[2]
Bypass Flow (Pit & Pipe)	0.000m^3/s	0.000m^3/s
Total Bypass Flow	0.020m^3/s	0.124m^3/s

[1] Pit and Pipe System limited by the existing pipe capacity.
[2] Gap flow between 1% and 10% AEP from PR-2 and gap flow between 1% AEP from PR-1 and inflow from the kerb inlet

As shown in the table above, the existing 375mm diameter reinforced concrete pipe has enough capacity to cater for the entire flow from the pit and pipe system in catchment PR-2 in a minor storm event. In both major and minor events, the bypass flow will continue to run within the Denison St kerb and channel down towards the stormwater infrastructure near and in Derby St.

Road Capacity – Denison St

Similar to the existing case the kerb inlet located in Denison St does not have the capacity for the entire flow of catchments PR-1 and PR-2 in the minor and major storm event. It is expected the bypassing flow will be channelled down Denison St. The flow depth has again been calculated for this. Detailed calculations of the road capacity are shown in Appendix E. The table below shows the results of the road capacity:

Table 7 - Proposed Road Flow

Description	Value	Unit
1% AEP surface flow [1]	0.124	m^3/s
Flow depth in 1% AEP (eastern kerb line)	76	mm
Maximum approximate half road capacity	1.25	m^3/s
Maximum flow depth before leaving road reserve	200	mm

[1] Surface flow is a combination of flow from PR-1 bypassing the kerb inlet and PR-2 bypassing the pit and pipe system.

As shown by the table above, there is sufficient capacity in the half road width of Denison St to cater for the 1% AEP bypassing flow for the catchments contributing to this road section directly adjacent the site. The existing kerb and channel for this section of Denison St is approximately 150mm high and therefore the bypassing flow is contained within the kerb and channel with flow depth calculated to be 76mm.

2.3 Existing Case vs Proposed Development Comparison

When comparing the site between the pre-developed and post-developed stages, it is seen that the proposed development does not worsen the impacts of stormwater on both neighbouring properties or council infrastructure. The development of this site does slightly increase the flow produced in the catchments from pre-development to post development due to the increase in impervious area of the site. However, by utilising the reserve capacity of the existing 375mm reinforced concrete pipe and conveying the 10% AEP minor storm runoff from the site directly to the existing underground stormwater drainage system, the surface flows are reduced.

The following table shows the comparison between the surface flow in both the Denison Street and Alma Lane road reserves:

Table 8 - Surface Flow Comparison

Location	Description	Measurement	Existing	Proposed	Difference	Unit
Denison St	10% AEP	Surface Flow	0.075	0.020	-0.055	m^3/s
	1% AEP	Surface Flow	0.150	0.124	-0.026	m^3/s
		Flow Depth	82	76	-6	mm
Alma Lane	10% AEP	Surface Flow	0.132	0.106	-0.026	m^3/s
	1% AEP	Surface Flow	0.241	0.193	-0.048	m^3/s

From the above it is clear that the surface flow is reduced from the pre to post-developed case for both Denison St & Alma Lane due to utilising the available pipe capacity in Denison St in the proposed case.

Analysis of flow to the 1,050mm diameter RCP shows the increase in flow created from the development of the site in a minor storm event is only equal to approximately 3.5% of the pipe's on grade capacity. Furthermore, the critical time of concentration for this pipe is much longer than the 15 minute standard inlet time used for this site. This is due to the length of the upstream portion of this pipe network and the associated catchment of the upstream network. This means the peak flow calculated for this site does not coincide with the peak flow for the 1,050mm diameter pipe. The flow from the proposed site catchment would contribute a much lesser quantity during the peak flow of the 1,050mm RCP than calculated in the earlier sections of this report.

Based on the above, we believe no stormwater mitigation measures such as detention are required to be incorporated into the proposed stormwater system.

3 Stormwater Quality

The stormwater quality assessment for the proposed development has been based on the requirements listed in the State Planning Policy (SPP) – July 2017 under the Water Quality section. The developed area of the site is over the 2,500m² area threshold stated within the SPP July 2017 and the total impervious area of the re-developed site will be greater than 25%. Therefore, the stormwater quality assessment benchmarks are triggered for an MCU development application under the SPP July 2017 for this project.

It is expected that the proposed development of the office building and associated infrastructure will generate stormwater pollutants that are exported from the subject site. A treatment train of suitable Stormwater Quality Improvement Devices (SQID's) has been proposed to intercept and capture the pollutants associated with the proposed development, so that the potential impacts external to the subject site will be adequately mitigated to achieve the target Water Quality Objectives (WQO's).

This section discusses:

- The identification of key stormwater pollutants associated with the proposed development;
- The Water Quality Objectives (WQO's) identified for the catchments;
- Proposed measures to mitigate the increase in pollutant export; and
- Modelling of the proposed measures and comparison to the identified WQO's.

Water quality modelling was undertaken with Model for Urban Stormwater Improvement Conceptualisation (MUSIC), generally in accordance with the Water By Design Music Modelling Guidelines (2018).

3.1 Pollutants of Concern

Pollutants typically generated during the operational phase of a development are as follows:

- Litter
- Sediment
- Oxygen demanding substances (possibly present)
- Nutrients (N & P)
- Pathogens/Faecal Coliforms
- Hydrocarbons
- Heavy Metals (often associated with the fine sediment)
- Surfactants
- Organochlorines & organophosphates
- Thermal Pollution
- pH altering substances

3.2 Water Quality Objectives

The load reduction WQO's presented in the table below have been extracted from Table B of the Queensland State Planning Policy (SPP) (July 2017) for the Central Queensland (south) climatic region.

Table 9 - Load Reduction Water Quality Objective Targets

Region	Total Suspended Solids (kg/yr)	Total Phosphorus (kg/yr)	Total Nitrogen (kg/yr)	Gross Pollutants (kg/yr)
Central QLD (south)	85%	60%	45%	90%

Source: Table B – Queensland State Planning Policy (July 2017)

3.3 Water Quality Management Strategy

As stated within previous sections of this report, a new internal pit and pipe stormwater drainage system is intended to be installed underneath the car park area as part of the office development. The site layout and spatial requirements limits the ability for any significant surface water quality treatment systems (i.e. bio retention). Therefore, it is proposed to include a proprietary in-ground stormwater quality treatment system as part of the internal pit and pipe drainage network discharging to the stormwater infrastructure on Denison Street, adjacent the site.

The stormwater quality catchments are shown on the stormwater quality catchment plan included in Appendix D of this report.

3.4 Meteorological and Rainfall Data

Six-minute pluviographic (rainfall) data was sourced from the Bureau of Meteorology (BOM) for Rockhampton. A ten (10) year data set from 31/03/2000 to 31/03/2010 was adopted due to the consistency in data over this period. Monthly evapotranspiration data for the period was sourced from the Bureau of Meteorology and entered into the MUSIC Model. The following image shows the rainfall and evapotranspiration pattern used and the table summarises key data for the modelling:

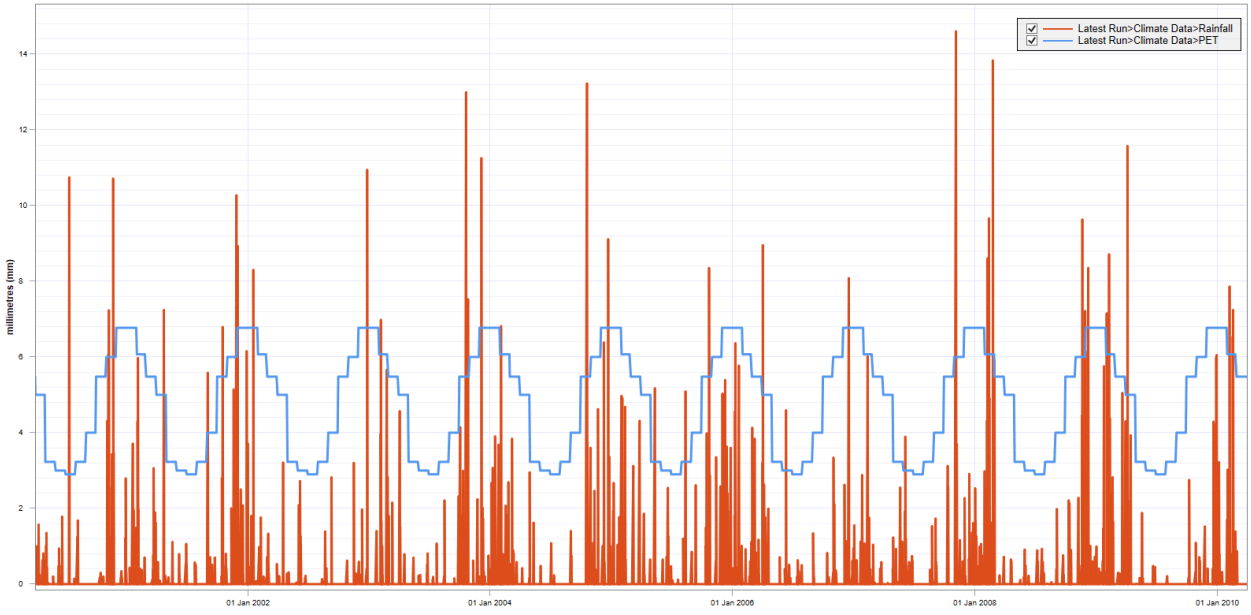

Figure 3 Rainfall and Evapotranspiration Pattern

Table 10 - Meteorological and Rainfall Runoff Data Table

Input	Data Used in Modelling
Rainfall Station	Rockhampton: BOM Station ID 039083
Time Step	6 Minute
Modelling Period	31/03/2000 to 31/03/2010
Rainfall runoff parameters	Commercial
Pollutant export parameters	Commercial

3.5 Source Nodes

Source nodes utilised for the proposed office development were assigned as commercial in nature with all Rainfall-Runoff parameters and concentration parameters being in accordance with the Water by Design MUSIC Modelling Guidelines – November 2018. A total of four (4) water quality catchments were used for modelling as shown on the catchment plan in Appendix D of this report. Catchment WQ2 covers the roof section of the office building & catchment WQ3 covers the car park, road section. The remaining catchments are for the ground area of the site. The following table provides a summary of the details for each source node:

Table 11- Catchment Definition Reporting Table

ID	Area (ha)	% Impervious	Description	Land Use
WQ1	0.0242	24	Ground	Commercial
WQ2	0.0720	100	Roof	Commercial
WQ3	0.1479	100	Road	Commercial
WQ4	0.0459	9.3	Ground	Commercial

3.6 Treatment Nodes

A number of different scenarios were investigated during the design process through trialling various methods of stormwater quality treatment including bio-retention basins and in-ground proprietary treatment systems. With the limitations of available depth to successfully outlet stormwater to the legal points of discharge, the adopted treatment incorporates an in ground proprietary treatment system as part of the internal pit and pipe network, just prior to discharge from the site. Each of the modelled water quality catchments discharge to a treatment node except WQ4 which is a combination of small grassed areas around the site which will bypass stormwater quality treatment. This catchment will discharge directly to the road reserve. The following table provides a summary of the parameters for each of the treatment nodes in the water quality system:

Table 12 - In Ground Proprietary Treatment System

Description	Details
In-Ground Proprietary Treatment System	Modelled using Atlan flow filter with 9 cartridge filters[1]
Litter Baskets	Modelled using 2 x Stormsacks[1]

[1]The modelling has been completed using Atlan stormwater quality treatment products. Other equivalent stormwater quality treatment products by other manufacturers may be considered to achieve treatment targets during the further detailed design phase of the project.

3.7 MUSIC Model

The following extract has been provided from the MUSIC model displaying the treatment train adopted for the site:

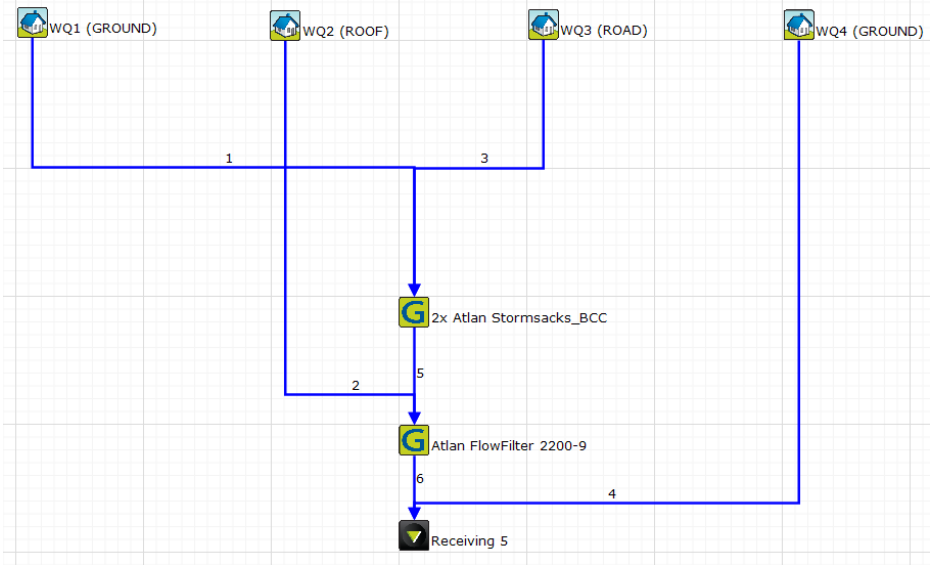

Figure 4 Adopted MUSIC Model

3.8 MUSIC Modelling Results

The development has been considered holistically for water quality analysis. The results from the MUSIC model at the receiving node, including the proposed treatment measures are shown below. The achieved percentage reductions in pollutants are compared with the water quality objective targets outlined in the State Planning Policy – July 2017.

Table 13 - MUSIC Modelling Results - Receiving Node

Description	Sources	Residual Load	% Reduction	Water Quality Objectives (%)
Flow (ML/yr)	1.524	1.524	0.00	
Total Suspended Solids (kg/yr)	406.6	53.51	85	85
Total Phosphorus (kg/yr)	0.8002	0.2615	65	60
Total Nitrogen (kg/yr)	4.846	2.171	53	45
Gross Pollutants (kg/yr)	33.39	0.504	97	90

As shown in the above table, the proposed treatment strategy successfully meets the water quality objectives for pollutant removal of Total Suspended Solids, Total Phosphorus, Total Nitrogen and Gross Pollutants.

4. Conclusion

There appears to be no insurmountable difficulties in relation to the stormwater management proposal for the new office development for Access Recreation located at 189 & 197 Denison Street, Rockhampton.

Stormwater Quantity and Quality for the development has been assessed with the following conclusions determined:

- An existing 375mm diameter stormwater pipe in the Denison St road reserve has additional capacity with only one kerb inlet connected. Upon review this pipe has enough capacity to convey the entire 10% AEP peak flow from catchment PR-2.
- The proposed stormwater strategy allows a reduction in surface flow to Denison St, by the proposed site pit and pipe system, and Alma Lane by proposed site earthworks and finished surface grading.
- No negative impacts on council infrastructure are expected due to the existing, remaining capacity of the existing infrastructure.
- No stormwater detention or upgrades to council infrastructure are required.
- Stormwater quality has been reviewed in accordance with the State Planning Policy – July 2017 (SPP). The use of an in ground proprietary device is incorporated into the site stormwater strategy to ensure that the development complies with the pollutant load reduction provisions within the SPP.

If you should have any questions regarding this report, please do not hesitate to contact the office of Janes and Stewart Structures Pty Ltd (07) 4922 1948.

Janes and Stewart
Structural+Civil
CONSULTANTS

Appendix A

Existing Stormwater Catchment Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP02

Janes and Stewart Structures Pty Ltd

ABN: 30 620 233 025
120 William Street
PO Box 1072
Rockhampton QLD 4700

07 4922 1948
janes.and.stewart@jsstructures.com.au

N

LEGEND

	EXISTING SEAL AREA
	EXISTING CONCRETE AREA
	EXISTING LOT BOUNDARY
	EXISTING STORMWATER DRAINAGE CATCHMENT
D	EXISTING STORMWATER DRAINAGE
	EXISTING BUILDING OUTLINE
10.00	EXISTING CONTOUR

ST PAUL'S CATHEDRAL

EX-3

ALMA LANE

LOT 23
CP892530

LOT 304
RP905533

LOT 303
RP905533

EX-2

WILLIAM STREET

EXISTING KERB INLET.

EX-1

EXISTING Ø375mm RCP.

DENISON STREET

NORTH COAST RAIL LINE

EXISTING Ø1,050mm RCP.

ACCESS RECREATION OFFICE

0 2.5 10.0m
1:500

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07 4922 1948
janes.and.stewart@jsstructures.com.au
ABN 30 620 233 025

JS² Janes and Stewart Structural+Civil CONSULTANTS

SK02[1]

Project Number
24055

Date
27/08/2024

EXISTING CATCHMENT PLAN

Janes and Stewart
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Appendix B

Proposed Stormwater Catchment Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP02

Janes and Stewart Structures Pty Ltd

ABN: 30 620 233 025
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N

LEGEND

	EXISTING SEAL AREA
	EXISTING CONCRETE AREA
	PROPOSED ASPHALT SEAL AREA
	PROPOSED CONCRETE AREA
	EXISTING LOT BOUNDARY
D	EXISTING STORMWATER DRAINAGE
	EXISTING KERB
	PROPOSED BUILDING OUTLINE
	PROPOSED INVERT LINE
	PROPOSED CROWN LINE
	PROPOSED STORMWATER DRAINAGE CATCHMENT
D	PROPOSED STORMWATER DRAINAGE
10.00	EXISTING CONTOUR

ST PAUL'S CATHEDRAL

PR-3

ALMA LANE

PROPOSED PIT & PIPE SYSTEM, REFER STORMWATER SITE PLAN.

PROPOSED OFFICE BUILDING

LOT 23
CP892530

LOT 304
RP905533

LOT 303
RP905533

PR-2

WILLIAM STREET

EXISTING KERB INLET.

PR-1

EXISTING Ø375mm RCP.

DENISON STREET

NORTH COAST RAIL LINE

EXISTING Ø1,050mm RCP.

ACCESS RECREATION OFFICE

0 2.5 10.0m 1:500

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Project Number
SK03[1]
24055
Date
27/08/2024

PROPOSED CATCHMENT PLAN

Janes and Stewart
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Appendix C

Stormwater Management Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP02

Janes and Stewart Structures Pty Ltd

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N

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

GRASSED SWALE.

ALMA LANE

Ø225 uPVC

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

Ø225 uPVC

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

Ø300 uPVC

Ø225 uPVC

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

Ø300 uPVC

Ø225 uPVC

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

Ø2200 ATLAN FLOW FILTER WITH 9 CARTRIDGES OR APPROVED EQUIVALENT.

600 SQ. GRATED INLET, CLASS D MIN. WITH AN ATLAN STORMSACK.

Ø225 uPVC

Ø375 SP

Ø375 SP

Ø375 SP

PROPOSED OFFICE BUILDING

LOT 23
CP892530

LOT 304
RP905533

LOT 303
RP905533

EX. Ø1,050 RCP

EX. Ø375 RCP

EX. Ø1,050 RCP

DENISON STREET

LEGEND

	EXISTING SEAL AREA
	EXISTING CONCRETE AREA
	PROPOSED ASPHALT SEAL AREA
	PROPOSED CONCRETE AREA
	EXISTING LOT BOUNDARY
D	EXISTING STORMWATER DRAINAGE
	EXISTING KERB
	EXISTING STORMWATER DRAINAGE (DIA. AS NOTED)
	PROPOSED INVERT LINE
	PROPOSED CROWN LINE
	PROPOSED BUILDING OUTLINE
	PROPOSED STORMWATER DRAINAGE (DIA. AS NOTED)

ACCESS RECREATION OFFICE

0 1.25 5.0m 1:250

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Project Number
SK04[1]
24055
Date
27/08/2024

STORMWATER MANAGEMENT PLAN

Janes and Stewart
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Appendix D

Stormwater Quality Catchment Plan

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

24055REP02

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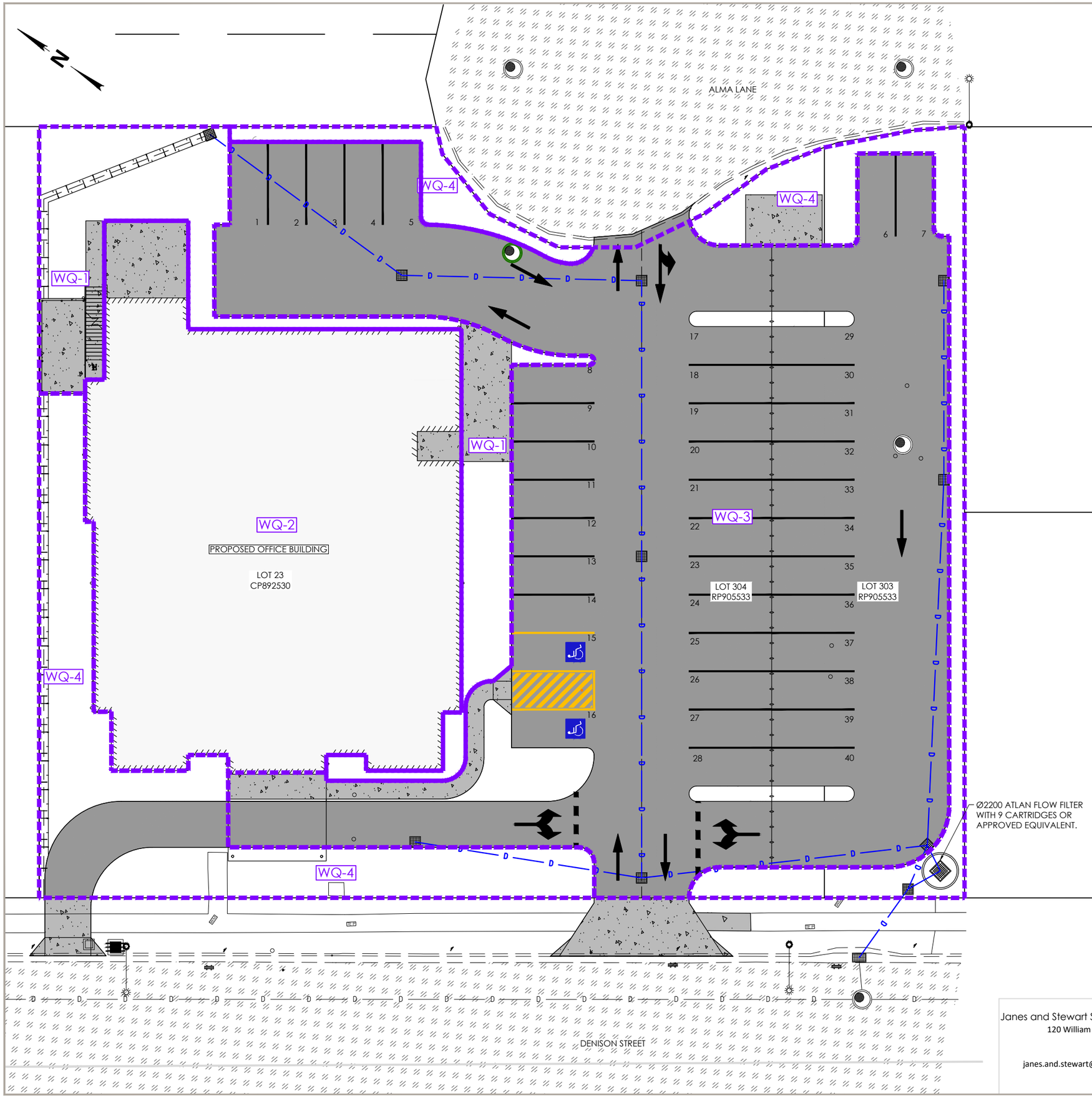

LEGEND

	EXISTING SEAL AREA
	EXISTING CONCRETE AREA
	PROPOSED ASPHALT SEAL AREA
	PROPOSED CONCRETE AREA
	EXISTING LOT BOUNDARY
D	EXISTING STORMWATER DRAINAGE
	EXISTING KERB
	PROPOSED BUILDING OUTLINE
	PROPOSED INVERT LINE
	PROPOSED CROWN LINE
	PROPOSED STORMWATER DRAINAGE CATCHMENT
D	PROPOSED STORMWATER DRAINAGE

ACCESS RECREATION OFFICE

0 2.5 10.0m 1:500

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Janes and Stewart Structural+Civil CONSULTANTS

Project Number	SK05[1]
	24055
Date	27/08/2024

PROPOSED QUALITY CATCHMENT PLAN

Janes and Stewart
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Appendix E

Stormwater Calculations

Access Recreation Office
189 & 197 Denison Street, Rockhampton
Designtek Pty Ltd

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Catchment EX-1

Catchment Parameters

Catchment Name EX-1

Job No: 24055
Name Access Rec
Date: 3/09/2024

Catcment Area 0.2516 Ha

Total Tc	15	mins	standard inlet time, 15min

Runoff Calculation (Rational method)

Rainfall Intensity Table

ARI	1 year	2 years	5 years	10 years	20 years	50 years	100 years	
15min	82.1	91.3	121	142	163	193	216	(mm/h)

	factor	co eff	mm/hr	ha	m³/sec	factor
Q_2	0.002778	0.701	91.3	0.2516	0.045	0.85
Q_5	0.002778	0.784	121	0.2516	0.066	0.95
Q_{10} - minor	0.002778	0.825	142	0.2516	0.082	1
Q_{20}	0.002778	0.866	163	0.2516	0.099	1.05
Q_{50}	0.002778	0.949	193	0.2516	0.128	1.15
Q_{100} - Majo	0.002778	0.990	216	0.2516	0.149	1.2

C10 value 0.825

Fi value 74.9 % = 0.749 Fi

Assumptions:

AREA, FI=100% : 1884m2, TOTAL=2516m2, FI=74.9%

Catchment EX-2

Catchment Parameters

Catchment Name EX-2

Job No: 24055
Name Access Rec
Date: 19/09/2024

Catcment Area 0.2012 Ha

Total Tc	15	mins	standard inlet time, 15min

Runoff Calculation (Rational method)

Rainfall Intensity Table

ARI	1 year	2 years	5 years	10 years	20 years	50 years	100 years	
15min	82.1	91.3	121	142	163	193	216	(mm/h)

	factor	co eff	mm/hr	ha	m³/sec	factor
Q_2	0.002778	0.564	91.3	0.2012	0.029	0.85
Q_5	0.002778	0.630	121	0.2012	0.043	0.95
Q_{10} - mino	0.002778	0.663	142	0.2012	0.053	1
Q_{20}	0.002778	0.696	163	0.2012	0.063	1.05
Q_{50}	0.002778	0.762	193	0.2012	0.082	1.15
Q_{100} - Majo	0.002778	0.796	216	0.2012	0.096	1.2

C10 value 0.663

Fi value 27.3 % = 0.273 Fi

Assumptions:

AREA, FI=100% : 549m2, TOTAL=2012m2, FI=27.3%

Catchment EX-3

Catchment Parameters

Catchment Name EX-3

Job No: 24055
Name Access Rec
Date: 3/09/2024

Catcment Area 0.4286 Ha

Total Tc	15	mins	standard inlet time, 15min

Runoff Calculation (Rational method)

Rainfall Intensity Table

ARI	1 year	2 years	5 years	10 years	20 years	50 years	100 years	
15min	82.1	91.3	121	142	163	193	216	(mm/h)

	factor	co eff	mm/hr	ha	m³/sec	factor
Q_2	0.002778	0.663	91.3	0.4286	0.072	0.85
Q_5	0.002778	0.741	121	0.4286	0.107	0.95
Q_{10} - mino	0.002778	0.780	142	0.4286	0.132	1
Q_{20}	0.002778	0.819	163	0.4286	0.159	1.05
Q_{50}	0.002778	0.897	193	0.4286	0.206	1.15
Q_{100} - Majo	0.002778	0.936	216	0.4286	0.241	1.2

C10 value 0.78

Fi value 59.8 % = 0.598 Fi

Assumptions:

AREA, FI=100% : 2562m2, TOTAL=4286m2, FI=59.8%

Catchment PR-1

Catchment Parameters

Catchment Name PR-1

Job No: 24055
Name Access Rec
Date: 3/09/2024

Catcment Area 0.2567 Ha

Total Tc	15	mins	standard inlet time, 15min

Runoff Calculation (Rational method)

Rainfall Intensity Table

ARI	1 year	2 years	5 years	10 years	20 years	50 years	100 years
15min	82.1	91.3	121	142	163	193	216

	factor	co eff	mm/hr	ha	m³/sec	factor
Q_2	0.002778	0.670	91.3	0.2567	0.044	0.85
Q_5	0.002778	0.749	121	0.2567	0.065	0.95
Q10-Minor	0.002778	0.788	142	0.2567	0.080	1
Q_{20}	0.002778	0.827	163	0.2567	0.096	1.05
Q_{50}	0.002778	0.906	193	0.2567	0.125	1.15
Q_{100} - Majo	0.002778	0.946	216	0.2567	0.146	1.2
C10 value		0.788				
Fi value	62.8	%	=	0.628	Fi	

Assumptions:

AREA, FI=100% : 1613m2, TOTAL=2567m2, FI=62.8%

Catchment PR-2

Catchment Parameters

Catchment Name PR-2

Job No: 24055
Name Access Rec
Date: 19/09/2024

Catcment Area 0.2789 Ha

Total Tc	15	mins	standard inlet time, 15min

Runoff Calculation (Rational method)

Rainfall Intensity Table

ARI	1 year	2 years	5 years	10 years	20 years	50 years	100 years
15min	82.1	91.3	121	142	163	193	216

	factor	co eff	mm/hr	ha	m³/sec	factor
Q_2	0.002778	0.723	91.3	0.2789	**0.051**	0.85
Q_5	0.002778	0.808	121	0.2789	**0.076**	0.95
$Q_{10\text{-minor}}$	0.002778	0.850	142	0.2789	**0.094**	1
Q_{20}	0.002778	0.893	163	0.2789	**0.113**	1.05
Q_{50}	0.002778	0.978	193	0.2789	**0.146**	1.15
Q_{100} - Majo	0.002778	1.000	216	0.2789	**0.167**	1.2

C10 value 0.85

Fi value 82.3 % = 0.823 Fi

Assumptions:

AREA, FI=100% : 2294m2, TOTAL=2789m2, FI=82.3%

Catchment PR-3

Catchment Parameters

Catchment Name PR-3

Job No: 24055
Name Access Rec
Date: 3/09/2024

Catcment Area 0.3458 Ha

Total Tc	15	mins	standard inlet time, 15min

Runoff Calculation (Rational method)

Rainfall Intensity Table

ARI	1 year	2 years	5 years	10 years	20 years	50 years	100 years
15min	82.1	91.3	121	142	163	193	216

	factor	co eff	mm/hr	ha	m³/sec	factor
Q_{2}- Minor	0.002778	0.659	91.3	0.3458	0.058	0.85
Q_{5}	0.002778	0.736	121	0.3458	0.086	0.95
Q_{10}	0.002778	0.775	142	0.3458	0.106	1
Q_{20}	0.002778	0.814	163	0.3458	0.127	1.05
Q_{50}	0.002778	0.891	193	0.3458	0.165	1.15
Q_{100} - Majo	0.002778	0.930	216	0.3458	0.193	1.2

C10 value 0.775

Fi value 58.3 % = 0.583 Fi

Assumptions:

AREA, FI=100% : 2015m2, TOTAL=3458m2, FI=58.3%

19/09/2024

Access Recreation Office
Existing Case
24055
Q_{100} Drainage Calculations

Denison St Road Reserve

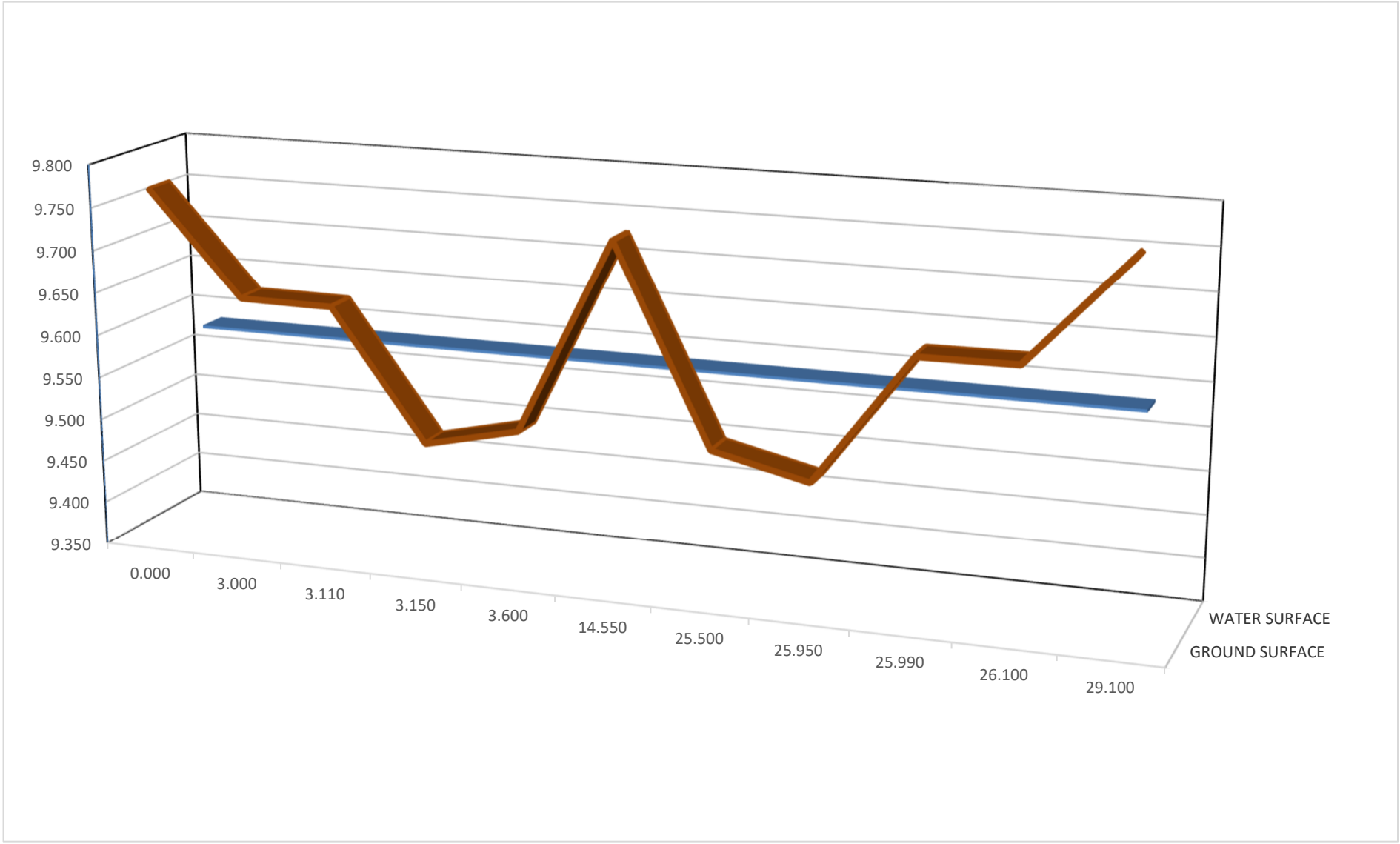
Water Level = 9.582 *m*

Chainage 1	RL1 (m)	RL2 (m)	W (m)	Ch	Bank Slope	n	WSL	Depth 1 (m)	Depth 2 (m)	Width (m)	Area (m˜)	p (m)	q (m˜/sec)	V (m/sec)	Slope (%)	D x V
	9.770	9.650	3.000	0.000	0.040	0.015	9.582	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.650	9.649	0.110	3.000	0.009	0.012	9.582	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.649	9.500	0.040	3.110	3.725	0.012	9.582	0.000	0.082	0.022	0.001	0.085	0.000	0.361	0.80	0.030
	9.500	9.525	0.450	3.150	-0.056	0.012	9.582	0.082	0.057	0.450	0.031	0.451	0.040	1.262	0.80	0.072
	9.525	9.750	10.950	3.600	-0.021	0.015	9.582	0.057	0.000	10.950	0.314	10.950	0.175	0.558	0.80	0.000
	9.750	9.525	10.950	14.550	0.021	0.015	9.582	0.000	0.057	2.787	0.080	2.788	0.045	0.558	0.80	0.032
	9.525	9.500	0.450	25.500	0.056	0.012	9.582	0.057	0.082	0.450	0.031	0.451	0.040	1.262	0.80	0.104
	9.500	9.649	0.040	25.950	-3.725	0.012	9.582	0.082	0.000	0.040	0.002	0.091	0.001	0.512	0.80	0.000
	9.649	9.650	0.110	25.990	-0.009	0.012	9.582	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.650	9.770	3.000	26.100	-0.040	0.015	9.582	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.770			29.100	#DIV/0!	0.035	9.582	0.000	9.582	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.80	#DIV/0!
	0.000			29.100	#DIV/0!	0.035	9.582	9.582	9.582	0.000	0.000	0.000	0.000	0.000	0.80	0.000
Total										**14.700**	**0.459**		**0.30**	**0.654**		

avg velocity	0.501 m/s

Note: Flow is for entire road section, in report half road capacity is referenced. Half Road capacity is half of the capacity shown above.

Max. Flow Depth	0.082	m


9.800
9.750
9.700
9.650
9.600
9.550
9.500
9.450
9.400
9.350
0.000
3.000
3.110
3.150
3.600
14.550
25.500
25.950
25.990
26.100
29.100
WATER SURFACE
GROUND SURFACE

19/09/2024

Access Recreation Office
Proposed Case
24055
Q_{100} Drainage Calculations

Denison St Road Reserve

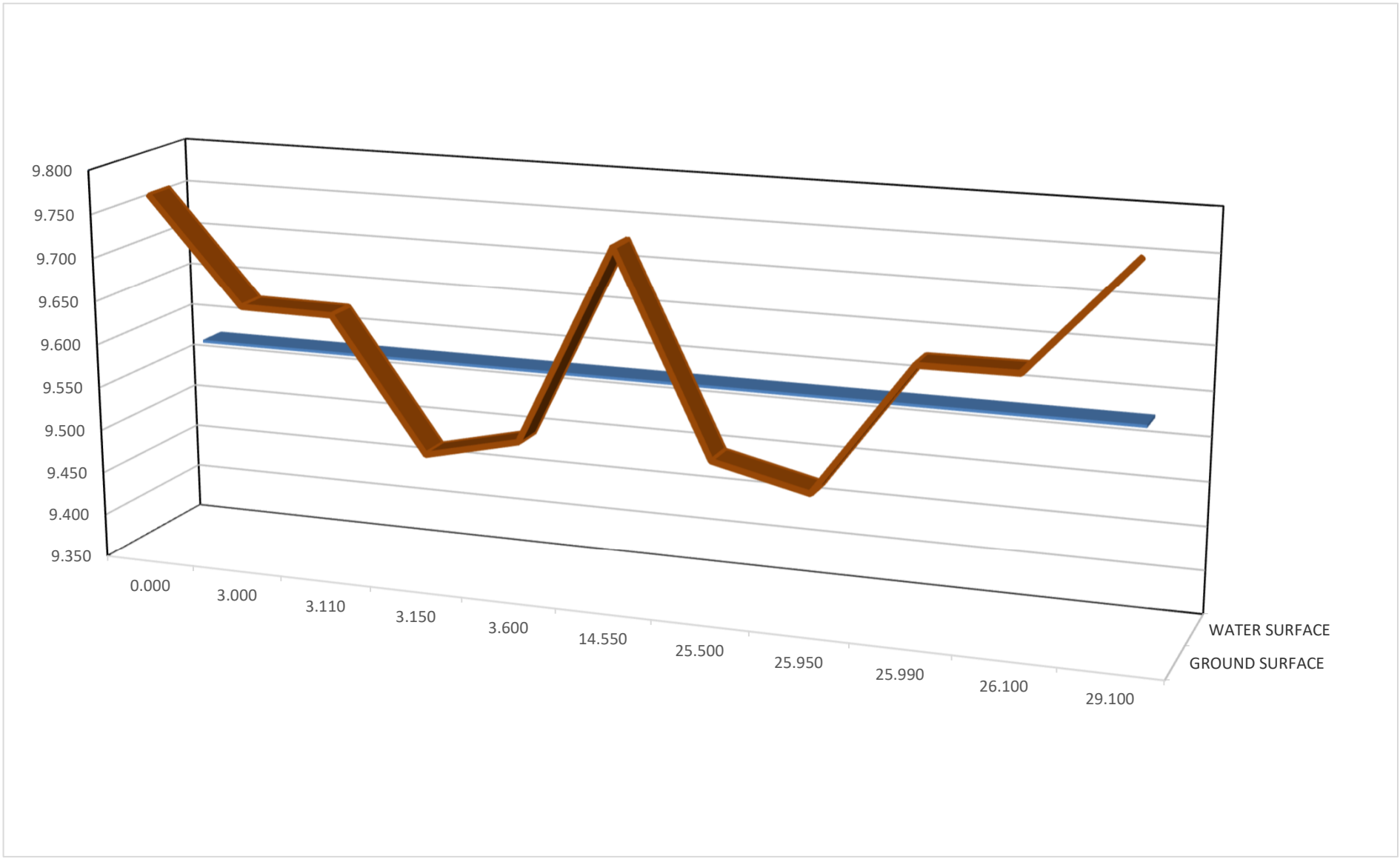
Water Level = 9.576 *m*

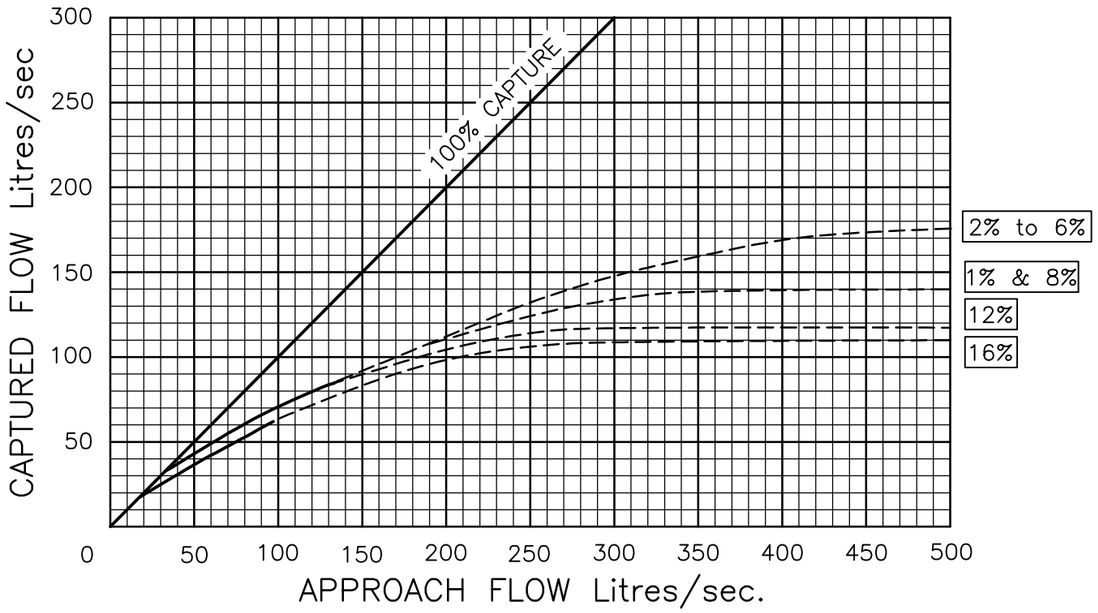
Chainage 1	RL1 (m)	RL2 (m)	W (m)	Ch	Bank Slope	n	WSL	Depth 1 (m)	Depth 2 (m)	Width (m)	Area (m^2)	p (m)	q (m^3/sec)	V (m/sec)	Slope (%)	D x V
	9.770	9.650	3.000	0.000	0.040	0.015	9.576	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.650	9.649	0.110	3.000	0.009	0.012	9.576	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.649	9.500	0.040	3.110	3.725	0.012	9.576	0.000	0.076	0.020	0.001	0.079	0.000	0.343	0.80	0.026
	9.500	9.525	0.450	3.150	-0.056	0.012	9.576	0.076	0.051	0.450	0.029	0.451	0.034	1.186	0.80	0.061
	9.525	9.750	10.950	3.600	-0.021	0.015	9.576	0.051	0.000	10.950	0.279	10.950	0.144	0.517	0.80	0.000
	9.750	9.525	10.950	14.550	0.021	0.015	9.576	0.000	0.051	2.484	0.063	2.484	0.033	0.517	0.80	0.026
	9.525	9.500	0.450	25.500	0.056	0.012	9.576	0.051	0.076	0.450	0.029	0.451	0.034	1.186	0.80	0.090
	9.500	9.649	0.040	25.950	-3.725	0.012	9.576	0.076	0.000	0.040	0.002	0.086	0.001	0.506	0.80	0.000
	9.649	9.650	0.110	25.990	-0.009	0.012	9.576	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.650	9.770	3.000	26.100	-0.040	0.015	9.576	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.80	0.000
	9.770			29.100	#DIV/0!	0.035	9.576	0.000	9.576	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.80	#DIV/0!
	0.000			29.100	#DIV/0!	0.035	9.576	9.576	9.576	0.000	0.000	0.000	0.000	0.000	0.80	0.000
Total										**14.394**	**0.402**		**0.25**	**0.612**		

avg velocity	0.473 m/s

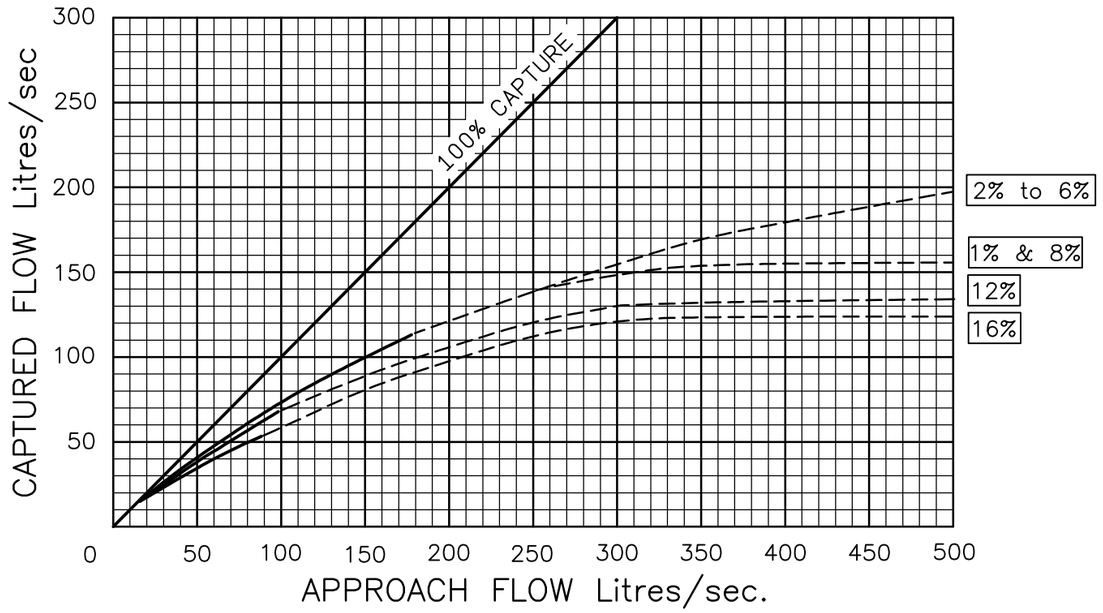
Note: Flow is for entire road section, in report half road capacity is referenced. Half Road capacity is half of the capacity shown above.

Max. Flow Depth	0.076 m


9.800
9.750
9.700
9.650
9.600
9.550
9.500
9.450
9.400
9.350
0.000
3.000
3.110
3.150
3.600
14.550
25.500
25.950
25.990
26.100
29.100
WATER SURFACE
GROUND SURFACE



ROAD CROSSFALL 1:40



ROAD CROSSFALL 1:30

LEGEND

_ %

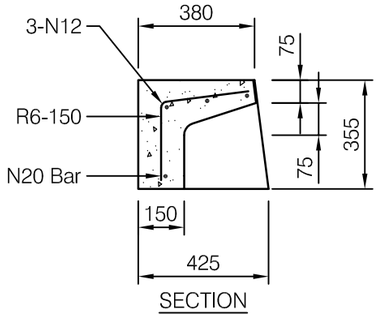
Kerb & channel longitudinal slope

NOTES

1. This capture chart should only be used in conjunction with the requirements of Design Guidelines D4 Stormwater Drainage.
2. Refer to standard drawings S1050, S1055, and S1060 for Kerb Inlet Pit details.

KERB INLET
CAPACITY DESIGN CHART
ON GRADE - TYPE 'S'

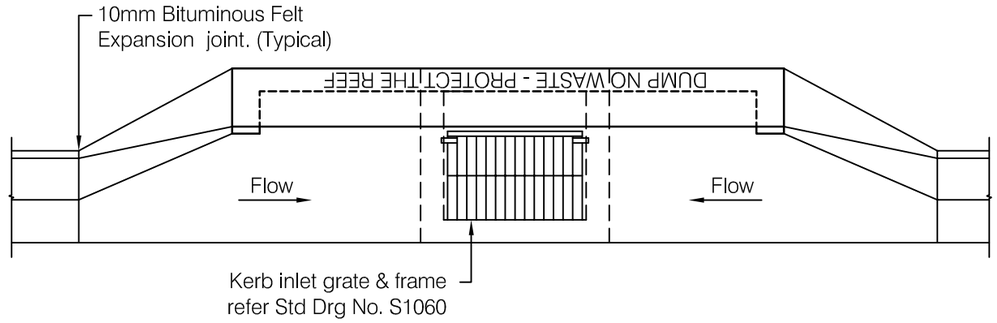
10% BLOCKAGE FACTOR



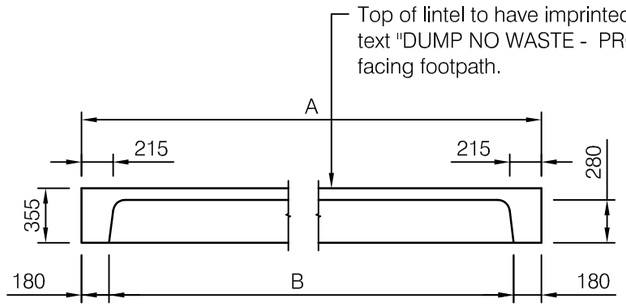
SECTION

TABLE OF DIMENSIONS

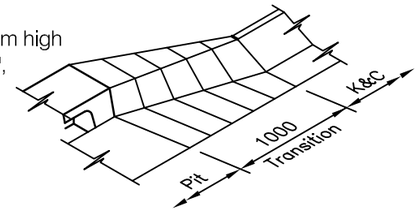
Lintel size	A	B	X	Mass (kg)
Small (S)	2400	2040	400	445
Medium (M)	3600	3240	690	550
Large (L)	4800	4440	1000	725



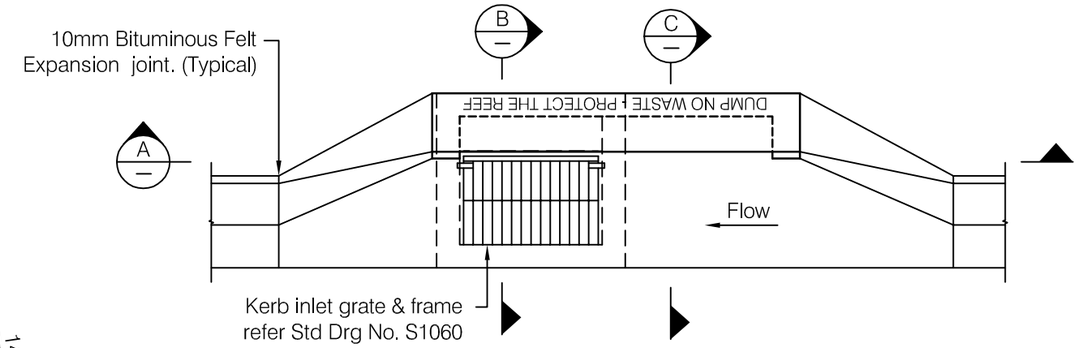
INLET IN SAG



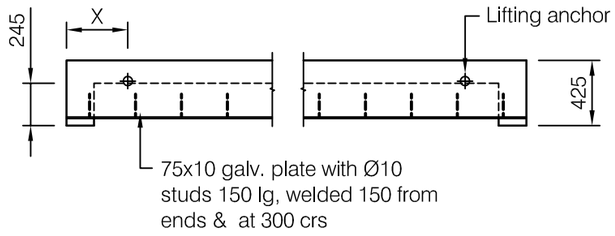
ELEVATION



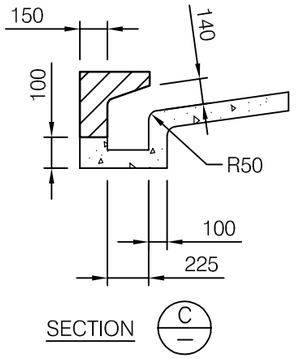
TRANSITION TO LAYBACK KERB & CHANNEL



INLET ON GRADE

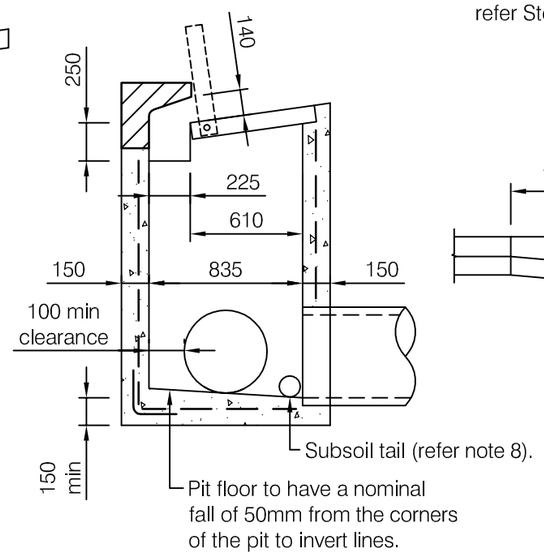


PLAN

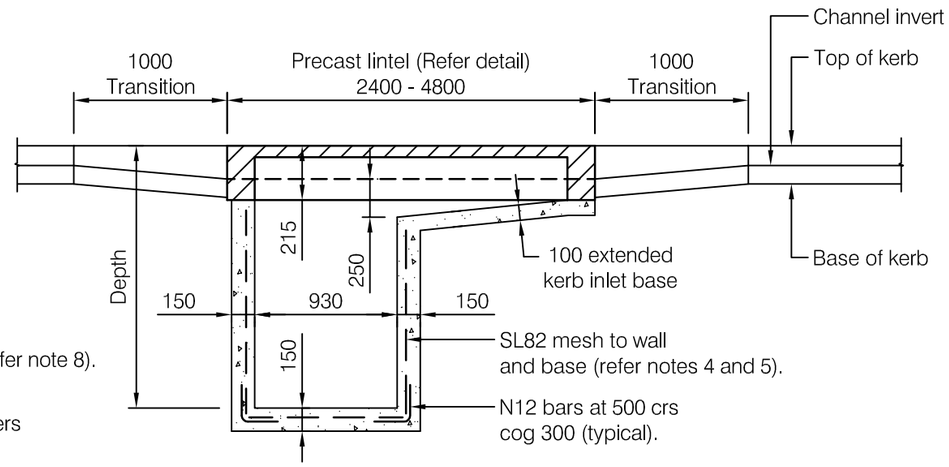


SECTION C

PRECAST LINTEL DETAIL



SECTION B



SECTION A

GRATED KERB INLET PIT

NOTES:-

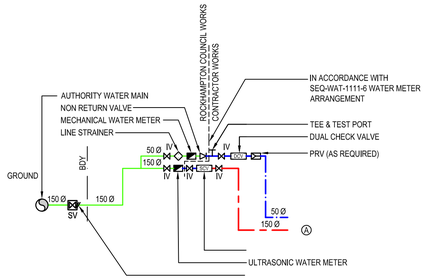
1. Concrete to precast lintel to be grade N 32. All other concrete to be grade N25 in accordance with AS 1379 and AS 3600. Minimum cover to be 40 mm.
2. In areas where any part of the pit is below 1.800m A.H.D. all concrete shall be grade N32 in accordance with AS 1379 and AS 3600 and cover increased to 65mm. Thickening of concrete section may be required.
3. Lifting anchors to be "Swiftlift" or equivalent, 1.3 tonne galvanized and installed to manufacturers specification.
4. For pit depths less than 1.50m wall and base reinforcing may be omitted.
5. For pit depths greater than 2.0m wall and base reinforcing to be increased to SL81 mesh. Pits greater than 2.5m depth shall be engineer designed and specifically detailed.
6. Step irons shall be provided to all pits with a depth greater than 1.5m.
7. Pipes shall enter pits through a single wall face. Pipes are not permitted to enter through the corner of the pit.
8. 2m long 100Ø subsoil drain to be provided to the sand bedding of all U/S pipes.
9. All dimensions in millimetres.

A ORIGINAL ISSUE	12/3/04
REVISIONS	DATE

FNQROC

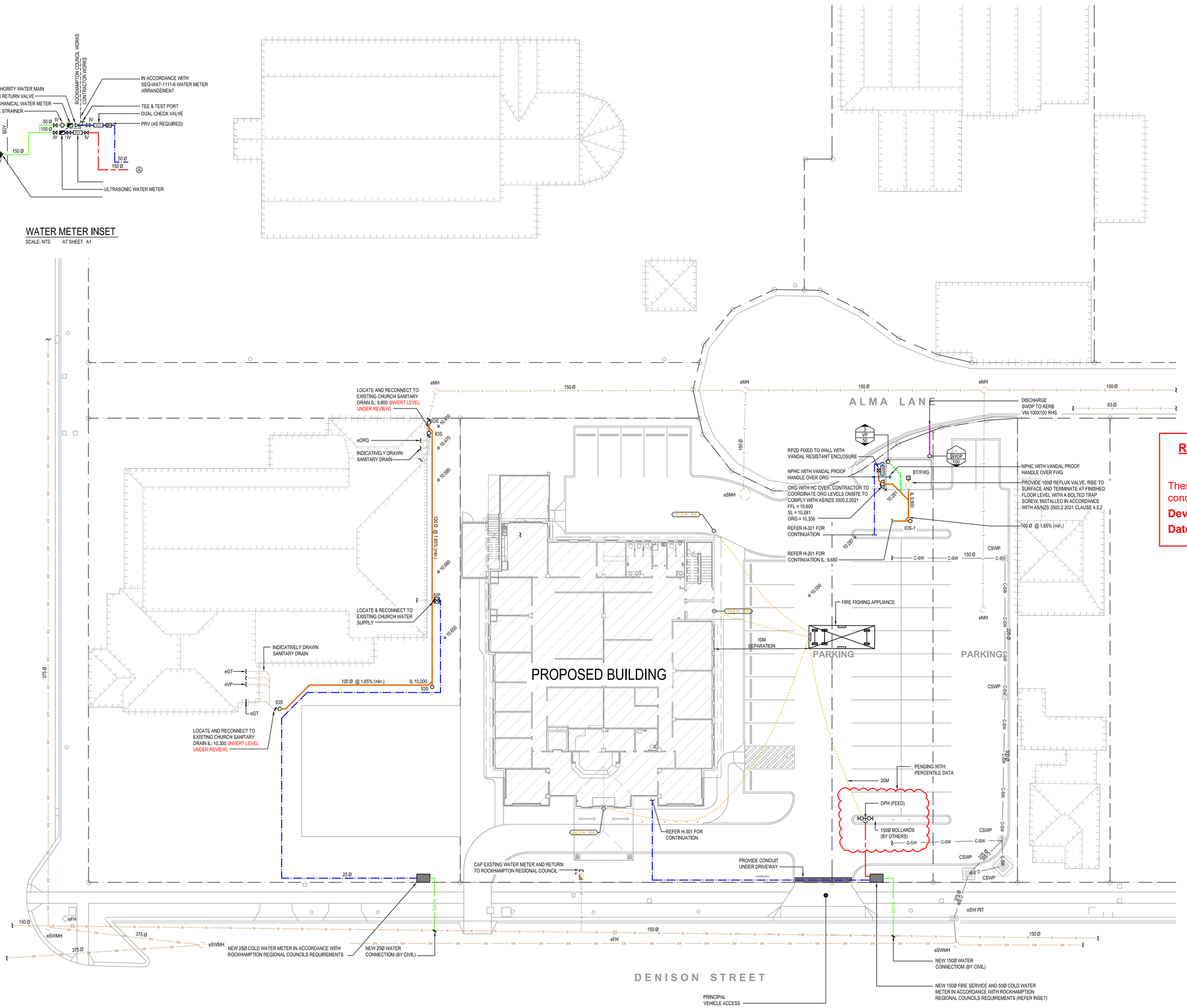
GRATED KERB INLET PIT
PIPE DIA ⩽ 600mm

Standard Drawing
S1050
A



WATER METER INSET

SCALE: NTS AT SHEET A1



NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

NOTE: EXISTING SERVICES HAVE BEEN DRAWN FROM HISTORICAL RECORDS AND ARE INDICATIVE ONLY. CONTRACTOR TO CONFIRM THE LOCATION, DIAMETER & INVERT LEVELS OF ALL EXISTING SERVICES ON-SITE BEFORE COMMENCING ANY ASSOCIATED WORKS & ALLOW ALL ASSOCAITED COSTS

NOTE: ALL FIXTURES, APPLIANCE & APPARATUS CONNECTED TO THE PLUMBING SYSTEM ARE REQUIRED TO HAVE WATERMARK CERTIFICATION OR COMPLY WITH THE PLUMBING CODE OF AUSTRALIA PART A2

NOTE: ALL UNDERGROUND SERVICES SHALL BE LOCATED ON SITE PRIOR TO COMMENCEMENT OF ANY WORKS

NOTE: STORMWATER DRAINAGE LEVLES MAY REQUIRE COORDINATING WITH FINAL FSL'S TO ACHIEVE MINIMUM DEPTH OF COVER. THE CONTRACTOR SHALL COORDINATE ON SITE PRIOR TO ANY ASSOCIATED WORKS.

NOTE: CIVIL SERVICES SHOWN ARE INDICATIVE ONLY. REFER CIVIL ENGINEERS PLANS FOR EXACT DETAIL

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/135-2024

Dated: 1 April 2025

DATE	STAGE	DESCRIPTION	REV. No.	AUTH.
06.02.25	PCP/C	PLUMBING COMPLIANCE PERMIT/CONSTRUCTION	03	AF
02.02.25	DD	DESIGN DEVELOPMENT	02	AF
28.01.25	SD	SCHEMATIC DESIGN ISSUE	01	AF

ARCHITECT / BUILDING DESIGNER
Shop 5/10 Denham St, Rockhampton, QLD 4700
PO Box 3371, Red Hill, North Rockhampton, QLD 4701
Phone: 0749 222880
Email: mail@designtek.com.au

CLIENT
DESIGNTEK

HYDRAULIC CONSULTANT
MRP HYDRAULIC & FIRE SERVICES CONSULTANTS PTY LTD
■ BRISBANE □ SUNSHINE COAST
A: Unit 1/83 Annerley Rd, Woolloongabba, QLD PO Box 8143, Woolloongabba, QLD, 4102
P: (07) 3452 1400
E: admin@mrp.com.au
W: mrp.com.au
BSA: 1137134 ABN: 23 126 270 326 QBCC: 1137134

VERIFIED BY: ANDREW GARDEN — DATE: 07.02.25
DESIGNER: AIDAN FLANNERY — DATE: 07.02.25

PROJECT DESCRIPTION & ADDRESS
ACCESS RECREATION - NEW OFFICES
189 & 197 DENISON ST, ROCKHAMPTON CITY QLD 4700
LOT 234 ON CP892530, 304 & 303 ON RP905533

HYDRAULIC SERVICE SHEET DESCRIPTION
SITE PLAN
HYDRAULIC SERVICES

ISSUED FOR APPROVALS

PROJECT NUMBER	SCALE	SHEET SIZE
24-0270	1:200	A1

SHEET NUMBER	REVISION NUMBER
H -103	03