

RPD

LOT 73 on LN569
PARISH: GRACEMERE
COUNTY: LIVINGSTON



COUNCIL: ROCKHAMPTON REGIONAL

SCHEDULE OF LOT AREAS

LOT 1

AREA: - 8,575m²
(INCLUDES EASEMENT A & B)

LOT 2

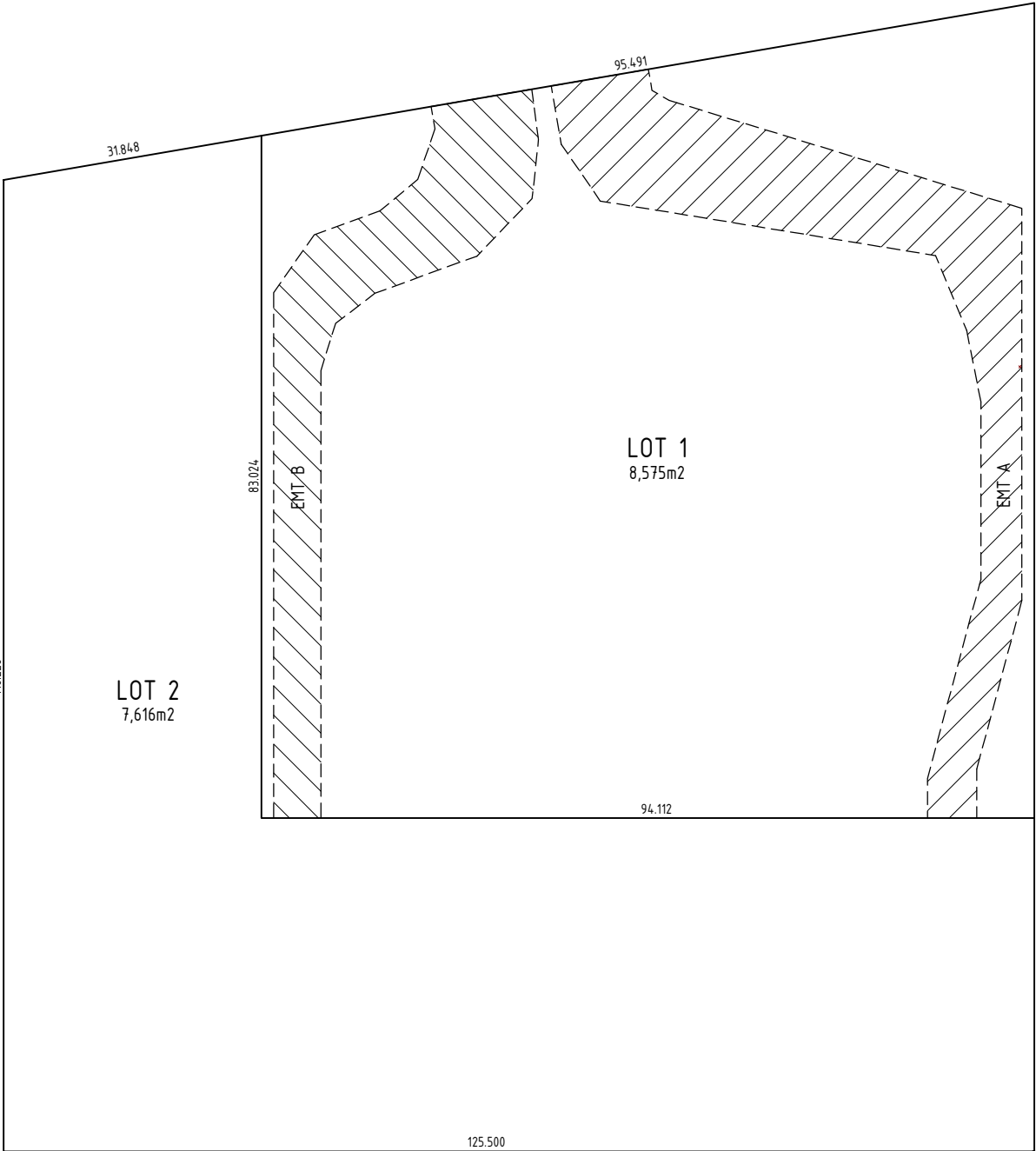
AREA: - 7,616m²

EASEMENT A

AREA: - 1,035m²
BURDENS LOT 1 IN FAVOUR OF LOT 2

EASEMENT B

AREA: - 771m²
BURDENS LOT 1 IN FAVOUR OF LOT 2



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/75-2023

Dated: 23 November 2023

Consulting Engineer



VERVE
BUILDING DESIGN CO.

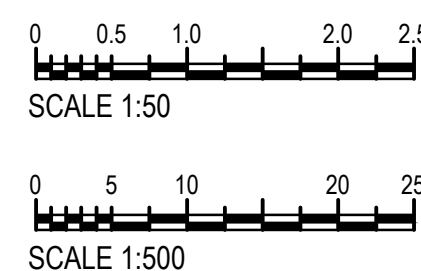
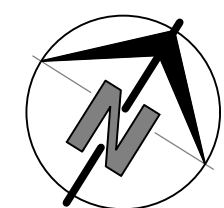
BUILDING DESIGNERS LICENCE No. 1002212
OFFICE 2, LEVEL 1, 488 LUTWYCHE ROAD, LUTWYCHE QLD 4030 E: info@vervebd.com.au PH: 07 3867 0942

imagine create deliver

- commercial / industrial / retail
- fast food restaurant design
- travel centre / service stations
- project concept to completion

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Revision and approvals					Project Description		Drawing Title	
Code	Date	Dm	Description	Dm	PROPOSED HIGHWAY SERVICE CENTRE 765 CAPRICORN HWY, GRACEMERE		PROPOSED SUBDIVISION PLAN	
B	02.11.2023	GN	ISSUE IN RESPONSE TO COUNCIL LR					
A	30.05.2023	GN	PRELIMINARY ISSUE		Scale 1:400@A1 / 1:800@A3	Approved	Drawing Number	Revision
					Drawn	Issued	22065-DA07	B



LAYOUT PLAN
SCALE 1:500

REV.	DATE	DESCRIPTION	BY	APP.
C	09.08.23	ISSUE FOR APPROVAL	JT	AvT
B	31.05.23	ISSUE FOR APPROVAL	JT	AvT
A	25.05.23	ORIGINAL ISSUE	JT	AvT

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Ph: 07 5897 9142
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SCALE:	AS SHOWN
SHEET SIZE:	A1
DATUM:	AHD
CHECKED:	ZL
APPROVED:	

DRAWN:	JT
DESIGN:	ZL
APPROVED:	

PROJECT:	PROPOSED HIGHWAY SERVICE CENTRE 765 CAPRICORN HWY, GRACEMERE QLD 4702
DRAWING TITLE:	PRELIMINARY SERVICES LAYOUT PLAN

JOB No.:	22368
DRAWING No.:	P300 PRELIMINARY
REV.:	C

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS

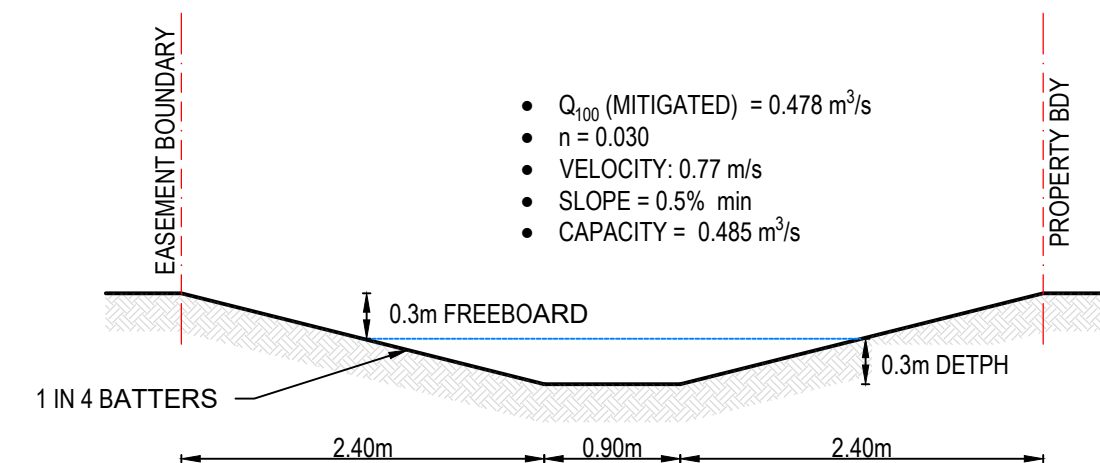
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Development Permit No.: D/75-2023
Dated: 23 November 2023

LEGEND

---	EXISTING PROPERTY BOUNDARY
---	EXISTING EASEMENT BOUNDARY
---	EXISTING CONTOUR - MAJOR
---	EXISTING CONTOUR - MINOR
---	DEMOLISHED BUILDING
---	EXISTING BUILDING
---	EXISTING KERB AND CHANNEL
---	EXISTING KERB
---	EXISTING RETAINING WALL
---	EXISTING STORMWATER DRAINAGE
---	EXISTING ROOFWATER DRAINAGE
---	EXISTING SEWER
---	EXISTING WATER
---	EXISTING ELECTRICAL
---	EXISTING ELEC. OVERHEAD
---	EXISTING COMMUNICATIONS
---	ABANDON EXISTING SERVICE
---	PROPERTY BOUNDARY
---	EASEMENT BOUNDARY
---	CONTOUR - MAJOR
---	CONTOUR - MINOR
---	BUILDING
---	EARTHWORKS TOP OF BATTER
---	EARTHWORKS BOTTOM OF BATTER
---	RETAINING WALL
---	SEDIMENT FENCE
---	FENCE - TYPE 1
---	KERB AND CHANNEL
---	KERB
---	STORMWATER DRAINAGE
---	ROOFWATER DRAINAGE
---	SUBSOIL DRAIN
---	SEWER
---	WATER
---	EXISTING SURFACE LEVEL (ESL)
+	FINISHED SURFACE LEVEL (FSL)
x	BULK EARTHWORKS LEVEL (BEL)

LEGEND - HATCH

---	EASEMENT
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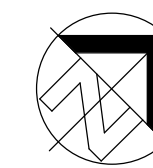
TYPICAL GRASS SWALE

SCALE 1:50

- Q_{100} (MITIGATED) = 0.478 m³/s
- n = 0.030
- VELOCITY: 0.77 m/s
- SLOPE = 0.5% min
- CAPACITY = 0.485 m³/s

CAPRICORN HIGHWAY

RAIL - BLACKWATER SYSTEM



DA ISSUE

THIS DRAWING IS NOT
FOR CONSTRUCTION

PROPERTY DESCRIPTION

RPD: LOT 73 on LN569
PARISH: GRACEMERE
COUNTY: LIVINGSTON
COUNCIL: ROCKHAMPTON REGIONAL

DEVELOPMENT ASSESSMENT

TOTAL SITE AREA - 16,190m²
LANDSCAPED AREA (APPROX) - 12,445m²
BUILDING SITE COVER (APPROX) - 10%
(INCLUDES ALL ROOFED AREAS)

IMPERVIOUS AREAS

PRE-DEVELOPMENT (APPROX) - 1,688m²

EXISTING BUILDING AREAS

EXISTING BUILDINGS (APPROX) - 1,628m²



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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CONSULTING ENGINEER



- ☐ commercial / industrial / retail
- ☐ fast food restaurant design
- ☐ travel centre / service stations
- ☐ project concept to completion

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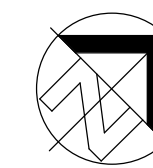
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Revision and approvals				
Rev	Date	Drn	Description	Appr
P1	23.05.2023	TM	PRELIMINARY ISSUE FOR COMMENT	GN
A	30.05.2023	SD	ISSUE FOR DA	GN

Project Description	
PROPOSED HIGHWAY SERVICE CENTRE	
765 CAPRICORN HWY, GRACEMERE	
Scale @A1 1 : 400	Date MAY 2023
Drawn TM	Approved By GN

Drawing Title	
EXISTING SITE PLAN	
Job Number - Drawing Number 22065	Revision A



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COUNTY: LIVINGSTON
COUNCIL: ROCKHAMPTON REGIONAL

DEVELOPMENT ASSESSMENT

TOTAL SITE AREA - 16,190m²
DEVELOPED SITE AREA - 8,575m²
(BASIS OF STATISTICS BELOW)
SURPLUS AREA - 7,615m²
LANDSCAPED AREA - 1,247m²
BUILDING SITE COVER - 8.6%
(INCLUDES ALL ROOFED AREAS)

IMPERVIOUS AREAS

PRE-DEVELOPMENT (APPROX) - 1,688m²
POST-DEVELOPMENT - 7328m²

BUILDING AREAS

T1 - SERVICE STATION - 292m²
T2 FOOD & DRINK OUTLET - 95m²

EXTERNAL STRUCTURES

CAR FUEL FORECOURT - 184m²
(UNENCLOSED BUILDING FOOTPRINT)

TRUCK FUEL FORECOURT - 169m²
(UNENCLOSED BUILDING FOOTPRINT)

T1 REFUSE ENCLOSURE - 21m²

CAR PARKING

PARKING REQUIRED - 16
PARKING PROVIDED - 19
TRUCK PARKING - 4
CAR REFUELING POSITIONS - 6
TRUCK REFUELING POSITIONS - 3
(DOUBLE SIDED REFUELING)

ROCKHAMPTON REGIONAL COUNCIL

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Dated: 23 November 2023

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☐ travel centre / service stations
☐ project concept to completion

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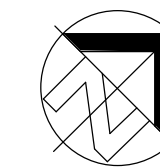
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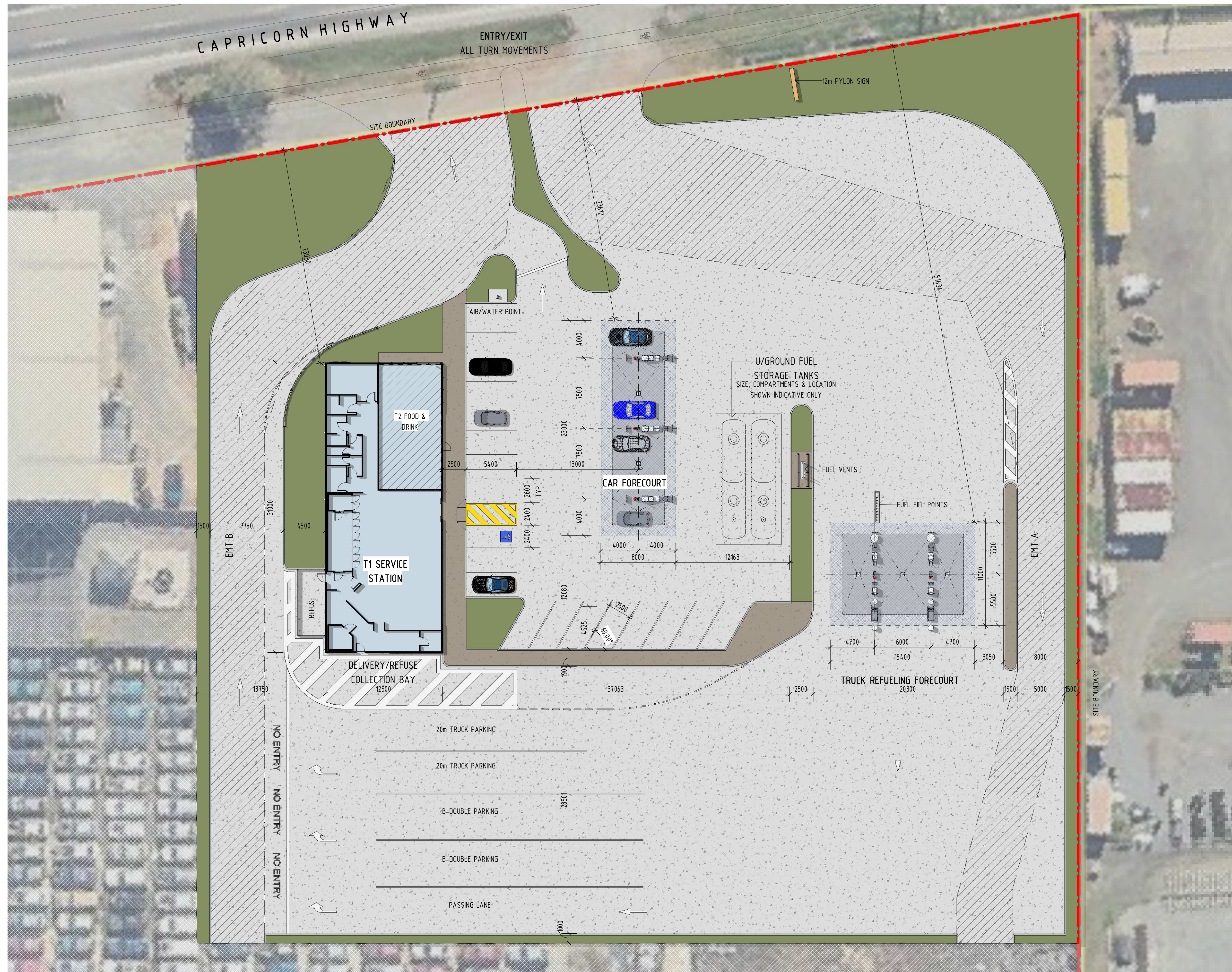
Revision and approvals					
Rev	Date	Drn	Description		
P1	23.05.2023	TM	PRELIMINARY ISSUE FOR COMMENT		
A	30.05.2023	SD	ISSUE FOR DA		
B	01.11.2023	BM	RESPONSE TO COUNCIL I.R.		

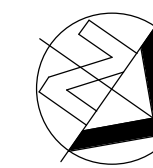
Project Description	
PROPOSED HIGHWAY SERVICE CENTRE	
765 CAPRICORN HWY, GRACEMERE	
Scale @A1 1 : 400	Date MAY 2023
Drawn TM	Approved By GN

Drawing Title	
OVERALL SITE PLAN	
Job Number - Drawing Number	Revision
22065 DA02	B



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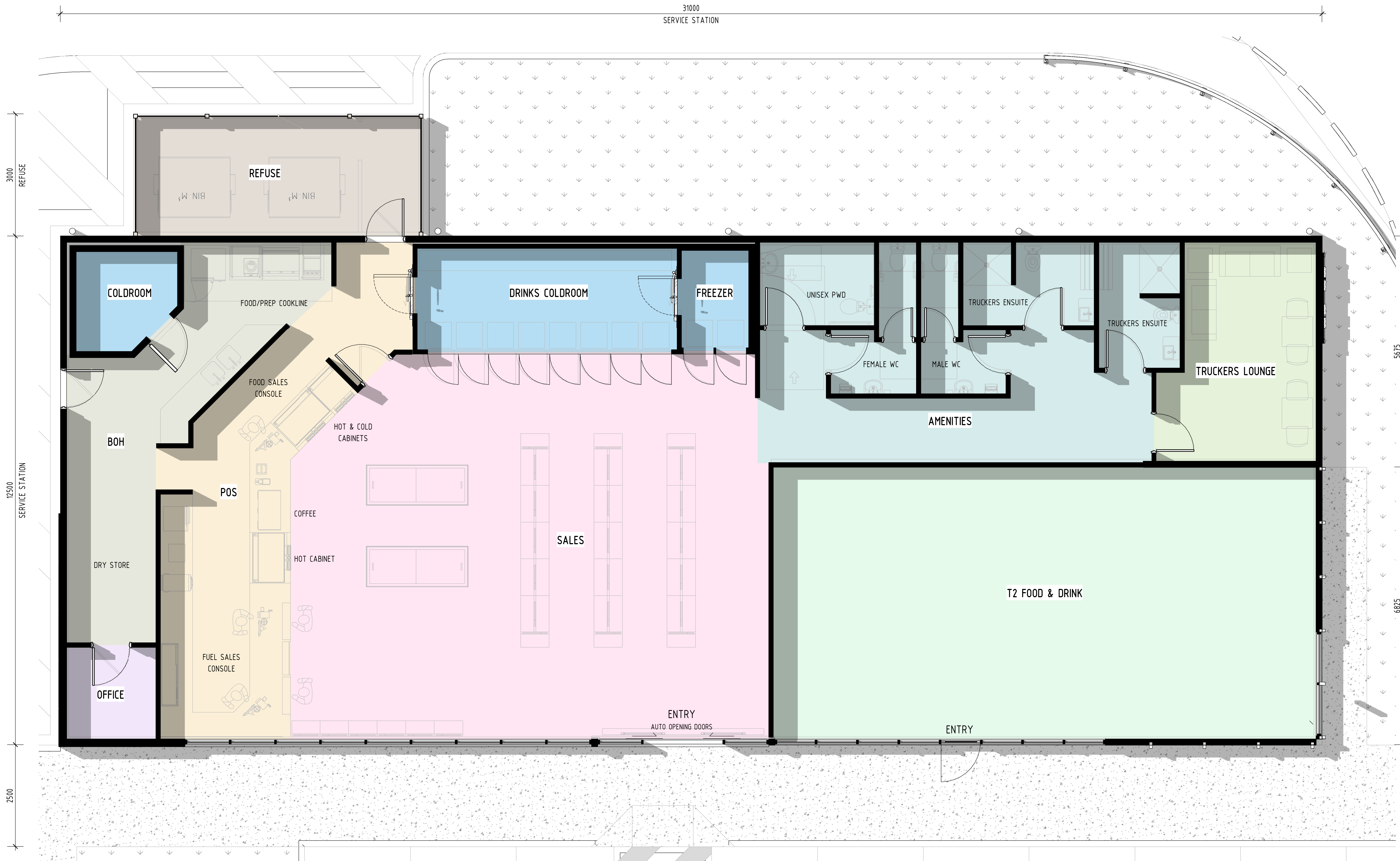


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- AMENITIES
- BOH
- COLDROOM
- DRINKS COLDROOM
- FREEZER
- OFFICE
- POS
- REFUSE
- SALES
- T2 FOOD & DRINK
- TRUCKERS LOUNGE

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS

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Development Permit No.: D175-2023
Dated: 23 November 2023

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P1	23.05.2023	TM	PRELIMINARY ISSUE FOR COMMENT	GN
A	30.05.2023	SD	ISSUE FOR DA	GN

Project Description	
PROPOSED HIGHWAY SERVICE CENTRE	
765 CAPRICORN HWY, GRACEMERE	
Scale @A1 1: 50	Date MAY 2023
Drawn TM	Approved By GN

Drawing Title	
FLOOR PLAN	
Job Number - Drawing Number	Revision
22065	DA04 A

LANDSCAPE CONCEPT PLAN



- A THREE-TIER PLANTING**
Provide three-tier planting consisting of trees, shrubs and groundcovers to frontage to assist in building presentation to the streetscape and provide visual and climatic amenity. Three-tier landscape treatment to be as per A06.1 of Rockhampton Region Planning Scheme - Part 9.3.4 Landscape code.
- 1 LARGE FEATURE SHADE/ SCREEN TREE**
Large canopied rounded tree species to provide shade over the frontage, provide visual amenity and landscape softening of the proposed service station; Refer Proposed Planting Schedule (ie: *Cupaniopsis anacardioides*, *Flindersia australis*, *Xanthostemon chrysanthus*)
- 2 COLUMNAR SCREEN TREE**
Columnar planting to assist in providing vertical softening of the proposed development to adjoining properties; Refer Proposed Planting Schedule (ie: *Buckinghamia celsissima*, *Elaeocarpus eumundii*)
- 3 SCREEN PLANTING**
Planting to provide visual amenity and privacy screening; Refer Proposed Planting Schedule (ie: *Syzygium australe* Elegance)
- 4 SHRUBS AND GROUNDCOVERS**
Mass planting to large areas to assist in building presentation to the streetscape and to provide visual amenity; Refer Proposed Planting Schedule

- EXISTING FENCE**
As taken from Survey drawings
- PROPOSED FENCE**
1800mm high timber screen fence
- PROPOSED GARDEN EDGE**
To future detail

ROCKHAMPTON REGIONAL COUNCIL
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Dated: 23 November 2023

NEARMAP DATED: 14/04/23 (PHOTOMANIPULATED)



CODE	SPECIES	COMMON NAME	SIZE**	HEIGHT(m)	WIDTH (m)
PROPOSED LARGE FEATURE SHADE/ SCREEN TREES					
1.1	Cupaniopsis anacardioides	Tuckeroo	45L	15	10
1.2	Flindersia australis	Crows Ash	45L	30	12
1.3	Xanthostemon chrysanthus	Golden Penda	45L	12	8
PROPOSED COLUMNAR TREES					
2.1	Buckinghamia celsissima	Ivory Curl	45L	8	4
2.2	Elaeocarpus eumundii	Smooth Leaved Quandong	45L	8	4
PROPOSED SCREEN PLANTING					
3.1	Syzygium australe Elegance	Lillypilly	300mm	3	1.5
**PLANT CONTAINER SIZE:					
45L	45 Litre container stock min	Min. height at time of planting: 1.9-2.3m			
300mm	300mm dia minimum pot size				

The spacing of plants shown on plan have been derived as a compromise between growth rate, anticipated size, and the ability to provide a good vegetative cover within a reasonable space of time.

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CODE	SPECIES	COMMON NAME	SIZE**	HEIGHT(m)	WIDTH(m)
PROPOSED SHRUBS AND GROUNDCOVERS					
4.1	Allamanda cathartica Sunee	Dwarf yellow Allamanda	200mm	1	1.2
4.2	Crinum pedunculatum	Swamp Lily	200mm	2	2
4.3	Evolvulus pilosus Blue Sapphire	Blue Sapphire	200mm	0.3	1
4.4	Gardenia jasminoides Radicans	Creeping Gardenia	140mm	0.5	1-2
4.5	Ixora chinensis Prince of Orange Dwarf	Ixora Dwarf	200mm	1	1.2
4.6	Liriope muscari Evergreen Giant	Liriope	140mm	0.8	0.8
4.7	Melaleuca linariifolia Claret Tops	Bottlebrush	200mm	1.5	1
4.8	Myoporum parvifolium Yareena	Creeping Boobialla	140mm	0.1	1
4.9	Xanthostemon chrysanthus Little Goldie	Dwarf Golden Penda	200mm	1	0.8

**PLANT CONTAINER SIZE:

200mm	200mm dia minimum pot size
140mm	140mm dia minimum pot size

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ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

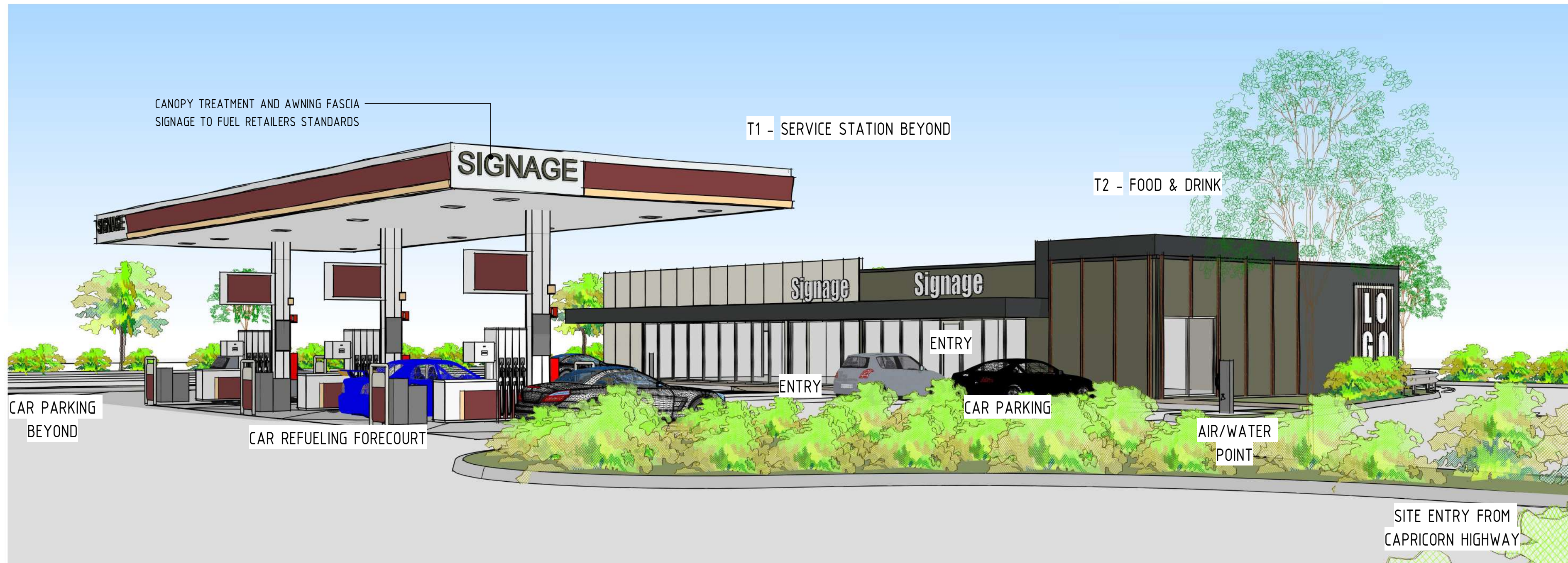
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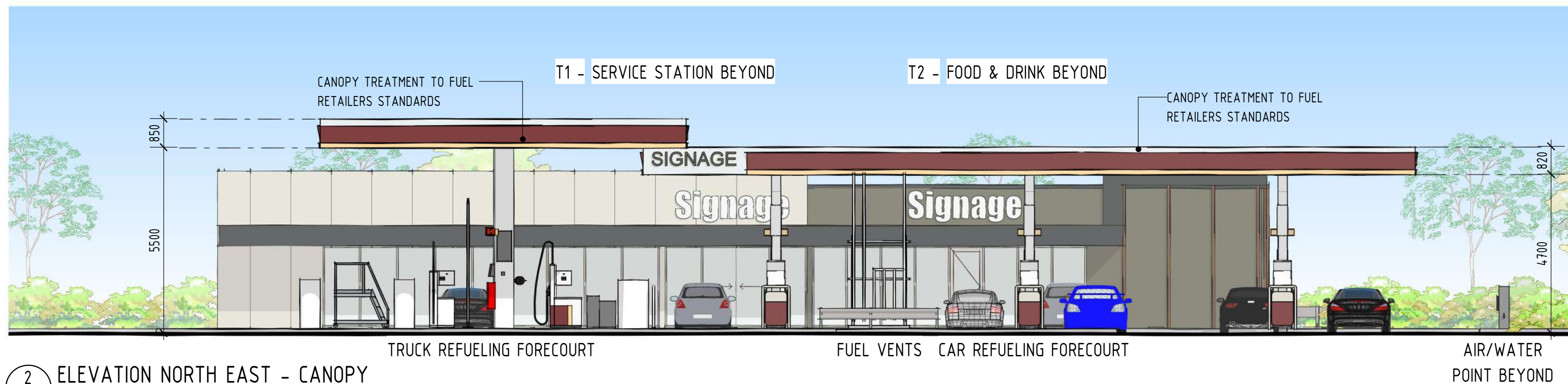
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NOTE:

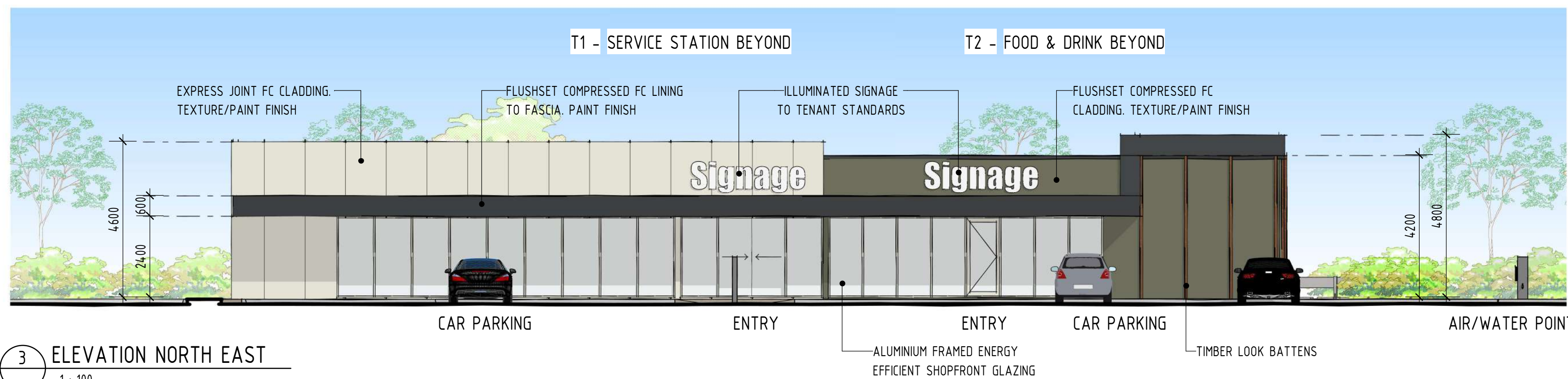
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1 3D PERSPECTIVE 1



2 ELEVATION NORTH EAST - CANOPY
1 : 100



3 ELEVATION NORTH EAST
1 : 100

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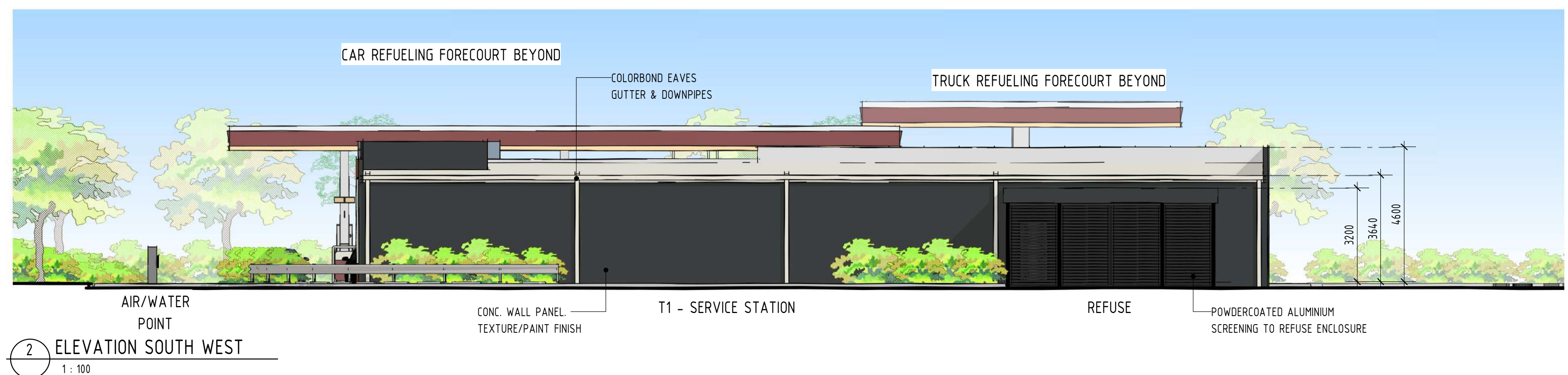
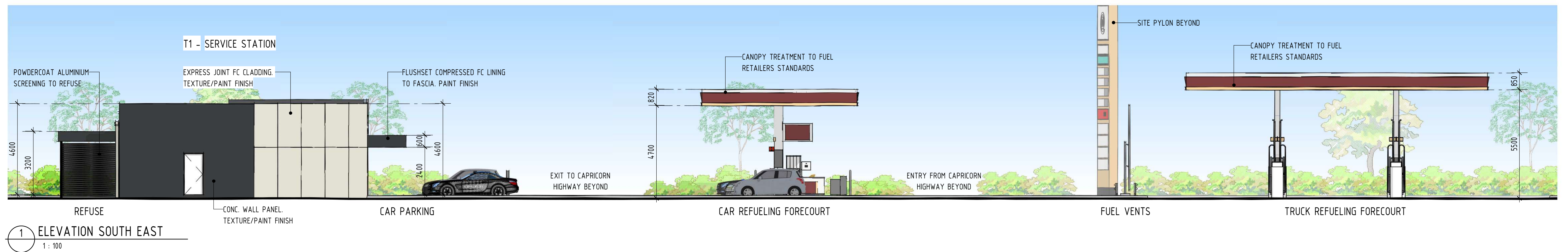
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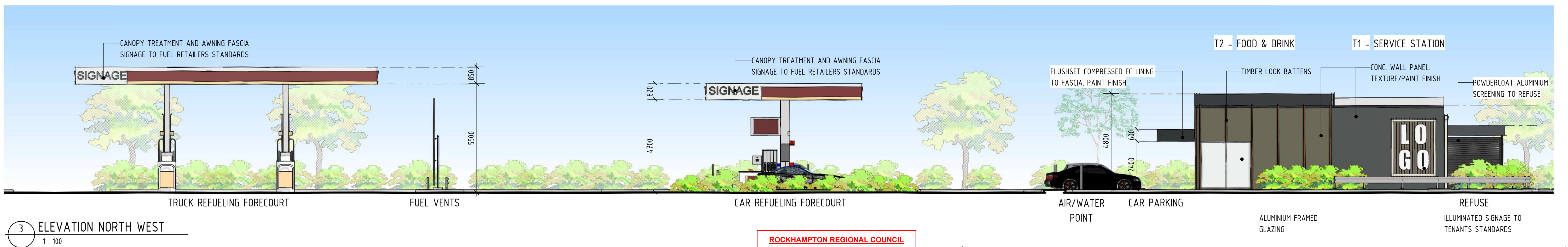
Project Description	
PROPOSED HIGHWAY SERVICE CENTRE	
765 CAPRICORN HWY, GRACEMERE	
Scale @A1 As indicated	Date MAY 2023
Drawn TM	Approved By GN

Drawing Title	
BUILDING ELEVATIONS & PERSPECTIVES	
Job Number - Drawing Number 22065	Revision A



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ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS

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Dated: 23 November 2023

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- ☐ commercial / industrial / retail
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- ☐ travel centre / service stations
- ☐ project concept to completion

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Revision and approvals				
Rev	Date	Drn	Description	Appr
P1	23.05.2023	TM	PRELIMINARY ISSUE FOR COMMENT	GN
A	30.05.2023	SD	ISSUE FOR DA	GN

Project Description	
PROPOSED HIGHWAY SERVICE CENTRE	
765 CAPRICORN HWY, GRACEMERE	
Scale @A1 As indicated	Date MAY 2023
Drawn TM	Approved By GN

Drawing Title	
BUILDING ELEVATIONS & PERSPECTIVES	
Job Number - Drawing Number	Revision
22065	DA06
	A



**765 Capricorn Highway,
Gracemere QLD 4702**
Engineering Report &
Stormwater Management Plan

August 2023
Project No.: 22368
Revision No.: C

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS

These plans are approved subject to the current
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Dated: 23 November 2023

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1. Introduction

vT Consulting Engineers has been commissioned by Development Holdings Pty Ltd to prepare this engineering services report and stormwater management plan. The development is located at 765 Capricorn Highway, Gracemere QLD 4702. The site locality is illustrated in Figure 1.1. This report is being submitted to support a Development Application for a Material Change of Use (Service Station) and Reconfiguring a Lot (1 lot into 2 lots subdivision and 2 access easements) for Rockhampton Regional Council’s consideration.

Project site is proposed to be subdivided from 1 lot into 2 lots. Subsequently, proposed lot 2 will be subjected to material change of use and proposed to be developed into a service station.

Refer attached Appendix A for proposed layout plans and details.

The following report will detail civil engineering requirements for the development.

Street Address	765 Capricorn Highway, Gracemere QLD 4702
Real Property Description	Lot 73 on LN569
Total Site Area	8,575 m ²
Proposed Use	Proposed Subdivision and Material change of use
Local Authority	Rockhampton Regional Council



Figure 1.1 Site Layout Plan (Nearmap)

a. Existing Land Use

The site is situated in an industrial and commercial area fronting Capricorn Highway. The development is currently occupied by few commercial units in front of the site and a large retail store on the west side of the lot. The rear of the site is vacant, and it is bounded by industrial and commercial units on all other sides. The rest of site is grassed with few trees and shrubs.

The existing commercial units and structures are to be demolished and removed.

2. Erosion and Sediment Control

Using the International Erosion Control Association's (IECA) Erosion Hazard Assessment Procedure AustIECA, 2016a), we believe the proposed development site represents an erosion risk as trigger values resulted in a total score of 17 (Refer Appendix B for Erosion Hazard Assessment Form). IECA requires that a preliminary Erosion and Sediment Control Plan (ESCP) be submitted to the local government for approval during the planning phase if the development obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.

The construction contractor is responsible for ensuring that soil and debris does not leave the site as well as the confines of the construction zone and is not deposited on external roads or existing in-use areas due to the proposed earthworks and construction activity.

Acid Sulphate Soils

The local council is listed in the Glossary (Acid Sulphate soil affected area) in State Planning Policy July 2017, indicating that this development application may require compliance with the State Planning Policy July 2017 acid sulphate soils development objectives.

Acid sulphate soil testing is typically conducted in areas with reduced levels of less than 5.0m Australian Height Datum (AHD) as stated in State Planning Policy July 2017. This policy also states that developments below 20.0m AHD that involve a Material Change of Use or operational works are required to be assessed against the State Planning Policy July 2017 acid sulphate soils development objectives. As the lowest point on this site is an approximate level of RL 20.19, we believe that there is no possibility of acid sulphate soil being present and therefore testing would not be likely.

Figure 2.1 provides a visual aid to determining assessable development.

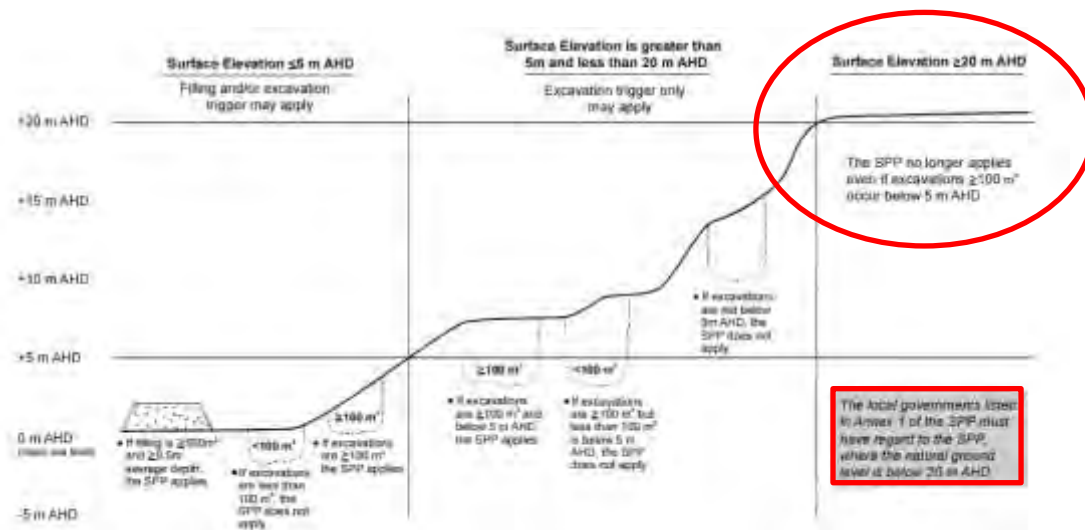


Figure 2.1 Acid Sulphate Soils assessment diagram
(Adapted from SPP Water Quality State Interest Guideline 2016)

As the proposed excavations are not expected to be below RL5.0m AHD, the State Planning Policy does not apply.

The requirements for Acid Sulphate Testing will be confirmed by a geotechnical engineer prior to the detailed design stage of this proposed development.

Land Disturbing Activities

Important causes/issues of erosion for this site would consist of the following:

- Precipitation and consequent run-off
- Stripping and removal of topsoil
- Removal of fill
- Other earthwork operations
- Heavy vehicle use on site
- Wind erosion

The proposed development is a short construction period which will be programmed so that the shortest period of time elapses between ground cover removal and restoration.

Erosion and Sediment Control Measures

Sediment control filter fabric will be securely placed around the downstream boundaries of the construction site. This will ensure sediment is trapped before being released into the catchment. Refer Appendix C.

An ESC measure will be provided at any vehicular access points to the site. Construction and maintenance details are given in Appendix C. A temporary construction entrance will be provided from the adjacent roads for access during construction.

A filter sock sediment trap will be utilized on all downstream stormwater inlets. Refer Appendix C for construction and maintenance details.

No clearing will be undertaken unless preceded or accompanied by installation of adequate run-off and sediment control measures, as described above.

Following practical completion of the project a minimum of 70% coverage of all soil with ground cover (i.e., topsoiling and seeding) will be provided within 30 calendar days.

During the demolition and construction phases, spraying of water will be used with care to act as a dust suppression method.

Monitoring and Maintenance Programs

Water discharge from the site will adhere to a total suspended solid content of less than 50 milligrams per litre and a pH range of between 6.5 and 8.5 at all times. If the pH of the flocculated water is not achieved, then pH adjustments will be required. This could possibly be done by a dosing of lime.

Site personnel will inspect all erosion and control measures at least at the following frequencies:

- Daily during construction works,
- Weekly when construction works are not happening,
- Within 24 hours of expected rain, and
- Within 18 hours of an impacting rainfall event.

All erosion and sediment control measures that have an order of efficiency below 75% will be corrected by the end of that working day.

3. Earthworks

For the purpose of this report, proposed development earthworks will be conducted for constructing the new proposed building platform. Excavation on site will be required for the service trenches. Any excess cut will need to be removed from the site by the contractor.

A geotechnical report will be prepared for the site during the detailed design stage.

4. Roadworks

The proposed development fronts onto Capricorn Highway. New crossovers will be provided as shown on the proposed layout plans. External roadworks are not proposed, and no new road is to be constructed for this development.

5. Stormwater Drainage

a. Existing Stormwater Drainage

Figure 5.1 below shows the existing stormwater drainage in the area as obtained from Rockhampton Regional Council. As shown in Council mapping, there are two culvert pipes located in front of the site. The existing site stormwater flows towards the rear of the site, towards a rail corridor which discharges to the east of the site.

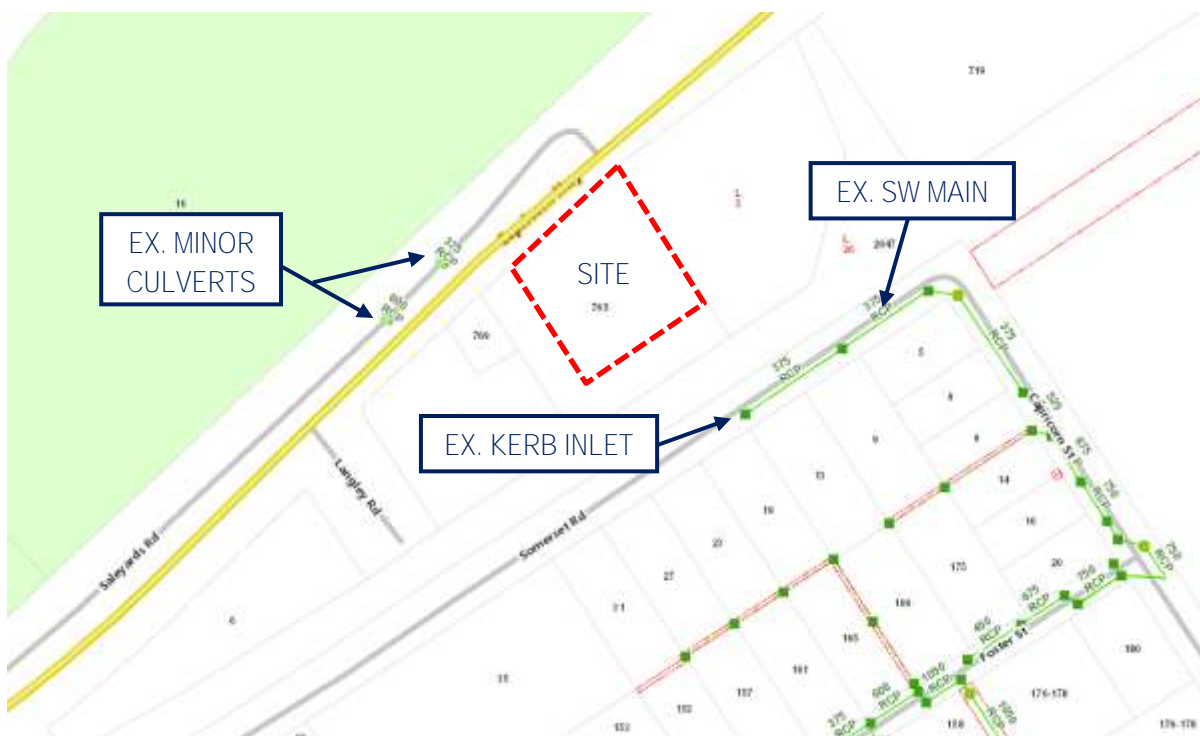


Figure 5.1 RRC Stormwater Layout Map

b. Proposed Stormwater Drainage

It is proposed for the development to construct new stormwater lines within the site where the stormwater runoff from the proposed development will be discharged. An underground detention tank is also proposed to mitigate developed flows and to cater for storage of stormwater quality improvement devices. The mitigated flows will be piped into a new swale to be constructed south of the development. Stormwater conveyed by the swale will be discharged south of the site, into the railway corridor. Discharge at the south boundary will occur via a level spreader, which will ensure that runoff enters the downstream property as sheet flow, as per the existing flow regime.

Refer to attached Appendix A for proposed layout plans and details.

c. Stormwater Quality Management

State Planning Policy

The State Planning Policy (SPP) applies for stormwater quality management and management of new or expanded non-tidal artificial waterways applies to development that is outlined below in Table 5.1.

SPP PART E: INTERIM DEVELOPMENT ASSESSMENT REQUIREMENTS. STATE INTEREST – WATER QUALITY	YES / NO
<i>Material change of use for urban purposes that involves a land area greater than 2500m² that:</i>	
<i>will result in an impervious area greater than 25% of the net developable area</i>	NO
<i>Will result in 6 or more dwellings</i>	NO
<i>Reconfiguring a lot for urban purposes that involves a land area greater than 2500m² and will result in six or more lots:</i>	NO
<i>Operational works for urban purposes that involve disturbing more than 2500m² of land</i>	YES

Table 5.1 Water Quality Objectives

The proposed development triggers one of the applicable items in the above Table 5.1, therefore the SPP is applicable, and compliance is expected by the local government authority.

d. MUSIC Model

The software program Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6 was used to assess pollutant generation and the performance of the stormwater treatment measures for the proposed development. Selection and testing of stormwater management options was undertaken in accordance with MUSIC Modelling Guidelines prepared by Water by Design (2018).

The catchment was further split to include pavement areas, road areas and landscaped areas in accordance with the MUSIC Modelling Guidelines prepared by Water by Design (2018).

Music Model Parameters

The split catchment parameters used as the MUSIC Pollutant Export Parameters are shown below in Table 5.2 and were derived from Table 3.9 of the MUSIC Modelling Guidelines prepared by Water by Design (2018).

FLOW TYPE	SURFACE TYPE	TSS LOG ¹⁰ VALUES		TP LOG ¹⁰ VALUES		TN LOG ¹⁰ VALUES	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Baseflow Parameters	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Road	0.78	0.39	-0.60	0.50	0.32	0.30
	Ground	0.78	0.39	-0.60	0.50	0.32	0.30
Stormflow Parameters	Roof	1.30	0.38	-0.89	0.34	0.37	0.34
	Road	2.43	0.38	-0.30	0.34	0.37	0.34
	Ground	2.16	0.38	-0.39	0.34	0.37	0.34

Table 5.2 Source Node MUSIC Pollutant Export Parameters

The parameters used as the MUSIC Rainfall-Runoff Parameters are shown in the table below, and were derived from Appendix A, Table A1.2 of the MUSIC Modelling Guidelines prepared by Water by Design (2018).

PARAMETER	COMMERCIAL
Rainfall Threshold (mm)	1
Soil Storage Capacity (mm)	18
Initial Storage (% Capacity)	10
Field Capacity (mm)	80
Infiltration Capacity Coefficient - a	243
Infiltration Capacity Exponent - b	0.6
Initial Depth (mm)	50
Daily Recharge Rate (%)	0
Daily Baseflow Rate (%)	31
Daily Deep Seepage Rate (%)	0

Table 5.3: MUSIC Rainfall-Runoff Parameters

Music Model Treatment Parameters

An approved stormwater treatment option is provided below. All proposed products are to be installed, operated, and maintained in accordance with the manufacturer's specifications.

An alternative proprietary system may be proposed during the detailed design of the project, subject to certification by the manufacturer and a Registered Professional Engineer of Queensland (RPEQ) that the alternative system meets the Rockhampton Regional Council and SPP requirements.

Treatment Option 1 - SPEL

The proprietary system is designed to treat the stormwater runoff by filtering the runoff through 13No. SPEL Stormsacks and 17No. SPEL filter cartridges (SF.15-EMC) in a SPEL Precast SPELVault Rectangle Tank in accordance with the manufacturers specifications. The MUSIC model parameters for Treatment Option 1 have been provided by SPEL.

Refer to Appendix D for SPEL Filter Operation and Maintenance Manual.

e. MUSIC Model Results

Using the MUSIC software, the treatment train for the catchment areas was designed to comply with the water quality objectives (WQO). It was determined that the water quality objectives for the whole proposed development were met as shown in the table below:

POLLUTANT TYPES	WQO OBJECTIVES REDUCTION (%)
Total Suspended Solids (kg/yr)	80.0
Total Phosphorus (kg/yr)	60.0
Total Nitrogen (kg/yr)	45.0
Litter/gross pollutants (kg/yr)	90.0

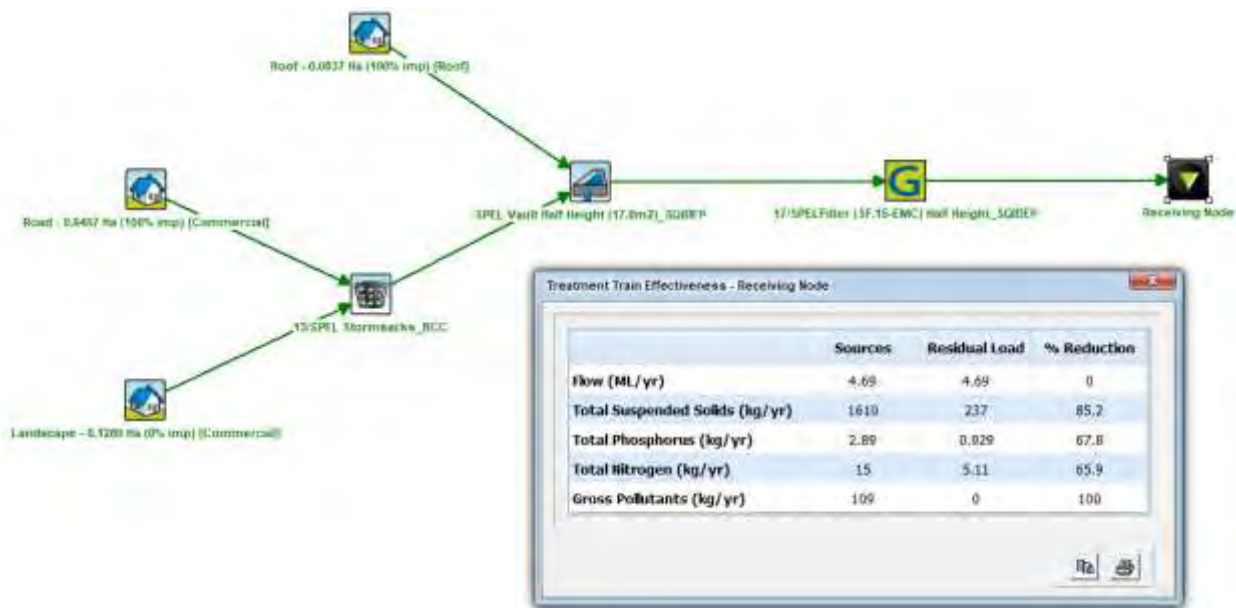


Table 5.5 Water Quality Treatment Results

As shown by the above results, the proposed stormwater treatment train adopts best practice stormwater treatment and will achieve the required Water Quality Objectives. The proposed design is in accordance with the Water Sensitive Urban Design Technical Design Guidelines (by Water by Design).

f. Service Station Treatment

The treatment of the water runoff from the service station has been excluded from the MUSIC model as these areas will be treated separately.

Service Station Assessment

The acceptable solutions from the BCC Guidelines for Stormwater from Service Stations & Fuel Dispensing Areas (FDA) will be used as a reference for stormwater treatment for the service station areas under the building canopy and areas outside of the canopy.

Under Canopy Areas:

- All ground surfaces within the FDA shall be constructed of concrete with all gaps and/or cracks filled so that the impervious barrier and integrity is maintained.
- The FDA shall be delineated by painted line-work on the ground. Other methods of delineating the FDA may be used e.g., Roll-over bunds, different colour concretes, etc.
- Signs indicating fate of flow such as “flows to containment vessel” shall be provided in locations around the under-canopy area
- The area shall be graded to a suitable underground containment vessel (i.e., sump/tank) compatible with petroleum products and other likely chemicals. The tank shall have no connections to stormwater or sewer. The containment vessel shall be constructed of precast concrete with a minimum certified design life of 50 years and be designed in accordance with AS 3600 - “Concrete Structures”. All internal concrete surfaces that may be exposed to contact with petroleum hydrocarbons shall be coated with an epoxy resin, to a minimum dry film thickness of 200 microns, applied in accordance with the supplier’s recommendations. Joints shall be made with epoxy or rubber ring seals. Epoxy joints shall be Megapoxy P1 or approved equivalent and used in accordance with supplier’s recommendations. For joints using a rubber ring seal, the rubber type shall be NBR (nitrile) complying with AS 1646.3 (Elastomeric seals for waterworks purposes – Material requirements for pipe joints seals used in water and wastewater applications with the exception of natural rubber and polyisoprene compounds). The ring shall be watertight to 90kPa internal pressure and comply with the general requirements of AS 1646.1 (Elastomeric seals for waterworks purposes – General requirements).
- The underground containment vessel shall maintain adequate capacity to contain both a volume equivalent to at least the volume of the largest tanker compartment likely to be delivering fuel to the site plus a nominal allowance for windblown rain.
- The roof or canopy shall overhang by a horizontal distance of $\frac{1}{4}$ of the roof height out from the vertical above the boundary of the demarcated FDA.
- Preference is for stormwater from roofed areas to be collected in tanks for non-potable use (e.g., toilet flushing or garden watering). Alternatively, it may be diverted directly to on-site stormwater infrastructure.
- Bulk fuel transfers may be carried out under the canopy area within a defined Tanker Delivery Standing Area graded and drained to the underground containment vessel.

Areas Outside of Canopy:

- All ground surfaces not under canopy shall be constructed of concrete or equivalent with all gaps and/or cracks filled so that the impervious barrier and integrity is maintained.
- Drainage separation options may include grading, bunding, kerbing and/or channelling.
- Bulk fuel transfers shall be carried out in a defined Tanker Delivery Standing Area. This area shall normally be drained to the uncovered area stormwater treatment system. However, during fuel delivery operations, automatic diversion valves shall be used to divert such drainage to the under-canopy containment vessel. The Tanker Delivery Standing Area in uncovered locations shall be sized so that the drainage area has a radius of at least 3 meters and a storage volume equivalent to that of the largest tanker storage compartment that is expected on site at any given time
- Signs indicating fate of flow such as “flows to creek” shall be provided in locations around the uncovered area.

Service Station Treatment

The fuel dispensing areas shall be graded to a suitable underground containment and treatment vessel (i.e., sump/tank) compatible with petroleum products and other likely chemicals. It is proposed that a SPEL Purceptor containment system (or an approved equivalent product) be installed to capture and retain flows from the fuel dispensing areas.

The SPEL Purceptor (model P.040.C1.2C) is a 6 minute full retention tank that will hold and treat all the stormwater runoff from the associated forecourt area catchment area of 479m². Based on a rainfall duration of 5 minutes and a rainfall intensity of 224 mm/hr for 20 year ARI (5%AEP) the associated runoff is approximately 30l/s. The proposed SPEL Purceptor P.040.C1.2C can treat up to 40l/s, therefore it is considered to be suitable for this application.

The SPEL Purceptor P.040.C1.2C has a spill containment capacity of 9000l which is sufficient to hold the contents of a fuel tanker in case of an emergency spill.

Refer to Appendix E for the SPEL Purceptor Operations and Maintenance Manual.

g. Stormwater Quantity Management

Detailed calculations of the flow from the site are summarised in the table below:

PARAMETERS			
Catchment Area - Developed:	8575	m ²	
Catchment Area - Undeveloped:	8575	m ²	
Fraction Impervious - Developed:	85	%	
Fraction Impervious - Undeveloped:	35	%	
Runoff Coefficient (C ₁₀) - Developed:	0.86	t _c = 6	min.
Runoff Coefficient (C ₁₀) - Undeveloped:	0.70	t _c = 12	min.

ARI		2yr	5yr	10yr	20yr	50yr	100yr
Rainfall Intensity	6 min. mm/hr	122	161	188	215	252	281
Rainfall Intensity	12 min. mm/hr	98.8	130	152	175	205	229
Frequency Factor	f _y =	0.85	0.95	1.00	1.05	1.15	1.20
Developed C	C _u =	0.73	0.82	0.86	0.90	0.99	1.00
Undeveloped C	C _d =	0.60	0.67	0.70	0.74	0.81	0.84

FLOWS								
Developed Flow	Q _u = C*I*A	I/s	212	313	385	462	594	669
Undeveloped Flow	Q _d =Q _i = C*I*A	I/s	140	206	253	306	393	458
Difference	Q _o =	I/s	-72	-107	-179	-156	-201	-211

Table 5.6 Quantity Summary using Rational Method

The proposed development will have a larger impervious area than the existing site and will require a stormwater detention system to mitigate the effects of the additional runoff.

The stormwater runoff from the development site will discharge into the proposed detention basin to ensure no actionable nuisance is caused to surrounding properties.

XP Storm is a software package for dynamic modelling of urban stormwater systems, river systems and floodplains. XP Storm was used to determine the required detention storage volume to ensure that the developed flow is equal to or less than the pre-development flow. The Laurensen method was used for determining the volume of runoff within the XP Storm model. The catchment inputs for the pre- and post-developed site are shown in the table below.

PARAMETER	PRE-DEVELOPMENT (I/s)		POST-DEVELOPMENT (I/s)	
	SUB-CATCH 01	SUB-CATCH 02	SUB-CATCH 01	SUB-CATCH 02
Area (ha)	0.569	0.288	0.128	0.729
Imp. (%)	0.0	100.0	0.00	100.0
Width (m)	0.01	0.01	0.01	0.01
Slope (%)	1.43	1.43	2.50	2.50

Table 5.7 Pre- and Post-Development XP Storm catchment parameters

Figure 5.4 shows the pre-development stormwater flows for various storm events. For clarity, only the maximum storm events for each return period are shown.

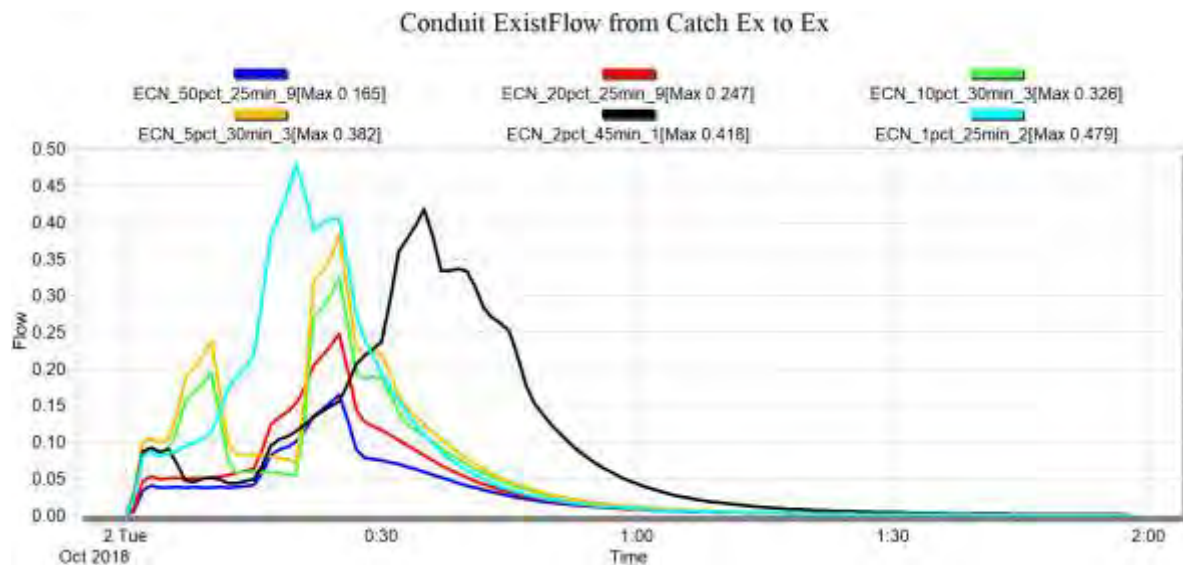


Figure 5.4 Existing stormwater flows for various storm events

As a check for the XP Storm model, the Rational Method was used as outlined in Section 4.3 of the Queensland Urban Drainage Manual (QUDM 2017), to determine the peak flow rate corresponding to the minor and major storm events for the existing conditions. It should be noted that the Rational Method was not used in the calculation of detention volumes but rather as a check that the peak flow outputs for the existing scenario in the XP Storm model were feasible.

Comparing the results from Figure 5.4 and the undeveloped flows within Table 5.6, the relationship is good between the XP Storm and Rational method results and therefore the XP Storm model output is acceptable.

Settings within the XP Storm models are shown in Tables 5.8. Results summaries are shown in Tables 5.9.

PARAMETER	DETENTION TANK
Detention Volume (m ³)	36.3
Base Area (m ²)	50.0
MAX. Water Depth (m)	0.726
Minor Orifice Area (m ²)	[2x] 0.0616 (0.28m dia)
Major Orifice IL Above Minor Orifice IL (m)	0.34
Major Orifice Area (m ²)	0.4950 (0.33m H x 1.50m W)

Table 5.8 Detention Parameters

EVENT	PRE-DEVELOPMENT (l/s)	POST-DEVELOPMENT (l/s)
2yr	165	165
5yr	247	243
10yr	326	239
20yr	382	290
50yr	418	406
100yr	479	478

Table 5.9 Pre- and Post-Development outlet flows

The detention basin was sized using the XP Storm model, the results of which are shown in Figures 5.5.

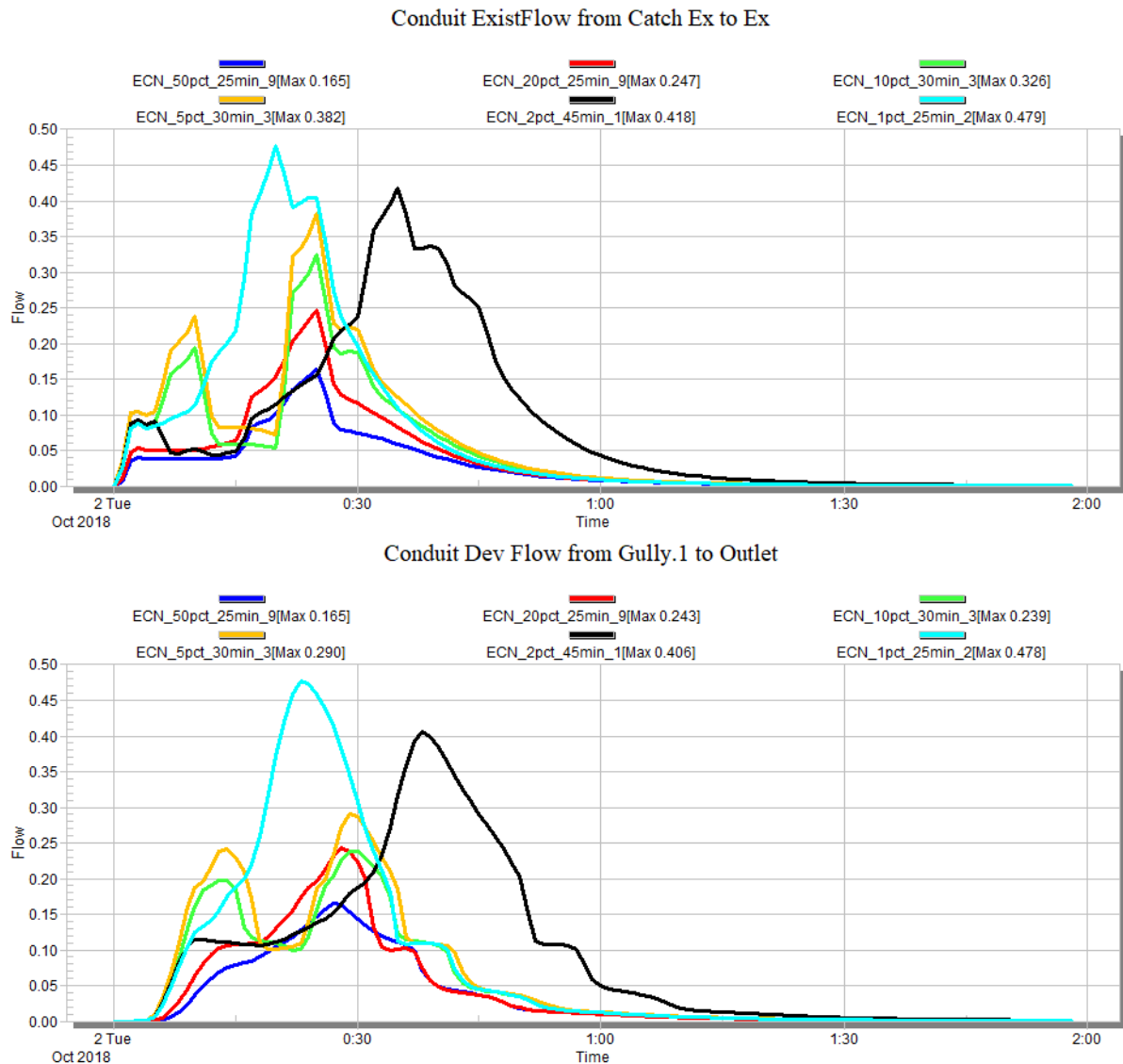


Figure 5.5 Undeveloped vs. Developed (mitigated) stormwater flows for various storm events

Figure 5.5 shows comparisons of the 2yr, 5yr, 10yr, 20yr, 50yr and 100yr flow events for pre- and post-development scenarios using a detention basin volume of **36.3m³** plus freeboard.

h. Proposed Swale Capacity

Capacity calculations have been undertaken for the proposed drainage swale at the south of the site to determine the required size to cater for the 100yr ARI flows (mitigated) at the outlet of the detention tank. The preliminary design details for the swale are shown in Appendix A and demonstrate the swale will be able to cater for all flows up to and including the 100yr ARI event. These preliminary design details provided are to be confirmed at detailed design.

i. Proposed Level Spreader Details

A level spreader is proposed at the downstream location of the swale to disperse flows as sheet flows. The level spreader dimensions have been determined in accordance with the International Erosion Control Association (IECA), Best Practice Erosion and Sediment Control (BPESC) guidelines.

Using the IECA Level Spreader design criteria, a maximum allowable velocity of 2.0 m/s has been adopted as shown in the figure below. It is to be noted that the grass swale is proposed to be established with a 0.5% longitudinal slope, however, a 1% slope has been adopted below.

Percentage grass cover	Gradient of grass surface (%)									
	1	2	3	4	5	6	8	10	15	20
70% ^[2]	2.0	1.8	1.7	1.6	1.6	1.5	1.5	1.4	1.3	1.3
100% ^[3]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.8	1.7
Poor soils ^[3]	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.1	1.0	0.9

Figure 5.7 Allowable flow velocity (m/s) for grassed surfaces (BPESC)

Figure 5.8 below depicts the level spreader's required sill length (m per m³/s discharge).

Land slope (%)	Allowable down-slope velocity over well grassed surface (m/s)						
	1.0	1.2	1.5	1.8	2.0	2.2	2.5
1.0	3.5*	2.5*	1.6*	1.1*	0.9*	0.8*	0.6*
2.0	5.2	3.8*	2.5*	1.8*	1.4*	1.2*	0.9*
3.0	6.6	4.8	3.2*	2.3*	1.8*	1.5*	1.2*
4.0	7.7	5.6	3.8*	2.7*	2.2*	1.8*	1.4*
5.0	8.7	6.3	4.3*	3.1*	2.5*	2.1*	1.6*
6.0	9.5	7.0	4.7	3.4*	2.8*	2.3*	1.8*
7.0	10.3	7.6	5.2	3.7*	3.1*	2.6*	2.0*
8.0	11.0	8.2	5.6	4.0*	3.3*	2.8*	2.2*
9.0	11.8	8.7	6.0	4.3*	3.5*	3.0*	2.4*
10.0	12.4	9.2	6.3	4.6*	3.8*	3.2*	2.5*
Caution the release of water onto grass slopes steeper than 10%.							
15.0	15.2	11.3	7.8	5.7	4.8	4.0*	3.2*
20.0	17.4	13.1	9.1	6.7	5.6	4.7	3.7*
25.0	19.4	14.6	10.3	7.6	6.3	5.3	4.3*
33.3	22.1	16.8	11.9	8.8	7.4	6.2	5.0
50.0	26.6	20.3	14.5	10.8	9.1	7.8	6.3

* Sill length limited to minimum 4m for discharges less than 0.85m³/s.

Figure 5.8 Level spreader sill length – m per m³/s discharge (BPESC)

From the figure above, the required sill length per $0.9 \text{ m}^3/\text{s}$, for a flow rate of $0.48 \text{ m}^3/\text{s}$ would equate to 0.43 m . A minimum 4 m sill length is required for discharges less than $0.85 \text{ m}^3/\text{s}$. Therefore, the proposed sill length is 4 m .

Figure 5.9 shows the dimensions of the level spreader required, in accordance with Table 3 of the BPESC level spreader design criteria.

Discharge (m^3/s)	Entrance width (m)	Depth (m)	End width (m)
0 to 0.28	3.0	0.15	0.9
0.29 to 0.57	4.9	0.18	0.9
0.58 to 0.85	7.3	0.21	0.9

Figure 5.9 Minimum dimensions of level spreader (BPESC)

j. External Catchments

Using site survey data, interactive mapping, and available documented records, it has been determined that an existing external catchment to the northwest of the proposed development discharges through the undeveloped portion of the site, per the existing stormwater arrangement.

Refer to the stormwater catchment layout plan in Appendix A.

k. Maintenance

Construction Phase Management Plan

Potential construction phase impacts include the following:

- Sedimentation and erosion
- Management of contaminated soils and materials on the site Construction Material (such as cement)

General

The objective of the Construction Phase Management Plan is to comply with the requirements of the Queensland Environmental Protection Act 1994 and Environmental Protection (Water) Policy 2009 so that the environmental values of effected receiving waters are maintained or enhanced. In essence the purpose of the Plan is to prevent polluted stormwater being discharged to the local waterways.

Performance Indicators

The management is not being effective when any of the following occur during the construction phase of the project.

- The required water quality objectives are not achieved,
- Contaminated water is released off site.

Construction Phase Management of Sedimentation and Erosion

Existing vegetation from site will be removed in stages as required to reduce the likelihood of surface erosion. A sediment and siltation fence will be erected around the property boundary to

ensure that sediment is not washed off site and onto adjacent properties or roads. Entry and exit from the site will be restricted to a single stabilised location to minimise the rise of onsite transport of silt sediment or mud. It is anticipated that a layer of crushed rock will provide the necessary stabilisation of the access route. If required a specific bunded wash down area will be provided for the cleaning of plant before leaving the site and all wash down wastewater will be collected. In the event that debris or sediment leaves the site it will be cleaned.

Management of Imported Materials

Any material imported to the site including construction materials will be stockpiled in a location where it cannot contaminate the stormwater system or stormwater runoff.

Complaint Response

The contractor will erect signage at the entrance to the works with contact information, including afterhours contact numbers. The contractor will properly deal with all complaints.

Monitoring and Reporting

All sediment and erosion control devices will be checked daily and after rainfall events by the construction site supervisor. Defective or full devices will be cleaned and repaired as required. Regular inspections and maintenance of the storm water system will be carried out by the property owner. The civil components (structural and erosion) are to be assessed by a suitably qualified engineer as required.

Stormwater Treatment Systems

The design, installation and ongoing maintenance of the stormwater treatment systems is to be in accordance with the manufacturers specifications and in accordance with the service station operator maintenance guidelines and procedures.

It remains the service provider and user's responsibility to maintain the treatment and site in accordance with the current State Planning Policy and legislation requirements.

Lifecycle cost assessment

There will be no abnormal capital or recurrent costs for the proposed stormwater strategy.

6. Flood Planning and Overland Flow

Figure 6.1 Rockhampton Regional Council flood overlay mapping below shows the extent of flooding in relation to the site. As shown, the site is not impacted by river, creek or waterway, and overland flow sources. In addition to this, there are currently no Coastal Hazard Overlays that apply this property.

The project development site is not located within an overland flow area, and it is anticipated that development complies with Rockhampton Regional Council's flooding requirements.

vT Consulting Engineers have not been commissioned to complete a flood assessment report for this development.

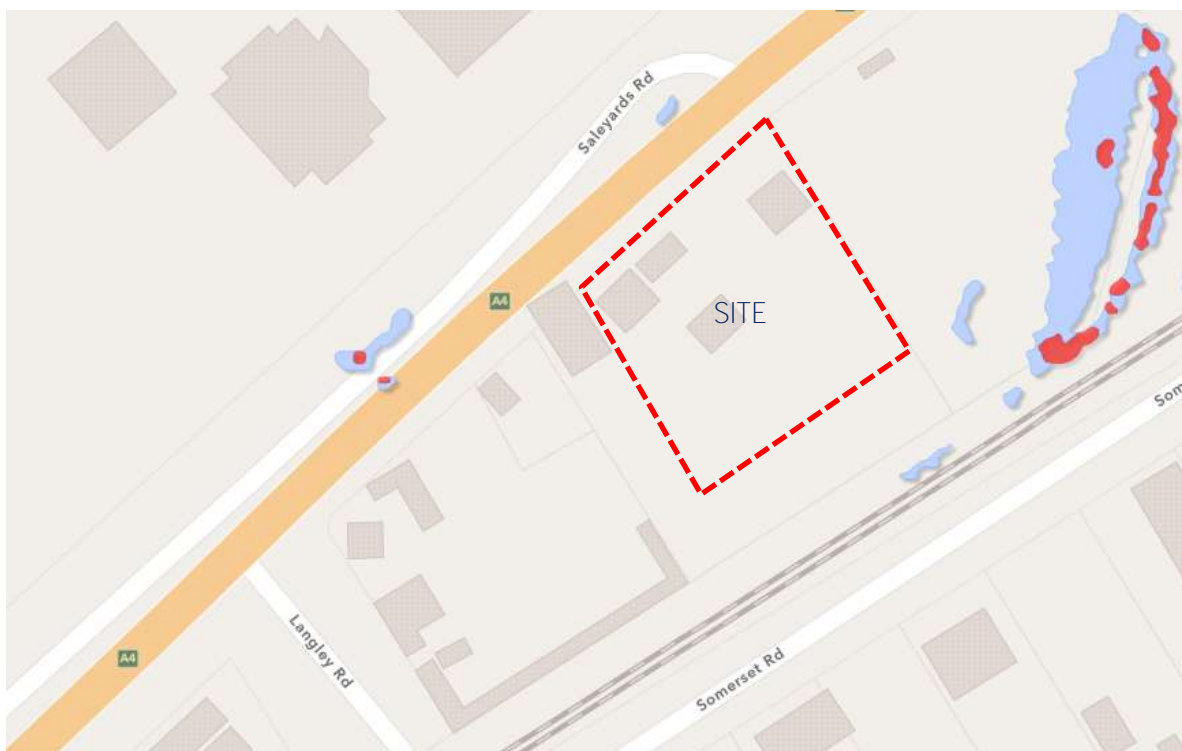


Figure 6.1 Rockhampton Regional Council Flood Overlay Mapping

7. Sewer Reticulation

Sewer infrastructure exists within the site and surrounding areas as shown below in Figure 7.1. Both the development site and adjacent surplus lot proposed to remain undeveloped contains sewer mains and maintenance structures within the property. It is proposed to demolish and remove the existing 150mm diameter Polyvinyl Chloride (PVC) pipe and maintenance structure within the development extents to terminate the existing line at the western side of the development site. A new sewer manhole and property connection is proposed to be established over the end of the demolished main on the west of the development, with a new diversion to be installed to maintain the existing connection to Lot 5 on SP108697.

For more details refer to the engineering plans in Appendix A.

Internal house drainage design for this proposed development will be by others.

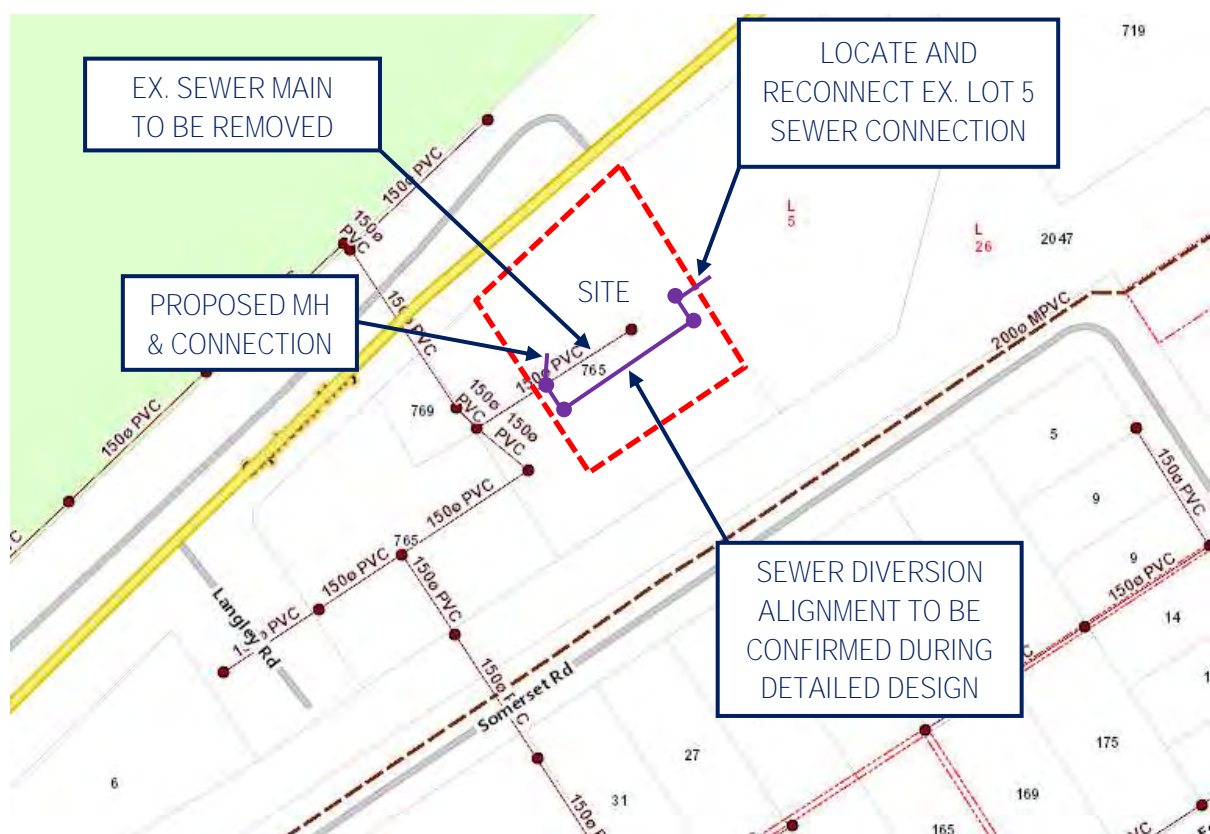


Figure 7.1 RRC sewer infrastructure plan

8. Water Reticulation

Water infrastructure exists in the area of the site as shown below in Figure 8.1. The site is currently serviced via a metered connection in the north corner of the site, connecting from the existing 150mm diameter reticulation main located adjacent to the site in Capricorn Highway. It is proposed to upgrade the existing connection to service the development.

The domestic and fire supply requirements to service the proposed development will be confirmed by a hydraulic consultant at detailed design.

For more details refer to the engineering plans in Appendix A.

The Internal water supply design for this proposed development will be by others.

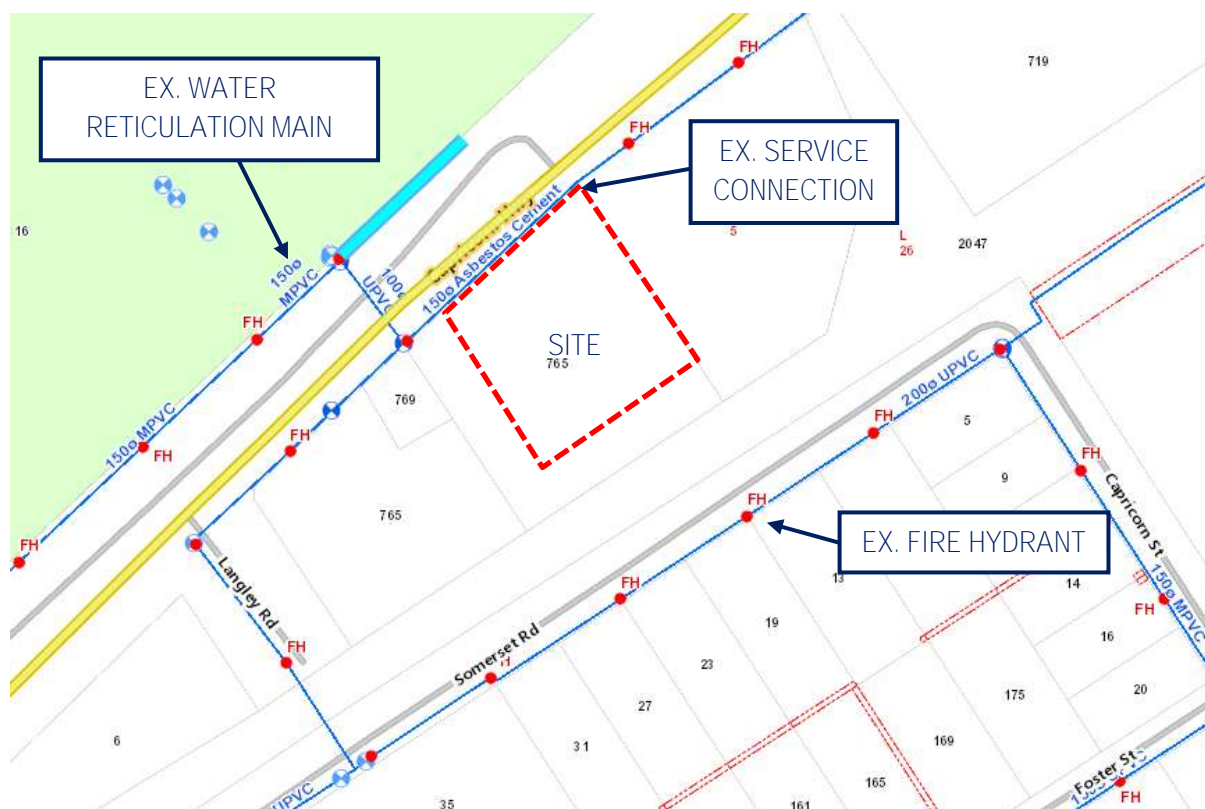


Figure 8.1 RRC water reticulation plan

9. Electrical and Telecommunication

The electrical supply and communications supply for this proposed development will be by others.

10. Development Codes

The following applicable Local Codes have been completed to address the proposed development and are included in Appendix F:

- Rockhampton Regional Council Filling and Excavation Code
- Rockhampton Regional Council Stormwater Management Code
- Rockhampton Regional Council Sewer and Water Code
- Rockhampton Regional Council Works code

11. Safety in Design

At the time of preparing this report, it is considered that there is no atypical safety in design issues for a project of this type and use. Typical issues to be reviewed include but are not limited to construction activities, falls, confined spaces, excavations, and hazardous materials.

A full review of and preparation of a Safety In Design report will be conducted during the detailed design of the project by the project design engineer. The ongoing implementation, review and amendments to the Safety in Design register is to be by the property owner or users.

12. Conclusions

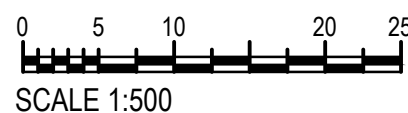
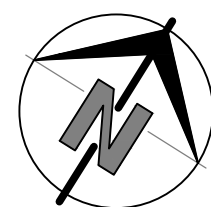
vT Consulting Engineers has undertaken a preliminary review of civil engineering services required for the proposed development located at 765 Capricorn Highway, Gracemere QLD 4702.

Based on all the findings outlined in this report, vT Consulting Engineers believes that, should the recommendation contained within the report be implemented, there are no significant engineering issues in relation to this development.

Appendix A - Proposed Preliminary Design Drawings

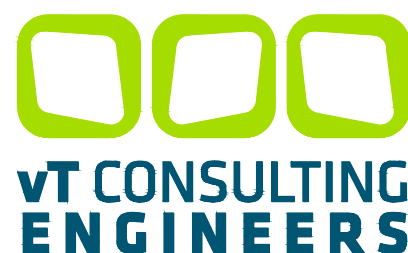


18/08/2023



LAYOUT PLAN
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PROJECT: PROPOSED HIGHWAY SERVICE CENTRE 765 CAPRICORN HWY, GRACEMERE QLD 4702
DRAWING TITLE: PRELIMINARY EROSION AND SEDIMENT CONTROL LAYOUT PLAN

JOB No.: 22368
DRAWING No.: P100 PRELIMINARY
REV.: C

LEGEND

---	EXISTING PROPERTY BOUNDARY
---	EXISTING EASEMENT BOUNDARY
---	EXISTING CONTOUR - MAJOR
---	EXISTING CONTOUR - MINOR
---	DEMOLISHED BUILDING
---	EXISTING BUILDING
---	EXISTING KERB AND CHANNEL
---	EXISTING KERB
---	EXISTING RETAINING WALL
---	EXISTING STORMWATER DRAINAGE
---	EXISTING ROOFWATER DRAINAGE
---	EXISTING SEWER
---	EXISTING WATER
---	EXISTING ELECTRICAL
---	EXISTING ELEC. OVERHEAD
---	EXISTING COMMUNICATIONS
---	ABANDON EXISTING SERVICE
---	PROPERTY BOUNDARY
---	EASEMENT BOUNDARY
---	CONTOUR - MAJOR
---	CONTOUR - MINOR
---	BUILDING
---	EARTHWORKS TOP OF BATTER
---	EARTHWORKS BOTTOM OF BATTER
---	RETAINING WALL
---	SEDIMENT FENCE
---	FENCE - TYPE 1
---	KERB AND CHANNEL
---	KERB
---	STORMWATER DRAINAGE
---	ROOFWATER DRAINAGE
---	SUBSOIL DRAIN
---	SEWER
---	WATER
---	EXISTING SURFACE LEVEL (ESL)
+	FINISHED SURFACE LEVEL (FSL)
x	BULK EARTHWORKS LEVEL (BEL)

CONTRACTOR TO ENSURE SURROUNDING
ROADS ARE KEPT CLEAN AND FREE OF
DEBRIS DURING CONSTRUCTION. TYPICAL

CONTRACTOR TO PROVIDE TRAFFIC CONTROL
(AS REQUIRED) AND ENSURE WORK ZONES
ARE SAFE DURING CONSTRUCTION. TYPICAL

PROVIDE KERB INLET SEDIMENT
PROTECTION AT ALL DOWNSTREAM
GULLIES UPTO 50m FROM SITE. TYPICAL

SITE TO BE CLEARED IN PREPARATION FOR
BUILDING CONSTRUCTION.
ALL EXISTING STRUCTURES (INCLUDING ANY
PILES) AND SITE IMPROVEMENTS TO BE
DEMOLISHED AND REMOVED, UNLESS NOTED
OTHERWISE.

CAPRICORN HIGHWAY

CONSTRUCTION ENTRY/EXIT

1 RP806583

6 RP840825

73 LN569

5 RP108697

RAIL - BLACKWATER SYSTEM

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3m WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE



1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO SOLUS IN THE FENCE. USUALLY THE CATCHMENT AREA FOR ONE POINT TO SOLUS DEEP TRENCH ALONG THE UPSLOPE SIDE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT INTERVALS EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
3. FIX UP SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS, ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES AS OR RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
4. JOINT SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm overlap.
5. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



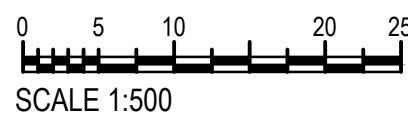
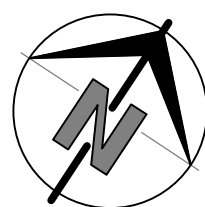
1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THE AREA TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.



1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm to 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

[illegible]

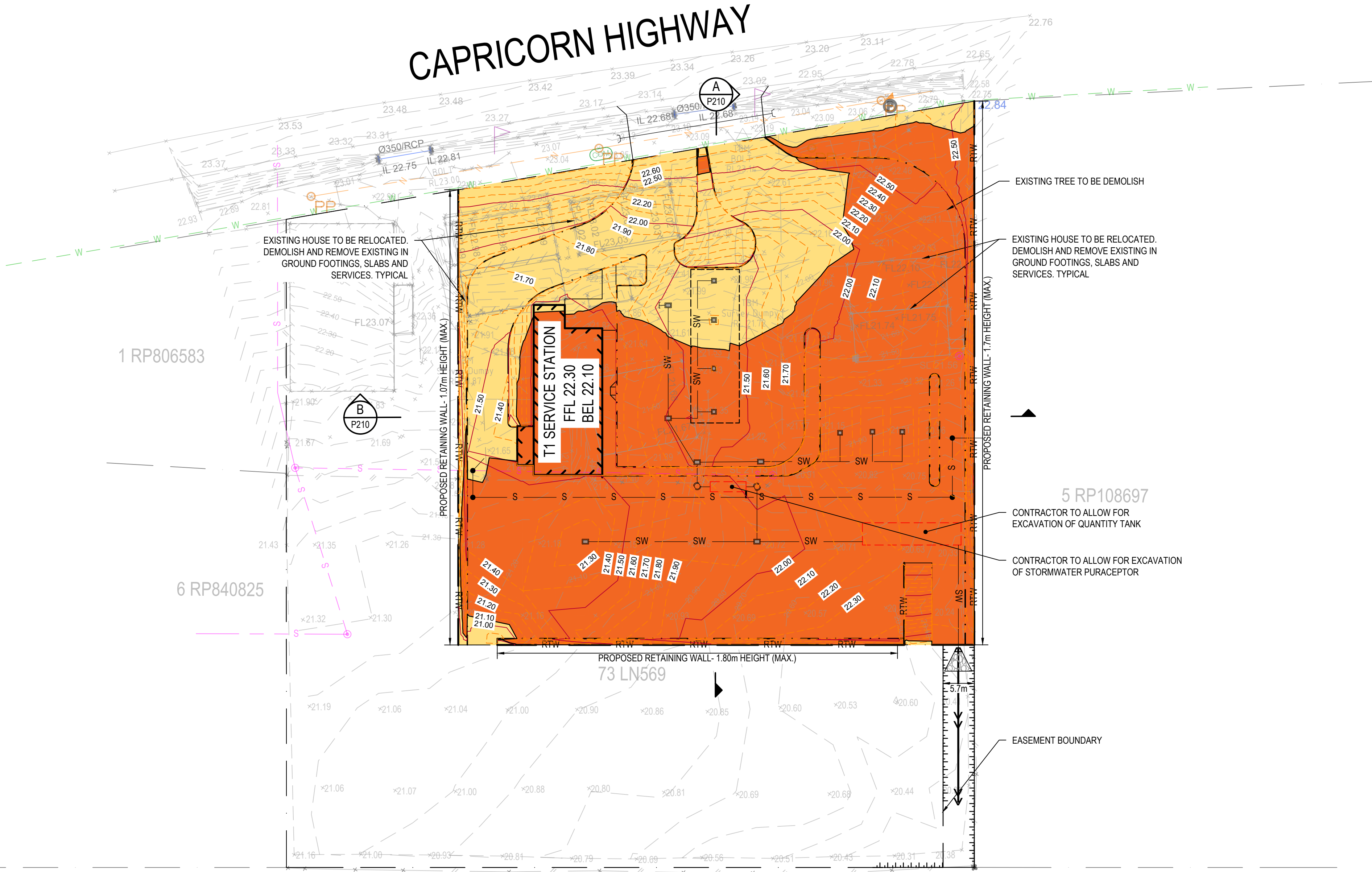
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								 VT CONSULTING ENGINEERS A: PO Box 26, Carina Q: 4152 E: admin@vtce.com.au Ph: 1300 185 737 W: vtce.com.au		 VERVE BUILDING DESIGN CO. BUILDING DESIGNERS LICENCE No. 100210 OFFICE 2, LEVEL 1, 488 LUTWYCHE ROAD, LUTWYCHE QLD 4030 Ph: 07 5897 0942 E: info@vervedesign.com.au		SCALE: AS SHOWN SHEET SIZE: A1 DATUM: AHD		DRAWN: JT DESIGN: ZL CHECKED: ZL APPROVED:		PROJECT: PROPOSED HIGHWAY SERVICE CENTRE 765 CAPRICORN HWY, GRACEMERE QLD 4702		JOB No.: 22368	
C	09.08.23	ISSUE FOR APPROVAL		JT	AvT							DRAWING TITLE: PRELIMINARY EARTHWORKS LAYOUT PLAN		DRAWING No.: P200		REV.: C			
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A	25.05.23	ORIGINAL ISSUE		JT	AvT							REVISIONS							
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RAIL - BLACKWATER SYSTEM

LAYOUT PLAN
 SCALE 1:500



LEGEND

	EXISTING PROPERTY BOUNDARY
	EXISTING EASEMENT BOUNDARY
	EXISTING CONTOUR - MAJOR
	EXISTING CONTOUR - MINOR
	DEMOLISHED BUILDING
	EXISTING BUILDING
	EXISTING KERB AND CHANNEL
	EXISTING KERB
	EXISTING RETAINING WALL
	EXISTING STORMWATER DRAINAGE
	EXISTING ROOFWATER DRAINAGE
	EXISTING SEWER
	EXISTING WATER
	EXISTING ELECTRICAL
	EXISTING ELEC. OVERHEAD
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	ABANDON EXISTING SERVICE
	PROPERTY BOUNDARY
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	CONTOUR - MAJOR
	CONTOUR - MINOR
	BUILDING
	EARTHWORKS TOP OF BATTER
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	FENCE - TYPE 1
	KERB AND CHANNEL
	KERB
	STORMWATER DRAINAGE
	ROOFWATER DRAINAGE
	SUBSOIL DRAIN
	SEWER
	WATER
	EXISTING SURFACE LEVEL (ESL)
	FINISHED SURFACE LEVEL (FSL)
	BULK EARTHWORKS LEVEL (BEL)

EARTHWORKS VOLUMES

AN ALLOWANCE OF 100mm HAS BEEN MADE FOR STRIPPING OF TOPSOIL AND LATENTS. STRIP DEPTH TO BE CONFIRMED ON SITE. TRIMMING TOLERANCE +0mm/-20mm.

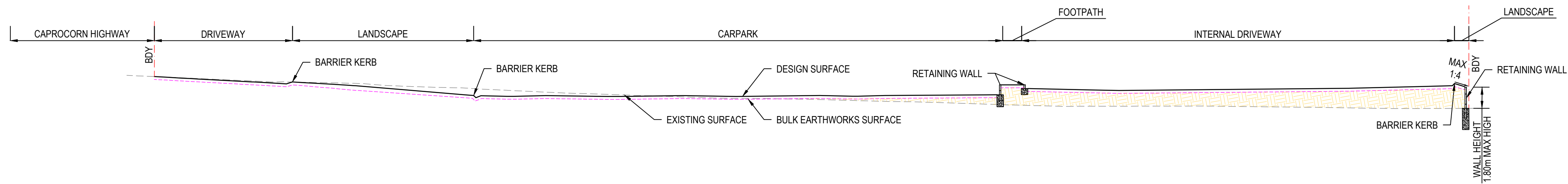
APPROXIMATE INSITU EARTHWORKS VOLUMES FROM STRIPPED SURFACE LEVEL TO BULK EARTHWORKS LEVEL HAVE BEEN CALCULATED AS:

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	FILL: 4900m³

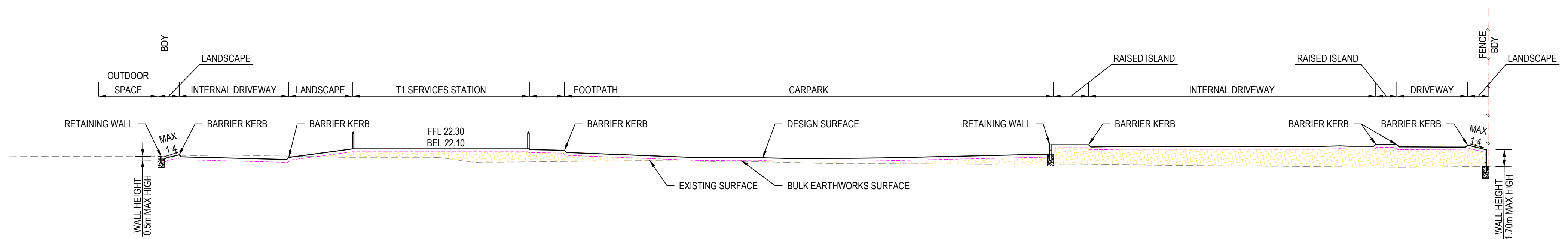
VOLUMES PROVIDED ARE INDICATIVE ONLY AND THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE VOLUMES PRIOR TO TENDERING AND CONSTRUCTION.

REFER TO STRUCTURAL ENGINEERS DETAILS FOR SAFE BEARING CAPACITY REQUIREMENTS.

NO ALLOWANCE HAS BEEN MADE FOR EXCAVATION OF STRUCTURAL FOOTING, SERVICE TRENCHES OR PITS.



A SECTION
P210 SCALE 1:200



B SECTION
P210 SCALE 1:200



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BUILDING DESIGN CO.

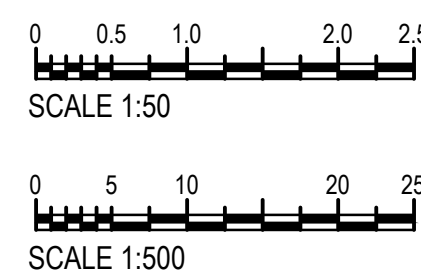
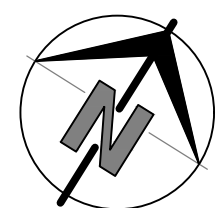
BUILDING DESIGNERS LICENCE No. 100212
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E: info@vervedesign.com.au
Ph: 07 5897 0942

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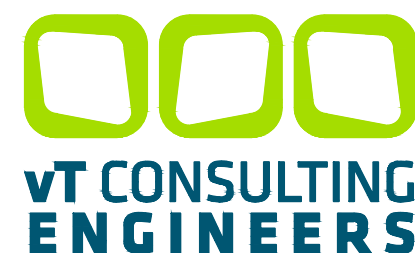
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DRAWING TITLE:	PRELIMINARY EARTHWORKS SECTIONS

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DRAWING No.:	P210
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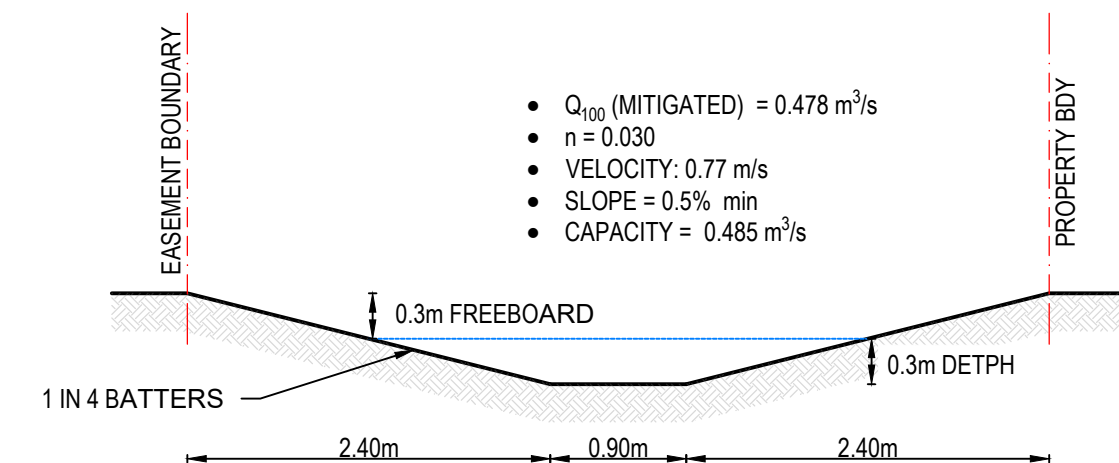
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REV.:	C

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	EXISTING BUILDING
	EXISTING KERB AND CHANNEL
	EXISTING KERB
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	EXISTING SEWER
	EXISTING WATER
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	KERB
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	SUBSOIL DRAIN
	SEWER
	WATER
	EXISTING SURFACE LEVEL (ESL)
	FINISHED SURFACE LEVEL (FSL)
	BULK EARTHWORKS LEVEL (BEL)

LEGEND - HATCH

	EASEMENT
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TYPICAL GRASS SWALE

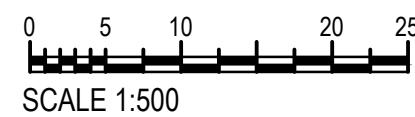
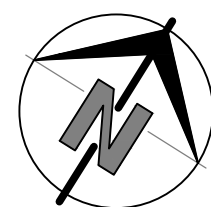
SCALE 1:50

- Q_{100} (MITIGATED) = 0.478 m³/s
- n = 0.030
- VELOCITY: 0.77 m/s
- SLOPE = 0.5% min
- CAPACITY = 0.485 m³/s

CAPRICORN HIGHWAY

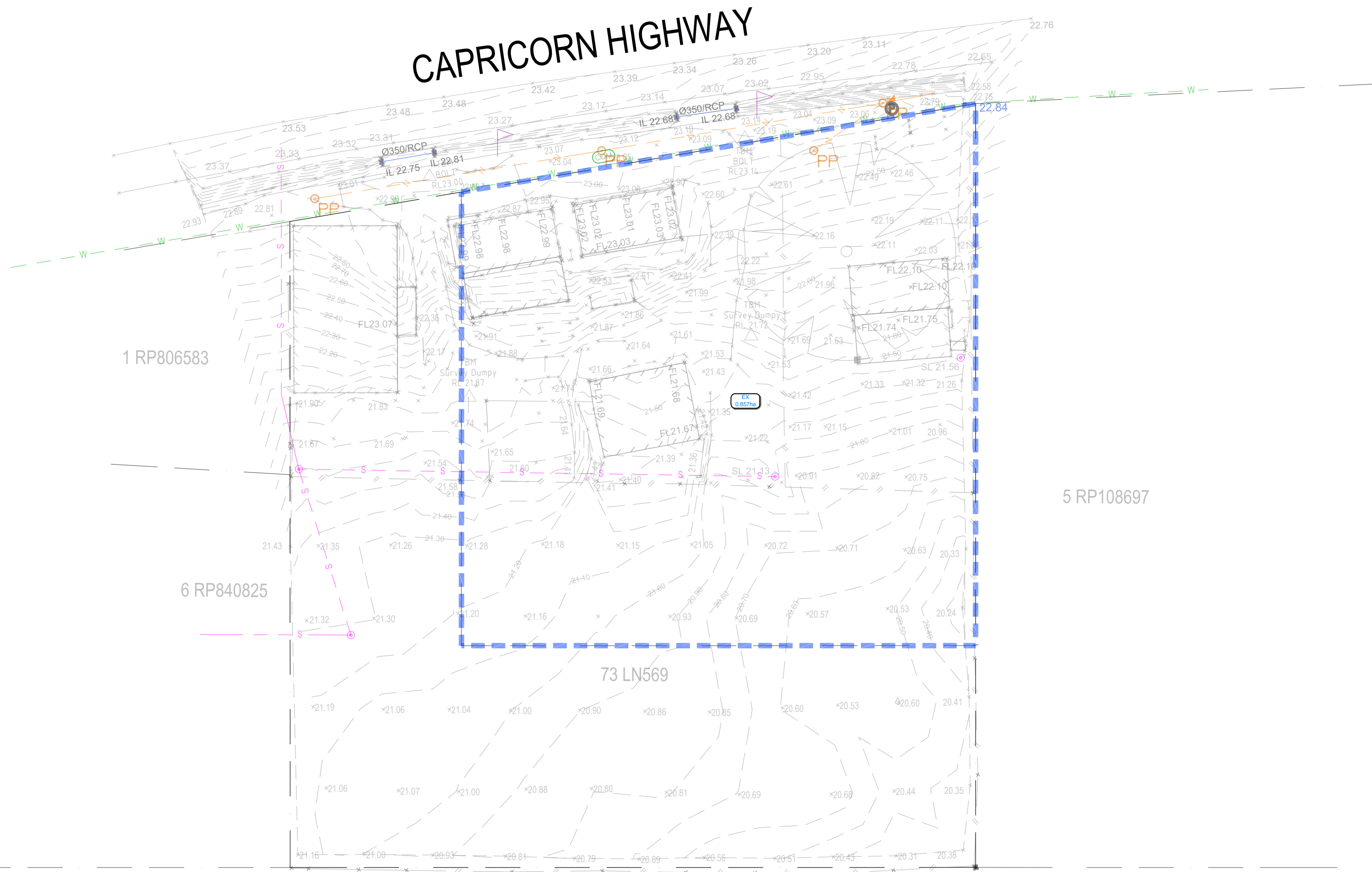
RAIL - BLACKWATER SYSTEM

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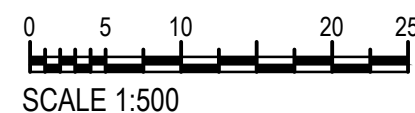
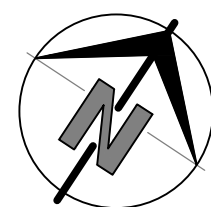
LAYOUT PLAN
SCALE 1:500

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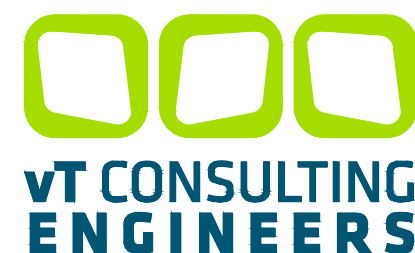


LEGEND	
	EXISTING PROPERTY BOUNDARY
	EXISTING EASEMENT BOUNDARY
	EXISTING CONTOUR - MAJOR
	EXISTING CONTOUR - MINOR
	DEMOLISHED BUILDING
	EXISTING BUILDING
	EXISTING KERB AND CHANNEL
	EXISTING KERB
	EXISTING RETAINING WALL
	EXISTING STORMWATER DRAINAGE
	EXISTING ROOFWATER DRAINAGE
	EXISTING SEWER
	EXISTING WATER
	EXISTING ELECTRICAL
	EXISTING ELEC. OVERHEAD
	EXISTING COMMUNICATIONS
	ABANDON EXISTING SERVICE
	PROPERTY BOUNDARY
	EASEMENT BOUNDARY
	CONTOUR - MAJOR
	CONTOUR - MINOR
	BUILDING
	EARTHWORKS TOP OF BATTER
	EARTHWORKS BOTTOM OF BATTER
	RETAINING WALL
	SEDIMENT FENCE
	FENCE - TYPE 1
	KERB AND CHANNEL
	KERB
	STORMWATER DRAINAGE
	ROOFWATER DRAINAGE
	SUBSOIL DRAIN
	SEWER
	WATER
	CATCHMENT BOUNDARY
	EXISTING SURFACE LEVEL (ESL)
	FINISHED SURFACE LEVEL (FSL)
	BULK EARTHWORKS LEVEL (BEL)

PLOTTED: 06/08/2023



REV.	DATE	AMENDMENT	BY	APP
C	09.08.23	ISSUE FOR APPROVAL	JT	AvT
B	31.05.23	ISSUE FOR APPROVAL	JT	AvT
A	25.05.23	ORIGINAL ISSUE	JT	AvT



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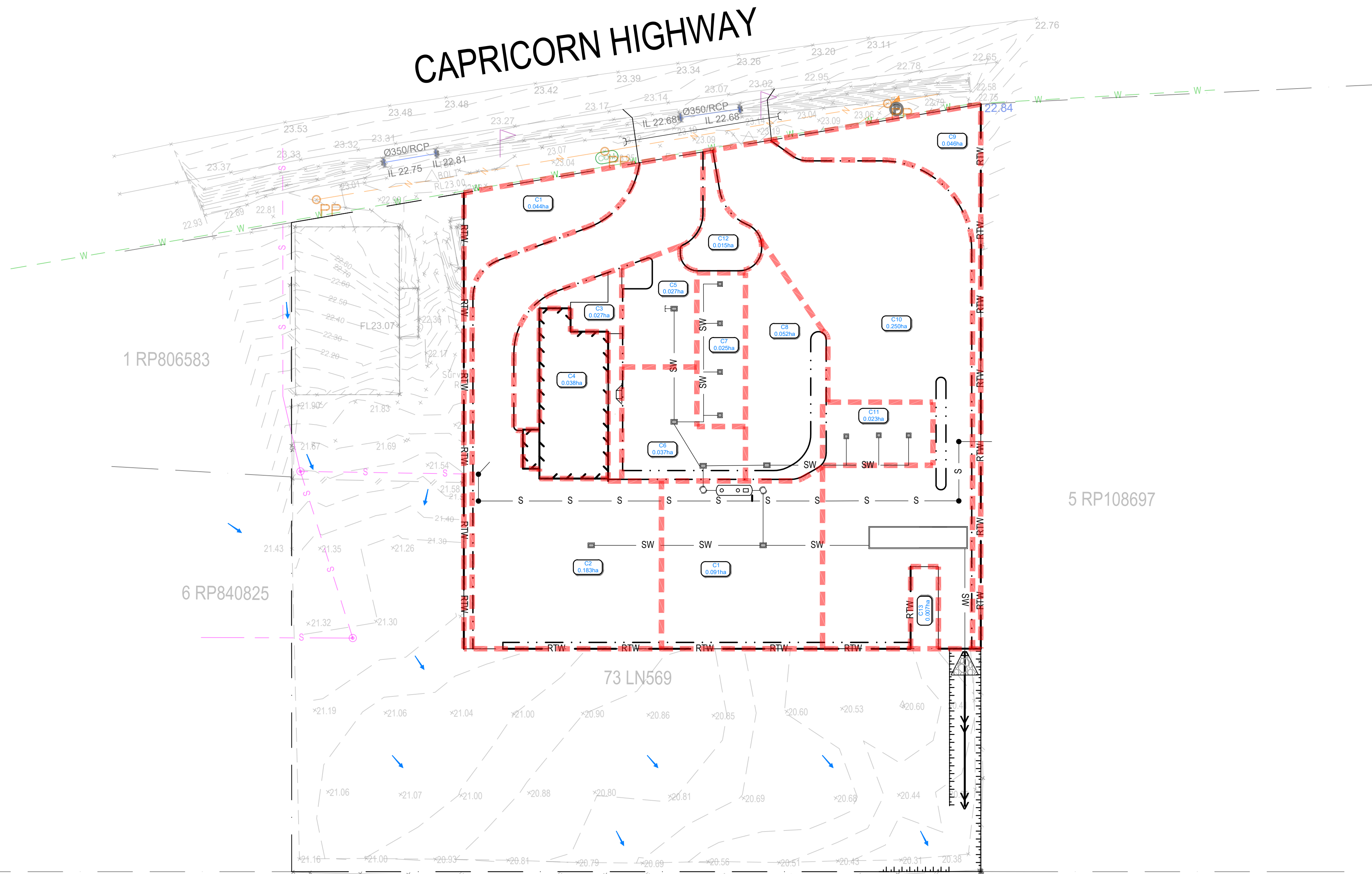


SCALE:	AS SHOWN
SHEET SIZE:	A1
DATUM:	AHD

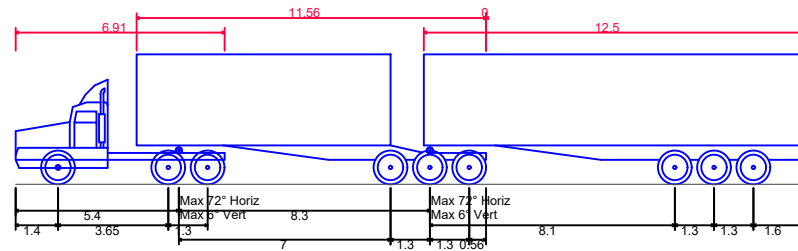
DRAWN:	JT
DESIGN:	ZL
CHECKED:	ZL
APPROVED:	

PROJECT:	PROPOSED HIGHWAY SERVICE CENTRE 765 CAPRICORN HWY, GRACEMERE QLD 4702
DRAWING TITLE:	POST - DEVELOPMENT CATCHMENT LAYOUT PLAN

JOB No.:	22368
DRAWING No.:	P401 PRELIMINARY
REV.:	C



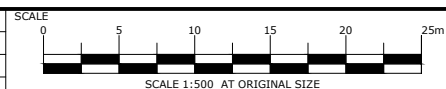
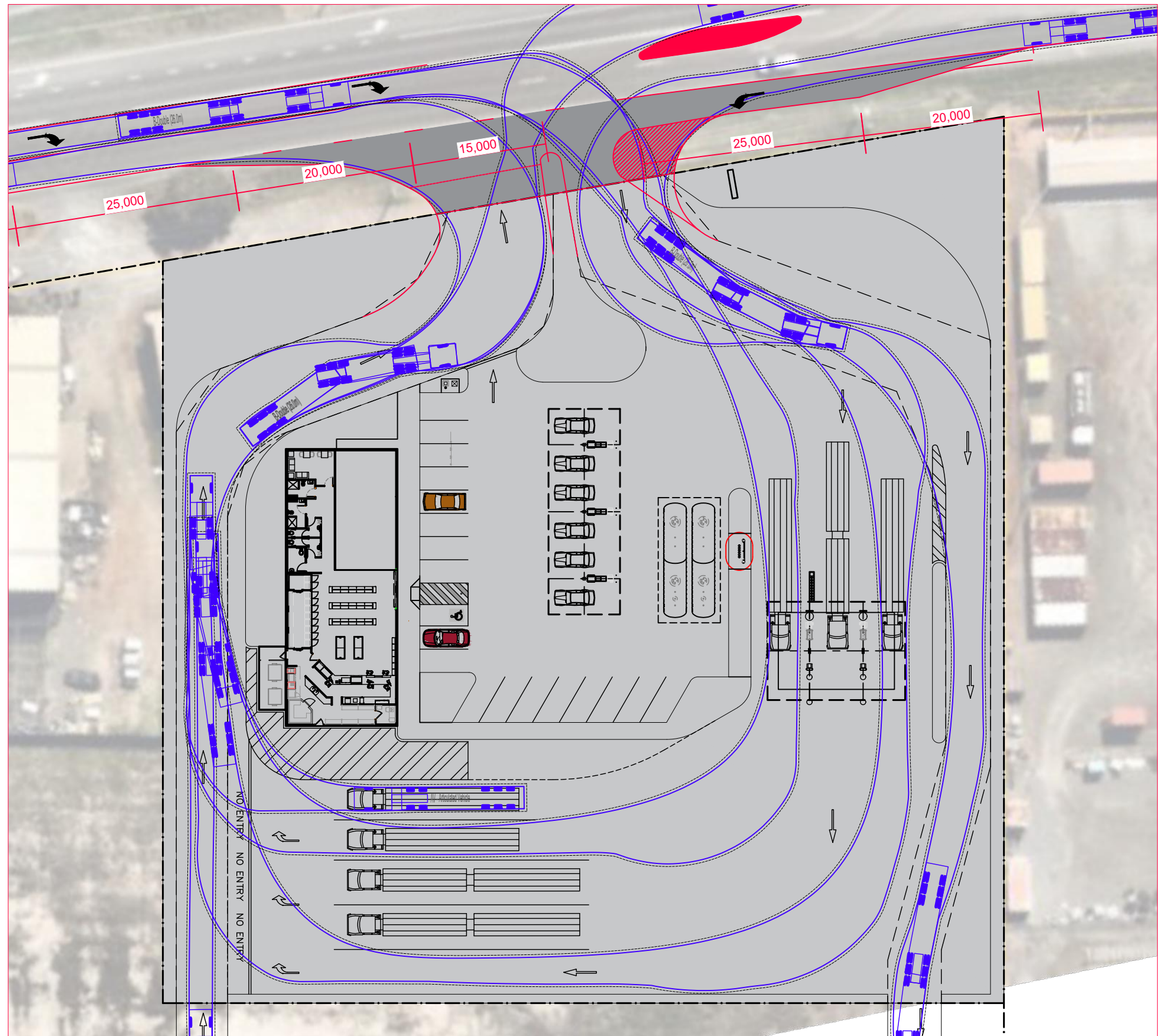
LEGEND	
	EXISTING PROPERTY BOUNDARY
	EXISTING EASEMENT BOUNDARY
	EXISTING CONTOUR - MAJOR
	EXISTING CONTOUR - MINOR
	DEMOLISHED BUILDING
	EXISTING BUILDING
	EXISTING KERB AND CHANNEL
	EXISTING KERB
	EXISTING RETAINING WALL
	EXISTING STORMWATER DRAINAGE
	EXISTING ROOFWATER DRAINAGE
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	EXISTING WATER
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	EXISTING ELEC. OVERHEAD
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	ABANDON EXISTING SERVICE
	PROPERTY BOUNDARY
	EASEMENT BOUNDARY
	CONTOUR - MAJOR
	CONTOUR - MINOR
	BUILDING
	EARTHWORKS TOP OF BATTER
	EARTHWORKS BOTTOM OF BATTER
	RETAINING WALL
	SEDIMENT FENCE
	FENCE - TYPE 1
	KERB AND CHANNEL
	KERB
	STORMWATER DRAINAGE
	ROOFWATER DRAINAGE
	SUBSOIL DRAIN
	SEWER
	WATER
	CATCHMENT BOUNDARY
	EXISTING SURFACE LEVEL (ESL)
	FINISHED SURFACE LEVEL (FSL)
	BULK EARTHWORKS LEVEL (BEL)



B-Double (26.0m)
Overall Length 26.000m
Overall Width 2.500m
Overall Body Height 4.300m
Min Body Ground Clearance 0.540m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 15.000m
Design Speed Forward Min. 5.0km/h
Clearance Envelope 0.500m

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/75-2023
Dated: 23 November 2023



CLIENT
ACCORD PROPERTY



TTM CONSULTING PTY LTD

ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003

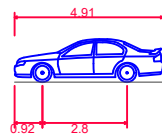
T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbri@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT
765 CAPRICORN HWY, GRACEMERE

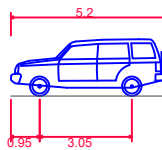
DRAWING TITLE
VEHICLE MANOEUVRING
INTERNAL B-DOUBLE SWEEP PATH ANALYSIS

PROJECT NUMBER 22BRT0852	ORIGINAL SIZE A3
DRAWING NUMBER 22BRT0852-02	REVISION A
DATE 31 May 2023	SHEET 1 OF 1

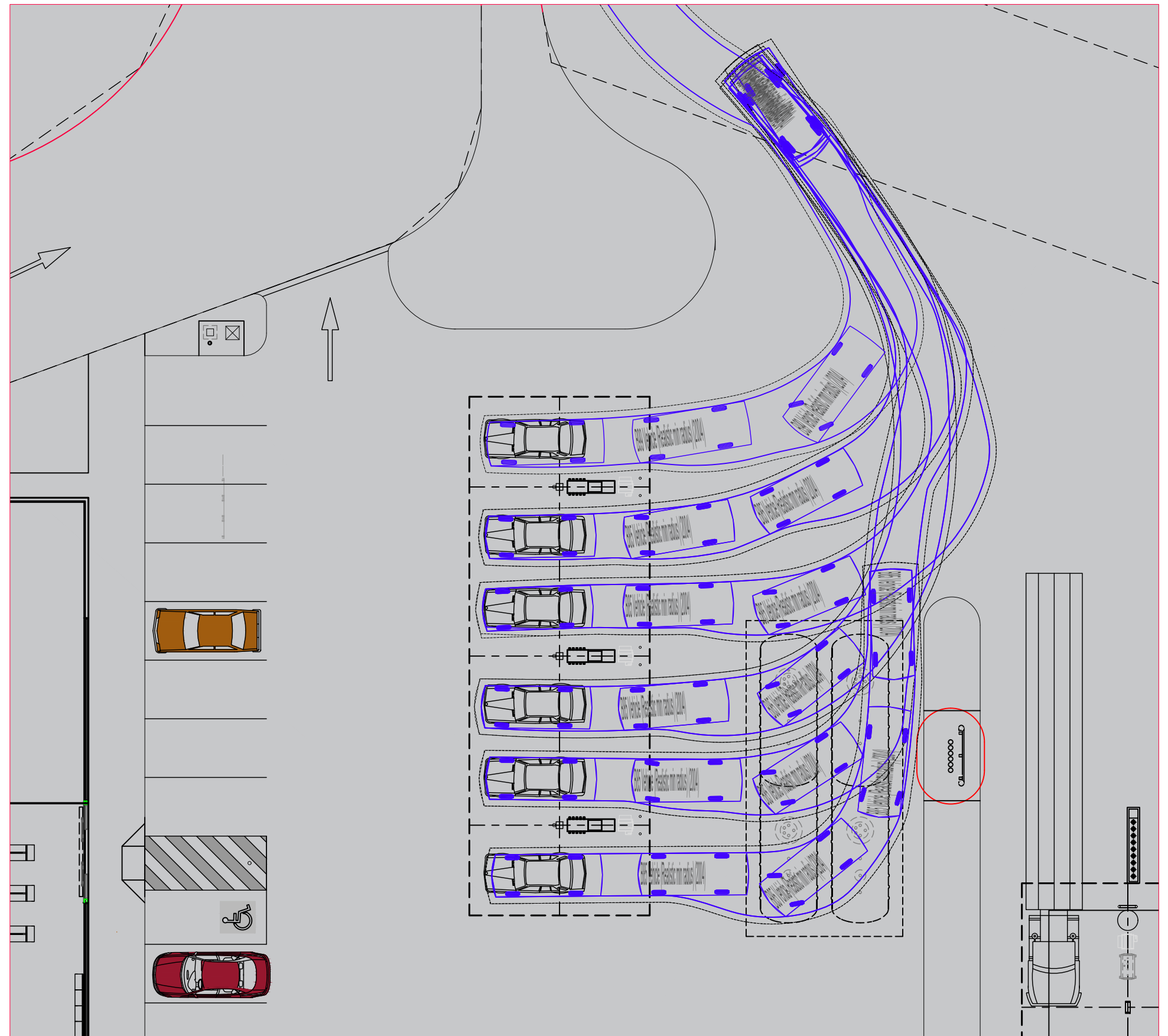
REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	31-05-23	ORIGINAL ISSUE	SC		SC



B85 Vehicle (Realistic min radius) (2004)
Overall Length 4.910m
Overall Width 1.870m
Overall Body Height 1.421m
Min Body Ground Clearance 0.159m
Track Width 1.770m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.750m
Design Speed Forward 5.0km/h
Clearance Envelope 0.300m



B99 Vehicle (Realistic min radius) (2004)
Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 1.878m
Min Body Ground Clearance 0.272m
Track Width 1.840m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 6.250m
Design Speed Forward 5.0km/h
Clearance Envelope 0.300m



ROCKHAMPTON REGIONAL COUNCIL

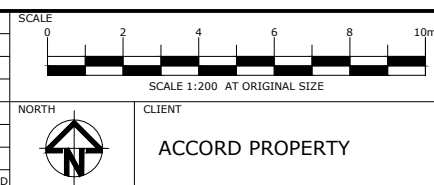
APPROVED PLANS

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

Development Permit No.: D/75-2023

Dated: 23 November 2023

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	31-05-23	ORIGINAL ISSUE	SC		SC



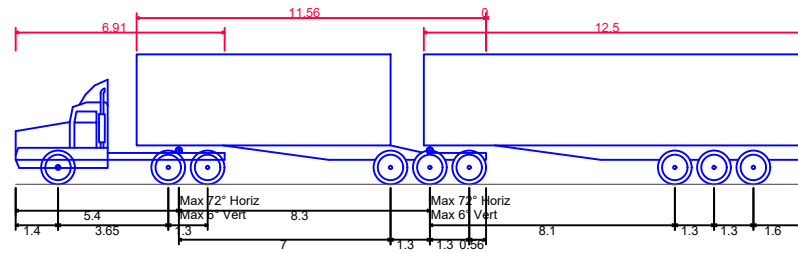
TTM CONSULTING PTY LTD

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P.O. BOX 12015, BRISBANE QLD 4003

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PROJECT	765 CAPRICORN HWY, GRACEMERE
DRAWING TITLE	VEHICLE MANOEUVRING INTERNAL BOWSER ACCESS AND QUEUING

PROJECT NUMBER	22BRT0852	ORIGINAL SIZE	A3
DRAWING NUMBER	22BRT0852-03	REVISION	A
DATE	31 May 2023	SHEET	1 OF 1



B-Double (26.0m)
Overall Length 26.000m
Overall Width 2.500m
Overall Body Height 4.300m
Min Body Ground Clearance 0.540m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 15.000m
Design Speed Forward Min. 5.0km/h
Clearance Envelope 0.500m

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/75-2023

Dated: 23 November 2023

DIRECTOR

Simon Crank

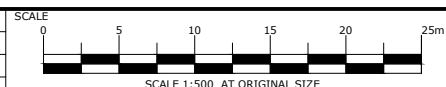
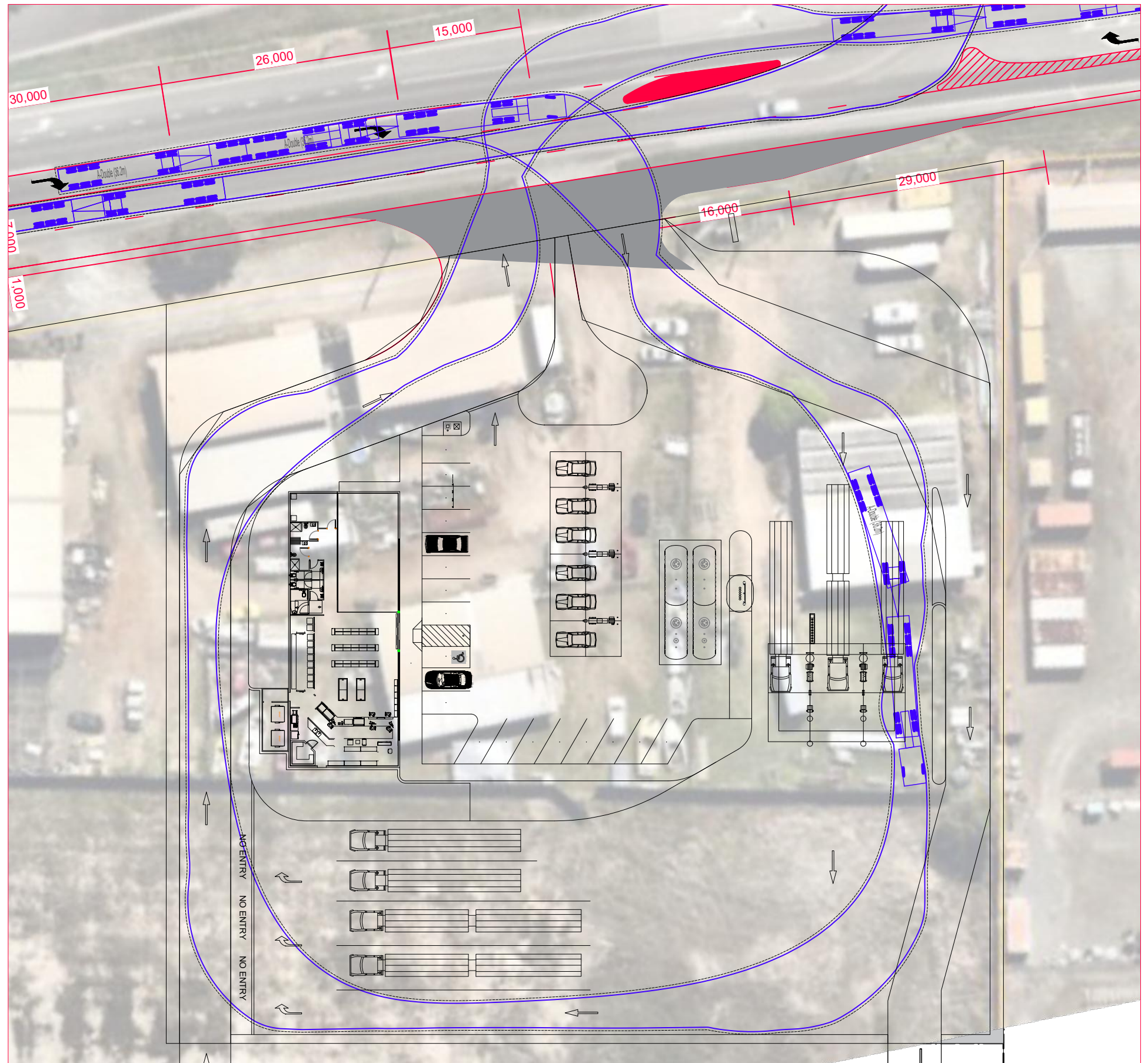
SIMON CRANK

RPEQ 18360

APPROVED 10 Aug 2023

**PRELIMINARY
ADVICE ONLY**

10 August 2023



CLIENT

ACCORD PROPERTY



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PROJECT

765 CAPRICORN HWY, GRACEMERE

DRAWING TITLE

**VEHICLE MANOEUVRING
INTERNAL A-DOUBLE SWEEP PATH ANALYSIS**

PROJECT NUMBER

22BRT0852

DRAWING NUMBER

22BRT0852-04

DATE

10 Aug 2023

ORIGINAL SIZE

A3

REVISION

A

SHEET

1 OF 1

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	10-08-23	ORIGINAL ISSUE	SC		SC