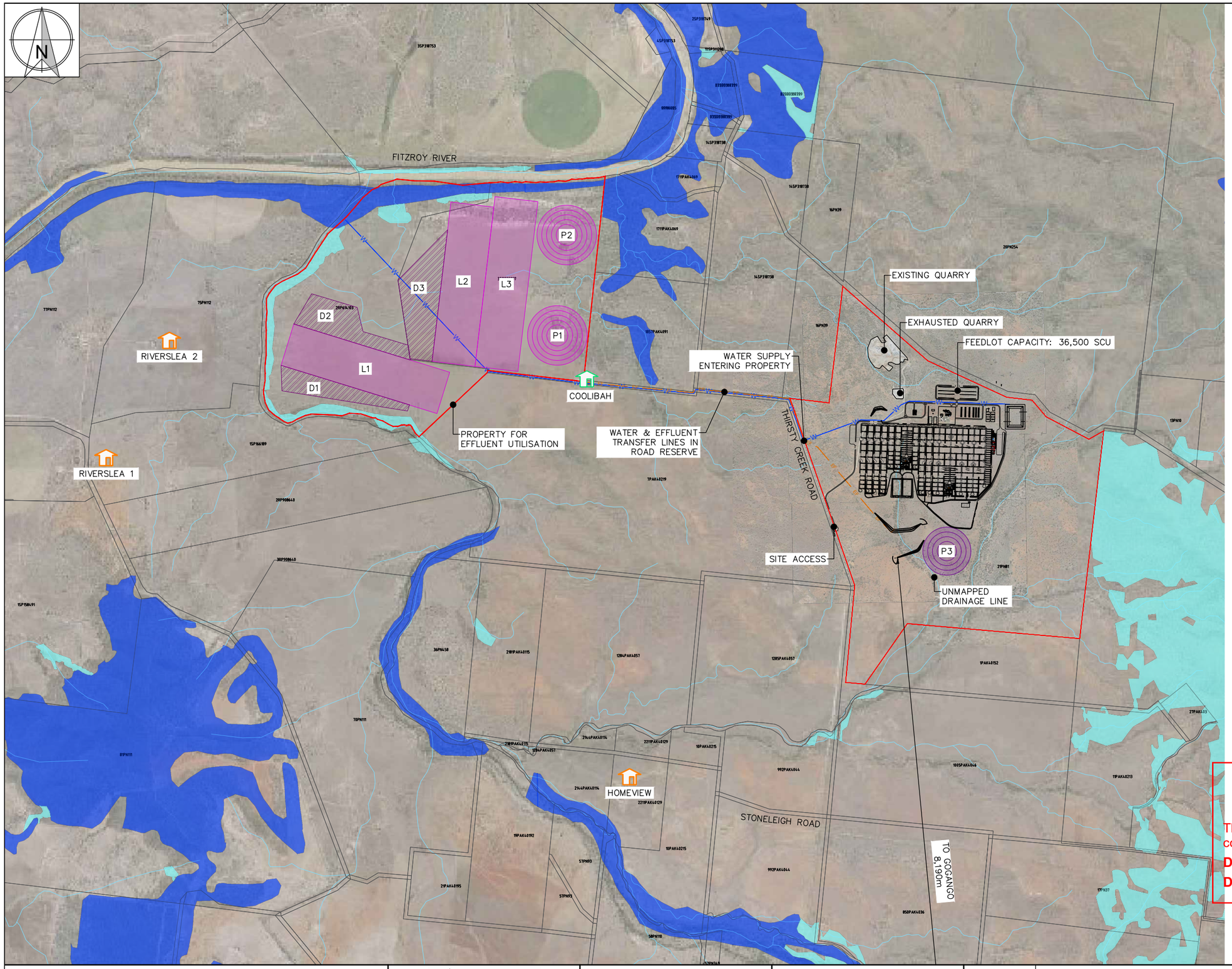


LEGEND

- PROPERTY BOUNDARY
- PRIMARY EFFLUENT UTILISATION (292.1 ha)
- SECONDARY EFFLUENT UTILISATION (19.6 ha)
- DRYLAND AREA (92.3 ha)
- REGULATED VEGETATION–CATEGORY B
- REGULATED VEGETATION–CATEGORY C
- MAPPED STREAM ORDER
- WATER SUPPLY LINE
- EFFLUENT PIPELINE
- SENSITIVE RECEPTOR
- DWELLING OWNED BY APPLICANT

NOTES

1. AERIAL IMAGE SOURCED FROM QLD GLOBE. IMAGE ACCESS DATE 18/01/2022.
2. CADASTRAL, VEGETATION & STREAM ORDER DATA SOURCED THROUGH QSPATIAL. DATA SOURCED JULY 2021.
3. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
4. PIVOT 2 (30ha) IS AN OPTIONAL INCLUSION THAT WILL ONLY BE DEVELOPED IN THE EVENT THAT NUTRIENT ACCUMULATION IS IDENTIFIED ON THE OTHER EFFLUENT UTILISATION AREAS.

UTILISATION AREAS

PADDOCK	DIMENSION	AREA
LATERAL 1 (L1)	450m x 1,700m	76.5
LATERAL 2 (L2)	450m x 1,670m	75.0
LATERAL 3 (L3)	450m x 1,780m	80.0
PIVOT 1 (P1)	310m	30.0
PIVOT 2 (P2)	310m	30.0
PIVOT 3 (P3)[1]	250m	19.6
DRYLAND 1 (D1)	VARIABLE	22
DRYLAND 2 (D2)	VARIABLE	30
DRYLAND 3 (D3)	VARIABLE	40
LATERAL 4 (L4)[2]	300m x 1,200m	36.0

[1]PIVOT 3 IS A SECONDARY PIVOT THAT IS ONLY TO BE USED IF THE OTHER PIVOTS ARE TEMPORARILY IMPACTED BY FLOOD WATER.
[2]PIVOT 2 IS ONLY TO BE DEVELOPED IF UNSUSTAINABLE NUTRIENT ACCUMULATION IS IDENTIFIED ACROSS THE OTHER EFFLUENT REUSE AREAS (L1, L2, L3, P1).

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/52-2022

Dated: 20 December 2022

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
PROPERTY PLAN (AERIAL IMAGE)

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 400 800 1,200m
SCALE 1:20,000 (A1)
0 800 1,600 2,400m
SCALE 1:40,000 (A3)

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

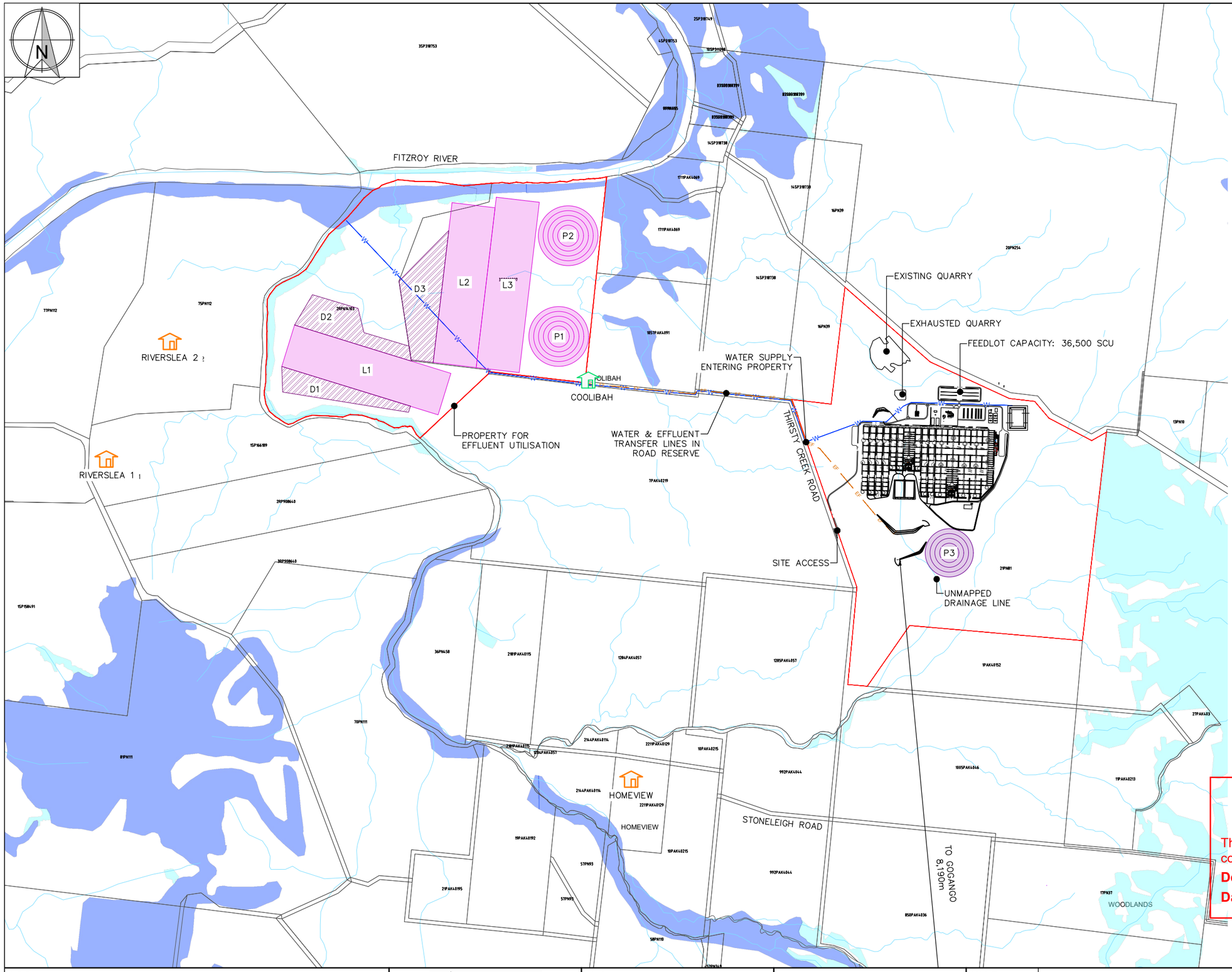
FOR APPROVAL

DATE	REV	DESCRIPTION	APP
11/07/2022	E	FINAL RFI RESPONSE	TJS
31/03/2022	D	FINAL FOR SUBMISSION	TJS
18/03/2022	C	FINAL DRAFT BEFORE SUBMISSION	TJS
03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A001
CURRENT REVISION: E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



LEGEND

- PROPERTY BOUNDARY
- PRIMARY EFFLUENT UTILISATION (292.1 ha)
- SECONDARY EFFLUENT UTILISATION (19.6 ha)
- DRYLAND AREA (92.3 ha)
- REGULATED VEGETATION–CATEGORY B
- REGULATED VEGETATION–CATEGORY C
- MAPPED STREAM ORDER
- WATER SUPPLY LINE
- EFFLUENT PIPELINE
- SENSITIVE RECEPTOR
- DWELLING OWNED BY APPLICANT

NOTES

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UTILISATION AREAS

PADDOCK	DIMENSION	AREA
LATERAL 1 (L1)	450m x 1,700m	76.5
LATERAL 2 (L2)	450m x 1,670m	75.0
LATERAL 3 (L3)	450m x 1,780m	80.0
PIVOT 1 (P1)	310m	30.0
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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/52-2022

Dated: 20 December 2022

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
PROPERTY PLAN

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 400 800 1,200m
SCALE 1:20,000 (A1)
0 800 1,600 2,400m
SCALE 1:40,000 (A3)

MORT & Co

DESIGNED TJS
CHECKED MRN
PROJECT MANAGER MRN

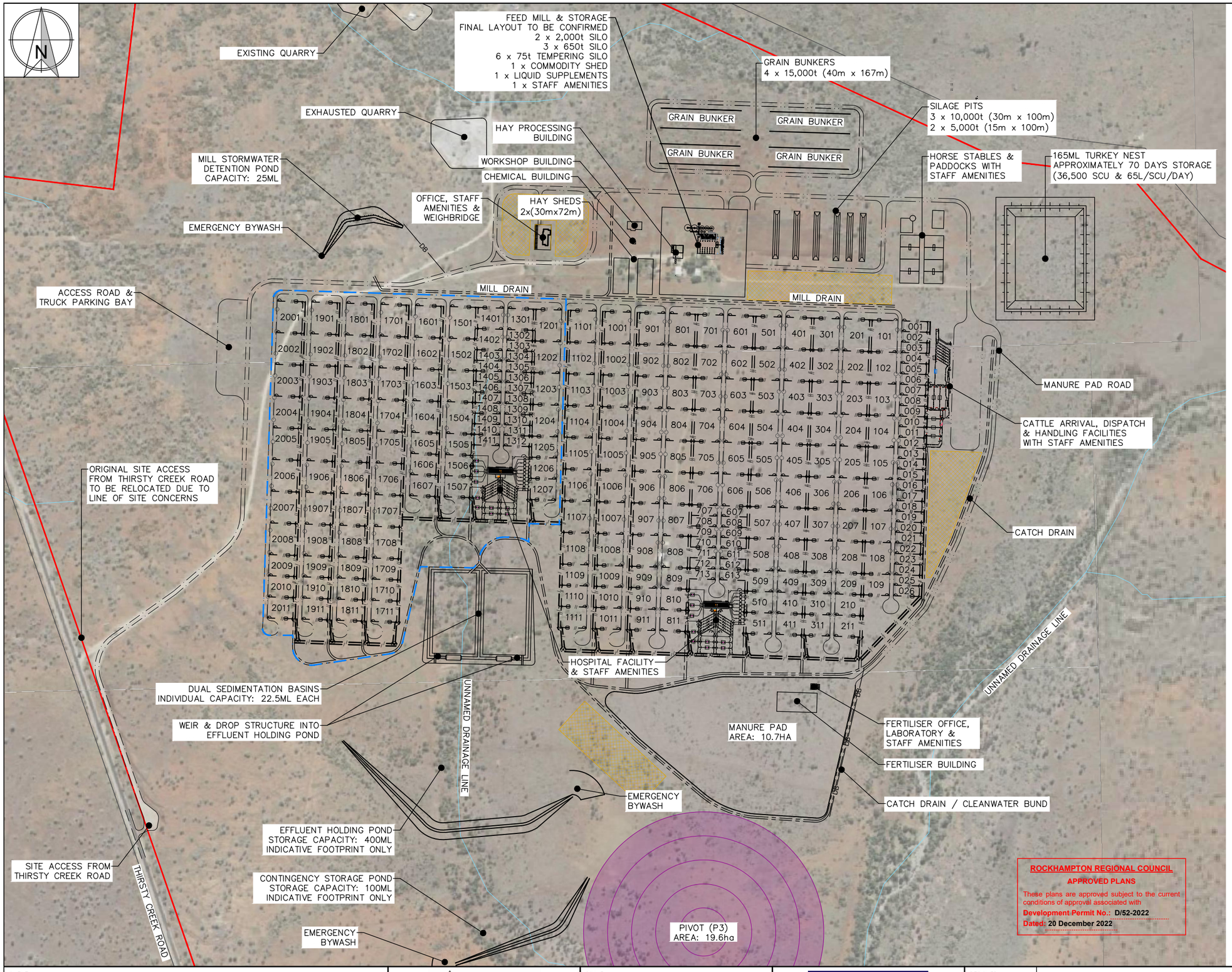
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DATE	REV	DESCRIPTION	APP
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18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE MCO–005
SHEET NUMBER A002
CURRENT REVISION E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



LEGEND

- CONTOUR – EXISTING (5.0m)
- CONTOUR – EXISTING (1.0m)
- PROPERTY BOUNDARY
- CADASTRAL BOUNDARY
- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- DIVERSION BANK
- STAGE 2 CONSTRUCTION BOUNDARY
- MAPPED STREAM ORDER
- SECONDARY EFFLUENT UTILISATION (19.6 ha)
- STP UTILISATION AREA (1.8ha EACH)

NOTES:

1. AERIAL IMAGE SOURCED FROM QLD GLOBE. IMAGE ACCESS DATE 18/01/2022.
2. CONTOURS HAVE BEEN GENERATED USING LIDAR INFORMATION AVAILABLE FROM THE ELVIS PORTAL & LIDAR INFORMATION FLOWN BY AIRBORNE RESEARCH AUSTRALIA ON BEHALF OF RFM.
3. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
4. ALL CAPACITIES ARE BASED ON A STOCKING DENSITY OF 15.4m²/SCU.
5. THE REQUIRED SEDIMENTATION BASIN CAPACITY & EFFLUENT HOLDING POND HAVE BEEN CALCULATED TO EXCEED THE MINIMUM CAPACITIES DETERMINED USING THE FEEDLOT ASSESSMENT SPREADSHEET – VERSION 8.6 – APRIL 2019.

DESIGN: GENERAL FACILITY

1.	FEED ROAD WIDTH	= 7.70 m
2.	BUNK WIDTH	= 1.15 m
3.	CATTLE LANE/DRAIN WIDTH	= 5.0 m

DESIGN: FEEDLOT PENS

1.	STOCKING DENSITY	= 15.4m²/SCU
2.	BUNK SPACE	= 291mm/SCU
3.	SHADE PROVISION	= 2.5m²/SCU
4.	LARGE (66.0m x 53.0m)	= 3,500m²/PEN
5.	LARGE PEN CAPACITY	= 227 SCU @ 15.4m
6.	SHADED AREA	= 565m²/PEN
7.	TOTAL LARGE PENS	= 128
8.	SMALL (44.0m x 53.0m)	= 2,330m²/PEN
9.	SMALL PEN CAPACITY	= 151 SCU @ 15.4m
10.	SHADED AREA	= 375m²/PEN
11.	TOTAL SMALL PENS	= 49
12.	HANDLING (22.0m x 53.0m)	= 1,170m²/PEN
13.	HANDLING PEN CAPACITY	= 75 SCU @ 15.4m²
14.	SHADED AREA	= 185m²/PEN
15.	TOTAL HANDLING PENS	= 60
16.	PRODUCTION CAPACITY	= 36,500 SCU
17.	HANDLING/HOSPITAL CAPACITY (12.4% CAPACITY ABOVE PRODUCTION)	= 4,500 SCU

DESIGN: STAGE FEEDLOT CAPACITY

1.	STAGE 1 (63%)	
1.1.	PRODUCTION CAPACITY	= 22,870 SCU
1.2.	HANDLING CAPACITY	= 3,000 SCU
2.	STAGE 2 (37%)	
2.1.	PRODUCTION CAPACITY	= 13,630 SCU
2.2.	HANDLING CAPACITY	= 1,500 SCU

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
CONCEPT PLAN

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 80 160 240m
SCALE 1:4,000 (A1)
0 160 320 480m
SCALE 1:8,000 (A3)

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

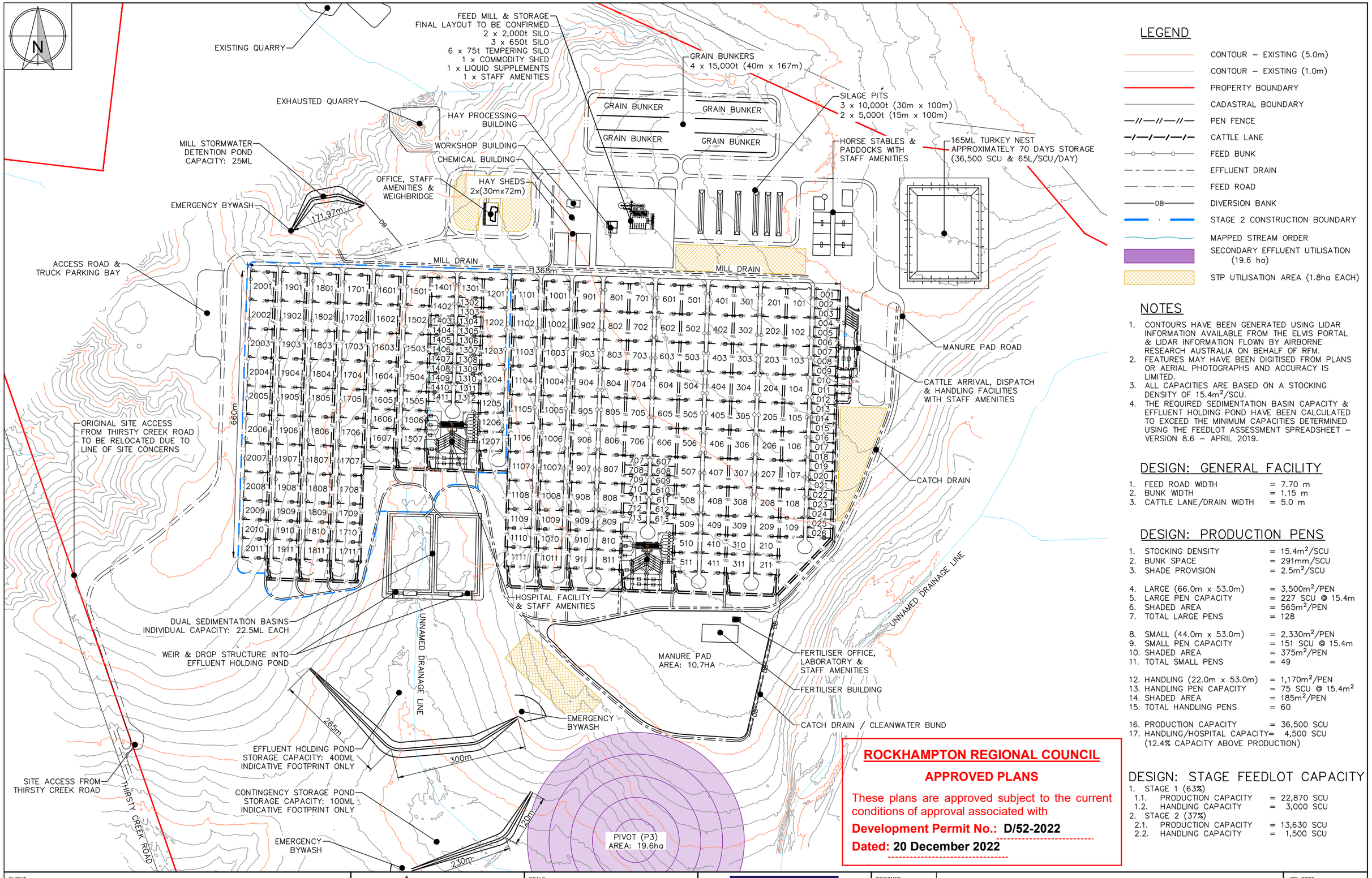
FOR APPROVAL

DATE	REV	DESCRIPTION	APP
11/07/2022	E	FINAL RFI RESPONSE	TJS
31/03/2022	D	FINAL FOR SUBMISSION	TJS
18/03/2022	C	FINAL DRAFT BEFORE SUBMISSION	TJS
03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A003
CURRENT REVISION: E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



LEGEND

- CONTOUR – EXISTING (5.0m)
- CONTOUR – EXISTING (1.0m)
- PROPERTY BOUNDARY
- CADASTRAL BOUNDARY
- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- DIVERSION BANK
- STAGE 2 CONSTRUCTION BOUNDARY
- MAPPED STREAM ORDER
- SECONDARY EFFLUENT UTILISATION (19.6 ha)
- STP UTILISATION AREA (1.8ha EACH)

NOTES

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4. THE REQUIRED SEDIMENTATION BASIN CAPACITY & EFFLUENT HOLDING POND HAVE BEEN CALCULATED TO EXCEED THE MINIMUM CAPACITIES DETERMINED USING THE FEEDLOT ASSESSMENT SPREADSHEET – VERSION 8.6 – APRIL 2019.

DESIGN: GENERAL FACILITY

1.	FEED ROAD WIDTH	= 7.70 m
2.	BUNK WIDTH	= 1.15 m
3.	CATTLE LANE/DRAIN WIDTH	= 5.0 m

DESIGN: PRODUCTION PENS

1.	STOCKING DENSITY	= 15.4m²/SCU
2.	BUNK SPACE	= 291mm/SCU
3.	SHADE PROVISION	= 2.5m²/SCU
4.	LARGE (66.0m x 53.0m)	= 3,500m²/PEN
5.	LARGE PEN CAPACITY	= 227 SCU @ 15.4m
6.	SHADED AREA	= 565m²/PEN
7.	TOTAL LARGE PENS	= 128
8.	SMALL (44.0m x 53.0m)	= 2,330m²/PEN
9.	SMALL PEN CAPACITY	= 151 SCU @ 15.4m
10.	SHADED AREA	= 375m²/PEN
11.	TOTAL SMALL PENS	= 49
12.	HANDLING (22.0m x 53.0m)	= 1,170m²/PEN
13.	HANDLING PEN CAPACITY	= 75 SCU @ 15.4m²
14.	SHADED AREA	= 185m²/PEN
15.	TOTAL HANDLING PENS	= 60
16.	PRODUCTION CAPACITY	= 36,500 SCU
17.	HANDLING/HOSPITAL CAPACITY	= 4,500 SCU (12.4% CAPACITY ABOVE PRODUCTION)

DESIGN: STAGE FEEDLOT CAPACITY

1. STAGE 1 (63%)
   - 1.1. PRODUCTION CAPACITY = 22,870 SCU
   - 1.2. HANDLING CAPACITY = 3,000 SCU
2. STAGE 2 (37%)
   - 2.1. PRODUCTION CAPACITY = 13,630 SCU
   - 2.2. HANDLING CAPACITY = 1,500 SCU

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/52-2022

Dated: 20 December 2022

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
DESIGN PLAN

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 80 160 240m
SCALE 1:4,000 (A1)
0 160 320 480m
SCALE 1:8,000 (A3)

MORT & Co

DESIGNED TJS
CHECKED MRN
PROJECT MANAGER MRN

FOR APPROVAL

DATE	REV	DESCRIPTION	APP
11/07/2022	E	FINAL RFI RESPONSE	TJS
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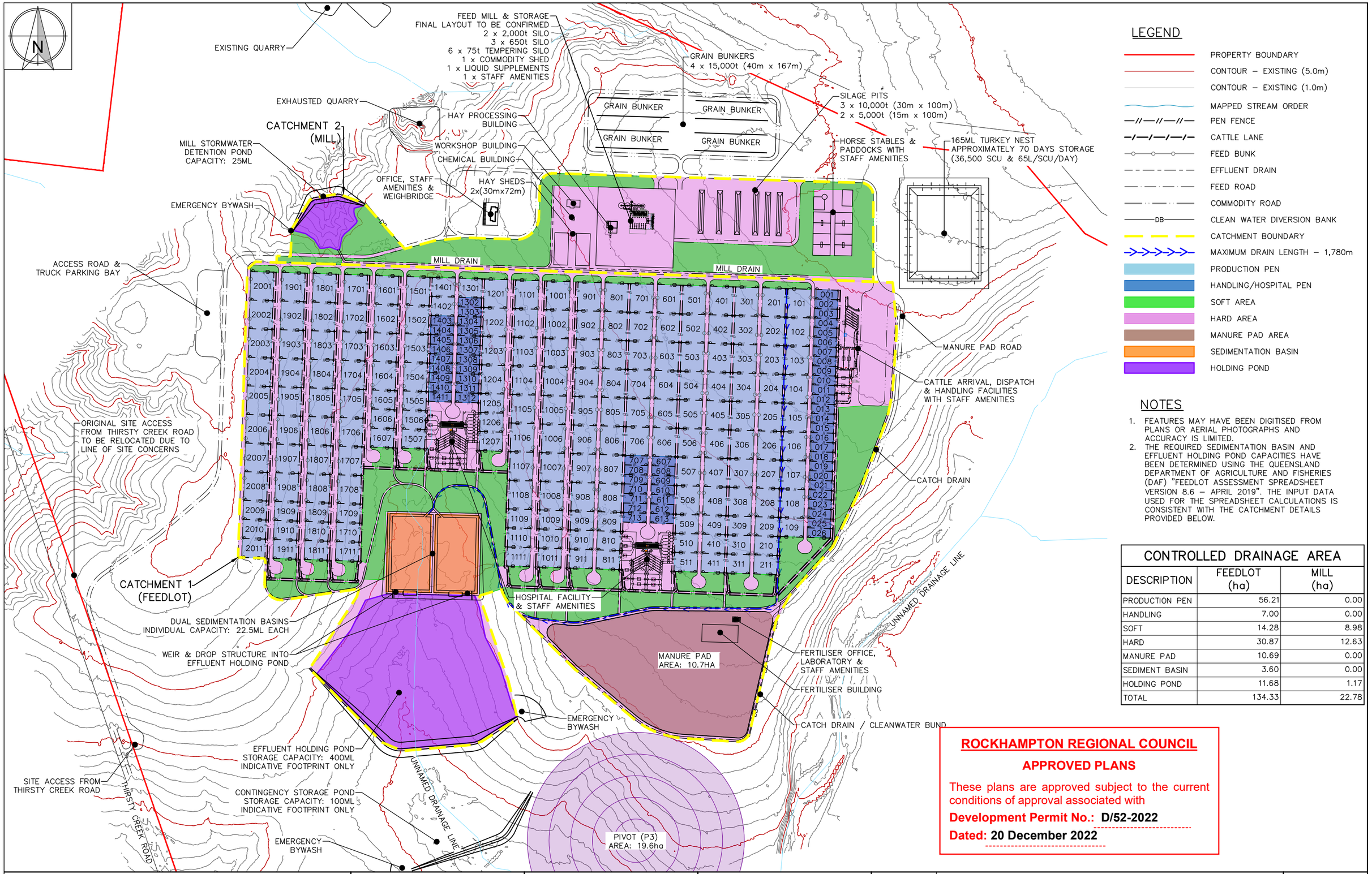
REVISIONS

JOB CODE
MCO–005

SHEET NUMBER
A004

CURRENT REVISION
E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



NOTES

1. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
2. THE REQUIRED SEDIMENTATION BASIN AND EFFLUENT HOLDING POND CAPACITIES HAVE BEEN DETERMINED USING THE QUEENSLAND DEPARTMENT OF AGRICULTURE AND FISHERIES (DAF) "FEEDLOT ASSESSMENT SPREADSHEET VERSION 8.6 – APRIL 2019". THE INPUT DATA USED FOR THE SPREADSHEET CALCULATIONS IS CONSISTENT WITH THE CATCHMENT DETAILS PROVIDED BELOW.

CONTROLLED DRAINAGE AREA

DESCRIPTION	FEEDLOT (ha)	MILL (ha)
PRODUCTION PEN	56.21	0.00
HANDLING	7.00	0.00
SOFT	14.28	8.98
HARD	30.87	12.63
MANURE PAD	10.69	0.00
SEDIMENT BASIN	3.60	0.00
HOLDING POND	11.68	1.17
TOTAL	134.33	22.78

ROCKHAMPTON REGIONAL COUNCIL

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PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
CONTROLLED DRAINAGE AREA PLAN

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
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SCALE
0 80 160 240m
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SCALE 1:8,000 (A3)

MORT & Co

DESIGNED TJS
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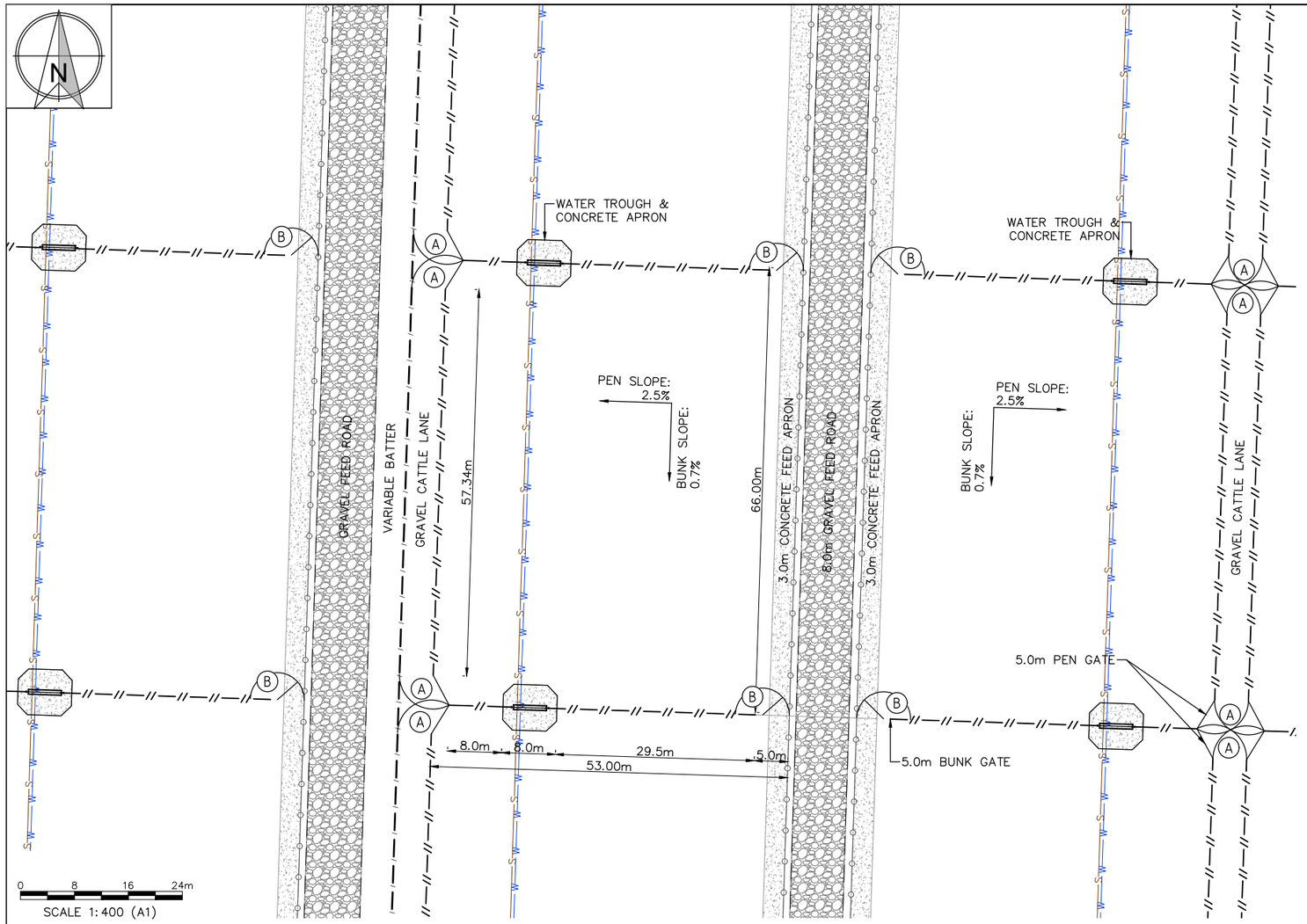
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REVISIONS

JOB CODE MCO–005
SHEET NUMBER A005
CURRENT REVISION E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



TYPICAL PLAN – PRODUCTION PENS

LEGEND

- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- A — GATE – 5.0m CATTLE ACCESS
- B — GATE – 5.0m BUNK PEN–PEN ACCESS
- WATER LINE
- TROUGH SEWER LINE
- CONCRETE APRON
- GRAVEL FEED ROAD

DESIGN: GENERAL FACILITY

1.	FEED ROAD WIDTH	= 7.70 m
2.	BUNK WIDTH	= 1.15 m
3.	CATTLE LANE/DRAIN WIDTH	= 5.0 m

DESIGN: PRODUCTION PENS

1.	STOCKING DENSITY	= 15.4m²/SCU
2.	BUNK SPACE	= 291mm/SCU
3.	SHADE PROVISION	= 2.5m²/SCU
4.	LARGE (66.0m x 53.0m)	= 3,500m²/PEN
5.	LARGE PEN CAPACITY	= 227 SCU @ 15.4m
6.	SHADED AREA	= 565m²/PEN
7.	TOTAL LARGE PENS	= 128
8.	SMALL (44.0m x 53.0m)	= 2,330m²/PEN
9.	SMALL PEN CAPACITY	= 151 SCU @ 15.4m
10.	SHADED AREA	= 375m²/PEN
11.	TOTAL SMALL PENS	= 49
12.	HANDLING (22.0m x 53.0m)	= 1,170m²/PEN
13.	HANDLING PEN CAPACITY	= 75 SCU @ 15.4m²
14.	SHADED AREA	= 185m²/PEN
15.	TOTAL HANDLING PENS	= 60
16.	PRODUCTION CAPACITY	= 36,500 SCU
17.	HANDLING/HOSPITAL CAPACITY= (12.4% CAPACITY ABOVE PRODUCTION)	4,500 SCU

MATERIALS

1. THE MATERIALS USED FOR THE CONSTRUCTION OF THE COMPOST PAD SHALL BE CLASSIFIED AS EITHER CL, CI, CH, SC OR GC IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM. IT SHALL COMPLY WITH THE FOLLOWING PARTICLE SIZE & PLASTICITY LIMITS.
2. PARTICLE SIZE DISTRIBUTION

37.5	100
19.0	70–700
2.36	40–100
0.075	25–90

3. FINES PLASTICITY LIMITS FINES (PASSING 0.425mm)

LIQUID LIMIT:	30–60%
PLASTICITY INDEX:	>10%

CONSTRUCTION REQUIREMENTS

1. TOPSOIL STRIPPING SHALL BE UNDERTAKEN TO A SUITABLE DEPTH TO CLEAR THE SITE OF TREES, SCRUB, STUMPS, GRASS & ORGANIC MATTER.
2. AFTER TOPSOIL STRIPPING HOLES RESULTING FROM THE STRIPPING SHALL BE FILLED.
3. RIPPING TO A DEPTH OF 150mm IS TO BE UNDERTAKEN AND WATER ADDED TO ENSURE MATERIAL IS WITHIN ±2% OF THE OPTIMUM MOISTURE CONTENT (OMC).
4. AFTER WATERING COMPACTION IS TO BE UNDERTAKEN TO PRODUCE EITHER A FIELD DRY DENSITY OF AT LEAST 95% OF THE STANDARD MAXIMUM DRY DENSITY (MDD) OR ALTERNATIVELY, A HILF DENSITY RATIO OF AT LEAST 95%.
5. SUITABLE FILL MATERIAL SHOULD BE PLACED IN LAYERS OF 200mm (PRIOR TO COMPACTION). EACH LAYER SHOULD BE TINED, WETTED TO ±2% OF OPTIMUM MOISTURE CONTENT (AS 1289 5.1.1) AND COMPACTED TO REACH THE REQUIRED COMPACTION RELATIVE TO THE MAXIMUM DRY DENSITY (AS1289 5.4.2).
6. THE FINAL SURFACE OF THE PAD MUST HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 20, & BE OF SUFFICIENT DEPTH TO ENSURE THE INTEGRITY OF THE STRUCTURE IS MAINTAINED THROUGHOUT THE GENERAL OPERATION OF THE FEEDLOT.
7. IRRESPECTIVE OF THE FINISHED PEN SURFACE, THE UNDERLYING SOILS MUST HAVE A MAXIMUM PERMEABILITY OF 1 x 10^{-9}m/s (0.1mm/day) FOR DISTILLED WATER WITH 1.0m OF PRESSURE HEAD.

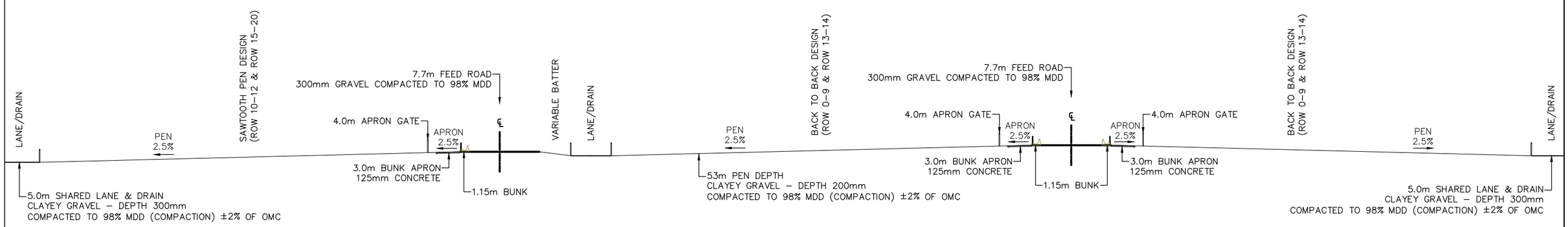
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/52-2022

Dated: 20 December 2022



TYPICAL SECTION THROUGH PENS

SCALE: 1=200 (A1); 1=400 (A3)

CLIENT: MORT & CO LOT FEEDERS PTY LTD

PROJECT: 'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION: THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE: TYPICAL PEN LAYOUT

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
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SCALE

0 5 10 15m
SCALE 1:250 (A1)

0 10 20 30m
SCALE 1:500 (A3)

MORT & Co

DESIGNED: TJS

CHECKED: MRN

PROJECT MANAGER: MRN

FOR APPROVAL

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18/03/2022	C	FINAL DRAFT BEFORE SUBMISSION	TJS
03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	ORIGINAL ISSUE	TJS

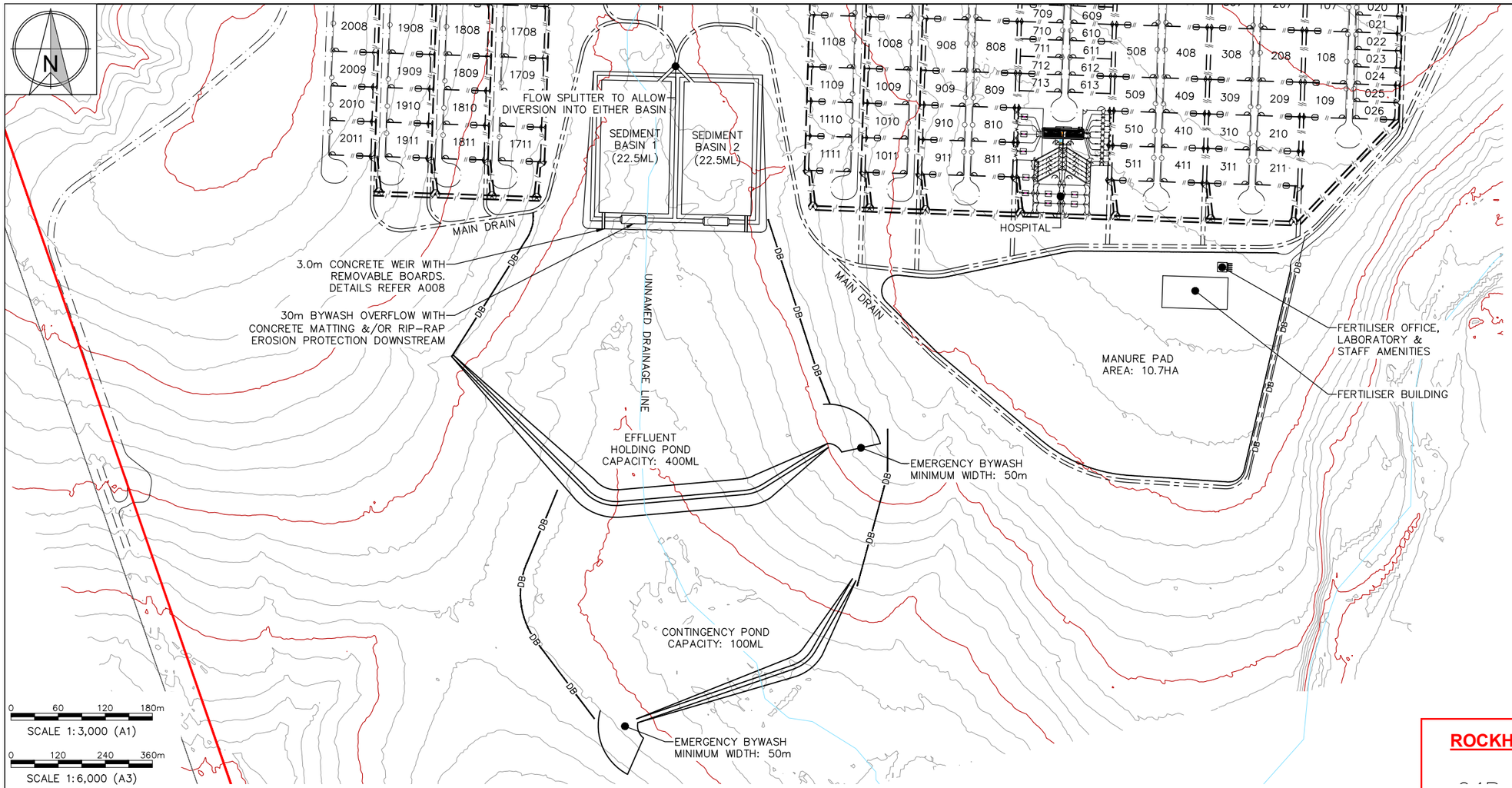
REVISIONS

JOB CODE: MCO–005

SHEET NUMBER: A006

CURRENT REVISION: E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



LEGEND

- CONTOUR – EXISTING (5.0m)
- CONTOUR – EXISTING (1.0m)
- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- DB — DIVERSION BANK
- DRAINAGE LINE

NOTES:

1. CONTOURS HAVE BEEN GENERATED USING LIDAR INFORMATION AVAILABLE FROM THE ELVIS PORTAL & LIDAR INFORMATION FLOWN BY AIRBORNE RESEARCH AUSTRALIA ON BEHALF OF RFM.
2. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
3. THE REQUIRED SEDIMENTATION BASIN CAPACITY & EFFLUENT HOLDING POND HAVE BEEN CALCULATED TO EXCEED THE MINIMUM CAPACITIES DETERMINED USING THE FEEDLOT ASSESSMENT SPREADSHEET – VERSION 8.6 – APRIL 2019.

DESIGN: SEDIMENTATION BASIN

1.	AVERAGE DEPTH	= 1.25 m
2.	SURFACE AREA AT TWL	= 1.80 ha
3.	CAPACITY	= 22.5 ML

DESIGN: EFFLUENT HOLDING POND

1.	AVERAGE DEPTH	= 3.4 m
2.	SURFACE AREA AT TWL	= 11.68 ha
3.	CAPACITY	= 400 ML

DESIGN: CONTINGENCY POND

1.	AVERAGE DEPTH	= 1.5 m
2.	SURFACE AREA AT TWL	= 6.40 ha
3.	CAPACITY	= 400 ML

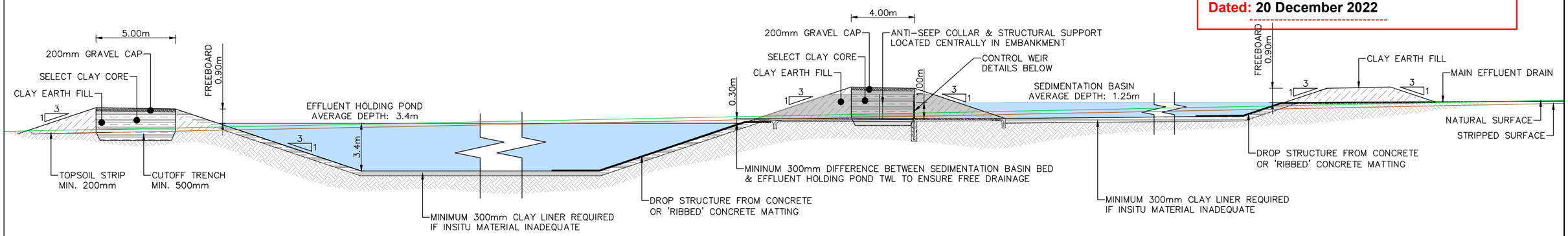
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/52-2022

Dated: 20 December 2022



NOT TO SCALE

TYPICAL CROSS SECTION THROUGH EFFLUENT MANAGEMENT SYSTEM

CLIENT: MORT & CO LOT FEEDERS PTY LTD
PROJECT: 'ROOKWOOD' FEEDLOT DEVELOPMENT
LOCATION: THIRSTY CREEK ROAD, GOGANGO, QLD 4702
SHEET TITLE: EFFLUENT MANAGEMENT SYSTEM

AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE: AS SHOWN

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

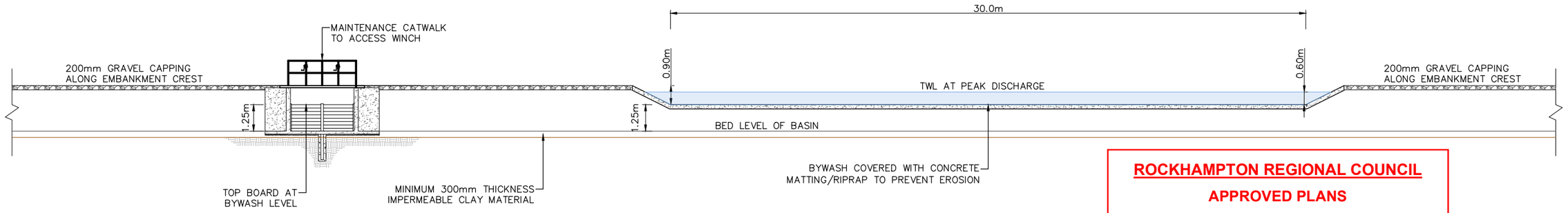
FOR APPROVAL

DATE	REV	DESCRIPTION	APP
11/07/2022	E	FINAL RFI RESPONSE	TJS
31/03/2022	D	FINAL FOR SUBMISSION	TJS
18/03/2022	C	FINAL DRAFT BEFORE SUBMISSION	TJS
03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	FINAL DRAFT BEFORE SUBMISSION	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A007
CURRENT REVISION: E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/52-2022

Dated: 20 December 2022

0 2 4 6m
SCALE 1:100 (A1)

0 4 8 12m
SCALE 1:200 (A3)

TABLE 1 DETAILS POTENTIAL FLOW CAPACITIES OF VARIOUS DRAIN CONFIGURATIONS. A MINIMUM DRAIN WIDTH OF 2.5m IS RECOMMENDED TO ALLOW FOR EASE OF MAINTENANCE.

TABLE 1 – 0.75% DRAIN CAPACITY (m^3/s)

DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.160	0.190	0.230	0.270	0.310	0.340	0.380
0.20	0.530	0.650	0.760	0.880	1	1.110	1.230
0.30	1.110	1.330	1.560	1.790	2.020	2.250	2.480
0.40	1.910	*2.27	*2.63	*2.99	*3.36	*3.73	*4.10
0.50	*2.95	*3.46	*3.98	*4.51	*5.03	*5.56	*6.09

DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.

TABLE 2 DETAILS THE CAPACITY OF VARIOUS RECTANGULAR WEIR CONFIGURATIONS.

TABLE 2 – BASE FLOW WEIR CAPACITY (m^3/s)

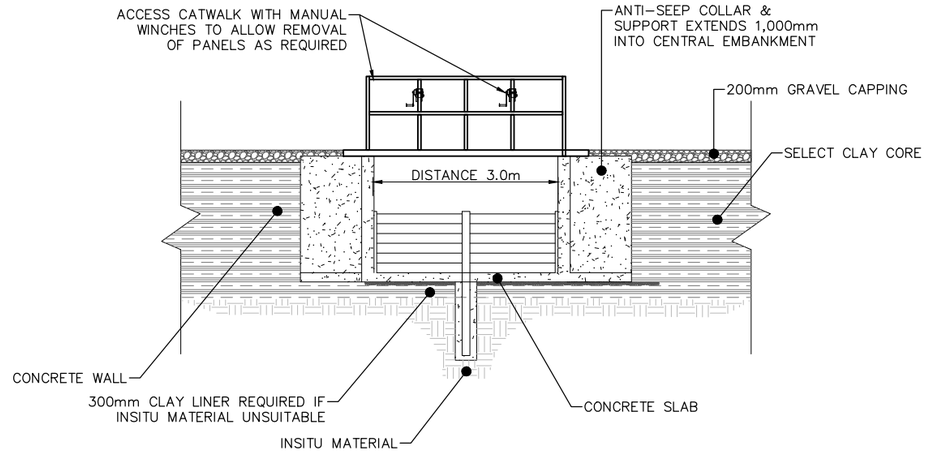
DEPTH (m)	RECTANGULAR WEIR WIDTH (m)							
	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0
0.3	0.56	0.70	0.84	0.98	1.12	1.26	1.40	1.68
0.4	0.86	1.08	1.29	1.51	1.72	1.94	2.15	2.58
0.5	1.20	1.50	1.80	2.10	2.40	2.70	3.01	3.60
0.6	1.58	1.98	2.37	2.77	3.16	3.56	3.95	4.74
0.7	1.99	2.49	2.99	3.48	3.98	4.48	4.98	5.98
0.8	2.43	3.04	3.65	4.26	4.87	5.47	6.08	7.30

MAXIMUM WEIR DEPTH OF 0.6m IS RECOMMENDED. WEIR WIDTH IS DIRECTLY PROPORTIONAL TO FLOW CAPACITY, THEREFORE, 2 x 5.0m WEIRS EQUAL A SINGLE 10.0m WEIR.

PROPOSED WEIR DESIGN

MINIMUM PASSING FLOW (DAF SPREADSHEET)	= 25.8m^3/s
SINGLE WEIR: 3.0m x 0.6m FLOW DEPTH	= 2.4m^3/s
OVERFLOW (30 x 0.6m FLOW DEPTH)	= 23.8m^3/s
TOTAL OVERFLOW	**= 26.2m^3/s**

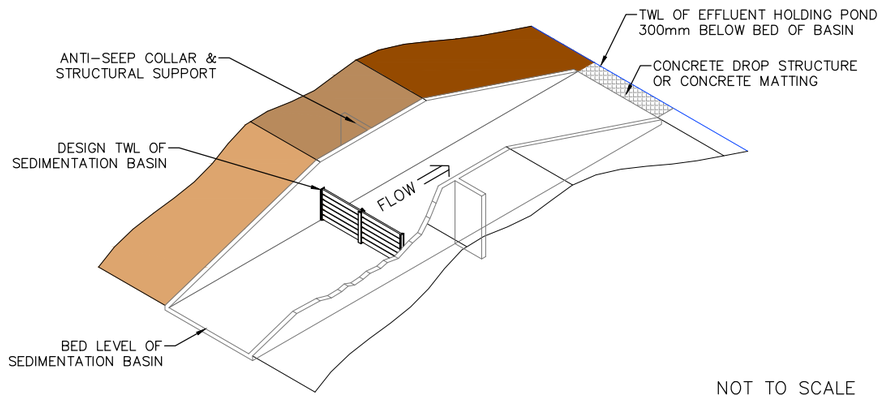
TYPICAL CROSS SECTION THROUGH EFFLUENT MANAGEMENT SYSTEM



CONTROL WEIR – FRONT ELEVATION

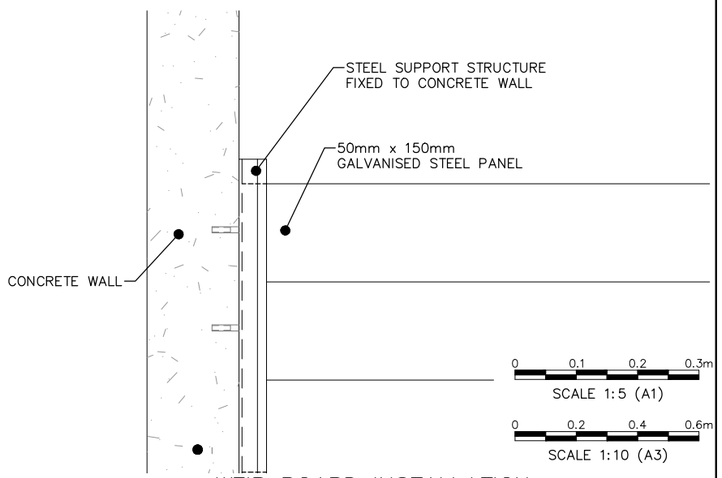
0 1 2 3m
SCALE 1:50 (A1)

0 2 4 6m
SCALE 1:100 (A3)



WEIR INSTALLATION

NOT TO SCALE



0 0.1 0.2 0.3m
SCALE 1:5 (A1)

0 0.2 0.4 0.6m
SCALE 1:10 (A3)

WEIR BOARD INSTALLATION

CLIENT: MORT & CO LOT FEEDERS PTY LTD
PROJECT: 'ROOKWOOD' FEEDLOT DEVELOPMENT
LOCATION: THIRSTY CREEK ROAD, GOGANGO, QLD 4702
SHEET TITLE: TYPICAL BASIN WEIR & OVERFLOW SYSTEM

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE: AS SHOWN

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

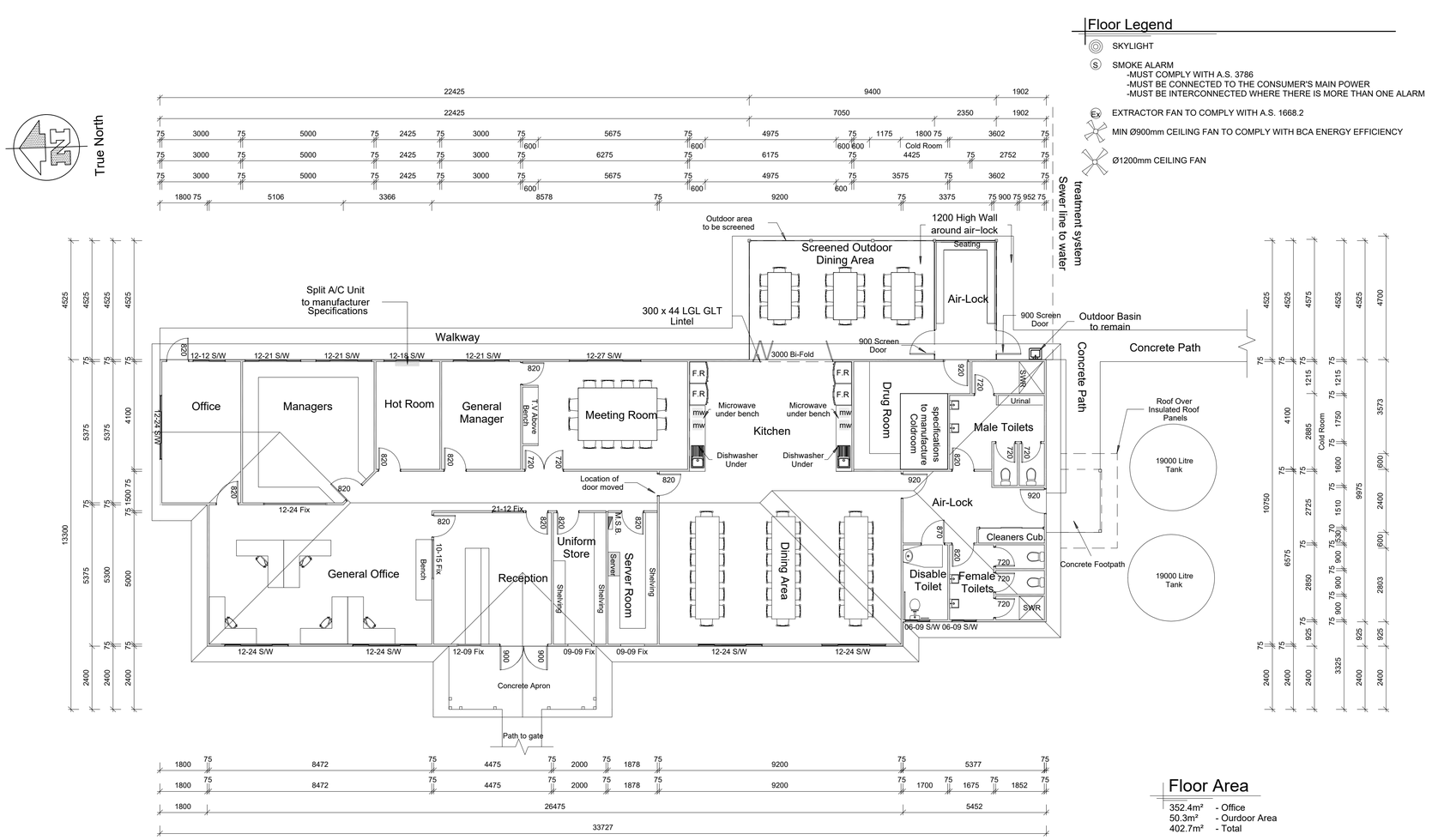
FOR APPROVAL

DATE	REV	DESCRIPTION	APP
11/07/2022	E	FINAL RFI RESPONSE	TJS
31/03/2022	D	FINAL FOR SUBMISSION	TJS
18/03/2022	C	FINAL DRAFT BEFORE SUBMISSION	TJS
03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A008
CURRENT REVISION: E

Document Set ID: 37496462
Version: 1, Version Date: 04/08/2022



Floor Plan

Floor Area

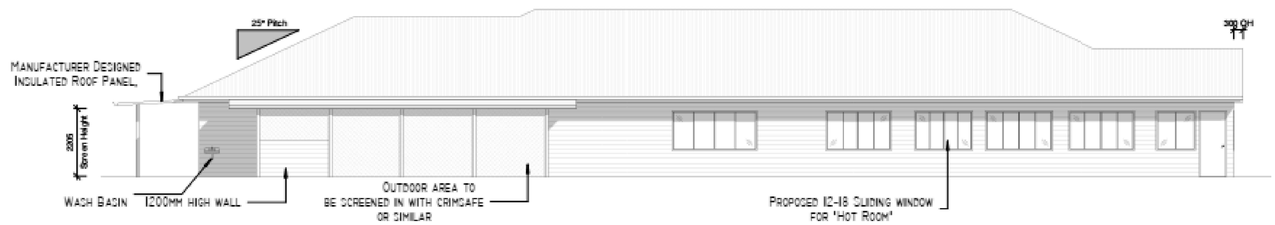
352.4m² - Office
50.3m² - Ourdoor Area
402.7m² - Total



West Elevation



North Elevation



East Elevation



South Elevation

Scale 0 5 10 15 20 25m — 1=200 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title: Rookwood Feedlot Administraton Building Proposed Plan & Elevations

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
		1:100
Drawing No.:		Revision No.:
2236-MMS-AB-01		B

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

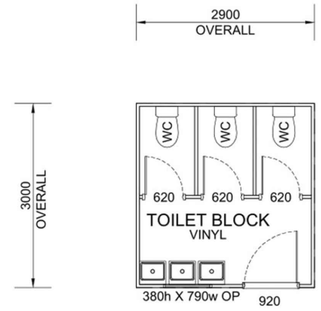
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/52-2022

Dated: 20 December 2022

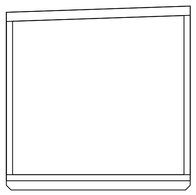
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Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

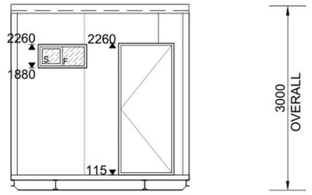


Floor Plan

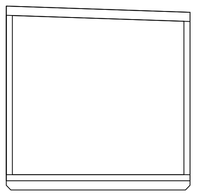
ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/52-2022
Dated: 20 December 2022



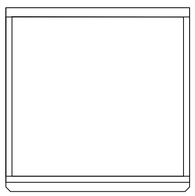
Left Side View



Front View



Right Side View



Rear View

Scale 0 1 2 3 4 5m 1=50 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title:
Rookwood Feedlot
Amenities Building
Proposed Plan & Elevations

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
		1:50
Drawing No.: 2236-MMS-AM-01		Revision No.: B

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Version: 1, Version Date: 22/04/2022



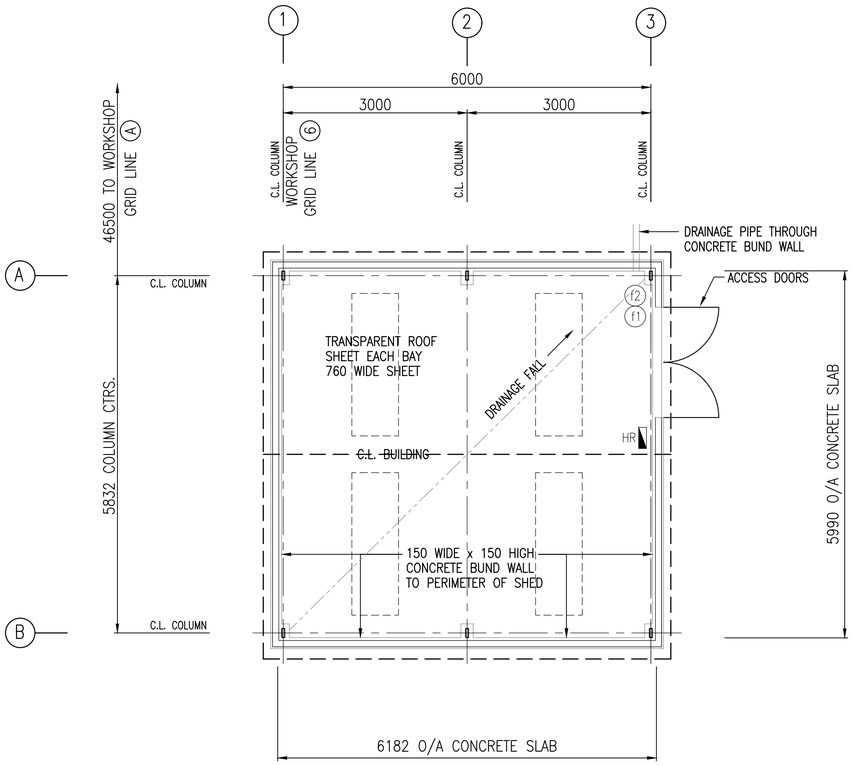
AREA OF CHEMICAL BUILDING 41.73 sq. m.

LEGEND

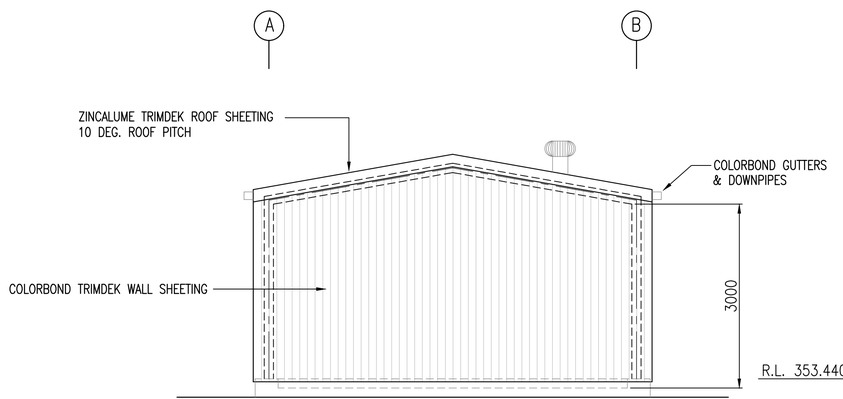
(f1) 3.5kg CO2 EXTINGUISHER
5B:E FIRE TEST RATING

(f2) 4.5kg ABE DRY CHEMICAL EXTINGUISHER
2A:40BE FIRE TEST RATING

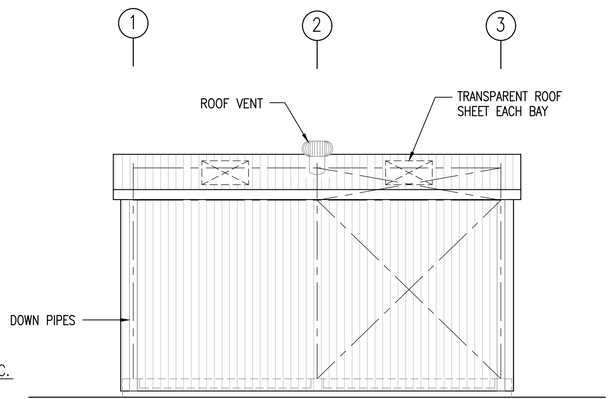
HR 36m FIRE HOSE REEL
TO AS2419.1 – 1994



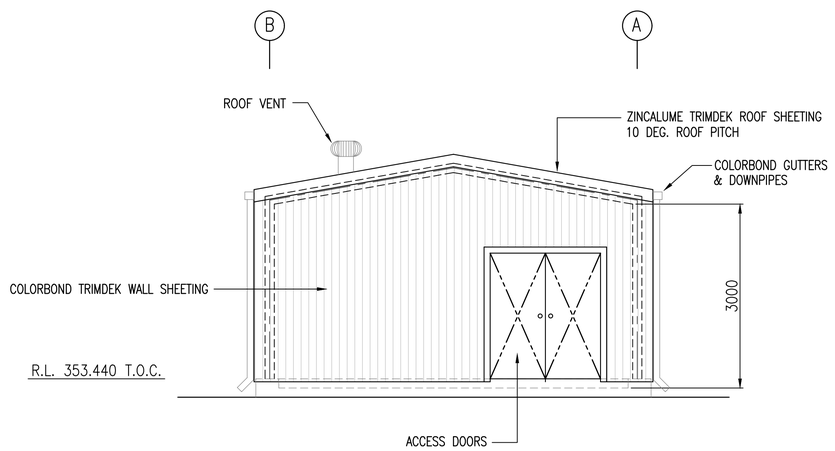
FLOOR PLAN LAYOUT



SOUTH ELEVATION



EAST & WEST ELEVATION



NORTH ELEVATION

SCALE 0 1 2 3 4 5m 1=50 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title:
Rookwood Feedlot
Chemical Building
Proposed Plan & Elevations

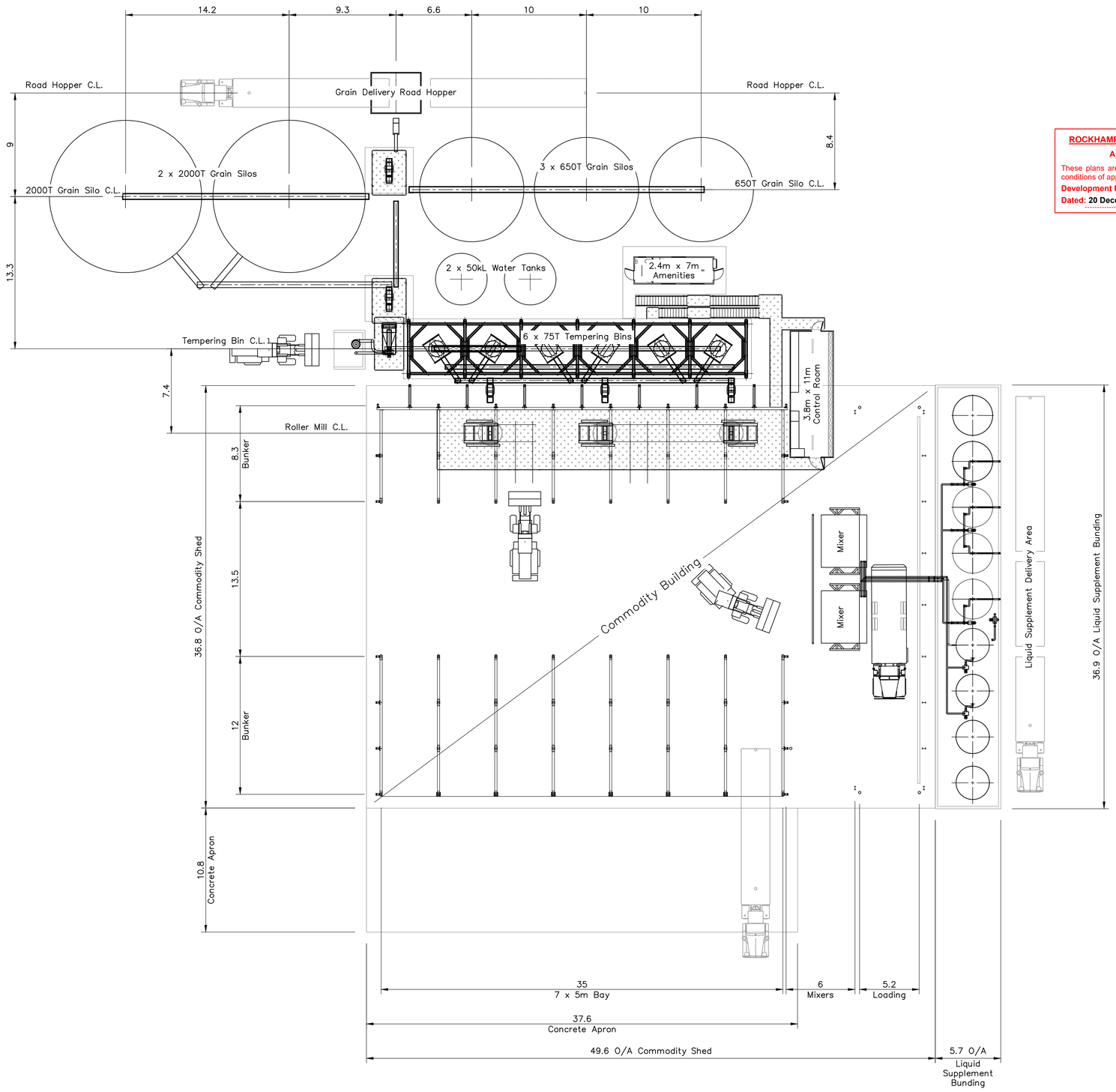
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Approved By:	Approved Date:	Scale:
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2236-MMS-CB-01		B

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/52-2022
Dated: 20 December 2022

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Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

True North



ROCKHAMPTON REGIONAL COUNCIL

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Development Permit No.: D/52-2022

Dated: 20 December 2022

Scale 0 5 10 15 20 25m 1=200 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

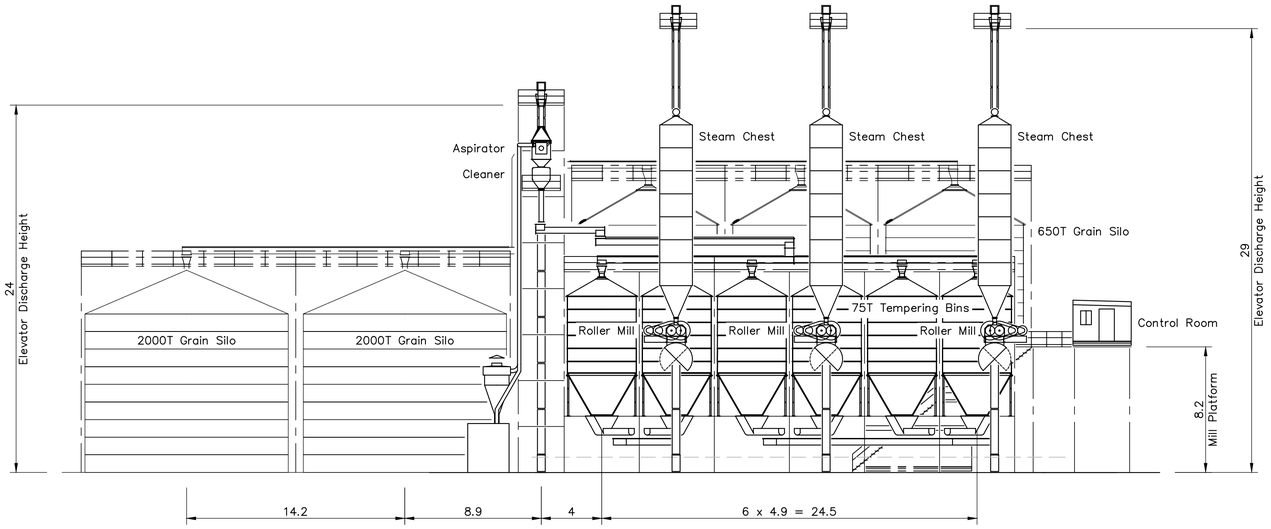
MORT & Co

Drawing Title:
Rookwood Feedlot
Feed Mill & Commodity Building
Proposed Plan

Drawn By: SGS	Drawn Date: 30/03/22	Sheet Size: A1
Approved By:	Approved Date:	Scale: 1:200 uno
Drawing No.: 2236-MMS-FM-01		Revision No.: B

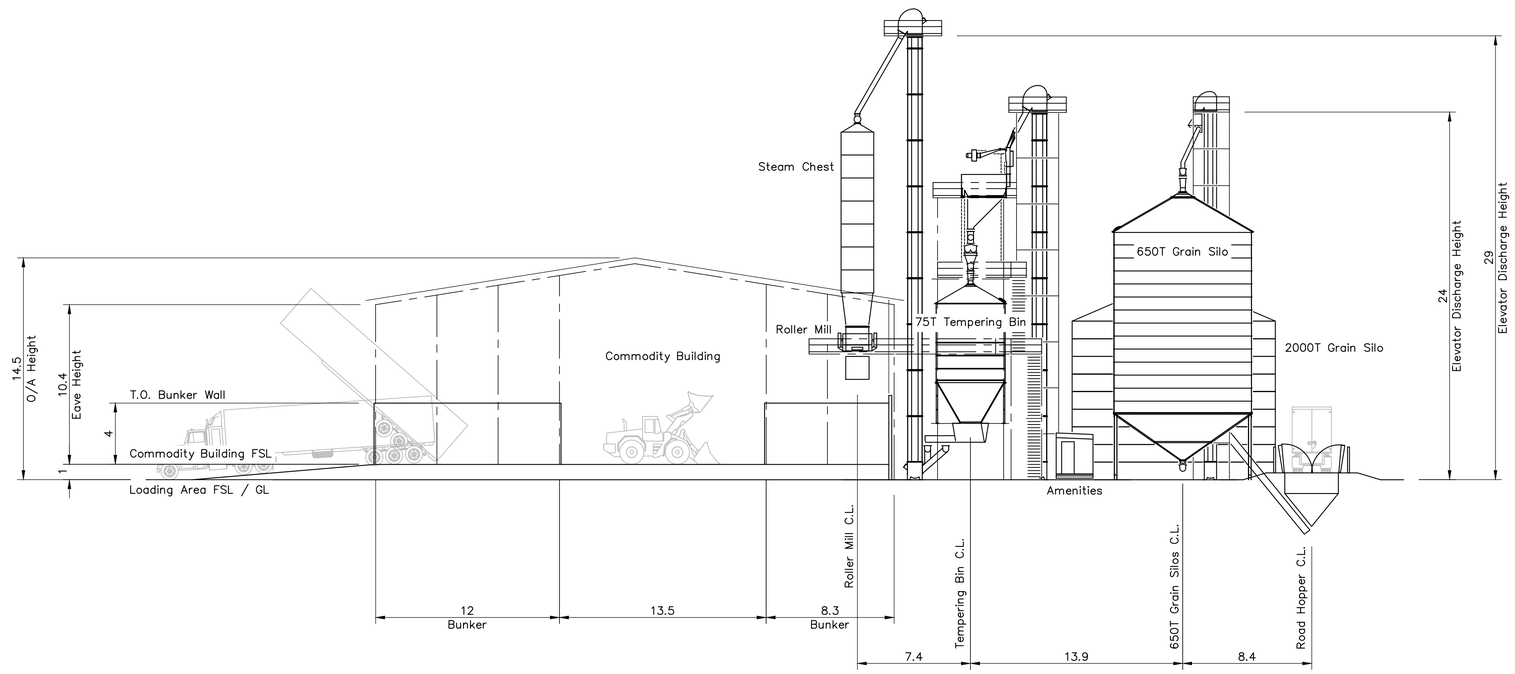
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Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



South Elevation

Note: Commodity Building Removed For Clarity



East Elevation

Note: Control Room & Liquid Supplement Tanks Removed For Clarity

Scale 0 5 10 15 20 25m — 1=200 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title:
Rookwood Feedlot
Feed Mill & Commodity Building
Proposed Elevations

Drawn By: SGS	Drawn Date: 30/03/22	Sheet Size: A1
Approved By:	Approved Date:	Scale: 1:200 uno
Drawing No.: 2236-MMS-FM-02		Revision No.: B

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ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
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Development Permit No.: D/52-2022
Dated: 20 December 2022

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

LEGEND	
ABV	NOTATION
BOL	BOLLARD
COL	COLUMN TO ENGINEER'S DESIGN
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
MUL	MULLION - TO ENGINEERS DETAI
RAD	ROLLER DOOR
RWT	RAINWATER TANK

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/52-2022

Dated: 20 December 2022

True North

SEPTIC TANK

OPTION FOR CONCRETE FOOTPATH (14m²)

OPTION FOR 7m WIDE CONCRETE APRON FULL LENGTH OF THE BUILDING (585m²)

OPTION FOR CONCRETE FOOTPATH (4m²)

RELOCATED OFFICE BUILDINGS

LUNCH RM

TOILET

NEW DOOR

QA LAB

RWT

RWT

FITOUT BY OWNER
FINAL LAYOUT TO BE DESIGNED BY OTHERS

CLEARZONE LINE MARKING

BAGGING

LOADING

OPTION TO ADD OBSERVATION ROOM
NOTE: TWO EXITS NEEDED IF ELECTRICAL SWITCHING IS INSTALLED IN ROOM

CONCRETE HARDSTAND

CONCRETE SLAB TO BE FINISHED WITH CEMENTAID DIAMITE + ROKITE APPLY AS PER MANUFACTURES SPECIFICATIONS

CONCRETE SLAB TO BE FINISHED WITH CEMENTAID DIAMITE + ROKITE APPLY AS PER MANUFACTURES SPECIFICATIONS

PROCESSING

STORAGE

BUILDING ENVELOPE	3318.72 m²
BUILDING VOLUME	42247.39 m³

Scale 0 2.5 5 7.5 10 15m 1=150 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

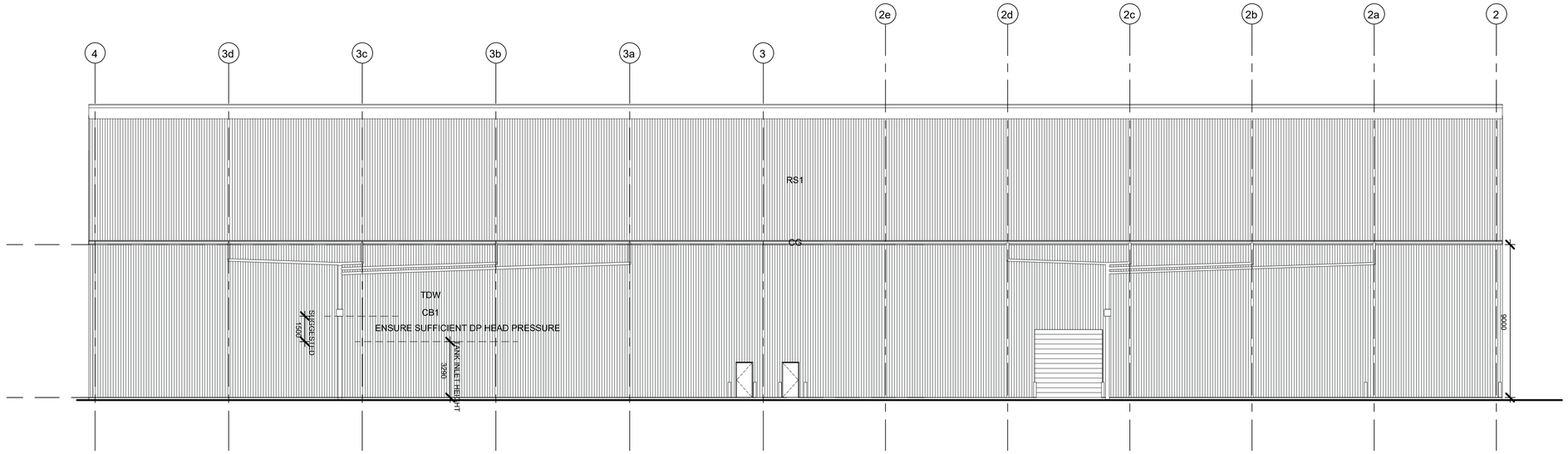
MORT & Co

Drawing Title: Rookwood Feedlot Fertiliser Building Proposed Floor Plan

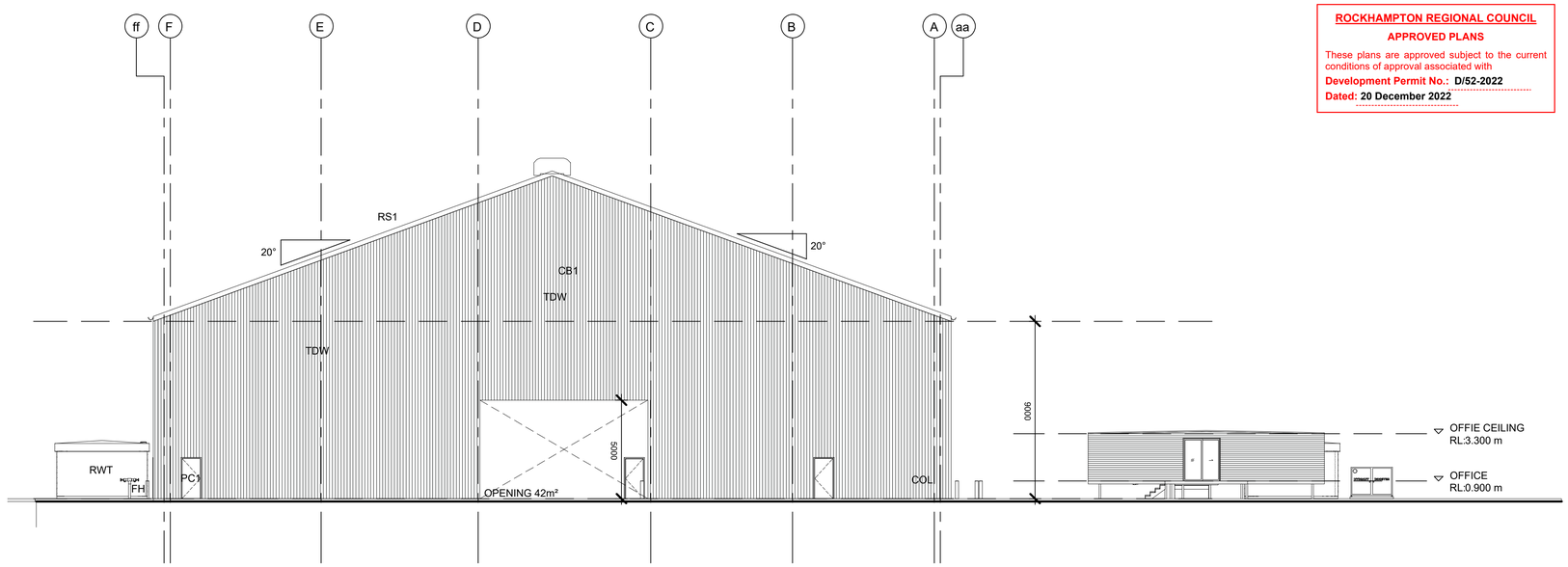
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SGS	30/03/22	A1
Approved By:	Approved Date:	Scale: 1:150
Drawing No.: 2236-MMS-FB-01		Revision No.: B

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Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



NORTH ELEVATION



EAST ELEVATION

ROCKHAMPTON REGIONAL COUNCIL

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Dated: 20 December 2022

LEGEND	
ABV	**NOTATION**
CB1	COLORBOND COLOUR 1
CG	COLORBOND GUTTER
COL	COLUMN TO ENGINEER'S DESIGN
FH	FIRE HYDRANT
PC1	PAINT COLOUR 1
RS1	ROOF SHEETING
RWT	RAINWATER TANK
TDW TRIM	DEK WALL SHEETING

Scale 0 2.5 5 7.5 10 15m 1=150 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

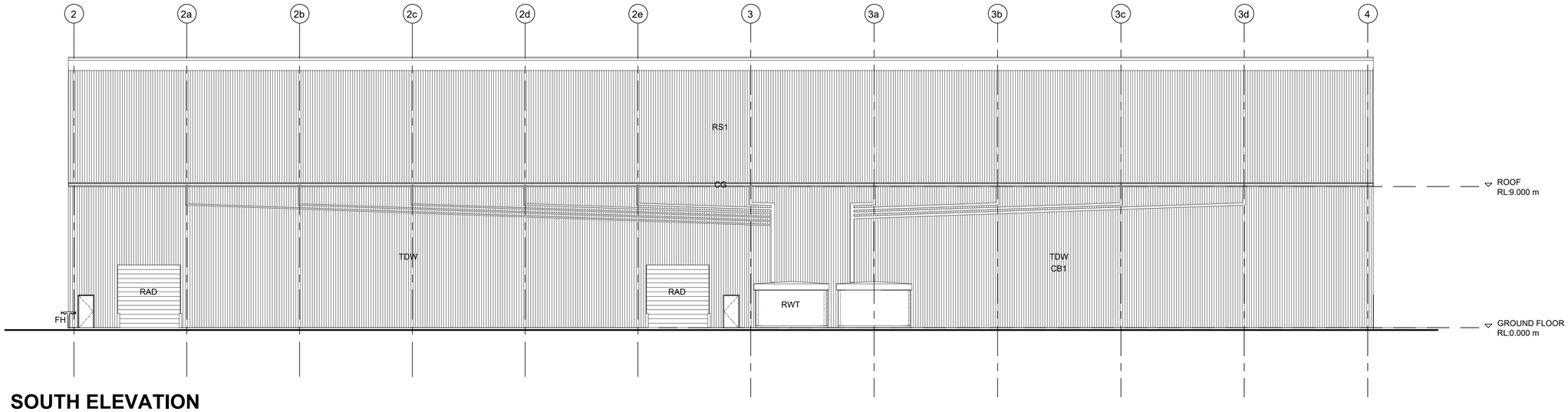
MORT & Co

Drawing Title: Rookwood Feedlot Fertiliser Building Proposed Elevations 1 of 2

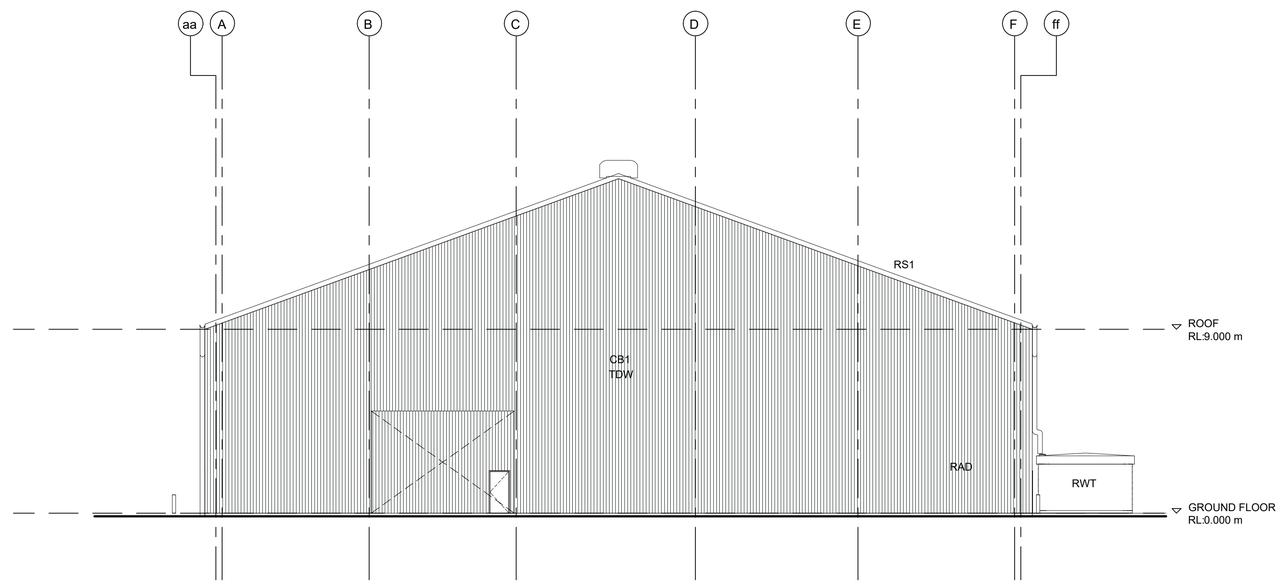
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SGS	30/03/22	A1
Approved By:	Approved Date:	Scale: 1:150
Drawing No.: 2236-MMS-FB-02		Revision No.: B

Z:\2236-MMS-Rookwoodfeedlot\Acad\2236-MMS-FertiliserBuilding_220331.dwg, 2236-MMS-FB-02, 31/03/22 3:42:38 PM

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



SOUTH ELEVATION



WEST ELEVATION

Scale 0 2.5 5 7.5 10 15m 1=150 (A1)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Dated: 20 December 2022

LEGEND	
ABV	**NOTATION**
CB1	COLORBOND COLOUR 1
CG	COLORBOND GUTTER
COL	COLUMN TO ENGINEER'S DESIGN
FH	FIRE HYDRANT
PC1	PAINT COLOUR 1
RS1	ROOF SHEETING
RWT	RAINWATER TANK
TDW TRIM	DEK WALL SHEETING

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

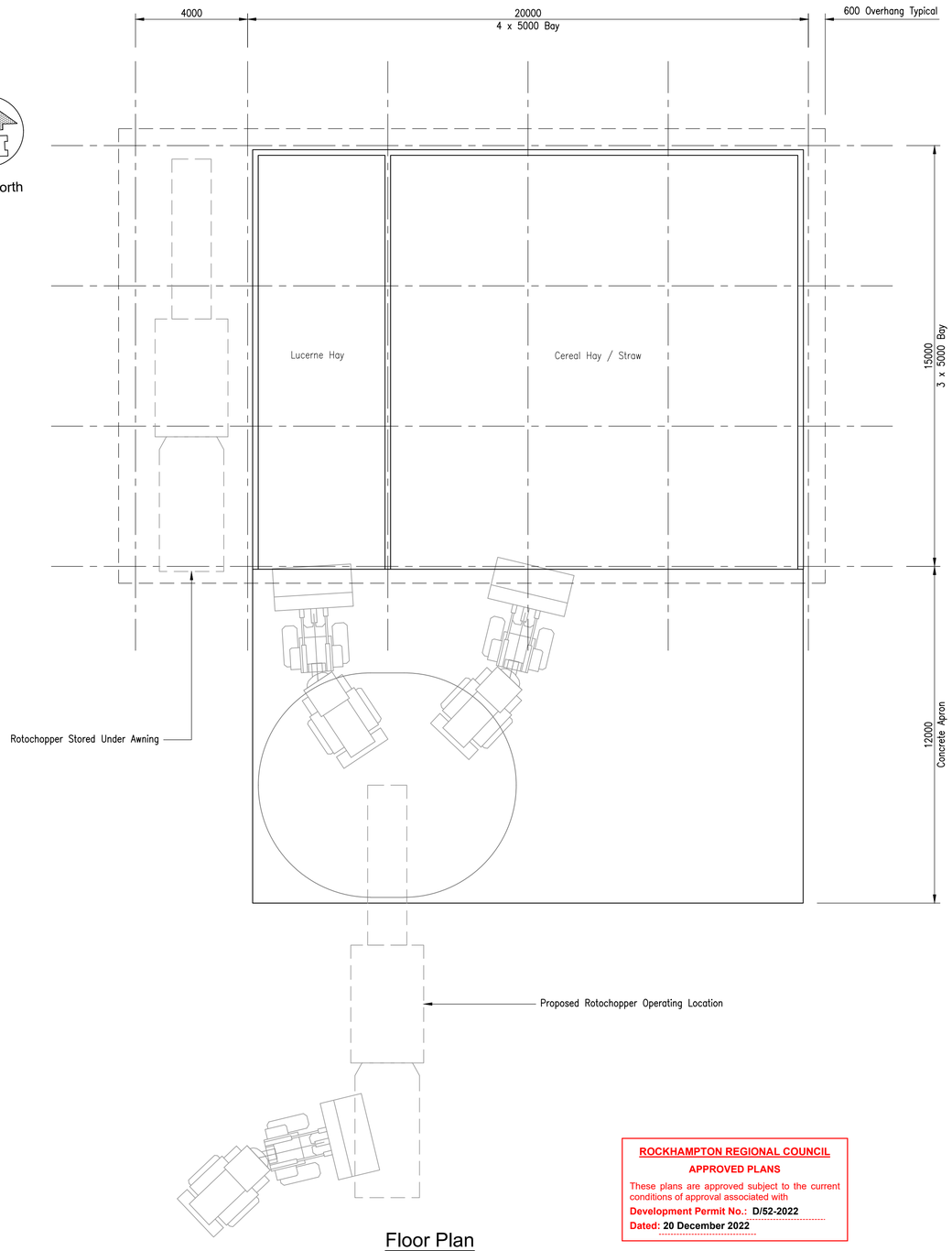
MORT & Co

Drawing Title: Rookwood Feedlot Fertiliser Building Proposed Elevations 2 of 2

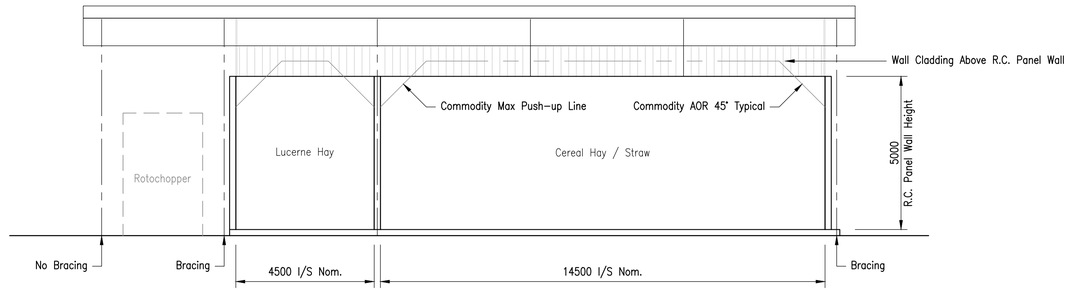
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Approved By:	Approved Date:	Scale: 1:150
Drawing No.: 2236-MMS-FB-03		Revision No.: B

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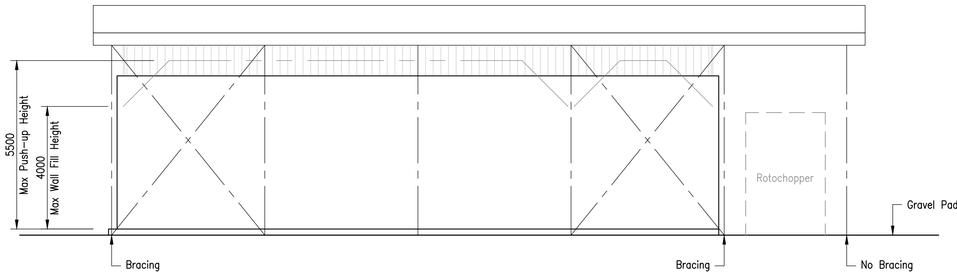
Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



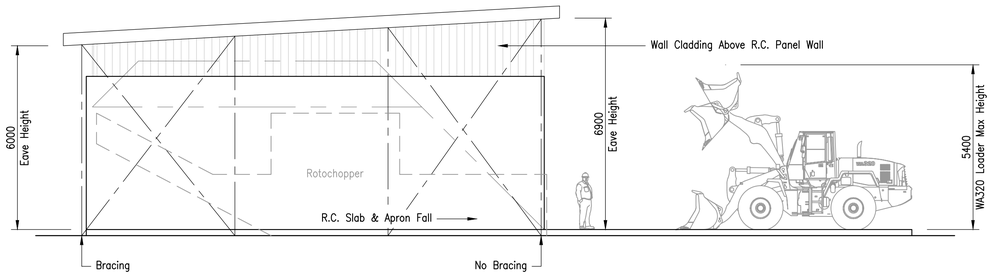
Floor Plan



Front / South Elevation



Rear / North Elevation



Side / West Elevation

Note: East Elevation Similar

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Scale 0 2 4 6 8 10m 1=100 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

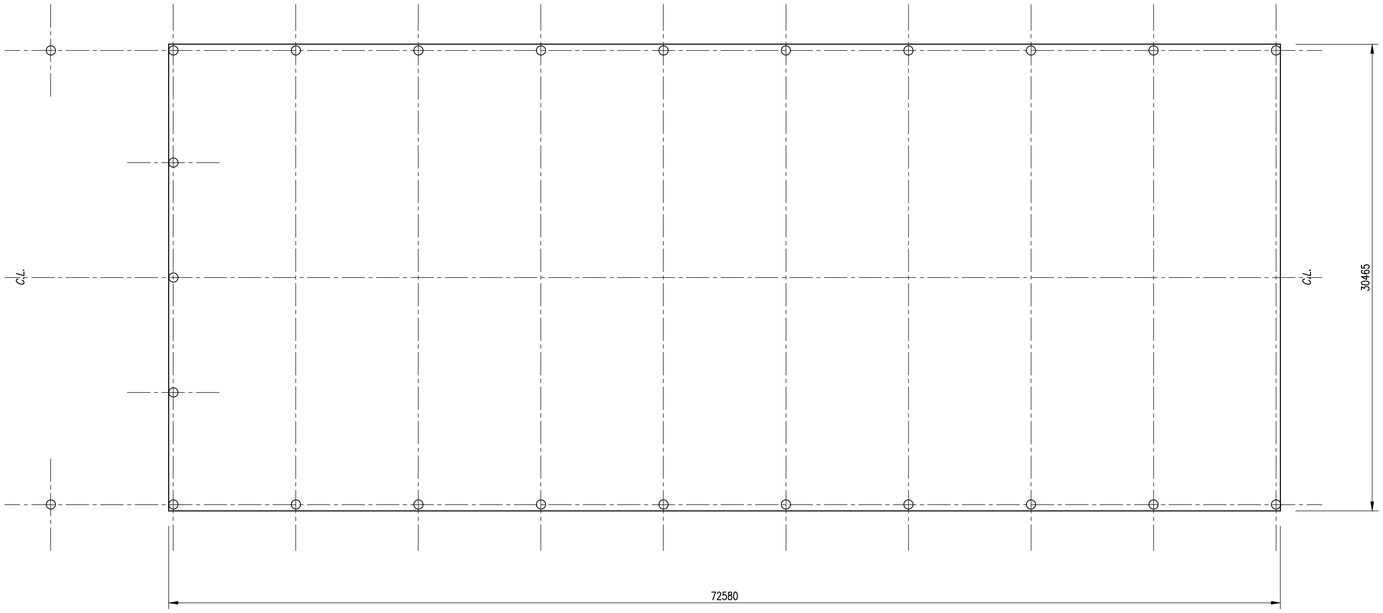
Drawing Title:
Rookwood Feedlot
Hay Processing Building
Proposed Plan & Elevations

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
		1:100
Drawing No.: 2236-MMS-HP-01		Revision No.: B

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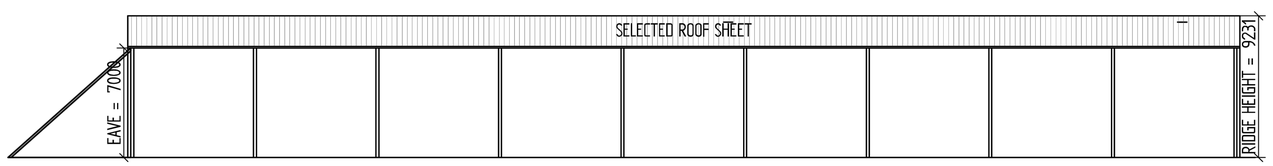
Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

True North

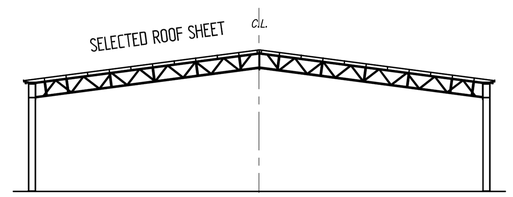


Floor Plan

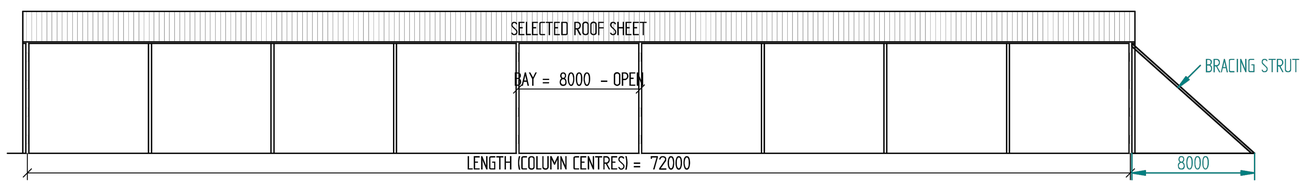
Note: Building Partially Enclosed



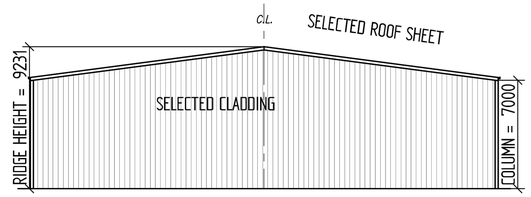
West Elevation



South Elevation



East Elevation



North Elevation

Scale 0 5 10 15 20 25m 1=200 (A1)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Dated: 20 December 2022

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

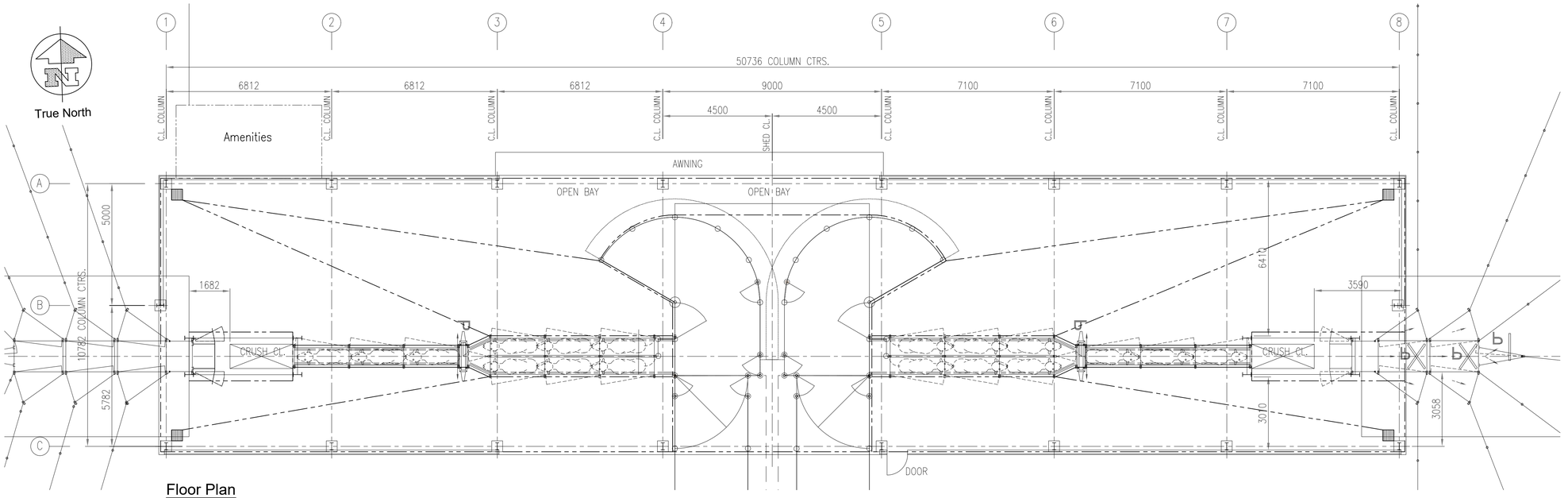
MORT & Co

Drawing Title:
Rookwood Feedlot
Hay Storage Building
Proposed Plan & Elevations

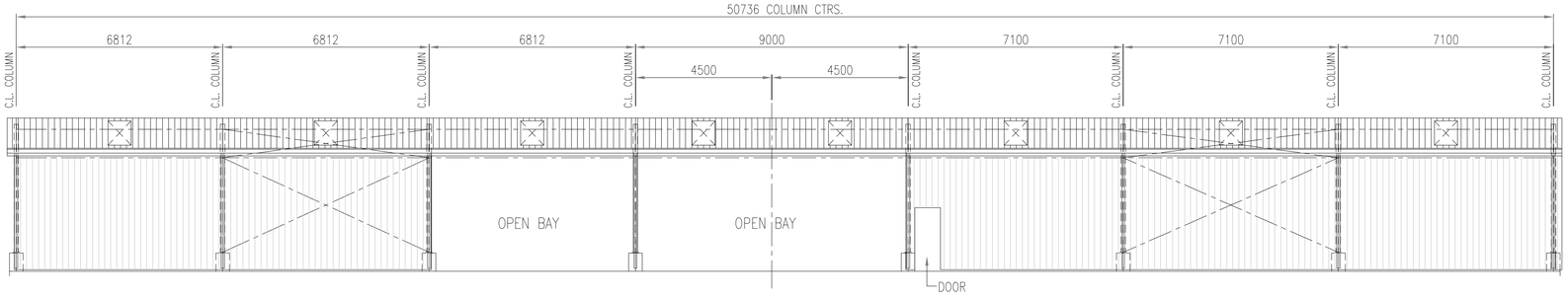
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SGS	30/03/22	A1
Approved By:	Approved Date:	Scale: 1:200
Drawing No.: 2236-MMS-HS-01		Revision No.: B

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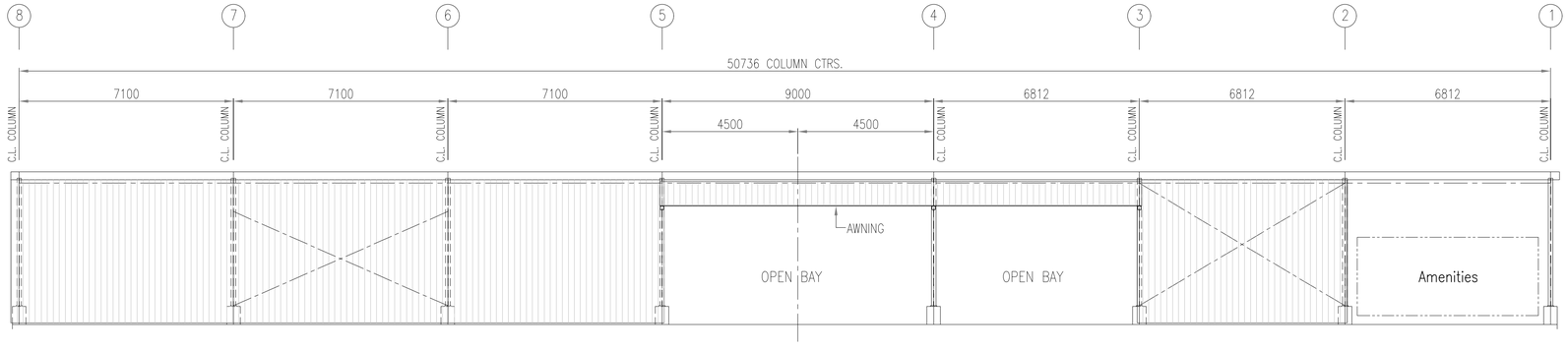
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Version: 1, Version Date: 22/04/2022



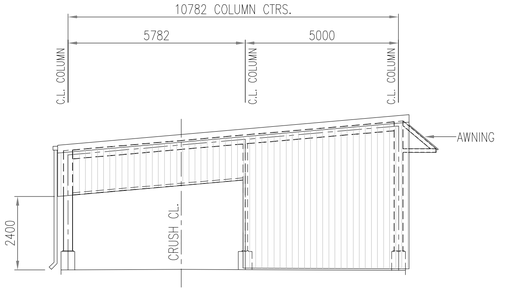
Floor Plan



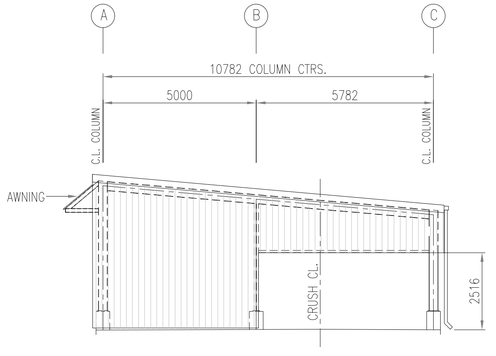
South Elevation



North Elevation



West Elevation



East Elevation

Scale 0 2 4 6 8 10m 1=100 (A1)

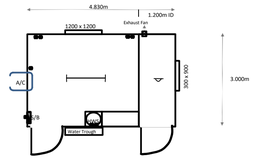
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/52-2022

Dated: 20 December 2022



Amenities Floor Plan

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

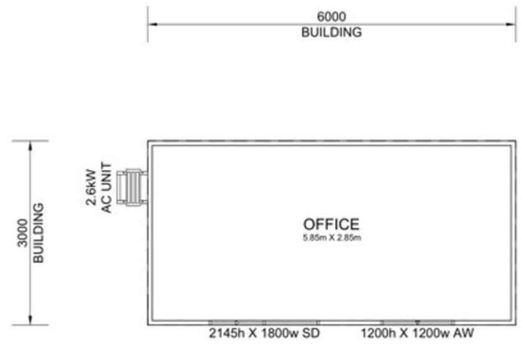
MORT & Co

Drawing Title: Rookwood Feedlot Hospital Building Proposed Plan & Elevations

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
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Drawing No.: 2236-MMS-HB-01		Revision No.: B

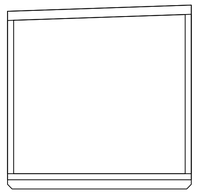
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Version: 1, Version Date: 22/04/2022

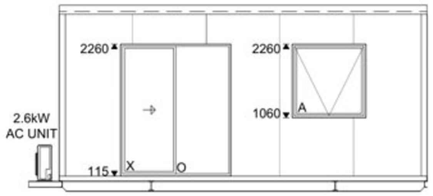


Floor Plan

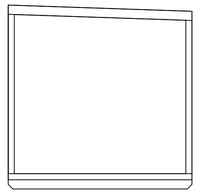
ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
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Dated: 20 December 2022



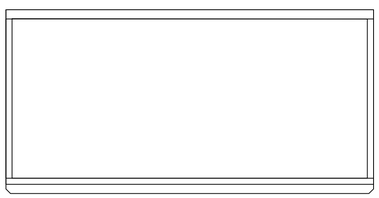
Left Side View



Front View



Right Side View



Rear View

Scale 0 1 2 3 4 5m 1=50 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title:
Rookwood Feedlot
Site Office Building
Proposed Plan & Elevations

Drawn By: SGS	Drawn Date: 30/03/22	Sheet Size: A1
Approved By:	Approved Date:	Scale: 1:50
Drawing No.: 2236-MMS-SE-01		Revision No.: B

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Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/52-2022
Dated: 20 December 2022

TRUE NORTH

AREA OF STABLES BUILDING 778 sq. m.

LEGEND

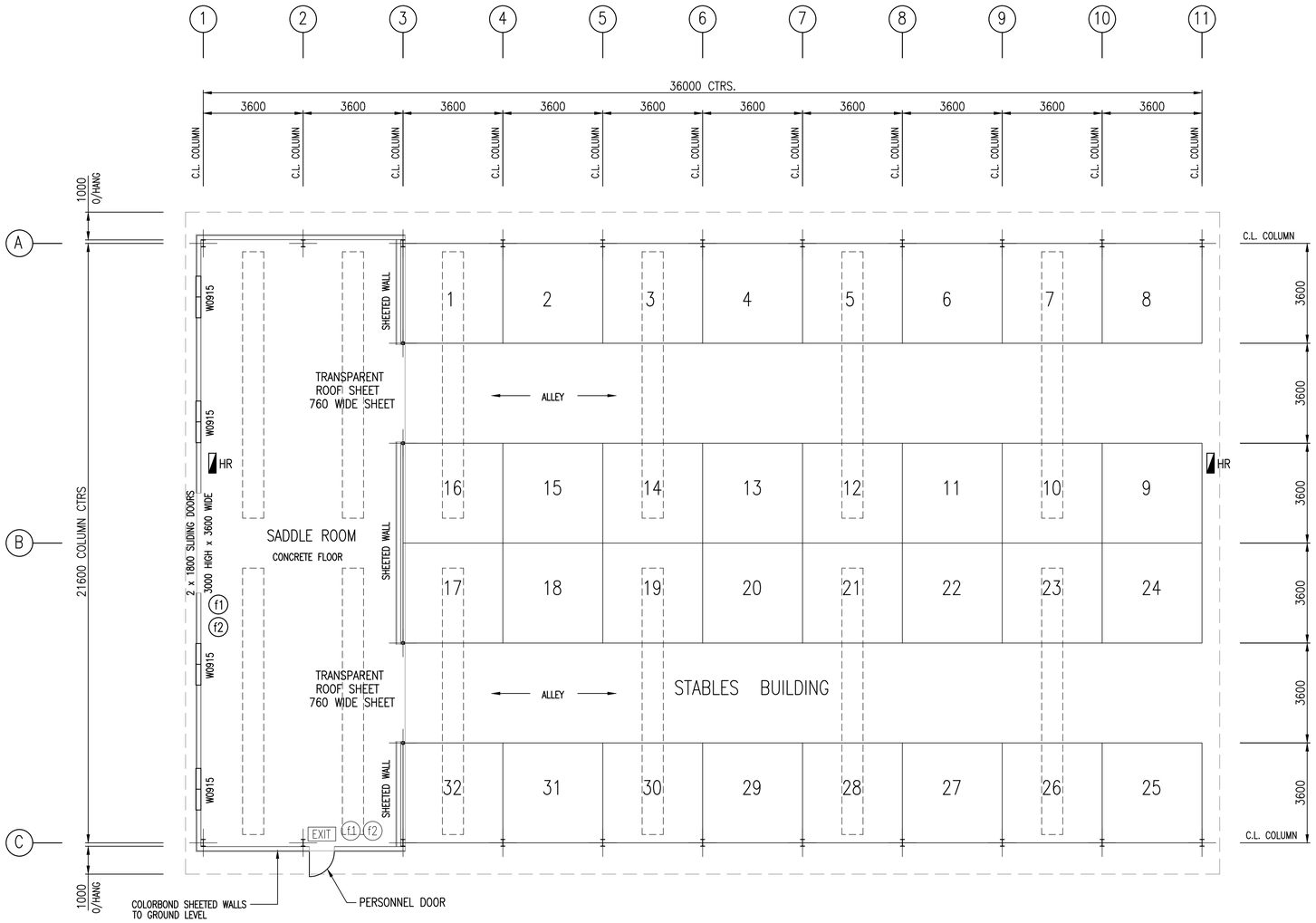
(f1) 3.5kg CO2 EXTINGUISHER 5B:E FIRE TEST RATING

(f2) 4.5kg ABE DRY CHEMICAL EXTINGUISHER 2A:40BE FIRE TEST RATING

EXIT EMERGENCY EXIT LIGHT (STANILITE MGF110M OR EQUIVALENT)

NOTES

1. INSTALLATION MUST COMPLY WITH ALL CURRENT STANDARDS, RULES AND REGULATIONS OF PROPERLY CONSTITUTED AUTHORITIES HAVING JURISDICTION OVER THE WORK, IN PARTICULAR
   - BUILDING CODE OF AUSTRALIA
   - AS3000 WIRING RULES
   - AS3008.1 CABLING FOR ALTERNATING VOLTAGES
   - AS2293 EMERGENCY LIGHTING
   - WORKPLACE HEALTH & SAFETY



LEGEND

(f1) 3.5kg CO2 EXTINGUISHER 5B:E FIRE TEST RATING

(f2) 4.5kg ABE DRY CHEMICAL EXTINGUISHER 2A:40BE FIRE TEST RATING

HR 36m FIRE HOSE REEL TO AS2419.1 – 1994

SCALE 0 5 10 15m 1=100 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

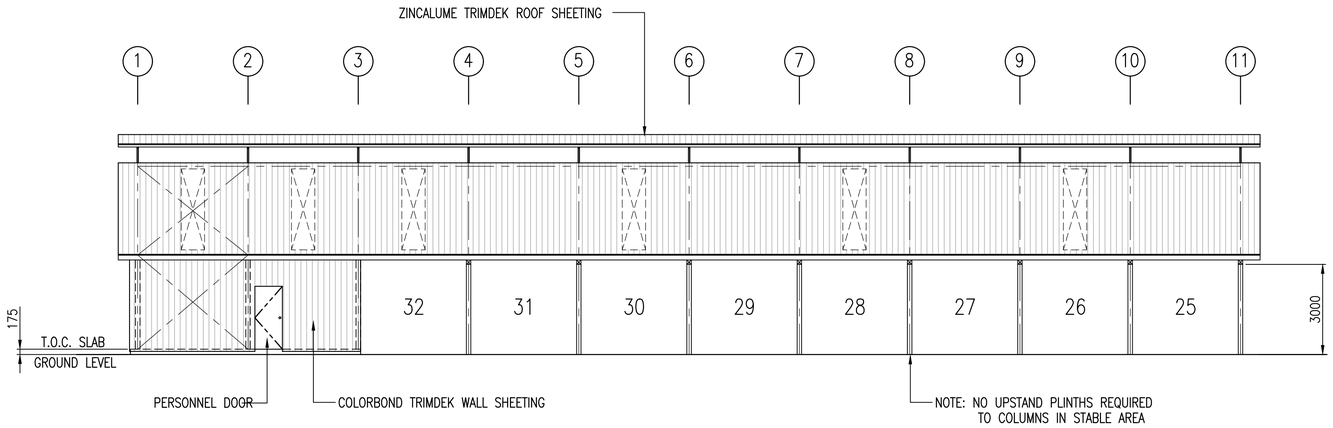
MORT & Co

Drawing Title: Rookwood Feedlot Stables Building Proposed Floor Plan

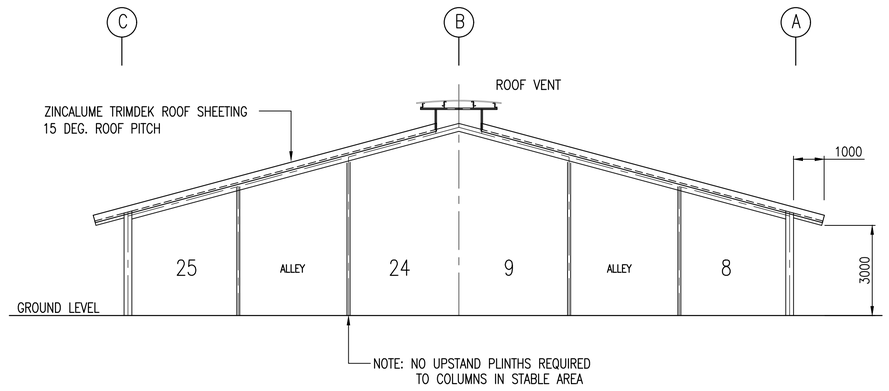
Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale: 1:200 uno
Drawing No.: 2236–MMS–SB–01		Revision No.: B

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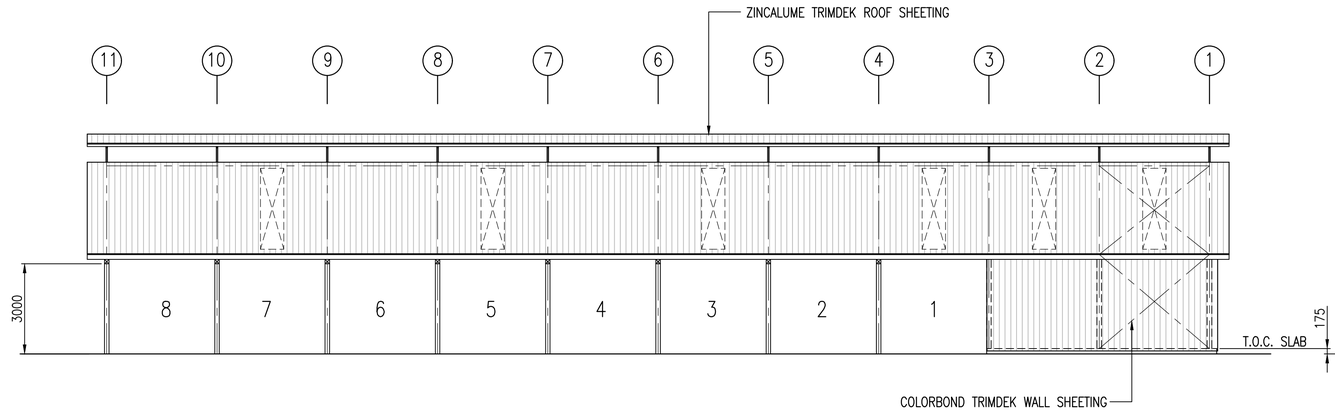
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Version: 1, Version Date: 22/04/2022



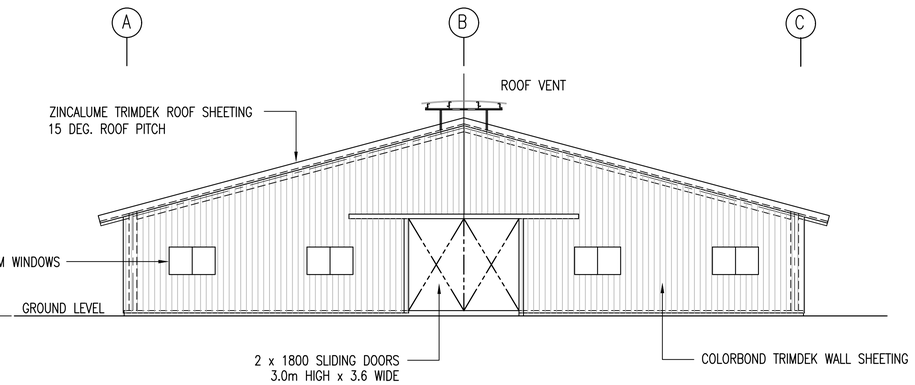
WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION



NORTH ELEVATION

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Dated: 20 December 2022

SCALE 0 5 10 15m 1=100 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title:
Rookwood Feedlot
Stables Building
Proposed Elevations

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
		1:200 uno
Drawing No.:		Revision No.:
2236-MMS-SB-02		B

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Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

TRUE NORTH

AREA OF WORKSHOP BUILDING 485 sq. m.

LEGEND

(f1) 3.5kg CO2 EXTINGUISHER
5B:E FIRE TEST RATING

(f2) 4.5kg ABE DRY CHEMICAL EXTINGUISHER
2A:40BE FIRE TEST RATING

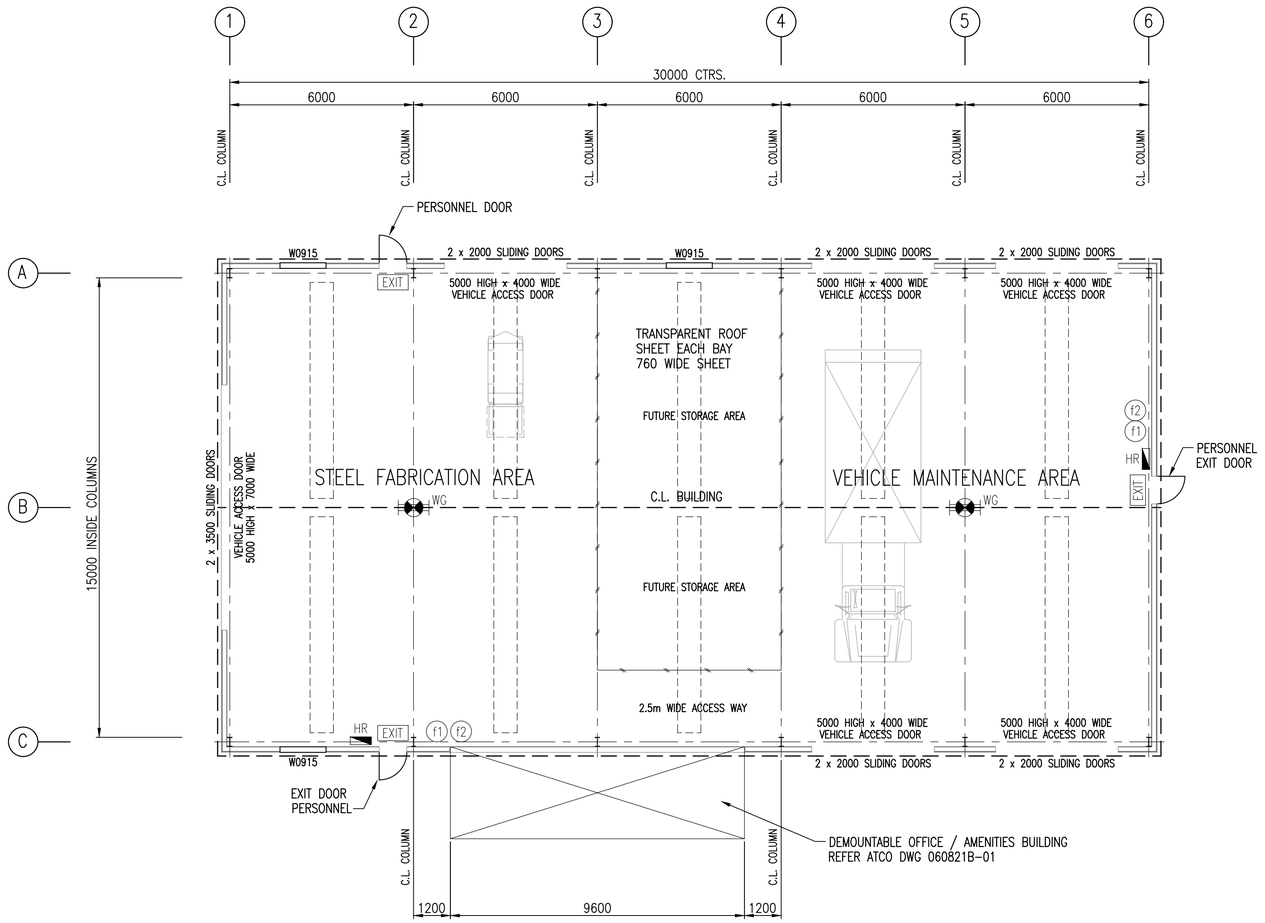
HR 36m FIRE HOSE REEL
TO AS2419.1 – 1994

WG TWIN 36 WATT NON–MAINTAINED EMERGENCY FLUORESCENT
(STANILITE BTN236 OR EQUIVALENT)
NOTE: REQUIRES 1 TUBE SWITCHED WITH SURROUNDING FTTINGS & SECOND TUBE FOR EMERGENCY LIGHTING ONLY

EXIT EMERGENCY EXIT LIGHT
(STANILITE MGF110M OR EQUIVALENT)

NOTES

1. INSTALLATION MUST COMPLY WITH ALL CURRENT STANDARDS, RULES AND REGULATIONS OF PROPERLY CONSTITUTED AUTHORITIES HAVING JURISDICTION OVER THE WORK, IN PARTICULAR
   - BUILDING CODE OF AUSTRALIA
   - AS3000 WIRING RULES
   - AS3008.1 CABLING FOR ALTERNATING VOLTAGES
   - AS2293 EMERGENCY LIGHTING
   - WORKPLACE HEALTH & SAFETY



FLOOR PLAN LAYOUT

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
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Development Permit No.: D/52-2022
Dated: 20 December 2022

SCALE 5m 4 3 2 1 0 5 10 15m 1=100 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title: Rookwood Feedlot Workshop Building Proposed Floor Plan

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
		1:200 uno
Drawing No.:		Revision No.:
2236–MMS–WB–01		B

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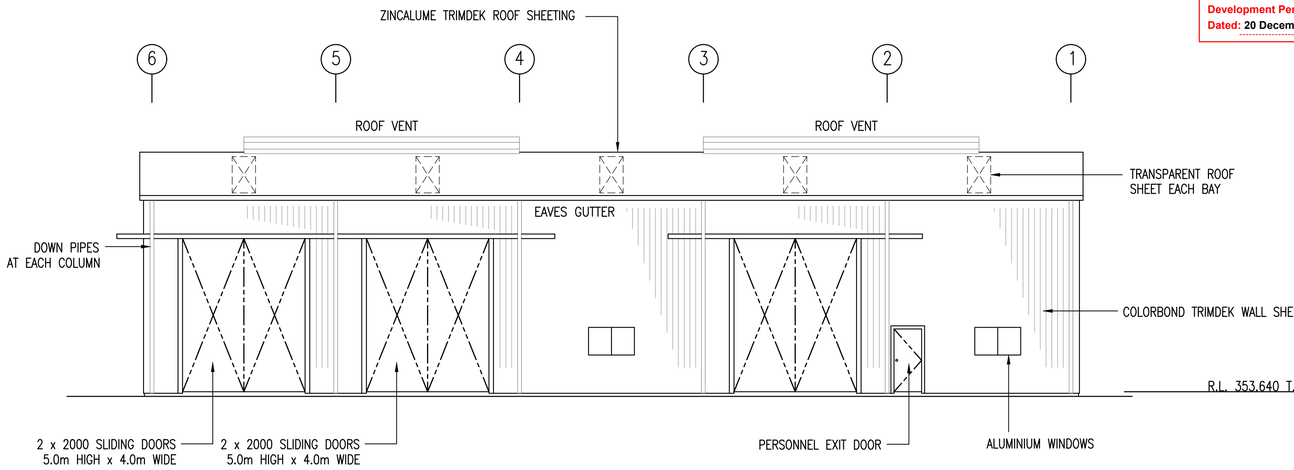
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

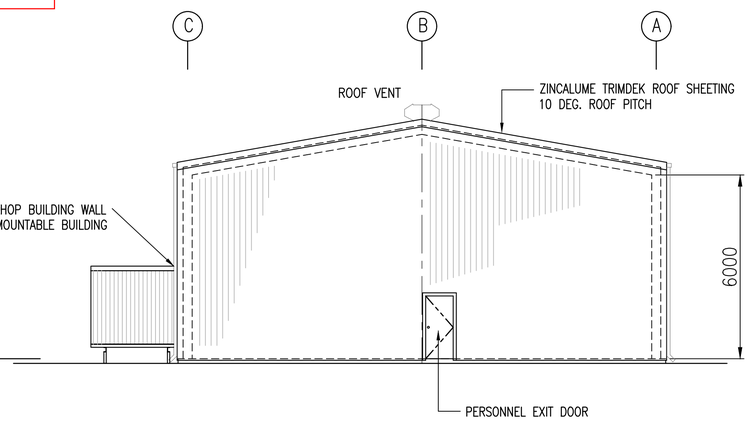
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/52-2022

Dated: 20 December 2022

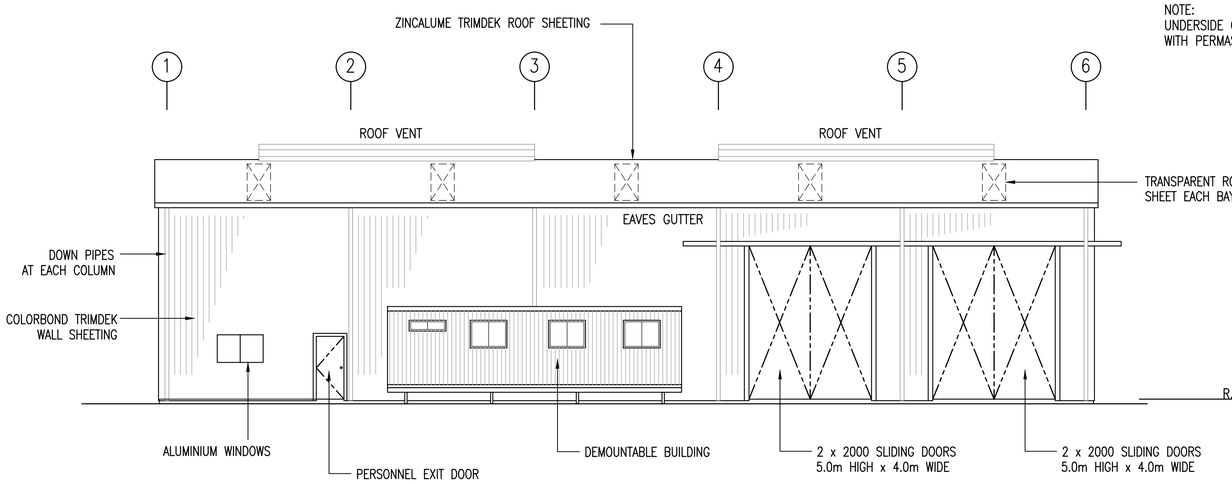


NORTH ELEVATION

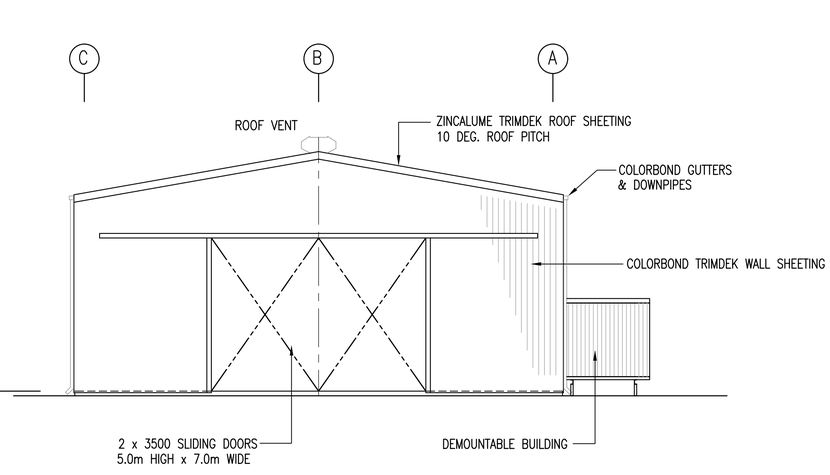


EAST ELEVATION

NOTE:
UNDERSIDE OF ROOF TO BE INSULATED WITH PERMASTOP BUILDING BLANKET



SOUTH ELEVATION



WEST ELEVATION

SCALE 5m 4 3 2 1 0 5 10 15m 1=100 (A1)

Rev.	Details	Drawn	Date
B	DA Issue	SGS	31/03/22
A	Preliminary Issue	SGS	30/03/22

MORT & Co

Drawing Title:
Rookwood Feedlot
Workshop Building
Proposed Elevations

Drawn By:	Drawn Date:	Sheet Size:
SGS	30/03/22	A1
Approved By:	Approved Date:	Scale:
		1:200 uno
Drawing No.:		Revision No.:
2236-MMS-WB-02		B

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Our Ref 220706 17063 TRA RFI Response 01

Contact Adam Gwatking

RMA Engineers

6 July 2022

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/52-2022

Dated: 20 December 2022

Mort & Co Lot Feeders Pty Ltd
91 Mort Street
Toowoomba QLD 4350
Australia
Attention: Michael Matthewson

Dear Michael,

Project Name: Thirsty Creek Road | Gogango
Project No: 17063

RMA Engineers has been engaged by Mort & Co Lot Feeders Pty Ltd to provide engineering advice in relation to a proposed cattle feedlot development (Rookwood Feedlot) located at 802 Thirsty Creek Road, Gogango (the subject site).

This letter has been prepared in response to the traffic and transport items raised in the Rockhampton Regional Council (RRC) Information Request (IR) dated 19 May 2022, RRC reference D/52-2022. More specifically, this letter responds to Item 2.1. The information request correspondence is included at Enclosure 1.

In this response, reference is made to the traffic impact assessment (TIA) report dated 6 April 2022 by RMA Engineers, which was previously submitted to Council as part of the development application.

The IR item and associated responses are detailed in the following sections.

It should be noted that all responses detailed below consider that the largest design vehicle accessing the subject site consists of Type 1 Road Trains (i.e. 36.5m long A-Doubles). It is acknowledged that following development application determination, heavy vehicle permits will be sought with the National Heavy Vehicle Regulator (NHVR) to permit these vehicle types.

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Council IR response

Item 2.1 – PIA request

> Provide a Pavement Impact Assessment (PIA). The PIA should identify all haulage routes within Council's local road network that will be relied on by the proposed intensive animal industry; however, the focus should be on Thirsty Creek Road.
>
> The submitted Traffic Impact Assessment (TIA) by RMA Engineers states a PIA could not be undertaken due to a lack of data and it has been suggested if required, this assessment could be carried out as part of future design stages. Council has estimated the traffic loadings associated with the proposed development to exceed the capacity of the existing Thirsty Creek Road pavement.
>
> Due to the likelihood of the PIA resulting in a maintenance levy being required for the upkeep of Thirsty Creek Road, and this levy needing to be conditioned as part of any development approval, Council will require the PIA to be submitted as part of the response to Council's Information Request.
>
> Please note that Council can provide any current road pavement and condition data that is available to inform the PIA. Any unavailable condition data required for the PIA will be the Applicant's responsibility to gather.

Figure 1 - Council Information Required - Item 2.1 – PIA request

Response:

A Pavement Impact Assessment has been completed focussing on Thirsty Creek Road. The assessment is provided at Enclosure 2 and results in developer contributions for pavement impacts of approximately $72,000 per annum (for the ultimate development stage). This equates to $7.12 per B-Double vehicle (in + out movement (i.e. loaded + unloaded)), and $9.36 per A-Double vehicle (in + out movement (i.e. loaded and unloaded)).

It should be noted that for the TIA and PIA assessment, the traffic generation was conservatively assumed based on markets targeted at the time of writing the TIA report. Therefore, it is suggested that a log be kept of the number of trucks accessing the site and the above development contributions be paid per vehicle (on an annual basis) in accordance with the actual demands. This is because the occupancy of the feedlot depends on market demands, and the livestock throughput can vary significantly across the lifetime of the feedlot.

Item 2.1 – Advisory note 1

> ***Advisory note:***
>
> *The sections of Thirsty Creek Road that have been identified as requiring upgrades to accommodate the swept paths of the proposed Type 1 Road Trains will need to be carried out prior to commencement of the use. It is not appropriate to monitor a known safety concern until such time as there is a near miss or collision prior to carrying out the required upgrades and Council is not willing to accept the risks associated with this methodology.*
>
> *Necessary road upgrades are generally conditioned as part of any Development Permit for Material Change of Use and not the National Heavy Vehicle Regulator (NHVR) permit. It is appropriate the upgrades allow for an A-Double to traverse the road network without crossing the centreline or encroaching on the road shoulders or opposing traffic lane in any of the locations identified in the TIA.*

Figure 2 - Council Information Required - Item 2.1 – Advisory note 1

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Response:

It is agreed that since the development will utilise A-Double vehicles, the pavement widenings (road upgrades) as detailed in the TIA should be undertaken. This can be conditioned as part of the Development Permit for Material Change of Use subject to NHVR permitting such vehicles along the route.

The required pavement widenings as detailed in the TIA are summarised below.

- Relocating the kerbing on the inside of the first corner (Capricorn Highway / Third Street intersection) to the edge of pavement (no widening is required) – refer to Figure 3.

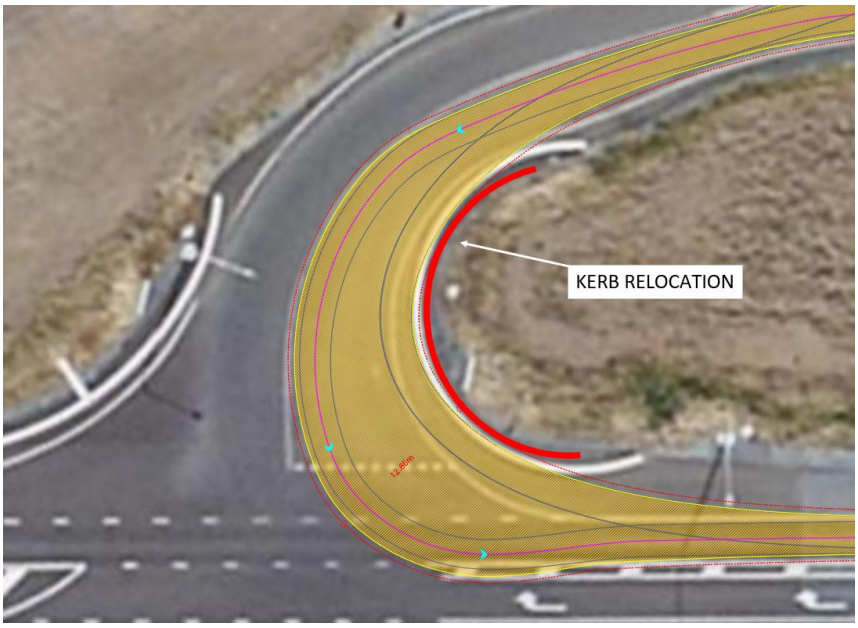


Figure 3: Kerb relocation on corner of Capricorn Highway / Third Street intersection

- Widening the inside of the second corner (Third Street) – refer to Figure 4.

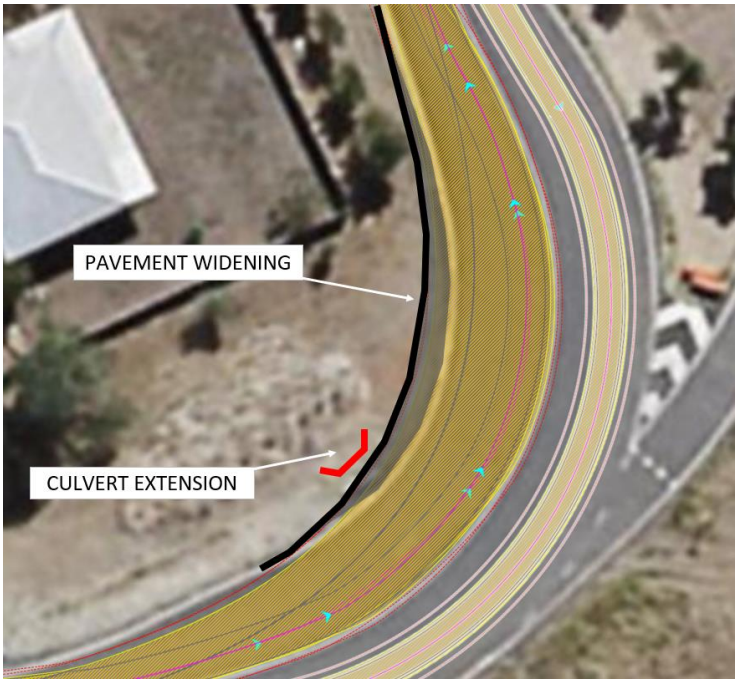


Figure 4: Widening extents of second corner (Third Street)

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- Widening of the outside curve on the Thirsty Creek Road approach to the Riverslea Road intersection – refer to Figure 5.

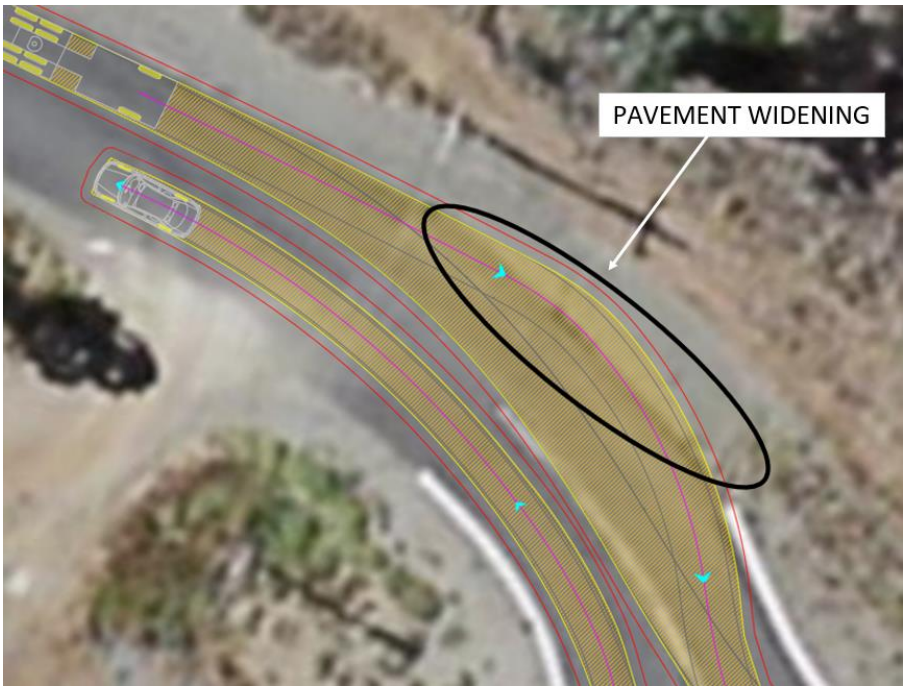


Figure 5: Widening extents of Thirsty Creek Road approach to Riverslea Road

- Widening of Thirsty Creek Road curves (Ch 1.25km and Ch 3.35km) – refer to Figure 6 and Figure 7.



Figure 6: A-Double – Thirsty Creek Road curve Ch 1.25km

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Figure 7: A-Double – Thirsty Creek Road curve Ch 3.35km

Item 2.1 – Advisory note 2

The PIA should address the structural adequacy of the cross-drainage structures on Thirsty Creek Road.

Figure 8 - Council Information Required - Item 2.1 – Advisory note 2

Response:

The 'As constructed" drawings provided by Rockhampton Regional Council include details of the box culvert crossings and extensions undertaken when the road was recently upgraded. Drawings 2018-025-18, 2018-025-19 and 2018-025-20 detail these culvert extensions and are provided at Enclosure 3. It is assumed that at the time of the extensions the existing box culverts would have been designed for the Rookwood Weir construction traffic and associated freight task (using B-Doubles), and therefore checked and assessed in accordance to meet the relevant Australian Standards (AS 5100). Therefore, since the upgrade was undertaken recently (i.e. after 2004), it is assumed that the culvert ratings should meet the Australian Standards for traffic loadings (SM1600 design loads) which include a moving and stationary 160 tonne load. Note that Type 1 road train common combinations are all less than 120 tonnes. Because of this, the structural integrity of the box culvert crossings of Thirsty Creek Road is considered to be acceptable to cater for the proposed development traffic.

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With respect to the large culvert floodway with at Chainage 2.9km, no design data could be provided, including the detail on the age of the crossing or structural strength rating. The floodway consists of a series of 12 circular 700mm diameter concrete pipes. The culvert pipes are encased in concrete with minimum of 100mm cover.

From a high level visual inspection, the culvert appears to be in good condition. There was no evident deformation, separation of units, adverse cracking, spalling or rusting.

Photos of the culvert and applicable condition are illustrated in Figures 9, 10, 11 and 12 below.



Figure 9: Thirsty Creek Road culvert at Chainage 2.9km (looking southbound)

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Figure 10: Concrete pipes on north-eastern side



Figure 11: Concrete pipes on south-western side

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Figure 12: Pipe condition and cover (south-western side)

It is likely that this culvert was constructed prior 2004 based on the visual inspection and aerial imagery. Although the culvert floodway is deemed to be in good condition, given that the culvert is constructed pre-2004 and no design data could be provided, it is recommended that the culvert be monitored for a period of 12 months post development operation (maintenance period) to determine if the development has any adverse effects on the structural integrity of the culvert (with a view of mitigating any adverse impacts if any are identified during this period).

It should be acknowledged that these types of pipe culvert crossings are used on a number of major highways in Queensland, which would have greater repetitive and peak traffic loadings than Thirsty Creek Road. An example of this is the Warrego Highway (along the Gatton Bypass) which is a Type 1 Road Train route with over 1,700 heavy vehicles per day (per direction) – refer to Figure 13 and Figure 14.

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Figure 13: Similar culvert located on Warrego Highway (Gatton Bypass section) WB Carriageway



Figure 14: Similar culvert located on Warrego Highway (Gatton Bypass section) EB Carriageway

Conclusion

From the above, no unacceptable or adverse traffic and transport engineering matters have been identified that should preclude approval of the proposed development.

The heavy vehicle traffic generated by the proposed development is considered appropriate and acceptable with the following recommendations:

- A Pavement Impact Assessment has been completed focussing on Thirsty Creek Road. The assessment results in developer contributions for pavement impacts of approximately $72,000 per annum (for the ultimate development stage). It is recommended that this contribution be paid annually on a per vehicle basis given applicable market demands.
- The geometry and alignment of the traffic route to the proposed development is generally adequate to cater for 36.5m A-Double and B-Triple vehicles. Swept path assessment of the horizontal geometry results in the following minor road widening locations:
  - Relocating the kerbing on the inside of the first corner (Capricorn Highway / Third Street intersection) to the edge of pavement (no widening is required)

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- Widening the inside of the second corner (Third Street)
- Widening of the outside curve on the Thirsty Creek Road approach to the Riverslea Road intersection
- Widening of Thirsty Creek Road curves (Ch 1.25km and Ch 3.35km)

- No adverse structural issues have been identified as part of the initial visual inspection and the structural integrity of the culvert crossings are assumed to be adequate for the proposed development traffic. It is recommended that a 12 month monitoring period of the major culvert crossing at Chainage 2.9km be undertaken with applicable mitigation measures undertaken if deficiencies are identified.

We trust the above adequately covers the issues raised. Please contact the undersigned if any further information is required.

Yours sincerely,



Adam Gwatking
Associate | Principal Engineer (Traffic | Transport | Civil)
BE (Civil), RPEQ 15158, CPEng
RMA ENGINEERS PTY LTD

Enclosures:

1. *RRC IR correspondence*
2. *Thirsty Creek Road – Pavement Impact Assessment*
3. *Culvert - As Constructed Drawings*

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RMA Engineers

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/52-2022

Dated: 20 December 2022

TRAFFIC IMPACT ASSESSMENT

Rookwood Feedlot Development | Gogango

Traffic Engineering Report

Client Mort & Co Lot Feeders Pty Ltd

Project Number 17063

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

REPORT CONTROL SHEET

Report Details	
Report Title:	Traffic Impact Assessment – Rookwood Feedlot Development | Gogango
Project No.:	17063
Site:	802 Thirsty Creek Road, Gogango
Author:	Adam Gwatking

Document Control					
Revision	**Author**	**Reviewer**	**Approved for Issue**		
			Name	**Signature**	**Date**
1	A Gwatking	A Baker	Adam Gwatking	NER, CPEng, RPEQ: 15158	06 / 04 / 22

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Disclaimer:

RMA Engineers has undertaken this report based on accepted traffic engineering practices, standards, and information available at the time of writing. It is not intended as a quote, guarantee or warranty and does not cover any latent defects. RMA Engineers do not accept any responsibility for the authentication of accuracy of supplied information or validation of data that is outside the scope of works. RMA Engineers are not accountable for any changes to the standards, physical infrastructure conditions or planning impacts that occur after the completion date of the assessment.

The conclusions in this report should not be read in isolation. We recommend that its contents be reviewed in person with the author so that the assumptions and available information can be discussed in detail to enable the reader to make their own risk assessment in conjunction with information from other sources.

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1. Introduction

RMA Engineers has been engaged by Mort & Co Lot Feeders Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application for a proposed cattle feedlot development (Rookwood Feedlot) located at 802 Thirsty Creek Road, Gogango (the subject site). The proposed development site is identified as Lot 21 on PN81 within the Rockhampton Regional Council (RRC) area.

The proposed feedlot comprises of 36,500 standard cattle units (SCU) and will be undertaken in two stages. The site gains direct access from Thirsty Creek Road.

This report has been prepared in support of a Material Change of Use (MCU) development application to be lodged with RRC and the Department of Transport and Main Roads (DTMR). This report considers the traffic impacts of the ultimate development scenario with respect to the traffic and pavement impacts of the vehicles associated with the proposed development.

This assessment has been undertaken in general accordance with the road transport related requirements identified in RRC Planning Scheme and the DTMR *Guide to Traffic Impact Assessment* (GTIA) (2018).

1.1 Report objectives and scope

The purpose of this Traffic Impact Assessment (TIA) is to document an investigation of traffic and transport impacts of the proposed development on the surrounding road network. The assessment considers the following:

- Estimation of traffic generated by the development and distribution on the surrounding road network
- Review of potential operational impacts at the key intersections with the proposed development influence at the year of completion
- Review of key intersection layouts and turn warrants
- Review of pavement impacts on the road network
- Assessment of sight distance in accordance with Austroads requirements.
- Review of the proposed development layout against relevant standards and Council planning scheme requirements.
- Safety considerations, review of historical crash data and commentary on required mitigation measures.
- Vehicle swept paths and manoeuvrability assessment at the key intersections.

Where required, this report makes recommendations for the mitigation of development impacts.

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1.2 Reference material

In preparing this report, reference has been made to the following:

- Austroads Guide to Road Design, Part 4A: *Unsignalised and Signalised Intersections* (2021)
- Austroads Guide to Traffic Engineering Practice Part 5: *Intersections at Grade* (2005)
- Austroads Guide to Traffic Management Part 12: *Integrated Transport Assessments for Developments* (2020)
- Austroads Guide to Traffic Management Part 6*: Intersections, Interchanges & Crossing*s (2017)
- DTMR *Guidelines for Traffic Impact Assessment* (GTIA) (2018)
- DTMR *Road Planning and Design Manual* (RPDM) (2020)
- RRC *Planning Scheme - Version 2.2* (2021)

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2. Proposed development

2.1 Location and descriptions

The subject site, Rookwood Feedlot, is located at 802 Thirsty Creek Road, Gogango. The development is located within the Rockhampton Regional Council (RRC) local government area, approximately 51km south-west of Rockhampton, 35km north-east of Duaringa and 7km north of Gogango township.

The feedlot site is described as Lot 21 on PN81. It is also noted that the subject property and development operations also includes Lot 3 on SP230297 and Lot 2 on RP614103 for irrigation purposes. The three lots comprise a total area of approximately 1,485 ha.

The site is surrounded by rural land uses as per the RRC Planning Scheme and gains access via Thirsty Creek Road. The site and its environs are illustrated in **Figure 2-1**.

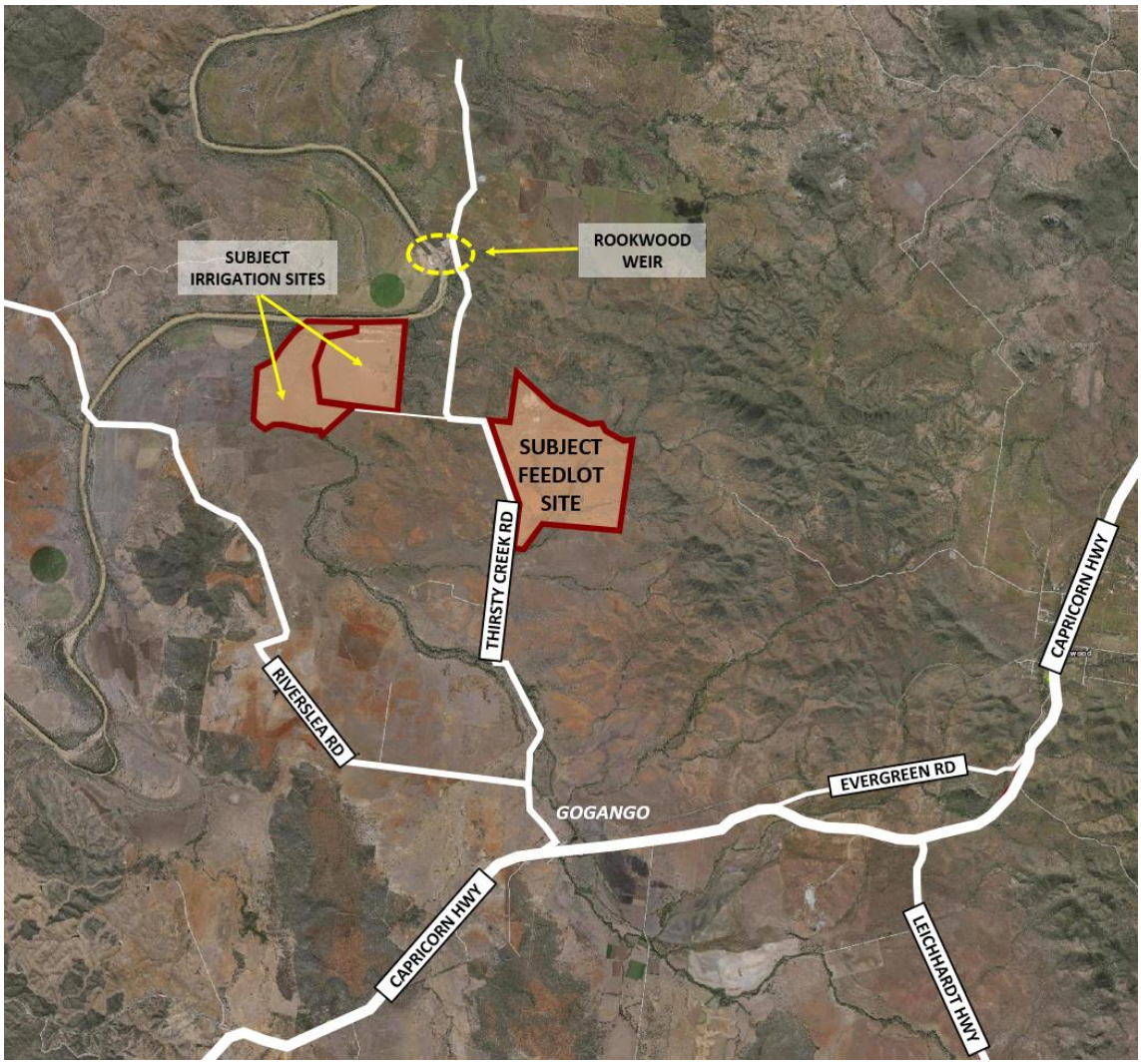


Figure 2-1 Locality plan

The feedlot site (Lot 21 on PN81) is the main site that will generate traffic and operations. The two other sites are considered ancillary and the irrigation will be pumped to the feedlot site via a pipe network (i.e. additional traffic generated by these ancillary sites is considered to be negligible to none). Therefore, the assessment focuses solely on the feedlot site which is referred to as the subject site herein.

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2.2 Current site use

The subject site is currently utilised for cattle grazing. There is also an approved quarry on the subject site which is operated by a third party. Gravel from this quarry is used in the nearby Rookwood Weir construction and is anticipated that materials from this quarry may be used in the feedlot construction and maintenance. The quarry is existing and is operated by a separate party under its own environmental authority (EA) and conditions.

Dwellings exist on the subject site and on Lot 3 on SP230297.

2.3 Development details

The proposed development includes the construction of a 36,500 standard cattle unit (SCU) feedlot. The proposed feedlot is proposed in two stages, as detailed in **Table 2-1**.

Table 2-1: Development yield

Stage	Estimated completion year	Capacity
1	2024	22,870
2	2025	13,630
	Total	**36,500**

The completion years for each stage shown in **Table 2-1** are an estimate only, based on client experience, and are subject to market conditions.

The assessment considers the traffic impacts of the ultimate scenario.

The proposed pen locations associated with each stage are shown in **Figure 2-2** and illustrated at **Appendix A**.

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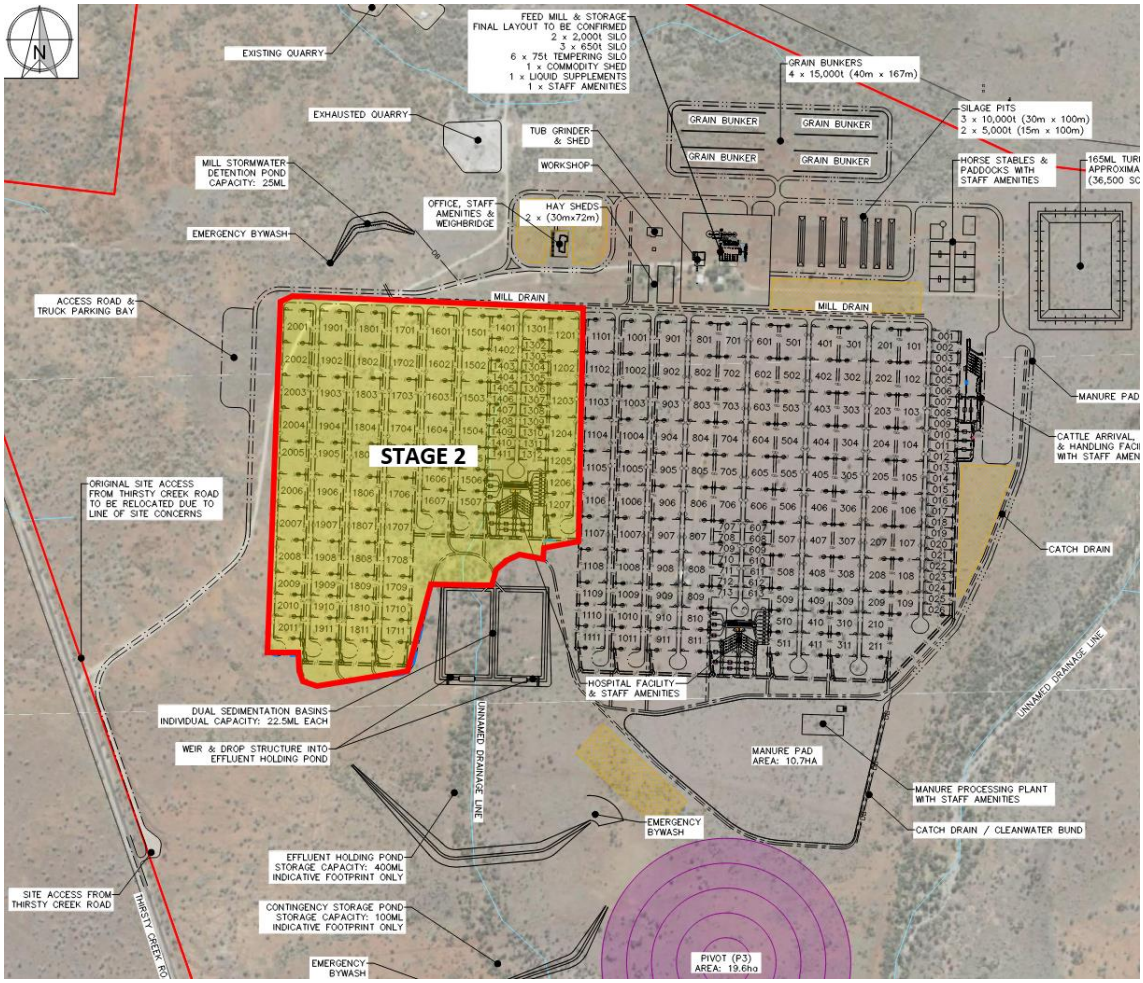


Figure 2-2: Proposed feedlot layout and staging

2.4 Development access

The development is accessed via the existing driveway with all-movements to Thirsty Creek Road. Thirsty Creek Road is a local road under the jurisdiction of RRC and is classified as a rural access road as per the RRC Planning Scheme Road Hierarchy mapping.

The largest vehicles accessing the subject site will consist of Type 1 Road Trains (i.e. 36.5m long A-Doubles). However, vehicle types will also include B-Doubles (26m long) and semi-trailers (i.e. 19m long articulated vehicles).

The internal circulation roads are proposed to comprise approximately 7.7m wide sealed bitumen carriageways. Additionally, 8m wide gravel roads are proposed to run between the pens for vehicle accessibility.

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2.5 Operational details

The development will operate between the hours of 3am and 9pm, seven days a week. The staff operating hours are between 3am and 7pm, whilst truck operations occur between 5am and 9pm.

Cattle are transported onto the feedlot in loads using both B-Doubles and A-Doubles predominantly from the west. Livestock throughput is dependent on the target markets for the feedlot which can vary significantly across the lifetime of the feedlot. For the purposes of this assessment, it has been assumed that the proposed feedlot will be stocked with approximately 70 % 100-day short-fed cattle and 30 % 140-day mid-fed cattle. It is anticipated that these will be the markets targeted and represents a conservative assumption for the purposes of traffic generation. However, this may be subject to change into the future as markets influence grain-fed cattle demand. Any change would likely result in cattle being fed longer (e.g. 300 days) which will reduce the number of cattle trucks accessing the property with no substantial impact on feed trucks. At the end of the feeding period, the outgoing cattle are transported east towards Rockhampton.

The occupancy of the feedlot depends on market demands, and has been estimated at 98% based on previous experience. Cattle mortalities are collected as soon as they are identified and transported to the manure pad for composting.

Staffing of the site will be undertaken by staff that live off-site on nearby properties or townships (such as Gogango). It is assumed that 25% of the off-site staff will carpool. Two staff (the feedlot manager and the farm manager) will live onsite.

Servicing contractors and visitors will also attend the site on a regular basis to provide upkeep and maintenance of the site operations.

Other activities associated with the site will include feed delivery and manure collection/delivery.

2.6 Expected traffic movements and design vehicles

The proposed operational activities on site will generate vehicle movements on the external road network. Details regarding the vehicle movements associated with the development are provided below.

2.6.1 Staff

A total of 64 full time staff will be employed to carry out the site operations seven days per week.

It is expected that the staff members will be based off-site on nearby properties or townships (such as Gogango).

The staff will be required to travel to and from the site in private (light) vehicles. It is assumed that 25% of the staff will carpool to and from the site each day. From previous experience with similar sites, cars will usually have between two to three persons per vehicle. For this assessment a conservative rate of two persons per vehicle has been used.

Depending on the staff roles, the staff travelling to and from the site will arrive for their shift between the hours of 3am and 7am, and leave the site when their shift ends, between 3pm and 7pm. It is assumed that the staff movements will be distributed evenly over the arrival and departure hours. This equates to 48 trips total for each arrival and departure period, equating to an average of 12 trips per hour during the applicable arrival and departure periods.

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It is noted that staff may travel to the site from different areas of the region, with most residing closer to the site on nearby properties or at Gogango. However, for the purpose of this traffic assessment, the following directional distribution assumptions have been made for a conservative assessment:

- 50% of staff will travel to the site from the west along Capricorn Highway.
- 50% of staff will travel to the site from the east along Capricorn Highway.

This provides a conservative 'worst-case' impact scenario of the development on the surrounding road network.

2.6.2 Deliveries and collections

The deliveries to and from the site are expected to involve the operational activities and associated vehicle movements described below.

Cattle

The tables in **Appendix B** illustrate the calculation steps of the number of annual vehicle trips associated with the expected cattle numbers for the development. The calculations consider the duration that the cattle are in the feedlot, the mortality rate, and the number of cattle head per vehicle type (taking into account the weight differentials between incoming and outgoing cattle).

The operation for the incoming and outgoing cattle is as follows:

- Cattle delivery (incoming cattle): A-Double road trains and B-Double trucks will deliver cattle to the site. The trucks will predominantly travel to and from the west (i.e. 90%) with a small portion (10%) from the east via Capricorn Highway. These deliveries are expected to occur at any given time and day between 5am to 9pm, 7 days a week. The deliveries can be staggered and arranged so that it doesn't coincide with any other deliveries or collections occurring on the site, or to occur outside staff movements. The vehicles will enter the site fully loaded and leave the site unloaded (empty).
- Cattle collection (outgoing cattle): A-Double road trains and B-Double trucks will collect the cattle from the site. The vehicles will all travel to and from the east (Rockhampton direction) via Capricorn Highway. These collections are expected to occur at any given time and day between 5am to 9pm, 7 days a week. The collections can be staggered and arranged so that they don't coincide with any other deliveries or collections occurring on the site, or to occur outside staff movements. The vehicles will enter the site unloaded (empty) and leave the site fully loaded.

Table 2-2 summarises the expected vehicle movements associated with the cattle.

Grain and feedstuffs

The feed for the cattle is a wet mix consisting of dry ingredients that are mixed onsite (and water is added) after the feedstuffs are delivered. It is assumed all the feedstuffs are delivered to the site.

The tables in **Appendix B** illustrate the calculation steps of the number of annual vehicle trips associated with the different types of feedstuffs expected for each stage of the development. The calculations consider the tonnes of feed per SCU, the breakdown percentage of the mix and the vehicle capacity for each feedstuff. It should be noted that the hay/straw is governed by the size/volumetric loading rather than weight.

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The operation for the feed delivery is as follows:

- Feed delivery: A-Double road trains and B-Double trucks will deliver feed to the site. Two-thirds of the trucks will travel to and from the east (i.e. 67%) via the Capricorn Highway and the Leichhardt Highway, and one-third will travel to and from the west (i.e. 33%) via Capricorn Highway. These deliveries are expected to occur at any given time and day between 5am to 9pm, 7 days a week. The deliveries can be staggered and arranged so that it doesn't coincide with any other deliveries or collections occurring on the site, or to occur outside staff movements. The vehicles will enter the site fully loaded and leave the site unloaded (empty).

Table 2-2 summarises the expected vehicle movements associated with the grain and feedstuffs.

Manure

Manure is collected from the feedlot and exported off-site. The tables in **Appendix B** detail the calculation of the manure produced and how many vehicle trips are required per annum. To ensure a conservative assessment, it has been assumed that all manure products will be exported from the site to properties outside the local area (via state-controlled roads). However, it is likely that some manure products will be utilised on-site or sold locally.

The manure collection is as follows:

- Manure collection: B-Double vehicles will collect manure from the site. The trucks will travel from the site to varying locations in the east and west (i.e. 50% / 50% via the Capricorn Highway). Note: this is considered to be a conservative assumption. These collections are expected to occur at any given time and day between 5am to 9pm, 7 days a week. The collections can be staggered and arranged so that they don't coincide with any other deliveries or collections occurring on the site, or to occur outside staff movements. The vehicles will enter the site unloaded (empty) and leave the site fully loaded.

Table 2-2 summarises the expected vehicle movements associated with the manure.

Servicing and visitors

The proposed development is expected to have other adhoc trips associated with servicing (such as maintenance, contractors and small deliveries), as well as visitors. On average, this is expected to consist of approximately one additional light vehicle per day.

Table 2-2 provides a summary of the anticipated daily development traffic volumes (deliveries and collections) based on the operational details above.

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Table 2-2: Anticipated development vehicle movements (deliveries and collections)

Stage	Trip type	Vehicle type	Origin / destination	Timing	No. loads per year	No. vehicle movements (i.e. in/ out)	Estimated annual traffic generation (no. movements)	Estimated weekly traffic generation (no. movements)	Estimated daily traffic generation (no. movements)
Stage 1	**Servicing / visitors**	Varies (B99 to MRV)	100% East	7am to 3pm (Mon-Fri)	164	2	329	6	1.3
	Incoming cattle	Road Train / B-Double	90% West 10% East	5am to 9pm (7 days)	740	2	1,481	28	4.0
	Outgoing cattle	Road Train / B-Double	100% East		1,256	2	2,511	49	6.9
	Grain and feedstuffs	Road Train / B-Double	33% West 67% East		2,672	2	5,345	103	14.6
	Manure	B-Double	50% West 50% East		752	2	1,503	29	4.1
						Total	**11,169**	**215**	**31**
Stage 2	**Servicing / visitors**	Varies (B99 to MRV)	100% East	7am to 3pm (Mon-Fri)	97	2	193	4	0.7
	Incoming cattle	Road Train / B-Double	90% West 10% East	5am to 9pm (7 days)	435	2	870	17	2.4
	Outgoing cattle	Road Train / B-Double	100% East		737	2	1,475	28	4.0
	Grain and feedstuffs	Road Train / B-Double	33% West 67% East		1,570	2	3,139	60	8.6
	Manure	B-Double	50% West 50% East		441	2	883	17	2.4
						Total	**6,559**	**126**	**18**
Ultimate (Stage 1 + Stage 2)	**Servicing / visitors**	Varies (B99 to MRV)	100% East	7am to 3pm (Mon-Fri)	261	2	522	10	2.0
	Incoming cattle	Road Train / B-Double	90% West 10% East	5am to 9pm (7 days)	1,175	2	2,350	45	6.4
	Outgoing cattle	Road Train / B-Double	100% East		1,993	2	3,986	77	10.9
	Grain and feedstuffs	Road Train / B-Double	33% West 67% East		4,242	2	8,484	163	23.2
	Manure	B-Double	50% West 50% East		1,193	2	2,386	46	6.5
						Total	**17,728**	**341**	**49**

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From **Table 2-2**, and the abovementioned operational details, it is identified that the ultimate development will generate low daily traffic volumes, consisting of an average of 24 heavy vehicles (48 movements) and 49 light vehicles (98 movements) per day. This equates to a total of approximately 146 vehicle trips per day.

The maximum number of trips per peak hour is expected to range between 12 to 15 trips depending on how the vehicles are managed throughout the day. **Table 2-3** shows two indicative daily timetables illustrating how the different types of vehicular trips for the ultimate development could be staggered across the day.

Table 2-3: Indicative daily timetables of vehicle trips for each trip type

Daily traffic volume schedule (vehicle movements per hour across the day) - Option A																			
Trip Type	**Max. typical daily movements**	**3am-4am**	**4am-5am**	**5am-6am**	**6am-7am**	**7am-8am**	**8am-9am**	**9am-10am**	**10am-11am**	**11am-12noon**	**12noon-1pm**	**1pm-2pm**	**2pm-3pm**	**3pm-4pm**	**4pm-5pm**	**5pm-6pm**	**6pm-7pm**	**7pm-8pm**	**8pm-9pm**
Off-Site Staff	96	12	12	12	12									12	12	12	12		
Servicing/visitors	2							1			1								
Incoming Cattle	8					2		2		2		2							
Outgoing cattle	12					2	2		2	2		2	2						
Grain and feedstuffs	24					3	3	3	3	3	3	3	3						
Manure	8						2		2		2		2						
Total trips	**150**	**12**	**12**	**12**	**12**	**7**	**7**	**6**	**7**	**7**	**6**	**7**	**7**	**12**	**12**	**12**	**12**	**0**	**0**

Daily traffic volume schedule (vehicle movements per hour across the day) - Option B																			
Trip Type	**Max. typical daily movements**	**3am-4am**	**4am-5am**	**5am-6am**	**6am-7am**	**7am-8am**	**8am-9am**	**9am-10am**	**10am-11am**	**11am-12noon**	**12noon-1pm**	**1pm-2pm**	**2pm-3pm**	**3pm-4pm**	**4pm-5pm**	**5pm-6pm**	**6pm-7pm**	**7pm-8pm**	**8pm-9pm**
Off-Site Staff	96	12	12	12	12									12	12	12	12		
Servicing/visitors	2						1					1							
Incoming Cattle	8			1	1	1	1	1	1	1	1								
Outgoing cattle	12							1	1	1	1	1	1	1	1	1	1	1	1
Grain and feedstuffs	24			2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
Manure	8				1	1	1		1		1		1		1		1		
Total trips	**150**	**12**	**12**	**15**	**15**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**3**	**15**	**15**	**15**	**15**	**3**	**2**

Option A has the truck trips movements outside the staff movements to distribute the total number of vehicle volumes more evenly throughout the day. Option B provides more flexibility with the truck trips as they are staggered evenly throughout the operational period. This shows that the maximum hourly volumes range between 12 to 15 trips per hour.

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3. Existing transport environment

The principal traffic route providing access to the subject site is via Capricorn Highway, Third Street, Second Street, Riverslea Road and Thirsty Creek Road. The key roads and intersections relevant to the site are discussed in the following sections.

3.1 Key roads

3.1.1 Capricorn Highway

Capricorn Highway (16A) is a State-controlled road (SCR) under the jurisdiction of the DTMR. It is classified as a state strategic road and is approximately 575km long. The Capricorn Highway runs predominantly east-west, extending from Rockhampton in the east to Barcaldine in the west.

In the vicinity of the site (the Gogango township), the Capricorn Highway has the following characteristics (refer to **Figure 3-1** and **Figure 3-2**):

- Two way, two lane, undivided configuration
- Sealed carriageway width of approximately 9m with 3.2m wide lanes
- Edge and centre lines (with approximately 1m wide centre line treatments)
- Audio tactile markings to the east of Gogango
- Shoulder widths of approximately 1.0m
- Road reserve width of approximately 60m
- Posted speed limit of 110km/h
- Daily traffic volumes of approximately 3,200 vehicles per day (2020 DTMR AADT data)



Figure 3-1: Capricorn Highway looking west towards Gogango

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Figure 3-2: Capricorn Highway looking east towards Gogango

3.1.2 Riverslea Road

Riverslea Road is classified as a major rural collector road under the jurisdiction of RRC. The road connects the Gogango township in the south-east to Rookwood Road at the Fitzroy River in the north-west.

In the vicinity of the site (i.e. between Thirsty Creek Road and the Gogango township), Riverslea Road has the following characteristics (refer to **Figure 3-3** and **Figure 3-4**):

- Two-way, undivided configuration
- No line marking
- Sealed carriageway width of 6.5m with approximately 1m to 2m wide grassed shoulders
- Road reserve width of approximately 30m to 40m
- Posted speed limit of 100km/h
- Daily traffic volumes of approximately 220 vehicles per day (2022 intersection count data (24hr))

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Figure 3-3: Riverslea Road looking north (north of rail crossing)



Figure 3-4: Riverslea Road looking south (south of Thirsty Creek Road)

3.1.3 Thirsty Creek Road

Thirsty Creek Road is a no-through road running north-south from Riverslea Road. It is classified as a rural access road under the jurisdiction of RRC.

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In the vicinity of the site Thirsty Creek Road has the following characteristics (refer to **Figure 3-5** and **Figure 3-6**):

- Two-way, undivided configuration
- No line marking
- Sealed carriageway width of 7m to 8m with approximately 1m wide gravel shoulders
- Road reserve width of approximately 40m
- Default rural unsigned speed limit of 100km/h
- Daily traffic volumes of approximately 180 vehicles per day (2022 intersection count data (24hr))
- Three one-lane floodway crossings (ranging from 4.5m to 5m carriageway width)



Figure 3-5: Thirsty Creek Road looking north (north of site access)



Figure 3-6: Thirsty Creek Road looking south (south of site access)

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3.1.4 Second Street and Third Street

Second Street and Third Street are local access streets under the jurisdiction of RRC. These streets are located within the Gogango township and connect Riverslea Road to the Capricorn Highway (refer **Figure 3-7**). The connection consists of four 90 degree turns and has a posted speed limit of 50km/h.



Figure 3-7: Second Street and Third Street layout (Gogango township)

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3.2 Key intersections

The following intersections are nominated as key intersections for the proposed feedlot operation:

- Capricorn Highway / Third Street
- Riverslea Road / Thirsty Creek Road
- Thirsty Creek Road / Feedlot Access

These intersections are discussed in detail in the relevant sections below and have been nominated as these are the intersections where the expected impact of the development is considered of significance (i.e. development traffic being more that five per cent of the background traffic).

3.2.1 Capricorn Highway / Third Street intersection

The intersection of Capricorn Highway and Third Street consists of a priority-controlled T-intersection. The Third Street leg is signed and line marked with 'Give Way' priority to the Capricorn Highway. Each leg of the intersection consists of one approach lane and one departure lane, with the exception of the Capricorn Highway which has additional short turn channelised lanes on both the eastern and western approaches.

The intersection allows all turning movements and consists of 3.3m wide channelised left and right turning lanes from the Capricorn Highway into Third Street. **Figure 3-8** shows the geometry of the intersection.



Figure 3-8: Capricorn Highway / Third Street intersection

3.2.2 Riverslea Road / Thirsty Creek Road intersection

The intersection of Riverslea Road and Thirsty Creek Road consists of a priority-controlled T-intersection located on a curve. The Thirsty Creek Road leg is signed and line marked with 'Give Way' priority to Riverslea Road. Each leg of the intersection consists of one approach lane and one departure lane, with the exception of the Riverslea Road which has an additional short right turn channelised lane on the southern approach.

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The intersection allows all turning movements and consists of a 3.1m wide channelised right turning lane and basic left turn provisions from Riverslea Road into Thirsty Creek Road. **Figure 3-9** shows the geometry of the intersection.



Figure 3-9: Riverslea Road / Thirsty Creek Road intersection

3.2.3 Thirsty Creek Road / Feedlot Access intersection

The site access intersection with Thirsty Creek Road consists of a priority-controlled T-intersection. The access driveway is signed with a 'Stop' sign with priority to Thirsty Creek Road. Each leg of the intersection consists of one approach lane and one departure lane.

The intersection allows all turning movements. No turning provisions exist for the access.

The feedlot access driveway is newly constructed and is 8m at the property boundary which flares out to 31m at the Thirsty Creek carriageway pavement edge. **Figure 3-10** illustrates a sketch of the geometry of the intersection. **Figure 3-11** shows a photo of the access approach to the intersection.

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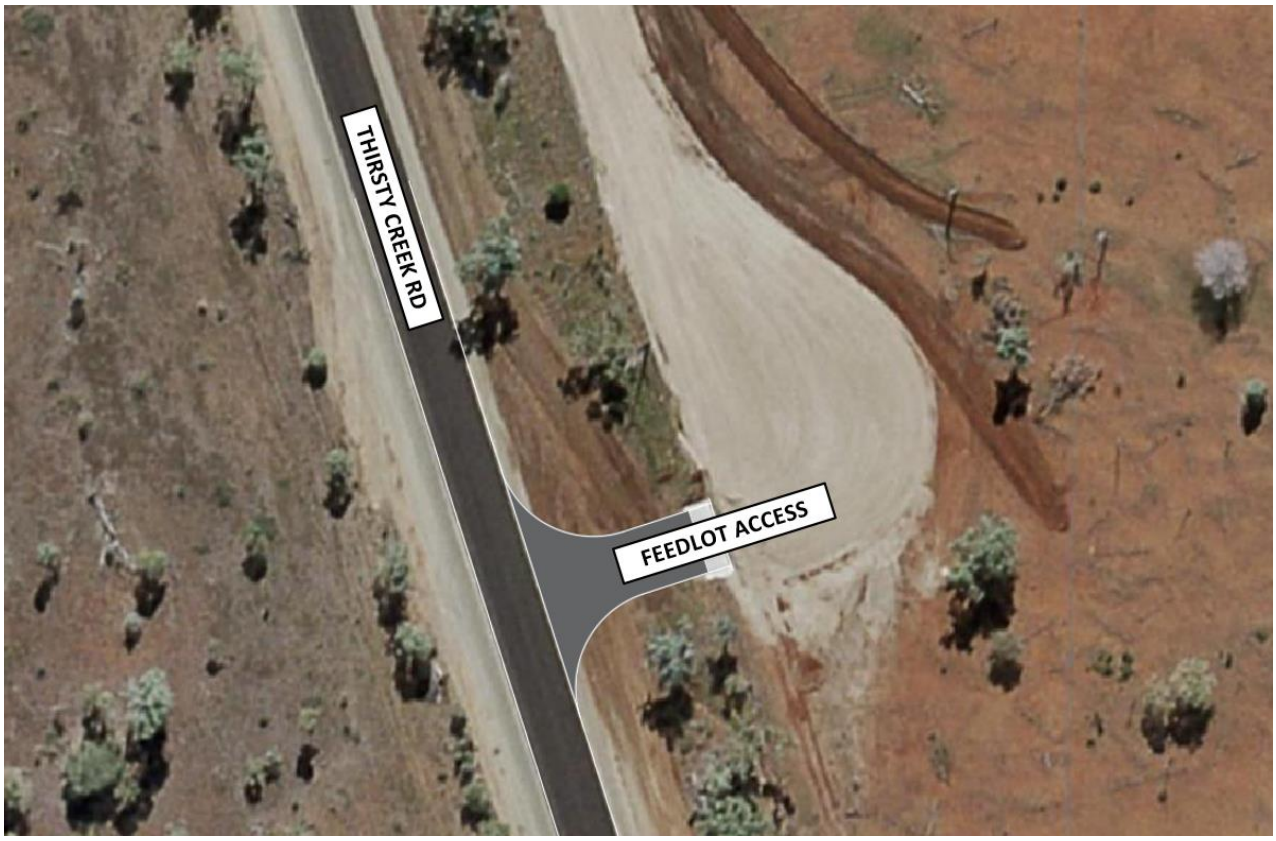


Figure 3-10: Thirsty Creek Road / Feedlot Access intersection



Figure 3-11: Approach from site access to Thirsty Creek Road

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3.3 Crash data

DTMR crash data was reviewed for the previous five years from 1 January 2014 to 31 December 2018 (the most recent available period). Data was obtained from Queensland Globe (transportation – road crash locations). Findings indicate that there were no recorded crashes in the vicinity of the site, along the access route (between the Capricorn Highway and the site access) or at the key intersections.

Because of this, no safety issues, crash patterns or mitigation measures could be determined from the crash data review.

It should also be noted that the key intersections and access route was recently upgraded (in the past year) as part of the Rookwood Weir project. These road and intersection upgrades would help improve the safety of the road network and road users.

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4. Future road network planning

The principal traffic route providing access to the subject site is currently being impacted by the construction of the Rookwood Weir project. The Rookwood Weir is a landmark project that will capture water in the lower Fitzroy River for use across the region. The Rookwood Weir construction is due for completion at the end of 2022, with the weir planned to be commissioned in 2023.

The Rookwood Weir project comprises of the construction of the weir and also enabling works that will upgrade existing infrastructure to support both the construction of the weir and its operation. Whilst the weir is still currently being constructed (at the time of writing this report), the following enabling works have recently been completed:

- Upgrading and widening 16.2 kilometres (km) of Thirsty Creek Road.
- Installing a new intersection on the Capricorn Highway and upgrading Second Street and Third Street through to the railway crossing at Gogango to accommodate B-Double vehicles.
- Building a 21-metre (m) high, 260m long bridge at Riverslea to replace the existing crossing and up to 300m of new road on the approaches to the bridge, connecting to the existing road

These works have been included as part of the background traffic and infrastructure for the assessment. It is also noted that it is expected that the traffic volumes will decrease on the principal traffic route once the weir is completed and that the operations of the on-site quarry will also likely to be reduced.

4.1 Local government planning

The RRC *Plans for Trunk Infrastructure* mapping does not include any planned upgrades in the vicinity of the subject site or the Gogango township.

4.2 State government planning

DTMR *Queensland Transport and Roads Investment Program* (QTRIP) does not include any planned upgrades in the vicinity of the subject site or the Gogango township.

4.3 Summary

From the above, no major changes to the existing road network are proposed within the examined development design horizon. It is expected that the future traffic volumes of the principal traffic route may decrease following the construction of the Rookwood Weir (i.e. prior to the development opening).

Therefore, the existing road network connections and intersection layouts will be used as the basis for this traffic impact assessment, this includes the road upgrades recently undertaken as part of the Rookwood Weir enabling works.

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5. Traffic operation

5.1 Existing traffic volumes

5.1.1 Traffic data

The following traffic data has been obtained for this assessment:

- Capricorn Highway / Third Street intersection (24hour turning movement counts, Wednesday 23 February 2022)
- Riverslea Road / Thirsty Creek Road intersection (24hour turning movement counts, Wednesday 23 February 2022)
- DTMR traffic census site closest to Gogango on Capricorn Highway (Count site 60045)

The data indicates:

- Road network peak hour periods of 8:00-9:00am and 1:30-2:30pm. The peak hour periods generally align for each
- An average of 25% heavy vehicles for the Capricorn Highway, Riverslea Road and Thirsty Creek Road

The traffic count surveys are included at **Appendix C**.

5.1.2 Historical growth rate (Capricorn Highway)

Midblock traffic count data was obtained from DTMR for Capricorn Highway (undertaken in 2020), at TDist 64km (Site ID 60045), west of Gogango.

The data indicates that the traffic volumes along the Capricorn Highway have generally been declining from 2012 to 2016 and have subsequently started increasing to previous historical volumes back in 2010. This is illustrated in **Figure 5-1** below. The compound growth rate for the latest period of increasing volume trend ranges between 3.9% per annum (for 2016-2020) and 5.3% per annum (for 2017-2020).

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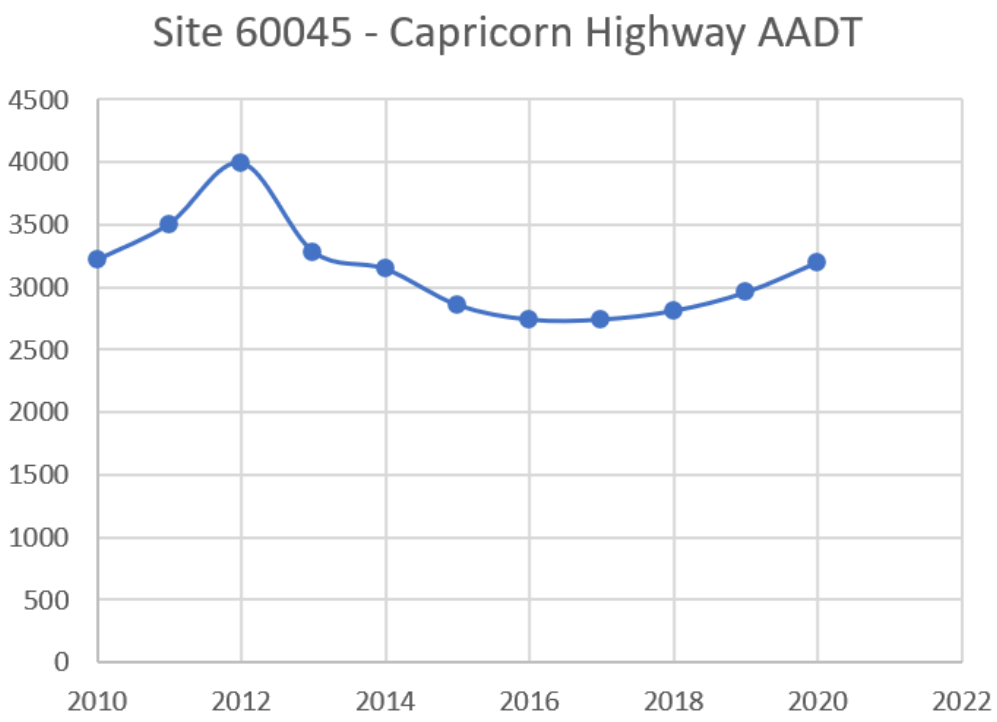


Figure 5-1: Capricorn Highway annual AADT count data

From the above, a 4% compound per annum background traffic growth rate has been applied for assessment for the Capricorn Highway volumes.

5.1.3 Historical growth rate (local rural roads)

Due to limited availability of historical traffic volume data, the background traffic growth rate has been estimated for the key local rural road network (principal traffic route) based on land use and development potential. Given that these roads are rural and do not provide through connection, the potential for background growth is considered to be negligible/nil. The traffic volumes along the principal traffic route would also decrease once the Rookwood Weir project and associated construction activities finishes. The quarry that exists on the subject site will also likely to reduce operations when the Rookwood Weir is completed.

Therefore, from the above, a conservative 1% compound per annum background growth rate has been applied for this assessment for the local rural roads of the principal traffic route.

From the above, the adopted background traffic demand scenarios used for analysis are illustrated at **Appendix D**.

5.2 Development traffic volumes

From the operational details (refer to **Section 2.6**), the estimated worst-case peak 'development' traffic volumes and 'background with development' traffic volumes are illustrated in **Appendix E**.

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6. Development traffic impact on external road network

The DTMR *Road Planning and Design Manual* Chapter 13.5.4 provides information relating to the maximum traffic volume combinations for uninterrupted traffic flow conditions. These combinations are shown on **Table 6-1** below and provide guidance for unsignalised intersections carrying light crossing and turning volumes. Where the volumes are less than that illustrated in **Table 6-1**, it is considered unnecessary to flare intersection approaches or carry out an intersection analysis.

Table 6-1: Intersection capacity – uninterrupted flow conditions

Major road type[1]	Major road flow (vph)[2]	Minor road flow (vph)[3]
Two-lane	400	250
	500	200
	650	100

1. *Major road is through i.e. has priority*
2. *Major road design volumes include through and turning movements*
3. *Minor road design volumes include through and turning volumes*

The anticipated 'background with development' traffic volumes for the ultimate development scenario detailed in **Appendix E** do not exceed the hourly volume combinations shown in **Table 6-1**, indicating that intersection analysis is not deemed warranted for the key intersections or site access location. It is expected that these intersections will operate under capacity, with the proposed development volumes.

Although operational analysis is therefore not deemed warranted for the key intersections, analysis has nevertheless been undertaken for the Capricorn Highway / Third Street intersection to illustrate the operational impact, as this intersection has the largest traffic volumes of the key intersections.

6.1 Capricorn Highway / Third Street intersection analysis

The Capricorn Highway / Third Street intersection layout as modelled in SIDRA is shown in **Figure 6-1**.

For conservativeness, the intersection analysis has been undertaken with the assumption that the development peak aligns with the external road network peak, and it has been assessed using a 10 year design horizon of 2035.

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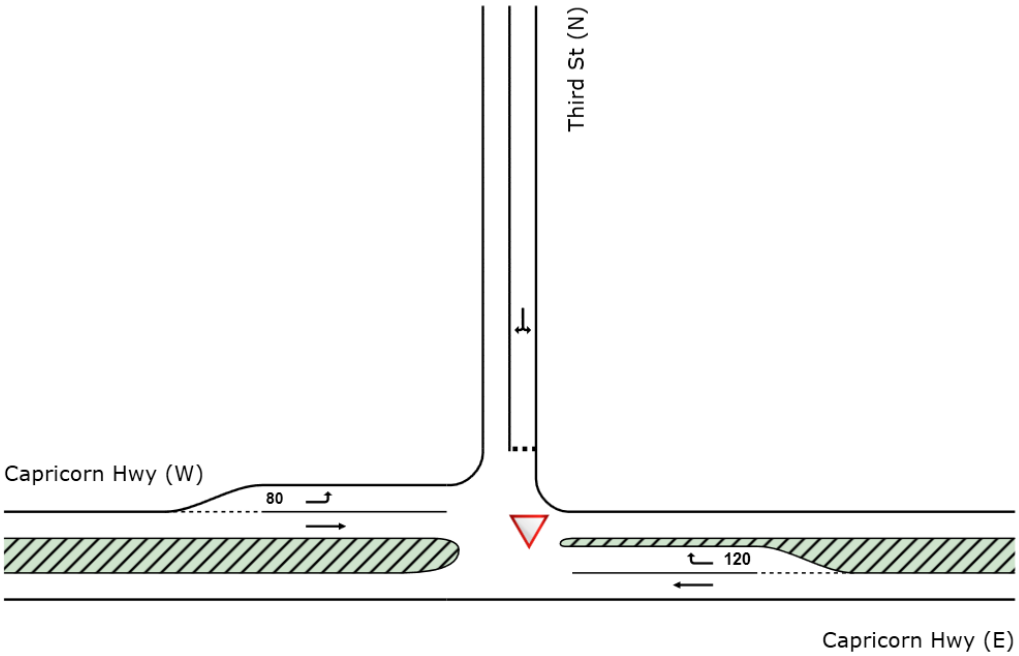


Figure 6-1: Capricorn Highway / Third Street SIDRA layout

The intersection has been assessed using SIDRA 9.0 intersection analysis program. This program calculates the operational performance of intersections based on input parameters such as geometry and traffic volumes. Output values that have been recorded include the degree of saturation (DOS), queues and delays. The DOS is a commonly used value, which is principally a volume to capacity ratio.

The typical desired standards of service (DSS) values for DOS and intersection performance are summarised in **Table 6-2**.

The SIDRA intersection analysis outputs are compared to the DSS. A DOS exceeding these values indicates that the intersection is exceeding its practical capacity and users of the intersection are likely to experience unsatisfactory queuing and delays.

Table 6-2: Accepted DOS for intersections

Intersection type	Maximum DOS
Signalised intersection	90% (0.90)
Roundabout	85% (0.85)
Unsignalised intersections	80% (0.80)

These maximum DOS values are also recommended by Austroads *Guide to Traffic Management – Part 12*.

It is noted that the DTMR GTIA has desired standard service (DSS) values using average movement delay instead of DOS, with any movement increasing more than a 5 percent triggering the need for mitigation. This method is still being improved upon as it has been found that some mitigation measures result in a better intersection performance but increase delays on the movements (i.e. the upgrade from a priority-controlled intersection to a signalised intersection). Therefore, for the assessment, both delay and DOS have been considered for operational limits.

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Table 6-3 summarises the SIDRA results for the 'background with development' traffic scenario for each peak period. Detailed SIDRA results are provided at **Appendix F**.

Table 6-3: Capricorn Highway / Third Street SIDRA summary

Scenario	Demand	Degree of saturation	Queue distance (m)	Average delay (sec)
2035 Ultimate (BG + Dev) AM peak hour	482	0.16	0.8	0.9
2035 Ultimate (BG + Dev) PM peak hour	541	0.14	1.6	0.8

The SIDRA analysis results indicate that the intersection operates well within the accepted performance thresholds. The development is expected to have minimal operational impact on the intersection.

Therefore, no mitigation of operational impacts is required at the intersection.

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7. Pavement impact assessment

7.1 State-controlled road pavement impacts

An assessment of the pavement impacts resulting from the development traffic has been carried out for the Capricorn Highway, at the ultimate opening year (2025). The assessment has been undertaken using traffic count data from the 2020 midblock volumes obtained from DTMR, and turning volumes for intersection count data, and is detailed at **Appendix G**.

The assessment has been undertaken for the sections of Capricorn Highway to the east and west of Third Street, Gogango. The development traffic includes both B-Double vehicles (Class 10) and A-Double road trains (Class 11). It should be noted that this is considered a conservative assumption given that some manure products will be utilised on-site or sold locally (refer to **Section 2.6.2**).

Table 7-1 and **Table 7-2** below summarise the background and development traffic loadings, in standard axle repetitions (SAR4s) for the Capricorn Highway.

Table 7-1 : Background SAR4s (ESAs) along the Capricorn Highway (2025)

Road	Segment	Site ID	Direction		AADT HV	SAR4 per HV	SAR4 per day	SAR4 per year
Capricorn Highway	West of Gogango	60045	Against gazettal	EB	383	3.2	1,227	447,809
			Gazettal	WB	594	3.2	1,902	694,361
	East of Gogango	60045 + Turning volumes	Against gazettal	EB	409	3.2	1,310	478,177
			Gazettal	WB	621	3.2	1,989	725,897

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Table 7-2: Development generated SAR4s (ESAs) along the Capricorn Highway (2025)

Development volumes - West of Gogango

Road	Site	Direction		Vehicle class	Daily demand	SAR4 per vehicle		SAR4 per year
Capricorn Highway	West of Gogango	Against gazettal	Eastbound	10	2	6.3	loaded	5,403
				10	2	0.53	unloaded	316
		Gazettal	Westbound	10	2	6.3	loaded	3,758
				10	2	0.53	unloaded	455
		Against gazettal	Eastbound	11	4	8.43	loaded	13,486
				11	0	0.55	unloaded	0
		Gazettal	Westbound	11	0	8.43	loaded	0
				11	4	0.55	unloaded	880
Total						**Eastbound**		**19205**
						Westbound		**5092**

Development volumes - East of Gogango

Road	Site	Direction		Vehicle class	Daily demand	SAR4 per vehicle		SAR4 per year
Capricorn Highway	East of Gogango	Against gazettal	Eastbound	10	3	6.3	loaded	7,110
				10	3	0.53	unloaded	596
		Gazettal	Westbound	10	3	6.3	loaded	7,084
				10	3	0.53	unloaded	598
		Against gazettal	Eastbound	11	4	8.43	loaded	12,316
				11	5	0.55	unloaded	1,009
		Gazettal	Westbound	11	5	8.43	loaded	15,471
				11	4	0.55	unloaded	804
Total						**Eastbound**		**21031**
						Westbound		**23956**

Table 7-3 below summarises the development road link impacts along the Capricorn Highway.

Table 7-3: Road link impacts along the Capricorn Highway

Road	Segment	Direction		Development SAR4 per year (2025)	Background SAR4 per year (2025)	Development impacts (%)	>5% impacts
Capricorn Highway	West of Gogango	Against gazettal	EB	19,205	447,809	4.3%	No
		Gazettal	WB	5,092	694,361	0.7%	No
	East of Gogango	Against gazettal	EB	21,031	478,177	4.4%	No
		Gazettal	WB	23,956	725,897	3.3%	No

Table 7-3 demonstrates that the increase in SAR4s (ESAs) are within the acceptable limits (less than 5 per cent influence) and the development is not considered to have a significant impact on the pavement of the Capricorn Highway. Therefore, as per the GTIA, no contributions are required by the developer.

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7.2 Local road pavement impacts

Given the lack of available data regarding the existing road pavement design and construction information, including the new upgraded pavement of Thirsty Creek Road, at the time of writing this report, a pavement impact assessment could not be undertaken at this stage.

If required, it is suggested that the local road pavement impacts be undertaken as part of the future design stages of the development when the pavement design information, construction quality assurance, maintenance and cost schedules, and subgrade information can be obtained.

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8. Safety considerations

8.1 Turn warrant assessment

Turn warrants are used to identify the need to provide separate turning provisions from a functionality and safety perspective. The warrants are essentially the relationship between the turning volumes versus the major road traffic volumes.

In accordance with Austroads, turn warrants are based on the construction of new roads (i.e. greenfield sites) and is also used as a reference for intervention levels for updating existing intersection turn treatments. Turn warrant assessment is usually undertaken at these intersections to determine if protected turning lanes (i.e. channelisation) are required from a safety perspective.

Given the key local intersections are considered brownfield sites with low volumes and existing constraints, a turn warrant assessment has been undertaken using the extended design domain (EDD) criteria.

The EDD warrants for turn treatments are detailed in the *Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (RPDM) published by DTMR, and include consideration of simple left (SL) and simple right (SR) turning movement provision.

The below sections summarise the turn warrant treatments required at the key intersections (using a design speed of 110km/h) with respect to the traffic volumes provided at **Appendix E**. Detailed turn warrant calculations are shown at **Appendix H**.

8.1.1 Capricorn Highway / Third Street

It should be noted that the intersection of Capricorn Highway and Third Street already has channelised left and right turning provisions and therefore no additional upgrades are warranted. The volumes experienced at this intersection triggers a short channelised right turn lane (CHR(S)) and a basic left turn lane (BAL). The existing configuration of the intersection exceeds this requirement.

8.1.2 Riverslea Road / Thirsty Creek Road

Similar to the Capricorn Highway / Third Steet intersection, the intersection of Riverslea Road and Thirsty Creek Road has a channelised right turning provision and therefore no additional upgrades are warranted. No left turning movements into Thirsty Creek Road are associated with the development and given the low volumes associated with the Riverslea Road through movements, the intersection doesn't trigger left or right channelisation.

8.1.3 Thirsty Creek Road / Feedlot Access

The worst case scenario with regards to turning provisions for the feedlot access occurs in the morning peak periods when staff arrive. A total of 15 right turning movements into the site are expected during the morning peak hour in the ultimate scenario (2025). The background traffic during this period consists of a maximum of 19 vehicles travelling along Thirsty Creek Road. This results in the right turn warrants being borderline between a simple right and basic right turn provision.

It is noted that the Stage 1 traffic does not trigger the requirement for BAR provisions given the lower right turning volumes.

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From the turn warrant assessment of right turning movements into the site access, it is recommended to retain the existing simple right configuration and monitor the traffic situation in the future (post completion of the ultimate development), with a view to install a BAR if required or if a pattern of near misses are recorded. This is because of the following:

- The right turn warrants are borderline between simple and basic provisions.
- The background volumes are expected to reduce following the completion of the Rookwood Weir (including the reduction in Quarry traffic), which is forecasted to be before the development completion of Stage 1.
- Motorists travelling northbound on Thirsty Creek Road have adequate sight distance to turning vehicles at the access (refer **Section 8.2.1**).
- Thirsty Creek Road has traversable shoulders and verge at the access location which would help in motorists to overtake a right turning vehicle at low speeds if required.

Because there is negligible left turning traffic volumes into the access, and the relatively low through volumes on Thirsty Creek Road, the development does not trigger any turn treatments or channelisation for left turning provisions. The existing simple left turn arrangement of the intersection is therefore considered appropriate.

8.2 Sight distance assessment

Sight distance has been reviewed for the key intersections and one-lane culvert locations for the principal traffic route. These are detailed in the relevant sections below.

8.2.1 Thirsty Creek Road / Feedlot Access intersection

Sight distance has been reviewed for the Thirsty Creek Road / Feedlot Access intersection. The review was completed to confirm applicable sight distance requirements in accordance with Austroads requirements. Measurements were taken from a site visit on 9 February 2022 under clear and dry conditions.

Table 8-1 summarises the variables used for this calculation.

Table 8-1 : Variables adopted for sight distance assessment (Thirsty Creek Road)

Variable symbol	Description	Value adopted for assessment		Unit of measure
		Truck	Car	
DT	Decision time (s) = observation time (3 s) + reaction time (s)	5	5	seconds
V	Operating (85th percentile) speed	110	110	km/hr
d	Coefficient of deceleration for cars / trucks *(Guide to Road Design – Part 3: Geometric Design (Austroads 2016))*	0.29	0.362	
a	Longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)	2.3 (NB) -2.3 (SB)	2.3 (NB) -2.3 (SB)	%
R_T	perception/reaction time *(Guide to Road Design – Part 3: Geometric Design (Austroads 2016))*	2.0	2.0	seconds
SISD	$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$ (Equation 2 *Guide to Road Design - Part 4a*)			

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The outcomes of this review are summarised in **Table 8-2**. Photos shown at **Figure 8-1** and **Figure 8-2** illustrates the available sight distance from the access.

Table 8-2: Austroads sight distance requirements (Thirsty Creek Road)

Intersection	Approach leg	Vehicle type	Direction	Available SISD (m)	Required SISD (m)	Compliance
Thirsty Creek Road / Feedlot Access	Thirsty Creek Road	Car	Northbound	>500m	277	Compliant
			Southbound	370m	294	Compliant
		Truck	Northbound	>500m	305	Compliant
			Southbound	370m	332	Compliant



Figure 8-1: Available sight (looking south along Thirsty Creek Road from Feedlot Access)

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Figure 8-2: Available sight (looking north along Thirsty Creek Road from Feedlot Access)

The review indicates that the sight distance available at the feedlot site access location is satisfactory and meets the minimum SISD requirements for both the north and south directions.

8.2.2 Riverslea Road / Thirsty Creek Road intersection

Sight distance has been reviewed for the Riverslea Road / Thirsty Creek Road intersection. The review was completed to confirm applicable sight distance requirements in accordance with Austroads requirements. Measurements were taken from a site visit on 9 February 2022 under clear and dry conditions. It should be noted that this intersection has been recently upgraded as part of the Rookwood Weir project and therefore it is assumed that sight distance was considered at the detailed design and construction of the intersection.

Table 8-3 summarises the variables used for this calculation. The speed limit has been reduced for Riverslea Road to reflect the advisory speed of 60km/h for motorists traversing the intersection curvature.

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Table 8-3 : Variables adopted for sight distance assessment (Riverslea Road)

Variable symbol	Description	Value adopted for assessment		Unit of measure
		Truck	Car	
DT	Decision time (s) = observation time (3 s) + reaction time (s)	5	5	seconds
V	Operating (85th percentile) speed	70	70	km/hr
d	Coefficient of deceleration for cars / trucks *(Guide to Road Design – Part 3: Geometric Design (Austroads 2016))*	0.29	0.362	
a	Longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)	0	0	%
R_T	perception/reaction time *(Guide to Road Design – Part 3: Geometric Design (Austroads 2016))*	2.0	2.0	seconds
SISD	$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$ (Equation 2 *Guide to Road Design - Part 4a*)			

The outcomes of this review are summarised in **Table 8-4**. Photos shown at **Figure 8-3** and **Figure 8-4** illustrates the available sight distance from Thirsty Creek Road.

Table 8-4: Austroads sight distance requirements (Riverslea Road)

Intersection	Approach leg	Vehicle type	Direction	Available SISD (m)	Required SISD (m)	Compliance
Riverslea Road / Thirsty Creek Road	Riverslea Road	Car	Northbound	300m	151	Compliant
			Eastbound	170m	151	Compliant
		Truck	Northbound	>300m	164	Compliant
			Eastbound	170m	164	Compliant

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Figure 8-3: Available sight (looking south along Riverslea Road from Thirsty Creek Road)



Figure 8-4: Available sight (looking west along Riverslea Road from Thirsty Creek Road)

The review indicates that the sight distance available at the Riverslea Road / Thirsty Creek Road intersection is satisfactory and meets the minimum SISD requirements for both the north and east directions.

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8.2.3 Capricorn Highway / Third Street intersection

Sight distance has been reviewed for the Capricorn Highway / Third Street intersection. The review was completed to confirm applicable sight distance requirements in accordance with Austroads requirements. Measurements were taken from a site visit on 9 February 2022 under clear and dry conditions. It should be noted that this intersection has been recently upgraded as part of the Rookwood Weir project and therefore it is assumed that sight distance was considered at the detailed design and construction of the intersection.

Table 8-5 summarises the variables used for this calculation.

Table 8-5 : Variables adopted for sight distance assessment (Capricorn Highway)

Variable symbol	Description	Value adopted for assessment		Unit of measure
		Truck	Car	
DT	Decision time (s) = observation time (3 s) + reaction time (s)	5	5	seconds
V	Operating (85th percentile) speed	120	120	km/hr
d	Coefficient of deceleration for cars / trucks *(Guide to Road Design – Part 3: Geometric Design (Austroads 2016))*	0.29	0.362	
a	Longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)	0	0	%
R_T	perception/reaction time *(Guide to Road Design – Part 3: Geometric Design (Austroads 2016))*	2.0	2.0	seconds
SISD	$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$ (Equation 2 *Guide to Road Design - Part 4a*)			

The outcomes of this review are summarised in **Table 8-6**. Photos shown at **Figure 8-5** and **Figure 8-6** illustrates the available sight distance from Third Street.

Table 8-6: Austroads sight distance requirements (Capricorn Highway)

Intersection	Approach leg	Vehicle type	Direction	Available SISD (m)	Required SISD (m)	Compliance
Capricorn Highway / Third Street	Capricorn Highway	Car	Westbound	>400m	324	Compliant
			Eastbound	>400m	324	Compliant
		Truck	Westbound	>400m	363	Compliant
			Eastbound	>400m	363	Compliant

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Figure 8-5: Available sight (looking east along Capricorn Highway from Third Street)



Figure 8-6: Available sight (looking west along Capricorn Highway from Third Street)

The review indicates that the sight distance available at the Capricorn Highway / Third Street intersection is satisfactory and meets the minimum SISD requirements for both the east and west directions.

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8.2.4 Floodway crossings

Three one-lane floodways exist along Thirsty Creek Road between Riverslea Rod and the development access. Two of the floodways are located close together at approximately Chainage 5.5-5.6km and both have a pavement width of 4.5m. The third floodway is located at Chainage 2.9km and consists of a large culvert crossing of 12 circular 700mm diameter pipes with a pavement width of 5m. The location and pictures of these floodways are shown in **Figure 8-7** below.



Figure 8-7: Floodway locations

All three floodways have advanced warning signs on all approaches and 'Give Way' signs on the southern approaches.

Given the restricted width (one-lane configuration) at each of these floodways, the sight distance has been reviewed to confirm applicable approach sight distance requirements in accordance with Austroads requirements. Measurements were taken from a site visit on 9 February 2022 under clear and dry conditions. The Safe Stopping Distance (SSD) was used as the minimum sight distance. The minimum SSD for the rural unsigned design speed (110km/h) is approximately 200m.

It should be noted that Thirsty Creek Road has been recently upgraded as part of the Rookwood Weir project and therefore it is assumed that sight distance was considered at these floodways during the detailed design and upgrade of the road.

Floodway Crossing – Chainage 2.9km

The available sight distance at the culvert crossing Give Way position and the leading approaches to the culvert range between 150m and 200m (refer to **Figure 8-8** and **Figure 8-9**). This available sight distance is adequate for a design speed of 90km/h for SSD of a car using a reaction time of 2.5 seconds, and 80km/h for SSD of a truck using a reaction time of 2.0 seconds.

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Figure 8-8: Floodway (Ch 2.9km) looking south from Give Way location



Figure 8-9: Floodway (Ch 2.9km) looking north from end of two lane section

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It is noted that the approaches leading to this culvert crossing have curves which would limit the travel speed of vehicles on the approach to less than the 110km/h design speed. The warning signage, road alignment and surrounding environment is also conducive of lower speeds and helps inform the driver and increase alertness/reaction times. Therefore, the above is considered acceptable for the available sight at the floodway crossing.

It is recommended that the vegetation be trimmed and maintained under maintenance schedules to improve sight distance at this location.

Floodway Crossings – Chainage 5.5-5.6km

The available sight distance at the culvert crossings Give Way positions and the leading approaches is greater than 300m (refer to **Figure 8-10** and **Figure 8-11**). This available sight distance (SSD) is adequate for the default rural design speed of 110km/h. Sight is also gained through the floodways to oncoming traffic for quite a distance greater than the 300m. This is considered acceptable for the crossings.



Figure 8-10: Floodway (Ch 5.6km) looking south on approach (Give Way sign is near the car)

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Figure 8-11: Floodway (Ch 5.6km) looking north on approach (400m of sight on approach)

8.3 Risk assessment

A risk assessment examining the increase in traffic movements relating to the proposed development operation at the relevant key intersections and along the principal traffic route has been considered as per the GTIA process. The safety risk score matrix as extracted from the GTIA is shown in **Figure 8-12**.

		Potential consequence				
		Property only (1)	Minor injury (2)	Medical treatment (3)	Hospitalisation (4)	Fatality (5)
Potential likelihood	Almost certain (5)	M	M	H	H	H
	Likely (4)	M	M	M	H	H
	Moderate (3)	L	M	M	M	H
	Unlikely (2)	L	L	M	M	M
	Rare (1)	L	L	L	M	M

Figure 8-12: Safety risk score matrix (GTIA)

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The risk items examined consider the potential to increase crashes and the safety deficiencies on the road network. The identified risks and associated mitigation is shown in **Table 8-7** below.

Table 8-7: Identified risk items and potential development mitigation

Risk item	Without development			With development			With development and mitigation			
	Likelihood	Consequence	Risk score	Likelihood	Consequence	Risk score	Mitigation measures	Likelihood	Consequence	Risk score
Risk of angle or rear end crash due to increase in traffic movements to/from the development access.	1	4	M	2	4	M	It is suggested that 'truck' warning signs be installed to inform motorists of the turning traffic associated with the access.	1	4	M
There is a lack of line marking along the local rural roads to provide delineation of travel lanes for motorists. This can result in a risk of run-off road and head-on crashes.	3	4	M	3	4	M	Install centre lines along the principal traffic route to help delineate travel paths and separation of traffic. Consider edge lines to improve delineation and reduce run-off road incidents.	1	4	M
Suitability of the principal road network for A-Double movements. Some of the 90 degree corners through the Gogango township may not be suitable for A-Doubles and may encourage the vehicles to use the full pavement width – resulting in potential head-on conflicts.	-	-	N/A	2	2	L	Install pavement widening where applicable to cater for A-double movements (refer to **Section 10.1**).	1	2	L
Vegetation on the inside of the curves leading to the one-lane culvert crossing on Thirsty Creek Road reduces intervisibility between approaching vehicles. This can result in head-on crashes.	3	4	M	3	4	M	Trim vegetation on the inside of curves under regular maintenance schedules to increase sight distance.	2	4	M

As shown, there is no change in the risk scores due to the addition of development traffic, and no high risks are identified.

From the above, no adverse safety issues were identified relating to the proposed development. The following mitigation measures are required by the developer:

- Installation of 'Truck' warning signs (W5-22) as per the MUTCD for the site access location
- Possible widening of the curves at the Gogango township (refer to **Section 10.1**)

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9. Site layout review

Bitumen sealed access roads and manoeuvring areas are proposed for the development, to provide access and internal connections between each of the buildings and associated amenity facilities on site. The internal circulation roads are proposed to comprise approximately 7.7m wide sealed bitumen carriageways. Additionally, 8m wide gravel roads are proposed to run between the pens for vehicle accessibility. This is considered satisfactory for the required servicing movements of heavy vehicles and staff traffic expected for the development.

The existing quarry on-site will provide gravel for the construction and maintenance of the internal roads.

The proposed layout plan for the development is detailed at **Appendix A**.

9.1 Site access

The site access has been recently constructed as a bitumen sealed crossover with 8m width at the property boundary. The access allows for all vehicle turning movements into and out of the development site from Thirsty Creek Road. The access has a cattle grid crossing and no gates.

It is recommended that if any internal gates at the access locations are proposed, they should be set back from the property boundary to allow heavy vehicles to stop without queuing back to the Thirsty Creek Road carriageway and through lanes.

The geometry of the site access crossover has been reviewed using an A-Double swept path detailed in **Section 9.3** below.

9.2 Car parking review

Car parking rates for intensive animal industry land uses are site specific and typically involve provision for one car parking space per employee vehicle generation, with a couple of additional car parking spaces provided for visitors / contractors. It is expected that each main staffing area of the development will include informal gravel car parking areas adjacent to building entrances, which will cater for the maximum number of staff and contractors anticipated on site at any given time (i.e. 49 light vehicles). This car parking provision will meet the expected employee demand and is considered satisfactory for the site.

It should also be noted that due to the size and greenfield nature of the development land, additional informal parking could also be accommodated, or constructed, if required.

It is expected that the car parking areas will be located within the vicinity of main staffing areas and building (where applicable), to minimise the walking distance and road crossings required for pedestrians.

The location of the car parking areas will provide separation from the main operational activities and loading areas on site, to minimise potential for undesirable interaction between heavy vehicles and light vehicles / pedestrians.

9.3 Swept path assessment

A swept path assessment was undertaken for the largest design vehicle (36m long A-Double Type 1 - road train [Australian Standards 2018]) that is expected to utilise the Thirsty Creek Road / Feedlot Access intersection. The swept path assessment is shown in **Figure 9-1** below and demonstrates that the access intersection configuration and geometry is suitable for the design vehicle movements.

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Note: given that the access is only newly constructed, it is not shown on aerial mapping. Therefore the geometry of the access has been estimated and drafted using measurements taken on-site.





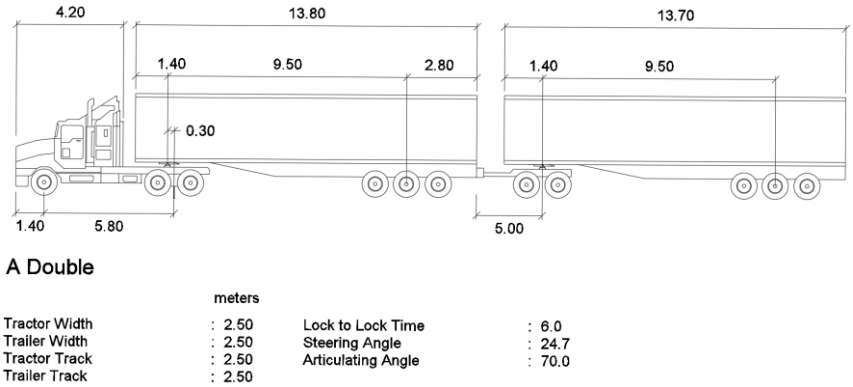


Figure 9-1: Development A-double swept paths – Thirsty Creek Road / Feedlot Access

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10. Suitability of the surrounding road network

The principal traffic route (local road network) from the Capricorn Highway to the site access is an approved PBS Level 2A (26m B-Double) route as per the National Heavy Vehicle Regulator (NHVR) route planner and QLD Globe mapping. The development proposes to utilise 36.5m Road Trains (i.e. A-Double and B-Triple vehicles) for the feedlot operations. The use of these larger vehicles will require a heavy vehicle permit by the NHVR. It should be noted that the Capricorn Highway is classified as a 36.5m Road Train route and therefore a heavy vehicle permit is not required for the state-controlled road network.

It is recommended that heavy vehicle permits be sought with the NHVR post development application determination. This is because, from previous experience, the NHVR does not investigate heavy vehicle travel routes without an approved development permit. Further discussion and collaboration between the developer and the NHVR will also be required to determine feasible and practical outcomes for accommodating 36.5m Road Trains as per the findings of this report.

The geometry and alignment of the traffic route to the proposed development is generally adequate to cater for 36.5m A-Double and B-Triple vehicles with only a few constrained locations of interest (refer to Section 10.1 and Section 10.2 which discusses these locations).

It has also been identified from a site inspection that A-Double road trains are currently using the principal traffic route to travel to a destination north of the subject site (refer to **Figure 10-1**). Therefore, this shows that these types of vehicles can utilise and access the road network, and that existing permits for these vehicle types may already be in use along the principal traffic route.



Figure 10-1: A-double travelling along Thirsty Creek Road (approximately 7.5km north of Gogango)

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10.1 Swept path assessment for A-doubles

A swept path assessment was undertaken for the largest design vehicle (36m long A-Double Type 1 - road train [Australian Standards 2018]) that is expected to utilise the principal traffic route. The swept path assessment for each constrained section (horizontal geometry) of the route are detailed in the relevant sections below.

Note: the swept path assessment has been undertaken using aerial imagery and on-site carriageway width measurements at select locations. Therefore, the assessment informs likely upgrades and widenings required to accommodate safe A-Double movements. Detailed investigation as to the required extents of widening is recommended to be undertaken at future development stages when detailed survey information is available to confirm geometry (horizontal and vertical) and constraints (i.e. culvert locations), and discussions have been undertaken with the NHVR with regards to applicable permits.

500mm clearance buffers have also been used to objects and hazards higher than 150mm (kerb height).

10.1.1 Capricorn Highway / Third Street intersection

The swept path assessment is shown in **Figure 10-2**, **10-3** and **10-4** below and demonstrates that an A-Double and opposing B99 car can traverse the road network without impacting on each other. There is enough total pavement width to accommodate these movements, however, given that the road has solid centre line marking, the swept paths have been undertaken without crossing the centre line into the opposing traffic lane.



Figure 10-2: A-double travelling northbound along Third Street (without crossing centre line)

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Figure 10-3: A-double travelling southbound Third Street (without crossing centre line)



Figure 10-4: A-double travelling northbound along Third Street – crossing centre line

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The upgrades required to cater for A-Double include:

- Relocating the kerbing on the inside of the first corner (intersection) to the edge of pavement (no widening is required) – refer to **Figure 10-5**
- Widening the inside of the second corner – refer to **Figure 10-6**

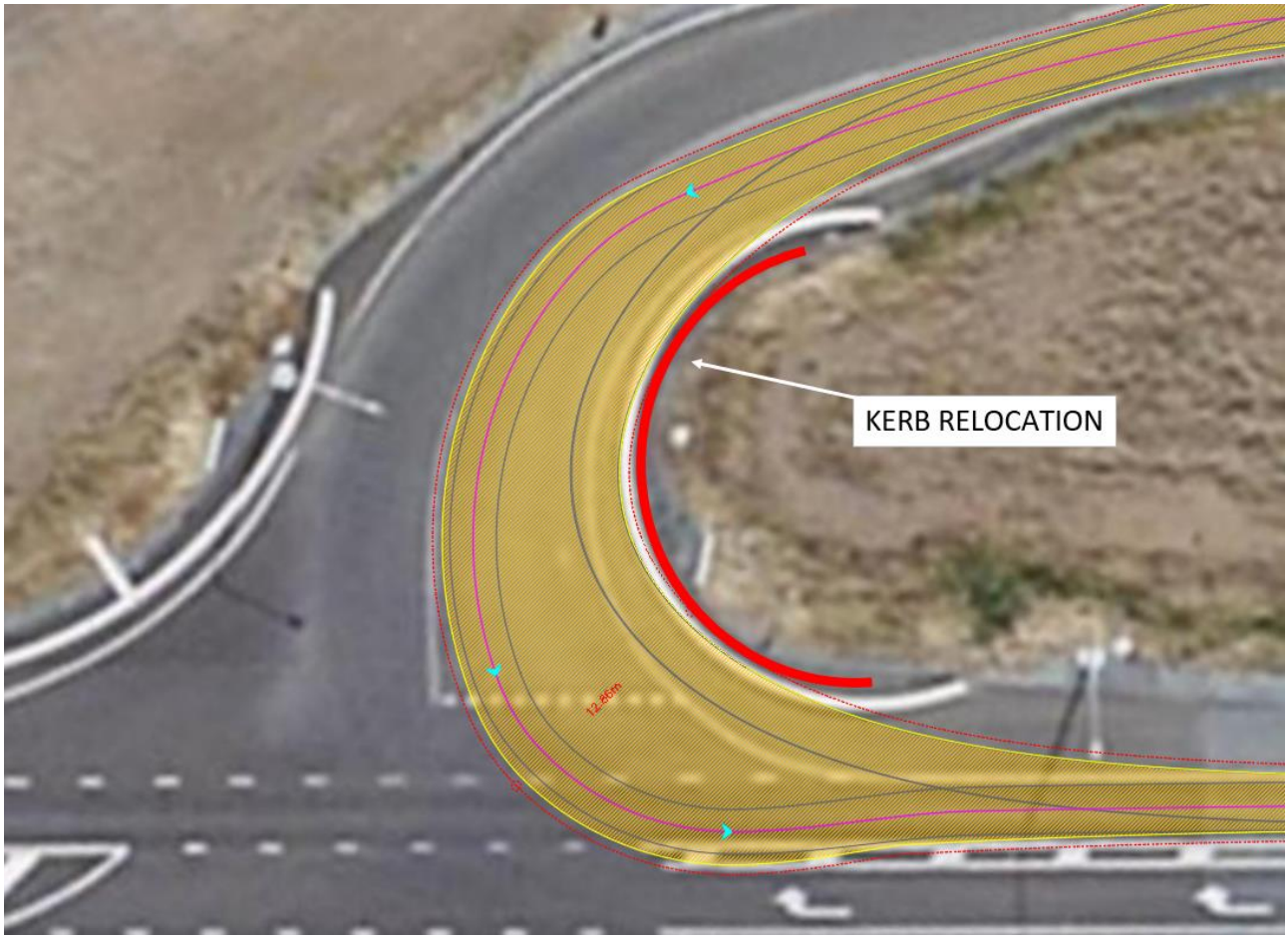


Figure 10-5: Kerb relocation on corner of Capricorn Highway / Third Street intersection

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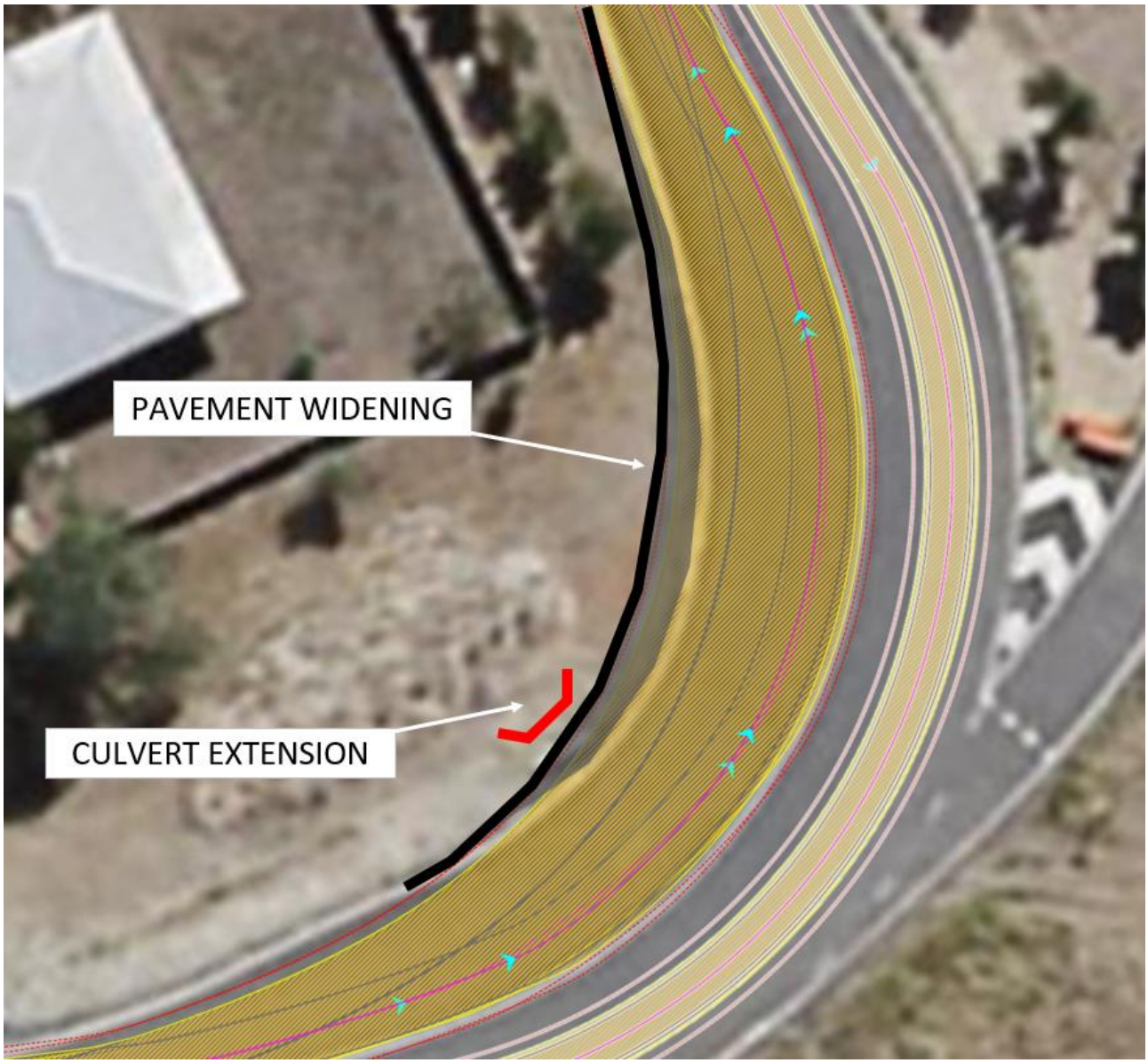


Figure 10-6: Widening extents of second corner

The requirement and determination of these upgrades will firstly need to be discussed in detail with the NHVR, as the risk of vehicular conflicts whilst manoeuvring through the local road network is deemed low (refer to **Table 8-7**). Given potential constraints (such as culverts and batter slopes), low vehicular volumes, the adequate total pavement width to accommodate A-Doubles and B99 cars passing, low cornering speed and intervisibility through the corners, the upgrades mentioned may be considered to be excessive and the situation could be monitored with a view of widening in the future if near misses are recorded by A-Double drivers.

10.1.2 Riverslea Road/Thirsty Creek Road intersection

The swept path assessment is shown in **Figure 10-7** and **Figure 10-8** below and demonstrates that an A-Double and opposing B99 car can traverse the road network without impacting on each other, with the provision of widening on the eastern side of the Thirsty Creek Road approach.

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Figure 10-7: A-Double travelling southbound on Thirsty Creek Road and Riverslea Road



Figure 10-8: A-Double travelling northbound on Thirsty Creek Road and Riverslea Road

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The widening is illustrated on **Figure 10-9** and is required for the tractor (cab) to utilise, so that the trailing trailer tracks through the approach without encroaching on the opposing traffic. With the widening there is enough total pavement width to accommodate the A-Double and B99 car movements. A-Double movement still does cross the centre line slightly on northern Thirsty Creek Road leg given the curve on this approach. However, given the intervisibility at the intersection and through the approaches, and the recommended widening, this is deemed acceptable.

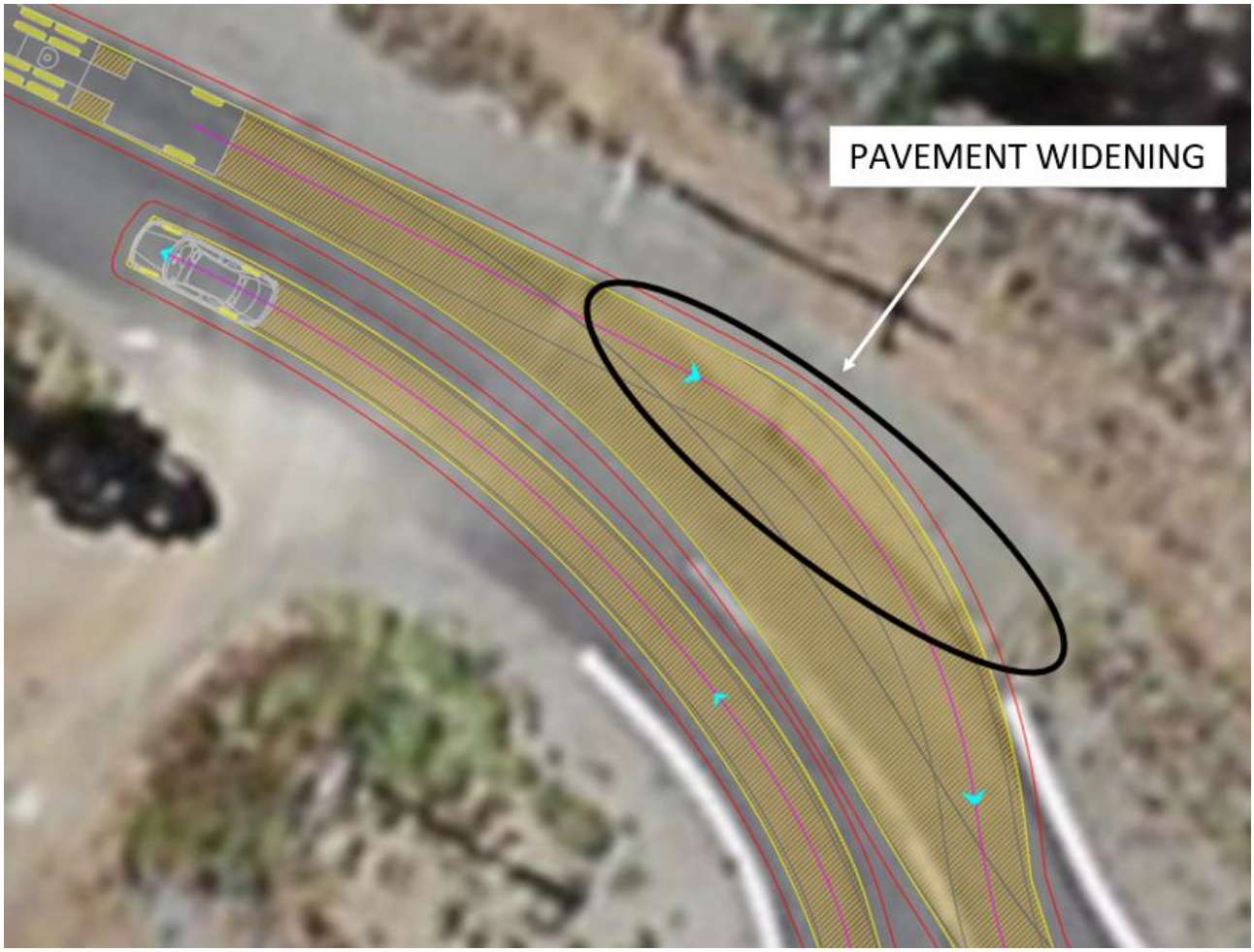


Figure 10-9: Widening extents of Thirsty Creek Road approach to Riverslea Road

10.1.3 Third Street and Second Street corners (local network through Gogango)

The swept path assessment is shown in **Figures 10-10**, **10-11**, **10-12** and **10-13** below and demonstrates that an A-Double and opposing B99 car can traverse the road network without impacting on each other. There is enough pavement width and lane widths on these corners to accommodate the A-Double movements without the need for the vehicles to cross the centre line. Therefore, no upgrades or widening is required at these curves.

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Figure 10-10: A-Double travelling northbound (Third Street / Second Street corner)

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Figure 10-11: A-Double travelling southbound (Third Street / Second Street corner)

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Figure 10-12: A-Double travelling northbound (Second Street / Riverslea Road corner)

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Figure 10-13: A-Double travelling southbound (Second Street / Riverslea Road corner)

10.1.4 Thirsty Creek Road curves (Ch 1.25km and Ch 3.35km)

It was identified that Thirsty Creek Road has two curves located at Chainage 1.25km and Chainage 3.35km (from Riverslea Road intersection) with small radii that may be difficult for A-Doubles to traverse without encroaching on the opposing traffic lane. These curves have single solid centre line markings, curve warning signs and chevron alignment markers.

The swept path assessment is shown in **Figure 10-14** and **Figure 10-15** below and demonstrates that widening may be required to accommodate the A-Double vehicles (circled in each figure).

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Figure 10-14: A-Double – Thirsty Creek Road curve Ch 1.25km

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Version: 1, Version Date: 22/04/2022



Figure 10-15: A-Double – Thirsty Creek Road curve Ch 3.35km

The requirement and determination of these upgrades will firstly need to be discussed in detail with the NHVR, as the risk of vehicular conflicts whilst manoeuvring through the local road network is deemed low. Given potential constraints (i.e. property boundaries), low vehicular volumes, lower cornering speeds, the adequate total pavement width to accommodate A-Doubles and B99 cars passing, and intervisibility through the corners (with maintenance of vegetation), the upgrades mentioned may be considered to be excessive and the situation could be monitored with a view of widening in the future if near misses are recorded by A-Double drivers.

10.2 Structural considerations

The structural integrity of smaller box culvert crossings and the large culvert floodway at Chainage 2.9km should also be considered as part of the NHVR permit application to determine if the A-Double loadings can be accommodated, or if strengthening or increase in cover depth is required. Details of the culverts and As Constructed details could not be obtained at the time of writing this report and therefore the structural integrity for the required loadings could not be determined.

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11. Compliance with Council and State Government planning criteria

The proposed development has been reviewed in accordance with the Department of State Development, Manufacturing, Infrastructure and Planning development assessment provisions – Code 6. The table and compliance responses are provided at **Appendix I**.

From the review, no non-compliance items are identified.

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12. Summary and recommendations

RMA Engineers has been engaged by Mort & Co Lot Feeders Pty Ltd to undertake a Traffic Impact Assessment (TIA) in support of a development application for a proposed cattle feedlot development (Rookwood Feedlot) located at 802 Thirsty Creek Road, Gogango (the subject site). The proposed development site is identified as Lot 21 on PN81 within the Rockhampton Regional Council (RRC) area.

This Traffic Impact Assessment (TIA) documents an investigation of traffic and transport impacts of the proposed development on the surrounding road network. This assessment has been undertaken in general accordance with the road transport related requirements identified in RRC Planning Scheme and the DTMR *Guide to Traffic Impact Assessment* (GTIA) (2018).

The following is a summary of the findings and recommendations of the TIA.

Operational impacts:

- The proposed development will generate relatively minor traffic volumes, consisting of an average of 73 vehicles per day, 24 heavy vehicles and 49 light vehicles in the ultimate development stage.
- The number of development trips per peak hour is expected to range between 4 and 15.
- Considering the relatively minor proposed development traffic volumes and the existing peak hour traffic volumes, it is not expected that there will be any operational or capacity issues on the surrounding external road network as a result of the proposed development.
- SIDRA analysis results indicate that the Capricorn Highway / Third Street intersection operates well within the accepted performance thresholds for the ultimate development stages at the ten year design horizon (2035). The development is expected to have minimal operational impact on the intersection. No mitigation of operational impacts is required at the intersection. This further justifies that the development does not adversely impact the operation of the external road network as per dot point above.

Pavement impacts:

- For the state controlled network - the increase in SAR4s (ESAs) on the Capricorn Highway are within the acceptable limits (less than 5 per cent influence) and the development is not considered to have a significant impact on the pavement of the Capricorn Highway. Therefore, as per the GTIA, no contributions are required by the developer.
- For the local road network - Given the lack of available data regarding the existing road pavement design and construction information, including the new upgraded pavement of Thirsty Creek Road, at the time of writing this report, a pavement impact assessment could not be undertaken at this stage.

  If required, it is suggested that the local road pavement impacts be undertaken as part of the future design stages of the development when the pavement design information, construction quality assurance, maintenance and cost schedules, and subgrade information can be obtained.

Safety considerations:

- From a historical crash data review, no crash patterns or mitigation measures could be identified within the vicinity of the site or along the principal traffic route providing access to the site.
- The turn warrant assessment of the key roads indicates that the existing turning provisions at each of the key intersections is deemed satisfactory.

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From the turn warrant assessment of right turning movements into the site access, it is recommended to retain the existing simple right configuration and monitor the traffic situation in the future (post completion of the ultimate development), with a view to install a BAR if required or if a pattern of near misses are recorded.

- The sight distance assessment of the key external intersections found that sight distance available is satisfactory and meets the minimum SISD requirements for all approaches.
- The sight distance assessment of the one-lane floodway locations along Thirsty Creek Road indicates that the available sight distance is satisfactory and is conducive to the road environment, alignment and expected travel speeds. It is recommended that vegetation be trimmed and maintained on the inside corners of the floodway crossing located at Chainage 2.9km under Council maintenance schedules.
- A risk assessment identified the following additional safety improvements:
  - Developer to install 'Truck' warning signs on Thirsty Creek Road (in accordance with the MUTCD) on the approaches to the development access to inform motorists of turning traffic.
  - Council to install centre line marking along the length of the principal traffic route to help delineate travel path and separation of traffic. Council to consider providing edge lines to further improve delineation.
  - Developer to install pavement widening to accommodate A-Double movements as per **Section 10.1**.
- No adverse 'high' risk or unacceptable risk items were identified from the road safety review (risk assessment).

Site layout:

- The internal road layout provisions of sealed and gravel pavements and associated width and geometry is considered satisfactory for the expected development traffic.
- The site access location is deemed satisfactory with respect to formation, separation and sight distance.

  It is recommended that if any internal gates at the access locations are proposed, they should be set back from the property boundary to allow heavy vehicles to stop without queuing back to the Thirsty Creek Road carriageway and through lanes.
- The site access geometry is considered appropriate from a swept path review of A-Double truck turning movements (refer to **Section 9.3**).
- Car parking provisions are considered appropriate as per below:
  - The proposed car parking provisions are considered suitable for the proposed development which is expected to meet the expected employee and visitor demands.
  - Due to the size and greenfield nature of the development land, additional informal parking could also be accommodated, or constructed, if required.
  - It is expected that the car parking areas will be located within the vicinity of main staffing areas and building (where applicable), to minimise the walking distance and road crossings required for pedestrians.
  - The location of the car parking areas will provide separation from the main operational activities and loading areas on site, to minimise potential for undesirable interaction between heavy vehicles and light vehicles / pedestrians.

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Suitability of the surrounding road network:

- The development proposes to utilise 36.5m Road Trains (i.e. A-Double and B-Triple vehicles) for the feedlot operations. The use of these larger vehicles will require a heavy vehicle permit by the NHVR.
- It is recommended that heavy vehicle permits be sought with the NHVR post development application determination.
- It has also been identified from a site inspection that A-Double road trains are currently using the principal traffic route to travel to a destination north of the subject site, which suggests that these types of vehicles can utilise and access the road network, and that existing permits for these vehicle types may already be in use along the principal traffic route.
- The geometry and alignment of the traffic route to the proposed development is generally adequate to cater for 36.5m A-Double and B-Triple vehicles. Swept path assessment of the horizontal geometry resulted in the following potential minor road widening locations:
  - Relocating the kerbing on the inside of the first corner (Capricorn Highway / Third Street intersection) to the edge of pavement (no widening is required) – refer to **Figure 10-5**
  - Widening the inside of the second corner (Third Street) – refer to **Figure 10-6**
  - Widening of the outside curve on the Thirsty Creek Road approach to the Riverslea Road intersection – refer to **Figure 10-9**
  - Widening of Thirsty Creek Road curves (Ch 1.25km and Ch 3.35km) – refer to **Figures 10-14** and **10-15**.

  The requirement and determination of these upgrades will firstly need to be discussed in detail with the NHVR, as the risk of vehicular conflicts whilst manoeuvring through the local road network is deemed low. The upgrades may be considered excessive given the potential constraints, ability for A-Doubles to pass B99 cars using the full pavement width, lower cornering speeds, intervisibility, and low vehicle volumes at each of the above sites.
- The structural integrity of smaller box culvert crossings and the large culvert floodway at Chainage 2.9km should also be considered as part of the NHVR permit application to determine if the A-Double loadings can be accommodated, or if strengthening or increase in cover depth is required.

Code compliance:

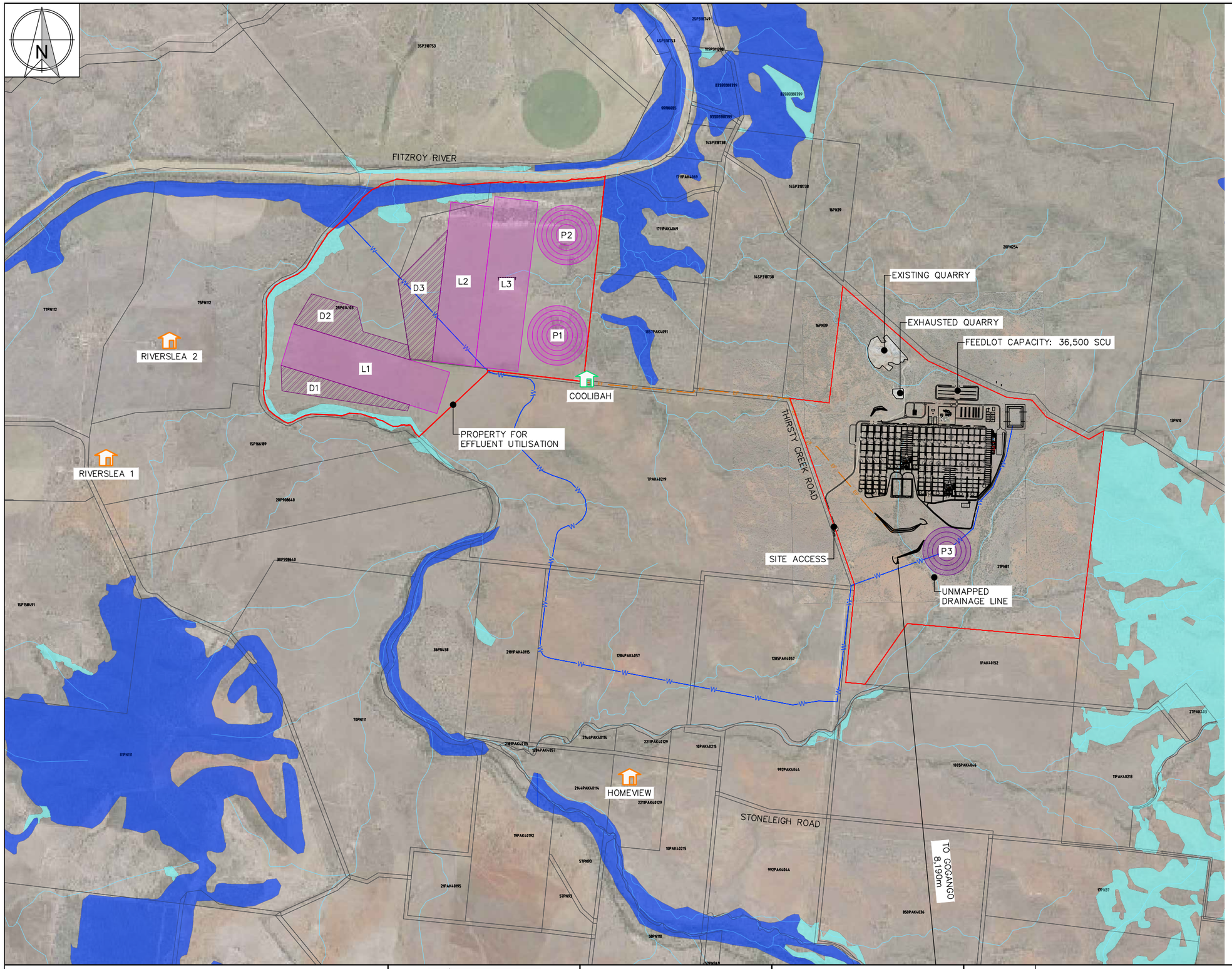
- From a review of the state government planning code (SDAP Code 6), with regards to traffic and transport, no non-compliance items have been identified at this Development Application stage of the assessment.

With respect to the above findings and recommendations of this TIA report, the proposed development can proceed without any unacceptable or adverse impacts on the external road network. No traffic and transport engineering matters have been identified that should preclude approval of the proposed development at this location.

Document Set ID: 34646000
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Appendix A Development layout

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Version: 1, Version Date: 22/04/2022



LEGEND

- PROPERTY BOUNDARY
- PRIMARY EFFLUENT UTILISATION (292.1 ha)
- SECONDARY EFFLUENT UTILISATION (19.6 ha)
- DRYLAND AREA (92.3 ha)
- REGULATED VEGETATION–CATEGORY B
- REGULATED VEGETATION–CATEGORY C
- MAPPED STREAM ORDER
- WATER SUPPLY LINE
- EFFLUENT PIPELINE
- SENSITIVE RECEPTOR
- DWELLING OWNED BY APPLICANT

NOTES

1. AERIAL IMAGE SOURCED FROM QLD GLOBE. IMAGE ACCESS DATE 18/01/2022.
2. CADASTRAL, VEGETATION & STREAM ORDER DATA SOURCED THROUGH QSPATIAL. DATA SOURCED JULY 2021.
3. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
4. PIVOT 2 (30ha) IS AN OPTIONAL INCLUSION THAT WILL ONLY BE DEVELOPED IN THE EVENT THAT NUTRIENT ACCUMULATION IS IDENTIFIED ON THE OTHER EFFLUENT UTILISATION AREAS.

UTILISATION AREAS

PADDOCK	DIMENSION	AREA
LATERAL 1 (L1)	450m x 1,700m	76.5
LATERAL 2 (L2)	450m x 1,670m	75.0
LATERAL 3 (L3)	450m x 1,780m	80.0
PIVOT 1 (P1)	310m	30.0
PIVOT 2 (P2)	310m	30.0
PIVOT 3 (P3)[1]	250m	19.6
DRYLAND 1 (D1)	VARIABLE	22
DRYLAND 2 (D2)	VARIABLE	30
DRYLAND 3 (D3)	VARIABLE	40
LATERAL 4 (L4)[2]	300m x 1,200m	36.0

[1]PIVOT 3 IS A SECONDARY PIVOT THAT IS ONLY TO BE USED IF THE OTHER PIVOTS ARE TEMPORARILY IMPACTED BY FLOOD WATER.
[2]PIVOT 2 IS ONLY TO BE DEVELOPED IF UNSUSTAINABLE NUTRIENT ACCUMULATION IS IDENTIFIED ACROSS THE OTHER EFFLUENT REUSE AREAS (L1, L2, L3, P1).

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
PROPERTY PLAN (AERIAL IMAGE)

AgDSA
AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA
PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 400 800 1,200m
SCALE 1:20,000 (A1)
0 800 1,600 2,400m
SCALE 1:40,000 (A3)

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

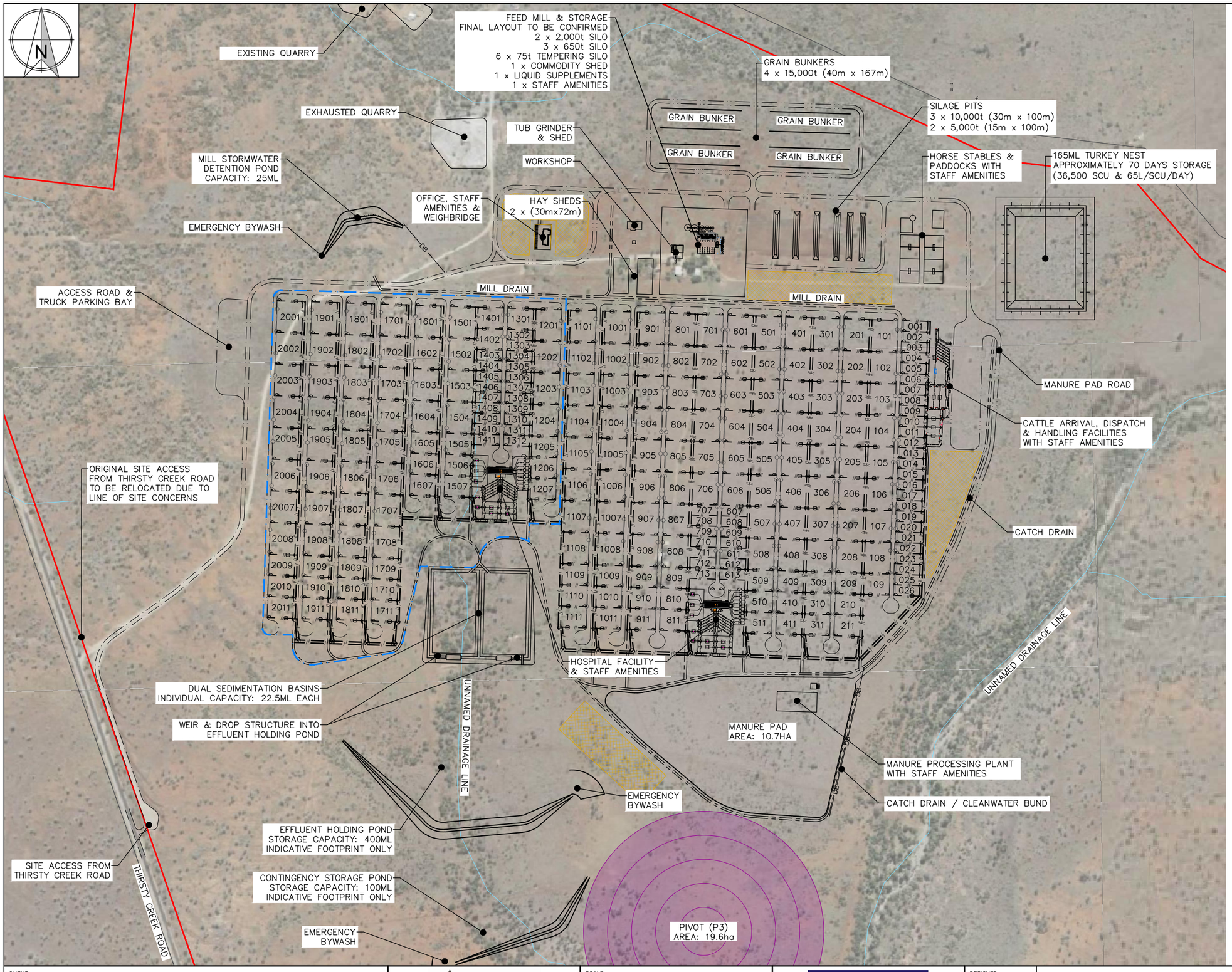
FOR APPROVAL

DATE	REV	DESCRIPTION	APP
31/03/2022	D	FINAL FOR SUBMISSION	TJS
18/03/2022	C	FINAL DRAFT BEFORE SUBMISSION	TJS
03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A001
CURRENT REVISION: D

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



LEGEND

- CONTOUR – EXISTING (5.0m)
- CONTOUR – EXISTING (1.0m)
- PROPERTY BOUNDARY
- CADASTRAL BOUNDARY
- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- DIVERSION BANK
- STAGE 2 CONSTRUCTION BOUNDARY
- MAPPED STREAM ORDER
- SECONDARY EFFLUENT UTILISATION (19.6 ha)
- STP UTILISATION AREA (1.8ha EACH)

NOTES:

1. AERIAL IMAGE SOURCED FROM QLD GLOBE. IMAGE ACCESS DATE 18/01/2022.
2. CONTOURS HAVE BEEN GENERATED USING LIDAR INFORMATION AVAILABLE FROM THE ELVIS PORTAL & LIDAR INFORMATION FLOWN BY AIRBORNE RESEARCH AUSTRALIA ON BEHALF OF RFM.
3. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
4. ALL CAPACITIES ARE BASED ON A STOCKING DENSITY OF 15.4m^2/SCU.
5. THE REQUIRED SEDIMENTATION BASIN CAPACITY & EFFLUENT HOLDING POND HAVE BEEN CALCULATED TO EXCEED THE MINIMUM CAPACITIES DETERMINED USING THE FEEDLOT ASSESSMENT SPREADSHEET – VERSION 8.6 – APRIL 2019.

DESIGN: GENERAL FACILITY

1.	FEED ROAD WIDTH	= 7.70 m
2.	BUNK WIDTH	= 1.15 m
3.	CATTLE LANE/DRAIN WIDTH	= 5.0 m

DESIGN: FEEDLOT PENS

1.	STOCKING DENSITY	= 15.4m^2/SCU
2.	BUNK SPACE	= 291mm/SCU
3.	SHADE PROVISION	= 2.5m^2/SCU
4.	LARGE (66.0m x 53.0m)	= 3,500m^2/PEN
5.	LARGE PEN CAPACITY	= 227 SCU @ 15.4m
6.	SHADED AREA	= 565m^2/PEN
7.	TOTAL LARGE PENS	= 128
8.	SMALL (44.0m x 53.0m)	= 2,330m^2/PEN
9.	SMALL PEN CAPACITY	= 151 SCU @ 15.4m
10.	SHADED AREA	= 375m^2/PEN
11.	TOTAL SMALL PENS	= 49
12.	HANDLING (22.0m x 53.0m)	= 1,170m^2/PEN
13.	HANDLING PEN CAPACITY	= 75 SCU @ 15.4m^2
14.	SHADED AREA	= 185m^2/PEN
15.	TOTAL HANDLING PENS	= 60
16.	PRODUCTION CAPACITY	= 36,500 SCU
17.	HANDLING/HOSPITAL CAPACITY	= 4,500 SCU
	(12.4% CAPACITY ABOVE PRODUCTION)	

DESIGN: STAGE FEEDLOT CAPACITY

1.	STAGE 1 (63%)	
1.1.	PRODUCTION CAPACITY	= 22,870 SCU
1.2.	HANDLING CAPACITY	= 3,000 SCU
2.	STAGE 2 (37%)	
2.1.	PRODUCTION CAPACITY	= 13,630 SCU
2.2.	HANDLING CAPACITY	= 1,500 SCU

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
CONCEPT PLAN

AgDSA
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PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 80 160 240m
SCALE 1:4,000 (A1)
0 160 320 480m
SCALE 1:8,000 (A3)

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

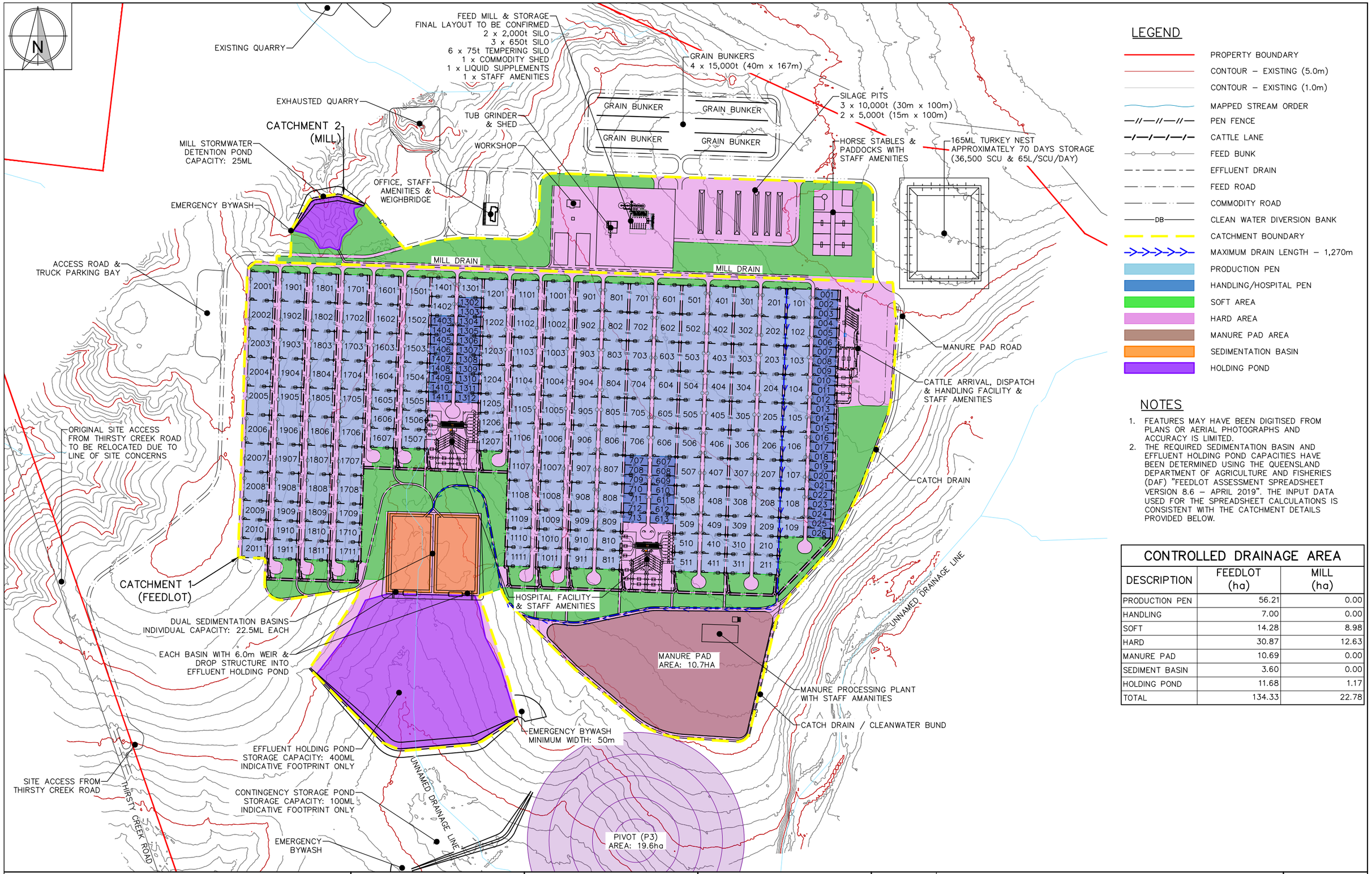
FOR APPROVAL

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03/02/2022	B	FINAL DRAFT FOR CONSULTATION	TJS
18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A003
CURRENT REVISION: D

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



LEGEND

- PROPERTY BOUNDARY
- CONTOUR – EXISTING (5.0m)
- CONTOUR – EXISTING (1.0m)
- MAPPED STREAM ORDER
- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- COMMODITY ROAD
- CLEAN WATER DIVERSION BANK (DB)
- CATCHMENT BOUNDARY
- MAXIMUM DRAIN LENGTH – 1,270m
- PRODUCTION PEN
- HANDLING/HOSPITAL PEN
- SOFT AREA
- HARD AREA
- MANURE PAD AREA
- SEDIMENTATION BASIN
- HOLDING POND

NOTES

1. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
2. THE REQUIRED SEDIMENTATION BASIN AND EFFLUENT HOLDING POND CAPACITIES HAVE BEEN DETERMINED USING THE QUEENSLAND DEPARTMENT OF AGRICULTURE AND FISHERIES (DAF) "FEEDLOT ASSESSMENT SPREADSHEET VERSION 8.6 – APRIL 2019". THE INPUT DATA USED FOR THE SPREADSHEET CALCULATIONS IS CONSISTENT WITH THE CATCHMENT DETAILS PROVIDED BELOW.

CONTROLLED DRAINAGE AREA

DESCRIPTION	FEEDLOT (ha)	MILL (ha)
PRODUCTION PEN	56.21	0.00
HANDLING	7.00	0.00
SOFT	14.28	8.98
HARD	30.87	12.63
MANURE PAD	10.69	0.00
SEDIMENT BASIN	3.60	0.00
HOLDING POND	11.68	1.17
TOTAL	134.33	22.78

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
CONTROLLED DRAINAGE AREA PLAN

AgDSA
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SCALE
0 80 160 240m
SCALE 1:4,000 (A1)
0 160 320 480m
SCALE 1:8,000 (A3)

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

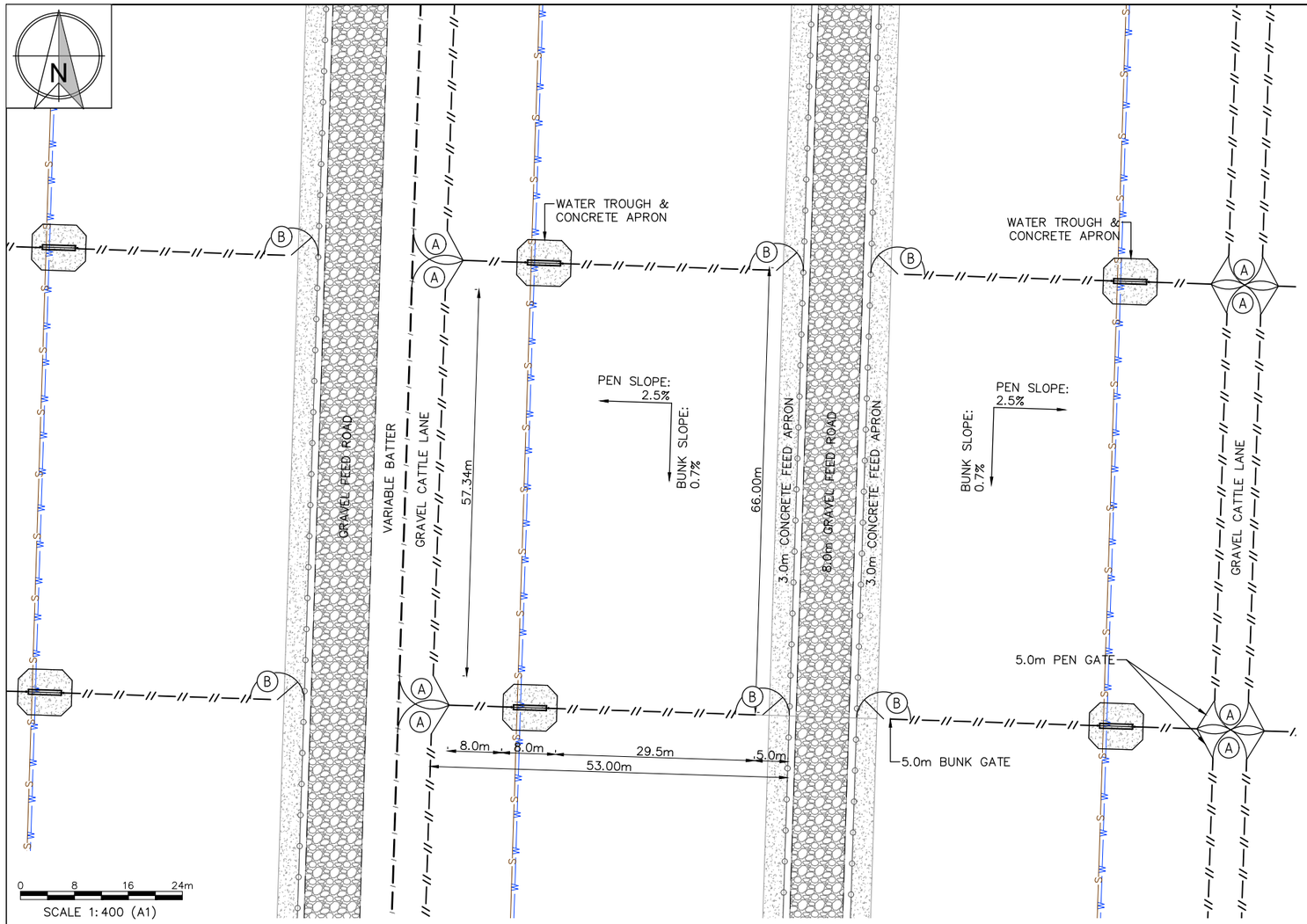
FOR APPROVAL

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18/01/2022	A	ORIGINAL ISSUE	TJS

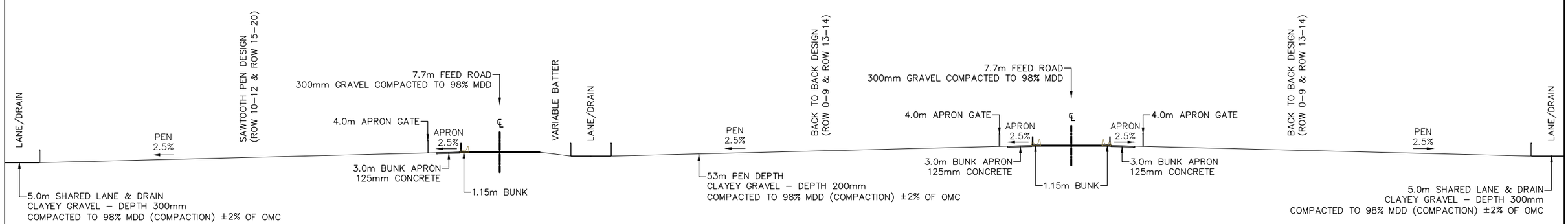
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JOB CODE: MCO–005
SHEET NUMBER: A005
CURRENT REVISION: D

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022



TYPICAL PLAN – PRODUCTION PENS



TYPICAL SECTION THROUGH PENS
SCALE: 1=200 (A1); 1=400 (A3)

LEGEND

- PEN FENCE
- CATTLE LANE
- FEED BUNK
- EFFLUENT DRAIN
- FEED ROAD
- (A) GATE – 5.0m CATTLE ACCESS
- (B) GATE – 5.0m BUNK PEN–PEN ACCESS
- WATER LINE
- TROUGH SEWER LINE
- CONCRETE APRON
- GRAVEL FEED ROAD

DESIGN: GENERAL FACILITY

1.	FEED ROAD WIDTH	= 7.70 m
2.	BUNK WIDTH	= 1.15 m
3.	CATTLE LANE/DRAIN WIDTH	= 5.0 m

DESIGN: PRODUCTION PENS

1.	STOCKING DENSITY	= 15.4m²/SCU
2.	BUNK SPACE	= 291mm/SCU
3.	SHADE PROVISION	= 2.5m²/SCU
4.	LARGE (66.0m x 53.0m)	= 3,500m²/PEN
5.	LARGE PEN CAPACITY	= 227 SCU @ 15.4m
6.	SHADED AREA	= 565m²/PEN
7.	TOTAL LARGE PENS	= 128
8.	SMALL (44.0m x 53.0m)	= 2,330m²/PEN
9.	SMALL PEN CAPACITY	= 151 SCU @ 15.4m
10.	SHADED AREA	= 375m²/PEN
11.	TOTAL SMALL PENS	= 49
12.	HANDLING (22.0m x 53.0m)	= 1,170m²/PEN
13.	HANDLING PEN CAPACITY	= 75 SCU @ 15.4m²
14.	SHADED AREA	= 185m²/PEN
15.	TOTAL HANDLING PENS	= 60
16.	PRODUCTION CAPACITY	= 36,500 SCU
17.	HANDLING/HOSPITAL CAPACITY= (12.4% CAPACITY ABOVE PRODUCTION)	4,500 SCU

MATERIALS

1. THE MATERIALS USED FOR THE CONSTRUCTION OF THE COMPOST PAD SHALL BE CLASSIFIED AS EITHER CL, CI, CH, SC OR GC IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM. IT SHALL COMPLY WITH THE FOLLOWING PARTICLE SIZE & PLASTICITY LIMITS.
2. PARTICLE SIZE DISTRIBUTION

37.5	100
19.0	70–700
2.36	40–100
0.075	25–90

3. FINES PLASTICITY LIMITS FINES (PASSING 0.425mm)

LIQUID LIMIT:	30–60%
PLASTICITY INDEX:	>10%

CONSTRUCTION REQUIREMENTS

1. TOPSOIL STRIPPING SHALL BE UNDERTAKEN TO A SUITABLE DEPTH TO CLEAR THE SITE OF TREES, SCRUB, STUMPS, GRASS & ORGANIC MATTER.
2. AFTER TOPSOIL STRIPPING HOLES RESULTING FROM THE STRIPPING SHALL BE FILLED.
3. RIPPING TO A DEPTH OF 150mm IS TO BE UNDERTAKEN AND WATER ADDED TO ENSURE MATERIAL IS WITHIN ±2% OF THE OPTIMUM MOISTURE CONTENT (OMC).
4. AFTER WATERING COMPACTION IS TO BE UNDERTAKEN TO PRODUCE EITHER A FIELD DRY DENSITY OF AT LEAST 95% OF THE STANDARD MAXIMUM DRY DENSITY (MDD) OR ALTERNATIVELY, A HILF DENSITY RATIO OF AT LEAST 95%.
5. SUITABLE FILL MATERIAL SHOULD BE PLACED IN LAYERS OF 200mm (PRIOR TO COMPACTION). EACH LAYER SHOULD BE TINED, WETTED TO ±2% OF OPTIMUM MOISTURE CONTENT (AS 1289 5.1.1) AND COMPACTED TO REACH THE REQUIRED COMPACTION RELATIVE TO THE MAXIMUM DRY DENSITY (AS1289 5.4.2).
6. THE FINAL SURFACE OF THE PAD MUST HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 20, & BE OF SUFFICIENT DEPTH TO ENSURE THE INTEGRITY OF THE STRUCTURE IS MAINTAINED THROUGHOUT THE GENERAL OPERATION OF THE FEEDLOT.
7. IRRESPECTIVE OF THE FINISHED PEN SURFACE, THE UNDERLYING SOILS MUST HAVE A MAXIMUM PERMEABILITY OF 1 x 10^{-9}m/s (0.1mm/day) FOR DISTILLED WATER WITH 1.0m OF PRESSURE HEAD.

CLIENT
MORT & CO LOT FEEDERS PTY LTD

PROJECT
'ROOKWOOD' FEEDLOT DEVELOPMENT

LOCATION
THIRSTY CREEK ROAD, GOGANGO, QLD 4702

SHEET TITLE
TYPICAL PEN LAYOUT

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PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE
0 5 10 15m
SCALE 1:250 (A1)
0 10 20 30m
SCALE 1:500 (A3)

MORT & Co

DESIGNED: TJS
CHECKED: MRN
PROJECT MANAGER: MRN

FOR APPROVAL

DATE	REV	DESCRIPTION	APP
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18/01/2022	A	ORIGINAL ISSUE	TJS

REVISIONS

JOB CODE: MCO–005
SHEET NUMBER: A006
CURRENT REVISION: D

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Appendix B Traffic generation calculations (ultimate stage)

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

Item	Assumptions	Comments
Completion year that the development will be fully operational	2024 Stage 1, 2025 Stage 2	12 months to construct and 6-12 months for full operation/stock
Operational days of the site per week	7 days a week.	
Staff movement hours	3am-7am for staff entering the site, AND 3pm-7pm for staff leaving the site	4 hours IN in the morning and 4 hours OUT in the evening
Staff movements	Spread evenly over the IN and OUT movement hours (above).	48/4 = 12 staff movements per applicable hour.
Truck operating hours	5am to 9pm	

trucks per annum	Type 10 B-Doubles	Type 11 Road Trains	Total
Incoming Cattle	357.0	818.0	**1175.0**
Outgoing cattle	532.0	1461.0	**1993.0**
Incoming feedstuffs	1625.0	2617.0	**4242.0**
Outgoing manure	1193.0	0.0	**1193.0**
Total	**3707.0**	**4896.0**	**8603.0**

trucks per day	Type 10 B-Doubles	Type 11 Road Trains	Total
Incoming Cattle	1.0	2.2	**3.2**
Outgoing cattle	1.5	4.0	**5.5**
Incoming feedstuffs	4.4	7.2	**11.6**
Outgoing manure	3.3	0.0	**3.3**
Total	**10.1**	**13.4**	**23.6**

Daily traffic volume schedule (vehicle movements per hour across the day) - Option A

Trip Type	Max. typical daily movements	3am-4am	4am-5am	5am-6am	6am-7am	7am-8am	8am-9am	9am-10am	10am-11am	11am-12noon	12noon-1pm	1pm-2pm	2pm-3pm	3pm-4pm	4pm-5pm	5pm-6pm	6pm-7pm	7pm-8pm	8pm-9pm
Off-Site Staff	96	12	12	12	12									12	12	12	12		
Servicing/visitors	2							1			1								
Incoming Cattle	8					2		2		2		2							
Outgoing cattle	12					2	2		2	2		2	2						
Grain and feedstuffs	24					3	3	3	3	3	3	3	3						
Manure	8						2		2		2		2						
Total trips	**150**	**12**	**12**	**12**	**12**	**7**	**7**	**6**	**7**	**7**	**6**	**7**	**7**	**12**	**12**	**12**	**12**	**0**	**0**

Daily traffic volume schedule (vehicle movements per hour across the day) - Option B

Trip Type	Max. typical daily movements	3am-4am	4am-5am	5am-6am	6am-7am	7am-8am	8am-9am	9am-10am	10am-11am	11am-12noon	12noon-1pm	1pm-2pm	2pm-3pm	3pm-4pm	4pm-5pm	5pm-6pm	6pm-7pm	7pm-8pm	8pm-9pm
Off-Site Staff	96	12	12	12	12									12	12	12	12		
Servicing/visitors	2						1					1							
Incoming Cattle	8			1	1	1	1	1	1	1	1								
Outgoing cattle	12							1	1	1	1	1	1	1	1	1	1	1	1
Grain and feedstuffs	24			2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
Manure	8				1	1	1		1		1		1		1		1		
Total trips	**150**	**12**	**12**	**15**	**15**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**3**	**15**	**15**	**15**	**15**	**3**	**2**

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Beef Feedlot
Feed, Manure & Traffic Calculator

The AgDSA Beef Feedlot Feed, Manure & Traffic Calculator has been developed to assist the preparation of development applications for beef feedlots in Australia.

Cattle stocking rates used to estimate cattle capacities per truck are based on the 2019 Meat & Livestock Australia (MLA) "Fit to Load" manual. Cattle weight above of below those provided in the manual have been interpolated or extrapolated as required.

Legend

	Data is to be entered into all of the grey cells, starting with the '1 - General' worksheet and proceeding through the other worksheets from left to right, using the tabs on the bottom of the screen.
Scroll over these cells.	For assistance with the selection of appropriate input data, scroll over the cells that have red triangles in the upper right corner to view explanatory comments.

Developed by: Tim Sullivan
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AgDSA
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General Feedlot Information

Feedlot Details

Landholders' name(s):	**Mort & Co Ltd**
Cattle feedlot name:	**Thirsty Creek**
Feedlot address:	**Thirsty Creek Road**
Feedlot locality:	**Gogango**
Feedlot State:	**QLD**
Feedlot Local Government Area:	**Rockhampton Regional**
Spreadsheet user name	**MRN**
Assessment date	**1/02/2022**

Feedlot Development

Is the feedlot developed in stages: **No**

	Market 1	Market 2	Market 3	Market 4	Market 5	Total
Cattle capacity per market type (SCU)	**10,950**	**25,550**				**36,500**
Percentage of full capacity	**30%**	**70%**				
Description (i.e Pen Numbers &/or Market Type)	**140-day**	**100-day**				
Anticipated completion date						

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Cattle Movements

Market Type	1	2	3	4	5	Total	Units
Maximum SCU Capacity	10,950	25,550	-	-	-	**36,500**	SCU
Maximum SCU Market Split	30%	70%				**100%**	%
Animal Performance Data							
Entry Weight	350	420					kg
Exit Weight	600	620					kg
Average Weight	475	520	-	-	-		kg
SCU Conversion	0.87	0.94		-	-		
Maximum Head Capacity	12,586	27,181	-	-	-	**39,767**	Head
Maximum Head Market Split	32%	68%				**100%**	%
					-		
Total Days on Feed	140	110					Days
Feed cycles per year	2.61	3.32	-	-	-		
Average Occupancy Rate			98%			**98%**	%
Average SCU in Feedlot	10,731	25,039	-	-	-	**35,770**	SCU
Average Head in Feedlot	12,334	26,637	-	-	-	**38,972**	Head
Maximum Head in Feedlot (100% Occupancy)	12,586	27,181	-	-	-	**39,767**	Head
Total Cattle Entering the Feedlot	32,158	88,387	-	-	-	**120,545**	Head
Average Mortality			0.80%			**0.80%**	%
Annual Deaths	257	707	-	-	-	**964**	Head
Outgoing Cattle	31,900	87,680	-	-	-	**119,581**	Head
Cattle Procurement							
Cattle Produced Onsite							Head
Cattle Produced Per Stage	0	0	0	0	0	-	Head
Cattle Produced Onsite	0.0%	0.0%				**0.0%**	%
Cattle Transported In	32,158	88,387	-	-	-	**120,545**	Head
Cattle Transported In	100.0%	100.0%				**100.0%**	%
Incoming Cattle Trucks							
Incoming Cattle	32,158	88,387	-	-	-		
Incoming Cattle Truck Type	B Double	Road Train					Type
Total Decks / Truck Type	3	4	-	-	-		kg
Incoming Cattle Weight	350	420	-	-	-		kg
Incoming Cattle Floor Area	0.98	1.08	-	-	-		m^2/head
Incoming Cattle/Deck	30	27	-	-	-		Head
Outgoing Cattle/Truck (Space Limiting)	90	108	-	-	-		Head
Outgoing Cattle/Truck	90	108					Head
Incoming Cattle Trucks/year	357	818	-	-	-	**1,176**	Trucks/year
Outgoing Cattle Trucks							
Outgoing Cattle	31,900	87,680	-	-	-		
Outgoing Cattle Truck Type	B Double	Road Train					Type
Total Decks / Truck Type	3	4	-	-	-		kg
Outgoing Cattle Weight	600	620	-	-	-		kg
Outgoing Cattle Floor Area	1.47	1.58	#N/A	#N/A	#N/A		m^2/head
Outgoing Cattle/Deck	20	15	#N/A	#N/A	#N/A		
Outgoing Cattle/Truck (Space Limiting)	60	60	#N/A	#N/A	#N/A		Head
Outgoing Cattle/Truck	60	60					Head
Outgoing Cattle Trucks/Year	532	1,461	-	-	-	**1,993**	Trucks/year

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Feedstuff Requirements

Market Type	1	2	3	4	5	Total	Units
Maximum SCU Capacity	10,950	25,550	-	-	-	**36,500**	SCU
Animal Performance Data							
Entry Weight	350	420	-	-	-		kg
Exit Weight	600	620	-	-	-		kg
Average Weight	475	520	-	-	-		kg
SCU Conversion	0.87	0.94	-	-	-		
Average Occupancy Rate			98%			**98%**	%
Average SCU in Feedlot	10,731	25,039	-	-	-	**35,770**	SCU
Average Head in Feedlot	12,334	26,637	-	-	-	**38,972**	Head
Maximum Head Capacity	12,586	27,181	-	-	-	**39,767**	Head
Animal Feed Intake							
As fed intake	2.7%	2.5%	0.0%	0.0%	0.0%		% Avg. LWT
As fed intake	13.0	13.0					kg/day
Ration Dry Matter	80%	80%					%
DM feed intake	10.4	10.4	-	-	-		kg/day
Days on Feed	140.0	110.0	-	-	-		days
Daily Gain	1.8	1.8	-	-	-		kg/day
FCR (as fed basis)	7.3	7.2	-	-	-		x:1
FCR (DM basis)	5.8	5.7	#DIV/0!	#DIV/0!	#DIV/0!		x:1
Feed consumed onsite/day	160.3	346.3	-	-	-	**506.6**	t/day
Feed consumed onsite/week	1,122.4	2,424.0	-	-	-	**3,546.4**	t/week
Feed consumed onsite/year	58,527.1	126,393.7	-	-	-	**184,920.8**	t/year
Diet & Ingredient Volumes							
Grain	75.0%	75.0%					%
Roughage (Hay/Straw)							%
Roughage (Silage)	16.0%	16.0%					%
Liquids + Supplements	9.0%	9.0%					%
Total	**100.0%**	**100.0%**	**0.0%**	**0.0%**	**0.0%**		%
Annual Feed Requirements							
Grain	43,895.3	94,795.3	-	-	-	**138,690.6**	t/year
Roughage (Hay/Straw)	-	-	-	-	-	**-**	t/year
Roughage (Silage)	9,364.3	20,223.0	-	-	-	**29,587.3**	t/year
Liquids + Supplements	5,267.4	11,375.4	-	-	-	**16,642.9**	t/year
Total	58,527.1	126,393.7	-	-	-	**184,920.8**	t/year
	OK	OK	OK	OK	OK	OK	
Annual Feed Grown Onsite							
Grains produced onsite			0			**-**	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Roughage (Hay/Straw) produced onsite			0			**-**	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Roughage (Silage) produced onsite			0			**-**	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Liquid + Supplements produced onsite			0			**-**	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Total feed produced onsite						**-**	t/year
							% supplied from onsite
Commodity Truck Movements							
Grain - *Ex. Farm Grown*	43,895	94,795	-	-	-	**138,691**	t/year
Grain Truck Type	B Double	Road Train					Type
Grain Truck Capacity (Suggested)	36	48	-	-	-		t/vehicle
Grain Truck Capacity (Used)	36	48					t/vehicle
Grain Truck Loads	1,219	1,975	-	-	-	**3,194**	Trucks/yr
Roughage (Hay/Straw) - *Ex. Farm Grown*	-	-	-	-	-	**-**	t/year
Roughage (Hay/Straw) Truck Type	B Double	Road Train					Type
Roughage (Hay/Straw) Truck Capacity (Suggested)	18	24	-	-	-		t/vehicle
Roughage (Hay/Straw) Truck Capacity (Used)	18	24					t/vehicle
Rough (Hay/Straw) Truck Loads	-	-	-	-	-	**-**	Trucks/yr
Roughage (Silage) - *Ex. Farm Grown*	9,364	20,223	-	-	-	**29,587**	t/year
Roughage (Silage) Truck Type	B Double	Road Train					Type
Roughage (Silage) Truck Capacity (Suggested)	36	50	-	-	-		t/vehicle
Roughage (Silage) Truck Capacity (Used)	36	50					t/vehicle
Rough (Silage) Truck Loads	260	404	-	-	-	**665**	Trucks/yr
Liquids + Supplements - *Ex. Farm Grown*	5,267	11,375	-	-	-	**16,643**	t/year
Liquids + Supplements Truck Type	B Double	Road Train					Type
Liquids + Supplements Truck Capacity (Suggested)	36	48	-	-	-		t/vehicle
Liquids + Supplements Truck Capacity (Used)	36	48					t/vehicle
Liquids + Supplements Truck Loads	146	237	-	-	-	**383**	Trucks/yr

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Manure Production Details

Market Type	1	2	3	4	5	Total	Units
Maximum SCU Capacity	10,950	25,550	-	-	-	**36,500**	SCU
Occupancy Rate			98%			**98%**	%
Average SCU in Feedlot	10,731	25,039	-	-	-	**35,770**	SCU
Manure Production							
Average raw manure harvested per SCU	1.20	1.20	1.20	1.20		**1.20**	t/SCU/yr
Average annual raw manure harvested	12,877	30,047	-	-	-	**42,924**	t/year
Manure processing utilised	Composted	Composted	Composted	Composted	Composted		
Average raw/processed manure per scu	1.20	1.20	1.20	1.20	0.00		t/SCU/yr
Average annual manure for reuse	12,877	30,047	0 0	0	0	**42,924**	
Manure exported off-site annually	12,880.0	30,050.0	0.0	0.0	0.0	**42,930**	t/yr
Manure exported off-site annually	100%	100%	#DIV/0!	#DIV/0!	#DIV/0!	**100%**	%
Manure transport typical truck type	B double	B double	B double	B double	B double		
Tonnes of manure/truckload	36	36	36	36	36		t/vehicle
No. outgoing trucks/year	357.8	834.7	0.0	0.0	0.0	**1,192.5**	truck/yr

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Traffic Generation - Individual Stages

Market Type	1	2	3	4	5	Total	Units
Incoming Cattle (Excludes farm grown)							
Average Occupancy	98%	98%	0%	0%	0%		%
Cattle per year	32,158	88,387	-	-	-	120,545	head/year
Typical truck type	B Double	Road Train	-	-	-		
No. of head/truck	90	108	-	-	-		head/truck
No. of trucks/year	357	818	-	-	-	1,176	trucks/year
No. of trucks/week	6.9	15.7	-	-	-	22.6	trucks/week
No. of trucks/day	1.0	2.2	-	-	-	3.2	trucks/day
Outgoing Cattle							
Cattle out per year	31,900	87,680	-	-	-	119,581	head/year
Typical truck type	B Double	Road Train	-	-	-		
No. of Head/truck	60	60	-	-	-		head/truck
No. of trucks/year	532	1,461	-	-	-	1,993	trucks/year
No. of trucks/week	10.2	28.1	-	-	-	38.3	trucks/week
No. of trucks/day	1.5	4.0	-	-	-	5.5	trucks/day
Grain and Feedstuffs							
Total feed Imported *Ex. Farm Grown*	58,527	126,394	-	-	-	184,921	t/year
Typical truck type	B Double	Road Train	-	-	-		
No. of trucks/year	1,626	2,616	-	-	-	4,242	trucks/year
No. of trucks/week	31.3	50.3	-	-	-	81.6	trucks/week
No. of trucks/day	4.5	7.2	-	-	-	11.6	trucks/day
Outgoing Manure							
Manure transported off-site	12,880	30,050	0	0	0	42,930	t/year
Typical truck type	B double	B double	B double	B double	B double		
No. of trucks/year	358	835	0	0	0	1,193	trucks/year
No. of trucks/week	6.9	16.1	0.0	0.0	0.0	22.9	trucks/week
No. of trucks/day	1.0	2.3	0.0	0.0	0.0	3.3	trucks/day
Total - Incoming and Outgoing Trucks							
No. of trucks - Incoming Cattle & Incoming Feed	1,983	3,435	-	-	-	5,418	trucks/year
Commodities	38	66	-	-	-	104	trucks/week
	5.4	9.4	-	-	-	14.8	trucks/day
Incoming Annual Average Daily Traffic (AADT)	10.9	18.8	-	-	-	29.7	trucks/day
No. of trucks - Outgoing Cattle & Manure taken for offsite	889	2,296	0	0	0	3,186	trucks/year
disposal	17	44	0	0	0	61	trucks/week
	2.4	6.3	0.0	0.0	0.0	8.7	trucks/day
Outgoing Annual Average Daily Traffic (AADT)	4.9	12.6	0.0	0.0	0.0	17.5	trucks/day
Total - Incoming & Outgoing Trucks	2,873	5,731	0	0	0	8,603	trucks/year
	55	110	0	0	0	165	trucks/week
	7.9	15.7	0.0	0.0	0.0	23.6	trucks/day
Total Annual Average Daily Traffic (AADT)	15.7	31.4	0.0	0.0	0.0	47.1	trucks/day
Total AADT (Rounded to Nearest Complete Trip)	16.0	32.0	2.0	2.0	2.0	48.0	trucks/day

Traffic Generation - Cumulative Stages

Market Type	1	1+2	1+2+3	1+2+3+4	1+2+3+4+5	Units
Incoming Cattle (Excludes farm grown)						
Average Occupancy	98%	98%	0%	0%	0%	%
Cattle per year	32,158	120,545	-	-	-	head/year
Typical truck type	B Double	Road Train	-	-	-	
No. of head/truck	90	108	-	-	-	head/truck
No. of trucks/year	357	1,176	-	-	-	trucks/year
No. of trucks/week	6.9	22.6	-	-	-	trucks/week
No. of trucks/day	1.0	3.2	-	-	-	trucks/day
Outgoing Cattle						
Cattle out per year	31,900	119,581	-	-	-	head/year
Typical truck type	B Double	Road Train	-	-	-	
No. of Head/truck	60	60	-	-	-	head/truck
No. of trucks/year	532	1,993	-	-	-	trucks/year
No. of trucks/week	10.2	38.3	-	-	-	trucks/week
No. of trucks/day	1.5	5.5	-	-	-	trucks/day
Grain and Feedstuffs						
Total feed Imported *Ex. Farm Grown*	58,527	184,921	-	-	-	t/year
Typical truck type	B Double	Road Train	-	-	-	
No. of trucks/year	1,626	4,242	-	-	-	trucks/year
No. of trucks/week	31.3	81.6	-	-	-	trucks/week
No. of trucks/day	4.5	11.6	-	-	-	trucks/day
Outgoing Manure						
Manure transported off-site	12,880	42,930	42,930	42,930	42,930	t/year
Typical truck type	B double	B double	B double	B double	B double	
No. of trucks/year	358	1,193	1,193	1,193	1,193	trucks/year
No. of trucks/week	6.9	22.9	22.9	22.9	22.9	trucks/week
No. of trucks/day	1.0	3.3	3.3	3.3	3.3	trucks/day
Total - Incoming and Outgoing Trucks						
No. of trucks - Incoming Cattle & Incoming Feed	1,983	5,418	-	-	-	trucks/year
Commodities	38	104	-	-	-	trucks/week
	5.4	14.8	-	-	-	trucks/day
Incoming Annual Average Daily Traffic (AADT)	10.9	29.7	-	-	-	trucks/day
No. of trucks - Outgoing Cattle & Manure taken for offsite	889	3,186	3,186	3,186	3,186	trucks/year
disposal	17	61	61	61	61	trucks/week
	2.4	8.7	8.7	8.7	8.7	trucks/day
Outgoing Annual Average Daily Traffic (AADT)	4.9	17.5	17.5	17.5	17.5	trucks/day
Total - Incoming & Outgoing Trucks	2,873	8,603	8,603	8,603	8,603	trucks/year
	55	165	165	165	165	trucks/week
	7.9	23.6	23.6	23.6	23.6	trucks/day
Total Annual Average Daily Traffic (AADT)	15.7	47.1	47.1	47.1	47.1	trucks/day
Total AADT (Rounded to Nearest Complete Trip)	16.0	48.0	48.0	48.0	48.0	trucks/day

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Assumptions

Table 1. Incoming cattle truck floor areas

Truck Type	Table Top	Semi Trailer (Single Deck)	Semi Trailer (Double Deck)	B Double	Road Train
Configuration	1 Deck	1 Deck	2 Decks	3 Decks	4 Decks
Total 12.5 x 2.4m decks	0.17	1	2	3	4
Total Floor Area (m^2)	5	29.3	58.5	87.8	117

Table 2. Minimum floor area by animal size

Mean liveweight (kg)	Area required (m^2/head)	Using Regression	% Difference	Head / Standard Deck
250	0.77	0.79	2.7%	38
300	0.86	0.86	0.6%	34
350	0.98	0.95	-3.4%	30
400	1.05	1.04	-1.4%	28
450	1.13	1.13	0.3%	26
500	1.23	1.24	0.8%	24
550	1.34	1.36	1.2%	22
600	1.47	1.48	1.0%	20
650	1.63	1.62	-0.4%	18
700	1.78	1.78		16
750	1.94	1.94		15
800	2.13	2.13		13
850	2.33	2.33		12
900	2.55	2.55		11
950	2.79	2.79		10
1000	3.05	3.05		9

Table 3. Incoming Grain truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Grain (tonnes)	12	24	24	36	48

Table 4. Incoming Roughage - Hay/Straw truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Roughage - Hay/Straw (tonnes)	6	12	12	18	24

Table 5. Incoming Roughage - Silage truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Roughage - Silage (tonnes)	12	25	25	36	50

Table 6. Incoming Other - Liquids truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Other - Liquids (tonnes)	12	24	24	36	48

Table 7. Manure quantities depending on manure treatment process

Truck Type	Tonne/SCU
Immediate Disposal	0.8
Stockpiled	0.56
Composted	0.35

Table 8. Outgoing manure truck loading rates

Truck Type	Tonne / truck
Body Truck	12
Truck & Dog	18
Semi Trailer	24
B double	36

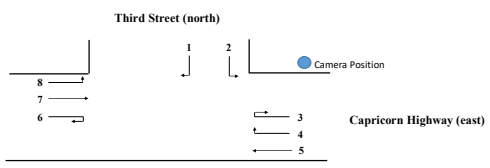
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Version: 1, Version Date: 22/04/2022

Appendix C Traffic count data

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Third Street/Capricorn Highway, Gogango
Day/Date: Wednesday, 23 February 2022
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 2:30 PM*



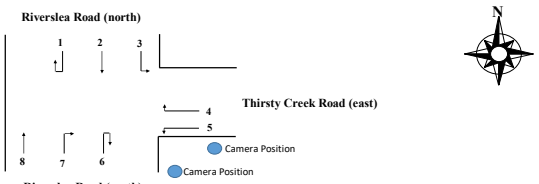


TIME (1/4 hr end)	Movement 1														Movement 2														Movement 3														Movement 4													
	Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train	Total

	Movement 5													Movement 6												Movement 7												Movement 8												
Total	Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine
Location: Riverslea Road/Thirsty Creek Road, Gogango
Day/Date: Wednesday, 23 February 2022
AM Peak: *Hour ending - 6:15 AM*
PM Peak: *Hour ending - 12:45 PM*



TIME (1/4 hr end)	Movement 1														Movement 2														Movement 3														Movement 4													
	Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train	Total		Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train	Total		Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train	Total		Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	0	0	0	0	0	0	0	0	0	0	0	**1**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	0	0	0	0	0	0	0	0	0	0	0	**1**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	1	0	0	0	0	0	0	0	0	0	0	**2**		0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	0	0	0	0	0	0	0	0	0	0	0	**1**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	0	0	0	0	0	0	0	0	0	0	0	**1**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		2	0	0	0	0	0	0	0	0	0	0	0	**2**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	0	0	0	0	0	0	0	0	0	0	0	**1**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		1	0	0	0	0	0	0	0	0	0	0	0	**1**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0	**0**		0	0	0	0	0	0	0	0	0	0	0	0
24 hr Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**13**	**1**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**17**		**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**		**5**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
AM Peak	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PM Peak	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**3**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**4**		**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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Version: 1, Version Date: 22/04/2022

	Movement 5														Movement 6														Movement 7														Movement 8													
Total	Short	Short - Towing	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated	B Double	Double Road Train	Triple Road Train

2020 - TMR Site 60045 summary

Class	AADT T1	AADT T2
1	1069.5	1183.2
2	62.1	78.3
3	235.5	76.4
4	26.5	22.7
5	5.6	5.1
6	9.9	3.9
7	16.4	9.4
8	6.4	5.7
9	43.1	45.6
10	93.3	90.2
11	50.9	54.0
12	1.1	2.1

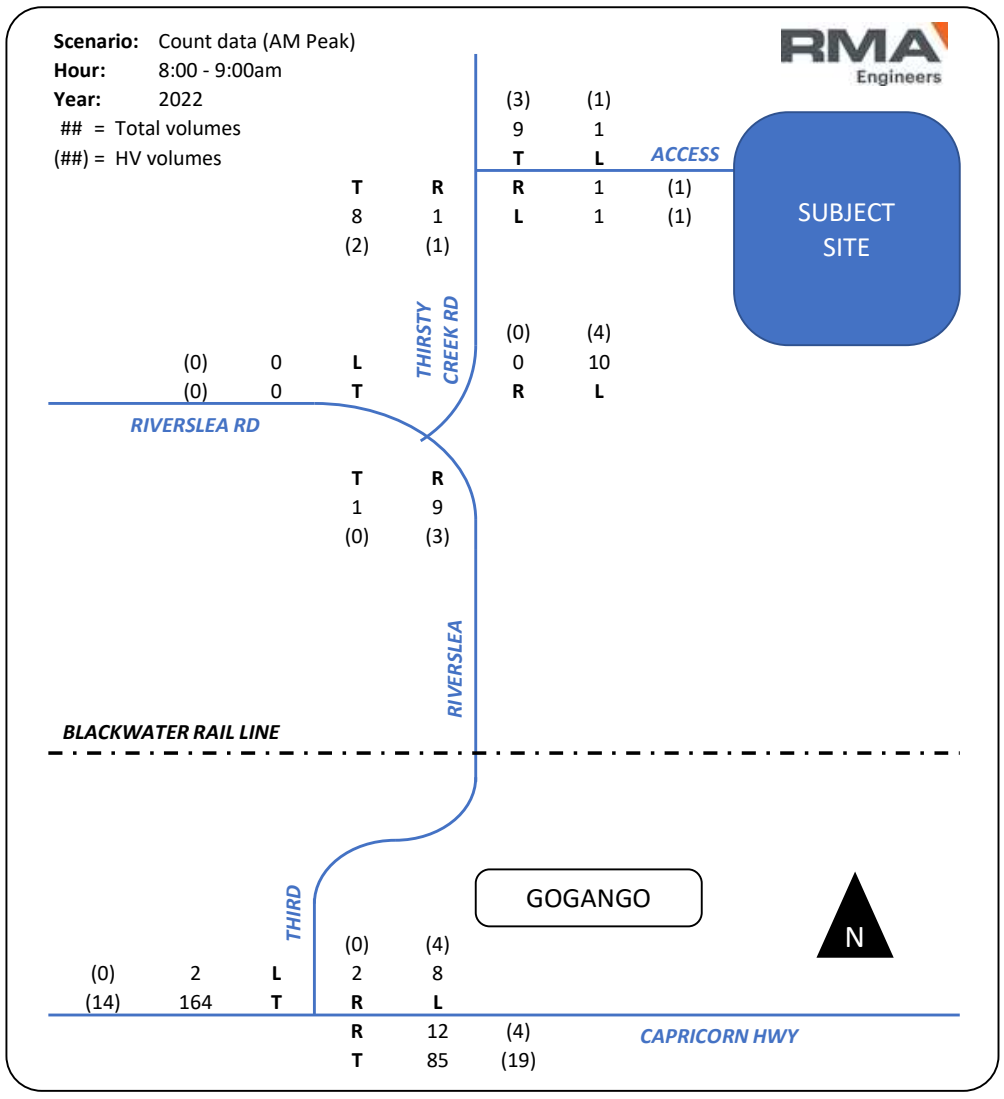
LV	1131.6	1261.5
HV	488.6	315.1
Total	**1620.2**	**1576.6**

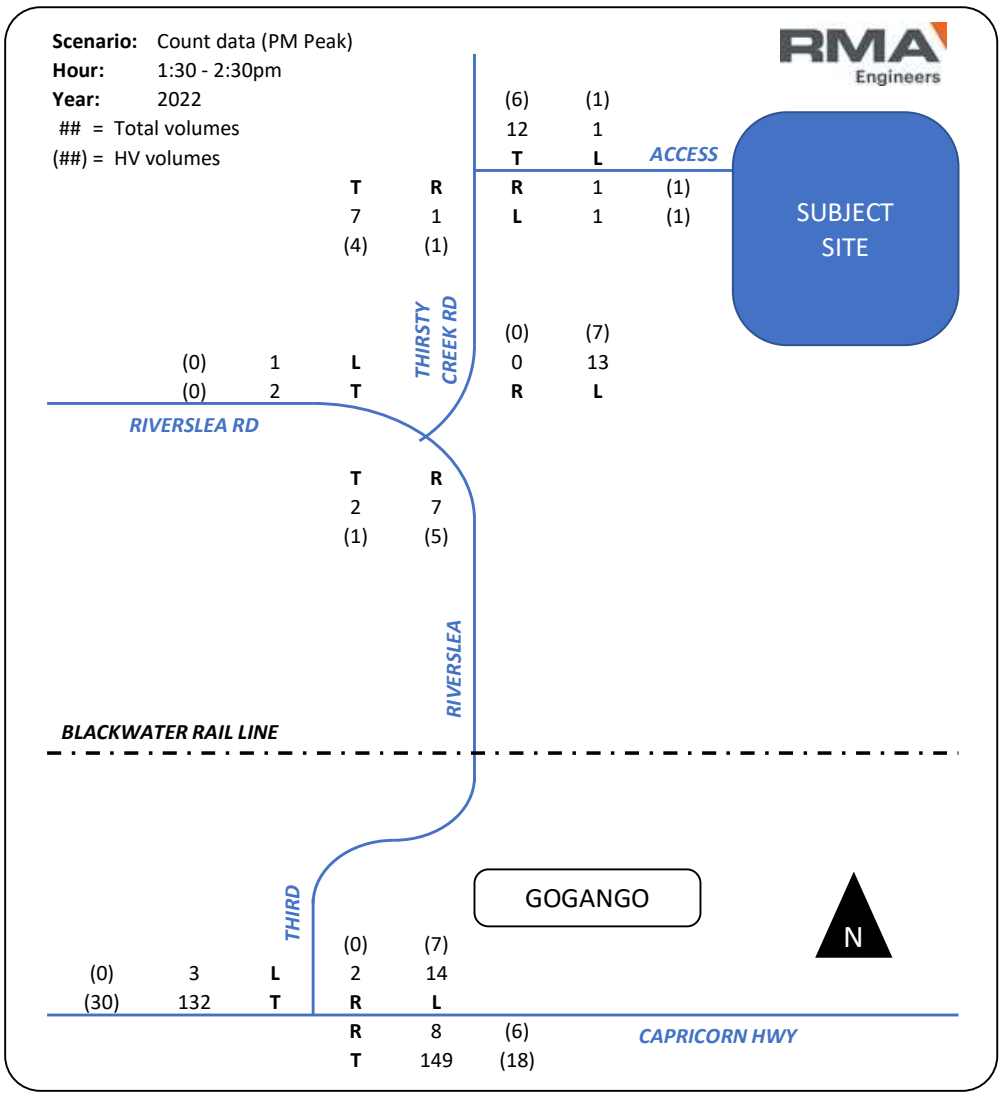
The gazettal direct, which is site stream/lane = T1, is traffic travelling from Rockhampton to Duaringa (westbound). Traffic travelling against gazettal direction, which is site stream/lane=T2, is traffic travelling from Duaringa to Rockhampton (eastbound).

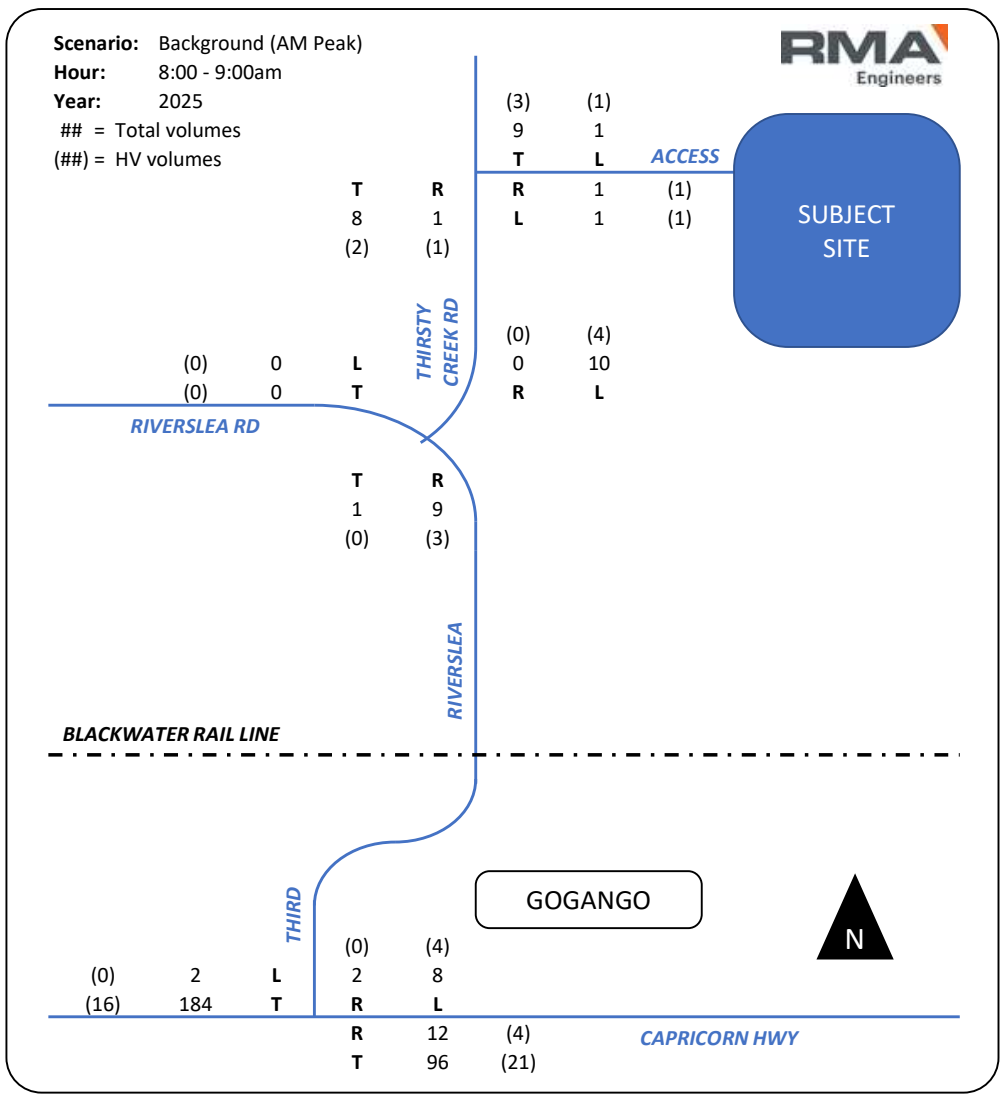
Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

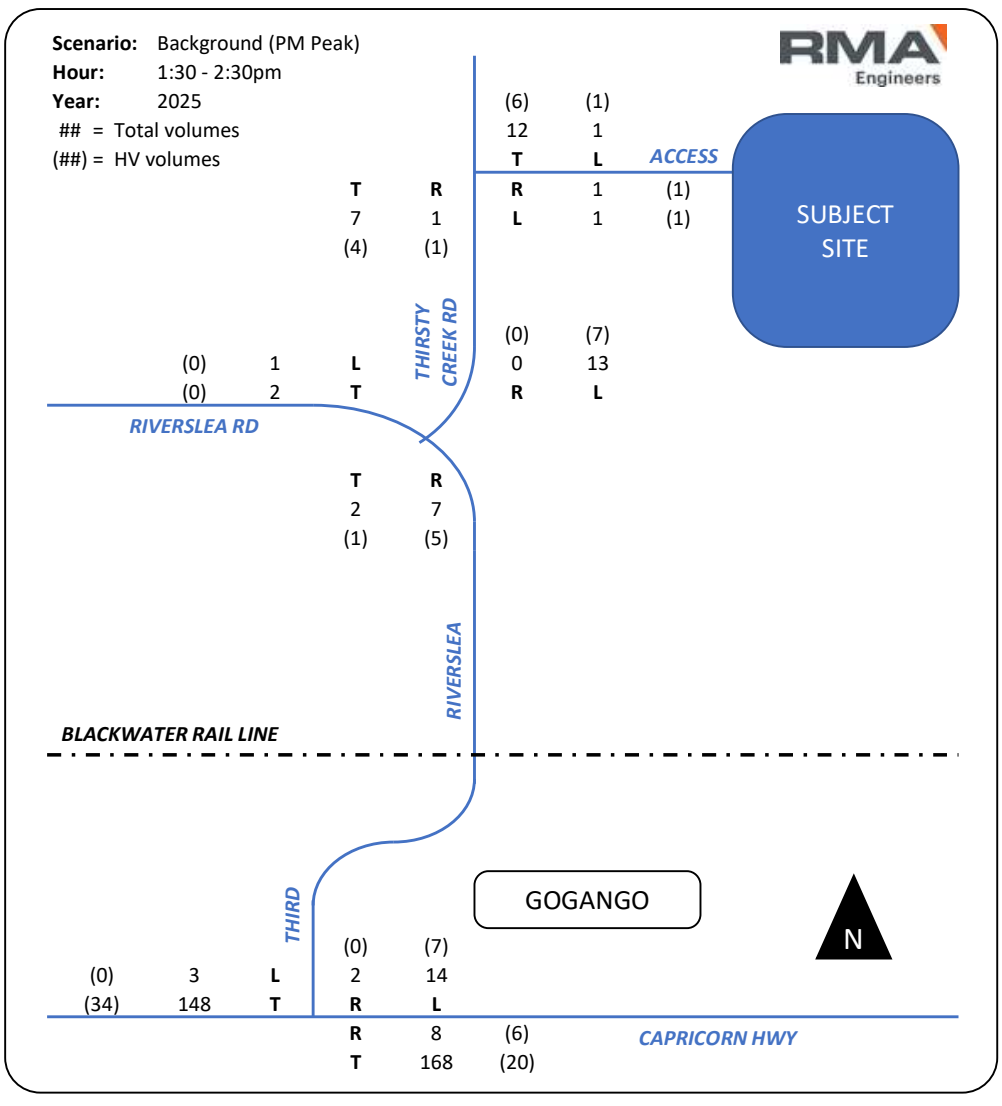
Appendix D Background traffic scenarios

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022







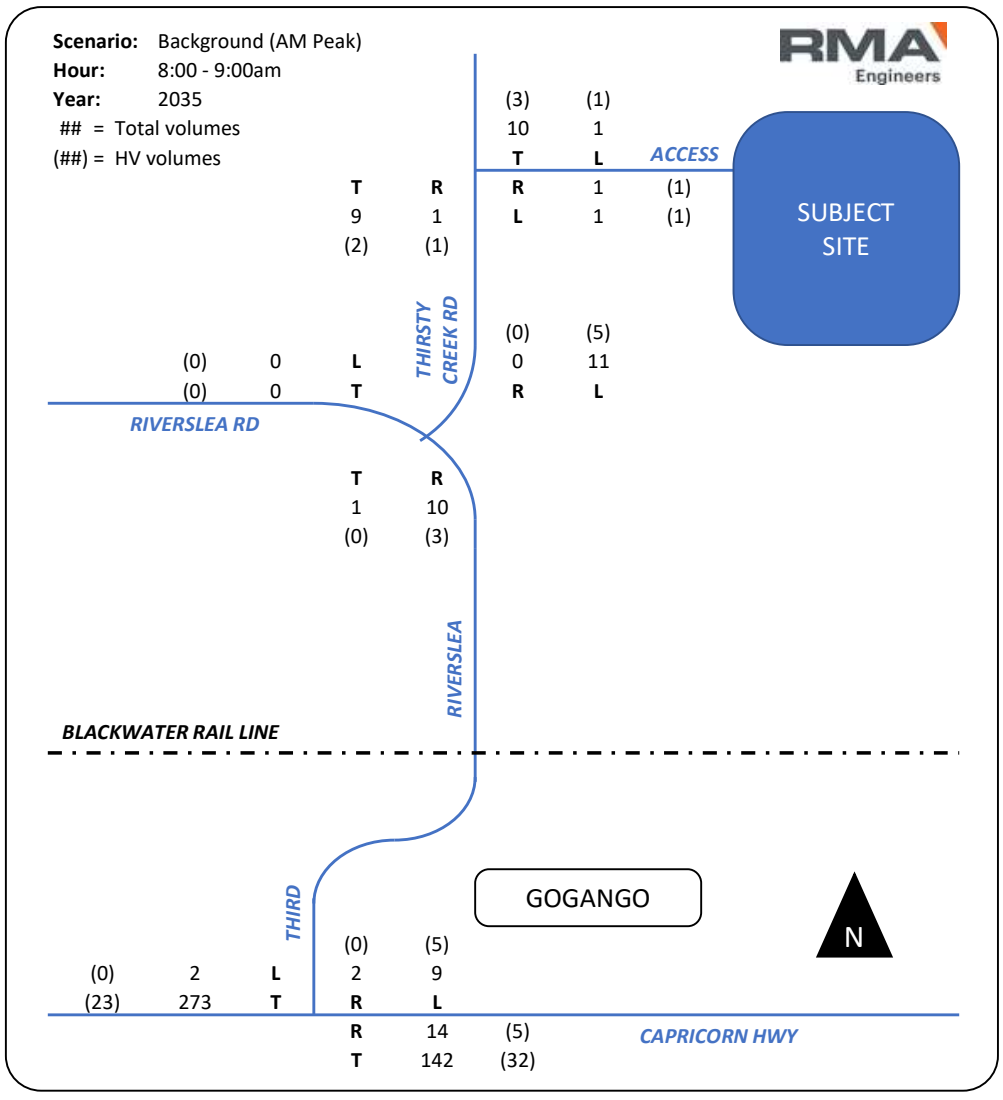


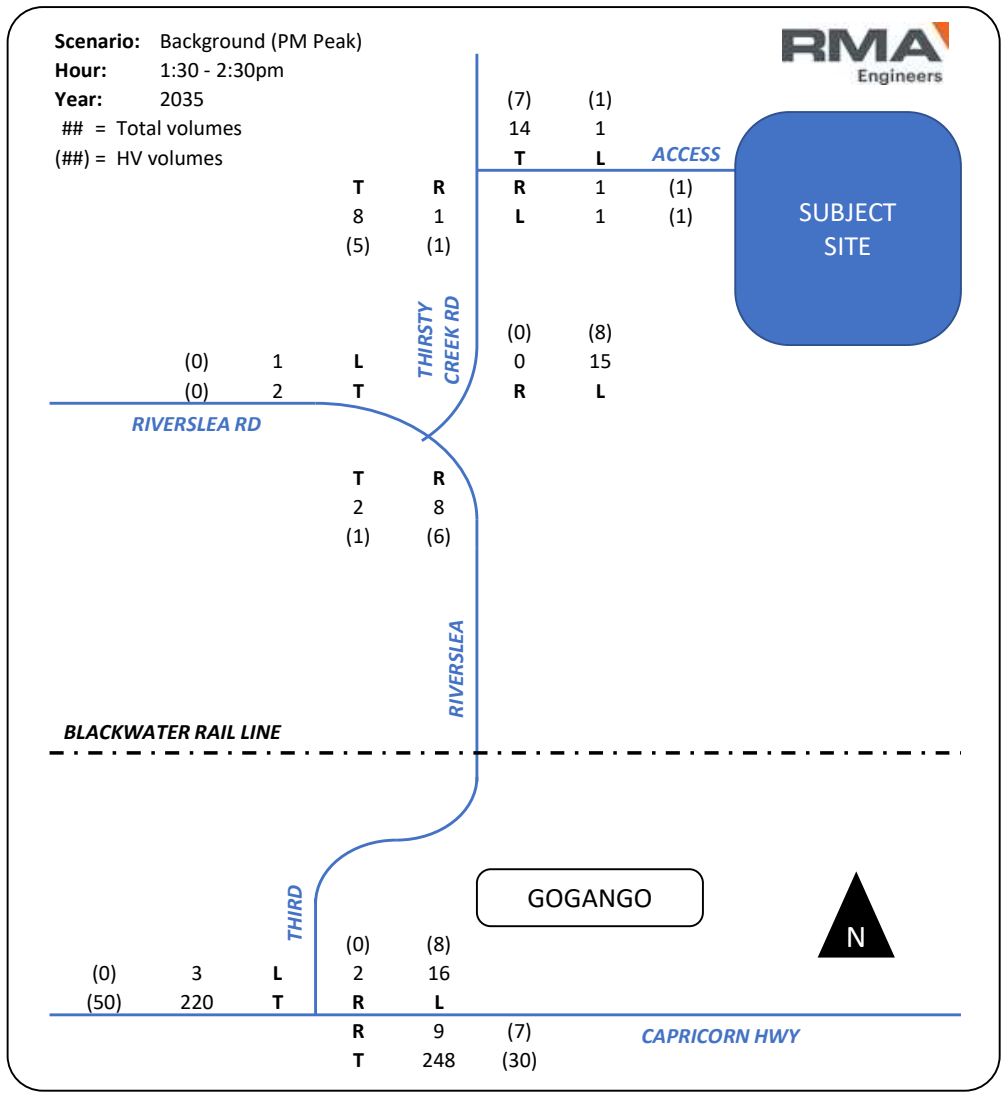
Count data:
Austraffic
Wednesday 23 Feb 2022

Growth Rate:

Local	1%	compound per annum
Capricorn Hwy	4%	compound per annum

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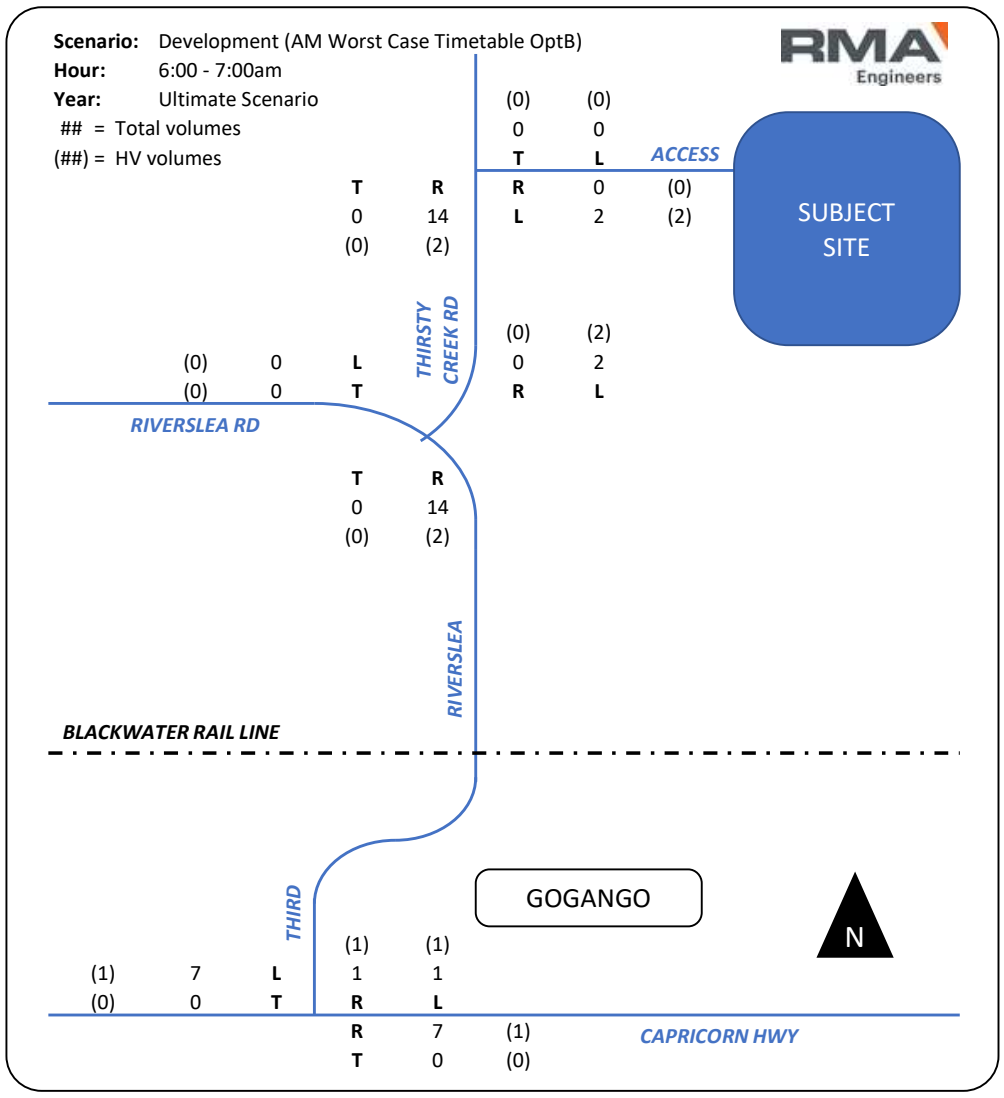


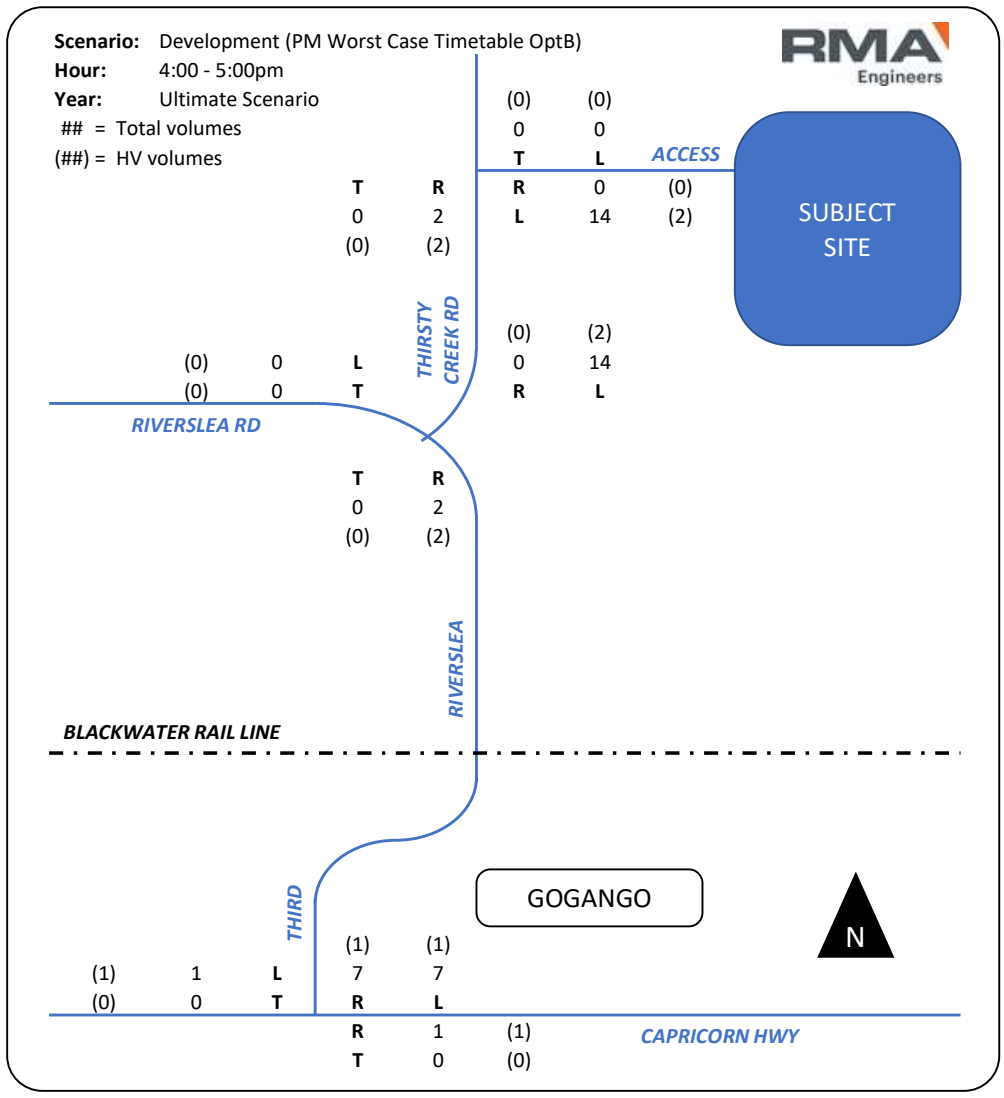


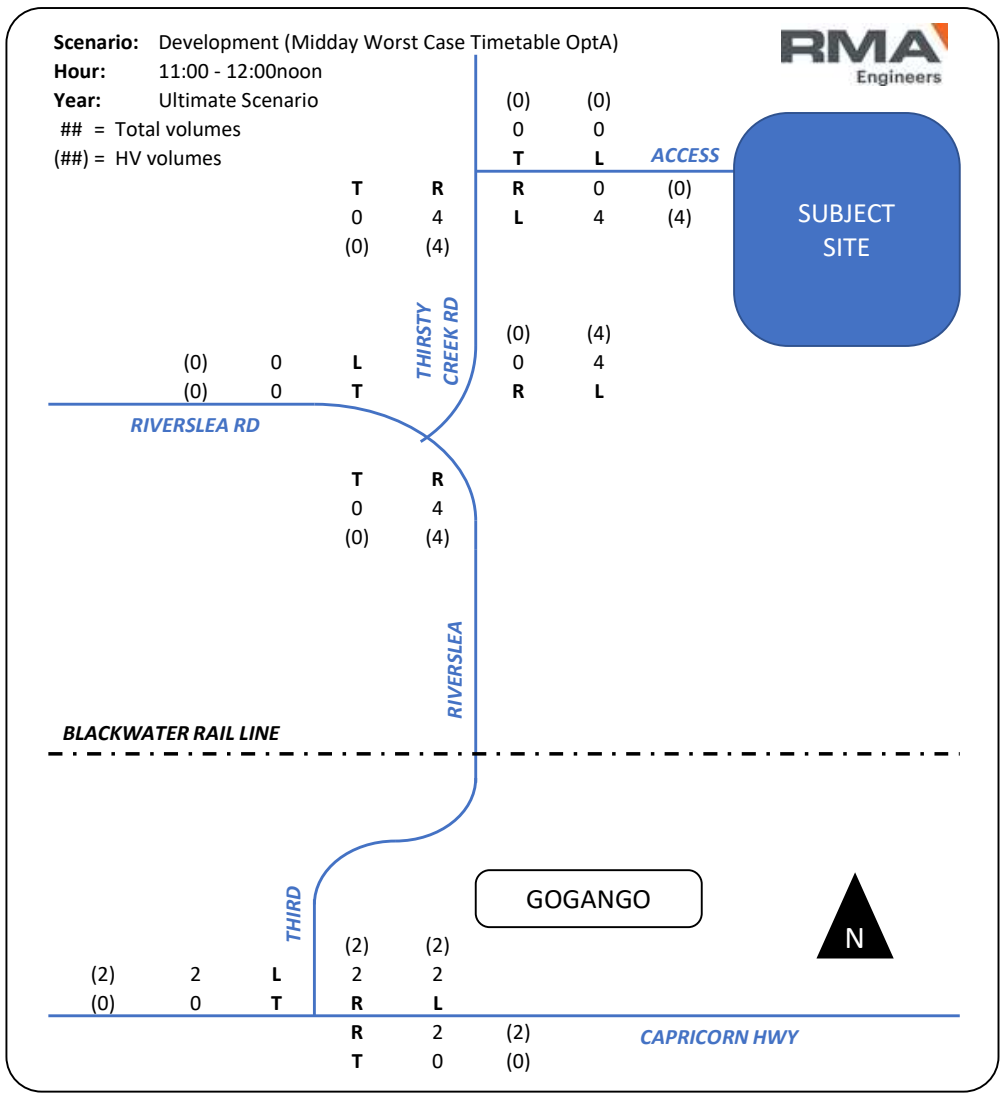
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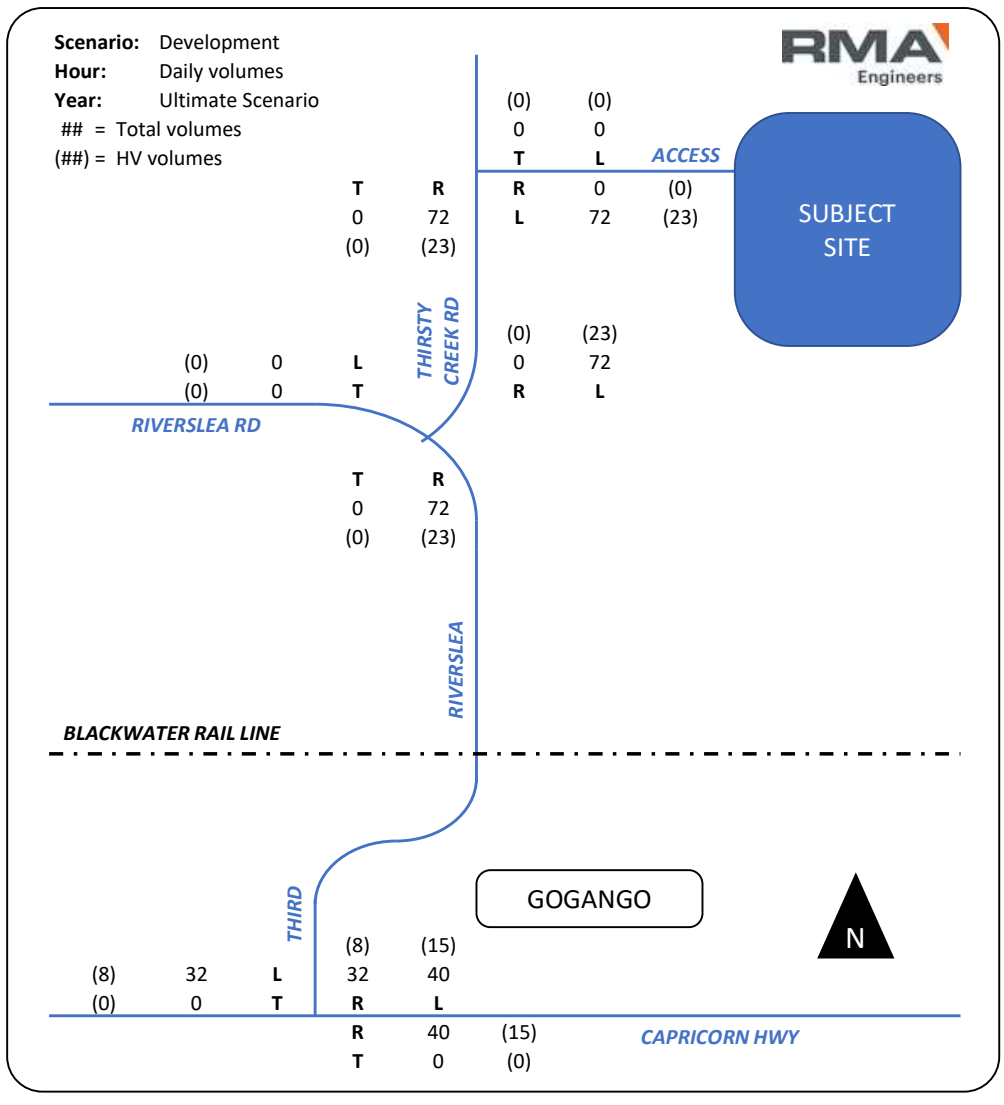
Appendix E Development traffic scenarios

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

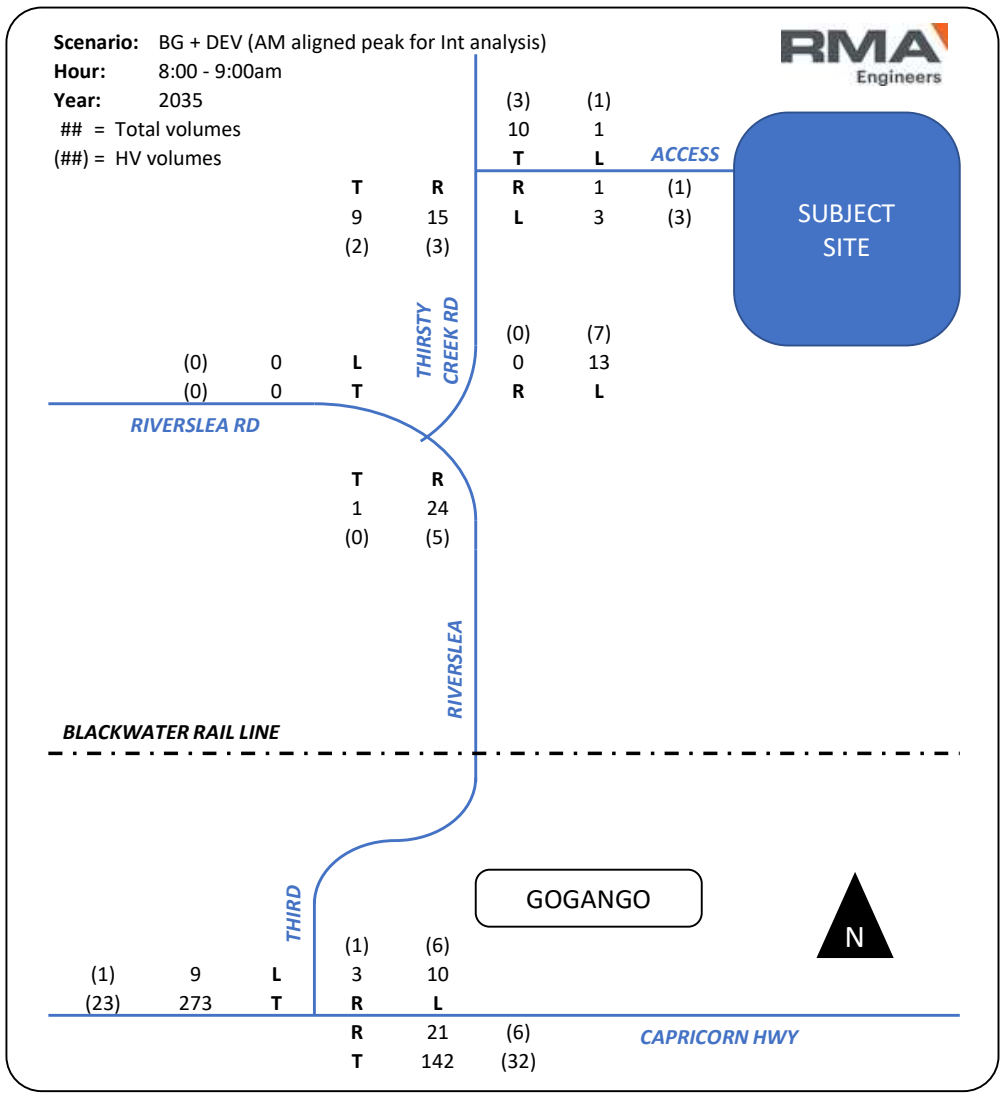


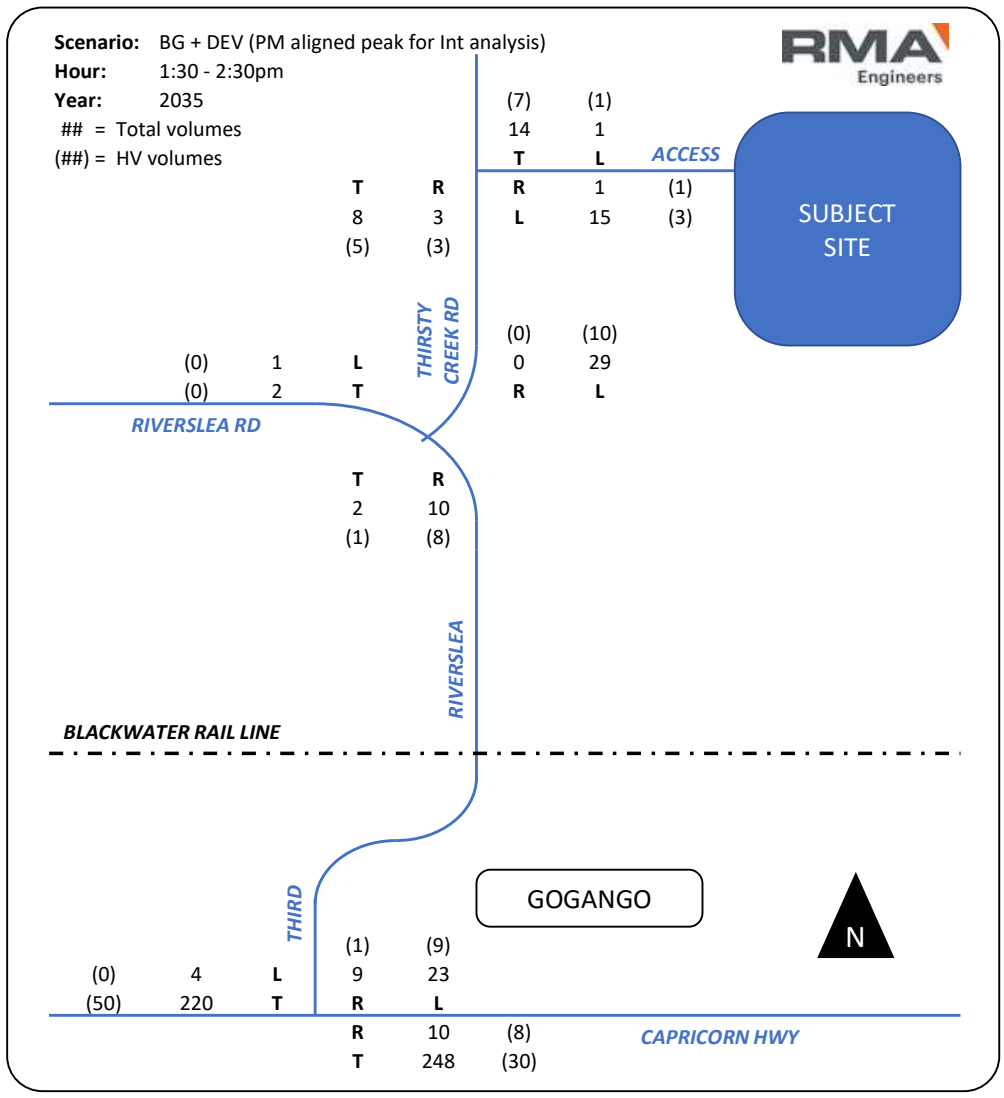






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Version: 1, Version Date: 22/04/2022

Appendix F SIDRA results

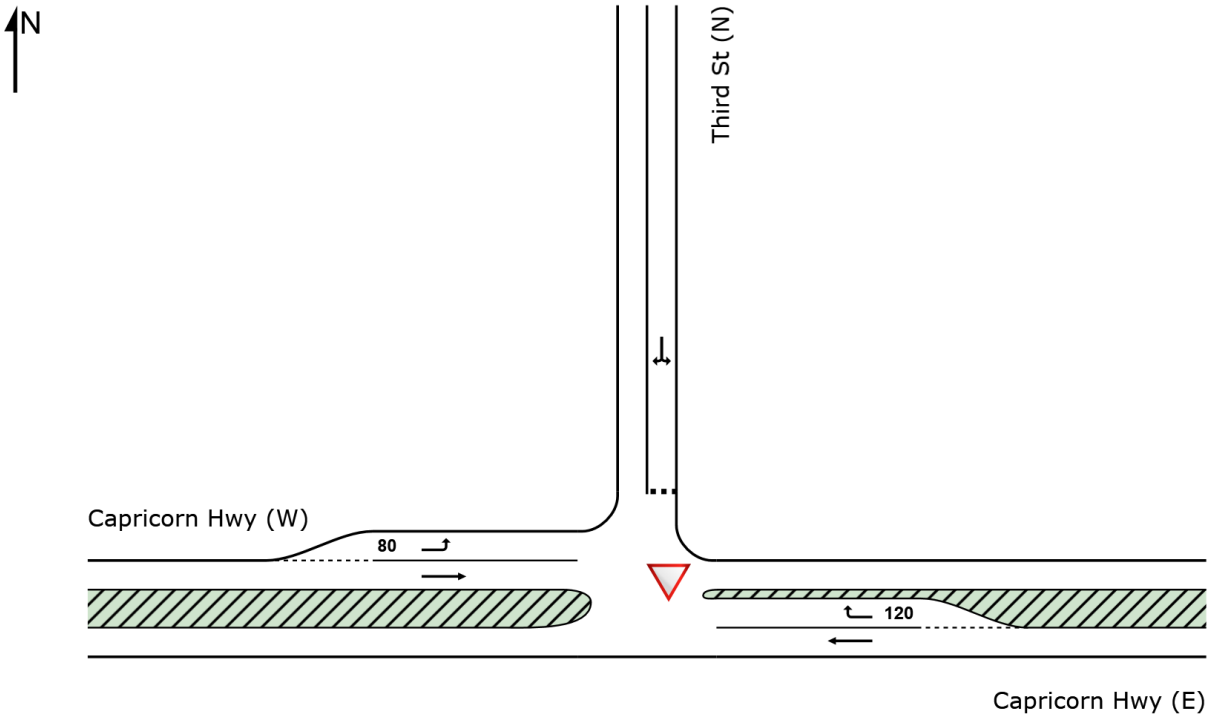
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SITE LAYOUT

Site: Capricorn Highway / Third Street

Capricorn Hwy/Third St
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: [2035 BG+DEV AM Peak (Site Folder: General)]

Capricorn Hwy/Third St
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Capricorn Hwy (E)														
5	T1	142	32	149	22.5	0.088	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	110.0
6	R2	21	6	22	28.6	0.025	10.3	LOS B	0.1	0.8	0.41	0.67	0.41	56.5
Approach		163	38	172	23.3	0.088	1.3	NA	0.1	0.8	0.05	0.09	0.05	98.0
North: Third St (N)														
7	L2	10	6	11	60.0	0.022	7.3	LOS A	0.1	0.8	0.45	0.61	0.45	45.8
9	R2	3	1	3	33.3	0.022	10.6	LOS B	0.1	0.8	0.45	0.61	0.45	48.0
Approach		13	7	14	53.8	0.022	8.0	LOS A	0.1	0.8	0.45	0.61	0.45	46.3
West: Capricorn Hwy (W)														
10	L2	9	1	9	11.1	0.006	8.5	LOS A	0.0	0.0	0.00	0.67	0.00	69.0
11	T1	273	23	287	8.4	0.155	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	110.0
Approach		282	24	297	8.5	0.155	0.3	NA	0.0	0.0	0.00	0.02	0.00	107.9
All Vehicles		458	69	482	15.1	0.155	0.9	NA	0.1	0.8	0.03	0.06	0.03	100.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [2035 BG+DEV PM Peak (Site Folder: General)]

Capricorn Hwy/Third St
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Capricorn Hwy (E)														
5	T1	248	30	261	12.1	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	110.0
6	R2	10	8	11	80.0	0.015	12.3	LOS B	0.1	0.7	0.41	0.67	0.41	54.9
Approach		258	38	272	14.7	0.144	0.5	NA	0.1	0.7	0.02	0.03	0.02	105.8
North: Third St (N)														
7	L2	23	9	24	39.1	0.049	6.5	LOS A	0.2	1.6	0.42	0.62	0.42	47.9
9	R2	9	1	9	11.1	0.049	10.1	LOS B	0.2	1.6	0.42	0.62	0.42	50.5
Approach		32	10	34	31.3	0.049	7.5	LOS A	0.2	1.6	0.42	0.62	0.42	48.6
West: Capricorn Hwy (W)														
10	L2	4	0	4	0.0	0.002	8.2	LOS A	0.0	0.0	0.00	0.67	0.00	79.7
11	T1	220	50	232	22.7	0.136	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	110.0
Approach		224	50	236	22.3	0.136	0.2	NA	0.0	0.0	0.00	0.01	0.00	109.2
All Vehicles		514	98	541	19.1	0.144	0.8	NA	0.2	1.6	0.03	0.06	0.03	99.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix G Pavement impact calculations

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SAR Calculation by Austroads Heavy Vehicle Classification

	Two Axle Truck or Bus	Three Axle Truck or Bus	Four Axle Truck	Three Axle Articulated	Four Axle Articulated	Five Axle Articulated	Six Axle Articulated & Truck and Dogs	B Double	Double Road Train	Triple Road Train	
Austroads vehicle classification	3	4	5	6	7	8	9	10	11	12	
Legal Loading (t)	15	22.5	27.5	24	31.5	39	42.5	62.5	79	115.5	
Base Load per SAR4	13.6	19.2	23	21.8	27.5	33	37.7	56.2	70	102.3	
Unloaded Axle Group Load (t)	8.5	9.5	12.5	12.5	13.5	14.5	16	22.5	27.5	39	
Unloaded SAR4	0.54	0.5	0.46	0.6	0.56	0.52	0.51	0.53	0.55	0.58	
Unloaded SAR5	0.43	0.41	0.37	0.46	0.44	0.41	0.41	0.42	0.43	0.44	
Unloaded SAR12	0.11	0.11	0.09	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
Loaded Axle Group Load (t)	15	22.5	27.5	24	31.5	39	42.5	62.5	79	115.5	
Loaded SAR4	2.98	3.57	4.09	4.43	5.02	5.61	4.93	6.3	8.43	11.75	
Loaded SAR5	3.29	4.14	4.89	4.88	5.73	6.58	5.61	7.09	9.53	13.45	
Loaded SAR12	6.6	12.08	17.07	9.65	15.13	20.61	14.63	17.17	25.71	36.79	
Payload (t)	6.5	13	15	11.5	18	24.5	26.5	40	51.5	76.5	
Average SAR4	1.76	2.035	2.275	2.515	2.79	3.065	2.72	3.415	4.49	6.165	
											total
60045 T1 WB (2020 AADT)	236	27	6	10	16	6	43	93	51	1	489
60045 T2 EB (2020 AADT)	76	23	5	4	9	6	46	90	54	2	315

2.3 Network statistics

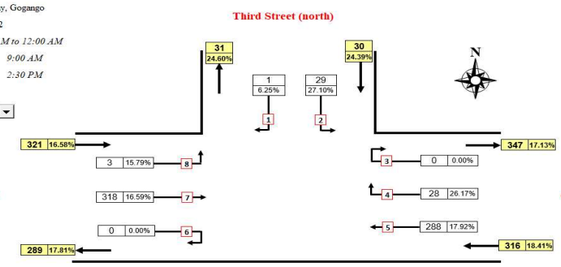
Table 6 provides a summary of the SCR network by pavement type. The vast majority of the sealed SCR network is constructed with GN pavement. The average marginal cost for GN is significantly higher than AC and CS. This is due to the wide variation in the structural capacity of GN pavements, with measured strength values being lower and more variable, and environmental effects.

Table 6: SCR network overview

Type	Length of pavement network	% of network	Average marginal cost	Damage unit
Sealed roads with granular pavement (GN)	24,886 km	82%	13.60 cents / SAR-km	SAR4
Sealed roads with asphaltic concrete pavement (AC)	2,523 km	7%	4.87 cents / SAR-km	SAR5
Sealed roads with cement stabilised pavement (CS)	2,761 km	8%	3.69 cents / SAR-km	SAR12
Sub total	30,171 km	88%	11.94 cents / SAR-km	-
Unsealed roads	4,277 km	12%	14.84 cents / LU-km	LU
Total	34,448 km	100%	-	-

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Third Street/Capricorn Highway, Gogango
Day/Date: Wednesday, 23 February 2022
Summary: 24 Hour Volumes : *12:00 AM to 12:00 AM*
AM Peak : *Hour ending - 9:00 AM*
PM Peak : *Hour ending - 2:30 PM*
Hour Ending: Total Time
On-road classification: Total Heavy Vehicles



Background

Road	Location	Site ID	Direction		Growth Rate	AADT 2020	AADT 2022	AADT 2025	%LV	%HV	AADT LV	AADT HV	SAR4 per HV	SAR4 per day	SAR4 per year
Capricorn Highway	West of Gogango	60045	Against gazettal	Eastbound	4%	1,577	1,705	1,918	80.0%	20.0%	1,535	383	3.2	1,227	447,809
			Gazettal	Westbound	4%	1,620	1,752	1,971	69.8%	30.2%	1,377	594	3.2	1,902	694,361
	East of Gogango		Against gazettal	Eastbound	-	-	-	-	-	-	-	409	3.2	1,310	478,177
			Gazettal	Westbound	-	-	-	-	-	-	-	621	3.2	1,989	725,897

Growth Rate: 4%

Historical Count Data

	AADT	%HV	5 year compound growth (% per annum)	Yearly Compound growth
2020	3197	25.14		
2019	2957	20.24		8.12%
2018	2810	29.56		5.23%
2017	2741	24.14		2.52%
2016	2740	22.42	3.93%	0.04%
2015	2856	25.84		-4.06%
2014	3143	24.99		-9.13%
2013	3280	19.5		-4.18%
2012	3988	20.72		-17.75%
2011	3503	22.19		13.85%
2010	3216	20.71		8.92%

Development volumes - West of Gogango

Road	Site	Direction		Vehicle class	Daily demand	SAR4 per vehicle		SAR4 per year
Capricorn Highway	West of Gogango	Against gazettal	Eastbound	10	2	6.3	loaded	5,403
				10	2	0.53	unloaded	316
		Gazettal	Westbound	10	2	6.3	loaded	3,758
				10	2	0.53	unloaded	455
		Against gazettal	Eastbound	11	4	8.43	loaded	13,486
				11	0	0.55	unloaded	0
		Gazettal	Westbound	11	0	8.43	loaded	0
				11	4	0.55	unloaded	880
Total						**Eastbound**		**19205**
						Westbound		**5092**

West of Gogango	Bdoubles (type 10)		Dev Yearly volumes		Dev Daily volumes		Road Trains (type 11)		Dev Yearly volumes		Dev Daily volumes	
			Loaded	Unloaded	Loaded	Unloaded			Loaded	Unloaded	Loaded	Unloaded
	Incoming	WB		321.3	0	1	Incoming	WB		736.2	0	2
		EB	321.3		1	0		EB	736.2		2	0
	Outgoing	WB			0	0	Outgoing	WB			0	0
		EB			0	0		EB			0	0
	Manure	WB	596.5		2	0	Manure	WB	0		0	0
		EB		596.5	0	2		EB		0	0	0
	Feed	WB		536.25	0	1	Feed	WB		863.61	0	2
		EB	536.25		1	0		EB	863.61		2	0
	Total	**WB**	596.5	857.55	2	2	**Total**	**WB**	0	1599.81	0	4
		EB	857.55	596.5	2	2		**EB**	1599.81	0	4	0

Development volumes - East of Gogango

Road	Site	Direction		Vehicle class	Daily demand	SAR4 per vehicle		SAR4 per year
Capricorn Highway	East of Gogango	Against gazettal	Eastbound	10	3	6.3	loaded	7,110
				10	3	0.53	unloaded	596
		Gazettal	Westbound	10	3	6.3	loaded	7,084
				10	3	0.53	unloaded	598
		Against gazettal	Eastbound	11	4	8.43	loaded	12,316
				11	5	0.55	unloaded	1,009
		Gazettal	Westbound	11	5	8.43	loaded	15,471
				11	4	0.55	unloaded	804
Total						**Eastbound**		**21031**
						Westbound		**23956**

East of Gogango	Bdoubles (type 10)		Dev Yearly volumes		Dev Daily volumes		Road Trains (type 11)		Dev Yearly volumes		Dev Daily volumes	
			Loaded	Unloaded	Loaded	Unloaded			Loaded	Unloaded	Loaded	Unloaded
	Incoming	WB	35.7		0	0	Incoming	WB	81.8		0	0
		EB		35.7	0	0		EB		81.8	0	0
	Outgoing	WB		532	0	1	Outgoing	WB		1461	0	4
		EB	532		1	0		EB	1461		4	0
	Manure	WB		596.5	0	2	Manure	WB		0	0	0
		EB	596.5		2	0		EB	0		0	0
	Feed	WB	1088.75		3	0	Feed	WB	1753.39		5	0
		EB		1088.75	0	3		EB		1753.39	0	5
	Total	**WB**	1124.45	1128.5	3	3	**Total**	**WB**	1835.19	1461	5	4
		EB	1128.5	1124.45	3	3		**EB**	1461	1835.19	4	5

Road	Segment	Direction		Development SAR4 per year	Background SAR4 per year	Development impacts (%)	>5% impacts
Capricorn Highway	West of Gogango	Against gazettal	EB	19,205	447,809	4.3%	No
		Gazettal	WB	5,092	694,361	0.7%	No
	East of Gogango	Against gazettal	EB	21,031	478,177	4.4%	No
		Gazettal	WB	23,956	725,897	3.3%	No

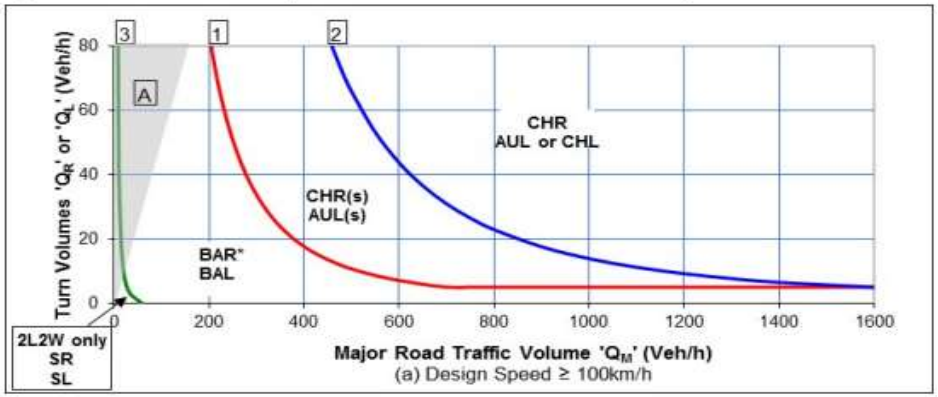
Total	Bdoubles (type 10)		Dev Yearly volumes		Dev Daily volumes		Road Trains (type 11)		Dev Yearly volumes		Dev Daily volumes	
			Loaded	Unloaded	Loaded	Unloaded			Loaded	Unloaded	Loaded	Unloaded
	Incoming	In	357		1	0	Incoming	In	818		2	0
		Out		357	0	1		Out		818	0	2
	Outgoing	In		532	0	1	Outgoing	In		1461	0	4
		Out	532		1	0		Out	1461		4	0
	Manure	In		1193	0	3	Manure	In		0	0	0
		Out	1193		3	0		Out	0		0	0
	Feed	In	1625		4	0	Feed	In	2617		7	0
		Out		1625	0	4		Out		2617	0	7
	Total	**In**	1982	1725	5	5	**Total**	**WB**	3435	1461	9	4
		Out	1725	1982	5	5		**EB**	1461	3435	4	9

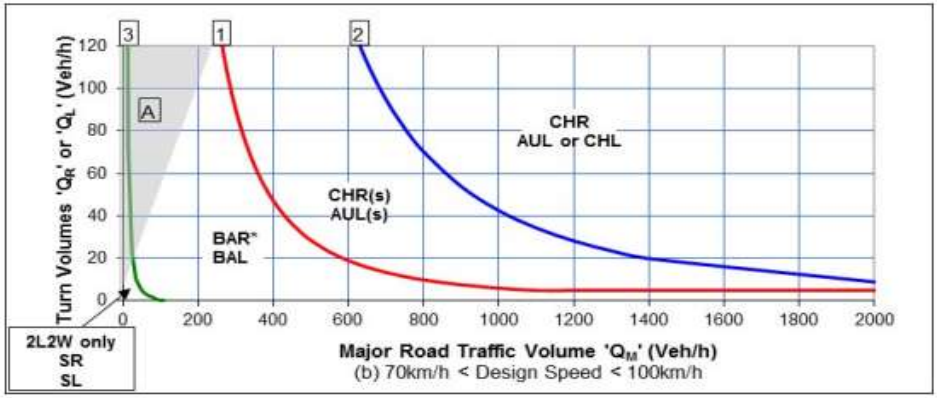
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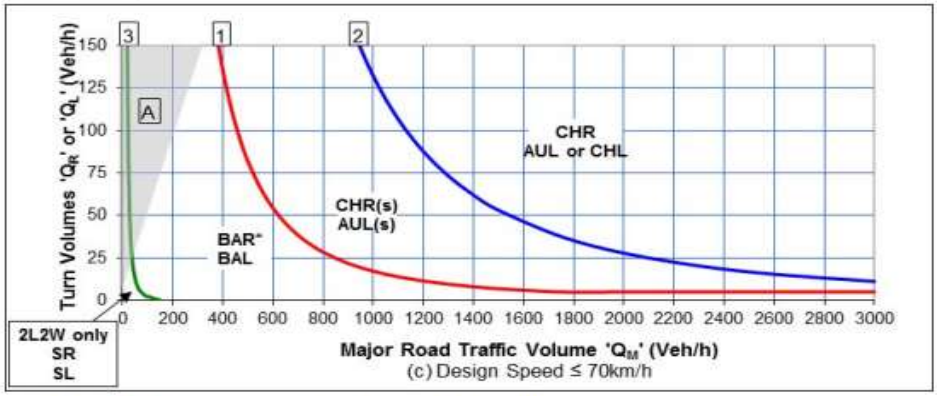
Appendix H Turn warrant assessment

Document Set ID: 34646000
Version: 1, Version Date: 22/04/2022

Figure 4A-A 4 - Warrants - Major road turn treatments - Extended Design Domain



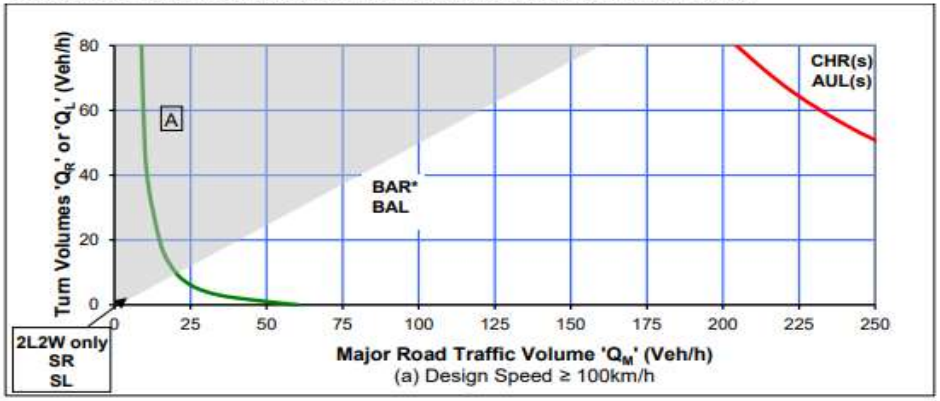


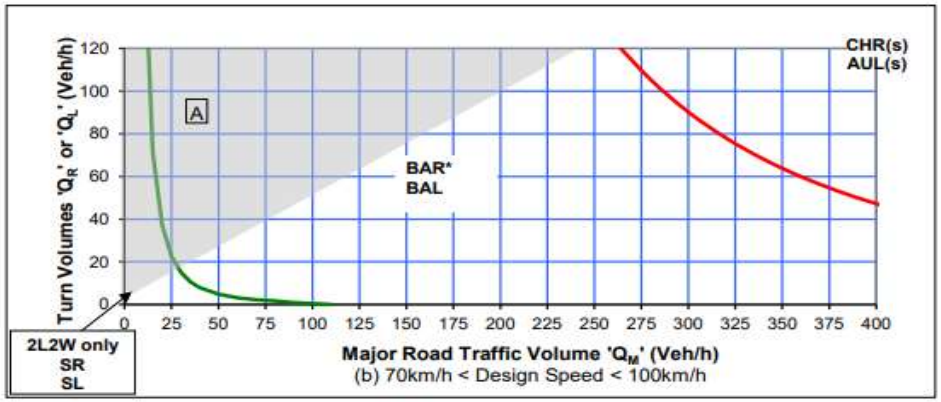


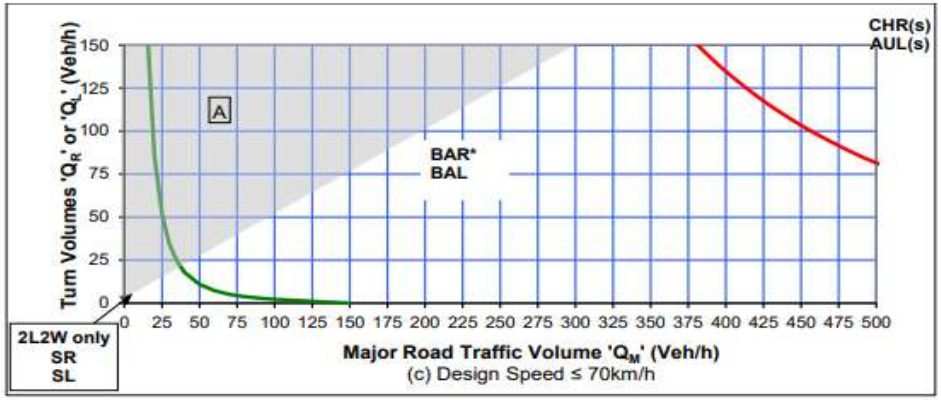
* - the minimum right-turn treatment for multi-lane roads is a CHR(s)

Figure 4A-A 4 (continued)

(expanded view of the bottom left corner of the warrants diagrams at 4A-A 3(a), (b) and (c))







* - the minimum right-turn treatment for multi-lane roads is a CHR(s)

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Capricorn Highway / Third Street

Turn	Scenario	Year	Qr/Ql	Qm	Turn warrant outcome
Left Turn	AM BG + DEV	2035	9	273	BAL
	PM BG + DEV	2035	4	220	BAL
Right Turn	AM BG + DEV	2035	21	424	CHR(S)
	PM BG + DEV	2035	10	472	BAR/CHR(S)

Figure 4A-A 4 - Warrants - Major road turn treatments - Extended Design Domain

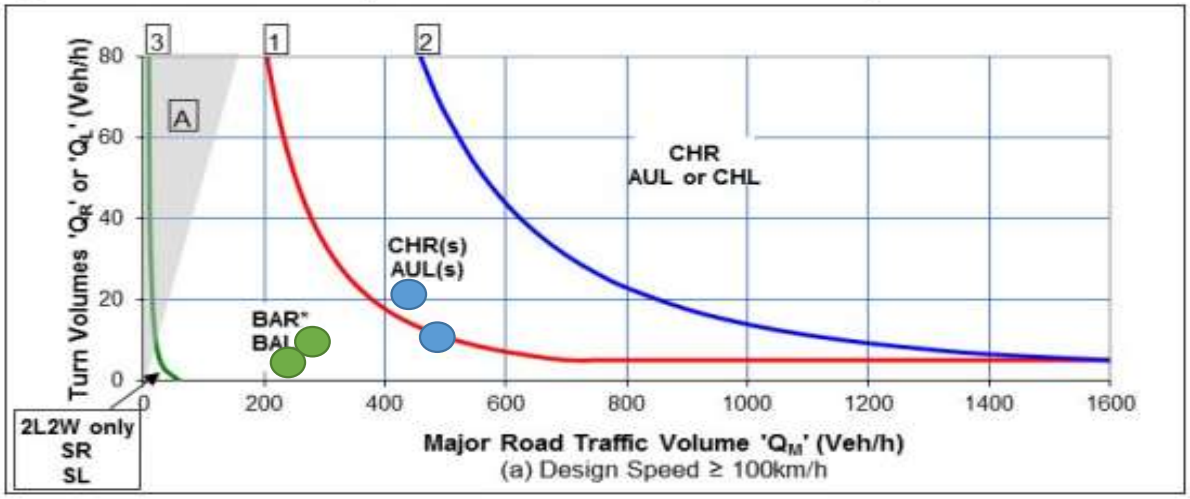
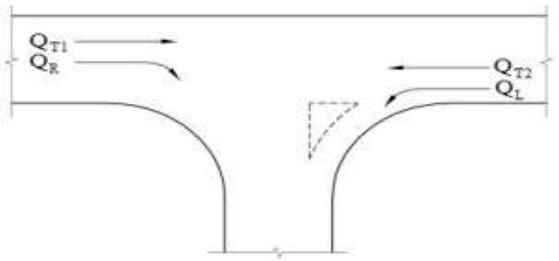


Figure 4A-A 5 - Calculation of the major road traffic volume parameter 'Q_M'



Road Type	Turn Type	Splitter Island	Q_M (veh/h)
2 Lane 2 Way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes/No	= Q_{T2}
4 Lane 2 Way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes/No	= 50% x Q_{T2}
6 Lane 2 Way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes/No	= 33% x Q_{T2}

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Riverslea Road / Thirsty Creek Road

Turn	Scenario	Year	Qr/Ql	Qm	Turn warrant outcome
Left Turn	AM BG + DEV	2035	0	0	SL
	PM BG + DEV	2035	1	2	SL
Right Turn	AM BG + DEV	2035	24	25	BAR
	PM BG + DEV	2035	10	15	SR

Figure 4A-A 3 (continued)

(expanded view of the bottom left corner of the warrants diagrams at 4A-A 3(a), (b) and (c))

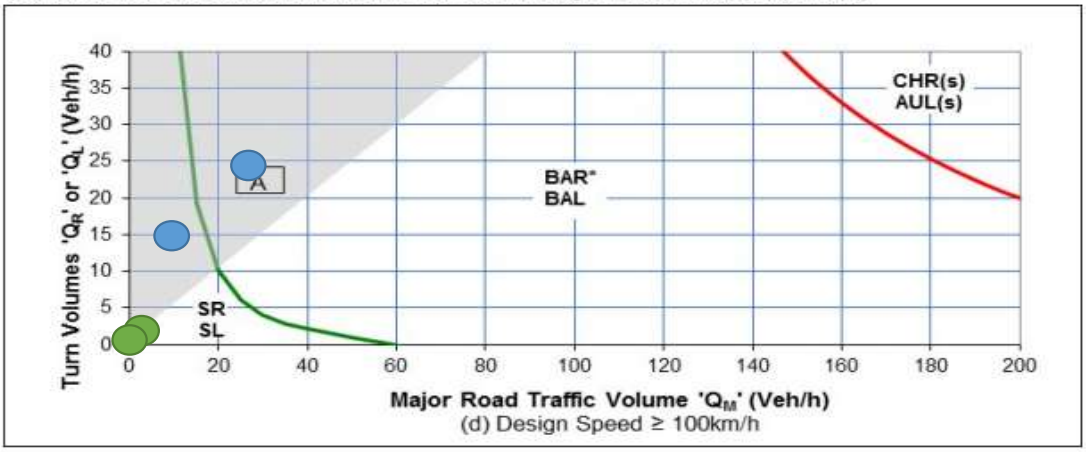
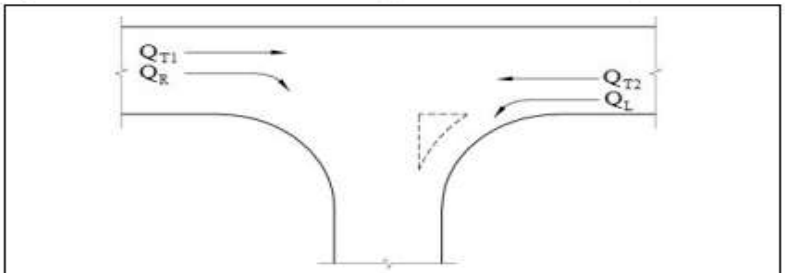


Figure 4A-A 5 - Calculation of the major road traffic volume parameter 'Q_M'



Road Type	Turn Type	Splitter Island	Q_M (veh/h)
2 Lane 2 Way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes/No	= Q_{T2}
4 Lane 2 Way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes/No	= 50% x Q_{T2}
6 Lane 2 Way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes/No	= 33% x Q_{T2}

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Thirsty Creek Road / Feedlot Access

Turn	Scenario	Year	Qr/Ql	Qm	Turn warrant outcome
Left Turn	AM BG + DEV	2035	1	10	SL
	PM BG + DEV	2035	1	14	SL
Right Turn	AM BG + DEV	2035	15	19/20	SR/BAR
	PM BG + DEV	2035	3	23	SR

Figure 4A-A 3 (continued)

(expanded view of the bottom left corner of the warrants diagrams at 4A-A 3(a), (b) and (c))

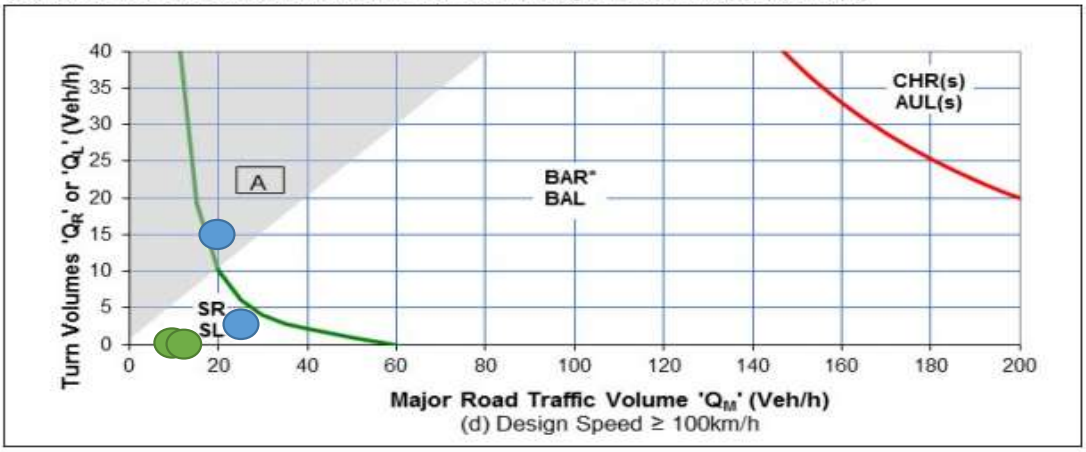
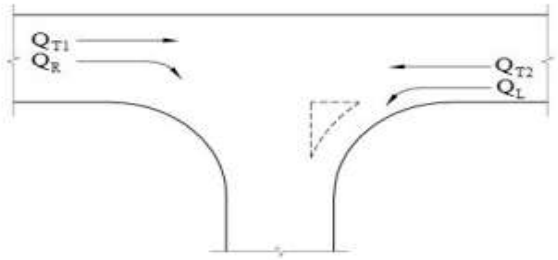


Figure 4A-A 5 - Calculation of the major road traffic volume parameter 'QM'



Road Type	Turn Type	Splitter Island	Q_M (veh/h)
2 Lane 2 Way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes/No	= Q_{T2}
4 Lane 2 Way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes/No	= 50% x Q_{T2}
6 Lane 2 Way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes/No	= 33% x Q_{T2}

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