APPENDIX 1

CENTRAL VICTORIA LIVESTOCK EXCHANGE

BALLARAT, VICTORIA

RLX INVESTMENT COMPANY PTY LTD

DEVELOPMENT PLAN DRAWINGS

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
502 - Schedule No. 15
Signed: Karen Hilton
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE: 13/04/16

SCHEDULE OF DRAWINGS	
DRAWING	TITLE
C001	TITLE SHEET AND DRAWING LIST
C002	EXISTING SITE LAYOUT
C003	PROPOSED SITE LAYOUT
C004	PROPOSED CUT AND FILL PLAN
C005	SITE TYPICAL SECTIONS
C006	SALEYARDS PLAN AND SECTION
C007	CATTLE YARDS LAYOUT
C008	SHEEP YARDS LAYOUT
C009	PROPOSED WETLANDS LANDSCAPING PLAN
C010	TYPICAL CENTRAL FACILITY BUILDING PLAN
C011	TYPICAL CENTRAL FACILITY BUILDING ELEVATIONS

SITE LOCALITY
NOT TO SCALE

REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
H	25/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
I	03/03/2016	MY	PPO	FENCING AND SALEYARDS PLAN AND SECTION ADDED
J	10/03/2016	AJD	PPO	PROPOSED SITE LAYOUT FENCING AMENDED
K	16/03/2016	MY	PPO	TYPICAL SECTIONS, CUT/FILL PLAN & WETLAND LANDSCAPING PLAN ADDED
L	29/04/2016	MY	PPO	VEHICLE MOVEMENT DIRECTION REVERSED
M	16/09/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL
CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

GEOLYSE
ORANGE
orange@geolyse.com
www.geolyse.com
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
Ph: (02) 6393 5000
Fx: (02) 6393 5050

DRAWING: TITLE SHEET AND DRAWING LIST

PROJECT NUMBER 215373	DRAWING FILE 215373_01M_C001-C011.dwg	SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55	HEIGHT DATUM A.H.D.	SET 01
IMAGE SOURCE GOOGLE MAPS		
STATUS FOR REVIEW	SHEET C001 OF C011	

APPENDIX 1

SUNRAYSIA HIGHWAY

266°19'30"
332.89
86°20'
18.15
218.35
107°41'20"
15.34
122°43'
175.50
39.33
83°55'
107°17'
45.28
DAM
(DRY)
GRASS PADDOCK
602.70
GRASS PADDOCK
ROAD
6°56'30"
GOVERNMENT
542
GRASS PADDOCK
6°58'20"
GRASS PADDOCK
SWAMP GUM TREE TO BE PROTECTED
371.70
ROAD
6°50'
140.40
43°52'30"
47.53
184°50'
186°50'
279.28
CLOSED
275°40'
117
132.15
239°48'20"
WESTERN HIGHWAY
245.48
271°42'30"
51.15
276°45'
276°45'
409.75
DAM

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
S U P Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE. 13/9/16

NOTE:
PLAN IS SUBJECT TO DETAIL DESIGN AND IS NOT FOR CONSTRUCTION

LEGEND:
- SITE BOUNDARIES
- EXISTING CONTOUR (0.25m INTERVAL)
- EXISTING FENCE
- EXISTING VEGETATION LINE

REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
H	25/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
I	03/03/2016	MY	PPO	FENCING AND SALEYARDS PLAN AND SECTION ADDED
J	10/03/2016	AJD	PPO	PROPOSED SITE LAYOUT FENCING AMENDED
K	18/03/2016	MY	PPO	TYPICAL SECTIONS, CUT/FILL PLAN & WETLAND LANDSCAPING PLAN ADDED
L	20/04/2016	MY	PPO	VEHICLE MOVEMENT DIRECTION REVERSED
M	18/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS06-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE
SCALE 1:1250 (A1)
0 20 40 60 80 100
0 20 40 60 80 100
SCALE 1:2500 (A3)
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL
CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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Ph: (02) 6363 5000
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DRAWING: EXISTING SITE LAYOUT

PROJECT NUMBER 215373	DRAWING FILE 215373_01M_C001-C011.dwg	SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55	HEIGHT DATUM A.H.D.	SET 01
IMAGE SOURCE -		
STATUS FOR REVIEW	SHEET C002 OF C011	

APPENDIX 1

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SU2 Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE 13/10/16

INTERSECTION LAYOUT SUBJECT TO DETAILED DESIGN
SUNRAYSIA HIGHWAY
PROPOSED FRONTAGE SIGNAGE
1,000m² OVERFLOW CARPARK
0.2ha
0.4ha
0.5ha
238 SPACE CARPARK
2,300m² OVERFLOW CARPARK
1.2ha
INTERPRETATIVE DISPLAY
CENTRAL FACILITIES BUILDING
APPROX FL 416.800
2.0ha
1.5ha
2ML FIRST FLUSH POND
SOLIDS TRAP
CATTLE YARDS
SOLIDS TRAP
1.1ha
2.1ha
ROAD
2.9ha
SURFACE WATER WETLAND
LINE
7ML RAINWATER POND
CLEAN SOFTFLOOR LAYDOWN AREA
SHEEP YARDS
1.8ha
1.0ha
2.2ha
FLOOD
GOVERNMENT
SECURE COMPOUND
2.2ha
1.0ha
100YR
ABLUTIONS BLOCK
TREATMENT PLANT PAD
TRUCK WASH
11.25ML MATURATION POND
24.75ML HOLDING DAM
10ML AEROBIC POND
ANOXIC ZONE
AEROBIC ZONE
1.9ML FACULTATIVE PONDS
SWAMP GUM TREE TO BE PROTECTED
1.3ha
0.9ha
SOLIDS REMOVAL SYSTEM
SOLIDS STOCKPILE AREA
WESTERN HIGHWAY

LEGEND:
- DRAINAGE SWALE
- FENCING LINE
- GRATED DRAIN
- GRAVEL STOCK MOVEMENT LANEWAY
- IRRIGATION AREA (11.2ha)
- OPEN DRAINAGE
- ROOFED CATTLE YARD AREA
- ROOFED SHEEP YARD AREA
- SEALED PAVEMENT AREA
- UNSEALED PAVEMENT AREA

NOTE:
PLAN IS SUBJECT TO DETAIL DESIGN AND IS NOT FOR CONSTRUCTION

REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
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L	20/04/2016	MY	PPO	VEHICLE MOVEMENT DIRECTION REVERSED
M	19/09/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	16/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	14/09/2016

DRAWING SCALE
SCALE 1:1250 (A1)
0 20 40 60 80 100
SCALE 1:2500 (A3)
0 20 40 60 80 100
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

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CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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Ph. (02) 6393 5000
Fx. (02) 6393 5050

DRAWING: PROPOSED SITE LAYOUT
PROJECT NUMBER 215373 | DRAWING FILE 215373_01M_C001-C011.dwg | SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55 | HEIGHT DATUM A.H.D. | SHEET 01
IMAGE SOURCE -
STATUS FOR REVIEW | SHEET C003 OF C011

APPENDIX 1

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE 13/10/16

INTERSECTION LAYOUT SUBJECT TO DETAILED DESIGN
SUNRAYSIA HIGHWAY
PROPOSED FRONTAGE SIGNAGE
1,000m² OVERFLOW CARPARK
238 SPACE CARPARK
2,300m² OVERFLOW CARPARK
2ML FIRST FLUSH POND
SOLIDS TRAP
INTERPRETATIVE DISPLAY
CENTRAL FACILITIES BUILDING
APPROX FL 416.800
SOLIDS TRAP
CATTLE YARDS
SURFACE WATER WETLAND
7ML RAINWATER POND
CLEAN SOFTFLOOR LAYDOWN AREA
SHEEP YARDS
SECURE COMPOUND
ABLUTIONS BLOCK
TREATMENT PLANT PAD
11.25ML MATURATION POND
24.75ML HOLDING DAM
1.9ML FACULTATIVE PONDS
10ML AEROBIC POND
ANOXIC ZONE
AEROBIC ZONE
TRUCK WASH
SWAMP GUM TREE TO BE PROTECTED
SOLIDS REMOVAL SYSTEM
SOLIDS STOCKPILE AREA
WESTERN HIGHWAY
ROAD
GOVERNMENT
FLOOD
100YR
LINE

LEGEND
CUT AREA
FILL AREA

NOTE:
PLAN IS SUBJECT TO DETAIL DESIGN AND IS NOT FOR CONSTRUCTION

REV.	DATE	DFTD.	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
H	25/03/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
I	03/03/2016	MY	PPO	FENCING AND SALEYARDS PLAN AND SECTION ADDED
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M	19/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE
SCALE 1:1250 (A1)
0 20 40 60 80 100
SCALE 1:2500 (A3)
0 20 40 60 80 100
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL
CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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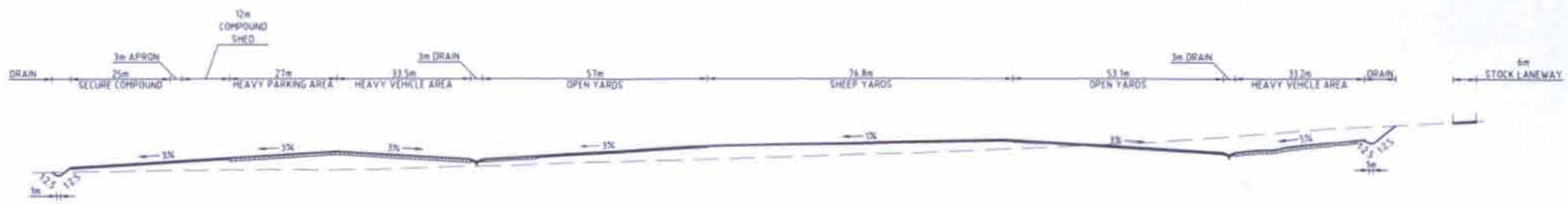
Fx (02) 6393 5050

DRAWING: PROPOSED CUT AND FILL PLAN
PROJECT NUMBER 215373 | DRAWING FILE 215373_01M_C001-C011.dwg | SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55 | HEIGHT DATUM A.H.D. | SET 01
IMAGE SOURCE -
STATUS FOR REVIEW | SHEET C004 OF C011

APPENDIX 1

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
542 Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE. 13/10/16



TYPICAL CROSS SECTION 1 / C004
NOT TO SCALE

TYPICAL CROSS SECTION 2 / C004
NOT TO SCALE

LEGEND

DESIGN SURFACE

NATURAL SURFACE

NOTE:
PLAN IS SUBJECT TO DETAIL DESIGN AND IS NOT FOR CONSTRUCTION

REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
H	29/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
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M	18/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE

HORIZONTAL SCALE 1:750 (A1) 1:1500 (A3)

0 10 20 30 40 50 60 70
0 20 40 60 80 100 120 140

VERTICAL SCALE 1:375 (A1) 1:750 (A3)

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL

CLIENT: RLX INVESTMENT COMPANY PTY LTD

PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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154 PEISLEY STREET
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ORANGE NSW 2800
Ph: (02) 6393 5000
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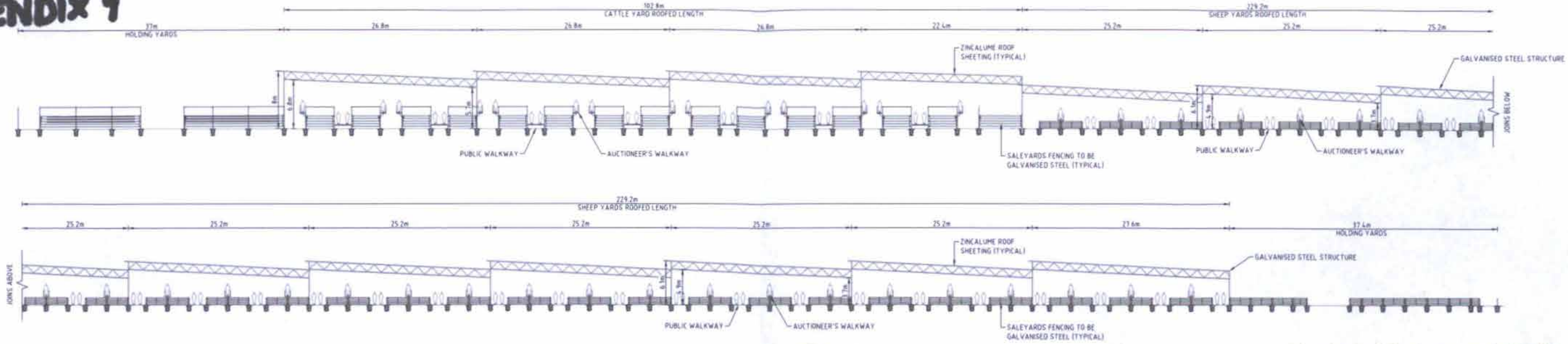
DRAWING: SITE TYPICAL SECTIONS

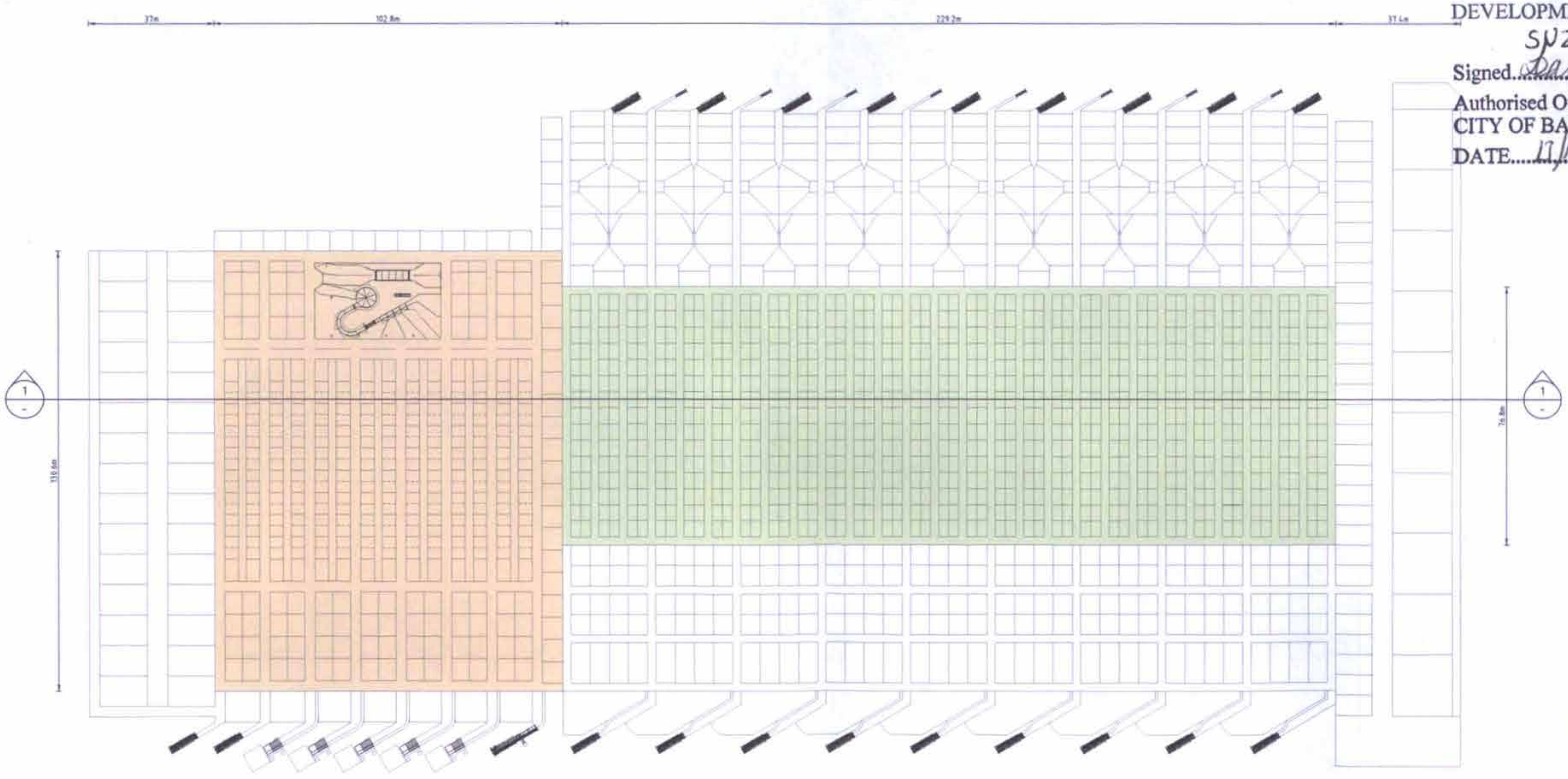
PROJECT NUMBER 215373	DRAWING FILE 215373_01M_C001-C011.dwg	SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55	HEIGHT DATUM A.H.D.	SET 01
IMAGE SOURCE -		
STATUS FOR REVIEW	SHEET C005 OF C011	

HPPENDIX 1



SECTION 1
SCALE 1:500 (A1)
SCALE 1:600 (A3)

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SU2 Schedule No. 15
Signed. Danae Walker
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE. 17/10/16



NOTE:
PLAN IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE DURING DETAIL DESIGN AND IT IS NOT FOR CONSTRUCTION

REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
H	25/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
I	03/03/2016	MY	PPO	FENCING AND SALEYARDS PLAN AND SECTION ADDED
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M	18/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE
SCALE 1:750 (A1)
0 10 20 30 40 50 60 70
SCALE 1:1500 (A3)
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL
CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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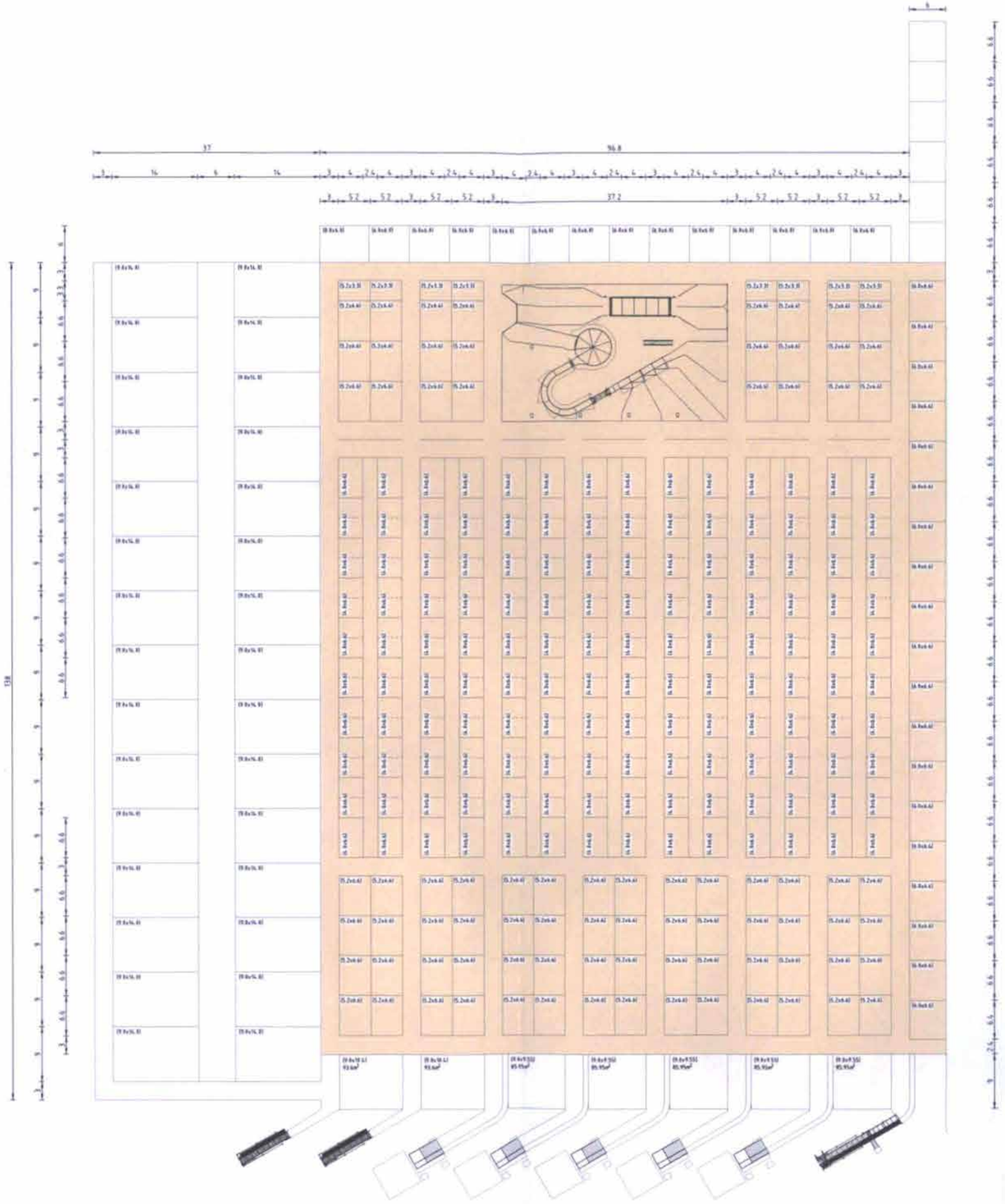
DRAWING: SALEYARDS PLAN & SECTION
PROJECT NUMBER: 215373
DRAWING FILE: 215373_01M_C001-C011.dwg
SIZE: A1
CO-ORDINATE DATUM: MGA94 ZONE 55
HEIGHT DATUM: A.H.D.
IMAGE SOURCE: -
SET: 01
STATUS: FOR REVIEW
SHEET C006 OF C011

APPENDIX 1



Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE.....13/10/16

LEGEND:

ROOFED CATTLE YARD AREA

NOTE:
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REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPD	LAYOUT SHIFTED
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L	20/04/2016	MY	PPD	VEHICLE MOVEMENT DIRECTION REVERSED
M	18/08/2016	AJD	PPD	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	3516SMPS05-ACAD	SPIRE	14/12/2015
DESIGN	-	PPD	15/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPD	18/08/2016

DRAWING SCALE

SCALE 1:400 (A1)

0 10 20 30 40

SCALE 1:800 (A3)

0 10 20 30 40

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL

CLIENT: RLX INVESTMENT COMPANY PTY LTD

PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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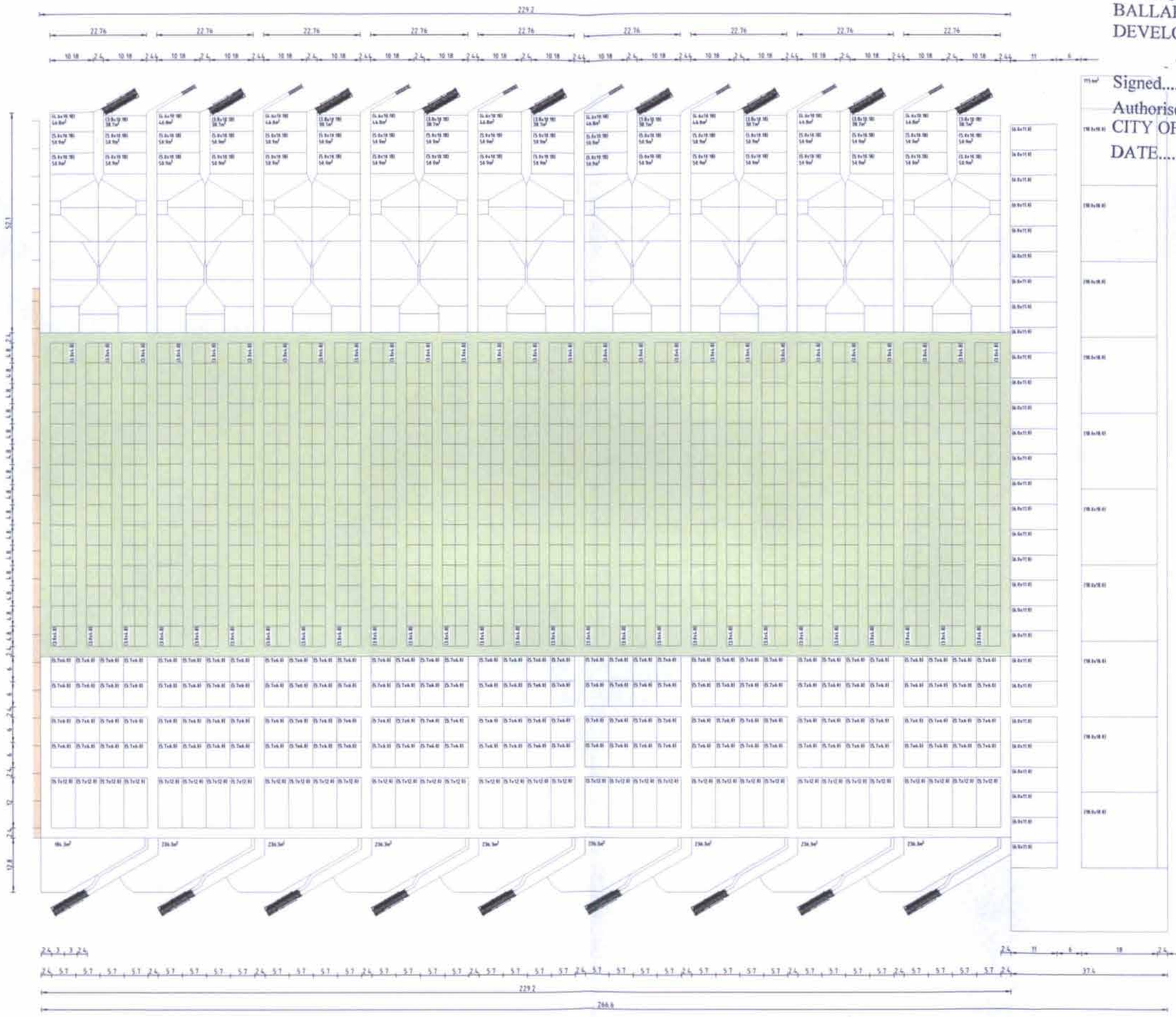
DRAWING: CATTLE YARDS LAYOUT

PROJECT NUMBER: 215373	DRAWING FILE: 215373_01M_C001-C011.dwg	SIZE: A1
CO-ORDINATE DATUM: MGA94 ZONE 55	HEIGHT DATUM: A.H.D.	SET: 01
IMAGE SOURCE: -		
STATUS: FOR REVIEW	SHEET C007 OF C011	

APPENDIX 1

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE.....



REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
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M	18/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301534FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE
SCALE 1:500 (A1)
0 10 20 30 40 50
SCALE 1:1000 (A3)
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: BALLARAT CITY COUNCIL
CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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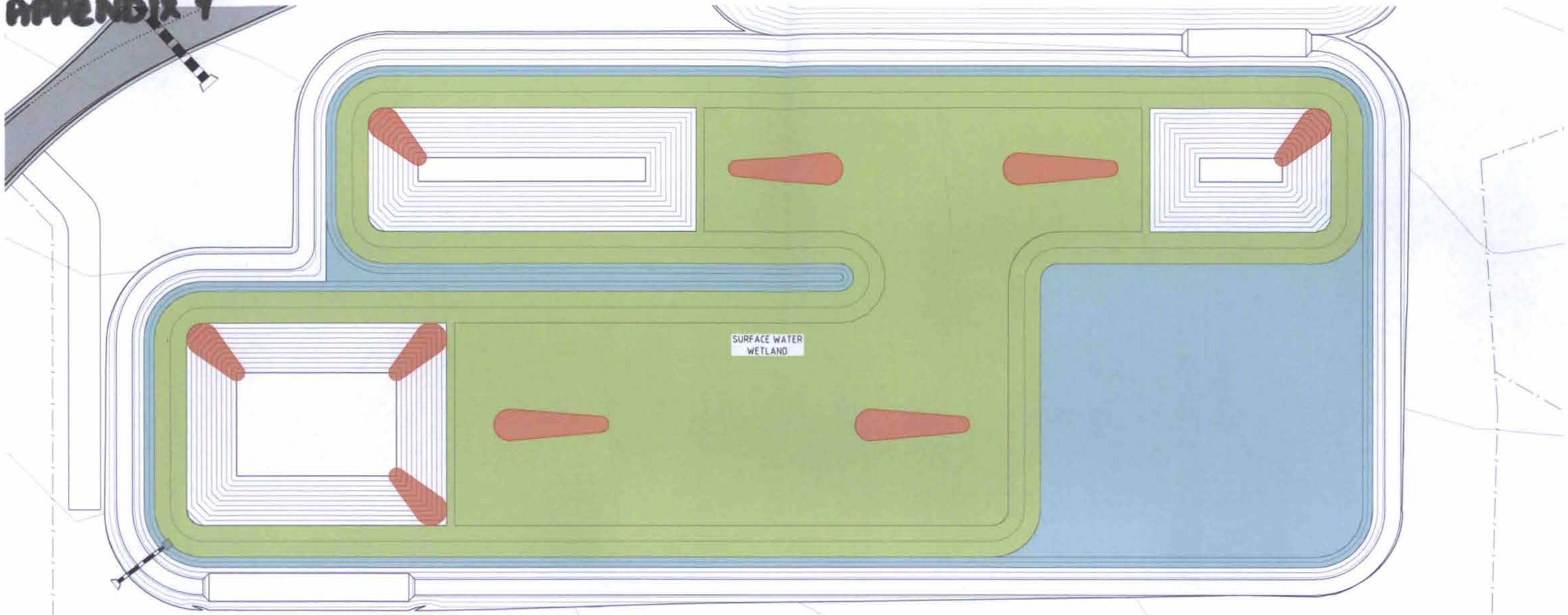
DRAWING: SHEEP YARDS LAYOUT

PROJECT NUMBER 215373	DRAWING FILE 215373_01M_C001-C011.dwg	SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55	HEIGHT DATUM A.H.D.	SET 01
IMAGE SOURCE -		
STATUS FOR REVIEW	SHEET C008 OF C011	

APPENDIX 1



WETLAND PLANTING SCHEDULE

Zone	Name	Size	Form	Planting Density	Planting areas	Notes
Ecotone Zone (Above waters edge)	*Carex appressa*	0.8 to 1.0 m	Damp soil above waters edge. (Likely to be dry)	0.4 m spacing	Plant 1.0 to 2.0 metre strip behind Fringing edge and shallow s plantings	Fringe plant just out of water. Forms dense clumps
	Lomandra longifolia Spiny head mat rush.	0.40 to 1.0m high	Damp soil at waters edge (clear of water)	0.4 m spacing		Tall strappy waters fringe plant.
Fringing, Edge and shallows	Eleocharis acuta Sined Spike Rush	0.25 to 0.40 m high	Shallow s to 0.25. Deeper once established	5 to 7 per m2	Plant mixed associations in different blocks. 3 to 5 m2	Good species for colonise broad standing shallow s.
	Bolboschoenus fluviatilis Marsh Club-rush	1.00 > 3.00 high	Evergreen rush. Planting suitable in slow or standing water to 0.30 m deep.	30 cm apart. Approx. 5 per m2.	Plant 3 m strip beyond normal water level if depth permits.	
	Juncus oxiletus Common Rush	0.7 > 1.0 m	Damp soil to emergent Planting suitable in standing water to 0.25 m deep.	Plant in patches as species can dominate. Approx. 4 per m2		Favourable frog habitat. Good performer in high nutrient conditions.
	Juncus amabilis Tasmanis Rush	0.5 > 1.0 m high	Damp soil to shallow emergent. Planting suitable at waters edge to 0.20 m deep.	Approx. 4 per m2		
Deeper water up to 2.0 m	Eleocharis sparcelata Tall spike rush	1.0 to 1.5 m high (in deeper water). Will grow in water up to 2.0 metres deep.	Emergent plantings to 0.25 m deep. Deeper once established	Mass planting 5 to 7 per m2. Plant alongside Baumea to restrict invasive spreading.		Important habitat species in deeper water. Forms dense swards of foliage. Plantings best done in small isolated corners to avoid dominance.
	Phragmites australis Common Reed	3.0 > 5.0 m high	Wet soil to water < 0.7 deep.	5 to 7 per m2. Plant alongside Baumea to restrict invasive spreading.		Important nutrient uptake plant. Forms dense swards of foliage
	Baumea articulata Jointed Rush	0.90 > 1.6m high	Fast growing evergreen sedge Planting suitable in standing water to 1 m deep.	5 to 7 per m2		Important waterbird habitat

LEGEND:

- WETLAND - ECOTONE ZONE
- WETLAND - FRINGING ZONE
- WETLAND - DEEP WATER PLANTING ZONE

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
Schedule No. 15
Signed. SUZ Leanne Wilson
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE. 15/12/16

NOTE:
PLAN IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE DURING DETAIL DESIGN AND IT IS NOT FOR CONSTRUCTION

REV	DATE	DFTD	APPD	DETAILS
G	25/02/2016	MY	PPO	LAYOUT SHIFTED
H	25/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
I	03/03/2016	MY	PPO	FENCING AND SALEYARDS PLAN AND SECTION ADDED
J	10/03/2016	AJD	PPO	PROPOSED SITE LAYOUT FENCING AMENDED
K	18/03/2016	MY	PPO	TYPICAL SECTIONS, CUT/FILL PLAN & WETLAND LANDSCAPING PLAN ADDED
L	29/04/2016	MY	PPO	VEHICLE MOVEMENT DIRECTION REVERSED
M	18/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
SURVEY	301034FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	PPO	16/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	16/08/2016

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CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

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ORANGE, NSW 2800
Ph. (02) 6393 5000
Fx. (02) 6393 5050

DRAWING: PROPOSED WETLANDS LANDSCAPING PLAN

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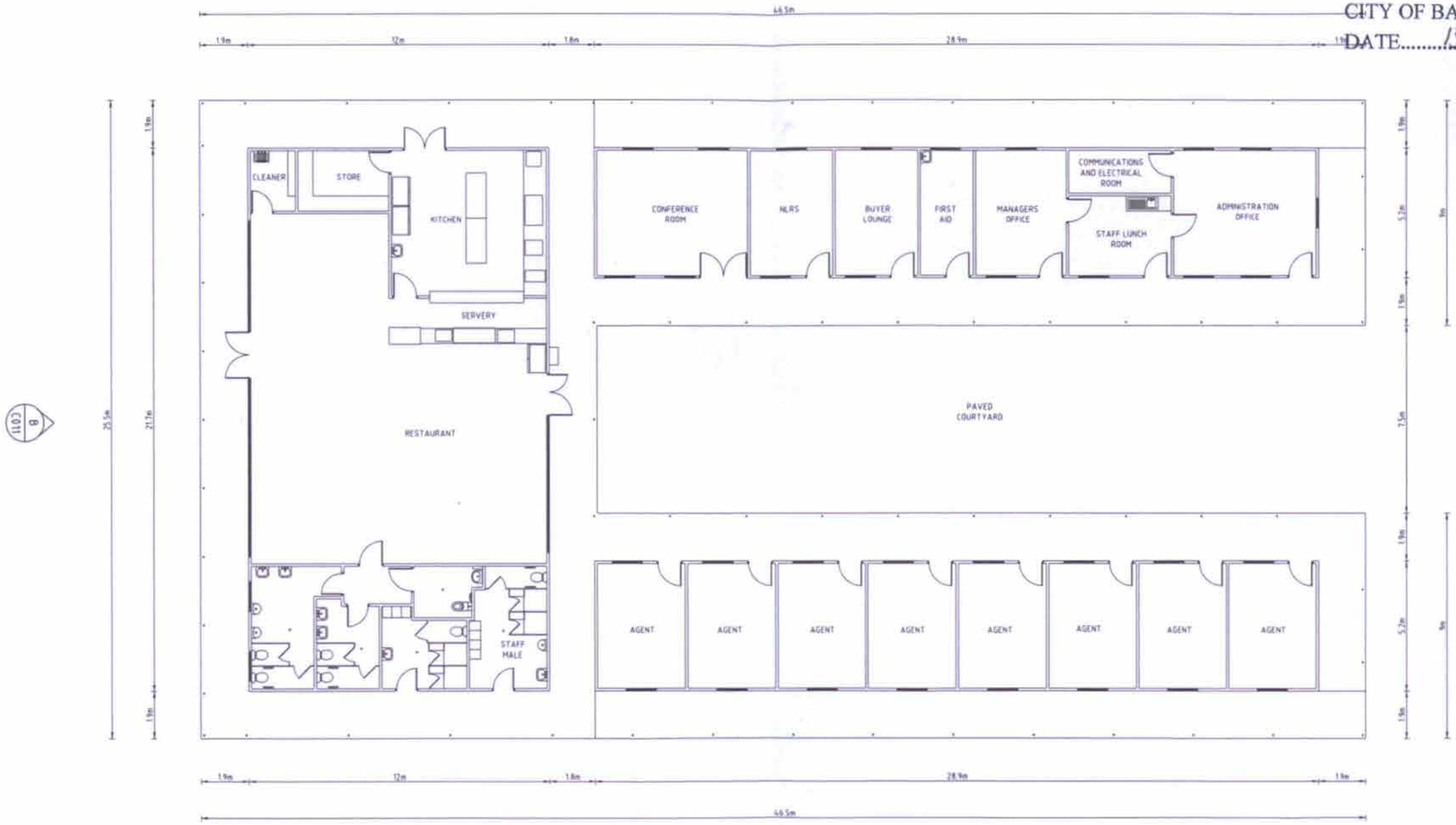
IMAGE SOURCE -		
STATUS FOR REVIEW	SHEET C009 OF C011	

APPENDIX 9

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE 13/10/16



NOTE:
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H	25/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
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J	10/03/2016	AJD	PPO	PROPOSED SITE LAYOUT FENCING AMENDED
K	15/03/2016	MY	PPO	TYPICAL SECTIONS, CUT/FILL PLAN & WETLAND LANDSCAPING PLAN ADDED
L	29/04/2016	MY	PPO	VEHICLE MOVEMENT DIRECTION REVERSED
M	15/06/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
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DESIGN	-	PPO	15/06/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	15/06/2016

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SCALE 1:200 (A3)
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ORANGE NSW 2800
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Fx (02) 6393 5050

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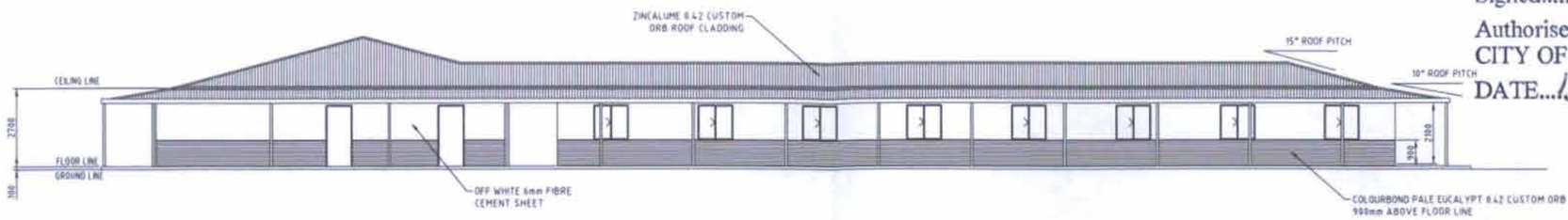
IMAGE SOURCE -
STATUS FOR REVIEW | SHEET C010 OF C011

APPENDIX 1

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE... 13/10/16



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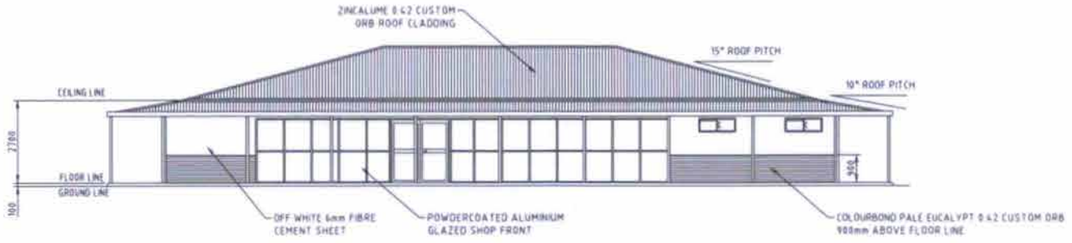

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NOTE:
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H	25/02/2016	MY	PPO	OVERFLOW CARPARK AREA INCREASED
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M	18/08/2016	AJD	PPO	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS

	FILE	INITIALS	DATE
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DESIGN	-	PPO	18/08/2016
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		PPO	18/08/2016

DRAWING SCALE
SCALE 1:100 (A1)
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SCALE 1:200 (A3)
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DRAWING: TYPICAL CENTRAL FACILITIES BUILDING ELEVATIONS
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SET: 01
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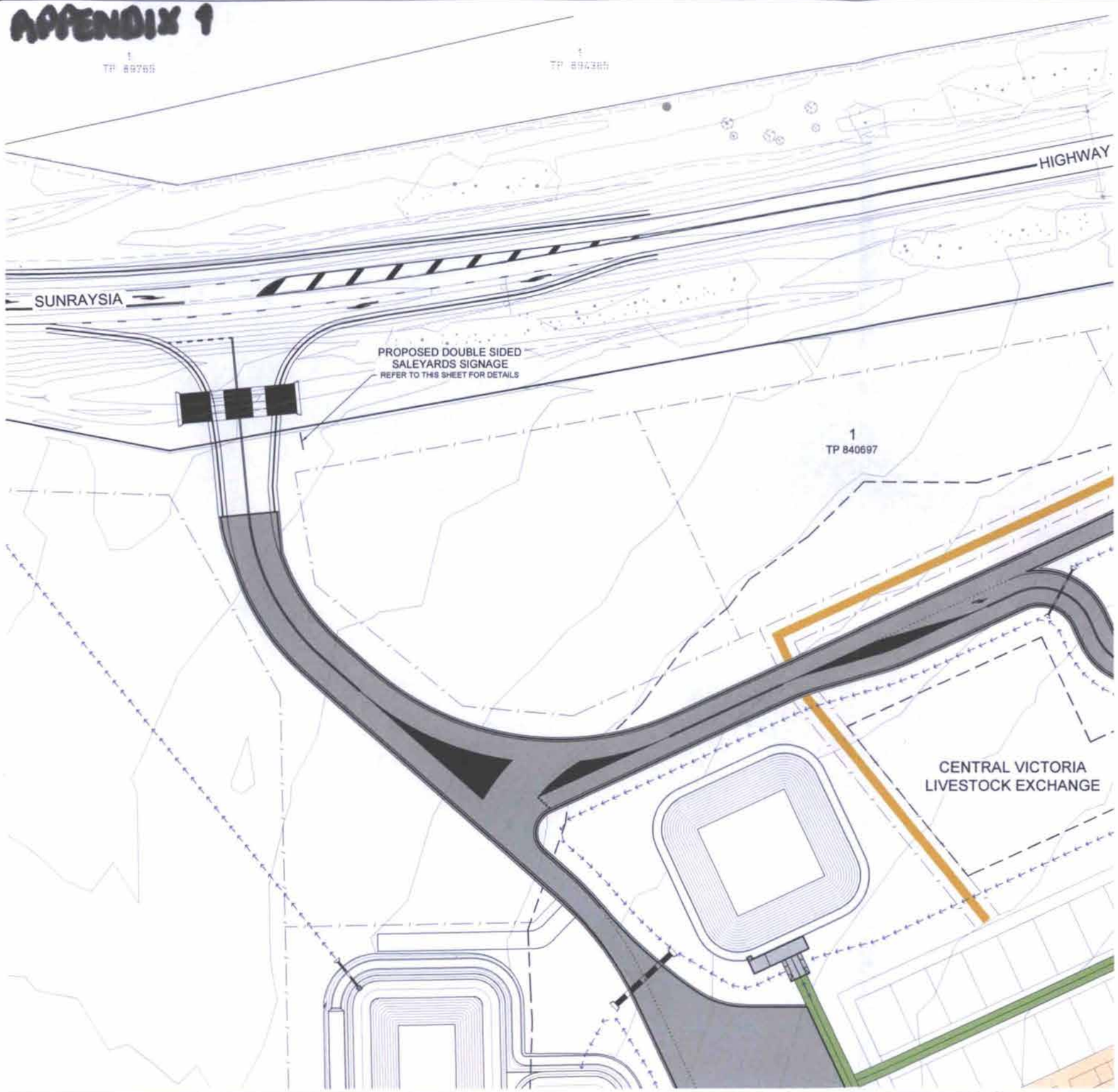
APPENDIX 1



Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No 15
Signed Leanne Lubca
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE 13/10/16

4m

CVLX

Central Victoria Livestock Exchange

SUNRAYSIA HIGHWAY,
MINERS REST

3m

2m

PROPOSED DOUBLE SIDED SALEYARDS SIGNAGE ELEVATION
NOT TO SCALE

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REV	DATE	DFTD	APPD	DETAILS
A	24/08/16	AJD	MDH	ISSUED FOR REVIEW

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APPROVAL AUTHORITY: BALLARAT CITY COUNCIL

CLIENT: RLX INVESTMENT COMPANY PTY LTD

PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

DRAWING: SIGNAGE PLAN

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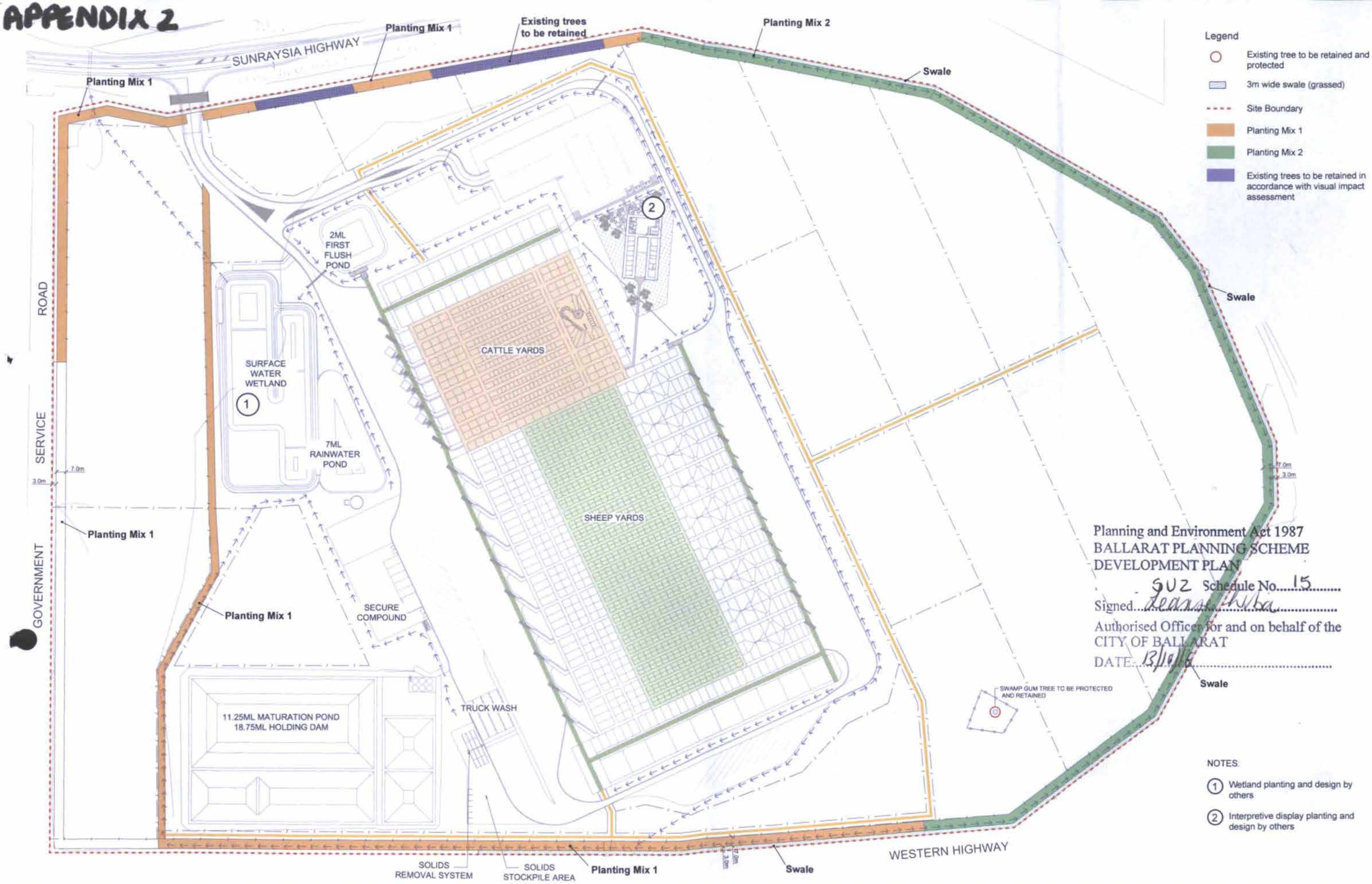

DATE 17.08.2016 | DES AS | AUTH KM | REV F

CENTRAL VICTORIA LIVESTOCK EXCHANGE

LMP 01 - LANDSCAPE CONCEPT

spiire

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APPENDIX 2

Planting Mix Schedules

Plant Schedule Mix 1

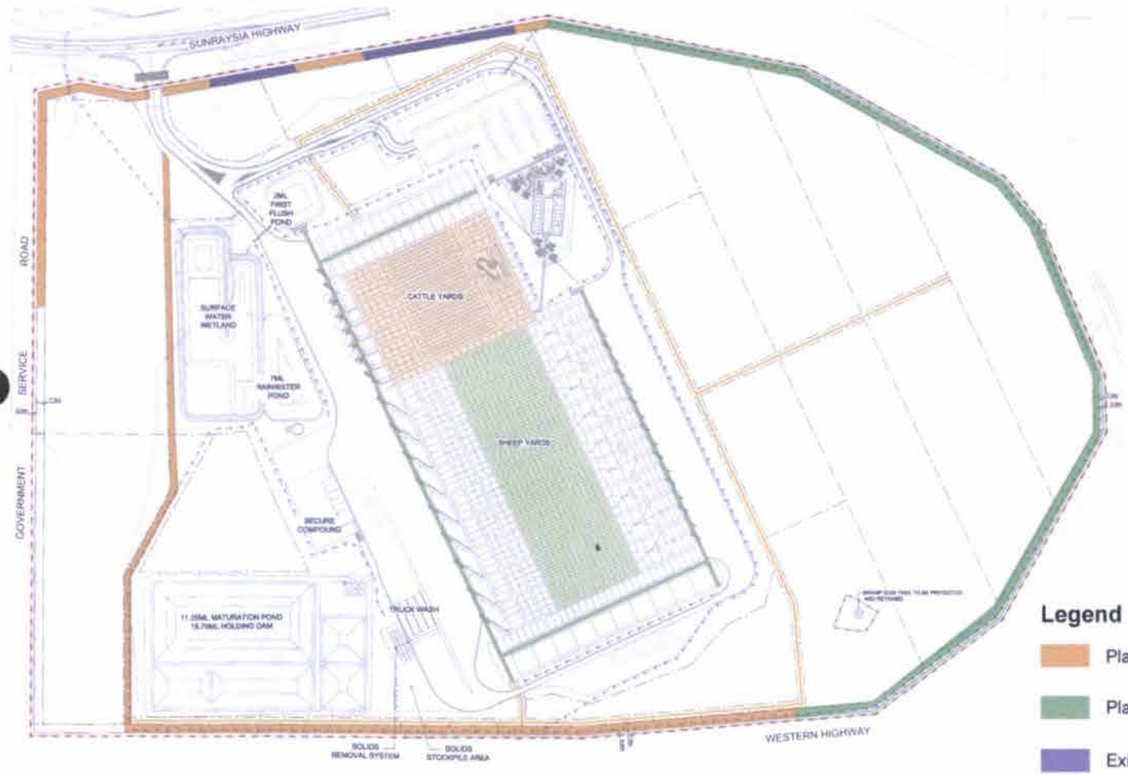
Botanical Name	Common Name	Height x Width	Install Size	Density	Total Area	9144	Mix 1 Total
					Percentage	Mix 1	
Trees							
Eucalyptus camaldulensis	River Red Gum	25 x 10m	Tubestock	1 per 10m2	20%	183	
Eucalyptus ovata	Swamp Gum	20 x 10m	Tubestock	1 per 10m2	20%	183	
						Subtotal	366
Low Shrubs							
Acacia dealbata	Silver Wattle	8 x 4m	Tubestock	1 per 2m2	15%	686	
Acacia mearnsii	Black Wattle	8-25 x 6-10m	Tubestock	1 per 2m2	15%	686	
Grevillea 'Robyn Gordon'	Robyn Gordon	2 x 1.5m	Tubestock	1 per 2m2	15%	686	
Leptospermum lanigerum	Woolly Tea Tree	3 x 2m	Tubestock	1 per 2m2	15%	686	
						Subtotal	2744
						Total	3110

Plant Schedule Mix 2

Botanical Name	Common Name	Height x Width	Install Size	Density	Total Area	7022	Mix 2 Total
					Percentage	Mix 2	
Trees							
Eucalyptus baxteri	Brown Stringy Bark	10-25 x 4-15m	Tubestock	1 per 10m2	15%	105	
Eucalyptus camaldulensis	River Red Gum	25 x 10m	Tubestock	1 per 10m2	15%	105	
Eucalyptus ovata	Swamp Gum	20 x 10m	Tubestock	1 per 10m2	15%	105	
Eucalyptus viminalis	Manna Gum	20 x 10m	Tubestock	1 per 10m2	15%	105	
						Subtotal	420
Low Shrubs							
Acacia implexa	Lightwood	5-10 x 5-10m	Tubestock	1 per 2m2	20%	702	
Callistemon sieberi	River Bottlebrush	3 x 2m	Tubestock	1 per 2m2	20%	702	
						Subtotal	1404
						Total	1824

Note: Spiire have recommended all trees to be planted as tubestock. Locally sourced seed (if possible).

Planting Mix Plan



Legend

- Planting Mix 1 (total area 9,144m2)
- Planting Mix 2 (total area 7,022m2)
- Existing trees to be retained

Planting notes

1. All plant material shall be obtained from an approved nursery/supplier where plants are exposed and have been hardened off in the open. Plants are to be healthy specimens, free of pest, injury and diseases.
2. Prior to planting, the plants shall be cared for adequately to the satisfaction of the Superintendent. Plants are to be delivered to site in such a manner as to prevent damage in transit.
3. Planting in large areas may be staged to ensure plants are not on site in containers for longer than 24 hours.
4. Planting shall not be carried out if the soil is very wet and waterlogged, or during periods of adverse or extreme weather or windy conditions.
5. It is the Contractors responsibility to adequately protect and maintain vegetative material against any adverse or damaging climatic conditions before and during the planting procedure.
6. Contractor to prepare all areas for plants and ensure that the existing topsoil is a friable loose growing medium free from compaction.
7. Contractor to ensure planting density is maintained to prevent weed infestation.
8. Tubestock planting to be used to mitigate for transplant shock and ensure establishment of a healthy root system to encourage rapid growth.
9. Maintenance to ensure root ball does not dry out before roots have established.
10. Tubestock trees: all trees to be supplied and installed by the Contractor. Installation works to include, preparation of tree hole (Hamilton Tree Planter), backfilling (with spoil from tree planter), 3 x hardwood stakes and protective plastic sleeve stapled to hardwood stakes to protect each & every tree, and associated works as per details.
11. All trees to be planted with 1 x slow release pesticide tablet (Confidor Tablets) to base of tree prior to planting.
12. Tubestock shrubs: all shrubs to be supplied and installed by the Contractor. Installation works to include, preparation of shrub hole (Hamilton Tree Planter), backfilling (with spoil from tree planter), 3 x hardwood stakes and protective plastic sleeve stapled to hardwood stakes to protect each & every tree, and associated works as per details.
13. Planting Procedure for Tube stocks, Shrubs & Groundcovers. Thoroughly soak the plant before planting. If the soil is very dry, fill with water and allow to drain completely. Remove plant from pot and gently tease out roots taking care not to damage the root structure. Place the plant into the hole and backfill with approved garden soil free from weeds, stones, clods of sub soil and other extraneous matter.. Plants are to be set plumb and level with the adjacent soil – ensure no soil is placed against the stem of the root crown. Backfill around plant with subsoil and topsoil. Gently apply pressure by hand for smaller tube stock planting to ensure contact with soil and roots is made. Form a watering 'bowl' around the plant. Thoroughly water in plants, with a minimum of 5 liters of water for each plant.
14. All planted areas to receive fencing to protect from livestock,.
15. Weed control with a non-residual herbicide shall occur twice prior to planting, once 6 weeks before planting and once 2 weeks before planting to all areas of new planting. After planting, the contractor to ensure all garden beds, grass, gravel and playground areas are kept free from weeds at all times.
16. The optimum time to plant is in autumn after the first autumn rains, during April or May. It is also feasible to plant in early Spring (August /September). Optimum planting is heavily dependent on thorough weed control and soil moisture conservation. Planting is undertaken when the ground is still moist and soil temperatures are starting to rise. Weed control must to cour twice prior, and continue for at least 12 months after planting.
17. Where existing planting or grass is within the landscape contract area, maintain it as for the corresponding classifications of new grassland or planting.
18. Throughout landscape maintenance / plant establishment period, continue to carry out recurrent works of a maintenance nature including, but not limited to, watering, mowing, weeding, rubbish removal, fertilizing, pest and disease control, staking and tying, replanting, cultivating, pruning, hedge clipping, aerating, renovating, top dressing, and keeping the site neat and tidy.
19. The Landscape Contractor is responsible for all losses of plant material due to nursery stock failure or improper horticultural care during the Landscape maintenance / Plant establishment period. If plants die as a result of poor horticultural practice, they are to be replaced within 48 hours.
20. Practical Completion of the planting works includes, but is not limited to, completion of planting, staking and mulching and specimen plants and planting areas. The works also include replacement of plants which have failed, been damaged or been stolen during the works. The Maintenance/Planting establishment period commences at the date of Practical Completion and is synchronous with the Defects Liability Period.

Plant Palette


Acacia implexa


Acacia dealbata


Acacia mearnsii


Callistemon sieberi


Eucalyptus camaldulensis


Eucalyptus baxteri


Eucalyptus ovata


Eucalyptus viminalis


Grevillea 'Robyn Gordon'


Leptospermum lanigerum

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SW2 Schedule No. 15
Signed: Leanne Wilson
Authorised Officer for and on behalf of the CITY OF BALLARAT
DATE 13/10/16

DATE 17.08.2016 | DES AS | AUTH KM | REV F

CENTRAL VICTORIA LIVESTOCK EXCHANGE
LMP 02 - PLANT SCHEDULE

spiire

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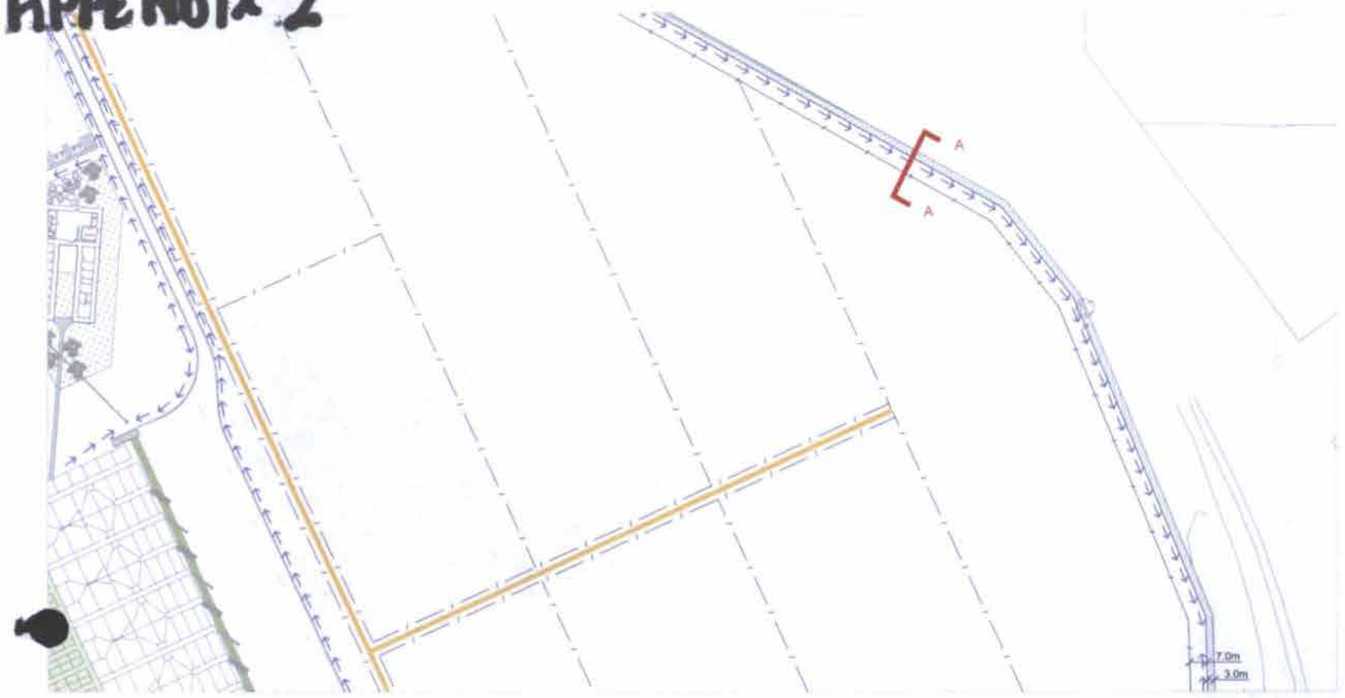
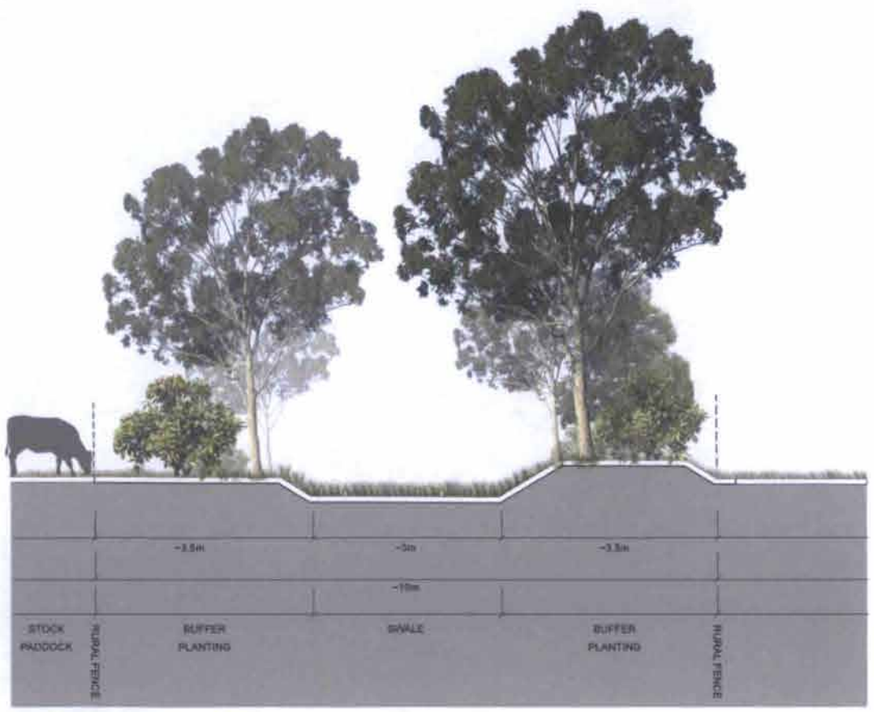
APPENDIX 2





Indicative section AA

* Section indicative only. Density shown in section reflects density of both planting mix 1 and 2

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE... 13/10/16

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DATE	DES	AUTH	REV
17.08.2016	AS	KM	F

CENTRAL VICTORIA LIVESTOCK EXCHANGE
Indicative section AA

spiire

APPENDIX 3

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SW2. Schedule No. 15
Signed Leanne Wilson
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE 13/10/16

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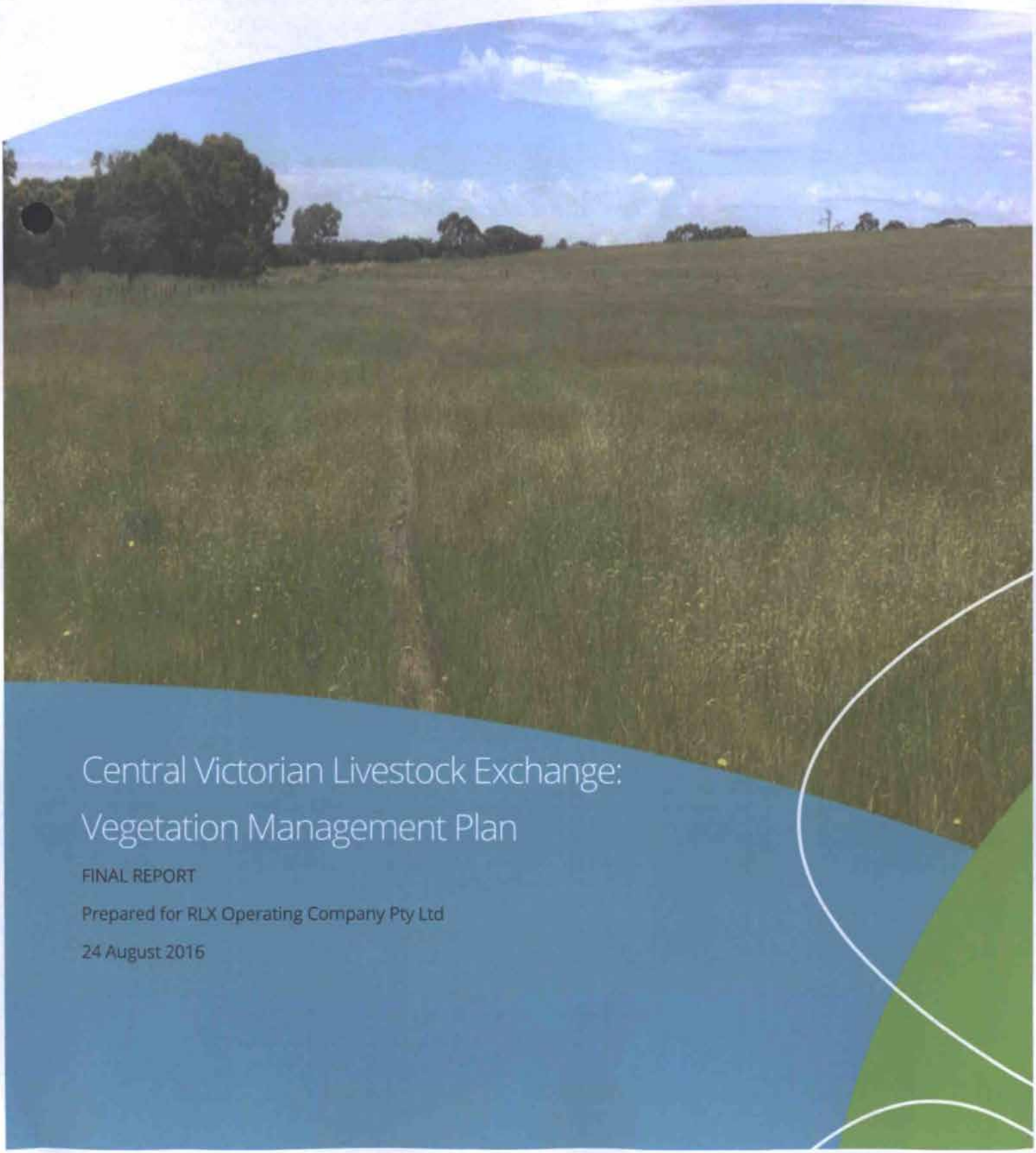

Central Victorian Livestock Exchange: Vegetation Management Plan

FINAL REPORT

Prepared for RLX Operating Company Pty Ltd

24 August 2016

APPENDIX 6

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Document information

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Prepared by:	John Miller
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Document control

Version	Internal reviewer	Date issued
Draft version 01	MSG	07/12/2015
Final version 01	MSG	23/12/2015
Final version 02	MSG	24/08/2016

Acknowledgements

Biosis acknowledges the contribution of the following people and organisations in undertaking this study:

- Spiire Australia: Sarah Auld

The following Biosis staff were involved in this project:

- Lauren Harley for mapping

Contents

1. Introduction

1.1 Project Background

Biosis Pty Ltd was commissioned by Spiire Australia on behalf of RLX Operating Company Pty Ltd to prepare a vegetation management plan for the proposed Central Victorian Livestock Exchange (CVLE), Miners Rest, Ballarat.

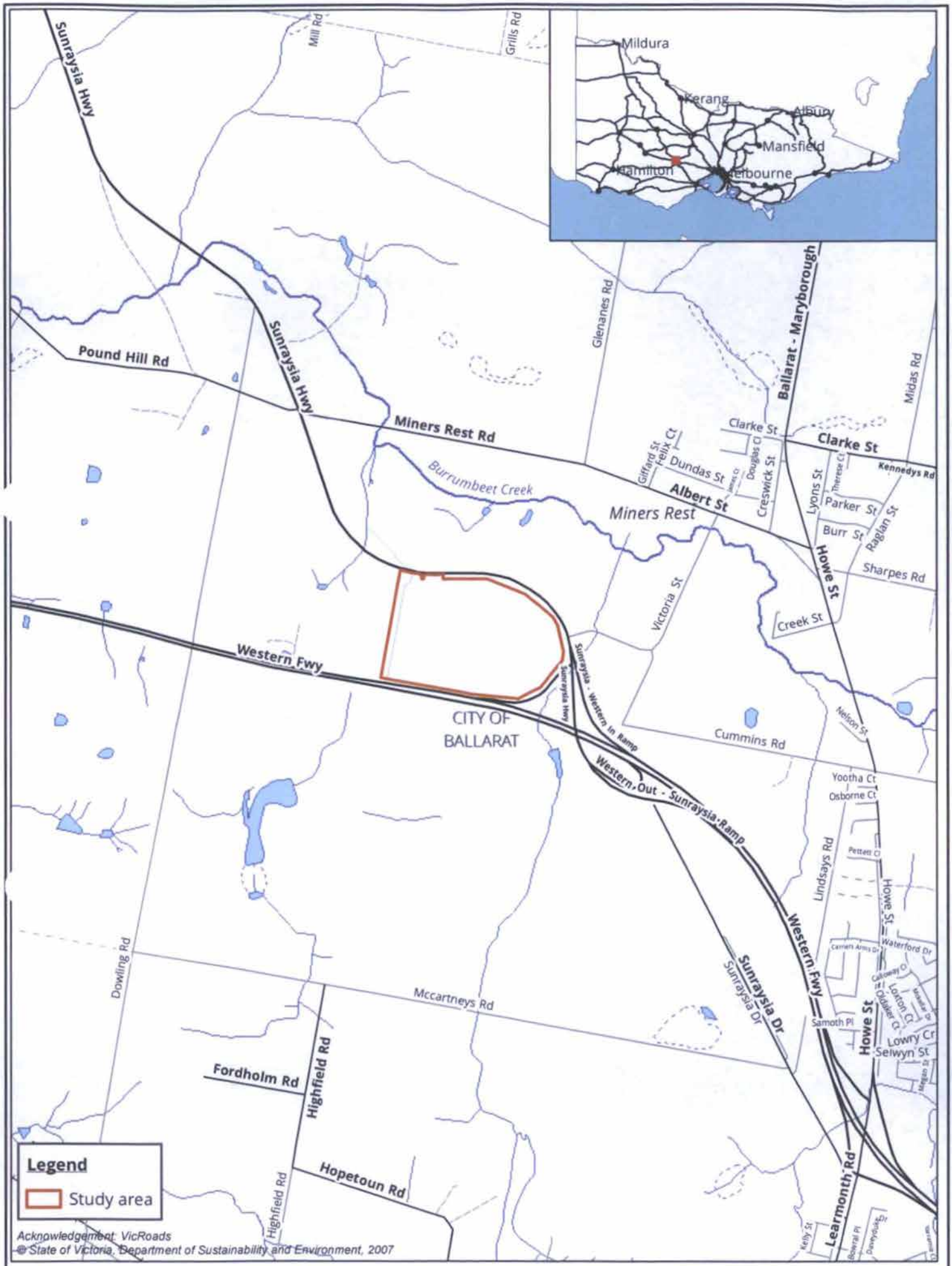
1.2 Location of the site

The CVLE is located between the Western Highway and the Sunrasia Highway at Miners Rest to the north west of Ballarat (Figure 1).

1.3 Previous ecological studies

A flora and fauna assessment of the site was undertaken in 2014 (Biosis 2014) which recorded and mapped areas of native vegetation and scattered indigenous trees within the site (Figure 2). A further vegetation assessment of the access to the site from the Sunrasia Highway was undertaken on 30 November 2015.

Both of these assessments informed the development of the vegetation management plan.



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Biosis Pty Ltd
Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Figure 1: Location of the Central Victorian Livestock Centre, Miners Rest, Victoria

Matter: 21340,
Date: 02 December 2015,
Checked by: JM, Drawn by: LH, Last edited by: lharley
Location:P:\21300s\21340\Mapping\

Legend

- Study area
- Swamp Gum
- Plains Grassy Wetland
- Dam

Figure 2: Vegetation management features of the Central Victorian Livestock Exchange site, Miners Rest, Victoria

0 30 60 90 120 150

Metres

Scale: 1:3,000 @ A3

Coordinate System: GDA 1994 MGA Zone 54

N

biosis.

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Sydney, Wangaratta & Wollongong

Matter: 21340,
Date: 02 December 2015,
Checked by: JM, Drawn by: LH, Last edited by: lharley
Location: P:\21300s\21340\Mapping\21340_F2_EcoFeatures

2. Vegetation management plan

2.1 Management of existing vegetation within the site

The whole of the site has been highly modified through clearing and is comprised of grassy agricultural paddocks. A single indigenous tree (Swamp Gum *Eucalyptus ovata*) occurs in the south-east sector of the site, a remnant of the former Plains Grassy Woodland vegetation, and a small Cypress plantation is present in the central north of the site (Figure 2). There are no patches of remnant native vegetation within the site (Biosis 2014).

The access from the Sunrasia Highway to the site (Figure 2) does not support any patches of native vegetation although a few sparsely scattered native grasses are present. No scattered indigenous trees are impacted by the development of the access point.

The management of existing vegetation within the site will maintain and protect the Swamp Gum from traffic and trampling.

No management measures are proposed for the Cypress plantation. It may be either maintained or removed to suit the development of the site.

Aim

To protect and maintain the existing Swamp Gum.

Actions

- Develop a tree protection zone around the Swamp Gum by erecting a fence at least 10m from the trunk of the tree.
- Exclude all vehicles and stock within the tree protection zone.

2.2 Management of weeds

A suite of introduced species has been recorded for the site (Biosis 2014) including four noxious weeds:

- Spear Thistle *Cirsium vulgare* Regionally Restricted
- Hawthorn *Crataegus monogyna* Regionally Restricted
- Sweet Briar *Rosa rubiginosa* Regionally Controlled
- Gorse *Ulex europaeus* Regionally Controlled

The noxious weeds will be controlled and where possible, eradicated from the site.

There is also potential for additional noxious and environmental weeds to be introduced to the site by stock and transport vehicles. Regular inspections of the site will be undertaken to ensure that any new weeds are quickly identified and eradicated before they have a chance to seed and spread.

Aims

Control and where possible eradicate noxious weeds.

Avoid the establishment of new weeds within the site.

Actions

- Control and where possible eradicate all identified noxious weeds through application of herbicide or mechanical removal.
- Undertake monthly inspections of the site to identify any new weeds.
- Eradicate all new weeds before they mature and set seed.

2.3 Management of adjacent vegetation

A small patch of Plains Grassy Wetland ecological vegetation class (Biosis 2014) occurs in the low-lying unused road reserve on the western margin of the site (Figure 2). This vegetation type requires seasonal inundation or waterlogging. To maintain this patch of Plains Grassy Wetland annual runoff from the site to the unused road should be maintained at current volumes and frequency. The quality of the water is also important. All water leaving the site should be free of contaminants and silt.

A range of vegetation occurs in the adjacent road reserve along the Sunrasia Highway (Figure 2). Most of the trees have been planted and the understorey is largely comprised of introduced species although there are a few scattered native grasses and herbs. Nevertheless, the vegetation provides a visual screen to the site from the Sunrasia Highway and habitat for some common open land bird species. Actions within the site will be managed so that impacts to the adjacent roadside vegetation is avoided or minimised.

Aim

To ensure activities within the site do not adversely impact on surrounding vegetation.

Actions

- Maintain the current volumes and frequency of runoff from the site to the unused road reserve.
- Ensure that runoff water leaving the site is clean and free of contaminants and silt.
- Locate development within the site well inside fences to ensure there is no impact on tree root zones.

2.4 Management of revegetation and visual screening

Where visual screening vegetation around the site is required the use of Australian native vegetation suited to the site conditions should be considered. The site would have supported Plains Grassy Woodland vegetation prior to clearing and the lone existing Swamp Gum is a remnant of that vegetation. Swamp Gum and other robust fast growing species suitable for revegetation within the site include Blackwood *Acacia melanoxylon*, Golden Wattle *Acacia pycnantha* and Hedge Wattle *Acacia paradoxa* and a range of other Australian native species.

Aim

Use suitable Australian native flora species for any revegetation or site screening.

Actions

- Revegetate non-developed and boundary areas as required with Australian native tree and large shrub species suited to the local environment.
- Use fast growing native Australian species for any screening plantings around the site boundary.

References

Biosis 2014. Biosis 2014. Central Victorian Livestock Exchange: Flora and Fauna Assessment. Report for RLMC Investment Company Pty Ltd. Biosis Pty Ltd, Ballarat.

APPENDIX 4

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE... 13/12/16

TraffixGroup
Traffic Engineers and Transport Planners

Car Parking and Traffic Management Plan

Central Victorian Livestock Exchange (CVLX), Sunraysia Highway, Miners Rest

Prepared For

RLX Investment Company Pty Ltd

August 2016
G15152R2E

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Email: admin@traffixgroup.com.au

Car Parking and Traffic Management Plan

Central Victorian Livestock Exchange (CVLX), Sunraysia Highway, Miners Rest

Document Control

Issue No.	Type	Date	Prepared By	Approved By
C	Final	15/03/2016	C. Morello	N. Chewta
D	Amended Site Plan	09/05/2016	J. Jellie	C. Morello
F	Amended Site Plan	24/08/2016	C. Morello	

Our Reference: G15152R2E

Executive Summary

It is intended to relocate the Ballarat Livestock Selling Centre (currently located at Latrobe Street, Delacombe) to the subject site at the north western corner of the Western Highway and Sunraysia Highway intersection in Miners Rest to become the Central Victorian Livestock Exchange (CVLX). The site is currently vacant and has an area of approximately 46 hectares.

Traffix Group has been engaged by RLX Investment Company Pty Ltd to prepare the following Car Parking and Traffic Management Plan to accompany the Development Plan and satisfy the requirements of Schedule 15 to the Special Use Zone relating to the proposal.

All vehicle access to the site is proposed via the construction of an ungated access point to Sunraysia Highway, located at the site's north-western corner of the site. A Channelised Right Turn treatment and Auxiliary Left Turn treatment are proposed at the access in accordance with VicRoads and Austroads requirements and has been approved by VicRoads (see Appendix B).

Deliveries of livestock, both loading and unloading, take place via a range of vehicles. Smaller, single live stock sales may take place via a utility vehicle or smaller flat-bed truck, larger livestock sales will typically take place from B-double trucks. The design of stock loading and unloading areas has been premised on the largest vehicle – a 26.0 metre B-double.

Larger sales days (premised on the 85th percentile sales day) are expected to generate demands for some parking for some 255 cars and 45 trucks (inclusive of loading, unloading, parked, propped and washing trucks).

The site layout plan identifies:

- A formal car park providing 238 car parking spaces which, along with the overflow parking area, would satisfy the demands associated with the 85th percentile sales day;
- Additional grassed area nominated for overflow parking and able to accommodate in the order of 100-130 spaces for high peak demand sales days when additional parking may be required; and
- Space for a minimum of 51 B-double vehicles to be on-site either parked, propped, loading, unloading or washing.

General passenger vehicle parking and truck access arrangements have been separated where possible to improve circulation and accessibility and reduce conflicts.

A Truck Management Plan has been prepared in order to encourage the use of an alternative route to/from the immediate northern towns for commercial vehicles. The route extends between the township of Clunes at the north, utilising Ballarat-Maryborough Road to Learmonth-Sulky Road to Sunraysia Highway and the reverse.

Works are nominated at the intersection of Learmonth-Sulky Road and Ballarat-Maryborough Road to accommodate turning paths for B-double trucks and VicRoads has provided their approval to the works nominated in the Functional Plans prepared by Geolyse (see Appendix D).

In addition, the provision of route information to drivers, by using regular mail-outs, the CVLX website or on-site induction material, would assist with encouraging the use of the alternative route.

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1 Introduction

Traffix Group has been engaged by RLX Investment Company Pty Ltd to prepare a car parking and traffic management plan for the proposed Central Victorian Livestock Exchange (CVLX) at Sunraysia Highway, Miners Rest.

In June 2015 a panel hearing was held in relation to Amendment C185 to the Ballarat Planning Scheme which proposed to rezone the subject site land from Farming Zone (FZ) to Special Use Zone (Schedule 15) and develop the site for the purposes of the Central Victorian Livestock Exchange to house the relocated Ballarat Saleyards. A report was prepared by Jason Walsh from Traffix Group as part of the Panel hearing (reference G15152A1 dated 12 June 2015).

A panel report was released (dated 2 September 2015) which recommended adoption of the proposed Amendment C185 and inclusion of Special Use Zone Schedule 15 to the Ballarat Planning Scheme. The amendment was gazetted in February 2016. The schedule requires the completion of a Development Plan, generally in accordance with the plan presented to the Panel, before the use can commence.

In relation to car parking and traffic, the Development Plan must contain a Car Parking and Traffic Management Plan that addresses car parking and traffic matters, including:

- *The likely traffic generation and impacts of the proposed use and development on the surrounding road network;*
- *How access to a road in a Road Zone Category 1 is to be addressed*
- *Vehicle access points, including illustrating that the access point from Sunraysia Highway will not be gated.*
- *The location and treatment of circulation areas, driveways and other accessways within the land.*
- *The location, layout, treatment and maintenance of all vehicle parking areas and loading and unloading areas;*
- *The minimum number of car parking spaces to be provided on the land;*
- *A truck management plan that identifies heavy vehicle truck routes which minimise impacts on townships and peripheral housing to the extent practicable, including driver induction protocols;*
- *Carparking provision and maintenance*
- *Loading and unloading arrangements*
- *Traffic management including external intersection and internal road design;*
- *A Traffic Management Impact Assessment Report to the satisfaction of VicRoads.*

This report is intended to satisfy the requirements of the Car Parking and Traffic Management Plan to be submitted with the Development Plan.

It is noted that this report supersedes a previous iteration of this report (G15152R2C dated March 2016) and relates to an amended plan dated 7th June 2016. The amended plan includes modifications to the site layout including a change of the internal truck circulation from anti-clockwise to clockwise and also modifications to loading areas, the truck wash, a split of truck parking and amendments to the main facility and stock yard layouts.

2 Subject Site

The subject site is located adjacent the intersection of Western Freeway and Sunraysia Highway, in Miners Rest, bound by Western Freeway at the south and Sunraysia Highway at the north and north-east, as shown in the locality plan in Figure 1.

Figure 1: Locality Plan

The subject site is currently used for grazing and has an area of approximately 46 hectares. It is a Special Use Zone (SUZ15) under the Ballarat Planning Scheme, having previously been zoned as Farming Zone (FZ), as shown in Figure 2.

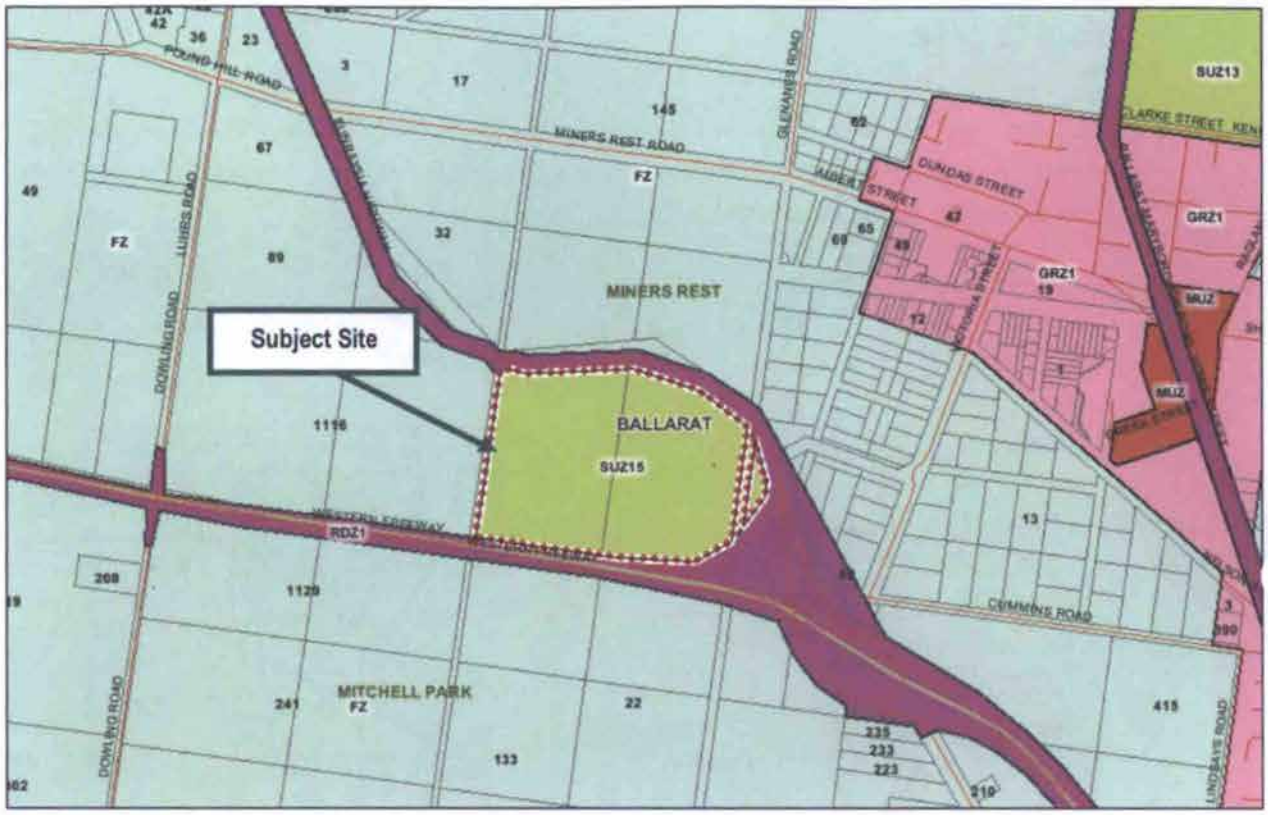


Figure 2: Planning Scheme Zone Map

Existing land use surrounding the subject site is predominantly farming related. The Miners Rest township is approximately one kilometre to the north west.

An aerial photograph of the site is shown in Figure 3.

Figure 3: Aerial Photograph of the site and surrounds

3 Central Victorian Livestock Exchange

3.1 Site Layout Plan

It is intended to relocate the Ballarat Livestock Selling Centre located at Latrobe Street, Delacombe to the subject land to be the new Central Victoria Livestock Exchange (CVLX).

A site layout plan has been prepared by Geolyse, dated 7th June 2016, and is attached as Appendix A.

Approximately 45,000 square metres is set-aside for sealed roadway and truck and car parking.

3.2 Sales

Fat cattle sales will occur weekly on Mondays, sheep sales will occur weekly on Tuesdays and store cattle sales will typically occur monthly on a Friday.

The majority of sheep and cattle are transported to the site the afternoon prior to the sale, and are transported from the site the afternoon of the sale.

The CVLX is estimated to have an annual throughput in the order of 70,000 cattle and 1.6 million sheep. In order to appropriately understand CVLX site operations, sales figures for the existing Ballarat Livestock Sales Centre for the period between May 2010 and May 2015 have been sourced. They indicate that the median; 85th percentile and maximum sales for each of sheep, prime cattle and store cattle are summarised below.

- Sheep: Median sale of 24,934 sheep; 85th percentile sale of 39,058 sheep, and maximum sale of 58,643 sheep.
- Prime cattle: Median sale of 343 cattle; 85th percentile sale of 555 cattle, and maximum sale of 1,211 cattle.
- Store cattle: Median sale of 3,024 cattle; 85th percentile sale of 3,940 cattle, and maximum sale of 5,019 cattle.

3.3 External Site Access

Vehicle access to the site is proposed via the construction of an access point to Sunraysia Highway, located at the site's north-western corner of the site. A Channelised Right Turn treatment and Auxiliary Left Turn treatment are proposed at the access.

All vehicle access will be via this location.

A Functional Layout Plan has been prepared for the proposed access and has been provided to VicRoads, who in an email dated 29th February 2016, provided approval to the plan. Subsequently, Geolyse prepared a Civil Functional Layout Plan, which has also been approved by VicRoads. These Functional Plans and email approvals are attached at Appendix B.

It is understood that this access is not to be gated.

3.4 Internal Access and Parking

3.4.1 Truck Parking, Access and Circulation

We are advised that deliveries of livestock, both loading and unloading, take place via a range of vehicles. Smaller, single live stock sales may take place via a utility vehicle or smaller flat-bed truck, larger live stock sales will typically take place from multi-deck semi trailers and B-double trucks. The design of stock loading and unloading areas has been premised on the largest vehicle – a 26.0 metre B-double.

Truck arrivals will circulate in a clockwise direction around the site.

The cattle yards are located to the north of the yard areas and are serviced by eight (8) loading/unloading ramps at the western side of the yards.

The sheep yards are provided with nine (9) loading/unloading ramps on each of the eastern and western sides of the yards.

Truck parking areas are located at the south and west of the yards, providing space for nine (9) and eight (8) B-double vehicles respectively.

A truck wash is located to the south-west of the yards and main circulation and provides space for four (4) vehicles to be washed and a minimum of four (4) additional vehicles queued waiting to be washed.

Trucks will drive past the nominated delivery pen, reverse to the unloading ramp and unload. Once empty, they will either:

- Drive to the truck parking area, to the south or west of the yards, to park and wait for a pick-up delivery; or
- Drive to the wash bay at the south-west of the site to be cleaned and then circulate to a parking area or depart the site if they are not required to load at the end of the event.

Having regard to the above, there is space on the site to accommodate a minimum of 51 trucks either parked, propped, loading, unloading or washing.

3.4.2 Car Parking, Access and Circulation

A formal car parking area is provided at the north of the site with space for overflow parking adjacent.

A total of 238 formal parking spaces will be provided within the formal car park. A further 3,300 square metres of grassed area is proposed to be allocated for overflow parking, which has capacity to accommodate in the order of 100-130 car parking spaces.

Once inside the site, passenger vehicles will be diverted from the main circulation route (which travels along the northern side of the sale yards, one-way in a clockwise direction) to access to the formal parking area. Exit will be via a short two-way section of this road toward the main access to Sunraysia Highway.

The main car park will be sealed and will be maintained to an appropriate standard.

Informal car parking within the overflow car park will be provided within grassed areas and will be maintained as necessary.

The internal circulation is shown in Figure 4.

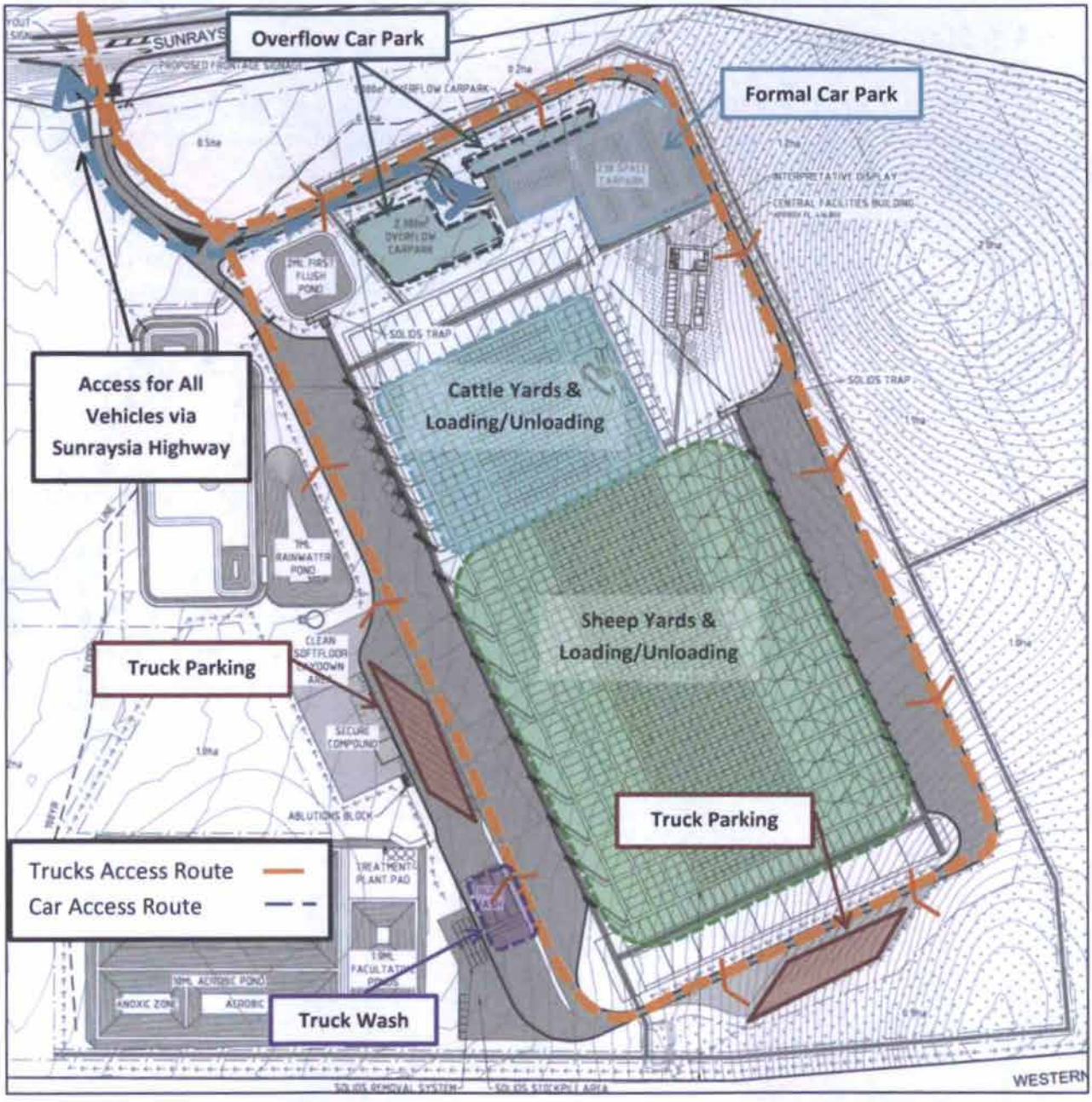


Figure 4: Site Layout and Circulation

All internal roads will be sealed and linemarked to direct vehicles around the site. Where required, additional wayfinding signage may be provided on-site to direct cars, trucks and pedestrians.

4 Car Parking Considerations

4.1 Statutory Parking Requirements

The proposed use of the site falls within the land-use category of 'saleyard' under Clause 74 of the Planning Scheme. Table 1 at Clause 52.06-05 of the Planning Scheme specifies the applicable rate for this use, requiring 10% of the site area to be set aside for parking.

We have assumed that this requirement relates to the area of the site designated for saleyards. The area of the site allocated for saleyards (including the wet lands and vehicle areas) is in the order of 165,000 square metres, and would therefore indicate a requirement for an area of 16,500 square metres to be available for parking.

The proposal sets aside approximately 13,500 square metres for car parking and truck parking (not including the circulatory road or truck loading and unloading areas) and in this regard, a partial waiver of the statutory car parking requirements is required.

Clause 52.06-3 of the Planning Scheme allows for the statutory car parking requirement to be reduced (including to zero).

Planning Practice Note 22 (June 2015) specifies that the provisions draw a distinction between the assessment of likely demand for parking spaces, and whether it is appropriate to allow the supply of fewer car spaces. These are two (2) separate considerations, one technical while the other is more strategic. Different factors are taken into account in each consideration.

Accordingly, the Responsible Authority must be satisfied that the provision of car parking is appropriate on the basis of a two-step process which has regard to:

- The car parking demand (Car Parking Demand Assessment) likely to be generated by development.
- Whether it is appropriate to allow fewer spaces to be provided than the number likely to be generated by the use.

A discussion of these considerations is as follows.

4.2 Car Parking Demand Assessment

4.2.1 Existing Ballarat Livestock Sales Centre

A series of parking occupancy surveys were completed of the existing BLSC in Delacombe by Cardno (Grogan Richards).

Surveys were completed for a single sheep sale, prime cattle sale and store cattle sale in August, 2005. Details of the sale date, number of head sold and peak parking demands are summarised as follows:

- Friday, 12th August, 2005: Peak parking demand of 234 vehicles for a monthly store cattle sale size of 3,092 cattle.
- Monday 15th August, 2005: Peak parking demand of 122 vehicles for a weekly prime cattle sale size of 122 cattle.

- Tuesday, 16th August, 2005: Peak parking demand of 140 vehicles for a weekly sheep sale size of 13,192 sheep.

It is noted that the above parked vehicle numbers include trucks. The Cardno (Grogan Richards) report states that in the order of 35-40 trucks were parked on site during the monthly store cattle sale i.e. around 200 cars and 35 trucks for a monthly store cattle sale size of 3,092 cattle.

4.2.2 Northern Livestock Exchange

Reference is made to a series of parking occupancy surveys which were completed of the existing Northern Victoria Livestock Exchange in its previous location in Whytes Road, Bandiana as part of a CPG (now SPIIRE) traffic assessment.

These surveys were completed at the following times:

- Wednesday 3rd March, 2010 between 3pm-10:30pm at 15 minute intervals, and
- Thursday 4th March, 2010 between 6am-3pm at 15 minute intervals.

The above times were chosen to cover the entire sale period for the 4th March, 2010 store cattle sale.

The Wednesday survey times correspond with times when cattle is delivered (receivables) to the livestock exchange. The Thursday survey times correspond with the remaining receivables, the sales times and the period over which the majority of buyers load vehicles for external deliveries.

The peak time for the surveys was recorded at 11am Thursday 4th March, 2010, where a total of 227 parked cars were observed on the site, which relates to a sale size of 2,800 store cattle. A maximum of 41 trucks was observed on the site at 12:30pm.

4.2.3 CVLX Expected Demands

From the parking survey results at the BLSC, it appears that the highest parking demands occurred during the monthly store cattle sale, when around 200 cars and 35 trucks were parked for a sale size of approximately 3,100 store cattle (median sale of 3,024 cattle).

It is not expected that parking demands will have a direct linear relationship to the size of the sale, albeit that larger sales would typically attract more parking. Nonetheless to provide a robust assessment, the recorded Ballarat parking demand for the monthly cattle sale have been factored to the 85th percentile sale (3,940 cattle), realising a projected car parking demand for 255 car spaces and 45 trucks. This total of 45 trucks on-site is expected to be made up of trucks parked, propped, loading, unloading and washing.

4.3 Appropriateness of Parking Provisions

4.3.1 Car Parking Provisions

The site layout plan for the site identifies a formal car park providing 238 car parking spaces, in addition to a grassed overflow car park area of some 3,300 square metres which would cater for a further 100-130 car parking spaces.

These provisions would satisfy the majority of demands associated with the 85th percentile sales day within the formal car park, with additional parking demands which may occur on larger event days capable of being accommodated within the grassed overflow area.

This is consistent with the overall provisions within the report provided to the Panel and considered satisfactory to cater for parking demands.

4.3.2 Truck Parking Provisions

The site layout plan identifies space for a minimum of 51 B-double vehicles to be on-site either parked, propped, loading, unloading or washing.

In addition to this, we have been advised that during busy periods, a second B-double truck will often wait, propped between adjacent loading and unloading bays whilst they are occupied in preparation for them to take a load of stock. This would effectively provide additional space for almost double the number of loading and unloading bays.

Consequently, we are comfortable that there is suitable provision for truck parking, waiting and unloading on the site to meet the demands.

4.4 Internal Design Considerations

We have reviewed the site layout plan and have undertaken a review for B-double vehicle access and of the car parking areas and are satisfied that the proposed layout can appropriately accommodate the desired internal traffic movements.

Car parking is provided with dimensions of 2.6 metres wide, 5.4 metres long accessed from aisles of 6.0 metres width. Because of the additional length provided to the car parking spaces themselves, these dimensions effectively exceed the requirements of the Planning Scheme.

They also exceed the minimum requirements for short-term city and town centre parking under AS2890.1:2004 which is considered adequate for the proposed use.

Ultimately, the proposed layout is considered acceptable, and by allocating more length to individual bays will allow larger farm vehicles, utilities and 4WD vehicles to be accommodated.

Detailed swept path diagrams have been prepared for the internal site layout and are attached at Appendix C.

The main car park will be sealed and will be maintained to an appropriate standard.

Informal car parking within the overflow car park will be provided within grassed and gravel areas and will be maintained as necessary.

5 Traffic Considerations

5.1 Immediate Road Network

Sunraysia Highway is a Road Zone Category 1 (RDZ1) under the Ballarat Planning Scheme and is under the control of VicRoads. Sunraysia Highway in the vicinity of the site is configured with an undivided carriageway, which generally accommodates a single lane of through traffic and a sealed shoulder in each direction.

Sunraysia Highway is aligned in a north westerly direction from Western Freeway travelling through to Mildura (via the Calder Freeway).

A speed limit of 100 km/h applies to Sunraysia Highway.

Sunraysia Highway is shown in Figure 5, and Figure 6.

Figure 5: Sunraysia Highway - view north-west

Figure 6: Sunraysia Highway - view south-east

Western Highway is a Road Zone Category 1 (RDZ1) under the Ballarat Planning Scheme and is under the control of VicRoads. Western Highway runs along the southern boundary of the site and is configured with a divided carriageway, which accommodates two lanes of through traffic and sealed shoulders in each direction of travel. East of its intersection with Sunraysia Highway, Western Highway continues as the Western Freeway.

Western Highway connects to Sunraysia Highway via two on-ramps. A speed limit of 110 km/h currently applies to Western Highway.

A cross section of Western Highway is illustrated in Figure 7 and Figure 8.

Figure 7:Western Highway - view east

Figure 8:Western Highway - view west

5.2 Regional Road Network

The proposed development will draw traffic from around the broader regional area. The regional road network is shown in Figure 9 which demonstrates the radial nature of the State Highway system, with Western Highway, Western Freeway, Sunraysia Highway, Glenelg Highway and Midland Highway all leading to Ballarat. These roads generally comprise "M", "A" and "B" class roads, defined as follows:

- "M" roads provide the primary road links that connect Melbourne and the major provincial centres. They are the highest quality divided roads with generally four lanes, good linemarking, delineation and sealed shoulders.
- "A" roads have a similar role to M roads. They are generally two lane undivided roads with good linemarking and delineation, sealed shoulders and reasonable overtaking opportunities.
- "B" roads provide the major link between regions not served by A roads, and are highly significant tourist roads. They are generally two-lane undivided roads with good linemarking and delineation.

These roads have been highlighted in Figure 9 which also shows, amongst others, the Main Road system of this section of regional Victoria. This system provides "cross country" connections between towns and generally comprises "C" class roads, defined as follows:

- "C" roads provide important links between Victoria's rural towns, and are generally two-lane sealed undivided roads.
- M, A, B, and C roads are under the control of VicRoads.

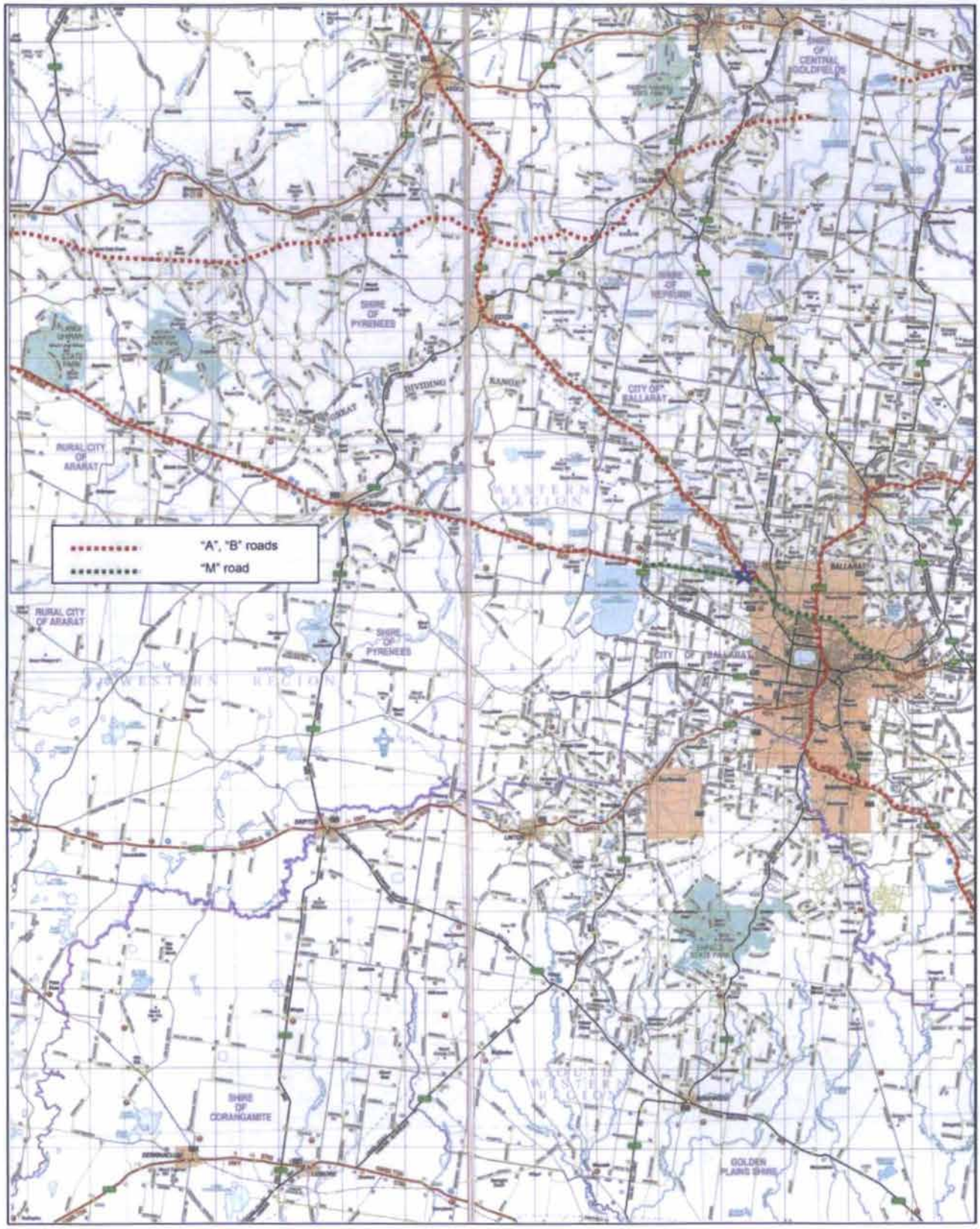


Figure 9: Regional Road Network Classifications

5.3 Existing Traffic Volumes

Traffic volumes recorded by VicRoads along Sunraysia Highway have been sourced, north of the Western Freeway ramps, in the vicinity of the site. A traffic count, completed over the 7 day period of Wednesday 20th November to Tuesday 26th November, 2013, has been sourced.

A summary of the survey results is presented in Table 1.

Table 1: Sunraysia Highway: Summary of Traffic Characteristics

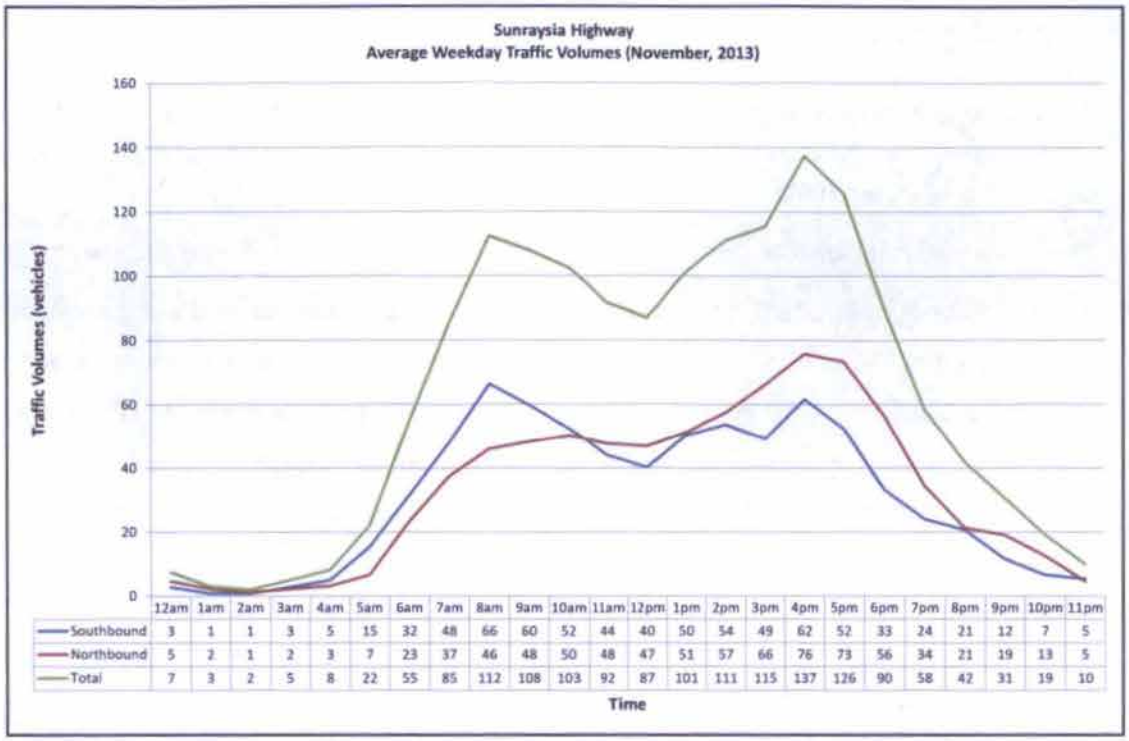
Traffic Characteristic	Southbound	Northbound	Two-way
Traffic Volumes			
24 Hour Weekday Average (All Vehicles)	738	792	1,530
24 Hour Weekday Average (Trucks)	188 (25.5%)	188 (23.7%)	376 (24.6%)
AM Peak Hour Weekday Volume (All Vehicles): 8-9am	66	46	112
PM Peak Hour Weekday Volume (All Vehicles): 4-5pm	62	76	138
24 Hour Saturday (All Vehicles)	658	642	1,300
24 Hour Saturday (Trucks)	94 (14.3%)	90 (14.0%)	184 (14.2%)
24 Hour Sunday (All Vehicles)	766	619	1,385
24 Hour Sunday (Trucks)	135 (17.6%)	88 (14.2%)	223 (16.1%)

The data indicates that on a typical weekday, Sunraysia Highway has a two-way volume of 1,530 vehicles per day, with 112 vehicles in the AM peak (8-9am) and 138 vehicles in the PM peak hour (4-5pm). Traffic volumes on the weekends are lower, with 1,300 vehicles recorded on the Saturday and 1,385 vehicles per day recorded on the Sunday.

This level of daily traffic is relatively low for a declared state highway and Category 1 Road Zone.

Figure 10 demonstrates the pattern of traffic volumes throughout a typical weekday. A discernible AM and PM peak period can be identified within the weekday average volumes at 8am-9am and 4pm-5pm, respectively.

The predominant movement in the AM peak is the southbound direction (towards the Ballarat Town Centre), while in the PM peak it is in the northbound direction (away from the Ballarat Town Centre).



	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Southbound	3	1	1	3	5	15	32	48	66	60	52	44	40	50	54	49	62	52	33	24	21	12	7	5
Northbound	5	2	1	2	3	7	23	37	46	48	50	48	47	51	57	66	76	73	56	34	21	19	13	5
Total	7	3	2	5	8	22	55	85	112	108	103	92	87	101	111	115	137	126	90	58	42	31	19	10

Figure 10: Sunraysia Highway – Weekday Average Traffic Volumes

5.4 Expected Traffic Generation (Peak)

We have been informed that the monthly store cattle sales are typically the most well attended event in relation to buyers and patrons.

To understand traffic associated with a typical sale, we have sourced traffic surveys undertaken at the Northern Victoria Livestock Exchange in March 2010 for a cattle sale. The survey recorded vehicle movements 3:15pm – 10:30pm on the 3rd of March (day before sale) and 6am – 3pm on the 4th of March (day of the sale).

On the day of the sale there were 2,800 cattle yarded, which is relatively close to the median store cattle sale of 3,024 of the existing Ballarat Saleyard.

The survey recorded peak hour traffic volumes in the order of 150 vehicles between 10am and 11am and in the order of 130 vehicles between 1pm and 2pm (of which 10-15% were trucks). These peak hours represent the highest volume of traffic associated with the arrival and departure of agents / patrons etc. attending the sale event.

We note that the recorded peak periods do not correspond with the AM and PM peak periods of Sunraysia Highway.

Whilst the number of patrons / buyers is likely to increase for a larger store cattle event, it is not a direct linear relationship.

In this regard, to provide a conservative assessment, we have adopted a peak hour traffic generation of 200 vehicle movements.

5.5 Traffic Distribution

CVLX has provided detailed data which shows the distribution of existing sheep and cattle vendors and buyers across the state. This has enabled likely routes to and from the site, particularly for heavy vehicles, to be determined.

The predicted traffic distribution and traffic volumes are based on the following assumptions:

- A directional split of 85% to / from the east, and 15% to / from the west along Sunraysia Highway.
- During the 10-11am arrival period, a split comprising 90% arrivals and 10% departures.
- During the 1pm-2pm departure period, a split comprising 10% arrivals and 90% departures.

It is typical for accesses to be designed to operate for a 10 year period. Therefore, a 2% compounded growth rate has been applied to traffic volumes on Sunraysia Highway to establish a 2024 design volume.

The projected post development peak hour volumes are illustrated in Figure 11.

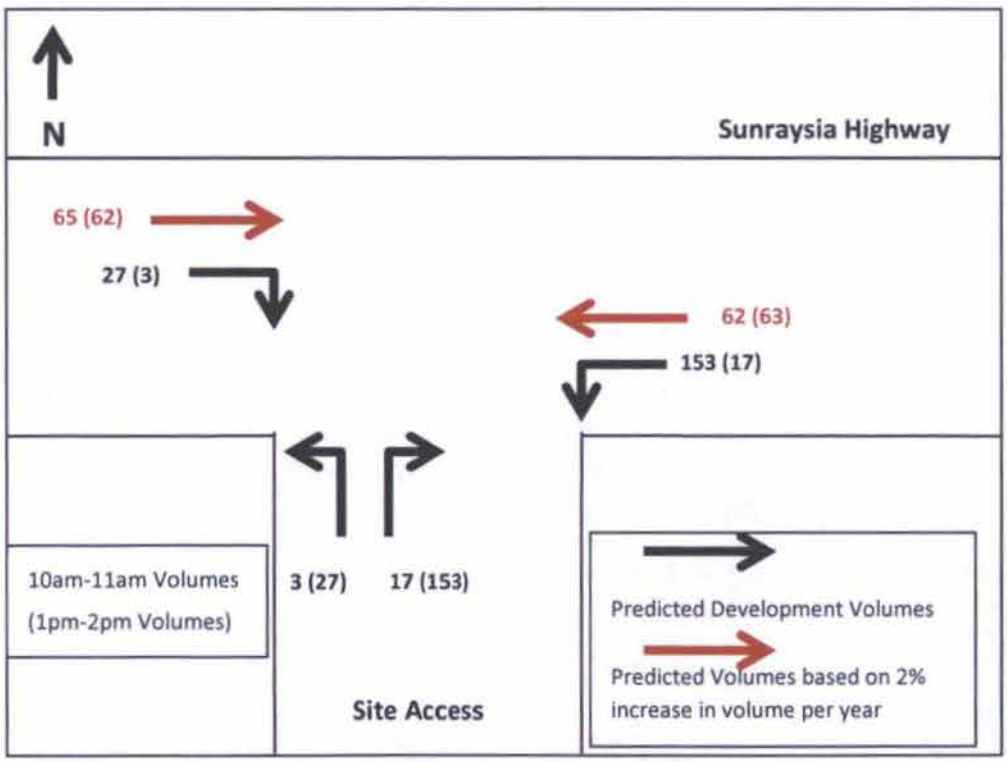


Figure 11: Predicted Tuesday Post-Development Traffic Volumes

5.6 Proposed Site Access Arrangements

The proposed site access location has been selected to maximise the available sight distance.

VicRoads advises to adopt a design speed of 10km/h over the posted speed limit for high speed rural roads and therefore a design speed of 110km/h is applicable for Sunraysia Highway. AustRoads Guide to Road Design Part 4A specifies a Safe Intersection Sight Distance requirement of 300 metres for cars and 332 metres for trucks (based on a 2.5s reaction time). This sight distance is available in both directions at the proposed access.

Based on the post development traffic volumes, AustRoads Guide to Road Design Part 4A at Figure 4.9 recommends localised widening of the Sunraysia Highway to accommodate a channelised short right turn lane (CHR(S)), and a basic left turn lane (BAL).

However, given the projected levels of left turning traffic, inclusive of commercial vehicles, it is recommended the requirement for a basic left turn lane is upgraded to a short auxiliary left turn lane (AUL(S)).

An Access Concept Layout Plan has been prepared, attached at Appendix B to demonstrate the works required to provide these turn treatments. Also included at Appendix B are swept path diagrams for B-double vehicles at the access.

This plan has been presented to VicRoads, who, in an email dated 28 May 2015 and sent by Sat Satkunam of VicRoads, provided in principle approval to the plan. VicRoads has since provided approval to the Functional Civil Design which was prepared by Geolyse and submitted to VicRoads in February 2016. A copy of these approvals are provided in Appendix B.

5.7 Traffic Impact

An assessment of the performance of the proposed site access has been undertaken using SIDRA Intersection. The intersection capacity analysis allows estimation of key operating parameters such as intersection degree of saturation (DoS), 95th percentile queue lengths, and average delay which are described below:

- Degree of Saturation (DoS) – measure of intersection performance expressed as a ratio of demand/capacity. A DOS greater than 0.90 is generally regarded as poor for a un-signalised intersection, as in the following table

Level of Service		Intersection Degree of Saturation	
Level of Service		Unsignalised Intersection	Signalised Intersection
A	Excellent	<= 0.60	<= 0.60
B	Very Good	0.60 – 0.70	0.60 – 0.70
C	Good	0.70 – 0.80	0.70 – 0.90
D	Acceptable	0.80 – 0.90	0.90 – 0.95
E	Poor	0.90 – 1.00	0.95 – 1.00
F	Very Poor	>= 1.0	>= 1.0

- 95th Percentile Queue Length (m) – one car represents a 7m queue.
- Average delay - no. of seconds delayed.

The critical gaps and follow up gaps for each movement which have been adopted within the SIDRA analysis are provided in Table 2. These allow for greater gaps than would be assumed for light vehicle traffic, to minimise the impacts on through traffic along Sunraysia Highway.

Table 2: Critical Gaps and Follow up Gaps Adopted for Sidra Analysis

Movement	Critical Gap	Follow up Gap	Source
Right turn into site access from Sunraysia Hwy	4.5s	2.5s	Sidra Default settings, which are higher than Austroads (AGRD Pt 4A) recommended gaps
Left turn into Sunraysia Hwy from site access	14s	3s	Required by Austroads (AGRD Pt 4A) in order for exiting vehicles to not interfere with vehicles on Sunraysia Highway
Right turn into Sunraysia Hwy from site access	14s	3s	Required by Austroads (AGRD Pt 4A) in order for exiting vehicles to not interfere with vehicles on Sunraysia Highway

The results of the SIDRA analysis are summarised in Table 3, and demonstrate that the proposed access will provide for convenient access to / from the site, with no material impact to the operation of the Sunraysia Highway.

Table 3: SIDRA Summary - Proposed Access Arrangements

Peak	Leg	Movement	DoS	Av. Delay	95th %ile queue
AM Peak	Site Access (S)	L	0.05	22	3
		R	0.05	22	3
	Sunraysia Hwy East	L	0.09	14	0
		T	0.04	0	0
	Sunraysia Hwy West	T	0.04	0	0
		R	0.03	15	1
PM Peak	Site Access (S)	L	0.30	17	27
		R	0.30	17	27
	Sunraysia Hwy East	L	0.01	14	0
		T	0.04	0	0
	Sunraysia Hwy West	T	0.04	0	0
		R	0.03	15	1

5.8 Regional Traffic Impacts

In order to understand truck movements associated with the proposal, we have reviewed heavy vehicle data collected at the existing BLSC site in July, 2014. The surveys undertaken included:

- Store Cattle Sale: unload between 12-6pm on Thursday, 17th July, 2014 and load between 12-7pm on Friday, 18th July, 2014.
- Prime Cattle Sale: unload between 1pm to 6pm on Sunday 6th July, 2014 and load between 7am-2pm on Monday, 7th July, 2014.
- Sheep Sale: unload between 3pm to 10pm on Monday 14th July, 2014 and load between 9am and 4pm Tuesday, 15th July, 2014.

The survey times recorded the large majority of trucks, however it is likely that a small amount of trucks would have unloaded or loaded outside of the survey period.

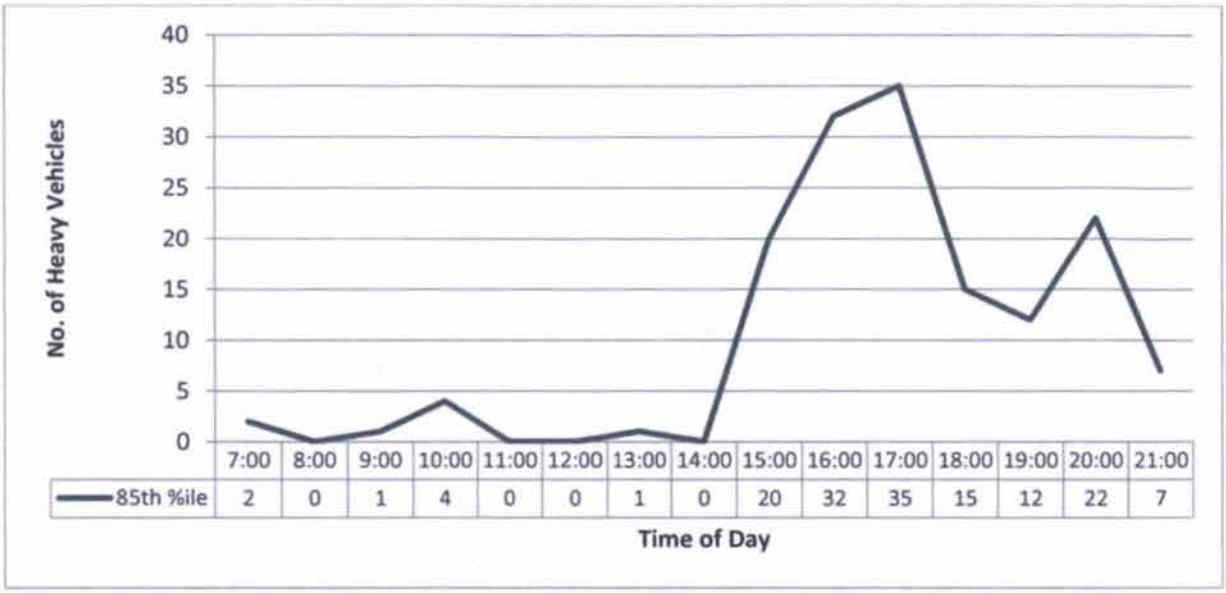
Given that prime cattle sale occurs on a Monday, and sheep begin arriving for the Tuesday sale on the Monday afternoon, Monday represents the overall peak commercial vehicle activity day.

For the Monday of the survey period, there were 376 prime cattle yarded and 12,629 sheep yarded. The prime cattle sale was above the median cattle sale (343 cattle), however the sheep sale was relatively small (median sheep sale of 24,934).

It is typical to design for the 85th percentile event. To this end, the recorded truck volumes have been factored based on the survey sales data compared to the 85th percentile sales data. However, BLSC

advises that during the low season, trucks are generally not loaded to capacity. Therefore, during the busier sales periods, the loading of trucks increases, thereby increasing efficiency. As such, the 85th percentile factors have been reduced by 20% to reflect this situation.

Based on the foregoing, we have prepared a Heavy Vehicle profile for the 85th percentile sales event for a Monday (7am – 10pm), illustrated as Figure 12.



	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
85th %ile	2	0	1	4	0	0	1	0	20	32	35	15	12	22	7

Figure 12: Anticipated Monday Heavy Vehicle Movement Profile – 85th Percentile Sales

The profile predicts a total of 151 heavy vehicles between the hours of 7am and 10pm for a Monday (crossover of prime cattle load and sheep unload) associated with an 85th percentile sales event.

As noted previously, CVLX has provided detailed data which identifies the location of cattle and sheep vendors and buyers by sale size all over the state allowing the likely routes of stock to and from the site to be established.

The data reveals that both vendors and buyers are located broadly throughout Victoria, and there is a relatively small percentage of locally generated traffic. In this regard, the majority of traffic is likely to be attracted to the primary roads, being the Western Highway to generally head east and west, and the Midland Highway (via the Western Highway) to head north or south.

Similarly, more locally generated traffic to the south, west and east is likely to use the Western Highway or Sunraysia Highway.

To the north-east, to towns such as Creswick, it is our view that commercial traffic is more likely to use the Midland Highway rather than Ballarat-Maryborough Road as there is no convenient arterial east-west route.

To the north, local traffic from towns such as Blowhard, Clunes, Talbot and Maryborough may be attracted to use the Ballarat-Maryborough Road travelling through the town of Miners Rest to access and egress the site.

Historical vendor and buyer data provided by CLVX provides an indication of the percentages of vendors and buyers who would be generated immediately to the north as follows:

- Sheep vendors: 3.89%
- Sheep buyers: none
- Cattle vendors: 4.87%
- Cattle buyers: 0.31%

Applying these percentages to the anticipated 85th percentile sale of stock results in the following heavy vehicle numbers (excludes deliveries made by utes and light vehicles with trailers attached):

- Sheep vendors: 3.89% of 144 heavy vehicles over a 3pm-10pm unload period weekly on a Monday equal to six (6) vehicles, or on average one vehicle an hour.
- Prime cattle vendors: 4.87% of 26 vehicles over a 1pm-6pm unload period weekly on a Sunday equal to a single vehicle over this period, and
- Store cattle vendors: 4.87% of 101 heavy vehicles over a 12pm-6pm unload period monthly on a Thursday equal to five (5) vehicles, or on average less than one vehicle an hour.

This level of traffic is relatively small and would make no material difference to the operation of Ballarat-Maryborough Road.

Furthermore, it is likely that the majority of the potential projected commercial vehicle volumes that may want to travel through Miners Rest would already utilise this route in accessing the existing Ballarat Livestock Sales Centre in Delacombe.

We are therefore satisfied that the regional traffic impacts are manageable.

6 Truck Management Plan

6.1 General

In order to address concerns with commercial vehicle traffic travelling through the township, the Development Plan requires the preparation of a Truck Management Plan detailing the proposed alternative truck route and any modifications to the road network required as part of the proposal.

As noted within the preceding section, CVLX has provided detailed data which identifies the location of cattle and sheep vendors and buyers by sale size all over the state allowing the likely routes of stock to and from the site to be established.

The data reveals that both vendors and buyers are located broadly throughout Victoria, and there is a relatively small percentage of locally generated traffic, particularly to and from the immediate north.

6.2 Northern Diversion Route

6.2.1 Description of Route

In order to encourage the use of an alternative route to/from the north for commercial vehicles, a potential diversion route has been identified.

The route extends between the township of Clunes at the north, utilising Ballarat-Maryborough Road to Learmonth-Sulky Road to Sunraysia Highway and the reverse.

This route is illustrated in Figure 13.

It is noted that Walsh Quarry is located on Learmonth-Sulky Road, and to this end this road and its intersections with Sunraysia Highway and Ballarat- Maryborough Road are already accommodating large commercial vehicles.

6.2.2 Mitigating Road Works

A review of swept paths for B-doubles using this route was undertaken at the key intersections which identified that vehicles are likely to traverse part of the splitter island on the west approach of the intersection of Learmonth-Sulky Road and Ballarat-Maryborough Road. To this end, it is recommended that part of the splitter island that is traversed should be reconstructed with mountable kerb to allow a B-Double to track over the splitter island.

A Concept Layout Plan has been prepared to identify the works required to this intersection to allow for appropriate access for B-double vehicles and Geolyse has prepared detailed Functional Plans and submitted these to VicRoads for approval. These plans, and VicRoads approval correspondence is attached at Appendix D. No works are required or proposed to the other intersections on the alternative route.

6.2.3 Driver Induction

In addition to the recommended works, it is suggested that CVLX provide information regarding the recommended truck route to potential drivers attending the site to and from the immediate north.

CVLX have data regarding existing vendors and purchasers and therefore could target those within the immediate northern towns that are likely to use the alternative route. This could be provided in the form of general correspondence by way of electronic or physical communication.

It is also understood that a number of regular contract drivers will also be attending the site, and those who may drive to and from the nominated northern areas should be inducted/advised to utilise the nominated alternative route.

Additional information could also be provided on the CVLX website with the recommended route to target new vendors or buyers.

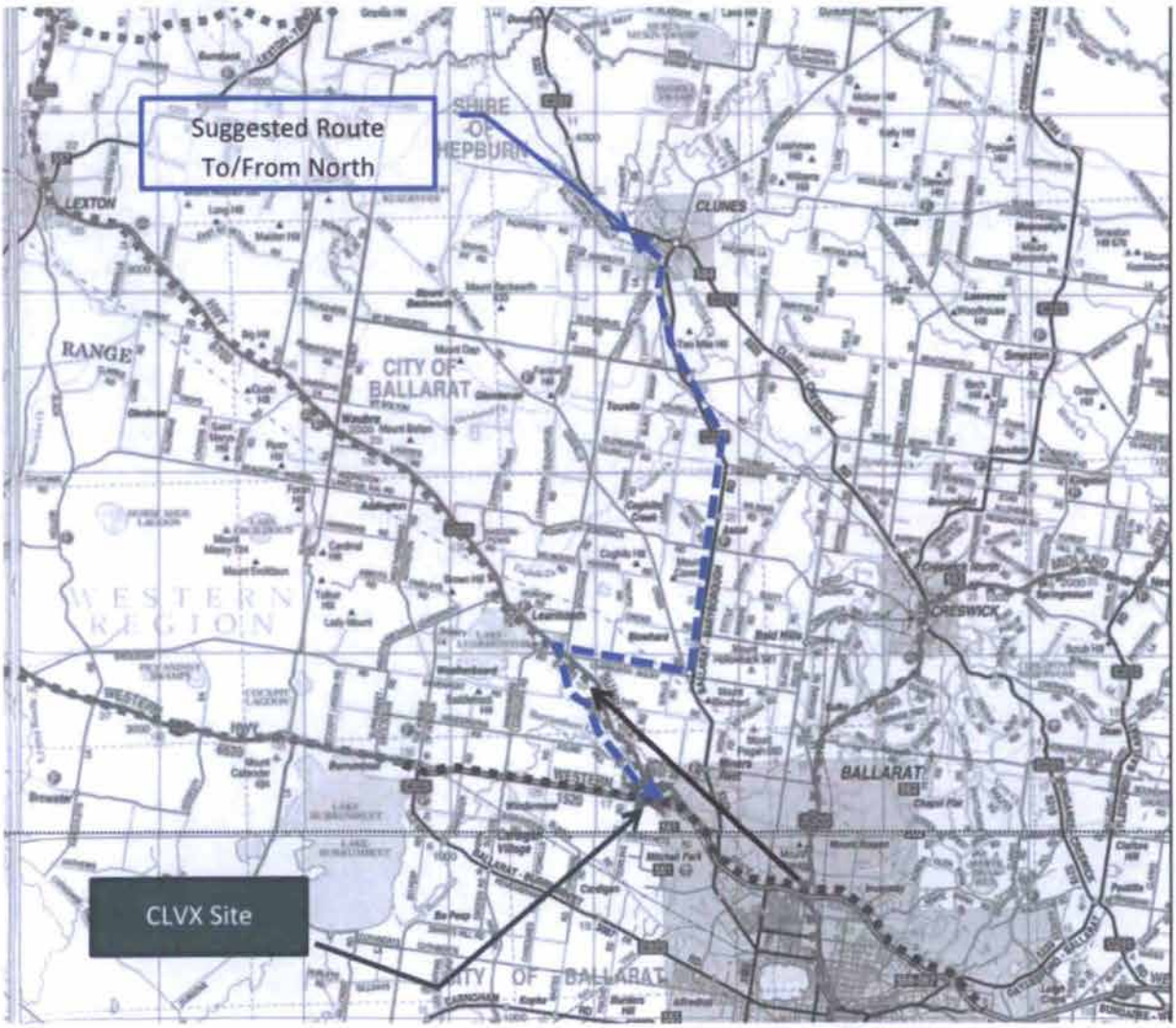


Figure 13: Alternative Truck Access Routes

7 Conclusions

The preceding Car Parking and Traffic Management Plan has been prepared to satisfy the requirements of Schedule 15 to the Special Use Zone of the Ballarat Planning Scheme and identifies that:

a) Site access is proposed to Sunraysia Highway at the site's northern boundary, at the west of the site, and it will not be gated.

b) A Functional Layout Plan has been prepared for the proposed site access works which has been approved by VicRoads and is considered appropriate and suitable to cater for B-double and other vehicle access to the site.

c) The proposed access intersection is expected to operate under satisfactory conditions given the level of traffic expected to be generated to and from the site during the peak period.

d) The traffic generated to the wider network is not considered to be excessive and the majority of access will be catered for by the existing arterial road network.

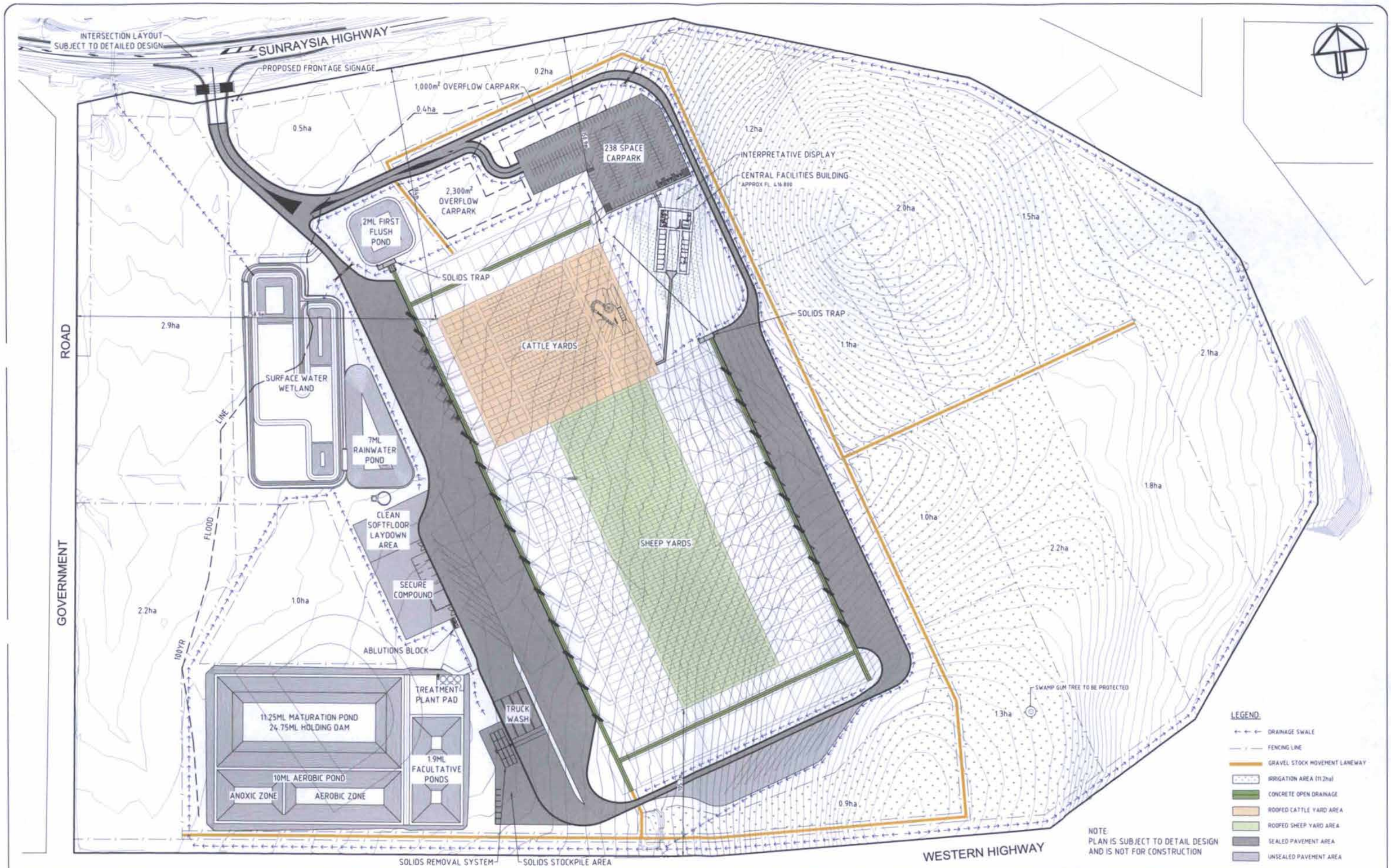
e) In consideration of the available regional network routes to / from the site, the level of heavy vehicle traffic generated through Miners Rest is expected to be very low in realistic terms, and is not expected to be materially different than the current use of this route resulting from the existing Ballarat Saleyard.

f) An alternative route has been identified using the intersections of Ballarat Maryborough Road, Learmonth Sulky Road and Sunraysia Highway to alleviate concerns with regard to commercial vehicle traffic to and from the north.

g) VicRoads has approved the recommended works along the alternative route at the intersection of Learmonth-Sulky Road and Ballarat-Maryborough Road to accommodate the B-double movement from north to west.

h) The proposed car parking and truck parking arrangements are considered acceptable and have been designed appropriately to cater for the relevant vehicles.

Appendix A: Development Plan



REV	DATE	DFTD	APPD	DETAILS
B	14/04/2016	MY	PPD	REVISED LAYOUT
C	18/04/2016	MY	MH	SOLIDS STOCKPILE AREA LAYOUT AMENDED
D	19/04/2016	MY	MH	STOCK LANEWAY AMENDED AND DRAINAGE SWALES ADDED
E	26/04/2016	MY	MH	TRUCK WASH AND SOLIDS REMOVAL SYSTEM AMENDMENTS
F	28/04/2016	MY	MH	CENTRAL FACILITY BUILDING LAYOUT AMENDED
G	02/06/2016	MY	MH	CENTRAL FACILITY BUILDING LAYOUT AMENDED
H	07/06/2016	MY	MH	MODIFICATIONS IN RESPONSE TO MEETING 01/06/16

	FILE	INITIALS	DATE
SURVEY	301634FS00-ACAD	SPIRE	14/12/2015
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		MH	07/06/2016

DRAWING SCALE
SCALE 1:1250 (A1)
0 20 40 60 80 100
0 20 40 60 80 100
SCALE 1:2500 (A3)
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION.

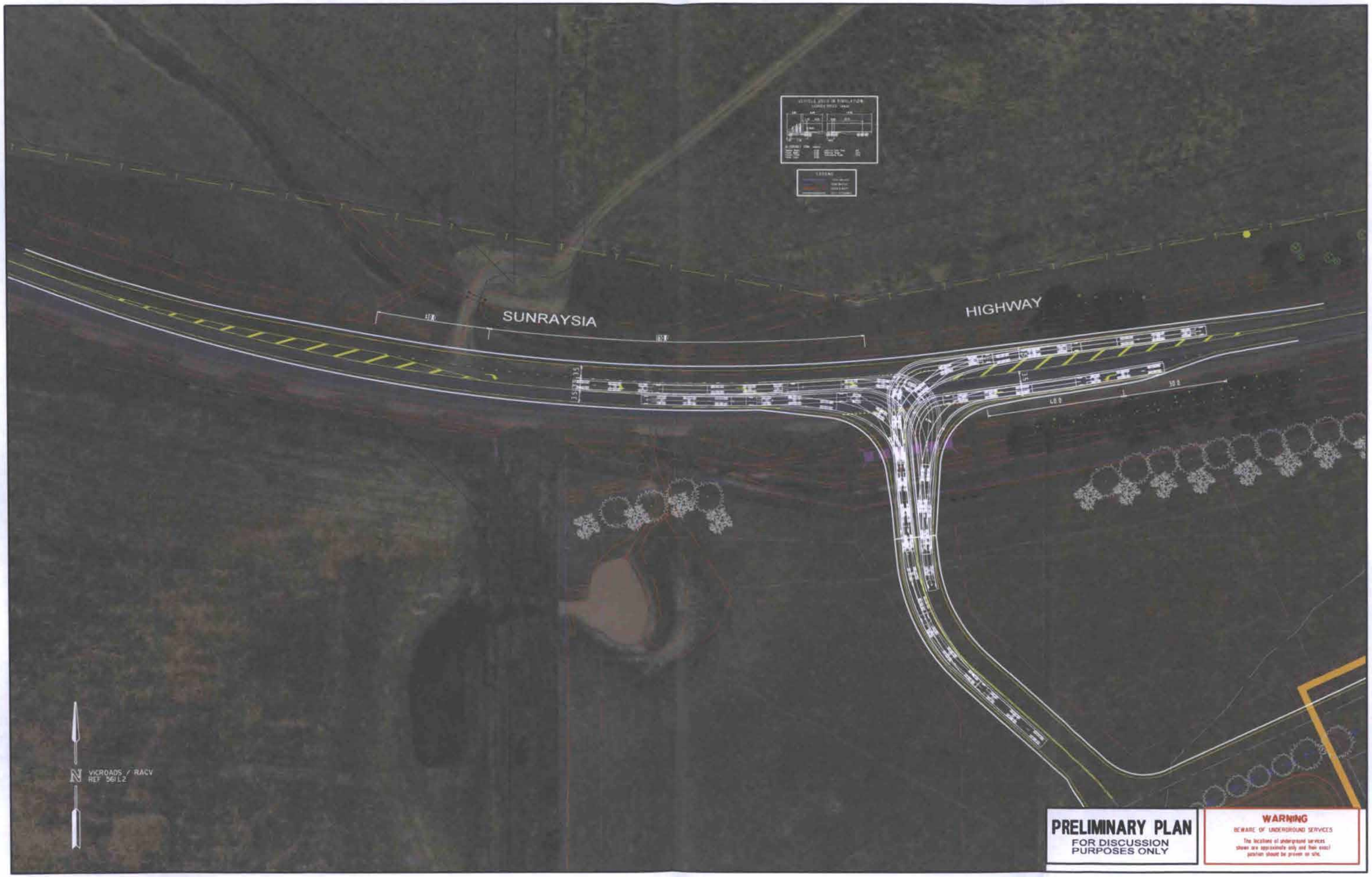
APPROVAL AUTHORITY: BALLARAT CITY COUNCIL
CLIENT: RLX INVESTMENT COMPANY PTY LTD
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

GEOLYSE
ORANGE
orange@geolyse.com
www.geolyse.com
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
Ph: (02) 6393 5000
Fx: (02) 6393 5050

DRAWING: ALTERNATIVE SITE LAYOUT

PROJECT NUMBER 215373	DRAWING FILE 215373_06H_C001.dwg	SIZE A1
CO-ORDINATE DATUM MGA94 ZONE 55	HEIGHT DATUM A.H.D.	SET 06
IMAGE SOURCE -		
STATUS FOR APPROVAL	SHEET C001 OF C001	

Appendix B: Site Access Functional Layout Plans & VicRoads Approvals



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY

WARNING
BEWARE OF UNDERGROUND SERVICES
The locations of underground services shown are approximate only and their exact position should be proven on site.

ISSUE	ISSUE DESCRIPTION	ISSUE DATE
D	BASE UPDATED AND PROPOSED INTERSECTION REVISED	09 MAR 2016
C	BASE UPDATED AND PROPOSED INTERSECTION REVISED	14 JAN 2016
B	BASE UPDATED - PLAN RE-ISSUED	08 DEC 2015
A	INITIAL ISSUE	07 MAY 2015

GENERAL NOTES
1. BASE INFORMATION FROM AERIAL PHOTOGRAPH (SOURCE NEARMAP APR 2015).
2. ALL DIMENSIONS ARE TO FACE OF KERB & CHANNEL.
3. DECLARED ROAD - SUNRAYSIA HIGHWAY (SPEED ZONE 100km/h).

DESIGNED
R. CARBARNS 07 MAY 2015

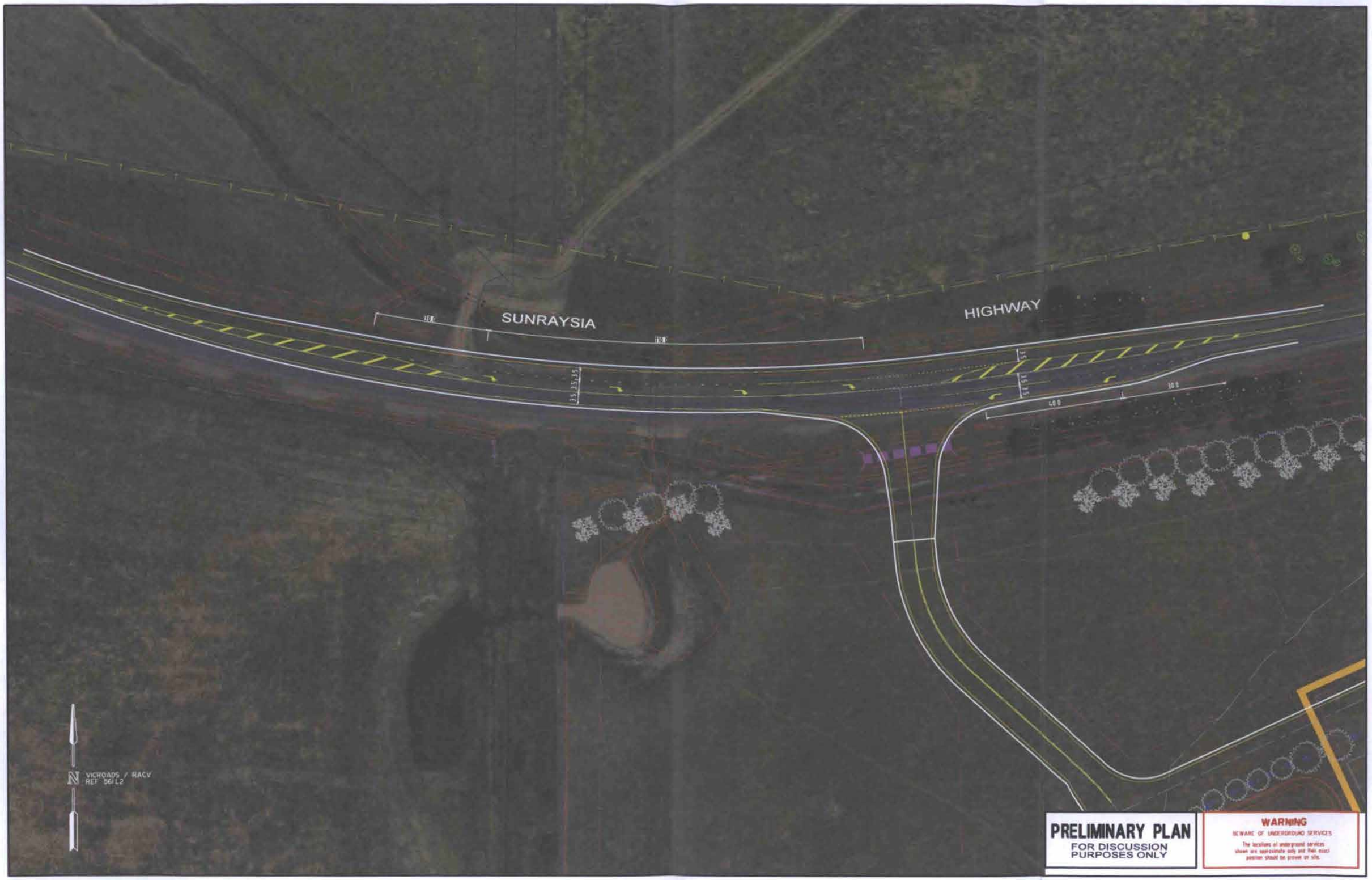
CHECKED/APPROVED
C. MORELLO 07 MAY 2015

FILE NAME
G15152A-00.dgn

TraffixGroup
Traffic Engineers and Transport Planners
Suite 8/431 Burke Road TEL (03) 9822 2888
GLEN IRIS VICTORIA 3146 FAX (03) 9822 7444
www.traffixgroup.com.au

SUNRAYSIA HIGHWAY - MINERS REST
PROPOSED ACCESS ROAD
BALLARAT CITY
FUNCTIONAL LAYOUT PLAN

SCALE 0 5 10 15 20 | SHEET No. | DWG No. G15152-01



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DESIGNED
R. CARBARNS 07 MAY 2015

CHECKED/APPROVED
C MORELLO 07 MAY 2015

FILE NAME
G15152A-00.dgn

TraffixGroup
Traffic Engineers and Transport Planners
Suite 9A31 Burke Road TEL: (03) 9822 2888
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SUNRAYSIA HIGHWAY - MINERS REST
PROPOSED ACCESS ROAD
BALLARAT CITY
FUNCTIONAL LAYOUT PLAN

SCALE 0 5 10 15 20 | SHEET No. | DWG No. G15152-01

From: Sat.Satkunam@roads.vic.gov.au
To: Pete Oste
Cc: Carlo Morello; Gary Turner; Martin Haege; Orange Document Control; "Paul Brown"; Ashley.Goad@roads.vic.gov.au; Michael.Wickerson@roads.vic.gov.au; Sam.Brown@roads.vic.gov.au
Subject: Re: 215373: CVLX Sunraysia Highway Intersection Functional Plan
Date: Monday, 29 February 2016 2:34:46 PM
Attachments: 215373_02A_C001-C005.pdf

Good afternoon Peter,

I refer to your email dated 12 February 2016,enclosed a functional layout plan for the proposed access arrangements on Sunraysia Highway.

The functional layout plan has been reviewed and is considered acceptable to VicRoads.

Should you have any enquiries regarding this matter, please contact me.

Regards

Sat Satkunam
Senior Statutory Planning Officer
88 Learmonth Road
Wendouree
Tel: 5333 8753
Fax: 5333 8771

From: "Pete Oste" <poste@geolyse.com>
To: <Sat.Satkunam@roads.vic.gov.au>,
Cc: <CMorello@traffixgroup.com.au>, "'Paul Brown'" <paul.brown@palisadepartners.com.au>, "Gary Turner" <gary.turner@ripl.com.au>, "Martin Haege" <mhaege@geolyse.com>, "Orange Document Control" <odoccontrol@geolyse.com>
Date: 12/02/2016 02:33 PM
Subject: 215373: CVLX Sunraysia Highway Intersection Functional Plan

---

Ext: **Business Area:**
Fax: **Internet:**
File Name: **File Description:**

Sat,

As per our phone conversation see attached Functional Plan for the proposed Saleyards Intersection off Sunraysia Highway.
Can you please review and confirm the layout meets VicRoads approval so we can progress with the detailed design

Please don't hesitate to contact me should you have any queries or wish to discuss things further,

Regards

Peter Oste
Senior Civil Engineer
Geolyse Pty Ltd
154 Peisley St
PO Box 1963
Orange NSW 2800
Ph: 02 6393 5000
Fx: 02 6393 5050
Mob: 0438 841 523
Email: poste@geolyse.com
Web: www.geolyse.com

Facebook | LinkedIn

From: Sat.Satkunam@roads.vic.gov.au [mailto:Sat.Satkunam@roads.vic.gov.au]
Sent: Thursday, 28 May 2015 10:23 AM
To: John Hannagan
Cc: Greg Tobin; pconnor@vicbar.com.au; Sam.Brown@roads.vic.gov.au; Benjamin.Anderson@roads.vic.gov.au
Subject: Re: - Ballarat Saleyards - Matter 21406061

Good morning John,

I refer to your email dated 18 may 2015, enclosed a letter and a report regarding the above development.

The report prepared by Traffic Group has been reviewed and comments are provided;

1. The proposed access arrangements on Sunraysia Highway is considered acceptable in principle subject to the following;

- All Saleyards vehicles must be allowed to enter inside the property without any restriction (parking area must not be fenced).
- Adequate parking spaces must be provided on-site for all Saleyards vehicles, including vehicles arriving outside of business hours (no parking is allowed along Sunraysia Highway).
- Confirm that at peak times for Saleyards activities that there is enough capacity within the facility to prevent vehicles queueing onto or along Sunraysia Highway.

2. It is noted the existing West On Ramp at the Sunraysia/Western interchange can accommodate B-Double vehicle movements. VicRoads has concerns regarding the weight distribution and speed of vehicles from the Saleyards using this tight radius curve ramp. Can the proponent please advise to the suitability of the ramp for use by Saleyards vehicles. VicRoads requires vehicle activated electronic signs on the West On Ramp to warn vehicles approaching at high speed.

3. Improvement works such as mountable noses, reinforced concrete aprons and directional signage are required at Ballarat -Maryborough Road and Sunraysia Highway intersections, to facilitate the movements of vehicles to and from the Saleyards.

Should you have any enquiries regarding this matter, please contact me.

Regards

Sat Satkunam
Senior Statutory Planning Officer
88 Learmonth Road
Wendouree
Tel: 5333 8753
Fax: 5333 8771

From: John Hannagan <jhannagan@harwoodandrews.com.au>
To: "sat.satkunam@roads.vic.gov.au" <sat.satkunam@roads.vic.gov.au>,
Cc: Greg Tobin <gtobin@harwoodandrews.com.au>, "pconnor@vicbar.com.au" <pconnor@vicbar.com.au>
Date: 18/05/2015 07:38 AM
Subject: - Ballarat Saleyards - Matter 21406061

Ext: **Business Area:**
Fax: **Internet:**
File Name: **File Description:**

Dear Sat,

Please see the attached letter plus report sent on behalf of Greg Tobin.

Regards

John Hannagan | Senior Associate

HARWOOD ANDREWS

T 03 5225 5202
M 0401 021 095
F 03 5225 5222

jhannagan@harwoodandrews.com.au | www.harwoodandrews.com.au
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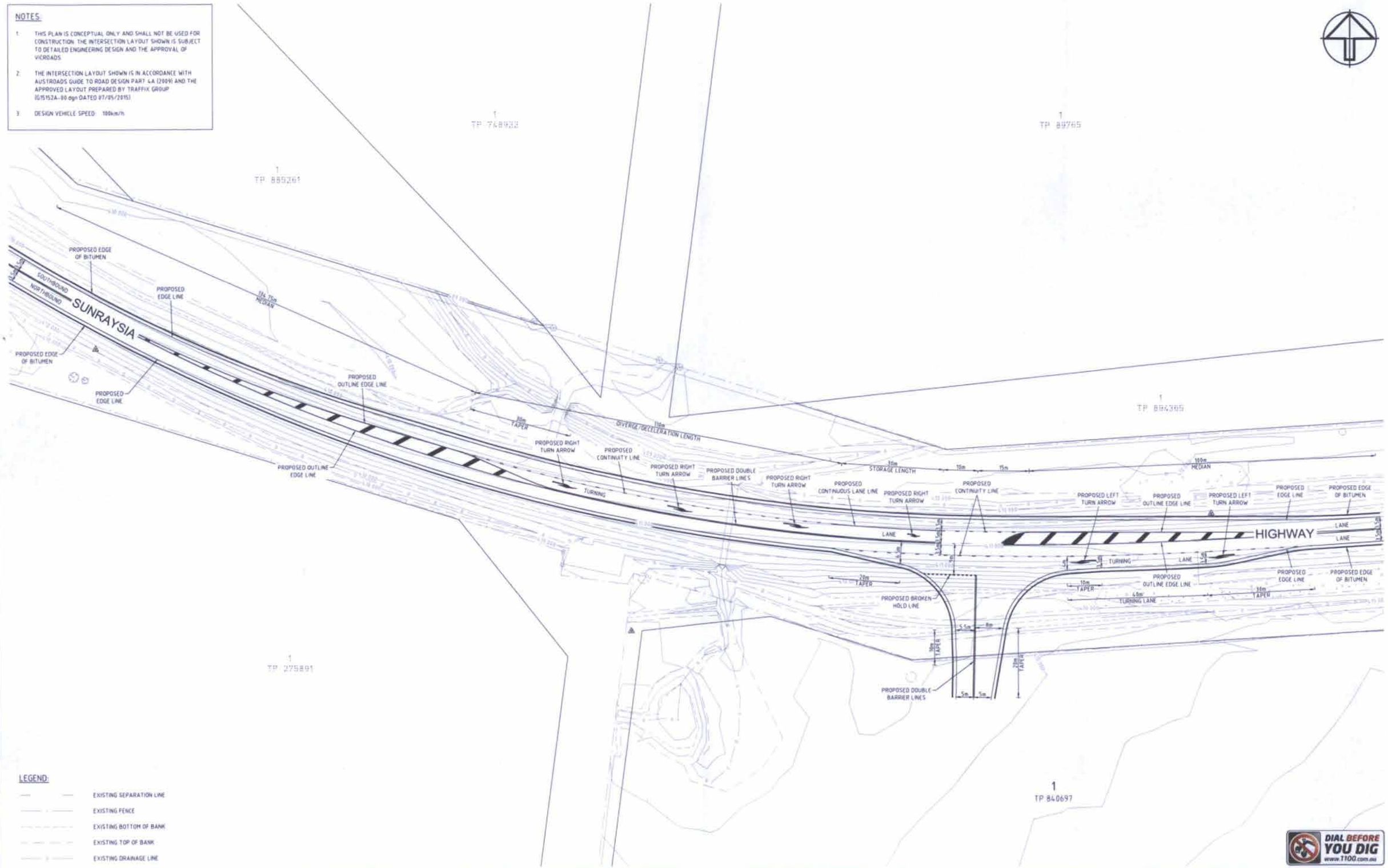
NOTES:

1. THIS PLAN IS CONCEPTUAL ONLY AND SHALL NOT BE USED FOR CONSTRUCTION. THE INTERSECTION LAYOUT SHOWN IS SUBJECT TO DETAILED ENGINEERING DESIGN AND THE APPROVAL OF VICROADS.
2. THE INTERSECTION LAYOUT SHOWN IS IN ACCORDANCE WITH AUSTROADS GUIDE TO ROAD DESIGN PART 4A (2009) AND THE APPROVED LAYOUT PREPARED BY TRAFFIX GROUP (G15152A-00.dgn DATED 07/05/2015)
3. DESIGN VEHICLE SPEED: 100km/h



LEGEND:

- EXISTING SEPARATION LINE
- EXISTING FENCE
- EXISTING BOTTOM OF BANK
- EXISTING TOP OF BANK
- EXISTING DRAINAGE LINE

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ENGINEERING/ SURVEYING APPROVAL		-	-

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0 10 20 30 40 50

SCALE 1:1000 (A3)

DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: VICROADS

CLIENT: RLX INVESTMENT COMPANY ATF RLX INVESTMENT TRUST

PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

GEOLYSE
ORANGE
orange@geolyse.com
www.geolyse.com
154 PEISLEY STREET
P.O. BOX 1963
ORANGE NSW 2800
Ph: (02) 6363 5000
Fx: (02) 6363 5050

DRAWING: PROPOSED INTERSECTION LAYOUT

PROJECT NUMBER: 215373 | DRAWING FILE: 215373_02A_C001-C005.dwg | SIZE: A1

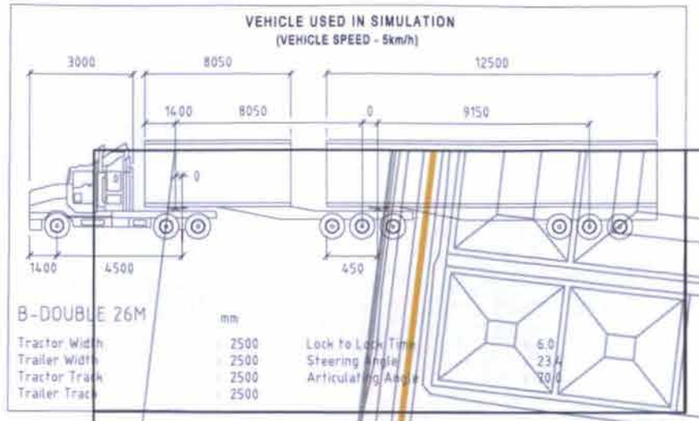
SURVEY MARK: PM 67 | R.L. 412.91 | DATUM: A.H.D. | SET: 02

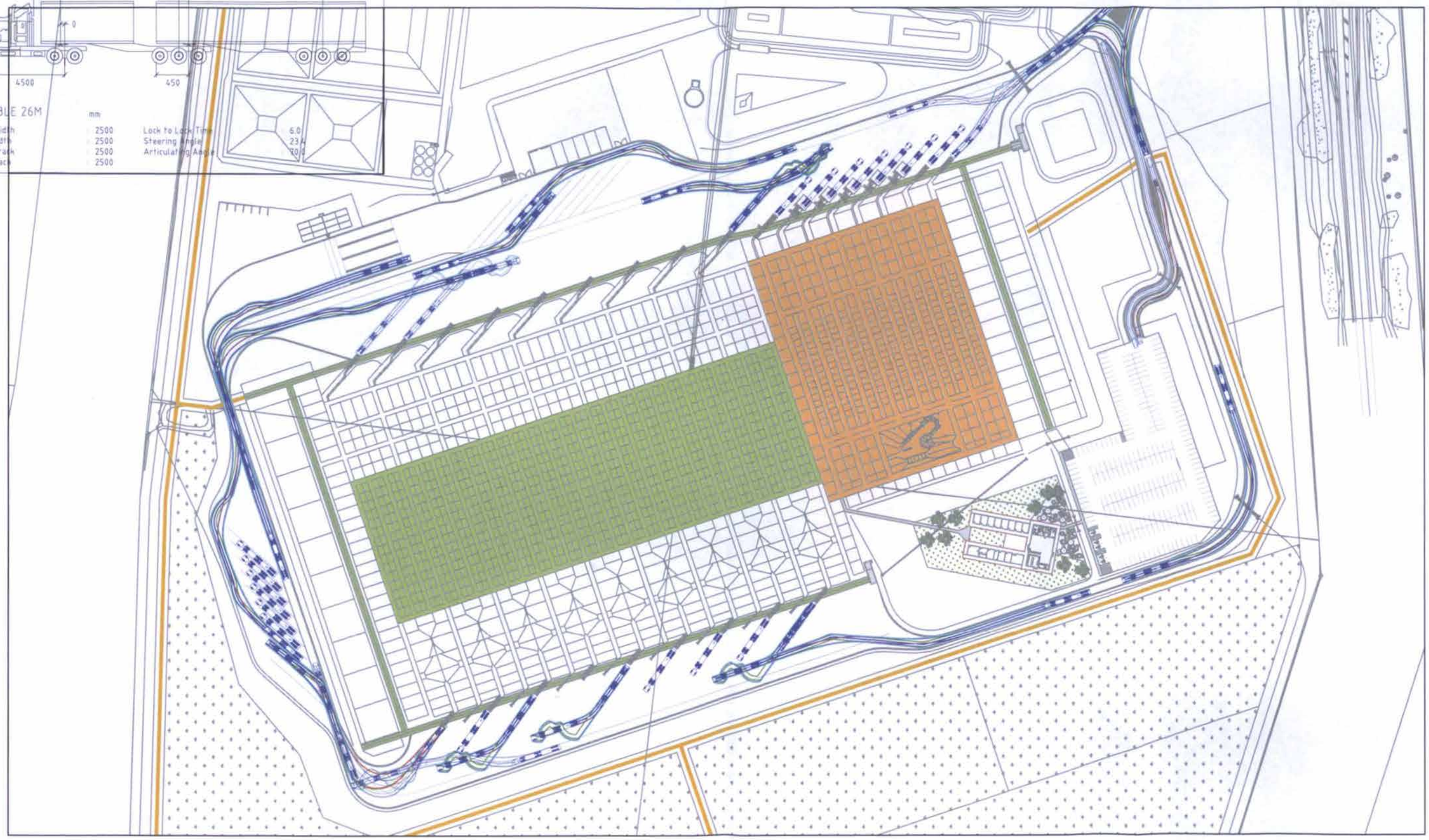
IMAGE SOURCE:

STATUS: FOR REVIEW | SHEET C003 OF C005

Appendix C:
Internal Swept Paths

SITE ACCESSIBILITY





REV.	REVISION NOTES	REVISION DATE
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01	FLIPPED LAYOUT	09-05-2016

GENERAL NOTES
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PREPARED BY GEOLYSE - received 28-04-16

DESIGNED: G. RAKITA	09 MAR 2016	
CHECKED: C. MORELLO	09 MAR 2016	
FILE NAME: 15152-01.DWG	ISSUE: A	

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GLEN IRIS VICTORIA 3146 FAX: (03) 9822-7444

Central Victorian Livestock Exchange

VEHICLE SWEPT PATHS

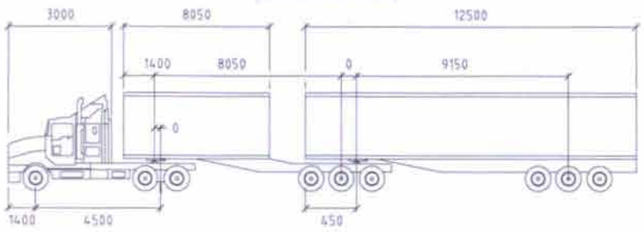
CENTRAL VICTORIAN LIVESTOCK EXCHANGE

SCALE 0 20 40 | SHEET No. 01/04 | 15152-01

CATTLE LOAD/UNLOAD

N

VEHICLE USED IN SIMULATION
(VEHICLE SPEED - 5km/h)



B-DOUBLE 26M mm

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Trailer Width	2500	Steering Angle	23.4
Tractor Track	2500	Articulating Angle	70.0
Trailer Track	2500		

REV.	REVISION NOTES	REVISION DATE
02	AMENDED SITE PLAN	23-08-2016
01	FLIPPED LAYOUT	09-05-2016

GENERAL NOTES
1. BASE INFORMATION FROM: 215373_01I_C001-C006.dwg
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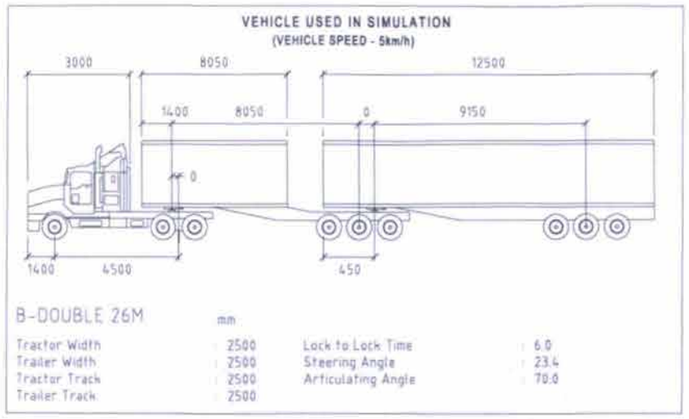
Central Victorian Livestock Exchange

VEHICLE SWEPT PATHS

CENTRAL VICTORIAN LIVESTOCK EXCHANGE

SCALE 1:500 @ A3	SHEET No. 02/04	15152-01

SHEEP LOADING / UNLOADING



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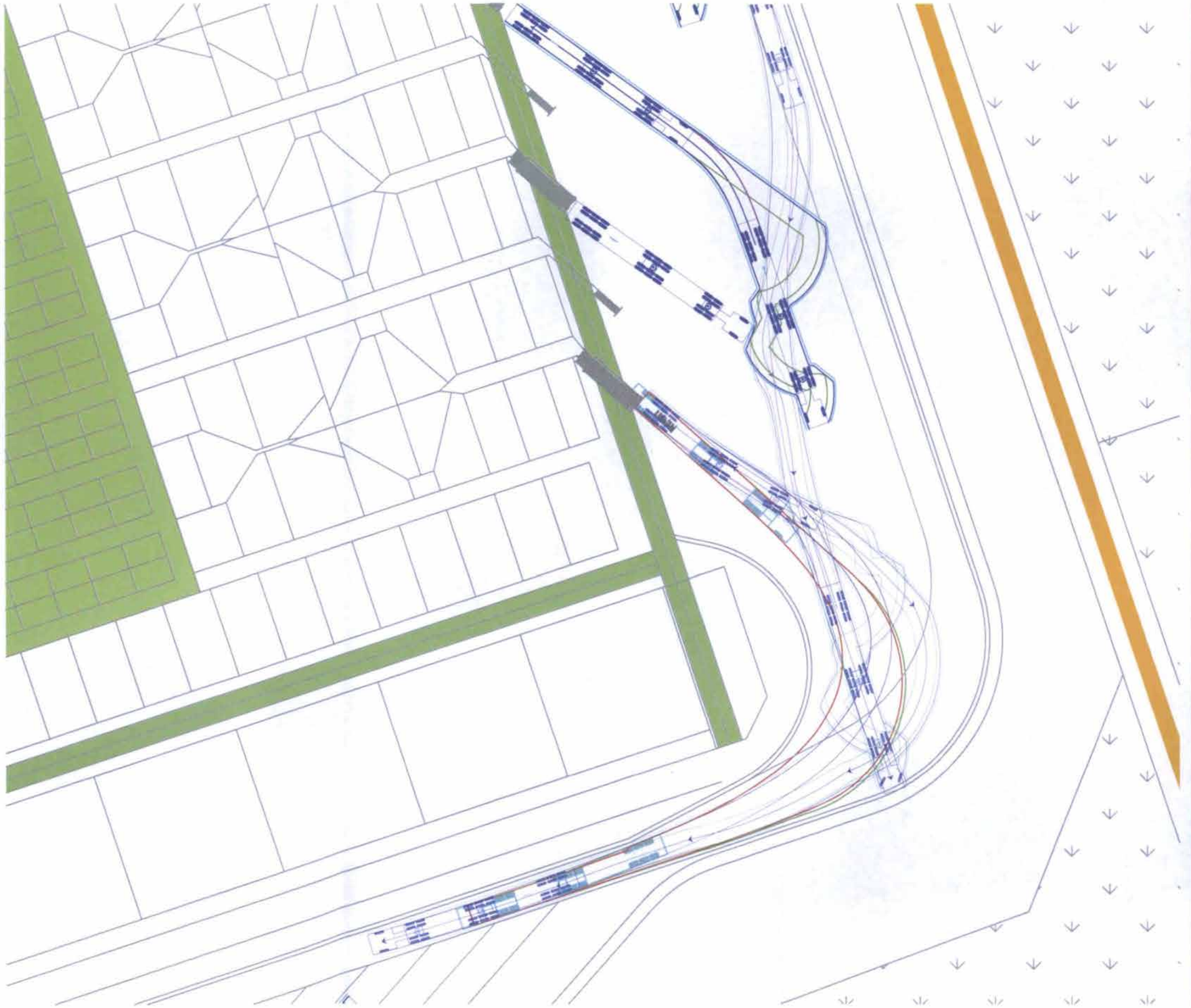

REV.	REVISION NOTES	REVISION DATE
02	AMENDED SITE PLAN	23-08-2016
01	FLIPPED LAYOUT	09-05-2016

GENERAL NOTES
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DESIGNED: G. RAKITA	09 MAR 2016	
CHECKED: C. MORELLO	09 MAR 2016	
FILE NAME: 15152-01.DWG	ISSUE: A	

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Central Victorian Livestock Exchange

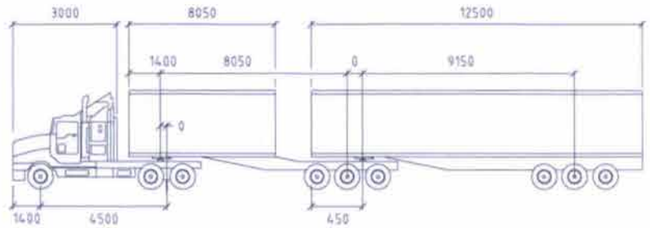
VEHICLE SWEPT PATHS

CENTRAL VICTORIAN LIVESTOCK EXCHANGE

SCALE 1:500 @ A3	SHEET No. 03/04	15152-01

NORTHERN CIRCULATION

VEHICLE USED IN SIMULATION



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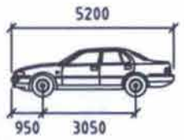
Tractor Track	2500	Articulating Angle	70.0
Trailer Track	2500		



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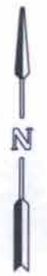


REV.	REVISION NOTES	REVISION DATE
02	AMENDED SITE PLAN	23-08-2016
01	FLIPPED LAYOUT	09-05-2016

GENERAL NOTES

1. BASE INFORMATION FROM: 215373_01I_C001-C006.dwg PREPARED BY GEOLYSE - received 3-3-2016

DESIGNED: G. RAKITA	05 MAY 2016
CHECKED: C. MORELLO	05 MAY 2016
FILE NAME: 15152-01.DWG	ISSUE: A

Suite 9/431 Burke Road GLEN IRIS VICTORIA 3146 TEL: (03) 9822-2888 FAX: (03) 9822-7444

Central Victorian Livestock Exchange

VEHICLE SWEPT PATHS

CENTRAL VICTORIAN LIVESTOCK EXCHANGE

SCALE 0 10 20 | SHEET No. 04/04 | 15152-01

Appendix D: Learmonth Sulky Road Functional Layout Plans & VicRoads Approvals

Carlo Morello

From: Sarah Auld <sarah.auld@spiire.com.au>
Sent: Wednesday, 11 May 2016 10:10 AM
To: Carlo Morello
Subject: FW: 215373 CVLX Function Plan for Learmonth-Sulky and Ballarat-Maryborough Rds Intersection
Attachments: 215373_05A_C001-C005.pdf

From: Sat.Satkunam@roads.vic.gov.au [mailto:Sat.Satkunam@roads.vic.gov.au]
Sent: Tuesday, 5 April 2016 3:09 PM
To: Pete Oste <poste@geolyse.com>
Cc: Martin Haege <mhaege@geolyse.com>; Orange Document Control <odoccontrol@geolyse.com>; 'Paul Brown' <paul.brown@palisadepartners.com.au>; Sarah Auld <sarah.auld@spiire.com.au>; Sam.Brown@roads.vic.gov.au; Ashley.Goad@roads.vic.gov.au
Subject: Re: 215373 CVLX Function Plan for Learmonth-Sulky and Ballarat-Maryborough Rds Intersection

Good afternoon Pete,

I refer to your email dated 22 March 2016, enclosed functional layout plans for the proposed works at the intersection of Ballarat-Maryborough Road and Learmonth-Sulky Road.

The functional plans have been reviewed and are considered acceptable to VicRoads.

Should you have any enquiries regarding this matter, please contact me.

Regards

Sat Satkunam
Senior Statutory Planning Officer
88 Learmonth Road
Wendouree
Tel: 5333 8753
Fax: 5333 8771

From: "Pete Oste" <poste@geolyse.com>
To: <Sat.Satkunam@roads.vic.gov.au>,
Cc: "Orange Document Control" <odoccontrol@geolyse.com>, "Martin Haege" <mhaege@geolyse.com>, "'Paul Brown'" <paul.brown@palisadepartners.com.au>, <sarah.auld@spiire.com.au>
Date: 22/03/2016 09:05 AM
Subject: 215373 CVLX Function Plan for Learmonth-Sulky and Ballarat-Maryborough Rds Intersection

---

Ext: **Business Area:**
Fax: **Internet:**
File Name: **File Description:**

Hey Sat,

See attached the Functional Plan for the additional intersection works required at the Learmonth-Sulky and Ballarat-Maryborough Rds Intersection as part of the Central Tablelands Livestock Exchange (CVLX) development.

Can you please review and confirm the layout and proposed works meet VicRoads approval.

Please don't hesitate to contact me should you have any queries or wish to discuss things further,

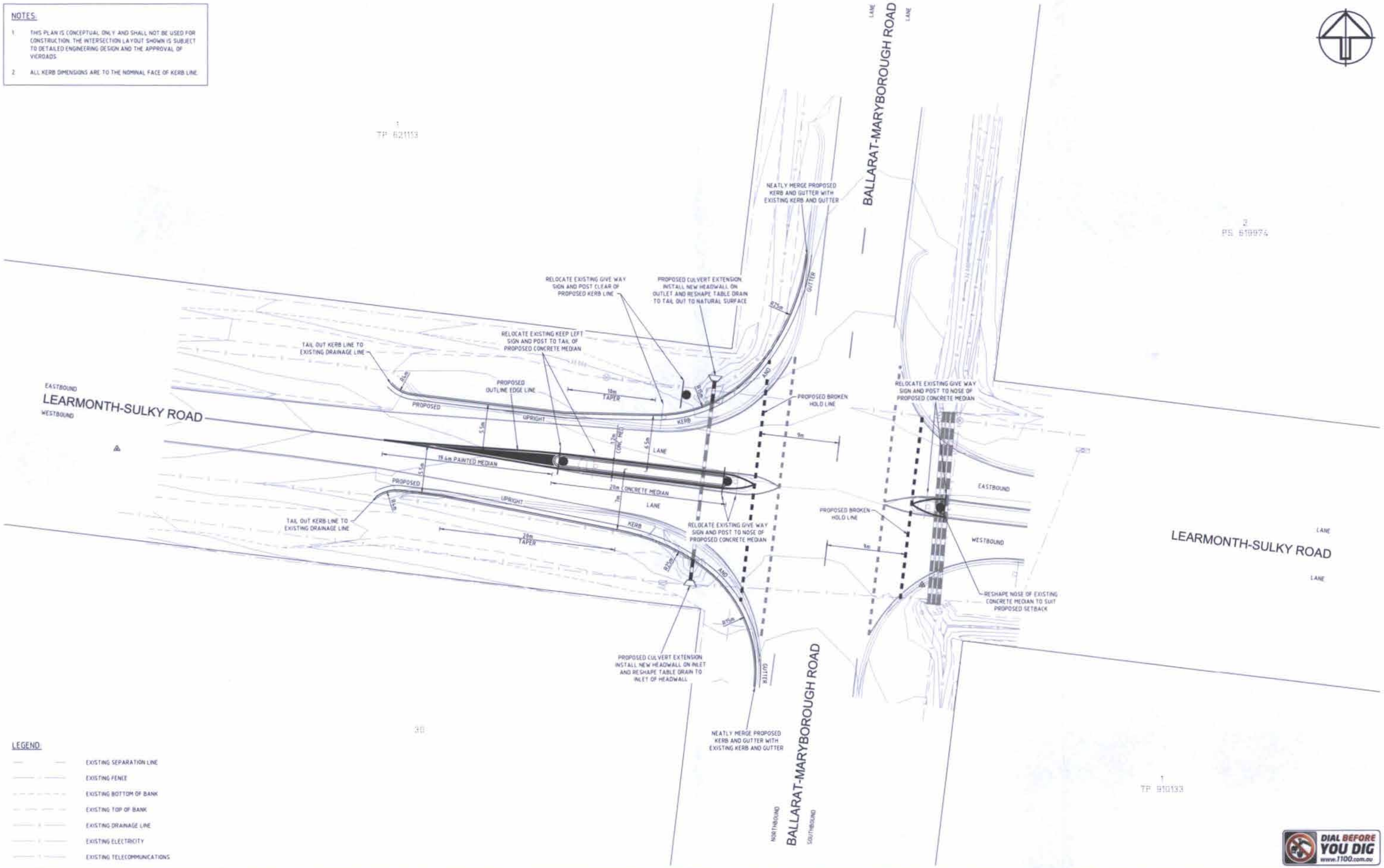
Regards

Peter Oste
Senior Civil Engineer
Geolyse Pty Ltd
154 Peisley St
PO Box 1963
Orange NSW 2800
Ph: 02 6393 5000
Fx: 02 6393 5050
Mob: 0438 841 523
Email: poste@geolyse.com
Web: www.geolyse.com

Facebook | LinkedIn

NOTES:

1. THIS PLAN IS CONCEPTUAL ONLY AND SHALL NOT BE USED FOR CONSTRUCTION. THE INTERSECTION LAYOUT SHOWN IS SUBJECT TO DETAILED ENGINEERING DESIGN AND THE APPROVAL OF VICROADS.
2. ALL KERB DIMENSIONS ARE TO THE NOMINAL FACE OF KERB LINE.



LEGEND:

- EXISTING SEPARATION LINE
- EXISTING FENCE
- EXISTING BOTTOM OF BANK
- EXISTING TOP OF BANK
- EXISTING DRAINAGE LINE
- EXISTING ELECTRICITY
- EXISTING TELECOMMUNICATIONS

REV	DATE	DFTD	APPD	DETAILS
A	21/03/16	AJD	PPO	CONCEPTUAL NORTHERN INTERSECTION LAYOUT

	FILE	INITIALS	DATE
SURVEY	301034FS00.dwg	SPIRE	14/12/15
DESIGN	-	-	-
DRAINS/ HEC-RAS MODELLING	-	-	-
ENGINEERING/ SURVEYING APPROVAL		-	-

DRAWING SCALE
SCALE 1:200 (A1)
SCALE 1:400 (A3)
DO NOT SCALE FROM THESE DRAWINGS. ALL MEASUREMENTS SHALL BE CONFIRMED ON SITE AND WITH GEOLYSE PTY. LTD. PRIOR TO CONSTRUCTION

APPROVAL AUTHORITY: VICROADS
CLIENT: RLX INVESTMENT COMPANY ATF RLX INVESTMENT TRUST
PROJECT: CENTRAL VICTORIA LIVESTOCK EXCHANGE

GEOLYSE
ORANGE
orange@geolyse.com
www.geolyse.com
154 PEISLEY STREET
P.O. BOX 1963
ORANGE, NSW 2800
Ph. (02) 6393 5000
Fx. (02) 6393 5050

DRAWING: PROPOSED INTERSECTION LAYOUT

PROJECT NUMBER 215373	DRAWING FILE 215373_05A_C001-C005.dwg		SIZE A1
SURVEY MARK STAR PICKET	R.L. 433.87	DATUM A.H.D.	SET 05
IMAGE SOURCE			
STATUS FOR REVIEW	SHEET C003 OF C005		

APPENDIX 5

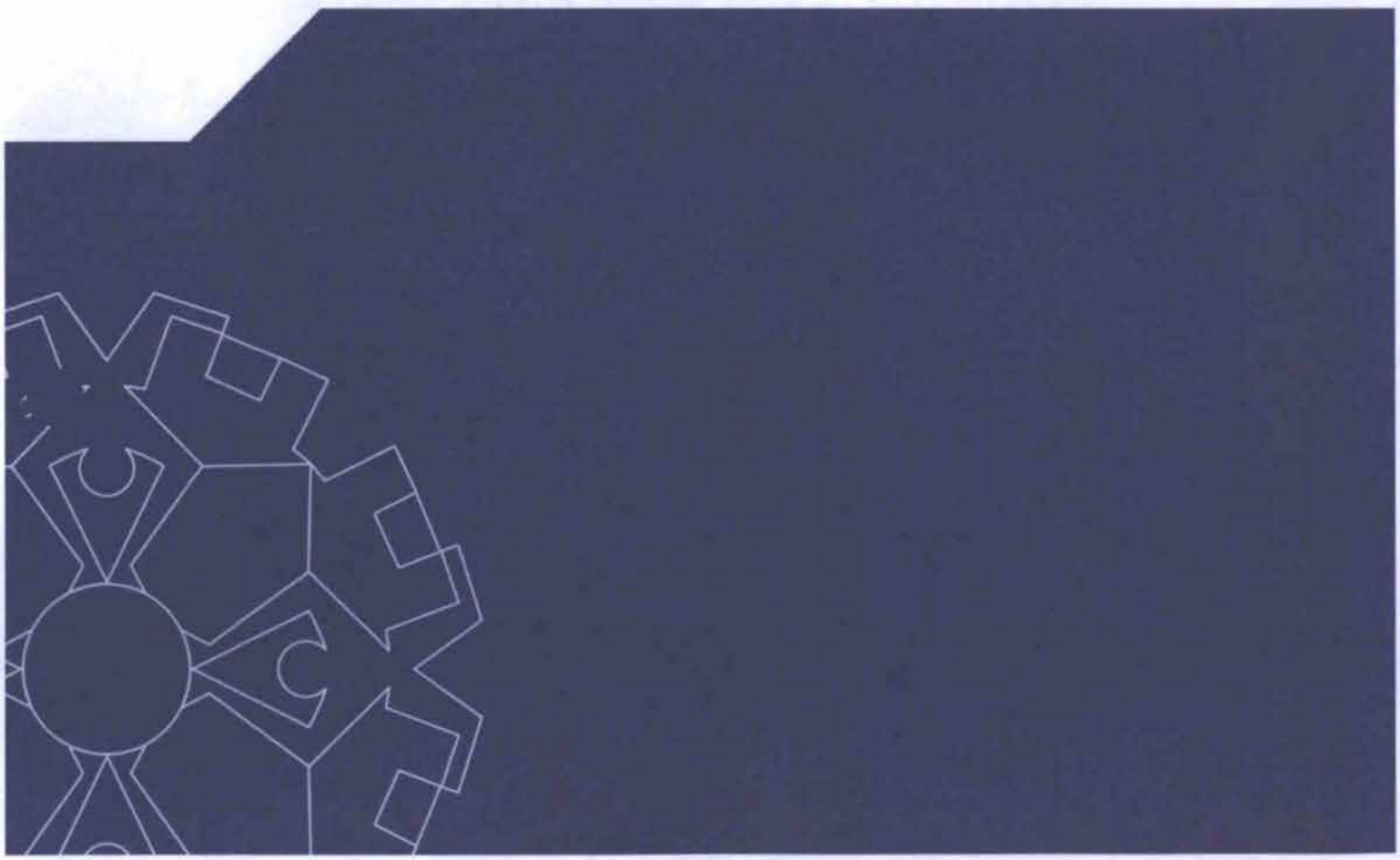
Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE 13/10/16

GEOLYSE

STORMWATER MANAGEMENT PLAN
CENTRAL VICTORIA LIVESTOCK EXCHANGE

PREPARED FOR
RLX INVESTMENT COMPANY PTY LTD

MAY 2016



• Civil, Environmental & Structural Engineering • Surveying • Environmental • Planning • Architecture

APPENDIX 2

STORMWATER MANAGEMENT PLAN

CENTRAL VICTORIA LIVESTOCK EXCHANGE

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN OVERLAY
Development Plan Schedule No.....
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE.....

DEVELOPMENT PLAN APPLICATION

PREPARED FOR:

RLX INVESTMENT COMPANY PTY LTD

MAY 2016

GEOLYSE

POSTAL ADDRESS PO BOX 1963 ORANGE NSW 2800
LOCATION 154 PEISLEY STREET ORANGE NSW 2800
TELEPHONE 02 6393 5000 FACSIMILE 02 6393 5050
EMAIL ORANGE@GEOLYSE.COM WEB SITE WWW.GEOLYSE.COM

Report Title:	*Stormwater Management Plan*
Project:	*Central Victoria Livestock Exchange*
Client:	*RLX INVESTMENT COMPANY PTY LTD*
Report Ref.:	*208120_REP_006D.docx*
Status:	*Final*
Issued:	*9 May 2016*

Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of RLX INVESTMENT COMPANY PTY LTD to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

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Executive Summary

RLX Investment Company Pty Ltd, as trustee for RLX Investment Trust (RLX IC), proposes to relocate the Central Victoria Livestock Exchange (CVLX) from its existing site in central Ballarat to the north-west outskirts of the city. This move will allow the development of a state-of-the-art facility that will provide livestock marketing and saleyard services for the Ballarat district and extending further into central Victoria.

Geolyse Pty Ltd was engaged by RLX Investment Company Pty Ltd, as trustee for RLX Investment Trust to provide this additional information relating to stormwater management to support the Development Plan application.

The information provided in this report is an update of documentation relating to stormwater management previously prepared for the site. The stormwater management system approach has not altered from that previously submitted, however due to the site layout changing from the original assessment the hydrologic and water quality models have been updated to reflect the current layout. Recommendations made by Neil Craigie in his expert review have also been incorporated into the water quality model.

Both the updated hydrologic and water quality modelling show that the stormwater management system will achieve 'zero adverse impacts' for surrounding areas up to and including the 1% AEP flood event.

Introduction

2.1 BACKGROUND

RLX Investment Company Pty Ltd, as trustee for RLX Investment Trust (RLX IC), proposes to relocate the Central Victoria Livestock Exchange (CVLX) from its existing site in central Ballarat to the north-west outskirts of the city. This move will allow the development of a state-of-the-art facility that will provide livestock marketing and saleyard services for the Ballarat district and extending further into central Victoria.

The facility will provide:

- Covered livestock selling centres (cattle and sheep);
- Offices, agents facilities and associated car parking areas;
- Truck parking and truck wash facilities;
- Holding yards and paddocks; and
- Associated site infrastructure.

The proposal is being considered through a works approval number 1001580 under the Environment Protection Act 1970 and a Development Plan pursuant to the Special Use Zone which applies to the site.

Geolyse Pty Ltd was engaged by RLX IC to provide this additional information to support the Development Plan application.

2.2 SCOPE

This report provides an updated description of the proposed stormwater management system for the CVLX. It includes:

- The basis of the system design;
- Updated hydrologic and water quality modelling;
- Details of flooding within the site; and
- Details regarding maintenance and construction.

Construction of the CVLX will be undertaken as a design and construct contract. The details presented in this report will inform the final detail design of the stormwater management system.

The information contained in this report is intended to address both the requirements of the '*Drainage Report*' and '*Stormwater Management Plan*' specified in the Ballarat Planning Scheme- Schedule 15 to the Special Use Zone.

2.3 REVISED DEVELOPMENT PLAN

This report replaces the Stormwater Management Plan report prepared in March 2016 and has been updated due to refinements in the site layout.

Stormwater Management System

3.1 OVERVIEW

The stormwater management system will include:

- Separate systems for collection of stormwater runoff of differing quality;
- Diversion drains;
- Grassed swales;
- A first flush pond;
- A rainwater pond; and
- A wetland/detention basin.

The proposed 2 ML stormwater first flush system will capture runoff from the external yard areas and the truck movement areas adjacent to the ramps. This system has been designed to capture runoff from approximately 55 mm of rainfall across this area. Captured water will be pumped to the solids removal system and will then enter the effluent management system. Treatment of the combined effluent stream water is included in Effluent Management System report.

Once the first flush pond is full, further runoff will divert to the surface water wetland.

The proposed site layout is shown on **Figure 1**.

3.2 DESIGN

3.2.1 DESIGN STRATEGY

Stormwater runoff from the CVLX site will be managed in a surface water management system that separates stormwater runoff of differing quality as follows:

- Runoff from roofed areas will be directed to the rainwater pond – a large proportion of this water is reused in the facility;
- Runoff from hardstand, roads, car/truck parking, residual areas and uncovered yards will be directed to the first flush pond (the first flush pond is also part of the effluent management system); and
- Runoff from irrigation areas will be directed to the wetland and grassed swales.

The first flush pond is part of the effluent management system which collects, treats and manages through irrigation or reuse runoff or wash-down water that contains animal waste. The effluent management system is detailed in the Effluent Management System report.

The surface water design strategy ensures that all stormwater runoff generated on the site is collected and appropriately managed to prior to discharge.

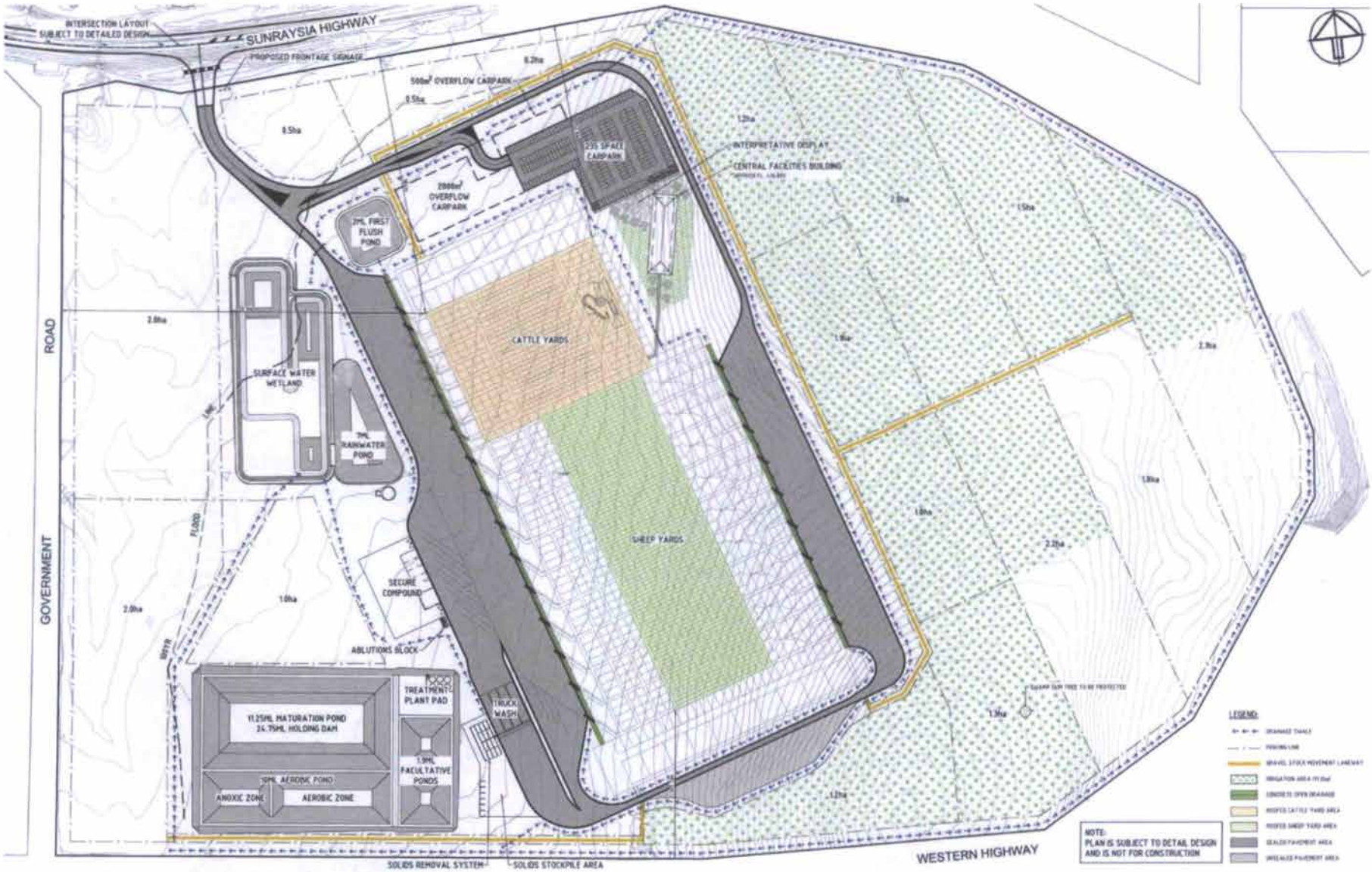

Figure 1: CVLX proposed site layout

3.2.2 HYDROLOGIC MODELLING

The site XP-RAFTS model was updated to reflect the recent refinements to the site layout. A review of the XP-RAFTS model undertaken by Neil Craigie stated that *'the water management strategy proposed by Geolyse for the CVLX very effectively limits fully developed peak discharges to the northwest outfall to less than existing conditions for all ARI's up to and including the 100 year ARI event'*. Given this previous conclusion the model parameters within the XP-RAFTS model were not amended, only the catchment areas were altered to reflect the current site layout. The model parameters are defined in Geolyse (2015).

The Ballarat Planning Scheme requires that the stormwater management system be designed for 'zero adverse impacts' to surrounding areas for up to and including the 1% Annual Exceedance Probability (AEP) flood event (100 year Average Recurrence Interval (ARI)). In terms of hydrologic modelling, 'zero adverse impacts' means that post-development peak flows from the site are to be reduced to or below existing peak flows.

The proposed surface water wetland system (shown in **Figure 1**) will be designed to have 0.8 m of air space (7,040 m^3) above the normal water level of the wetland. Outflow from the wetland would be controlled by a 0.9 m x 0.9 m box inlet connected to a 750 mm diameter pipe. A 25 m wide spillway would be provided 0.8 m above the normal water level, with the top of bank 0.3 m above the spillway level. The combination of air space and outlet configuration provides the required detention to meet the requirements of the Ballarat Planning Scheme.

A summary of the XP-RAFTS modelling results for the site are shown below in **Table 3.1**.

Table 3.1 – XP-RAFTS Model Results

ARI (years)	Existing Peak Flow (m^3/s)	Post-Development Peak Flow (m^3/s)
1	0.185	0.009
10	0.933	0.562
100	2.284	2.102

Results in **Table 3.1** show that the peak flows from the post-development site are below the existing peak flows for up to and including the 1% AEP flood event.

3.2.3 WATER QUALITY MODELLING

The design objective for the stormwater management system in terms of water quality was to ensure that the system achieved 'zero adverse impacts' as specified by the Ballarat Planning Scheme. To achieve the Ballarat Planning Scheme requirement the following stormwater treatment devices will be constructed on the site:

- Diversion drains to direct stormwater runoff to the appropriate treatment system;
- A constructed wetland;
- Grassed swales; and
- A first flush pond (part of the effluent treatment system).

The proposed stormwater treatment system will ensure that no stormwater leaves the site without appropriate treatment.

A MUSIC model was set up by Geolyse to undertake the initial modelling of the site. An expert review of the MUSIC model by Neil Craigie suggested some amendments. The suggested amendments to the MUSIC model were as follows:

- Mean annual evapotranspiration adjusted to the long term local average of 1,031 mm/yr;

- Soil storage capacity 120 mm, field capacity 50 mm for non-irrigated pervious areas;
- Soil storage capacity 120 mm, field capacity 40 mm for irrigated pervious areas;
- 6 minute rainfall data for 1986-1995 at Ballarat Aerodrome; and
- A pond added after the wetland for reuse extraction.

The suggested amendments and the changes to the site layout have been incorporated into the MUSIC model and catchment areas modified to suit the current layout.

The proposed constructed wetland shown in **Figure 1** has the following key design parameters:

- Inlet pond volume 2,000 m^3;
- Macrophyte area 3,870 m^2;
- Macrophyte area depth 0.5 m;
- Extended detention depth 0.5 m
- Outlet pond volume 1,800 m^3;
- Total volume 5,700 m^3 @ NWL; and
- Total surface area 6,800 m^2 @ NWL.

Water for reuse in the facility will be drawn from the outlet pond. The wetland macrophyte zone will have 200 mm high internal bunds that will trap water within the macrophyte area in the event that greater than 300 mm of water is drawn from the wetland system. This will maintain the macrophyte area.

Results of the revised MUSIC model are shown in **Table 3.2**.

Table 3.2 – MUSIC Modelling Results

Parameter	Existing	Post Development Pre-Treatment	Post Development Post-Treatment	Post Development % Reduction from Pre-Treatment	Post Development % Reduction from Existing
Flow (ML/yr)	42	77.3	46.6	39.7%	+11.0%
TSS (kg/yr)	1150	11,400	645	94.3%	44.0%
TP (kg/yr)	9.6	29.6	4.7	84.3%	51.0%
TN (kg/yr)	52.7	163	52.3	68.1%	0.7%

The figures in **Table 3.2** show that the proposed stormwater treatment system reduces pollutant levels to below the levels in stormwater currently leaving the site, achieving the objective of 'zero adverse impacts' specified by the Ballarat Planning Scheme.

3.2.4 FLOODING

3.2.4.1 Flooding Assessment

Flooding has not been specifically covered by this report; a separate report for the proposed development relating to flooding has been prepared by Water Technology which is included in **Appendix A**.

The development footprint in relation to existing mapped 1% AEP flooding in the area is provided in **Figure 2**. This shows that there is a drainage line along the western portion of the site and that drainage occurs around the eastern and norther boundaries.

The flooding around the northern part of the site adjacent to the Sunraysia Highway occurs in flood events greater than the 5% AEP event. A culvert will be included beneath the site access road to accommodate this flow and allow it to reach the western drainage line.

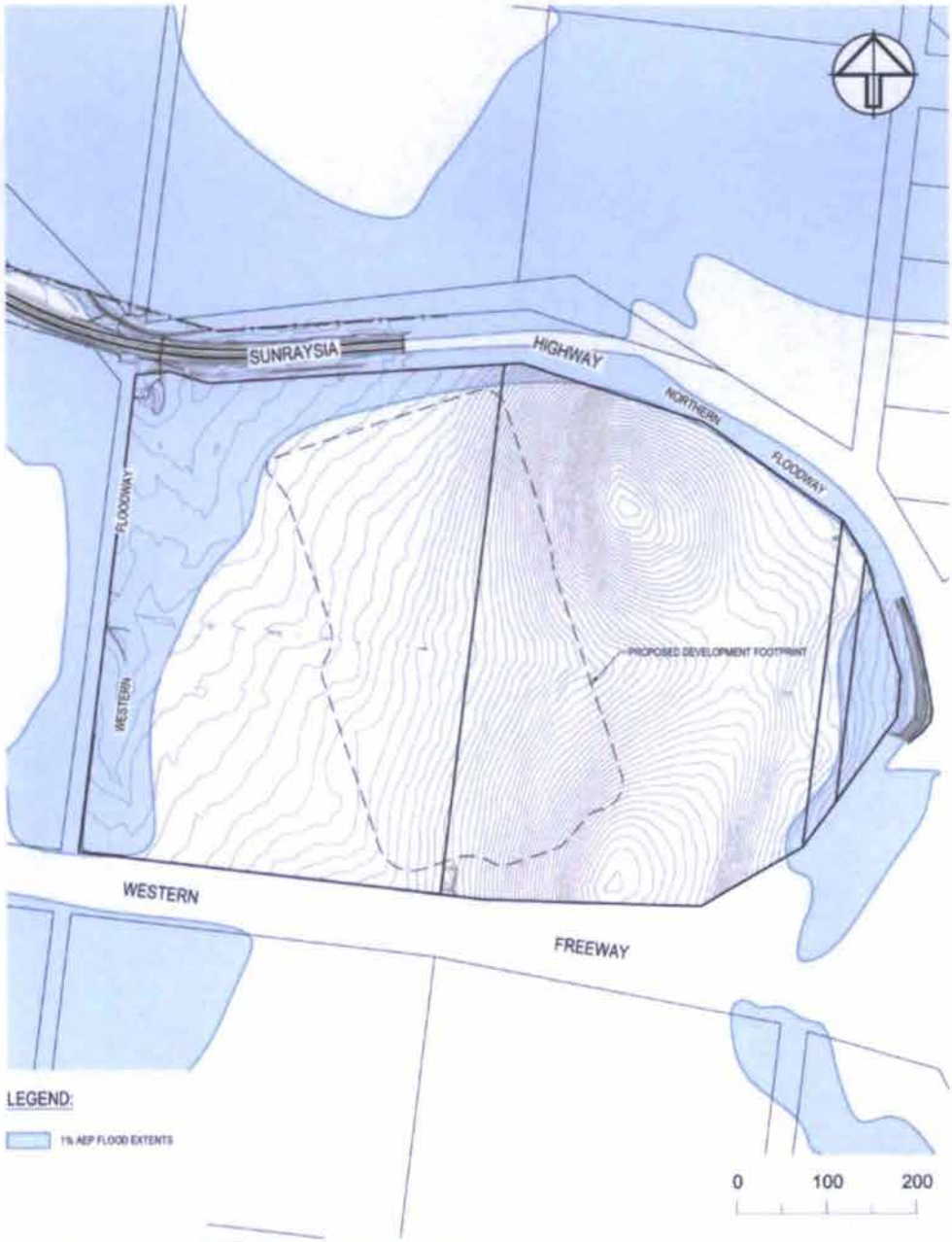

Figure 2: Existing 1% AEP flooding patterns

A key consideration in the assessment of flooding was to separate the development from 1% AEP flooding. This means raising sections of the development or constructing embankments to separate the development from flooding. This was represented in the model by using a levee.

The modelling determined a levee alignment that did not result in changes to local flooding patterns. This alignment is shown on **Figure 3**. The site layout was designed to locate all proposed infrastructure to the east of the revised levee alignment shown in Figure 3-5 of the Water Technology report (in **Appendix A**). As a result the proposed development will not increase flooding levels in Burrumbeet Creek or along the Sunraysia Highway.

The design of all stormwater overland flow paths within the site will ensure they have capacity to convey the 1% AEP flood event whilst maintaining separation of runoff containing differing levels of pollutants.

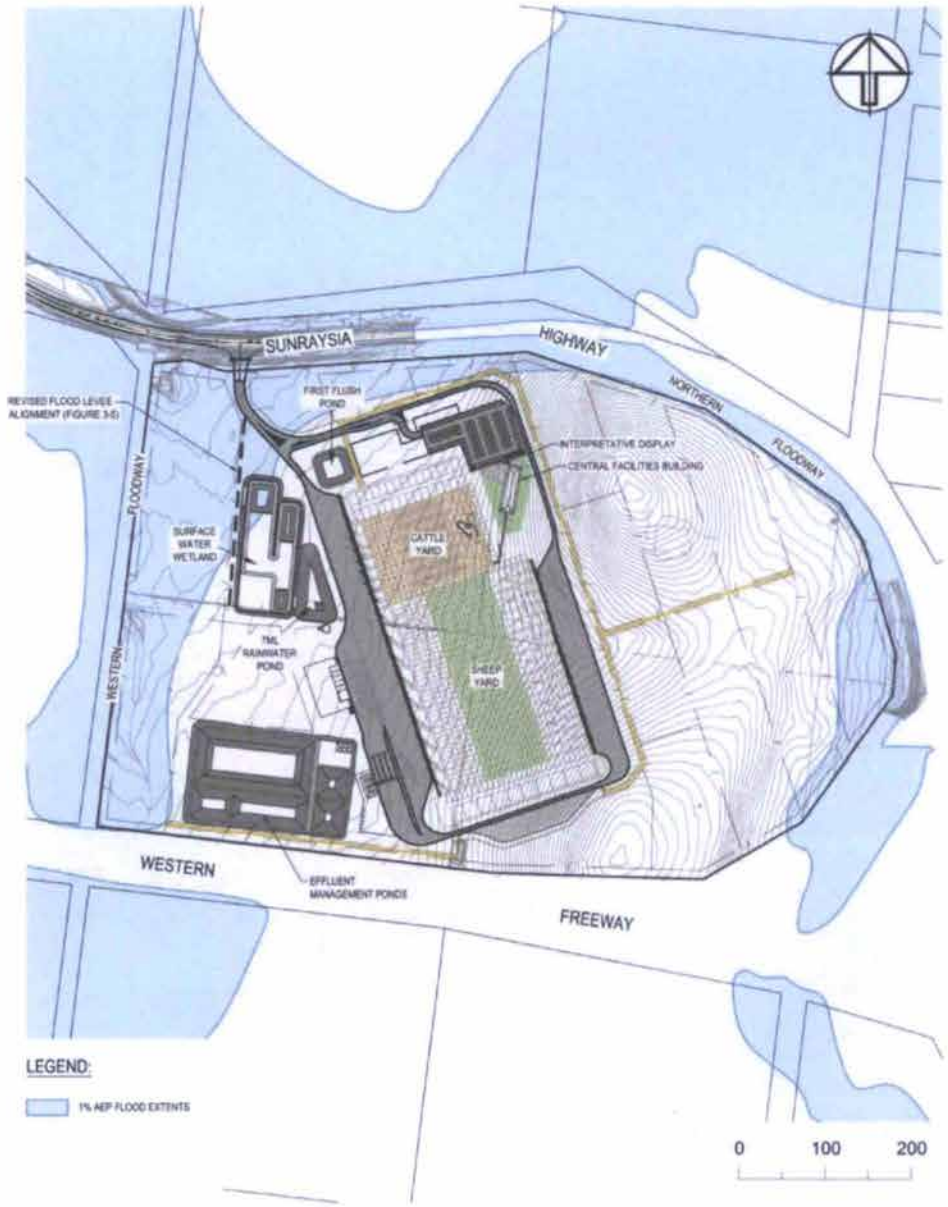

Figure 3: Proposed site layout and modelled levee alignment

3.2.4.2 Hydrographs

The flood modelling undertaken by Water Technology (**Appendix A**) does not explicitly take into account the discharge hydrograph from the proposed CVLX site. The modelling undertaken by Water Technology includes both hydrology and hydraulics: the catchment hydrology (runoff) is determined at various points throughout the catchment and runoff hydrographs are input to the hydraulic model to determine flooding patterns. The hydrological model used for the Water Technology assessment

includes the catchment area occupied by the proposed CVLX – therefore flows from this catchment, in its existing state (pre development), are included in the model.

The 1% AEP flood hydrographs from the Water Technology model are shown in **Figure 4**. The red lines are the flood hydrographs in the western drainage line adjacent to the site. The green lines are the flood hydrographs in the drainage line that runs around the northern side of the site adjacent to the Sunraysia Highway. The flood hydrographs for the western drainage line (red lines) show a peak at around 5 hours after the start of rainfall. It is a long hydrograph most likely due to the culvert on the western freeway controlling the discharge past the site. The northern drainage line (green lines) peaks at around 4.3-4.5 hours from the start of rainfall.

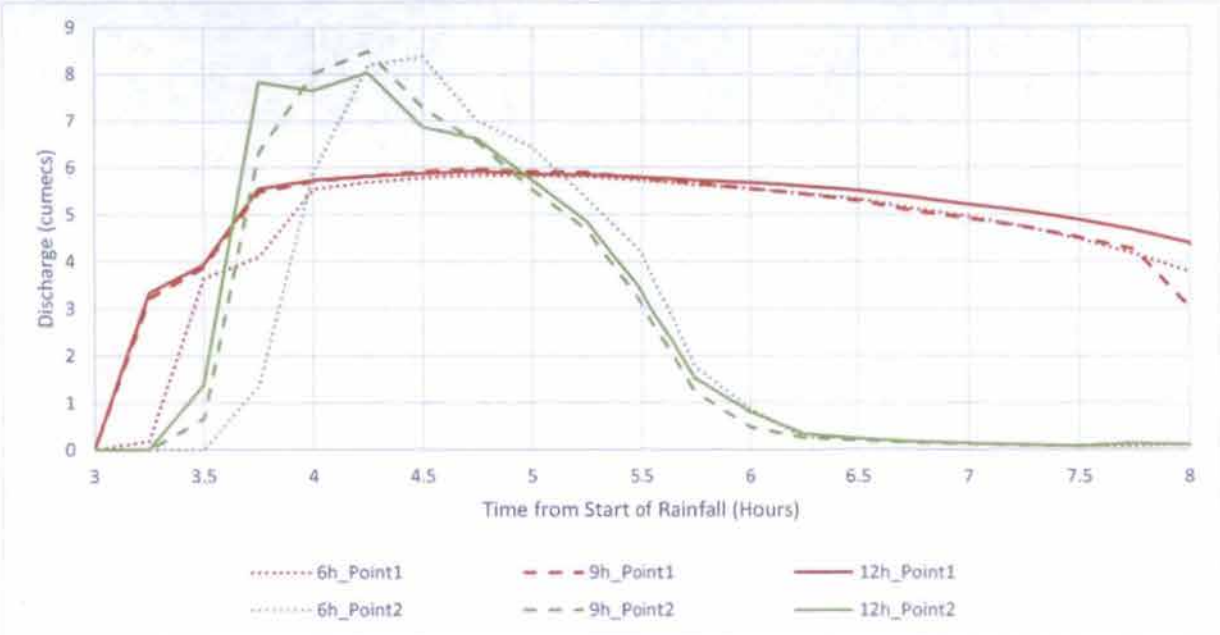

Figure 4: Flood hydrographs from Water Technology model (provide by Water Technology)

The design premise for the CVLX surface water management system is to achieve zero adverse impact across a range of design storms. Modelled discharge hydrographs for the CVLX site are shown in **Figure 5** for two 100 year ARI design storms. In the pre-development case, the 2 hour 100 year ARI design storm produces the highest peak discharge. The 12 hour 100 year ARI design storm produces the highest site discharge for the post development case. However, it is important to note that the post development site discharge is less than the current site discharge at all points through the hydrograph when comparing each design storm.

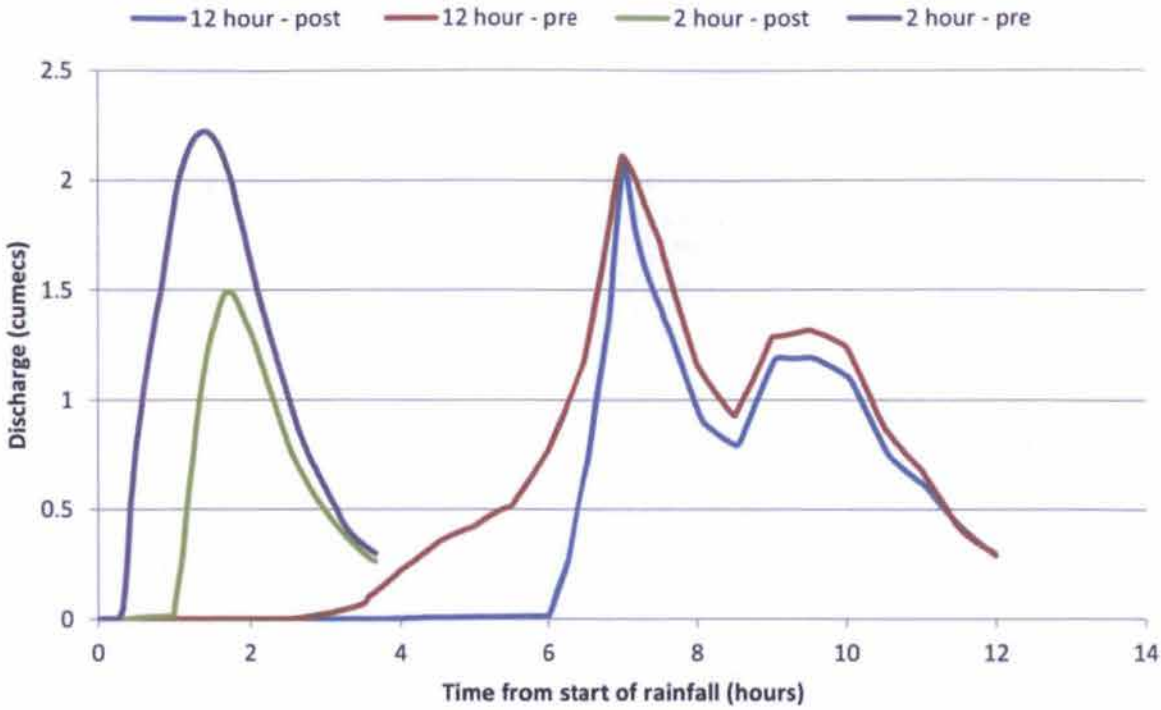

Figure 5: 100 year ARI site hydrographs

Given that the Water Technology modelling includes discharge from the proposed CVLX catchment in its current state, and the proposed surface water management system reduces the site discharge to below the current state, the discharge of stormwater from the CVLX site would not have a detrimental impact on flood levels adjacent to the site.

3.2.5 MAINTENANCE

The site will be managed by the RLX IC including the stormwater management system. The maintenance of the stormwater management system including all drains, swales, levees, the wetland, first flush pond and rainwater pond will be undertaken by RLX IC.

A rising stage sampler will be installed on the outlet of the stormwater wetland system that will collect discharge from the wetland in the event of overflow.

A minimum of four samples will be collected in the first year of operations. This will then reduce to two samples per year (winter and summer periods).

The surface water analysis suite will include:

- Conductivity;
- pH;
- Total suspended solids;
- Total nitrogen;
- Nitrate;
- Ammonia; and
- Total Phosphorus.

The inspection and maintenance program for the wetland and stormwater management system is contained in **Table 3.3**.

Table 3.3 – Stormwater Management System – Inspection and Maintenance Program

Objective	Zone	Activity	Frequency
Water Quality	Inlet Zone	*Maintain integrity of structure* - inspect headwall, banks and scour protection works.	Every 3 months and following major storms
		Bank maintenance - correct erosion and slumping as soon as possible.	
		Litter removal - remove excess litter and debris.	
	Deep Water Zone	*Maintain integrity of structure* - inspect fence and bank areas around the open water zone.	Every 3 months and following major storms
		Sediment removal - inspect sediment level ad remove when volume has been reduced by 30%. Remove sediment and ensure disposal in accordance with the Waste Minimisation Act, 1995.	Inspect sediment level annually and remove as required.
		Bank maintenance – check bank areas for slumps and hollows that can trap water and provide mosquito breeding habitat and repair as required.	Inspect every 3 months and following major storms
	Macrophyte Zone	*Water level manipulation* – lower water levels for about 1-2 weeks in summer by about 0.3m-0.4m (if it has not occurred through evaporation) for plant establishment and to mimic natural water level variations.	Annually in summer if required
		Plant replacement - replace plants as required.	Inspect every 3 months and following major storms
		Weed control - remove undesirable species from the wetland.	
		Plant maintenance - plants should be checked for signs of disease or insect damage.	
		Maintenance of open water area - remove emergent vegetation colonising open water areas.	
		Bank maintenance – check bank areas for slumps and hollows that can trap water and provide mosquito breeding habitat and repair as required.	
Habitat	Macrophyte Zone	*Encourage wildlife opportunities* – control feral animals, ensure habitat integrity	As required
		Protect deep open water habitat – do not completely drain open water areas.	When manipulating water level
		Weed control - remove undesirable species from the wetland.	Inspect every 3 months
		Bank maintenance – check bank areas for slumps and hollows that can trap water and provide mosquito breeding habitat and repair as required.	Inspect every 3 months and following major storms
	Outlet Structure	*Maintain integrity of structure* – inspect and clean as required	Inspect every 3 months and following major storms
	Surrounds	*Shading* – do not shade out the wetland with surrounding vegetation.	Ongoing
		Weed control - remove undesirable species from the wetland.	Inspect every 3 months
		Bank maintenance – check bank areas for slumps and hollows that can trap water and provide mosquito breeding habitat and repair as required.	Inspect every 3 months and following major storms

Table 3.3 – Stormwater Management System – Inspection and Maintenance Program

Objective	Zone	Activity	Frequency
Recreation and Visual Amenity	All	*Maintain vegetative cover* – ensure edging and water macrophyte plantings remain vigorous and healthy.	Inspect every 3 months and following major storms
		Weed control - remove undesirable species from the wetland.	Inspect every 3 months
		Public Health and Safety - inspect for safety (ie bank stability, slumping)	Inspect every 3 months
		Maintain signs – inspect and replace as required	Inspect every 3 months

3.2.6 CONSTRUCTION

The construction phase of the project will entail a significant amount of earthworks and building works. As a result there is the potential for erosion and sediment to impact stormwater runoff leaving the site during the construction phase. To mitigate construction related impacts it is proposed to undertake the following:

- A temporary sedimentation basin will be constructed within the footprint of the proposed wetland in accordance with the *Construction Techniques for Sediment Pollution Control- EPA Victoria*. All stormwater runoff generated during the construction phase will be directed to the temporary sedimentation basin;
- Erosion and sedimentation controls in accordance with *Construction Techniques for Sediment Pollution Control- EPA Victoria* will be installed at appropriate locations and maintained to ensure ongoing effectiveness.

The implementation of the above measures will ensure that stormwater quality leaving the site is not adversely affected during the construction phase.

Conclusion

RLX Investment Company Pty Ltd, as trustee for RLX Investment Trust (RLX IC), proposes to relocate the Central Victoria Livestock Exchange (CVLX) from its existing site in central Ballarat to the north-west outskirts of the city. This move will allow the development of a state-of-the-art facility that will provide livestock marketing and saleyard services for the Ballarat district and extending further into central Victoria.

The information provided in this report is an update of documentation relating to stormwater management previously prepared for the site. The stormwater management system approach has not altered from that previously submitted, however due to the site layout changing from the original assessment the hydrologic and water quality models have been updated to reflect the current layout. Recommendations made by Neil Craigie in his expert review have also been incorporated into the water quality model.

Both the updated hydrologic and water quality modelling show that the stormwater management system will achieve 'zero adverse impacts' for surrounding areas up to and including the 1% AEP flood event. The flood modelling undertaken by Water Technology shows that the current site layout will not increase flood levels in Burrumbeet Creek or along the Sunraysia Highway.

Appendix A

FLOOD RISK REPORT

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Central Victorian Livestock Exchange – Flood Risk Report

February 2016

DOCUMENT STATUS

Version	Doc type	Reviewed by	Approved by	Distributed to	Date issued
v01	Report	Ben Hughes	Ben Hughes	Sarah Auld	12/02/2016
v02	Report	Ben Hughes	Ben Hughes	Sarah Auld	25/02/2016

PROJECT DETAILS

Project Name	Central Victorian Livestock Exchange Flood Risk Report
Client	Spiire
Client Project Manager	Sarah Auld
Water Technology Project Manager	Ben Tate
Report Authors	Ben Tate
Job Number	4305-01
Report Number	R01
Document Name	4305-01R01v02_CVLX-FloodReport.doc

Cover Photo: Existing flood mapping and inset photo from the www.thecourier.com.au

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1. INTRODUCTION

As required by the State Planning Policy Framework and the Local Planning Policy Framework this report documents the results of a flood study hydraulic analysis (Section 3) and a flood risk assessment (Section 4).

Assessment of the 1% AEP flood event was undertaken for the proposed Central Victorian Livestock Exchange site located in the Burrumbeet Creek catchment between the Sunraysia and Western Highways south-west of Miners Rest, Figure 2-1. This memo outlines the hydraulic model re-establishment, verification to previous results and presents results for existing and proposed developed conditions.

2. BACKGROUND

Water Technology completed the Burrumbeet Creek Flood Investigation in December 2013. The project was a detailed flood investigation of the Burrumbeet Creek catchment to Lake Burrumbeet. Key input data included laser survey (LiDAR), rainfall data and details of key hydraulic structures throughout the catchment, including bridges, culverts and weirs.

The proposed site has a small overland drainage path located on the western boundary feeding into Burrumbeet Creek downstream of Miners Rest. Another small drainage path is located on the eastern boundary, with breakout flows shown to flow along the southern side of the Sunraysia Highway flowing into the western drainage line mentioned previously. The Geoscience Australia (2006) 250k topography vector data classifies both these drainage paths as unnamed non-perennial minor watercourses. Figure 2-1 shows the available 1% AEP flood mapping of the catchment with Figure 2-2 showing a number of photos of the site.

Water Technology have previously constructed a calibrated hydrological RORB model and a calibrated hydraulic TUFLOW model of the catchment. This model was re-established, trimmed upstream and downstream of the site, verified to previous results for existing conditions and used to model a proposed levee alignment for the site. This is described in the following sections.

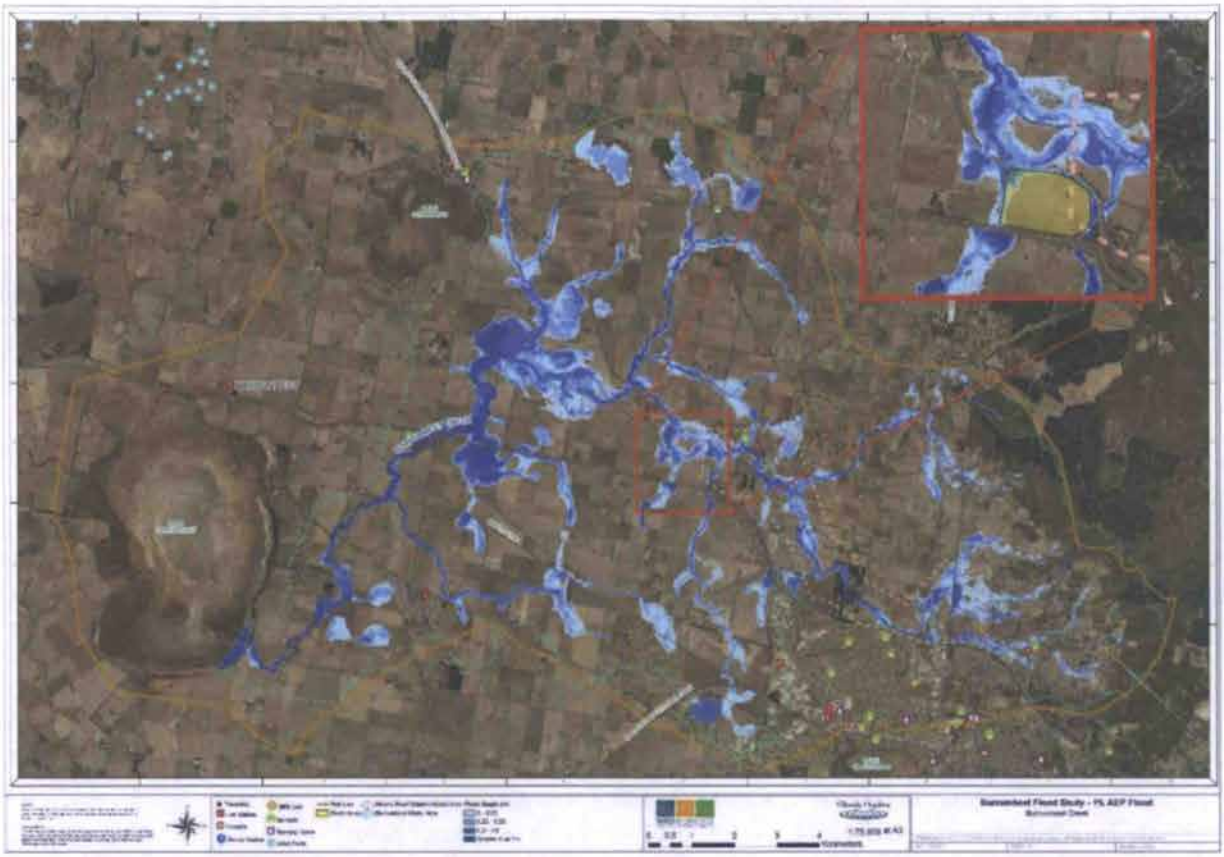

Figure 2-1 Study Site

Figure 2-2 Photos of the Site (source: Google StreetView)

Top Left: Western Highway looking north along waterway across the site; Top Right: Western Highway looking north-west across the site

Bottom Left: Sunraysia Highway looking south along waterway across the site; Bottom Right: Sunraysia Highway looking north-west along waterway away from the site

3. FLOOD MODELLING ANALYSIS

The existing hydraulic model developed for the Burrumbeet Creek Flood Investigation was trimmed upstream and downstream of the study site. Figure 3-1 shows the area of the trimmed model overlaying the previous 2013 flood modelling results.

3.1 Model Verification

Processed results from the previous Burrumbeet Creek Flood Investigation (2013) were available for the final GIS deliverables. It is our understanding that the final deliverables enveloped the 9, 24 and 36 hour durations for each of the design events as these durations were found to be critical at some key locations throughout the study area. Only a 36 hour duration 1% AEP model result file was found on archive. So unfortunately the results we have available from the previous investigation are the enveloped durations of the final design runs and the 36 hour duration as a standalone TUFLOW result file.

When investigating the impact of the adopted critical durations closer it was found that the 9 hour duration has split a number of the RORB inflow points from a single point in the main flow path to multiple points in the same area but on smaller tributary flow paths leading into the main flow path. This was most likely done to ensure known overland flow paths were mapped. However it seems that it was not done for all durations.

In re-establishing and verifying the modelling it was found that the shorter duration was critical for the overland flow paths across the site. Therefore 6, 9 and 12 hour durations were run and produced slightly higher peak flows for the overland flow paths across the site compared to previous modelling. The 12 hour duration was found to be critical and had approximately a 10% higher peak flow on the source inflow points along the overland flow paths. Using these shorter durations on the overland flow paths is appropriate and provides a conservative result.

For Burrumbeet Creek boundaries in the trimmed model, the only options were to use the 36 hour model result file or results from PO lines. The 36 hour duration result was only available for the 2D and had no 1D results available. PO lines were available for the 9 hour duration only. As the 9 hour duration PO lines incorporates both the 2D and 1D results, these were used as the basis for the inflow boundary to Burrumbeet Creek in the trimmed model. A hydrograph with a peak flow of 45 m^3/s was used as the 1% AEP inflow boundary for all model scenarios.

As we had no PO lines for other durations to test what duration was critical on Burrumbeet Creek, sensitivity tests were carried out on the impact of flows in Burrumbeet Creek on flood levels at the Sunraysia Highway culverts. For Burrumbeet Creek flows of between 20 and 100 m^3/s, the water level upstream of the Sunraysia Highway culverts on the subject site varies by less than 1.5 cm. This provides confidence that trimming the model to a smaller area and adopting the 9 hour duration 1% AEP inflow on Burrumbeet Creek Burrumbeet Creek has no impact on the hydraulic assessment of the subject site.

The model was rerun for the 1% AEP flood event for existing conditions with critical storm durations of 9, 24 and 36 hours on the overland flow paths. The results were compared to the previous Burrumbeet Creek Flood Investigation (2013) for the 9, 24 and 36 hour durations, Figure 3-1. It was found that they were generally within plus or minus 0.5 cm of the previous results along the western drainage path. The modelling showed the breakout flows from the eastern drainage path that flow along the southern side of the Sunraysia Highway to be approximately 7-10 cm higher than the previous modelling results. This is due to the previous model splitting some of the inflow boundaries up onto the minor overland tributaries for the 9 hour duration. The flood extents are unchanged across the majority of the site. Downstream of the site on the Burrumbeet Creek floodplain, the modelled water levels were between 2 to 5 cm higher than in previous modelling purely because of

the storm duration adopted on Burrumbeet Creek and the splitting of the inflow boundaries in the 9 hour event in the old modelling. Given that the water levels are higher in the new modelling this reflects a conservative approach which is appropriate for modelling of the development proposal.

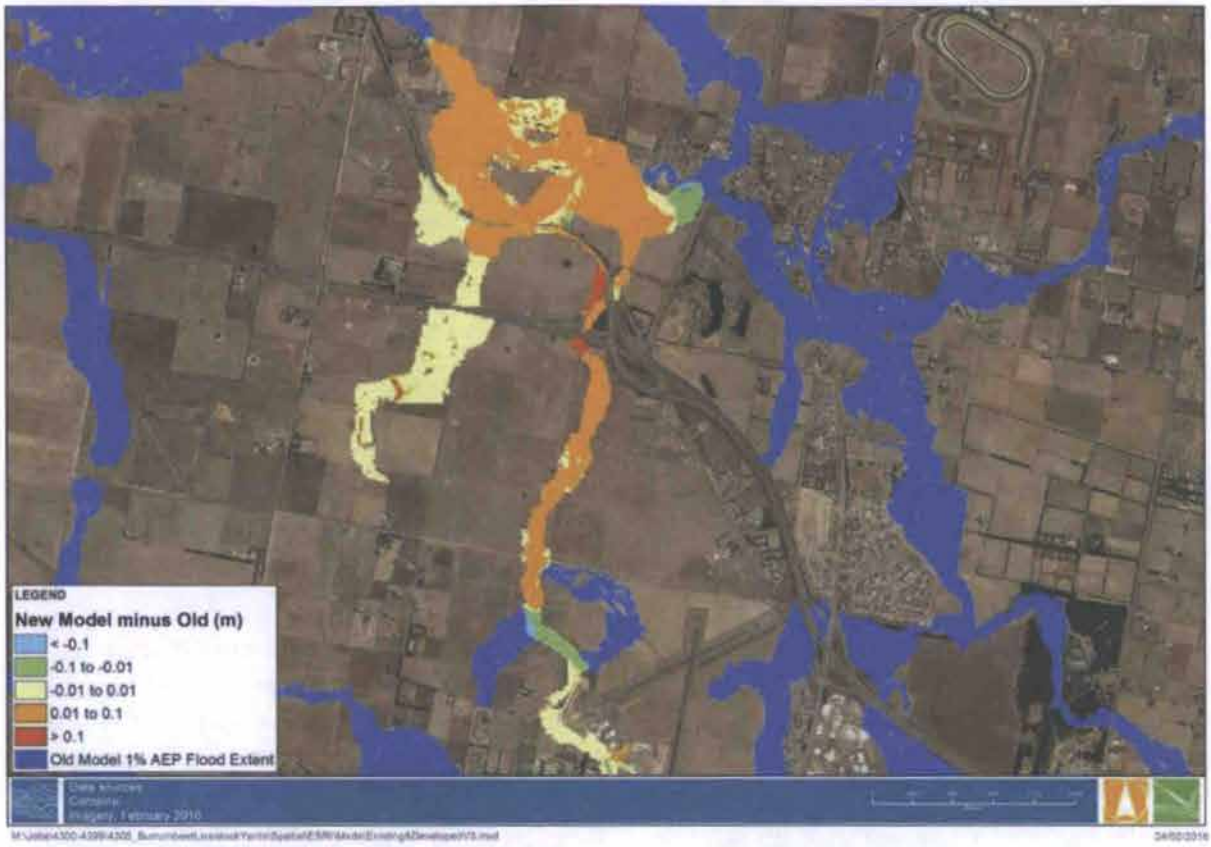

Figure 3-1 Trimmed Model Difference Results

3.2 Existing Conditions

The 1% AEP flood event was run for a series of storm durations. It was found that the maximum water levels across the site varied by up to half a metre over the various duration events. The 6, 9 and 12 hour durations generated the peak water levels across the site and were within 1-2 cm of each other.

The Burrumbeet Creek inflow used in the trimmed model was extracted from the 2013 investigation model and adopted the 9 hr duration with a peak flow of 45 m^3/s. The 6, 9 and 12 hour local catchment inflows were adopted as per the 2013 investigation, and included 7 source points along the local overland tributary inflows. These overland inflows were exactly the same as those incorporated into the 2013 investigation. The outflow boundary adopted at the trimmed downstream boundary used a Q-H relationship developed from the previous 2013 investigation model results. These boundary conditions adopted for existing conditions were used again for the proposed design conditions discussed later in the report.

The existing conditions 1% AEP flood modelling showed water levels along the western drainage line falling across the site from 412.2 to 410.65 m AHD between the Western and Sunraysia Highways.

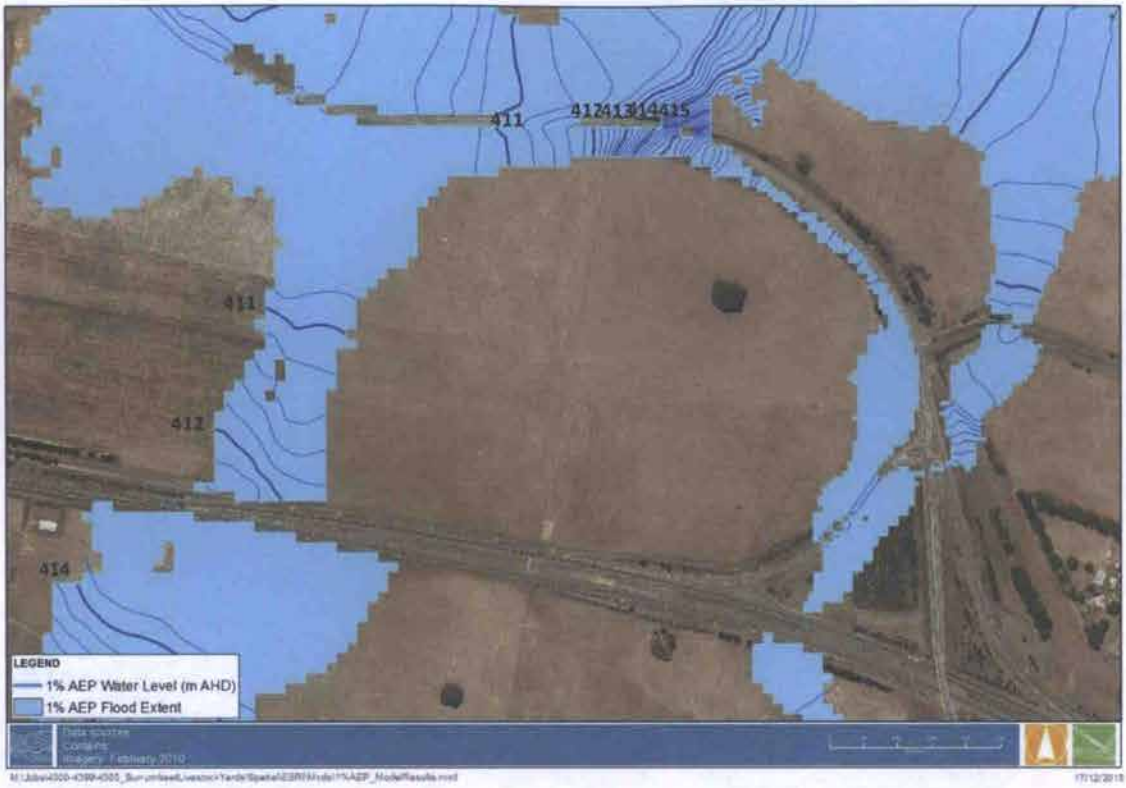

Figure 3-2 1% AEP Flood Event Existing Conditions Flood Mapping

3.3 Proposed Development

3.3.1 Initial Development Modelling

Water Technology was provided a concept plan for a levee alignment and raised entrance roadway for the site. The levee and roadway was added into the model originally leaving a one cell wide gap in the 2D model grid to represent culverts under the entrance road. No specification for culverts was provided so a generous waterway width was allowed for in the original modelling. Water levels and flow were extracted from the developed conditions model around the culvert location under the entrance road to assist with future culvert sizing. A flow of 6.6 m^3/s was extracted with water levels of 410.81 and 410.68 m AHD on the eastern and western side of the road respectively.

The developed model was subsequently refined, with the final modelled scenario including four box culverts 1,500 mm wide by 600 mm high. Four box culverts were decided on as through iteration it was found that any less resulted in significant afflux and overtopping of the entrance road. Figure 3-3 shows the proposed levee alignment modelled, with the western (dashed) alignment the option that was modelled initially.

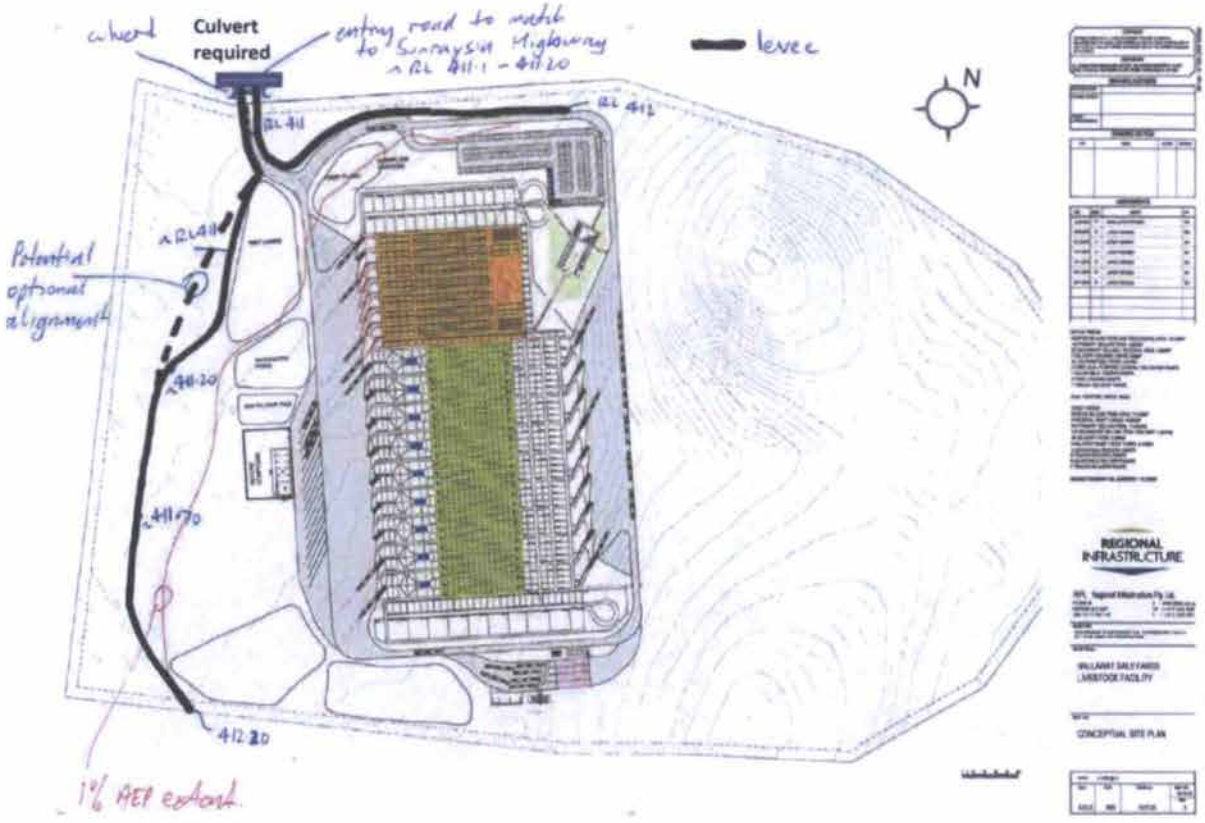

Figure 3-3 Proposed Levee Alignment and Entrance Road

Modelling showed that the proposed levees protected the site with an increase in water levels to the west of the levee of approximately 1 to 1.5 cm. This did not change the flood extent, and is well within the level of accuracy of the hydraulic modelling. It was noted that the Burrumbeet Creek conditions were not identical in the existing and proposed conditions and resulted in some differences north of the Sunraysia Highway. This was rectified in subsequent modelling presented later in this report.

Preliminary discussions with Glenelg Hopkins CMA indicated that they would prefer to see no afflux (increase in water level) on adjacent properties. Water Technology in discussions with Spiire and Geolyse refined the developed scenario and remodelled. Initially the entrance roadway was sketched up and provided to Water Technology as a 50 m wide entrance. This was refined down to an 18 m wide carriageway. This reduced width entranceway was modelled and it was found that the flood levels were lowered back to existing levels across most of the adjacent land. Figure 3-4 shows the revised water level difference plot. As shown, differences south of the Sunraysia Hwy are contained on site, with only a small area of land adjacent to the narrowest section of the western flow path shown to have raised levels greater than 1 cm on adjacent land.

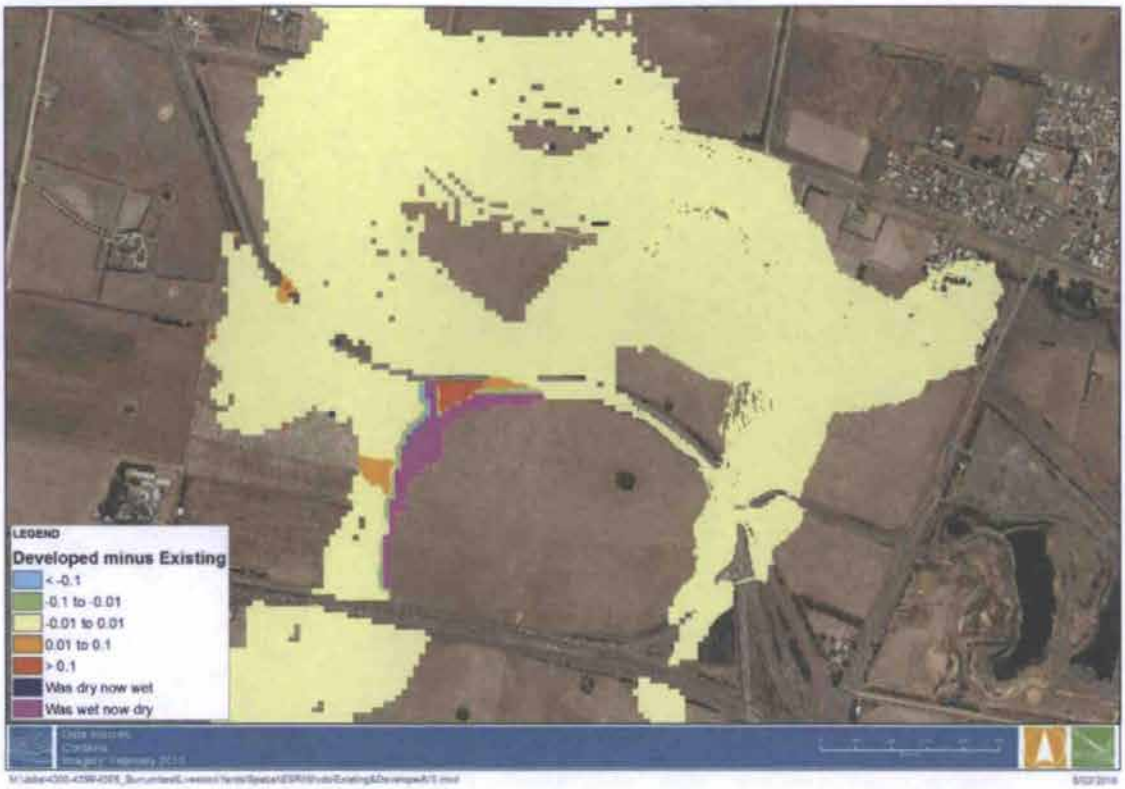

Figure 3-4 Difference Plot of 1% AEP Flood Levels with the Proposed Development

3.3.2 Final Development Modelling

In a bid to reduce the developed water levels further the proposed levee was realigned to be closer to the proposed built infrastructure as shown in Figure 3-5. The revised levee was designed to a crest level of 411.5 m AHD from the Sunraysia Hwy to the southern end of the large proposed wetland, then graded back up to 412 m AHD at the end of the levee beyond the 1% AEP flood extent.

By providing a wider western overland flow path across the southern half of the site, back to existing conditions, the modelling demonstrated that there was no significant afflux on adjacent properties, see Figure 3-6.

The modelled 1% AEP flood velocities for developed conditions are provided in Figure 3-7, with a difference plot of proposed development minus existing conditions provided in Figure 3-8. These plots illustrate that the velocity along the northern boundary of the site adjacent to the Sunraysia Highway can be reasonably high (2 to 2.5 m/s), but along the western boundary velocities are generally below 0.5 m/s. The proposed development may increase velocities by up to 0.25 m/s south of the Sunraysia Highway near the entrance road, this may require erosion control measures. Regardless of the proposed development, the velocities are high and erosion control is most likely required under existing conditions. The increases in velocity along the western drainage path are minimal, between 0 and 0.02 m/s for the majority of the area.

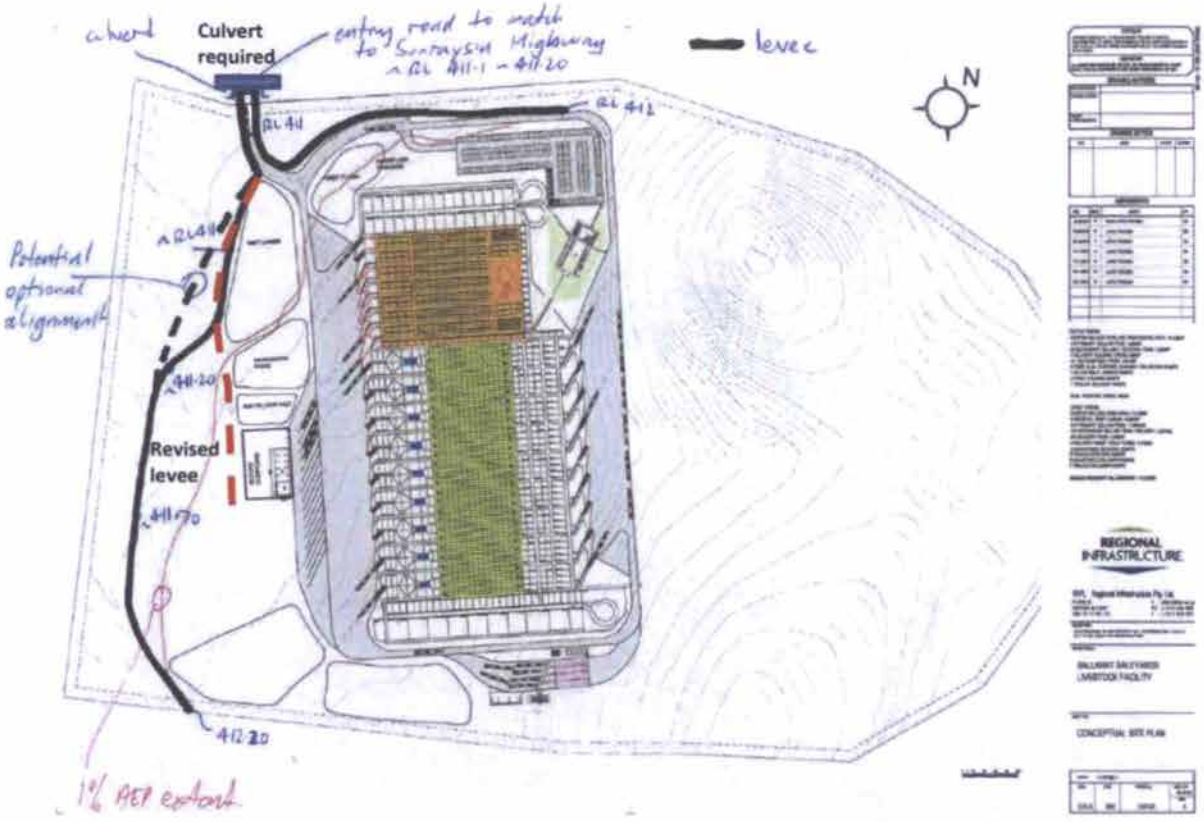

Figure 3-5 Revised Levee Alignment and Entrance Road

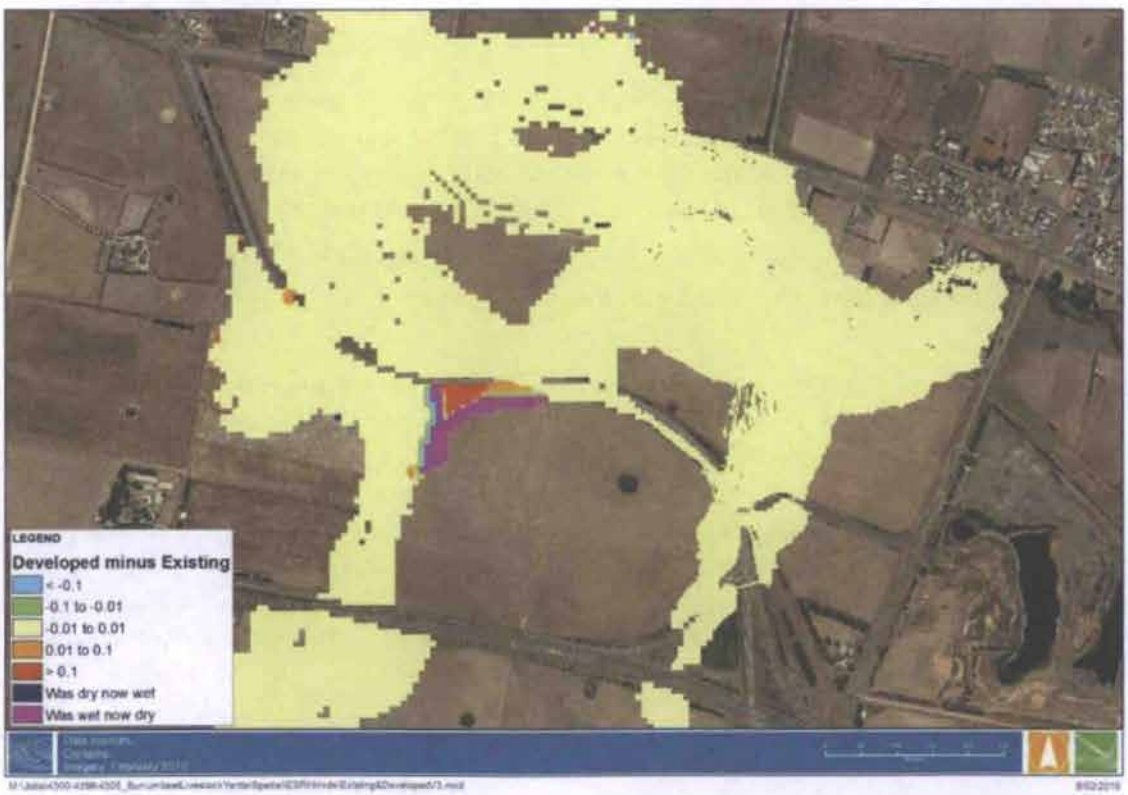

Figure 3-6 Difference Plot of 1% AEP Flood Levels with the Final Proposed Development

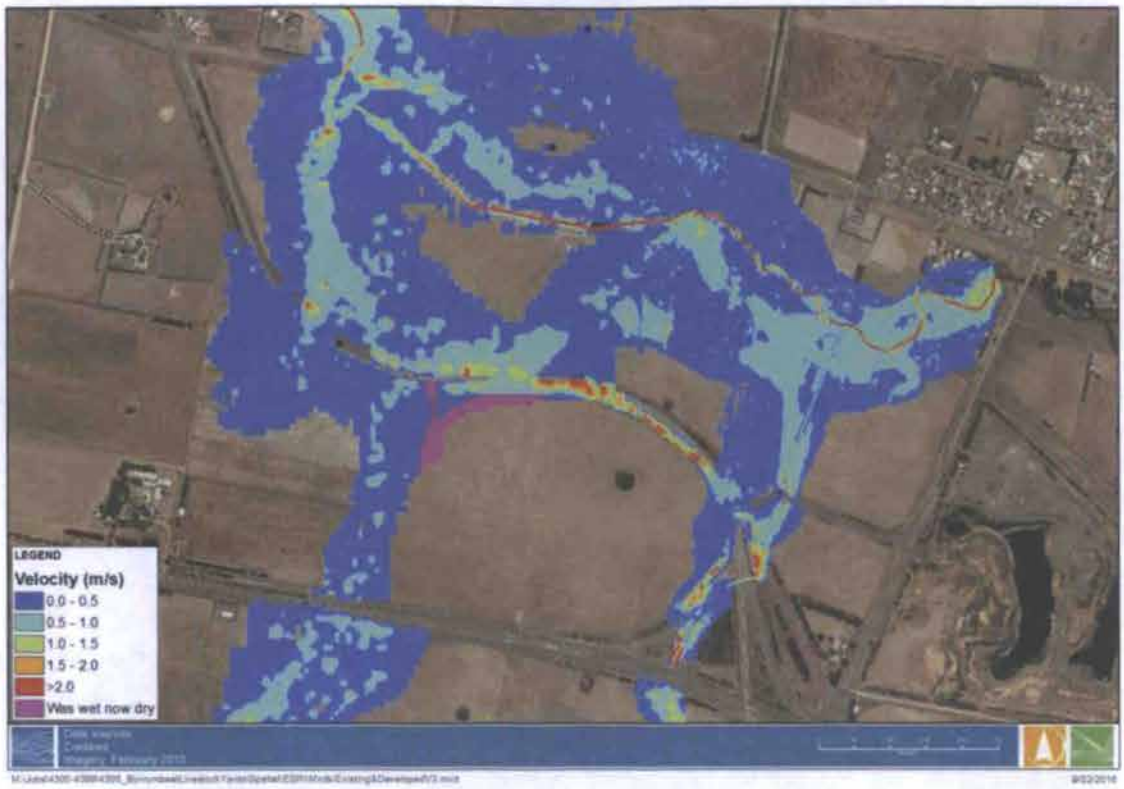

Figure 3-7 1% AEP Flood Velocity with Final Proposed Development

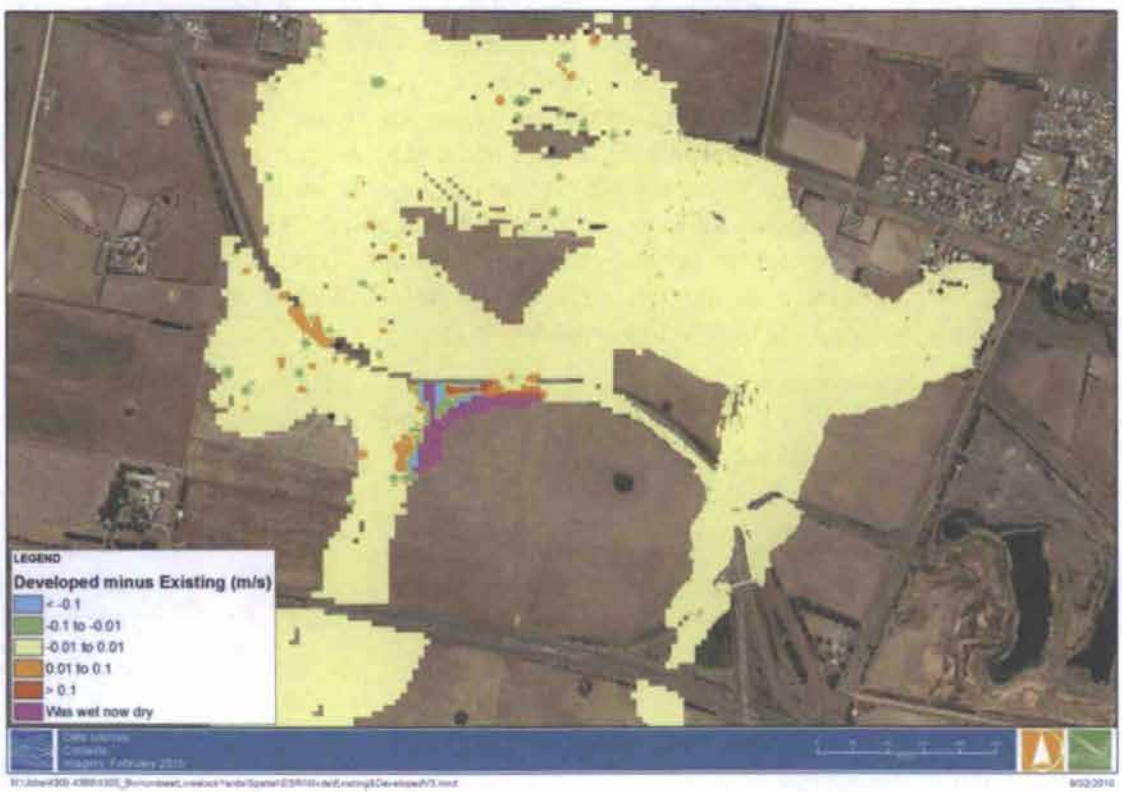

Figure 3-8 Difference Plot of 1% AEP Flood Velocity with Proposed Development

4. FLOOD RISK ASSESSMENT

As required by the State Planning Policy Framework and the Local Planning Policy Framework this report documents a flood study and flood risk assessment.

The current planning scheme was reviewed via the online planning maps indicating that the property is within the Farming Zone and has no Planning Overlays on it. At the time of the investigation a planning scheme amendment to rezone this land to a Special Use Zone was introduced. It is understood that Land Subject to Inundation and Flood Overlays are soon to be introduced following the Burrumbeet Creek Flood Investigation. The current land use appears to be grazing of beef cattle.

The proposed livestock exchange development is of sufficient size to prohibit moving the layout further east outside of the current 1% AEP flood extent. Therefore mitigation measures have been considered. The area of floodplain that is proposed to be protected to allow development is currently subject to flooding in a 1% AEP flood event to a depth of less than 0.5 m with velocities below 0.3 m/s. The proposed development does extend into the current flood fringe. However with appropriate mitigation the flood modelling has demonstrated the proposed development will remain flood free during a 1% AEP flood event.

Given the site is located on a small drainage path which flows into Burrumbeet Creek, the warning time is likely to be very short. However this does not pose a significant danger given that it has been demonstrated that mitigation can protect the site for large flood events including the 1% AEP flood event. Flood free access in a 1% AEP flood event will be provided to the Sunraysia Highway from the site. The Burrumbeet Creek Flood Investigation has shown that the Sunraysia Highway may be overtopped in a 1% AEP flood event with depths of less than 0.3 m likely. A secondary access to the Western Freeway could be considered for emergency purposes in the event that the Sunraysia Highway is closed.

The initial proposed flood mitigation levee and raised access road was shown to raise the water levels west of the levee on adjacent land by 1 to 1.5 cm. By resizing and realigning the levee the modelling has shown that the site can remain flood free in a 1% AEP flood event without increasing water levels on adjacent properties. The proposed development with the final road and levee alignment will not result in any discernible difference in flood levels or extents and will not unduly impact land use on adjacent properties. Velocities are practically unchanged along the western drainage path. Velocities along the drainage line south of the Sunraysia Highway are increased by up to 0.25 m/s and are significantly high under existing and developed conditions as to require erosion control works. An opportunity through this development may be to address the issue of erosion potential along this drainage line that is currently unchecked.

Water Technology believes that the development will not unduly impact on river health values. If the development can address the erosion potential along the drainage line south of the Sunraysia Highway benefits may in fact be achieved.

5. CONCLUSIONS

Water Technology has prepared a flood investigation for the proposed development of the Victorian Livestock Exchange, located between the Sunraysia Highway and the Western Freeway near Miners Rest.

Water Technology has re-established the Burrumbeet Creek Flood Investigation hydraulic model, trimmed it to the area of interest for this investigation and verified it to previous model results.

The proposed levee alignment and entrance roadway from the Sunraysia Highway was added to the model and the model run for the 1% AEP flood event. Initial levee and road alignments produced minor increases in water levels on the adjacent property to the west of the site. Refinements to the road and levee alignment have enabled the site to be fully protected from a 1% AEP flood event with negligible difference to flood levels on adjacent properties.

APPENDIX 6

ENVIRONMENT IMPROVEMENT PLAN

CENTRAL VICTORIA LIVESTOCK EXCHANGE

Planning and Environment Act 1987
BALLARAT PLANNING SCHEME
DEVELOPMENT PLAN
SUZ1 Schedule No. 15
Signed.....
Authorised Officer for and on behalf of the
CITY OF BALLARAT
DATE.....

DRAFT

PREPARED BY:

REGIONAL INFRASTRUCTURE PTY LTD

AUGUST 2016

REGIONAL
INFRASTRUCTURE

Report Title:	*Environment Improvement Plan*
Project:	*Central Victoria Livestock Exchange*
Client:	*Regional Infrastructure Pty Ltd*
Report Ref.:	*208120_EIP_2.0.docx*
Status:	*Draft for submission with Development Plan*
Issued:	*25 August 2016*

Geolyse Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of Regional Infrastructure Pty Ltd to accompany this report for the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Geolyse Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

Version	Revision Date	Details	Authorised	
			Name/Position	Signature
1.0	23/08/16	Draft for client review	M Haege/Geolyse	
1.1	24/08/16	Minor edits – draft for client review	M Haege/Geolyse	
2.0	25/08/16	Draft for submission with Development Plan	M Haege/Geolyse	

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APPENDIX G
Forms

TABLES

FIGURES

ABBREVIATIONS

BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
cfu	Colony Forming Units
CVLX	Central Victoria Livestock Exchange
dm	Dry matter
EC	Electrical conductivity
EIP	Environment Improvement Plan
EPA	Environment Protection Authority
ha	Hectare
kL	Kilolitres (1,000 litres)
L	Litre
mg/L	Milligrams per litre
mL	Millilitre
ML	Megalitre (1,000,000 litres)
mm	Millimetre
RIPL	Regional Infrastructure Pty Ltd
t	Tonnes
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids

ENDORSEMENT

This Environment Improvement Plan (EIP) is a living document and sections of it will be periodically updated. Some sections of the EIP, such as the commissioning plans and initial noise and dust monitoring, will become obsolete and be removed after individual action items are completed and signed off. Other sections, such as Operational Procedures, will continue to grow if new initiatives are implemented and new procedures and responsibilities emerge.

For these reasons, document control is an important part of our environmental management system. It is critical that we always know who holds copies of the EIP (or individual sections of it), and that only the latest version is in use. Details of the version are recorded on each page of the EIP.

Revised and updated versions of the EIP will always be issued with a covering memo summarising the changes. When you receive a new insert, the old version is to be replaced.

In summary, this EIP is a functional document. It is meant to help personnel at the Central Victoria Livestock Exchange undertake their tasks with minimal environmental risk and understand their environmental responsibilities.

The structure and scope of this EIP reflects the requirements of EPA publication 739 *Guidelines for the Preparation of Environment Improvement Plans*, and in so doing, embodies the principles of best practice environmental management.

Through using this EIP, we will be able to improve, monitor and demonstrate our environmental performance. If you have any suggestions for amendments, additions or improvements, please discuss these with your supervisor

Regional Infrastructure Pty Ltd senior management and site management endorse this EIP to confirm their understanding of the plan's environmental management strategies and procedures, and to demonstrate commitment to the implementation of the EIP. Signatories are provided below.

EIP Endorsement

Date	Name	Position	Signature
		Company Executive (RIPL)	
		Site Manager (RIPL)	
		EPA Officer (VIC EPA)	

Introduction

1.1 THE FACILITY

The Central Victoria Livestock Exchange (CVLX) is a regional cattle and sheep selling centre located approximately 10 kilometres north-west of Ballarat in Victoria. The CVLX is a state-of-the-art facility that provides livestock marketing and saleyard services for the Ballarat district and extending further into central Victoria. The facility can accommodate an annual throughput of 70,000 head of cattle and 1,600,000 sheep and hosts around 112 sales per year.

The CVLX is operated by Regional Infrastructure Pty Ltd.

1.2 EIP OBJECTIVES

This Environment Improvement Plan (EIP) provides operating procedures and an environmental management plan that establishes a commitment to environmental performance at the Central Victoria Livestock Exchange (CVLX).

The objectives of this EIP are to:

- comply with applicable environmental legislation;
- identify and manage environmental risk;
- comply with RIPL environmental guidelines and requirements;
- ensure all environmental safeguards are implemented correctly; and
- monitor, review and report on the environmental impact.

The EIP has been prepared in accordance with the EPA Victoria publication *Guidelines for the preparation of Environmental Improvement Plans* (Publication 739, June 2002) and prepared for the reuse scheme (irrigation scheme) in accordance with the *Guidelines for Environmental Management – Use of Reclaimed Water (2002)* (EPA publication 464), specifically using Appendix E of this document to inform the structure and content of the EIP.

1.3 EIP CONTEXT

The environmental assessment for the CVLX confirmed that the facility can operate with low risk to the environment subject to ongoing management and monitoring. Design features have been incorporated to facilitate recycling and reuse of resources and to manage environmental risk.

The starting premise for this EIP is that there is nothing to "improve". It therefore outlines how each risk is managed, monitored and reported.

RIPL will adopt an adaptive management approach for environmental management at CVLX. This provides a systematic approach for improving environmental management by predicting the outcomes of management activities and then strategically monitoring the actual outcomes to gather information to improve future management.

If the environmental monitoring program indicates that some component of the operation is not performing as predicted there may be a need to add improvement programs to this EIP. These would be developed and added to this EIP as required.

1.4 EIP STRUCTURE

The EIP contains seven sections as described below in **Table 1.1**.

Table 1.1 – EIP Structure

Section	Purpose
Section 1 – Introduction	Identifies the purpose of the EIP and structure.
Section 2 – Environmental Management	Outlines the RIPL environmental policy, site environmental management and responsibilities.
Section 3 – Site and Operations	Provides an overview of the site and the operations.
Section 4 – Environmental Risks	Identifies the environmental risk that need to be managed.
Section 5 – Operating Procedures	States the environmental objectives and provide operational procedures to manage environmental risk.
Section 6 – Monitoring	Details the monitoring program for assessing environmental performance.
Section 7 – Reporting and Review	Provides reporting requirements and details of the EIP review and auditing process.

Environmental Management

2.1 OPERATIONS

The CVLX is operated by Regional Infrastructure Pty Ltd (RIPL).

2.2 ENVIRONMENTAL POLICY

RIPL is a company that is focused on regional livestock exchange (RLX) development, and involved in RLX operations and management at various locations within Australia. We recognise the expectations of our own staff, suppliers, customers and the community in relation to environmental protection and food chain product quality.

We commit to managing our environmental effects and wastes in compliance with our legal obligations. Furthermore, we will strive to continually improve all our operations and specifically commit to:

- Work to achieve the environmental expectations of our staff, customers, suppliers and local community.
- Apply best practice standards for environmental management.
- Improve efficiency of operations to minimise water and raw material use, energy consumption, waste and pollution generation; in particular to:
  - Protect the beneficial uses of groundwater and surface water.
  - Prevent adverse environmental impacts in terms of the beneficial uses of surface-water, where the beneficial use onsite is agriculture and irrigation.
  - Maintain and where appropriate and practicable, improve the condition of the land environment sufficient to protect current and future beneficial uses of land from the detrimental effects of contamination.
  - Protect groundwater quality sufficient to protect existing and potential beneficial uses of groundwater.
  - Avoid structural changes to the soil or contamination (for example, soil salinity or sodicity) that may reduce the (short or long term) productivity of the land.
  - Avoid uptake of pathogens and/or metals and organic contaminants by vegetation, livestock and humans.
  - Protect human and stock health and improve wastewater quantities and quality.
  - Avoid contamination of the air environment by the production of offensive odours, spray drift and aerosols.
- Create awareness among our staff and suppliers of the potential environmental effect of operations with which they are involved, and how they can work towards minimising these environmental effects.
- Continue to conduct regular assessments of the environmental effects of our operations to identify potential areas for improvement, and to follow through with programs to achieve these improvements.

2.3 ENVIRONMENTAL MANAGEMENT

RLX Investment Trust are the owners of the facility and lease it to the RLX Operating Company. All management and operation of the CVLX is undertaken by Regional Infrastructure Pty Limited (RIPL) under an operations and maintenance agreement with the RLX Operating Company. The overall management structure is provided in **Figure 1**.

The RIPL General Manager is responsible for the management of the following five departments:

- Safety and compliance;
- Business development (no responsibility for environmental management);
- Design and construction (no responsibility for environmental management);
- RLX sites; and
- Administration and Finance (no responsibility for environmental management).

The safety and compliance manager is responsible for (among other things) operational systems and operational management. This includes the preparation of the relevant documentation (e.g. site-based operations manuals, (SBOMs)) for the management of wastewater.

The design and construction manager is responsible for (among other things) design review, and design and construction supervision. This includes compliance to the sediment and soil erosion management during construction. The design and construction manager has no responsibility in operational environmental management.

The RLX site managers (site managers) are responsible for managing the site and related facilities, for environmental compliance and for meeting authority requirements. This includes responsibility for the day-to-day running of the saleyard in accordance with the relevant SBOMs.

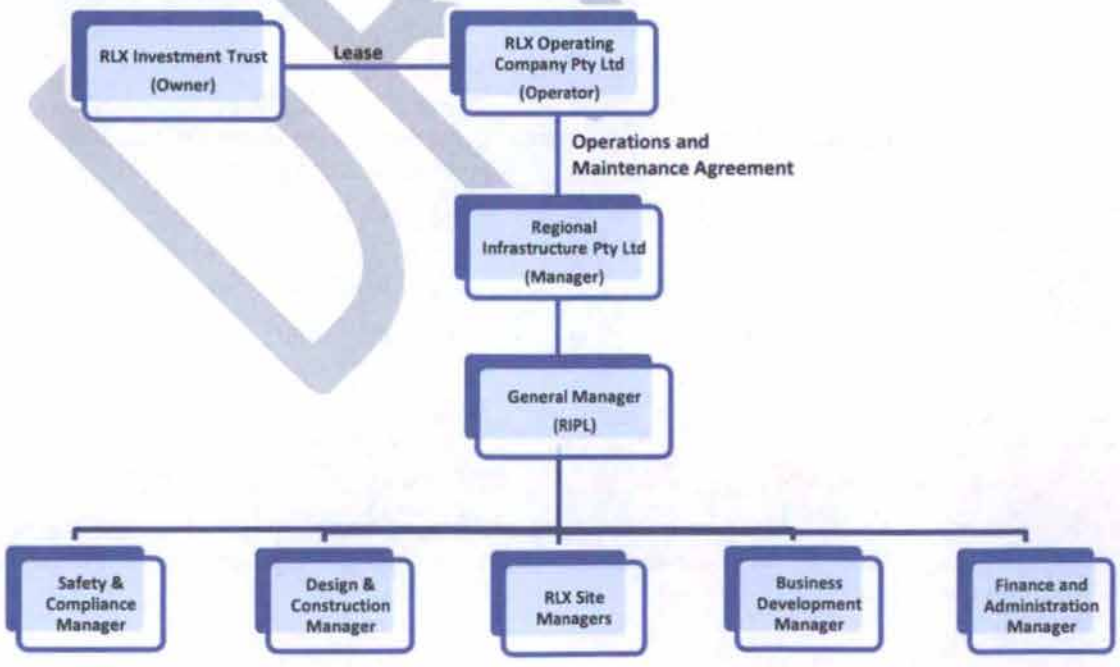

Figure 1: Management structure

A matrix of responsibilities for environmental management at the CVLX is provided in **Table 2.1**.

Table 2.1 – Environmental responsibility matrix

Responsibility	RIPL General Manager	Safety & Compliance Manager	CVLX Site Manager
Corporate environmental management	✓	✓	
EIP implementation and effectiveness	✓	✓	✓
EIP review	✓	✓	✓
EIP audit		✓	✓
Administrative support		✓	
Reporting/records		✓	✓
Community liaison	✓		✓
Environmental awareness/training		✓	✓
Monitoring/checking			✓
Operational control			✓
Non-conformance/corrective actions		✓	✓
Compliance with legal & other requirements	✓	✓	✓
Point of emergency contact			✓

Site and Operations

3.1 SITE

The site is located approximately 10 km north-west of Ballarat and approximately 1.2 km south west of Miners Rest, between the Western Highway and Sunraysia Highway. The site is accessed from Sunraysia Highway.

The location, surrounding areas and sensitive receptors are shown in **Figure 2**.

3.2 SITE LAYOUT

Layout of the facility is shown on **Figure 3** and includes:

- A roofed cattle saleyard with holding pens, sale pens, drafting, loading/unloading facilities and uncovered holding yards.
- A sheep saleyard with uncovered receival and delivery pens, roofed sales pens, drafting, loading/unloading facilities and uncovered holding yards.
- A central amenities building with offices, amenities and café.
- Parking for trucks and cars.
- A truck wash down area for four (4) trucks (with 24 hour/7 day access).
- A maintenance shed and feed store.
- Secure compound for maintenance equipment and stores.
- Solids removal system and solids stockpile area.
- Clean soft floor laydown area.
- Paddocks for the temporary accommodation of stock held over at the facility.
- A surface water wetland.
- A rainwater pond.
- A series of water treatment ponds to capture and treat wastewater for reuse and irrigation.
- An 11.2 ha irrigation area and associated irrigation infrastructure.
- Landscaping.
- Business identification signage.

3.3 OPERATIONS

3.3.1 OPERATING HOURS

The facility will operate 24/7 to provide access to the truck wash and to facilitate stock receival and delivery requirements.

3.3.2 THROUGHPUT

Annual throughput is expected to be 70,000 head of cattle and 1,600,000 sheep. The facility would host around 112 sales per annum including monthly store cattle sales on Fridays, weekly prime cattle sales on Mondays and weekly sheep sales on Tuesdays. Additional special cattle sales may occur as required by market conditions.

3.3.3 SALE DAYS

Sales are held as follows:

- Prime cattle Monday (every week except Christmas)
- Store Cattle Friday (once per month with 2 sales in January)
- Special Tuesday (every week expect Christmas)

Stock are received the day before sale day generally between 2:00pm to 9:00pm, with weighing from 4:00pm to 6:00am.

Sales typically start at 8:00am and go through to around 2:00pm with stock delivery commencing around 10:00am. Stock deliveries may continue through to the following day as required.

3.4 MAJOR PLANT AND EQUIPMENT

The operation of the facility does not require the use of specialised plant or equipment with all equipment to be used typical of plant and machinery associated with the general agricultural use of the land.

Plant and equipment will include:

- Transport, access and maintenance machinery including all-terrain vehicles, tractors, feeding machines, power harrows and bobcats (or similar);
- Adjustable and fixed ramps for loading/unloading of stock;
- Yards, fences and weighing areas;
- A rainwater pond for roof water harvesting and associated pumps and tanks;
- Water pumps and tanks for facility and truck wash-down areas;
- First flush pond and associated solids traps and transfer pumps for the management of surface water;
- Ponds for the treatment and management of liquid wastes with associated mechanical aeration and pumps;
- Treatment system to allow recycling of effluent for wash down and truck wash;
- Water pumps to transfer of irrigation water around the site;
- Plant and equipment associated with the administrative building; and
- General maintenance equipment including handheld power tools, a generator.

3.5 ENERGY CONSUMPTION

The main use of energy on the site is lighting. Energy efficient lighting is incorporated into the design and accompanied with natural lighting of the pavilion yards. The facility does not comprise any processes that require significant amounts of energy.

3.6 PROCESSES

The operation of the site generally involves the transportation, holding and sale of livestock. The associated processes are typical of general agricultural use, albeit with an increased level of activity on the site during sale periods. The truck wash and associated wastewater treatment process is the only non-routine process that would not be typically found on a general agricultural site. A summary of site processes and their environmental interaction is provided in **Table 3.1**.

Table 3.1 – Processes and environmental interactions

Process	Description	Environmental Interaction
Livestock sales	Receipt of livestock (typically the day before), livestock penning, sale activity, livestock delivery.	• Noise • Air (odour) • Air (dust) • Surface water • Traffic
Truck wash	Wash down of vehicles using the truck wash facility which is open 24/7.	• Noise • Air (odour) • Surface water • Groundwater
First flush water management	Solids traps and pons system for the collection of site runoff from exposed yard and trafficable areas. Transfer pumps to effluent treatment system.	• Air (odour) • Surface water • Groundwater
Effluent treatment	Solids separation system followed by a biological pond system for effluent treatment and enclosed system for recycling.	• Noise • Air (odour) • Surface water • Groundwater
Treated effluent reuse	Irrigation of treated effluent across cropping areas.	• Air (odour) • Surface water • Groundwater
Soft floor system	Regular replacement of soiled cattle yard soft floor material	• Air (odour) • Air (dust)
Solid waste management	Separation of solids waste from the truck wash effluent stream, collection of solids waste from the sheep yards, removal of soft floor material	• Air (odour) • Air (dust) • Surface water
Temporary livestock holding	Temporary holding of livestock either before or after sales.	• Air (dust) • Surface water
Cropping	Establishment of crops/pasture in the effluent irrigation area with associated maintenance and harvesting.	• Noise • Air (odour) • Air (dust) • Surface water
Water harvesting	Capture of roof runoff and surface water runoff for reuse through the facility to reduce potable water demand.	• Surface water

3.7 WATER CYCLE MANAGEMENT

3.7.1 WATER DEMAND AND SUPPLY

Water for the facility is provided through a combination of roof water harvesting, recycling and connection to reticulated water supply. Water demand and supply are summarised in **Table 3.2**.

Table 3.2 - Water demand and supply

Demand	Main Supply	Primary Top-up Supply	Secondary Top-up Supply
Stock water	Roof water pond	Reticulated potable	NA
Domestic – potable	Reticulated potable	NA	NA
Truck wash	Recycled Class A	Surface water wetland	Reticulated potable
Yard wash down	Recycled Class A	Surface water wetland	Reticulated potable
Dust suppression	Roof water pond	Reticulated potable	NA
Scale wash down	Roof water pond	Reticulated potable	NA
Water trough cleaning	Roof water pond	Reticulated potable	NA
Irrigation	Recycled Class C	NA	NA
Fire services	Reticulated potable	NA	NA

The total modelled average annual water demand is approximately 42 ML/year. On-site harvesting and reuse makes up about 40 ML/year; approximately 95% of the annual demand.

3.7.2 LIQUID WASTE MANAGEMENT

All liquid wastes are managed on site using an effluent treatment system with treated effluent being reused for irrigation or recycled for truck and yard washing.

Liquid wastes are generated from the truck wash, trough washing, sheep yard wash down, first flush surface water catchment and rainfall runoff from the truck wash and solids stockpile area. Domestic effluent generated from the central amenities building and transport operator's amenities is managed using on-site effluent management systems for primary treatment with the treated effluent then further treated through the facility's effluent treatment system.

3.7.2.1 Effluent Quality

The effluent treatment system will provide two water sources for reuse:

- Class C water for reuse across irrigation areas; and
- Class A water for reuse in the truck wash and for sheep yard wash down.

Class C Water

The effluent treatment system is designed to achieve Class C effluent in accordance with the *EPA Publication 464.2: Guidelines for Environmental Management – Use of Reclaimed Water (2003)* (see **Table 3.3**).

Table 3.3 – EPA classification criterion for reclaimed water

Class	Water quality objectives (medians unless specified)[1,2]	Treatment processes[a]	Range of uses
C	- <1000 E.coli org/100 mL - pH 6 – 9[5] - < 20 / 30 mg/L BOD / TSS[8]	Secondary and pathogen reduction[7] (including helminth reduction for cattle grazing use schemes).	Urban (non-potable) with controlled public access. Agricultural: e.g. human food crops cooked/processed, grazing/fodder for livestock Industrial: systems with no potential worker exposure.
D	- <10000 E.coli org/100 mL - pH 6 – 9[5] - < 20 / 30 mg/L BOD / TSS[8]	Secondary	Agricultural: non-food crops, including instant turf, woodlots, and flowers.

Source: EPA Victoria (2003)

Notes to Table 4.1

1. *Medians to be determined over a 12-month period. Refer table 6 for Notification / reclassification limits.*

2. *Refer also to Chapter 6 and 7, and Waste Water Irrigation Guideline (EPA Victoria, 1991 Publication 168) for additional guidance on water quality criteria and controls for salts, nutrients and toxicants.*

5. *pH range is 90th percentile. A higher upper pH limit for lagoon-based systems with algal growth may be appropriate, provided it will not be detrimental to receiving soils and disinfection efficacy is maintained.*

7. *Guidance on pathogen reduction measures and required pre-treatment levels for individual disinfection processes are described in GEM: Disinfection of Reclaimed Water (EPA Victoria, 2003 Publication 730.1). Helminth reduction is either detention in a pondage system for greater than or equal to 30 days, or by an NRE and EPA Victoria approved disinfection system (for example, sand or membrane filtration).*

8. *Where Class C or D is via treatment lagoons, although design limits of 20 milligrams per litre BOD and 30 milligrams per litre SS apply, only BOD is used for ongoing confirmation of plant performance. A correlation between process performance and BOD / filtered BOD should be established and in the event of an algal bloom, the filtered BOD should be less than 20 milligrams per litre.*

a. *Where schemes pose a significant risk of direct off-site movement of reclaimed water, nutrient reductions to nominally five milligrams per litre total nitrogen and 0.5 milligrams per litre total phosphorous will be required.*

Class A Water

Effluent from the maturation pond is further treated to Class A standard and reused in the truck wash and for wash down of the sheep yards. This dramatically reduces the volume of potable water used by the facility and the volume of effluent being irrigated.

Note for the DRAFT EIP:

Victoria EPA addendum to *EPA Publication 464.2: Guidelines for Environmental Management – Use of Reclaimed Water (2003)* notes that the Class A water quality objectives described in 464.2 are not deemed appropriate for the protection of human health. The *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)* (NRMMC, EPHC and AHMC, 2006) are therefore recommended to identify water quality objectives.

The water recycling guidelines provide a risk management framework that can be applied to the reuse scheme. This framework contains 12 elements that need to be addressed which are organised within the following four general areas:

1. **Commitment to responsible use and management of recycled water**;
2. **System analysis and management** – assessment of the system, identification of preventative measures, operational procedures and process control, verification, incident and emergency response;
3. **Supporting requirements** – employee training and awareness, end user involvement, research and development, documentation and reporting; and
4. **Review** – evaluation and audit processes, review and continuous improvement.

The treatment system has not yet been finalised. However, the proposed system will conceptually include multiple barriers as follows:

- Primary treatment (facultative ponds);
- Secondary treatment (aerobic and anoxic ponds);
- Lagoon detention;
- Filtration (either coagulation and filtration or membrane filtration);
- Disinfection (chlorine and UV);
- Onsite controls (signage etc); and
- User education.

Preliminary assessment of the raw effluent quality and exposure indicates that the system would need to achieve the following log reductions:

- Virus 5.0
- Protozoa 4.0
- Bacteria 5.0

Indicative log removals for the conceptual treatment system is provided in the table below. This indicates that the proposed system includes adequate barriers.

Indicative log removals

Treatment	Virus	Protozoa	Bacteria
Primary	0.1	0.5	0.5
Secondary	1.0	1.0	2.0
Lagoon	1.0	3.0	2.0
Filtration (coagulation, dual media)	1.0	2.0	0.5
Chlorine	2.0	1.0	3.0
Ultraviolet	1.0	3.0	3.0
Total	6.1	10.5	11.0

Source: Table 3.4 NRMMC, EPHC and AHMC (2006)

A Recycled Water Quality Management Plan (RWQMP) including risk identification, assessment of barriers and processes, validation, operational and verification monitoring and reporting will be developed and incorporated into the EIP once the system design is further progressed.

3.7.2.2 Helminth Reduction

The minimum 30 days of pondage detention required for any effluent reuse scheme involving cattle grazing is met by CVLX to fulfil the requirements for helminth reduction processes as per the EPA guidelines 464.2. This is provided in the maturation.

3.7.2.3 Irrigation Loads

Hydraulic Load

The integrated water cycle assessment (refer to **Figure 4**) shows an average of 16.7 ML/year will be irrigated across the 11.2 ha irrigation area. This is a low average annual hydraulic load of 1.5 ML/ha/year. The hydraulic loading on the effluent irrigation area is low given the need to balance nutrient loadings.

Nutrient Loads

The principle objective of the effluent irrigation scheme is to use or immobilise the added nutrients quickly to prevent potential contamination of surface water and/or groundwater. To achieve this, the amount of each nutrient applied in the treated effluent must be less than or similar to the amount removed from the site as well as the fixing of phosphorus by the soil. The nutrients of greatest environmental concern are nitrogen and phosphorus.

The effluent availability dictates the annual application rate, not the crop water demand. That is, there is not sufficient treated effluent volume to meet the crop water demands. This would be reflected in reduced crop yields, which is factored into the nutrient balances

Nutrient balances for the irrigation reuse scheme are summarised in **Table 3.4**. The nutrient balance shows a nitrogen deficit across the irrigation area and a slight phosphorus excess. The phosphorus excess can be assimilated by the soil profile with an expected capacity exceeding 100 years.

Table 3.4 - Nutrient balances

Component	Units	Nitrogen	Phosphorus
Effluent applied	ML/year	16.7	16.7
Nutrients in effluent	mg/L	45	30
Nutrients applied in effluent	kg/ha/year	67	45
Total nutrient uptake in 6 t(dm)/ha/yr	kg/ha/year	204	18
Average net balance	kg/ha/year	- 137	27
Years before phosphorus threshold	years	-	107

Organic Load

The organic content of the treated effluent is expected to be <10 mg/L. Based on the average application of 150 mm, the organic loading will be 15 kg/ha/year which is well below guideline values.

Salt Loading and Management

The treated effluent is expected to a have an electrical conductivity (EC) of approximately 1,900 µS/cm; salinity Class 3 in accordance with *EPA Publication 168* (EPA, 1991). Management will be required to control salinity levels in the soil profile.

A leaching fraction will be the key management tool to control soil salinity. The required leaching fraction can be calculated using equation 5-5 from EPA Publication 168 as follows:

Leaching required = $100 \times EC_{iw}/EC_{dw}$

Where EC_{iw} = electrical conductivity of the irrigation water = 1.9 dS/m
ECdw = electrical conductivity of the drainage water at which the relative crop yield is 50% = 12.2 dS/m (Table 13 EPA Publication 168)

Therefore the leaching required is 16%, or 21 mm.

Modelling shows that with irrigation, the average annual deep soil drainage increases by 22 mm which indicates that the majority of the required leaching fraction is achieved without special leaching events. The requirement for additional leaching would be based on profile monitoring.

3.7.2.4 Wet Weather Storage

The water cycle model indicates an average of 41.1 ML/year enters the holding pond (combined maturation/holding pond – refer to **Figure 4**). An average of 16.7 ML/year is irrigated across 11.2 ha and 23.2 ML/year is recycled for Class A reuse.

SEPP (Waters of Victoria) requires that effluent reuse schemes are designed and constructed to contain all wastes in at least the 90th percentile wet year. This is consistent with the Victorian EPA reuse guidelines (EPA Victoria, 2003) which allow a 90th percentile design criteria. This design criteria allows discharge from the holding pond on average once in every 10 years.

The combined maturation/holding pond shown on the site layout (**Figure 3**) provides a wet weather storage of 24.75 ML (volume above the maturation pond volume).

The wet weather holding pond results spills in 3 years of the 125 years modelled; a spill frequency of 1 in 42 years which exceeds the 90th percentile design criteria (spill frequency of 1 in 10 years on average). The modelled spill volumes in these 3 years range from 1.8 ML to 6.6 ML. The proposed combined maturation/holding pond has a freeboard volume of approximately 5 ML. If this volume was included, the wet weather holding pond would only spill in one of the 125 years modelled.

3.7.3 SURFACE WATER MANAGEMENT

Runoff from dirty catchments (uncovered yards) and a portion of the trafficable areas is managed through a first flush system (refer to **Figure 3**). This system is designed to capture runoff from approximately 55 mm of rainfall across its catchment area. Captured water is pumped to the solids removal system and then enters the effluent management system. Once the first flush pond is full, further runoff diverts to the surface water wetland.

The remainder of the site is managed using an integrated surface water management system incorporating grass swales and a constructed surface water wetland. All surface water runoff is directed to the surface water wetland and is either reused or discharges off-site following treatment through the wetland.

The surface water wetland provides surface water quantity (peak flow and volume) and quality control.

3.7.4 WATER CYCLE

The integrated water cycle for the facility is shown on **Figure 4**.

3.8 WASTE MANAGEMENT

The types and volumes of waste generated by site operations is provided in **Table 3.5**.

Table 3.5 – Operational waste types and volumes

Waste Type	Source	Quantity	Management
Liquid waste	Truck wash, wash down, trough washing and runoff from the solid stockpile area	Average = 41.1 ML/year	Treated through an on-site pond system and reused through: • irrigation across 11.2 ha (16.7 ML/year); and • reuse as Class A water (23.2 ML/year)
Domestic effluent	Site amenities	Average = 0.9 ML/year	Primary treatment in septic tanks. Then combined with other liquid waste for further treatment through the effluent treatment ponds and reuse through irrigation.
Solids wastes	Solids separated from truck wash effluent and used soft floor	Average = 2,500 m^3/year	Temporarily stored in windrows on a nominated solids stockpile are before being removed off-site for further processing at an appropriately licenced facility.
Stock mortalities	Stock	Average 1 beast per sale	Removed from site to a licenced landfill facility within 24 hours of sale.
General refuse	Employees, site workers, patrons and contractors	One 6 m^3 skip bin per week	Appropriate receptacles and space will be provided for the temporary storage of garbage and recyclables to ensure separation of waste products.

3.9 TEMPORARY STOCK HOLDING

The CVLX includes multiple resting paddocks for livestock to rest and freshen up before or after sales or transport. Some of these paddocks are in areas that are used for effluent irrigation. It is important that the majority of the effluent reuse area is managed as a cut and carry program to ensure nutrients are removed from the site.

Figure 2: Site and surrounds

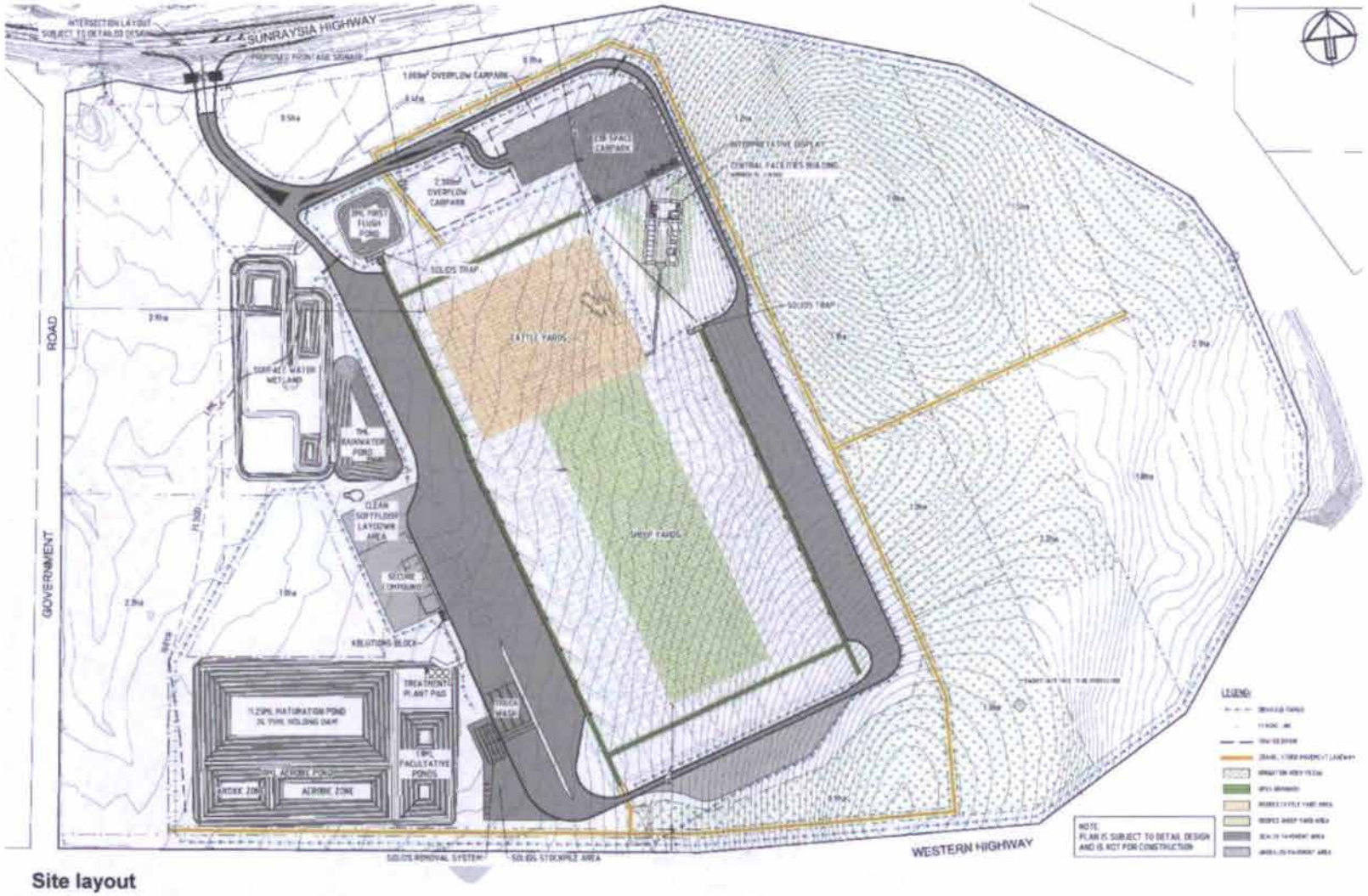

Figure 3: Site layout

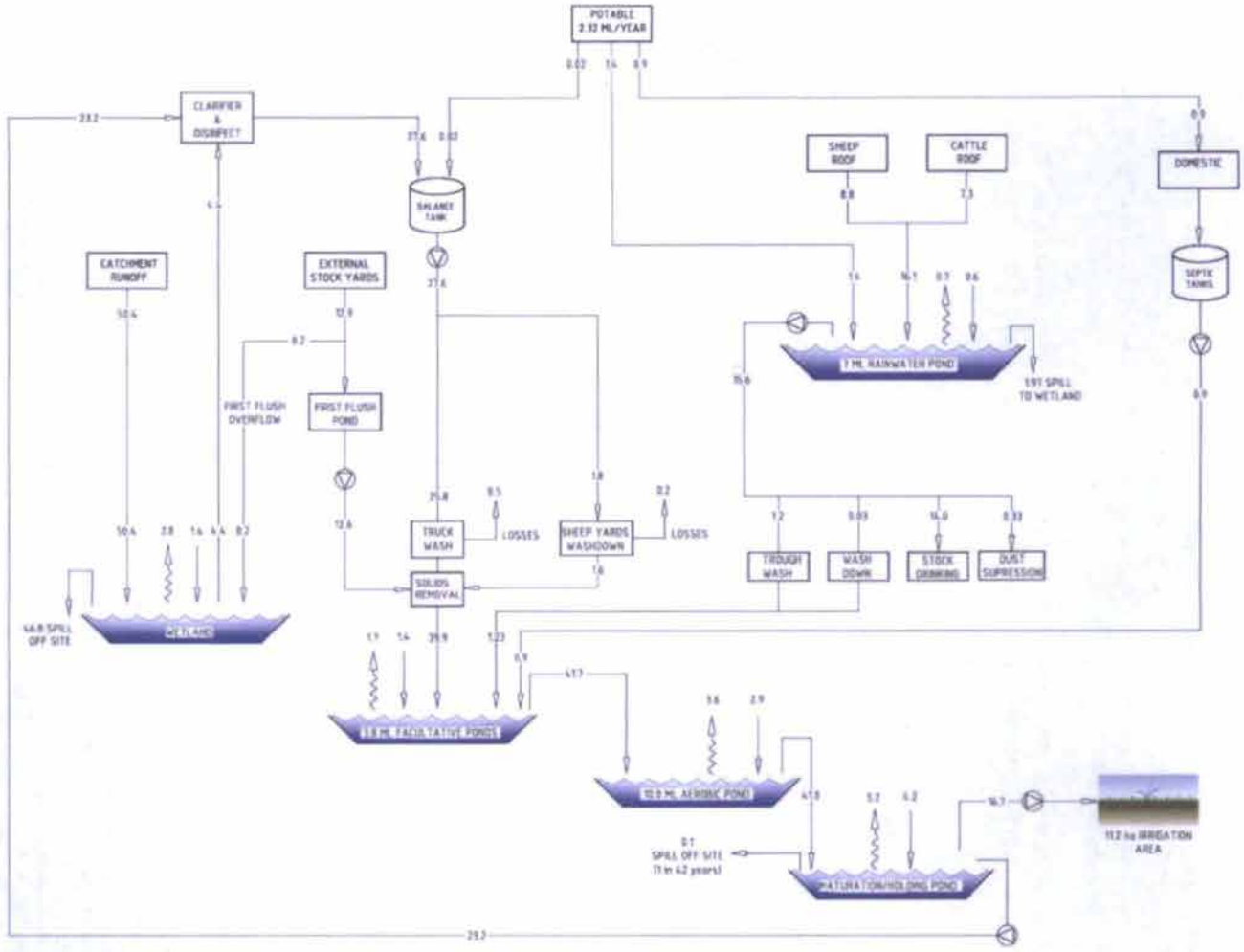

Figure 4: CVLX water cycle schematic – average annual volume in ML/year

Risk Assessment

4.1 INTRODUCTION

This section of the EIP identifies potential environmental impacts associated with operating the CVLX. Potential impacts have been identified through consideration of the activities to be undertaken, as well as issues identified in the environmental impact assessment, as well as matters raised by stakeholders during the approvals process.

These potential impacts are treated as risks that need to be managed through environmental management activities, controls and monitoring designed to prevent or minimise these risks being realised.

4.2 RISK ASSESSMENT

The environmental risk rating of an identified impact is measured in terms of consequence (severity) and likelihood (probability) of the event happening. The risk assessment matrix and rating is provided below.

		CONSEQUENCE				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
LIKELIHOOD	A. Rare	Low	Low	Low	High	High
	B. Unlikely	Low	Low	Moderate	High	Very High
	C. Possible	Low	Moderate	High	Very High	Very High
	D. Likely	Low	Moderate	High	Very High	Very High
	E. Almost certain	Low	Moderate	High	Very High	Very High

Figure 5: Risk assessment matrix

The qualitative measures of likelihood and consequence are shown in **Tables 4.1** and **4.2**.

Table 4.1 – Qualitative measures of likelihood

Level	Descriptor	Example description
A	Rare	Uncommon, unusual: not likely to occur within a 10 year period
B	Unlikely	Not expected to happen: may occur once every 5 to 10 years
C	Possible	Could happen: will probably occur between 1 to 5 years
D	Likely	Expected to happen: expected to occur at least once in a 6 to 12 month period
E	Almost certain	Will happen: imminent or will occur in 1 to 6 months

Table 4.2 – Qualitative measures of consequence or impact

Level	Descriptor	Example description
1	Insignificant	Negligible impact, little disruption to normal operation, low increase in normal operation costs
2	Minor	Minor impact for small population, some manageable operation disruption, some increase in operating costs
3	Moderate	Minor impact for large population, significant modification to normal operation but manageable, operation costs increased, increased monitoring
4	Major	Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required s
5	Catastrophic	Severe impact for large population, complete failure of systems

4.3 RISK ASSESSMENT SUMMARY

Appendix A: Risk Management contains a list of potential environmental risks associated with the operation of the CVLX and how they will be managed.

Section 5 outlines the operating procedures and control measures that will be used to prevent or minimise environmental risks and impacts.

Operating Procedures

5.1 WEEKLY ENVIRONMENTAL CHECKLIST

5.1.1 OBJECTIVE

To provide a checklist of weekly management and inspection activities relating to environmental management.

5.1.2 PROCEDURES

Who:	Site Manager (SM), Workers (W)	
Where:	Entire site	
When:	Every Thursday	
Actions:		**Responsible Person(s)**
1.	The Site Manager shall undertake inspections and complete **Form 1 – Weekly Environmental Checklist** every Thursday.	SM
2.	The Site Manager shall undertake and/or coordinate remedial action if required as a result of completing **Form 1 – Weekly Environmental Checklist**.	SM
3.	The Site Manager shall record on **Form 1 – Weekly Environmental Checklist** if a non-compliance has triggered the need for an Incident Report. If required, an Incident Report shall be prepared in accordance with **Section 5.14**.	SM
4.	The Workers will be responsible for undertaking any remedial action as directed by the Site Manager.	W
5.	The Site Manager shall inspect and sign-off on **Form 1 – Weekly Environmental Checklist** when remedial action work has been adequately completed.	SM
6.	The Site Manager shall ensure that the **Form 1 – Weekly Environmental Checklist** is appropriately filed (hard copy or electronic copy) and that records are kept on site for a minimum of four (4) years, and are available to the EPA on request.	SM
Records:	Form 1 – Weekly Environmental Checklist	
References:	nil	

5.2 EFFLUENT SYSTEM MANAGEMENT

5.2.1 OBJECTIVE

The effluent treatment system shall be managed to minimise odour generation and achieve Class C effluent for reuse through irrigation. Relevant Class C targets are:

- pH 6 to 9
- BOD < 20 mg/L
- Total suspended solids < 30 mg/L
- Microbiological <1000 E.coli org/100 mL

The above targets are median values derived over 12 months.

Note for DRAFT EIP

Further details will be added to the EIP once the design of the Class A treatment system is finalised and specific operational procedures are known.

5.2.2 PROCEDURES

Who:	Site Manager (SM)	
Where:	Effluent treatment system	
When:	Weekly	
Actions:		**Responsible Person(s)**
1.	The effluent management system shall be managed in accordance with the Effluent System Commissioning Plan outlined in **Appendix B** for the first 18 months of operations. Once fully commissioned the effluent treatment system shall be managed in accordance with the following procedures. The Effluent System Commissioning Plan shall then be removed from this EIP.	SM
2.	The Site Manager shall undertake weekly inspections of the effluent treatment system which includes: – The solid separation basin and transfer pump – Facultative ponds – Aerobic pond – Anoxic pond – Maturation/holding pond Record of the inspection shall be maintained on **Form 1 – Weekly Environmental Checklist** in accordance with **Section 5.1**.	SM
3.	The Site Manager shall undertake weekly dissolved oxygen and pH measurements and record on **Form 1 – Weekly Environmental Checklist**. Measurements shall be take: – In the upper layer of each facultative pond – At approximate mid-depth of the aerobic pond – At approximately 1.0 m depth in the maturation pond	SM

Who:	Site Manager (SM)
Where:	Effluent treatment system
When:	Weekly

Actions:		**Responsible Person(s)**
4.	Observations to be made at each pond are: – Pond colour or changes from previous inspections – Pond odour rated as low, moderate or strong – Any solids build-up or floating scum layers – Any damage to HDPE liners – Aerator cables and anchor points Any observations shall be recorded on **Form 1 – Weekly Environmental Checklist**.	SM
5.	If the measured DO of the aerobic pond is < 0.5 mg/L, re-test the pond at four (4) locations around the pond. If the re-test shows results less than 0.5 mg/L, then: – increase the aerator run time – re-test in 48 hours	SM
6.	If the measured DO in the aerobic pond is > 1.5 mg/L, re-test the pond at four (4) locations around the pond. If the re-test shows results greater than 1.5 mg/L, then: – decrease the aerator run time – re-test in 48 hours	SM
7.	The Site Manager shall ensure that irrigation ceases when the level of the combined maturation pond/wet weather holding pond reaches the minimum volume for the maturation pond. A marker shall be placed on the pond wall to indicate this level. It is noted that evaporation losses may draw the pond lower than this marker during summer.	SM
8.	If the effluent management system is not meeting Class C, the Site Manager shall commission appropriate investigations and shall employ the following management actions: – Applying minimum buffer distances of 50 m to the irrigation area to minimise the possibility of spray drift into adjoining properties; – Using a low pressure travelling irrigator to minimise spray drift; – Irrigating only under suitable wind conditions; – Adopting deficit irrigation scheduling to ensure the irrigation area does not become saturated due to irrigation. – Withholding stock from the reuse area.	SM
9.	If effluent is unsuitable for irrigation and/or reuse the Site Manager shall adopt one or all the following contingency measures: – Removing part or all of the effluent load from the site by tanker; – Reducing effluent generation. If required, RIPL shall consider connection to the reticulated sewerage system.	SM

Who:	Site Manager (SM)	
Where:	Effluent treatment system	
When:	Weekly	
Actions:		**Responsible Person(s)**
10.	The Site Manager shall ensure monthly monitoring of the effluent treatment system is undertaken in accordance with **Section 6.3**.	SM
11.	Effluent monitoring data shall be reported in the Annual Environmental Management Report in accordance with **Section 7.1**.	SM
Records:	Form 1 – Weekly Environmental Checklist Annual Environmental Management Report	
References:	EPA Victoria (2003) *Guidelines for environmental management, Use of reclaimed water. Publication 464.2.*	

5.3 SOLID WASTE MANAGEMENT

5.3.1 OBJECTIVE

To ensure solid wastes are managed to:

- prevent surface water pollution;
- minimise odour generation;
- minimise the quantity held on site; and
- record quantities and end use.

5.3.2 PROCEDURES

Who:	Site Manager (SM), Workers (W)
Where:	Solids stockpile, solids separation basin, cattle soft floor
When:	Weekly and as required

Actions:		**Responsible Person(s)**
1.	The Site Manager shall undertake weekly inspections of the cattle area soft floor system and observe that it is dry and odour free. Record of the inspection shall be maintained on **Form 1 – Weekly Environmental Checklist** in accordance with **Section 5.1**.	SM
2.	The Site Manager shall schedule weekly (or as required) scarifying of the soft floor system at a time that does not interfere with livestock sales.	SM, W
3.	The Site Manager shall schedule rolling replacement of the soft floor system as required. Triggers for soft floor removal shall be moisture and odour generation.	SM
4.	The Site Manager shall ensure that all new (clean) soft floor material is stored in the designated area indicated on **Figure 3** at the northern end of the secure compound.	SM
5.	Workers removing spent soft floor shall ensure that it is placed in the designated stockpile area indicated on **Figure 3**. Soft floor material shall be stockpiled in triangular windrows separate to the effluent system solids.	W
6.	Workers shall wash solids from the truck wash bays each morning.	W
7.	The external sheep yards shall be dry cleaned on a weekly or as need basis following sales. Material removed from the sheep yards will be placed in the solids stockpile area. Sheep yards solids shall be stockpiled with the solids removed from the solids separation basin.	W
8.	The Site Manager shall inspect the external sheep yards following dry cleaning and determine if a wash down is required.	SM
9.	If the sheep yards are washed down, the Workers shall inspect the surface water solids traps and removed solids as require after they have sufficiently drained. Solids shall be placed in the solids stockpile area.	W

Who:	Site Manager (SM), Workers (W)
Where:	Solids stockpile, solids separation basin, cattle soft floor
When:	Weekly and as required

Actions:		**Responsible Person(s)**
10.	The truck wash solids separation basin shall be checked daily by the Site Manager. Once the operational side reaches capacity, the flow will be diverted to the clean side. The stored solids will be allowed to drain for several days before the solids are removed and placed in the solids stockpile area. Solids removed from the solids separation basin shall be stored separate to the used soft floor material.	SM, W
11.	The Site Manager shall undertake weekly inspections of the solids stockpile area to observe that all solids are in appropriate areas and that the stockpiles are odour free. Record of the inspection shall be maintained on **Form 1 – Weekly Environmental Checklist** in accordance with **Section 5.1**.	SM
12.	The SM shall direct workers to turn the solids stockpiles if a moderate odour is being generated.	SM, W
13.	The Site Manager shall arrange removal within 48 hours of any stockpiled solids that are generating a strong odour that is noticeable at the site boundary in a downwind direction.	SM
14.	The quantity of solids stockpiled on site shall be recorded on **Form 1 – Weekly Environmental Checklist** in accordance with **Section 5.1**.	SM
15.	The Site Manager shall ensure that, where possible, the maximum quantity of stockpiled soft floor and effluent system solids stored on site shall not exceed: – Used soft floor 200 m^3 – Effluent system solids 180 m^3	SM
16.	Any solids removed from the facultative ponds (infrequent event) shall be removed from the site on the same day.	SM
17.	The Site Manager shall arrange for the removal of stockpiled solid waste as required to comply with Action 13. Organic solid waste shall be removed to an appropriately licenced/approved facility. Where possible, organic waste shall be removed for composting in preference to waste disposal (landfill). Organic waste may also be used off-site for agricultural land improvement.	SM
18.	The Site Manager shall ensure that if the solid waste cannot be managed to prevent environmental harm (odour generation) that RIPL will implement increased frequency of waste removal.	SM
19.	The Site Manager shall require that any vehicles removing solid waste: – Are appropriately sealed/waterproof to avoid any potential leakage; and – Are covered to prevent dust.	SM