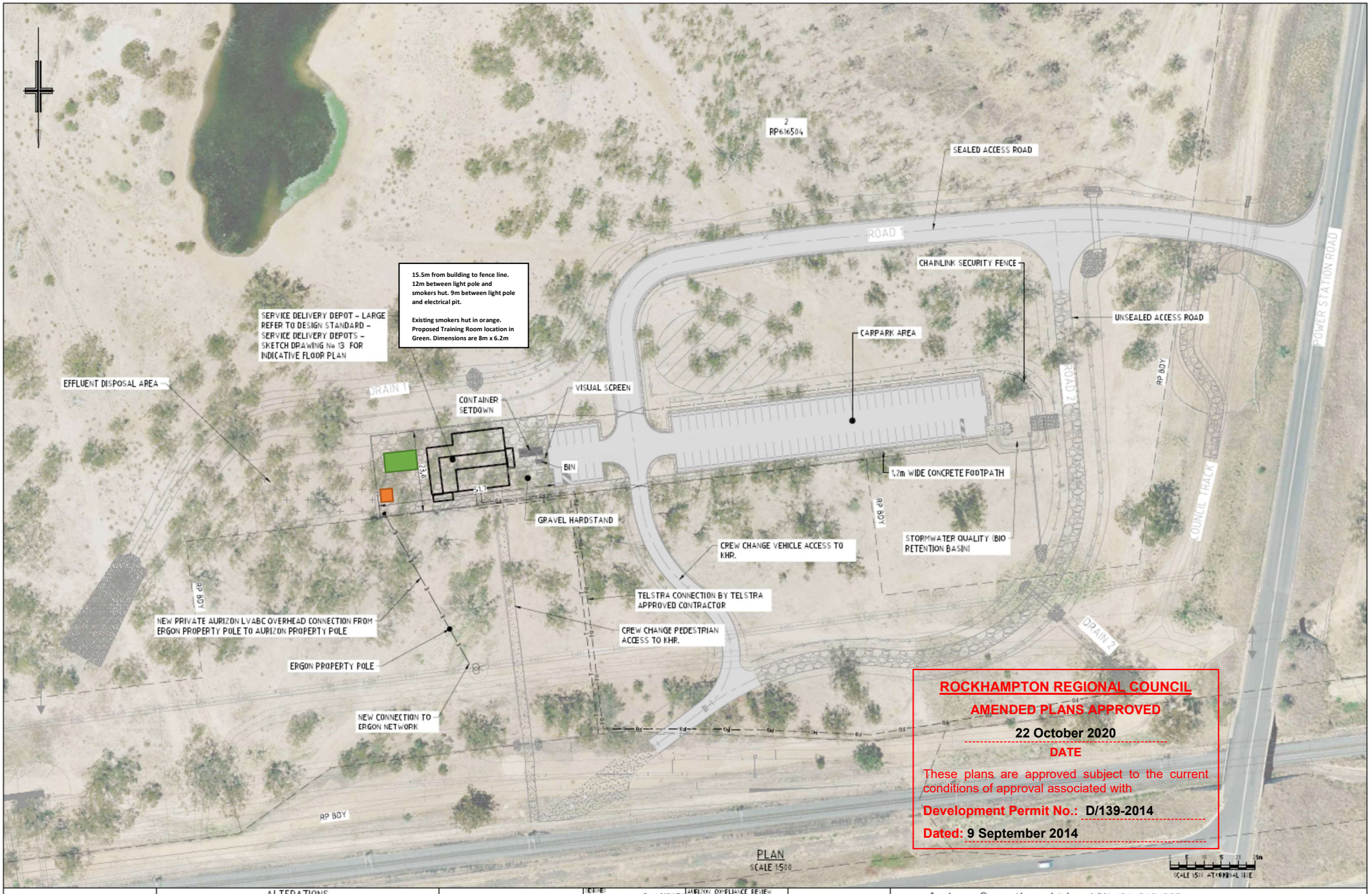

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

22 October 2020

DATE

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

Development Permit No.: D/139-2014

Dated: 9 September 2014

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR REVIEW	8.9.14	FG
2	ISSUE FOR REVIEW	22.9.14	FG
3	ISSUE FOR REVIEW	22.9.14	FG

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PROJECT No 41-27647
DRAWING No 41-27647-SK700

DESIGNED T. McPHILLIPS
DESIGN CHECKED
DRAWN T. McPHILLIPS
DRAWING CHECK
APPROVED
WES No.

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

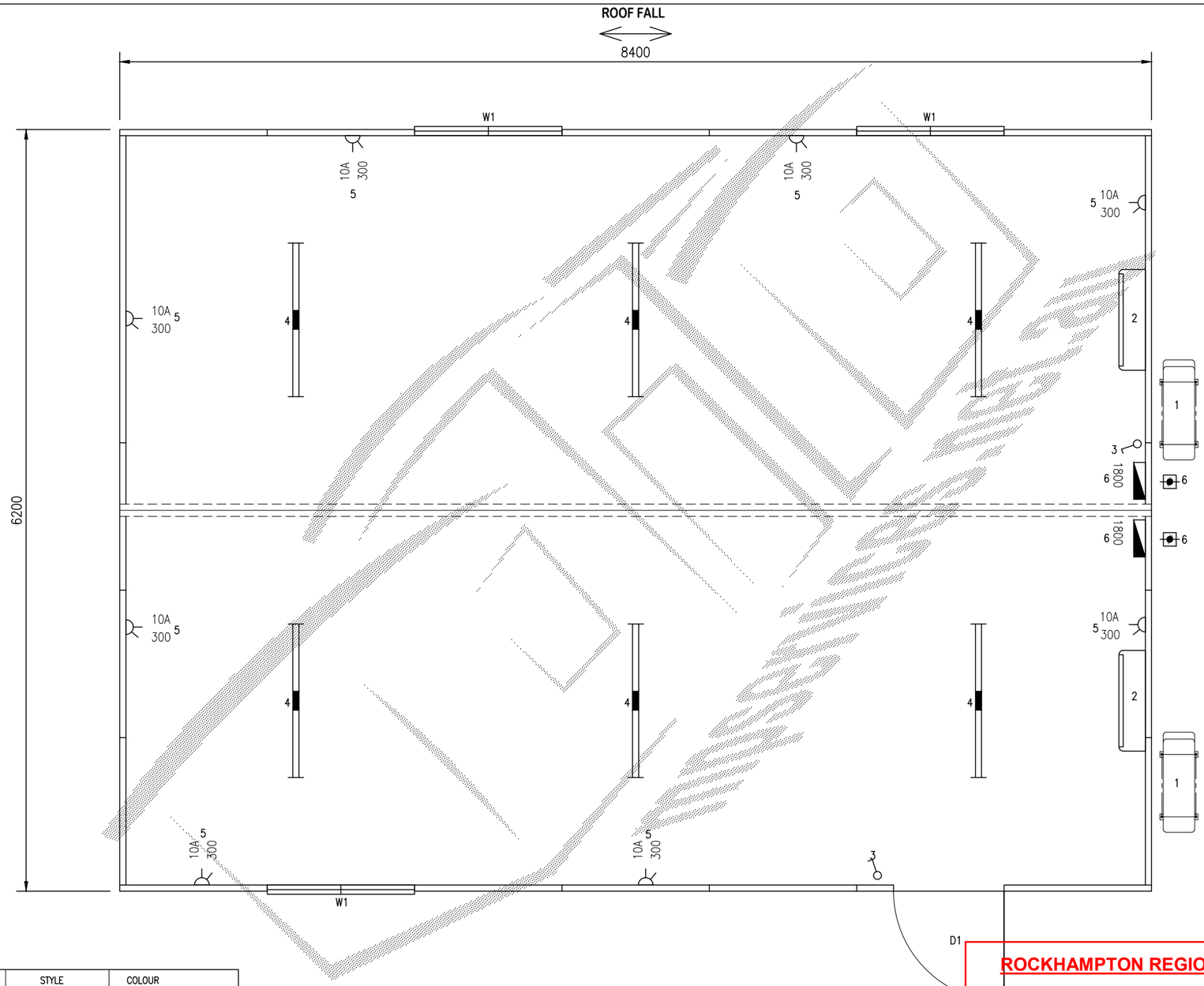
AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR – STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km – CENTRAL LINE
ADMINISTRATION BUILDING
PROPOSED LOCATION

FILE No. F14/15659

DRAWING NUMBER	ISSUE
41-27647-SK700	3



FLOOR PLAN
BUILDING LAYOUT

ITEM DESCRIPTION

1. 5.0kW SPLIT SYSTEM REV. CYCLE A/C OUTDOOR UNIT WITH BRACKET & ISOLATOR
2. 5.0kW SPLIT SYSTEM REV. CYCLE A/C INDOOR UNIT
3. SINGLE INTERNAL LIGHT SWITCH
4. DIFFUSED LED BATTEN LIGHT
5. 10A DOUBLE GPO
6. POWER P.O.E.
7. DISTRIBUTION BOARD WITH MAIN SWITCH EARTH LEAKAGE & CIRCUIT BREAKERS

DOOR LEGEND

D1	1–2040x900mm PANEL DOOR & LOCKSET

WINDOW LEGEND

W1	3–900x1200 SGW – GREY GLASS WITH FULL COVER SECURITY FLYSCREEN

NOTES

1. IF IN DOUBT ASK
2. REFER STANDARD DRAWING SET 1000–MPS FOR RELEVANT INFORMATION.
3. ALL WALL AND ROOF PANELS TO BE SEALED WITH BOSTICK SEAL'N'FLEX

BUILDING SPECIFICATION

DESCRIPTION	TYPE	STYLE	COLOUR
ROOFING PANEL	75mm	SKILLION	WHITE
ROOF CAPPING	110x80 1.2mm HT	POWDER COATED	BLACK
EXTERNAL WALLS	50mm PANEL	SATINLINE	WHITE
EXT/INT CORNERS	ALUMINIUM	POWDER COATED	BLACK
FLOORING	STRUCTURAL PLY	F11 17mm	
GUTTERING & DOWNPIPES	SQUARELINE & RECTANGLE	COLORBOND	BLACK
WINDOWS	ALUMINIUM	POWDER COATED	BLACK
GLASS	FLOAT	GREY	GREY
SECURITY SCREENS	ALUMINIUM	AMPLIMESH	BLACK
EXTERNAL DOORS	50mm PANEL	SWING	WHITE
VINYL FLOOR COVERINGS	2mm THICK	COMMERCIAL GRADE	GREY
SKIRTING	PVC	FEATHEREDGE	BLACK

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

22 October 2020

DATE

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

Development Permit No.: D/139-2014

Dated: 9 September 2014

M&P SERVICES (QLD) Pty Ltd
1 Diesel Drive
Paget, Queensland, 4740
Australia
Phone: (07) 4965 7777
Fax: (07) 4808 0599
Email: enquiries@mpservices.net.au

CLIENT: AURIZON
SITE LOCATION: STANWELL, QLD
DESCRIPTION: 8.4x6.2m OFFICE FLOOR PLAN
CLIENT SIGNATURE:
DATE SIGNED:
DRAWN: JKH
CHECKED:
DATE: 29–07–2020
SIZE: A3
WIND RATING: C2
FLOOR LOAD: 3.0kPa/1.8kN
SCALE: NOT TO SCALE DO NOT SCALE

REVISION	DESCRIPTION OF CHANGES	DATE CHANGED
01	ISSUED FOR APPROVAL	

JOB/DRAWING NUMBER: 81641-MPS-02
REVISION: 01
SHEET: 1

G:\Current Year\Gracemere\Gracemere July 2020 – June 2021\81641–MPS – Aurizon\DWG\81641–MPS–02.dwg

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

LEGEND

- EXISTING PROPERTY BOUNDARY
- SITE BOUNDARY
- EXISTING MAJOR CONTOURS (1.0m INT)
- EXISTING MINOR CONTOURS (0.25m INT)
- EXISTING CHANGE OF GRADE
- EXISTING FENCE
- EXISTING TELSTRA
- EXISTING OVERHEAD ELECTRICITY
- EXCLUSION ZONE
- MAJOR CONTOURS (1.0m INT)
- MINOR CONTOURS (0.2m INT)
- ROAD CENTRELINE
- DRAIN CENTRELINE
- STORMWATER DRAINAGE CULVERT
- ELECTRICITY (INDICATIVE)
- TELSTRA (INDICATIVE)
- FIBRE OPTIC CABLES (INDICATIVE)
- CULTURAL HERITAGE SITE AND PLACE NO.

2 RP616504

SEALED ACCESS ROAD. REFER DRAWING AUR-Q-0598-5000 FOR TYPICAL SECTIONS AND DETAILS

CULVERT CROSSING REFER DRAWING AUR-Q-0598-4200

DRAIN 1. REFER DRAWING AUR-Q-0598-2101 FOR DETAILS

PROPOSED RP BDY

ROAD 1

ROAD 2

POWER STATION ROAD

BUILDING WORKS AREA. INDICATIVE LOCATION OF TEMPORARY FENCING

12m FIRE BREAK

DEPOT ADMINISTRATION INCLUDING LOCKER SHOWER AND COVERED OUTDOOR AREA (INDICATIVE)

CHAINLINK SECURITY FENCE IN ACCORDANCE WITH QR DWG 2544

LOCKING RAIL IN ACCORDANCE WITH CMDG-G-013 STANDARD DRAWING

LOG BARRIER FENCE IN ACCORDANCE WITH CMDG-G-012 STANDARD DRAWING

SCAR TREE AND EXCLUSION ZONE

REFER DRAWING AUR-Q-0598-5300 FOR INTERSECTION DETAILS

UNSEALED ACCESS ROAD. REFER DRAWING AUR-Q-0598-5000 FOR TYPICAL SECTIONS AND DETAILS

DRAIN 1, BUND AND TRAY. REFER DRAWING AUR-Q-0598-2101 FOR DETAILS

REFER DRAWING AUR-Q-0598-5301 FOR CARPARK DETAILS

EFFLUENT DISPOSAL AREA STANDARD RURAL FENCING WITH PLAIN WIRE TO SURROUND AREA. PROVIDE 1800mm WIDE SINGLE LEAF GATE FOR MAINTENANCE ACCESS. REFER AURIZON STD DWG 2549

DRAIN 1

CONTAINER SETDOWN

VISUAL SCREEN

6 BAYS

3 BAYS

BIN

38 BAYS

35 BAYS

RP BDY

1.2m WIDE CONCRETE FOOTPATH IN ACCORDANCE WITH CMDG-R-051

8m WIDE DOUBLE LEAF GATE IN ACCORDANCE WITH QR DWG 2544

2 NO. PWD PARKING BAYS AND SHARED ZONE

BARRIER KERB AND CHANNEL

JOIN NEATLY TO EXISTING TRACK

COUNCIL TRACK

DEMOLISH AND REMOVE EXISTING FENCE

GRAVEL HARDSTAND REFER AUR-Q-0598-2000 AND 2100 FOR DETAILS

1200mm WIDE SINGLE LEAF GATE IN ACCORDANCE WITH QR DWG 2544

CREW CHANGE PEDESTRIAN ACCESS TO KHR. 2.5m WIDE CONCRETE FOOTPATH IN ACCORDANCE WITH CMDG-R-051.

CREW CHANGE VEHICLE ACCESS TO KHR. 5m SEALED FORMATION REFER DRAWING AUR-Q-0598-5000 FOR TYPICAL SECTIONS AND DETAILS

STORMWATER QUALITY (BIO RETENTION BASIN). REFER DRAWING AUR-Q-0598-4202 FOR DETAILS

CULVERT CROSSING REFER DRAWING AUR-Q-0598-4200

DRAIN 2

LIMIT OF SID DESIGN

LIMIT OF KHR DESIGN

DISCHARGE DRAIN TO GROUND PROVIDE SCOUR PROTECTION. REFER DRAWING AUR-Q-0598-2101 FOR DETAILS.

INDICATIVE TELSTRA LEAD IN CONDUIT TBC WITH SERVICE PROVIDER (BY OTHERS)

CONSTRUCT FOOTPATH OVER KHR DRAIN. REFER DRAWING AUR-Q-0598-4000 FOR CULVERT DETAILS

LOCALLY MODIFY WORKS AS REQUIRED TO PROVIDE NEAT CONNECTION TO EXISTING

INDICATIVE FIBRE OPTIC HAULTBC WITH SERVICE PROVIDER (BY OTHERS)

KHR PEDESTRIAN CROSSING (BY OTHERS)

KHR LEVEL CROSSING (BY OTHERS)

KHR CULVERT EXTENSION (BY OTHERS)

PLAN

SCALE 1:500

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	JAM
2	ISSUE FOR 90% REVIEW	14.5.14	JGM
3	ISSUE FOR APPROVAL	22.5.14	JAM
4	ISSUE FOR TENDER	27.5.14	JAM
5	UPDATED CULTERAL HERTAGE SITE COORDINATES	04.6.14	JAM
6	ISSUED FOR COUNCIL REVIEW	1.8.14	JAM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C001

DESIGNED	J.McDONALD
DESIGN CHECKED	A.OLIVER
DRAWN	J.MURRAY
DRAFTING CHECK	D.SIPPEL
APPROVED	A.BIRD 22.5.14 DATE
RPEQ No.	11384

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
SITE WORKS
GENERAL ARRANGEMENT

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-0100**
ISSUE **6**

Plot Date: 1 August 2014 - 4:21 PM Plotted by: Jay McDonald Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-0100.dwg

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

LEGEND

- PROPOSED ROAD RESERVE BOUNDARY
- SITE BOUNDARY
- EXISTING CONTOURS (0.25m INT)
- EXISTING CHANGE OF GRADE
- EXISTING FENCE
- EXISTING TELSTRA
- EXISTING OVERHEAD ELECTRICITY
- EXISTING SUNWATER PIPELINE
- EXCLUSION ZONE
- ELECTRICITY (INDICATIVE)
- TELSTRA (INDICATIVE)
- FIBRE OPTIC CABLES (INDICATIVE)

PARISH OF STANWELL
COUNTY OF LIVINGSTONE

2 RP616504

1 RP616504

PROPOSED RP BDY
ROAD 1
POWER STATION ROAD
EFFLUENT DISPOSAL AREA
PROPOSED CAR PARK
DEPOT SITE REFER DRG. AUR-Q-0598-0100
EXISTING RP BDY
COUNCIL TRACK
DEPOT ADMINISTRATION AREA AND FACILITIES
FOOTPATH ACCESSWAY
TELSTRA FEED IN (BY OTHERS)
FIBRE OPTIC HAUL (BY OTHERS)
LIMIT OF SID DESIGN
LIMIT OF KHR DESIGN
PROPOSED ROAD RESERVE BOUNDARY
MURPHY ROAD
E. WILLIAMS ROAD
EXISTING OVERHEAD ELECTRICAL
EXISTING TELSTRA OPTIC FIBRE (PLOTTED - INDICATIVE ONLY)
EXISTING SUNWATER PIPELINE
CAPRICORN HIGHWAY

PLAN
SCALE 1:1000

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	JAM
2	ISSUE FOR 90% REVIEW	14.5.14	JGM
3	ISSUE FOR APPROVAL	22.5.14	JAM
4	ISSUE FOR TENDER	27.5.14	JAM
5	ISSUED FOR COUNCIL REVIEW	1.8.14	JGM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C002

DESIGNED	J.McDONALD	
DESIGN CHECKED	A.OLIVER	
DRAWN	J.MURRAY	
DRAFTING CHECK	D.SIPPEL	
APPROVED		
A.BIRD	22.5.14	DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

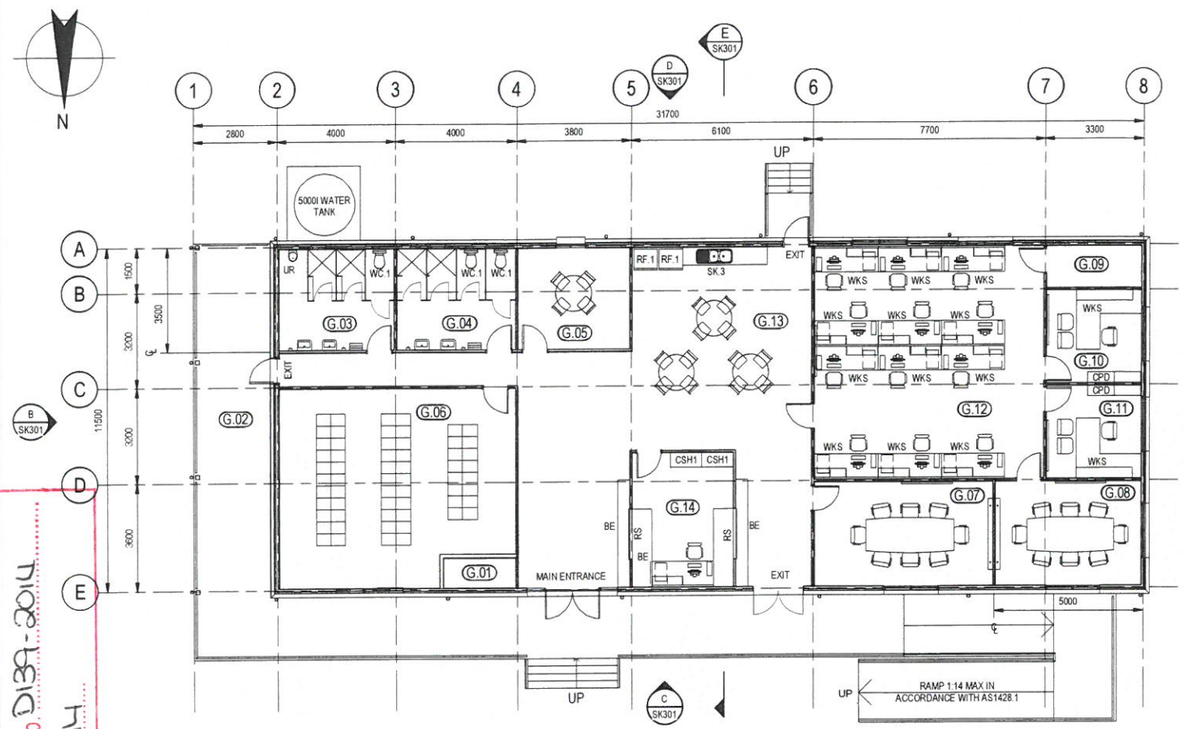
AURIZON

Aurizon Operations Ltd - ACN 124 649 967

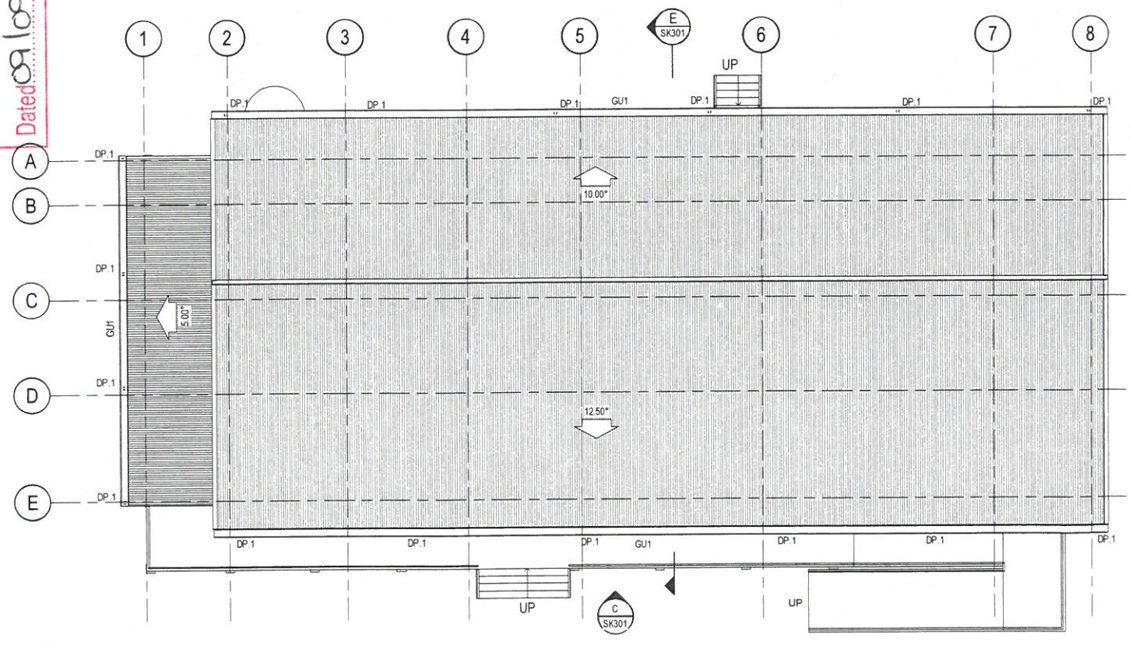
ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
SITE WORKS
LAYOUT PLAN

FILE No. F14/15659
DRAWING NUMBER AUR-Q-0598-0101
ISSUE 5

Plot Date: 1 August 2014 - 4:21 PM Plotted by: Jay McDonald
Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-0101.dwg

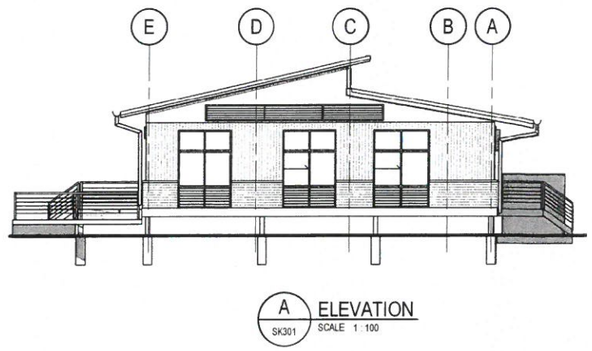


GENERAL ARRANGEMENT - GROUND FLOOR
SCALE 1 : 100

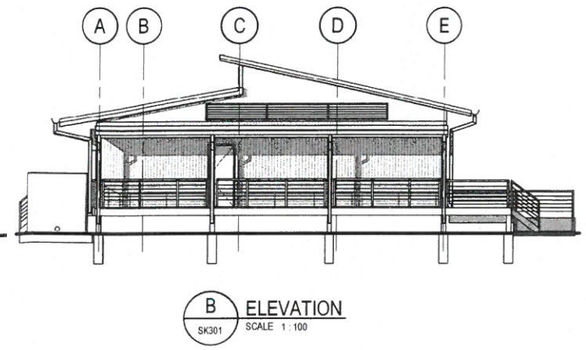


GENERAL ARRANGEMENT - ROOF
SCALE 1 : 100

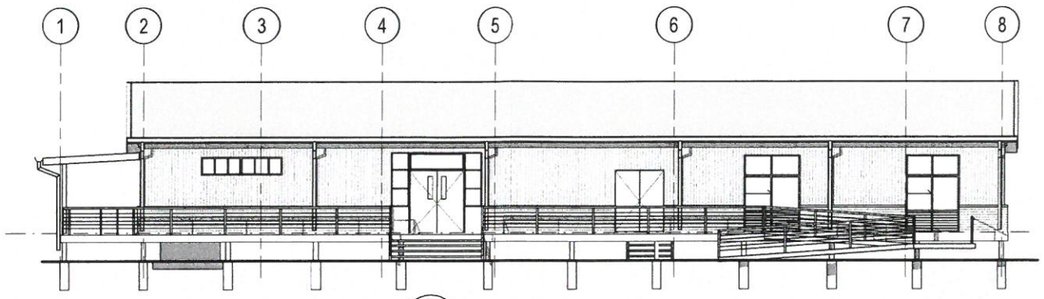
0 1000 2000 3000 4000 5000mm
SCALE 1 : 100 AT ORIGINAL SIZE



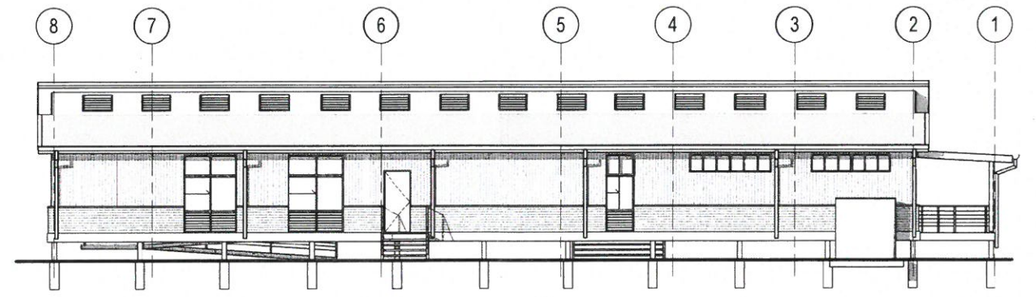
A SK301 ELEVATION
SCALE 1 : 100



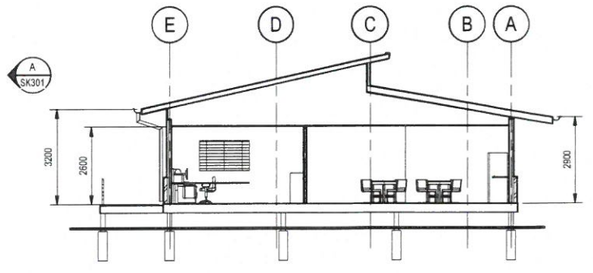
B SK301 ELEVATION
SCALE 1 : 100



C SK301 ELEVATION
SCALE 1 : 100



D SK301 ELEVATION
SCALE 1 : 100



E SK301 SECTION
SCALE 1 : 100

ROOM SCHEDULE

NUMBER	NAME	AREA
G.01	BRETHALYSER STATION	2.35 m²
G.02	OUTDOOR AREA	30.61 m²
G.03	MALE WC / SHOWER	13.23 m²
G.04	FEMALE WC/ SHOWER	13.25 m²
G.05	QUIET	12.60 m²
G.06	LOCKER AREA	50.02 m²
G.07	CONFERENCE ROOM 1	20.66 m²
G.08	CONFERENCE ROOM 2	17.12 m²
G.09	IT	4.46 m²
G.10	SDM2	9.94 m²
G.11	SDM1	9.94 m²
G.12	TMO/ SUPERVISOR AREA	59.33 m²
G.13	LUNCH AREA	90.82 m²
G.14	RECEPTION/ SIGN- ON AREA	15.33 m²
		349.68 m²

LEGEND

ABBV	DESCRIPTION
BE	BENCHTOP
CPD	CUPBOARD
CSH1	COAT STORAGE AND SHELF TYPE 1
DP.1	COLOURBOND ROUND DOWNPIPE (REFER HYDRAULIC DRAWINGS FOR SIZE)
GU1	GUTTER
RF.1	REFRIGERATOR
RS	ROLLER SHUTTER
SK.3	SINGLE AND HALF BOWL AND STRAINER STAINLESS STEEL TEA SINK
UR	URINAL
WC.1	TOILET SUITE
WKS	WORKSTATION

ANNOTATION LEGEND

G.01	ROOM IDENTIFIER
??° PITCH	ROOF PLAN PITCH AND DIRECTION
?% FALL	FALL IN SURFACE
℄	CENTRELINE

GENERAL NOTES

1. REFER SITE PLANS FOR LOCATION, SETOUT AND ACTUAL LEVELS OF BUILDINGS. CONFIRM PRIOR EXCAVATION.
2. CONTRACTOR TO CHECK ON SITE ALL DIMENSIONS PRIOR TO SHOP DRAWINGS AND FABRICATION.
3. ALL DIMENSIONS ARE TO GRID LINES, FACE OF BLOCKWORK/BRICKWORK , FACE OF STUD OR CENTRELINE OF COLUMNS, U.N.O.
4. CONTRACTOR TO CO-ORDINATE ALL SERVICES, PENETRATIONS AND STRUCTURE PRIOR TO CONSTRUCTION AND INFORM THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION/FABRICATION.
5. ALL RAMPS, STAIRS, AND PATHWAYS/APRONS TO COMPLY WITH AS1428.1 (2009).
6. WHERE A TRADE NAMED PRODUCT IS SPECIFIED IN THESE DOCUMENTS, IT IS TO BE CONSIDERED AS, 'OR EQUIVALENT TO APPROVAL OF CONTRACT ADMINISTRATOR.'

FOR DEVELOPMENT APPROVAL ONLY
Not for Construction

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR DEVELOPMENT APPROVAL	24.6.14	AW

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PROJECT No. 41-27647
DRAWING No. 41-27647-A002

DESIGNED	A.WOLSKI
DESIGN CHECKED	R.ANDRADE
DRAWN	S.BLOOMER
DRAFTING CHECK	R.ORTIZ CHIVARA
APPROVED	
RPEQ No.	DATE

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

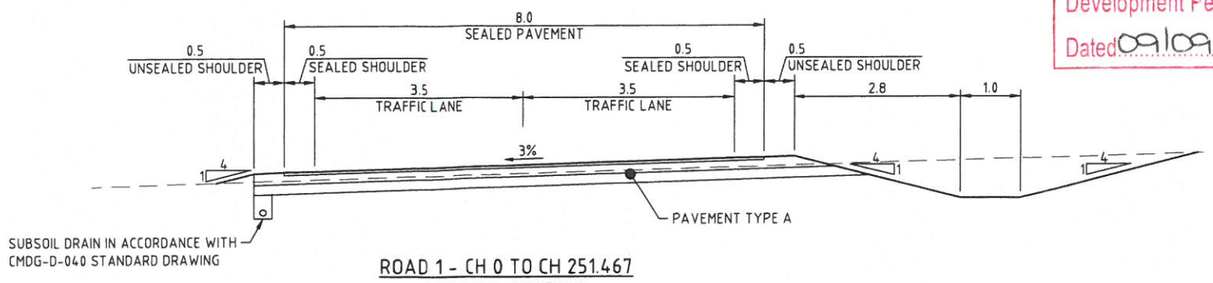
Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
BUILDING WORKS
GENERAL ARRANGEMENT PLANS, SECTIONS & ELEVATIONS

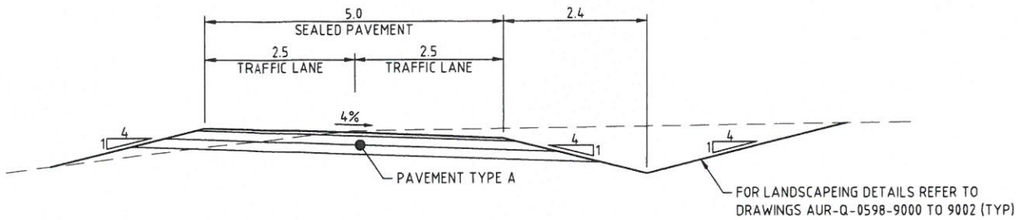
FILE No. F14/15659
DRAWING NUMBER 41-27647- SK301
ISSUE A

Plot Date: 6/24/2014 2:17:19 PM
Cad File No: G:\41\27647\CADD\Revit\41-27647-Stanwell_Intermediate_Depot-2014.rvt

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014



ROAD 1 - CH 0 TO CH 251.467
TYPICAL SECTION
SCALE 1:50

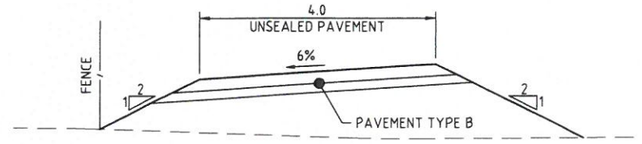


ROAD 1 - CH 270.947 TO CH 361.500
TYPICAL SECTION
SCALE 1:50

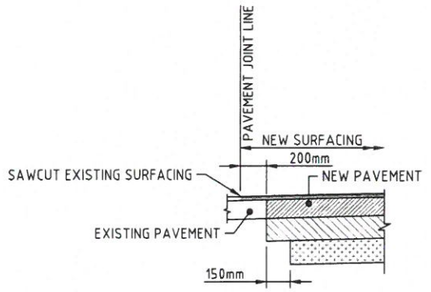
PAVEMENT SPECIFICATIONS TABLE		
TYPE	DESCRIPTION	IN-SITU DESIGN CBR
A	ASPHALT ACCESS ROAD / CARPARK - 35mm DG10 (C320) - 10mm C170 SEAL AND AMCO PRIME - 150mm TYPE 2.1 UNBOUND GRANULAR BASE - 160mm TYPE 2.3 UNBOUND GRANULAR SUBBASE	≥ 3%
B	UNSEALED ACCESS ROAD - 200mm COMBINED WEARING COURSE AND BASE COURSE (CBR 50) - 150mm SUBBASE COURSE (CBR 30)	≥ 3%

PAVEMENT NOTES

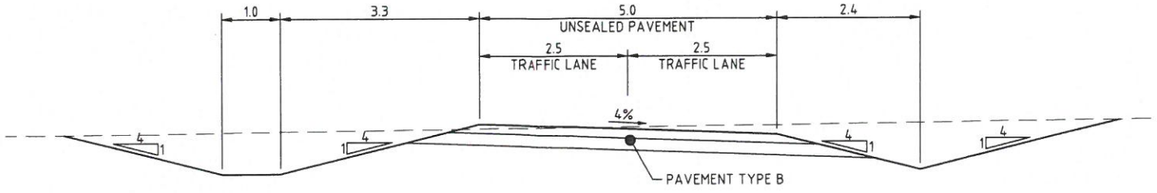
1. INSITU SUBGRADE CONDITIONS TO BE CONFIRMED BY 4-DAY SOAKED CBR AND SWELL TESTING PRIOR TO CONSTRUCTION. MIN 3 TESTS WILL BE UNDERTAKEN PER LOT
2. WHERE CBR < 3 PROVIDE THE FOLLOWING MINIMUM CAPPING USING A CBR 10 SELECT FILL MATERIAL
   - CBR ≤ 1.0, 400mm
   - 1.0 < CBR ≤ 1.5, 300mm
   - 1.5 < CBR ≤ 2.0, 200mm
   - 2.0 < CBR ≤ 3.0, 150mm
3. WHERE 4-DAY SOAK SWELL ≥ 2.5% A MINIMUM COVER OF 75mm CBR 10 SELECT FILL IS REQUIRED FROM THE TOP OF SUBGRADE TO BOTTOM OF PAVEMENT LEVELS
4. THE PAVEMENT MATERIALS AND CONSTRUCTION SHALL COMPLY WITH SPECIFICATION



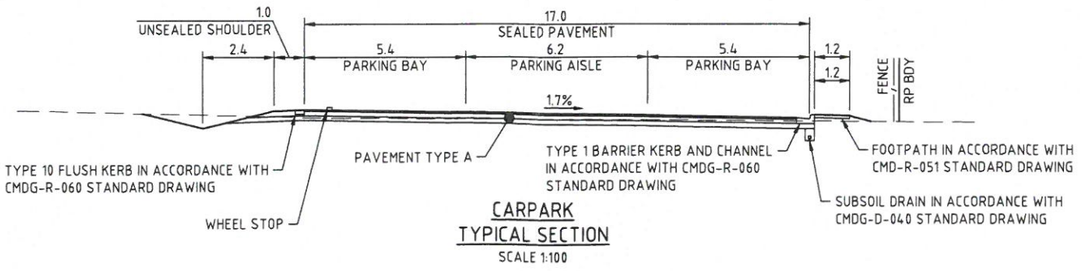
COUNCIL TRACK
TYPICAL SECTION
SCALE 1:50



PAVEMENT JOINT DETAIL
NOT TO SCALE



ROAD 2
TYPICAL SECTION
SCALE 1:50



CARPARK
TYPICAL SECTION
SCALE 1:100

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 AT ORIGINAL SIZE

0 1 2 3 4 5m
SCALE 1:100 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	JAM
2	ISSUE FOR 90% REVIEW	14.5.14	JGM
3	ISSUE FOR TENDER	27.5.14	JAM
4	ISSUED FOR COUNCIL REVIEW	01.08.14	JGM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C400

DESIGNED	J.McDONALD	
DESIGN CHECKED	A.OLIVER	
DRAWN	J.MURRAY	
DRAFTING CHECK	D.SIPPEL	
APPROVED	A.BIRD	22.5.14 DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

AURIZON

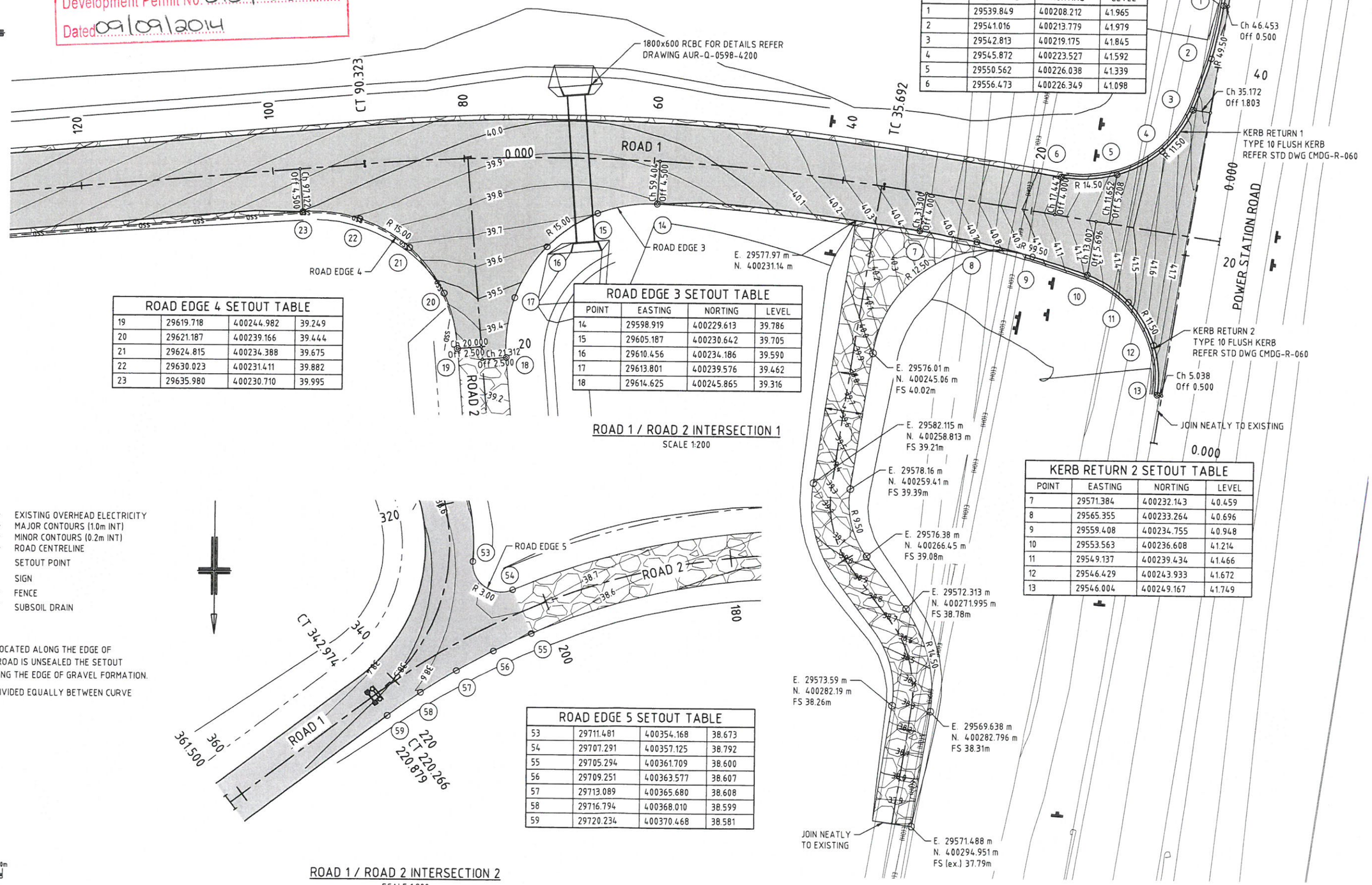
Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
ROADWORKS
TYPICAL SECTIONS AND DETAILS

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-5000**
ISSUE 4

Plot Date: 1 August 2014 - 4:23 PM Plotted by: Jay McDonald Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-5000.dwg

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014



KERB RETURN 1 SETOUT TABLE

POINT	EASTING	NORTING	LEVEL
1	29539.849	400208.212	41.965
2	29541.016	400213.779	41.979
3	29542.813	400219.175	41.845
4	29545.872	400223.527	41.592
5	29550.562	400226.038	41.339
6	29556.473	400226.349	41.098

ROAD EDGE 4 SETOUT TABLE

19	29619.718	400244.982	39.249
20	29621.187	400239.166	39.444
21	29624.815	400234.388	39.675
22	29630.023	400231.411	39.882
23	29635.980	400230.710	39.995

ROAD EDGE 3 SETOUT TABLE

POINT	EASTING	NORTING	LEVEL
14	29598.919	400229.613	39.786
15	29605.187	400230.642	39.705
16	29610.456	400234.186	39.590
17	29613.801	400239.576	39.462
18	29614.625	400245.865	39.316

ROAD 1 / ROAD 2 INTERSECTION 1
SCALE 1:200

KERB RETURN 2 SETOUT TABLE

POINT	EASTING	NORTING	LEVEL
7	29571.384	400232.143	40.459
8	29565.355	400233.264	40.696
9	29559.408	400234.755	40.948
10	29553.563	400236.608	41.214
11	29549.137	400239.434	41.466
12	29546.429	400243.933	41.672
13	29546.004	400249.167	41.749

LEGEND

- EXISTING OVERHEAD ELECTRICITY
- MAJOR CONTOURS (1.0m INT)
- MINOR CONTOURS (0.2m INT)
- ROAD CENTRELINE
- SETOUT POINT
- SIGN
- FENCE
- SUBSOIL DRAIN

NOTES

1. SETOUT POINTS ARE LOCATED ALONG THE EDGE OF BITUMEN. WHERE THE ROAD IS UNSEALED THE SETOUT POINT IS LOCATED ALONG THE EDGE OF GRAVEL FORMATION.
2. SETOUT POINTS ARE DIVIDED EQUALLY BETWEEN CURVE TANGENT POINTS

ROAD EDGE 5 SETOUT TABLE

53	29711.481	400354.168	38.673
54	29707.291	400357.125	38.792
55	29705.294	400361.709	38.600
56	29709.251	400363.577	38.607
57	29713.089	400365.680	38.608
58	29716.794	400368.010	38.599
59	29720.234	400370.468	38.581

ROAD 1 / ROAD 2 INTERSECTION 2
SCALE 1:200

0 2 4 6 8 10m
SCALE 1:200 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 90% REVIEW	14.5.14	JGM
2	ISSUE FOR APPROVAL	22.5.14	JAM
3	ISSUE FOR TENDER	27.5.14	JAM
4	ISSUED FOR COUNCIL REVIEW	01.08.14	JGM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C430

DESIGNED	J.McDONALD	
DESIGN CHECKED	A.OLIVER	
DRAWN	J.MURRAY	
DRAFTING CHECK	D.SIPPEL	
APPROVED	A.BIRD	22.5.14 DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
ROADWORKS
INTERSECTION DETAILS

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-5300**
ISSUE 4

Plot Date: 1 August 2014 - 4:27 PM Plotted by: Jay McDonald
Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-5300.dwg

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Dated 09/09/2014

LEGEND

- EXISTING PROPERTY BOUNDARY
- SITE BOUNDARY
- EXISTING MAJOR CONTOURS (1.0m INT)
- EXISTING MINOR CONTOURS (0.25m INT)
- EXISTING CHANGE OF GRADE
- EXISTING FENCE
- EXISTING TELSTRA
- EXISTING OVERHEAD ELECTRICITY
- EXCLUSION ZONE
- MAJOR CONTOURS (1.0m INT)
- MINOR CONTOURS (0.2m INT)
- ROAD CENTRELINE
- OPEN DRAIN FLOW DIRECTION
- STORMWATER DRAINAGE CULVERT
- ELECTRICITY (INDICATIVE)
- TELSTRA (INDICATIVE)
- FIBRE OPTIC CABLES (INDICATIVE)
- LOG BARRIER FENCE
- SUBSOIL DRAIN

PROPOSED RP BDY
LOCALLY MODIFY EARTHWORKS TO PROVIDE FREE DRAINING FLOW PATH
HW 1/1
1800 x 600 RCBC
ROAD 1
SUBSOIL DRAIN TO DISCHARGE TO OPEN DRAIN
HW 2/1
POWER STATION ROAD
COUNCIL TRACK
WEIR WITH 300 RCP LOW FLOW PIPE. REFER DRAWING AUR-Q-0598-4201 FOR DETAILS.
DRAIN 1
ROAD 2
FI 1/3
300 RCP CLASS 2
SUBSOIL DRAIN AND KERB AND CHANNEL TO DISCHARGE TO BIO-RETENTION BASIN. PROVIDE STONE PITCHING AT DISCHARGE IN ACCORDANE WITH IPWEAQ STANDARD DRAWING SEQ-R-142
AUR-Q-0598-4202
HW 2/3
HW 1/2
1200x300 RCBC
HW 2/2
DRAIN 2
RP BDY
SUBSOIL DRAIN TO DISCHARGE TO OPEN DRAIN
DISCHARGE DRAIN TO GROUND. PROVIDE 40m² (APPROX) Ø300 DUMPED ROCK TO A DEPTH OF 600mm
WEIR WITH 300 RCP LOW FLOW PIPE. REFER DRAWING AUR-Q-0598-4201 FOR DETAILS.
DISCHARGE DRAIN TO GROUND. PROVIDE 367m² (APPROX) Ø300 DUMPED ROCK TO A DEPTH OF 600mm
JOIN NEATLY TO EXISTING OPEN DRAIN
PROVIDE 4.5m³ OUTLET PROTECTION 200mm ROCK AT 600mm DEPTH OVER BIDIM A39 GEOFABRIC
PROVIDE 4.5m³ INLET PROTECTION 200mm ROCK AT 400mm DEPTH OVER BIDIM A39 GEOFABRIC
KHR CULVERT EXTENSION (BY OTHERS)

CULVERT DESIGN DETAILS

	Q (m³/s)	V (m/s)	HWL
Q10	0.1	1.25	PIPE INVERT + 325mm
Q100	0.17	1.55	PIPE INVERT + 455mm

NOTE
450 RCP CLASS 2 WITH PRECAST HEADWALLS. LEVELS TO MATCH KHR DRAIN LEVELS. 4.8m LENGTH MIN 1% LONGITUDINAL GRADE.

NOTES

1. FOR CONNECTIONS TO EXISTING STORMWATER DRAINAGE NETWORKS, LEVELS AND GRADIENTS OF STORMWATER DRAINAGE PIPES AND/OR OPEN DRAINS MAY BE VARIED TO ACHIEVE A SATISFACTORY CONNECTION. WRITTEN APPROVAL FROM THE SUPERINTENDENT AND COUNCIL SHALL BE OBTAINED PRIOR.
2. ALL NEW AND EXISTING STORMWATER DRAINAGE NETWORKS SHALL BE KEPT FREE OF SEDIMENT AND DEBRIS. ALL NEW STORMWATER LINES SHALL BE CLEANED OF ALL SEDIMENT AND DEBRIS PRIOR TO 'ON-MAINTENANCE' INSPECTION.
3. ALL STORMWATER DRAINAGE WORKS AND MATERIALS TO BE IN ACCORDANCE WITH CAPRICORN MUNICIPAL DEVELOPMENT GUIDELINES AND STANDARD DRAWINGS.
4. PRECAST CONCRETE ITEMS MAY BE USED AT THE DISCRETION OF AURIZON.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO PROTECT THE SITE AND SURROUNDING AREA FROM DAMAGE RESULTING FROM STORMWATER RUNOFF. TEMPORARY DIVERSION DRAINS AND OR OTHER DRAINAGE CONTROL DEVICES ARE TO BE IMPLEMENTED BY THE CONTRACTOR DURING CONSTRUCTION TO MINIMISE THE EFFECTS OF WEATHER.
6. EXISTING SERVICES ARE TO BE RETAINED UNLESS NOTED OTHERWISE. CONTRACTOR TO TAKE DUE CARE TO PROTECT EXISTING SERVICES DURING CONSTRUCTION
7. FOR EXCAVATION BEDDING AND BACKFILLING DETAILS REFER TO CAPRICORN MUNICIPAL DEVELOPMENT GUIDELINES AND STANDARD DRAWINGS

PLAN
SCALE 1:500

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	JAM
2	ISSUE FOR 90% REVIEW	14.5.14	JGM
3	ISSUE FOR APPROVAL	22.5.14	JAM
4	ISSUE FOR TENDER	27.5.14	JAM
5	ISSUED FOR COUNCIL REVIEW	01.08.14	JGM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C500

DESIGNED	J.McDONALD	
DESIGN CHECKED	A.OLIVER	
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DRAFTING CHECK	D.SIPPEL	
APPROVED	A.BIRD	22.5.14 DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
STORMWATER DRAINAGE
LAYOUT PLAN

FILE No. F14/15659
DRAWING NUMBER: AUR-Q-0598-4000
ISSUE: 5

Plot Date: 1 August 2014 - 4:22 PM Plotted by: Jay McDonald Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-4000.dwg

ROCKHAMPTON REGIONAL COUNCIL
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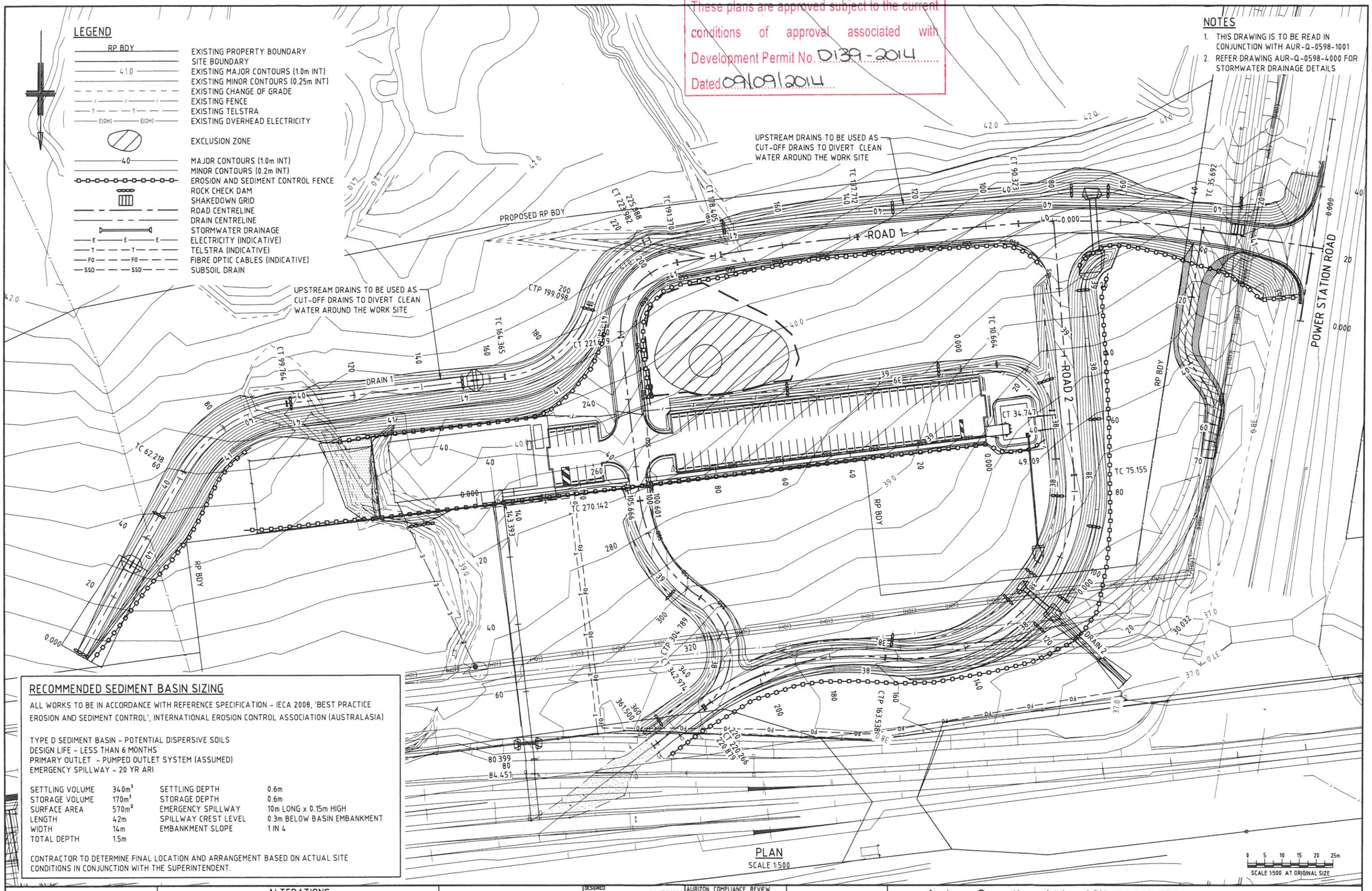
Dated 09/09/2014

LEGEND

- EXISTING PROPERTY BOUNDARY
- SITE BOUNDARY
- EXISTING MAJOR CONTOURS (1.0m INT)
- EXISTING MINOR CONTOURS (0.25m INT)
- EXISTING CHANGE OF GRADE
- EXISTING FENCE
- EXISTING TELSTRA
- EXISTING OVERHEAD ELECTRICITY
- EXCLUSION ZONE
- MAJOR CONTOURS (1.0m INT)
- MINOR CONTOURS (0.2m INT)
- EROSION AND SEDIMENT CONTROL FENCE
- ROCK CHECK DAM
- SHAKEDOWN GRID
- ROAD CENTRELINE
- DRAIN CENTRELINE
- STORMWATER DRAINAGE
- ELECTRICITY (INDICATIVE)
- TELSTRA (INDICATIVE)
- FIBRE OPTIC CABLES (INDICATIVE)
- SUBSOIL DRAIN

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AUR-Q-0598-1001
2. REFER DRAWING AUR-Q-0598-4000 FOR STORMWATER DRAINAGE DETAILS



RECOMMENDED SEDIMENT BASIN SIZING

ALL WORKS TO BE IN ACCORDANCE WITH REFERENCE SPECIFICATION - IECA 2008, 'BEST PRACTICE EROSION AND SEDIMENT CONTROL', INTERNATIONAL EROSION CONTROL ASSOCIATION (AUSTRALASIA)

TYPE D SEDIMENT BASIN - POTENTIAL DISPERSIVE SOILS
DESIGN LIFE - LESS THAN 6 MONTHS
PRIMARY OUTLET - PUMPED OUTLET SYSTEM (ASSUMED)
EMERGENCY SPILLWAY - 20 YR ARI

SETTLING VOLUME	340m³	SETTLING DEPTH	0.6m
STORAGE VOLUME	170m³	STORAGE DEPTH	0.6m
SURFACE AREA	570m²	EMERGENCY SPILLWAY	10m LONG x 0.15m HIGH
LENGTH	42m	SPILLWAY CREST LEVEL	0.3m BELOW BASIN EMBANKMENT
WIDTH	14m	EMBANKMENT SLOPE	1 IN 4
TOTAL DEPTH	1.5m		

CONTRACTOR TO DETERMINE FINAL LOCATION AND ARRANGEMENT BASED ON ACTUAL SITE CONDITIONS IN CONJUNCTION WITH THE SUPERINTENDENT.

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	JAM
2	ISSUE FOR 90% REVIEW	14.5.14	JGM
3	ISSUE FOR APPROVAL	22.5.14	JAM
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5	ISSUED FOR COUNCIL REVIEW	01.08.14	JGM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C100

DESIGNED	J.McDONALD	
DESIGN CHECKED	A.OLIVER	
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DRAFTING CHECK	D.SIPPEL	
APPROVED	A.BIRD	22.5.14 DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
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MANAGER CIVIL ENGINEERING DATE

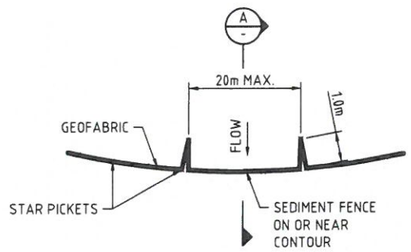
AURIZON

Aurizon Operations Ltd - ACN 124 649 967

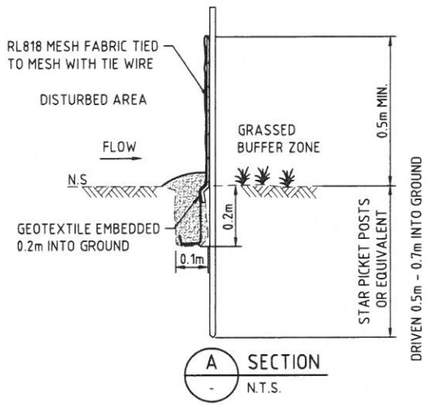
ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
EROSION AND SEDIMENT CONTROL
PLAN

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-1000**
ISSUE **5**

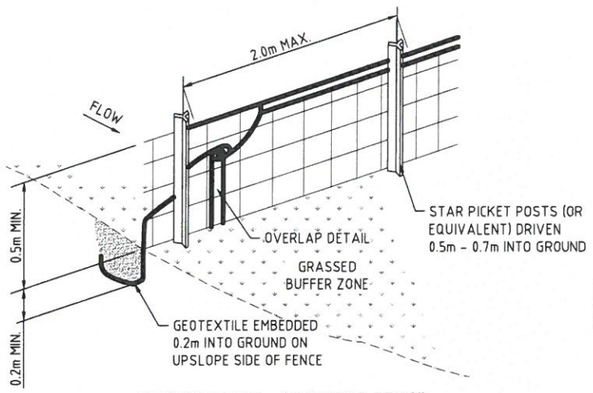
Plot Date: 1 August 2014 - 4:21 PM Plotted by: Jay McDonald Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-1000.dwg



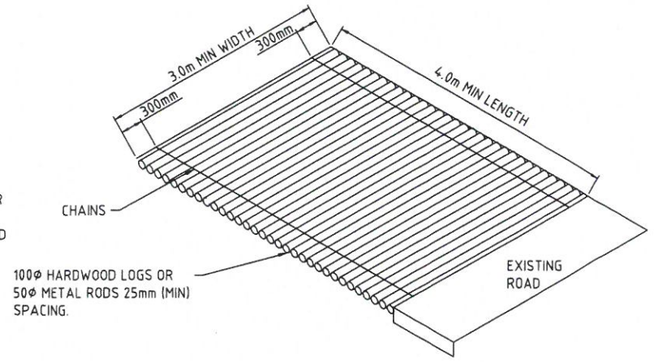
PLAN - SEDIMENT FENCE
N.T.S.



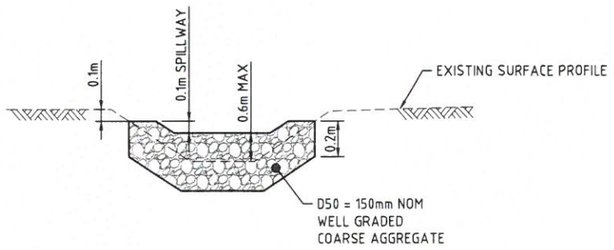
SECTION
N.T.S.



PERSPECTIVE - SEDIMENT FENCE
N.T.S.

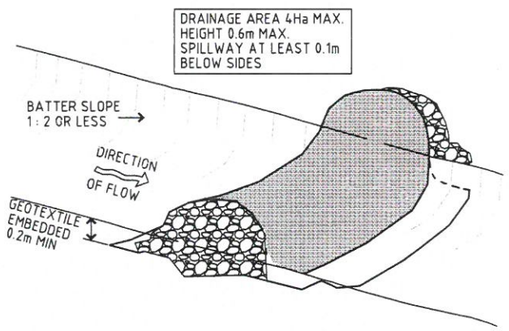


SHAKEDOWN GRID (OR APPROVED EQUIVALENT)
N.T.S.



CHECK DAM DETAIL
N.T.S.

CHECK DAM LONG SECTION
N.T.S.



PERSPECTIVE - CHECK DAM
N.T.S.

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AUR-Q-0598-1000
2. ALL SEDIMENT CONTROL DETAILS SHOWN ARE INDICATIVE ONLY AND FINAL LOCATIONS ARE TO BE DETERMINED ONSITE BY THE CONTRACTOR IN ACCORDANCE WITH THE CONTRACTORS ENVIRONMENTAL MANAGEMENT PLAN (CEMP).
3. ALL SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE IN ACCORDANCE WITH 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' PUBLISHED BY INTERNATIONAL EROSION CONTROL ASSOCIATION, AUSTRALASIA, 2008.
4. STOCKPILES, BORROW PITS, STORAGE AREAS TO BE CONSTRUCTED IN ACCORDANCE WITH PRINCIPLES DETAILED IN 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' PUBLISHED BY INTERNATIONAL EROSION CONTROL ASSOCIATION, AUSTRALASIA, 2008.
5. IF EROSION AND SEDIMENT CONTROL DEVICES HAVE BEEN FOUND TO BE DEFICIENT OR FAILED IN SERVICE, DUE TO UNFORESEEN CIRCUMSTANCES, CORRECTIVE ACTION IS TO BE UNDERTAKEN IMMEDIATELY WHICH MAY INCLUDE AMENDMENTS/ADDITIONS TO THE ORIGINAL APPROVED PLANS. SUCH ADDITIONS ARE TO BE APPROVED BY SUPERINTENDENT.
6. THE SEQUENCE OF OPERATIONS SHALL BE AS FOLLOWS:
   - 6.a. DELINEATION OF BUFFER AREAS AND DRAINAGE RESERVES, ERECTION OF BARRIER FENCING.
   - 6.b. LOCATION OF TOPSOIL STOCKPILES AND ERECTION OF DOWNHILL SEDIMENT FENCE.
   - 6.c. THE CONSTRUCTION OF TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (E.G. SEDIMENT FENCES).
   - 6.d. LAND CLEARING AND TOPSOIL STRIPPING.
   - 6.e. CONSTRUCTION OF STORMWATER DRAINAGE FACILITIES.
   - 6.f. LAND SHAPING.
   - 6.g. CONSTRUCTION OF ROADS AND ACCESS WAYS, INSTALLATION OF SERVICES.
   - 6.h. FINAL REHABILITATION AND LANDSCAPING.
   - 6.i. MAINTENANCE.
7. ALL SEDIMENT FENCES ARE TO BE INSTALLED PARALLEL TO CONTOURS UNLESS SHOWN OTHERWISE.
8. SEDIMENT FENCES ARE TO BE INSTALLED DOWNHILL AND DIVERSION BANKS UPHILL OF STOCKPILES.
9. TOPSOIL STOCKPILES ARE TO BE MULCHED OR TEMPORARILY VEGETATED IF THEY ARE TO REMAIN FOR MORE THAN 30 DAYS.
10. MOVEMENT OF CONSTRUCTION EQUIPMENT SHALL BE LIMITED TO THE AREA OF WORK AND EXISTING ROADS.
11. FINISHED TREATMENT OF DISTURBED AREAS ARE TO TAKE PLACE FOLLOWING FINAL TRIMMING. AREAS DISTURBED ARE TO BE RESTORED PROGRESSIVELY. REFER LANDSCAPE DRAWINGS FOR FINISHED TREATMENT DETAILS.
12. MAINTAIN SEDIMENT CONTROL DEVICES UNTIL NEW GROUND IS ESTABLISHED AND/OR REVEGETATED, OR UNTIL WRITTEN NOTICE FROM SUPERINTENDENT.
13. BOTH TEMPORARY AND PERMANENT SEDIMENT MANAGEMENT DEVICES SHALL BE MAINTAINED AT A SUITABLE LEVEL/CONDITION THROUGHOUT CONSTRUCTION. SEDIMENT FENCES ARE TO BE CLEANED OUT WHEN CAPACITY IS REDUCED BY 25%.
14. WORK AREAS SHALL BE KEPT DAMP BY USE OF A WATER TRUCK TO CONTROL DUST ON SITE.
15. TOPSOIL AND EXCAVATED MATERIAL SHOULD BE STOCKPILED SEPARATELY.
16. CARE SHOULD BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. PLACE APPROPRIATE SEDIMENT CONTROLS INCLUDING SEDIMENT FENCES AROUND STOCKPILES.
17. FILTRATION CONTROL MEASURES SHOULD BE PLACED DOWNSTREAM OF ANY EXCAVATION WORK. IE. SEDIMENT FENCES, ROCK CHECK DAMS.
18. PRE-DISTURBANCE SOIL PROFILES AND COMPACTION LEVELS ARE TO BE REINSTATED. E.G. REINSTATEMENT OF EXISTING FOLLOWING USE OF TEMPORARY DEVICES
19. PRE-DISTURBANCE VEGETATION PATTERNS SHALL BE RESTORED. E.G. REINSTATEMENT OF EXISTING CONDITIONS FOLLOWING USE OF TEMPORARY DEVICES
20. EROSION AND SEDIMENT CONTROL DEVICES ARE TO BE INSPECTED PRIOR TO FORECAST RAINFALL, DURING EXTENDED RAIN PERIODS AND FOLLOWING RAIN EVENTS. ANY SEDIMENT OR DEBRIS DEPOSITS ARE TO BE DISPOSED OF IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD
21. IF DISPERSIVE, HIGHLY UNSTABLE, OR HIGHLY EROSIVE SOILS ARE EXPOSED, THEN PRIORITY MUST BE GIVEN TO THE PROMPT STABILISATION OF ALL SUCH AREAS.
22. MANAGEMENT OF CONSTRUCTION TRAFFIC IS TO OCCUR IN ACCORDANCE WITH THE CONTRACTOR'S TRAFFIC MANAGEMENT PLAN.
23. THE PERSON RESPONSIBLE FOR THE DEMOLITION WORKS SHALL ENSURE THAT ALL VEHICLES LEAVING THE SITE CARRYING DEMOLITION MATERIALS, HAVE THEIR LOADS COVERED AND DO NOT TRACK SOIL OR WASTE MATERIALS ONTO ROAD.

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	JAM
2	ISSUE FOR 90% REVIEW	14.5.14	JAM
3	ISSUE FOR APPROVAL	22.5.14	JAM
4	ISSUE FOR TENDER	27.5.14	JAM
5	ISSUED FOR COUNCIL REVIEW	31.08.14	JAM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C110

DESIGNED	J.McDONALD	
DESIGN CHECKED	A.OLIVER	
DRAWN	J.MURRAY	
DRAFTING CHECK	D.SIPPEL	
APPROVED	A.BIRD	22.5.14 DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
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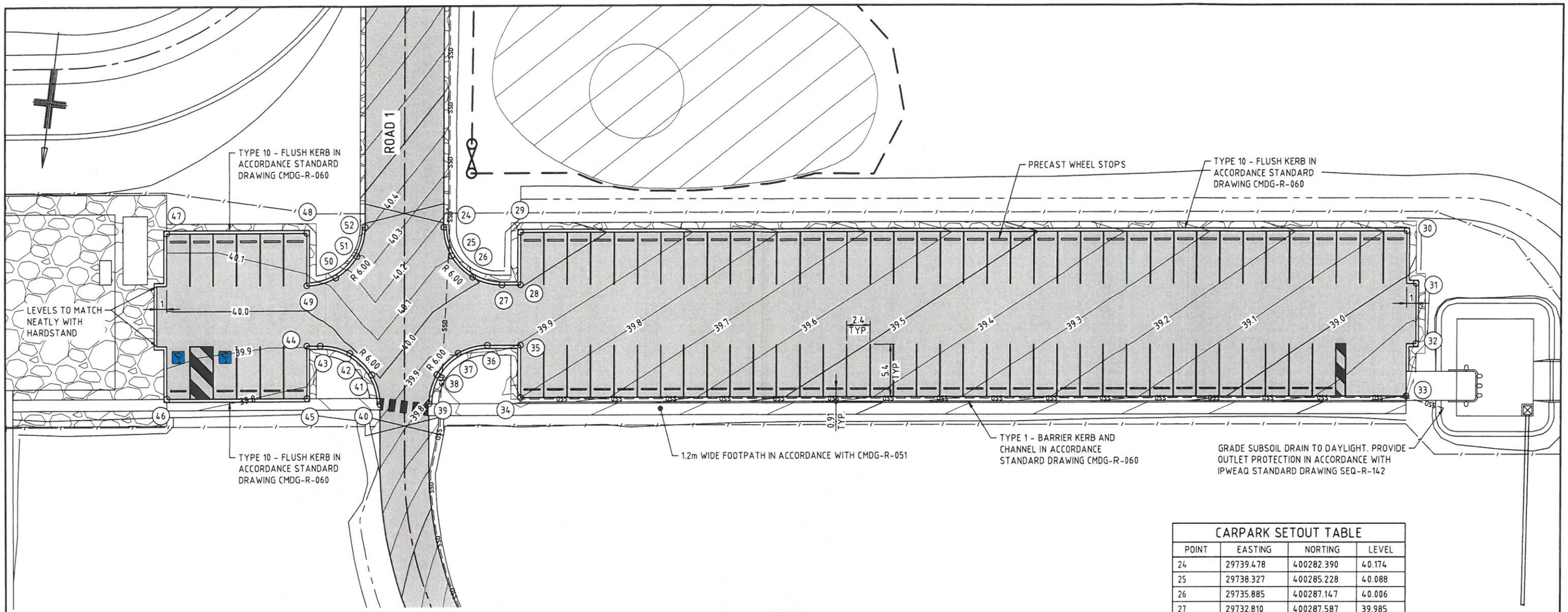
AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
EROSION AND SEDIMENT CONTROL
NOTES AND DETAILS

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-1001**
ISSUE **5**

Plot Date: 1 August 2014 - 4:21 PM Plotted by: Jay McDonald Cad File No: G:\41\27647\CADD\Drawings\AUR-Q-0598-1001.dwg



PLAN
SCALE 1:200

CARPARK SETOUT TABLE			
POINT	EASTING	NORTING	LEVEL
24	29739.478	400282.390	40.174
25	29738.327	400285.228	40.088
26	29735.885	400287.147	40.006
27	29732.810	400287.587	39.985
28	29730.924	400287.360	40.005
29	29731.568	400281.999	40.100
30	29641.019	400271.122	39.071
31	29639.382	400276.364	38.969
32	29638.643	400282.520	38.871
33	29638.991	400288.000	38.797
34	29729.540	400298.878	39.800
35	29730.184	400293.516	39.895
36	29733.560	400293.922	39.927
37	29736.443	400295.078	39.906
38	29738.362	400297.520	39.854
39	29738.802	400300.595	39.787
40	29743.761	400301.235	39.936
41	29744.932	400298.295	39.984
42	29747.437	400296.359	39.976
43	29750.578	400295.966	39.930
44	29751.967	400296.133	39.904
45	29751.323	400301.494	39.771
46	29765.620	400303.212	39.847
47	29767.648	400286.333	40.133
48	29753.351	400284.616	40.133
49	29752.707	400289.977	40.069
50	29749.806	400288.832	40.136
51	29747.871	400286.386	40.296
52	29747.426	400283.300	40.415

NOTES
1. FOR LEGEND AND NOTES REFER DRAWING AUR-Q-0598-5300

0 2 4 6 8 10m
SCALE 1:200 AT ORIGINAL SIZE

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These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 90% REVIEW	14.5.14	JGM
2	ISSUE FOR APPROVAL	22.5.14	JAM
3	ISSUE FOR TENDER	27.5.14	JAM
4	ISSUED FOR COUNCIL REVIEW	01.08.14	JGM

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PROJECT No. 41-27647
DRAWING No. 41-27647-C431

DESIGNED	J.McDONALD	AURIZON COMPLIANCE REVIEW
DESIGN CHECKED	A.OLIVER	
DRAWN	J.MURRAY	DESIGN MANAGER DATE
DRAFTING CHECK	D.SIPPEL	ISSUE AUTHORISED
APPROVED	A.BIRD 22.5.14	
RPEQ No.	11384	MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
ROADWORKS
CARPARK DETAIL

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-5301**
ISSUE **4**

Plot Date: 1 August 2014 - 4:28 PM Plotted by: Jay McDonald Cad File No. G:\41\27647\CADD\Drawings\AUR-Q-0598-5301.dwg

ROCKHAMPTON REGIONAL COUNCIL
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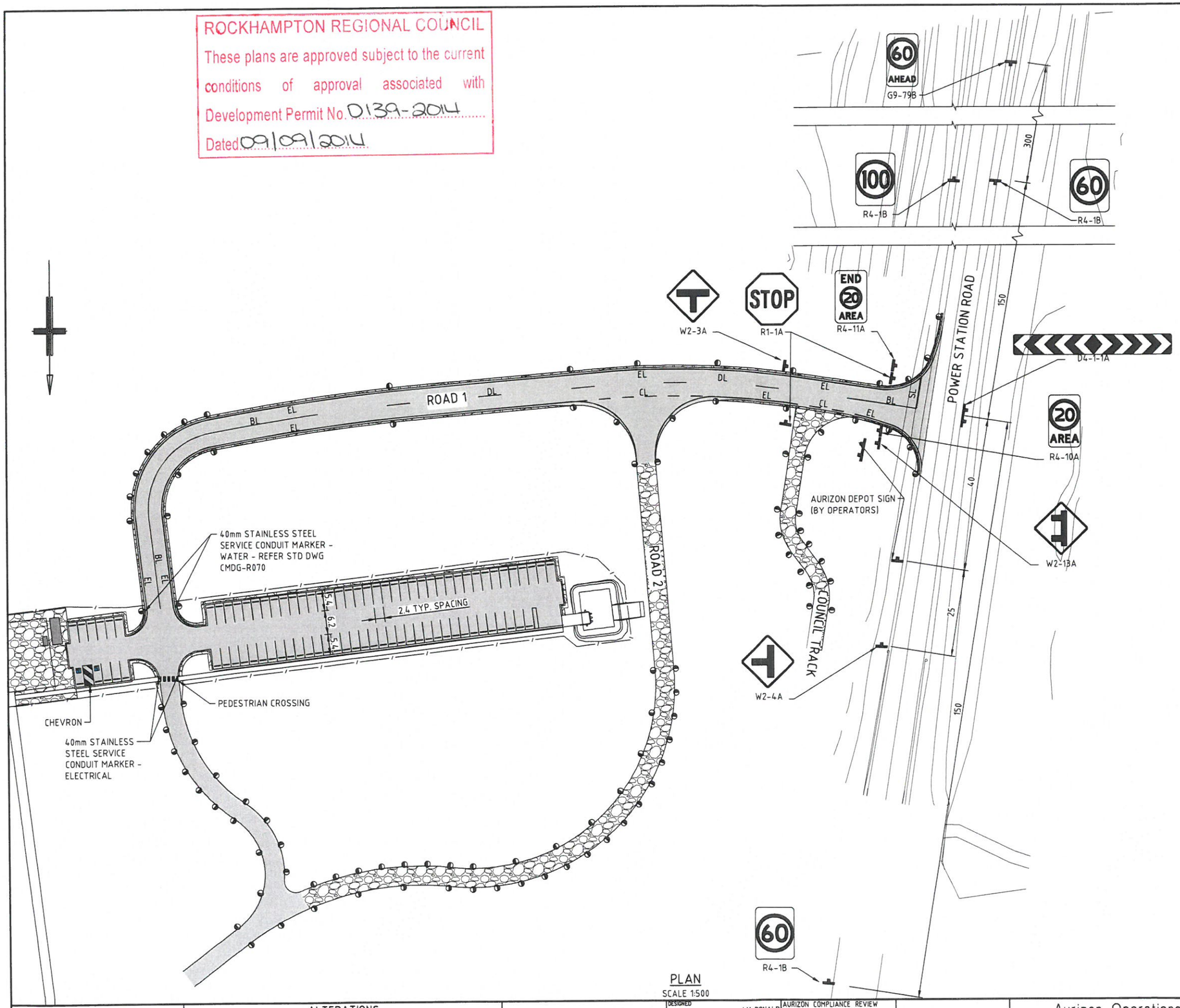
Dated 09/09/2014



PLAN
SCALE 1:500

NOTES

1. ALL ROAD SIGNAGE AND PAVEMENT LINE MARKING TO BE IN ACCORDANCE WITH QUEENSLAND DEPARTMENT OF MAIN ROADS PUBLICATION 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)'.
2. ALL EXISTING ROAD SIGNAGE REQUIRED TO BE RE-LOCATED AS A RESULT OF CONSTRUCTION WORKS SHALL BE TAKEN-UP AND PLACED IN STORAGE FOR RE-INSTATEMENT FOLLOWING COMPLETION OF CONSTRUCTION WORKS.
3. ALL EXISTING REDUNDANT LINE MARKING TO BE REMOVED.
4. ALL GUIDE POSTS TO BE INSTALLED IN ACCORDANCE WITH MUTCD.
5. EACH GUIDE POST ON THE INSIDE OF A CURVE IS TO BE PLACED OPPOSITE A POST ON THE OUTSIDE OF THE CURVE WHEREVER PRACTICABLE
6. FOR SIGN SUPPORT DETAILS REFER CMDG STD DWG CMDG-R-081.

LINEMARKING LEGEND

BARRIER LINE W=100mm — BL
DIVIDING LINE L=3m G=9m W=100mm — DL
EDGE LINE W=150mm — EL
STOP LINE W=300mm — SL
CONTINUITY LINE L=1m G=3m W=150mm — CL
PARKING SPACES W=80-100mm
ROAD EDGE GUIDE POST
PEDESTRIAN CROSSING (0.6 / 0.6)
CHEVRON (45°)
DISABLED PARKING BAY REFER TO AS 2890.6

ROAD EDGE GUIDE POST SPACING

CURVE RADIUS	MAXIMUM SPACING ON OUTSIDE OF CURVE (m)	MAXIMUM SPACING ON INSIDE OF CURVE (m)
<100	6	12
200 - 299	15	30
400 - 599	30	60

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14 JAM
2	ISSUE FOR 90% REVIEW	14.5.14 JGM
3	ISSUE FOR APPROVAL	22.5.14 JAM
4	ISSUE FOR TENDER	27.5.14 JAM
5	ISSUED FOR COUNCIL REVIEW	01.08.14 JGM

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PROJECT No. 41-27647
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DRAWN	J.MURRAY	
DRAFTING CHECK	D.SIPPEL	
APPROVED	A.BIRD	22.5.14 DATE
RPEQ No.	11384	

AURIZON COMPLIANCE REVIEW
DESIGN MANAGER DATE
ISSUE AUTHORISED
MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
ROADWORKS
SIGNAGE AND LINE MARKING PLAN

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-5302**
ISSUE **5**

Plot Date: 1 August 2014 - 4:28 PM Plotted by: Jay McDonald Cad File No: G:\41\27647\CAD\Drawings\AUR-Q-0598-5302.dwg

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

PARISH OF STANWELL
COUNTY OF LIVINGSTONE

2 RP616504

1 RP616504

81 SP102204

71 SP102204

LAND REQUIRED
PART LOT 2 RP616504
AREA APPROX 47,957m²

DEPOT SITE
REFER GENERAL
ARRANGEMENT

DEPOT ADMINISTRATION
AREA AND FACILITIES

PROPOSED CAR PARK

PROPOSED RP BDY

PROPOSED ROAD RESERVE BOUNDARY

EXISTING RP BDY

126.704
258°56'22"

126.486
263°20'47"

66.485
254°46'25"

72.221
241°38'51"

20.745
263°7'33"

55.638
188°31'28"

319.097
245°14'53"

201.168
263°7'33"

144.362
188°31'28"

40.234

75.816
263°7'33"

35.137
35.137

179.713
262°21'58"

138.949
263°1'44"

13.345
310°28'59"

55.965
263°7'33"

POWER STATION ROAD

MURPHY ROAD

E. WILLIAMS ROAD

CAPRICORN HIGHWAY

PLAN
SCALE 1:1000

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SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	PRELIMINARY RESUMPTION PLAN	24.4.14	J.G.M.
2	LOT DETAILS ADDED	30.4.14	J.G.M.
3	AERIAL IMAGE ADDED	5.5.14	J.G.M.
4	ORTHORECTIFIED IMAGE ADDED	28.5.14	J.G.M.
5	ROAD RESERVE BOUNDARY ADDED	5.8.14	RO

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PROJECT No. 41-27647
DRAWING No. 41-27647-SK102

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DESIGN CHECKED	X
DRAWN	J.McDONALD
DRAFTING CHECK	X
APPROVED	X DATE
RPEQ No.	X

REVIEWED FOR QR REQUIREMENTS
REVIEWED XX DATE
DESIGN MANAGER
ISSUE AUTHORISED
AUTHORISED XX DATE
MANAGER CIVIL ENGINEERING

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000KM TO 20.500 - CENTRAL LINE
CONCEPT DESIGN
LAND REQUIREMENTS

FILE No.

DRAWING NUMBER 41-27674-SK102

ISSUE 5

Stanwell Intermediate Depot

AURIZON

Road Impact Assessment

Document No.02 | Final

28 February 2014

Document history and status

Revision	Date	Description	By	Review	Approved
A	25 / 02 / 2014	Road Impact Assessment Report	W Coller	R Green (RPEQ No.10690	W Rowles
0	26/02/2014	Road Impact Assessment Report	W Coller	W Rowles	A Cormack
1	28/02/2014	Road Impact Assessment Report	W Coller	W Rowles	A Cormack

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments
0	A Cormack	26/02/2014	Aurizon	Draft Report issued to Aurizon
1	A Cormack	28/02/2014	Aurizon	Final Report issued to Aurizon

SINCLAIR KNIGHT MERZ
SKM

Stanwell Intermediate Depot

Project no:	QE06896
Document title:	Road Impact Assessment
Document no:	Document No.02
Revision:	1
Date:	28 Feb 2014
Client name:	Aurizon
Project manager:	Will Rowles
Author:	Wesley Coller
File name:	I:\QENV2\Projects\QE06896\Reports\TIA Template\Report for client\FINAL ISSUED\Stanwell Intermediate Depot_RIA_Rev 1.docx

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Contents

1. Introduction

Sinclair Knight Merz (SKM) has been commissioned by Aurizon to undertake a Road Impact Assessment (RIA) in support of a development application for the proposed Stanwell Intermediate Depot (the proposed development), west of Rockhampton, adjacent to the Blackwater Central Railway Line, in Central Queensland.

In line with Queensland Department of Transport and Main Roads (TMR) information requirements for the assessment of development applications, the RIA should include the following components:

- Traffic Impact Assessment (TIA)
- Pavement Impact Assessment (PIA)

Aurizon have discussed with both TMR and Rockhampton Regional Council (RRC) regarding the need for a pavement report due based on the following understandings:

1) Construction within the site will be limited to formation of an internal roadway, hardstands for car parks and building foundations. The buildings on the site will be demountable and can be delivered on 19m Semi-Trailers (Class 9 – TMR RPDM Chapter 5);
2) The construction period for the site is only expected to be for a maximum of 4 months duration; and
3) Once the Depot has been constructed the main vehicle using accessing the site will be private cars and motorcycles. Deliveries will be infrequent and a garbage collection vehicle will access the site once a week.

Based on the above understandings and feedback provided by TMR and RRC (refer to meeting minutes dated 28 January 2014, provided in **Appendix A**), there were no concerns raised over any adverse effects on the pavement life or condition. This is also due to the reasonably low construction traffic volumes and short construction period, with operational traffic being 99% private vehicles.

Given the above, the PIA report is not considered necessary for the Project at this stage.

This report outlines the TIA component only. This report investigates the impacts on the existing road network during the proposed revised operational phase and a 10 year horizon. The report considers the current traffic conditions, traffic generated during the proposed increase in extractive products phase and the 10 year horizon phase.

This report documents the outcomes of our traffic impact assessment and should be read in the context of the overall submission to RRC and TMR.

Principle 3 of TMR's Guidelines for Assessment of Road Impacts of Development (GARID) states that road impacts are considered to be insignificant if the development generates an increase in traffic on a State Controlled Road (SCR) of no more than 5% of existing levels.

1.1 Consultation

SKM have consulted with TMR and RRC to confirm the information requirements for the development application and to gather available traffic data, which includes crash data and traffic count data for the relevant sections of the road network, namely:

- Capricorn Highway for the section 1km either side and including the intersection with Power Station Road; and
- Power Station Road in the proximity to the proposed access for the Depot.

1.2 Documents sighted

The following documents and data were used for this assessment:

- TMR's GARID, 2006;
- 2011 & 2012 Annual Average Daily Traffic (AADT) counts from TMR for Capricorn Highway;
- 2011 intersection turning counts for Capricorn Highway / Power Station Road;
- 2006 – 2012 TMR crash data for the Stanwell and Kabra area;
- Chapter 4A Unsignalised and signalised intersections, Guide to Road Design (Austroads);
- Austroads Guide to Road Safety: Part 6 Road Safety Audit 2009; and
- NC.2665 Environment Services Panel Request for Services Version 1 (3 September 2013) – Statement of works Brief – Aurizon.

1.2.1 Limitations of report

SKM has not sighted any plan of the proposed development at the time of preparation of this report and has therefore been unable to comment on the safety of proposed site access.

A site construction program has been developed by SKM in order to make a judgement on the volume and level of traffic expected to arise from the construction phase of the development. This estimate is based on general advice from Aurizon has not been approved by Aurizon and is subject to change, which may affect the outcomes of the assessment.

2. Existing conditions

2.1 Locality of proposed site

The proposed development is located off Power Station Road, which is off the Capricorn Highway (A4) and is approximately 23.5km west of Rockhampton. Capricorn Highway is classified as a SCR.

Power Station Road is managed by RRC. An existing un-made (or paper) road, called E Williams Road, is located between the proposed development and the adjacent rail corridor. This un-made road is also managed by RRC. The location of the proposed development is shown in **Figure 2.1**.

Figure 2.1: Geographical location of site

2.2 Existing traffic generation

Table 2.1 : Summary of existing two way traffic volumes

Road Name	AADT (CVs) – as at 10/05/2011
Capricorn Highway (East of Power Station Road)	3,894 (776)
Capricorn Highway (West of Power Station Road)	3,483 (695)
Power Station Road	999 (194)

(- the level of service is covered under Chapter 3 of this report which includes commentary on factoring these figures from 2011 to 2014)
(Source: TMR email dated 17/02/2014)

2.3 Existing road network

The road network within the surrounding area of the proposed development is shown in **Figure 2.1**.

2.3.1 State Controlled Roads

The Capricorn Highway is located in Central Queensland and links the City of Rockhampton with Western Queensland. It is approximately 575 kilometres long, and joins the Landsborough Highway at Barcaldine. The road does not form part of the Australian National Highway Network, but it serves as a key tourist and freight route, specifically from Emerald to Rockhampton.

Running predominantly east/west, the highway traverses the area known as the Central Highlands, and crosses the Great Dividing Range between Alpha and Jericho. Towns other than Rockhampton and Barcaldine situated along the highway include Gracemere, Westwood, Stanwell, Duaringa, Dingo, Blackwater, Emerald, Bogantungan, Alpha and Jericho.

The Capricorn Highway in the vicinity of the proposed development is a two lane two way sealed road with sealed shoulders and bordered by relatively flat grassed agricultural / pastoral land. There is road lighting at the intersection with Power Station Road and on its approaches on the Capricorn Highway. The current posted speed limit for the Capricorn Highway is 80km/h (*source TMR Fitzroy Division*).

The typical lane width is approximately 3.5m in each direction with an approximate shoulder width of one metre. It has a painted double white line centreline and edge of road markings near the intersection with Power Station Road.

The Blackwater rail corridor runs parallel with the Capricorn Highway and is used primarily for the carriage of coal and other freight. It is managed by Aurizon Network in accordance with the existing perpetual lease arrangement with the State of Queensland.

Access across the railway to Power Station Road (from the Capricorn Highway) is via grade separation (road over rail and road over road – see **Section 2.3.3** for information on the access and turning arrangements).

It should be noted that the Capricorn Highway speed limits are under review by TMR and may change pending the review.

2.3.2 Local roads

Power Station Road is a two lane two way sealed road approximately 6.5m wide with minimal / no shoulder. It has a grade separated intersection over the Capricorn Highway which also crosses over the Blackwater railway line. The road leads directly to some minor properties, namely Stanwell Power Station and a sandstone quarry. The posted speed limit from the overpass to the power station is 100km/h, where it drops to 80km/h past the power station and then reverts back to 100km/h where the road width decreases to 6.0m wide (source email dated 24/02/2014 – RRC).

An existing un-made (or paper) road, called E Williams Road, is located between the proposed development and the adjacent rail corridor. This un-made road is also managed by RRC.

2.3.3 Intersections

Access to Power Station Road from the Capricorn Highway for vehicles travelling in a westerly direction is via a diverge lane and off ramp which rises up a graded embankment to the south of Capricorn Highway (refer to **Figures 2.2 and 2.3**).

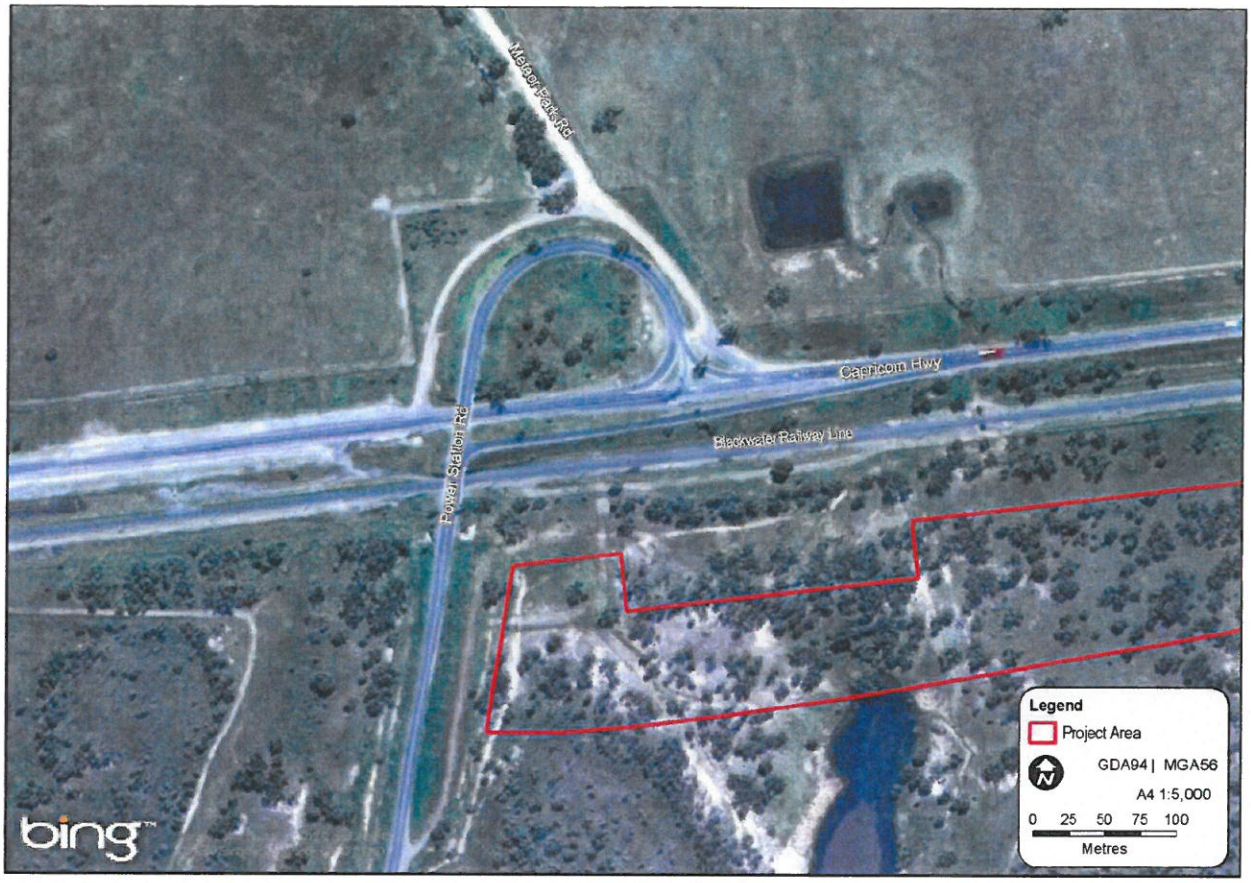


Figure 2.2: Layout of intersection of Capricorn Highway and Power Station Road

Figure 2.3: Off ramp to Power Station Road (heading west)

Entry by vehicles onto the Capricorn Highway from Power Station Road is via an overpass and a descending curve approach where there is a give way line and a short merge taper onto the Capricorn Highway heading east towards Rockhampton. The right turn is via a give way at which is at 90 degrees to the Capricorn Highway for vehicles travelling west towards Stanwell (refer to **Figure 2.4**).

Access to Power Station Road from a westerly direction is via a short diverge left lane which continues around a spiral rising curve and then via an overpass over the Capricorn Highway and the Blackwater railway line (effectively opposite in direction to the traffic exiting Power Station Road).

Figure 2.4: Intersection of Power Station Road and Capricorn Highway for vehicles entering PSR from the west and the right and left turn from PSR onto the CH

2.3.4 School bus routes

A school bus operates on the Capricorn Highway – Route S421; operated by Rod North and Sons for the Stanwell to Rockhampton State High School (refer **Figure 2.5**).

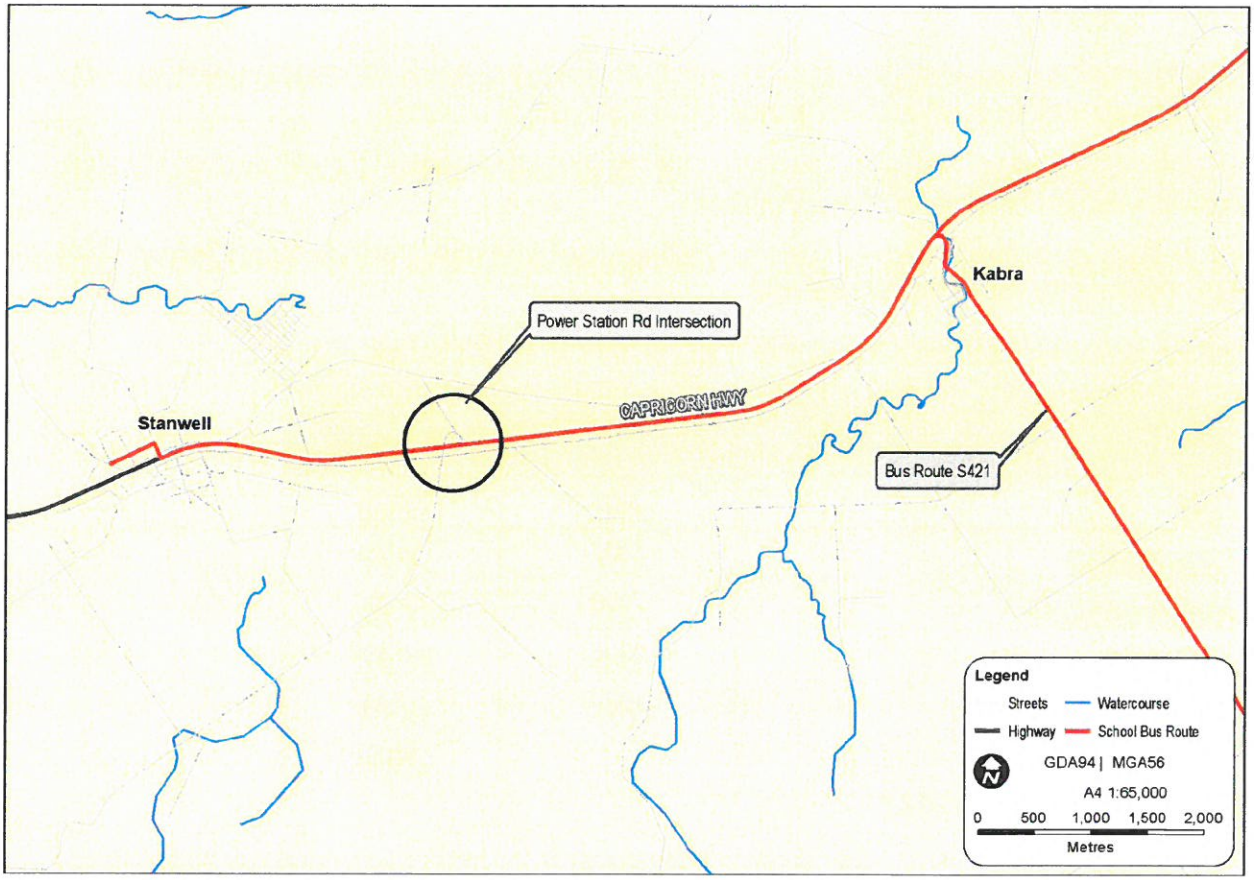


Figure 2.5: School Bus Route

2.3.5 Other bus routes

2.3.6 Local bus routes

There are no other local bus routes identified along Capricorn Highway or Power Station Road in the vicinity of the proposed development.

2.3.7 Long distance coach services

A Greyhound bus operates on a Tuesday and Sunday from Rockhampton to Longreach – Route DX471

2.3.8 Heavy vehicle access / gazettal routes

The Capricorn Highway is gazetted by TMR for access by B-Triple Road Trains, Type 1 Road Trains and 23m – 25m B-Double heavy vehicles.

Current traffic volumes indicate the percentage of CV's ranges from 20% to 27% of the total volume of traffic on the Capricorn Highway (*source TMR Traffic Census data 2012*).

2.3.9 Scheduled road improvements

There are no scheduled road improvements identified in the local vicinity, either for Capricorn Highway or Power Station Road.

2.3.10 Crash record

Crash data has been supplied by TMR for the Capricorn Highway and RRC for Power Station Road. The section covers incidents from Stanwell through to the region known as Kabra.

DTMR privacy conditions restrict the information that can be made available for public viewing. Therefore, detailed investigations have not been undertaken.

The available crash data records for Capricorn Highway were assessed for a 6 year period between 2006 and 2012. Table 2.3 summarises these statistics

Table 2.2: Summary of crash statistics (June 2006 to June 2012) for the Stanwell & Kabra areas

Severity	Number of Incidents	Date	Percentage
Fatal	1	2009	14.3%
Hospitalisation	1	2007	14.3%
Medical treatment	1	2006	14.3%
Minor injury	1	2006	14.3%
Property damage	3	2009	42.8%
TOTAL	**7**		**100%**

Source: TMR, data received 18/02/2014

From the data provided, only 1 crash occurred in the vicinity of the intersection with Power Station Road / Capricorn Highway. One crash occurred 50m west of Meteor Park Road which is approximately 200m west of the intersection of Capricorn Highway and Power Station Road resulting in hospital treatment.

It should be noted however, there have been no recorded / reported crashes since 2009 and only 7 reported collisions in total in the 6 year period shown.

2.4 Background traffic – existing level of operation

2.4.1 Existing traffic volumes

Existing traffic volumes have been sourced from TMR and include turning volumes and total daily volumes for both Capricorn Highway and Power Station Road.

Volumes were sourced from TMR 2011 AADT reports, two-way total and the Queensland Government Traffic Census Data 2012, shown in **Table 2.3**. Note that there is no information regarding the increase in traffic numbers between 2011 and 2012.

Table 2.3: Two way traffic volumes for 2011 and 2012

Road	Total 2 way AADT 2011	Total 2 way AADT 2012
Capricorn Highway	7,377 (20% CV's[1])	8,922 (27% CV's)
Power Station Road	999 (20% CV's)	Not Available

[1] CV means Commercial Vehicle

Commercial Vehicles account for between 20% and 27% of the current estimated daily traffic volumes.

2.4.2 Intersection turning counts

TMR provided intersection turning count volumes for the intersection of Power Station Road and Capricorn Highway. They are shown in **Figure 2.6**. It should be noted that these are shown diagrammatically as a 4 way intersection, however for the actual arrangement, refer to **Figure 2.2**.

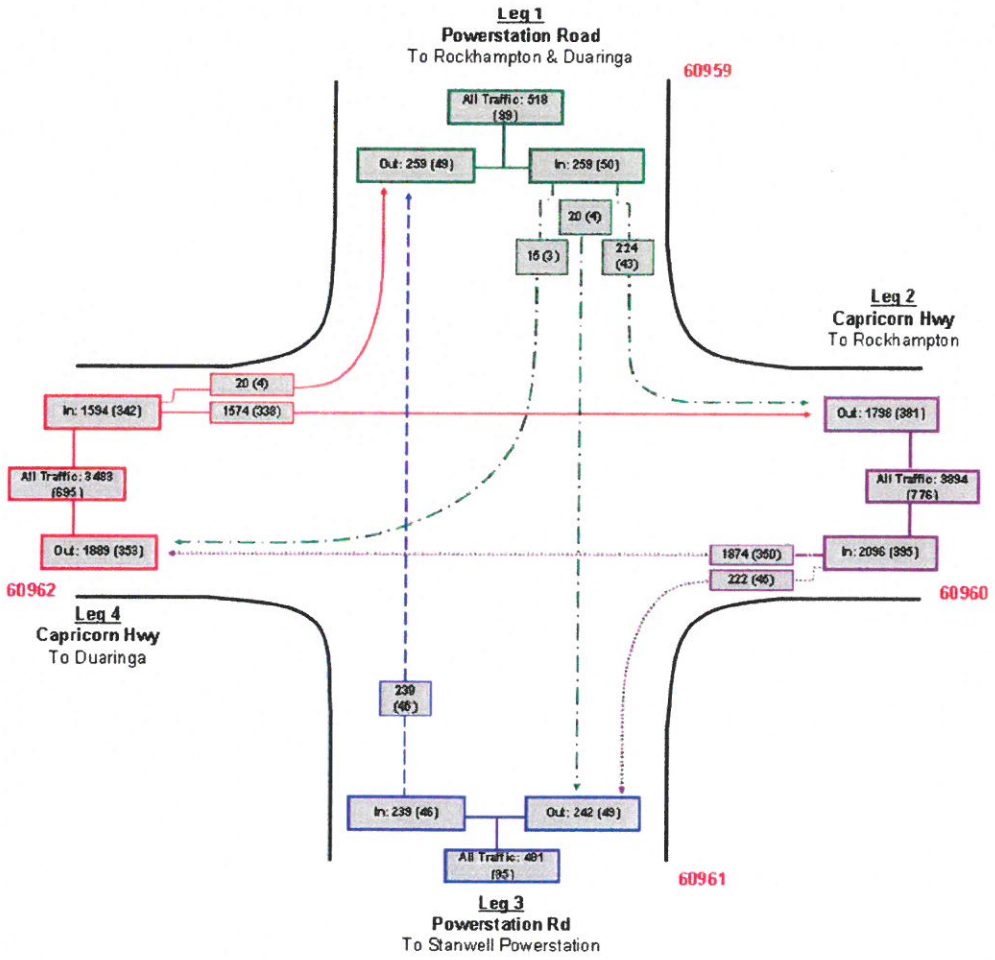


Figure 2.6: Daily turning volumes as at 11/05/2011 (*source TMR email dated 17/02/2014*)

2.4.3 Peak periods

Peak periods obtained from the traffic survey results are as follows:

- Capricorn Highway / Power Station Road intersection traffic counts, 11/05/2011:
  - **AM** peak hour from 6:15 am to 7:15 am
  - **PM** peak hour from 15:45 pm to 16.45 pm

The peak hour counts for the key intersections are summarised in **Appendix A**.

2.4.4 Traffic growth rates

An annual growth should be adopted when estimating future background traffic volumes along the Capricorn Highway and Power station Road. Based on the data provided by TMR and RRC, the 10 year growth rates for the Capricorn Highway have varied in last 10 years (between 4% and 7% averaged around 5.48%).

There was no information available regarding traffic growth rates for Power Station Road.

It is therefore considered that a 5% growth rate for all traffic on both roads for a 10 year horizon is appropriate and has been adopted for the purposes of estimating likely future traffic and impact.

3. Existing levels of operation

3.1 Existing traffic volumes

Figure 3.1 to **Figure 3.4** below summarise the existing peak hour turning volumes for the 2 key intersections during the AM and PM periods respectively. These summaries have been factored up by a 5% growth rate to compensate for the original data being for 2011.

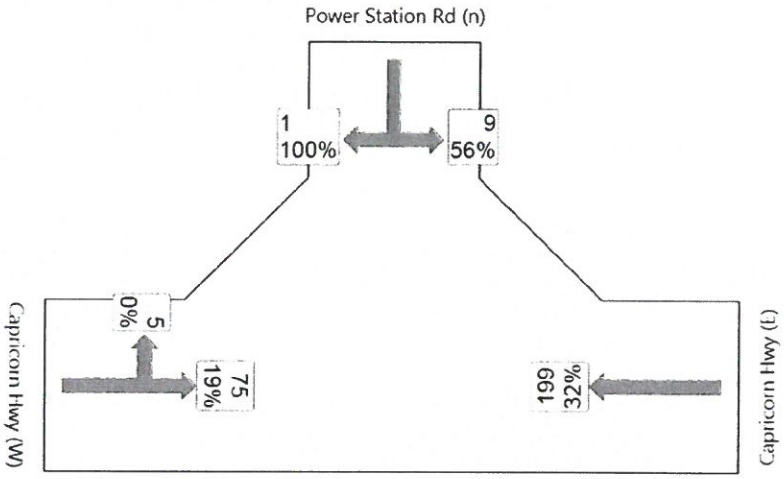


Figure 3.1: Peak AM turning volumes for 2014

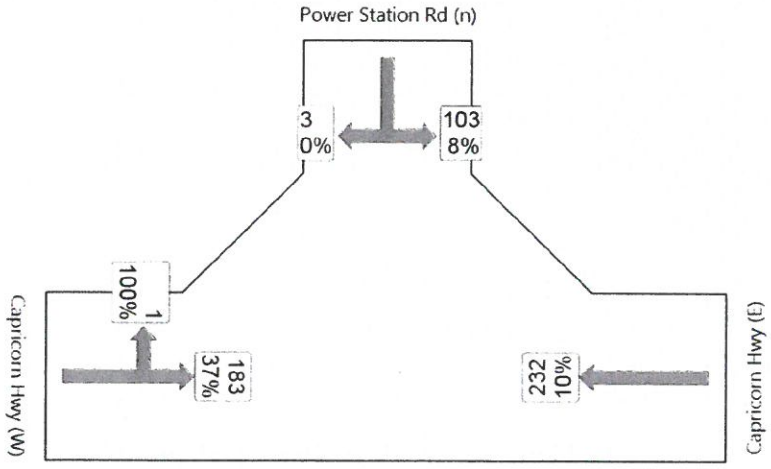


Figure 3.2: Peak PM turning volumes for 2014

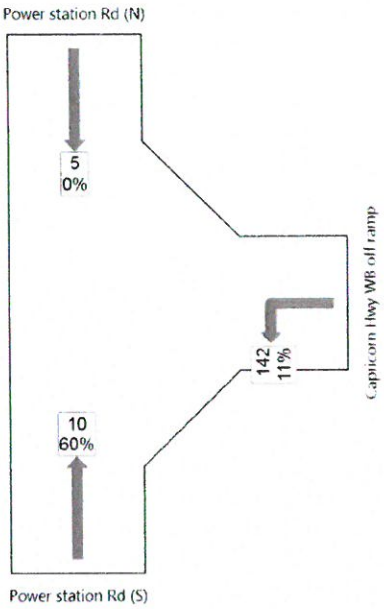


Figure 3.3: AM Peak turning volumes for 2014 – off ramp

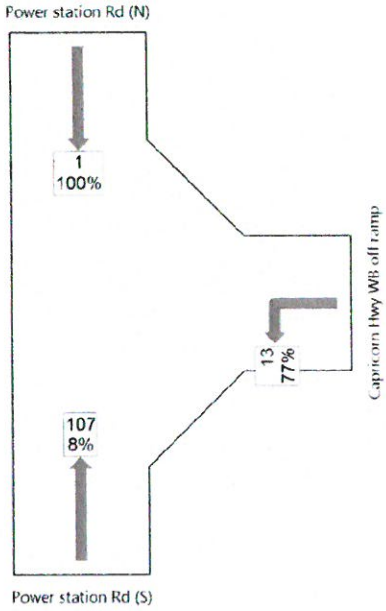


Figure 3.4: PM Peak turning volumes for 2014 – off ramp

3.2 Existing intersection performance

For the purposes of this assessment, analyses have been undertaken for the 2 key intersections using SIDRA intersection analysis software:

- Intersection 1: Power Station Road / Capricorn Highway; and
- Intersection 2: Power Station Road / off ramp from Capricorn Highway.

For the purposes of traffic volumes for existing conditions and level of service, the turn count volume data (11/05/2011) has been used and factored up at a growth rate of 5%, because current turn volumes that match the current traffic volume data are not available.

It should be noted that at the intersection of Capricorn Highway and Power Station Road, there are 2 traffic count sites based either side that have different AADTs (site 60040 and site 61457). There is a difference in the traffic counts of 986 vehicles per day either side of the intersection which corresponds approximately to the 999 AADT volumes for Power Station Road.

The reason for this may be due to a disproportionate spike in traffic numbers during the period the data was collected. The difference in traffic as a percentage increase over 1 year was approximately an 18% increase. However, if average growth at the 2 TMR sites is reviewed, site 60040 decreased by -3.25%, while site 61457 increased by 8.33%.

This may be due to the location of the counters and the time that the information was collected. The location of the traffic counters for sites 60040 (1km east of Westwood) and 61457 (WiM Site at Kabra) would collect localised movements and may not be a true representation of the section of Capricorn Highway specific to this study.

3.2.1 Performance criteria

The operation of both the access onto Power Station Road and the Power Station Road / Capricorn Highway has been analysed using the SIDRA intersection analysis software. This program assesses the operation of the intersection based on inputs relating to the layout and geometry of the intersection and traffic volumes. The key performance indicator for intersections is the degree of saturation (DoS), defined as the ratio of demand to available capacity for the most critical movement at the intersection.

GARID defines the following standard DoS thresholds:

- Priority controlled intersection: 0.80;
- Roundabout: 0.85 – not relevant for this assessment; and
- Signalised intersections: 0.90 – not relevant for this assessment.

GARID notes that a DoS exceeding these thresholds indicates that an intersection is nearing its practical capacity and upgrade works may be required. If the DoS are above the stated threshold values, users of the intersections will experience increasing delays and queues.

3.2.2 Existing intersection layouts

The existing layouts for the 2 key intersections are illustrated diagrammatically from SIDRA and are shown in **Figure 3.5** and **Figure 3.6**.

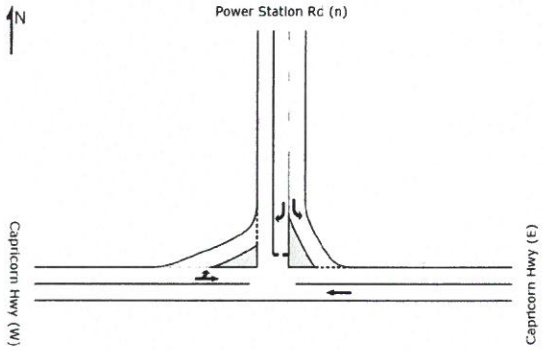


Figure 3.5: Capricorn Highway intersection

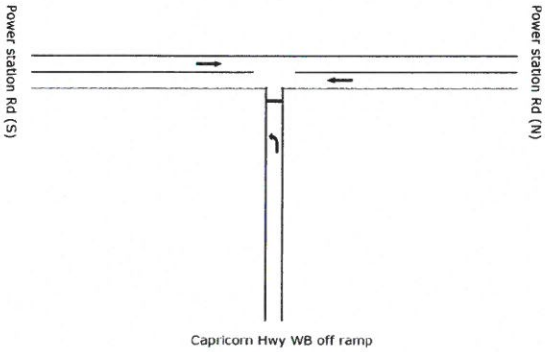


Figure 3.6: Capricorn Highway off ramp / Power Station Road

3.2.3 2014 intersection performance

Results of the SIDRA intersection analysis performance are summarised in **Table 3.1** to **Table 3.4**.

Table 3.1: AM existing south – 2014 – Off ramp/ Power Station Road

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power station Rd (S)											
2	T	10	60.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		10	60.0	0.007	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Capricorn Hwy WB off ramp											
4	L	142	10.6	0.126	11.2	LOS B	0.5	3.8	0.04	0.97	46.4
Approach		142	10.6	0.126	11.2	LOS B	0.5	3.8	0.04	0.97	46.4
North: Power station Rd (N)											
8	T	5	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		5	0.0	0.003	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		157	13.4	0.126	10.2	NA	0.5	3.8	0.03	0.88	47.4

Table 3.2: AM existing north – 2014 – Capricorn Highway / Power Station Road

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Capricorn Hwy (E)											
5	T	199	32.2	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		199	32.2	0.123	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Power Station Rd (n)											
7	L	9	55.6	0.011	9.3	LOS A	0.0	0.4	0.23	0.54	48.5
9	R	1	100.0	0.003	19.2	LOS C	0.0	0.1	0.53	0.69	41.1
Approach		10	60.0	0.011	10.3	LOS B	0.0	0.4	0.26	0.55	47.6
West: Capricorn Hwy (W)											
10	L	5	0.0	0.046	7.9	LOS A	0.0	0.0	0.00	1.57	49.4
11	T	75	18.7	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		80	17.5	0.046	0.5	NA	0.0	0.0	0.00	0.10	59.2
All Vehicles		289	29.1	0.123	0.5	NA	0.0	0.4	0.01	0.05	59.2

Table 3.3: PM exiting south – 2014 – Off ramp/ Power Station Road

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power station Rd (S)											
2	T	107	8.4	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		107	8.4	0.058	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Capricorn Hwy WB off ramp											
4	L	13	76.9	0.019	14.6	LOS B	0.1	0.8	0.02	0.98	46.4
Approach		13	76.9	0.019	14.6	LOS B	0.1	0.8	0.02	0.98	46.4
North: Power station Rd (N)											
8	T	1	100.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1	100.0	0.001	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		121	16.5	0.058	1.6	NA	0.1	0.8	0.00	0.11	58.2

Table 3.4: PM existing north – 2014 – Capricorn Highway / Power Station Road

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Capricorn Hwy (E)											
5	T	232	10.3	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		232	10.3	0.127	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Power Station Rd (n)											
7	L	103	7.8	0.094	8.8	LOS A	0.4	2.8	0.35	0.62	47.9
9	R	3	0.0	0.004	11.1	LOS B	0.0	0.1	0.47	0.67	45.9
Approach		106	7.5	0.094	8.9	LOS A	0.4	2.8	0.36	0.62	47.8
West: Capricorn Hwy (W)											
10	L	1	100.0	0.117	10.2	LOS B	0.0	0.0	0.00	3.17	48.3
11	T	183	37.2	0.117	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		184	37.5	0.117	0.1	NA	0.0	0.0	0.00	0.02	59.9
All Vehicles		522	19.3	0.127	1.8	NA	0.4	2.8	0.07	0.13	57.0

The results of the SIDRA for the existing intersection capacity impacts at the Power Station Road / Capricorn Highway intersection show that the existing intersection layout (give way priority) performs well within the acceptable range of DoS, with the DoS being only 0.126 as compared to the acceptable limit of 0.8, and with only a maximum delay of 19.2 seconds, for 1 heavy vehicle turning right entering Capricorn Highway (heading towards Stanwell) during the AM peak, but still giving a Level of Service (LoS) of C.

The current level of service of the road is considered to be within acceptable ranges for a rural intersection onto the SCR (Capricorn Highway) and acceptable for Power Station Road.

3.3 2014 road level of service (LoS)

3.3.1 Performance criteria

The performance measure for road links is the LoS, as defined in the Austroads Guide to Engineering Practice – Roadway Capacity (Part 2). LoS is a qualitative measure describing operational conditions within a traffic stream and the perception of these by motorists and/or passengers. LoS ranges from A (the best) to E (the worst – representing an intersection at capacity). LoS F describes a breakdown in vehicle flow.

In rural areas, LoS C can be considered a minimum desirable standard. A deterioration of the LoS under this level would imply that remedial measures to maintain the existing LoS would be sought.

For urban roads, LoS E is considered the limit of acceptable urban area operation and remedial works would be required if LoS F would otherwise result.

This assessment has adopted the maximum AADT levels for various LoS contained in Table 3.9 of the Austroads Guide to Engineering Practice (Part 2)[2] with additional parameters of level terrain, two-lane, two-way rural road and a ratio between the design hour volume and AADT of 0.11.

The resulting LoS levels are as follows:

- 1 veh/day < LoS A < 2,200 veh/day
- 2,200 veh/day < LoS B < 4,400 veh/day
- 4,400 veh/day < LoS C < 7,200 veh/day
- 7,200 veh/day < LoS D < 12,200 veh/day
- 12,200 veh/day < LoS E < 20,800 veh/day

3.3.2 2012 level of service

Based on the criteria in **Section 3.3.1** and the daily traffic volumes sourced from TMR 2012 AADT data, the current LoS for key road links are estimated in **Table 3.5**.

Table 3.5: Existing LoS for key roads

Road Name	Road Type	2 Way Traffic Volume (veh/day)	LoS
Capricorn Highway	Rural	8,540*	D
Power Station Road	Rural	999	A

*factored at 5% growth from 2011 vehicle count figures

[2] GTEP part 2 has been superseded by Austroads Guide to Traffic Management and this generally references the Highway Capacity Manual. For the purposes of ease of reference GTEP part 2 has been used

4. Traffic generation and distribution

4.1 Proposed development

The proposed development is shown in **Figure 4.1**.

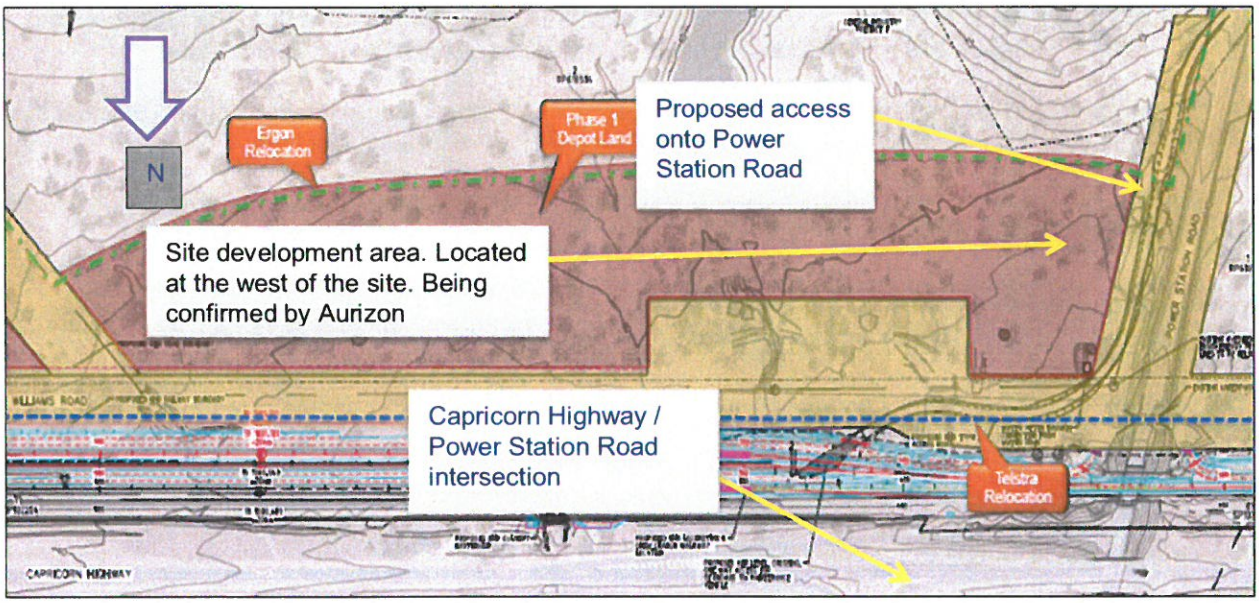


Figure 4.1: Proposed site layout

4.1.1 Site usage and operational hours

At the time of preparation of this report, the final building arrangement had not been finalised by Aurizon. Despite this, the scope of the arrangement was defined and includes an administration building with a maximum floor area of 260m^2, a 40m^2 outdoor area and a separate shower/locker room building with a maximum floor area of 80m^2.

It is proposed that there will be 6 full-time management and administrative staff at the site per shift per day.

The site will cater for up to 55 train drivers each day with 35 drivers completing a 12 hour shift and the other 20 drivers will leave the car parked for 30 hours (which would typically fall outside the peak demand).

In addition to the light vehicle component, the site will be accessed by large rigid vehicles for deliveries and waste removal on a once or twice a week basis only.

4.1.2 Parking requirements

The proposed development will have provision for 80 car parking spaces. The number of management and administration staff plus drivers will be 61. This provides a surplus of 19 spaces for visitors and additional staff as required.

It has been determined by RRC that the proposed development meets the criteria of a 'Transport Terminal' under the *Fitzroy Shire Planning Scheme 2005* (the planning scheme). Parking requirements based on the "Local Planning Policy No. 10/96 – Car Parking Policy" under the planning scheme for car parking requirements does not specify parking requirements for a Transport Terminal.

The buildings are proposed to be demountable types and will provide an approximate total floor area of 340m^2.

The parking provision proposed on any given day will have an approximate surplus capacity of around 25%, which will allow for visitors and any delays in changeover for early arrivals or differing shift changeovers.

It should be noted that the car parking arrangement and layout should conform to AS2890 requirements and provide a minimum of 1% - 2% of the total spaces for accessible parking.

Based on the parking provision against the likely demand, it is considered that the 80 spaces proposed will be adequate to service the facility.

4.1.3 Construction traffic

Full details of the construction methodology have not yet been finalised by Aurizon. Aurizon have indicated that it is estimated that the civil and building construction will take a maximum of 4 months (Aurizon email dated 20/02/2014).

Generally, construction traffic would include articulated vehicles for plant/material/building deliveries, truck trailers for material deliveries, large rigid vehicles for water/fuel/concrete deliveries, cranes for building construction and light vehicles for construction staff.

Due to the nature of the construction and limited construction development required to install demountable buildings on the site, it is expected that construction traffic will be restricted to:

- construction personnel entering/exiting the site;
- earthmoving equipment transported to/from the site;
- concrete and materials truck deliveries;
- water cart for dust suppression;
- pavement surfacing vehicles transported to/from the site for sealed pavement works; and
- demountable buildings delivered in sections.

Table 4.1 and **Table 4.2** provide a breakdown of possible construction traffic required based on an estimated site area for development of 1.85 hectares and the site is adjacent to Power Station Road.

Table 4.1: Estimate of construction traffic for the proposed depot – vehicle trips

Vehicle Trips Return												
Activity	Trucks /day	Light Vehicles /day	Unit	Quantity	Days Duration	Surveyor	Foreman	Labour	Operations	Trades	Low Loader	Trucks
Clear and grub	1	5	ha	2	5	2	5	10	1		2	
Chip vegetation		5	ha	2	3		3	6	3		2	
Windrow topsoil		5	m^3	1000	3		3	6	2			
Imported bulk earthworks 0.3m ave.	61	5	m^3	6000	10	1	10	20	3		6	600
Gravels 0.2m ave. for 1ha	50	5	m^3	5000	10	2	10	20	3			500

Concrete footings and pads	3	10	m^3	60	10	5	10	20	1	50		30
Build units at 10m x 3m	1	9	units	12	20	10	20	20		100	2	10
Stick Build Components	1	9	m^2	40	10	2	10	20		40		10
Fixture fittings and finishes	1	6			10		10	10		30		10
Plumbing, drainage, sanitary and power	1	7			10	1	10	10		30		10
Totals					**91**	**23**	**91**	**142**	**13**	**250**	**12**	**1170**

This estimate has been produced by SKM to provide an indication of likely traffic during the construction phase – but it should be noted this has not been agreed with Aurizon at this time and may be subject to changes depending on the contractor appointed to undertake the development.

Table 4.2: Estimate of construction traffic for the proposed depot – plant required

Plant Used						
Activity	**Dozer**	**Chipper**	**Excavator**	**Compactor**	**Grader**	**Crane**
Clear and grub	1					
Chip vegetation	1	1	1			
Windrow topsoil	1				1	
Imported bulk earthworks 0.3m ave.			1	1	1	
Gravels 0.2m ave. for 1ha			1	1	1	
Concrete footings and pads			1			
Build units at 10m x 3m						1
Stick Build Components						
Fixture fittings and finishes						
Plumbing, drainage, sanitary and power						
Totals	**3**	**1**	**4**	**2**	**3**	**1**

This estimate has been produced by SKM to provide an indication of likely traffic during the construction phase – but it should be noted this has not been agreed with Aurizon at this time and may be subject to changes depending on the contractor appointed to undertake the development.

At this time, construction traffic has not been taken into account in the traffic assessment because it is considered that the total daily movements of construction traffic will be lower overall, with many of the deliveries occurring outside peak traffic times. It is considered that the predicted volumes for peak traffic during the development's operation, outlined in **Table 4.1** and **Table 4.2**, is the worst case scenario for traffic assessment.

5. Traffic Impact assessment

5.1 Assessment scenarios

The traffic impact assessment has considered the following assessment scenarios:

- Existing traffic and intersection performance for 2014 (modified from 2011 TMR turning volumes by factoring up by 5% pa);
- Existing traffic and intersection performance plus new traffic generated by the proposed development for 2014;
- Ten year horizon period (2024) with a compound annual growth rate of 5% per annum for the background traffic whilst maintaining the development traffic volumes used in 2014; and
- Commentary on construction traffic volumes.

5.2 Assessment network volumes

5.2.1 Traffic impacts on existing intersection operations 2014 – including depot traffic

Table 5.1 to **Table 5.4** summarises the future impacts of the existing intersections and include the additional traffic generated from the proposed depot site for the current 2014 year scenario.

Table 5.1: AM Peak South 2014 including off ramp to Power Station Rd with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power station Rd (S)											
2	T	10	60.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		10	60.0	0.007	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Capricorn Hwy WB off ramp											
4	L	197	7.6	0.170	11.1	LOS B	0.7	5.2	0.06	0.95	46.4
Approach		197	7.6	0.170	11.1	LOS B	0.7	5.2	0.06	0.95	46.4
North: Power station Rd (N)											
8	T	11	0.0	0.006	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		11	0.0	0.006	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		218	9.6	0.170	10.0	NA	0.7	5.2	0.06	0.86	47.4

Table 5.2: AM Peak North 2014 intersection with Capricorn Highway with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Capricorn Hwy (E)											
5	T	199	32.2	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		199	32.2	0.123	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Power Station Rd (n)											
7	L	9	55.6	0.011	9.3	LOS A	0.0	0.4	0.23	0.54	48.5
9	R	1	100.0	0.003	19.3	LOS C	0.0	0.1	0.53	0.69	41.0
Approach		10	60.0	0.011	10.3	LOS B	0.0	0.4	0.26	0.55	47.5
West: Capricorn Hwy (W)											
10	L	11	0.0	0.049	7.9	LOS A	0.0	0.0	0.00	1.39	49.4
11	T	75	18.7	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		86	16.3	0.049	1.0	NA	0.0	0.0	0.00	0.18	58.4
All Vehicles		295	28.5	0.123	0.6	NA	0.0	0.4	0.01	0.07	59.0

Table 5.3: PM Peak South 2014 including off ramp to Power Station Rd with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power station Rd (S)											
2	T	168	5.4	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		168	5.4	0.089	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Capricorn Hwy WB off ramp											
4	L	13	76.9	0.019	14.6	LOS B	0.1	0.8	0.02	0.98	46.4
Approach		13	76.9	0.019	14.6	LOS B	0.1	0.8	0.02	0.98	46.4
North: Power station Rd (N)											
8	T	1	100.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1	100.0	0.001	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		182	11.0	0.089	1.0	NA	0.1	0.8	0.00	0.07	58.8

Table 5.4: PM Peak North 2014 intersection with Capricorn Highway with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Capricorn Hwy (E)											
5	T	232	10.3	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		232	10.3	0.127	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Power Station Rd (n)											
7	L	158	5.1	0.140	8.8	LOS A	0.6	4.3	0.36	0.63	47.8
9	R	9	0.0	0.013	11.1	LOS B	0.0	0.3	0.47	0.71	45.8
Approach		167	4.8	0.140	8.9	LOS A	0.6	4.3	0.37	0.63	47.7
West: Capricorn Hwy (W)											
10	L	1	100.0	0.117	10.2	LOS B	0.0	0.0	0.00	3.17	48.3
11	T	183	37.2	0.117	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		184	37.5	0.117	0.1	NA	0.0	0.0	0.00	0.02	59.9
All Vehicles		583	17.3	0.140	2.6	NA	0.6	4.3	0.11	0.19	55.8

The above results indicate that for the current levels of traffic for 2014 and including the proposed depot traffic volumes indicate that all intersections operate at a LoS of A or B with only the right turn from Power Station Road into Capricorn Highway indicating a LoS of C, which is still within acceptable performance limits.

5.2.2 Traffic impacts on future intersection operations 2024 – including depot traffic

Table 5.5 to **Table 5.9** summarises the future impacts of the existing intersections with the added additional traffic generated from the proposed development for the current 2024 year scenario. It is expected that the site traffic movements will not increase, although background traffic on both roads will increase.

Table 5.5: AM Peak South 2024 intersection with Capricorn Highway with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power station Rd (S)											
2	T	17	58.8	0.012	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		17	58.8	0.012	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Capricorn Hwy WB off ramp											
4	L	286	8.4	0.250	11.2	LOS B	1.1	8.4	0.08	0.94	46.4
Approach		286	8.4	0.250	11.2	LOS B	1.1	8.4	0.08	0.94	46.4
North: Power station Rd (N)											
8	T	14	0.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		14	0.0	0.007	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		317	10.7	0.250	10.1	NA	1.1	8.4	0.07	0.85	47.4

Table 5.6: AM Peak North 2024 intersection with Capricorn Highway with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Capricorn Hwy (E)											
5	T	324	32.1	0.201	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		324	32.1	0.201	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Power Station Rd (n)											
7	L	15	53.3	0.019	9.8	LOS A	0.1	0.7	0.31	0.56	48.1
9	R	2	100.0	0.012	29.1	LOS D	0.0	0.5	0.72	0.85	35.4
Approach		17	58.8	0.019	12.1	LOS B	0.1	0.7	0.36	0.59	46.0
West: Capricorn Hwy (W)											
10	L	14	0.0	0.078	7.9	LOS A	0.0	0.0	0.00	1.45	49.4
11	T	122	18.9	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		136	16.9	0.078	0.8	NA	0.0	0.0	0.00	0.15	58.7
All Vehicles		477	28.7	0.201	0.7	NA	0.1	0.7	0.01	0.06	59.0

Table 5.7: PM Peak South 2024 intersection with Capricorn Highway with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power station Rd (S)											
2	T	235	5.5	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	60.0

Approach		235	5.5	0.125	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Capricorn Hwy WB off ramp											
4	L	21	76.2	0.030	14.6	LOS B	0.1	1.2	0.03	0.98	46.4
Approach		21	76.2	0.030	14.6	LOS B	0.1	1.2	0.03	0.98	46.4
North: Power station Rd (N)											
8	T	2	100.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		2	100.0	0.002	0.0	NA	0.0	0.0	0.00	0.00	60.0
All Vehicles		258	12.0	0.125	1.2	NA	0.1	1.2	0.00	0.08	58.6

Table 5.8: PM Peak North 2024 intersection with Capricorn Highway with additional depot traffic

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Capricorn Hwy (E)											
5	T	378	10.3	0.207	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		378	10.3	0.207	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Power Station Rd (n)											
7	L	224	5.8	0.241	9.9	LOS A	1.0	7.5	0.50	0.73	47.1
9	R	11	0.0	0.024	14.3	LOS B	0.1	0.6	0.62	0.83	43.0
Approach		235	5.5	0.241	10.1	LOS B	1.0	7.5	0.51	0.74	46.9
West: Capricorn Hwy (W)											
10	L	2	100.0	0.192	10.2	LOS B	0.0	0.0	0.00	3.15	48.3
11	T	298	37.2	0.192	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		300	37.7	0.192	0.1	NA	0.0	0.0	0.00	0.02	59.9
All Vehicles		913	18.1	0.241	2.6	NA	1.0	7.5	0.13	0.20	55.9

The results of the SIDRA analysis for the intersection capacity impacts shows that the Capricorn Highway, the off ramp intersection and proposed development access would perform within the acceptable range of DoS, delays and queues for both the AM and PM peak periods for 2014 however the right turn for 2024 traffic onto Capricorn Highway operates at a LoS D with a maximum delay of 29 seconds.

In practice this LoS is because both vehicles exiting right onto Capricorn Highway are heavy vehicles and thus require a longer period to accelerate up to speed and move from a standing start across the intersection. It is considered that in practice this is not a significant issue and generally does not affect the overall performance of the major direction (left turn towards Rockhampton).

The 12 hour proposed shift period would mean that the there is a possibility that either the AM or PM peak traffic is missed depending upon the shift times. This could mean that if the shift started at 6.00 am then the AM peak would be missed. However from a traffic point of view this is all exiting the Capricorn Highway and so minimises impact on the major road and with very little through traffic coming from Stanwell and exiting onto Power Station Road.

The intersection will operate more like a free left turn with minimal queuing and delay – same for the right turn into the site, but this depends on the Power Station shifts as well. This would mean that the main impact and most likely delay will occur for right turns to Stanwell in the PM peak as traffic seeks gaps in the through traffic during the PM peak (15.15 pm – 16.15 pm).

Based on this analysis, the estimated traffic due to the proposed increase in traffic from the depot (includes daily depot traffic and construction traffic) under all scenarios will not have a significant impact on the upgraded Capricorn Highway / Power Station Road intersections.

5.3 Traffic impacts for 2014 and 2024 for Power Station Road / Development access

5.3.1 Development access layout

Figure 5.1 below is the typical intersection/ access arrangement used for the assessment of development traffic. It has been assumed that no traffic will turn into the development or exit from / to the south (from the direction of the nearby Stanwell Power Station).

Note that we have based our assessment on a worst case scenario of 61 vehicles entering and leaving the site daily, whereas in reality the pm peak exiting traffic from the depot probably will be outside the PM peak based on the assumption that the depot works on a 12 hour shift and also that approximately 30 of the cars will be laid over for a 30 hour period and will exit outside of the following day AM peak.

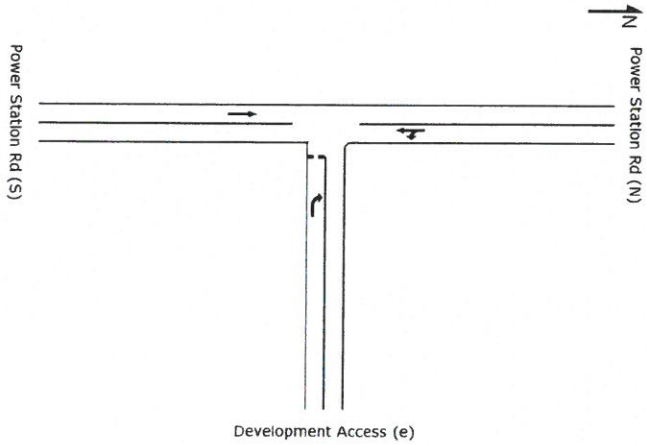


Figure 5.1: Power Station Road / Development Access

5.3.2 SIDRA estimates for development traffic

Tables 5.5 to **5.8** show the SIDRA analysis for the proposed access arrangements for the site for a base case of 2014 (factored up by 5% from 2011 traffic counts provided by TMR).

Table 5.9: Power Station Road / Development access AM Peak 2014

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power Station Rd (S)											
2	T	10	60.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		10	60.0	0.007	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Development Access (e)											
6	R	1	0.0	0.001	9.3	LOS A	0.0	0.0	0.29	0.61	47.5
Approach		1	0.0	0.001	9.3	LOS A	0.0	0.0	0.29	0.61	47.5
North: Power Station Rd (N)											
7	L	61	0.0	0.113	8.2	LOS A	0.0	0.0	0.00	0.91	49.0
8	T	147	10.2	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		208	7.2	0.113	2.4	NA	0.0	0.0	0.00	0.27	56.3
All Vehicles		219	9.6	0.113	2.3	NA	0.0	0.0	0.00	0.26	56.4

Table 5.10: Power Station Road / Development access PM Peak 2014

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power Station Rd (S)											
2	T	107	8.4	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		107	8.4	0.058	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Development Access (E)											
6	R	61	0.0	0.058	9.1	LOS A	0.2	1.5	0.24	0.66	47.7
Approach		61	0.0	0.058	9.1	LOS A	0.2	1.5	0.24	0.66	47.7
North: Power Station Rd (N)											
7	L	1	0.0	0.011	8.2	LOS A	0.0	0.0	0.00	1.04	49.0
8	T	14	78.6	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		15	73.3	0.011	0.5	NA	0.0	0.0	0.00	0.07	59.1
All Vehicles		183	10.9	0.058	3.1	NA	0.2	1.5	0.08	0.22	55.2

Table 5.11: Power Station Road / Development access AM Peak 2024

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power Station Rd (S)											
2	T	17	58.8	0.012	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		17	58.8	0.012	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Development Access (e)											
6	R	1	0.0	0.001	9.9	LOS A	0.0	0.0	0.37	0.62	47.1
Approach		1	0.0	0.001	9.9	LOS A	0.0	0.0	0.37	0.62	47.1
North: Power Station Rd (N)											
7	L	61	0.0	0.163	8.2	LOS A	0.0	0.0	0.00	0.96	49.0
8	T	239	10.0	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		300	8.0	0.163	1.7	NA	0.0	0.0	0.00	0.20	57.4
All Vehicles		318	10.7	0.163	1.6	NA	0.0	0.0	0.00	0.19	57.5

Table 5.12: Power Station Road / Development access PM Peak 2024

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Power Station Rd (S)											
2	T	174	7.5	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		174	7.5	0.094	0.0	NA	0.0	0.0	0.00	0.00	60.0
East: Development Access (E)											
6	R	61	0.0	0.064	9.5	LOS A	0.2	1.6	0.32	0.68	47.4
Approach		61	0.0	0.064	9.5	LOS A	0.2	1.6	0.32	0.68	47.4
North: Power Station Rd (N)											
7	L	1	0.0	0.018	8.2	LOS A	0.0	0.0	0.00	1.06	49.0
8	T	23	78.3	0.018	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		24	75.0	0.018	0.3	NA	0.0	0.0	0.00	0.04	59.4
All Vehicles		259	12.0	0.094	2.3	NA	0.2	1.6	0.08	0.16	56.4

5.3.3 Summary assessment

The maximum average total delay for all scenarios is approximately 3 seconds. The LoS for the 2014 and 2024 years for both AM and PM peaks are all LoS A with a DoS of 0.163. This is considered to be more than acceptable and demonstrates that the development traffic will not affect the overall performance of Power Station Road.

5.4 Construction traffic

An estimate of the construction traffic has been made by SKM to determine the increase in traffic during the construction phase. The details of the calculations are contained in the **Appendix A**.

The summary of the traffic estimates are shown in **Table 5.13** (full estimate of construction traffic is shown in **Table 4.1**)

Table 5.13: Summary of construction traffic

Vehicle type	Estimated No. of vehicles
Light vehicles	519
Low loaders	12
Trucks	1,170
TOTAL	**1,701**

It is expected that the construction phase will be for approximately 91 days based on a 1.85 hectare site that is positioned directly off Power Station Road. The number of construction vehicles may vary on a daily basis with deliveries being done in in the morning, which probably will be outside the am peak and leaving before the pm peak.

It is considered that the number of vehicles accessing the site during the construction phase will be no more than the estimated peak traffic volumes for 2014 that include the depot traffic volumes, i.e. 61 cars which shows a LoS A. Additionally, it would be expected that the construction phase will be managed in accordance with a Traffic Management Plan, with traffic control and access to the site during peak times all agreed with RRC and TMR.

It is considered that the construction traffic will have little or no effect on the road or intersection performance during the construction period for the traffic volumes in 2014.

6. Road safety review

Safety considerations for traffic travelling east / west on Capricorn Highway relate to temporary visibility impairment due to low sun glare at certain times of the day and season. The low sun could impair a driver's ability to read the intersection priorities correctly, including failure to slow and give way in low sun conditions when approaching Power Station Road from the off ramp. Minimizing this risk would be achieved through good maintenance of signs, warnings and line markings. Installation of a glare screen opposite the intersection may also need to be considered to reduce effects of glare when approaching the intersection. The glare screen would need to be positioned appropriately so that it does not create a hazard to approaching motorists travelling north / south.

The clearance of the bridge on the Capricorn Highway is 6.4m and there is a detour along Meteor Park Road for high sided vehicles. Vehicles approaching from the west (from Rockhampton) also have to use Meteor Park Road as a heavy vehicle bypass for oversize vehicles. This requires the oversize vehicle to enter onto an unmade road by crossing the short left turn merge lane.

Section 2.3.8 summarises the crash rates for the existing key road sections for all crashes between 2006 and 2012. There have not been any reported crashes from 2009 to 2012 on either Power Station Road or Capricorn Highway.

It should be noted that a full plan of the proposed development has not been reviewed at the time of writing this report and as such, no assessment of sight lines for the access point or other road safety conditions have been assessed. Therefore, it is recommended that a road safety audit is undertaken once the site plan has been developed to check for any latent site conditions that may affect safety at the proposed development's entrance.

A road safety audit is not considered necessary for the Power Station Road / Capricorn Highway off ramp.

A road safety audit of the intersection of Power Station Road and Capricorn Highway is advised, particularly also to look at the intersection for the heavy vehicle diverge arrangements on both approaches to the bridge (Meteor Park Road), which may be required to be used for specific construction site equipment.

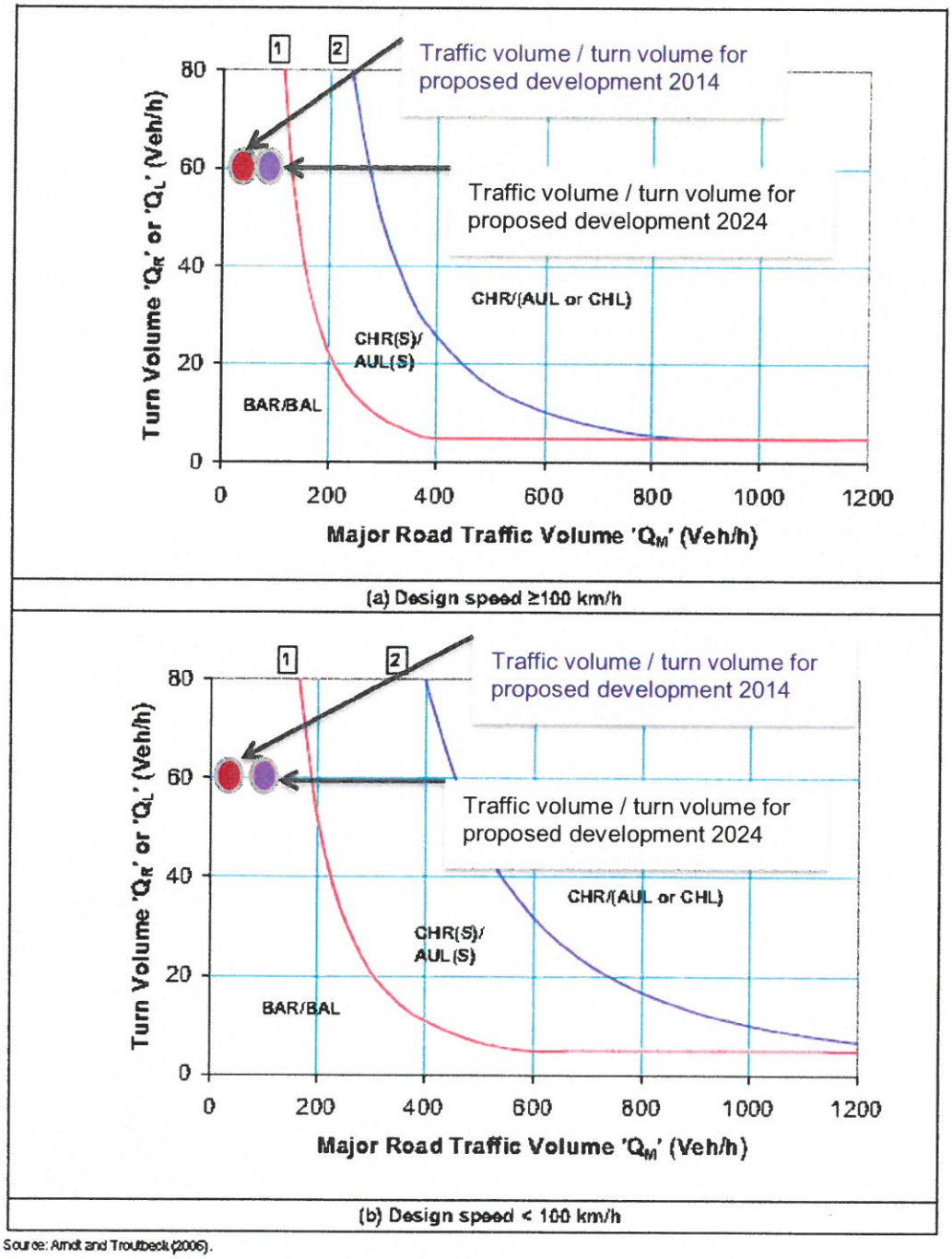
A review of the Meteor Park Road intersection may also be required to identify any specific issues relating the road collision incident highlighted in **Section 2.3.1**.

The turn warrant assessments for the key intersection are outlined in the following sections.

6.1 Turn warrant assessment for the proposed development entrance

6.1.1 Assessment criteria

In accordance with Section 4.8 of Chapter 4A *Unsignalised and signalised intersections, Guide to Road Design (Austroads)*, the warrants for major road turn treatments at unsignalised intersections are based on Figure 4.9 of the manual which is illustrated in **Figure 6.1** below. This will be used for the selection of appropriate turn treatments at unsignalised intersections with a design speed of for both speeds equal or greater than 100km/h and less than 100km/h.



Source: Arndt and Troutbeck (2006).

Figure 4.9: Warrants for turn treatments on the major road at unsignalised intersections

Figure 6.1: Warrants for turn treatments on road with design speed<100km/h

Curve 1 (red line) represents the boundary between a basic left turn treatment (BAR) and short channelized turn treatment CHR(S) or a short auxiliary left turn AUL (S).

Curve 2 (blue line) represents the boundary between a CHR(S)/AUL(S) and a channelized turn treatment (CHR) and auxiliary left turn (AUL).

The warrants apply to turning movements from the major road only. The key parameters for the assessment are the as follows:

- Q_M – major road traffic volume parameter;
- Q_R – right turn volume along the major road; and
- Q_L - left turn volume along major road.

The assessments of key intersection are outlined within the following sections.

6.1.2 Turn warrant assessment

The estimated traffic demands created by the development for current and horizon traffic volumes indicate that a CHR (channelised right turn is required to be installed based on the above assessment criteria.

The Q_M, Q_R or Q_L parameters for the estimated traffic demands on Power Station Road access during the AM and PM peak periods for the two scenarios have been calculated and summarised within **Table 6.1**.

Table 6.1: Q_M, Q_R or Q_L values based on the estimated traffic demands

Peak period	Time horizon	Turning type	Q_R or Q_L	Q_M	Proposed turn treatment
AM	2014	Right	$Q_R = 61$	$Q_M = 56$	BAR/BAL
		Left	$Q_L = 0$	$Q_M = 56$	BAR/BAL
	2024	Right	$Q_R = 61$	$Q_M = 56$	BAR/BAL
		Left	$Q_L = 0$	$Q_M = 56$	BAR/BAL
PM	2014	Right	$Q_R = 61$	$Q_M = 90$	BAR/BAL
		Left	$Q_L = 0$	$Q_M = 90$	BAR/BAL
	2024	Right	$Q_R = 61$	$Q_M = 90$	BAR/BAL
		Left	$Q_L = 0$	$Q_M = 90$	BAR/BAL

6.1.3 Assessment summary

The AM and PM traffic demands turn warrant assessment indicates that the additional traffic generated by the proposed increase in traffic by the development will not trigger an upgrade to the existing turning arrangements on Power Station Road.

Based on this intersection and road performance analysis undertaken, the proposed increase in traffic generated by the proposed development for all scenarios will not have a significant impact on the performance and operation of the existing key road section and intersections.

7. Summary

In line with the requirements for the development application process, this report outlines the TIA component of a RIA which investigates the impacts of the proposed development on the existing road network and considers the current traffic conditions (2014), traffic generated during the construction period (2014), depot operations in 2014 and also considers a 10 year horizon (2024) assessing the traffic generation from the site against predicted future traffic conditions.

7.1 Traffic generation and distribution

The traffic to and from the proposed development is not expected to increase over the next 10 years and will remain steady at 61 vehicles or less per day. However, it is expected that the existing background traffic will increase by an average of 5% per annum. The majority of traffic will arrive from Rockhampton and surrounding area (based on current traffic turn volumes).

Traffic will exit Capricorn Highway via an off ramp where traffic will turn left onto Power Station Road and then left into the proposed development. At the end of the typical 12 hour shift (suggested shift derived from Aurizon) the traffic will exit out onto Power Station Road and re-enter Capricorn Highway through a left turn movement at the intersection.

7.2 Traffic impact assessment

The following scenarios were assessed:

- 2014 existing intersection AM and PM Peak Volumes without additional depot traffic to ascertain current levels of service for the existing road conditions;
- 2014 AM and PM Peak traffic scenarios including the proposed development's traffic;
- 2024 AM and PM Peak traffic scenarios including the proposed development's traffic; and
- Potential impact of construction traffic on the 2014 AM and PM peak traffic volumes.

7.2.1 Intersection impact assessment

For the purposes of this assessment, SIDRA analyses have been undertaken for the following key intersections:

- Intersection of Capricorn Highway and Power Station Road;
- Intersection of Power Station Road and Capricorn Highway off ramp; and
- Access to the depot on Power Station Road.

7.2.2 Capricorn Highway / Power Station Road

The Capricorn Highway / Power Station Road intersection is a priority give way intersection with the predominant traffic flow exiting the intersection and heading east back towards Rockhampton. The SIDRA results show levels of service (LoS) and delay are considered well within normal operating parameters for the following scenarios:

- Current background traffic volumes without additional depot traffic in both the AM and PM peaks for 2014;
- Current background traffic volumes including the additional depot traffic in both the AM and PM peaks for 2014; and
- Estimated future background traffic volumes including the additional depot traffic in both the AM and PM peaks for 2024.

It should be noted that the LoS for right turn is affected by the fact that it is a heavy vehicle and as such, requires additional gap acceptance to exit Power Station Road onto the Capricorn Highway. In reality, this delay is minimal and unlikely to occur during peak traffic times and even if it does, the delay is considered acceptable (LoS D was shown).

7.2.3 Power Station Road / Capricorn Highway Off Ramp

This is a priority intersection that typically operates like a free flow left turn heading directly onto Power Station Road and is only held to a give way if there is any traffic approaching up the circular ramp from the Capricorn Highway from the westerly direction (which current and expected volumes for this manoeuvre are very low).

The SIDRA results show levels of service (LoS) and delay are considered well within normal operating parameters for the following scenarios:

- Current background traffic volumes without additional depot traffic in both the AM and PM peaks for 2014;
- Current background traffic volumes including the additional depot traffic in both the AM and PM peaks for 2014; and
- Estimated future background traffic volumes including the additional depot traffic in both the AM and PM peaks for 2024.

7.2.4 Power Station Road / Depot Access

The Power Station Road / Proposed Development intersection will predominantly take traffic entering the proposed development from the north, turning left directly into the depot and upon exiting all vehicles will turn right.

The SIDRA results show levels of service (LoS) and delay are considered well within normal operating parameters for the following scenarios:

- Current background traffic volumes without additional depot traffic in both the AM and PM peaks for 2014;
- Current background traffic volumes including the additional depot traffic in both the AM and PM peaks for 2014; and
- Estimated future background traffic volumes including the additional depot traffic in both the AM and PM peaks for 2024.

7.2.5 Hours of Operation

Aurizon has advised that the proposed development will operate on a 12 hour shift cycle with approximately 63% of the vehicles laying over for 30 hours. This will mean that the exiting volumes will vary and be lower than the SIDRA assessment, thus improving the LoS and reducing delay even more than the worst case scenario analysed (full depot traffic entering and exiting during both AM and PM peaks).

Additionally, with Aurizon proposing to operate a 12 hour shift, the traffic impact may only occur at one of the peak times, whilst missing the other due to the shift patterns. If this were to be the am peak, vehicles will be exiting Capricorn Highway thus not significantly affecting the intersection operation. If traffic were to exit during the pm peak where entry to Capricorn Highway is required, this scenario has been analysed and shown also not to adversely affect capacity.

Therefore, it is considered that traffic generated by the proposed development will not have any significant effect on the intersection capacity.

7.2.6 Road link assessment

The assessment results showed that the impact of the additional traffic generated by the proposed development is minimal and will not impact on the existing LoS levels on the surrounding roads. It is forecast to operate within the acceptable threshold.

7.2.7 Turn warrant assessment

A turn warrant assessment was undertaken for Power Station Road access in accordance to Chapter 4A *Unsignalised and signalised intersections, Guide to Road Design (Austroads)* for a typical unsignalised intersections with a design speed of less than 100 km/h and greater than 100 km/h.

The assessment showed that the current arrangement for Capricorn Highway does not need to be modified for both 2014 and 2024 traffic scenarios and similarly, there is no warrant required to change the current proposed access arrangements to the proposed development.

7.2.8 Construction Traffic

The estimated construction traffic is considered not to have a major impact on any of the intersection performances. However, a suitable Construction Traffic Management Plan should be submitted and approved by TMR / RRC to cover traffic control and access for the larger oversize low loader vehicles and construction traffic.

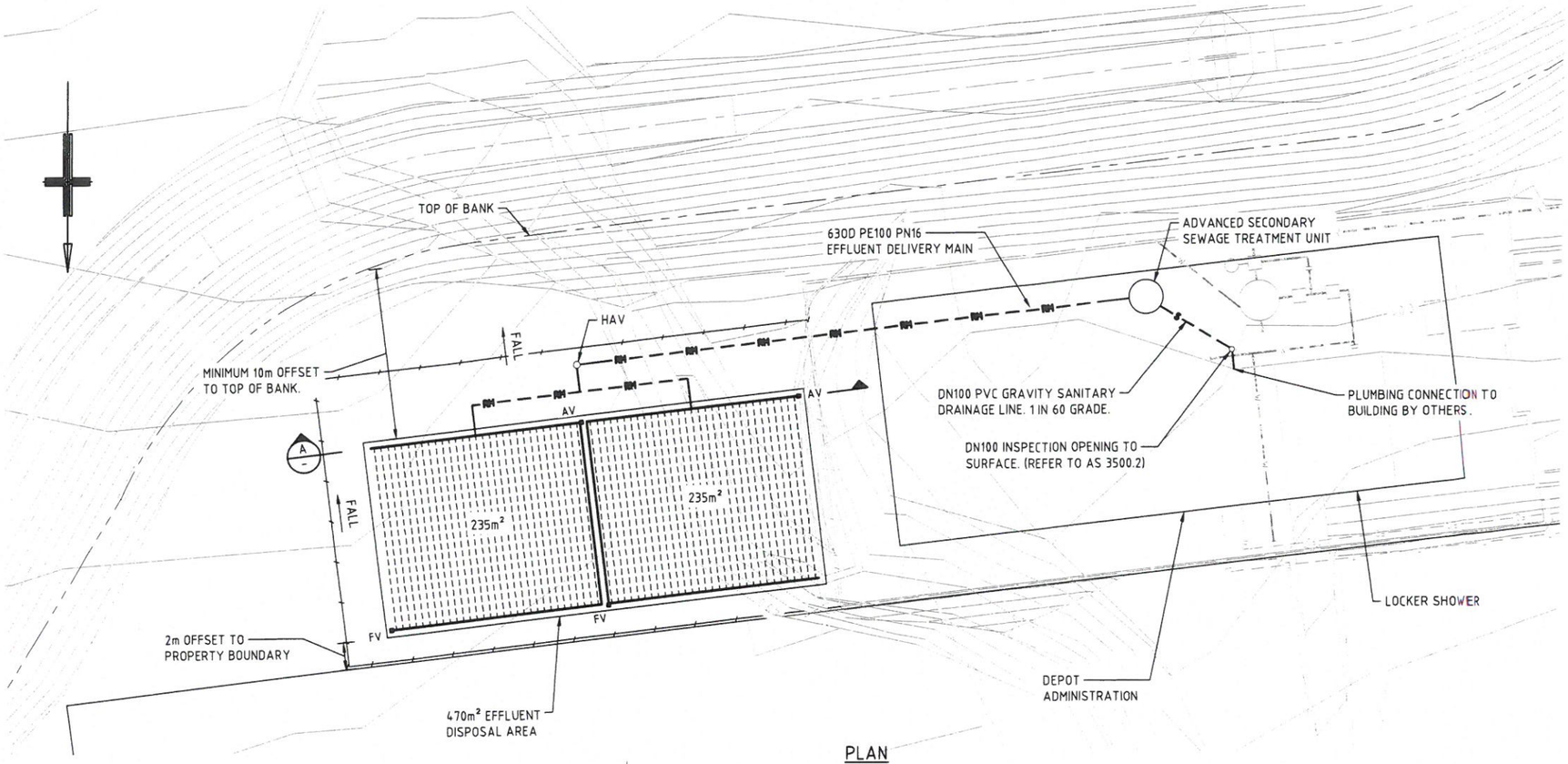
7.2.9 Parking

Aurizon indicate they are proposing to provide 80 cars parking spaces at the proposed development. The daily parking requirement for operation staff is anticipated to be approximately 61 private vehicles (if every person drove to the site using their own transport). This provides a surplus of parking for visitors and possible shift crossover traffic. Parking provision is therefore considered adequate for the proposed development. Consideration must be given to the provision of 1% - 2% accessible parking spaces for either employees or visitors.

7.2.10 Road Safety

It is recommended that a road safety audit is undertaken for the access to the proposed development and the intersection Capricorn Highway / Power Station Road and Meteor Park Road to identify any road safety risks that may be present.

Appendix A. Additional Information



PLAN
SCALE 1:200

LEGEND

W	PROPOSED WATER MAIN
RM	PROPOSED EFFLUENT DELIVERY MAIN
S	PROPOSED SANITARY DRAINAGE LINE
HAV	HYDRAULIC ACTUATING VALVE
AV	AIR VALVE
FV	FLUSHING VALVE

NOTES:

1. LAND APPLICATION SYSTEM SHALL BE INSTALLED AS A SUB-SURFACE EFFLUENT IRRIGATION SYSTEM. LAYOUT SHOWN IS TYPICAL ONLY AND PROVIDED FOR THE GUIDANCE OF THE CONTRACTOR.
2. DRIP IRRIGATION SYSTEM TO COMPLY WITH CONTRACT REQUIREMENTS AND BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. REFER ALSO TO SPECIFICATION FOR LAND APPLICATION SYSTEM.
3. ALL DRIPPER LINE SECTIONS SHALL BE INSTALLED WITH A COVER OF 150mm. ALL DISTRIBUTION MAINS SHALL BE INSTALLED WITH COVER OF 600mm.
4. DRIPPER LINE SPACING TO BE 600mm, EMITTER SPACING TO BE 500mm.
5. 63mm O.D. POLYETHYLENE COMPOUND PE100, CLASS 16, MANUFACTURED TO AS/NZS 4130.
6. DISPOSAL AREA TO BE SET BACK IN ACCORDANCE WITH THE REQUIREMENTS OUTLINED IN THE QUEENSLAND PLUMBING AND WASTEWATER CODE.
7. NOTICES ARE TO BE SECURELY INSTALLED ON THE BOUNDARY OF THE IRRIGATION AREA CLOSEST TO THE PROPERTY BOUNDARIES. NOTICES ARE TO CLEARLY STATE "IRRIGATION AREA USING RECYCLED TREATED EFFLUENT WATER. DO NOT USE OR DRINK".
8. WHERE REQUIRED ESTABLISH GRASS COVER OVER APPLICATION AREA PRIOR TO PRACTICAL COMPLETION.
9. ELECTRICAL CONDUIT AND EFFLUENT DELIVERY MAIN ARE TO BE INSTALLED SEPARATELY. COMMON TRENCH INSTALLATION IS NOT PERMITTED.
10. INSTALL PIPE ALIGNMENT MARKERS AT EVERY CHANGE IN DIRECTION OF THE DELIVERY MAIN AND SUB-MAIN PIPEWORK. WHERE POSSIBLE PLACE MARKERS ON EXTERNAL BUILDINGS.
11. 2m MINIMUM SETBACK FROM BUILDINGS UPSLOPE OR EVEN GRADE.
12. 2m MINIMUM SET BACK FROM PROPERTY BOUNDARY.

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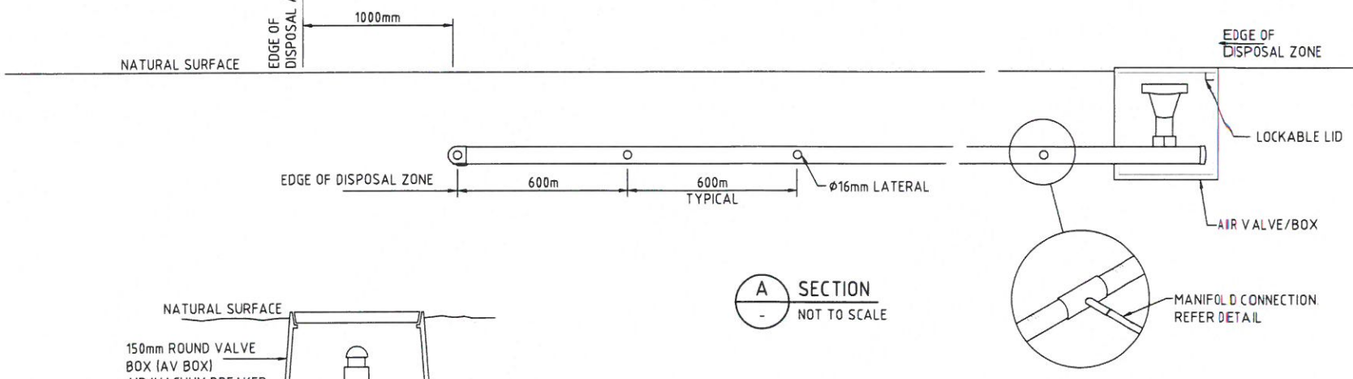

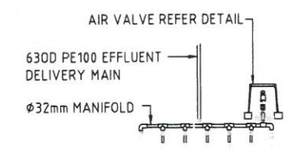

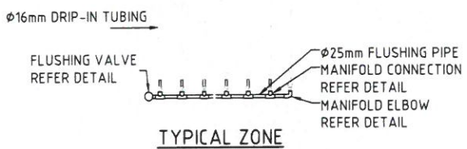

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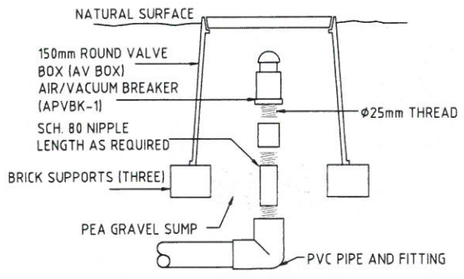
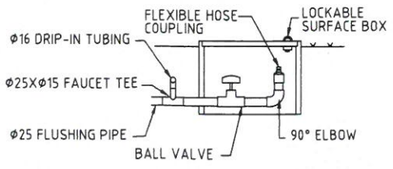


AIR VALVE DETAIL (AV)
NOT TO SCALE

A SECTION
NOT TO SCALE



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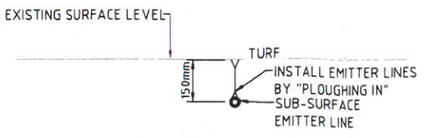

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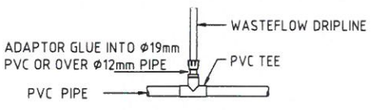

MANIFOLD CONNECTION
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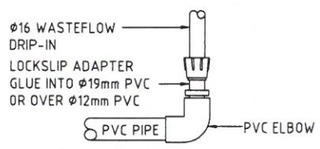

MANIFOLD ELBOW DETAIL
NOT TO SCALE

0 2 4 6 8 10m
SCALE 1:200 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 90% REVIEW	14.5.14	RJK
2	ISSUE FOR 100% REVIEW	22.5.14	RJK
3	ISSUE FOR TENDER	27.5.14	RJK

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PROJECT No. 41-27647
DRAWING No. 41-27647-W004

DESIGNED	M.PAGE	
DESIGN CHECKED	D.WILLIS	
DRAWN	K.AHIER	
DRAFTING CHECK	S.WOOD	
APPROVED		
J.SKENE	22.5.14	DATE
RPEQ No.	9480	

AURIZON COMPLIANCE REVIEW
REVIEWED XX
DESIGN MANAGER DATE
ISSUE AUTHORISED
AUTHORISED XX
MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
COAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
SEWAGE TREATMENT
GENERAL ARRANGEMENT

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-9200**
ISSUE **3**

Plot Date: 27 May 2014 - 4:39 PM Plotted by: Jonathan Murray Cad File No: G:\41\27647\CADD\Drawings\41-27647-W004.dwg

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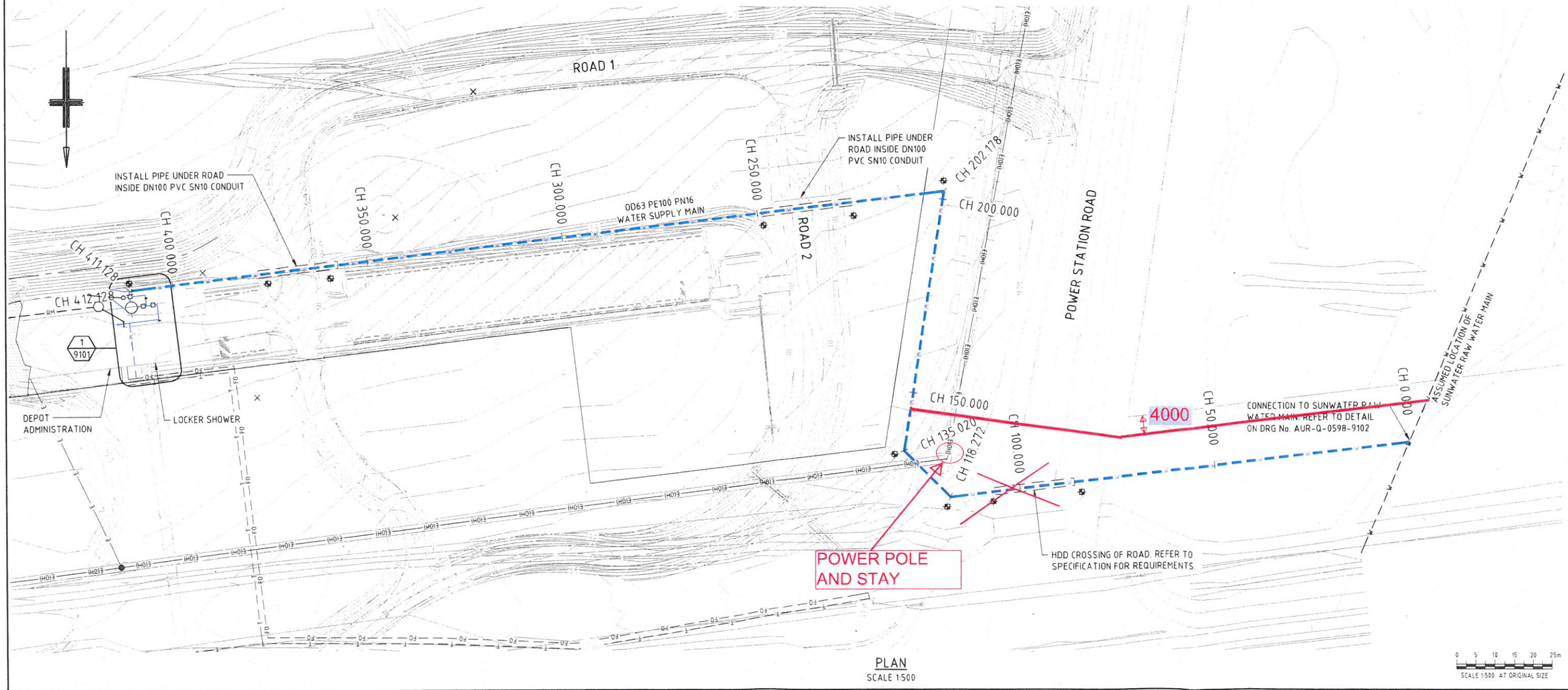
SET-OUT TABLE				
CHAINAGE	EASTING	NORHTING	BEARING	DEF ANGLE
0.000	29460.012	400324.700	83d09'01"	
118.272	29577.440	400338.806	83d09'01"	51d46'19"
135.020	29589.299	400326.980	134d55'20"	53d36'09"
202.178	29579.344	400260.564	188d31'28"	105d22'28"
411.128	29786.803	400285.485	83d09'01"	90d00'00"
412.128	29786.683	400286.478	353d09'01"	

NOTES

1. REFER TO DRAWING No. AUR-Q-0598-0002 FOR GENERAL NOTES, STANDARD DRAWING LIST AND SURVEY NOTES.
2. REFER TO SPECIFICATION FOR WATER MAIN INSTALLATION DETAILS.
3. REFER TO DRAWING No. AUR-Q-0598-9102 FOR TRENCH DETAILS.
4. HDPE PIPE TO BE BENT TO ACHIEVE REQUIRED DEFLECTION ANGLE. MINIMUM RADIUS OF CURVATURE SHALL BE 2000mm.
5. REFER TO AUR-Q-0598-9102 FOR SERVICE MARKER DETAILS.
6. LOCATION OF SUNWATER PIPELINE TO BE CONFIRMED BY CONTRACTOR.

LEGEND

- EXISTING MAJOR CONTOURS (1.0m INT)
- EXISTING MINOR CONTOURS (0.25m INT)
- EXISTING CHANGE OF GRADE
- EXISTING FENCE
- EXISTING TELSTRA
- EXISTING OVERHEAD ELECTRICITY
- EXCLUSION ZONE
- MAJOR CONTOURS (1.0m INT)
- MINOR CONTOURS (0.2m INT)
- ELECTRICITY
- TELSTRA
- FIBRE OPTIC CABLES
- PROPOSED WATER MAIN
- SUNWATER RAW WATER MAIN
- PROPOSED SEWER RISING MAIN
- PROPOSED SEWER MAIN
- PROPOSED GATE VALVE
- PROPOSED SERVICE MARKER



PLAN
SCALE 1:500

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS			
1	ISSUE FOR 50% REVIEW	30.4.14	KA
2	ISSUE FOR 90% REVIEW	14.5.14	RJK
3	ISSUE FOR 100% REVIEW	22.5.14	RJK

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PROJECT No. 41-27647
DRAWING No. 41-27647-W001

DESIGNED	B.HOIBERG	AURIZON COMPLIANCE REVIEW
DESIGN CHECKED	A.BADINI*	
DRAWN	K.AHIER	REVIEWED XX DESIGN MANAGER DATE
DRAFTING CHECK	S.WOOD*	ISSUE AUTHORISED
APPROVED	A.BADINI* 22.5.14 DATE	AUTHORISED XX MANAGER CIVIL ENGINEERING DATE
RPEQ No.	04941	

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
WATER SUPPLY MAIN
GENERAL ARRANGEMENT

FILE No. F14/15659
DRAWING NUMBER AUR-Q-0598-9100
ISSUE 3

Plot Date: 23 May 2014 - 12:47 PM Plotted by: Jonathan Murray Cad File No: G:\41\27647\CADD\Drawings\41-27647-W001.dwg

AURIZON

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

March 2014

Stanwell Intermediate Depot

Environmental Management Plan (Planning)

Document history

Title	Name	Prepared	Date	Signature	Reviewed	Date	Signature
1.0	First Draft	Andrew Batts	04-03-2014	AndrewBatts	Mark Harris	10-03-2014	MarkHarris
2.0	Final	Andrew Batts	11-03-2014	AndrewBatts	Mark Harris	11-03-2014	MarkHarris

Contents

GLOSSARY

Abbreviation	Description
ACH Act	Queensland *Aboriginal Cultural Heritage Act 2003*
AHD	Australian Height Datum
AS	Australian Standard
CLR	Contaminated Land Register
DAFF	Queensland Department of Agriculture, Fisheries and Forestry
DEHP	Queensland Department of Environment and Heritage Protection
DNRM	Queensland Department of Natural Resources and Mines
DTMR	Queensland Department of Transport and Main Roads
EMP (C)	Environmental Management Plan (Construction)
EMP (P)	Environmental Management Plan (Planning)
EMR	Environmental Management Register
EP Act	Queensland *Environmental Protection Act 1994*
EPAP	Aurizon's Environmental Planning Assessment Procedure
EPP Air	Queensland *Environmental Protection (Air) Policy 2008*
EPP Noise	Queensland *Environmental Protection (Noise) Policy 2008*
EP Regulation	Queensland *Environmental Protection Regulation 2008*
EP Waste Regulation	Queensland *Environmental Protection (Waste Management) Regulation 2000*
EPP Water	Queensland *Environmental Protection (Water) Policy 2009*
ESCP	Erosion and Sediment Control Plan

Abbreviation	Description
EVNT	Endangered, Vulnerable or Near-Threatened
LP Act	Queensland *Land Protection (Pest and Stock Route Management) Act 2002*
MSDS	Material Safety Data Sheets
NC Act	Queensland *Nature Conservation Act 1992*
RE	Regional Ecosystem
RRC	Rockhampton Regional Council
SHEM System	Aurizon's Safety Health and Environmental Management System
SID	Stanwell Intermediate Depot
SMP	Species Management Program
SP Act	Queensland *Sustainable Planning Act 2009*
SP Regulation	Queensland *Sustainable Planning Regulation 2009*
TECs	Threatened Ecological Communities
VM Act	Queensland *Vegetation Management Act 1999*
Water Act	Queensland *Water Act 2000*
Water Regulation	Queensland *Water Regulation 2002*
WRR Act	Queensland *Waste Reduction and Recycling Act 2011*

1 INTRODUCTION

Aurizon Operations Limited (Aurizon) is intending to develop and operate a train crew depot on land situated at Power Station Road, Kabra which is located within the Rockhampton Regional Council local government area.

The new facility (known as the Stanwell Intermediate Depot – SID) requires a development approval from the Rockhampton Regional Council and this EMP (P) has been prepared as part of the supporting information for the development application. The EMP (P) has been developed to address the environmental issues, constraints and opportunities that have been identified in studies of the project site.

This EMP (P) will be refined and expanded further when an EMP (C) is prepared by the construction contractor during the construction phase of the project in accordance with Aurizon's *Specification for Work Provider Development of Construction Environmental Management Plan.*

1.1 Site Description

The site is located at Kabra approximately 23 kilometres south-west of Rockhampton. Situated off Power Station Road, the site sits adjacent to the Blackwater Central Line and, in particular, adjacent to the proposed holding roads at Kabra being developed by Aurizon Network as part of the Wiggins Island Rail Project.

The land is vacant, fenced and has been used for agistment of cattle on a regular basis for some time. SKM (February 2014a) describes the site as *a grassy paddock with sub-adult vegetation.*

Further details of the site are provided in the *CQAR Kabra Intermediate Depot - Preliminary Environment and Planning Assessment Report* (Aurizon 2013d).

1.2 Proposed Development

The proposed development will cater for the following functional requirements:

- A demountable crew change building suitable for a total Stanwell based crew of 55 train drivers on any given day and up to 6 full time management and administrative staff per shift. The building will likely have a maximum floor area of 260m^2. There will be a 40m^2 outdoor area and a separate shower/locker room with a maximum floor area of 80m^2.
- A car parking area providing for 82 spaces for train crew and permanent staff parking requirements.
- Security fencing and secure access to the depot.
- All-weather, 24-hour access from a public road to the depot and from the depot to the adjacent rail corridor.
- External rubbish storage area.
- External storage area of suitable size for single shipping container.

1.3 Previous Studies

A PEPA for the project was prepared by Aurizon in accordance with the EPAP and completed in November 2013. Subsequently, an Ecological Pre-clearing Survey Report and a Road Impact Assessment Report was prepared by Sinclair Knight Merz Pty Ltd in February 2014.

1.4 Format of the EMP (P)

Section 2 provides a preamble to the site-specific management measures and includes a discussion of relevant legislation and standards, the purpose of the EMP (P) and the roles and responsibilities for its implementation.

Aspects of the environmental management of the SID project have been assessed, and management measures relating to the following elements are included in Section 3 of the EMP (P):

1. Noise and Vibration;
2. Air Quality (Dust and Emissions);
3. Erosion and Sediment Control;
4. Flora and Fauna;
5. Weeds and Pests;
6. Waste;
7. Bushfire;
8. Cultural Heritage;
9. Surface Water;
10. Groundwater;
11. Sustainability;
12. Traffic; and
13. Hazardous Materials.

The EMP (P) addresses each element individually. For each element, the following components are included:

- Rationale: brief rationale for inclusion of the element in the EMP (P);
- Objective: environmental objective(s) relevant to each element;
- Performance Indicators: specific performance indicators relevant to each element; and
- Management Measures: including a description of issue/s, action(s) required, and the responsible party for the action(s).

2 PREAMBLE TO THE EMP (P)

2.1 Legislation and Standards

The following environmental/planning legislation applies directly to the project:

Commonwealth Government

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

Queensland Government

- *Environmental Protection Act 1994 and Regulation 2008*
- *Environmental Protection (Noise) Policy 2008*
- *Environmental Protection (Air) Policy 2008*
- *Environmental Protection (Water) Policy 2009*
- *Environmental Protection (Waste Management) Regulation 2000*
- *Nature Conservation Act 1992* and *Wildlife Regulation 2006*
- *Aboriginal Cultural Heritage Act 2003*
- *Vegetation Management Act 1999*
- *Sustainable Planning Act 2009 and Sustainable Planning Regulation 2009*
- *Land Protection (Pest and Stock Route Management) Act 2002* and *Regulations 2003*
- *Work Health and Safety Act 2011* and *Regulation 2011*
- *Waste Reduction and Recycling Act 2011* and *Regulation 2011*
- *Water Act 2000* and *Regulation 2002*

In addition to the legislation identified above, the following standards, specifications, publications and codes of practice relating to environmental management will be implemented or referenced in regard to the design and construction activities during project delivery to ensure compliance with Aurizon specifications and obligations:

Australian Standards

- *Australian Standard AS 2436 'Guide to Noise Control on Construction, Maintenance and Demolition Sites'.*
- *Australian Standard AS 1940 'The Storage and Handling of Flammable and Combustible Liquids'.*
- *Australian Standard AS 4970 'Protection of Trees on Development Sites'.*
- *Australian Standard AS4123 'Mobile Waste Containers'.*
- *Australian/New Zealand Standard AS/NZS 5667 'Water Quality Sampling'.*
- *Australian Standard AS1055 'Description and Measurement of Environmental Noise'.*
- *Australian Standard AS2012 'Measurement of Airborne Noise Emitted by Earth Moving Equipment and Agricultural Tractors'.*
- *Australian Standard AS2221 'Methods for Measurement of Airborne Sound Emitted by Compressor Units*

Queensland Government Guidelines and Publications

- *Code of Practice - Railway Noise Management' (Queensland Rail, November 2007).*
- *'Waste Tracking Guideline' (DEHP, 2013)*
- *Aboriginal Cultural Heritage Act 2003 Duty of Care Guidelines.*

Industry Codes and Publications

- *'Best Practice Erosion & Sediment Control Guidelines' (International Erosion Control Association, 2008).*

2.2 Approach to Environmental Management

Aurizon's commitment to ensuring the environment is protected and considered in all operations is communicated through Aurizon's Environmental Policy, endorsed by the Board of Directors. The policy provides the framework that personnel work within and ensures that environmental principles are aligned throughout the company.

Environmental Policy

Aurizon Holdings Limited (the "Company")

Date approved by the Board: July 2013

Contacts
The Senior Vice President & Company Secretary / Senior Vice President Safety, Health and Environment

Aurizon Holdings Limited
ACN 146 335 622
175 Eagle Street
Brisbane QLD 4000
Australia
Telephone: 13 23 32
Email: companysecretary@aurizon.com.au
Website: www.aurizon.com.au

Environmental Policy

Aurizon is committed to achieving world class environmental performance across all its operations as one of Australia's largest transport and logistics businesses.

Aurizon business activities will be managed in a manner that minimises adverse environmental impacts and delivers continual improvement in environmental performance.

This will be achieved by,

- Implementing environmental management systems which identify, control, and where possible, minimise adverse environmental impacts arising from our operations.
- Meeting or exceeding all relevant legal obligations and relevant codes of practice.
- Preventing pollution, minimising waste and improving resource use efficiency.
- Setting internal objectives and targets for environmental performance, reviewing progress, and reporting results.
- Progressively assessing our energy consumption to identify opportunities for improving the energy efficiency of our operations.
- Ensuring our employees, contractors and others working on our behalf understand and have skills and resources to comply with this policy.
- Communicating openly with the community, government and other stakeholders regarding our environmental performance.
- Periodically reviewing this policy and effectiveness of management system procedures in delivering our environmental objectives.

All Aurizon employees are accountable for ensuring all business activities, facilities and equipment within their area of responsibility are managed in accordance with this policy.

Approved by the Board in July 2013

2.3 Purpose of the EMP (P)

The EMP (P) is a key management and reference document for the management of environmental issues associated with the design, construction and operation of the SID. It has been developed to address the environmental issues, constraints and opportunities identified in the previous studies of the project site. It is noted that the construction contractor will be required to comply with the requirements contained within this EMP (P) and the standard requirements listed in Aurizon's *Specification for Work Provider Development of Construction Environmental Management Plan*.

2.3 Roles and Responsibilities

Aurizon has overall responsibility for the successful environmental performance of the project. The key Aurizon officer with responsibilities in relation to the preparation of the EMP (P) is the Principal Environmental Advisor (Projects).

Aurizon's Enterprise Real Estate Team has the primary role in dealing with the landowner (Stanwell Corporation Limited) in relation to obtaining land for the project (including establishing and implementing access provisions and protocols with landowners).

The key roles and responsibilities include:

Aurizon Project Manager

The Aurizon Project Manager has overall responsibility for ensuring that Aurizon meets its obligations under the EMP (P).

Aurizon Environmental Advisor

The responsibilities of Aurizon Environmental Advisor include:

- Overall project guidance on town planning, environmental and sustainability matters;
- Preparation of Aurizon Environmental Planning Assessment Procedure (EPAP) documentation for the planning and detailed design phases [i.e. PEPA and EMP(P)];
- Technical review and approval of documents under the EPAP;
- Ensuring Aurizon interests and standards are addressed in the preparation of development applications and upheld in the delivery of project approvals;
- Liaising with relevant stakeholders (including relevant local governments, State and Commonwealth government agencies, ports corporations and service providers);
- Technical review of all deliverables prior to submission of development applications to relevant authorities for approval; and
- Negotiation of approvals with relevant authorities as required.

Aurizon Cultural Heritage and Native Title Advisor

The Aurizon Cultural Heritage and Native Title Advisor has corporate responsibility for the management of the Aboriginal cultural heritage for the project. Duties include:

- Stakeholder engagement;
- Coordination of cultural heritage surveys;
- Implementation of Cultural Heritage Management Plan Agreements; and
- Negotiation of construction cultural heritage management requirements.

Aurizon Design Manager

Within the Design Team the Aurizon Design Manager is responsible for:

- Taking environmental considerations of the PEPA, requirements of this EMP (P) and statutory approval conditions into account during the preliminary, detailed and final design stages;
- Performing the detailed design of the project and incorporating the requirements of this EMP (P) in the design;
- Reporting on the functionality of the final planning layouts; and
- Ensuring the design minimises the environmental footprint.

Site Construction Manager and Site Environment Officer

Within the construction team, the Site Construction Manager has overall responsibility for the delivery of the works. Assisting the Construction Manager will be a Site Environmental Officer, who is responsible for liaising with stakeholders during the construction phase of the project, and the preparation and implementation of an EMP (C).

Responsibilities of the Site Construction Manager include:

- Implementation of conditions of the EMP (P), EMP (C), and approvals;
- Ensuring staff are trained in their obligations under the EMP (P) and EMP (C); and
- Overall responsibility for managing responses to incidents during construction and reporting thereon.

Responsibilities of the Site Environmental Officer include:

- Preparation of the EMP (C) for Aurizon approval prior to the commencement of construction;
- Preparation, submission and negotiation of all relevant permits and development applications for the construction phase;
- The continual improvement of this EMP (P) to take account of all relevant legislation and environmental factors as a result of development of the project and location specific mitigation measures;
- Monitoring and reporting on the performance of environmental protection measures in accordance with the requirements of the EMP (C);
- Confirming relevant environmental commitments have been satisfied; and

- Reviewing the EMP (C) for effectiveness.

Project Personnel and Subcontractors

All personnel (staff, employees, subcontractors and their employees) will be required to:

- Complying in full with the requirements of the EMP (P), the EMP (C) and approvals as they apply to the project and site environmental management and control;
- Performing their tasks having due consideration for the environment and in compliance with the requirements of any approval and the EMPs; and
- Taking all reasonable and practicable measures to prevent and/or minimise the likelihood of environmental harm being caused.

Asset Owner

Notwithstanding any other conditions that may be required by a regulator, the Asset Owner will be responsible for:

- Developing, implementing and complying with an EMP (O) consistent with the EMP (P) and EMP (C); and
- Obtaining any and all operational permits, licences and approvals under relevant legislation.

3 EMP (PLANNING)

3.1 Element 1: Noise and Vibration

Rationale

No noise or vibration management measures are anticipated to be necessary during the design phase of the project.

Construction works will likely involve the use of powered mechanical equipment, which will generate noise and vibration in the vicinity of the works. As no sensitive receptors were identified on aerial photography within a radius of 2 kilometres from the site, the construction works are unlikely to pose a significant risk of noise or vibration nuisance. However, best practice noise and vibration management measures should be implemented, in accordance with the *Environmental Protection (Noise) Policy 2008* and *AS 2436-2010: Guide to Noise Control on Construction, Maintenance and Demolition Sites.*

It is understood that the depot will have no significant noise or vibration impacts during its operation.

Objective

To minimise and manage any adverse noise or vibration impacts on the surrounding environment during the construction phase of the project.

Performance Indicators

Construction works are carried out by such means necessary so as to satisfy the acoustic quality objectives specified in the *Environmental Protection (Noise) Policy 2008* for relevant sensitive receptors.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Construction			
1.1	Minimise construction noise	Control all noise-generating mobile and stationary plant, equipment and processes to minimise noise emissions in accordance with *AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites.*	Site Construction Manager
1.2		Fit all powered mechanical equipment with effective exhaust mufflers, and shut down/switch off when not in use.	
1.3		Consider and implement the following noise control methods, where relevant/necessary: • Substitution of noise generating activities by alternative processes; • Silencing and other noise suppression of plant and equipment;	

Task No.	Issue Description	Action Required	Responsibility
		• Alternative placement of plant and equipment (location, direction and distance from noise-sensitive receptors); • Use of acoustic enclosures/screening.	
1.4	Minimise construction noise	In the event of the adjusted noise level for a single construction noise source significantly exceeding the background noise level, give consideration to restricting the times during which the activity can take place to a number of separate hours each day.	Site Construction Manager
1.5		Construction activities must only occur between 06:00 and 18:00 hours to ensure compliance with the *Environmental Protection (Noise) Policy 2008*. Regardless of the above, there should be no operation of machinery – Sunday or Public Holidays. Where it is absolutely necessary to conduct noise-generating construction activities outside of these times, obtain prior approval from an Aurizon Environmental Advisor.	
1.6		Truck deliveries to laydown areas and construction sites must be avoided between 18:00hours and 06:00hours unless otherwise authorised by the Site Construction Manager.	
1.7		Suitable routes and times of travel should be identified to reduce disturbances to residents and local traffic conditions.	
1.8	Manage noise-related complaints	Record, investigate and respond to noise complaints.	Site Construction Manager
1.9		If a complaint remains valid after a review of operational practices reveals no practical way of reducing noise further, monitoring should be undertaken in accordance with the requirements of DEHP and any other relevant authorities.	Aurizon Project Manager
Operation			
1.10	Investigate noise-related complaints	In the event that a complaint is received that is not frivolous or vexatious in regards to noise generated by the operation of the SID, commission a suitably qualified and experienced acoustic or vibration engineer to conduct an investigation and make recommendations in regards to appropriate mitigation measures. All environmental incidents relating to noise must be reported through SHEM Event.	Manager Service Delivery Coal South

3.2 Element 2: Air Quality (Dust and Emissions)

Rationale

Construction works will likely involve the use of powered mechanical equipment for the excavation and movement of soil. Potential air emission sources include exposed areas, stockpiles, vehicle tracks and vehicle exhausts. These emissions have the potential to create air impurities through the release of odour, dust and particulate emissions.

No direct adverse impacts to air quality are expected to be associated with the operation of the SID.

Objective

To minimise and appropriately manage dust and air emissions associated with the project.

Performance Indicators

No dust complaints received from residents, motorists or statutory authorities.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
2.1	Minimise area of disturbance	Minimise the area of land disturbance by defining clearing limits and/or using previously disturbed land.	Aurizon Design Manager
2.2	Minimisation of vehicle, plant and equipment emissions	Identify opportunities to avoid and/or minimise air emissions throughout the life of the project, e.g. by minimising machinery use, ensuring that machinery selected is energy/fuel efficient, purchasing goods from local suppliers.	Aurizon Project Manager
Construction			
2.3	Avoidance/minimisation of dust generation	Define and use construction vehicle access roads.	Site Construction Manager
2.4		Monitor the Bureau of Meteorology weather forecasts for dry/windy conditions to prepare additional dust controls in advance.	
2.5		Minimise land disturbance and clearance of vegetation (including groundcover and grasses) as much as practicable, to reduce particulate	

Task No.	Issue Description	Action Required	Responsibility
		sources.	
2.6		Stabilise and seed with native grass seed any exposed areas greater than 10 square metres as soon as practicable following completion of construction works.	
2.7		Cover all erodible materials that are to be stockpiled for less than one month with plastic, geotextile or surface binding agents etc.	
2.8		Cover all erodible materials that are to be stockpiled for one month or longer with native grass seed, erosion blanketing, emulsion spray or another approved method.	
2.9		Regularly water all exposed areas - including roads, unsealed areas and stockpiles - as required during dry conditions to prevent dust emissions beyond the site boundary. No oil is to be used for the suppression of dust, and recycled water should be used in preference to potable water. Water must not be allowed to create runoff and leave the site or enter waterways.	
2.10		Install hardstand on internal roads and storage areas and keep clean of spoil and waste (i.e. sweep and water spray regularly).	
2.11		Post and ensure vehicle speed limits are adhered to on the construction site.	
2.12		If wind conditions are such that dust emissions are observable beyond the site boundary, minimise or cease dust-generating activities until dust emissions can be controlled.	
2.13		Ensure vehicles and plant comply with the Australian Design Standards for emissions, and are regularly maintained to meet emission standards and manufacturers' specifications. If exhausts are observed to be emitting excessive smoke, undertake appropriate maintenance immediately.	
2.14		Ensure vehicle service records are maintained and made available for review.	
2.15		Minimise idling of unused plant and equipment.	
2.16		Clean wheels and the undercarriage of vehicles in designated truck/wheel wash areas prior to vehicles leaving the work site.	
2.17		Promptly remove and dispose of materials (e.g. mud) spilled on to the road surface or railway formation by vehicles transporting material to and from the site.	
2.18		Cover spoil loads and secure tailgates prior to trucks leaving the work site.	
2.19		Ensure odour-generating materials are removed and disposed of as soon as practicable.	
2.20		Undertake dust monitoring if requested by the Administering Authority (e.g. in response to a valid complaint, or in accordance with	

Task No.	Issue Description	Action Required	Responsibility
		condition/s of statutory approvals) in locations and at the frequency specified by the Administering Authority. At sensitive places, the project must comply with the air quality goals established in the EPP Air, including 50 µg/m3 over 24 hours for PM_{10}, 25 µg/m3 over 24 hours for $PM_{2.5}$, and a total suspended particles (TSP) objective of 90 µg/m3. Monitoring locations must be marked on construction diagrams.	
2.21		Record, investigate and respond to air quality complaints.	
2.22		All environmental incidents relating to air quality (dust or emissions) must be reported through SHEM Event.	
Operation			
2.22	Minimisation of vehicle, plant and equipment emissions	Identify opportunities to avoid and/or minimise air emissions throughout the life of the project, e.g. by minimising machinery use, ensuring that machinery selected is energy/fuel efficient, and purchasing goods from local suppliers.	Manager Service Delivery Coal South

3.3 Element 3: Erosion and Sediment Control

Rationale

Construction of the SID will involve vegetation clearance, grading and infrastructure works, as well as stockpiling of materials. If bare soil and excavated areas are exposed to the elements, erosion of the landscape and sedimentation of water bodies may occur, with potentially undesirable effects on water chemistry and ecological function. Uncontrolled erosion and sedimentation can also result in direct toxicity to flora and fauna, costly site damage, and reductions in visual and recreational amenity.

This element of the EMP (P) does not preclude the Construction Contractor from preparing additional plans containing preferred erosion and sediment control measures previously demonstrated as successful on sites with similar characteristics. Any Contractor Erosion and Sediment Control Plan (ESCP) should, however, be consistent with the management intent specified below.

No erosion and sediment control management measures are anticipated to be necessary during the operational phase of the project.

Objective

To minimise the impacts of soil erosion and sedimentation on the receiving environment within and in the vicinity of the construction site.

Performance Indicators

Sediment and erosion control devices are installed and operational prior to the commencement of site establishment and construction activities.

No failure of erosion and sedimentation control devices is detected during construction works.

No erosion or changes in flows of water bodies within or in the vicinity of the site occur as a result of the works.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
3.1	Erosion and Sediment Control Plan	Design the development to minimise erosion (i.e. by minimising as far as practicable the area of land which is bare of vegetation at any one time).	Aurizon Design Manager

Task No.	Issue Description	Action Required	Responsibility
Construction			
3.2	Minimise erosion and sedimentation associated with the construction works	Develop an ESCP for the construction stage of the project, commensurate with the degree of environmental risks associated with the proposed works. This shall detail controls and management measures which will be implemented to control erosion and minimise sedimentation of areas affected by the works. Erosion and sediment control measures must be designed in accordance with the requirements of *Best Practice Erosion and Sediment Control Guidelines* (IECA 2008), and may include such measures as filter/sediment fences, sediment basin traps, diversion drains and energy dissipaters.	Site Construction Manager
3.3		Design and undertake a soil sampling program prior to preparing the ESCP, to determine areas of dispersive and problematic soils. Soil samples shall be sent to a NATA accredited laboratory and at a minimum the following analyses shall be undertaken for erosion and sediment potential: • Particle size analysis and soil texture (to determine proportion of clay, silt, sand and gravel); • Exchangeable sodium percentage (ESP); • Cation exchange capacity (CEC); • Electrical conductivity (EC); • Chloride content; • Dispersion percentage; and • Emerson aggregate class.	
3.4		Provide a management strategy for dispersive and problematic soils within the ESCP.	
3.5		Schedule construction activities, particularly bulk earthworks, outside of peak rainfall periods (December to April) as far as practicable.	
3.6		Cover all erodible materials that are to be stockpiled for less than one month with plastic, geotextile, surface binding agents, etc.	
3.7		Cover all erodible materials that are to be stockpiled for one month or longer with grass, erosion blanketing, emulsion spray or another approved method.	
3.8		Ensure topsoil stockpiles are: • Limited in height to 3 m; • Limited in width of the base to 10 m; • Retained for the minimum possible period; and • Covered as described above.	
3.9		During stripping of soils, do not remove material from within the drip lines of existing plants to be retained.	

Task No.	Issue Description	Action Required	Responsibility
3.10		Implement and audit the erosion and sedimentation management strategies and control measures detailed in the site ESCP(s) at all times during the construction works.	
3.11		Inspect drains, sediment basins and ponds/waters/drainage facilities daily for signs of erosion and sedimentation.	
3.12		Ensure erosion control devices such as catch drains, slope drains, diversion drains and energy dissipaters are installed in conjunction with sediment traps to divert stormwater around the construction site.	
3.13		Stockpile materials only in designated stockpile areas, and ensure that sediment controls are installed around the stockpiled material.	
3.14		Conduct daily checks of the spoil stockpile and handling areas to ensure effectiveness in preventing spoil loss from the construction site.	
3.15		Cover all disturbed areas such as drains and batters, and erodible materials that are to be stockpiled for one month or longer, with grass or another approved method.	
3.16		Maintain erosion and sediment control devices so that they are effective throughout the whole construction period, until the completion of construction works and stabilisation of disturbed surfaces. Ensure devices have at least 70% of their capacity available at all times, and are checked/maintained daily and following rainfall events. Dispose of accumulated sediment appropriately.	
3.17	Site restoration	Stabilise ground surfaces promptly at the completion of works to a profile that does not encourage channelised flow.	Site Construction Manager
3.18	Manage incidents / complaints	All incidents, complaints and non-compliances related to erosion and sedimentation shall be reported through SHEM Event and to Aurizon's Environment Team.	Site Construction Manager / Supervisor

3.4 Element 4: Flora and Fauna

Rationale

Vegetation clearance will be required at the site for earthworks and construction activities. SKM (2014a) has indicated that *no TECs, remnant vegetation or EVNT flora species* were identified on site during the field survey undertaken in February 2014 and *no vegetation clearing permits are required for the Project under the VM Act or the NC Act.*

SKM (2014a) has also identified that whilst the site has *limited fauna habitat value due to the absence of microhabitats such as logs, leaf litter and diversity in arboreal hollows, there are three (3) habitat trees containing hollows that were identified and a fauna spotter catcher will be required to be on site during the removal of these habitat trees.*

All works are to be undertaken in accordance with the terms and conditions as specified by relevant legislative exemptions:

- Aurizon has a class exemption under the *Nature Conservation (Protected Plants) Conservation Plan 2000*, such that Aurizon (and its contractors) is able to clear native plants designated as Least Concern provided that this is undertaken in accordance with the conditions of the exemption.
- Aurizon has an exemption under the *Nature Conservation (Wildlife Management) Regulation 2006*, such that Aurizon (and its contractors) is able to for tamper with an animal breeding place for Least Concern species provided that this activity is undertaken in accordance with the conditions outlined in the Species Management Program for this activity.

Objectives

To ensure:

- areas of native flora and fauna habitat that are to be retained are appropriately protected during the construction phase; and
- flora and fauna habitat disturbance is carried out in accordance with best practice environmental management measures, as well as the terms of the relevant legislative exemptions that permit such disturbance;

Performance Indicators

Vegetation adjacent to the proposed development area is retained and protected at all times during clearing of the site and ongoing works.

The clearance of native vegetation and tampering with animal breeding places is undertaken in accordance with the conditions of the relevant legislative exemptions.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
4.1	Vegetation clearing	Design the development to minimise vegetation clearing.	Aurizon Design Manager
Construction			
4.2	Vegetation clearing	Undertake all vegetation clearing in accordance with the conditions of the relevant legislative exemption for Least Concern species.	Site Construction Manager
4.3		Limit ground clearing to the minimum area required to construct the works. Where possible, retain vegetation or transplant within the site and incorporate into site revegetation activities.	
4.4		Prior to the commencement of vegetation clearance, clearly identify all areas to be cleared on construction plans and in the field.	
4.5		To prevent disturbance or damage during construction works, ensure any vegetation identified for retention is adequately protected (e.g. temporary fencing) in a manner that generally reflects *AS 4970-2009 Protection of trees on development sites*. Where practicable, provide fences and/or trunk girdles to prevent unintended physical damage to the root system, trunk or canopy of native vegetation identified for retention adjacent to any proposed works.	
4.6		Clearing should progress in a manner whereby smaller non-habitat trees are removed in the first instance, and the larger remaining habitat trees are removed several (e.g. three) days after the initial clearing. Furthermore, vegetation clearing is to be conducted in a sequential manner, whereby felling operations are undertaken in discrete stages. The number of discrete stages required within the works area is to be determined in consultation with an appropriately-registered and qualified spotter-catcher. Clearing vegetation in this manner provides a disturbances stimulus and provides fauna with time to leave the site, thereby maximizing the chances of fauna survival while reducing the need for human intervention for translocation or rescue purposes.	
4.7		Monitor the health of vegetation close to the construction area during the construction period for signs of stress/damage. An appropriately qualified person should be consulted for the implementation of corrective actions, if necessary, to ensure the survival of the vegetation.	
4.8		Mulch cleared vegetation within 60 days of clearing for re-use in site landscaping, or remove to an approved disposal location in accordance with local government requirements. Declared pest plant species (listed by the LP Act) are not to be mulched with cleared vegetation intended for re-use in landscaping.	

Task No.	Issue Description	Action Required	Responsibility
4.9	Prevent and minimise injury to native fauna	Undertake clearing in accordance with 4.2 to 4.7 above.	Site Construction Manager
4.10		Vegetation should be cleared in a sequential manner to encourage fauna to move away from the project area.	
4.11		An appropriately registered and qualified spotter-catcher should be present on site during the removal of the three (3) habitat trees identified in the *Stanwell Intermediate Depot - Pre-Clearance and Weeds Survey Report* (SKM 2014a), for the purposes of capturing and relocating fauna disturbed by the clearing process or remaining within the felled trees. The spotter-catcher must comply with all relevant conditions of their Rehabilitation Permit and submit sighting records to the Queensland Parks and Wildlife Service (QPWS) as required.	
4.12		Inspect any fauna recovered during vegetation clearance or construction works immediately upon capture for any signs of physical injury. If the fauna appear to be injured, they must be reported to the Aurizon Environmental Advisor and QPWS (Tel.: 13 74 68), and transported immediately to a suitably qualified veterinarian. Place uninjured fauna inside a calico or similarly porous bag, and place in a shaded and secure position away from the area where clearance works are being undertaken. Relocate uninjured fauna to suitable habitat in the surrounding area (e.g. retained onsite vegetation) and release at an appropriate time of day (i.e. after nightfall for nocturnal animals, during daylight hours for diurnal animals) in order to reduce the risk of predation.	
4.13	Revegetation works	Any exposed areas greater than 10 m^2 are to be stabilised and native grass seed sown as soon as practicable following completion of construction works.	Site Construction Manager
Operation			
4.14	Prevent and minimise injury to native fauna	Any native fauna must be handled in accordance with the instructions of the local office of the QPWS. Injured fauna should be reported to QPWS and transported immediately to a suitably qualified veterinarian (as described in Task 4.12 above). All incidents related to native fauna injury shall be reported through SHEM Event and to Aurizon's Environment Team.	Manager Service Delivery Coal South

3.5 Element 5: Weeds and Pests

Rationale

Aurizon has certain obligations under the LP Act and subordinate management plans prepared and implemented under that Act by the Queensland Government and the Rockhampton Regional Council to manage pest plants and animals. In particular, under Section 77 of the LP Act, Aurizon will have an obligation (as the landowner) to remove any Class 1 and 2 pests from the SID site and take reasonable steps to keep the land free from the pests.

SKM (2014a) has identified a total of five (5) declared weeds on the site that will need to be managed as part of the development, including:

- Harrisia Cactus (*Eriocereus martini*);
- Lantana (*Lantana camara*)
- Velvet Tree Pear (*Opuntia tomentose*);
- Fireweed (*Senecio madagascariensis*); and
- Chinee Apple (*Ziziphus mauritiana*).

In all cases, when moving or transporting vehicles containing soil or other organic material which may contain the reproductive material of a declared pest plant, Aurizon (and its contractors) must seek to:

- Restrict the release of the reproductive material when the vehicle or thing is moved or transported; or
- Ensure the vehicle or thing is free of the reproductive material (Section 46).

Objective

To ensure that existing infestations of pest flora or fauna species are controlled and no new infestations or pest species are established within the site.

Performance Indicators

No spread of pest flora or fauna within or outside the site due to construction activities;
Declared pest plants are removed by appropriate means upon detection; and
No complaints related to pest flora or fauna associated with construction activities from the local community.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Construction			
5.1	Weed management	Suppress and destroy weeds that have been identified in the *Stanwell Intermediate Depot - Pre-Clearance and Weeds Survey Report* (SKM 2014a) as requiring management, while minimising impacts to native vegetation and erosion. Appropriate weed control methods are to be used, and use of herbicides is to be restricted to that registered for the specific weed species and circumstances. Weed control methods must adhere to Rockhampton Regional Council standards for weed control.	Site Construction Manager
5.2		Ensure that vehicles and heavy machinery do not transport weed material into the construction and worksite areas. A Weed Hygiene Declaration certifying that all vehicles, plant and equipment are free of weed seeds and propagates is to be provided. All weed material is to be removed and disposed of appropriately. All Weed Hygiene Declarations will be available for inspection at the site offices for the duration of the construction phase and then kept on file in accordance with the requirements of DAFF.	
5.3		Weed Hygiene Declarations must be provided by all suppliers of imported soils and other materials which are to be delivered and used in the construction site. These Weed Hygiene Declarations will be available for inspection at the site offices for the duration of the construction phase and then kept on file in accordance with the requirements of DAFF.	
5.4	Pest management	Food scraps and waste must be cleaned up at the end of each shift to avoid luring native and pest species into the construction site. Bins must be adequately covered to restrict animal access.	Site Construction Manager
Operation			
5.5	Weed management	Undertake reasonable steps to keep the site free from any Class 1 and 2 pests.	Manager Service Delivery Coal South

3.6 Element 6: Waste

Rationale

Management of waste materials generated by activities at the site is required to determine appropriate methods to avoid, reuse, recycle and dispose of waste in order to minimise the unnecessary depletion of natural resources and reduce the amount of waste requiring disposal.

Objective

To ensure all waste material associated with the works is appropriately managed to minimise resource depletion and adverse impacts to the environment.

Performance Criteria

Waste generation is minimised throughout the life of the project.

No waste of any type is inappropriately disposed on site.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
6.1	Avoid/minimise waste generation	Identify opportunities to avoid and/or minimise waste generation throughout the life of the project in accordance with the WRR Act, by minimising areas of vegetation to be destroyed, balancing earthworks, purchasing products in bulk, with minimal and recyclable packaging and/or in the sizes required by the project.	Aurizon Design Manager
Construction			
6.2	Waste Management Plan	Development and implement a Waste Management Plan in accordance with the waste management hierarchy principles, in conformity with the EP Act and EP Waste Regulation. The Waste Management Plan must clearly identify the way in which all wastes which constitute Regulated Waste pursuant to Schedule 7 of the *Environmental Protection Regulation 2008* must be stored separately from general wastes. Relevant regulated wastes include (but are not limited to): hydrocarbons (e.g. oils, fuels) and containers of same (including empty containers); halogenated organic solvents; lead batteries; and tyres.	Site Construction Manager
6.3	Reuse waste products	Reuse waste products from project activities wherever practicable, e.g. wood packaging, pallets, wood used for formwork, scrap metal, cardboard boxes, plastic wrapping.	Site Construction Manager
6.4		Employ all reasonable measures to reuse excavated spoil material for project works. If excavated spoil cannot be reused on site, wherever possible it is to be transported offsite to an appropriate reuse location.	

Task No.	Issue Description	Action Required	Responsibility
6.5		Store any empty fuel, lubricant, chemical or similar containers for collection by a drum recycler for cleaning and reuse where such a service is available.	
6.6	Recycle waste products	Recycle any waste products that cannot be reused, wherever practicable.	Site Construction Manager
6.7		Provide clearly labelled waste receptacles at the work site, site offices and compound in convenient locations for segregation of recyclable materials.	
6.8		Use recycled (crushed) concrete for hardstand areas where practicable to provide stabilised vehicle access and prevent dirt being transported offsite.	
6.9	Appropriately dispose of waste	Provide clearly labelled waste receptacles for non-hazardous, non-recyclable waste in appropriate and convenient locations on site, and ensure a contractor is commissioned to regularly remove/empty the bins and dispose of waste at an appropriate location, i.e. approved landfill.	Site Construction Manager
6.10		Ensure chemical wastes are placed in sealed drums in designated, bunded areas for collection by a waste contractor for offsite treatment.	
6.11		Ensure all hazardous or contaminated waste materials are disposed of at approved disposal facilities.	
6.12		An appropriately licensed contractor is to remove general, regulated and hazardous wastes and provide the Site Construction Manager with evidence that a Trackable Waste Certificate has been issued to the DEHP.	
6.13		Maintain records of waste disposal and recycling in a waste register, including records and tracking of regulated / trackable waste as required.	
6.14		Upon completion of construction works, ensure the site is cleared of all rubbish and left in a clean and tidy condition.	
Operation			
6.15	Avoid/minimise waste generation	Regularly (i.e. at least once yearly) assess waste types and quantities generated by the site, and investigate opportunities for further waste avoidance and/or minimisation.	Manager Service Delivery Coal South
6.16	Recycle waste products	Recycle any waste products that cannot be reused, wherever practicable.	Manager Service Delivery Coal South
6.17		Provide clearly labelled waste receptacles at the depot in convenient locations for segregation of recyclable materials.	

Task No.	Issue Description	Action Required	Responsibility
6.18	Appropriately dispose of waste	Provide clearly labelled waste receptacles for non-hazardous, non-recyclable waste in appropriate and convenient locations on site, and ensure a contractor is commissioned to regularly remove/empty the bins and dispose of waste at an appropriate location, i.e. approved landfill.	Manager Service Delivery Coal South
6.19		Ensure all waste transporters are appropriately licensed to carry the materials to licensed waste facilities.	
6.20		Maintain records of waste disposal and recycling in a waste register, including records and tracking of regulated/trackable waste as required.	

3.7 Element 7: Bushfire

Rationale

Bushfire - an uncontrolled fire burning in forest, scrub or grassland vegetation - poses a significant risk to human safety and Aurizon plant and assets. While the site is designated as a low bushfire risk area by the *Fitzroy Shire Planning Scheme 2005* (refer Map B8: Bushfire Prone Land Overlay (Shire – West), best practice bushfire management measures should be implemented on site to minimise bushfire risk as far as practicable.

No bushfire management measures are anticipated to be necessary during the design phase of the project.

Management Objective

To minimise bushfire risk within the site as far as practicable.

Performance Indicators

Human safety and assets are appropriately protected from bushfire.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Construction			
7.1	Prevent bushfire	Ensure appropriate bushfire mitigation measures, such as maintained firebreaks are incorporated into the design of the SID. Ensure fire procedures and fire fighting equipment are located adjacent to storage areas for fuel and/or any other flammable materials.	Site Construction Manager
7.2	Respond to bushfire emergency situation	Ensure emergency contact numbers, including the location of the nearest Queensland Fire and Rescue Service station, are clearly displayed in the site office at all times.	
7.3	Management of ignition sources	Smoking is only to be undertaken within an area specifically designated for this activity. A cigarette waste receptacle is to be provided so as to ensure appropriate disposal of cigarette butts.	
Operation			
7.4	Prevent bushfire	Maintain bushfire mitigation measures such as firebreaks. Ensure fire-fighting equipment is located in an appropriate position to enable first response.	Manager Service Delivery Coal South

Task No.	Issue Description	Action Required	Responsibility
7.5		If necessary, reduce fuel load around site to minimise risk of fire damage.	
7.6	Respond to bushfire emergency situation	Ensure emergency contact numbers, including the location of the nearest Queensland Fire and Rescue Service station, are clearly displayed in the depot at all times.	Manager Service Delivery Coal South
7.7	Prevent unauthorised burning	No fires are to be lit at any time without a permit issued by the Rural Fire Brigade. Conditions of fire permit are to be complied with.	Manager Service Delivery Coal South

3.8 Element 8: Cultural Heritage

Rationale

Construction of the SID will involve ground-breaking works that may potentially disturb or damage sites and/or objects of cultural heritage value. While no sites or objects of cultural heritage value are known to occur on site, appropriate management measures must be implemented in the case of an unexpected cultural heritage find.

No cultural heritage management measures are anticipated to be necessary during the operational phase of the project.

Objective

To avoid disturbance to or damage of sites or objects of cultural heritage significance during the works.

Performance Indicators

No destruction or damage of sites or objects of cultural heritage value.
Compliance with the ACH Act and associated duty of care guidelines and human remains guidelines, and any relevant Cultural Heritage Management Plan or Cultural Heritage Agreement.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
8.1	Indigenous cultural heritage clearance for construction works	Undertake an Indigenous cultural heritage survey and obtain clearance from the relevant Aboriginal party for construction works to proceed.	Aurizon Cultural Heritage and Native Title Coordinator
Construction			
8.2	Train staff in the identification of potential cultural heritage finds	All construction personnel are to undertake *Aurizon Aboriginal Cultural Heritage Induction Toolbox Talk* (Aurizon 2013a).	Site Construction Manager / Aurizon Cultural Heritage and Native Title Coordinator

Task No.	Issue Description	Action Required	Responsibility
8.3	Construction Indigenous cultural heritage management	Implement agreed on-site Indigenous cultural heritage management procedures with Aboriginal parties, if required.	Aurizon Cultural Heritage and Native Title Coordinator
8.4	Discovery of new Indigenous cultural heritage sites	If, in the course of project activities, Aurizon locates a new Indigenous cultural heritage site, Aurizon may continue project activities in the relevant new find area if such activities are in accordance with *Aurizon's Aboriginal Cultural Heritage New Find Procedure* (Aurizon 2013b).	Aurizon Cultural Heritage and Native Title Coordinator
8.5	New find measures	Implement *Aurizon's Aboriginal Cultural Heritage New Find Procedure* (Aurizon 2013b).	Aurizon Cultural Heritage and Native Title Coordinator
8.6	Human remains	Implement *Aurizon's Human Remains Procedure* (Aurizon 2013c).	Aurizon Cultural Heritage and Native Title Coordinator

3.9 Element 9: Surface Water

Rationale

Construction activities will involve grading and infrastructure works, as well as the stockpiling of materials and potential use of fuel and other hazardous materials. These activities have the potential to adversely impact surface waters within and downstream of the site.

No surface water management measures are anticipated to be necessary during the design phase of the project.

Objectives

To minimise impacts to surface waters in the vicinity of the site from pollution caused as a result of construction works.

Performance Indicators

Surface waters downstream of the site are not adversely impacted as a result of the proposed works.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Construction			
9.1	Minimise impacts to surface waters	Ensure that water quality protection measures are installed and maintained throughout the duration of construction and maintenance works and during operation. Water which is contaminated by fuels, oil, chemicals etc. or loaded with insoluble matter must not be discharged into stormwater or natural drainage systems.	Site Construction Manager
9.2		Design stockpile areas and material storage areas with adequate runoff containment measures (i.e. bunding and diversion drains).	
9.3		Contact the Aurizon Environmental Advisor prior to the discharge of water offsite or into a waterway. All off-site discharges shall comply with *Best Practice Erosion and Sediment Control* (IECA 2008), and shall not exceed 50 mg/L of suspended solids.	
9.4	Monitor water quality throughout construction	Undertake water quality monitoring and sampling during construction to analyse the quality of any surrounding waterways (if water is present), if required by conditions of approval and/or requested by a regulatory authority. Monitoring locations must be marked on construction diagrams. Monitoring results, analysis and any corrective actions must be reported to the Contract Administrator on a monthly basis. Breaches of licence conditions, or environmental incidents, must be reported immediately to the Contract Administrator.	Site Environmental Officer
9.5	Minimise unnecessary water use	Capture rainwater/surface water runoff for re-use on-site (e.g. in dust suppression) where possible.	Site Construction Manager
9.6	Stabilise works on completion of construction	Schedule works to ensure that disturbed areas are revegetated/stabilised progressively and as soon as practicable after completion of works.	Site Construction Manager

Task No.	Issue Description	Action Required	Responsibility
Operation			
9.7	Minimise impacts to surface waters	Provide adequate runoff diversion/containment methods.	Manager Service Delivery Coal South

3.10 Element 10: Groundwater

Rationale

Groundwater may be identified as a source of water for use during construction activities and may also potentially be impacted by earthworks or oil or chemical use in relation to the works.

No groundwater management measures are anticipated to be necessary during the operational phase of the project.

Objective

To minimise adverse impacts on local groundwater quality.

Performance Indicators

No adverse impacts to local groundwater quality.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
10.1	Geotechnical modelling	Where it is intended to explore the use of groundwater for construction activities, conduct geotechnical assessment to identify depth of groundwater table and management, and identify potential impacts on groundwater.	Aurizon Design Manager
Construction			
10.2	Water permit	Where it is intended to use groundwater for construction activities, obtain and comply with a water permit under Section 237 of the *Water Act 2000.*	Site Construction Manager
10.3	Reuse of groundwater	Where possible, reuse any groundwater collected through dewatering of excavations for dust suppression, wheel and vehicle wash and other on-site uses.	Site Construction Manager
10.4	Groundwater monitoring	Where impacts on groundwater are predicted at the design phase, undertake groundwater quality monitoring. Monitoring locations must be marked on construction diagrams.	Site Environmental Officer

3.11 Element 11: Sustainability

Rationale

Aurizon's Environmental Policy (POL 08) aspires to a goal of ***ZERO***HARM to the natural environment, and commits the Enterprise to the management of its activities and services in an environmentally responsible manner to meet legal, social and moral obligations. While many sustainability measures have been incorporated into the relevant elements of the EMP (P), a number of additional measures are listed below.

Objective

To identify and reduce environmental impacts through resource management, preventing pollution, minimising emissions and waste, and protecting significant habitats.

Performance Indicators

Environmental performance is monitored and recorded, where possible.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
11.1	Incorporation of sustainability principles into project design	Identify opportunities to incorporate sustainability principles into the project design. Factors to be considered should include: • Minimisation of energy use and waste generation during project construction and operation; • Minimisation of vegetation clearance; • Minimisation of transportation distance and use of toxic or harmful substances when selecting construction materials; and • Consideration of community and amenity impacts in project siting and design.	Aurizon Design Manager
11.2		Design on-site lighting (with the exception of security lighting) to avoid unnecessary use of electricity.	

Task No.	Issue Description	Action Required	Responsibility
Construction			
11.3	Minimise energy use during construction	Ensure any site air-conditioning/lights/appliances are turned off when not required.	Site Construction Manager
11.4	Monitor energy and water use during construction	Monitor and record construction energy and water use, to assist in ongoing minimisation.	Site Construction Manager
Operation			
11.5	Minimise operational energy use	Minimise lighting on-site (with the exception of security lighting) to avoid unnecessary use of electricity.	Manager Service Delivery Coal South
11.6	Monitor operational energy and water use	Monitor and record operational energy and water use, to assist in ongoing minimisation. Report results to Aurizon's Environment Strategy Manager on a monthly basis.	

3.12 Element 12: Traffic

Rationale

Construction and operation of the SID will result in a minor increase in traffic volumes on the State-controlled and local road networks in the general vicinity of the site above the current 2014 levels. However, SKM (2014b) indicates that the impact of the traffic generated both during the construction phase and when SID is operational, will be minimal and that existing levels of service on the Capricorn Highway and Power Station Road and the intersection of these roads will not be effected.

A Construction Traffic Management Plan will need to be developed prior to the commencement of construction activities to outline how potential construction traffic access and operational impacts will be managed in accordance with the relevant requirements of DTMR and RRC.

Objective

To minimise the impact of traffic generated during the construction phase (including any extraordinary vehicles) on the surrounding road network and the local community.

Performance Indicators

No complaints regarding traffic issues / incidents received during the construction phase.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Construction			
12.1	Manage construction-related traffic	A Construction Traffic Management Plan is prepared in accordance with DTMR and RRC requirements, including any specific requirements provided as condition/s of development approval/s.	Site Construction Manager
12.2	Manage construction-related traffic	The Construction Traffic Management Plan is implemented and access from public roads to the construction site managed in accordance with all DTMR and/or RRC regulatory requirements, including warning signage and transport control staff at critical intersections.	Site Construction Manager

3.13 Element 13: Hazardous Materials

Rationale

Works may require the storage or handling of dangerous or hazardous materials such as fuels, oils and hydraulic fluids (e.g. during on-site refuelling of construction machinery). While these are not expected to be stored on-site in large quantities during either the construction or operational phase of the project, management of hazardous materials is required on site in order to avoid potential adverse impacts to human health and/or contamination of the receiving environment.

Objective

To effectively manage the safe storage and handling of hazardous materials within the site.

Performance Indicators

No adverse impacts to human health or the receiving environment associated with the storage or handling of hazardous materials on site.

Management Measures

Task No.	Issue Description	Action Required	Responsibility
Design			
13.1	Plan for the provision of storage for hazardous materials	Ensure a safe and secure hazardous materials storage area is allocated throughout the construction and operational phases of the project.	Aurizon Design Manager
Construction			
13.2	Record all hazardous materials stored/used on site	Maintain a register of all hazardous materials stored within the site, and display an appropriate Material Safety Data Sheet (MSDS) with each substance, and as part of the register.	Site Construction Manager
13.3	Storage of hazardous materials	Store hazardous materials in an adequately controlled containment area, with incompatible substances stored separately. Containment areas must ensure: • Hazardous materials are stored at the site camp or as far as practicable from any woody vegetation or waters/drainage lines; • Entry of stormwater is prevented; • The containment of spillages is achieved in accordance with the nature of the material, the MSDS, and manufacturers' instructions; and • Provision is made for disposal of any captured liquid in accordance with the MSDS and manufacturers' instruction. Containment areas should be regularly audited.	Site Construction Manager

Task No.	Issue Description	Action Required	Responsibility
13.4	Handling of hazardous materials	Ensure site induction training includes appropriate information regarding the storage and handling of hazardous substances, including instructions on emergency spill response procedures and the location of spill response kits.	Site Construction Manager
13.5		Ensure appropriate and sufficient spill clean-up materials are available at all times.	
13.6		Ensure storage and handling of hazardous materials (e.g. refuelling) occurs at the site compound or as far as practicable from any woody vegetation or waters/drainage lines, to protect the receiving environment in the event of a spill.	
13.7		Maintain a record of any accidental release or spillage of hazardous materials including details of corrective actions undertaken. All incidents, complaints and non-compliances related to any accidental release or spillage of hazardous materials shall be reported through SHEM Event and to Aurizon's Environment Team.	
13.8		Notify the Aurizon Environmental Advisor and DEHP in the event of an accidental release of hazardous materials from the site with the potential to cause environmental harm.	
13.9	Management of spills of hazardous materials	Clean up exposed contaminated surfaces by dry methods as soon as practicable, and before storm events.	Site Construction Manager
13.10		Ensure water which is contaminated by hazardous materials is not discharged into stormwater or natural drainage systems.	
13.11		Provide documentation demonstrating that contaminated material has been disposed of properly.	
Operation			
13.12	Record all hazardous materials stored/used on site	Maintain a register of all hazardous materials stored within the site, and display an appropriate MSDS with each substance, and as part of the register.	Manager Service Delivery Coal South

4 REFERENCES

Aurizon Operations Limited (2013a)	*Aurizon Aboriginal Cultural Heritage Induction Toolbox Talk* (Version 3, August 2013)
Aurizon Operations Limited (2013b)	*Aurizon Aboriginal Cultural Heritage New Find Procedure* (Version 2, August 2013)
Aurizon Operations Limited (2013c)	*Aurizon Human Remains Procedure* (Version 2, February 2013)
Aurizon Operations Limited (2013d)	*CQAR Project – Kabra Intermediate Depot – Preliminary Environment and Planning Assessment Report*
International Erosion Control Association (Australasia) 2008	*Best Practice Erosion and Sediment Control Guidelines.*
Sinclair Knight Merz (2014a)	*Stanwell Intermediate Depot – Pre-clearance and Weeds Survey Report* (Brisbane, 28th February 2014)
Sinclair Knight Merz (2014b)	*Stanwell Intermediate Depot – Road Impact Assessment Report* (Brisbane, 28th February 2014)

TABLE 1 - FINISHES SCHEDULE

ITEM	COLOUR, SIZE & FINISH	INSTALLATION	SUPPLIER
CONCRETE GARDEN EDGING	**TYPE:** PLAIN GREY CONCRETE **FINISH:** TROWEL FINISH	INSTALL TO EXTENTS BETWEEN GARDEN BEDS AND TURF. REFER TO DRG AUR-Q-0598-9001 FOR LOCATIONS AND TYPICAL DETAILS ON DRG AUR-Q-0598-9002	SUPPLIER TO BE NOMINATED BY CONTRACTOR FOR APPROVAL PRIOR TO ORDERING.
IMPORTED HARDWOOD MULCH 100mm DEPTH	IMPORTED HARDWOOD CHIPS OR OTHER CHUNKY WOOD MATERIAL WITH NO MORE THAN 5% FINES BY VOLUME (PREFERABLY ZERO FINES). THE MATERIAL MUST NOT CONTAIN ANY BARK. AVERAGE SIZE APPROX. 30mm x 20mm, NOT EXCEEDING 50mm LENGTH. IT MUST BE FREE OF SOIL, WEEDS, STONES, VERMIN, INSECTS OR OTHER FOREIGN MATERIAL.	INSTALL TO EXTENTS OF GARDEN BED AREAS. REFER TO DRG AUR-Q-0598-9001 FOR LOCATIONS AND TYPICAL DETAILS ON DRG AUR-Q-0598-9002	SUPPLIER TO BE NOMINATED BY CONTRACTOR FOR APPROVAL PRIOR TO ORDERING.
SCREEN TO BIN ENCLOSURE	**PRODUCT:** CLICK 'N' FIT COLORBOND STEEL SLAT PANEL FENCING **PANEL SIZE:** 2m (L) x 2.1m (H) **SLAT SIZE:** 55mm WITH 15mm GAP BETWEEN SLATS **COLOUR:** WOODLAND GREY	INSTALL TO MANUFACTURERS SPECIFICATION - TO EXTENTS OF SCREENING REQUIRED. REFER TO DRG AUR-Q-0598-9001 FOR LOCATION.	SUPERIOR SCREENS T 1300 766 799 www.superiorscreens.com.au OR APPROVED EQUIVALENT
ENVIRONMENTAL MATTING	**PRODUCT:** MACCAFERRI MACJUTE HEAVY **MATERIAL:** BIODEGRADABLE MATTING **SIZE:** 1.83m (W) x 25m (L) ROLLS	INSTALL TO MANUFACTURERS SPECIFICATION - TO EXTENTS OF BIO RETENTION BASIN. REFER TO DRG AUR-Q-0598-9001 FOR LOCATION AND TYPICAL DETAILS ON DRG AUR-Q-0598-9002	MACCAFERRI T 07 3890 3820 www.maccaferri.com.au OR APPROVED EQUIVALENT
RIBBED LINEAR ROOT BARRIER	**CODE:** ReROOT 1000 **MATERIAL:** HDPE **DEPTH:** 1500mm **THICKNESS:** 2.0mm	INSTALL TO EXTENTS OF TREE PITS IN CLOSE PROXIMITY TO INFRASTRUCTURE/SERVICES. REFER TO DRG AUR-Q-0598-9001 FOR LOCATIONS AND TYPICAL DETAILS ON DRG AUR-Q-0598-9002	CITY GREEN URBAN LANDSCAPE SOLUTIONS T 02 6578 8250 www.citygreen.com OR APPROVED EQUIVALENT

TABLE 2 - MASS PLANTING SCHEDULE

QTY	CODE	PLANT SPECIES - BOTANICAL NAME	PLANT SPECIES - COMMON NAME	CENTRES (mm)	POT SIZE
TREES					
3	BAC cit	BACKHOUSIA citriodora	LEMON MYRTLE	AS SHOWN	25L
4	TAB arg	TABEBUIA argentea	SILVER TRUMPET TREE	AS SHOWN	25L
4	XAN chr	XANTHOSTEMON chrysanthus	GOLDEN PENDA	AS SHOWN	25L
SHRUBS					
20	AUS CT	AUSTROMYRTUS dulcis x tenuifolia 'Copper Tops'	COPPER TOPS	750	140mm
72	AUS dul	AUSTROMYRTUS dulcis	MIDGEN BERRY	750	140mm
165	MEL CT	MELALEUCA linariifolia 'Claret Tops'	CLARET TOPS	750	140mm
15	MEL SNO	MELALEUCA linariifolia 'Snowstorm'	SNOWSTORM	1250	140mm
53	WES MUN	WESTRINGIA fruticosa 'Mundi'	COASTAL ROSEMARY	1250	140mm
GROUNDCOVERS					
200	DIE gra	DIETES grandiflora	LARGE WILD IRIS	500	140mm
165	LIR AME	LIRIOPE muscari 'Amethyst'	AMETHYST	350	140mm
290	LOM TAN	LOMANDRA longifolia 'Tanika'	TANIKA	500	140mm
125	OPH SW	OPHIOPOGON intermedians 'Stripey White'	STRIPEY WHITE	400	140mm
TURF					
10 530 m^2	-	CYNODON dactylon 'Wintergreen Couch' (GRADE 'A')	WINTER GREEN COUCH	-	-

TABLE 3 - BIO-RETENTION PLANT SCHEDULE

QTY	CODE	PLANT SPECIES - BOTANICAL NAME	PLANT SPECIES - COMMON NAME	DENSITY (PLANTS/m^2)	POT SIZE
SEDGES/RUSHES					
130	CAR app	CAREX appressa	TALL SEDGE	6	VIRO-TUBE
130	ELE acu	ELEOCHARIS acuta	SPIKE RUSH	6	VIRO-TUBE
130	FIC nod	FICINIA nodosa	KNOBBY CLUB RUSH	6	VIRO-TUBE
130	JUN usi	JUNCUS usitatus	COMMON RUSH	6	VIRO-TUBE
130	LEP lat	LEPIDOSPERMA laterale	VARIABLE SWORD SEDGE	6	VIRO-TUBE
130	LOM hys	LOMANDRA hystrix	MAT RUSH	6	VIRO-TUBE
130	LOM lon	LOMANDRA longifolia	MAT RUSH	6	VIRO-TUBE

SCHEDULE NOTES

1. WHERE DISCREPANCIES OCCUR BETWEEN PLANTING QUANTITIES SHOWN ON DRAWING AND PLANT SCHEDULE A QUANTITY DERIVED FROM PLANT CENTRES SPECIFIED IN THE PLANT SCHEDULE SHOULD BE USED.
2. WHERE SITE CONDITIONS DIFFER FROM AREAS SHOWN ON THE DRAWINGS AND PLANT QUANTITIES REQUIRE MODIFICATION, A QUANTITY SHOULD BE DERIVED BY USING PLANT CENTRES AS SPECIFIED IN THE PLANT SCHEDULE
3. QUANTITY OF TURF IS AN APPROXIMATE ESTIMATE AND IS DEPENDENT ON EXTENT OF DISTURBANCE ON SITE. QUANTITY TO BE CONFIRMED ON SITE AND APPROVED PRIOR TO INSTALLATION.
4. REFER TO SOFT LANDSCAPE SPECIFICATION NOTES BELOW FOR FURTHER PLANT SETOUT INFORMATION.

LANDSCAPE NOTES

GENERAL

1. LANDSCAPE DRAWINGS SHALL BE READ IN CONJUNCTION WITH CIVIL DESIGN DOCUMENTATION AND SURVEY INFORMATION
2. REFER TO CIVIL ENGINEERING DRAWINGS FOR SITE CLEARANCE, DEMOLITION PLAN AND ALL SERVICES INFORMATION
3. WORKS TO BE CARRIED OUT IN ACCORDANCE WITH ALL RELEVANT AUSTRALIAN AND INDUSTRY STANDARDS UNLESS DIRECTED OTHERWISE
4. FOR ANY DISCREPANCIES CONSULT WITH THE SUPERINTENDENT BEFORE PROCEEDING WITH ANY WORKS OR PROCEDURES
5. CONTRACTOR IS TO VERIFY ALL SET OUT POINTS AND DIMENSIONS PRIOR TO PROCEEDING WITH THE WORKS
6. FINISHED LEVELS OF LANDSCAPE WORKS MUST NOT EXCEED CIVIL DESIGN FINISHED LEVELS. REFER TO CIVIL DESIGN DRAWINGS FOR FINISHED LEVELS.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED. DO NOT SCALE FROM DRAWINGS
8. VERIFY ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION
9. REFER TO SEPARATE DRAWINGS FOR ALL INFORMATION CONTAINED WITHIN THESE DOCUMENTS RELATING TO AND NOMINATED AS SPECIALIST CONSULTANT WORK. INFORMATION RELATING TO SPECIALIST WORKS CONTAINED WITHIN THE LANDSCAPE DOCUMENTS ARE INDICATIVE ONLY AND NOT FOR CONSTRUCTION OR CERTIFICATION PURPOSES

PLANT SETOUT

1. SET-OUT OF PLANTING WORKS TO BE IN ACCORDANCE WITH THE DRAWINGS.
2. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SUPERINTENDENT IMMEDIATELY FOR RESOLUTION.
3. THE SETOUT OF THE PLANTING PLAN IS TO BE APPROVED BY THE SUPERINTENDENT PRIOR TO PLANTING.
4. CONTRACTOR IS TO MAINTAIN RELEVANT CLEARANCES FROM VEGETATION TO ALL SERVICES: UNDERGROUND SERVICES (SW, SEWER, WATER & ELECTRICAL) - 2.0m OFFSET FROM OUTER EDGE OF PIPES. ABOVE GROUND SERVICES (ELECTRICAL, LIGHTS) - 2.5m OFFSET FOR VEGETATION WITH A MATURE HEIGHT GREATER THAN 4.0m
4. ALL SHRUB PLANTING TO BE LOCATED A MINIMUM 500mm OR HALF MATURE WIDTH OF PLANT, WHICHEVER IS GREATER FROM ALL CONSTRUCTED AND GARDEN EDGES INCLUDING; KERBS, WALLS AND PATHS.
5. WHERE UNFORESEEN SITE CONDITIONS, SERVICES, ROAD FURNITURE, LIGHTING OR SIGNS MAY NOT ACCOMMODATE PLANTING BATTERS OR SPACINGS AND AS A RESULT ALTERATIONS TO PLANTING DESIGN AND SETOUT IS REQUIRED, DESIGN ALTERATIONS MUST BE APPROVED IN WRITING BY THE SUPERINTENDENT.

VERIFICATION OF SERVICES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION OF SERVICES WITHIN THE EXTENT OF WORKS. SERVICE LINES ARE TO BE MARKED AND BROUGHT TO THE ATTENTION OF ALL WORKERS. PERMISSION SHALL BE OBTAINED FOR ANY MODIFICATION OR TEMPORARY INTERRUPTION OF SERVICES FROM RESPECTIVE AUTHORITIES OR AS OTHERWISE ORGANISED BY CONSTRUCTION SERVICES.

PROTECTION OF EXISTING TREES AND VEGETATION

1. ALL TREE PROTECTION WORKS TO BE IN ACCORDANCE WITH AS4970 2009 - PROTECTION OF TREES ON DEVELOPMENT SITES. ANY VARIATION FROM THE STANDARDS IS TO BE APPROVED BY AURIZON APPOINTED ARBORIST
2. ALL VEGETATION WITHIN AND BORDERING THE EXTENT OF WORKS AREA, OTHER THAN THOSE APPROVED BY THE SUPERINTENDENT FOR REMOVAL, SHALL BE PROTECTED FROM DAMAGE INCURRED DURING THE WORKS PROGRAM.
3. ANY DAMAGE TO EXISTING TREES AND VEGETATION MUST BE RECTIFIED AT CONTRACTORS COST.

RIPPING AND TOPSOIL REQUIREMENTS

1. SITE SOIL AND IMPORTED TOPSOIL SHALL COMPLY WITH AS4419(2003), INCLUDING BUT NOT LIMITED TO SAMPLING, TESTING AND AMELIORATION REQUIREMENTS.
2. WHERE POSSIBLE PRIORITISE THE USE OF SITE SOIL, CONSIDERING THE REQUIREMENTS OF AS4419. WHERE RECOVERING SITE SOIL BECOMES IMPRACTICAL OR COST PROHIBITIVE, IMPORT TOPSOIL IN ACCORDANCE WITH AS 4419.
3. NUTRIENT LEVELS OF SITE TOPSOIL/IMPORTED TOPSOIL SHALL CONFORM WITH REQUIREMENTS LISTED IN TABLE 6 - TOPSOIL NUTRIENTS.
4. IF USING ADDITIVES TO RAISE SITE TOPSOIL TO THE REQUIRED STANDARD, ENSURE COMPLIANCE WITH RELEVANT TEST CRITERIA OF AS4419.
5. CULTIVATION AND TOPSOIL DEPTHS SHOULD BE APPLIED TO PLANTING AREAS IN ACCORDANCE WITH TABLES 4 AND 5.
6. ANY HYDRAULIC FLOWS DIRECTED ONTO LANDSCAPES BATTERS SHOULD BE MANAGED BY CONTRACTOR TO PREVENT ANY POSSIBLE RILLING OR GULLYING FROM OCCURRING.

SOURCING PLANTS

1. THE QUALITY OF CONTAINER STOCK, 25L AND GREATER, SHALL CONFORM TO THE REQUIREMENTS OF THE NATSPEC GUIDE TO SPECIFYING TREES
2. LOCAL PROVENANCE STOCK SHOULD BE USED WHERE POSSIBLE.
3. WHERE PARTICULAR PLANT SPECIES CAN NOT BE SOURCED, PLANT SPECIES SUBSTITUTIONS MUST NOT BE MADE WITHOUT WRITTEN APPROVAL FROM THE SUPERINTENDENT
4. EACH SPECIES TO ARRIVE ON SITE MUST HAVE IDENTIFICATION TAGS. TAGS ARE TO BE REMOVED AFTER PLANTING. THE CONTRACTOR SHALL NOTIFY THE SUPERINTENDENT OF ANY ISSUES SOURCING PLANTS.
5. REFER TO THE ADJACENT PLANT SCHEDULE FOR PLANT QUANTITIES AND SIZE/CONTAINER VOLUMES.
6. SOURCING, PURCHASING, COLLECTION AND DELIVERY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE SURE THAT PLANT STOCK IS SUITABLE TO MEET SPECIFICATIONS.
7. AT THE TIME OF INSPECTION THE SUPERINTENDENT SHALL ACCEPT OR REJECT THE PLANT MATERIAL. ANY DAMAGED OR POOR QUALITY PLANT SPECIMENS ARE TO BE REJECTED AND REPLACEMENTS ORGANISED. ALL PLANTS SHALL BE FREE FROM LIVING INSECT PESTS, ANY PLANT MATERIAL NOT MEETING THE MINIMUM SIZE REQUIREMENTS AS SHOWN ON THE PLANT SCHEDULE SHALL BE REJECTED BY THE SUPERINTENDENT, AND THE CONTRACTOR SHALL REPLACE ANY REJECTED PLANT MATERIAL.
8. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL PLANT MATERIALS IS TO BE TRANSPORTED CORRECTLY. PLANTS IN TRANSIT SHALL BE KEPT MOIST, PROTECTED FROM THE SUN AND ANY DAMAGING WINDS AND SHALL BE SECURELY HELD IN POSITION SUCH THAT MOVEMENT IS MINIMISED. UPON ARRIVAL AT THE SITE PLANTS SHALL BE STORED IN A SUITABLE LOCKABLE YARD AND WATERED REGULARLY TO PREVENT DRYING OUT.

PLANTING PROCEDURE

1. WATER PLANTS IN CONTAINERS IMMEDIATELY PRIOR TO PLANTING.
2. SQUARE HOLES SHOULD BE DUG AND THE BOTTOM AND SIDES LIGHTLY DISTURBED SO THAT ROOTS CAN PENETRATE MORE EASILY.
3. THE HOLE SHOULD BE LIGHTLY WATERED AND ALLOWED TO SOAK AWAY BEFORE PLANTING THE FRESHLY WATERED PLANT.
4. PLANTING HOLES SHALL BE PREPARED NO MORE THAN 24 HOURS PRIOR TO PLANTING.
5. AGRIFORM SLOW RELEASE FERTILISER TABLETS OR APPROVED EQUIVALENT ARE TO BE INSTALLED WHERE REQUIRED. APPLY TABLETS AT A RATE AND DEPTH AS PER THE MANUFACTURER'S SPECIFICATIONS. TYPICALLY 150mm BELOW SOIL SURFACE AND 100mm AWAY FROM THE ROOT BALL.
6. COMPLIANT TOPSOIL (PREFERABLY FROM SITE) SHALL BE PLACED AROUND THE PLANT AS SPECIFIED IN DETAILS ON DRG AUR-Q-0598-9002 AND SPECIFICATION NOTES.
7. AVOID LEAVING AIR POCKETS IN BACKFILL BY CAREFULLY FIRMING SOIL PROGRESSIVELY.
8. AN INDENTATION AROUND THE NEW PLANT SHOULD BE FORMED TO AID WATER RETENTION.
9. WATER ALL PLANTS THOROUGHLY AFTER PLANTING AND FOR THE DURATION OF THE ESTABLISHMENT/MAINTENANCE PERIOD.
10. ROOT BARRIERS SHOULD BE INSTALLED ON RELEVANT EDGES OF TREE PIT FOR TREES THAT ARE LOCATED WITHIN 3m OF UNDERGROUND INFRASTRUCTURE, RETAINING WALLS OR BUILDINGS.

TURFING PROCEDURE

1. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES ARE TO BE TOPSOILED AND TURFED AS DIRECTED BY THE SUPERINTENDENT UNLESS SPECIFIED OTHERWISE.
2. REFER TO DRG AUR-Q-0598-9002 FOR TURF INSTALLATION DETAIL.
3. MAINTAIN TURFED AREAS UNTIL THE ATTAINMENT OF A DENSE CONTINUOUS SWARD OF HEALTHY GRASS OVER THE WHOLE TURFED AREA, EVENLY GREEN AND OF A CONSISTENT HEIGHT.
4. WHERE TURF FAILS: LIFT FAILED TURF AND RELAY WITH NEW TURF.
5. LEVELS: WHERE LEVELS HAVE DEVIATED FROM THE DESIGN LEVELS AFTER PLACING AND WATERING, LIFT TURF AND REGRADE TOPSOIL TO ACHIEVE DESIGN LEVELS.
6. TOP DRESSING - WHEN THE TURF IS ESTABLISHED MOW, REMOVE CUTTINGS AND LIGHTLY TOP DRESS WITH 5mm LAYER OF COARSE PIT SAND. RUB THE DRESSING WELL INTO THE JOINTS AND CORRECT ANY UNEVENNESS IN THE TURF SURFACE.

CONCRETE EDGING

1. ALL MACHINE PLACED (EXTRUDED) CONCRETE TO BE GRADE S32. INSTALL CONTRACTION JOINTS AT 4m INTERVALS TO ALL EXPOSED CONCRETE EDGING

MULCH

1. ORGANIC HARDWOOD MULCH IS TO BE INSTALLED TO EXTENTS OF MASS PLANTED AREAS
2. ALL SURFACE TREATMENTS ARE TO SMOOTHLY TRANSITION INTO EXISTING SURFACES.
3. PLANTING MULCH TO BE ORGANIC FRIABLE MULCH, AS PER FINISHES SCHEDULE.
4. PLANTING IS TO BE MULCHED AT APPROXIMATELY 100mm THICK AND REPLENISHED IF MULCH LAYER DEGRADES BELOW 75mm DEPTH.
5. MULCH TO BE KEPT CLEAR OF TREE STEMS BY 75mm AND ALL OTHER PLANTS STEMS BY 50mm.
6. MULCH LAYER IS NOT TO BE INSTALLED TO BIO-RETENTION BASIN IN LIEU OF USING ENVIRONMENTAL MATTING - SEE NOTES BELOW.

ENVIRONMENTAL MATTING

1. ENVIRONMENTAL MATTING IS 100% BIODEGRADABLE MATERIAL, INSTALLED TO ENTIRETY OF BIORETENTION BASIN TO ASSIST IN EROSION CONTROL OF THE BASIN EXTENTS. REFER TO DRAWING AUR-Q-0598-4202 FOR BASIN DETAILS.

ESTABLISHMENT & MAINTENANCE PERIODS

1. MAINTAIN WHOLE OF LANDSCAPE WORKS FOR AN ESTABLISHMENT AND MAINTENANCE PERIOD OF 52 WEEKS FROM PRACTICAL COMPLETION OF LANDSCAPE WORKS.
2. AN INITIAL 12 WEEK ESTABLISHMENT PERIOD IS INCLUDED IN THE MAINTENANCE PERIOD.
3. WORKS FOR ESTABLISHMENT AND MAINTENANCE PERIODS TO INCLUDE (EACH VISIT): WATERING, MOWING, FERTILISING, PEST/DISEASE/WEED CONTROL AND PLANTING REPLACEMENTS WHERE NECESSARY.
4. MAINTENANCE SCHEDULE SHALL CONSIST OF 45 VISITS OVER 52 WEEKS AND BE AS FOLLOWS:
   - A. WEEKS 1-12 2 VISITS/WEEK
   - B. WEEKS 13-52 1 VISIT/FORTNIGHT
5. A BASIC MAINTENANCE LOG SHALL BE KEPT FOR THE DURATION OF THE ESTABLISHMENT AND MAINTENANCE PERIODS OUTLINING A RECORD OF ALL MAINTENANCE ACTIVITIES UNDERTAKEN DURING EACH VISIT AND INSPECTION REPORTING ON THE CONDITION OF THE LANDSCAPE WORKS

TABLE 4 - GROUND PREPARATIONS AND DEPTHS

OPERATION	FUNCTION	PLANTING ACTIVITY	DEPTH
RIPPING	BREAK UP GROUND PRIOR TO CULTIVATION	TREE PLANTING, CONTAINER STOCK PLANTING AND TURFING	300mm OR 450mm FOR HEAVILY COMPACTED SOILS
CULTIVATION	PREPARE FINELY TILLED PLANTING BED AND/OR INCORPORATE SOIL AMELIORATION AGENTS	TREE PLANTING, CONTAINER STOCK PLANTING AND TURFING	150mm

TABLE 5 - PLACEMENT OF TOPSOIL

PLANTING ACTIVITY	DEPTH
SEEDING AND/OR LAYING TURF	100mm MIN
TREE AND / OR CONTAINER STOCK PLANTING	300mm MIN

TABLE 6 - TOPSOIL NUTRIENT TABLE

NUTRIENT	UNIT	SUFFICIENCY RANGE
NITRATE-N (NO3)	mg/kg	>25
PHOSPHATE-P (PO4) - P TOLERANT	mg/kg	43-63
PHOSPHATE-P (PO4) - P SENSITIVE	mg/kg	<28
PHOSPHATE-P (PO4) - P VERY SENSITIVE	mg/kg	<6
POTASSIUM (K)	mg/kg	178-388
SULPHATE-S (SO4)	mg/kg	39-68
CALCIUM (Ca)	mg/kg	1200-2400
MAGNESIUM (Mg)	mg/kg	134-289
IRON (Fe)	mg/kg	279-552
MANGANESE (Mn)	mg/kg	18-44
ZINC (Zn)	mg/kg	2.6-5.1
COPPER (Cu)	mg/kg	4.5-6.3
BORON (B)	mg/kg	1.4-2.7

METHOD REFERENCES
pH IN H2O (1:5), pH IN CaCl2 (1:5) AND ELECTRICAL CONDUCTIVITY (EC) BY RAYMENT & HIGGINSON (1992) METHOD 4A2, 4B2, 3A1
SOLUBLE NITRATE-N BY APHA 4500
SOLUBLE CHLORIDE BY RAYMENT & HIGGINSON (1992) MODIFIED METHOD 5A2
EXTRACTABLE P BY MEHLICH 3 - ICP
EXCHANGEABLE CATIONS - Ca, Mg, K, Na BY MEHLICH 3 - ICP
EXTRACTABLE S BY MEHLICH 3 - ICP
EXTRACTABLE TRACE ELEMENTS (Fe, Mn, Zn, Cu, B) BY MEHLICH 3 - ICP

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

ISSUED FOR TENDER

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	CAP
2	ISSUE FOR 90% REVIEW	14.5.14	CAP
3	ISSUE FOR APPROVAL	22.5.14	CAP
4	ISSUE FOR TENDER	27.5.14	CAP

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PROJECT No. 41-27647
DRAWING No. 41-27647-L001

DESIGNED	C.PERCY	AURIZON COMPLIANCE REVIEW
DESIGN CHECKED	E.NICHOLAOU	
DRAWN	C.PERCY	REVIEWED XX DESIGN MANAGER DATE
DRAFTING CHECK	J.HULME	ISSUE AUTHORISED
APPROVED	E.NICHOLAOU 22.5.14 DATE	
RPEQ No. -		AUTHORISED XX MANAGER CIVIL ENGINEERING DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
LANDSCAPE DESIGN
NOTES AND SCHEDULES

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-9000**
ISSUE **4**

Plot Date: 27 May 2014 - 4:38 PM Plotted by: Jonathan Murray Cad File No: G:\41\27647\CADD\Drawings\41-27647-L001.dwg

ROCKHAMPTON REGIONAL COUNCIL
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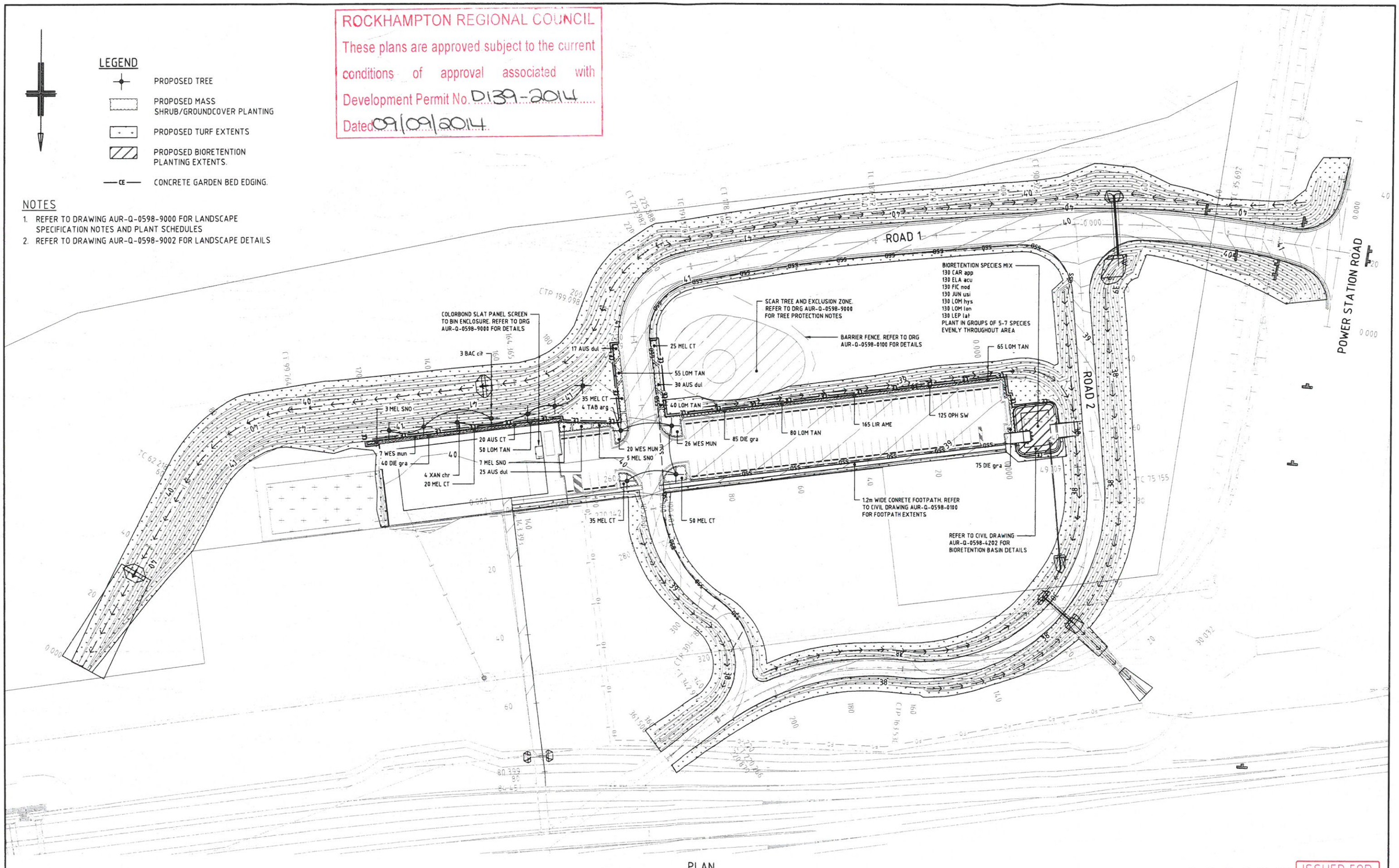
Dated 09/09/2014

LEGEND

- PROPOSED TREE
- PROPOSED MASS SHRUB/GROUNDCOVER PLANTING
- PROPOSED TURF EXTENTS
- PROPOSED BIORETENTION PLANTING EXTENTS.
- —CE— CONCRETE GARDEN BED EDGING.

NOTES

1. REFER TO DRAWING AUR-Q-0598-9000 FOR LANDSCAPE SPECIFICATION NOTES AND PLANT SCHEDULES
2. REFER TO DRAWING AUR-Q-0598-9002 FOR LANDSCAPE DETAILS



PLAN
SCALE 1:500

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

ISSUED FOR TENDER

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	CAP
2	ISSUED FOR 90% REVIEW	14.5.14	CAP
3	ISSUE FOR APPROVAL	22.5.14	CAP
4	ISSUE FOR TENDER	27.5.14	CAP

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PROJECT No. 41-27647
DRAWING No. 41-27647-L002

DESIGNED	C.PERCY	
DESIGN CHECKED	E.NICHOLAOU	
DRAWN	C.PERCY	
DRAFTING CHECK	J.HULME	
APPROVED	E.NICHOLAOU	22.5.14 DATE
RPEQ No.	-	

AURIZON COMPLIANCE REVIEW
REVIEWED XX DATE
DESIGN MANAGER
ISSUE AUTHORISED
AUTHORISED XX DATE
MANAGER CIVIL ENGINEERING

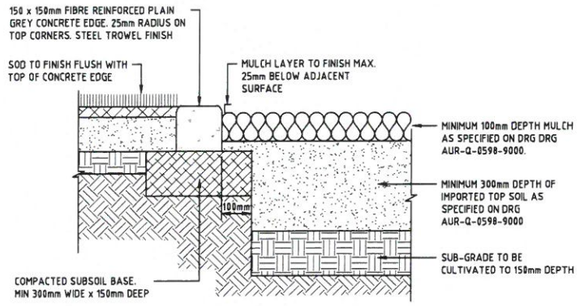
AURIZON

Aurizon Operations Ltd - ACN 124 649 967

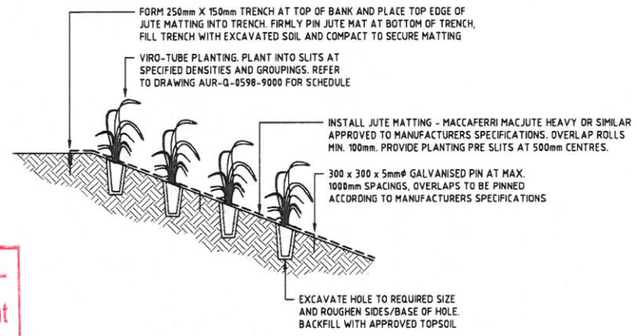
ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
LANDSCAPE DESIGN
LAYOUT PLAN

FILE No. F14/15659
DRAWING NUMBER **AUR-Q-0598-9001**
ISSUE **4**

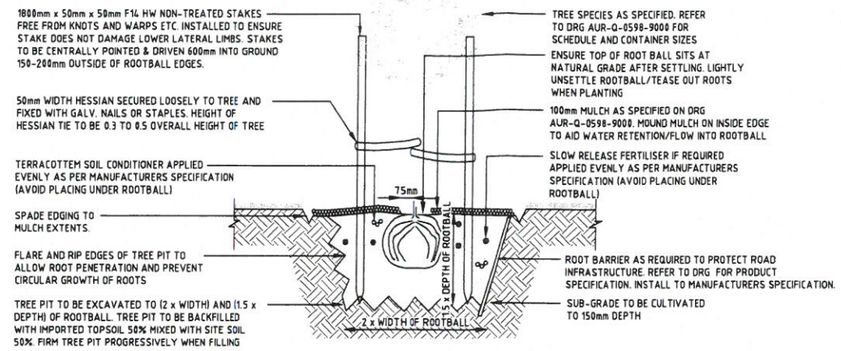
Plot Date: 27 May 2014 - 4:38 PM Plotted by: Jonathan Murray Cad File No: G:\41\27647\CADD\Drawings\41-27647-L002.dwg



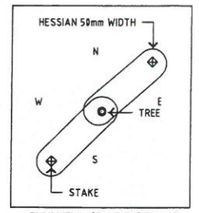
GARDEN BED EDGE DETAIL
SCALE 1:10



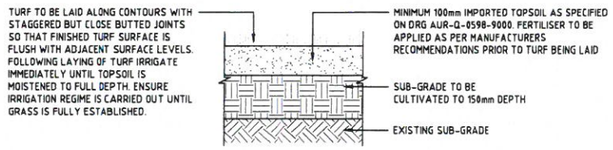
BIORETENTION BATTER PLANTING DETAIL
SCALE 1:50



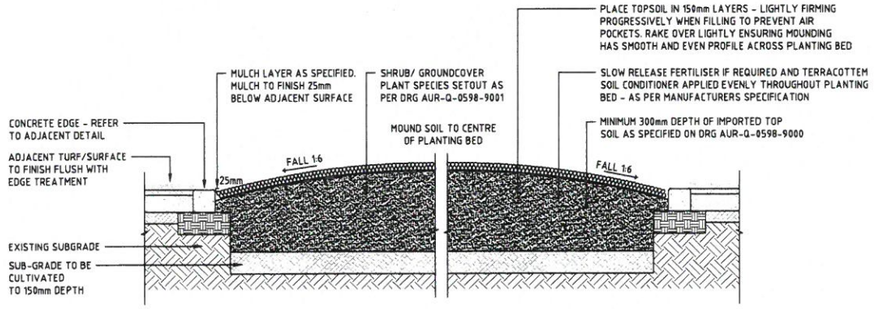
ADVANCED TREE PLANTING DETAIL
SCALE 1:20



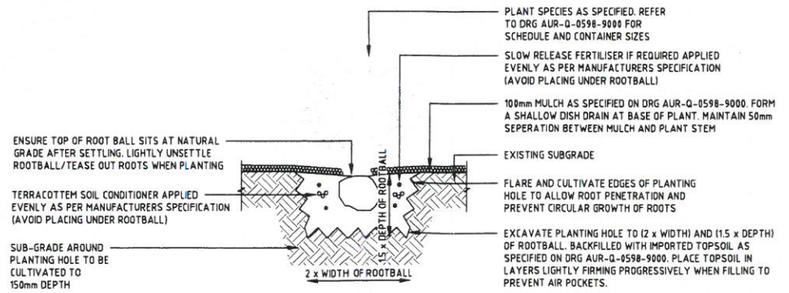
PLAN VIEW - STAKE POSITIONING AND HESSIAN LOOP (EXAMPLE WHEN PREVAILING WIND IS SOUTH EAST)



TURF DETAIL
SCALE 1:10



TYPICAL CONTAINED PLANTING BED
SCALE 1:20



INDIVIDUAL SHRUB & GROUNDCOVER PLANTING DETAIL
SCALE 1:20

0 0.1 0.2 0.3 0.4 0.5m
SCALE 1:10 AT ORIGINAL SIZE

0 0.2 0.4 0.6 0.8 1.0m
SCALE 1:20 AT ORIGINAL SIZE

0 0.5 1.0 1.5 2.0 2.5m
SCALE 1:50 AT ORIGINAL SIZE

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D139-2014
Dated 09/09/2014

ISSUED FOR TENDER

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING

ALTERATIONS

1	ISSUE FOR 50% REVIEW	30.4.14	CAP
2	ISSUED FOR 90% REVIEW	14.5.14	CAP
3	ISSUE FOR APPROVAL	22.5.14	CAP
4	ISSUE FOR TENDER	27.5.14	CAP

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PROJECT No. 41-27647
DRAWING No. 41-27647-L003

DESIGNED	C.PERCY	
DESIGN CHECKED	E.NICHOLAOU	
DRAWN	C.PERCY	
DRAFTING CHECK	J.HULME	
APPROVED	E.NICHOLAOU	22.5.14 DATE
RPEQ No.	-	

AURIZON COMPLIANCE REVIEW

REVIEWED	XX
DESIGN MANAGER	DATE
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AUTHORISED	XX
MANAGER CIVIL ENGINEERING	DATE

AURIZON

Aurizon Operations Ltd - ACN 124 649 967

ROCKHAMPTON TO EMERALD
CQAR - STANWELL INTERMEDIATE DEPOT
20.000km TO 20.500km - CENTRAL LINE
LANDSCAPE DESIGN
DETAILS

FILE No. F14/15659
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