Highland
Infrastructure Group

- Civil/Subdivision Design
- Traffic Signal/Street Lighting Design
- Project Managers
- Stormwater Management/Flood Studies

Preliminary Design Report

Blackwater Eastern Growth Area
Urban Land Development Authority

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 13 / 7 / 12

Prepared by	C. Penrose
Title	Senior Civil Designer
Location	Rockhampton Office
Version date	February 2012

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Document control sheet

Contact for enquiries and proposed changes

If you have any questions regarding this document or if you have a suggestion for improvements, please contact:

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Title Senior Civil Designer

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Version history

Version no.	Date	Changed by	Nature of amendment
1	04/02/12	CDP	Draft
2			

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated

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1. Introduction

This report has been prepared for the Urban Land Development Authority (ULDA) and outlines the design assumptions adopted in the preparation of the preliminary design for the proposed access to the Blackwater eastern growth area. The Blackwater eastern growth area will comprise a mix of residential dwellings and accommodation camps for non-resident works. The development will include internal access roads connecting with Rosewood Street, Walsh Avenue, Bauman Way and the Capricorn Highway.

This report also included a preliminary intersection layout based on the findings and an estimate for construction in 2012 dollars.

2. Background

In May 2011, Parsons Brinckerhoff Australia Pty Ltd (PB) prepared a written report titled "Road Infrastructure Study for Blackwater Eastern Growth Area" which provided preliminary estimates of daily trip generations and distributions. The Highland Infrastructure Group (HIG) was supplied with this information and instructed to use it to undertake an analysis of the proposed access to the Capricorn Highway.

The Department of Transport and Main Roads (DTMR) had originally conditioned the intersection to be a Channelised Right Turn and Auxiliary Left Turn (CHR/AUL) treatment. Analysis of the PB traffic data resulted in a signalised intersection being proposed by HIG.

3. Access

The development access will intersect the Capricorn Highway just outside the current 80km/hr speed zone. This section of the Capricorn Highway is on a straight alignment with approximately 0.34% grade. It is proposed to extend the 80km/hr speed zone approximately 450m toward the east. This will ensure the proposed signalised intersection is within the 80km/hr zone.

A 19m semi-trailer was adopted as the design vehicle and traffic island setout was designed to suite.

A meeting was held with DTMR CMO staff on the 24th January 2012 where the following items were discussed and adopted:

- Trip generation rates of 0.85 vph for residential and 0.4 vph for camps
- 100% occupancy (as per other DTMR approved developments)
- CHR/AUL as a minimum standard
- Signals will require advance warning. At this location the Capricorn Highway is an East – West orientation with sunrise/sunset conflict.
- 80/20 split west /east for vehicles entering the Capricorn Highway from the development and for vehicles entering the development from the Capricorn Highway. The 80/20 split in traffic directions is reflected in the actual traffic count for the intersection of the Capricorn Highway and Arthur Street, approximately 660m to the west. This 80/20 West /East distribution of traffic is based on the location of coal mines to the west of Blackwater, with mining being the predominate source of employment and therefore trip destination.
- A CHR intersection with an acceptable queue length within the development may promote rat running via other internal streets. This may have an impact on Arthur Street; however no

assessment has been made of the impact on the existing streets accessing the Capricorn Highway.

- Long queues within the proposed development may also encourage drivers to perform unsafe driving manoeuvres when attempting to exit the development.

4. Analysis

The intersection has been analysed for the design horizon 2024 scenario using SIDRA 5.1 analysis program. This program calculates the operation of the intersection based on input parameters, including intersection geometry and traffic volumes. SIDRA 5.1 reports average delays, level of service (LOS), queue length and degree of saturation (DOS). A LOS-D is considered the minimum for the operation of an intersection.

The DOS is a commonly used value, which is essentially a volume to capacity ratio. The typically adopted upper limit of the DOS for a signalised intersection is 0.9 – 0.95 and a sign controlled intersection between 0.8 – 0.9. A DOS between these values indicates that the intersection is nearing its operation capacity. Above these values, users of the intersection are likely to experience unsatisfactory queuing and delays. The following intersection and scenarios have been analysed:

- Capricorn Highway & ULDA Development Access
    - 2024 Sign Controlled Intersection
    - 2024 Signalised Intersection

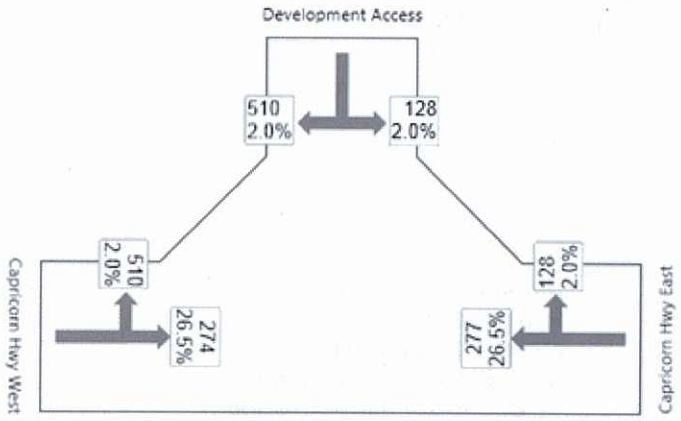


Figure 1 - Volume Summary

The CHR intersection layout has been design to accommodate deceleration within the right turn lane from 90km/hr to a stop condition.

PHASING SUMMARY

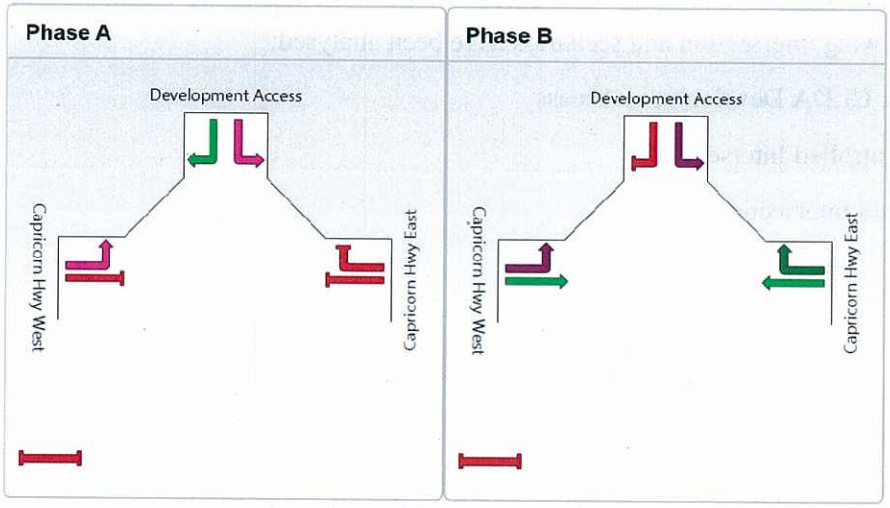
Site: ULDA Blackwater signals - 2024 80/20 split - Slip Lanes

ULDA Blackwater
Signals - Fixed Time Cycle Time = 30 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: Opposed Turns
Input Sequence: A, B
Output Sequence: A, B

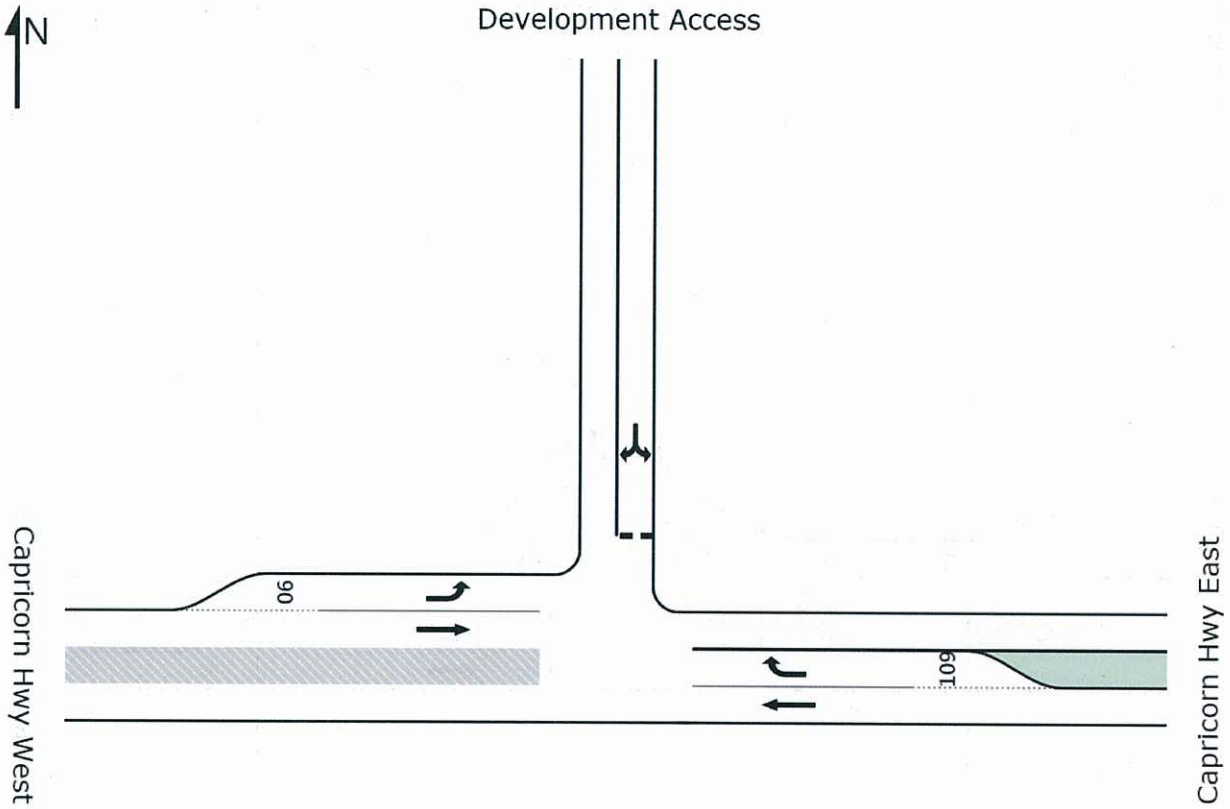
Phase Timing Results

Phase	A	B
Green Time (sec)	11	7
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	17	13
Phase Split	57 %	43 %



	Normal Movement		Permitted/Opposed
	Slip-Lane Movement		Opposed Slip-Lane
	Stopped Movement		Continuous Movement
	Turn On Red		Undetected Movement
			Phase Transition Applied

Analysis of the sign controlled intersection resulted in unacceptable queue length of up to 2394m with in the development. The Capricorn Highway performed well with a LOS - D on the right turn into the development.



LANE SUMMARY

Site: ULDA Blackwater no slip - 2024 80/20 split - Copy

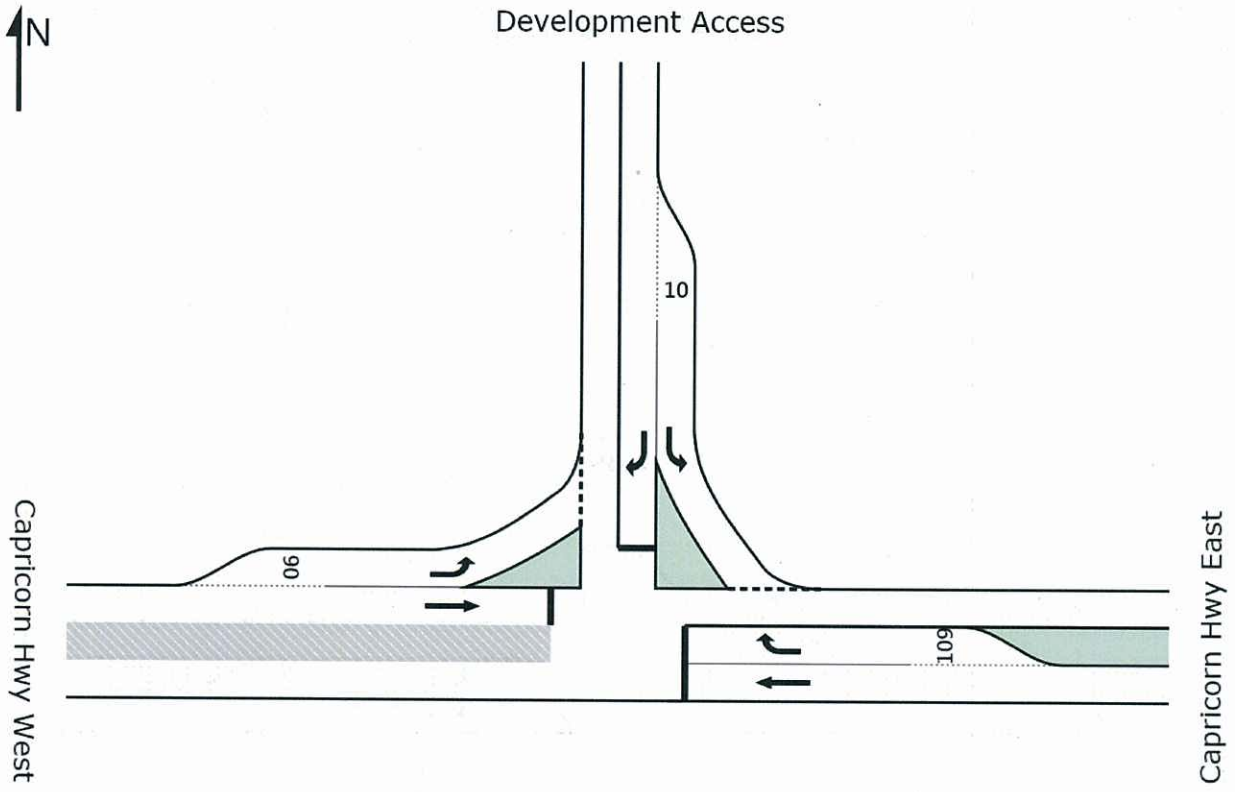
ULDA Blackwater
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
East: Capricorn Hwy East																
Lane 1	0	292	0	292	26.5	1664	0.175	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	0	135	135	2.0	536	0.252	100	26.7	LOS D	1.0	7.3	285	Turn Bay	0.0	0.0
Approach	0	292	135	426	18.7		0.252		8.5	NA	1.0	7.3				
North: Development Access																
Lane 1	135	0	537	672	2.0	158	4.241	100	2959.8	LOS F	336.2	2394.0	500	–	0.0	100.0
Approach	135	0	537	672	2.0		4.241		2959.8	LOS F	336.2	2394.0				
West: Capricorn Hwy West																
Lane 1	537	0	0	537	2.0	1831	0.293	100	20.3	LOS C	0.0	0.0	90	Turn Bay	0.0	0.0
Lane 2	0	288	0	288	26.5	1664	0.173	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	537	288	0	825	10.5		0.293		13.2	NA	0.0	0.0				
Intersection				1923	9.4		4.241		1041.1	NA	336.2	2394.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

Analysis of the signalised intersection resulted in a LOS- C for the right turn out of the development. The internal queue within the development was reduced to an acceptable 73m. This intersection configuration also included the provision of two slip lanes.



LANE SUMMARY

Site: ULDA Blackwater signals - 2024 80/20 split - Slip Lanes

ULDA Blackwater
Signals - Fixed Time Cycle Time = 30 seconds (Practical Cycle Time)

Lane Use and Performance

	Demand Flows L	T	R	Total	HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Lane Length	SL Type	Cap. Adj.	Prob. Block.
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%	%
East: Capricorn Hwy East																
Lane 1	0	308	0	308	26.5	392	0.785	100	15.7	LOS B	5.3	68.9	500	–	0.0	0.0
Lane 2	0	0	142	142	2.0	264	0.539	100	35.8	LOS D	2.2	15.8	140	Turn Bay	0.0	0.0
Approach	0	308	142	450	18.7		0.785		22.0	LOS C	5.3	68.9				
North: Development Access																
Lane 1	142	0	0	142	2.0	373[1]	0.381	100	10.0	LOS A	0.8	5.7	10	Turn Bay	0.0	0.0
Lane 2	0	0	567	567	2.0	678	0.835	100	22.5	LOS C	10.1	72.2	500	–	0.0	0.0
Approach	142	0	567	709	2.0		0.835		20.0	LOS B	10.1	72.2				
West: Capricorn Hwy West																
Lane 1	567	0	0	567	2.0	1225	0.463	100	22.2	LOS C	2.6	18.2	90	Turn Bay	0.0	0.0
Lane 2	0	304	0	304	26.5	392	0.776	100	15.4	LOS B	5.2	67.5	500	–	0.0	0.0
Approach	567	304	0	871	10.5		0.776		19.8	LOS B	5.2	67.5				
Intersection				2030	9.4		0.835		20.4	LOS C	10.1	72.2				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

5. Conclusion

The proposed intersection of the Capricorn Highway and the Blackwater Eastern Growth development access will require the installation of traffic signals and in/out slip lanes. This will accommodate the predicted traffic volumes generated by the proposed development and background traffic volumes for the design horizon 2024 and beyond

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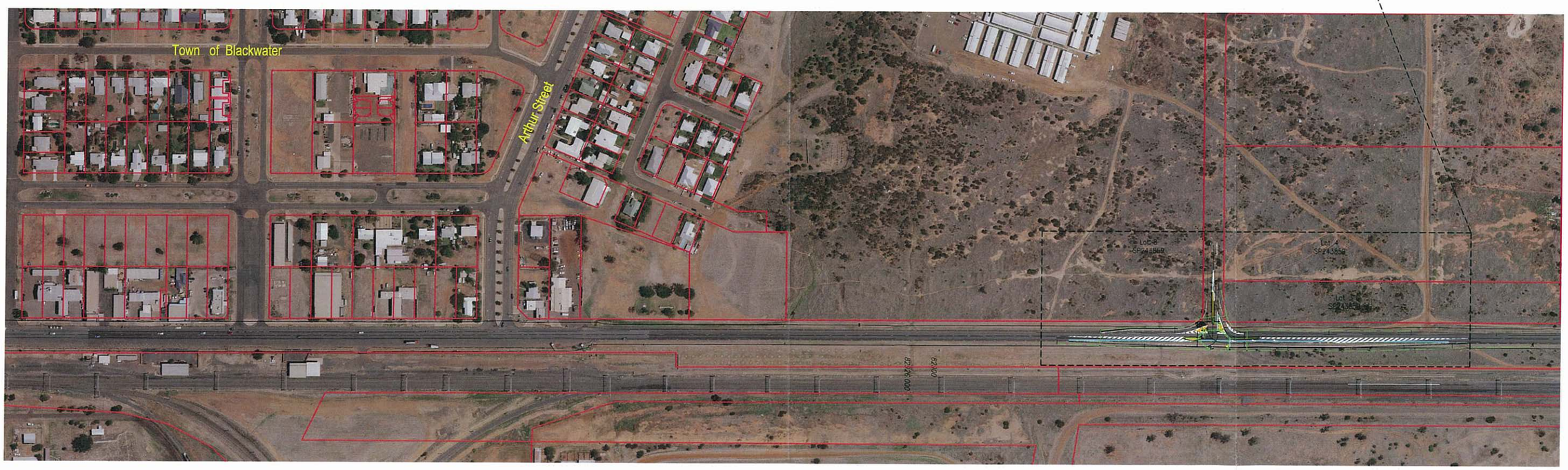
Cameron Penrose, Senior Civil Designer
Highland Infrastructure Group, Rockhampton

Appendix 1 – Intersection Plans

Appendix 1 – Intersection Plans

Parish of Blackwater



Revisions	Approved	Date
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Scales

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PROPOSED DEVELOPMENT LAYOUT

Drawing	Design	Engineering Certification	Sheet	Job No.	Revision
C. Penrose	C. Penrose		1	ROC-001	A
Checked	Verified		of	Drawing No.	
B. Mrogan	B.Morgan	RPEQ No.	5	ROC001-1	

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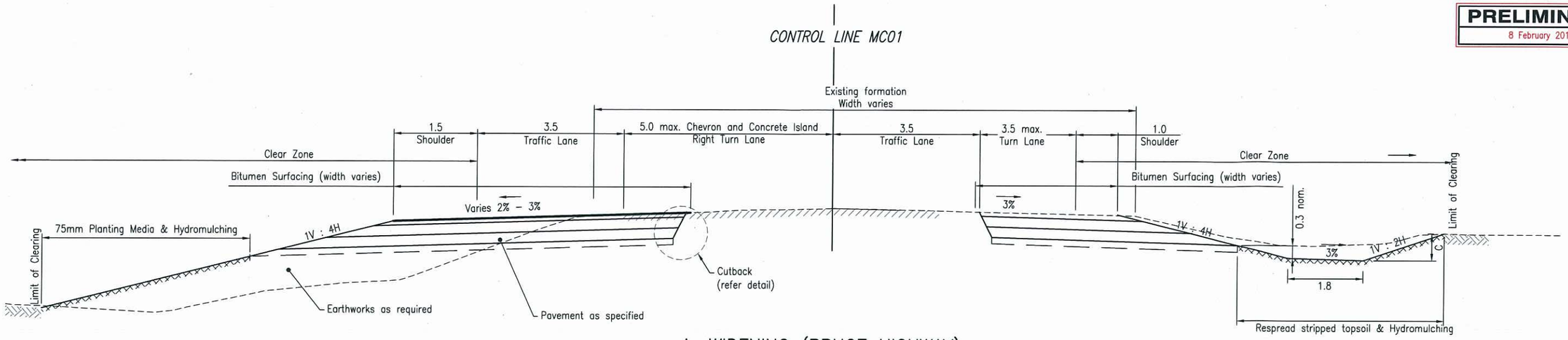
8 February 2012



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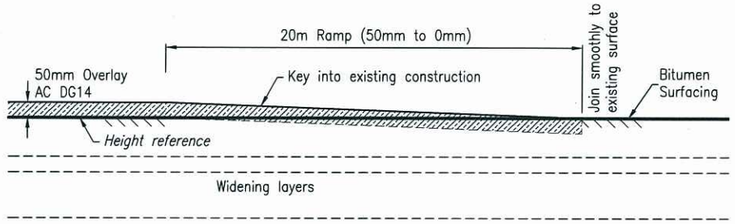

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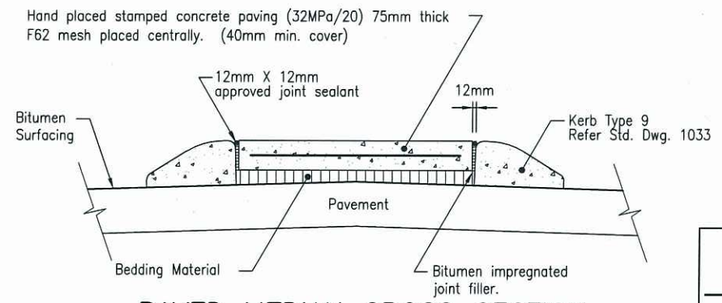
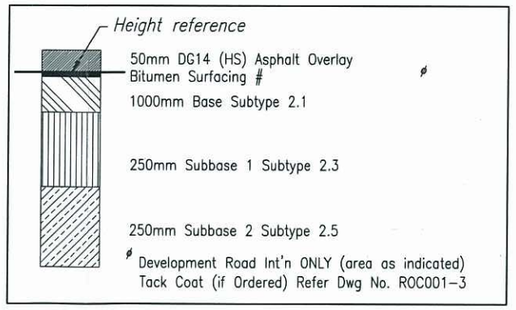
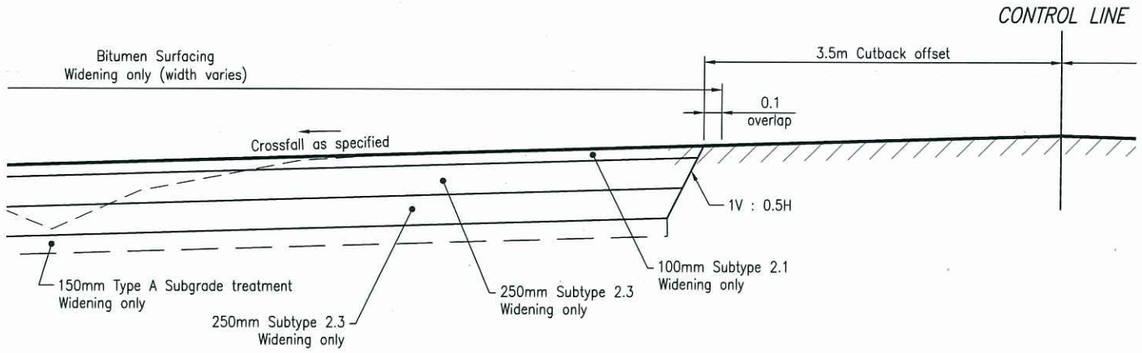


PAVED MEDIAN CROSS SECTION

(N.T.S.)

PAVEMENT DESIGN – WIDENING





CUTBACK DETAIL

BITUMEN SURFACING

Primerseal: (Widening only)	Binder §	Class 170 (6% cutter)
	Spray Rate	1.2 Litres/m²
	Cover Aggregate	10mm @ 120m²/m³
Seal Coat: (Full Width)	Binder	PMB S4.5S
	Spray Rate	2.0 Litres/m²
	Cover Aggregate	16mm @ 85m²/m³

§ Mixed on site

PAVEMENT DESIGN & TRAFFIC DATA

AADT: 2786 VPD (15% HVs) (2010 data)

PAVEMENT DESIGN

Design Life = 20 years, Austroads Design Standard

Subgrade : CBR = 3 (soaked)
Design Traffic = 2.0 x 10^7 ESAs

Revisions	Approved	Date
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TYPE CROSS SECTION AND DETAILS

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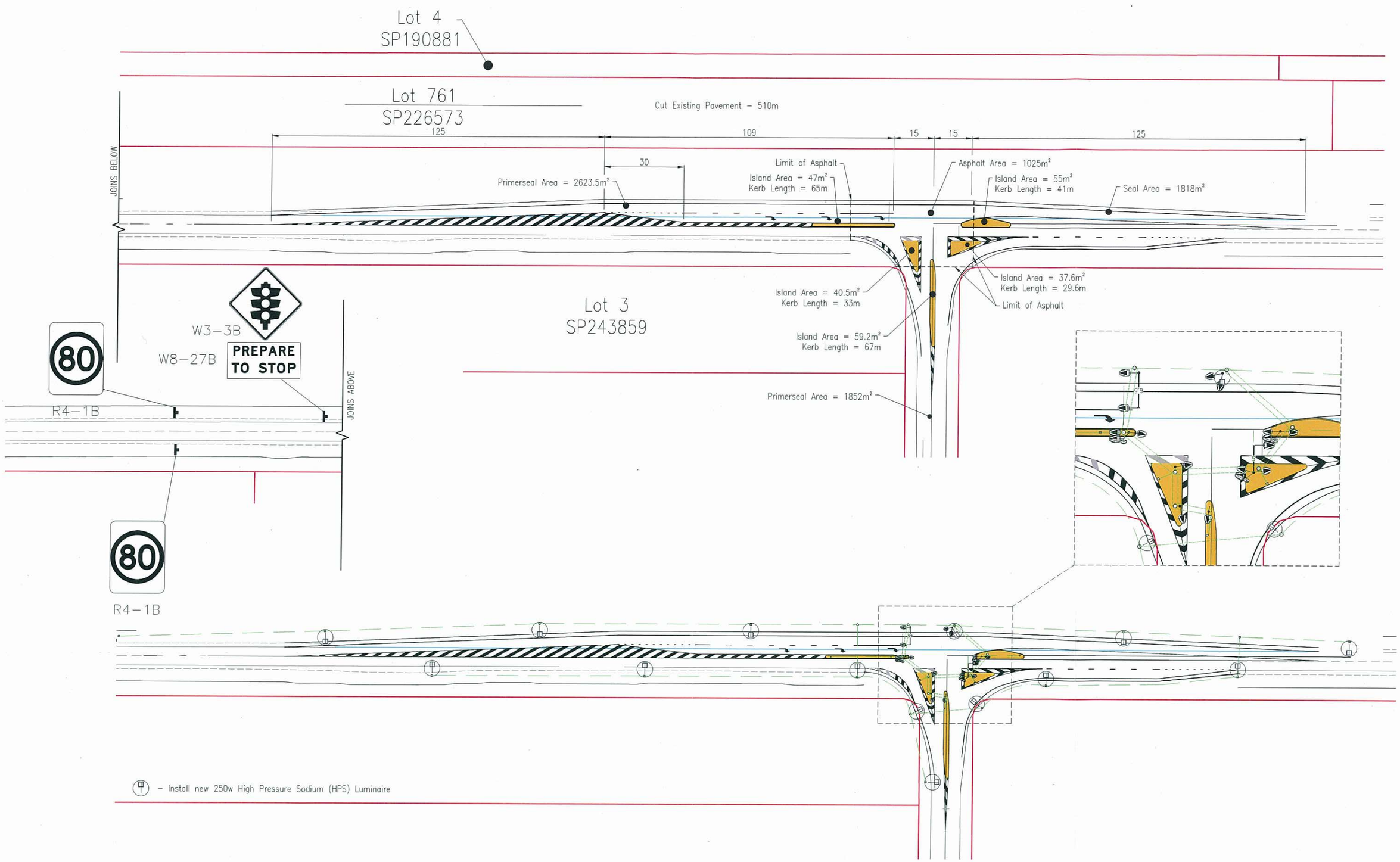

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BLACKWATER EASTERN GROWTH AREA
LAYOUT AND DETAILS DRAWING

Drawing	Design	Engineering Certification	Job No.	Revision
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Checked	Verified		Drawing No.	Sheet
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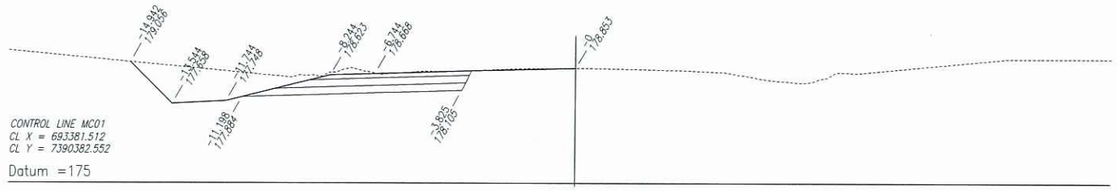

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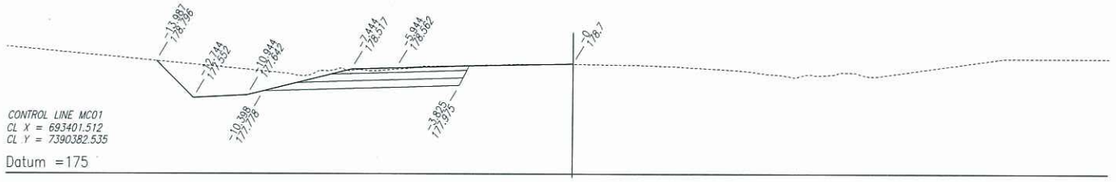

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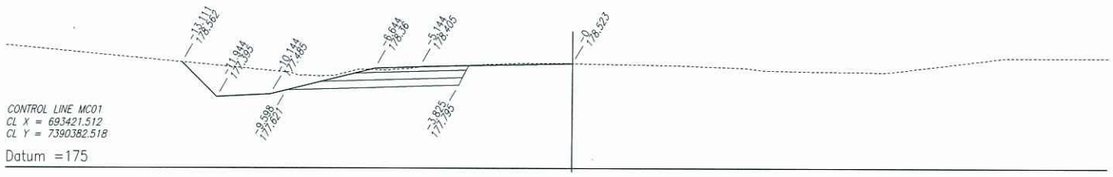

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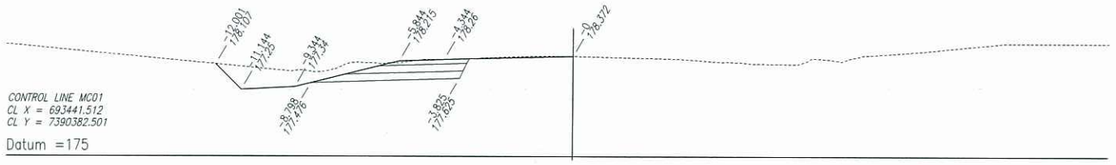

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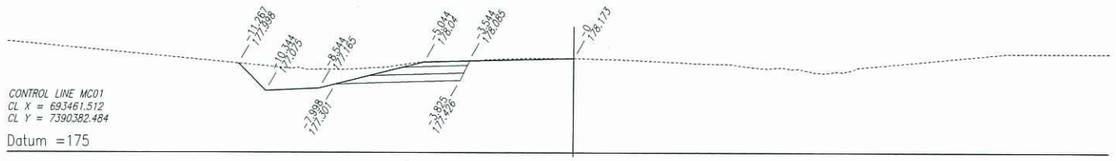

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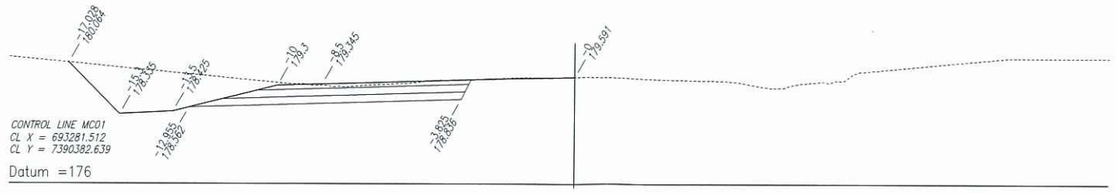

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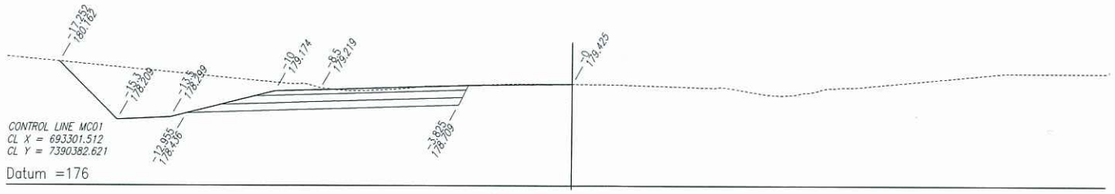

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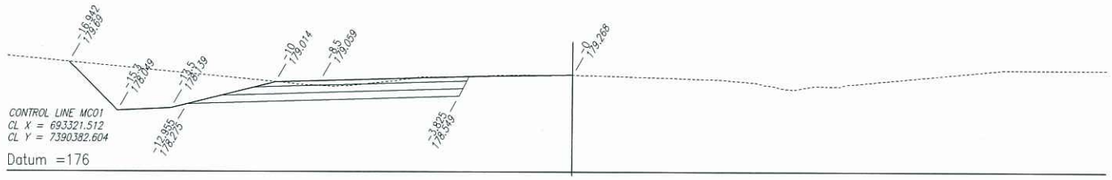

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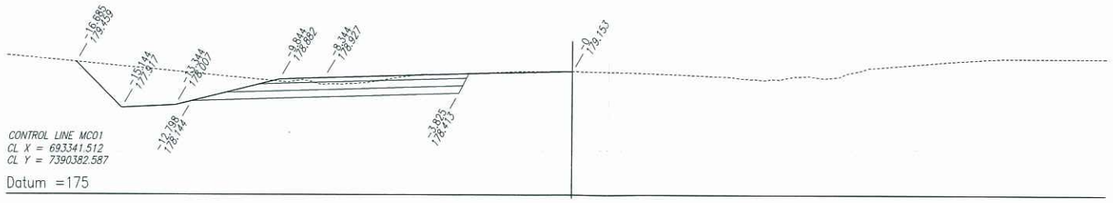

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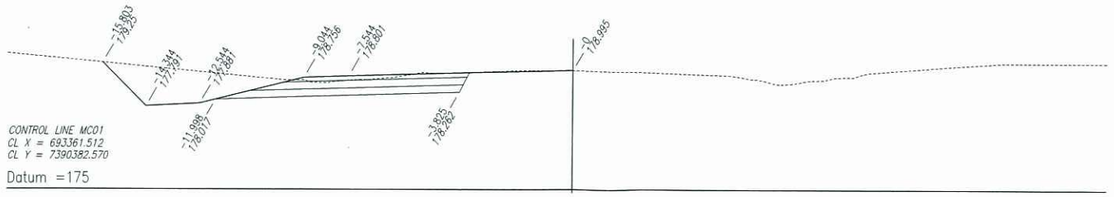

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Revisions	Certified	Date
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SURVEY DATUM

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Scales

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BLACKWATER EASTERN GROWTH AREA
PRELIMINARY CROSS SECTIONS (1 OF 2)

Drawing	Design	Engineering Certification	Job No.	Revision
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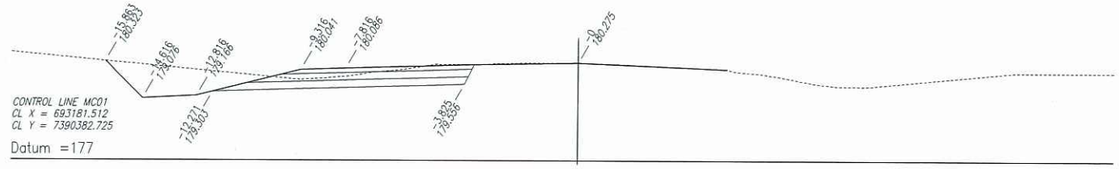
Checked	Verified		Drawing No.	Sheet
CDP		RPEQ No.	ROC-001-4	of



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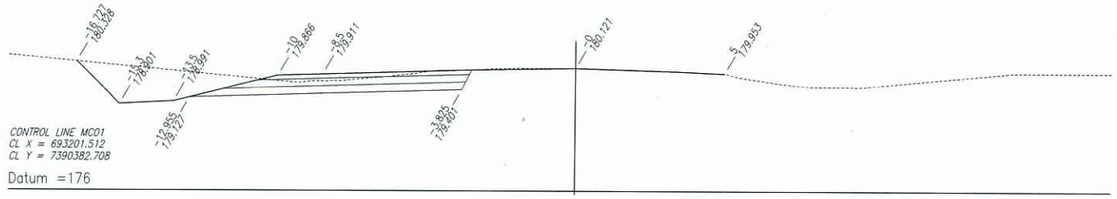

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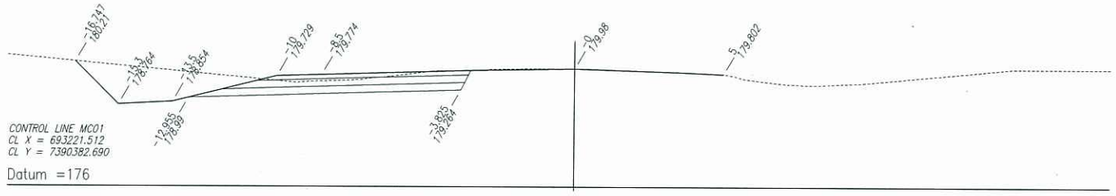

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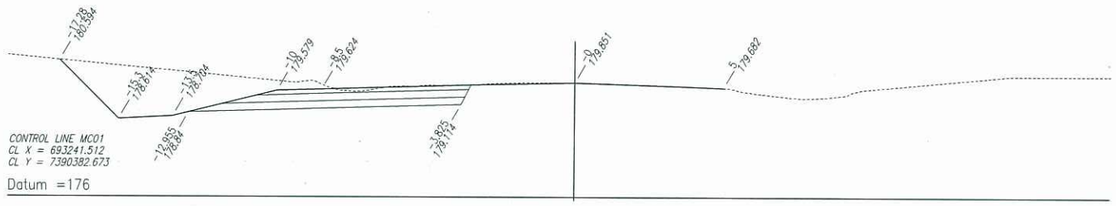

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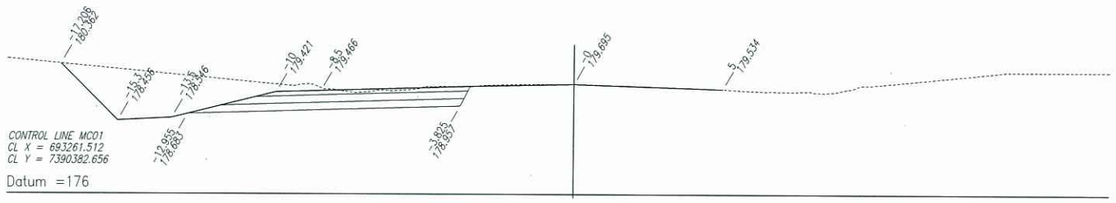

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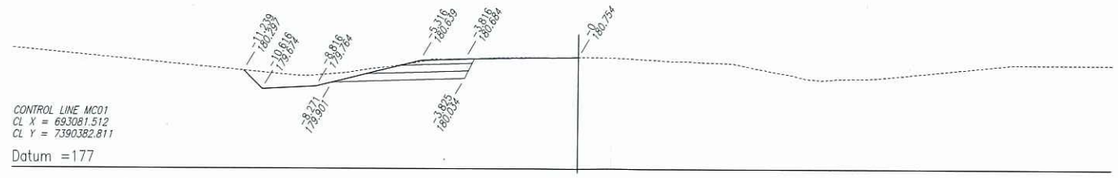

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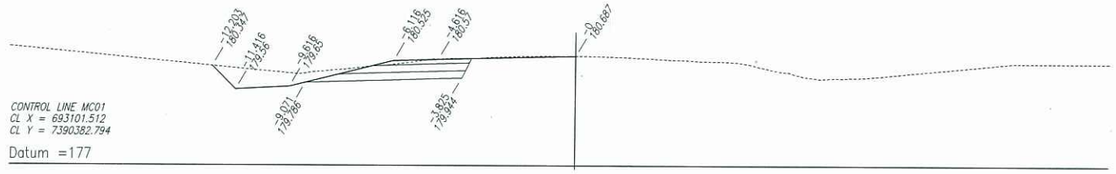

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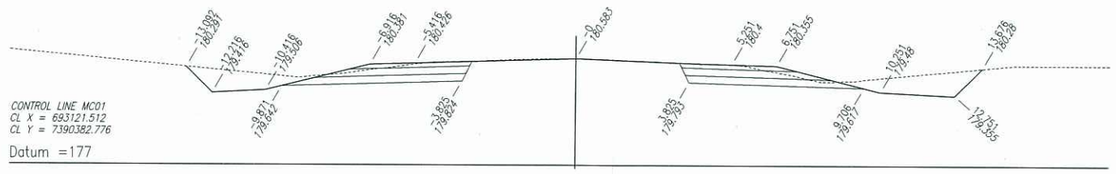

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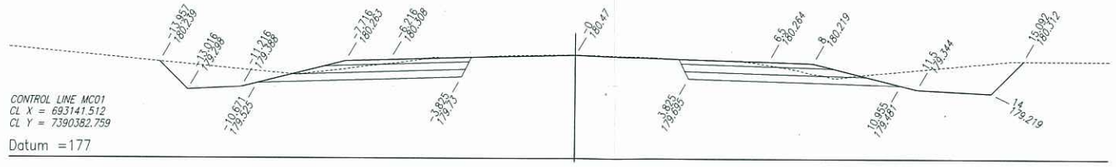

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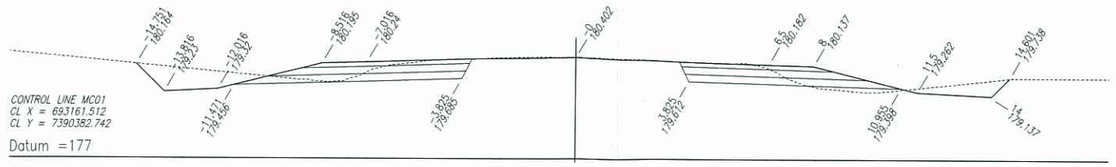

CHAINAGE 82680.000

Revisions	Certified	Date
A Original Issue		

SURVEY DATUM

Horizontal:

Vertical:

Surveyor: Date:

CLIENT: URBAN LAND DEVELOPMENT AUTHORITY

Scales

Dimensions in metres except where shown otherwise.

Dwg Ref. G:\ROC-001 UDLA Blackwater\AutoCAD\Preliminary Design Revised.dwg Plot Date: 08.02.2012

Highland Infrastructure Group

Traffic Signal/Street Lighting Design
Civil/Subdivision Design
Project Managers

Level 1, 218 Anzac Ave TMBA QLD 4350
Ph: +61 7 4636 6522
Fax: +61 7 4687 7022

BLACKWATER EASTERN GROWTH AREA
PRELIMINARY CROSS SECTIONS (2 OF 2)

Drawing	Design	Engineering Certification	Job No.	Revision
BBM	CDP		ROC-001	A
Checked	Verified		Drawing No.	Sheet
CDP		RPEQ No.	ROC-001-5	of

Appendix 2 – Estimate

Appendix 3 – Site Photos

PRELIMINARY DESIGN ESTIMATE - BLACKWATER INTERSECTION ULDA DEVELOPMENT

Local Authority: 225 - CENTRAL HIGHLANDS REGIONAL COUNCIL
Road: 16B - CAPRICORN HIGHWAY (DUARINGA - EMERALD)
Estimate Location: ARMIS Chainage 82.46km (DRCL Chge 82627.910)
Contract Number:

PROJECT SPECIFICS:
- Signalised ULDA Development Access with full separate left and right turn lanes
- formation widening
- Replacing minor drainage structure

Item Number	Description	Unit of Measurement	Quantity	Unit Rate $c	Amount $
Construction					
	CONTRACTOR'S SITE FACILITIES AND CAMP (MRS11.28 Dec 99)				
1101.01	Contractor's site facilities (MRS11.28 Dec 99)	lump sum			$20,000.00
1102.01	Contractor's camp (MRS11.28 Dec 99)	lump sum			$100,000.00
	TRAFFIC MANAGEMENT (MRS11.02 Jan 08)				
1201.01S	Provision for traffic (MRS11.02 Jan 08)	lump sum			$100,000.00
1202.01	Traffic Management Plan (MRS11.02 Jan 08)	lump sum			$10,000.00
	MANAGEMENT PLAN(S) (MRS11.51 Dec 07)				
1331.01	Develop Environmental Management Plan (Construction) (MRS11.51 Dec 07)	lump sum			$2,000.00
1332.01	Implement Environmental Management Plan (Construction) (MRS11.51 Dec 07)	lump sum			$5,000.00
	REMOVAL/DEMOLITION (MRS11.03 Dec 06)				
2101.01	Removal or demolition of culverts, complete (MRS11.03 Dec 06)	lump sum			$10,000.00
	SUPPLY AND INSTALLATION OF CULVERTS (MRS11.03 Dec 06)	lump sum			$50,000.00
	2/450 mm diameter, 3/525 mm diameter & 2/1200x450 RCBC				
	PAVEMENT DRAINAGE (MRS11.03 Dec 06)				
2401.01	Concrete kerb, Type 9 (MRS03 Jun 09)	m	235.6	$100.00	$23,560.00
	CONCRETE IN CULVERTS AND END STRUCTURES (MRS11.03 Dec 06)	lump sum			$12,000.00
	PROTECTIVE PAVING (MRS11.03 Dec 06)				
2631.01	Hand placed concrete paving, 125 mm thick (MRS11.03 Dec 06)	m2	202	$150.00	$30,300.00
	PROTECTION WORKS (MRS11.03 Dec 06)				
2643.01	Rock protection (MRS11.03 Dec 06) For culvert inlets and outlets	m3	2	$90.00	$180.00
	SILT PROTECTION (MRS11.03 Dec 06)				
2661.01P	Silt fence (Provisional Quantity) (MRS11.03 Dec 06) as directed	m2	50	$12.00	$600.00
	EARTHWORKS, PREPARATION (MRS11.04 Dec 07)				
3101.01	Clearing and grubbing (MRS11.04 Dec 07)	m2	7690	$2.50	$19,225.00
3103.01P	Stripping of topsoil (Provisional Quantity as directed) (MRS11.04 Dec 07)	m3	327	$30.00	$9,810.00
3104.01	Ground surface treatment under embankment, standard (MRS11.04 Dec 07)	m2	20	$5.00	$100.00
3109.01P	Excavation and disposal of Unsuitable Material with individual excavation > 10 m3 (Provisional Quantity as directed) (MRS11.04 Dec 07)	m3	493	$30.00	$14,790.00
	EARTHWORKS, EXCAVATION (MRS11.04 Dec 07)				
3201.01	Road excavation, all materials (MRS11.04 Dec 07)	m3	4933	$20.00	$98,660.00
	EARTHWORKS, EMBANKMENT (MRS11.04 Dec 07)				
3301.01	Road embankment (MRS11.04 Dec 07)	m3	10	$30.00	$300.00
	EARTHWORKS, SUBGRADE (MRS11.04 Dec 07)				
3401.01P	Testing of existing material below subgrade level in cuttings (Provisional Quantity if ordered) (MRS11.04 Dec 07) as directed	per set	1	$1,500.00	$1,500.00
3402.01P	Subgrade treatment Type A in cuttings and in embankments (Provisional Quantity if ordered) (MRS11.04 Dec 07)	m2	5444	$7.00	$38,108.00
	EARTHWORKS, BACKFILL (MRS11.04 Dec 07)				
3501.02S	Backfill with general backfill material to subgrade (>10m^3) (MRS11.04 Dec 07)	m3	493	$30.00	$14,790.00
	LANDSCAPING (MRS11.16 Dec 99)				
3841.01	Stripped topsoil as planting media (MRS11.16 Dec 99)	m3	327	$2.00	$654.00
3861.01P	Hydraulic seeding and mulching, mix to be DTMR approved (Provisional Quantity) (MRS11.16 Dec 99) as directed	m2	3265	$2.50	$8,162.50
	UNBOUND PAVEMENTS TYPE 2 (MRS11.05 Dec 99)				
4103.01	Base, unbound pavement, Type 2, Subtype 2.1, new works (MRS11.05 Dec 99)	m3	365	$190.00	$69,350.00
4104.01	Subbase, unbound pavement, Type 2, Subtype 2.3, new works (MRS11.05 Dec 99)	m3	736	$170.00	$125,120.00
4104.02	Subbase, unbound pavement, Type 2, Subtype 2.5, new works (MRS11.05 Dec 99)	m3	849	$140.00	$118,860.00
9004.01S	Cut Existing Pavement (SPECIFICATION REQUIRED)	m	510	$2.00	$1,020.00
	SUPPLY OF COVER AGGREGATE (MRS11.22 Dec 99)				
5011.01	Supply of cover aggregate precoated, 16 mm nominal size (MRS11.22 Dec 99) Full Width	m3	43.2	$100.00	$4,320.00
5011.02	Supply of cover aggregate precoated, 10 mm nominal size (MRS11.22 Dec 99) Widening only	m3	30.6	$100.00	$3,060.00
5031.01	Construction of stockpile site (MRS11.22 Dec 99)	lump sum			$5,000.00
	SPRAYED BITUMINOUS SURFACING (EXCLUDING EMULSION) (MRS11.11 Dec 99)				
5102.01	Primerseal, grade C170 (+6% cutter mixed on site), spray rate 1.2 L/m2, including supply of binder, including supply of additives, widening only (MRS11.11 Dec 99)	litre	4404	$5.50	$24,222.00
5103.02	Seal, class PMB, spray rate 2.0 L/m2, including supply of binder, including supply of additives, full width (MRS11.11 Dec 99)	litre	7340	$6.00	$44,040.00
5112.01	Spreading cover aggregate 16mm, 1m3/85m2, (MRS11.11 Dec 99) Full Width	m3	43.2	$90.00	$3,888.00
5112.02	Spreading cover aggregate 10mm, 1m3/120m2, (MRS11.11 Dec 99) Widening only	m3	30.6	$90.00	$2,754.00
	PREPARATION OF THE EXISTING SURFACE (MRS30 Jun 09)				

5401.01	Preparation of the existing surface (MRS30 Jun 09) Area = 1025m2	m2	1025	$0.20	$205.00
5404.01	Tack coat 0.3 litres/m2, residual bitumen (MRS30 Jun 09) Area = 1025m2	litre	308	$0.70	$215.60
	DENSE GRADED ASPHALT (MRS30 Jun 09)				
5503.01	Dense graded asphalt, DG14 mix (MRS30 Jun 09) PMB Binder, 50mm Thick, Area = 1025m2, 2.4t/m3	tonne	123	$260.00	$31,980.00
	REMOVAL, DEMOLITION AND RE-ERECTION (MRS11.14 Dec 07)				
6101.01	Demolition of road furniture, as listed in Clause 2 of Annexure MRS11.14.1 (MRS11.14 Dec 07)	lump sum			$2,000.00
6104.01	Removal and re-erection of road furniture, as listed in Clause 4 of Annexure MRS11.14.1 (MRS11.14 Dec 07)	lump sum			$2,000.00
	GUIDANCE AND INFORMATION SYSTEMS (MRS11.14 Dec 07)				
6111.01	Road edge guide posts (MRS11.14 Dec 07)	each	12	$90.00	$1,080.00
6121.01	Supply of regulatory, warning and hazard sign faces, as listed in Clause 6.2 of Annexure MRS11.14.1 (MRS11.14 Dec 07)	lump sum			$1,000.00
6123.01	Supply of direction and information sign faces, as listed in Clause 6.4 of Annexure MRS11.14.1 (MRS11.14 Dec 07)	lump sum			$5,000.00
6131.01	Installation of regulatory, warning and hazard signs, as listed in Clause 6.2 of Annexure MRS11.14.1 (MRS11.14 Dec 07)	lump sum			$1,000.00
6131.01	Installation of direction and information signs, as listed in Clause 6.4 of Annexure MRS11.14.1 (MRS11.14 Dec 07)	lump sum			$5,000.00
	LINE MARKING (MRS11.45 Dec 07)				
6301.01	Spotting only for longitudinal lines (MRS11.45 Dec 07)	m	1717	$1.00	$1,717.00
	Linemarking - Lines and chevrons	lump sum			$10,000.00
	Linemarking - RRPMs (36 m intervals edge line and 24 m intervals others)	lump sum			$5,000.00
	TRAFFIC SIGNALS				
	TRAFFIC SIGNAL POSTS AND MAST ARMS (MRS93 Jun 09)				
9007.01	Supply and installation of traffic signal mast arm including lanterns	each	2	$30,000.00	$60,000.00
9008.02	Supply and installation of traffic signal post including lanterns	each	5	$20,000.00	$100,000.00
9009.01	Supply and installation of joint use traffic signal and road lighting pole, length metres long (MRS93 Jun 09)	each	1	$25,000.00	$25,000.00
	DETECTOR LOOPS (MRS93 Jun 09)				
6661.01	Supply and installation of vehicle detector loops, description (MRS93 Jun 09)	lump sum			$6,000.00
	TRAFFIC SIGNAL CONTROLLER (MRS93 Jun 09)				
6673.01	Supply and installation of traffic signal controller, description of traffic signal site (MRS93 Jun 09)	lump sum			$32,000.00
6675.01	Supply and installation of Personality EPROM (MRS93 Jun 09)	lump sum			$2,000.00
6676.01	Commissioning and testing of Personality EPROM (MRS93 Jun 09)	lump sum			$1,000.00
	MAINS CONNECTION (MRS95 Jun 09)				
6831.01	Supply of mains connection equipment including the supply of mains connection cable, 150m, Mains, 16mm2, 2 cores, XLPE, PVC, Copper (MRS95 Jun 09)	each	1		$3,500.00
6832.01	Installation of mains connection including mains connection cable (MRS95 Jun 09)	each	1		$3,000.00
				Total Estimated Amount:	**$1,270,071.10**

Principal's Costs			
Road Works			
		Sub Total	**$0.00**
Preconstruction (allow 8.5% min.)			
Project Management			$0.00
Survey			$20,000.00
Options Analysis, Preliminary Design, Detailed Design			$50,000.00
Power Connection - Ergon			$10,000.00
Service Relocation - Telstra			$10,000.00
Estimating			$0.00
		Sub Total	**$90,000.00**
Implementation (allow 6.5% min.)			
Project Management			$0.00
Contract Administration			$25,000.00
Travel/accomodation			$0.00
Q Leave Fees (0.525% of Contract)	$1,270,071.10	0.00525	$6,667.87
Principal Arranged Insurance (0.65% of Contract)	$1,270,071.10	0.0065	$8,255.46
Unspecified Audit Testing			$5,000.00
Post Construction Safety Audit			$0.00
Relationship Workshop			$0.00
		Sub Total	**$44,923.34**
Finalisation (allow 0.5% min.)			
Project Management			$0.00
Finalisation report			$0.00
As Constructed Plans			$0.00
		Sub Total	**$0.00**
		Total Before Contingency	**$1,404,994.44**
Contingency (30%)			$421,498.33
		Total	**$1,826,492.77**

Appendix 3 – Site Photos

Appendix 4 – Environmental/Cultural Heritage

ENVIRONMENTAL IMPACT ASSESSMENT REVIEW – MINOR PROJECTS

Highland Infrastructure Group

PURPOSE OF CHECKLIST

- This checklist provides a minimal level of impact assessment for Safer Roads, Minor Work and Blackspot projects
- The assigned Project Manager should complete this checklist with advice from the District Environmental Officer as required
- This assessment may give rise to more detailed investigation

Project Number:	**ROC-001**		**Project Description:**	**ULDA Development Intersection**	
Location:	**Road:**	**Capricorn Highway**	**Start Chainage:**		**End Chainage:**
Scope of Works:	Signalised CHR/AUL intersection				
Assessment Officer:	**Cameron Penrose**	**Date:**	**10/01/12**	**Signature:**	
Environmental Officer		**Date:**		**Signature:**	
Manager		**Date:**		**Signature:**	

Impact Assessment Review

Flora and Fauna	**Y / N / ?**	**Description of Value and Work Impacts**	**Mitigation Strategy**
▪ Is the work located in an area of "High" environmental value? (Refer District RCEA map)	N		
▪ Does the work involve the clearing of mature vegetation? (Increased potential habitat value)	N		
▪ Does the work involve clearing marine or riverine plants? (Permit requirements may apply)	N		
▪ Does the site contain any declared plants?	N	Road Reserve well grassed and maintained.	
Soils			
▪ Is there any evidence of highly erosive soils?	N		
▪ Is the work likely to disturb acid sulphate soils? (Typically below 7m AHD)	N		
Water Quality			
▪ Is there any likelihood of works impacting on the physical or chemical properties of a watercourse, waterbody or other downstream environment?	Y	Several minor culverts within the project extents	Implement standard environmental construction practices.
▪ Will temporary erosion and sediment controls be required during works?	Y		
▪ Will disturbed areas be revegetated or otherwise stabilised?	Y	Earthworks to cut table drains	Hydromulch disturbed area
Nuisance to Sensitive Receivers			
▪ Will the works produce any noise, dust, smoke, odour, light, vibration, visual amenity or other impacts on neighbouring properties?	N	Site located away from existing properties. Implement standard environmental construction practices. Monitor dust and noise during construction.	

ENVIRONMENTAL IMPACT ASSESSMENT REVIEW – MINOR PROJECTS

Highland Infrastructure Group

Waste Management			
▪ Will the works produce any waste/spoil intended for on-site disposal? (Detail disposal intentions)	Y		Excess spoil to be used for subdivision internal road construction.
▪ Will the works produce any waste/spoil that require off-site disposal? (Detail disposal intentions)	N		
Cultural Heritage			
▪ Are all works contained within limits of existing catch points (Category 4 land)? (If "No" refer to E&H Unit for CH Evaluation)	Y	Site shows evidence of previous disturbance.	
Other (insert others)			
▪			
▪			
▪			
▪			
▪			
▪			
Referral			
▪ Does the environmental impact of this work require further investigation by the Environmental Officer?	N		

Notes