LOCAL AUTHORITY SPECIFIC REQUIREMENTS

INTRODUCTION

This Section contains variations and additions to the Operational Works Guidelines, which are considered necessary for the effective application of the Guidelines in Cairns Regional Council and shall be treated as amendments to the Guidelines.

CONTENTS

The following sections have varied or additional clauses

CLAUSE **CONTENTS** **PAGE**

APPENDIX A **DELETED**

APPENDIX B **FIELD OUTSTATION RTU REQUIREMENTS**

APPENDIX C **ASPHALT SPECIFICATION "CRC 10"**

CONSTRUCTION PROCEDURES

APPENDIX P – 4. DRAFTING REQUIREMENTS ("AS CONSTRUCTED")

SUBSITUTE CLAUSE

1. Area Prefix numbers are listed in the Table below: The "Sewer Main Number" and "Manhole Numbers" are to be as designated on the relevant design drawings.

SUBURB NAME	ALPHA CODE	SUBURB NAME	ALPHA CODE	SUBURB NAME	ALPHA CODE
Aeroglen	AG	Edge Hill	EH	Noah	NO
Aloomba	AL	Edmonton	ED	Oak Beach	OB
Babinda	BA	Ellis Beach	EB	Palm Cove	PC
Bamboo	BO	Finlay Vale	FV	Parramatta Park	PP
Bartle Frere	BF	Fishery Falls	FF	Portsmith	PS
Barron Gorge	BG	Forest Creek	FC	Port Douglas	PD
Bayview Heights	BH	Freshwater	FW	Redlynch	RL
Bellenden Ker	BL	Goldsborough	GB	Rocky Point	RP
Bessie Point	BP	Gordonvale	GV	Rural	RR
Bentley Park	BK	Green Island	GI	Shannonvale	SH
Bloomfield	BI	Group Titles	GT	Smithfield	SM
Bonnie Doon	BD	Holloways Beach	HB	Spurgeon	SP
Bramston Beach	BB	Kamerunga	KA	Stewart Ck Valley	SC
Brinsmead	BM	Kanimbla	KI	Stratford	ST
Cairns North	CN	Kewarra Beach	KB	Syndicate	SY
Cape Tribulation	CT	Killaloe	KL	Thornton Beach	TH
Caravonica	CV	Kimberley	KM	Trinity Beach	TB
Cassowary	CA	Low Isles	LI	Trinity Park	TP
Centenary Park	CP	Lower Daintree	LD	Upper Daintree	UD
City of Cairns	CC	Machans Beach	MB	Wangetti	WA
Clifton Beach	CB	Manoora	MR	Westcourt	WC
Cooya Beach	CY	Manunda	MU	White Rock	WR
Cow Bay	CO	Meringa	ME	Whitfield	WF
Craiglie	CR	Miallo	MI	Wonga	WG
Dagmar	DA	Miriwinni	MW	Whyanbeel	WY
Daintree	DN	Mooroobool	ML	Woolanmaroo	WM
Dedin	DD	Mossman	MO	Wooroonooran	WO
Degarra	DG	Mossman Gorge	MG	Woree	WE
Deeral	DE	Mowbray	MY	Yorkeys Knob	YK
Diwan	DI	Mount Sheridan	MS		
Earlville	EV	Newell	NE		

DESIGN GUIDELINE – D1 ROAD GEOMETRY

D1.22 SIGNS AND ROAD MARKINGS

SUBSTITUTE CLAUSE

Street signs installed within Cairns Regional Council are to be in accordance with CRC specific standard drawing S1040 – CRC.

DESIGN GUIDELINE - D3 ROAD PAVEMENTS

D3.14 ASPHALTIC CONCRETE

SUBSTITUTE CLAUSE

4. For all asphalt surfacing within Cairns Regional Council Local Authority, up to 30mm thickness, the asphalt grading defined as “CRC 10” shall be used. Refer to Appendix C for details

DESIGN GUIDELINE – D4 STORMWATER DRAINAGE

D4.05 DESIGN AVERAGE RECURRANCE INTERVAL

ADDITIONAL CLAUSES

3. Due to the nature of the topography within and around Cairns City, varying design criteria have been developed for different areas.

4. Figure D4.01 shows areas of the Cairns City where different design criteria apply. Area B generally relates to the historical developed area between the Whitfield Ranges and the Trinity Inlet where existing drainage systems are constrained by tidal influence. Area B is divided into the High Zone and Low Zone as indicated on Figure D4.02. Design criteria within the Area B (Low Zone) have been established to ensure that primary drainage systems are designed taking into account established tailwater levels as adopted by Cairns Regional Council. Tailwater levels for design of primary drainage systems within the Area B (Low Zone) area shall be as advised by the Council.

5. The design Annual Recurrence Intervals for all forms of development are as follows (these requirements shall apply in lieu of the requirements specified in Table 7.02 of the QUDM):

6. Within the Low Zone of Area B, Council will allow a minimum of 150mm freeboard from Habitable Floor levels to the 1 in 100 year ARI storm tide or flood event, whichever is the higher level. This level should be confirmed by Council prior to proceeding with any planning work. Within the High Zone of Area B, and the whole of Area A, the provisions of QUDM for freeboard are to apply.

   AREA A – (Relates to all areas within Cairns Regional Council’s area of responsibility not included in Area B – Refer Figure D4.01).

   In accordance with Table 7.02.1 of the QUDM

   AREA B (High Zone) – Refer Figure D4.02)

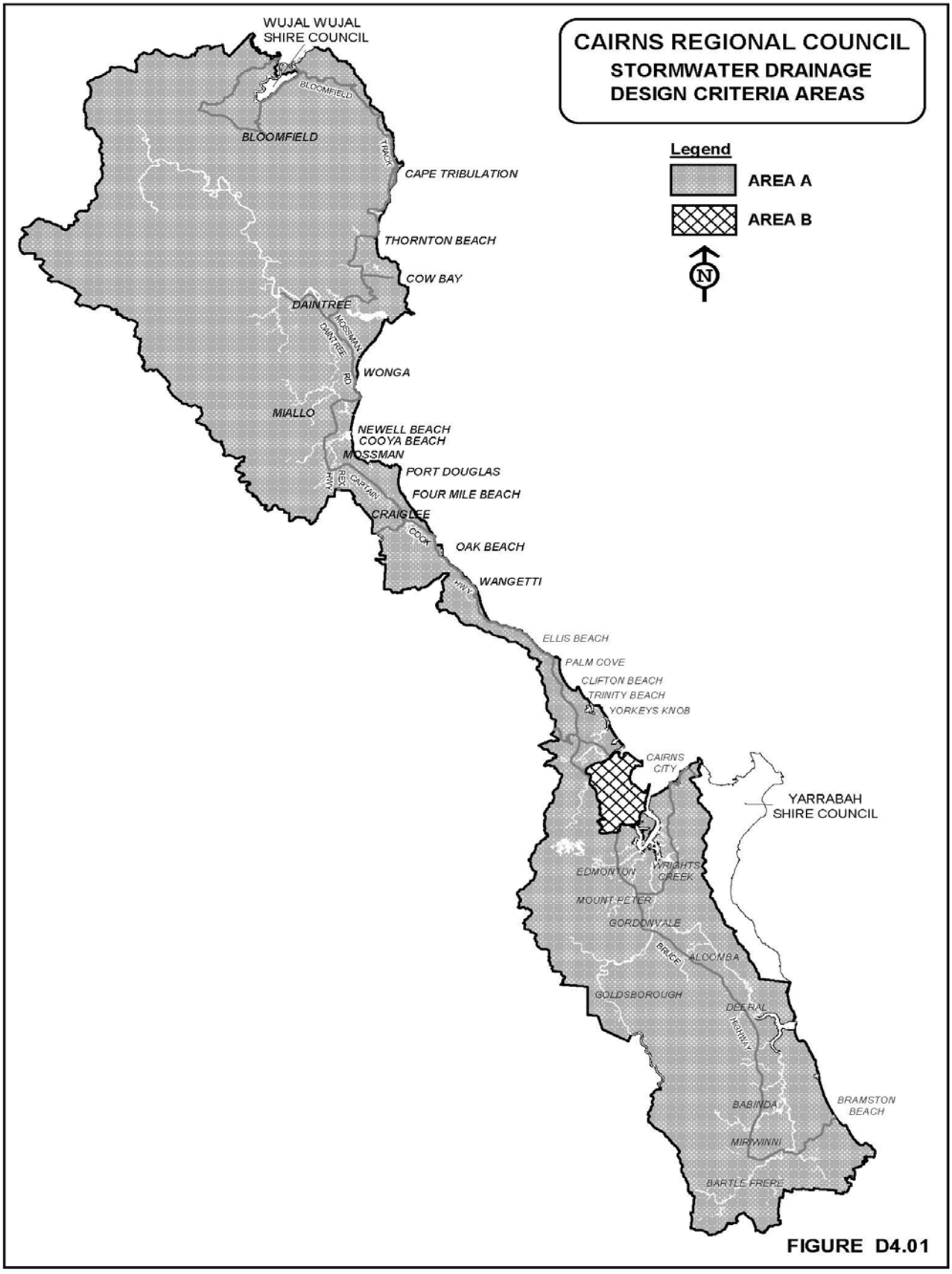
   Major System Design – ARI 100 years. (Downstream emergency relief paths in low zone to be checked).

Minor System Design	–	ARI 5 years (with the exception of "Greenfield Sites", that subject to Council approval may be ARI 2 year).
Cross Drainage	-	ARI 10 years for all roads.

AREA B (Low Zone – Refer Figure D4.02))

Major System Design	-	Surcharge paths for flows greater than ARI 5 years and overland flow paths shall be checked to ensure that flows do not enter private property, or cause local flooding and are conveyed to receiving water without causing damage to private property or municipal works.
Minor System Design	-	ARI 5 years
Cross Drainage	-	ARI 5 years for all roads.

6. Council will allow a minimum of 150 mm freeboard from Habitable Floor levels to the 1 in 100 year ARI storm tide flood event in accordance with Council's Flood Management Code.


CAIRNS REGIONAL COUNCIL
STORMWATER DRAINAGE
DESIGN CRITERIA AREAS
Legend
AREA A
AREA B
N
WUJAL WUJAL
SHIRE COUNCIL
BLOOMFIELD
BLOOMFIELD TRACK
CAPE TRIBULATION
THORNTON BEACH
COW BAY
DAINTREE
MOSSMAN DAINTREE RD
WONGA
MIALLO
NEWELL BEACH
COOYA BEACH
MOSSMAN
PORT DOUGLAS
CAPTAIN COOK HWY
FOUR MILE BEACH
CRAIGLEE
OAK BEACH
WANGETTI
HWY
ELLIS BEACH
PALM COVE
CLIFTON BEACH
TRINITY BEACH
YORKEYS KNOB
CAIRNS CITY
YARRABAH
SHIRE COUNCIL
EDMONTON
WRIGHTS CREEK
MOUNT PETER
GORDONVALE
BRUCE HIGHWAY
ALOOMBA
GOLDSBOROUGH
DEERAL
BABINDA
BRAMSTON BEACH
MIRIWINNI
BARTLE FRERE
FIGURE D4.01


STORMWATER DRAINAGE
AREA B HIGH & LOW ZONES
Barron
River
KAMERUNGA
ROAD
STRATFORD PDE
CAPTAIN COOK HIGHWAY
AEROGLEN
STRATFORD
FRESHWATER
HIGH ZONE
RICHARDSON ST
RUSSELL ST
AIRPORT AVE
WHITFIELD
EDGE HILL
WESTERN
BRINSMEAD
JENSEN ST
COLLINS AVE
CAIRNS NORTH
GREENSLOPES ST
POLENTZ ST
CALDER ST
Cairns Harbour
ARTERIAL RD
RESERVOIR ROAD
MANOORA
ANDERSON ST
ENMORE ST
PEASE ST
MANUNDA
CAIRNS CITY
KANIMBLA
MURRAY ST
LOW ZONE
PARRAMATTA PARK
LAKE MORRIS RD
MOODY ST
SWALLOW ST
WESTCOURT
CALLUM ST
MULGRAVE RD
MOOROOBOOL
BUNGALOW
RAY JONES DRIVE
EARLVILLE
HIGH ZONE
Chinaman Creek
PORTSMITH
TOOGOOD RD
JACKSON DR
BAYVIEW HEIGHTS
WOREE
ANDERSON RD
N
BRUCE HWY
0 0.5 1 2
kilometres
WHITE ROCK
FIGURE D4.02

DESIGN GUIDELINE - D6 WATER RETICULATION

D6.17 TELEMETRY SYSTEMS

ADDITIONAL CLAUSE

2. SCADA telemetry for field outstations shall be in accordance with Council's Field Outstation RTU Requirements. Refer **Appendix B** at the end of this section.

DESIGN GUIDELINE - D7 SEWERAGE

D7.13 PROPERTY CONNECTION

SUBSITUTE CLAUSE

1. All House Connection Branches (HCB's) constructed within Cairns Regional Council shall be constructed in accordance with CRC standard drawing S3005 – CRC.

D7.25 TELEMETRY SYSTEMS

ADDITIONAL CLAUSE

2. SCADA telemetry for field outstations shall be in accordance with Council's Field Outstation RTU Requirements. Refer **Appendix B** at the end of this section.

CAIRNS REGIONAL COUNCIL STANDARD DRAWINGS

1. The following additional Standard Drawings, shall be deemed to be applicable for those works that shall ultimately become Cairns Regional Council's responsibility for ongoing maintenance:

Roadwork's & Drainage

S1010C-CRC	**Public Utilities on Road Verges**
S1020A-CRC	**Segmental Paving Units**
S1040B-CRC	**Street Signage**

Water

S2000A-CRC	**Valve Box Installation**
S2001A-CRC	**Air Valve Pit - Dia. 50mm & Dia. 80mm Air Valves**
S2005A-CRC	**Hydrant Box Installation**
S2010A-CRC	**Marker Plates and Kerb Marking**
S2015A-CRC	**Thrust Block Details**
S2016A-CRC	**Water Reticulation Bedding Details**
S2020A-CRC	**Main Connection Details**
S2025A-CRC	**Water Service Road Crossings Low Density Urban**
S2035-CRC	**Water Reservoir Level Indicator Details (Under revision, refer CRC for guidance)**
S2038A-CRC	**Standard Arrangement of 20mm Water Service Installation & recycled water installations**
S2040-CRC	**(Deleted – refer CRC for guidance)**
S2041-CRC	**(Deleted – refer CRC for guidance)**
S2042-CRC	**(Deleted – refer CRC for guidance)**
S2043-CRC	**(Deleted – refer CRC for guidance)**
S2050A-CRC	**Standard Arrangement of >80mm Water & Fire Service Installation**

Sewerage

S3000B-CRC **Sewerage Manholes**

S3005A-CRC **Property Connection Branches**

S3010A-CRC **Connection To Existing Sewer Mains**

S3015A-CRC **Sewer Bedding & Trench Details**

S3020B-CRC **Sewerage Pump Station Cast In Situ**

S3025A-CRC **Sewerage Pump Station Precast Units**

S3030A-CRC **Sewerage Pump Station Details**

S3035A-CRC **Pump Station Overflow**

S3040-CRC **(Deleted – refer CRC for guidance)**

S3041-CRC **(Deleted – refer CRC for guidance)**

S3042-CRC **(Deleted – refer CRC for guidance)**

S3043-CRC **(Deleted – refer CRC for guidance)**

S3045-CRC **(Deleted – refer CRC for guidance)**

S3046-CRC **(Deleted – refer CRC for guidance)**

S3047-CRC **(Deleted – refer CRC for guidance)**

S3048-CRC **(Deleted – refer CRC for guidance)**

S3049-CRC **(Deleted – refer CRC for guidance)**

Landscaping

S4010A-CRC **Typical Planting Plan & Plant Schedule**

S4020A-CRC **Typical Hard Landscape Plan**

S4110A-CRC **Landscaping Guidelines - Tree Grate Type 1**

S4120A-CRC **Landscaping Guidelines - Footpath Planter Type A**

S4130A-CRC **Landscaping Guidelines - Footpath Planter Type B**

S4140A-CRC **Landscaping Guidelines - Footpath Planter Type C**

S4150A-CRC **Landscaping Guidelines - Footpath Planter Type D**

S4160A-CRC **Landscaping Guidelines - Footpath Planter Type E**

S4200A-CRC **Verge Landscaping Guidelines - Tree Planting: Setout**

S4210A-CRC **Urban Street Tree Planting**

S4220A-CRC **Car Park Tree Planting**

S4310B-CRC Landscaping Guidelines - Timber Bollard

Miscellaneous

S9000A-CRC Water and Sewer Pump Station – Preferred Equipment List

S9004A-CRC Water and Sewer Pump Station – Generator Autochangeover Circuit

S9005A-CRC Water and Sewer Pump Station – Flow Meter Wiring

S9006A-CRC Water and Sewer Pump Station – Pump Control Switchboard Solar Shade To Suit 1300mm Wide Switchboard

S9007A-CRC Water and Sewer Pump Station – - Pump Control Switchboard Solar Shade To Suit 2150 Wide Switchboard

S9015A-CRC Levels Datum

APPENDIX A

DELETED

APPENDIX B

FIELD OUTSTATION RTU REQUIREMENTS

*CRC Version **1878623-v2***

Field Outstations

Cairns Water require that all the following characteristics are fully supported in tendered field RTU's.

Time stamping. Time stamped logging of all events both for non-critical events and change of state.

***Background polling*.** Background polling requests data logged in the RTU since the last poll, and updates the HMI historical database. For efficient operation the background polls occur at suitably long intervals, ensuring that a suitable "window" exists for any report-by-exception communications from the field RTU to occur. This ensures that the site is still communicating and that any important trends are accumulated by the Supervisory system and are available for viewing on the SCADA system.

Report by exception. In the event of an alarm or other abnormal condition, the RTU is able to notify the SCADA system of the condition, and the Supervisory system is able to immediately request all logged data since the last poll. This allows any trend leading up to the alarm or abnormal condition to be analyzed by the system or operators.

Intelligent device. The RTU must be able to support both internal data logging and complex mathematical and control functionality. This ability allows raw data to be processed in the field. With considered implementation the data retrieval can be maximized while minimizing the use of the communications bandwidth.

Open Standards protocol. Support of Open Standards for both communications protocol and the RTU programming language. The RTU must be able to communicate with the SCADA using the DNP 3 protocol.

Remote programming. The RTU must be able to be configured, programmed and reset remotely via the telemetry radio network.

Field Outstation Inputs & Outputs

Analogue Inputs
All analogue inputs must be calibrated to provide loop fail detection. They are to be 4 to 20mA signals and must be calibrated from 3.5mA to 20.5mA for loop or device failure detection.

Analogue Outputs
All analogue outputs must be able to provide 4 to 20mA signals into an 850 ohm load and must be calibrated from 3.5mA to 20.5mA for loop or device failure detection.

DC power supply
A 24VDC supply must be included in the RTU for use with the inputs and outputs so that any devices providing / receiving the 4 to 20mA signals can be powered from the DC supply via these signals.

Digital Inputs
Input signals must be from voltage-free contacts. The RTU is to supply the switching voltage. The state (on/off) of each input must be displayed on a light emitting diode to allow for on site interrogation without the need for panel lights.

Digital Outputs
Outputs are to be voltage-free contacts rated at 0.5A at 24VDC or 32VAC. The state (on/off) of each outputmust be displayed on a light emitting diode to allow for on site interrogation without the need for panel lights.

Field Outstation Data
The Field Outstation equipment must be able to provide any combination of water and wastewater control functions and monitoring. The speed with which a new sewerage or water station can be added to the system by an end user will be important selection criteria. RTU's, that require specialized integration, will not be considered. In order to evaluate the likely time required for configuration of a new water or wastewater pumping station into the "SCADA System", details are given below of the minimum Station I/O, Derived Data, Control Function and Statistical Functions.

Wastewater Pump station RTU I/O Requirements

The following station I/O is required where the RTU will perform individual pump control based on well level (all inputs and outputs are active high unless specified otherwise):

Standard Inputs and Outputs for 2 pump Sewage Pumping Station Table 1

Standard Inputs and Outputs for 2 pump Sewage Pumping Station					
I/O	No	Kingfisher Slot/Card/Pin No	Description	System	Input Mechanism
Digital Input	1	15/IO3/T10	Pump 1 is Running	Pump 1	Run Relay
	2	15/IO3/T11	Pump 1 has a Fault	Pump 1	Fault Relay
	3	15/IO3/T12	Pump 1 is in Auto Mode	Pump 1	Pump 1 Control Switch: Auto/Off/Local in Auto position
	4	15/IO3/T13	Pump 1 is in Local Mode	Pump 1	Pump 1 Control Switch: Auto/Off/Local in Local position
	5	16/IO3/T10	Pump 2 is Running	Pump 2	Run Relay
	6	16/IO3/T11	Pump 2 has a Fault	Pump 2	Fault Relay
	7	16/IO3/T12	Pump 2 is in Auto Mode	Pump 2	Pump 2 Control Switch: Auto/Off/Local in Auto position
	8	16/IO3/T13	Pump 2 is in Local Mode	Pump 2	Pump 2 Control Switch: Auto/Off/Local in Local position
	9	14/DI5/T4	Wet Well level is Very High	Common	Float Switch (for alarm redundancy & control redundancy)
	10	14/DI5/T5	Wet well is Overflowing	Common	Float Switch (for EPA requirements)
	11	14/DI5/T2	Flow Pulse	Common	Flow Pulse Relay
	12	14/DI5/T3	Station has Phase Failure	Common	Phase Failure Relay
	13	14/DI5/T1	Rain Gauge	Ancillary	Tipper bucket , 0.2mm tip
	14	14/DI5/T6	Wet well exhaust fan is running	Common	Current Sensing Relay
	15	14/DI5/T14	"Generator Set is in Auto Mode"	Generator Set	Contacts in Gen Set cabinet
	16	14/DI5/T13	Generator Set has Fault	Generator Set	Contacts in Gen Set cabinet
	17	14/DI5/T12	Generator Set is "On Line"	Generator Set	Contacts in Gen Set cabinet
	18	14/DI5/T7	Sump Pump is Running	Dry Well Sump	Run Relay
	19	14/DI5/T8	Sump Pump has a Fault	Dry Well Sump	Fault Relay
	20	14/DI5/T11	Sump Liquid Level is High	Dry Well Sump	Float Switch
	21	14/DI5/T17	Spare		
	22	14/DI5/T18	Station is being Accessed	Common	Door switches
	23	14/DI5/T15	Spare		
	24	14/DI5/T16	Spare		
Digital Output	1	15/IO3/T15	Run Pump 1	Pump 1	Contacts to control relay
	2	15/IO3/T16	Reset Pump 1	Pump 1	Contacts to control relay
	3	16/IO3/T15	Run Pump 2	Pump 2	Contacts to control relay
	4	16/IO3/T16	Reset Pump 2	Pump 2	Contacts to control relay
	5	16/IO3/T17	Well Wash Spray	Wet Well	Contacts to control relay
Analogue Input	1	15/IO3/T1	Pump 1 Motor Current	Pump 1	AC currnet transducer
	2	16/IO3/T1	Pump 2 Motor Current	Pump 2	AC currnet transducer
	3	15/IO3/T2	Wet Well Level	Common	Pressure transducer
	4	15/IO3/T3	Sewage Flow Rate	Common	Flow Meter (if available)
	5	15/IO3/T4	Ground Water Level	Ancillary	Water Level transducer (if available)
	6	16/IO3/T2	Discharge/Mains Water Pressure	Ancillary	Water Pressure transducer (if available)
Analogue Output	1	15/IO3/T7	Pump 1 VSD Speed	Pump 1	4-20mA or 0-10 V (if present)
	2	16/IO3/T7	Pump 2 VSD Speed	Pump 2	4-20mA or 0-10 V (if present)

Note: All inputs are active high

.
A Diesel Pump shall be configured as a generator set, except that it shall run in case of both standard pumps being unavailable or in fault, and reservoir filling is required.

Note: All digital inputs and outputs are active high.
The RTU should include some additional I/O or allow additional I/O cards to be
added. Each RTU must have the I/O per pump as listed above with the General Station I/O customised in standard configurations to suit individual station requirements.

Waste water pump station control is generally to be driven using a pressure transducer level signal from the station wetwell. The Generator Fault Input is a combination of Low Battery Voltage, Low Fuel Level, and critical Generator Faults (Low oil pressure, water temperature, no fuel etc)

The RTU should include some additional I/O or allow additional I/O cards to be added. Each RTU must have the I/O per pump as listed above with the General Station I/O customized in standard configurations to suit individual station requirements. The RTU should include some additional I/O and/or allow additional I/O cards to be added. The RTU at every pumping station must calculate an estimate of flow from pump operations, given the well parameters. The current transmitters are used for determining possible pump choke or ragging. If the station current usage is outside a pre-determined band for "XX" seconds then this may indicate a pump ragging. Excessive current may mean a faulty bearing or similar, while a decrease in current may mean impeller damage or ragging of the impeller. Maximum & minimum allowed current set points are to be retained in the RTU for comparison and alarming. The value must be adjustable via the SCADA.

Wastewater Pump Station I/O between RTU and SCADA

The RTU is to perform calculations and station monitoring, based on set points and parameters adjustable via the SCADA. This allows standardization of the RTU programs, it allows flexibility of calculations, flexibility of alarming and of pump control duty and other functions. The modules within the RTU code for monitoring and calculating information based on optional devices such as a rain gauge and flow meter are to be enabled and disabled via the SCADA without the need to reprogram the RTU. Because the calculations are done in the RTU, accurate time stamped events are possible. All RTU data provided to the SCADA is to be time stamped in the RTU. Should the RTU lose connection with the SCADA, the RTU must store the events until they are later transferred to the SCADA database.

NOTES:
All daily totalisation uses a rollover time of Midnight .
A pump becomes unavailable when any of the following occur:

- . There is a AC phase failure
- . The station is inhibited (by SCADA)
- . The pump has a fault
- . The pump has failed to start, and this condition has not been reset by the SCADA
- . The RTU input pump auto is false

When a pump becomes unavailable, the other available pump(s) must take over the pumping duty automatically. The SCADA operator will use the Control points to override normal automatic operation of the station and individual pumps. The Analogue Set points are used to set station operating and alarm parameters. The RTU control program must be capable of the control functions and calculations indicated by the RTU I/O and RTU/SCADA I/O listed above. The adjustment of the setpoints is to be via SCADA. The adjustments must not require modification of the RTU's control program.

Water Supply Pump station I/O Requirements

The following station I/O is required for sites where the RTU will perform individual pump control based on a controlled reservoir level:

Standard Inputs and Outputs for 2 pump Water Pumping Station Table 2

Standard Inputs and Outputs for 2 pump Water Pumping Station					
I/O	No	Kingfisher Slot/Card/Pin No	Description	System	Input Mechanism
Digital Input	1	15/IC3/T10	Pump 1 is Running	Pump 1	Run Relay
	2	15/IC3/T11	Pump 1 has a Fault	Pump 1	Fault Relay
	3	15/IC3/T12	Pump 1 is in Auto Mode	Pump 1	Pump 1 Control Switch: Auto/Off/Local in Auto position
	4	15/IC3/T13	Pump 1 is in Local Mode	Pump 1	Pump 1 Control Switch: Auto/Off/Local in Local position
	5	16/IC3/T10	Pump 2 is Running	Pump 2	Run Relay
	6	16/IC3/T11	Pump 2 has a Fault	Pump 2	Fault Relay
	7	16/IC3/T12	Pump 2 is in Auto Mode	Pump 2	Pump 2 Control Switch: Auto/Off/Local in Auto position
	8	16/IC3/T13	Pump 2 is in Local Mode	Pump 2	Pump 2 Control Switch: Auto/Off/Local in Local position
	9	14/DI5/T18	Station is being Accessed	Common	Door switches
	10	14/DI5/T3	Station has Phase Failure	Common	Phase Failure Relay
	11	14/DI5/T1	Rain Gauge	Ancillary	Tipper bucket , 0.2mm tip
	12	14/DI5/T2	Flowmeter Pulse	Ancillary	Pulse per kilolitre
	13	14/DI5/T7	"Generator Set is in Auto Mode"	Generator Set	Contacts in Gen Set cabinet
	14	14/DI5/T6	Generator Set has Fault	Generator Set	Contacts in Gen Set cabinet
	15	14/DI5/T5	Generator Set is "On Line"	Generator Set	Contacts in Gen Set cabinet
	16	14/DI5/T8	Generator Set Low Fuel Level	Generator Set	Float Switch
	17	14/DI5/T9	Plant Fault	Ancillary	Fault Relay
Digital Output	1	15/IC3/T15	Run Pump 1	Pump 1	Contacts to control relay
	2	15/IC3/T16	Reset Pump 1	Pump 1	Contacts to control relay
	3	16/IC3/T15	Run Pump 2	Pump 2	Contacts to control relay
	4	16/IC3/T16	Reset Pump 2	Pump 2	Contacts to control relay
Analogue Input	1		Spare		
	2		Spare		
	3		Spare		
	4	16/IC3/T4	Flow Rate	Common	Flow Meter (if available)
	5		Spare		
	6		Spare		
	7		Spare		
	8		Spare		
Analogue Output	1				4-20mA or 0-10 V (if present)
	2				4-20mA or 0-10 V (if present)

A Diesel Pump shall be configured as a generator set, except that it shall run in case of both standard pumps being unavailable or in fault, and reservoir filling is required.

Note: All digital inputs and outputs are active high.
The RTU should include some additional I/O or allow additional I/O cards to be added. Each RTU must have the I/O per pump as listed above with the General Station I/O customised in standard configurations to suit individual station requirements.

The Pump Control is generally to be driven using a DNP3 level signal from a remote reservoir. The Generator Set Fault Input is a combination of Generator Low Battery Voltage, Generator Low Fuel Level, and critical Generator Faults (Low oil pressure, water temperature, no fuel etc)

Water Supply Pump Station I/O between RTU and SCADA

The RTU is to perform calculations and station monitoring, based on setpoints and parameters adjustable via the SCADA. This allows standardisation of the RTU programs, it allows flexibility of calculations, flexibility of alarming and of pump control duty and other functions. The modules within the RTU code for monitoring and calculating information based on optional devices such as a rain gauge and flow meter are to be enabled and disabled via the SCADA without the need to reprogram the RTU. Because the calculations are done in the RTU, accurate time stamped events are possible. All RTU data provided to the SCADA is to be time stamped in the RTU. Should the RTU lose connection with the SCADA, the RTU must store the events until they are later transferred to the SCADA database.

NOTES:
All daily totalisation uses a rollover time of midnight .
A pump becomes unavailable when any of the following occur:

- . There is a AC phase failure
- . The station is inhibited by SCADA
- . The pump has a fault
- . The pump has failed to start, and this condition has not been reset by the SCADA
- . The RTU input pump auto is false

When a pump becomes unavailable, the other available pump(s) must take over the pumping duty automatically. The SCADA operator will use the control points to override normal automatic operation of the station and individual pumps. The analogue Set points are used to set station operating and alarm parameters. The RTU control program must be capable of the control functions and calculations indicated by the RTU I/O and RTU/SCADA I/O listed above. The adjustment of the set points is to be via SCADA. The adjustments must not require modification of the RTU's control program.

Standard RTU control functions for Wastewater and Water Supply pumping stations.

Well Level Control / Reservoir Level Control using SCADA adjustable set points for Duty Pump Start, Standby Pump Start & Pump Stop, and using the input from an analogue level transmitter or a reservoir level from a remote peer RTU at a reservoir. The RTU will activate a Pump Run Output when the well/reservoir level reaches the Duty Pump Start set point and deactivate the output when the level reaches the Pump Stop setpoint. The pump to be started will be determined by the duty control option selected. See below.

Pump Duty Control with user selectable options for:
CYCLE: where pump duty is swapped at the end of each pump cycle to ensure even run times of both pumps.
DUTY 1-2: where Pump 1 is the duty pump & Pump 2 is standby.
DUTY 2-1: where Pump 1 is the duty pump & Pump 2 is standby.

Duty Level Override must be provided for testing purposes to allow the operator to start the station if it is between normal Start & Stop Levels. The station would start and run until the Stop level is reached and then return to normal operation.

Maximum Permitted Pumps must be provided to allow the operator to specify how many pumps can run at one time. The Hydraulic Design of the station or the capacity of the electricity supply to the station will determine this. If the maximum permitted number of pumps is 1, it is assumed that one pump can cover all pumping requirements. If the duty pump is running and the well/reservoir level reaches the Standby Pump Start level, the Duty pump should stop and the Standby pump will start in its place as it is assumed that there may be a problem with the first pump. If the maximum permitted number of pumps is 2, it is assumed that in times of high flow that two (2) pumps will be required to run. The Standby Duty pump will start if the Standby Pump Start level is reached and both pumps will cut-out when the Pump Stop Level is reached.

Station & Pump Inhibit - this option must be provided to allow the operator to inhibit a pump from running or the entire station for maintenance purposes. This command will generate some form of feedback to notify the operator that the station is inhibited.

Setpoint checks must be performed by the RTU program to confirm the validity of setpoints entered. This is to ensure that there is no logic error in the values entered. Default setpoints must also be provided within the RTU program to ensure that the program will operate when loaded for the first time without the need to enter setpoints.

Pump Current Monitoring (SEWER SITES ONLY) must be implemented utilising a current transducers monitoring current of each pump. The program should compare the pump current against the *Normal Pump Current* setpoint and see whether it is above or below a tolerance setpoint. This must flag an alarm if the pump is running out of its rated range. It may also be an option to take some action within the program such as change pump duty.

Optional Control Functions

Reservoir Fill Control – reservoir should periodically send a refresh command to the pump station while it requests water, the pump station receiving the refresh command must start a watchdog timer that is reset by each refresh. If a refresh is not received within the watchdog period, the pump station RTU will stop pumping.

STANDARD STATISTICAL FUNCTIONS

All statistical functions are to work based on day running from midnight to midnight the next morning. This enables the various personnel to have the latest information available at the commencement of their work each day.

Pump Starts Totalisation must count the *Starts in the last hour* as this relates to the capacity of the motor starter, which generally has a starts/hour rating. This *Starts in the last hour* figure should be compared with a *Normal Starts* setpoint and flag an alarm if exceeded. Values for Pump Starts Today & Yesterday must also be calculated. The value for yesterday will be uploaded to the SCADA for use in calculations to provide Weekly, Monthly & Annual figures.

Pump Hours Run Totalisation must count the hours run since the pump has started. This *Hours Run Since Start* figure should be compared with a *Normal Hours* setpoint and flag an alarm if exceeded. This would come into play if there was a problem with the pump impeller or a faulty level transmitter where the well level failed to reach the Pump Stop setpoint. Values for Pump Hours Run Today & Yesterday must also be calculated. The value for yesterday can uploaded to the SCADA for use in calculations to provide Weekly, Monthly & Annual figures.

OPTIONAL STATISTICAL FUNCTIONS

Station Flow Totalisation should totalise the station inflow signal to provide total flow figures for Today &Yesterday. The value for yesterday can uploaded to the SCADA for use in calculations to provide Weekly, Monthly & Annual figures. It is preferred that the RTU totalise the raw count and apply a scaling factor at the SCADA. This is done to keep program generic and suitable for any flow meter scaling.

Water Supply Reservoir I/O Requirements

The reservoir I/O required for sites will depend upon proposal, contact Cairns Regional Council, Water & Waste SCADA Co-ordinator for requirements.

Water Supply Multiple Booster Pressure Pump Station I/O Requirements

The Booster Pressure Pump Station I/O required for sites will depend upon proposal, contact Cairns Regional Council, Water & Waste SCADA Co-ordinator for requirements.

APPENDIX C

ASPHALT SPECIFICATION "CRC 10"

CAIRNS REGIONAL COUNCIL ASPHALT SPECIFICATION " CRC 10"

MODIFIED GRADING LIMITS
FOR COMBINED AGGREGATE/FILLER IN 10mm STANDARD ASPHALT

A.S. Sieve Size (mm)	Percent Passing By Mass (%)
13.20	100
9.50	95 - 100
4.75	66 - 80
2.36	38 - 52
0.600	23 - 29
0.300	16 - 22
0.150	7 - 13
0.075	3 - 7
Binder Content	**5.40 – 6.00 %**