

Challenges facing WRC W&S







Water Quality







Asset management

Water Quality

Primary Obligation = Maintaining a safe water supply

Water Supply (Safety and Reliability) Act 2008

Framework for risk based approach to water quality management need for Water Quality management plans (DERM)
WRC required to demonstrate to the Regulator what steps are being taken to address risk

Public Health Act 2005

Water quality limits for health based parameters
Reliability and repeatability of water quality
Sets out requirement for monitoring

Australian Drinking Water Guidelines (ADWG)
Benchmark for drinking water quality



Where does it come from?



- Geographical spread
- Poor scada and telemetry control
 - Diversity of supplies = sources, methods
 - •Potential for poor raw water quality
- •Bowen & Proserpine Lack of available treatment infrastructure = Chlorination only
- •Bowen supply Pipeline approx 50klm - 'slothing' of Mn and Fe deposits contributes to dirty water events



What's with the water!?

Bowen = Dirty Water Events (Iron (Fe), Manganese (Mn), and Turbidity)

Proserpine = Dirty Water Events (Mn) and Aggressive Water (Low pH, High CO₂)

Recent Ecoli. incidents

Typically represent exceedance of 'Aesthetic Threshold Values' as per ADWG

ADWG 'Health Threshold Values' have been exceeded



Water Quality Issues - Bowen

Dirty Water complaints typically associated with high iron and manganese levels

Proserpine Intake primarily responsible (Inc Happy Valley Ck)

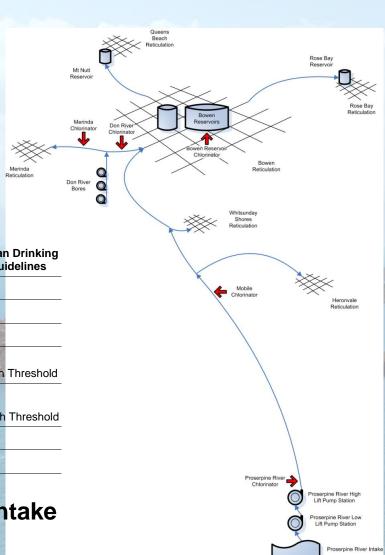
Don River Borefield - occasional 'spikes in hardness' scaling (CaCO₃)

No current treatment

Parameter	Mean	Min	Max	Australian Drinking Water Guidelines
Ph	7.6	7.1	8.1	6.5-8.5
Alkalinity (mg/L CaCO ₃)	75	58	102	> 40
Hardness (mg/L CaCO ₃)	102	60	156	< 200 1
Total Iron (mg/L)	0.14	0.04	0.7	< 0.3 ² No Health Threshold
Total Manganese (mg/L)	0.18	0.02	0.27	<0.1 ³
				0.5 Health Threshold
Turbidity (NTU)	1.56	0.6	11	< 1
Colour (Hazen Units)	4.5	1	14	< 5

Historical WQ Data for Proserpine Intake

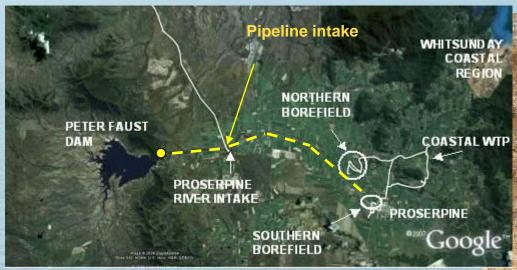








Proserpine Intake





Whitsunday Regional Council

Proserpine Intake spears exposed



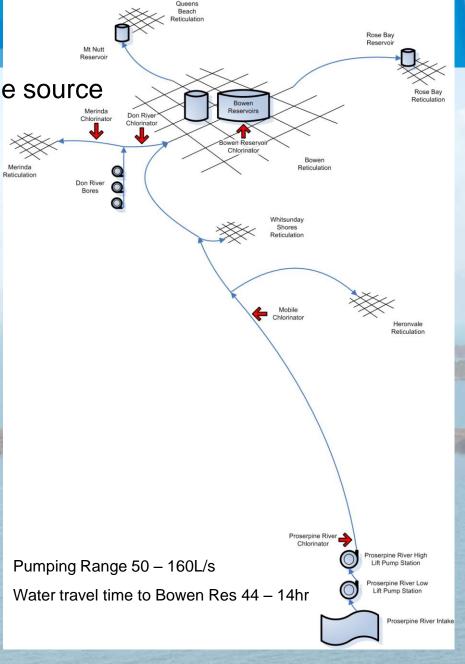


Proserpine Pipeline – DN450 MSCL

Ecoli Outbreaks

Long transportation from Proserpine source

Dosing pump failure
Poor scada / telemetry
No inline testing chlorine probe
Condition of Reservoirs





So what are we doing about it?



Council have completed the design, documentation, tendering and awarding of two water treatment plants.

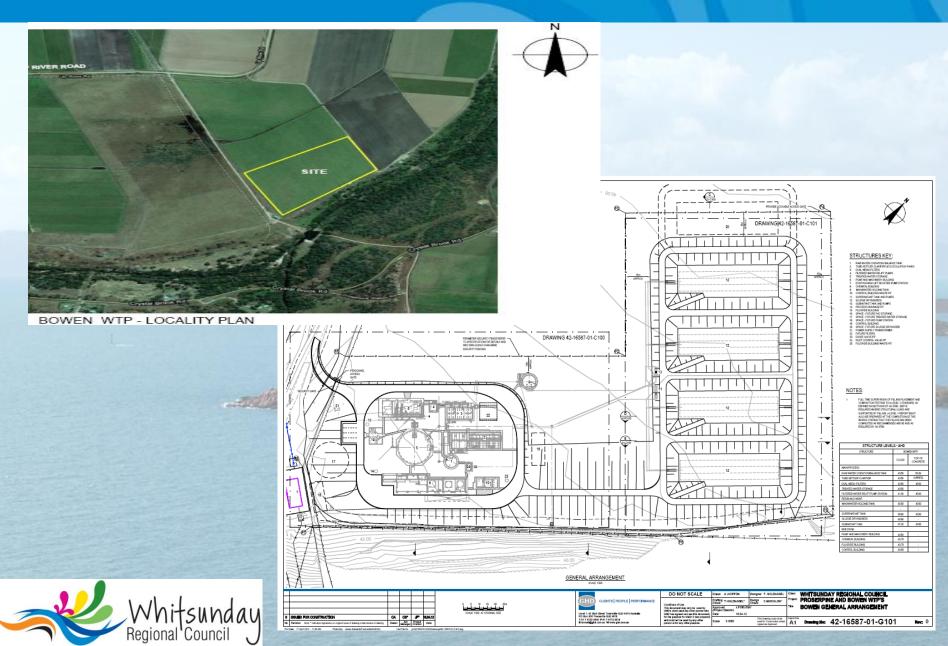
Bowen WTP stage 1 = 16.5ML capacity

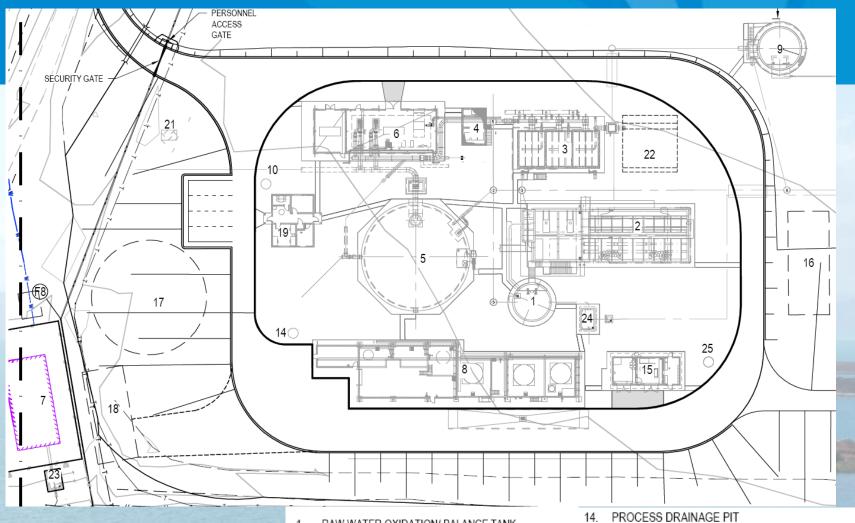
(Stage 2 = 23.5ML)

Proserpine WTP = 14ML capacity



BOWEN WTP STAGE 1 - 16.5ML





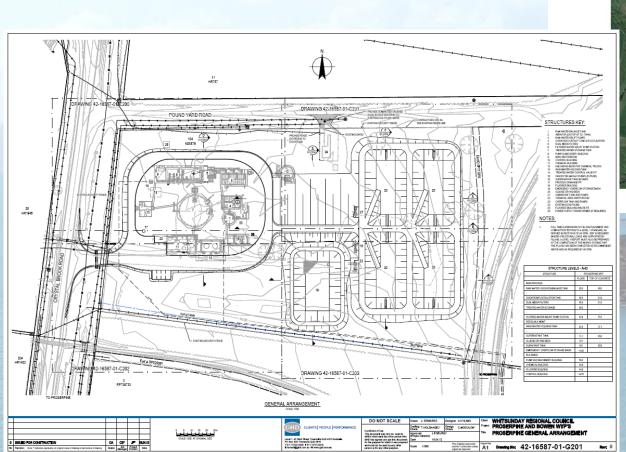


- TUBE SETTLER CLARIFIER & FLOCCULATION TANKS
- DUAL MEDIA FILTERS
- FILTERED WATER RELIFT PUMPS
- TREATED WATER STORAGE 5.
- PUMP AND MACHINERY BUILDING
- EXISTING HIGH LIFT BOOSTER PUMP STATION
- CHEMICAL BUILDING
- WASHWATER HOLDING TANK
- 10. CONTROL BUILDING WASTE PIT
- 11. SUPERNATANT TANK AND PUMPS SLUDGE DRYING BEDS
- SUBNATANT TANK AND PUMPS

- 15. FLUORIDE BUILDING
- SPACE FUTURE PAC STORAGE
- SPACE FUTURE TREATED WATER STORAGE
- SPACE FUTURE PUMP STATION
- CONTROL BUILDING
- 20. SPACE FUTURE SLUDGE DRYING BED
- POWER SUPPLY TRANSFORMER
- 22. FUTURE FILTERS
- DIVIDE VALVE PIT
- INLET CONTROL VALVE PIT
- 25. FLUORIDE BUILDING WASTE PIT

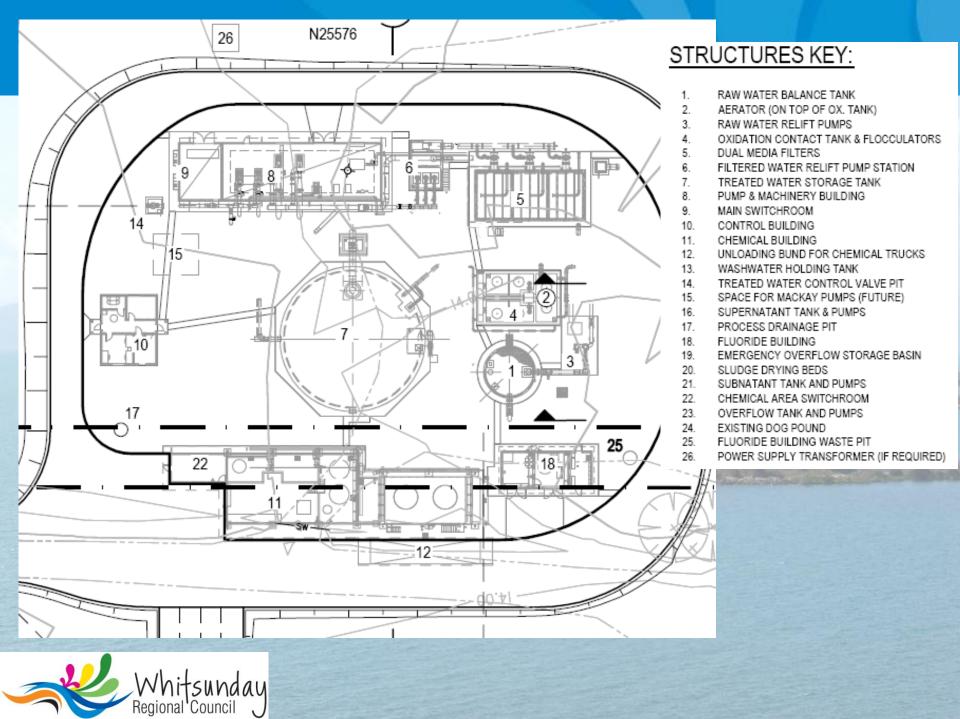


PROSERPINE WTP 14ML









Proserpine Pipeline Pigging project STN 3 STN 5 PROBERPINE RIVER INTAKE FOR BOWEN PIPELINE STN 1 Whitsunday Regional Council y

Install a re-chlorination station

- •Lower dosing level at the intake.
- lower risk of extreme precipitation of soluble manganese
- Maintain target of 0.2mg
 residual chorine in reticulation

Flow Meter

Pump

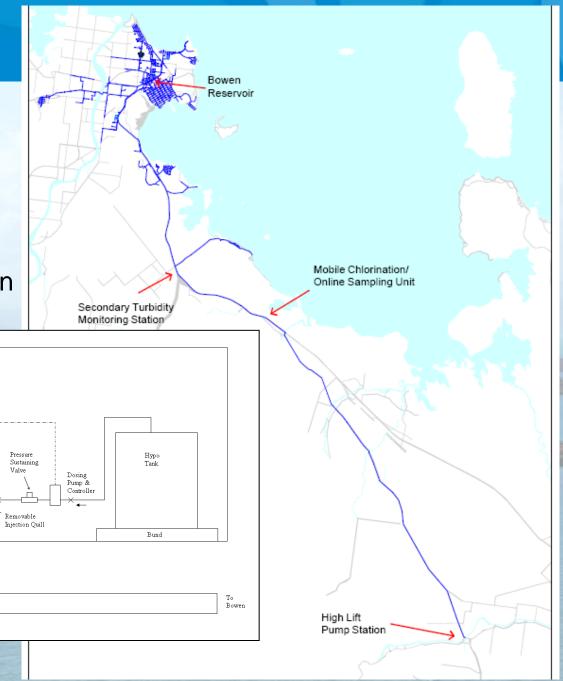
Controller

Circulation Pump ~ 0.5 L/s

Trunk Main

Offtake for

Samplers





Stainless 50mm

Tapping Band

80mm Conduit

Weld-on 50mm

Tapping

Saddle

Flow Meter

From

Proserpine

Abbot Point – Future Expansion 10/11 Coal export via T1= 15MT (50MT capacity) 2017 T2, 3 increases capacity to 110MT 20?? T4 – 9 increases capacity to 290MT 20?? NQ Bulk Ports MCF other cargos Bowen Regional'Counci



Table 1 Summary of Population Projections for Proserpine and Whitsunday Coast

Supply Area	2006	2010	2015	2020	2025	2030
Bowen Township	10,652	11,324	16,394	18,570	19,497	20,014
Proserpine	3,342	3,423	3,733	4,043	4,353	4,663
Whitsunday Coastal	13,179	15,028	17,331	19,634	21,937	24,240

Source: Proserpine and Whitsunday Coastal populations projections based on PIFU data (low growth scenario for Whitsunday and medium growth scenarios for Bowen and Proserpine). Bowen populations based on PIFU data and NQBP projections.

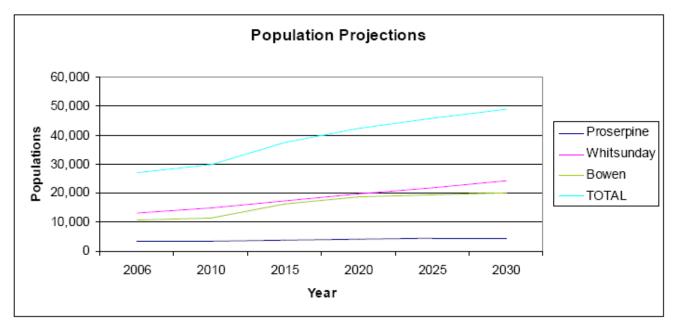


Figure 2 Population Projections



WRC/GHD developed details of existing Development Approvals in place, DA applications, and potential DA/Subdivisions in the 15-20+ years timeframe. 2000 - 3250lots

Expect infill of existing vacant lots and large population to the south of Bowen.

Will result in the need for a large reservoir to maintain supply to Bowen and Queens Beach



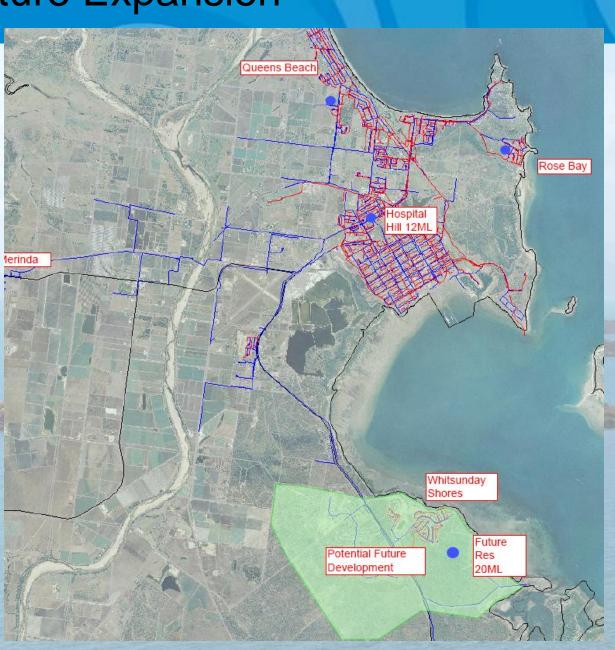


Table 2 Projected Water Demands (ML/d)						
Supply Area	2006	2010	2020	2030		
Bowen						
Average	8.3	8.8	13.0	15.5		
Mean Day Max Month	12.4	13.2	19.5	23.3		
Peak Day	13.5	14.3	21.2	25.3		
Proserpine						
Average	1.7	1.7	2.0	2.3		
Mean Day Max Month	2.3	2.4	2.8	3.3		
Peak Day	2.5	2.6	3.0	3.5		
Whitsunday Coast						
Average	6.6	7.5	9.8	12.1		
Mean Day Max Month	9.2	10.5	13.7	17.0		
Peak Day	9.9	11.3	14.7	18.2		
TOTAL						
Average	16.5	18.0	24.8	30.0		
Mean Day Max Month	23.9	26.1	36.1	43.5		
Peak Day	25.8	28.1	38.9	47.0		

Bowen Plant Stg 1 - 16.5 ML/day

Stg 2 - 23.5 ML/day

Proserpine Plant 14ML/day

Coastal Plant 8ML/day

Water consumption rates for Bowen and Whitsunday have been assessed as part of the previous investigations and are summarised as follows:

- ▶ Bowen 775 L/EP/day, as per Bowen Water Supply Planning Report (GHD, 2005); and
- Proserpine/ Whitsunday 500 L/EP/day, as per the Proserpine Water Treatment Plant Planning Report (GHD, 2009).





Identified Issues

- Network and pump station information missing from database
- Data formats differing between amalgamated Councils
- No network hydraulic models
- Rapid development placing strain on existing infrastructure
- High levels of inflow and infiltration and regular overflows in wet weather



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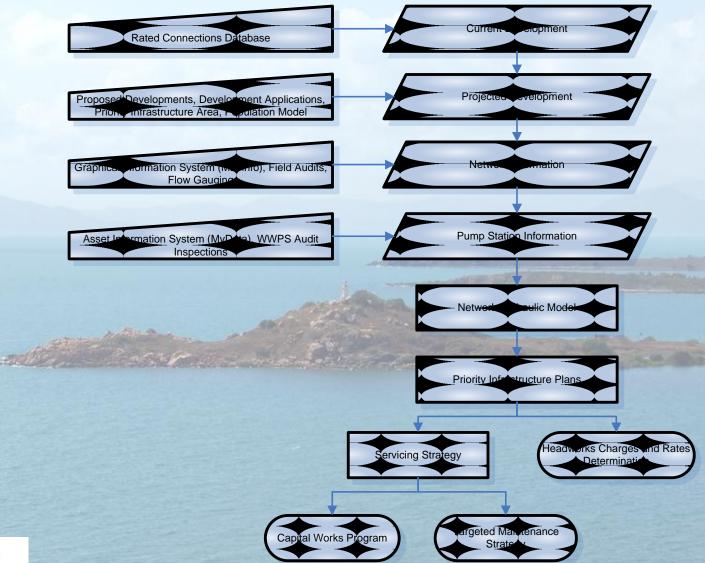


Goals

- Unified, accessible, up to date and complete data set
- Representative, calibrated hydraulic models
- Accurate picture of future demand and upgrade requirements to feed into PIP and DAs
- Reduced inflow and infiltration and wet weather overflows



Target Process





Plan of Attack

- Verify existing information, identify gaps and fill in
- Implement schedules to keep information up to date
- Build new tools
- Update capital works and maintenance strategies



Network Information Systems

- Two information databases
 - –MyData asset management database.
 - Purchased in 2009 to replace JRA Lifecycle
 - -MapInfo Graphical information system
- Significant amount of unpopulated fields
- Quality and extent of information varies between former Shire Council areas



Hydraulic Modeling Project

- One model per treatment plant
- Development challenges
 - -Lack of information on pump stations
 - -Incomplete GIS data sets
 - -Minimal historical information on flow rates and wet weather system response



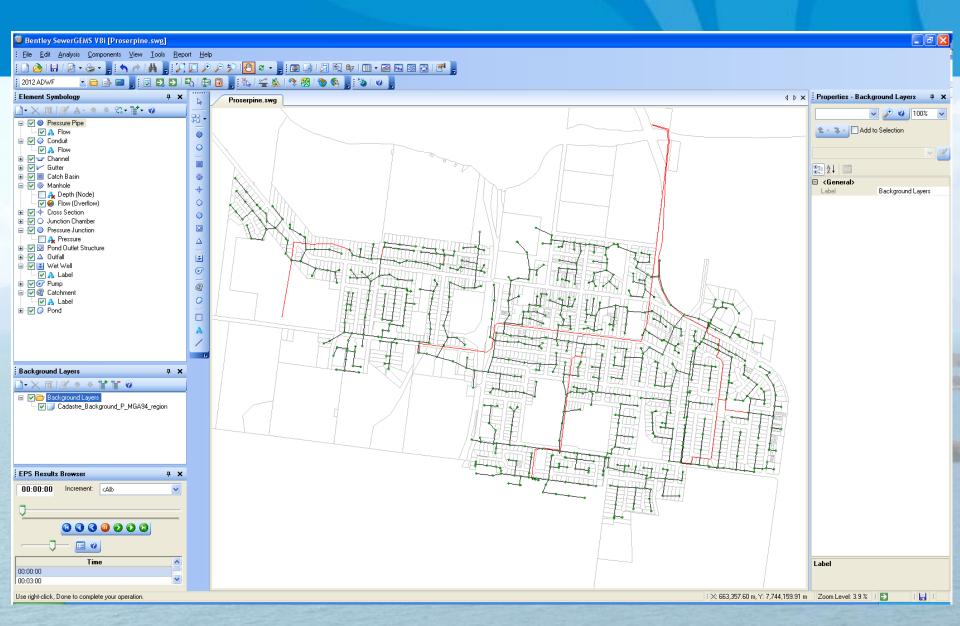




Figure - Proserpine Wastewater Network Hydraulic Model

Pump Station Audit

- Site inspections and audits at all WWPS
 - -Measurement of pump station structure and operating levels
 - Condition assessment of wells, electrical and mechanical equipment
 - Detailed structural assessment and remediation report where deterioration is identified
 - –Information to feed back into MyData and MapInfo



Flow Gauging Project

- Gauge locations selection
 - -Pump station catchments split into main legs
 - Airlie Beach and Proserpine selected to match model development program
- Project rollout
 - -Initial 2 month installation of 25 gauges in Proserpine and Cannonvale
 - -Bowen and Collinsville study planned for 2012-2013



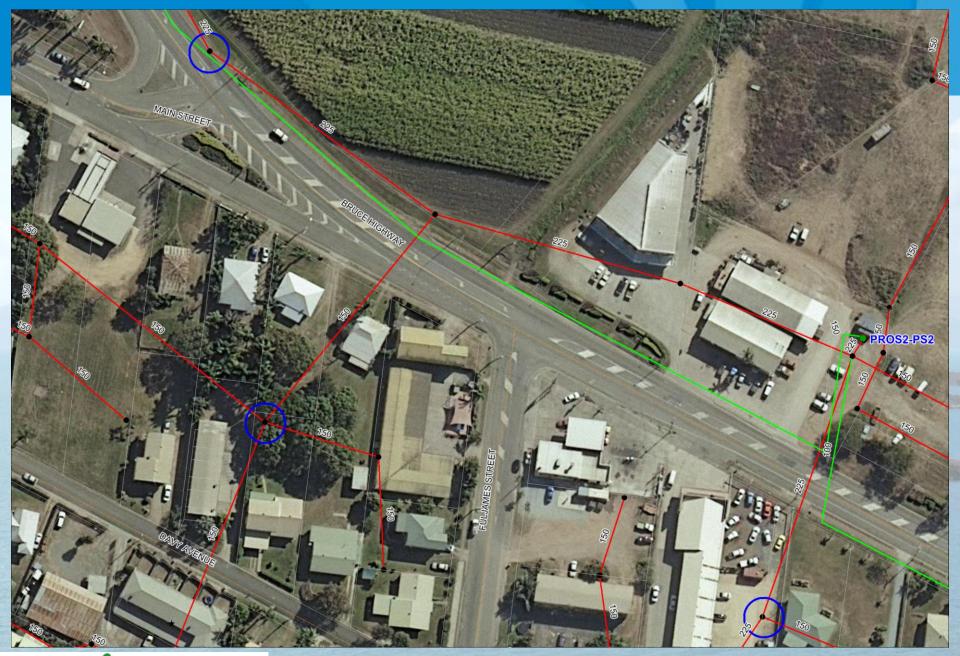




Figure - Flow gauge catchment breakup for Proserpine WWPS 2

Inflow and Infiltration Program

- Reticulation system installed starting in 1950's
- Many lines installed below water table
- High proportion of earthenware and AC lines, suffering cracking
- Some pipes approaching end of design life







Figure: George St Bowen Concrete Main H₂S Damage

Relining Project

- Annual budget allocation for re-lining approx\$1m
- Catchments selected based on
 - -Operator experience for I-I, failure rates
 - -Age of infrastructure and material type
- Technologies successfully employed
 - -Spiral wound PVC lining
 - -Steam cured PVC lining







Figure: George St Bowen Main Relining

Schedule

- •2012
 - -Full audit of all WWPS
 - -Flow gauging for Proserpine and Cannonvale
 - -Current ADWF and PWWF models for all catchments
 - -Inspection and re-lining of priority catchments
- •2013-2015
 - -Calibration of models and development of future scenarios
 - -Remediation and repair of pump stations
 - Develop and implement 10 year capital works and priority maintenance plan



