Cardno
Shaping the Future

WATER SUPPLY PLANNING REPORT

Baralaba

January 2007
Job No. 3900-07

Banana Shire Council

Cardno (Qld) Pty Ltd

ABN 57 051 074 992

1 Clifford Street

Toowoomba

Queensland 4350 Australia

Telephone: 07 4633 9333

Facsimile: 07 4633 9355

International: +61 7 4633 9333

toowoomba@cardno.com.au

www.cardno.com.au

Document Control

Version	Date	Author		Reviewer	
		Name	Initials	Name	Initials
1.2	January 2007	Anthony Morris	AM	Kelly Egan	KE

The quantities and cost estimates presented in this report are an indicative engineering estimate. They are based on Cordell's and Rawlinsons' cost data and our engineering experience on similar projects. These quantities and cost estimates are not Quantity Surveyor quantities or estimates. Cardno do not warrant the accuracy of these quantities or estimates in any way and they should only be used for indicative budgeting purposes.

WATER SUPPLY PLANNING REPORT

BARALABA

TABLE OF CONTENTS

1. INTRODUCTION

Water supply for the township of Baralaba is extracted from the Neville Hewitt Weir under the Dawson Valley Water Supply Scheme.

Water is treated to a potable standard at the Baralaba water treatment plant and distributed via reticulated infrastructure to service the township.

The purpose of this report is to detail the process undertaken to:

- Determine the desired standards of service and design criteria for water supply;
- Determine demand and population projections;
- Construct a water supply reticulation model and use it to assess Baralaba's water supply reticulation;
- Determine augmentation strategies to ensure future demands are met.

2. EXISTING WATER SUPPLY INFRASTRUCTURE

Baralaba's water supply is drawn from the Neville Hewitt weir under the Dawson Valley Water Supply Scheme, where Banana Shire Council has a high priority allocation of 182 ML/annum.

Raw water is drawn from the weir storage by 2 submersible pumps (one duty and one standby) each with a reported capacity of 13 L/s at 43m head. The head is delivered to a DN150 rising main leading to a conventional 15 L/s package water treatment plant.

Treated water is stored in a 71kL clear water holding tank adjacent to the treatment plant. The reticulation system is fed from a single service reservoir with a total capacity of 450 kL. The reservoir is a standpipe design of 6 m diameter and 17.7 m high, fed from the clear water holding tank at the water treatment plant via 2 booster pumps (one duty and one standby) each delivering 16 L/s at 34m head. The service reservoir and booster pump station are linked via Council's RADTEL radio telemetry system.

The reticulation system is predominantly DN100 AC mains, with a DN150 trunk main running between the raw water intake and the standpipe reservoir. The total length of installed mains is approximately 5 km.

An overview of the Baralaba water supply reticulation is presented on Figure 2.1.

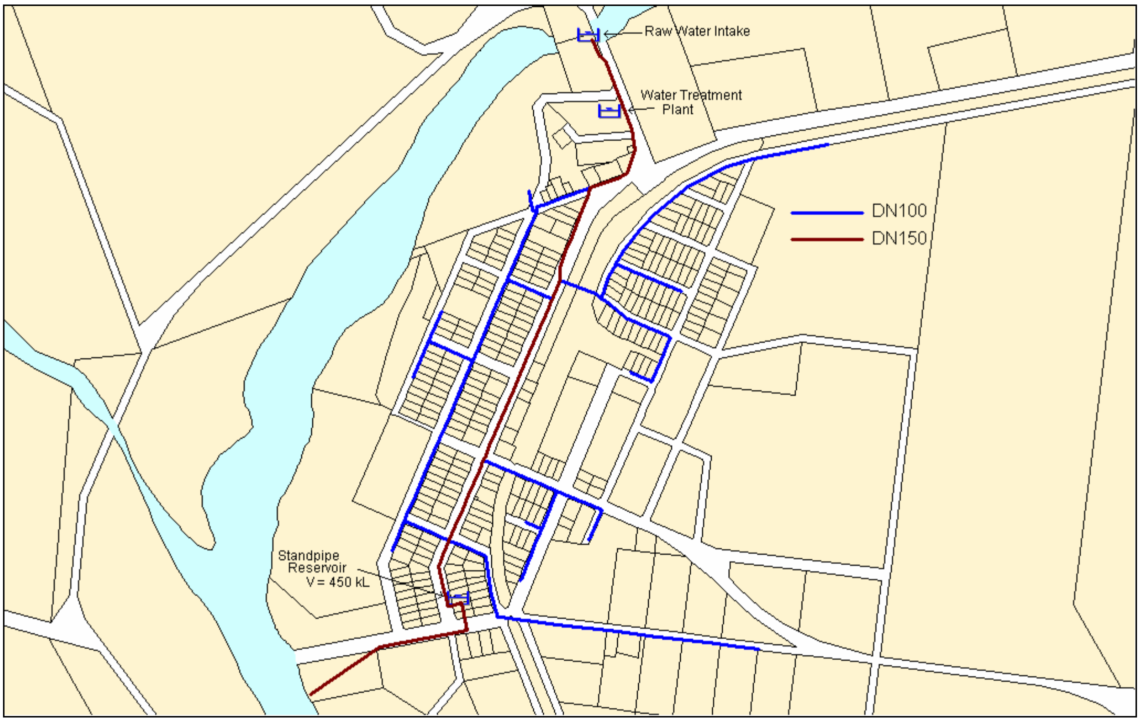


Figure 2.1 – Overview of Existing Infrastructure

3. DESIGN CRITERIA AND STANDARDS OF SERVICE

The water supply design criteria were determined in accordance with the Banana Shire Council Planning Scheme, the Banana Shire Council Strategic Asset Management Plan (SAMP) and the Department of Natural Resources and Mines Planning Guidelines for Water and Sewerage (DNR&M Guidelines). The following criteria were adopted for this study:

3.1 DEMAND AND PEAKING FACTORS

Average Day Demand, AD = 600 L/EP/day
Mean Day Maximum Month, MDMM = 780 L/EP/day
Peak Day Demand, PD = 1150 L/EP/day
Peak Hour Demand, PH = 95 L/EP/hour

MDMM:AD = 1.3
PD:AD = 1.91
PH:PD = 1/12

3.2 RESIDUAL PRESSURES

Maximum Pressure = 80 m

Desired Minimum Pressure = 22 m
Absolute Minimum Pressure = 12 m

3.3 FIRE-FIGHTING REQUIREMENTS

Fire Flow Demand = 15 L/s for 2 hours
Minimum Critical Pressure = 12 m

3.4 MINIMUM RESERVOIR STORAGE CAPACITY

Elevated Reservoir = 6*(PH – MDMM/12) + fire-flow

- Reservoir is to have a positive net inflow at the end of each MDMM
- No reservoir is not to fail during the analysis

3.5 MINIMUM PUMP FLOW RATE

Reticulation Mains = PH + fire-flow
Raw Water Pumps = MDMM over 20 hours
Pumps feeding ground level reservoir = MDMM over 20 hours

4. DEMAND AND POPULATION PROJECTIONS

4.1 POPULATION AND WATER DEMAND

The current service population at Baralaba was projected based on historical population data contained in the Banana Shire Council Comparative Profile. According to census data, the 1996 population was 238 and the 2001 population was 260, leading to a population growth rate of 1.8%. Producing the nominal growth rate to 2007, the current projected population at Baralaba is 289.

Based on metered consumption records, there are 115 residential water connections at Baralaba, yielding an occupancy ratio of 2.51 EP/connection in 2007. Observing the annual average water consumption from detached residential dwellings and dividing by AD = 600 L/EP/Day, the average occupancy ratio was found to be 2.46 EP/connection. An occupancy ratio of 2.5 EP/connection was adopted for this study. Table 4.1 outlines the EP demand for various land use types.

Table 4.1 – EP Demands for various land use types

Land Use Type	EP
Caravan Parks	2.6
Cattle Facility	2.0
Commercial Premises	1.2
Community Protection	3.2
Educational	21.7
Hospital	12.9
Hotel	4.5
Industrial	2.1
Multi Unit Dwelling	2.5
Non-business Clubs	1.0
Outbuildings	1.1
Parks and Gardens	11.4
Professional Offices	1.4
Religious	0.7
Retail Warehouse	0.2
Service Station	3.4
Single Unit Dwelling	2.5
Special Tourist attraction	2.9
Sportsclubs/facilities	7.7
Transport Terminal	1.7
Vacant Urban Land	0.9

4.2 PROJECTION SCENARIOS

A number of projection scenarios were developed after liaison with the Banana Shire Council Water Supply and Sewerage Engineer.

4.2.1 Scenario 1 – Existing (2007) Development

This scenario consists of the 2007 projected service population of 443 EP, including 289 residential EP.

4.2.2 Scenario 2 – Existing (2007) Development plus small subdivision

The service population for this scenario is as per Scenario 1, with an additional 18 lot (45 EP) development situated in the village precinct, yielding a total EP demand of 488, including 334 residential EP.

4.2.3 Scenario 3 – Ultimate Development

This scenario is adopted assuming ultimate development of Baralaba, including the development of vacant lots, and the subdivision of all large lots within the 'village' area to 1000 m^2 residential lots. The total projected service population for this scenario is 1340 EP, including 1185 residential EP.

4.3 SUMMARY

The projected population of Baralaba is illustrated on Figure 4.3. The dashed line represents population projections based on census counts.

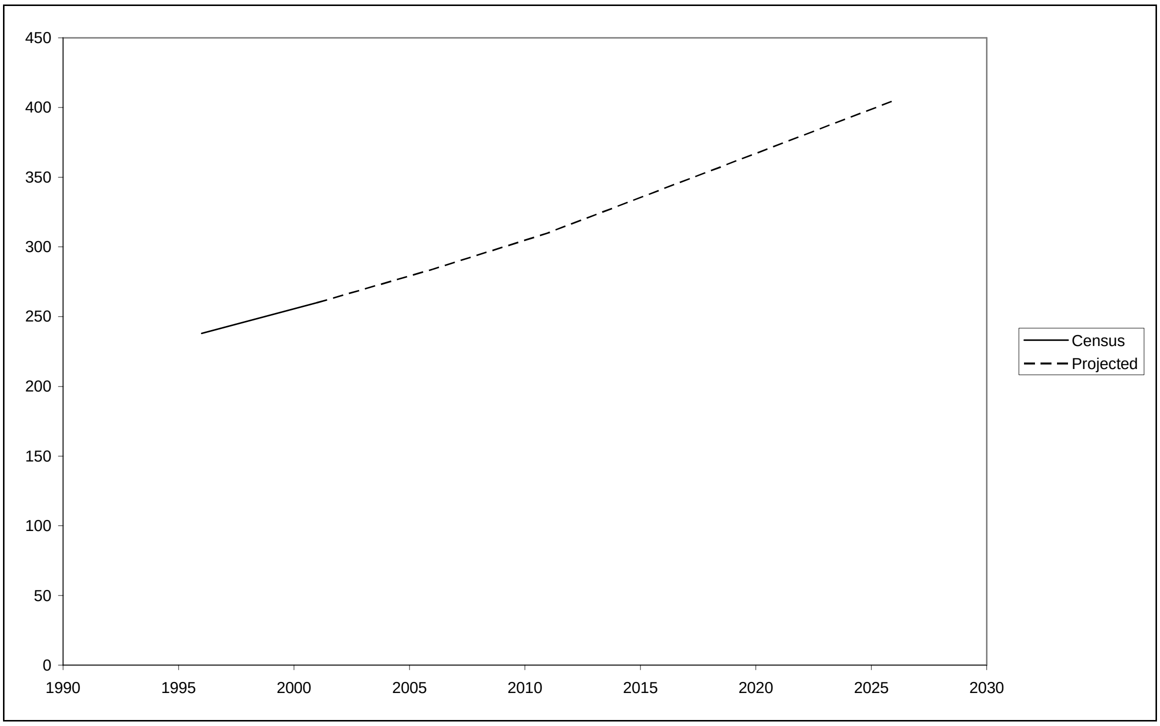


Figure 4.3 – Projected Service Population

5. WATER SUPPLY RETICULATION MODEL

An H_2OMAP model was constructed to assess the capability of the water supply infrastructure to adequately supply the projected population of Baralaba.

5.1 MODEL CONSTRUCTION

5.1.1 Raw Water Supply

It was reported in Banana Shire Council Drawing 3-482 (refer Appendix A) that the low water level at the intake works is 71.58 mAHD. This value was adopted as the static boundary condition for the model. The submersible intake pumps were modelled as a single duty pump giving 43 m head at 13 L/s. H_2OMAP rule controls were assigned such that the duty pumps were closed when the water treatment plant clear water storage tanks reached 98% of capacity, and opened when the clear water storage tanks fell to 90% capacity.

5.1.2 Water treatment plant and reservoirs

Raw water is treated to a potable standard at the Baralaba water treatment plant. The plant was modelled using a flow control valve set to the design capacity of 15 L/s. The clear water storage tank was modelled with the following characteristics:

Elevation (mAHD) = 89.70
Minimum Level (RL) = 0
Maximum Level (RL) = 2.73
TWL (RL) = 2.68
BWL (RL) = 2.46
Initial Level (RL) = 2.46
Diameter (m) = 5.75

Volume (kL) = 70.89

The clear water booster pump station located at the water treatment plant was modelled as a single duty pump delivering 16 L/s at 34 m head, set to produce an operating level between 90-98% in the 450kL standpipe reservoir. The reservoir was modelled with the following characteristics:

Elevation (mAHD) = 94.5
Minimum Level (RL) = 0
Maximum Level (RL) = 17.7
TWL (RL) = 17.35
BWL (RL) = 15.93
Initial Level (RL) = 15.93
Diameter (m) = 5.69

Volume (kL) = 450.08

5.1.3 Pipes

The pipe layout was input to H_2OMAP from GIS data. The pipe diameters were read in directly and were used for the model simulations. The H_2OMAP model was scaled to coincide with actual pipe lengths.

Hazen-Williams coefficients were entered as follows:

Diameter 150mm or less = 100
Diameter 200mm to 300mm = 110
Diameter 375mm or greater = 120

5.1.4 Nodes

Elevation details for Baralaba are contained in the Banana Shire Council Drawing Number 2-010 (refer Appendix A). H_2OMAP nodes were inserted strategically throughout the reticulation and assigned relative values in mAHD. Minor reticulation was skeletonised to the bounds of the contour data.

Nodal demands were assigned as number of EP in accordance with the preceding chapter. The global demand multiplier was set to produce AD flows of 600 L/EP/day. A fire-flow demand of 15 L/s was assigned to each demand node.

The diurnal demand pattern shown on Figure 5.1 was extracted from the Banana Shire Council telemetry data, and from the Watsys user manual. Patterns were normalised to produce a diurnal average of 1.

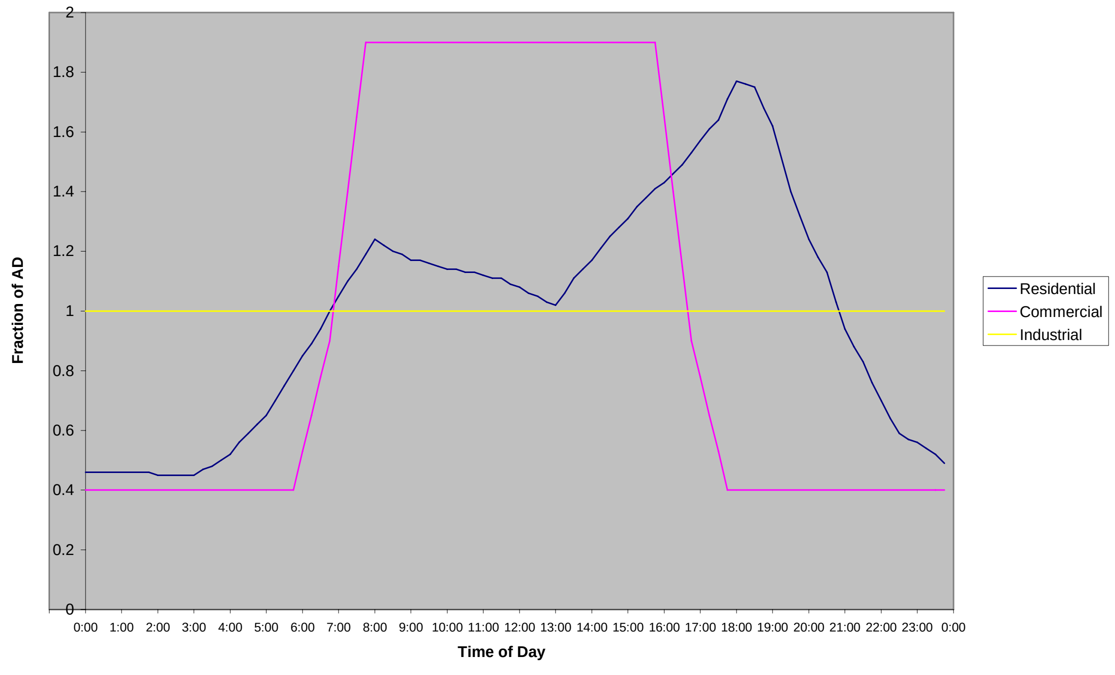


Figure 5.1 – Diurnal demand pattern

5.2 OVERVIEW

A schematic of the water supply reticulation model is shown on Figure 5.2. The level of skeletonisation is shown by the dashed lines.

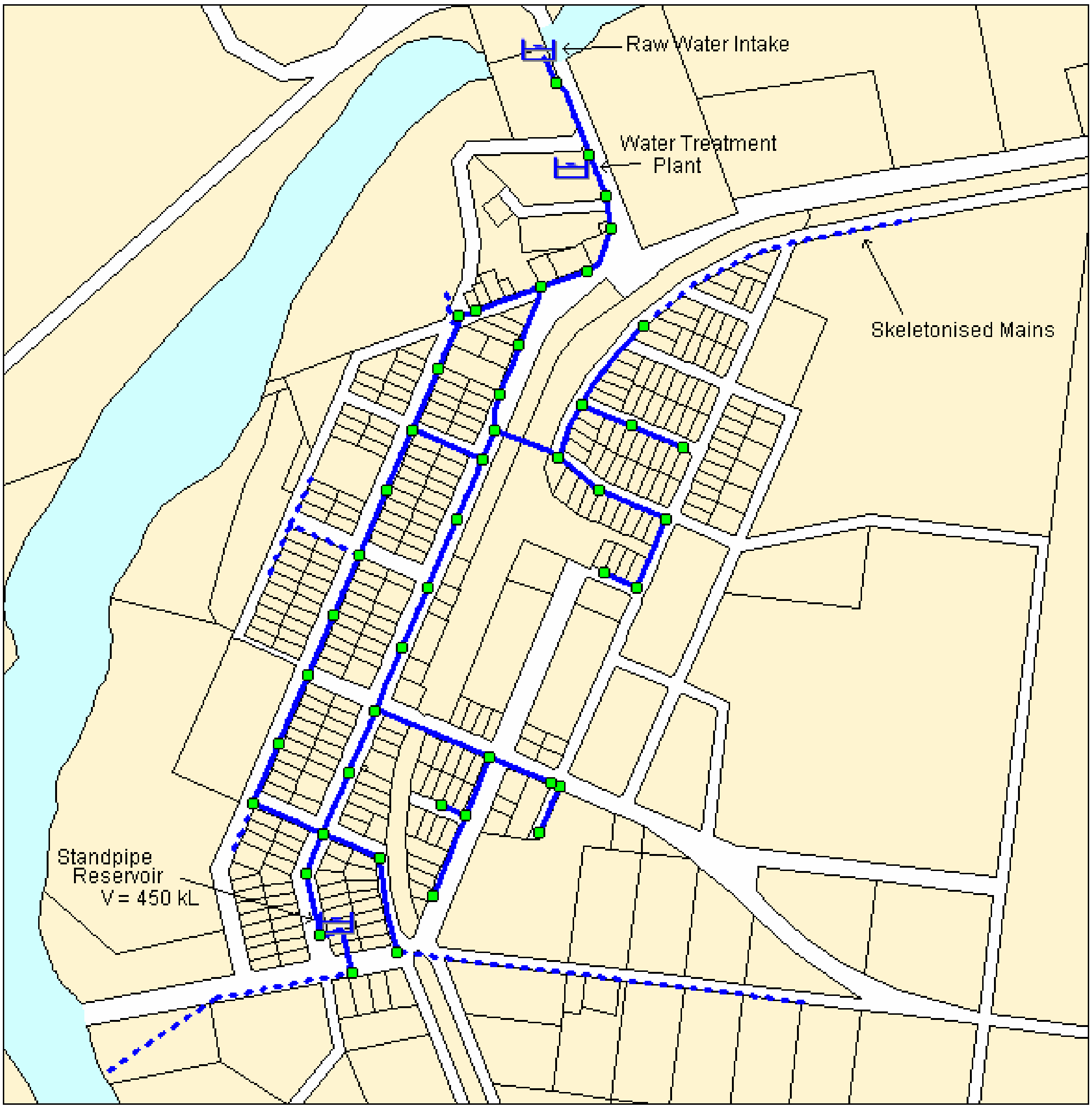


Figure 5.2 – Model Schematic

6. MODELLING RESULTS

Following the procedures set out in the DNR&M Guidelines, the model was run for a 9 day period consisting of 3 days at AD, 3 days at MDMM and 3 days at PD. Fire flow analyses were conducted at the maximum demand section of the diurnal flow curve for the third PD.

Given that the top water level of the southern elevated reservoir is 17m, and considering the relatively flat topography, it is not considered that the mains pressure in Baralaba will exceed 80m. As such, modelling results showing average night flow were not extracted. However, the minimum service pressure during Peak Hour is presented for each scenario.

The following is an excerpt from the DNR&M Guidelines:

> *"For small communities (ie less than 1,000 population), sizing a reticulation system for full fire fighting capability may have a significant impact on infrastructure size and hence cost and affordability. The designated fire-flows must take into account the town's fire fighting capability. This is particularly important where the service is provided by a rural fire service."*

In the presentation the results of fire-flow analyses, the critical node pressure is first taken into consideration. The critical node pressure is a measure of the minimum pressure in the reticulation when a particular node is loaded with the total (base + fire-flow) demand. It is considered unlikely that the desired design criteria for critical fire-flow pressure will be met for all parts of Baralaba. Accordingly, a critical design flow analysis was also undertaken. The critical design flow is defined as the available flow that may be extracted to produce a critical node pressure of 12m.

6.1 SCENARIO 1 – NOMINAL POPULATION GROWTH

The model was run with the existing infrastructure, loaded with the nominal 2007 service population as outlined in Section 4.2.1.

The PH service pressure is outlined on Figure 6.1.

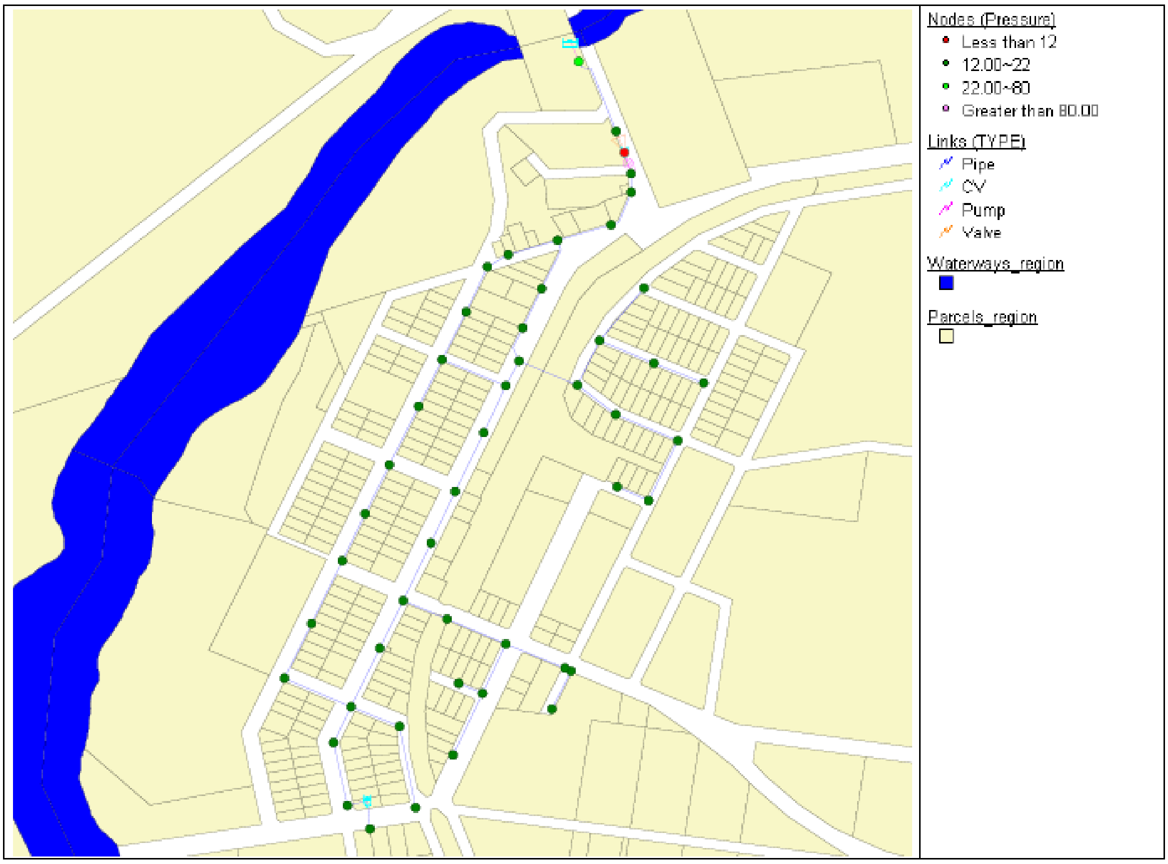


Figure 6.1 – Peak Hour pressure (m) for Scenario 1

Whilst the minimum desirable residual pressure of 22m is not met, an acceptable level of service provision is maintained in accordance with the Banana Shire Council's customer service standard. The minimum PH pressure is 16.6m at Stopford St, south of Ashfield St.

Demand nodes were loaded with a 15 L/s fire-flow demand and a fire-flow analysis was undertaken. The model indicated that the design criteria for critical fire-flow pressure is met at various points around the DN150 trunk main. The nodes shown in red on Figure 6.2 indicate that the critical node pressure drops below 12m. A design flow analysis was undertaken to determine the magnitude of available fire-flow. As shown on Figure 6.3, the design flow decreases markedly with increasing distance from the central trunk main. The minimum design flow is noticed at the southern end of Wooroonah St, where 5.0 L/s is available at 12m head.

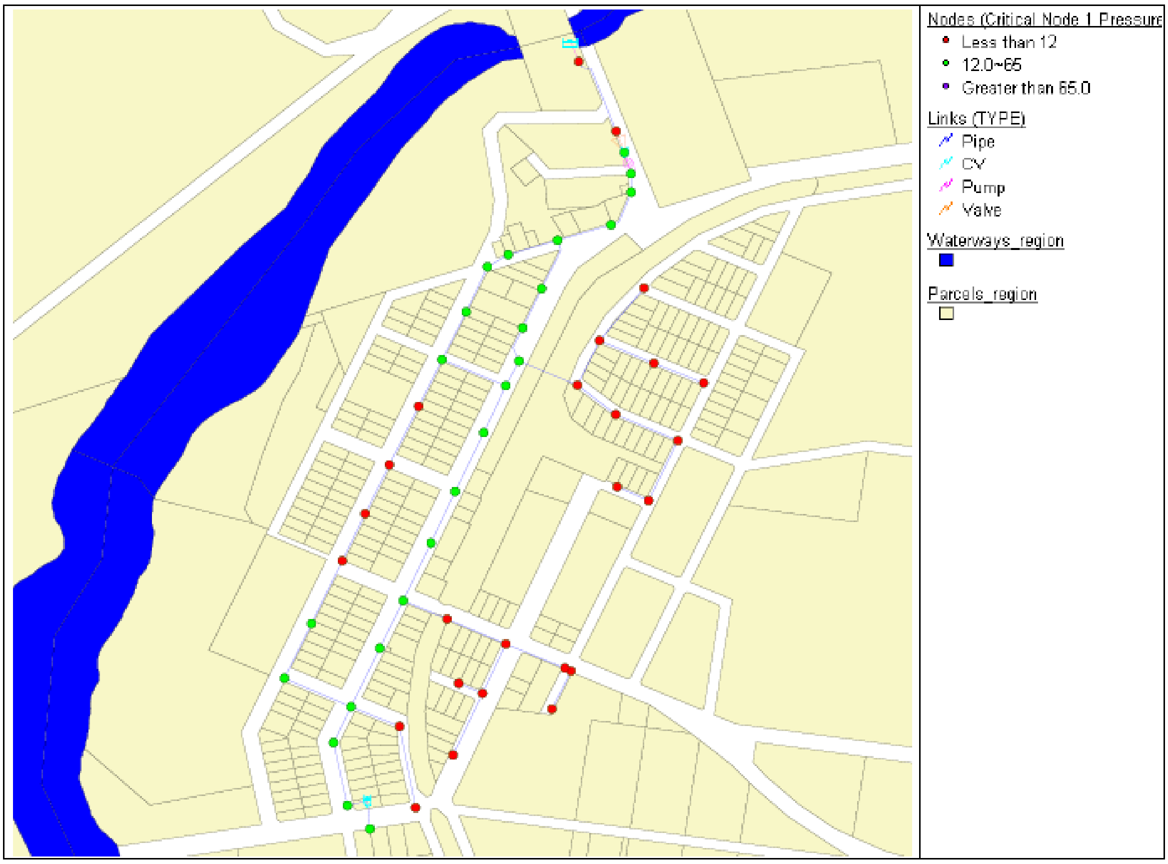


Figure 6.2 – Critical Node Pressure (m) for Scenario 1

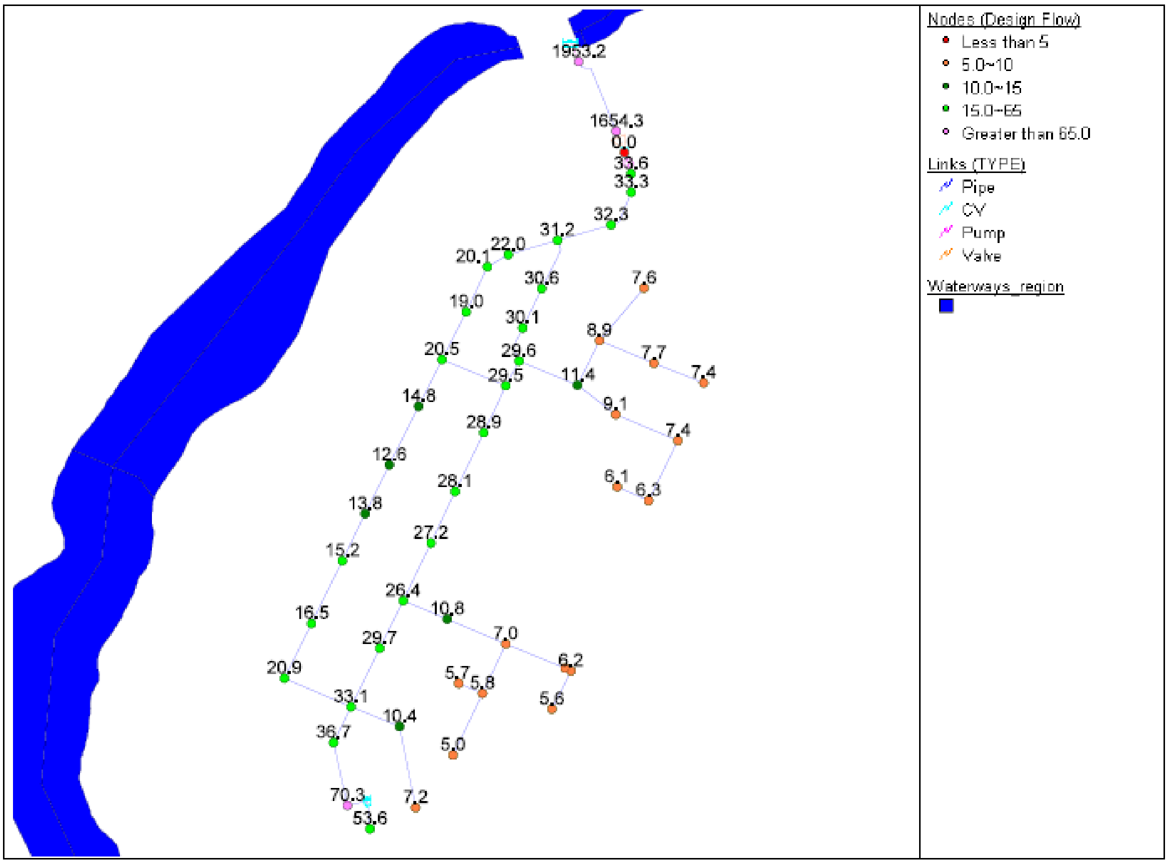


Figure 6.3 – Design Flow (L/s) for 2007 Scenario 1

6.2 SCENARIO 2 – NOMINAL GROWTH PLUS 18 LOT SUBDIVISION

The second H_2OMAP scenario was activated as a child of the first – existing infrastructure, including pipe settings, water treatment plant capacity and reservoir storage was retained. Model demands (including fire-flow) were inherited and an 18 lot subdivision was included between Mimosa St and Wooroonah St. A preliminary water supply concept design was suggested by Boyd Water Services in order to supply the proposed subdivision. Matching the recommendations of the study, the existing reticulation was linked between Dunstan St and Benleith St with approximately 800m of DN150 along Wooroonah St and Mimosa St. The proposed augmentations are outlined on Figure 6.4.

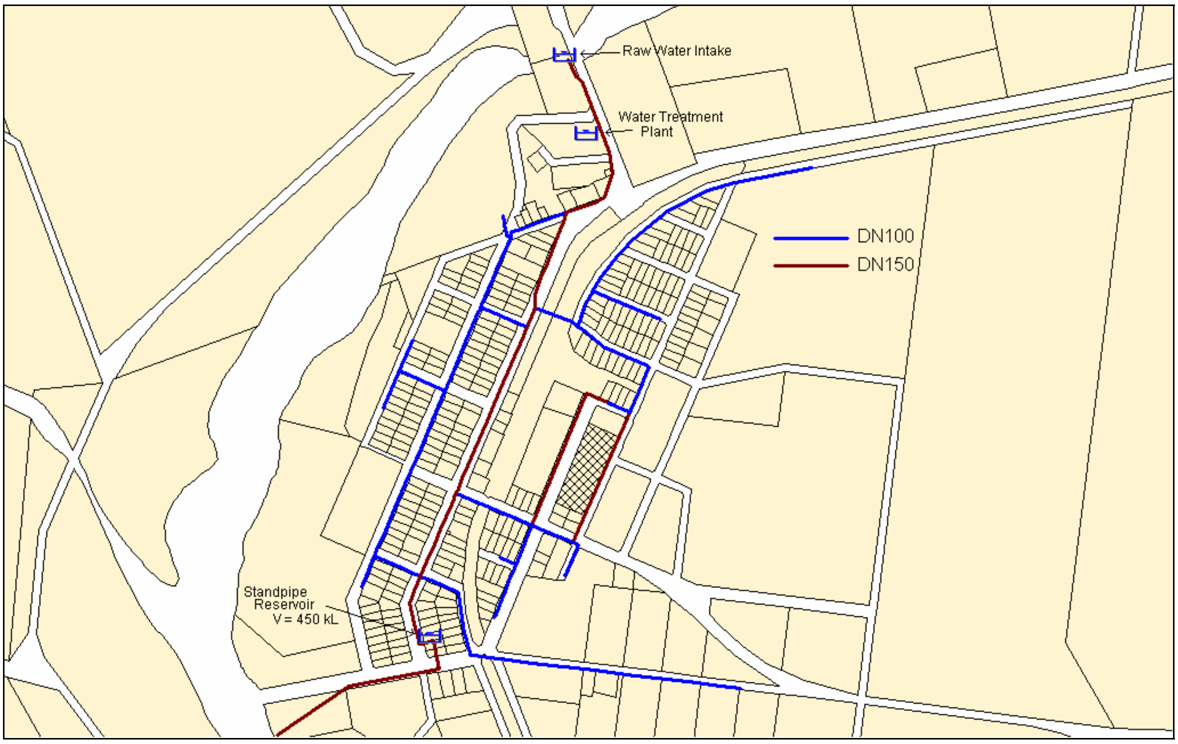


Figure 6.4 – Schematic showing proposed augmentations for Scenario 2. Proposed subdivision is shown hatched.

The PH service pressure is outlined on Figure 6.5.

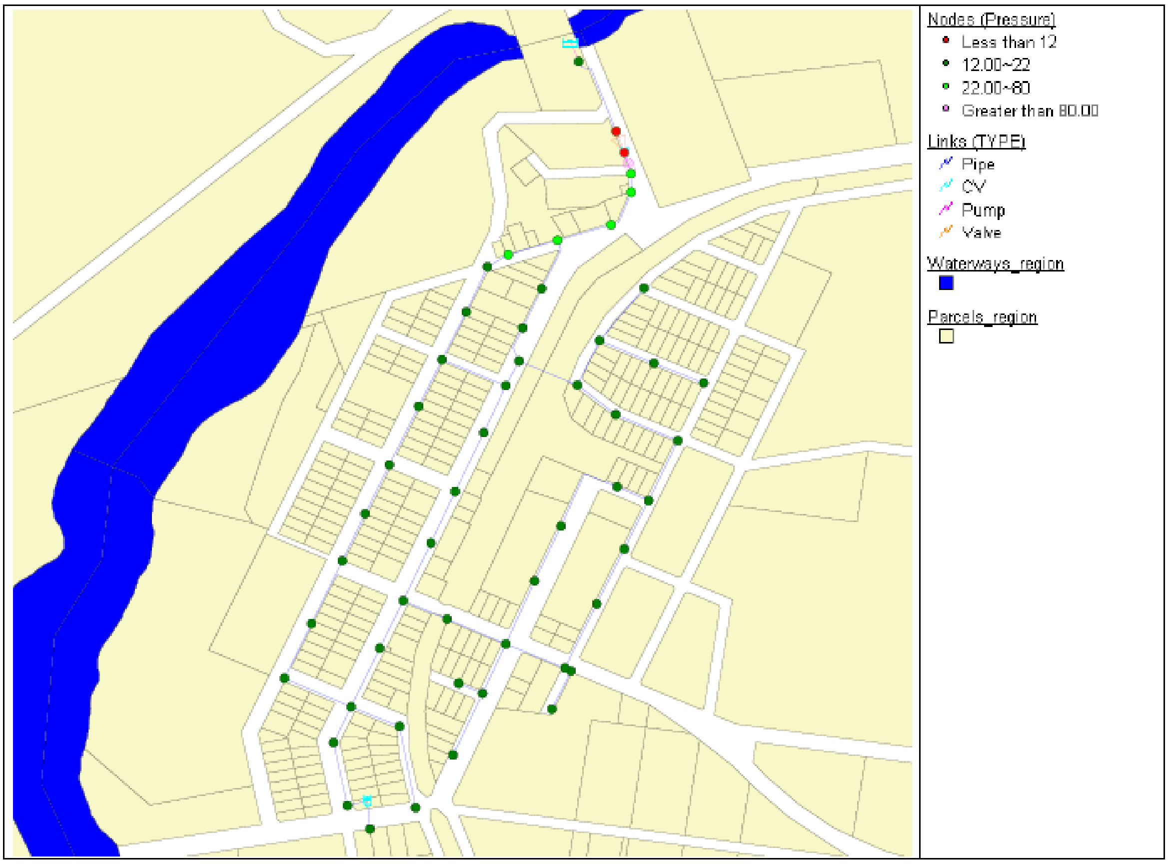


Figure 6.5 – Peak Hour pressure (m) Scenario 2

Compared with Scenario 1, similar PH pressure trends are noticed throughout much of the township in that the minimum desirable service standards are not met. However, the minimum PH pressure of 15m at the southern end of Wooroonah St is above the absolute minimum residual pressure requirement as set out in the Banana Shire Council's customer service standard.

This development scenario was subjected to a fire-flow analysis. The critical node analysis shown on Figure 6.6 shows that the proposed augmentations are successful in supplying a greater area of the township with fire-flows in accordance with the DNR&M Guidelines. However, it is noted that a significant portion to the east produces critical node pressures below 12m. The resulting critical design flow analysis revealed that the proposed subdivision is supplied with some 11 L/s at 12m head, and that the minimum design flow at Wooroonah St has increased from 5.0 L/s to 6.2 L/s.

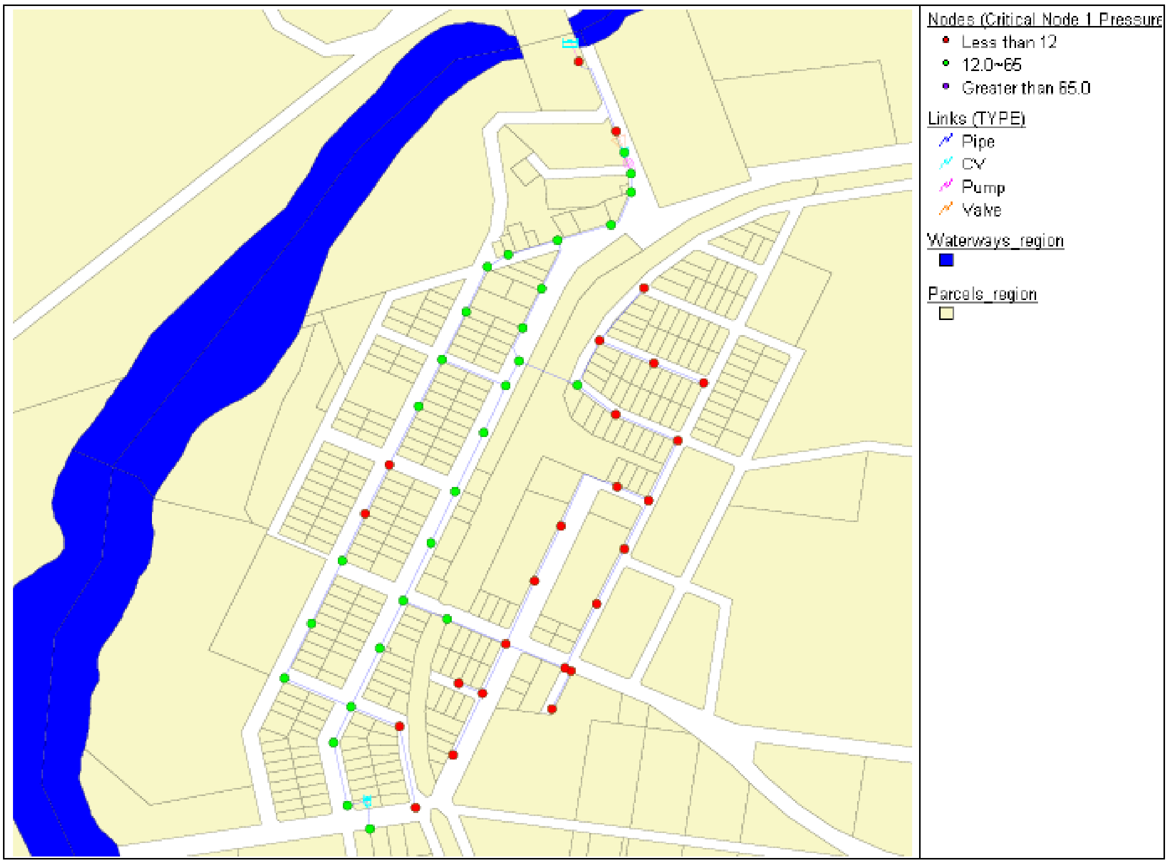


Figure 6.6 – Critical node pressure (m) for Scenario 2

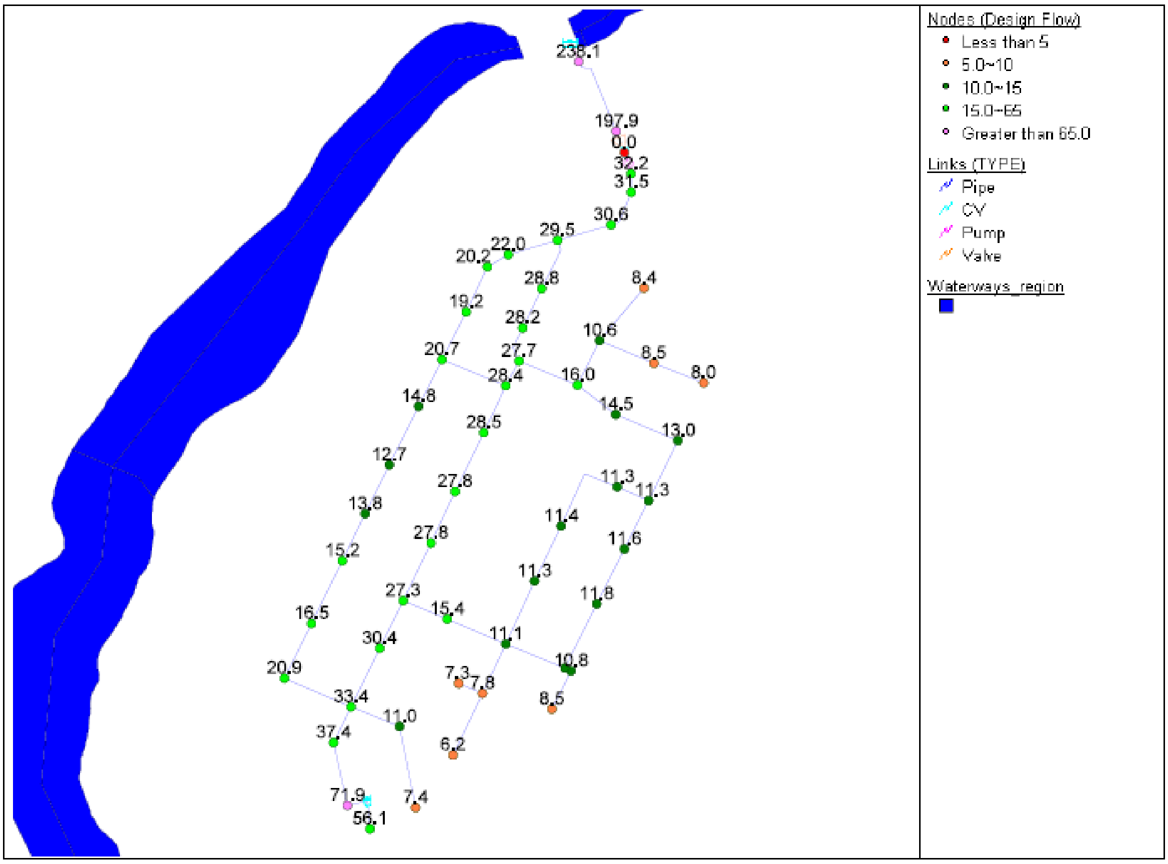


Figure 6.7 – Design flow (L/s) for Scenario 2

6.3 SCENARIO 3 – ULTIMATE DEVELOPMENT

The ultimate projected population of Baralaba was input. The model indicated that the clear water storage reservoir failed during PD. Ultimately, augmentations are considered necessary in order to supply the township with an adequate level of service.

In order to determine an augmentation strategy for the township, an intermediate projection scenario was established. The scenario was created using the existing water supply infrastructure. Future demands were increased iteratively until the level in the clear water storage showed significant depletion during PD, as shown in Figure 6.8.

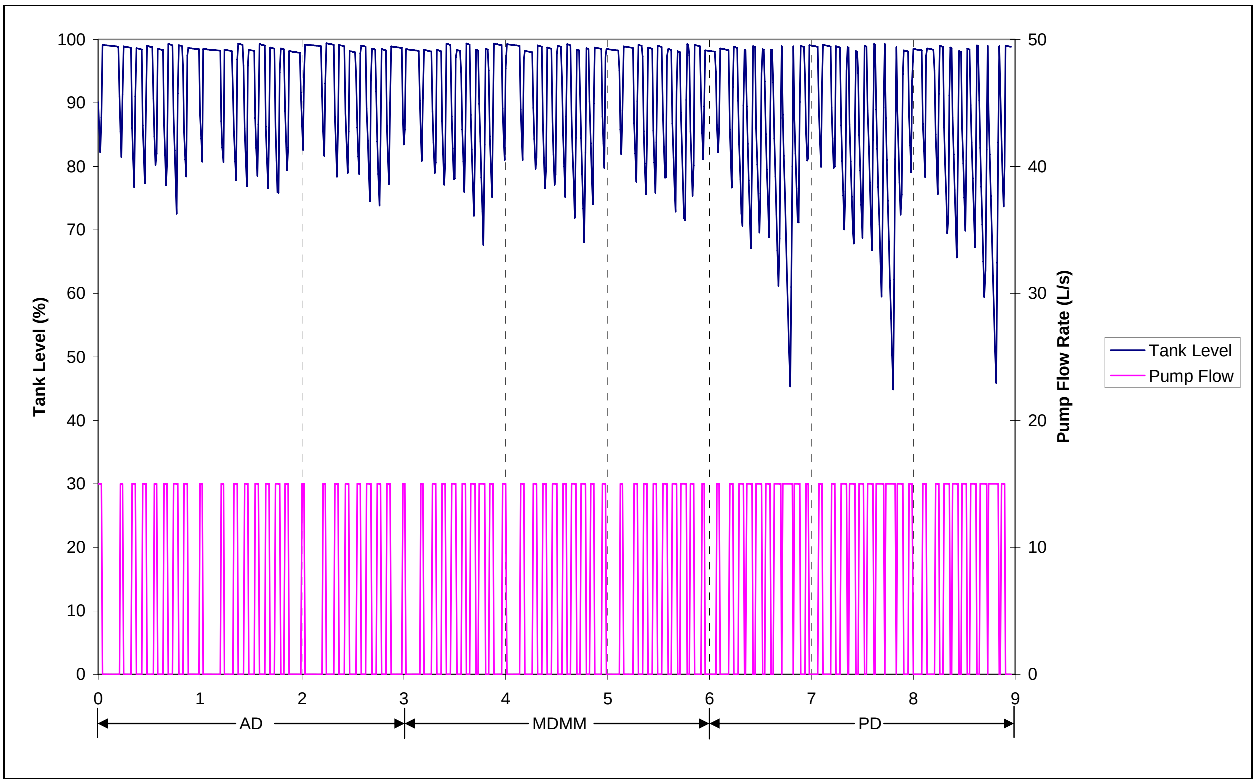


Figure 6.8 – Level in clear water storage, pre augmentation

In order to ensure the township of Baralaba is adequately serviced in accordance with the adopted design criteria, it is considered that the water treatment plant will require augmentation to its current design capacity and clear water storage. The Equivalent Person demand trigger for the augmentation of Baralaba's water supply infrastructure is 700 EP, including some 540 residential EP (216 connections).

The following augmentations were modelled:

- Increase the design capacity of the Baralaba water treatment plant by 5 L/s, to match the capacity of the raw water delivery main (nominal Q = 20 L/s).
- Increase the clear water storage by constructing a 200 kL holding tank, providing a total storage capacity of 271kL.

The immediate effect of the augmentation is shown on Figure 6.9. The model indicates that the clear water storage no longer becomes depleted during PD, and that the water treatment plant is subject to 8 stop/start cycles during AD.

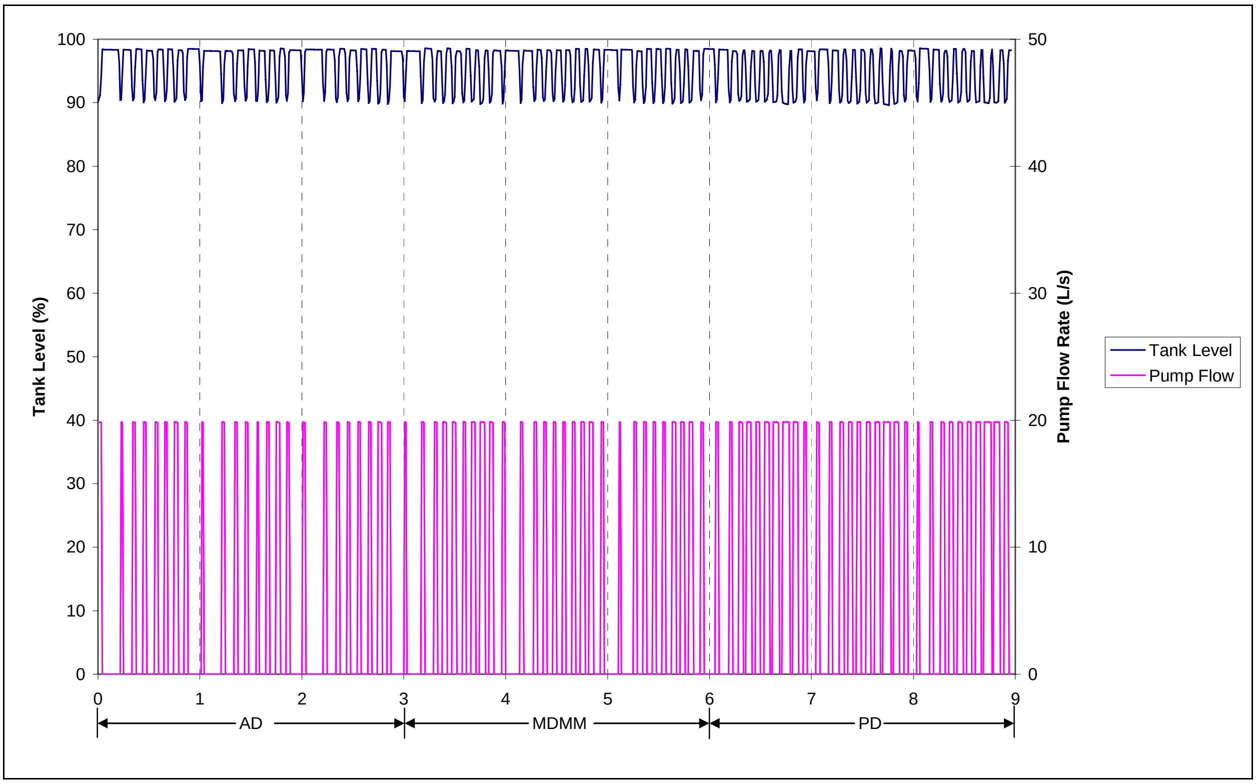


Figure 6.9 – Level in clear water storage, post augmentation

The total ultimate demand model for Baralaba (1340 EP) was rerun. Figure 6.10 shows the potential residential development sites within the township, and illustrates the proposed augmentations to the water treatment plant.

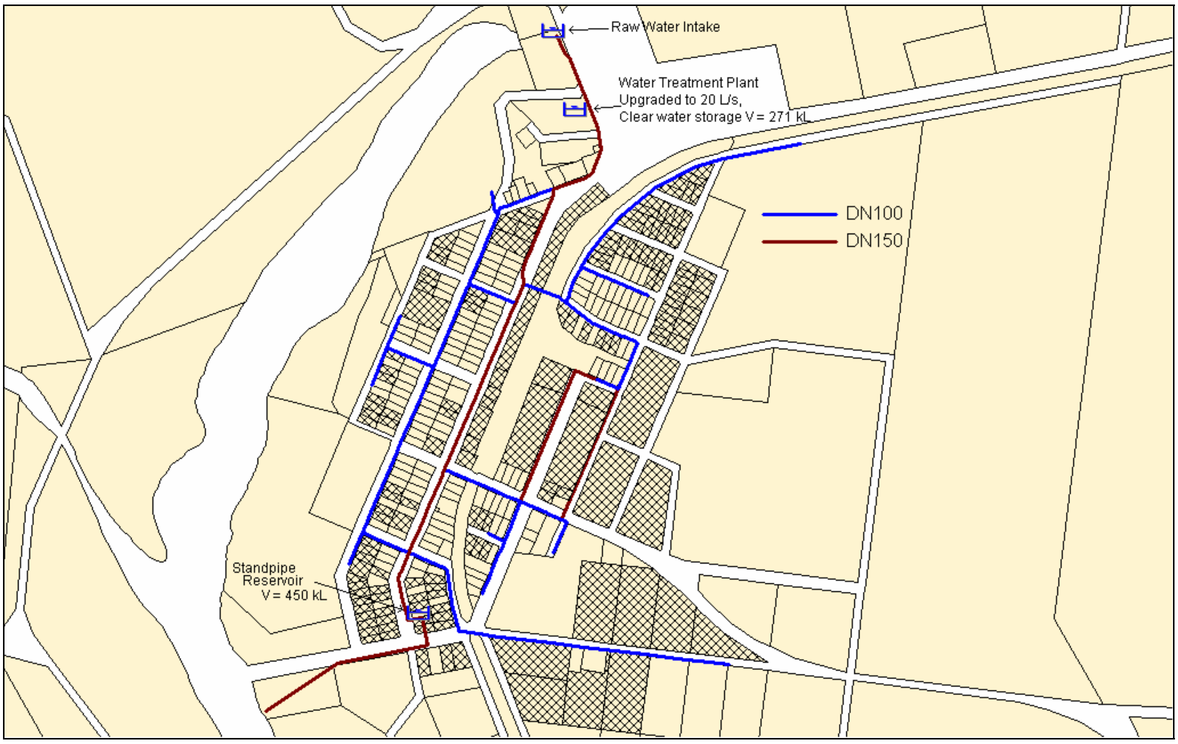


Figure 6.10 – Potential residential development sites within Baralaba

The model indicated that whilst major water supply infrastructure provided an adequate level of service provision in accordance with the DNR&M Guidelines, there are some areas to the south of the township that exhibit residual pressures less than 12m during PH, as shown on Figure 6.11. Given the uncertain nature of the location and extent of the ultimate development, it is considered that preliminary concept design modelling will be undertaken for individual subdivisions if and when they occur, to ensure that an adequate level of service is maintained.

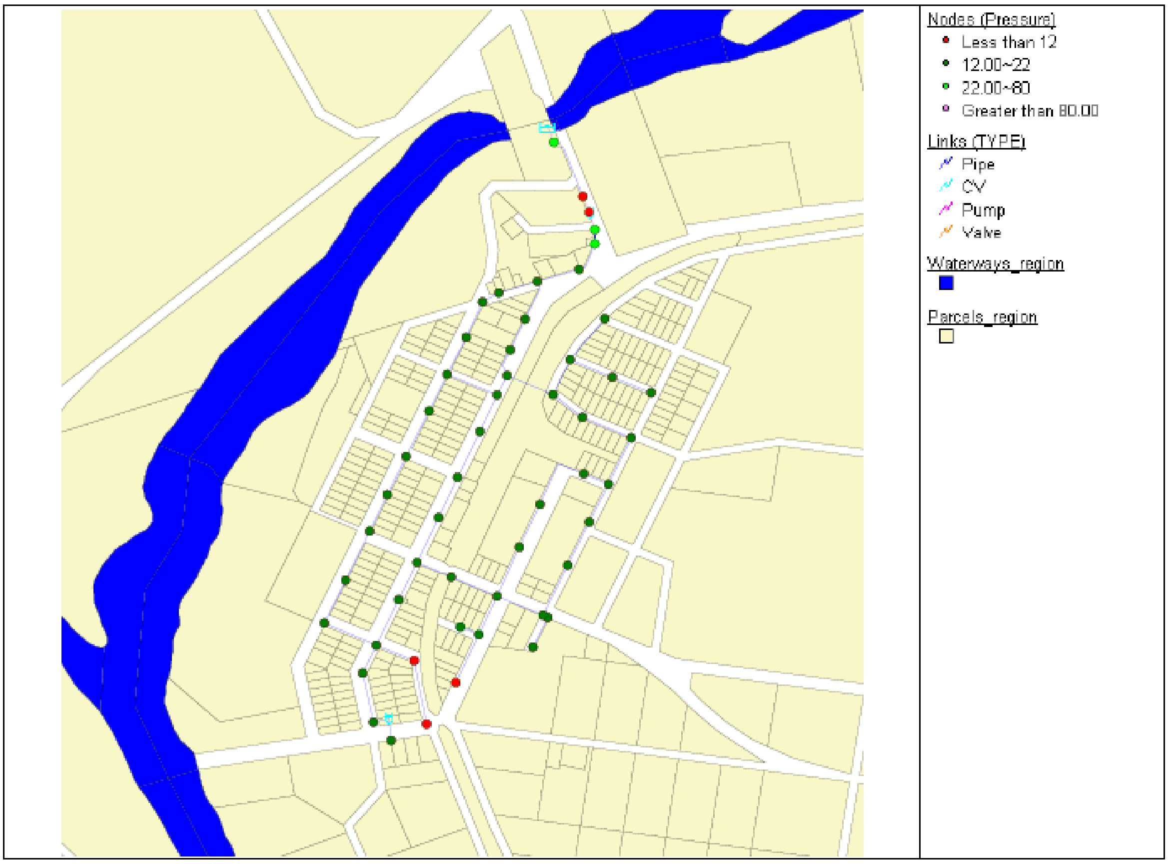


Figure 6.11 – Peak Hour pressure (m) Scenario 3

The ultimate fire-flow capability of Baralaba was analysed. As seen on Figure 6.10, the critical node pressure falls below 12m for the majority of the township. The subsequent design flow analysis (Figure 6.12) indicates that the flows as little as 1.2 L/s may be extracted at 12m head.

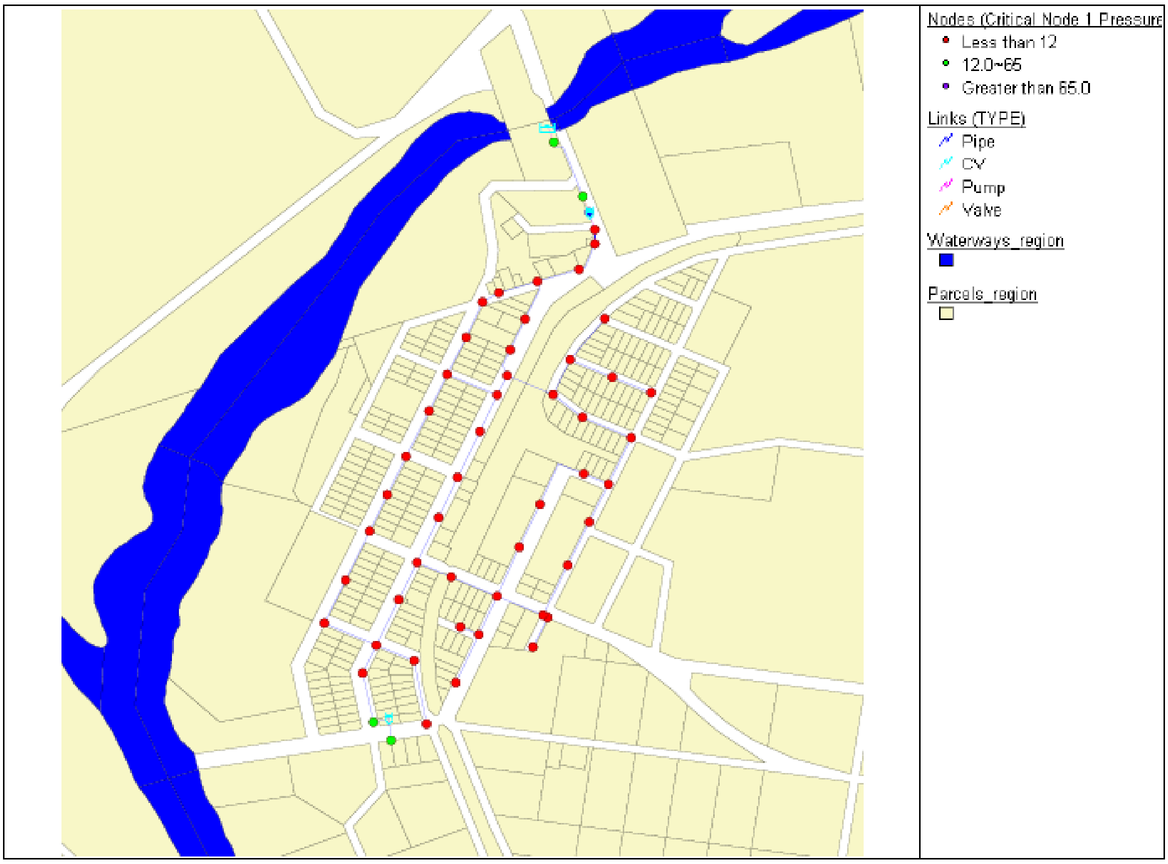


Figure 6.12 – Critical node pressure (m) for Scenario 3

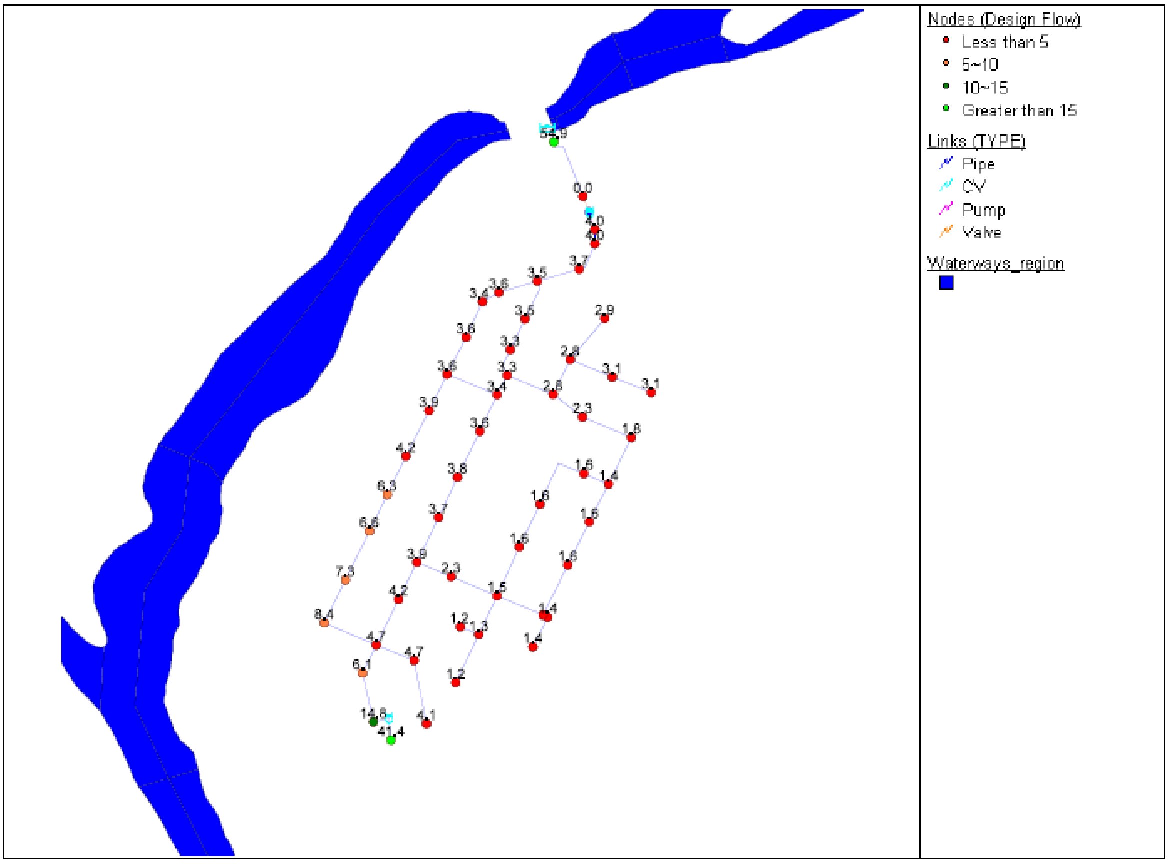


Figure 6.13 – Design flow (L/s) for Scenario 3

It is considered that future concept design modelling will be undertaken to ameliorate the fire-flow service provision. For example, the installation of a DN100 connection between the southern end of Ashfield St leading north into Wooroonah St will increase the design flow in the vicinity to some 3-5 L/s. The additional augmentation of the DN150 trunk main between the service reservoir and the connection at Ashfield St would provide a further increase to the design flow capability, maintaining a 15 L/s design flow along the central DN150 trunk main. The design flow given these two proposed augmentations is shown on Figure 6.14.

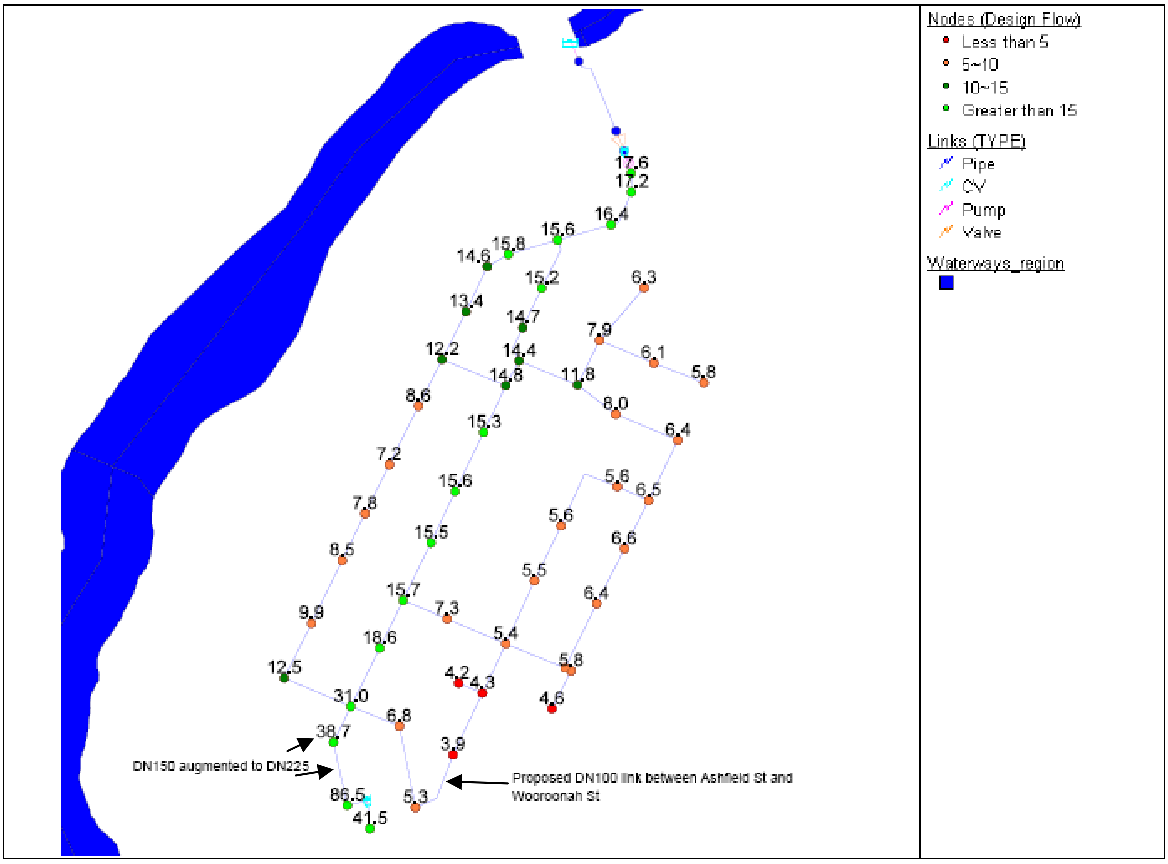


Figure 6.14 – Critical design flow for future possible augmentations

7. SUMMARY

Water supply for the township of Baralaba is extracted under the Dawson Valley Water Supply Scheme, providing an allocation of 182 ML/annum.

Existing infrastructure consists of a submersible raw water intake, a 15 L/s water treatment plant with clear water storage, an elevated reservoir to service the township, and approximately 5 km of reticulation mains.

The water supply design criteria were determined in accordance with the Banana Shire Council Planning Scheme, the Banana Shire Council Strategic Asset Management Plan and the Department of Natural Resources and Mines Planning Guidelines for Water and Sewerage.

Demand and population projections were made based on a nominal growth rate of 1.8% in Baralaba and accounting for known or expected future development. Equivalent Person demands for various land use types, including residential dwellings, were determined in accordance with the Department of Natural Resources and Mines Water Supply and Planning Guidelines.

A water supply reticulation model was constructed in order to assess the service standards provided in the township. Model scenarios were created to assess the projected development scenarios.

The Peak Hour service pressure was examined for each modelling scenario. The model indicated that the absolute minimum service pressure of 12m is met in accordance with the Banana Shire Council Strategic Asset Management Plan for Scenarios 1 and 2. System modelling of Baralaba’s ultimate development population (Scenario 3) indicated that the PH service pressure drops below 12m. However, it is considered that future augmentations strategies will be developed if and when such development occurs.

Fire-flow analyses were undertaken for each modelling scenario. The model indicated that a critical node pressure of 12m at 15 L/s was not met for much of the town. Design flow analyses were undertaken in accordance with the Department of Natural Resources and Mines Planning Guidelines for Water and Sewerage for ‘small communities’. The design flow is presented graphically for each scenario.

Modelling of the ultimate development population indicated that the 71 kL clear water storage tank is emptied during PD. An augmentation strategy, including augmenting the treatment plant capacity to 20 L/s and the total reservoir capacity to 271 kL, was considered to overcome shortfalls in the design flow particularly during PD. The EP trigger for the presented augmentation strategy is 700 EP, including 540 residential EP (216 residential connections) in the township. Whilst major infrastructure components were found to be adequate to service the ultimate population, head losses due to friction in minor reticulation was found to be quite high. It is considered that preliminary concept design modelling will be undertaken for individual subdivisions if and when they occur.

8. SCHEDULE OF WORKS

A number of augmentations and upgrades were presented in order to supply the township of Baralaba with the desired standards of service. An overview is provided on Table 8.1, outlining the proposed augmentation, the development trigger, and a preliminary cost estimate.

Table 8.1 – Summary of augmentations

Component	Trigger	Quantity	Unit Rate	Sub-total
Dual DN150 link between Dunstan St and Benleith St	As the proposed subdivision is developed	800	$216	$172,800
Augment clear water storage with 200kL ground level concrete reservoir	When the township has a total of 700 EP	1	$160,000	$160,000
Augment water treatment plant	When the township has a total of 700 EP	See notes.		
Link existing reticulation from Ashfield St to Wooroonah St with DN100	Possible augmentation - dependant on location and extent of development	150	$162	$24,300
Upgrade existing DN150 trunk between service reservoir and Ashfield St with DN225	Possible augmentation - dependant on location and extent of development	250	317	$79,250

NOTE: It is expected that the processes involved in the augmentation of the water treatment plant will depend on many variables not limited to the raw water quality and the design and operation of the existing plant. It is recommended that Banana Shire Council seek to commission further detailed planning as the Equivalent Person trigger is approached.

9. RECOMMENDATIONS

Water supply reticulation modelling was undertaken in accordance with the Department of Natural Resources and Mines Planning Guidelines for Water and Sewerage.

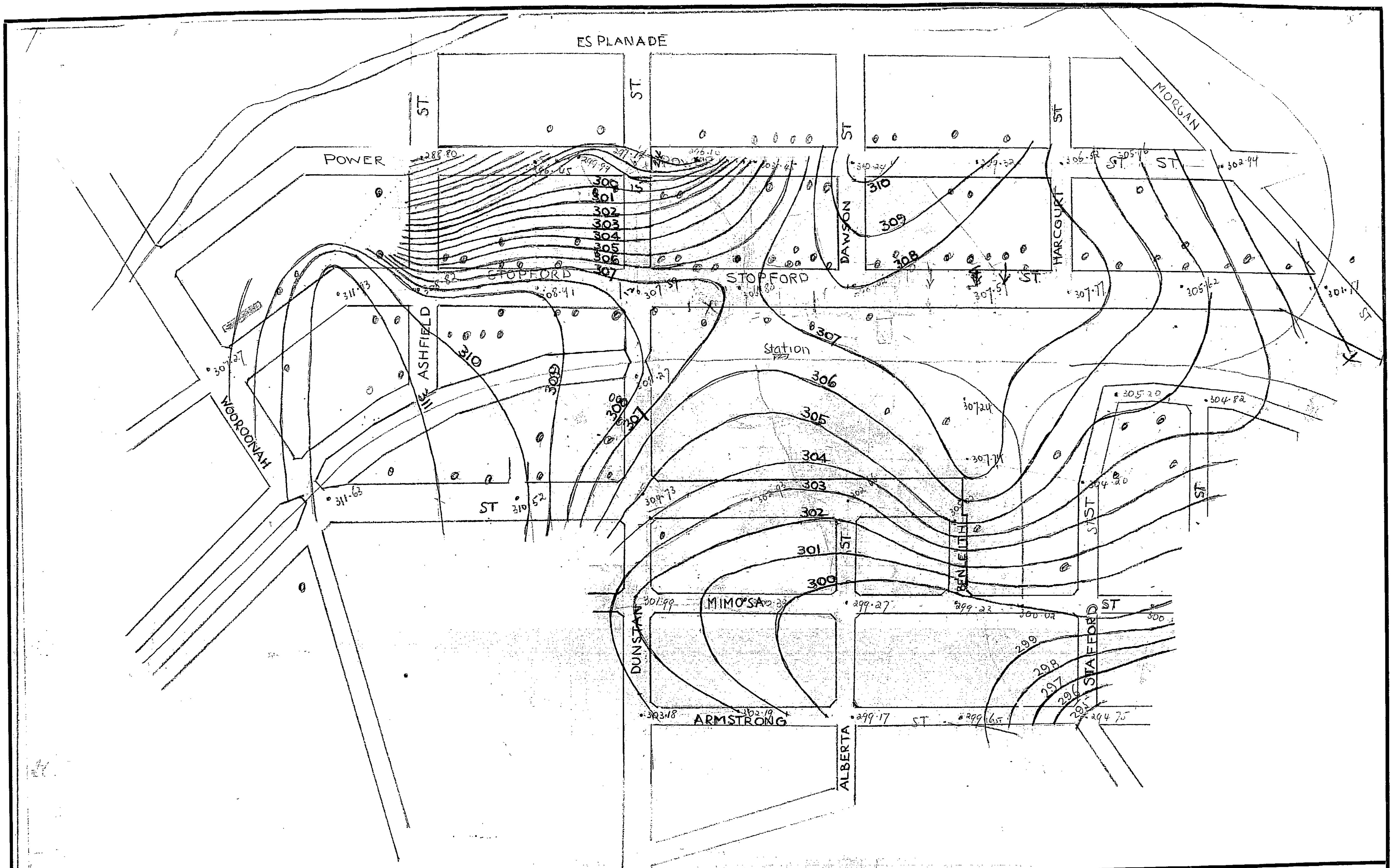
System modelling has indicated that Baralaba's current water supply infrastructure provides an adequate level of service provision for the existing service population. It is proposed to develop a parcel of land located in the declared 'village area'. The associated augmentations were found to afford an adequate level of service provision up to a total service population of 700 EP, including 540 residential EP (216 connections). At such point in time, it is recommended that the Baralaba water supply infrastructure be augmented as follows:

- Increase the design capacity of the water treatment by approximately 5 L/s, giving a total design flow of 20 L/s, and
- Increase the volume of clear water storage by 200 kL to provide a total capacity of 271 kL.

It is recommended that concept design modelling be undertaken for specific subdivisions in Baralaba if and when they occur, ensuring that an adequate level of service provision is maintained as the township is developed.

APPENDIX A

Figures



BARALABA contour

4 ...

20466

BANANA SHIRE COUNCIL

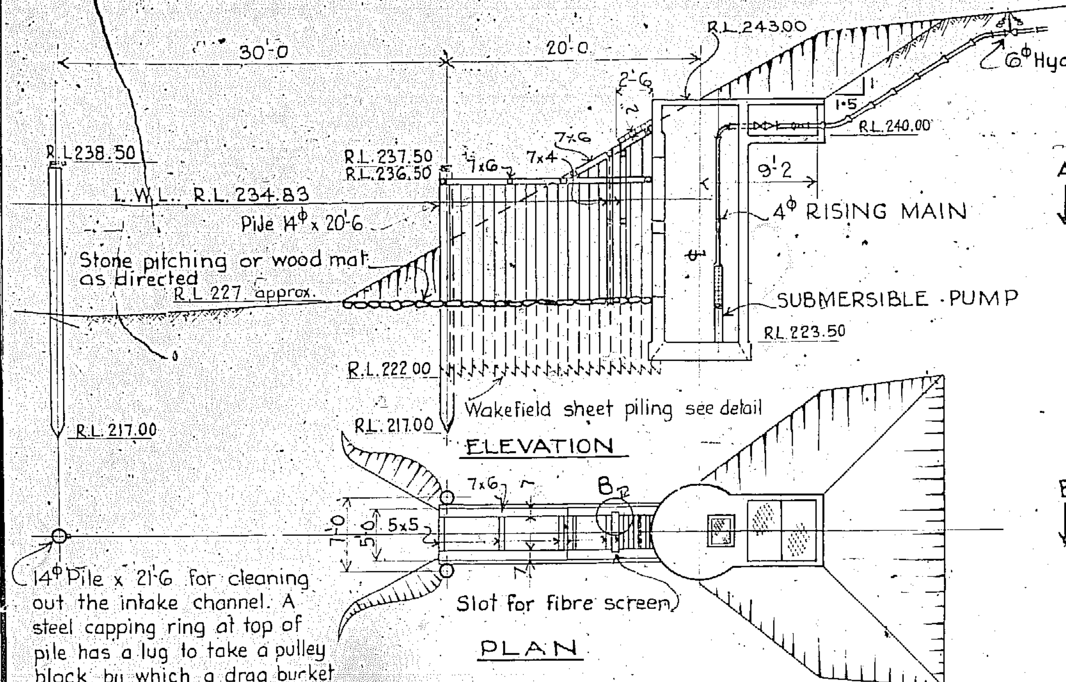
BARALABA contour

PLAN

SCALE	
DRAWN	
TRACED	
CHECKED	
DATE	

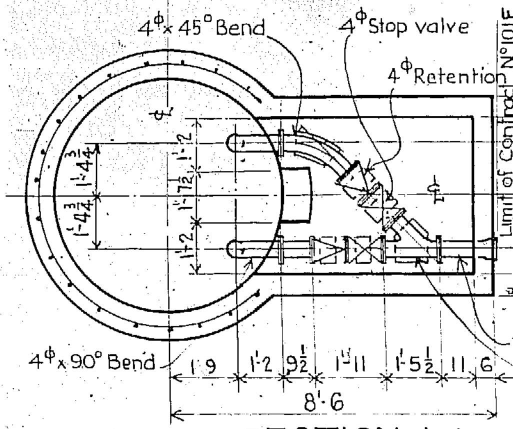
APPROVED

2-010

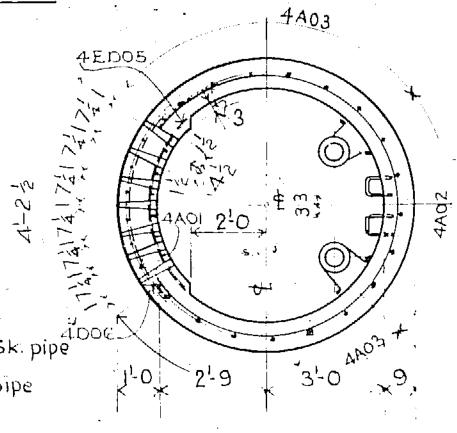


14φ Pile x 21'-6 for cleaning out the intake channel. A steel capping ring at top of pile has a lug to take a pulley block by which a drag bucket is operated

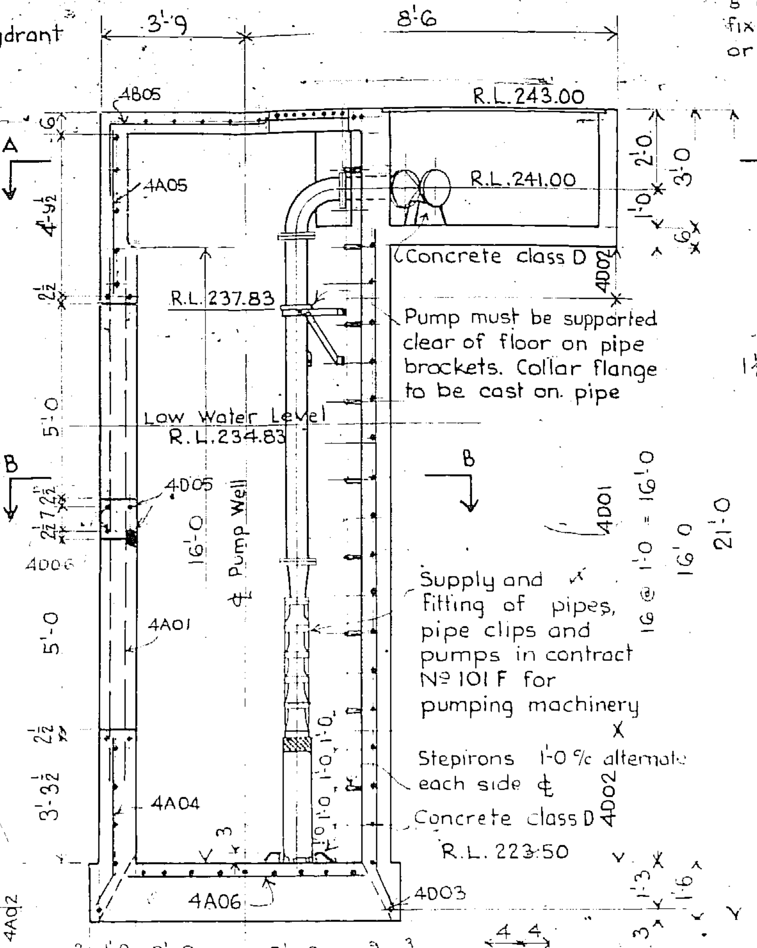
GENERAL ARRANGEMENT
Scale 1/8" = 1'-0



SECTION A-A



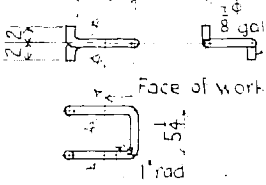
SECTION B-B



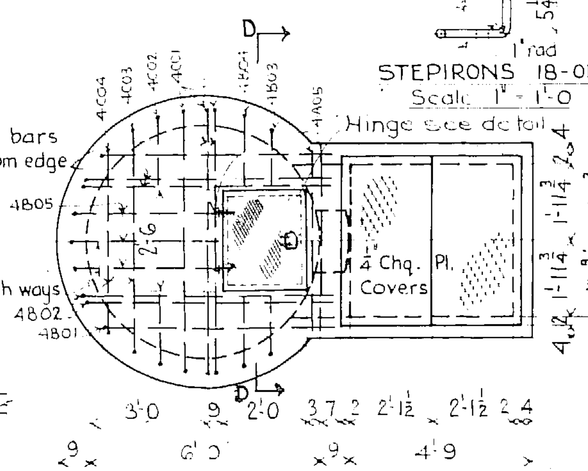
3 1'-0 2'-9 3'-0 9 3

8'-0 dia

SECTION C-C



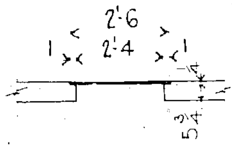
STEPIRONS 18-OFF
Scale 1" = 1'-0



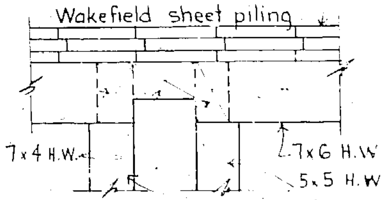
2/Selvedge bars 2" c/c & 2" from edge

C

C

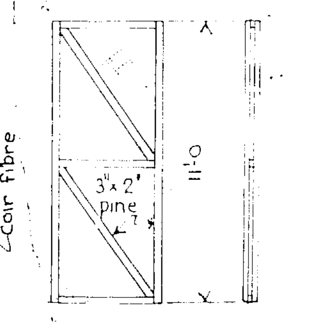


PLAN
PUMP WELL
Scale :- 3/8" = 1'-0

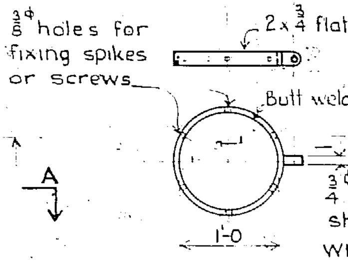


SECTION DD

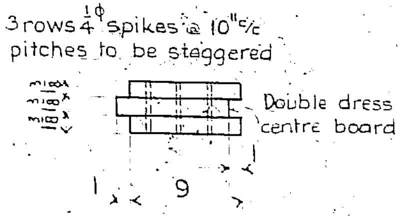
DETAIL B Scale 1" = 1'-0
SLOT FOR FIBRE SCREEN



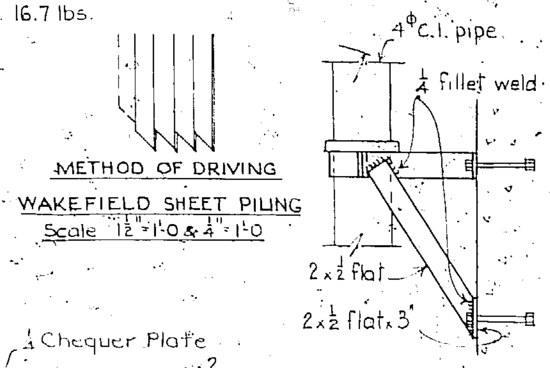
FIBRE SCREEN 1-OFF Scale ¼" = 1'-0



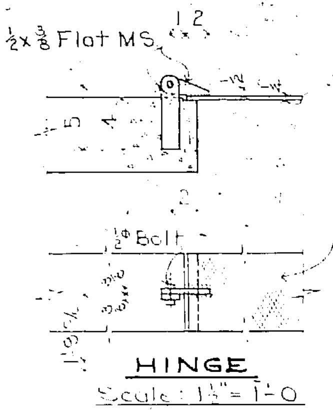
PILE RING
1 - Off
Scale 1" = 1'-0



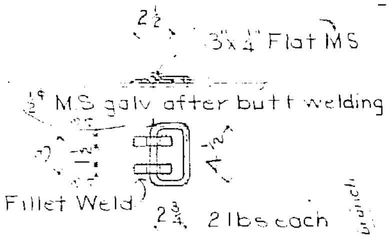
SECTION OF SHEET PILE



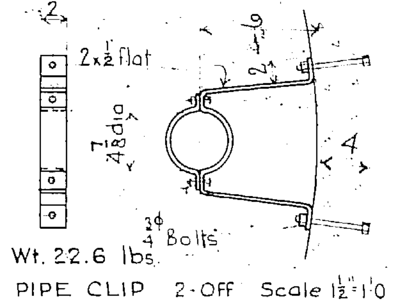
METHOD OF DRIVING
WAKEFIELD SHEET PILING
Scale 1½" = 1'-0 & 4" = 1'-0



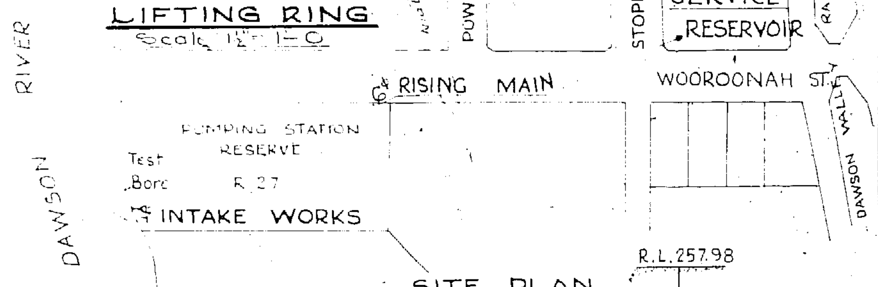
HINGE
Scale 1½" = 1'-0



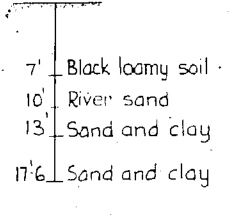
LIFTING RING
Scale 1½" = 1'-0



PIPE CLIP 2-OFF Scale 1½" = 1'-0
In Contract No 101 F.



SITE PLAN
Scale 1" = 4 chain



DETAILS OF TEST BORE

REINFORCING SCHEDULE

SHAPE	LOCATION	MARK	DIA.	A	B	C	L	N°	TOTAL LENGTH
A	Grill (vert)	4A01	½	13'-6	-	-	13'-6	12	162
	Wall (")	4A02	"	17'-6	-	-	17'-6	5	88
	" "	4A03	"	20'-6	-	-	20'-6	14	287
	" "	4A04	"	4'-6	-	-	4'-6	6	27
	" "	4A05	"	4'-0	-	-	4'-0	4	16
	Bot. slab	4A06	"	Variable			80'-0	-	80
B, A	Top slab	4B01	"	6'-0	2'-0	-	8'-0	2	16
	" "	4B02	"	6'-4	"	-	8'-4	4	34
	" "	4B03	"	1'-6	"	-	3'-6	2	7
	" "	4B04	"	1'-9	"	-	3'-9	2	8
	" "	4B05	"	2'-6	"	-	4'-6	3	14
B, A	" "	4C01	"	6'-9	"	-	10'-9	3	33
	" "	4C02	"	6'-4	"	-	10'-4	1	11
	" "	4C03	"	5'-9	"	-	9'-9	1	10
	" "	4C04	"	4'-9	"	-	8'-9	1	9
B, A	Wall (horiz)	4D01	"	6'-9	17'-5½	-	17'-6	11	193
	" "	4D02	"	"	23'-2	-	23'-2	6	139
	" "	4D03	"	"	16'-2	-	16'-2	3	49
	" "	4D04	"	7'-6	25'-2	-	25'-2	1	26
	Grill "	4D05	"	3'-0	5'-0	-	5'-0	4	20
	" "	4D06	"	3'-6	5'-6	-	5'-6	4	22

Total Length in feet 1251
Total Weight in tons 0.362

QUANTITIES

Concrete Class B	17.13 c.yds
Concrete Class D	0.2 "
Reinforcing Steel	0.362 tons
Ironwork (excluding Pipe Clips)	43-lbs
Sheet Piling	2265 s.ft.
H.W. Framing	370 s.ft
14φ Piles	62.5-l.ft.

NOTE
All concrete class B except where shown otherwise

3-482

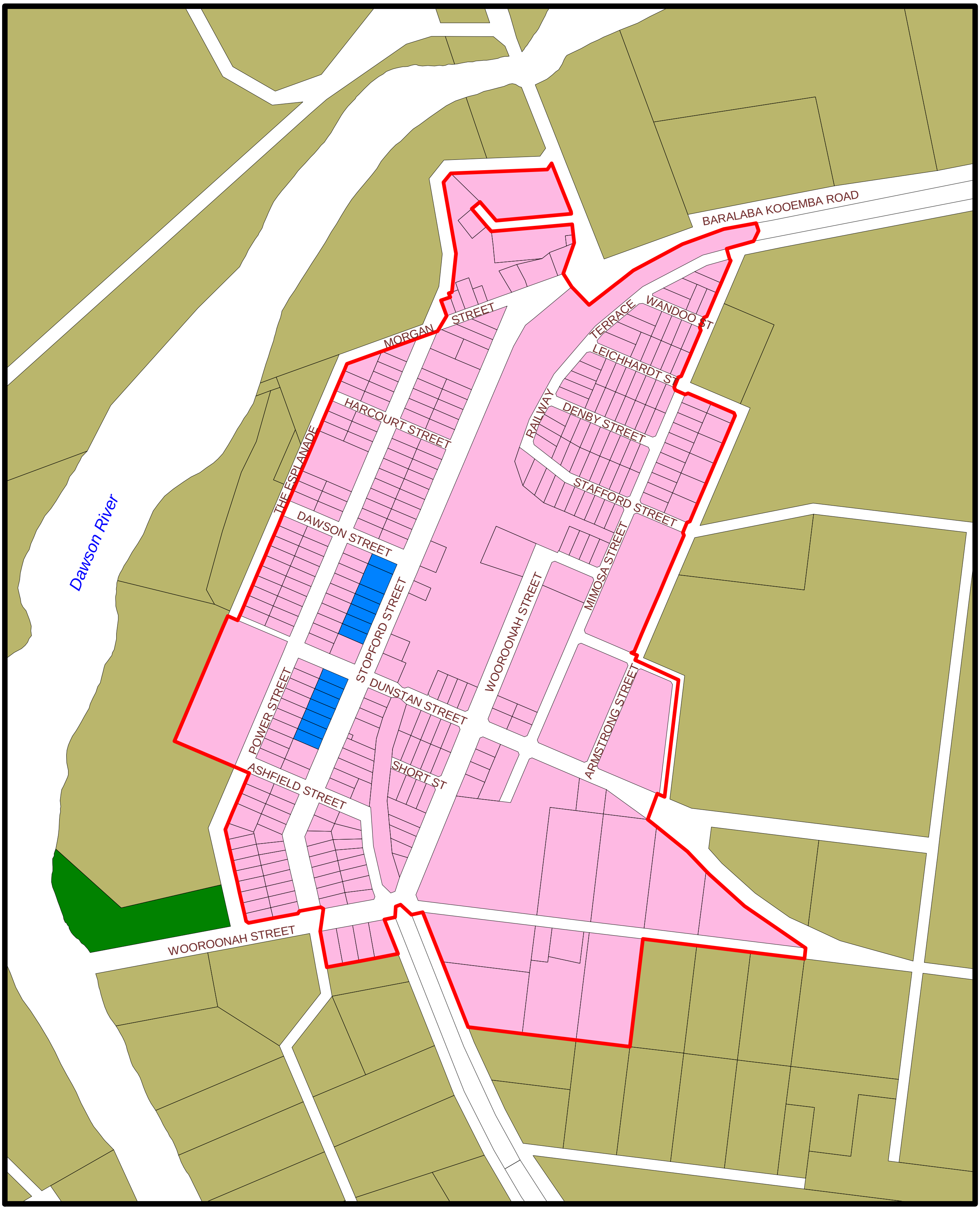
BANANA SHIRE COUNCIL
CARDNO AND DAVIES
CONSULTING CIVIL ENGINEERS
BARALABA WATER SUPPLY
INTAKE WORKS

5.11.50 shown thus ✗
REVISIONS

DESIGNED
DRAWN
CHECKED
SCALES AS SHOWN
C
APPROVED
18 NOV 49
1 101B

APPENDIX B

Zoning Map



VILLAGE OF BARALABA
Town Planning Scheme
Map No. ZONE-4

Key

Zones

- 🟩 Open Space
- ● Rural
- 🟥 Village

Village Areas

- ● Central Business Area

Scale 1:10 000

100 0 100 200 300 400

Metres

December 2004