



**ASSESSMENT of the PROPOSED WATER
SERVICING PLAN
of the**

**FITZGIBBON URBAN DEVELOPMENT AREA
- AREAS B, C, E1, E2, F & G**

Document Date: 17 March 2010

**PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 9 / 12 / 11**

Revision History

Rev No	Author	Branch	Approved for Issue			
			Position	Name	Signature	Date
0	Arash Alizadeh	Asset Management	Manager - Infrastructure Planning	Andy Kunnins		Feb 26, 2010
1	Arash Alizadeh	Asset Management	Manager - Infrastructure Planning	Andy Kunnins		Mar 17, 2010

APPROVED \ \
referred to in the ULDA
PLANS AND DOCUMENTS

TABLE OF CONTENTS

1	INTRODUCTION.....	4
2	POPULATION AND DEMAND.....	8
3	HYDRAULIC ANALYSIS.....	11
3.1	Peak Hour Scenario.....	11
3.2	Fire Flow Scenario.....	11
3.3	Reliability of Supply.....	11
4	PROPOSED AND REVIEWED WATER RETICULATION MAINS	12
5	CONCLUSION	14

LIST OF FIGURES

Figure 1-1 Fitzgibbon UDA	5
Figure 1-2 Study Area.....	6
Figure 1-3 Bracken Ridge WSA Existing Infrastructure.....	7
Figure 2-1 Number and Types of Allotments in Study Area.....	9
Figure 4-1 QJW Proposed Water Reticulation Mains - Option 1.....	16
Figure 4-2 QJW Proposed Water Reticulation Mains - Option 2.....	17
SK06-10 ULDA Proposed Water Reticulation Mains.....	18

LIST OF TABLES

Table 2-1 Study Area Equivalent Persons Calculation.....	8
Table 2-2 Study Area Demand Calculation.....	10

1 INTRODUCTION

Queensland Urban Utilities (QUU) was commissioned by the Urban Land Development Authority (ULDA) to assess the required water mains for development of areas B, C, E1, E2, F and G of the Fitzgibbon Urban Development Area (UDA).

The Fitzgibbon UDA covers 295 hectares of land in the northern suburbs of Fitzgibbon, Carseldine, Bald Hills, Taigum and Deagon. The area is located approximately 12 km from the Brisbane Central Business District. (see Figure 1-1)

Areas B, C, E1, E2, F and G of the Fitzgibbon UDA are proposed to contain about 310 low, low-medium and medium residential allotments. The area is located south of Telegraph Rd, north of the railway and west of stages 1-4 which are currently being constructed (see figure 1-2).

The study area is within the Bracken Ridge Water Supply Area (WSA) and is supplied by gravity from Bracken Ridge reservoir (50.4 mAHd Minimum Operating Level) (see Figure 1-3).

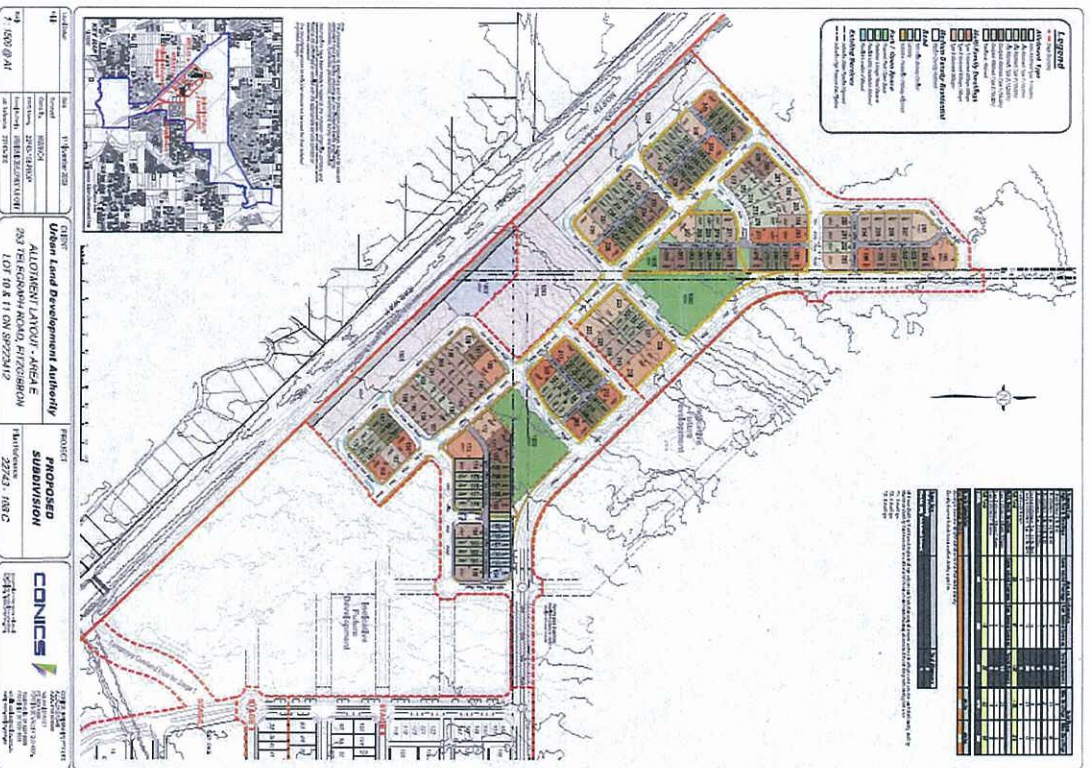
This document has been prepared to assess the required water mains to meet Brisbane City Council (BCC) design standards to:

- Achieve minimum pressures;
- Achieve required fire-flow capacities;
- Ensure reliability of supply to the proposed development.

Figure 1-1 Fitzgibbon UDA



Figure 1-2 Study Area



2 POPULATION AND DEMAND

Number and types of allotments for the study area were provided by the ULDA and are shown in Figure 2-1.

The majority of allotments are of Low Density residential (LDR) and Low-Medium Density Residential (LMR) categories with three larger allotments (Super Lots) along the railway line categorised as Medium Density Residential (MR).

Equivalent Persons (EP) were calculated from the allotment data by equating one LDR and LMR dwelling to 2.5 EP, and one MR dwelling to 1.7 EP. (see Table 2-1)

Table 2-1 Study Area Equivalent Persons Calculation

Allotment Type	City Plan Category	No. of Allotments	Yield Range		EP per Dwelling	Total Max EP
			Min Dwellings	Max Dwellings		
Single Family Dwellings	LDR	126	126	213	2.5	533
Multi-Family Dwellings	LMR	26	178	309	2.5	773
					Total EP	1,305
Allotment Type	City Plan Category	No. of Allotments	Total Area (ha)	Dwellings per ha	Total No. of Dwellings	EP per Dwelling
Super Lots	MR	3	21.76	66	1,436	1.7
					Total EP	2,441

Per capita demands were calculated based on an Average Day Demand (AD) of 268L/person/d, a Peak Day (PD) to Average Day factor of 1.7 and a Peak Hour Demand (PH) factor of 1.89. Non Revenue Water of 46L/EP/day was also added to the calculated demand. This equated to a Peak Hour Demand of 0.011L/s/EP. Table 2-2 shows the study area's demand calculation.

Allotment Type	Access Configuration		Total Allotments	Yield Range	
	Conventional Frontage	Rear Loaded Laneway		Min. Dwellings	Max. Dwellings
Single Family Dwellings					
Soho Allotment (10x25m)	0	6	6	6	12
Villa Allotment Type 1 (10x25m)	3	31	34	34	65
Villa Allotment Type 2 (10x32m)	5	22	27	27	49
Villa Allotment Type 3 (12.5x32m)	7	1	8	8	9
Courtyard Allotment Type 1 (15x25m)	3	14	17	17	31
Courtyard Allotment Type 2 (15x32m)	16	13	29	29	42
Traditional Allotment	5	0	5	5	5
Sub Total	39	87	126	126	213
Multi-Family Dwellings					
Type 1 Allotment 450sqm-599sqm	2	11	13	26	39
Type 2 Allotment 600sqm-749sqm	2	6	8	16	32
Type 3 Allotment 750sqm+	3	2	5	10	25
Sub Total	7	19	26	52	96
TOTAL	46	106	152	178	309

Density Calculation		dw/ha	dw/ha
Net Residential Density		14.6	25.3

Density is based on SEQRP definition for Net Residential Density

Density does not include future medium density super lots

Super Lots	Total Allotments
Medium Density	3
Possible Utility Installation Allotment	1

Minimum Dwelling Yield based single dwellings only on rear loaded laneway allotments and two dwellings constructed on each Multi-family dwelling

Maximum Dwelling Yield based on an additional loft home on rear loaded laneway allotments & the following multi-family yield rates:

T1 - 3 dwellings

T2 - 4 dwellings

T3 - 5 dwellings

Figure 2-1 Number and Types of Allotments in Study Area

Table 2-2 Study Area Demand Calculation

City Plan Category	Total EP	AD (L/EP/d)	PD/AD (L/EP/d)	PD (L/EP/d)	MH/PD	MH (L/EP/d)	MH (L/EP/s)	MH Inc. NRW (L/EP/s)	MH (L/EP/s)
LDR/LMR	1,305	268	1.70	456	1.89	861	0.010	0.011	13.76
MR	2,441	268	1.70	456	1.89	861	0.010	0.011	25.75

In hydraulic modeling and for LDR and LMR allotments, EP loads were distributed uniformly across the existing parcels within the study area. For the Super Lots, the EP demand for each parcel was applied to the nearest junction in the model.

3 HYDRAULIC ANALYSIS

Hydraulic analysis of the proposed water reticulation mains was undertaken using hydraulic analysis software. The following scenario runs were undertaken:

1. Peak Hour pressures
2. Fire Flow

3.1 PEAK HOUR SCENARIO

System performance was assessed under PH demands with Bracken Ridge reservoir at Minimum Operating Level (MOL). The adequacy of proposed water service mains was checked to ensure a minimum service pressure of 210kPa (21m) is maintained at the water meters.

3.2 FIRE FLOW SCENARIO

System requirements were identified to supply fire fighting flows of 25 (from two hydrants) and 45 L/s (from up to three hydrants) for low and high risk areas respectively. Assessment of fire flow capacity was made with a concurrent background demand equivalent to 2/3 of PH demand with a minimum allowable residual pressure of 100kPa (10m) at the hydrants.

3.3 RELIABILITY OF SUPPLY

The network configuration was reviewed to ensure that a reliable supply to the development would be available into the future. Potential connection to the adjacent Aspley WSA and also the number of cross connections between the reticulation and trunk mains were considered to provide an adequate reliability of supply.

4 PROPOSED AND REVIEWED WATER RETICULATION MAINS

The augmentations proposed by ULDA are shown in SK06 - SK10. The plan comprises a DN225 backbone supply that runs parallel to the existing DN410 along the future extension of Roghan Rd and connects to the existing DN300 in Roghan Rd. The proposed water reticulation mains are mostly sized as DN150.

Supplementary information provided by ULDA in the course of reviewing the draft version of the study is also listed below:

- Major parts of the study area are subject to bulk fill. In worst case the fill depth in the vicinity of the existing DN410 trunk main can add as much as 1.7m extra soil depth.
- Some sections of the proposed plan have already been constructed (see sketch SK06) in smaller size than proposed by QUU in previous advice¹.
- It was proposed to lay reticulation mains in the future busway to connect to as existing main in Lavender Pl.

The proposed plan and the background information were reviewed by QUU and recommendations were identified as follows:

- Contingency of Supply: Due to the development being situated on a trunk main branch from Bracken Ridge reservoir, and given the size of the development, it is necessary to ensure that a contingent supply from adjacent Aspley WSA can be delivered in case of failure/maintenance of the trunk mains. Two options were identified either can address the above issue:
 - Option 1: To upsize the proposed DN150 water main supplying Area B to DN250 (Line 4, see Figure 4-1) and to connect it to existing DN225 in Aspley WSA via Carselgrove

¹ "Assessment of the Proposed Water Servicing Plan of the Fitzgibbon Urban Development Area - Areas B, C, E1, E2, F & G - Draft" - Dated 26 February 2010

Ave. It is also proposed to upsize the section further north (line 3, see Figure 4-1) from DN150 to DN200.

- Option 2: To install a standard 200mm BCC flow meter / PRV pit, with internal pipework as an offtake from the existing DN300 in Roghan Rd (see Figure 4-2). It is recommended to initially install pipe shorts instead of the PRV and flow meter. This will allow relatively easy installation of a PRV and flow meter, if required. It is also required to insert a new valve into the existing DN410 (see Figure 4-2) to isolate the trunk main from Bracken Ridge in case it has to be shutdown.
- Fire Flow Provision: The reticulation has been sized on the basis of providing minimum flows of 45 L/s. However it is suggested the ULDA engage with the fire authority to ascertain the overall level of fire protection required.
- Water main sizing: Opportunities were identified to downsize some of the proposed main sizes from DN150 to DN100 whilst meeting the Peak Hour and Fire Flow requirements. There may be opportunities to downsize the reticulation mains in area G; however it can not be determined until a detailed layout of the development of the surrounding area is known.
- Future busway: It is recommended not to lay any future reticulation mains in the busway as it is not in compliance with the BCC Standards which implies: "water mains shall be located to allow easy access for repairs and maintenance".
- Bulk Fill: It is recommended to lay the proposed water reticulation mains until after the bulk fill within the area is completed, if possible. This is to avoid issues of access the water mains in case of maintenance or repair. With regards to the existing water mains such as the DN410 trunk main between Norris Rd and Dorville Rd, the issue is currently being discussed between the BCC and the

ULDA representatives to ensure the necessary actions will be taken to protect the assets.

- The proposed DN225 (line 1) is upsized to DN250 as DN225 is not a standard size for BCC's new water mains.
- Two connection points between the proposed line 3 and the existing DN410 were identified to ensure robust supply to the proposed development.
- The proposed main sizes are expressed as Nominal Bore. The material and class of pipe will need to be selected during design to give hydraulic equivalence.

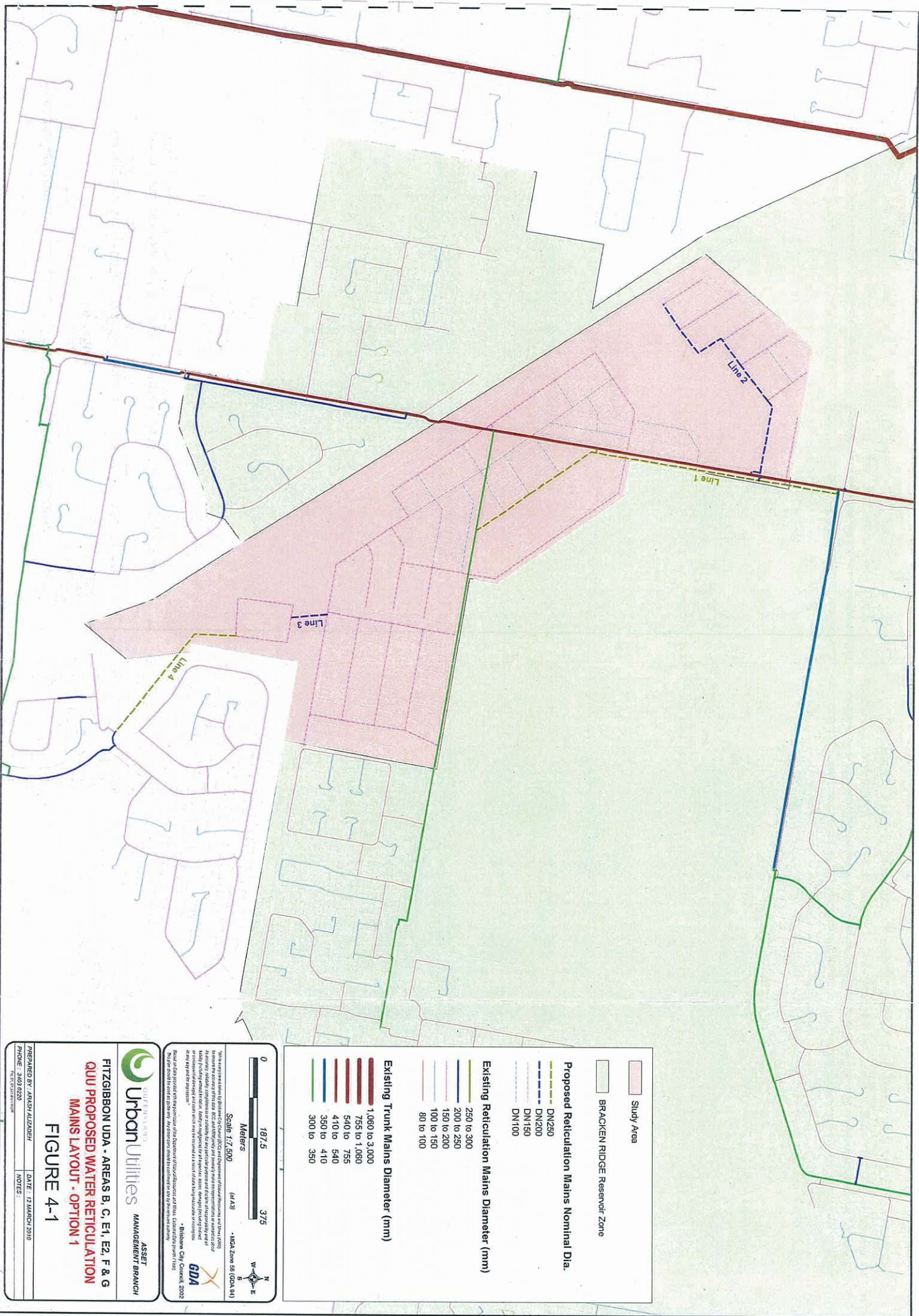
5 CONCLUSION

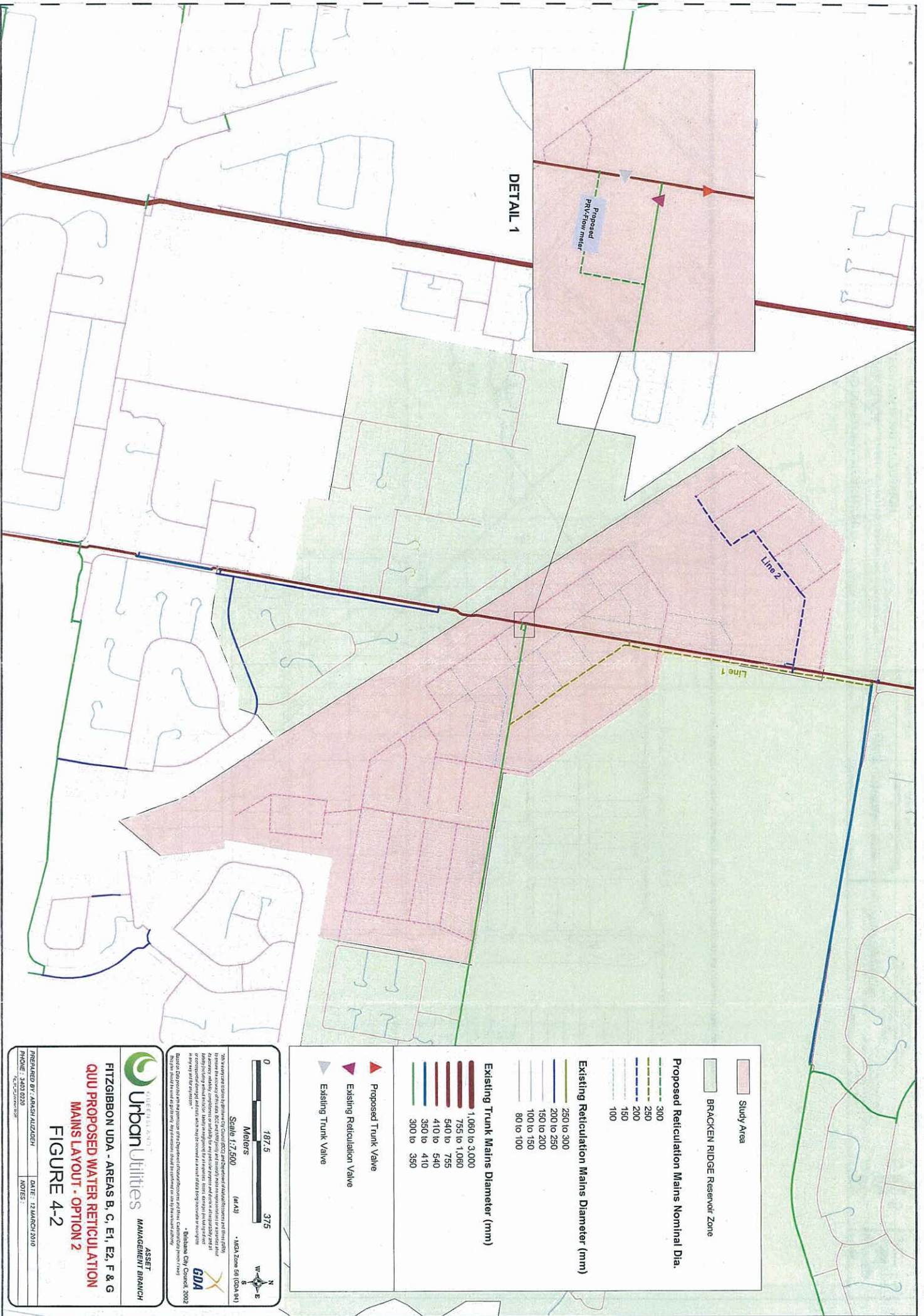
The proposed two options for water main network are shown in figures 4-1 and 4-2 for Areas B, C, E1, E2, F and G of the Fitzgibbon UDA.

References

Queensland Urban Utilities. Bracken Ridge WSA Master Planning Report, July 2009.

Urban Land Development Authority. Fitzgibbon Urban Development Area Development Scheme, July 2009.





DETAIL 1

Study Area

BRACKEN RIDGE Reservoir Zone

Proposed Reticulation Mains Nominal Dia.

- 300
- 250
- 200
- 150
- 100

Existing Reticulation Mains Diameter (mm)

- 250 to 300
- 200 to 250
- 150 to 200
- 100 to 150
- 80 to 100

Existing Trunk Mains Diameter (mm)

- 1,080 to 3,000
- 755 to 1,080
- 540 to 755
- 410 to 540
- 350 to 410
- 300 to 350

- Proposed Trunk Valve
- Existing Reticulation Valve
- Existing Trunk Valve



Scale 1:7,500

(M4)

• M4 Zone (GDA 94)

This drawing is to be used in conjunction with the Design and Construction Specifications and the Design and Construction Specifications for the proposed reticulation system. It is not to be used for any other purpose without the written consent of the Engineer. The Engineer is not responsible for any errors or omissions in this drawing or for any consequences arising from its use. The user of this drawing is advised to verify the accuracy of the information contained herein before using it for any purpose. The user of this drawing is also advised to verify the accuracy of the information contained herein before using it for any purpose. The user of this drawing is also advised to verify the accuracy of the information contained herein before using it for any purpose.

Urban Utilities **ASSET MANAGEMENT BRANCH**

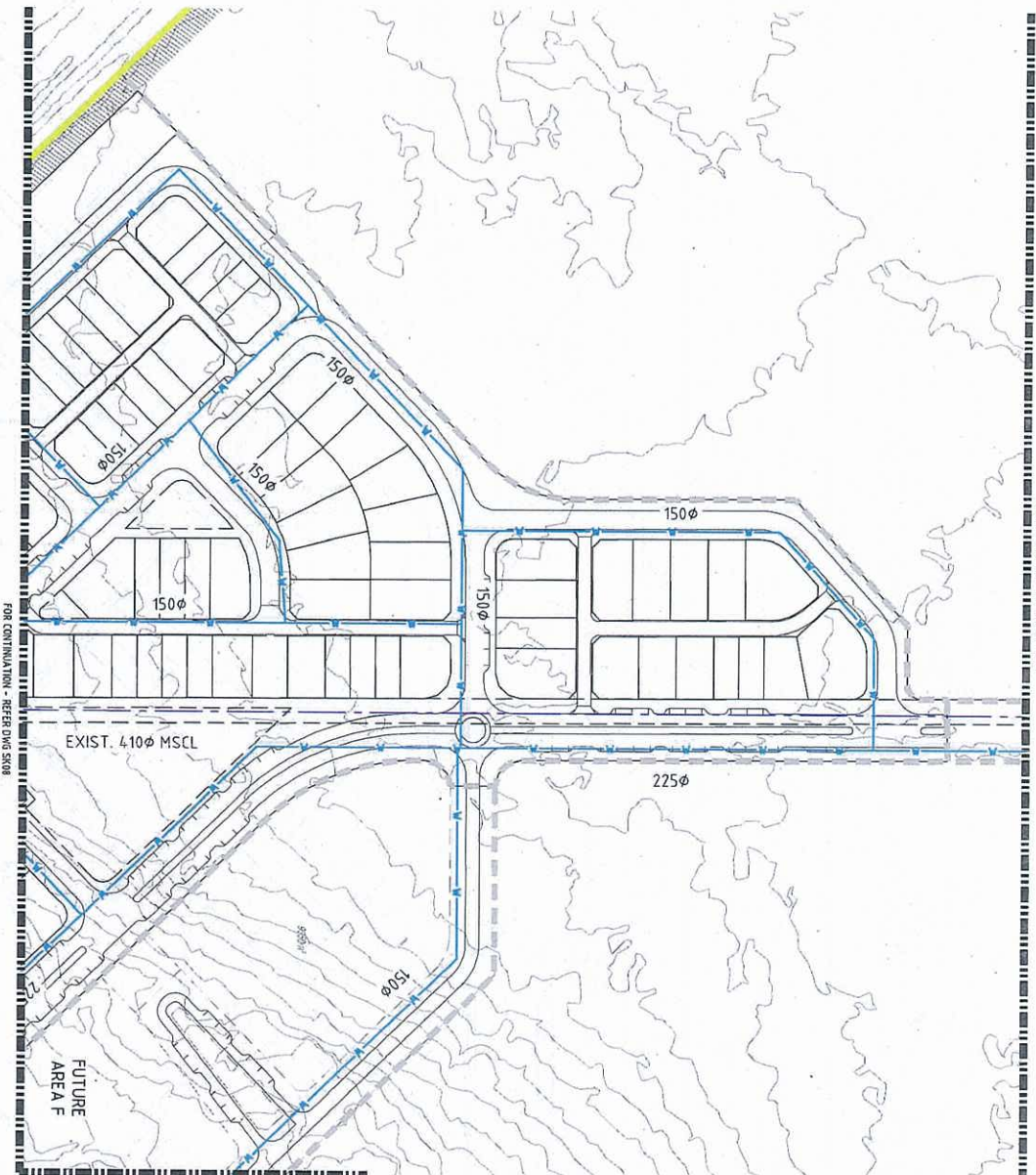
FITZGIBBON UDA - AREAS B, C, E1, E2, F & G
AQUA PROPOSED WATER RETICULATION
MAINS LAYOUT - OPTION 2

FIGURE 4-2

PREPARED BY: ANISH ALIZADEH DATE: 12 MARCH 2010
 PHONE: 3403 0220 NOTES:



FOR CONTINUATION - REFER DWG SK08



FOR CONTINUATION - REFER DWG SK08

LEGEND

- PROPOSED WATER
- EXISTING WATER MAIN
- STAGE BOUNDARY
- TOTAL SITE BOUNDARY

ASSOCIATED COMPLAINTS

CITY URBAN LAND DEVELOPMENT AUTHORITY

PROJECT FITZGIBBON CHASE

LOCATION 153 TELEGRAPH ROAD, FITZGIBBON

SHEET WATER RETICULATION LAYOUT PLAN - SHEET 4 OF 5

DATE 15 JANUARY 2010

DESIGNED AL

DATE

SCALE 1:1000 (A1)

ARCHITECTS CIVIL & STRUCTURAL ENGINEERS

ULDSFC SK09 P1

Revision History

Rev No	Author	Branch	Approved for Issue			
			Position	Name	Signature	Date
0	Arash Alizadeh	Asset Management	Manager - Infrastructure Planning	Andy Krumins		Feb 26, 2010
1	Arash Alizadeh	Asset Management	Manager - Infrastructure Planning	Andy Krumins		Mar 17, 2010

TABLE OF CONTENTS

1 INTRODUCTION..... 4

2 POPULATION AND DEMAND..... 8

3 HYDRAULIC ANALYSIS..... 11

3.1 Peak Hour Scenario..... 11

3.2 Fire Flow Scenario..... 11

3.3 Reliability of Supply..... 11

4 PROPOSED AND REVIEWED WATER RETICULATION MAINS 12

5 CONCLUSION 14

LIST OF FIGURES

Figure 1-1 Fitzgibbon UDA5

Figure 1-2 Study Area.....6

Figure 1-3 Bracken Ridge WSA Existing Infrastructure.....7

Figure 2-1 Number and Types of Allotments in Study Area.....9

Figure 4-1 QUU Proposed Water Reticulation Mains - Option 1.....16

Figure 4-2 QUU Proposed Water Reticulation Mains - Option 2.....17

SK06-10 ULDA Proposed Water Reticulation Mains.....18

LIST OF TABLES

Table 2-1 Study Area Equivalent Persons Calculation.....8

Table 2-2 Study Area Demand Calculation.....10

1 INTRODUCTION

Queensland Urban Utilities (QUU) was commissioned by the Urban Land Development Authority (ULDA) to assess the required water mains for development of areas B, C, E1, E2, F and G of the Fitzgibbon Urban Development Area (UDA).

The Fitzgibbon UDA covers 295 hectares of land in the northern suburbs of Fitzgibbon, Carseldine, Bald Hills, Taigum and Deagon. The area is located approximately 12 km from the Brisbane Central Business District. (see Figure 1-1)

Areas B, C, E1, E2, F and G of the Fitzgibbon UDA are proposed to contain about 310 low, low-medium and medium residential allotments. The area is located south of Telegraph Rd, north of the railway and west of stages 1-4 which are currently being constructed (see figure 1-2).

The study area is within the Bracken Ridge Water Supply Area (WSA) and is supplied by gravity from Bracken Ridge reservoir (50.4 mAHD Minimum Operating Level) (see Figure 1-3).

This document has been prepared to assess the required water mains to meet Brisbane City Council (BCC) design standards to:

- Achieve minimum pressures;
- Achieve required fire-flow capacities;
- Ensure reliability of supply to the proposed development.

Figure 1-1 Fitzgibbon UDA

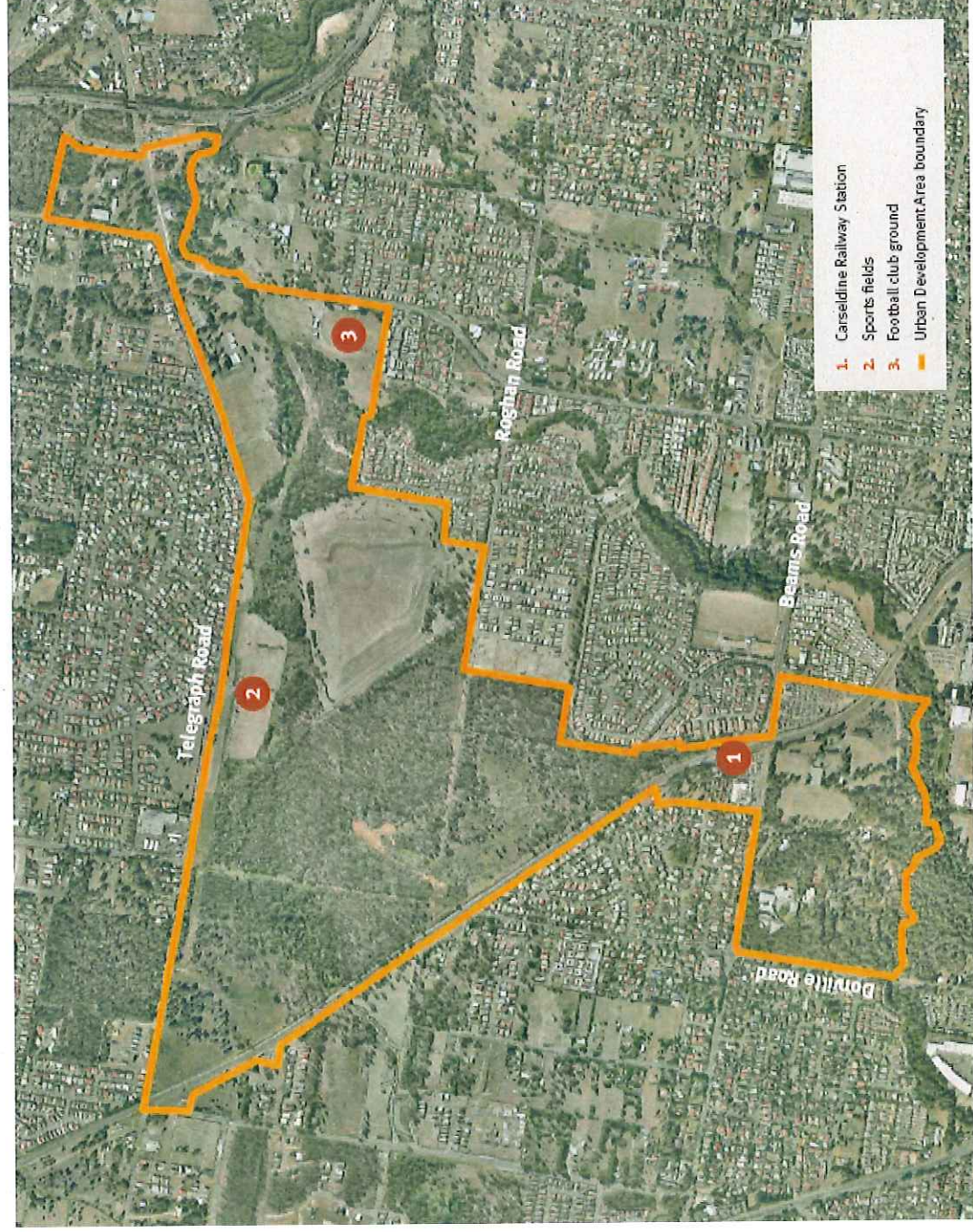
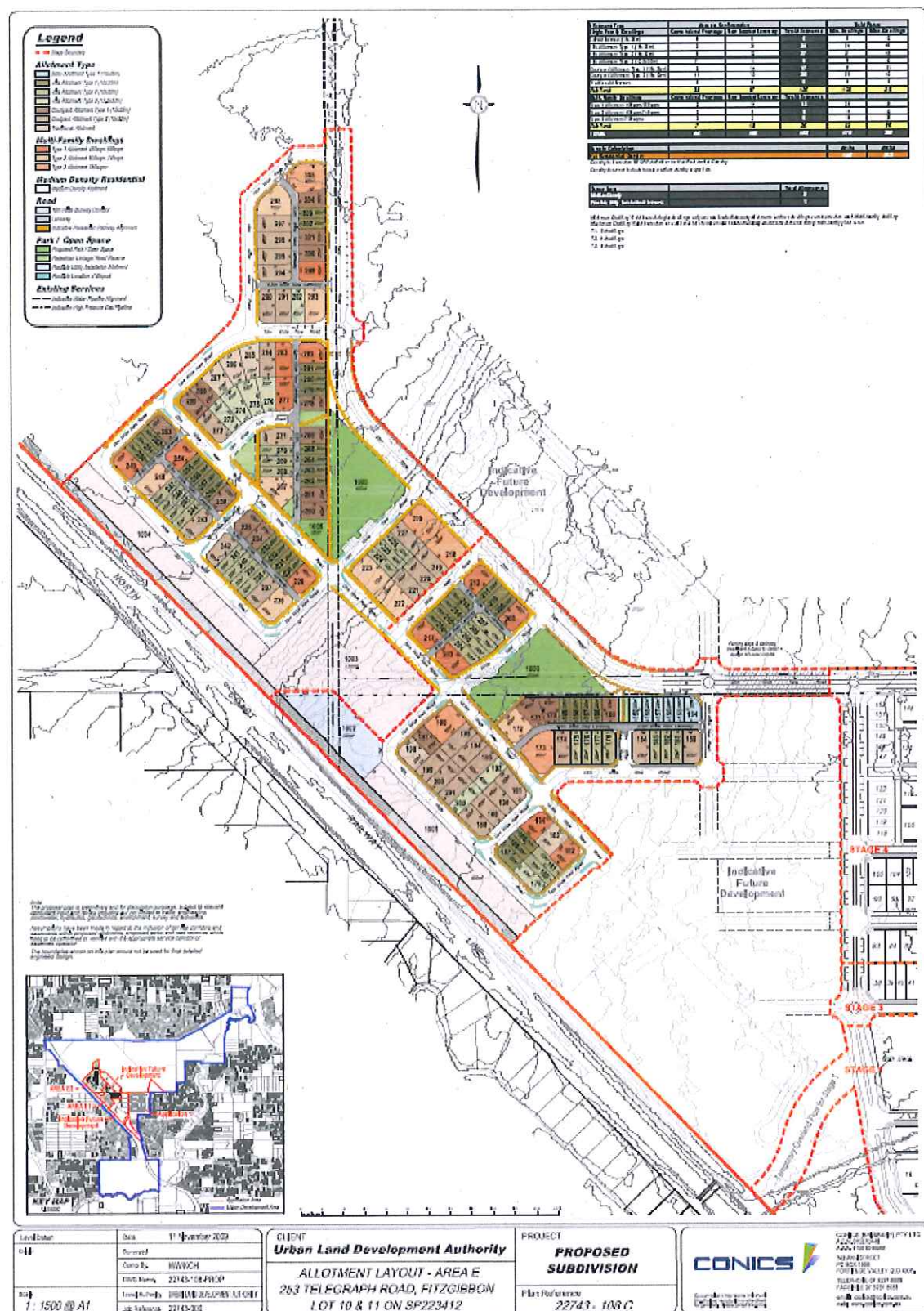
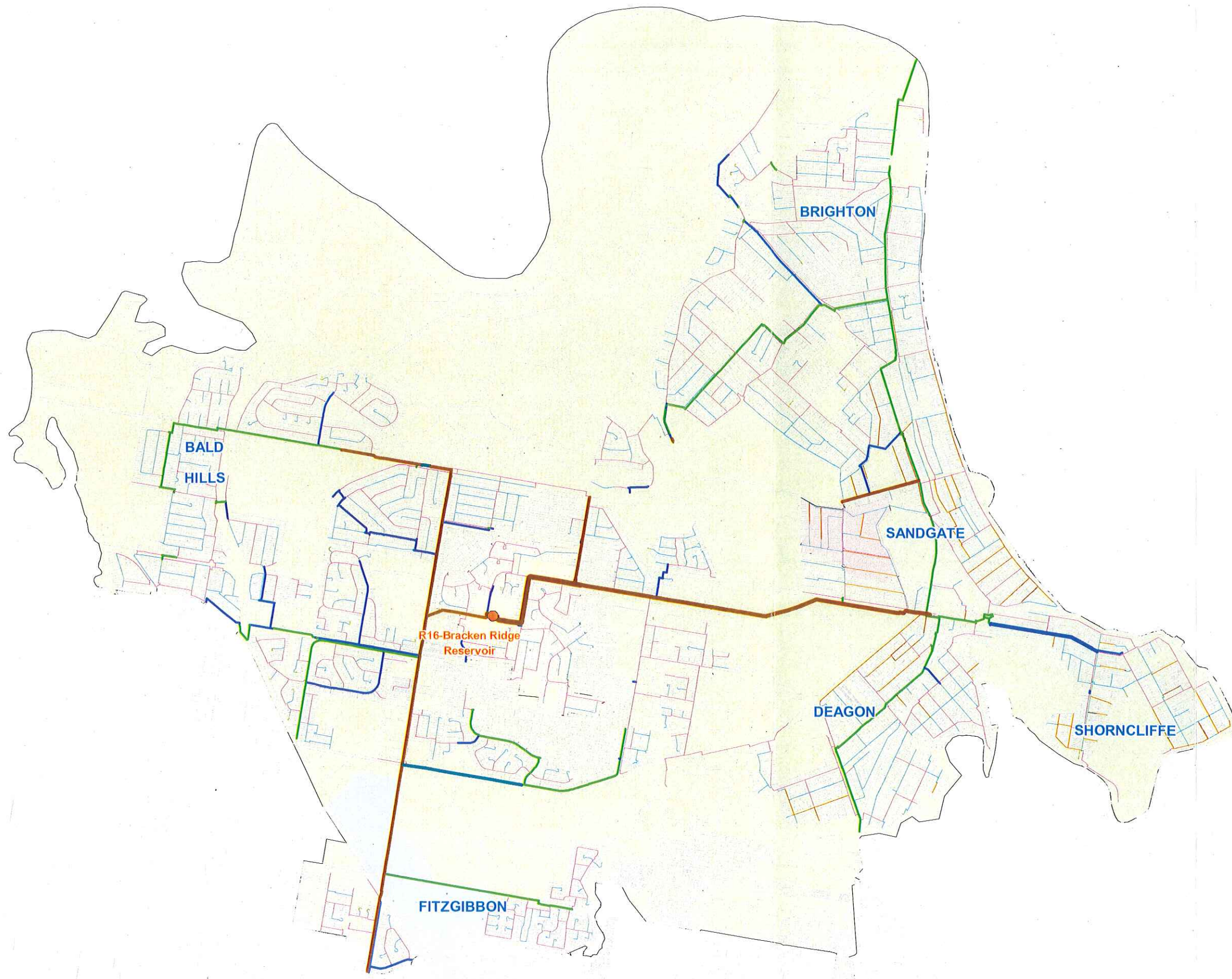


Figure 1-2 Study Area





Water Supply Zones

- ☐ BASKERVILLE ST BOOSTER - WB8
- ☐ BRACKEN RIDGE RES
- ☐ JUDE ST & BRACKEN RIDGE RES BOOSTER

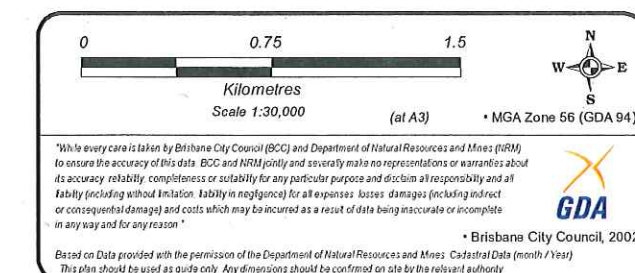
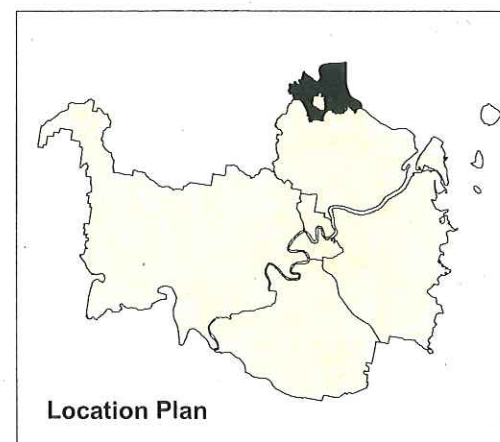
Study Area

Reticulation Diameter (mm)

- 250
- 200
- 150
- 100
- 80
- < 80

Trunk Main Diameter (mm)

- 1,060 to 3,000
- 755 to 1,060
- 540 to 755
- 410 to 540
- 350 to 410
- 300 to 350



FITZGIBBON UDA - AREAS E & G

BRACKEN RIDGE WSA
EXISTING INFRASTRUCTURE

FIGURE 1-3

PREPARED BY: ARASH ALIZADEH DATE: 22 FEBRUARY 2010
PHONE: 3403 0220 NOTES:

Fig_01_01_LocPlan_W09

2 POPULATION AND DEMAND

Number and types of allotments for the study area were provided by the ULDA and are shown in Figure 2-1.

The majority of allotments are of Low Density residential (LDR) and Low-Medium Density Residential (LMR) categories with three larger allotments (Super Lots) along the railway line categorised as Medium Density Residential (MR).

Equivalent Persons (EP) were calculated from the allotment data by equating one LDR and LMR dwelling to 2.5 EP, and one MR dwelling to 1.7 EP. (see Table 2-1)

Table 2-1 Study Area Equivalent Persons Calculation

Allotment Type	City Plan Category	No. of Allotments	Yield Range		EP per Dwellings	Total Max EP
			Min Dwellings	Max Dwellings		
Single Family Dwellings	LDR	126	126	213	2.5	533
Multi-Family Dwellings	LMR	26	178	309	2.5	773
					Total EP	1,305
Allotment Type	City Plan Category	No. of Allotments	Total Area (ha)	Dwellings per ha	Total No. of Dwellings	EP per Dwellings
Super Lots	MR	3	21.76	66	1,436	1.7
					Total EP	2,441

Per capita demands were calculated based on an Average Day Demand (AD) of 268L/person/d, a Peak Day (PD) to Average Day factor of 1.7 and a Peak Hour Demand (PH) factor of 1.89. Non Revenue Water of 46L/EP/day was also added to the calculated demand. This equated to a Peak Hour Demand of 0.011L/s/EP. Table 2-2 shows the study area's demand calculation.

Allotment Type	Access Configuration		Total Allotments	Yield Range	
	Conventional Frontage	Rear Loaded Laneway		Min. Dwellings	Max. Dwellings
Single Family Dwellings					
Soho Allotment (10x25m)	0	6	6	6	12
Villa Allotment Type 1 (10x25m)	3	31	34	34	65
Villa Allotment Type 2 (10x32m)	5	22	27	27	49
Villa Allotment Type 3 (12.5x32m)	7	1	8	8	9
Courtyard Allotment Type 1 (15x25m)	3	14	17	17	31
Courtyard Allotment Type 2 (15x32m)	16	13	29	29	42
Traditional Allotment	5	0	5	5	5
Sub Total	39	87	126	126	213
Multi-Family Dwellings					
Type 1 Allotment 450sqm-599sqm	2	11	13	26	39
Type 2 Allotment 600sqm-749sqm	2	6	8	16	32
Type 3 Allotment 750sqm+	3	2	5	10	25
Sub Total	7	19	26	52	96
TOTAL	46	106	152	178	309

Density Calculation	dw/ha	dw/ha
Net Residential Density	14.6	25.3

Density is based on SEQRP definition for Net Residential Density

Density does not include future medium density super lots

Super Lots	Total Allotments
Medium Density	3
Possible Utility Installation Allotment	1

Minimum Dwelling Yield based single dwellings only on rear loaded laneway allotments and two dwellings constructed on each Multi-family dwelling

Maximum Dwelling Yield based on an additional loft home on rear loaded laneway allotments & the following multi-family yield rates:

T1 - 3 dwellings

T2 - 4 dwellings

T3 - 5 dwellings

Figure 2-1 Number and Types of Allotments in Study Area

Table 2-2 Study Area Demand Calculation

City Plan Category	Total EP	AD (L/EP/d)	PD/AD	PD (L/EP/d)	MH/PD	MH (L/EP/d)	MH (L/EP/s)	MH Inc. NRW (L/EP/s)	MH (L/EP/s)
LDR/LMR	1,305	268	1.70	456	1.89	861	0.010	0.011	13.76
MR	2,441	268	1.70	456	1.89	861	0.010	0.011	25.75

In hydraulic modeling and for LDR and LMR allotments, EP loads were distributed uniformly across the existing parcels within the study area. For the Super Lots, the EP demand for each parcel was applied to the nearest junction in the model.

3 HYDRAULIC ANALYSIS

Hydraulic analysis of the proposed water reticulation mains was undertaken using hydraulic analysis software. The following scenario runs were undertaken:

1. Peak Hour pressures
2. Fire Flow

3.1 PEAK HOUR SCENARIO

System performance was assessed under PH demands with Bracken Ridge reservoir at Minimum Operating Level (MOL). The adequacy of proposed water service mains was checked to ensure a minimum service pressure of 210kPa (21m) is maintained at the water meters.

3.2 FIRE FLOW SCENARIO

System requirements were identified to supply fire fighting flows of 25 (from two hydrants) and 45 L/s (from up to three hydrants) for low and high risk areas respectively. Assessment of fire flow capacity was made with a concurrent background demand equivalent to 2/3 of PH demand with a minimum allowable residual pressure of 100kPa (10m) at the hydrants.

3.3 RELIABILITY OF SUPPLY

The network configuration was reviewed to ensure that a reliable supply to the development would be available into the future. Potential connection to the adjacent Aspley WSA and also the number of cross connections between the reticulation and trunk mains were considered to provide an adequate reliability of supply.

4 PROPOSED AND REVIEWED WATER RETICULATION MAINS

The augmentations proposed by ULDA are shown in SK06 - SK10. The plan comprises a DN225 backbone supply that runs parallel to the existing DN410 along the future extension of Roghan Rd and connects to the existing DN300 in Roghan Rd. The proposed water reticulation mains are mostly sized as DN150.

Supplementary information provided by ULDA in the course of reviewing the draft version of the study is also listed below:

- Major parts of the study area are subject to bulk fill. In worst case the fill depth in the vicinity of the existing DN410 trunk main can add as much as 1.7m extra soil depth.
- Some sections of the proposed plan have already been constructed (see sketch SK06) in smaller size than proposed by QUU in previous advice¹.
- It was proposed to lay reticulation mains in the future busway to connect to an existing main in Lavender Pl.

The proposed plan and the background information were reviewed by QUU and recommendations were identified as follows:

- Contingency of Supply: Due to the development being situated on a trunk main branch from Bracken Ridge reservoir, and given the size of the development, it is necessary to ensure that a contingent supply from adjacent Aspley WSA can be delivered in case of failure/maintenance of the trunk mains. Two options were identified either can address the above issue:
 - Option 1: To upsize the proposed DN150 water main supplying Area B to DN250 (Line 4, see Figure 4-1) and to connect it to existing DN225 in Aspley WSA via Carselgrove

¹ "Assessment of the Proposed Water Servicing Plan of the Fitzgibbon Urban Development Area – Areas B, C, E1, E2, F & G – Draft" - Dated 26 February 2010

Ave. It is also proposed to upsize the section further north (line 3, see Figure 4-1) from DN150 to DN200.

- Option 2: To install a standard 200mm BCC flow meter / PRV pit, with internal pipework as an offtake from the existing DN300 in Roghan Rd (see Figure 4-2). It is recommended to initially install pipe shorts instead of the PRV and flow meter. This will allow relatively easy installation of a PRV and flow meter, if required. It is also required to insert a new valve into the existing DN410 (see Figure 4-2) to isolate the trunk main from Bracken Ridge in case it has to be shutdown.
- Fire Flow Provision: The reticulation has been sized on the basis of providing minimum flows of 45 L/s. However it is suggested the ULDA engage with the fire authority to ascertain the overall level of fire protection required.
- Water main sizing: Opportunities were identified to downsize some of the proposed main sizes from DN150 to DN100 whilst meeting the Peak Hour and Fire Flow requirements. There may be opportunities to downsize the reticulation mains in area G; however it can not be determined until a detailed layout of the development of the surrounding area is known.
- Future busway: It is recommended not to lay any future reticulation mains in the busway as it is not in compliance with the BCC Standards which implies: "water mains shall be located to allow easy access for repairs and maintenance".
- Bulk Fill: It is recommended to lay the proposed water reticulation mains until after the bulk fill within the area is completed, if possible. This is to avoid issues of access the water mains in case of maintenance or repair. With regards to the existing water mains such as the DN410 trunk main between Norris Rd and Dorville Rd, the issue is currently being discussed between the BCC and the

ULDA representatives to ensure the necessary actions will be taken to protect the assets.

- The proposed DN225 (line 1) is upsized to DN250 as DN225 is not a standard size for BCC's new water mains.
- Two connection points between the proposed Line 3 and the existing DN410 were identified to ensure robust supply to the proposed development.
- The proposed main sizes are expressed as Nominal Bore. The material and class of pipe will need to be selected during design to give hydraulic equivalence.

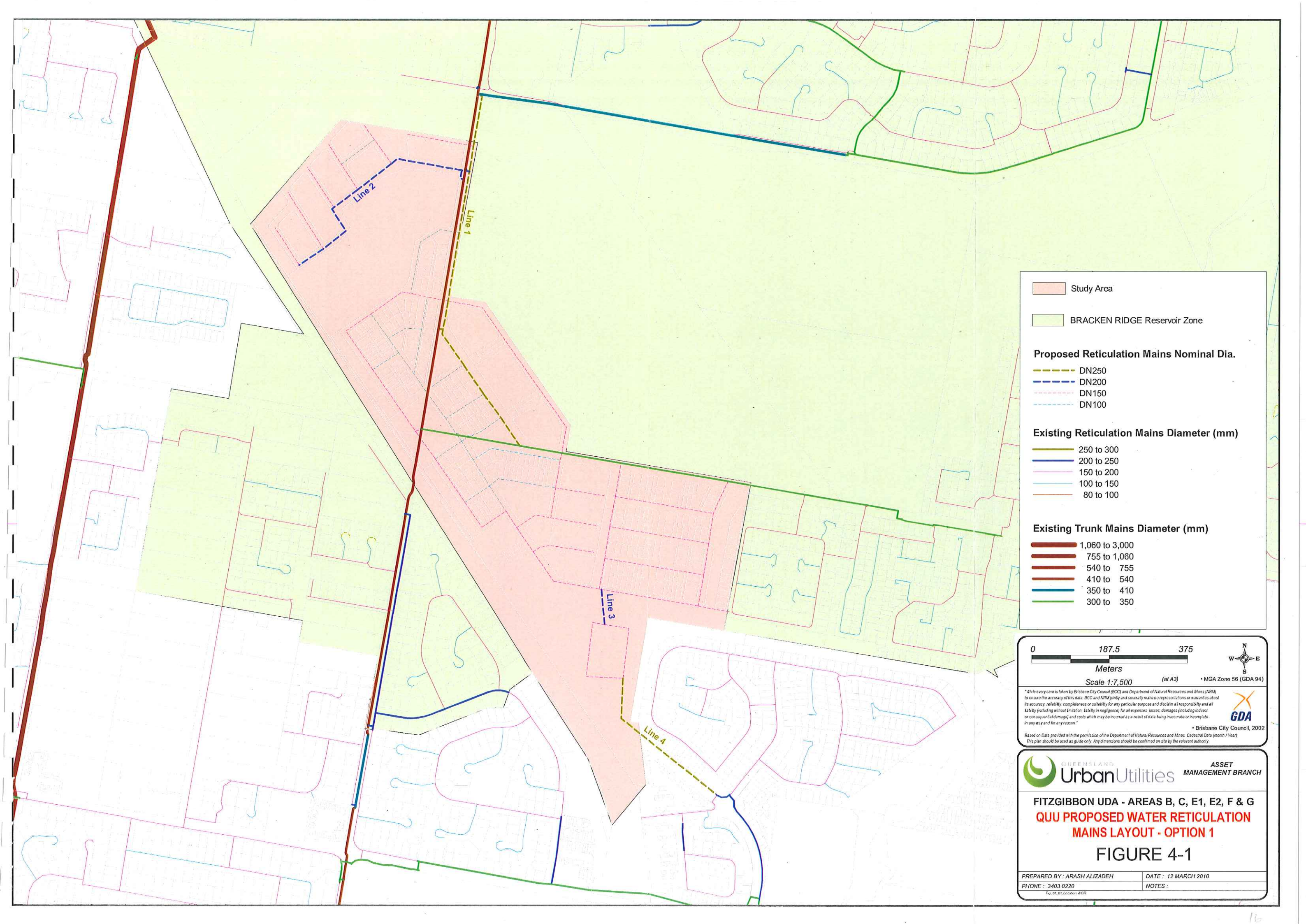
5 CONCLUSION

The proposed two options for water main network are shown in figures 4-1 and 4-2 for Areas B, C, E1, E2, F and G of the Fitzgibbon UDA.

References

Queensland Urban Utilities. Bracken Ridge WSA Master Planning Report, July 2009.

Urban Land Development Authority. Fitzgibbon Urban Development Area Development Scheme. July 2009.



Study Area

BRACKEN RIDGE Reservoir Zone

Proposed Reticulation Mains Nominal Dia.

- DN250
- DN200
- DN150
- DN100

Existing Reticulation Mains Diameter (mm)

- 250 to 300
- 200 to 250
- 150 to 200
- 100 to 150
- 80 to 100

Existing Trunk Mains Diameter (mm)

- 1,060 to 3,000
- 755 to 1,060
- 540 to 755
- 410 to 540
- 350 to 410
- 300 to 350

0 187.5 375
Meters
Scale 1:7,500 (at A3) • MGA Zone 56 (GDA 94)

"While every care is taken by Brisbane City Council (BCC) and Department of Natural Resources and Mines (DRM) to ensure the accuracy of this data, BCC and DRM jointly and severally make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which may be incurred as a result of data being inaccurate or incomplete in any way and for any reason."

Based on Data provided with the permission of the Department of Natural Resources and Mines. Cadastral Data (month / Year)
This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority.

GDA
Brisbane City Council, 2002

QUEENSLAND UrbanUtilities **ASSET MANAGEMENT BRANCH**

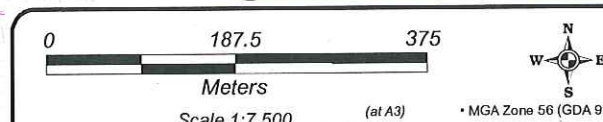
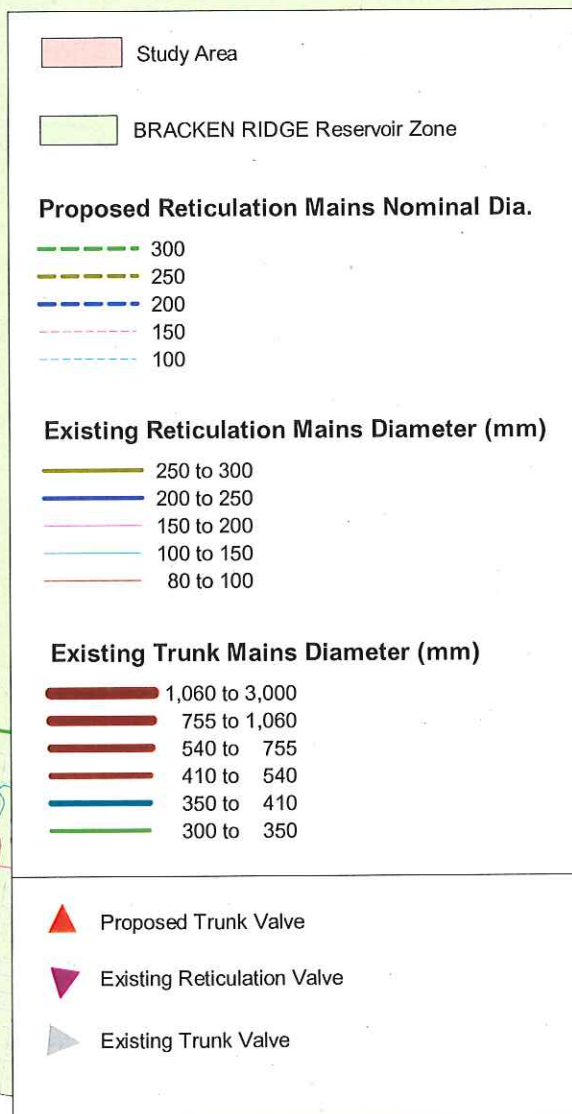
FITZGIBBON UDA - AREAS B, C, E1, E2, F & G
QUU PROPOSED WATER RETICULATION MAINS LAYOUT - OPTION 1
FIGURE 4-1

PREPARED BY: ARASH ALIZADEH	DATE: 12 MARCH 2010
PHONE: 3403 0220	NOTES:

Fig. 01, 01, Location WDR



DETAIL 1



"While every care is taken by Brisbane City Council (BCC) and Department of Natural Resources and Mines (NRM) to ensure the accuracy of this data, BCC and NRM jointly and severally make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which may be incurred as a result of data being inaccurate or incomplete in any way and for any reason."

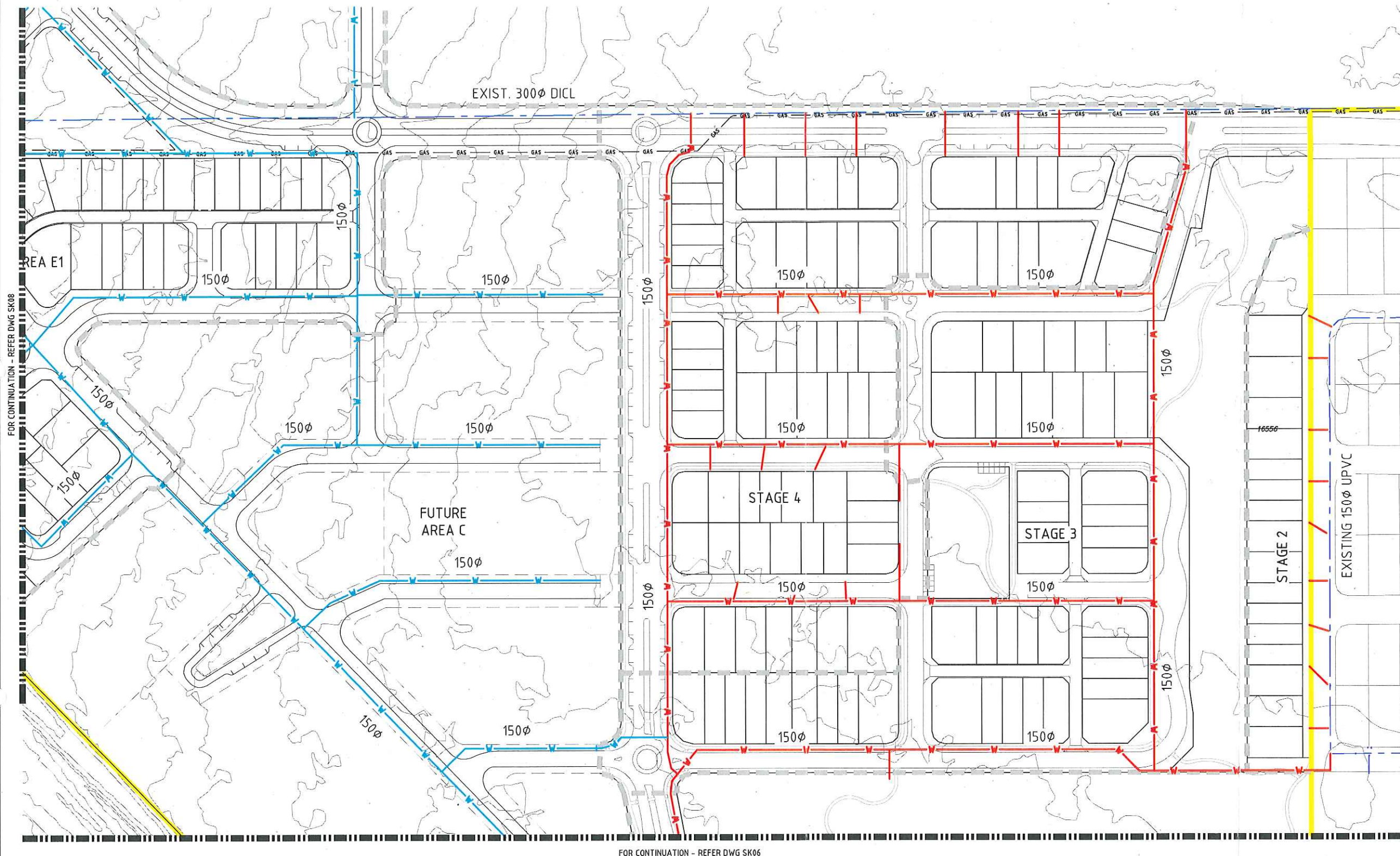
Based on Data provided with the permission of the Department of Natural Resources and Mines. Cadastral Data (month / Year)
This plan should be used as guide only. Any dimensions should be confirmed on site by the relevant authority.

• Brisbane City Council, 2002

QUEENSLAND UrbanUtilities **ASSET MANAGEMENT BRANCH**

FITZGIBBON UDA - AREAS B, C, E1, E2, F & G
QUU PROPOSED WATER RETICULATION MAINS LAYOUT - OPTION 2
FIGURE 4-2

PREPARED BY: ARASH ALIZADEH DATE: 12 MARCH 2010
PHONE: 3403 0220 NOTES:



LEGEND

- PROPOSED WATER
- PROPOSED WATER MAIN (STAGES 1-4)
- EXISTING WATER MAIN
- STAGE BOUNDARY
- TOTAL SITE BOUNDARY

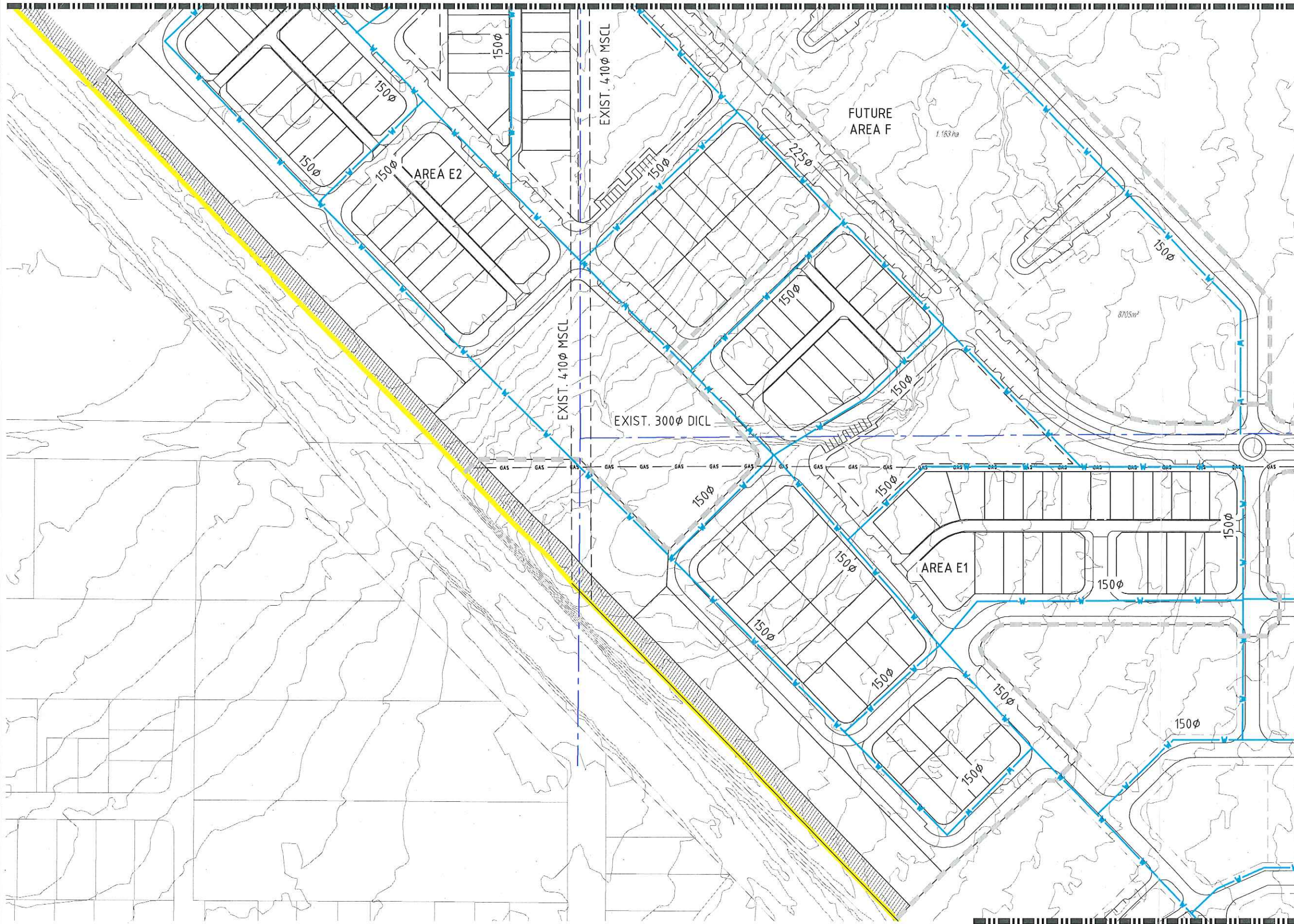
FOR CONTINUATION - REFER DWG SK08

FOR CONTINUATION - REFER DWG SK06

ASSOCIATED CONSULTANTS		CLIENT URBAN LAND DEVELOPMENT AUTHORITY		DESIGNED AL		APPROVED DATE		BRISBANE 555 CORONATION DRIVE TOOWONG QLD 4068 PH: (07) 3371 7000 FAX: (07) 3371 5579 EMAIL: mail@etsgroup.net.au		AUSTRALIA SUNSHINE COAST 20 INNOVATION PARKWAY BIRRTINYA QLD 4575 PH: (07) 5438 8100 FAX: (07) 5438 8200 EMAIL: mail@etsgroup.net.au		JOB CODE: ULDSFC	
PROJECT FITZGIBBON CHASE		LOCATION 153 TELEGRAPH ROAD, FITZGIBBON		DRAWN AL		CHECKED DATE		PAPUA NEW GUINEA PORT MORESBY 5TH FLOOR CUTHBERTSON HOUSE, PO BOX 908 TELEPHONE (675) 321 1333 FACSIMILE (675) 321 7653 EMAIL: etspng@datec.net.pg		ARCHITECTS • CIVIL & STRUCTURAL ENGINEERS		SHEET NUMBER: SK07	
DATE 8/01/10		REV P1		PRELIMINARY ISSUE		DATE JANUARY 2010		SCALE 0 20 40 60m SCALE 1:1000 (A1)		FORM E027 10 AUG 2006		REV: P1	
REVISIONS		APPROVED		DATE		DATE		DATE		DATE		DATE	



FOR CONTINUATION - REFER DWG SK09

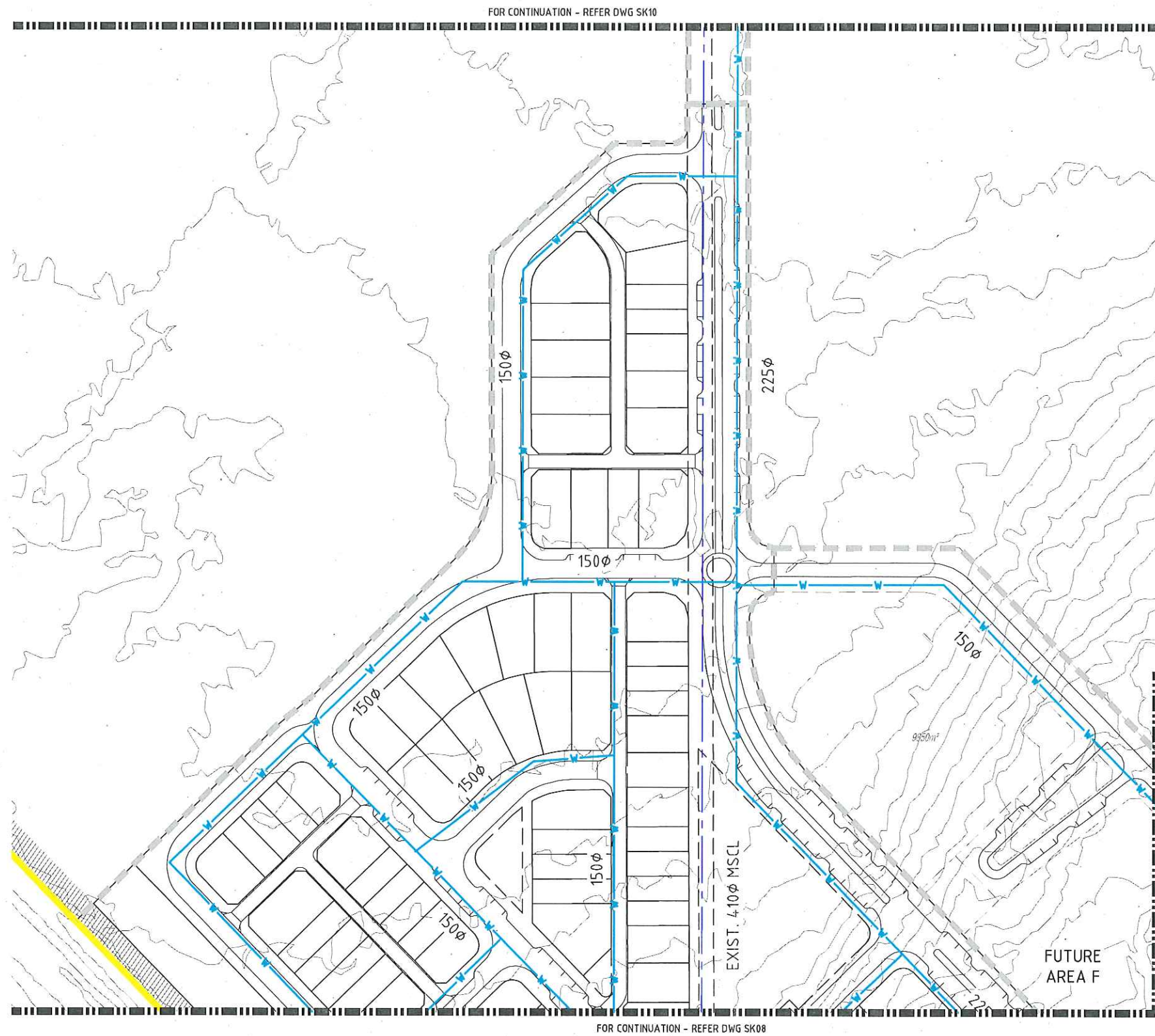


LEGEND

-  PROPOSED WATER
-  EXISTING WATER MAIN
-  STAGE BOUNDARY
-  TOTAL SITE BOUNDARY

FOR CONTINUATION - REFER DWG SK07

ASSOCIATED CONSULTANTS		CLIENT URBAN LAND DEVELOPMENT AUTHORITY		DESIGNED AL		APPROVED DATE		BRISBANE AUSTRALIA		SUNSHINE COAST		JOB CODE: ULDSFC	
PROJECT FITZGIBBON CHASE		LOCATION 153 TELEGRAPH ROAD, FITZGIBBON		DRAWN AL		CHECKED DATE		555 CORONATION DRIVE, TOOWONG QLD 4068 PH: (07) 3371 7000 FAX: (07) 3371 5879 EMAIL: mail@etsgroup.net.au		20 INNOVATION PARKWAY, BIRTMYIA QLD 4575 PH: (07) 5438 8100 FAX: (07) 5438 8200 EMAIL: mail@etsgroup.net.au		SHEET NUMBER: REV: SK08 P1	
SHEET TITLE WATER RETICULATION LAYOUT PLAN - SHEET 3 OF 5		DATE JANUARY 2010		SCALE SCALE 1:1000 (A1)		SCALE 0 20 40 60m		PAPUA NEW GUINEA PORT MORESBY 5TH FLOOR CUTI-BERTSON HOUSE, PO BOX 908 TELEPHONE: (675) 311 1333 FACSIMILE: (675) 321 7653 EMAIL: etspng@datac.net.pg		ARCHITECTS CIVIL & STRUCTURAL ENGINEERS		FORM E027 10 AUG 2006	



LEGEND

-  PROPOSED WATER
-  EXISTING WATER MAIN
-  STAGE BOUNDARY
-  TOTAL SITE BOUNDARY

ASSOCIATED CONSULTANTS			
-			
5/01/10	P1	PRELIMINARY ISSUE	
DATE	REV	DESCRIPTION	
REVISIONS			
APPROVED			

CLIENT	URBAN LAND DEVELOPMENT AUTHORITY
PROJECT	FITZGIBBON CHASE
LOCATION	153 TELEGRAPH ROAD, FITZGIBBON
SHEET TITLE	WATER RETICULATION LAYOUT PLAN - SHEET 4 OF 5

DESIGNED	AL
DRAWN	AL
CHECKED	DATE
DATE	JANUARY 2010
APPROVED	DATE
KEITH HOWELLS	RPEQ 7285
STEPHEN HUGHES	RPEQ 7760
SCALE	0 20 40 60m
SCALE	SCALE 1:1000 (A1)

BRISBANE AUSTRALIA

555 CORONATION DRIVE, TOOWONG QLD 4018
PH: (07) 3371 7000 FAX: (07) 3371 5879
EMAIL: - mail@etsgroup.net.au

SUNSHINE COAST

20 INNOVATION PARKWAY BIRRTINYA QLD 4575
PH: (07) 5438 8100 FAX: (07) 5438 8200
EMAIL: - mail.sc@etsgroup.net.au

PAPUA NEW GUINEA

PORT MORESBY

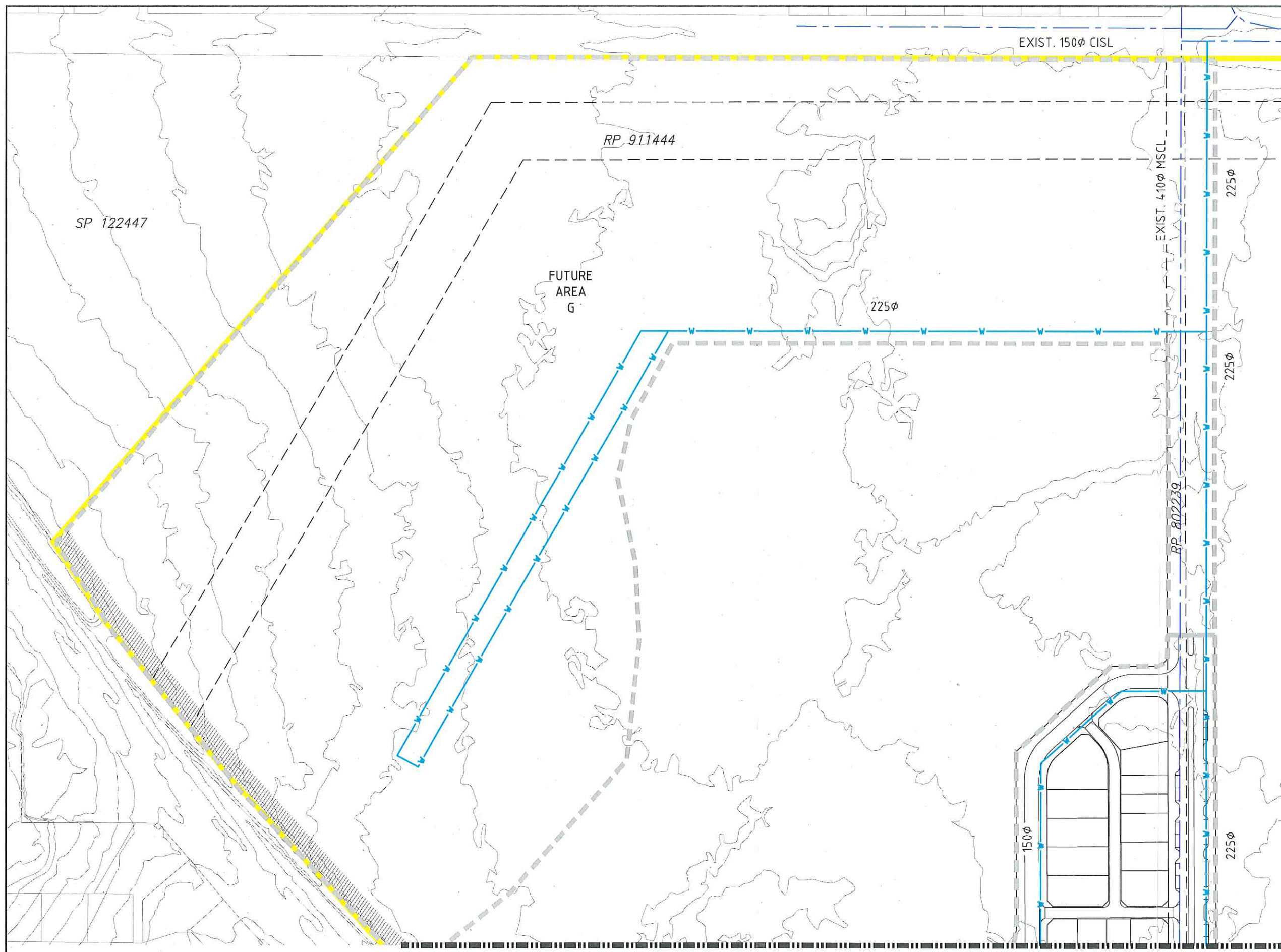
5TH FLOOR CUTHBERTSON HOUSE PO BOX 908
TELEPHONE (675) 321 1333 FACSIMILE (675) 321 7553
EMAIL: - etspng@datac.net.pg

ARCHITECTS • CIVIL & STRUCTURAL ENGINEERS

ETS GROUP

www.etsgroup.net.au

JOB CODE:	ULDSFC
SHEET NUMBER:	SK09
REV:	P1
©Copyright	FORM E027 10 AUG 2006



- LEGEND**
- PROPOSED WATER
 - EXISTING WATER MAIN
 - STAGE BOUNDARY
 - TOTAL SITE BOUNDARY

FOR CONTINUATION - REFER DWG SK09

ASSOCIATED CONSULTANTS				CLIENT URBAN LAND DEVELOPMENT AUTHORITY				DESIGNED AL				APPROVED DATE				BRISBANE AUSTRALIA 555 CORONATION DRIVE, TOOWONG QLD 4063 PH: (07) 3371 7000 FAX: (07) 3371 5878 EMAIL: mail@etsgroup.net.au				SUNSHINE COAST 20 INNOVATION PARKWAY BIRTINYA QLD 4575 PH: (07) 5438 8100 FAX: (07) 5438 8200 EMAIL: mail.sc@etsgroup.net.au				JOB CODE: ULDSFC			
PROJECT FITZGIBBON CHASE				DRAWN AL				CHECKED DATE				SCALE 0 20 40 60m SCALE 1:1000 (A1)				PAPUA NEW GUINEA PORT MORESBY 5TH FLOOR CUTHERBERTSON HOUSE PO BOX 908 TELEPHONE: (075) 321 1333 FACSIMILE: (075) 321 7853 EMAIL: etspng@data.net.pg				SHEET NUMBER: SK10				REV: P1			
LOCATION 153 TELEGRAPH ROAD, FITZGIBBON				DATE JANUARY 2010				FOR CONTINUATION - REFER DWG SK09				Copyright 10 AUG 2008				ARCHITECTS CIVIL & STRUCTURAL ENGINEERS				www.etsgroup.net.au				©Copyright FORM E027 10 AUG 2006			
SHEET TITLE WATER RETICULATION LAYOUT PLAN - SHEET 5 OF 5																											
6/01/10 P1 PRELIMINARY ISSUE																											
DATE REV DESCRIPTION				REVISIONS																							
APPROVED																											