

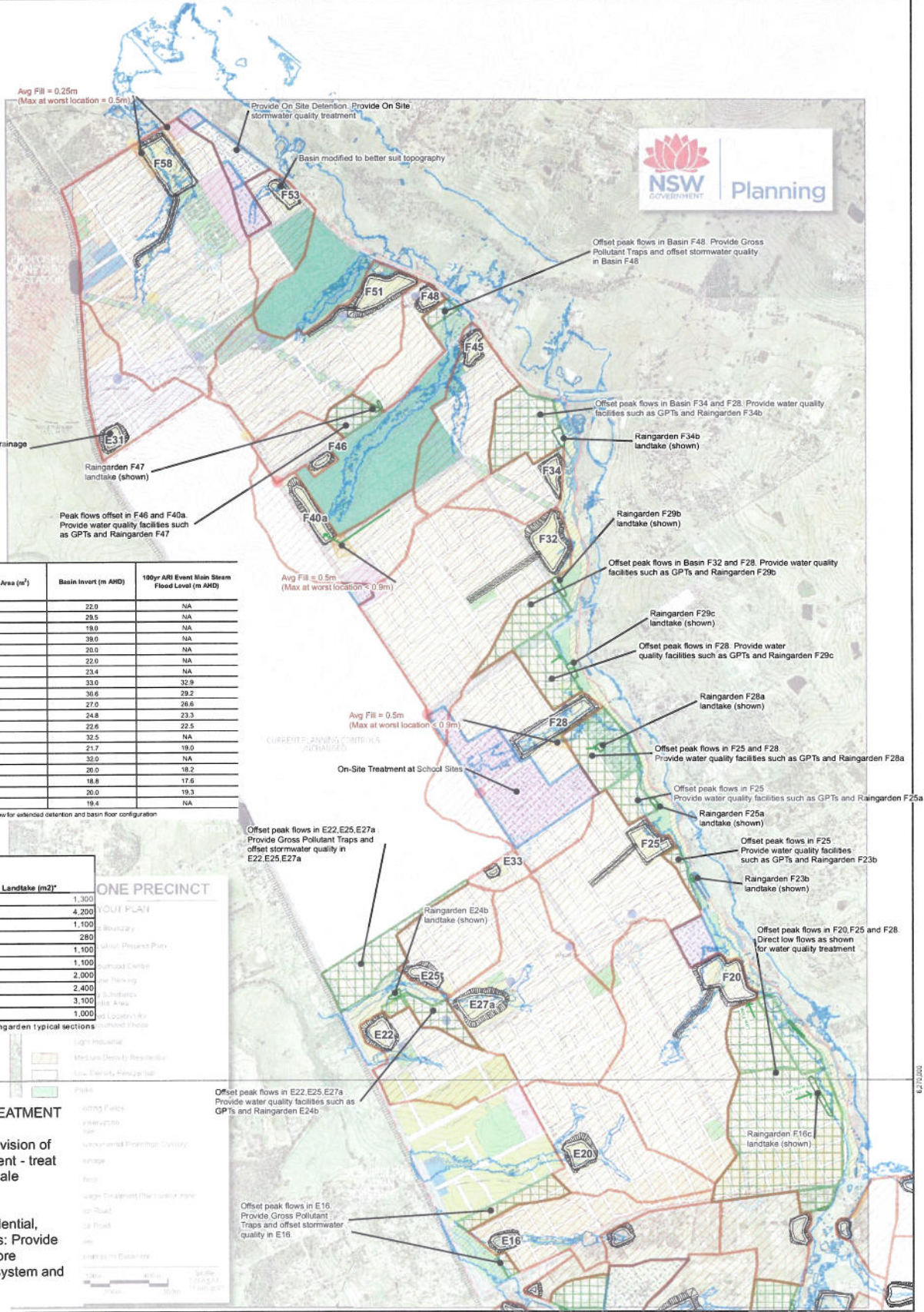


# DRAFT ONLY\*

## Appendix B Stormwater Management Plans

- Concept Stormwater Management Plan – Riverstone Precinct
- Concept Stormwater Management Plan – Alex Avenue Precinct
- Concept Stormwater Management Plan with Online Basins – Riverstone Precinct
- Concept Stormwater Management Plan with Online Basins – Alex Avenue Precinct
- Proposed Bridges and Culverts – Riverstone Precinct
- Proposed Bridges and Culverts – Alex Avenue Precinct
- Stream Classification and Top of Bank Locations – Map A
- Stream Classification and Top of Bank Locations – Map B
- Stream Classification and Top of Bank Locations – Map C
- Stream Classification and Top of Bank Locations – Map D

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	Active Detention Storage * (m <sup>3</sup> )	Bio-Retention Filter Area (m <sup>2</sup> )	Basin Invert (m AHD)	100yr ARI Event Main Stream Flood Level (m AHD)
E16	8,600	1,000	22.0	NA
E20	14,700	4,000	29.5	NA
E22	14,800	5,000	18.0	NA
E33	2,500	600	38.0	NA
E31	8,900	900	26.0	NA
E25	10,100	4,500	22.0	NA
E27a	22,700	9,000	23.4	NA
F20	40,100	12,000	33.0	32.9
F25	20,700	8,000	30.6	29.2
F28	37,200	4,500	27.0	26.6
F32	32,500	12,000	24.8	23.3
F34	9,600	4,000	22.6	22.5
F40a	16,200	2,800	32.5	NA
F45	9,100	4,200	21.7	19.0
F46	3,200	1,400	32.0	NA
F48	6,700	2,800	20.0	18.2
F51	31,400	6,000	18.8	17.6
F53	7,900	1,200	20.0	19.3
F58	44,000	7,000	19.4	NA

\* Active detention storage excludes an initial 0.3m depth, to allow for extended detention and basin floor configuration

Raingarden	Filter Area (m <sup>2</sup> )	Approximate Landtake (m <sup>2</sup> )*
E24b	900	1,300
F16c	3,000	4,200
F16b	800	1,100
F23b	200	280
F25a	750	1,100
F28a	800	1,100
F29c	1,400	2,000
F29b	1,700	2,400
F34b	2,200	3,100
F47	700	1,000

\* Landtake determined through analysis of raingarden typical sections

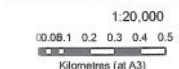
**NOTES - WATER QUALITY TREATMENT**

**Low Density Residential:** No provision of on-lot stormwater quality treatment - treat stormwater quality in precinct scale detention/bio-retention basins

**Medium and High Density Residential, Commercial and Industrial Areas:** Provide on-lot stormwater treatment before discharge to street stormwater system and precinct scale basins

**Legend**

- Potential Raingarden Locations
- Fill Area
- Stormwater directed to basins for detention and treatment
- On-site Detention and Treatment Area
- Stormwater directed to creeks with offset in basins for detention. Water quality treatment provided through GPTs and Raingardens or offset in basins
- 100 year ARI Event Developed Flood Extents
- Existing 2m Contours



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Riverstone Alex Avenue

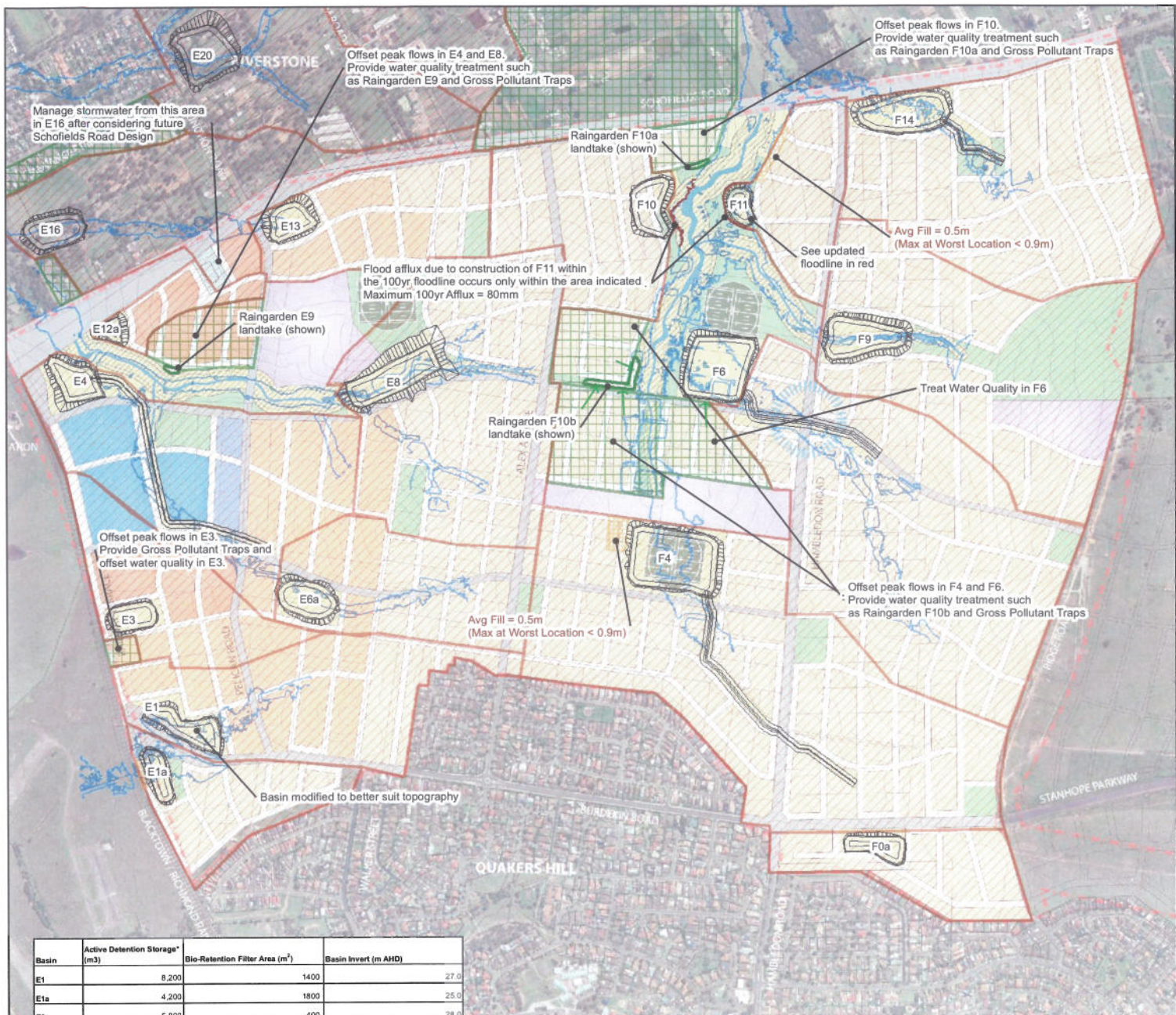
**Riverstone: Stormwater Management Strategy**

**Figure B1**

**For Information**

Job Number 21-18423  
 Revision D  
 Date 7th May 2010





Basin	Active Detention Storage* (m3)	Bio-Retention Filter Area (m <sup>2</sup> )	Basin Invert (m AHD)
E1	8,200	1400	27.0
E1a	4,200	1800	25.0
E3	5,800	400	28.0
E4	7,500	1000	24.0
E6a	9,400	1300	36.7
E12a	1,400	100	24.0
E13	6,700	600	34.0
E8	14,500	3500	34.0
F0	4,800	1750	57.8
F4	20,400	4000	47.0
F8	21,400	7500	43.8
F9	14,000	6100	44.7
F10	8,900	3000	41.7
F11	3,400	1500	40.0
F14	16,800	6000	42.5

\* Active detention storage excludes an initial 0.3m depth, to allow for extended detention and basin floor configuration

Raingarden	Filter Area (m2)	Approximate Landtake (m2)*
F10b	1,700	2,400
F10a	370	520
E9	250	350

\* Landtake determined through analysis of raingarden typical sections

#### NOTES - WATER QUALITY TREATMENT

Low Density Residential: No provision of on-lot stormwater quality treatment - treat stormwater quality in precinct scale detention/bio-retention basins

Medium and High Density Residential, Commercial and Industrial Areas: Provide on-lot stormwater treatment before discharge to street stormwater system and precinct scale basins

#### Legend

- Potential Raingarden Locations
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- 100-year ARI Event developed flood Extents
- 100-year ARI Event developed flood extents after construction of Basin F11 in floodplain
- Existing 2m Contours



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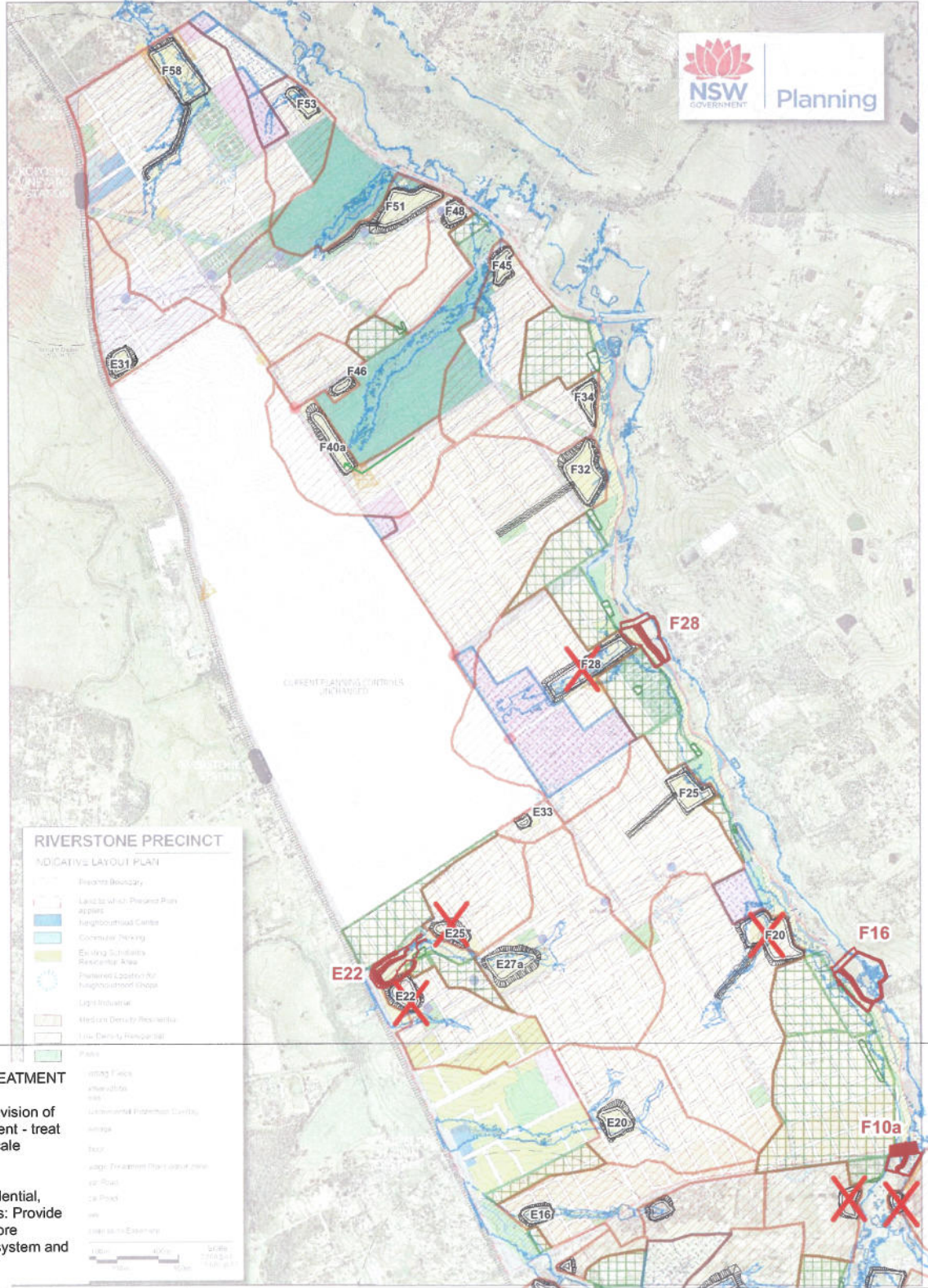
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Riverstone Alex Avenue  
 Alex Ave: Stormwater Management Strategy

Job Number | 21-18423  
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### Figure B2





**NOTES - WATER QUALITY TREATMENT**

**Low Density Residential:** No provision of on-lot stormwater quality treatment - treat stormwater quality in precinct scale detention/bio-retention basins

**Medium and High Density Residential, Commercial and Industrial Areas:** Provide on-lot stormwater treatment before discharge to street stormwater system and precinct scale basins

**RIVERSTONE PRECINCT INDICATIVE LAYOUT PLAN**

- Boundary
- Land to which Precinct Plan applies
- Neighbourhood Centre
- Commercial Parking
- Existing Suburban Residential Area
- Preferred Location for Neighbourhood Shops
- Light Industrial
- Medium Density Residential
- Low Density Residential
- Parks
- Utility Trench
- Watercourse
- Environmental Protection Corridor
- Wetland
- Flow
- Large Treatment Plant (about 1000)
- Lot Road
- Local Road
- Water to be Expanded

Scale: 1:20,000

- Legend**
- Potential Raingarden Locations
  - Fill Area
  - Stormwater directed to basins for detention and treatment
  - On-site Detention and Treatment Area
  - Stormwater directed to creeks with offset in basins for detention. Water quality treatment provided through GPTs and Raingardens or offset in basins
  - 100-year ARI Event Developed Flood Extents
  - Existing 2m Contours

1:20,000  
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 Kilometres (at A3)  
 Map Projection: Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994  
 Grid: Map Grid of Australia, Zone 56



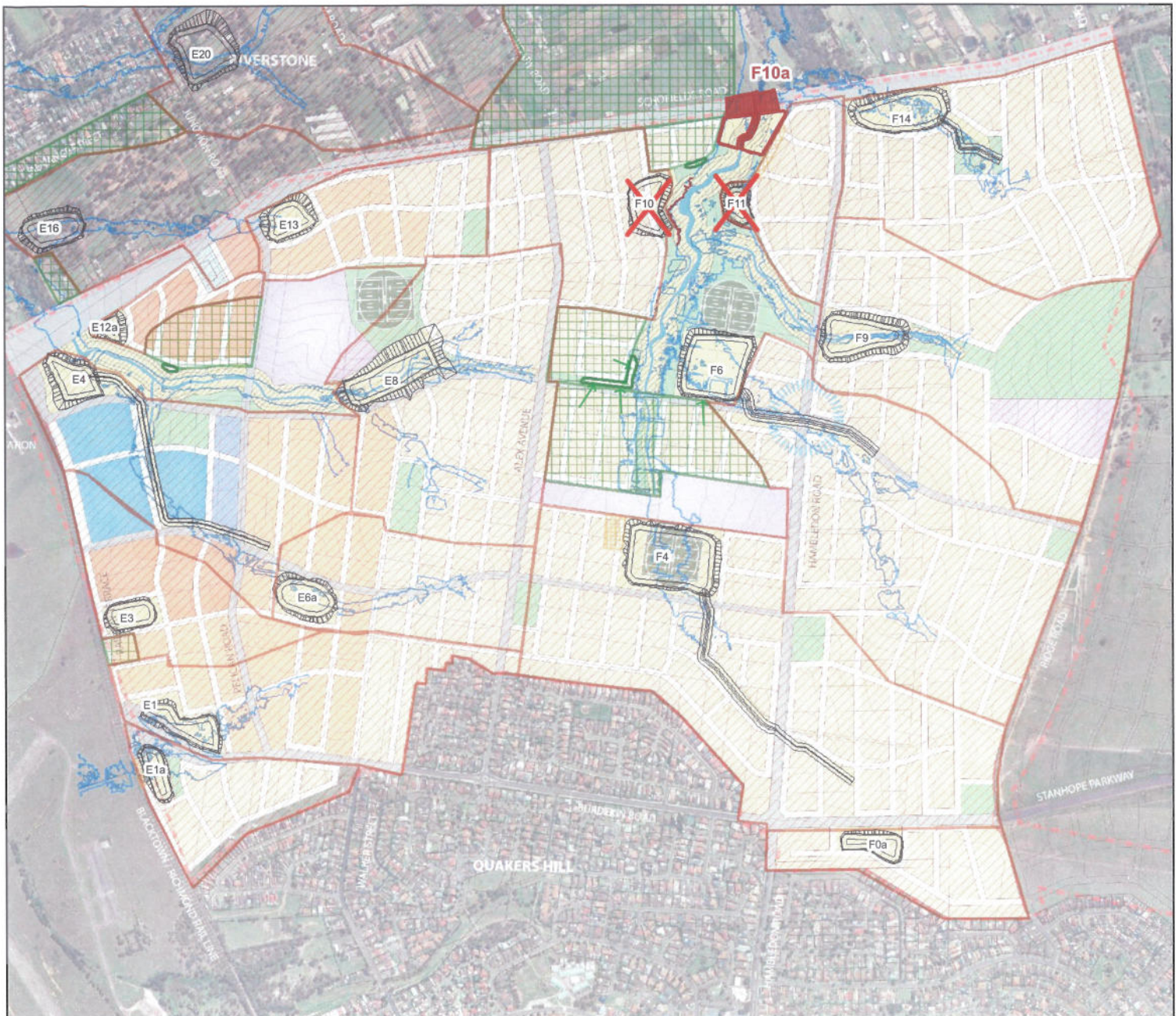
Riverstone Alex Avenue  
**Riverstone: Stormwater Management Strategy with Online Basins**

**For Information**

Job Number: 21-18423  
 Revision: B  
 Date: 23rd May 2010

**Figure B3**





**NOTES - WATER QUALITY TREATMENT**

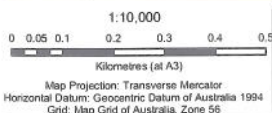
Low Density Residential: No provision of on-lot stormwater quality treatment - treat stormwater quality in precinct scale detention/bio-retention basins

Medium and High Density Residential, Commercial and Industrial Areas: Provide on-lot stormwater treatment before discharge to street stormwater system and precinct scale basins

**Legend**

- Potential Raingarden Locations
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For Information



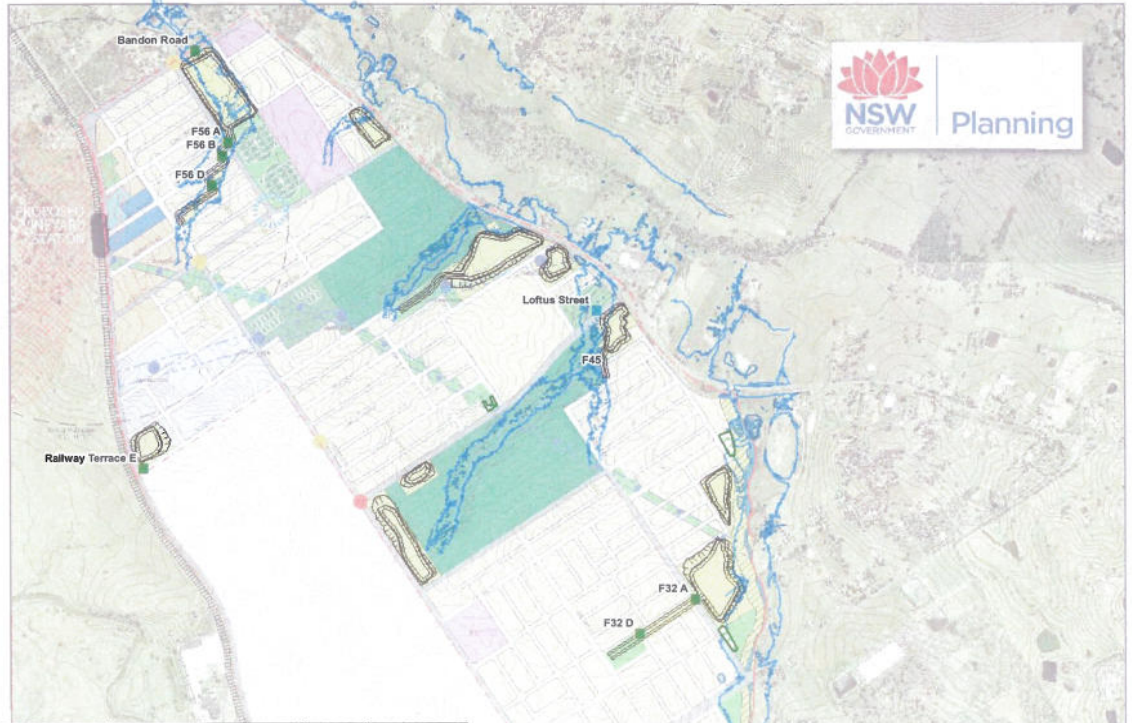
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Riverstone Alex Avenue  
**Alex Ave: Stormwater Management Strategy with Online Basins**

Job Number 21-18423  
 Revision D  
 Date 7th May 2010

**Figure B4**





Name	Type	Bridge Sizing Criteria	Q100 (m <sup>3</sup> /s)	Culvert Dimensions (mm)	Bridge Span (m)	Culvert Length or Bridge Width (m)
Railway Terrace C	Culvert		11.3	1 x 3000 x 1200*		30
Cranbourne Street	Culvert		4.9	2 x 3600 x 1200		30
Riverstone Road	Culvert		2.0	1 x 3600 x 1200		30
E16	Culvert		9.7	3 x 4200 x 1200		30
Junction Road	Culvert		2.5	1 x 3600 x 1200		30
Railway Terrace D	Culvert		11.5	1 x 1500 x 1200*		30
Railway Terrace E	Culvert		6.1	2 x 3600 x 1200		140
F25 A	Culvert		14.8	4 x 4200 x 1200		20
F25 B	Culvert		12.4	3 x 4200 x 1200		20
F24	Culvert		10.0	3 x 4200 x 1200		20
F32 A	Culvert		24.4	6 x 4200 x 1200		30
F32 D	Culvert		19.3	5 x 4200 x 1200		20
Bandon Road	Culvert		7.1	3 x 3600 x 1200		30
F56 A	Culvert		17.5	5 x 3600 x 1200		30
F56 B	Culvert		17.0	5 x 3600 x 1200		30
F56 D	Culvert		15.0	4 x 4200 x 1200		20
Kensington Park	Bridge	Q100 > Rp			160	30
Loftus Street	Bridge	Q100 > Rp	5.0		130	30

\* These culverts sized to match capacity of existing culverts in these locations



**Legend**

- Bridge
- Culvert

Preliminary: For Discussion

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 Kilometres (at A3)  
 Map Projection: Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994  
 Grid: Map Grid of Australia, Zone 56



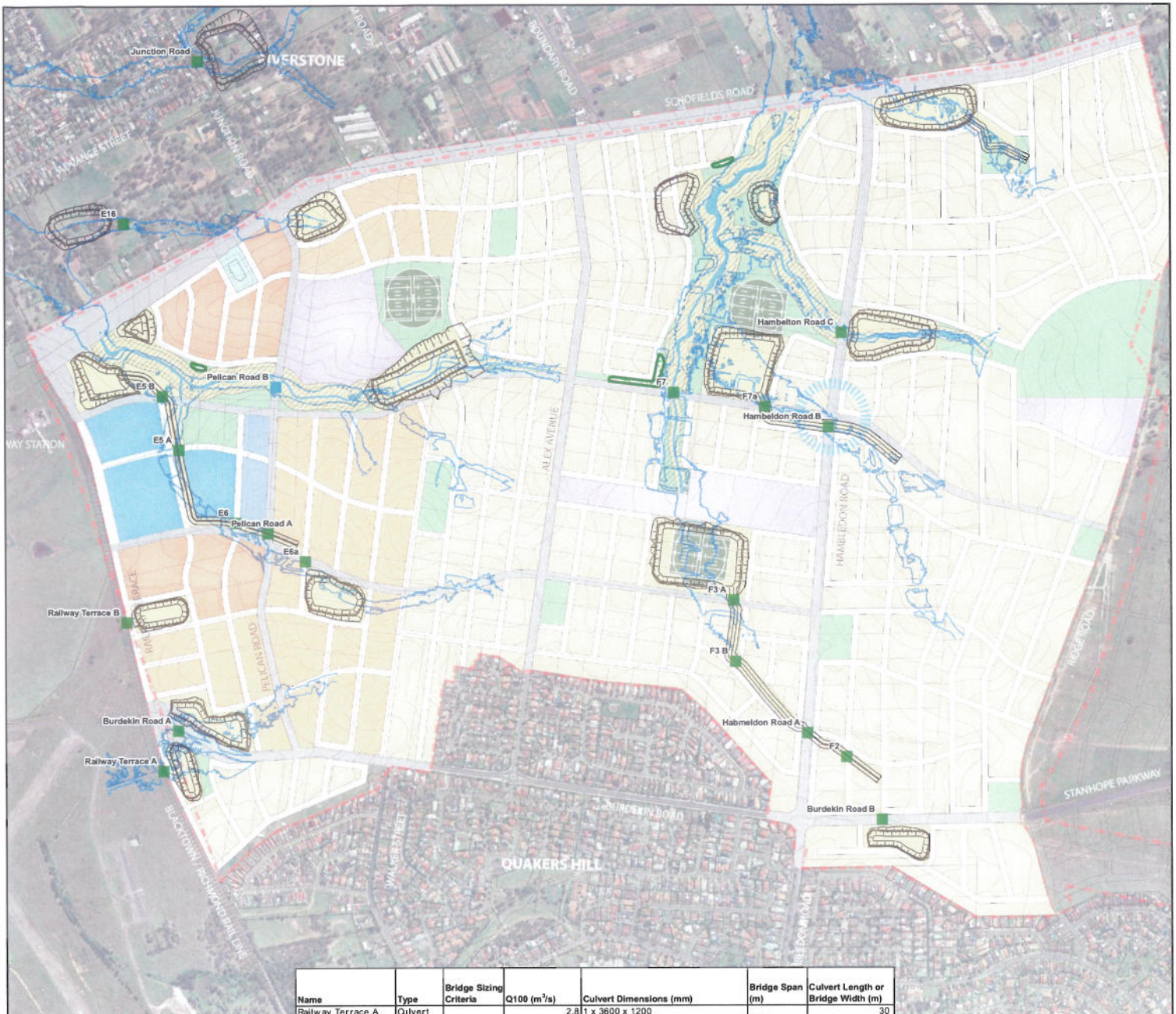
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Riverstone Alex Avenue  
 Riverstone: Bridges and Culverts

Job Number 21-18423  
 Revision C  
 Date 7th May 2010

Figure B5





Name	Type	Bridge Sizing Criteria	Q100 (m <sup>3</sup> /s)	Culvert Dimensions (mm)	Bridge Span (m)	Culvert Length or Bridge Width (m)
Railway Terrace A	Culvert		2.8	1 x 3600 x 1200		30
Burdekin Road A	Culvert		1.9	1 x 3600 x 1200		30
Railway Terrace B	Culvert		1.3	1 x 1800 x 1200		30
E6a	Culvert		0.7	1 x 1200 x 1200		30
Pelican Road A	Culvert		2.5	1 x 3600 x 1200		30
E6	Culvert		3.5	2 x 3600 x 1200		20
E5 A	Culvert		7.0	3 x 3600 x 1200		20
E5 B	Culvert		8.4	3 x 3600 x 1200		30
Pelican Road B	Bridge	R <sub>p</sub> > Q100	3.2		70	30
Burdekin Road B	Culvert		0.9	1 x 1200 x 1200		100
F2	Culvert		0.0	1 x 1200 x 1200		15
Hambleton Road A	Culvert		11.4	3 x 4200 x 1200		30
F3 B	Culvert		12.0	3 x 4200 x 1200		15
F3 A	Culvert		15.4	4 x 4200 x 1200		15
F7	Culvert		10.5	3 x 4200 x 1200		30
F7a	Culvert		16.0	4 x 4200 x 1200		30
Hambleton Road B	Culvert		15.1	4 x 4200 x 1200		30
Hambleton Road C	Culvert		2.5	1 x 3600 x 1200		30

**Legend**

- Bridge
- Culvert

Preliminary: For Discussion

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 Kilometres (at A3)  
 Map Projection: Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994  
 Grid: Map Grid of Australia, Zone 56



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Riverstone Alex Avenue

Alex Ave: Bridges and Culverts

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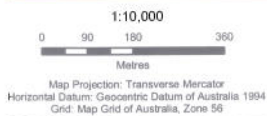
Figure B6





**Legend**

- |   |  |
|---|--|
| <b>Stream Class - Water Management Act 2000</b> | Indicative stream buffer based on stream order |
| 3rd order stream                                | Precinct Boundary                              |
| 2nd order stream                                | Road   |
| 1st order stream                                |  |



GROWTH CENTRES COMMISSION  
 RIVERSTONE AND ALEX AVENUE  
 PRECINCT - ENVIRONMENTAL ASSESSMENT

Job Number | 21-15717  
 Revision | D  
 Date | 7 Oct 2009

**Stream classification and top of bank  
 derived from GIS analysis of ALS DEM**

**Map A**





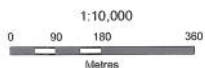
# Riverstone

## Legend

### Stream Class - Water Management Act 2000

- 3rd order stream
- 2nd order stream
- 1st order stream

- Indicative stream buffer based on stream order
- Precinct Boundary
- Road



GROWTH CENTRES COMMISSION  
 RIVERSTONE AND ALEX AVENUE  
 PRECINCT - ENVIRONMENTAL ASSESSMENT  
 Stream classification and top of bank  
 derived from GIS analysis of ALS DEM

Job Number | 21-15717  
 Revision | D  
 Date | 7 Oct 2009

Map B

Map Projection: Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994  
 Grid: Map Grid of Australia, Zone 56

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**Legend**

- |   |  |
|---|--|
| <b>Stream Class - Water Management Act 2000</b> | Indicative stream buffer based on stream order |
| 3rd order stream                                | Precinct Boundary                              |
| 2nd order stream                                | Road   |
| 1st order stream                                |  |

 	<b>GROWTH CENTRES COMMISSION</b> RIVERSTONE AND ALEX AVENUE PRECINCT - ENVIRONMENTAL ASSESSMENT <b>Stream classification and top of bank</b> derived from GIS analysis of ALS DEM	Job Number   21-15717 Revision   D Date   7 Oct 2019
	<b>Map C</b>	
	10 Bond Street Sydney NSW 2000 Australia T 61 2 9239 7100 F 61 2 9239 7199 E sydmil@ghd.com.au W www.ghd.com.au	
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