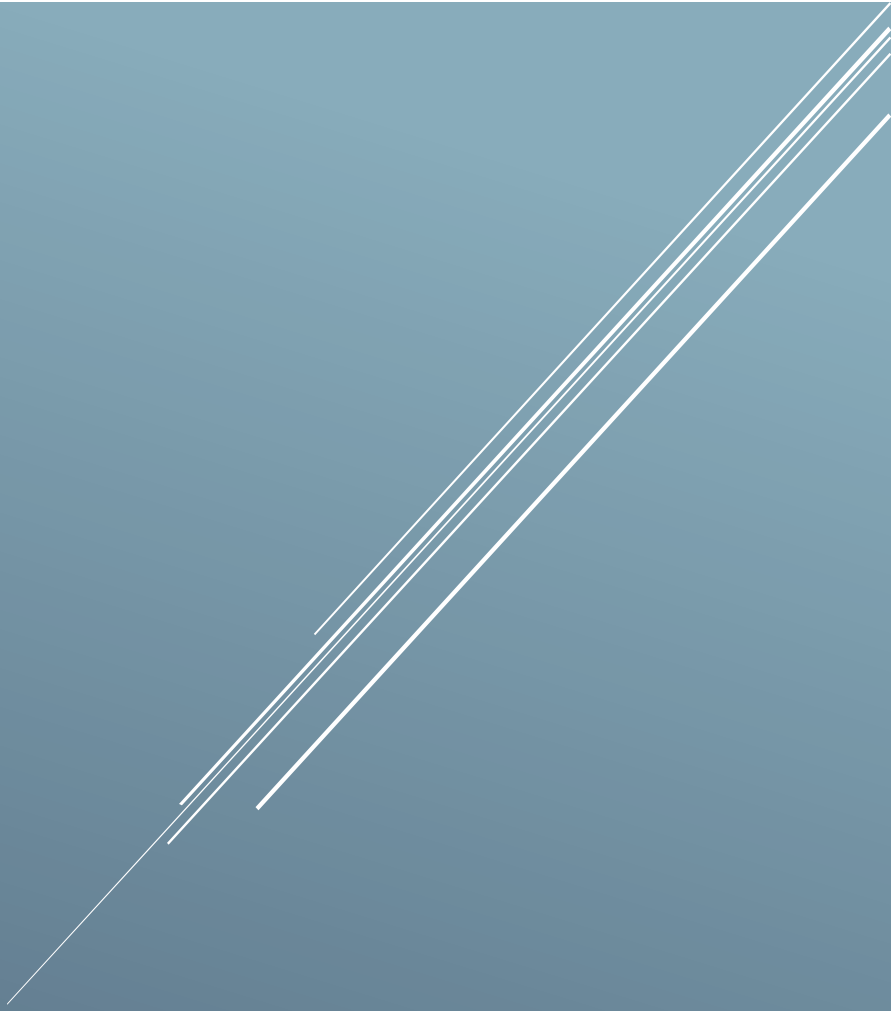


APPENDIX D SEWAGE REPORT



SUNNYSIDE ESTATE WAGGA WAGGA

Preliminary Sewage Report

John Randall Consulting Pty Ltd

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John Randall Consulting Pty Ltd

1. EXECUTIVE SUMMARY

A rezoning application of 456 and 474 Plumpton Road will be submitted to Wagga Wagga City Council. The site is currently zoned RU1 under the Wagga City Council [WCC] zoning – Primary Production, and it is proposed to rezone the land to R5 to allow for residential development.

John Randall Consulting (JRC) has been engaged to prepare a preliminary sewage report for the proposed residential estate development of 456 and 474 Plumpton Road, Wagga Wagga to support the rezoning application.

The conclusions drawn from the preliminary Sewage Report (Refer Section 6 of this Report) are:

- The proposed estate would generate approx. 32.75litres per second design flow for 420 dwellings
- A 225mm dia. sewerage pipe can be constructed from the north east corner of the estate to the point of discharge at Nelson Drive as nominated by the WWCC Manager Technical & Strategy

2. INTRODUCTION

2.1 General

A rezoning application of 456 and 474 Plumpton Road will be submitted to Wagga Wagga City Council. The site is currently zoned RU1 under the Wagga City Council [WCC] zoning – Primary Production, and it is proposed to rezone the land to R5 to allow for residential development.

John Randall Consulting (JRC) has been engaged to prepare a preliminary sewage report for the proposed residential estate development of 456 and 474 Plumpton Road, Wagga Wagga to support the rezoning application.

2.2 Site Location

The site is located some 430 metres south of the intersection of Lloyd Road and Plumpton Road, Rowan and to the west of Plumpton Road. The site extends to Rowan Road to the south. The site comprises Lot 23 DP 757246 and Lot 25 DP 757246.

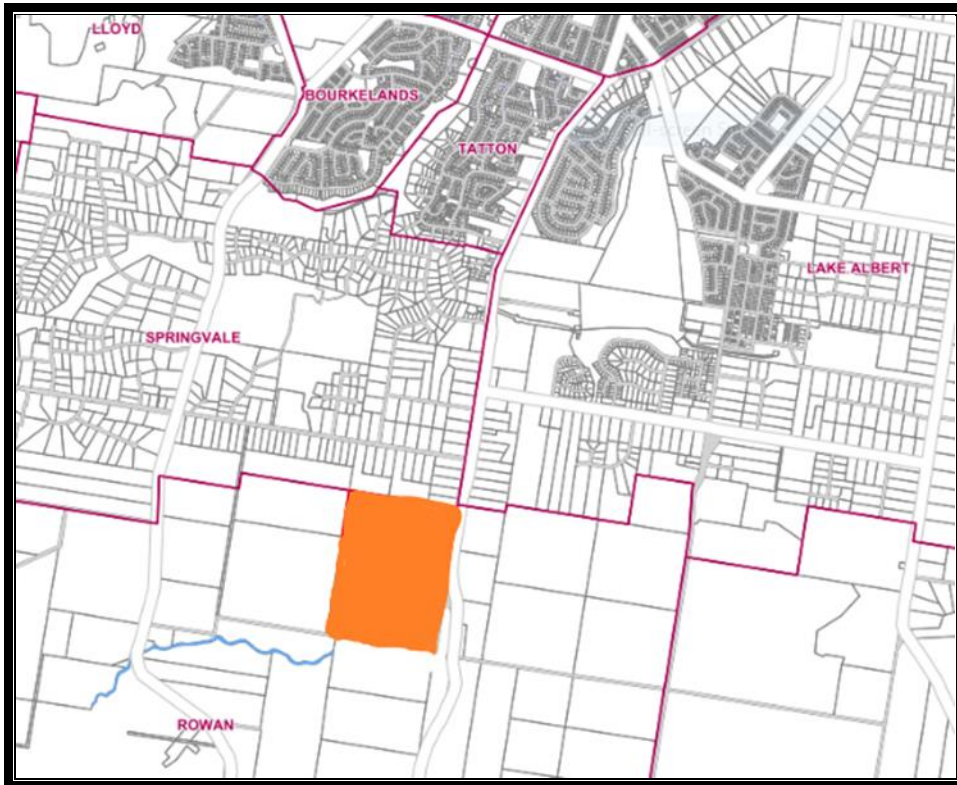


Figure 1: Site location (source: WWCC maps 2020)

3. EXISTING CONDITIONS

The proposed development is located some 430 metres south of the intersection of Lloyd Road and Plumpton Road, extends to Rowan Road, Rowan and is to the west of Plumpton Road. The proposed development is to be accessed from Plumpton Road.

The site of the proposed residential estate contains a single farm residence with associated outbuildings. The residence has an on-site sewage management system (OSMS).

3.1 Landuse

The site is currently zoned RU1 under the Wagga City Council [WWCC] zoning – Primary Production. The site is currently farmed growing crops and raising livestock. The land immediately north of the subject site is zoned residential.

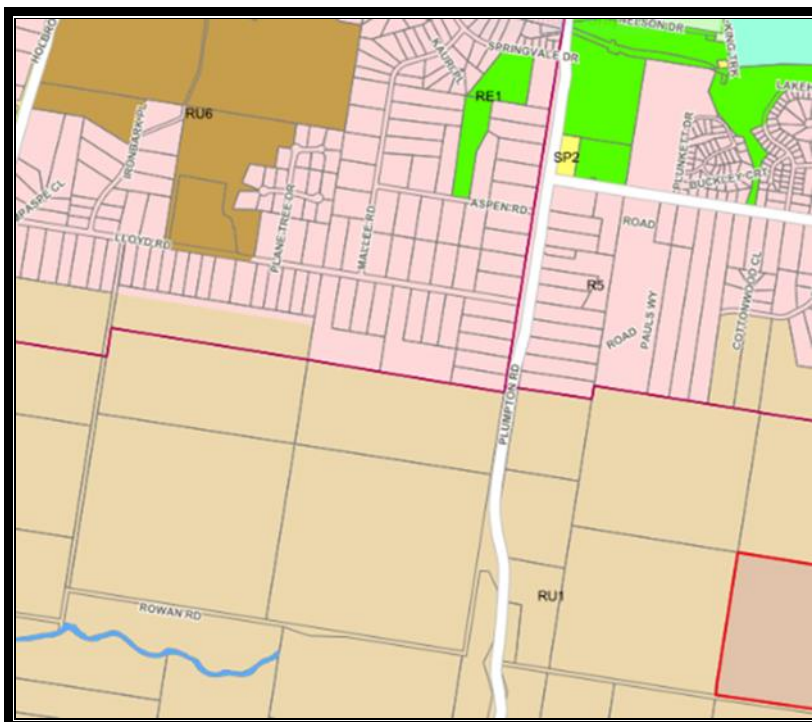


Figure 2: Landuse (source: WWCC maps 2020)

3.2 Site area

The subject site comprises approx. 110.17 hectares of land:

Address	Lot	Deposited Plan	Approx. area (ha)
474 Plumpton Road	23	757246	73.45
456 Plumpton Road	25	757246	36.72
			110.17

Table 1 Block sizes (source: WWCC Rates Notices 2020)

3.3 Sewerage network

The Wagga Wagga City Council operates a sewerage network consisting of conventional sewerage and pressurised sewage systems and three sewage treatment plants. There are also on-site sewage management system (OSMS) within some blocks in the City.

The site of the proposed residential estate contains a single farm residence with associated outbuildings. The residence has an on-site sewage management system.

The blocks immediately to the north of the proposed residential estate at 456 and 474 Plumpton Road appear to be serviced by OSMS. The closest sewer to the proposed residential estate is a 100mm dia. sewer to the north west of the site in Lloyd Road. There are also larger diameter sewers (225 to 300mm dia.) at the intersection of Plumpton Road and Nelson Drive some 1,735metres from the north east corner of the site as shown in Figure 3.

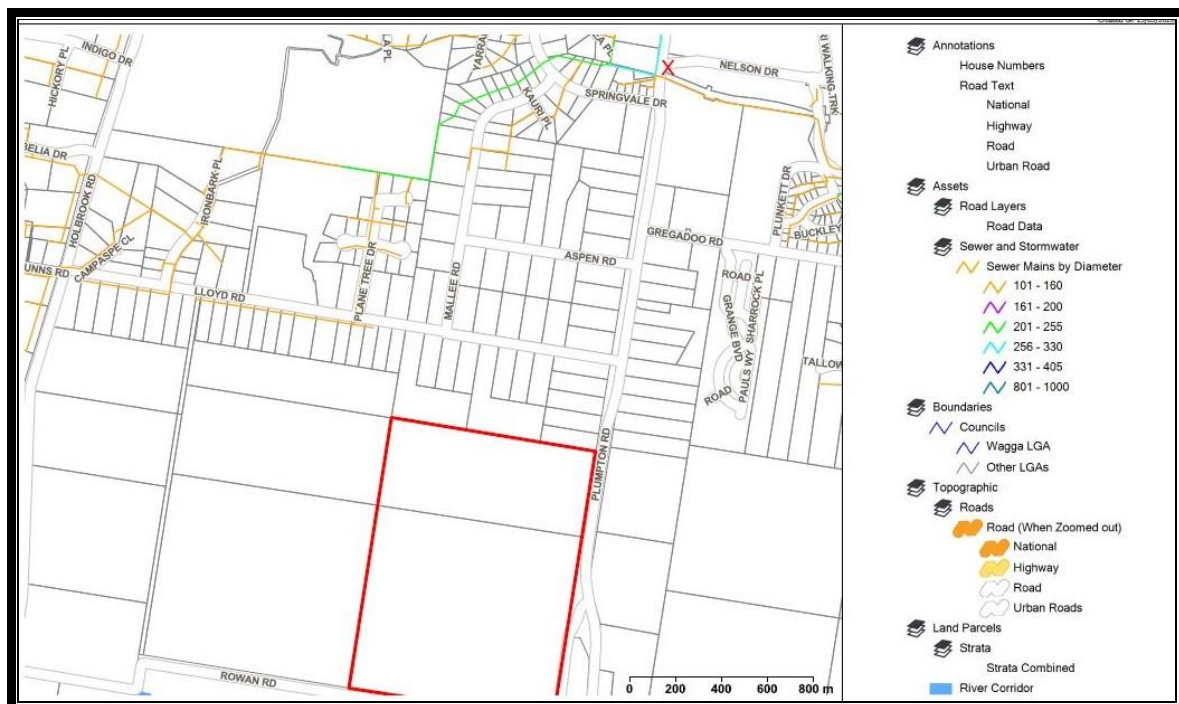


Figure 3: local sewer network (source: WWCC May 2020)

4. PROPOSED DEVELOPMENT

The proposal seeks to rezone blocks 456 and 474 Plumpton Road, which are currently zoned RU1 Primary Production, to R5 General Residential.

Preliminary estate planning has been undertaken and it is anticipated the site will yield approx. 420 blocks 1,000 sqm or greater in area together with a small neighbourhood shop, playgrounds, open space / parkland and wetlands. The residential estate would be developed over several years with possibly 50 to 100 blocks in the initial stage then subsequent stages of approx. 50 blocks per year depending on demand.

In the above development scenario, the maximum sewage discharge from the residential estate would not occur for approx. 8 to 10 years.

5. PROPOSED ESTATE SEWAGE MANAGEMENT

5.1 Estate Sewage System

It is proposed that the estate be provided with a conventional sewerage system based on gravity flows within the sewerage pipe network. The proposed residential estate is anticipated to generate a design flow of approx. 32.75litres per sec (refer Appendix A).

Based on the above flow, a 225mm dia. sewer would appear to be suitable to convey the discharge from the north east corner of the proposed residential estate to the point of connection to the city sewerage network nominated by Wagga Wagga City Council Manager Technical & Strategy at the intersection of Plumpton Road and Nelson Drive¹.

Based on the distance (1,735metres) and levels (estate ground surface approx. RL215m connection point ground surface approx. RL202m)², the sewer along Plumpton Road from the estate to the nominated connection point could be constructed at approx. 6 to 7% grade subject to other services constraints in the verge. The minimum grade required for discharge of the sewage from the approx. 420 dwellings is approx. 0.75% hence this provides for some flexibility in the pipe grades along Plumpton Road and to connect unsewered areas along the route of the outfall sewer.

5.2 Additional Sewerage Catchments

Based on the sewage network diagram provided by Wagga Wagga City Council (refer Figure No 3), there are unsewered areas on both sides of Plumpton Road that may be able to be connected to the proposed sewer along Plumpton Road. Figure 4 details the approx. area to the west of Plumpton Road; Figure 5 details the approx. area to the east of Plumpton Road.

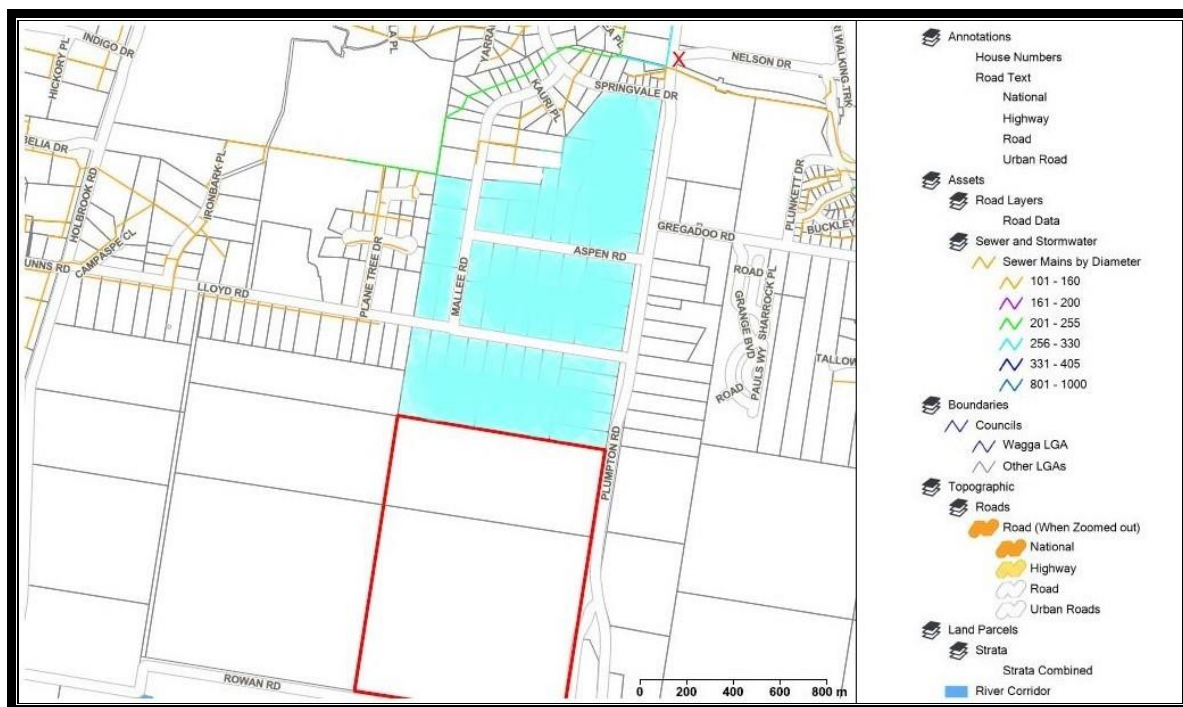


Figure 4: Catchment to west of Plumpton Road

¹ Email WWCC 18th May 2020 (Peter Ross, Manager Technical & Strategy)

² Source WWCC Maps

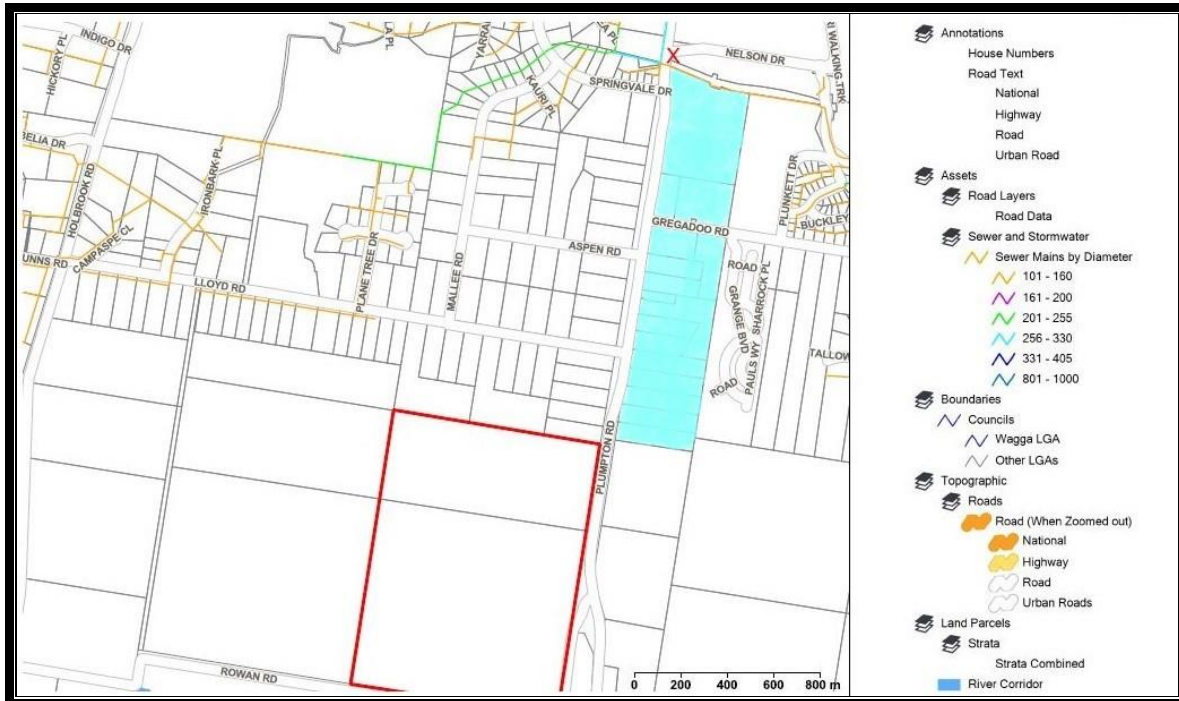


Figure 5: catchment to east of Plumpton Road

The eastern catchment is approx. 54ha in area and has 13 dwellings, the western catchment is approx. 124ha in area and contains 45 dwellings.

Discussions are required with WWCC engineers to determine how the discharges from the additional catchments should be assessed. It is noted that in accordance with NSW Local Government Act Section 124 (24) premises within 75 metres of a sewer of the Council are required to connect with the Councils sewage system hence properties along Plumpton Road would be expected to connect to the proposed sewer from the residential estate.

6. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are made:

- The proposed estate would generate approx. 32.75litres per second design flow from 420 dwellings
- A 225mm dia. sewerage pipe could be constructed from the north east corner of the estate to the point of discharge at Nelson Drive as nominated by the WWCC Manager Technical & Strategy

The following recommendations are made:

- Further calculations of the sewage discharge be undertaken for the final block numbers
- Discussions be held with WWCC to determine any additional catchments that should be allowed for in the design of the sewer outfall along Plumpton Road and those catchments be included in the design flow calculations
- Discussions with WWCC regarding the minimum grade of the outfall sewer given the staging of the estate and the low flows for the initial stages of the estate
- An investigation (potholing and survey) be undertaken as to the potential points of conflict with the proposed outfall sewer along Plumpton Road to verify the proposed outfall sewer construction

7. REFERENCES

1. Email WWCC 18th May 2020 (Peter Ross, Manager Technical & Strategy)
2. Wagga Wagga City Council Engineering Guidelines for Subdivisions and Development Standards
3. Sewerage Code of Australia, Water Services Association of Australia (WSAA).

APPENDIX A – PRELIMINARY ESTATE SEWAGE FLOW

Reference: WSA 02— Section 5.5.5.2 Design assumptions. WSA states the default design assumptions tabulated below, together with the 1 hour rainfall intensity at the location, for an average recurrence interval of 2 years, 11,2 are considered to be reasonably conservative.

		Grade		DN150						
				Flow (L/s)		Equiv. Tenements		Equiv. Population		
				Q _{sc}	Q _f	Min	Max	Min	Max	
k	1.50 mm	1 in 300	0.33%							
d/D	1.00	1 in 250	0.40%							
EP/ET	3.50	1 in 200	0.50%	3.01	10.92	112	116	392	407	
ADWF	180 L/d/EP	1 in 175	0.57%	2.30	11.68	78	126	273	441	
Ave Lot Area	1000 m ²	1 in 150	0.67%	1.71	12.62	52	138	182	483	
Net/Gross Lot Area	70%	1 in 140	0.71%	1.51	13.07	44	144	154	503	
Sewer below water table	70%	1 in 130	0.77%	1.32	13.56	37	150	129	526	
Soil aspect	0.80 = S _{aspect}	1 in 125	0.80%	1.23	13.83	33	154	115	538	
Network defects aspect	0.50 = N _{aspect}	1 in 120	0.83%	1.14	14.12	30	157	105	551	
Leakage Severity C	1.30 = S _{aspect} + N _{aspect}	1 in 110	0.91%	0.99	14.75	25	166	87	580	
Ave Lot Density	7 Lots/ha	1 in 105	0.95%	0.92	15.10	22	170	77	596	
I _{1,2}	21.1 mm/hr	1 in 100	1.00%	0.84	15.48	20	175	70	614	
ARI	5 years	1 in 90	1.11%	0.70	16.32	15	187	52	653	
T _{av}	1.60 Pa	1 in 80	1.25%	0.58	17.31	12	200	42	700	
g	9.81 m/s ²	1 in 70	1.43%	0.47	18.52	9	216	31	757	
U	1.01E-06 m ² /s	1 in 60	1.67%	0.36	20.01	6	237	21	829	
		1 in 50	2.00%	0.27	21.93	4	263	14	922	
		1 in 40	2.50%	0.19	24.53	2	300	7	1050	

Q_{sc} = Self cleansing flow L/s
Q_{df} = Design flow L/s

Figure 6: DN150mm sewer capacity (source: WSA)

		Grade		DN225						
				Flow (L/s)		Equiv. Tenements		Equiv. Population		
				Q _{sc}	Q _f	Min	Max	Min	Max	
k	1.50 mm	1 in 300	0.33%							
d/D	1.00	1 in 250	0.40%	5.03	28.79	218	362	1218	1265	
EP/ET	3.50	1 in 200	0.50%	3.33	32.21	128	412	448	1441	
ADWF	180 L/d/EP	1 in 175	0.57%	2.61	34.45	92	445	322	1558	
Ave Lot Area	1000 m ²	1 in 150	0.67%	2.03	37.23	66	487	231	1704	
Net/Gross Lot Area	70%	1 in 140	0.71%	1.81	38.54	56	507	196	1774	
Sewer below water table	70%	1 in 130	0.77%	1.60	40.00	48	529	168	1852	
Soil aspect	0.80 = S _{aspect}	1 in 125	0.80%	1.50	40.80	44	541	154	1894	
Network defects aspect	0.50 = N _{aspect}	1 in 120	0.83%	1.39	41.64	40	554	140	1940	
Leakage Severity C	1.30 = S _{aspect} + N _{aspect}	1 in 110	0.91%	1.21	43.51	33	583	115	2040	
Ave Lot Density	7 Lots/ha	1 in 105	0.95%	1.12	44.53	29	599	101	2096	
I _{1,2}	21.1 mm/hr	1 in 100	1.00%	1.04	45.64	26	616	91	2156	
ARI	5 years	1 in 90	1.11%	0.86	48.12	20	655	70	2291	
T _{av}	1.60 Pa	1 in 80	1.25%	0.71	51.05	16	701	56	2453	
g	9.81 m/s ²	1 in 70	1.43%	0.58	54.59	12	757	42	2649	
U	1.01E-06 m ² /s	1 in 60	1.67%	0.45	58.98	8	827	28	2895	
		1 in 50	2.00%	0.33	64.63	5	919	17	3215	
		1 in 40	2.50%	0.23	72.28	3	1044	10	3654	

Q_{sc} = Self cleansing flow L/s
Q_{df} = Design flow L/s

Figure 7: DN225mm sewer capacity (source: WSA)

Q _f (l/s)	ET (max)	
32.21	412	from table
32.75	420	calculated
34.45	445	from table

Table 2 calculated flow for 420 dwellings