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## **Narrandera Shire Council**

### Engineering Guidelines for Subdivisions and Development Standards

#### Part 5 -Sewerage Reticulation

February 2011



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# 1. Introduction

This Part of The Authority's "Engineering Guidelines for Subdivisions and Developments" is related to sewerage reticulation. Reference to the Authority will include reference to the Council as the Sewerage Authority.

The Design and Construction of sewerage reticulation shall generally be in accordance with the latest version of the Water Services Association of Australia (WSAA) "Sewerage Code of Australia (WSA02)".

**However this part of The Authority's "Engineering Guidelines" takes precedence over the WSAA Standards.** (i.e. these are The Authority's requirements which may be different to WSA 02).

The other Parts of the engineering Guidelines for Subdivisions and Development are as follows:

- Part 1      General Requirements
- Part 2      Guidelines for Design of Roads
- Part 3      Guidelines for Design of Drainage
- Part 4      Guidelines for Design of Water Reticulation
- Part 5      Guidelines for Design of Sewerage Reticulation**
- Part 6      Guidelines for Landscaping and Measures for  
Erosion, Sedimentation and Pollution Control
- Part 7 -     Guidelines for Testing

This part of the "Engineering Guidelines" is set out in the same order as WSA 02 for ease of cross-referencing.



## 2. General

### 2.1 **Scope** *(refer WSA 1.1)*

The design of sewage pumping stations (SPSs) is addressed in WSA 04 2001 Sewage Pumping Station Code of Australia. The Authority has an objective of minimising the number of pump stations to reduce ongoing maintenance costs and liabilities. Pump station and rising main shall be in accordance with the Authority Standards. These standards encourage a consistent approach to telemetry, electrical, pumps and maintenance issues throughout the system.

The authority may give consideration to the installation of pressure sewer systems subject to Authority approval on a case by case basis. Consistency will be required with electrical and mechanical components of equipment across the Authority municipal area to minimize ongoing maintenance liabilities to the Authority. Pressurised systems are more likely to be considered in sparsely developed and industrial areas where low flows are generated.

This Part of The Authority's "Engineering Guidelines for Subdivisions and Developments" is related to sewer reticulation. Reference to the Authority will include reference to the Council as the Water Authority.

Pressure systems may be used subject to Council approval.



### 3. System Planning *(refer WSA 2)*

#### 3.1 **Assessment of future loads** *(refer WSA 2.3.2)*



## 4. Flow Estimation *(refer WSA 3)*

### 4.1 **Design Flow Estimation Method** *(refer WSA 3.2)*

Flow estimation assumptions shall be given in the concept plan.

#### 4.1.1 **Traditional Design Flow Estimation Method** *(refer WSA 3.2.2)*

The method for determining the design flow shall be in accordance with the methodology specified by the water agency as follows.



## 5. Detail Design

### 5.1 Detail Design Considerations *(refer WSA 4.2)*

#### 5.1.1 Catchment Design *(refer WSA 4.2.1)*

Where future development has the potential to occur beyond the estate, the estate sewer reticulation is to be consistent with a catchment master plan. In the absence of a master plan prepared by the Authority a master plan must be prepared by the developer to an extent necessary to determine sewerage component sizing and location within the estate so that orderly development can occur.

Estate sewerage reticulation shall be extended through the estate to service future upstream catchments. Sewer extension to service the upstream catchment shall be subject to Authority approval at the cost of the Authority. Easements shall be created as part of an approved estate master plan to enable sewer construction that is not dependent and restricted by estate staging and lot release. Construction may be either directed by the Authority or alternatively constructed by the Authority or its representatives.

#### 5.1.2 Design Accuracy *(refer WSA 4.2.2)*

Location in plan shall be referenced to MGA coordinates.

#### 5.1.3 Easements *(refer WSA 4.2.5)*

Where Community or Shared Title occurs, The Authority's sewer responsibility ends at the property connection point (typically where the property vertical is located as visible on site / MH inside the boundary line of the property). There will be one connection to service the combined community lots. The Authority may require an easement to be created over part or the entire infrastructure. Refer also public and private property *(refer WSA 4.3.4)*.

### 5.2 Horizontal Alignment of Sewers *(refer WSA 4.3)*

Road Crossings are perpendicular to the road centreline unless otherwise approved.

#### 5.2.1 Public and Private Property *(refer WSA 4.3.4)*

Sewers located in property other than owned by The Authority are to have an easement in favour of The Authority. The Developer is responsible for obtaining this easement; the release of the Deposited Plan of Subdivision is subject to the creation of this easement. The Developer is to transfer to The Authority sewer easements provided in the subdivision and execute a transfer and grant of easement in favour of The Authority pursuant to Section 88b of the Conveyancing Act 1919, as amended. The minimum width of sewer easement should be 3.0 metres.

Development that requires the submission of a development application to the Authority for approval will require the provision of an easement over existing sewer infrastructure.





### 5.2.2 All changes in direction using MH *(refer WSA 4.3.5)*

An internal MH through drop between inlet pipe and outlet pipe is required as detailed in Table 1:

**Table 1 Deflection Angles**

Deflection Angle	Drop (mm)
0° to 45°	30
46° to 90°	50
91° to 120°	100

Deflections between 91° to 120° are by approval only. Deflections greater than 120° through Maintenance Holes are not permitted.

### 5.2.3 Horizontal Curves in Sewers *(refer WSA 4.3.7)*

Typically not accepted but the corporation may approve curved sewers on a case-by-case basis.

## 5.3 Obstructions and Clearances *(refer WSA 4.4)*

Sewer mains located within lots adjacent to stormwater drainage lines shall be a minimum of 750 mm clear of the stormwater pipe.

The Authority has a preference that buildings not be located over sewer mains. Where this is unavoidable subject to approval of the Authority, buildings may be constructed over sewer reticulation mains provided they are constructed so that no load from the structure is transmitted to the sewer main and the portion of the main under the building (and for a distance outside of the building shall be 2 metres minimum) is laid in unlined cast iron or ductile iron pipe equivalent to Class PN 35. Refer to standard drawing. Class 18 uPvc DIOD (ductile iron outside diameter compatible). This concession is made primarily for buildings in established areas and will not be extended to new subdivisions unless special circumstances prevail.

## 5.4 Pipe Sizing and Grading *(refer WSA 4.5)*

### 5.4.1 General *(refer WSA 4.5.1)*

Sewers shall be designed for PWWF capacity. The maximum and minimum allowable loadings for various pipe diameters are as shown in Appendix of these standards.

### 5.4.2 Minimum pipe sizes for maintenance purposes *(refer WSA 4.5.4)*

The minimum sewer main diameter is 150 mm.

### 5.4.3 Minimum grades for sewers *(refer WSA 4.5.7)*

At the ends of lines the minimum grade is 1 in 80.



#### 5.4.4 Minimum grades for self cleansing (refer WSA 4.5.7)

The maximum grade of reticulation sewer is limited to 1 in 10.

The minimum grades are shown in a table attached in Appendix A.

The values of Colebrook White roughness to be used in the design of gravity sewers are detailed in Table 2:

**Table 2 Valves of Colebrook White roughness**

Nominal Pipe Size (mm)	Full Flow - for estimation of Peak Hydraulic Capacity	Partial Flow - for estimation of Self-Cleansing Flows
150-300	k = 0.6 mm	k = 1.5 normal k = 3.0 for control lines
375-600	k = 0.6 mm	k = 3.0 mm
Above 600	k = 1.5 mm	k = 6.0 mm

*Note: Control Lines are those lines that affect the overall depth of the system.*

Minimum grades for property sewers is 1 in 60.

#### 5.4.5 Minimum Cover over sewers (refer WSA 4.6.3)

In accordance with WSA.

#### 5.4.6 Minimum Depth of Sewer Connection Point (refer WSA 4.6.5)

The depth of the junction is to be such that any location within the lot can be drained to it via a pipe with a minimum 300 mm of cover laid at a grade of 1 in 60. The pipe is to be located parallel to boundaries and account for raft slab construction.

#### 5.4.7 Depth of Connection Point (refer WSA 4.6.5.4)

Refer to Table 3 for specific details for Narrandera sewers.

**Table 3 Property sewers Narrandera**

Maximum depth to invert	2.0 metres
Termination of sewers that provide for future connection	Mark with tape and marker post

#### 5.4.8 Vertical Curves (refer WSA 4.6.7)

Not accepted.

#### 5.4.9 Compound Curves (refer WSA 4.6.8)

Not accepted.



## 6. Property Connection *(refer WSA 5)*

### 6.1 Limitation of Connection to Sewers *(refer WSA 5.2)*

Written approval is required from the Authority for connection to the existing Authority sewerage system. All work is to be carried out by Authority approved contractors at the developers' expense. Seven days prior notice is required. All materials are to be supplied by the Developer.

All work conducted on live sewers is to be in accordance with the relevant Occupational Health and Safety Regulations and Confined Spaces Regulations.

### 6.2 Methods of Property Connection *(refer WSA 5.3.1)*

Refer to Table 4 for specific details for Narrandera property connections.

**Table 4 Methods of Property Connection Narrandera**

WSA 5.3.3 Buried interface method (type A)	Approved
WSA 5.3.2 IO interface method	Not approved
Reference	WSA standard drawing WAT 1107

### 6.3 Location Of Connection Points *(refer WSA 5.6.)*

Where an unsewered dwelling is located on land that is being developed, the Developer shall connect the dwelling to the sewerage reticulation at his cost as part of the subdivision work. The Developer shall be responsible for the removal of any septic tanks and backfilling of the excavation to the satisfaction of Council. All new sewer mains and maintenance holes (MH) must be tested prior to the dwelling being connected.

### 6.4 Y Property Connections *(refer WSA 5.7)*

Not accepted.





## 8. Ancillary Structures *(refer WSA 7)*

### 8.1 Water Seals, Boundary Traps and Water Sealed MH's *(refer WSA 7.2)*

Not required.

### 8.2 Gas check MH's *(refer WSA 7.3)*

Not required.

### 8.3 Inverted Syphons *(refer WSA 7.8)*

Not accepted.



## 9. Structural Design *(refer WSA 8)*

### 9.1 Products and Materials *(refer WSA 8.2)*

Reticulation Pipes and Fittings must be in accordance with the manufacturers and relevant Standards. The materials listed in Table 5 are approved for use:

**Table 5 Approved materials for use Narrandera**

Gravity sewer reticulation pipelines may be constructed from uPVC non pressure pipe and fittings (AS 1260) minimum class SN8.

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Ductile Iron, PN35, lining type to be confirmed with the Authority. NOTE: Portland cement concrete lining is not acceptable.

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DIOD uPVC.

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Other materials may be considered however these materials will require approval on a case-by-case basis.

All pipes should be rubber ring jointed.



## 10. Standard drawings

**Table 6 Authority Standard Drawings Narrandera**

<b>No.</b>	<b>Description</b>	<b>Drawing No.</b>
1	VC Sewer Connections	Subject to development
2	uPVC Sewer Connections	
3	Sewer Connection where there is an obstruction between sewer main and connection point	
4	Sewer main Replacement Details (Ductile Iron or	
5	Equivalent)	
	Sewer Main Junctions Cut-In Details	
6	Sewerage Maintenance Holes	
7	Footings in Vicinity of Sewer Mains	
8	Sewer mains in Vicinity of Swimming Pools	
9	Standard Trench Details	



Appendix A  
**Sewer Capacity Grading Table**





Grade	Pipe size 150			Pipe size 225			Pipe size 300			Pipe size 375		Pipe size 450		Pipe size 525		Pipe size 600		Grade
	Tenements			Tenements			Tenements			Tenements		Tenements		Tenements		Tenements		
	Min K (in mm)		Max	Min K (in mm)		Max	Min K (in mm)		Max	Min K (in mm)	Max	Min K (in mm)	Max	Min K (in mm)	Max	Min K (in mm)	Max	
	1.5	3.0	0.6	1.5	3.0	0.6	1.5	3.0	0.6	3.0	0.6	3.0	0.6	3.0	0.6	3.0	0.6	
80	1	1	221															80
90	3	2	208															90
100	6	4	196	11	8	609												100
110	9	7	186	15	11	580												110
120	13	10	178	20	15	553	28	22	1225									120
130	18	14	170	25	20	530	33	27	1175									130
140	23	18	164	31	25	510	38	32	1129	39	2081							140
150	30	24	158	36	30	492	43	36	1089	44	2007							150
160	35	30	152	41	35	475	49	41	1053	49	1941	58	3188					160
180	48	41	143	52	45	446	61	52	989	61	1825	71	3000					180
200	65	56	135	66	57	422	76	65	936	75	1727	86	2839	98	4313			200
220	89	77	128	83	71	401	92	79	890	90	1642	103	2703	116	4104			220
250				11	97	374	120	105	832	117	1536	131	2527	146	3840	163	5511	250
300	204	176	119	3	16	339	184	159	755	172	1395	188	2296	207	3492	227	5013	300
350				18	1	312	269	234	695	242	1287	259	2118	281	3222	305	4627	350
400				6	28													
450				32	3		389	340	648	332	1199	347	1975	370	3006	396	4316	400
				4			577	507	608	448	1120	454	1855	475	2826	504	1060	450
500							1175	1039	575	602	1066	585	1757	600	2674	628	3843	500
550										809	1013	747	1670	748	2544	773	3656	550
600										1191	967	953	1596	926	2430	940	3494	600
650												1226	1531	1138	2331	1134	3351	650
700												1630	1471	1400	2242	1362	3222	700
750												2829	1420	1732	2162	1628	3109	750
800														2185	2089	1948	3006	800
850														2925	2024	2341	2926	850
900																2850	2825	900
1000																5668	2673	1000

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*Normal Flattest grade to be adopted in reticulation design*  
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*Absolute limiting grade for pipe line designed to be cleansed by gravity flows*



**GHD**

105 Hume Street  
Wodonga VIC 3690 Australia  
T: 61 2 6043 8700 F: 61 2 6043 8711 E: abxmail@ghd.com.au

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