

## **0071 WATER SUPPLY – RETICULATION (DESIGN)**

### **1. General**

#### **1.1. Responsibilities**

##### 1.1.1. General

Requirement: Provide design and documentation for the construction of a reticulated water supply system (either drinking or dual drinking/non-drinking) conforming to the requirements of WSA 03 and Narrabri Shire Council as documented.

##### 1.1.2. Performance

Requirement: Performance requirements shall typically be in accordance with WSA 03 however shall be confirmed with Council prior to design works commencing.

#### **1.2. Cross References**

##### 1.2.1. General

Requirement: This is not a self-contained design document, conform to the following worksection(s):

- 0010 Quality Requirements for Design.

#### **1.3. Standards**

##### 1.3.1. General

Standard: To WSA 03 Part 1.

#### **1.4. Interpretations**

##### 1.4.1. Definitions

General: For the purposes of this worksection the definitions given in WSA 03 Part 0 apply.

## 2. Pre-Design Planning

### 2.1. General

#### 2.1.1. Environmental Impact Assessment

Requirement: Provide evidence that impact on the environment has been considered as part of the design to satisfy the requirements of relevant legislation.

#### 2.1.2. Concept plan

Requirements: Provide concept plans to Council at 50% and 80% completion for perusal and comment.

#### 2.1.3. Critical infrastructure protection

All hazards risk assessment: In consultation with Council, conduct a risk assessment addressing critical supply interruption.

### 2.2. System Planning

#### 2.2.1. Demands

Peak demands shall be modelled in accordance with WSA 03 Section 2.3.4 and confirmed with Council prior to completion of the design.

A peak instantaneous demand of 0.15 L/s/tenement shall be used except that when supplying more than 1000 tenements, a demand of 0.1 L/s/tenement shall be used. Water demand for other industries shall be determined in consultation with Council.

Reticulation systems shall be designed to service peak instantaneous demand by gravity while maintaining a minimum static head as specified in WSA 03 Table 2.3.

#### 2.2.2. System configuration

System configurations shall be in accordance with WSA 03 Section 2.4 and confirmed with Council prior to completion of the design.

#### 2.2.3. System hydraulics

System hydraulics shall be designed in accordance with WSA 03 Section 2.5 and confirmed with Council prior to completion of the design.

Under no circumstances shall system pressure be able to exceed the safe working pressure of the reticulation pipe material (included existing pipework intended for use). The effect of water hammer is to be taken into account for the maximum pressure.

Allowance shall be made for a desirable maximum pressure of 600kPa. Zoning of the reticulation system by means of pressure reducing valves (PRV's) may be necessary to achieve these pressures across a development.

Water mains required for fire-fighting purposes shall be designed in accordance with the National Construction Code.

## 2.3. Subsidised Schemes

### 2.3.1. Funding

Government grant funds: If the works form part of a contract attracting Government grant funds, identify the following:

- Items which are not of the least cost option, that:
  - Are intended to have a much longer design life than the typical asset design lives listed in WSA 03 Table 1.2.
  - Do not meet the project objectives and the requirements of the various authorities for the least net present value (NPV) but may become the preferred option for construction.
- Particular equipment which is procured without relevant competition through tendering;
- Duplication of equipment or unit processes in a system configuration.

## 2.4. Consultation

### 2.4.1. Council and other authorities

Requirements: Consult with the Council and other relevant authorities during the preparation of the design. In addition to the requirements of this worksection, identify the specific design requirements of these authorities.

### 2.4.2. Public consultations

Requirements: Undertake public consultation on design in conformance with Council policy.

### 2.4.3. Utilities services plans

Existing services: Obtain service plans from all relevant utilities and other organisations whose services exist within the area of the proposed development. Plot these services on the relevant drawings including the plan and cross-sectional views.

## 3. Design criteria

### 3.1. General

#### 3.1.1. Requirements

Conflicting requirements: If there is conflict between this specification and other Water Agency requirements, seek clarification.

#### 3.1.2. Positional information

The required co-ordinate system is GDA94 with heights referenced to AHD.

### 3.2. Hydraulic Design

3.2.1. Hydraulic design should be in accordance with WSA 03 Part 1. Details regarding future water supply and demand and required redundancies shall be confirmed with Council prior to starting the design.

3.2.2. Trunk mains directly supplying reticulation systems shall be designed as part of the reticulation system to carry peak instantaneous demands. WSA 03 Section 3.

3.2.3. Mains feeding service reservoirs shall be designed to service peak daily demands over 24 hours in the case of gravity mains and 22 hours in the case of rising mains.

3.2.4. The minimum diameter of all pipes shall be 100mm unless otherwise specified in writing by Council. In commercial or industrial areas, the minimum shall be DN150. In all cases, pipe sizes and residual pressures shall be designed to cater for fire fighting flows.

### 3.3. Products and Materials

Products and materials shall be in accordance with WSA 03 Part 1.

#### 3.3.1. Water supply mains and property services – drinking water

The working pressure of pipes, fittings, valves and hydrants shall be fit for the purpose in accordance with the relevant Australian Standard and shall be minimum PN16 rated.

The designer shall select pipe type, class and standard based on system requirements and in accordance with AS 2200 and site conditions. All pipes shall be a minimum Class PN12 unless specified in writing by Council.

Pipes and fittings for water reticulation shall be of unplasticised PVC, modified PVC, ABS, ductile iron, steel, polyethylene, glass reinforced plastic (GRP), or copper. The material specifications for each pipe shall be as per WSA 03 Part 1 and relevant Australian Standards specific to the pipe material.

### 3.3.2. Property services – non drinking water

Shall meet the same specifications as required for drinking water services.

Shall be coloured and marked so that it can be easily distinguished from drinking water services.

## 3.4. System Design

3.4.1. System design shall be in accordance with WSA 03 Part 1.

3.4.2. Reticulation mains shall be looped to eliminate dead ends unless permitted otherwise by Council. Where a dead end is permitted to provide for future extension from staged development, the end shall be fitted with a stop valve, hydrant bend and hydrant.

3.4.3. Wherever possible, a development shall be serviced by two or more trunk mains to avoid the loss of supply in the event of maintenance or breakage.

3.4.4. Each dwelling/allotment shall have an individual service tapped from the main and extending 300mm inside the lot boundary.

## 3.5. Structural Design

### 3.5.1. Pipe cover

Minimum depth of cover shall be as per the requirements of WSA 03 Part 1 Section 7 and WSA 03 Part 3 relevant standard drawings.

### 3.5.2. Buoyancy

Provide evidence that buoyancy has been considered and apply approved measures to resist buoyancy.

### 3.5.3. Pipeline anchorage

Pipeline anchorage and restraints shall be as specified in WSA 03. The designer shall design thrust blocks and restraints to resist the maximum test pressure of the pipe (WSA 03 Part 2, section 19.4.2), not the estimated surge pressure.

### 3.5.4. Restrained joint ductile iron water mains

Shall be specified only following approval by Council.

## 3.6. Appurtenances

### 3.6.1. Valves – General

Shall be in accordance with WSA 03 Section 8.

### 3.6.2. Stop valves

Shall be in accordance with WSA 03 Section 8.2.

### 3.6.3. Air valves

Shall be automatic combination air valves in accordance with the requirements of WSA 03 Section 8.4 unless specified otherwise in writing by Council.

### 3.6.4. Non-return valves

Shall be in accordance with WSA 03 section 8.5.

### 3.6.5. Scours and pump out branches

Shall be in accordance with WSA 03 section 8.6.

### 3.6.6. Hydrants

Hydrants shall be in accordance with WSA 03 section 8.8.

### 3.6.7. Surface fittings

Shall have trafficable covers fit for purpose. The designer shall allow for clear identification and delineation between potable and non-potable supplies.

### 3.6.8. Valve pits and access

The designer shall take into account Occupational Health and Safety requirements in providing for access and inspection covers.

Ladders shall comply with AS 1657 and applicable Health and Safety legislation.

### 3.6.9. Appurtenance location marking

The designer shall take into account the location and type of valve required considering maintenance and repair requirements and access for lifting equipment.

## 4. Documentation

### 4.1. General

#### 4.1.1. Approvals

Requirement: Document the approval conditions advised by the appropriate authority which contribute to the basis for the design of the water supply reticulation system.

Concept plan: Document and review the concept plan for the water supply system.

#### 4.1.2. Design reports

Requirements: Provide a design report including the following:

- Design criteria;
- Site investigation reports supporting the design;
- Calculations, studies and references supporting the design;
- Demonstrated conformance with the approved concept plan and the requirements of WSA 03 Section 9.1.

#### 4.1.3. Design certification

Requirement: Provide a signed and dated design certificate.

#### 4.1.4. Final certification of completed works

Certificate: Provide a signed and dated design certificate as evidence that a suitably qualified professional has reviewed all the design documents, including program and plans for the development, and can verify that the designed water mains and associated components and structures for the development site meet the Council and statutory requirements.

### 4.2. Drawings

#### 4.2.1. General

Requirement: Provide drawings and/or computer output defining the works and assumed operating and maintenance procedures to the requirements of WSA 03 Section 9.2.

#### 4.2.2. Drawing content

Requirement: Provide drawings to the requirements of WSA 03 Section 9.2 and 0010 Quality Requirements for Design.

#### 4.2.3. Work as Executed drawings

Requirement: Provide an additional set of final construction drawings for the purpose of recording the Work as Executed by the Contractor.

Required format: AutoCAD .dwg and pdf.

### 4.3. Specifications

#### 4.3.1. Construction documentation

Requirement: Prepare technical specifications using the AUS-SPEC Construction worksection templates from the National Classification System including workgroups 02, 03, 11 and 13.

## 5. Annexure

### 5.1. Annexure – Referenced Documents

The following documents are incorporated into this worksection by reference:

WSA 03	2011	Water Supply Code of Australia
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