Water Supply Code of Australia
WSA 03 - 2011 - v3.1
Melbourne Retail Water Agencies Edition Version 2.0

Industry Awareness Workshops

Friday, 13th April 2012 - Sunshine Convention Centre, Victoria University
Tuesday, 17th April 2012 - Whitehorse Centre, Nunawading
Thursday, 19th April 2012 - Hemisphere Conference Centre, Moorabbin

City West Water
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Welcome & Background ..

- Colin Paxman
  Standards and Products Specialist

  South East Water

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Agenda ..

Time	Session	Presenter
9.00 – 9.10	**Welcome & Introduction**	Colin Paxman (SEW)
9:10 - 10.15	**Planning & Design**	Kevin Dawson (YVW)
10.15 – 10.30	Morning Tea	
10.30 – 10.35	**Introduction for new arrivals**	Robert Jagger CWW)
10.35 – 11.30	**Standard Drawings**	Robert Jagger (CWW)
11.30 – 12.30	**Construction**	Colin Paxman (SEW)
12.30 – 1.30	Lunch	

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Intent of Today's Workshop ..

- Introduce the new MRWA Edition of the WSAA Water Supply Code
- Not intended to step through the Code
- Highlight salient aspects & features of the new MRWA Edition of the WSAA Water Supply Code
  - Specific technical requirements
  - Introduction to new standard drawings
  - Introduction to other relevant supporting documentation
  - More importantly - **What has Changed from Version 1**

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Why WSAA Codes ..

- Established to
  - embody “National Industry Best Practice”
  - encourage innovation
  - provide standardisation
- Define technical best practice for design and construction of water supply & recycled water supply systems
- Focus on asset creation

  (Can also be applied to asset renewal and/or rehabilitation)
- Include -
  - deem to comply solutions
  - guidance & informative material (italic text)
- Applicable to small and large diameter mains

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Why WSAA Codes ..

- Key Code Objectives
  - Excellence in customer service
    - Right pressure
    - Right quality: no dirt, air, corrosion products or surge
    - Continuity of supply
    - Minimise impacts (subsidence, intrusion, consideration of other services)
  - Lowest Life Cycle Cost
    - LASTS > 100 YEARS
    - Lowest reasonable design and construction cost (based on risk)
    - Quick and easy to maintain and renew
    - Withstand hydraulic, surface and ground forces
    - Corrosion control
    - Control risk of 3rd party damage

Why MRWA Editions of the WSAA Codes ..

- Needed to represent the collective view of the MRWA
  - local practice, climatic, geographic and topographic conditions
  - statutory requirements, or
  - where the National Code is otherwise silent
- Define MRWA design & construction standards / benchmark
- Benchmark against which to audit

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Code Compliance ..

- Code defines what is considered "**Deemed to Comply**" What's does that mean?
  - **IF IT'S AS PER THE CODE, IT'S OK**
- Does all design and construction need to comply?
  - **NO**
  - Codes will not fit every application
  - Should always aim to comply with Code Requirements
- Are variations to the Code possible?
  - **YES - WHERE THERE IS A DISTINCT ADVANTAGE**
- How do I manage a variation from the code?
  - **DISCUSS IT WITH YOUR WATER AGENCY**
  - **SEEK APPROVED CONCESSION FOR VARIATION PRIOR TO THE EVENT**
  - **CAN BE ONGOING ACCEPTANCE**

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The Journey To Date ..

- Current WSAA Water Supply Code
  - Published in 2002
  - MRWA Edition adopted December 2004
  - Current Code Structure
    - Part 0 - Glossary of Terms, Abbreviations and References
    - Part 1 - Planning & Design
    - Part 2 - Products & Materials
    - Part 3 - Construction
    - Part 4 - Standard Drawings
  - Water Supply Code review - initiated by WSAA, March 2008
  - WSAA published 3rd Edition of the Water Supply Code - March 2011

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Review Process ..

- Review of published WSAA Water Supply Code by MRWA
- New MRWA Standard Drawings Drafted
- ALDE / CCF Feedback received & incorporated from -
  - Comdain
  - Mooroolbark Excavations
  - ALDE
  - Reeds Consulting Group
  - WBCM
- Specialist Industry advice sought from -
  - Tunney & Houlihan
  - Comdain
  - Mooroolbark Excavations
  - Scarriff
  - Pipeline Welding Contractors
  - Major Suppliers
- MRWA Edition of the Code & MRWA Standard Drawings finalised

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The New Water Supply Code ..

- New Code structure
  - Part 0 – Glossary of Terms, Abbreviations and References
  - Part 1 – Planning & Design
  - Part 2 – Construction
  - Appendices
- Products & Material
  - Now embedded within Parts 1 & 2
- Standard Drawings
  - **MRWA has created a set of MRWA Std Dwgs**
    - To be managed by CWW/SEW/YVW

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The New Water Supply Code ..

- Now includes -
  - Recycled Water
    - Dual Water Supply Supplement now embedded with the Code
  - Booster Pumping
    - New section added, including pressure management
  - Introduction of Tools
    - Thrust block calculators
    - PE pipe shrinkage & restraint calculator
    - Restrained joint system design calculator
    - PE Pressure Testing Calculator

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The New Water Supply Code ..

- Appendices -
  - Appendix A - Infrastructure protection guidance
  - Appendix B - Equivalent pipe diameters
  - Appendix C - Under pressure cut-in connections
  - Appendix D - Booster pump configurations
  - Appendix E - Selection of pump attenuator tanks
  - Appendix F - Water mains slips within unstable areas
  - Appendix G - Soil classification guidelines
  - Appendix H - Hydrant Spacings
  - Appendix I – **Not used by MRWA** (refer WQ Compliance Spec)
  - Appendix J - Safety Assurance
  - Appendix K - Connectivity Inspection
  - Appendix H - Cathodic Protection (tbc)- **MRWA only**

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The New Water Supply Code ..

- Format
  - Same look and feel as Version 1.
  - Bold vertical line and purple text for MRWA alterations
  - Added clauses have an “MRWA prefix”
  - **Electronic Only (not available in hardcopy)**

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The New Water Supply Code ..

- Availability to Electronic Documents:
  - Now a reality that many key personnel have access to a field computer
  - No issues with going out of date
  - Majority of documents & all drawings linked and easy to access
  - Drawings and MRWA documentation available on MRWA website free of charge (refer to mrwa.com.au).
  - Code text available from the WSAA book shop on their website (wsaa.asn.au)
  - Licensed intranet version available from WSAA

The New Water Supply Code ..

- Requirements Regarding Access to the Code
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  - All Accredited Companies will be required to purchase the code
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MRWA Web Portal ..

- CWW, SEW, YVW Approved Products List
- Standards
  - Industry Standards
    - Eg - Pressure Sewer Code Supplements
  - MRWA Specs
    - Backfill Spec
    - Water Quality Spec
  - Standard Drawings
    - MRWA Std Dwgs

Launch the mrwa web site

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The New MRWA Edition of the WSAA Water Supply Code, v2.0

- Part 0 - Glossary of Terms, Abbreviations and References
- Part 1 - Planning & Design

- Kevin Dawson
  Manager Delivery Services
  Yarra Valley Water

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The New Water Supply Code ..

- Part 0 - Glossary of Terms, Abbreviations and References
  - An enhanced Glossary or Terms
    - Allowable horizontal bearing pressure
    - Direct tapping
    - Dual water supply terms
    - Life cycle
    - Minimum static head
    - Scour
    - Socket / Spigot
    - Trafficable Area / Non-trafficable area
    - Water sensitive urban design
    - Water service

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The New Water Supply Code ..

- Part 0 - Glossary of Terms, Abbreviations and References
  - Minor enhancement of Abbreviations
    - Inclusion of most current MRWA Code amendments
  - Updated to Reference Documents
    - AS standards
    - AS/NZ Standards
    - PIPA Documents
    - BS EN Standards
    - ISO Standards
    - WSAA Standards
    - ASCE / ASTM

The New Water Supply Code ..

- Part 0 - Glossary of Terms, Abbreviations and References
  - Updated to Reference Documents (cont.)
    - ASTT Standards -
      - Trenchless Technology Guidelines
      - Guidelines on HDD, Pipe Bursting and Microtunnelling
      - Standard for Horizontal Directional Drilling
      - Sample Specification for Horizontal Directional Drilling
      - Standard for Pipe Bursting
      - Sample Specification for Pipe Bursting
      - Standard for Microtunnelling and Pipe Jacking
      - Sample Specification for Microtunnelling and Pipe Jacking
    - Links to
      - Thrust Restraint Design for Ductile Iron Pipelines, 6th Edition
      - Australian Guidelines for Water Recycling
      - Foundation for Water Research Report FR0448
      - Australian Drinking Water Guidelines

Planning & Design ..

- Current MRWA WS Code requirements - now embedded within the New **National** Code
  - Designer responsibilities
  - Court bowl arrangements
  - Easement requirements
  - Location of water mains – landscaping
  - Tapping under pressure requirements
  - Chlorination assemblies
  - Property Service requirements
  - Pipeline Concrete encasement
  - Valve spacing provisions
  - Valving configurations - confirmation
    - valving arrangements for interconnection

Planning & Design ..

- System Planning
  - Predominantly
    - Informative
    - Remains unchanged
  - Each Water Company will continue to:
    - Undertake the necessary system planning to service required areas, ie -
      - System modelling
      - Define the system functional needs to service an area
      - Overall system configuration
    - Issue concept plans for each project

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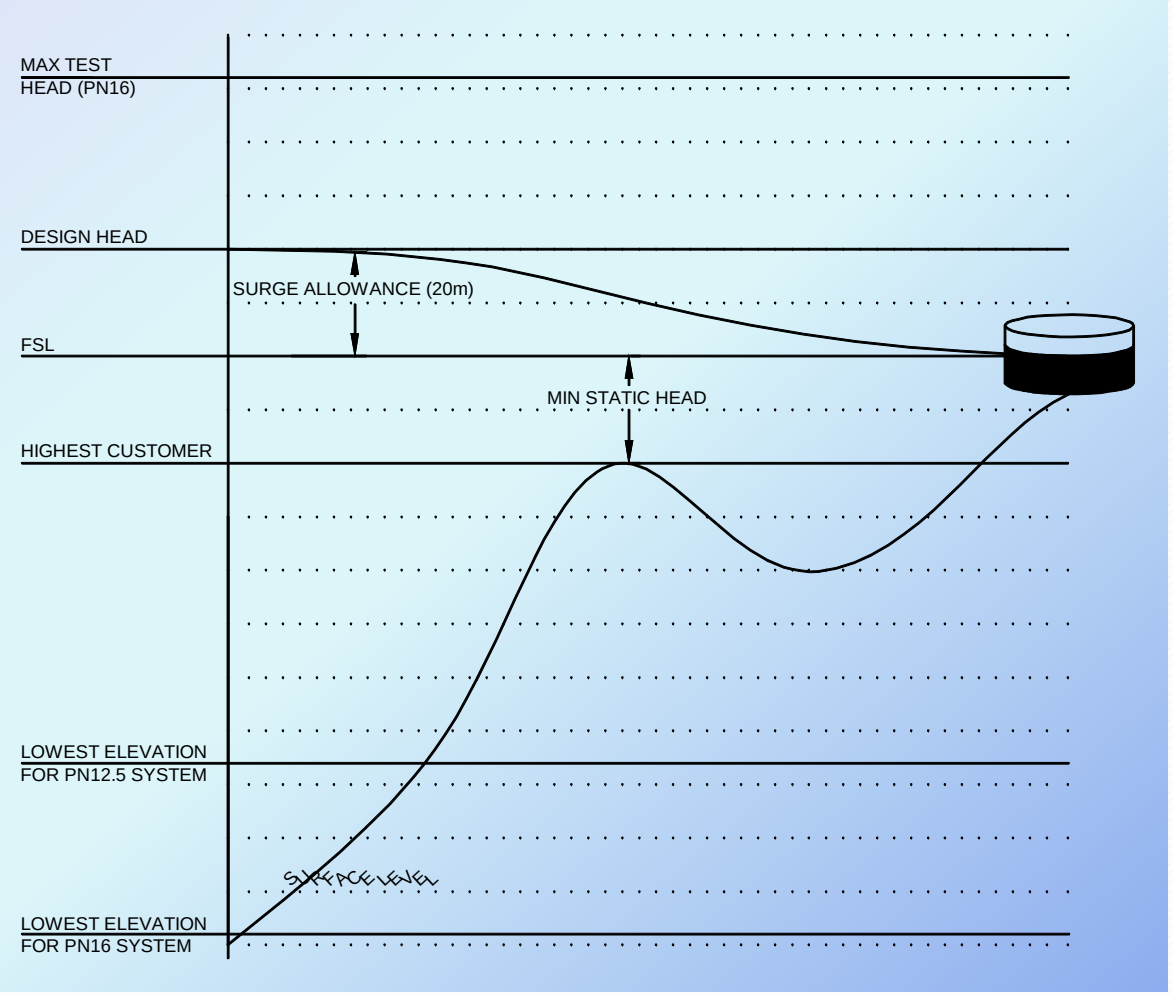
Planning & Design ..

- Hydraulic Design
  - Minimum Pipe Sizing (Section 3.1)
    - Reduced Drinking Water mains sizes is possible where a Dual Water System (ie DW & NDW) is defined and where fire fighting access is from the Non-drinking water system (MRWA preference)
  - Enhanced definition of Pipeline Pressure Ratings & System Pressure Limits (Section 3.2)
    - System Test Pressure
    - Max Operating Pressure
    - Design Pressure

Planning & Design ..

- Design pressures
  - Gravity System
    - Operating Pressure
    - Design Pressure
      - Based on Operating Pressure
      - Includes Surge Allowance
    - Test Pressure
      - Based on Design Pressure



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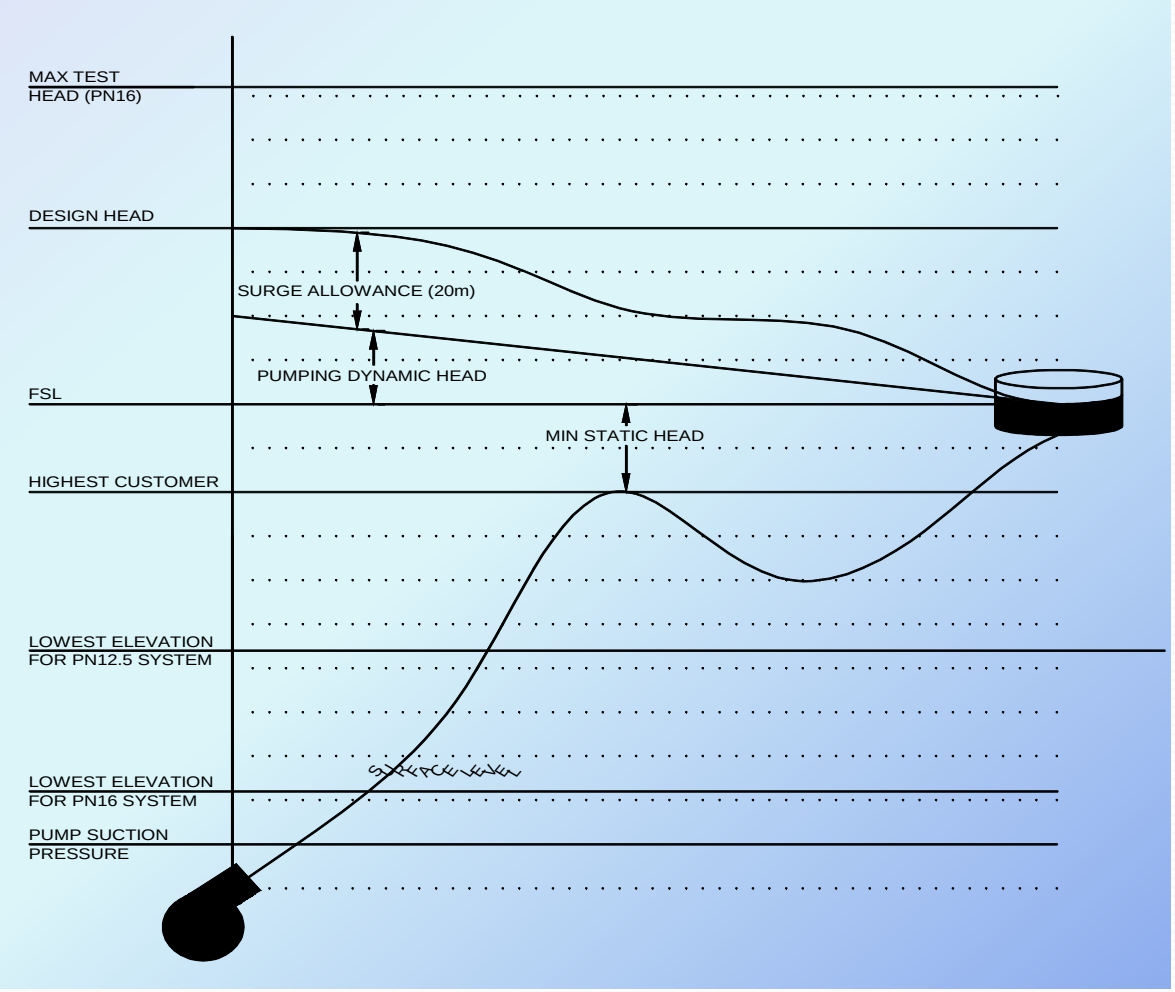
Planning & Design ..

- Design pressures
  - Pumped System
    - Operating Pressure
    - Design Pressure
      - Based on Operating Pressure
      - Includes Surge Allowance
    - Test Pressure
      - Based on Design Pressure



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Planning & Design ..

- System Component Pressure Class (Section 3.2)
  - Pipe/Fitting pressure rating > Test Pressure
    - PN12.5 rating system components
      - Acceptable pipe system - ≤ DN63, PE80 PE Pipe
      - Max Operating pressure - 76m (760kPa)
      - Max Design pressure - 96m (960kPa)
      - Max Test Pressure - 120m (1200kPa)
    - PN16 rating system components
      - Any approved pipe system (pipe/fittings)
      - Max Operating pressure - 108m (1080kPa)
      - Max Design pressure - 128m (1280kPa)
      - Max Test Pressure - 160m (1600kPa)

Planning & Design ..

- Products & Materials
  - Reference to MRWA Web Portal for Water Company approved products list (Section 4.1)
  - Product Details (Section 4.3)
    - Product Specifications
    - Sizes & configurations
    - Coatings, if applicable
    - Sleeving, if applicable
    - Jointing
  - Applicable to -
    - Ductile Iron P/L Systems
    - PVC P/L Systems
    - Polyethylene P/L Systems
    - Mild Steel P/L Systems

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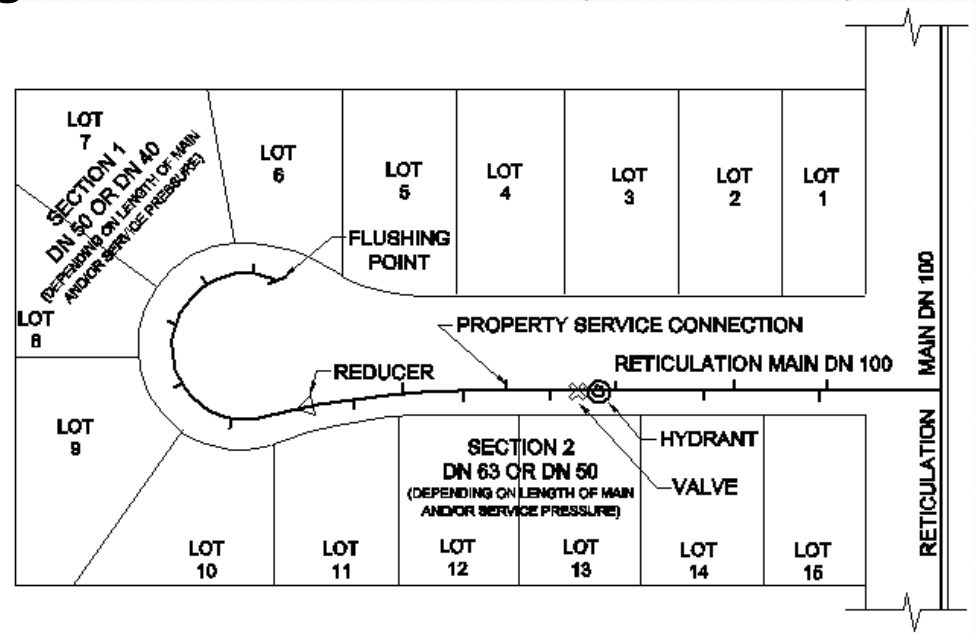
COMPONENT		DRINKING WATER SYSTEM	NON-DRINKING WATER SYSTEM
RETICULATION MAINS			
Pipe	PVC	Plain blue	Plain purple
	PE	Plain blue OR black + blue stripes[1]	Plain purple OR black + purple stripes[1]
	Ductile Iron	Blue PE sleeving OR blue coating	Purple PE sleeving OR purple coating[2]
Fitting e.g. bend, coupling		Colour not required [3]	Colour not required [3]
Valve (spindle cap)		Blue coating	Purple coating
Valve (body)		Colour not required [3]	Colour not required [3]
Hydrant (claw)		Blue coating OR blue shroud	Purple coating OR purple shroud
Hydrant (body)		Colour not required [3]	Colour not required [3]
Marking tapes		Blue	Purple
Surface fittings and surrounds		Refer to Drawing MRWA-W-301	Refer to Drawing MRWA-W-301
Signage (marker posts, plates		Refer to Drawing MRWA-W-301	Refer to Drawing MRWA-W-301
PROPERTY SERVICES			
PE Pipe		Plain blue OR black + blue stripes[1]	Plain purple
Pre-tapped connector (body)		Colour not required [3]	Colour not required [3]
Tapping band or saddle		Colour not required [3]	Plain purple plastics (plastics moulding) or purple coating (metallic)
Fittings e.g. ball valve		Colour not required [3]	Plain purple handle (plastics moulding) or purple coating (metallic)
Meters		Colour not required [3]	Plain purple plastics (plastics moulding) or purple coating (metallic)
Meter boxes (lids)		Colour not required [3]	Colour not required [3]

Planning & Design ..

- General Design
  - Water main renewals—electrical safety and earthing to water services (Section 5.1.3)
  - Enhanced Court Bowl design details (Section 5.2.4)
    - New Standard Dwg - *MRWA-W-108*
    - Improved diagram & method of determination



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Planning & Design ..

- General Design (cont)
  - Preferred location of water pipeline alignment (Section 5.4)
    - Locate within non-trafficable areas - MRWA-W-201
    - Pipe/Service road crossings - $90^{o} \pm 15^{o}$
    - Encasing pipes
      - Annulus gap > 50mm (b/w bore & pipe OD) requires grouting
      - Steel Sleeves require Cathodic protection to be designed by a protection specialist
    - Railway crossings
      - Where pipe sleeve is required, extend sleeve beyond the rail reserve
    - Creek crossings
      - Whilst concrete encasement is not preferred, it shall be specified where mandated the owner

Planning & Design ..

- General Design (cont)
  - Curved pipeline alignments (Section 5.4.14)
    - Order of preference
      - Manufactured bends
      - Joint deflection - cut pipes
        - Cut pipes shall be limited to ≥ ½ full length of pipe
      - Cold bending of pipe - PE only; Not permitted for PVC pipe
    - Design drawings shall include
      - Design radius & tangent point
      - Total length of curved main
      - Definition of allowable joint deflection, where applicable
      - A cut-pipe scheduled, where applicable
      - A list of preferred suppliers

Planning & Design ..

- General Design (cont)
  - Location Markers (Section 5.4.15)
    - Marker Posts required in rural or unmade roads
    - Marker posts not required within residential areas
  - Marking Tape (Section 5.4.16)
    - Detectable marking tape is require above all DW & NDW open cut mains
    - Located on of the 1st layer of backfill
  - Tracer Wire (Section 5.4.16)
    - Required for all conduited and trenchless installed DW & NDW pipelines

Planning & Design ..

- General Design (cont)
  - Trenchless Technology (Section 5.5)
    - Limit the use of RRJ flexible pipes within unprotected bored alignments
      - No more than 2 joints
      - Ground conditions do not impose excessive loads on pipe during bore installation
  - Shared Trenching (Section 5.6)
    - Water Agency Approval required
    - Only with DW, NDW and/or Gas mains
  - Proving of existing services (Section 5.12.5.1)
    - Within unpaved surfaces, required at the design stage where new mains proposed with 5 x Min. clearance to other services
    - Within paved surfaces, required at the time of excavation

Planning & Design ..

- Structural Design
  - Pipe Cover (Section 7.4.2)
    - Limit Pipeline cover to 1.5 x Min cover
  - Pipe Embedment (Section 7.4.4)
    - Design to specify pipe embedment material
    - Special embedment required where
      - Irregular rock outcrops occur
      - AHBP < 50kPa
      - Uncontrolled ground water present

Planning & Design ..

- Structural Design (cont)
  - Geotechnical assessment (Section 7.5)
    - require where
      - AHBP < 50kPa
      - P/Ls ≥ DN450
      - High ground water
      - Known poor ground conditions
  - Concrete encasement (Section 7.6)
    - General not preferred
    - Only when mandated by the land owner

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Planning & Design ..

- Structural Design (cont)
  - Pipeline anchorage (Section 7.9)
    - to be based on system test pressure
    - Timber thrust block limited to
      - ≤ DN300 mains
      - Test pressures ≤ 160m (1600kPa)
    - Alternative anchorage for dual water supply systems
      - Thrust area shall be the sum of thrust areas required for both DW & NDW mains
    - Restrained Joints
      - May be used on mains
        - DN100 to DN375
        - Design pressures ≤ 160m (1600kPa)

Planning & Design ..

- Appurtenances
  - Enhanced valve design definitions (Section 8.1)

VALVE TYPE WATER AGENCY PREFERENCES

	Resilient Seated Gate Valves	Resilient Seated Gate Valves with Integrated Bypass	Metal Wedge Gate Valves	Butterfly Valves
CWW	Buried valves ≤DN 450	Where space is insufficient for flanged bypass valve plus hydrants	Not normally used	Above-ground valves and valves >DN 450
SEW	Buried valves ≤DN 450	Buried valves >DN 450 to DN 600	Not normally used	Above-ground valves and valves >DN 600
YVW	Buried valves ≤DN 450	Not normally used	Off-take mains >DN 375 (2 turns/inch	Above-ground valves and divide valves >DN 450

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Planning & Design ..

- Appurtenances (cont)
  - Valve spacing

Water main size DN	Number of property services connected (nominal)	Maximum spacing m
≤150	25 (YVW) 40 (SEW & CWW)	300*
200-300	100	750
375	N/A	1000
450	N/A	1150
600	N/A	1500
750	N/A	1900
>750	N/A	5000#

NOTES * In rural areas, the maximum spacing shall be 500 m.

The divide valve spacing for mains larger than DN 750 shall be decided in consultation with the Water Agency.

Where mains >DN 300 provide a single source of supply to reticulation systems for any significant time (i.e. >5 years), the numbers of customers impacted by valve closure shall be considered and the spacing between stop valves reduced accordingly.

Closer spacing may be required at locations such as bridge, motorway or railway crossings or where the main is in flat terrain and drainage times may be significant.

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Planning & Design ..

- Appurtenances (cont)
  - Enhanced valve by-pass details (MRWA Section 8.2.3.1)
  - Enhanced air valve design parameters (Section 8.4)
    - Specific Water Company Requirements
  - Hydrants (Section 8.8)
    - Min distance b/w hydrants (ie DW & NDW) - 2.5m
    - CWW reduced spacing (200m -120m - residential)
    - 1m clear of driveways - preferred
    - Valve controlled hydrants - Water Company specific

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Planning & Design ..

- Appurtenances (cont)
  - Location markings (Section 8.11)
    - Marker posts - only required in rural areas
    - Pavement markers required
      - Retro-reflective pavement marking (ie Cats Eyes) - Hydrants Only
      - Triangular thermoplastic marker or Marking Paint - Hydrants Only
    - Kerb (when existing) & Surface fitting ID Discs

Planning & Design ..

- Design Plan Requirements
  - Design templates
    - Locality, notes
    - Design layout
    - Design detail

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Calculation Tools

- PE Pressure Testing Calculator
- Concrete Thrust Anchorage (Project) Calculator
- Concrete Thrust Anchorage (Individual) Calculator
- PE Shrinkage Restraint Calculator
- Restrained Main Length Calculator

Launch Spreadsheet

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Morning Tea

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Brief Introduction

- Robert Jagger
  Manager Standards, Engineering
  City West Water

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Welcome to Contractors

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- Products & Material
  - Now embedded within Parts 1 & 2
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The New Water Supply Code ..

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MRWA Standard Drawings

- Robert Jagger
  Manager Standards, Engineering
  City West Water

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Standard Drawings- How they will affect you?

- Familiarise yourself with the content.

  (Not just about construction, lot of design information)
- New requirements will take time to become common practice.
- New requirements will / may require changes to:
  - CAD standards & templates
  - QA Checklists & Procedures
  - Plant & Equipment
  - Structure of work crews, personnel & schedules

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Standard Drawings- Objectives

- One stop shop. Bring all key information together.
- Easy to Read & Find Information.
- Cross referenced (not duplicated).
- More clarity, less need for interpretation.
- A “whole” package (not a loose collective).
- Theme based: one theme, one drawing.
  - Somewhat busy, but related information is all together.
  - Critical description included in diagram (NO COMMENTARY)
- Reflect Modern Practice & Products

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Standard Drawings

Accessing the drawings via the mrwa.com.au website

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New MRWA Standard Drawings ..

- MRWA Standard Drawings

Current Std Dwgs	
Dwg No.	Description
1100	Pipe Layout
1200	Embedment & Trench Fill
1300	Installation
1400	Fabrication Details
1800	Dual Water Supply

New Std Dwgs	
Dwg No.	Description
100	Pipeline & Connection Arrangements
200	Structural Details And Deviations
300	Appurtenances
400	Steel Pipelines
500	Water Metering

New MRWA Standard Drawings ..

- MRWA Standard Drawings - 100 Series

Dwg No.	Description
MRWA-W- 100	Water Supply Symbol Library
MRWA-W- 101	Example Design Template (Locality Plan & Notes)
MRWA-W- 102A	Example Design (Detail Plan)
MRWA-W-102B	Example Design (Details Sheet)
MRWA-W- 103	General Pipeline System Requirements
MRWA-W- 104A	Restrained Main Branch & Bend Arrangements
MRWA-W- 104B	Concrete Thrust Block Branch & Bend Arrangements

Dwg No.	Description
MRWA-W- 105	Distribution Main Arrangements
MRWA-W- 106	Connection of DN>= 100 Offtakes to Existing Mains
MRWA-W- 107	Connection of DN40, 50 & 63 PE Offtakes for Submains to Reticulation Mains
MRWA-W- 108	Polyethylene Reticulation in Residential Cul-De-Sacs
MRWA-W- 109	Polyethylene Reticulation Details
MRWA-W- 110	Property Service Main Arrangements
MRWA-W- 111	Property Service Connections

New MRWA Standard Drawings ..

- MRWA Standard Drawings - 200 Series

Dwg No.	Description
MRWA-W- 200	Soil Classification Guidelines and Allowable Bearing Pressures
MRWA-W- 201	Pipeline Embedment and Trench Backfill
MRWA-W- 202	Pipeline Trench Details
MRWA-W- 203	Special Embedment Systems
MRWA-W- 204	Thrust Restraint Area Calculations
MRWA-W- 205A	Single Socket Spigot Main Concrete Thrust Restraint Details
MRWA-W- 205B	Multiple Socket Spigot Main Concrete Thrust Restraint Details
MRWA-W- 205C	Vertically Cantilevered Thrust Blocks

Dwg No.	Description
MRWA-W- 206	Timber / recycled Plastic Thrust restraint Details
MRWA-W- 207	Restrained Joints
MRWA-W- 208	Trench Bulkheads and Trenchstops
MRWA-W- 209	Trench Drainage
MRWA-W- 210	Underground Crossings
MRWA-W- 211	Bridge Crossings
MRWA-W- 212	Socket-Spigot Deflections and Curved Mains

New MRWA Standard Drawings ..

- MRWA Standard Drawings - 300 Series

Dwg No.	Description
MRWA-W- 300	Valve and Hydrant Marker Arrangements
MRWA-W- 301	Valve and Hydrant Marking Details
MRWA-W- 302	Valve Surface Details
MRWA-W- 303	Hydrant Surface Details
MRWA-W- 304	Air Valve & Hydrant Arrangements

Dwg No.	Description
MRWA-W- 305	Air Valve & Hydrant Details
MRWA-W- 306A	Flange Arrangements
MRWA-W- 306B	Flange Details & Flange Fastening Arrangements
MRWA-W- 307	Scour Arrangements
MRWA-W- 308	Swabbing & Extending the Network

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New MRWA Standard Drawings ..

- MRWA Standard Drawings - 400 Series
  - Steel Pipelines
  - Cathodic Protection
- Steel Pipeline Jointing (MRWA-W-400) is complete & available.
- Cathodic Protection Drawings are being redesigned and will be ready in a few months.
- Use Version 1 Code Cathodic Protection drawings in the mean time.

City West Water

Yarra Valley Water

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Construction

- Colin Paxman
  Standards and Products Specialist
  South East Water

City West Water

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Construction

- General information about Construction part of Water Code:
  - The documentation provided outlines default requirements for construction of water mains, property services and structures.
    - It is not a Construction specification
  - Should be read in conjunction with -
    - Development Deed agreements
    - Project Specific Contract documents
    - General conditions of contract (eg: AS 2124 or equivalent)
    - Construction specification prepared by the Designer
    - Other documents nominated by the Water Agency.
  - Specific requirements defined in the detailed design and project specification take precedence over default requirements.

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Construction

- **Section 11 - General Construction summary**
  - Chapter 11.1 - General - *(UPDATED)*
  - Chapter 11.2 - Order of Construct, test & commissioning-*(UPDATED)*
  - Chapter 11.3 - Contract Interfaces - (No Change)
  - Chapter 11.4 - Customer Focus - *(UPDATED)*
  - Chapter 11.5 - Protection of environment & heritage areas *(UD)*
  - Chapter 11.6 - Operation of Water supply network - (No Change)
  - Chapter 11.7 - Alteration of Existing Services- (No Change)
  - Chapter 11.8 - Connection, work on existing AC water mains #
  - Chapter 11.9 - Cut-in connection equipment - *(NEW REQ)*
  - Chapter 11.10 - Survey marks - (No Change)
  - Chapter 11.11 - Construction tolerances - *(Deleted)*
  - Chapter 11.12 - Latent Conditions- (No Change)

# denotes 2004 MRWA Edition requirements embedded within the new Code.

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Construction

General construction points to note:

- Contractors must have easy access to this Code, all standard drawings & Appendices documents at all times while working on site.
- Personnel Qualifications & Quality Assurance requirements section in 2004 MRWA Code have been removed from this Code.
  - Water Agency Supplier Accreditation requirements take precedence.
- OH&S requirements in 2004 MRWA Code have been removed, replaced with legislative requirements: (eg *relevant Acts, regulations, by-laws, codes of practice etc,)*
- Contractor to submit Safety Assurance Plan, work method statement, - Refer to Appendix J - *Safety Assurance Plan and Job Safety analysis*)

Construction

Order of Construction, Testing and Commissioning

OPTION 1- City West Water & Yarra Valley Water preferred method

- Surveyor to set out the water main.
- Deeper Assets intersecting proposed water main alignment to be constructed first.
- Install the water main including:
  - Installation of property service conduits under paved surfaces,
  - Defer installation of property services until adjoining services complete,
  - Defer installation of surface fittings until adjoining paved surfaces are complete,
- Swab and flush the water main.
- Pressurise the water main. Leave main disconnected from network.
- Install & flush property services once adjoining services are complete.
- Conduct Acceptance testing - (main & property services)
  - Visual inspection, compaction, hydrostatic pressure test
  - Dual water property service validation by Water Agency
- Install all surface fittings & markings once all paved surfaces have been constructed.
- Undertake disinfection if required.
- Undertake WQ testing and once results have passed.
- Undertake Final connection to existing network, commission water main, submit asset recording.

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Construction

Order of Construction, Testing and Commissioning

OPTION 2 - South East Water preferred method

- Surveyor to set out water main alignment.
- Install the water main & property services, clean, swab and flush.
- Conduct Acceptance testing - (main & property services)
  - Visual inspection, compaction, hydrostatic pressure test
  - Water Quality testing (mandatory) and disinfection if required
- Undertake Final connection to existing network, recharge & commission water main, set appurtenance surface fittings, Asset recording submission
- Dual water property service interconnection validation & AoW validation by the Water Agency.
- ***If variation to a preferred method is required, obtain approval from the individual Water Agency.***

City West Water

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Construction

General construction points to note:

Protection of property, environment & heritage areas

- Updated requirement have been included for:
  - Collection and disposal of wastes.
  - Protection of adjacent lands and vegetation.
  - Contaminated soils
  - Control of noise and atmospheric pollution
  - Disused and redundant water mains

- New Requirements have been introduced for:
  - Equipment & machinery use in bush fire prone areas
  - Work during extreme fire risk days – Wildfire management overlay areas.

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Construction

General construction points to note:

- **Property Owner notifications:** *(Contractor obligation)*
  - Property owners are to be notified of works in prior to construction of works. (updated requirements)
  - Indicate works that will be undertaken within or adjacent to the individual property, notify the superintendent.

- **Under Pressure Cut-in connections** (*also known as TUP connections*)
  - Specific requirements for TUP connections are referenced in many parts of this Code: Sections 11, 12, 13, 15 & 22.
  - Requirements are to be read in conjunction with Standard Drawings MRWA-W-106 & MRWA-W-107
  - Appendix C provides informative requirements on the planning, design and installation aspects for TUP connections

Construction

Section 12 - Products And Materials Summary

- Chapter 12.1 - Authorised Products and Materials - *(UPDATED)*
- Chapter 12.2 - Delivery Inspection of Products & Materials -*(No Change)*
- Chapter 12.3 - Transportation, Handling and Storage of Products & Materials - *(UPDATED)*
- Chapter 12.4 - Rejected Products and Materials - *(No Change)*
- Chapter 12.5 - Concrete Works - *(UPDATED)*
- Chapter 12.6 - Supply Of Water to The Works #
- Chapter 12.7 - Supply Of Water to Existing Properties - *(No Change)*
- Chapter 12.8 - Under Pressure Cut-In Connection to pressure pipes ≥ DN 80 - *(NEW REQ)*

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Construction

Product and Materials points to note:

- Products and Materials used on water main systems have a direct linkage to the WSAA suite of Product Specifications:
  - https://www.wsaa.asn.au/Codes/Pages/Product-Specifications.aspx
- Updated requirements for steel reinforcement, concrete placement & curing, use of formwork for structures set out in AS 3600 and 3610. These requirements are also to be read in conjunction with Standard Drawings MRWA-W-205A, MRWA-W-205B & MRWA-W-205C
- Updated requirements for the handling and installation of continuous lengths of coiled PE pipe materials ≤ 125 OD.
- Products and materials approved by each Water Agency can be found on the MRWA Web portal www.mrwa.com.au

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Construction

Section 13 - Excavation Summary

- Chapter 13.1 - Precautions - *(UPDATED)*
- Chapter 13.2 - Limits of Clearing and Excavation - *(No Change)*
- Chapter 13.3 - Protection of Trees - *(No Change)*
- Chapter 13.4 - Blasting - *(No Change)*
- Chapter 13.5 - Support of Excavations - *(No Change)*
- Chapter 13.6 - Drainage and Dewatering - *(No Change)*
- Chapter 13.7 - Under Pressure Cut-In Connection to Pressure Pipes ≥Dn 80 - *(NEW REQ)*
- Chapter 13.8 - Excavation across Improved Surfaces - *(No Change)*
- Chapter 13.9 - Trench Excavation - *(UPDATED)*
- Chapter 13.10 - Refill of Excessive Excavation - *(UPDATED)*
- Chapter 13.11 - Foundations and Foundation Stabilisation - *(No Change)*
- Chapter 13.12 - Surplus Excavated Material - *(No Change)*
- Chapter 13.13 - Trenchless Excavation - *(UPDATED)*

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Construction

Excavation points to note:

- Updated requirements have been provided where excavations occur in close proximity to existing valves and other fittings.
- Trench Excavation & Refill of over excavated areas - Reference to Standard Drawing MRWA-W-202
- Updated requirements for construction of embankment areas near a pipe trench.
- Additional information provided for trenchless excavations including hand tunnelling, micro tunnelling, directional drilling and horizontal boring techniques.

Construction

Section 14 - Bedding for pipes Summary

- Chapter 14.1 - Trench Floor Preparation - *(No Change)*
- Chapter 14.2 - Bedding And Pipe Support - *(No Change)*
- Chapter 14.3 - Special Pipe Support For Non-Supportive Soils - *(No Change)*

Point to note:

- Bedding requirements to be read in conjunction with Standard Drawings: MRWA-W-201, MRWA-W-202 & MRWA-W-203

Construction

Section 15 *(Part A)* - Pipe laying, jointing & connect summary

- Chapter 15.1 - Installation of pipes - *(UPDATED)*
- Chapter 15.2 - Horizontal and vertical deflections of pipes - *(NC)*
- Chapter 15.3 – Horiz & vert separation of crossing pipelines - *(UD)*
- Chapter 15.4 - Valves, Hydrants and other Appurtenances - *(NC)*
- Chapter 15.5 - Under Pressure Cut-In connections ≥ DN 80 -*(NEW)*
- Chapter 15.6 - Flotation control - *(No Change)*
- Chapter 15.7 - Thrust, Anchor blocks and restrained joints #
- Chapter 15.8 -Tapping of mains, prop services & water meters *(UD)*
- Chapter 15.9 - Trench Stops - *(No Change)*
- Chapter 15.10 - Bulkheads - *(No Change)*

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Construction

Section 15 *(Part B)* - Pipe laying, jointing and connecting summary

- Chapter 15.11 - Corrosion protection of Ductile Iron - *(UPDATED)*
- Chapter 15.12 - Marking Tapes - *(NEW REQ)*
- Chapter 15.13 - Valves, Hydrants and Surface boxes & fittings- *(NR)*
- Chapter 15.14 - Scours - *(No Change)*
- Chapter 15.15 - Bored pipes under roads, driveways, etc *(UPDATED)*
- Chapter 15.16 - Aqueducts - *(No Change)*
- Chapter 15.17 - Bridge crossings - *(No Change)*
- Chapter 15.18 - Appurtenance location marking - *(NEW REQ)*
- Chapter 15.19 - Flanged Joints - *(UPDATED)*
- Chapter 15.20 - Welding of steel pipelines - *(NEW REQ)*
- Chapter 15.21 - Welding of PE pipelines - *(NEW REQ)*

Construction

Pipe Laying, jointing and connecting points to note:

- Contractor to prepare and submit a ITP in dual water reticulation areas for system integrity and cross connection avoidance.
  - Undertaken in conjunction with the requirements set out in Appendix K - *Connectivity Inspection of Dual Water Supply Systems*
- Use of witness marks - Standard Drawing MRWA-W-103
- Horizontal and vertical deflection of pipes to be undertaken in conjunction with preferences set-out in Standard Drawing MRWA-W-212
- Valves, Hydrants and other appurtenance installations Refer to Standard Drawings: MRWA-W-109, MRWA-W-205A, MRWA-W-300, MRWA-W-301, MRWA-W-302, MRWA-W-303, MRWA-W-304, MRWA-W-305, MRWA-W-307 & MRWA-W- 308

Construction

Pipe Laying, jointing and connecting points to note:

- Thrust, Anchor blocks and restrained joint installation – Refer to Standard Drawings:
  MRWA-W-104A, MRWA-W-104B, MRWA-W-204, MRWA-W-205A, MRWA-W-205B, MRWA-W-205C, MRWA-W-206, & MRWA-W- 207
- Tappings of mains & property services - Refer to Standard Drawings MRWA-W-106, MRWA-W-107, MRWA-W-110 & MRWA-W-111,
- Code makes reference to the MRWA Water Metering & Servicing guidelines manual. (*Available for download from each Water Agency's website*)
  - 500 series Standard Drawings available from MRWA web portal
  - Includes dual water interconnection assembly drawings.
- Detectable Marker tape installation mandatory on all open cut water mains and property services - Refer to Standard Drawing MRWA-W-202A

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Construction

Pipe Laying, jointing and connecting points to note:

- Tracer wire installation now mandatory on all trenchless water mains - Refer to Standard Drawing MRWA-W-202
- Trench stop and Bulkhead installation - Refer to Standard Drawings MRWA-W-208, & MRWA-W-209
- Valves, hydrants, surface boxes and fittings - Refer to Standard Drawings: MRWA-W-205A, MRWA-W-302, MRWA-W-303, MRWA-W-304 & MRWA-W-305
- Multiple configurations - posts, pavement markers & reflectors.
- New requirements for bored pipes under roads, driveways & elsewhere - Refer to Standard Drawing MRWA-W-210
  - Continuous pipe preferred, encasement pipes as specified
  - No more than 2 pipe joints contained in borehole for RRJ pipes
  - Grouting of annulus required where gap exceeds 50mm

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Construction

Pipe Laying, jointing and connecting points to note:

- Welding of Steel pipelines- Refer to Standard Drawing MRWA -W-400.
- Cathodic protection of Steel pipelines- Refer to Standard Drawings MRWA -W-401, MRWA -W-402, MRWA -W-403 & MRWA -W-404.
- Updated requirements for steel pipelines include:
  - Welder qualifications, training & experience.
  - QA documentation, inspection & non destructive weld testing.
  - Fabricated Steel fittings & welding of flanges.
  - Corrosion protection methods using tape & heat shrink systems.
  - Reinstatement of cement mortar lining.

Construction

Pipe Laying, jointing and connecting points to note:

- Welding of PE pipelines- Refer to Standard Drawing MRWA -W-103.
- New requirements for PE pipeline include:
  - Welder qualifications, training & experience requirements.
  - QA documentation, inspection requirements.
  - **Destructive testing** requirements
  - Use of welding equipment & enclosed temporary shelters.
  - Butt welding (preferred method), Electrofusion & Extrusion welding techniques.
  - Linkages to WSAA PE Code WSA 01 and PIPA Technical guidelines POP001 and POP003.

Construction

Section 16 - Pipe Embedment And Support Summary

- Chapter 16.1 - General - *(No Change)*
- Chapter 16.2 - Embedment materials - *(No Change)*
- Chapter 16.3 - Compaction of embedment - *(No Change)*
- Chapter 16.4 - Special bedding and embedment / Geotextile surround and pillow - *(No Change)*
- Chapter 16.5 - Removal of trench supports - *(No Change)*
- Chapter 16.6 - Concrete embedment and encasement #

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Points to note:

- Pipe embedment & support details - Refer to Standard Drawings MRWA-W-200, MRWA-W-201, MRWA-W-202 & MRWA-W-203
- Embedment materials to comply with WSAA Product Specs.
- Single sized aggregates require use of approved geotextile filter fabric.
- Concrete encasement to be discussed with the Water Agency.

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Construction

Section 17 - Trench Fill Summary

- Chapter 17.1 - Trench Fill - *(UPDATED)*
- Chapter 17.2 - Embankment Fill - *(No Change)*
- Chapter 17.3 - Trenchless Excavation Fill - *(No Change)*

Points to note:

- Trench fill details - Refer to Standard Drawings MRWA-W-201, MRWA-W-202 & MRWA Backfill Specification.
- Trench fill materials to comply with WSAA Product Specs & VIC Roads Specifications.
- Compaction of embedment materials - nominated on Standard Drawing MRWA-W-201 and Table 19.1.
- Improved definition of Trafficable & Non-trafficable areas.
- Placement of backfill material has been updated, use of compacted CR materials beneath covers & frames.

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Construction

Section 18 - Swabbing Summary

- Chapter 18.1 - General - *(UPDATED)*
- Chapter 18.2 - Swabs - *(No Change)*
- Chapter 18.3 - Swabbing Procedure - *(UPDATED)*

Points to note:

- Swabbing details - Refer to Standard Drawing MRWA-W-308.
- Swabbing is undertaken in accordance with the swabbing plan prepared by the designer.
- Updated swabbing and flushing procedure requirements:
  - Insertion, isolation & operation of swabs.
  - flushing time calculation provided.
  - Swab mains from a low point to a high point where practicable.

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Construction

Section 19 - Acceptance Testing Summary

- Chapter 19.1 - General - *(No Change)*
- Chapter 19.2 - Visual Inspection #
- Chapter 19.3 - Compaction Testing - *(No Change)*
- Chapter 19.4 - Hydrostatic Pressure Testing - *(UPDATED)*
- Chapter 19.5 - Block Testing Dual Water Supply Systems For Connectivity - *(UPDATED)*
- Chapter 19.6 - Insulated Joint Resistance Test - *(NEW REQ)*
- Chapter 19.7 - Water Quality Testing #

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Construction

Acceptance testing points to note:

- Updated requirements for the compaction testing of embedment & trench fill, refer to the following documents:
  - MRWA Backfill Specification, Table 19.1 of the Code
  - Standard Drawing MRWA-W-201

- Hydrostatic pressure testing of pipeline systems only - Pneumatic (air) pressure testing is not allowed.
  - Test lengths: > 20 metres (min), 1000 metres (max)
  - The pressure testing method and duration is to be selected from the requirements set out in Table MRWA 19.2 of the Code.
  - The test pressures for the water main system is to be carried out in accordance with the requirements set out in Clause 3.5 of the Code.
  - A Polyethylene (PE) pressure test calculator is available for use from the MRWA Web portal site.

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Construction

Acceptance testing points to note:

- Updated requirements have been specified for the storage, calibration and component set-up for Pressure test equipment.
- Block testing dual water supply systems for connectivity (no cross-connections) is to be undertaken in accordance with the requirements set out in the following documents:
  - Clause 19.5 of the Code.
  - Appendix K - *Connectivity Inspection of dual water supply systems*.
- New requirements have been set out for resistance testing of insulated joints between dissimilar metals of fittings (eg: off-take clamp and valve)
- Updated Water Quality testing procedure, Physical, chemical and microbiological parameters for dual water mains are set out in the MRWA Water Quality Compliance specification

Construction

Section 20 - Disinfection Summary

- Chapter 20.1 - Application - *(No Change)*
- Chapter 20.2 - Flushing of disinfection water - *(No Change)*

Points to note:

- Application chapter has been updated from the existing MRWA requirements.
- Disinfection of water mains is to comply with the requirements set out in MRWA Water Quality Compliance Specification

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Construction

Section 21 - Tolerances on As-Constructed work Summary

- Chapter 21.1 - General - *(No Change)*
- Chapter 21.2 - Horizontal Tolerances - *(No Change)*
- Chapter 21.3 - Vertical Tolerances - *(No Change)*
- Chapter 21.4 - Tolerances on finished surface structures & fittings - *(No Change)*
- Chapter 21.5 - Cast in-situ concrete structures and slabs - *(NC)*

Points to note:

- Out of tolerance Report to be submitted to the Water Agency.
- Asset recording of water mains, property connections & structures to be undertaken with requirements set out in Section 24 of Code.

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Construction

Section 22 - Connections to existing water mains Summary

- Chapter 22.1 - General - *(UPDATED)*
- Chapter 22.2 - Under pressure connections - *(UPDATED)*
- Chapter 22.3 - Inserted tee connections - *(No Change)*
- Chapter 22.4 - Connection and charging the new water mains - *(NOT USED)*
- Chapter 22.5 - Reconnection of properties supplied by temporary private services - *(No Change)*

Points to note:

- Connection details - Refer to Standard Drawings MRWA-W-106, MRWA-W-107 & MRWA-W-308
- Updated requirements for Inserted tee connections on existing water main
- No connections allowed on Total Fire ban days & extreme fire risk periods. (*Refer to Water Agency if in doubt*)

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Construction

Section 23 - Restoration Summary

- Chapter 23.1 - General - *(No Change)*
- Chapter 23.2 - Pavements #
- Chapter 23.3 - Lawns - *(No Change)*
- Chapter 23.4 - Grassed Areas - *(No Change)*
- Chapter 23.5 - Bushland - *(No Change)*
- Chapter 23.6 - Provision for and rectification of settlement - *(UD)*
- Chapter 23.7 - Maintenance of restored surfaces - *(UPDATED)*

Points to note:

- Additional filling and compaction requirements for rectification of settlement over trench fill areas.
- Maintain all restored surfaces in a satisfactory condition until the end of the Defects Liability Period.

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Construction

Section 24 - Work As Constructed details

- Chapter 24.1 - General #

Points to note:

- As Constructed information is to be recorded and supplied in accordance with requirements set out in the updated MRWA Survey Manual.
- Abandoned and removed assets are to be documented and supplied to the Water Agency.

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Implementation

- Kevin Dawson
  Manager Delivery Services
  Yarra Valley Water

City West Water

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Implementation

- Industry Awareness Sessions - Apr 2012
  - (All Accredited Key Personnel)
- Standard Drawings Available - Apr 2012
  - (available from mrwa.com.au)
- Code Available - May 2012
  - (available from bookshop at wsaa.asn.au)
- "Go Live" - 1 June 2012
  All new CAPEX & Land Development projects initiated from this date shall comply

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Any Questions ..

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