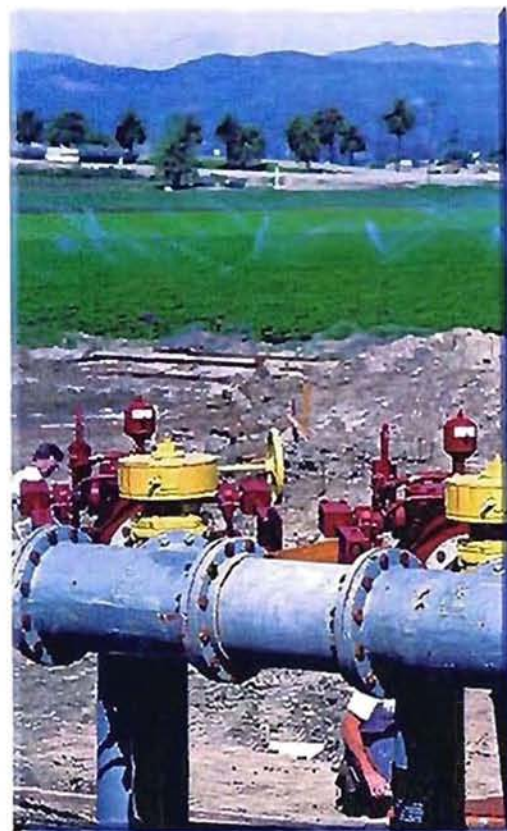


**Book**

**7**

Guidelines and Standards

# Recycled Water System Guidelines



City of San Diego Water Department  
Capital Improvements Program



## **Water CIP Guidelines and Standards**

### **BOOK LISTING**

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- |               |   |
|---------------|---|
| <b>Book 1</b> | <b>General Design Guidelines</b>          |
| <b>Book 2</b> | <b>Facility Design Guidelines</b>         |
| <b>Book 3</b> | <b>Standard and Guide Details</b>         |
| <b>Book 4</b> | <b>Standard and Guide Specifications</b>  |
| <b>Book 5</b> | <b>CADD Standards</b>                     |
| <b>Book 6</b> | <b>Construction Management Guidelines</b> |
| <b>Book 7</b> | <b>Recycled Water System Guidelines</b>   |

# **BOOK 7**

## **RECYCLED WATER SYSTEM GUIDELINES**

**Revision Table**

<b>Chapter</b>	<b>Initial Issue</b>	<b>Revised Dates</b>				
<b>1</b>	November 2000	June 2001		November 2009		
<b>2</b>	November 2000	June 2001	December 2002	November 2009	April 2010	
<b>3</b>	November 2000	June 2001		November 2009		
<b>4</b>	November 2000	June 2001		November 2009		
<b>5</b>	November 2000	June 2001		November 2009		
<b>6</b>	November 2000	June 2001		November 2009		

## PREFACE

This Guidelines and Standards Book contains information to assist planners and engineers with the design and construction of water facilities. The City's intent is to ensure uniformity of design concepts, formats, methodologies, procedures, construction materials, types of equipment and quality of work products. These standards have been produced and adopted to encourage exceptional quality while using current technology for all Public Utilities Department facilities.

These Guidelines and Standards are not a substitute for good engineering. Sound judgement must be exercised in all applications to create quality and cost efficient facilities.

Public Utilities Department management encourages the creation of relationships between project stakeholders that promotes engineering excellence and timely completion of projects. City staff and consultants are encouraged to take the time at the beginning of all projects to identify common goals, common interests, lines of communication, and a commitment to cooperative problem solving.

**Book**

**7**

# Recycled Water System Guidelines

## Table of Contents



City of San Diego Water Department  
Capital Improvements Program

# **Table of Contents**

---

## **Chapter 1 – Introduction to Recycled Water System Design Guidelines**

---

1.1	Purpose and Intent of Recycled Water System Design Guidelines .....	1-1
	Figure 1-1 Recycled Water Service Areas .....	1-2
1.2	Definitions.....	1-3
1.3	General Requirements .....	1-5
1.4	References .....	1-5

## **Chapter 2 – Offsite Recycled Water Facilities**

---

2.1	Pressure Criteria.....	2-1
	2.1.1 Design Pressure Recycled Water System.....	2-1
	2.1.2 Booster Pumps.....	2-1
	2.1.3 Sealing Water.....	2-1
2.2	Depth of Pipeline Cover .....	2-1
2.3	Separation From Other City Utility Pipelines .....	2-2
	2.3.1 Horizontal .....	2-2
	2.3.2 Vertical .....	2-2
	2.3.3 Alternative Criteria for Construction of Recycled Water Pipelines.....	2-2
	2.3.4 Miscellaneous Guidance .....	2-2
2.4	Color Identification of Recycled Water Pipes .....	2-3
2.5	Pipeline Materials .....	2-3
2.6	Pipeline Identification Tapes .....	2-3
	Figure 2-1 Sample Tape Marking .....	2-4
2.7	Recycled Water Valve Castings and Cover .....	2-4
2.8	Valve Box Identification .....	2-4
2.9	Color-Coding Exposed Recycled Water Appurtenances .....	2-4
2.10	Blow-Off and Air and Vacuum Assemblies.....	2-5
2.11	Storage Tanks .....	2-5

2.12	Swivel EII Connections.....	2-5
	Figure 2-2 Parallel Construction.....	2-7
	Figure 2-3 Crossings.....	2-8
	Table 2-1 Summary of Recycled Water Hydraulic Design Criteria.....	2-9

### **Chapter 3 - Specifications**

---

Section 01043 - Connections to Recycled Water System.....	3-2
Section 15151 - Recycled Water Facilities Identification.....	3-6

### **Chapter 4 - Standard Details**

---

RW-101	Recycled Water Trench Detail.....	4-2
RW-102	Recycled Water Service Marking.....	4-3
RW-102A	50mm (2") Recycled Water Service Installation.....	4-4
RW-103	Recycled Water Valve and Valve Box (Light Duty).....	4-5
RW-104	Recycled Water Valve and Valve Box (Heavy Duty).....	4-6
RW-105	Recycled Water Valve Well Cover.....	4-7
RW-106	Recycled Water Valve Key Extension.....	4-8
RW-107	Separation Requirements for Recycled Water Pipelines.....	4-9
RW-108	Recycled Water Irrigation Advisory Sign.....	4-10
RW-108A	Recycled Water Sign (for Process Water).....	4-11
RW-108B	Recycled Water Sign (for Irrigation).....	4-12
RW-108C	Recycled Water Sign (Toilet & Urinal Flushing).....	4-13
RW-109	Sign/Tag for Recycled Water Irrigation Remote Control Valve.....	4-14
RW-110	Sign/Tag for Recycled Water Irrigation Valves.....	4-15
RW-111	Sign/Tag for Identification of Recycled Water Control Devices.....	4-16
RW-112	Sign/Tag for Recycled Water Irrigation Box Covers/Lid.....	4-17
RW-113	Sign/Tag for Recycled Water Irrigation System Controller.....	4-18
RW-114	Tag for Recycled Water.....	4-19
RW-115	Recycled Water Quick Coupling Valve.....	4-20
RW-116	Cross Connection Control Test Station.....	4-21
RW-117	Swivel EII Schematic.....	4-22
RW-118	Swivel EII Details.....	4-23
RW-119	Recycled Water Quick Coupling Valve.....	4-24
RW-120	Threshold Bypass Piping.....	4-25
RW-121	Typical Curb Marker Installation Location.....	4-26

### **Chapter 5 – Onsite Recycled Water Facilities**

---

5.1	General.....	5-1
5.2	Identification of Onsite Pipes and Fittings.....	5-1
5.3	Pipeline Identification Tapes.....	5-2

5.4	Color-Code for Recycled Water Pipes.....	5-2
5.5	Separation.....	5-2
5.6	Hundred Year Flood Clause.....	5-3
5.6.1	Runoff and Erosion.....	5-3
5.6.2	Peak Flood Levels.....	5-3
5.7	Submittals.....	5-3
5.7.1	Customer's Plan and Specifications.....	5-3
5.7.2	Information on Customer's Contract Documents.....	5-3
5.7.3	Information to be Called Out on Customer's Drawings.....	5-4
5.7.4	Information Required for Recycled Water Irrigation Systems.....	5-4
5.7.5	Standard Notes for Inclusion on Customer's Drawings.....	5-5
5.8	Declaration of Responsible Charge.....	5-8
5.9	Recycled Water Inspection Procedures.....	5-8
5.9.1	General.....	5-8
5.9.2	Coverage Test.....	5-8
5.9.3	Shutdown Test (Cross-Connection Control Test).....	5-9
5.10	Procedures.....	5-10
5.10.1	Notification.....	5-10
5.10.2	Shutdown (Cross-Connection Control) Test General Considerations.....	5-11

## ***Chapter 6 – Recycled Water for Construction Use***

---

6.1	Permits.....	6-1
6.2	Construction Uses.....	6-1
6.3	Equipment.....	6-1
6.4	Ponds for Storage.....	6-1
6.5	Equipment and Facilities Cleaning.....	6-1
6.6	Recycled Water or Service Outlet Security Fence.....	6-2

### ***City of San Diego Public Utilities Department***

Permanent Water Tanker Filling Station Recycled Water Service Guidelines.....	6-3
Application for Recycled Water Use.....	6-4

### ***Appendix A***

Memorandum Dated: May 7, 2003 (6 pages)

### ***Appendix B***

Memorandum Dated: April 14, 2003 (8 of 11 pages)



# Chapter 1

## ***INTRODUCTION TO RECYCLED WATER SYSTEM DESIGN GUIDELINES***

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This book is intended as a stand-alone document to assist DESIGN CONSULTANTS, Customers, and Users with implementing recycled water use projects for the City of San Diego. This book is organized into the following chapters:

- Chapter 1 - Introduction to Recycled Water System Design Guidelines
- Chapter 2 - Offsite Recycled Water Facilities
- Chapter 3 - Specifications
- Chapter 4 - Standard Details
- Chapter 5 - Onsite Recycled Water Facilities
- Chapter 6 - Recycled Water for Construction Use

Chapters 2 through 5 include guidelines for the following engineering disciplines as appropriate:

- Civil
- Structural
- Mechanical - Piping
- Hydraulics

Figure 1-1 shows the currently planned City of San Diego Recycled Water Distribution Systems and Service Areas. The figure also shows the location of two water reclamation plants and the approximate alignment of proposed offsite recycled water pipelines.

### ***1.1 Purpose and Intent of Recycled Water System Design Guidelines***

The purpose of this book is to ensure the health, safety, and general welfare of the citizens of the City of San Diego when using recycled water, consistent with the laws and regulations of the State of California and County of San Diego applicable to the use of recycled water.

The Design Guidelines are to ensure uniformity in design concepts, format, methodology, procedures, construction materials, and quality of work products on recycled water improvements projects. These Guidelines are intended as a stand-alone document to assist DESIGN CONSULTANTS, Customers, and Users to plan, design, and construct recycled water systems. It is the intent of this Book to ensure compliance with the San Diego Municipal Code, City of San Diego Administrative Regulations, and Public Utilities Department policies, instructions, and regulations related to the use of recycled water provided by the City of San Diego. These Guidelines do not limit the responsibility of the DESIGN CONSULTANT, Customer, or User, but assist in providing professionally sound, efficient, uniform, and workable criteria and requirements for recycled water improvements. These Guidelines do not address all aspects of a complete design. The other six books of the City of San Diego Public Utilities Department CIP Guidelines and Standards may be used for information on planning, design, and construction on recycled water projects. For areas not addressed in these Guidelines, the DESIGN CONSULTANT, Customer, and User must use good engineering judgment and practices.



## 1.2 Definitions

The following are definitions of several terms used in this book.

<b>Applicable Codes Regulation Potable Water</b>	Any recycled water connection or use that would violate any other section of the Municipal Code if said connection or use were for potable water applies to reclaimed water.
<b>Backflow Prevention</b>	Where required to protect public health and safety, it shall be unlawful to make any recycled water connection without authorization from the Department
<b>Customer</b>	Individual or entity that has executed an agreement for use of recycled water
<b>Compression Joint</b>	A protective tube of high-density-polyethylene (HDPE) pipe with heat fusion joints or other non-potable metallic casing without joints into which a pipe is inserted
<b>Continuous Sleeve</b>	A protective tube of high-density-polyethylene (HDPE) pipe with heat fusion joints or other non-potable metallic casing without joint into which a pipe is inserted
<b>Disinfected Tertiary</b>	Wastewater that has been filtered and subsequently disinfected in accordance with Section 60301.230, Chapter 3 (Water Recycling Criteria), Title 22, California Code of Regulations
<b>Illegal Connection</b>	It shall be unlawful to make connection to any recycled or potable water connection without authorization from the Department.
<b>House Lateral</b>	A sewer line connecting the building drain and the sanitary sewer main serving the street
<b>Offsite Facilities</b>	City of San Diego Public Utilities Department recycled water system, including the water meter
<b>Onsite Facilities</b>	User's or Customer's recycled water facilities downstream from the water meter
<b>Pantone</b>	A color standard system referenced in the American Water Works Association California-Nevada Section Guidelines for Distribution of Nonpotable Water
<b>Recycled Water and Reclaimed Water</b>	The terms are identical and any reference to reclaimed water refers to recycled water and vice versa
<b>Sanitary Sewer Main</b>	A gravity sewer conveying untreated municipal wastewater.

<b>Supply Line</b>	Pipelines conveying raw water to be treated for drinking purposes in accordance with Section 64572, <u>proposed</u> Water Work Standards
<b>User</b>	Individual or entity responsible for the handling and use of recycled water
<b>Unauthorized Use – Use without a meter</b>	Any use of recycled water without the authority of the Public Utilities Department and a meter designed for use with recycled water and approved by the Department shall be deemed unauthorized use and unlawful.
<b>Unauthorized Use – Cross Connection</b>	Any use of reclaimed water whereby there is actual or potential cross connection with any potable water source shall be unlawful. It is unlawful to allow reclaimed water to enter any potable water system at any time, including but not limited to flushing of mains, pipes, and potable water systems.
<b>Unauthorized Use – Tools and Equipment</b>	It shall be unlawful for any person, including the City of San Diego personnel, to make use of any tool, device, equipment, or object for potable water service where that tool, device, equipment, or object has come in physical contact with the recycled water system.
<b>Unauthorized Use – Self Restoration</b>	It shall be unlawful for any person to restore recycled water service to any person or entity that has been shut off by the Public Utilities Department for any reason, unless written authorization is given in advance.
<b>Unauthorized Use – Unlawful Use of Separate Water Service</b>	It shall be unlawful for any person to connect a house, building, or irrigation system to the potable or recycled water service connection for a separate house, building, or irrigation system without authorization from the Department, or to maintain such connection, or to use potable or recycled water from such a connection, regardless of intent.
<b>Water Main</b>	Means any pipeline, except for user service lines, within the distribution system in accordance with Section 64551.70, <u>proposed</u> Water Works Standards.

### **1.3 General Requirements**

The design of the offsite facilities, including the preparation of Contract Documents, is conducted under the direction of a responsible professional engineer registered in the state of California. The design of onsite facilities that will use recycled water and the preparation of Contract Documents is under the direction of a responsible professional landscape architect, civil engineer, or mechanical engineer registered in the state of California. The recycled water system, including offsite and onsite facilities, is separate and independent of any potable water system.

### **1.4 References**

All offsite and onsite recycled water facilities must conform to the requirements of the *Design Guidelines for Distribution of Nonpotable Water* developed by the AWWA California-Nevada Section, and the DHS' *Guidelines for Use of Recycled Water*. Any recycled-water improvements must also comply with the requirements, conditions, and standards set forth in the current edition of the *Standard Specifications for Public Works Construction*, including the Regional Amendments of the County and City of San Diego, and the Standard Drawings for the City of San Diego, the City's *Landscape Technical Manual, Park & Recreation Consultant's Guide*, the *Rules and Regulations for Recycled Water Use and Distribution* within the City of San Diego, the County of San Diego latest edition of *Recycled Water Plan Check and Inspection Manual* and other related design standards and construction specification guidelines.

## Chapter 2

# ***OFFSITE RECYCLED WATER FACILITIES***

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### **2.1 Pressure Criteria**

#### **2.1.1 Design Pressure Recycled Water System must be designed to provide minimum pressure equal to demand conditions.**

The San Diego Public Utilities Department determines service pressure requirements. The DESIGN CONSULTANT designs for available pressure. Typical recycled water service pressure is between 60 and 80 pounds per square inch (psi).

When reasonable recycled water service pressure is not available for onsite facilities not previously served from potable water systems, the user is responsible for providing booster pumps to increase the pressure. If the recycled water service pressure is above 80 psi, the user provides a pressure regulator downstream of the meter to obtain the correct pressure.

Recycled water pipelines should be sized to provide recycled water in the 60 to 80 psi pressure range with minimum diameters as described in Book 2, Chapter 3, San Diego Public Utilities Department CIP *Facilities Design Guidelines*.

Whenever possible, the San Diego Public Utilities Department operates the recycled water system at a lower pressure than the adjacent potable water system. This approach helps prevent contamination of the potable water system in the unlikely event of a cross-connection.

#### **2.1.2 Booster Pumps**

Customers that provide booster pumps to increase the operating pressure must identify the pumping systems as recycled water, avoid the release of recycled water in an uncontrolled manner, and provide proper drainage of the packing seal water. At least one sign in English and Spanish must be posted on the booster pump premises. The signage must be readily seen by all operations personnel that are in the working area. The San Diego Public Utilities Department may require backflow prevention assembly to protect the recycled water distribution system from back pressure that may be caused by using booster pumps.

#### **2.1.3 Sealing Water**

Any potable water used as seal water for recycled water pump seals must be adequately protected against backflow.

### **2.2 Depth of Pipeline Cover**

The top of recycled water transmission pipelines must be a minimum of 4 feet below the finished grade, unless otherwise approved. The depth of cover on service lines is considered on a case-by-case basis in accordance with the City's *Landscape Technical Manual*.

## **2.3 Separation from Other City Utility Pipelines**

### **2.3.1 Horizontal**

A 4-foot horizontal separation outside of pipe to outside of pipe should be maintained when a new recycled water pipeline is built parallel to an existing potable water pipeline, an existing sanitary sewer, an existing sewage force main, an existing recycled water pipeline. Horizontal separation requirements are illustrated in Chapter 4 of this book on Standard Detail RW-107, *Separation Requirements for Recycled Water Pipelines*.

If a 4-foot horizontal separation is not possible, criteria in Figure 1 must be met. Zone A criteria apply where lines are running parallel. For these situations, the Zone “P” criteria are in effect and prohibit construction less than 1 foot in parallel installations.

### **2.3.2 Vertical**

At crossings of potable water, recycled water, and/or sewer pipelines, pipelines should be located from the ground surface in the order of descending quality, with potable water above recycled water and recycled water above sewer. The minimum vertical separation should be 1 foot between outside top and bottom surfaces of pipes. Vertical separation requirements are illustrated in Chapter 4 of this book, on Standard Detail RW-107, *Separation Requirements for Recycled Water Pipelines*.

If a 1-foot vertical separation is not possible, criteria shown in Figure 2 must be met. For these situations, the Zone “P” criteria are in effect and prohibit construction less than 4 inches in vertical (crossing) situations.

### **2.3.3 Alternative Criteria for Construction of Recycled Water Pipelines**

When new recycled water mains are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install recycled water mains at a distance less than that required by the regulations. In such cases, the DESIGN CONSULTANT must obtain approval from the State of California Department of Health Services (DHS) and/or the County of San Diego Department of Environmental Health (DEH). The alternative approach is allowed under Title 22 California Code of Regulations, Section 64551(c).

### **2.3.4 Miscellaneous Guidance**

- More stringent requirements may be necessary if conditions such as high groundwater exist. HDPE or similar pipe may be required to provide flexibility to move without potential joint leaks.
- When installing recycled water mains, measures should be taken to prevent or minimize disturbances of existing pipelines. Disturbance of the conduit’s supporting base could eventually result in pipeline failure.

For additional information please see Appendix B, Guidance Memo No. 2003-02: Guidance Criteria for the Separation Water Mains and Non-Potable Pipelines, Department of Health Services.

## **2.4 Color Identification of Recycled Water Pipes**

All new transmission/distribution pipelines in the recycled water system, including service pipelines, valves, and other appurtenances, are either:

**Colored purple and embossed or integrally stamped and/or marked:**

**“CAUTION: RECYCLED WATER – DO NOT DRINK,” and “PELIGRO: AGUA IMPURA – NO BEBER,” or**

**Installed with a purple pipeline identification tape or a purple polyethylene or vinyl wrap.**

Color-coded identification (caution) tape differentiating the recycled water piping from other utility lines must be consistent throughout the service area. Use Pantone 522 for the purple color.

When converting an existing potable water pipeline to recycled water usage, the water pipeline must be accurately located and tested in coordination with the Public Utilities Department, DHS, and DEH, and the necessary actions must be taken to bring the water pipeline and appurtenances into compliance with all applicable rules and regulations. If the existing pipeline is approved by the Public Utilities Department and the DEH and/or DHS, except for pipe identification, the pipeline can be considered approved for recycled water service. If the use of the existing pipeline cannot be verified, the pipeline must be uncovered, inspected, and its use identified before it can be converted to another use. All replacements of an offsite distribution and/or delivery system connected to a recycled water irrigation system must be color coded for identification in accordance with these Guidelines.

## **2.5 Pipeline Materials**

Recycled water pipeline materials must be as defined in Book 2, Chapter 3 of the City of San Diego Public Utilities Department CIP *Facility Design Guidelines* for water mains except as noted here. All new polyvinylchloride (PVC) pipe used for recycled water must be colored purple by using Pantone 522. The PVC pipe must be integrally stamped and/or marked: “CAUTION: RECYCLED WATER – DO NOT DRINK” and “PELIGRO: AQUA IMPURA – NO BEBER.” Where PVC pipe cannot be used due to size, depth, or load restrictions, an alternative pipe must be installed with a purple identification tape secured every 3 feet to the top of the pipe (see Standard Detail RW-101 in Chapter 4 of these Guidelines).

Metallic piping will have coating and lining according to section 09800 and section 16640.



## 2.6 Pipeline Identification Tapes

Identification tapes for protection and identification of the pipeline are prepared with black printing on a purple field having the words: "CAUTION – RECYCLED WATER – DO NOT DRINK" and "PELIGRO: AGUA IMPURA – NO BEBER" alternately on the tape. The overall tape width must be at least 3 inches.

Identification tapes must be installed over the pipe longitudinally 2 feet below the finished surface and centered over the pipeline. The identification tape must be continuous in its coverage of the pipeline and fastened to each pipe section. Taping attached to sections of pipe before they are placed in the trench must have overlaps sufficient for continuous coverage. During trench backfill, other means of securing identification tape may be used (if suitable for the work) as determined by the Public Utilities Department. Sample tape marking and the inscriptions are shown below in Figure 2-1.

During trench backfill, other means of securing identification tape may be used (if suitable for the work) as determined by the Public Utilities Department. Sample tape marking and the inscriptions are shown below in Figure 2-1.

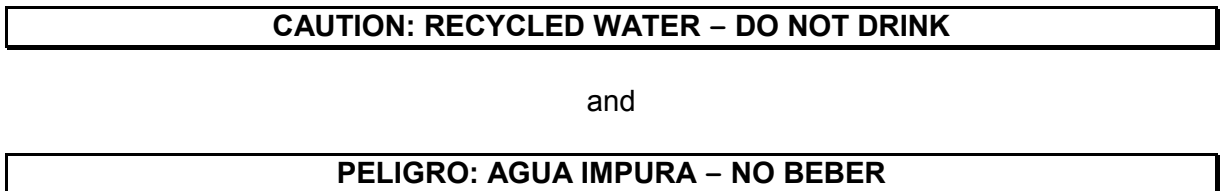


Figure 2-1  
Sample Tape Marking

## 2.7 Recycled Water Valve Castings and Cover

Valve castings are standard steel castings with a special heavy-duty cover. All valve covers on offsite recycled water transmission pipelines are non-interchangeable with potable water covers. Covers must be painted purple by using Pantone 522 and must conform with Standard Drawings RW-103 through RW-106 in Chapter 4 of this book.

## 2.8 Valve Box Identification

Valve boxes for light traffic are the standard concrete or fiber glass box with a special cover as illustrated on Standard Drawing RW-103 in Chapter 4. Valve boxes for traffic areas are of heavy-duty traffic design as illustrated on Standard Drawing RW-104 in Chapter 4. All valve covers on offsite recycled water transmission pipelines are non-interchangeable with potable water pipeline covers and must have a recognizable inscription cast on the top surface. As illustrated on Standard Drawing RW-105 in Chapter 4, all recycled water valve covers must be painted purple by using Pantone 522.

## **2.9 Color-Coding Exposed Recycled Water Appurtenances**

All aboveground, exposed pipeline facilities must be consistently color-coded purple by using Pantone 522 and marked accordingly to differentiate recycled water facilities from potable water and wastewater facilities.

## **2.10 Blow-Off and Air and Vacuum Assemblies**

Either an in-line or end-of-line blow-off drain assembly must be installed to remove water or sediment from the recycled water pipeline. Blow-off assemblies must be installed in a low point of the pipeline. The pipeline tap for the assembly must be no closer than 18 inches from a valve, coupling, joint, or fitting unless it is at the end of the pipeline. The discharge from blow-offs should be designed to drain into a sewer. Discharge of recycled water to storm drains is restricted. If there is no sewer that can receive the discharge from a blow-off, the San Diego Regional Quality Control Board and the DEH must be consulted regarding acceptable alternatives. Except regarding discharge locations, blow-off assemblies must be provided as described in Book 2, Chapter 3.

Air and vacuum valves must be provided in high points according to Book 2, Chapter 3. Air and vacuum valves must be sized as described in Book 2, Chapter 3.

All below ground appurtenances for blow-off and air and vacuum valve assemblies must be consistently color-coded purple by using Pantone 522 and marked to differentiate recycled water facilities from potable water and/or wastewater facilities.

## **2.11 Storage Tanks**

Storage tanks are as defined in Book 2, Chapter 5 except as noted here. Recycled water storage tanks may have potable water connections for makeup from potable water sources. In all cases and under all circumstances, an approved air gap separation must be provided between the storage tank and the potable water discharge point. A copy of the proposed air gap assembly plans shall be submitted for DHS review and approval.

Where potable water is to be used for make-up to a storage tank, the flow must be controlled from the remote supervisory control and data acquisition (SCADA) system. Flow and pump run, stop, and/or fail status information, where applicable, must be available at the remote SCADA system.

The water level in each tank must be determined and electrical conductivity must be determined in tanks that receive potable water for makeup. Water level and conductivity status must be available at the remote SCADA system.

## **2.12 Swivel Ell Connections**

When the recycled water supply is temporarily unavailable, potable water may be used as an emergency source of supply. This is acceptable only in cases where there is an

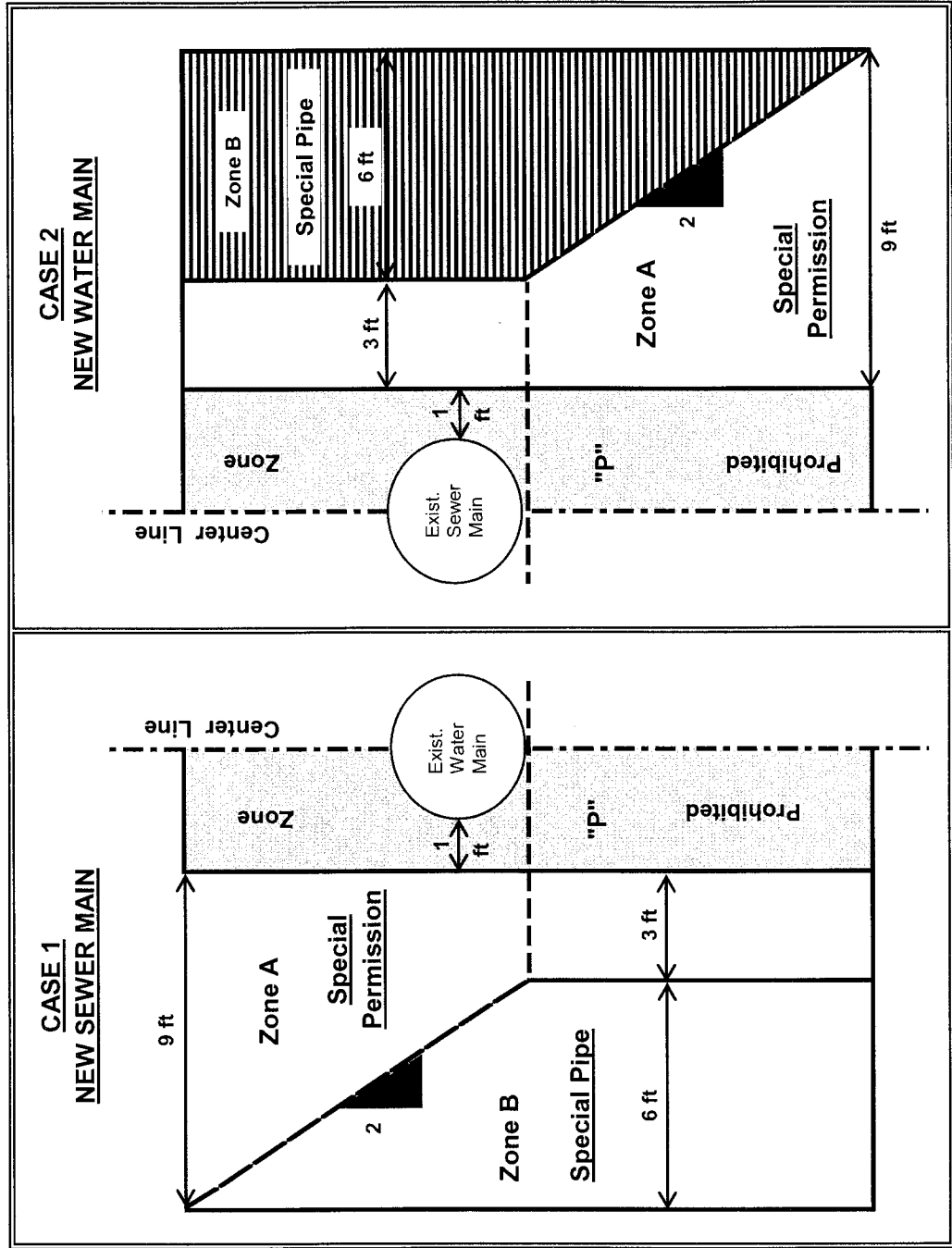
unplanned, short-term interruption of the recycled water service. No concurrent use of the potable water supply and the recycled water supply will be allowed. Prior to construction of

any facilities, written approval shall be obtained from the Public Utilities Department and DHS. If a storage tank with appropriate air gap from the potable water source is not provided for the recycled water system, a swivel ell connection is necessary to allow augmentation of the supply with potable water. The potable water supply must never be directly connected to the recycled water supply. To ensure that this requirement is achieved, a swivel ell connection is used to preclude connecting both sources to the use area at the same time.

DHS Policy Memo 2003-03, dated May 7, 2003, describes the requirements for swivel ell connections (see Appendix A). The design, maintenance, and operation of swivel ell connections shall be in compliance with the Policy Memo 2003-03. A copy of the swivel ell connection shall be submitted to DHS for review and approval.

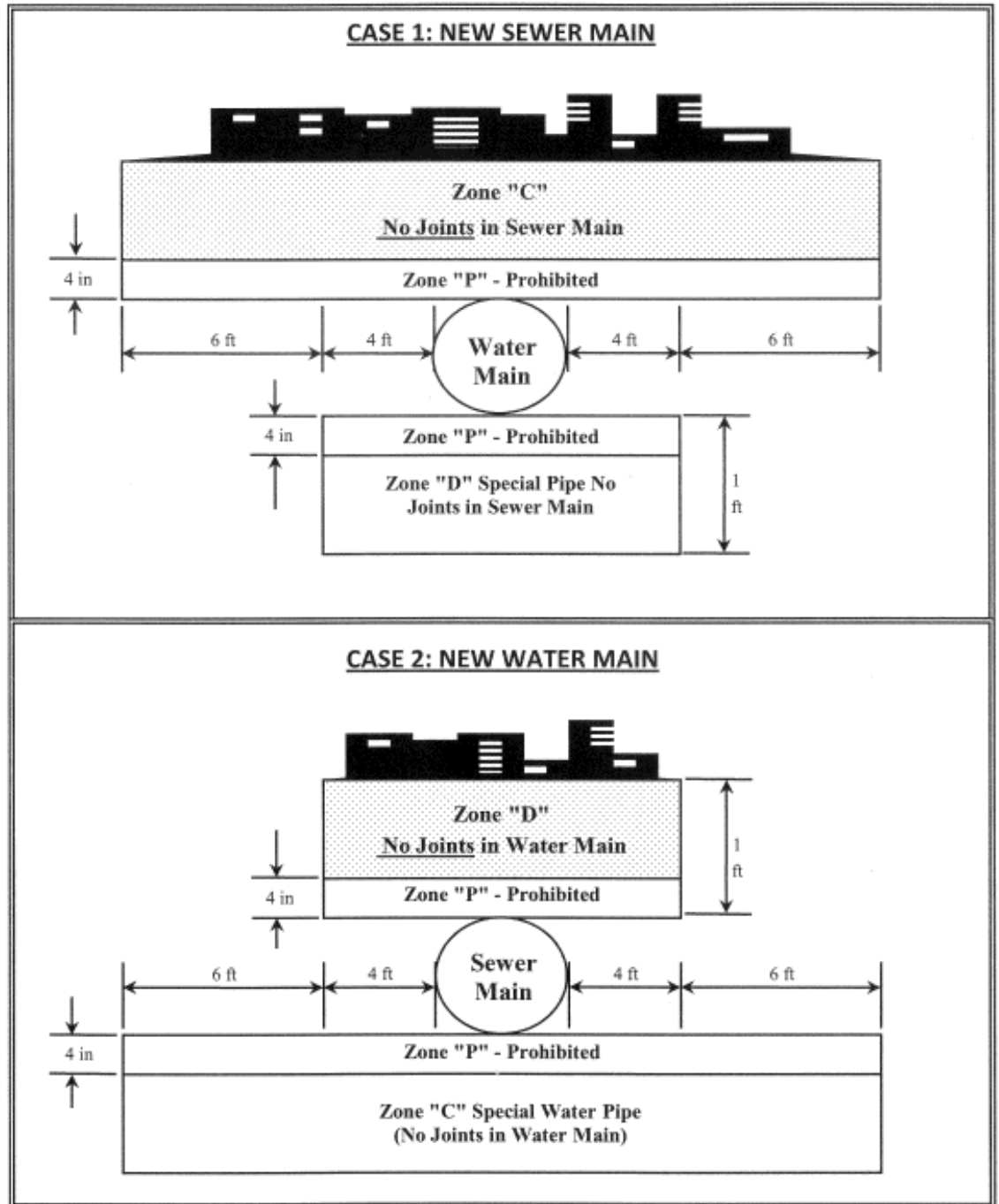
Swivel ell connections are illustrated in Standard Detail RW-117, *Swivel Ell Schematic*, and Standard Detail RW-118, *Swivel Ell Details*. In an emergency, the swivel ell is switched from the normal recycled water connection to the potable connection. This procedure is reversed once the recycled water supply is restored. The potable water supply must be protected by an reduced pressure principle backflow preventer. In no case will it be acceptable for the potable supply to be directly connected to a recycled water supply.

**FIGURE 2-2 - PARALLEL CONSTRUCTION**



**Note:** Zones identical on either side of center lines  
 Zones "P" is a prohibited zone, Section 64630 (e) (2) California Administrative Code, Title 22

**FIGURE 2-3 - CROSSINGS**



**Table 2-1  
Summary of Recycled Water Hydraulic Design Criteria**

<b>Recycled Water Criteria</b>	
Irrigation Time	10 pm to 6 am (8 hours)
Pressure:	
Maximum Static (psi)	125
Minimum Static (psi)	65
Maximum Operating (psi)	100
Minimum Operating (psi)	50
Typical Service Pressure Range (psi)	60 to 80
Pipelines:	
Maximum Velocity (fps)	8 to 10
Desirable Velocity (fps)	3 to 5
Maximum Allowable Headloss (ft/1000 ft)	10
Hazen Williams Coefficient (C)	120
Acceptable Materials	PVC colored purple by using Pantone 522 Alternative Pipe must be installed with warning tape secured to top of pipe
Minimum Horizontal Separation	10 feet from potable water or sewer pipeline CDHS Approved required for distances <10ft Less than 4 ft is not allowed
Minimum Vertical Separation	1 foot below potable water pipeline 1 foot above sewer pipeline
Minimum Depth of Cover	4 ft
Operational Reservoir Storage	Typical stores 2/3 Peak Day Demand May have potable water connections for emergency supply with approved air gap separation of CDHS-approved swivel ell connection
Pump Station - Minimum No. of Pumps:	3

## Chapter 3

# ***SPECIFICATIONS***

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This Chapter provides guide specifications to be used in recycled water projects. Additional guide specifications are provided in Book 4. The DESIGN CONSULTANT shall prepare and edit these specifications in accordance with instructions presented in Chapter 17 of Book 1.

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**SECTION 01043 - CONNECTIONS TO RECYCLED WATER SYSTEM**

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NTS: As the Engineer of Record, the DESIGN CONSULTANT assumes full responsibility for project-specific use of these specifications. As a result, when preparing contract specifications, the DESIGN CONSULTANT cannot assume that the guide specification automatically meets all project requirements. For this reason, The DESIGN CONSULTANT must conduct its specification writing and quality control activities so that appropriate adaptations and refinements can be made to the project specification as necessary. The DESIGN CONSULTANT shall prepare and edit this specification in accordance with instructions presented in Chapter 17 of Book 1 of these Capital Improvements Program Guidelines and Standards.

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**PART 1 - GENERAL****1.1 WORK COVERED IN THIS SECTION**

- A. This Section includes connections to recycled water system, including killing and abandoning the existing potable water system, if applicable. This Section also includes leakage and cross connection testing, coordination of Work with the City, and acceptance of Work by the State of California Department of Health Services (DHS), and the County of San Diego Department of Environmental Health (DEH).

**1.2 RELATED SECTIONS**

- A. The following Sections apply to the Work of the Section. Other Sections, not referred below, shall also apply to the extent required for proper performance of this Work.
1. Section 02666 Water Pipeline Testing and Inspection
  2. Section 02667 Testing and Disinfection of Hydraulic Structures
  3. Section 15151 Recycled Water Facilities Identification
  4. Section 01043 Connection to the Recycled Water System

**1.3 REFERENCES SPECIFICATIONS, CODES AND STANDARDS**

- A. Except as otherwise indicated in this section, the CONTRACTOR shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction together with the latest adopted editions of the Regional and City of San Diego Supplement Amendments.
- B. City of San Diego Public Utilities Department CIP Guidelines and Standards.



- C. Recycled Water Plan Check and Inspection Manual, latest edition, County of San Diego, Department of Environmental Health (DEH).
- D. The Work of this Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:
  - 1. Uniform Plumbing Code
  - 2. Uniform Mechanical Code
  - 3. Uniform Fire Code
- E. Except as otherwise indicated, the current editions of the following apply to the Work of this Section:
 

<ul style="list-style-type: none"> <li>1. ANSI/AWWA B300</li> <li>2. ANSI/AWWA B301</li> <li>3. ANSI/AWWA C651</li> <li>4. APHA, AWWA, and WEF</li> </ul>	<ul style="list-style-type: none"> <li>Hypochlorites</li> <li>Liquid Chlorine</li> <li>Disinfecting Water Mains</li> <li>Standard Methods for the Examination of Water and Wastewater</li> </ul>
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#### **1.4 CONTRACTOR SUBMITTALS**

- A. The CONTRACTOR shall submit the following in accordance with the requirements of Section 01300- Submittals:
  - 1. If potable water is currently used for irrigation, the CONTRACTOR shall submit a complete schedule for killing and abandoning of connections to the potable water system. This shall include pipe by pipe schedule of disconnection from the potable water system and connection to the recycled water system. The schedule shall also contain the schedule for disinfection and re-commissioning of the potable water system, as well as cross connection and leakage testing required per DHS and DEH Guidelines and requirements of this Section. The schedule shall be submitted in writing to the CONSTRUCTION MANAGER for approval a minimum of 7 days before proceeding with the Work.
  - 2. If potable water is not currently used for irrigation, there are no supplementary submittal requirements.

#### **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 SEPARATION VERIFICATION PROCEDURE**

- A. The CONTRACTOR shall perform a separation verification procedure as follows:
1. Perform all construction and modifications as required in the Contract Documents. Make Connections between the existing irrigation system and the new recycled water system only after authorized by the CONSTRUCTION MANAGER.
  2. Shut off all domestic water service valves and close all valves between the recycled water connection point and the irrigation system.
  3. Open all existing irrigation valves to be served with recycled water and allow residual water to drain from the system.
  4. Open the source valve serving the domestic water system. Ensure that all valves to the irrigation system remain closed.
  5. After no less than two hours, determine whether water is flowing through the irrigation system. No water should be flowing through the irrigation system as all valves to the irrigation system are closed. If flow occurs, the irrigation system is still connected to the potable water system at some location.
  6. Visually inspect for flow at all sprinkler heads, quick couplers, and any other irrigation service intended for recycled water use. Replace all hose bibbs connected to the irrigation system with a quick-coupler connection. The quick coupler cap shall be locked and marked with a recycled water warning. If a cross-connection is found at a drinking water fountain, a new potable line shall be installed to supply the fountain or the fountain shall be abandoned as directed by the DHS, DEH, and the CONSTRUCTION MANAGER. Replacement of hose bibbs found but not indicated on the Drawings, including corresponding sign installation and drinking fountain modifications due to cross-connections, shall be paid for as extra work.
  7. If flow is detected in irrigation systems intended for recycled water use, the cross connection source shall be identified and isolated from the irrigation system by killing and abandoning the connection to the potable system. Killing and abandoning not identified on the Drawings that is a result of an unknown cross-connection will be paid for by the OWNER as extra work.
  8. After completion of items 1 through 6 above, the CONTRACTOR shall again close the potable water supply source valve and drain the residual potable water from the irrigation system. The CONTRACTOR shall confirm to the satisfaction of the CONSTRUCTION MANAGER the separation between the

recycled and potable water systems using the procedures identified in the DEH's Recycled Water Plan Check and Inspection Manual.

9. After verifying complete water separation between the irrigation system and the potable water system, and with the DHS', the DEH's, and the CONSTRUCTION MANAGER's approval, the CONTRACTOR shall make the connection between the recycled water service and the on-site irrigation system.

### **3.2 TESTING AND COMMISSIONING**

- A. Testing and commissioning shall be performed by the CONTRACTOR. Modified portions of the domestic water service shall be disinfected in accordance with Section 02666, Water Pipeline Testing and Disinfection, prior to re-commissioning.
- B. All materials, equipment, and work shall be tested and inspected to prove compliance with Contract requirements. All costs of hydrostatic pipeline testing and disinfection testing shall be borne by the CONTRACTOR. No tests shall be performed until the item to be tested had been inspected by the CONSTRUCTION MANAGER. Any changes, adjustments or replacements required to make the system operate as specified shall be carried out by the CONTRACTOR as part of the work and at its own expense.
- C. Installed leakage tests shall be specified in related sections. Tests shall be performed on the new modified portions of the potable water service as well as the recycled water irrigation system. These tests shall demonstrate that the modifications comply with Contract requirements.
- D. Other tests shall be conducted as identified in other Sections.

### **3.3 FINAL COMPLETION**

- A. Final completion is defined as the date when written acceptance is given by the CONSTRUCTION MANAGER that states the Work is complete and in accordance with the requirements of the Section and the Contract Documents. This shall include, but not limited to the following:
  1. Correction of all work deficiencies and/or non-compliance items, including testing and retesting if required.
  2. Completion of all landscape restoration.
  3. Completion of subgrade and/or pavement restoration.
  4. Providing the CONSTRUCTION MANAGER with certified copies of the testing and retesting results documenting that connections to the recycled water system are complete and satisfactorily tested.

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**SECTION 15151- RECYCLED WATER FACILITIES IDENTIFICATION**

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**3.4 RELATED SECTIONS**

The Work of the following Sections applies to the Work of this Section. Other Sections not referenced below, also apply to the extent required for proper performance of this Work.

**3.5 CONTRACTOR SUBMITTALS**

- A. The following shall be submitted in compliance with Section 01300 – Submittals:
1. Shop drawings of all stenciled pipe, joints, valve covers and boxes, special labels and identification tags.
  2. Manufacturer's technical data and instructions plus samples of all materials proposed for use on the Work. Samples shall be clearly marked to show the manufacturer's name and product identification.

**3.6 OPERATION AND MAINTENANCE INFORMATION**

The CONTRACTOR shall provide information in accordance with Section 01730 – Operations and Maintenance Information. This information shall include the manufacturer's certificates of compliance indicating that all materials provided under this Section meet the requirements of the Contract Documents.

**3.7 IDENTIFICATION LABELS AND SIGNS**

- A. In all cases, the identification labels or signs must be approved prior to installation. Failure to receive prior approval may result in the Owner, OR Public Utilities Department removing such sign(s) and providing approved replacement(s). All costs will be at the CONTRACTOR'S, or Customer's expense. The identification labels shall be a product of T. Christy Enterprises or approved equal.
- B. Buried Piping Identification Tape: the plastic tape shall be an inert plastic film specifically formulated for prolonged underground use and shall be prepared with black printing on a purple field having the words, "CAUTION: RECYCLED WATER – DO NOT DRINK" and „PELIGRO: AQUA IMPURA – NO BEBER." The minimum thickness shall be 4 mils and the overall width of the tape shall be 12 inches (for 8-inch pipe) and 6 inches (for 6-inch and smaller pipe).

- C. Warning Labels: Labels shall be inert plastic film specifically formulated for prolonged exposure and shall be prepared with black printing on a purple field (Pantone #512) having the words: „RECYCLED WATER – DO NOT DRINK” and “AVISO, GUA IMPURA – NO TOMAR.” The minimum thickness shall be 4 mils for adhesive backed labels and 10 mils for tag type labels. Tag type labels shall have reinforced tie holes and shall be attached with heavy-duty nylon fasteners. The size, type of label and location will be dictated by each individual application and subject to acceptance by the city’s Representative. The minimum size shall be 1/2” high letters.
- D. Integrally Stamped/Marked Purple Pipe:
1. The use of integrally stamped/marked purple pipe will be accepted as an alternative to the use of identification or warning tape.
  2. The pipe shall have the words “CAUTION: RECYCLED WATER – DO NOT DRINK” and “PELIGRO: AQUA IMPURA – NO BEBER” in 5/8-inch letters repeated every 12 inches. All such piping shall be purple with black on white stenciling appearing on the top of the pipe.
  3. The use of a purple polyethylene or vinyl wrap will be acceptable to the use of integrally stamped/marked purple pipe. The wrap shall have the words “CAUTION: RECYCLED WATER – DO NOT DRINK” and “PELIGRO: AQUA IMPURA – NO BEBER” repeating every 2 feet and shall be a product of T. Christy Enterprises or approved equal.
- E. Valve Boxes:
1. Valve boxes for light duty shall be the standard concrete or fiberglass box with a special triangular cover. The cover shall have “RW” cast upon it and be painted purple (Pantone #512). The valve box and cover shall be a Brooks 4TT or approved equal.
  2. Valve boxes for heavy-duty service shall be of heavy-duty traffic design per City’s Standard for Recycled Water heavy-duty valve boxes. All valve covers will be painted purple (Pantone #512).
- F. Quick-Coupling Valves:
1. Quick coupling valves shall be 1-inch or 3/4-inch nominal size Nelson #7645, with brass construction and a nominal working pressure of 150 psi, or equal.
  2. The cover shall be permanently attached to the quick-coupling valve. It shall be purple rubber or vinyl.
  3. Special or locking covers are required.

**3.14 EXECUTION**

- A. All onsite recycled water facilities shall be restricted from public access so that the general public cannot draw water from the system. Facilities such as washdown hydrants (typically found at tennis courts), blowoff hydrants, blowoffs on strainers, and other such facilities, shall be restricted from public access.
- B. Recycled water facilities, both above and below grade, shall be housed in an approved lockable container colored purple. A sign reading "CAUTION: RECYCELD WATER – DO NOT DRINK" both in English and Spanish shall be installed. Use of valves that operate by means of hexagonal heads (such as those typically found on fire hydrants) shall also be used.

**3.15 WARNING SIGNS AND LABELS**

- A. The City requires warning labels to be installed on all appurtenances in vaults, such as, but not limited to, air release valves, blowoffs, and meters, and on designated facilities, such as, but not limited to, controller panels and washdown or blowoff hydrants on water trucks and temporary construction services.
- B. Each pump and every pipe shall be identified with a painted label. In the fenced pump station area, at least one sign shall be posted on the fence which can be readily seen by all operations personnel utilizing the facilities.

**3.16 QUICK-COUPLING VALVES**

- A. In order to prevent unauthorized use, all recycled water quick-coupling valves shall be operated only with a special coupler key with an acme thread for opening and closing the valve.
- B. Quick-coupling valves used in potable water systems shall be operated with a coupler key not using an acme thread for opening and closing the valve, and with a brass or yellow cover.
- C. A warning sign shall be attached to each recycled water valve as specified herein.

**3.17 ON-SITE POTABLE WATER PIPING**

- A. All potable water piping installed within the same project limits as the onsite recycled water piping shall be installed with potable water identification.
- B. All PVC potable water piping shall be blue or shall be white with blue stenciling appearing on both sides of the pipe with the marking "POTABLE WATER" in 5/8-inch letters repeated every 12 inches.

- C. Blue warning tape identifying it as a potable waterline and stating "CAUTION: WATERLINE BURIED BELOW" may be used as an alternate to blue or stenciled pipe. The tape shall run continuously for the entire length of the main line piping. The tape shall be attached to the top of the pipe with plastic tape banded around the warning tape and pipe every 5 feet on center.
- D. Where a potable and recycled line crosses within 3 feet vertically, the recycled line shall be installed within a Class 200 PVC protective sleeve. The sleeve shall extend 5 feet either side of the potable line of a total of 10 feet. A minimum 12-inch vertical separation between utilities must be maintained at all times. The potable line must be installed above the reclaimed lines. A 10-foot horizontal separation must be maintained at all times.

### **3.18      *INSTALLATION OF PIPE IDENTIFICATION (WARNING) TAPE***

Identification tapes shall be installed directly on the longitudinally and shall be centered. The tape shall be installed continuously for the entire length of the pipe and shall be fastened to each pipe length by plastic adhesive tape banded around the pipe and warning tape at no more than 5-foot intervals. Tape attached to the sections of pipe before laying in the trench shall have 5-foot minimum overlap for continuous coverage. All risers between the main line and control valves shall be installed with warning tape.

### **3.19      *INSTALLATION OF WARNING LABELS***

Warning labels shall be firmly attached to all appurtences using heavy-duty fasteners.

# Chapter 4

## **STANDARD DETAILS**

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This chapter provides standard details for recycled water systems. The details, developed in MicroStation, are available in electronic format. These details are directly referenced or are inserted in detail drawings for recycled water systems.

### **Related References**

Recycled water system standard details must be used in conjunction with Book 3, Standard and Guide Details. City of San Diego Standard Drawings were referenced in developing this book. City of San Diego Standard Drawings include all the San Diego Area Regional Standard Drawings developed by the San Diego Regional Standards Committee, as well as additional standard drawings unique to public works construction in the City of San Diego.

### **Revisions**

Revisions to these standards or new details are accepted for review. These changes should be submitted to the CIP Program Manager at the Water Department following the deviation procedure described in Book 1, General Design Guidelines. Any revisions to the drawings must be indicated in the revision list at the front of this book.

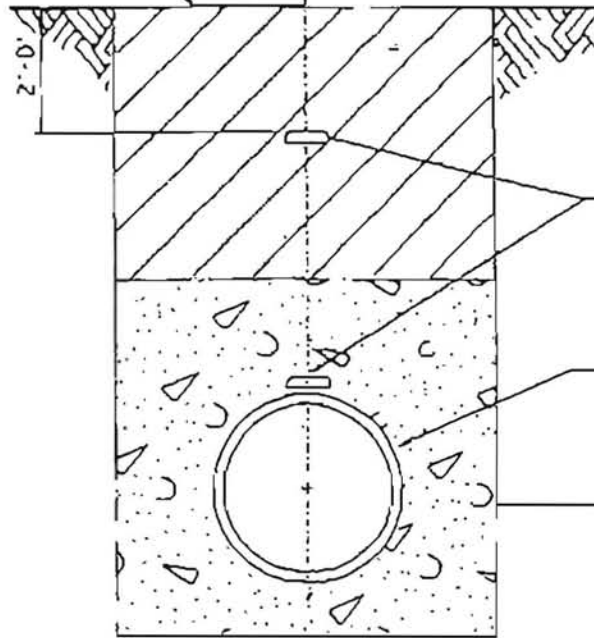
DESIGN CONSULTANTS are responsible for designs and must resolve all conflicts, inconsistencies, errors, and omissions in any conflicting or inconsistent guidelines and standards to ensure that completed designs meet all standards.

### **Numbering Procedures**

The Standard detail drawings for the CIP are identified by a single discipline letter and a three digit drawing number. For recycled water standard detail drawings, the discipline letter is RW.



FINISHED SURFACE



RECYCLED WATER WARNING TAPE. SEE NOTES 3 AND 4.

RECYCLED WATER PIPELINE SEE NOTE 2

PIPE TRENCH. SEE NOTE 1

RECLAIMED WATER TRENCH

NOTES:

1. TRENCH DETAILS SHALL BE PER SAN DIEGO STANDARD DRAWINGS 1-25, 1-26 OR W-21.
2. RECYCLED WATER PIPE SHALL BE PURPLE COLOR CODED INTEGRALLY STAMPED OR MARKED AS "CAUTION-RECYCLED WATER-DO NOT DRINK" AND "PELIGRO: AGUA IMPURA-NO BEBER" OR USE A PURPLE POLYETHYLENE OR VINYL WRAP OR USE RECYCLED WATER WARNING TAPE.
3. RECYCLED WATER WARNING TAPE 6 INCHES WIDE FOR 6-INCH AND SMALLER PIPE AND 12 INCHES WIDE FOR 8-INCH OR LARGER PIPE SHALL BE PURPLE WITH BLACK LETTERING STATING "CAUTION-RECYCLED WATER-DO NOT DRINK" AND "PELIGRO: AGUA IMPURA-NO BEBER" AND SHALL BE PLACED 2 FT BELOW FINISHED SURFACE. AN ADDITIONAL TAPE ALONG TOP OF PIPE SHALL BE SECURED EVERY 3 FT TO TOP OF PIPE (EXCEPT FOR PURPLE COLORED PIPE IDENTIFIED AS RECYCLED WATER).
4. FOR NON-METALLIC PIPE, METALLIC RECYCLED WATER WARNING TAPE SHALL BE USED AT THE 2 FT DEPTH BELOW FINISH SURFACE PER SAN DIEGO STANDARD DRAWING W-25.
5. THE TERM "RECLAIMED WATER" IS THE SAME AS THE TERM "RECYCLED WATER".

RECYCLED WATER TRENCH DETAIL



REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

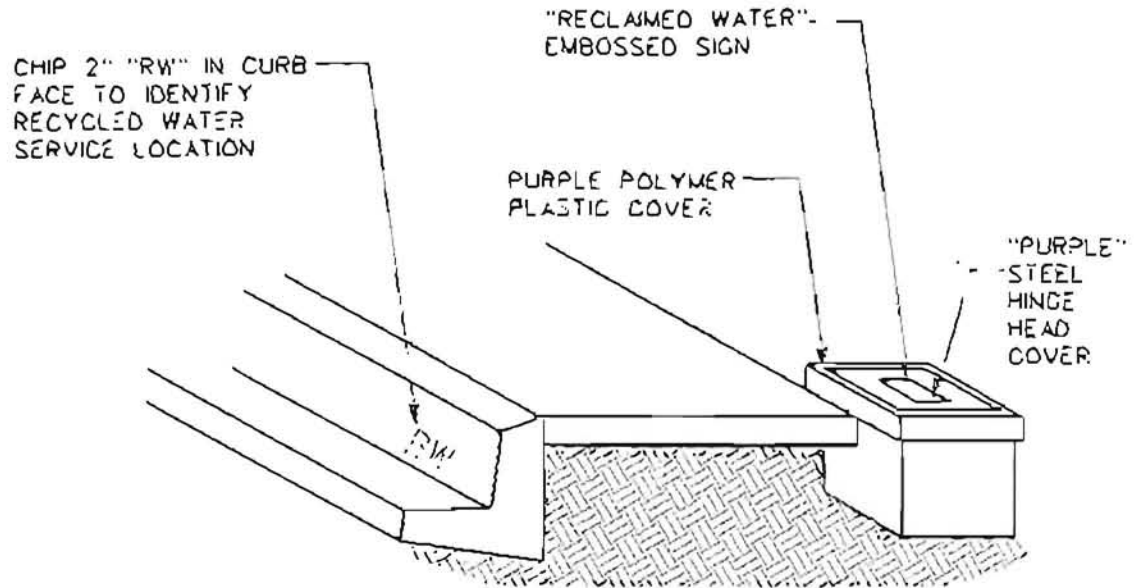


STANDARD  
DETAIL

CIP

RECYCLED WATER TRENCH DETAIL

RW-101

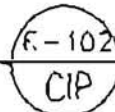


NOTES:

1. SERVICE CONNECTIONS SHALL BE PER DRAWINGS W-1 AND W-2.
2. READING LID ONLY OF METER BOX SHALL BE PAINTED WITH PURPLE -PANTONE #512 FOR ALL RECYCLED WATER SERVICE.
3. METER AND VALVES SHOULD BE LABELED OR TAGGED TO INDICATE RECYCLED WATER.

RECYCLED WATER SERVICE MARKING

N.T.S.



REVISION BY:	APPROVED	DATE
REVIEWED BY:	INITIALS	DATE

WATER DEPARTMENT

City of San Diego

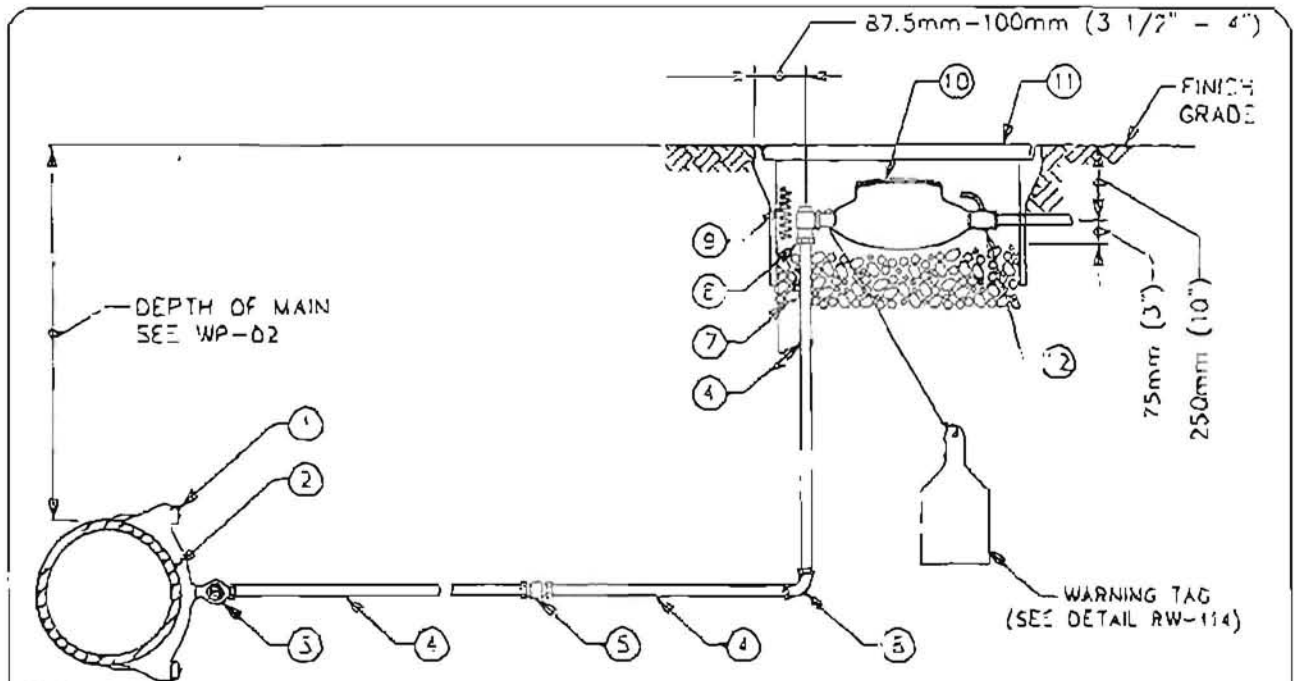


STANDARD  
DETAIL

CIP

RECYCLED WATER SERVICE MARKING

RW-102



**NOTES.**

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) INSTALL CORPORATION STOP WITH KEY IN THE SIDE POSITION
- 3) SET TOP OF METER BOX FLUSH WITH SIDEWALK, CURB, OR FINISH GRADE
- 4) LOCATE METER BOX AS SHOWN ON WS-03
- 5) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON WP-01
- 6) WATER LATERALS INSTALLED FOR THE USE OF RECYCLED WATER SHALL BE IDENTIFIED AS DESCRIBED IN AGENCY SPECIFICATIONS
- 7) SILVER SOLDER JOINTS SHALL NOT BE USED
- 8) ON STEEL MAINS USE WELD ON COUPLINGS. ON DUCTILE IRON MAINS USE DUCTILE IRON SERVICE SADDLES (INSULATING BUSHINGS ARE REQUIRED)
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

50mm (2")

LEGEND ON P. 2

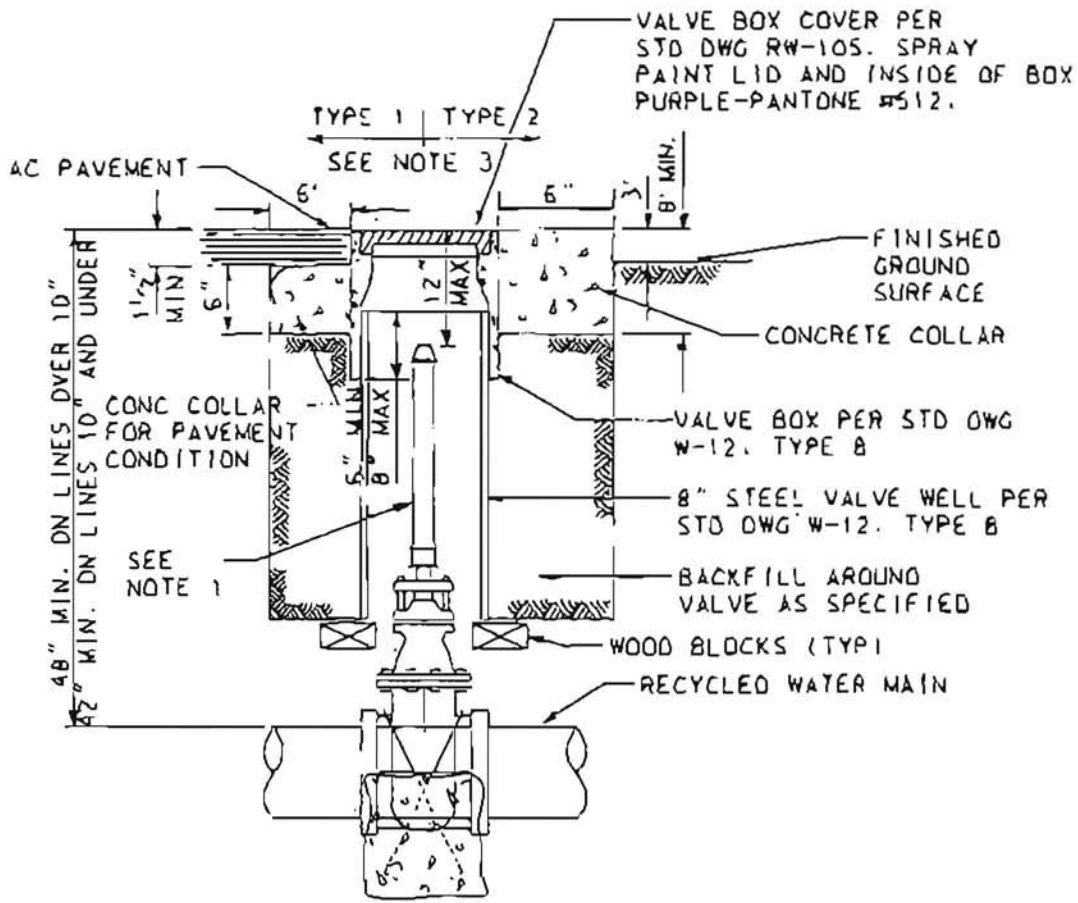
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SIZE x 50mm (2") SERVICE SADDLE	⑦	10mm (3/8") ROCK, 100mm x 150mm (4" TO 6") DEEP
②	WATER MAIN	⑧	50mm (2") BRONZE ANGLE METER STOP WITH LOCKWING
③	50mm (2") BRONZE CORPORATION STOP	⑨	TRACER WIRE (AS REQUIRED), SEE WP-01
④	50mm (2") x REQUIRED LENGTH COPPER PIPE TYPE "X" SOFT/RIGID OR UNLESS OTHERWISE SPECIFIED BY AGENCY OF JURISDICTION	⑩	WATER METER FURNISHED AND INSTALLED BY THE WATER AGENCY OF JURISDICTION
⑤	50mm (2") BRONZE COMPRESSION COUPLING COPPER TO COPPER (IF REQUIRED)	⑪	METER BOX WITH LID, 425mm x 750mm (17" x 30")
⑥	50mm (2") BRONZE COMPRESSION ELL	⑫	CUSTOMER SHUT-OFF VALVE (LOCKABLE)

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REVIEWED BY:	INITIALS	DATE

**WATER DEPARTMENT**  
City of San Diego

50mm (2") RECYCLED WATER SERVICE INSTALLATION

STANDARD DETAIL
CIP
RW-102A



RECYCLED WATER VALVE AND VALVE BOX (LIGHT DUTY)

R-103  
CIP

NOTE:

1. PROVIDE HEXAGONAL TYPE VALVE STEM EXTENSION IF DEPTH TO VALVE NUT EXCEEDS 2 FEET. SEE DWG. RW-106.
2. VALVE BOX IS FOR H10 LOADINGS OR LESS.
3. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS. TYPE 2 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

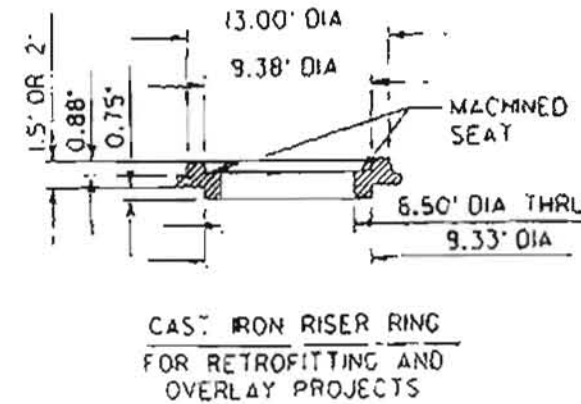
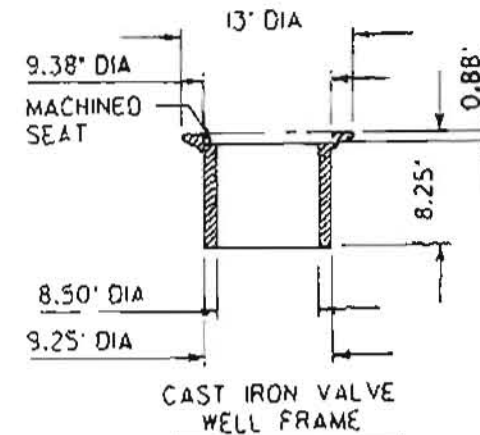
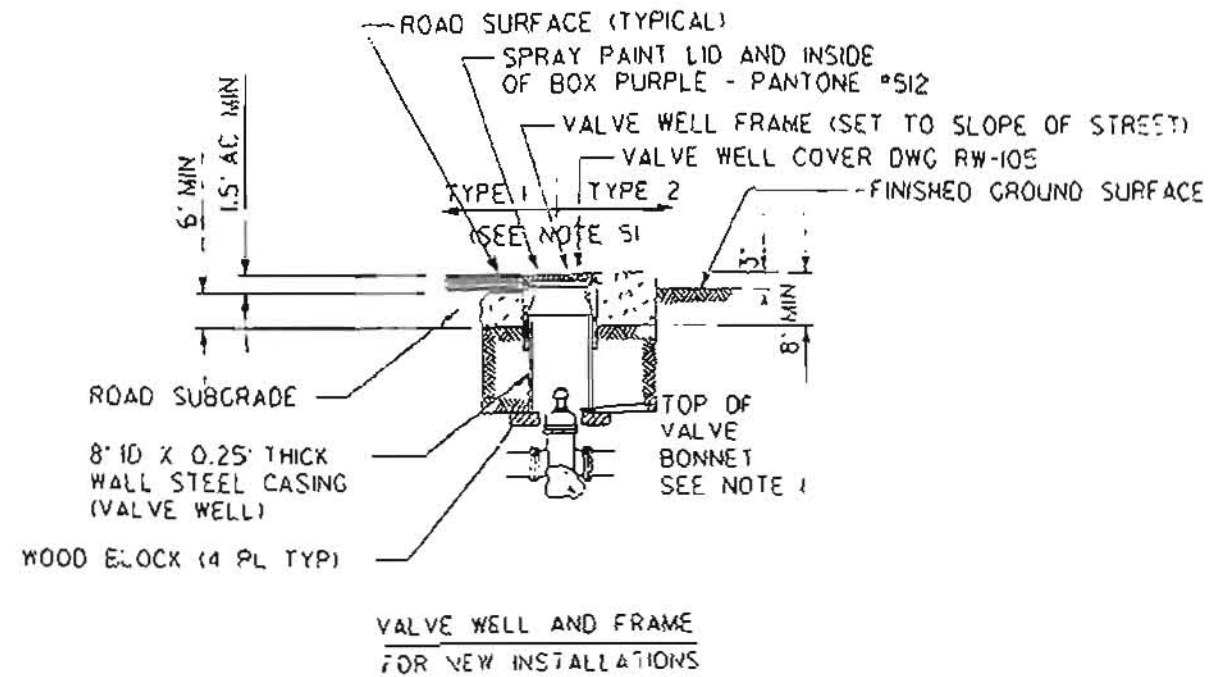
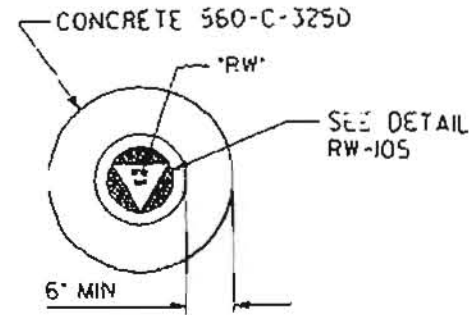
WATER DEPARTMENT  
City of San Diego



STANDARD  
DETAIL

RECYCLED WATER VALVE AND VALVE BOX (LIGHT DUTY)

CIP  
RW-103



RECYCLED WATER VALVE  
AND VALVE BOX (HEAVY DUTY)

R-104  
CIP

NOTES:

1. PROVIDE RECYCLED WATER VALVE KEY EXTENSION FOR ALL VALVES.
2. THE SURFACE OF THE VALVE WELL COVER SHALL MATCH THE STREET CROSS SLOPE AND PROFILE.
3. SEE DRAWING RW-106 FOR VALVE STEM EXTENSION.
4. VALVE BOX AND COVER BASED ON SOUTH BAY FOUNDRY #1208N OR APPROVED EQUAL.
5. TYPE 1 INSTALLATION APPLIES TO VALVES WITHIN ROADWAYS.  
TYPE 2 INSTALLATION APPLIES TO VALVES OUTSIDE ROADWAYS.

REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT  
City of San Diego

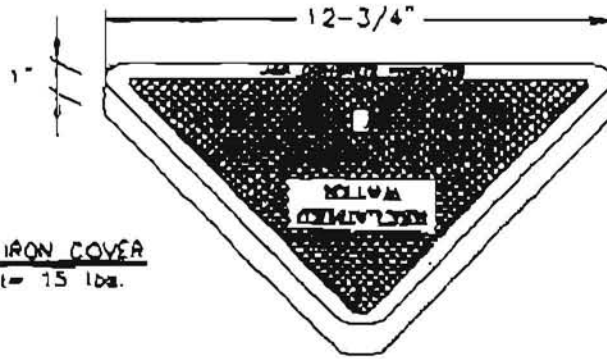


STANDARD  
DETAIL

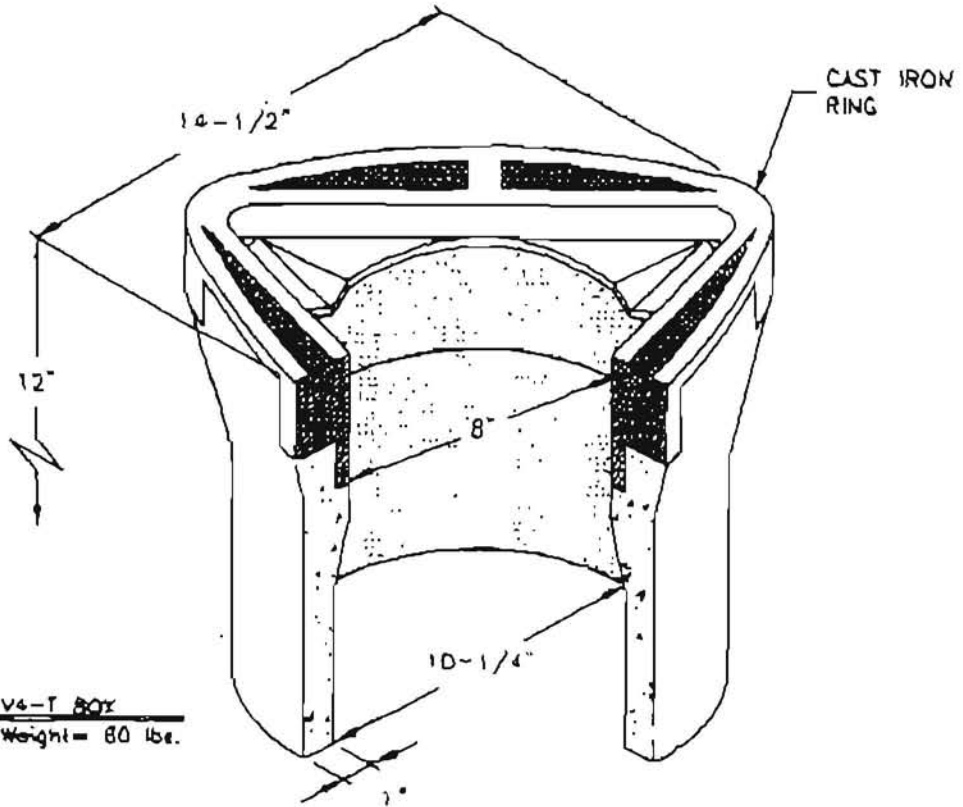
CIP

RECYCLED WATER VALVE  
AND VALVE BOX (HEAVY DUTY)

RW-104



CAST IRON COVER  
Weight = 15 lbs.



V4-T BOX  
Weight = 80 lbs.

RECYCLED WATER VALVE WELL COVER

R-105  
CIP

REVISION/ BY	APPROVED	DATE

REVIEWED BY	DATE	DATE

WATER DEPARTMENT  
City of San Diego

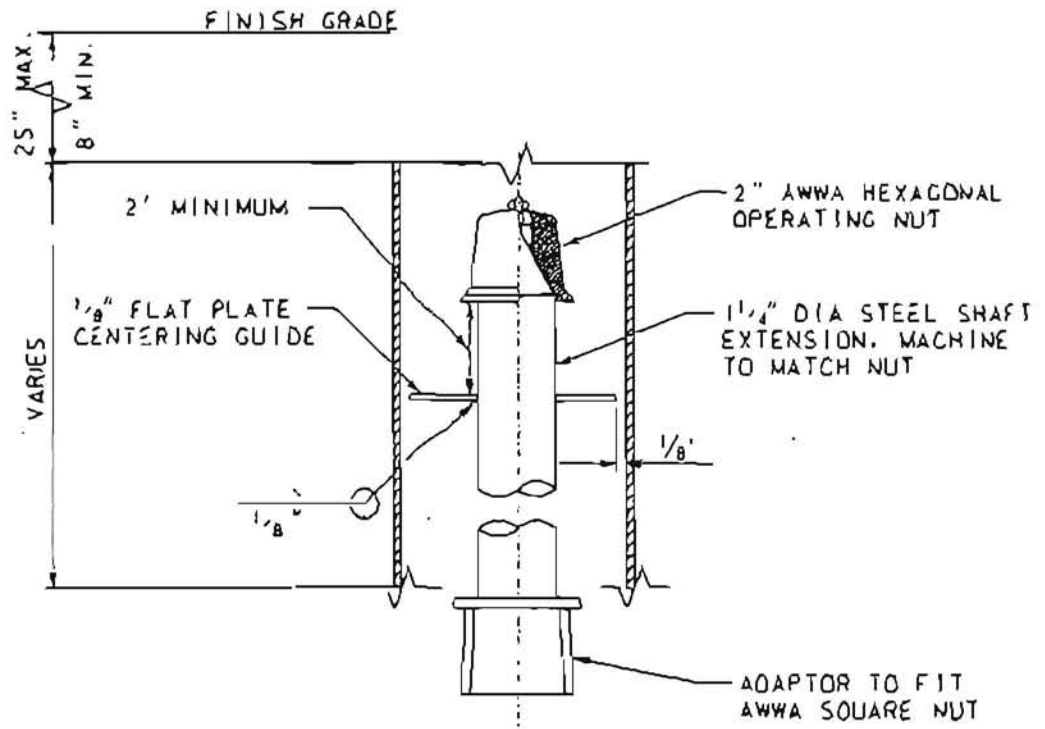


STANDARD  
DETAIL

RECYCLED WATER VALVE  
WELL COVER

CIP

RW-105



RECYCLED WATER VALVE KEY EXTENSION R-106  
CIP

REVISION	BY	APPROVED	DATE

REVIEWED BY	DETAILS	DATE

WATER DEPARTMENT  
City of San Diego



STANDARD  
DETAIL

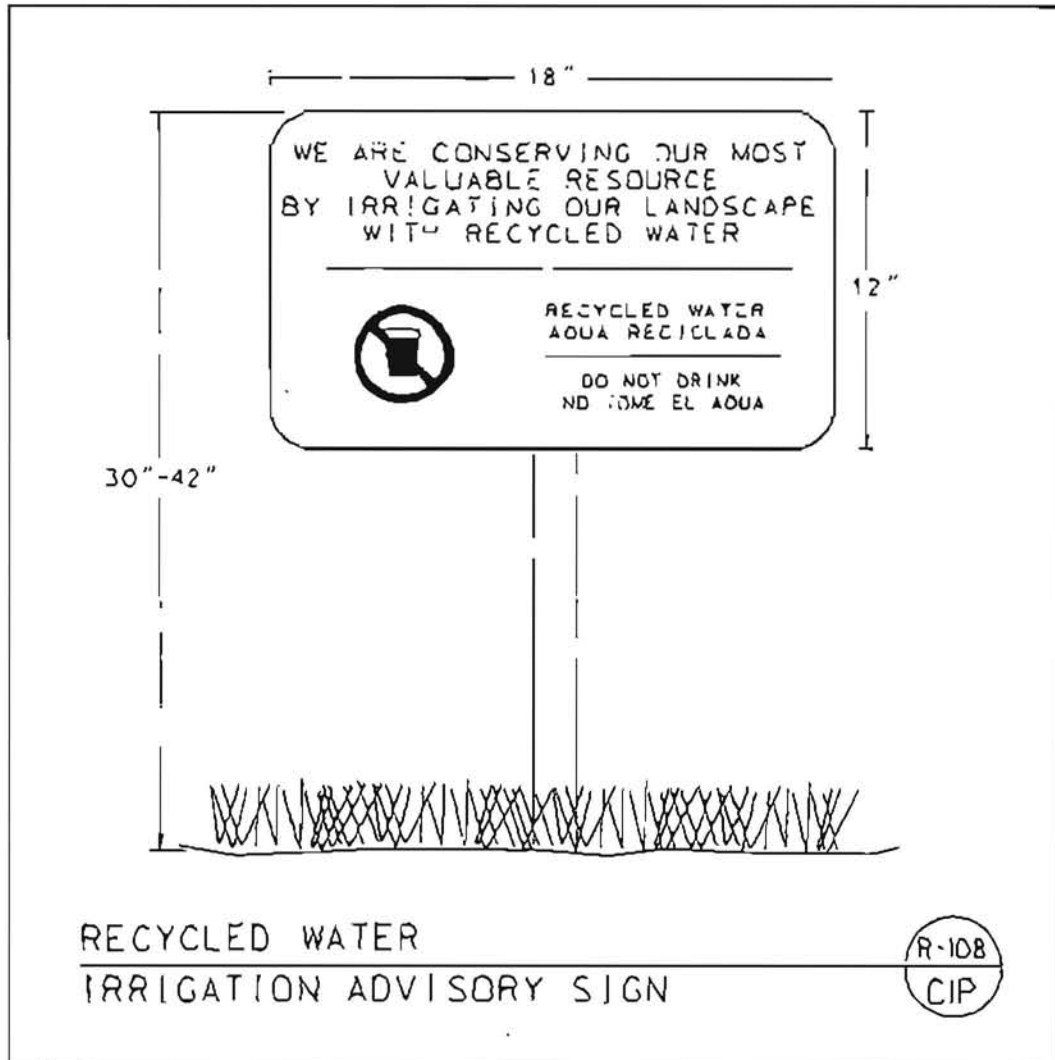
CIP

RECYCLED WATER  
VALVE KEY EXTENSION

RW-106








RECYCLED WATER  
IRRIGATION ADVISORY SIGN

R-108  
CIP



REVISION BY	APPROVED	DATE	<b>WATER DEPARTMENT</b> City of San Diego		STANDARD DETAIL
					CIP
					RW-108
REVIEWED BY	INITIALS	DATE	<b>RECYCLED WATER IRRIGATION ADVISORY SIGN</b>		



Size: 4" high x 8" wide

Colors:

Background;	White
Letters;	Pantone 522 Purple
Circle/Slash;	Dark Red Over Water Glass
Water Glass;	Pantone 522 Purple
1/4" Wide Border;	Pantone 522 Purple
Holes:	1/8" at Corners

REVISION	BY	APPROVED	DATE	<b>WATER DEPARTMENT</b> <i>City of San Diego</i>		STANDARD DETAIL
						CIP
REVIEWED BY	INITIALS	DATE		<b>RECYCLED WATER SIGN</b> <b>(FOR PROCESS WATER)</b>		RW-108A



REVISION	BY	APPROVED	DATE

REVIEWED BY	INITIALS	DATE

WATER DEPARTMENT  
City of San Diego



STANDARD  
DETAIL

CIP

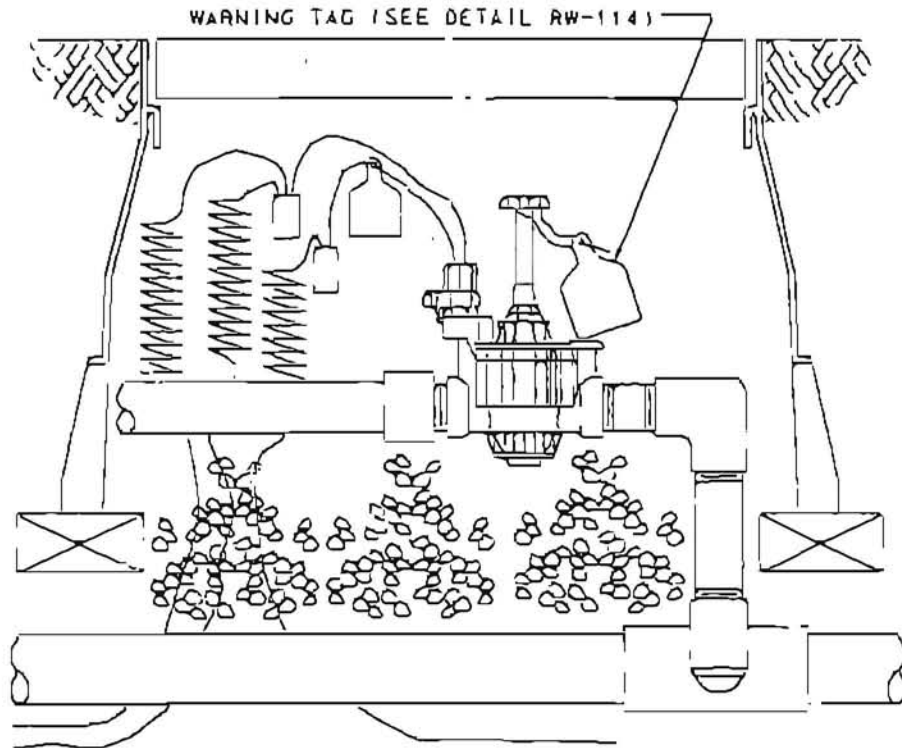
RECYCLED WATER SIGN  
(FOR IRRIGATION)

RW-108B




Size: 4" high x 8" wide  
 Colors:  
 Background: White  
 Letters: Pantone 522 Purple  
 Circle/Slash: Dark Red Over Water Glass  
 Water Glass: Pantone 522 Purple  
 1/2" Wide Border: Pantone 522 Purple  
 Notes: 1/8" at Corners

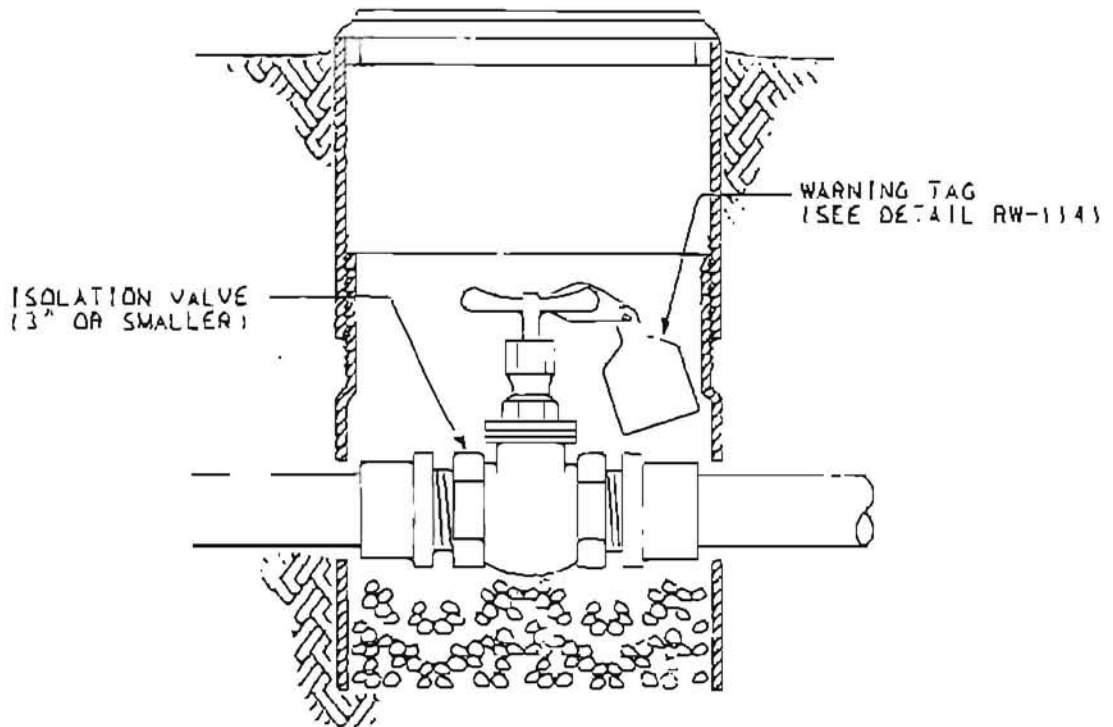
REVISION	BY	APPROVED	DATE	WATER DEPARTMENT City of San Diego		STANDARD DETAIL
						CIP
						RW-108C
REVIEWED BY	DETAILS	DATE		RECYCLED WATER SIGN (TOILET & URINAL FLUSHING)		



SIGN/TAG FOR RECYCLED WATER  
IRRIGATION REMOTE CONTROL VALVE

R-109  
CIP

REVISION	BY	APPROVED	DATE	<p style="text-align: center;"><b>WATER DEPARTMENT</b> City of San Diego</p> 	STANDARD DETAIL
					CIP
					RW-109
REVIEWED BY	INITIALS	DATE	SIGN/TAG FOR RECYCLED WATER IRRIGATION REMOTE CONTROL VALVE		



SIGN/TAG FOR RECYCLED WATER IRRIGATION VALVES

R-110  
CIP

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego

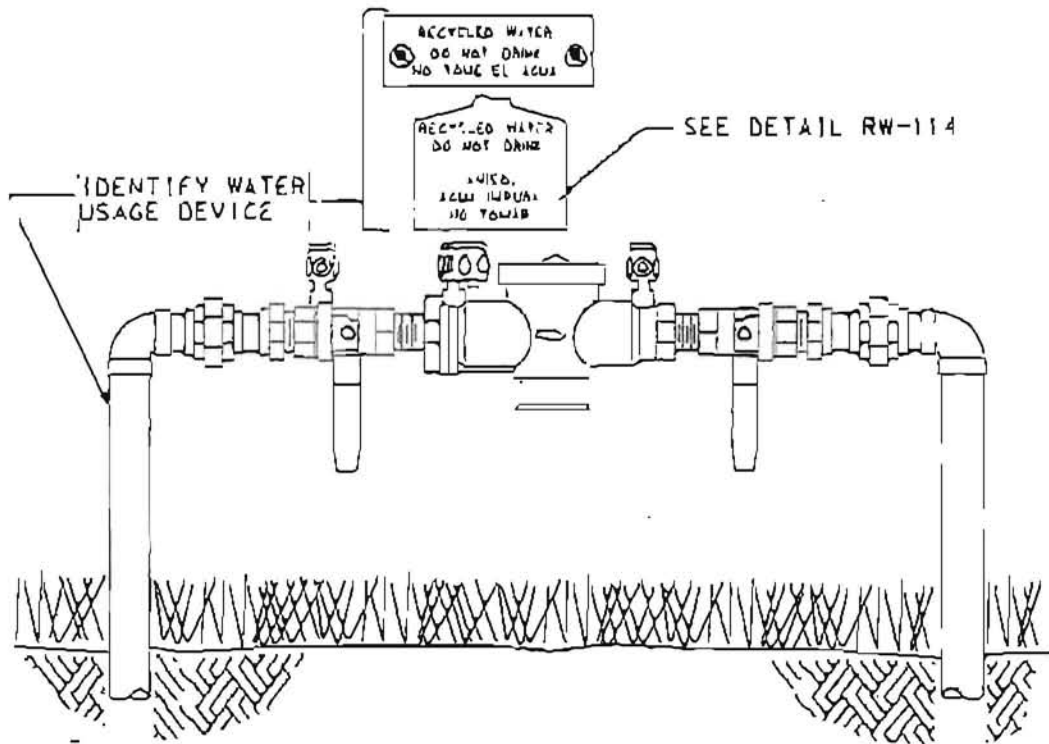


STANDARD  
DETAIL

CIP

SIGN/TAG FOR RECYCLED  
WATER IRRIGATION VALVES

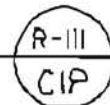
RW-110




NOTE:

ALL RECYCLED METERS, AIR/VACUUM RELIEF VALVES, VALVES, PRESSURE REDUCING VALVES, PUMPS, PUMP CONTROL VALVES, ETC., SHALL BE TAGGED OR LABELED INDICATING THAT THE DEVICES ARE ON RECYCLED WATER AND COLOR CODED PANTONE #522. 2" MINIMUM CLEARANCE BETWEEN GROUND AND WATER CONTROL DEVICES.

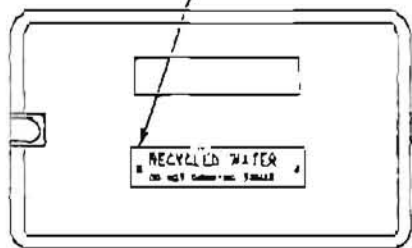
SIGN/TAG FOR IDENTIFICATION OF RECYCLED WATER CONTROL DEVICES



REVISION	BY	APPROVED	DATE	WATER DEPARTMENT City of San Diego		STANDARD DETAIL
						CIP
REVIEWED BY	INITIALS	DATE	SIGN/TAG FOR IDENTIFICATION OF RECYCLED WATER CONTROL DEVICES			RW-111



VALVE BOX  
NAMEPLATE  
(PURPLE PANTONE  
#522 TAG)




VALVE BOX  
NAMEPLATE  
(PURPLE PANTONE  
#522 TAG)

SIGN/TAG FOR RECYCLED WATER  
IRRIGATION BOX COVERS/LID

R-112  
CIP

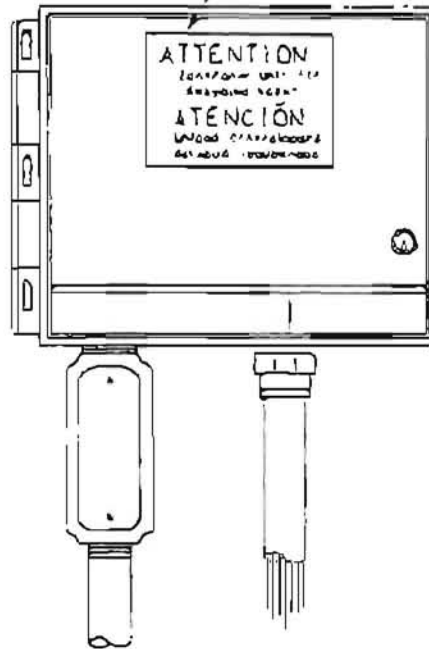
NOTE:

ALL RECYCLED WATER IRRIGATION BOX COVERS AND LIDS SHALL BE  
COLOR CODED PANTONE #522

REVISION	BY	APPROVED	DATE	<b>WATER DEPARTMENT</b> City of San Diego		STANDARD DETAIL
						CIP
						RW-112
REVIEWED BY	INITIALS	DATE	SIGN/TAG FOR RECYCLED WATER IRRIGATION BOX COVERS/LID			



CONTROLLER BOX PURPLE  
 (PANTONE #522) MARKER  
 DECAL - SHOWN AFFIXED TO  
 BOX EXTERIOR; PREFERABLY,  
 AFFIX TO INTERIOR OF BOX



SIGN/TAG FOR RECYCLED WATER  
 IRRIGATION SYSTEM CONTROLLER

R-113  
 CIP

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REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
 City of San Diego



STANDARD  
 DETAIL

CIP

SIGN/TAG FOR RECYCLED WATER  
 IRRIGATION SYSTEM CONTROLLER

RW-113



FRONT





BACK

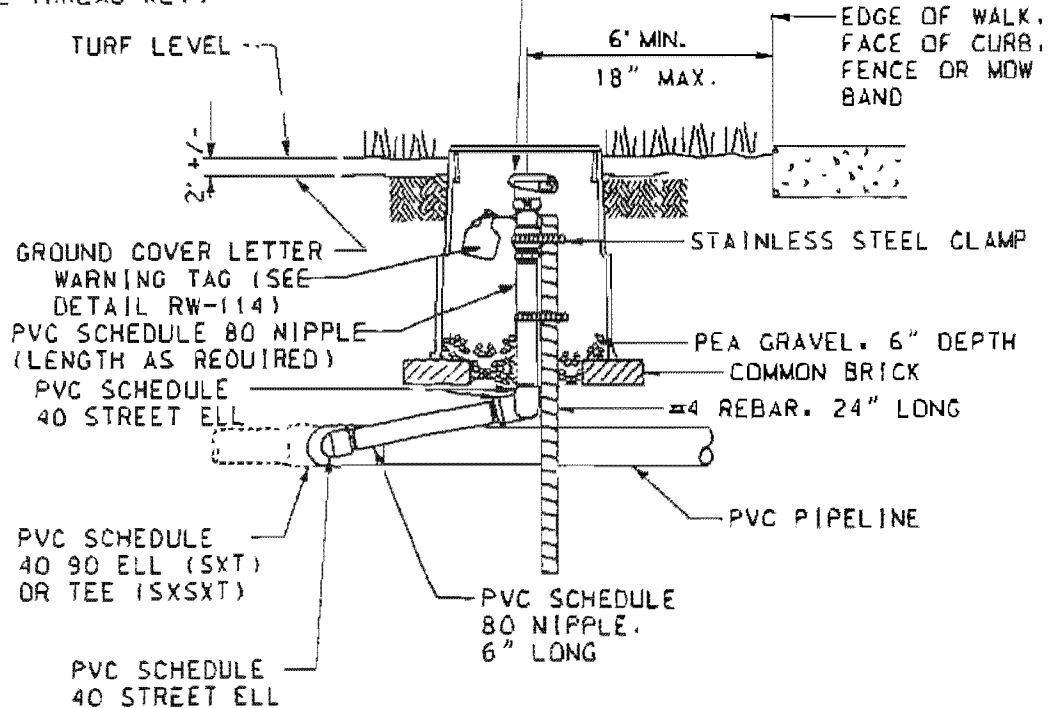
SAMPLE WARNING TAG. BACKGROUND PURPLE (PANTONE 512) WITH BLACK LETTERING

TAG FOR RECYCLED WATER



REVISION	BY	APPROVED	DATE	<b>WATER DEPARTMENT</b> City of San Diego		STANDARD DETAIL
						CIP
REVIEWED BY	INITIALS	DATE		<b>TAG FOR RECYCLED WATER</b>		RW-114

1" QUICK COUPLING VALVE (NELSON)  
#7645 OR RAINBIRD #44 NP WITH  
ACME THREAD KEY



RECYCLED WATER  
QUICK COUPLING VALVE

R-115  
CIP

**NOTE:**

1. NEW CONSTRUCTION-ALL QUICK COUPLING VALVES MUST HAVE NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.
2. RETROFITS-REPLACE ALL EXISTING QUICK COUPLING VALVES WITH NON-POTABLE LOCKING PURPLE THERMOPLASTIC RUBBER COVERS.

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WATER DEPARTMENT  
City of San Diego

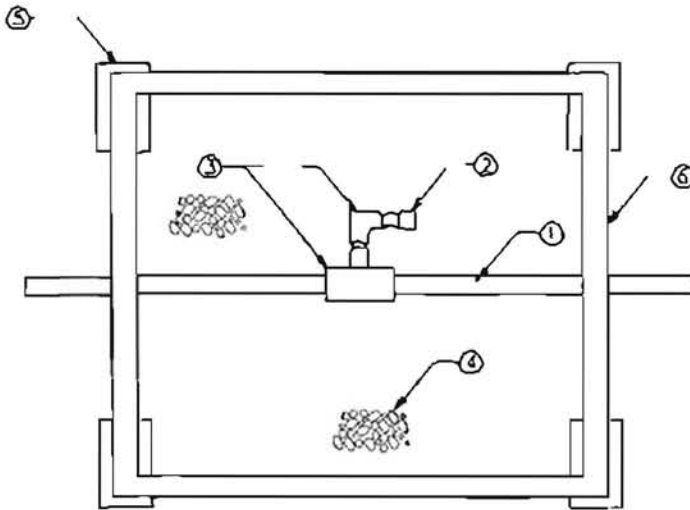


STANDARD  
DETAIL

CIP

RECYCLED WATER  
QUICK COUPLING VALVE

RW-115



- ①-MAIN LINE
- ②-BALL VALVE WITH 3/4" FEMALE THREAD
- ③-PVC SCH 40 SOLVENT WELD FITTINGS
- ④-3/8" DIAMETER PEA GRAVEL SUMP (MIN. 1/2 CU. FT.)
- ⑤-BRICK SUPPORTS ON COMPACTED UNDISTURBED SUBGRADE (MIN. OF FOUR PER BOX)
- ⑥-PURPLE COLOR VALVE BOX AND LID

CROSS CONNECTION CONTROL TEST STATION  
N.T.S.

R-116  
CIP

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**WATER DEPARTMENT**

City of San Diego

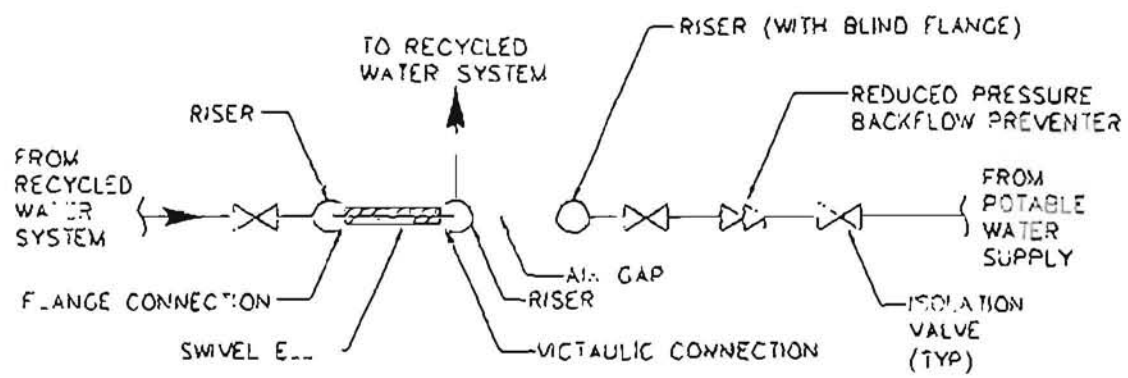


CROSS CONNECTION CONTROL  
TEST STATION

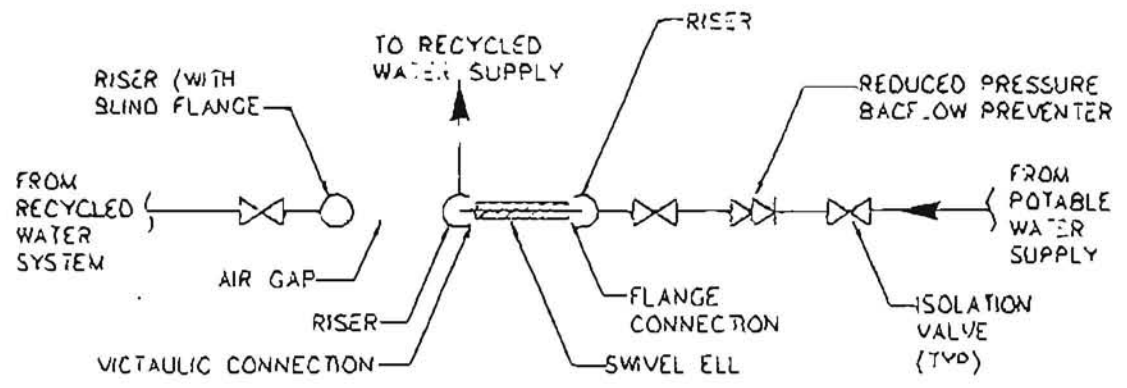
STANDARD  
DETAIL

CIP

RW-116



NORMAL RECYCLED WATER CONNECTION

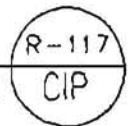







SHORT-TERM POTABLE SUPPLY CONNECTION DURING INTERRUPTION OF NORMAL RECYCLED WATER SOURCE

SWIVEL ELL

SCHEMATIC

PLAN-NO SCALE



- KEY
-  RISER WITH ELBOW (SEE DRAWING RW-118)
  -  RISER (WITH BLIND FLANGE) (SEE DRAWING RW-118)
  -  ISOLATION VALVE (SEE DRAWING RW-103 & RW-104)
  -  SWIVEL ELL (SEE DRAWING RW-118)
  -  REDUCED PRESSURE BACKFLOW PREVENTER (SEE DRAWING W-26)

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REVIEWED BY:	INITIALS	DATE

WATER DEPARTMENT  
City of San Diego

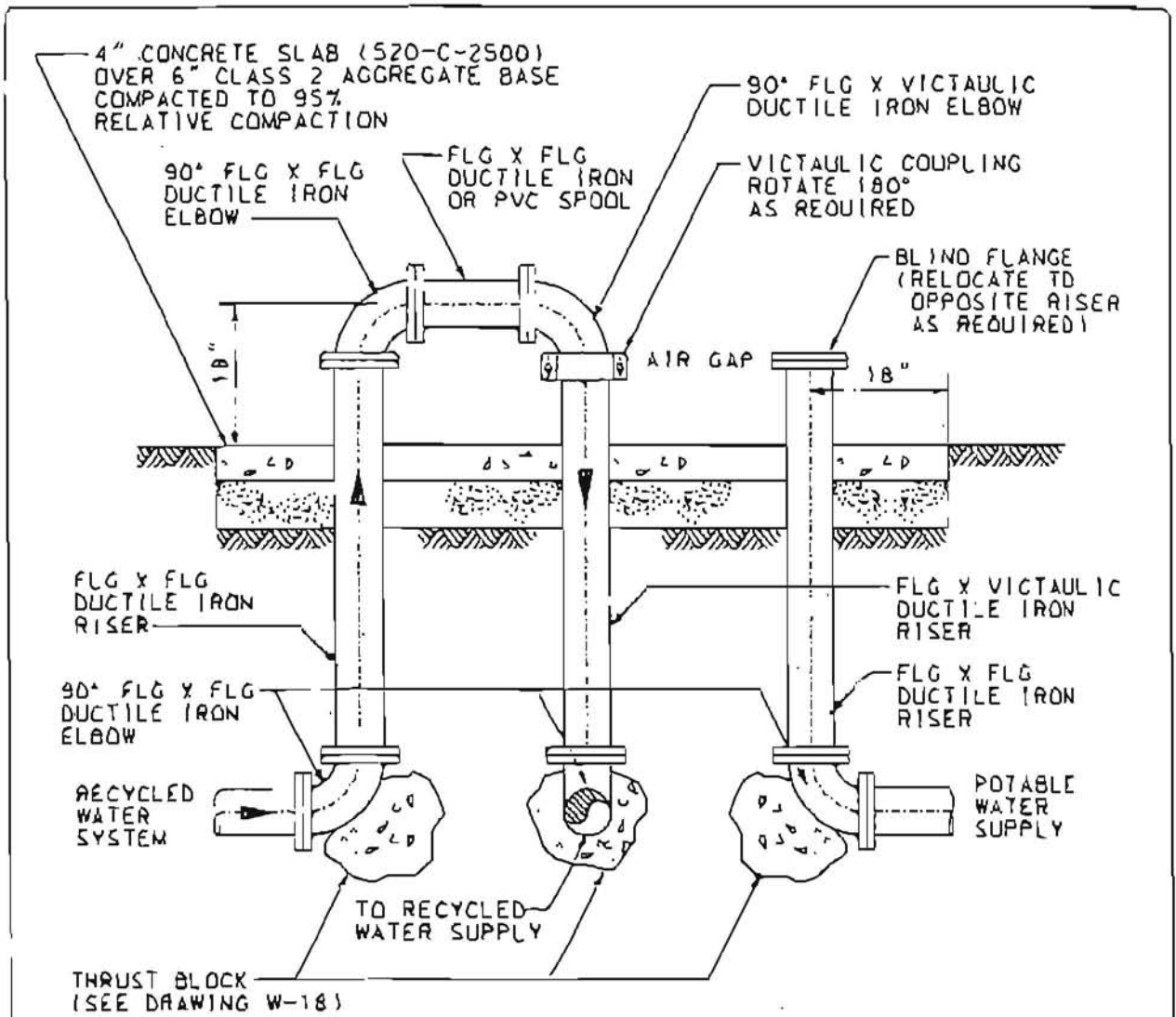


STANDARD  
DETAIL

CIP

SWIVEL ELL SCHEMATIC

RW-117



SWIVEL ELL  
DETAILS

PLAN-NO SCALE R-118  
CIP

NOTE: SWIVEL ELL SHOWN IN NORMAL POSITION  
(SUPPLY FROM RECYCLED WATER SOURCE)

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
City of San Diego



STANDARD  
DETAIL

CIP

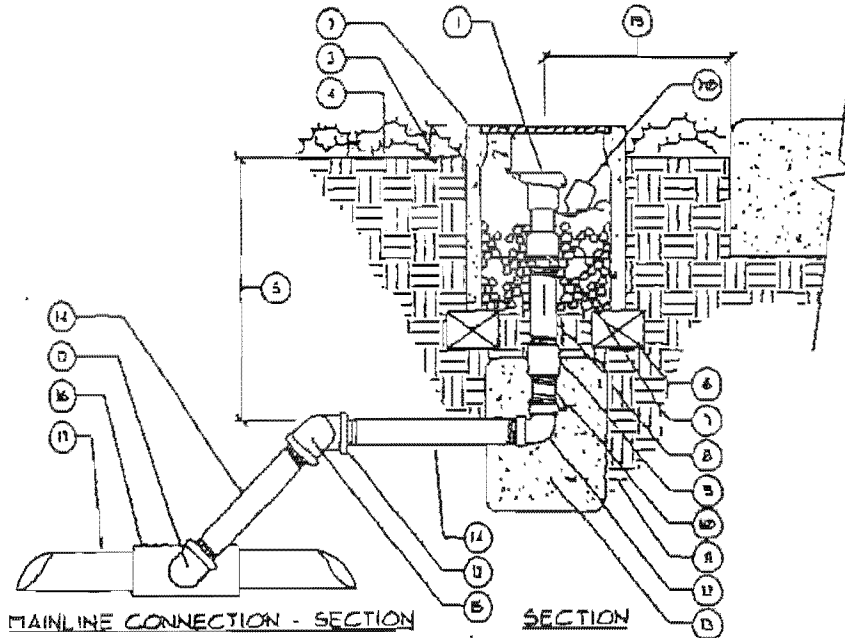
SWIVEL ELL  
DETAILS

RW-118

- ① - 1" QUICK COUPLING VALVE WITH PURPLE-COLORED LID (SEE LEGEND AND SPECIFICATIONS)
- ② - VALVE BOX WITH PURPLE COVER (SEE SPECIFICATIONS)

- ③ - FLUSH IN TURF AREAS, 2" IN SHRUBS AND GROUND COVER AREAS
- ④ - FINISH GRADE
- ⑤ - SEE SPECIFICATIONS FOR PIPE DEPTHS

- ⑥ - UNMORTARED BRICK SUPPORTS (2 MIN.)
- ⑦ - PEA GRAVEL SUMP, 6" DEPTH
- ⑧ - RED BRASS NIPPLE, 6" LENGTH MIN.
- ⑨ - RED BRASS COUPLING, EXTEND 17" ABOVE TOP OF CONCRETE THRUST BLOCK
- ⑩ - RED BRASS NIPPLE, LENGTH AS REQUIRED
- ⑪ - UNDISTURBED OR 90% COMPACTED SUBGRADE
- ⑫ - RED BRASS ELL
- ⑬ - ONE CUBIC FOOT CONCRETE THRUST BLOCK
- ⑭ - RED BRASS NIPPLE, 8" LENGTH MIN.
- ⑮ - RED BRASS STREET ELL
- ⑯ - PVC ELL OR TEE ON MAINLINE PIPE
- ⑰ - PVC IRRIGATION MAINLINE PIPE, PURPLE COLOR
- ⑱ - SCHEDULE 80 PVC NIPPLE, 4" LENGTH MIN.
- ⑲ - 6" MIN. TO 18" MAX. FROM EDGE OF CURBS, WALKS, ETC.
- ⑳ - LETTER WARNING TAG



**NOTE:**  
 QUICK COUPLING VALVE SHALL BE OF A TYPE APPROVED FOR RECLAIMED WATER USE, AND COLOR DESIGNATED AS SUCH WITH PURPLE-COLORED LID.

REVISION	BY	APPROVED	DATE
REVIEWED BY	INITIALS	DATE	

WATER DEPARTMENT  
 City of San Diego

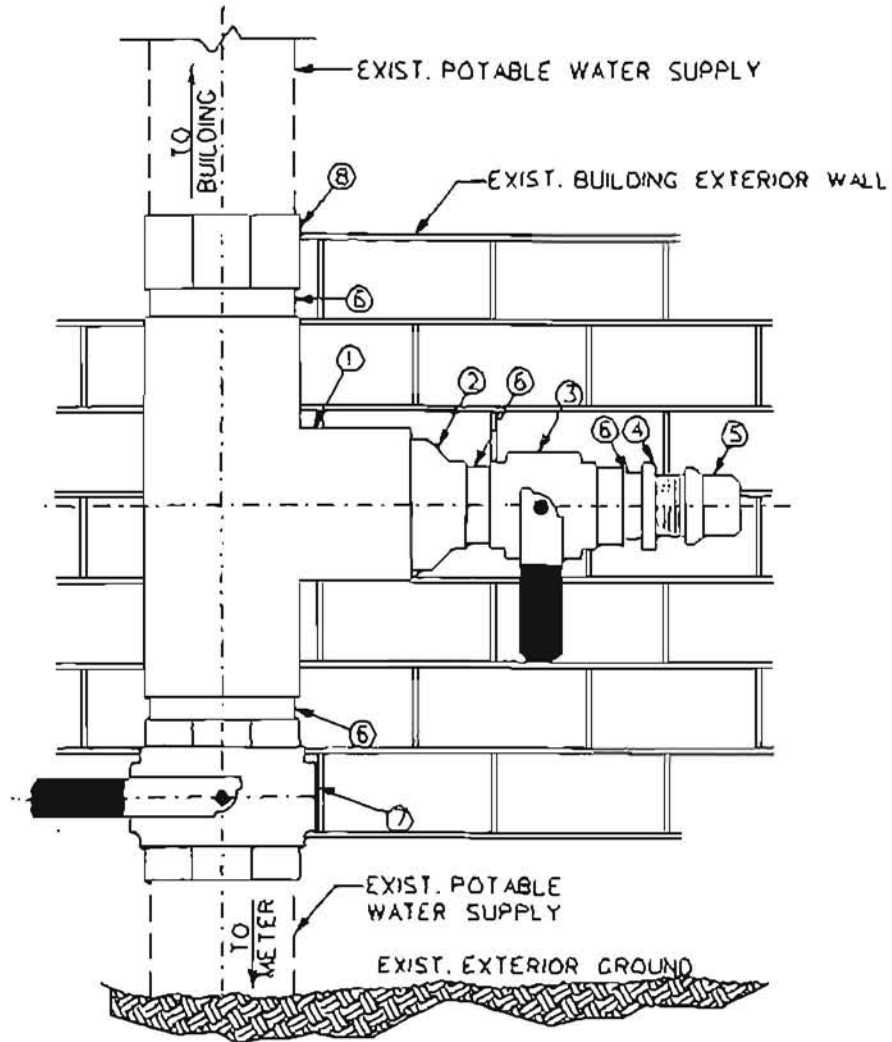


STANDARD  
 DETAIL

CIP

RECYCLED WATER  
 QUICK COUPLING VALVE

RW-119



**NOTES:**

- ①-INSTALL TEE SIZE TO MATCH EXIST. PIPE
- ②-INSTALL REDUCER TO 2" PIPE, IF TEE IS LARGER THAN 2"  
INSTALL INCREASER TO 2" PIPE, IF TEE IS SMALLER THAN 2"
- ③-INSTALL 2" BRASS BALL VALVE
- ④-INSTALL 1-1/2" FIRE HOSE CONNECTION, MIN. 4" HORIZ.  
CLEARANCE 5" TO 14" ABOVE EXIST. GROUND
- ⑤-INSTALL 1-1/2" CAP
- ⑥-MISC. NIPPLES AS REQUIRED
- ⑦-INSTALL BRASS BALL VALVE SIZE TO MATCH EXIST. PIPE
- ⑧-INSTALL UNION SIZE TO MATCH EXIST. PIPE

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**WATER DEPARTMENT**

City of San Diego



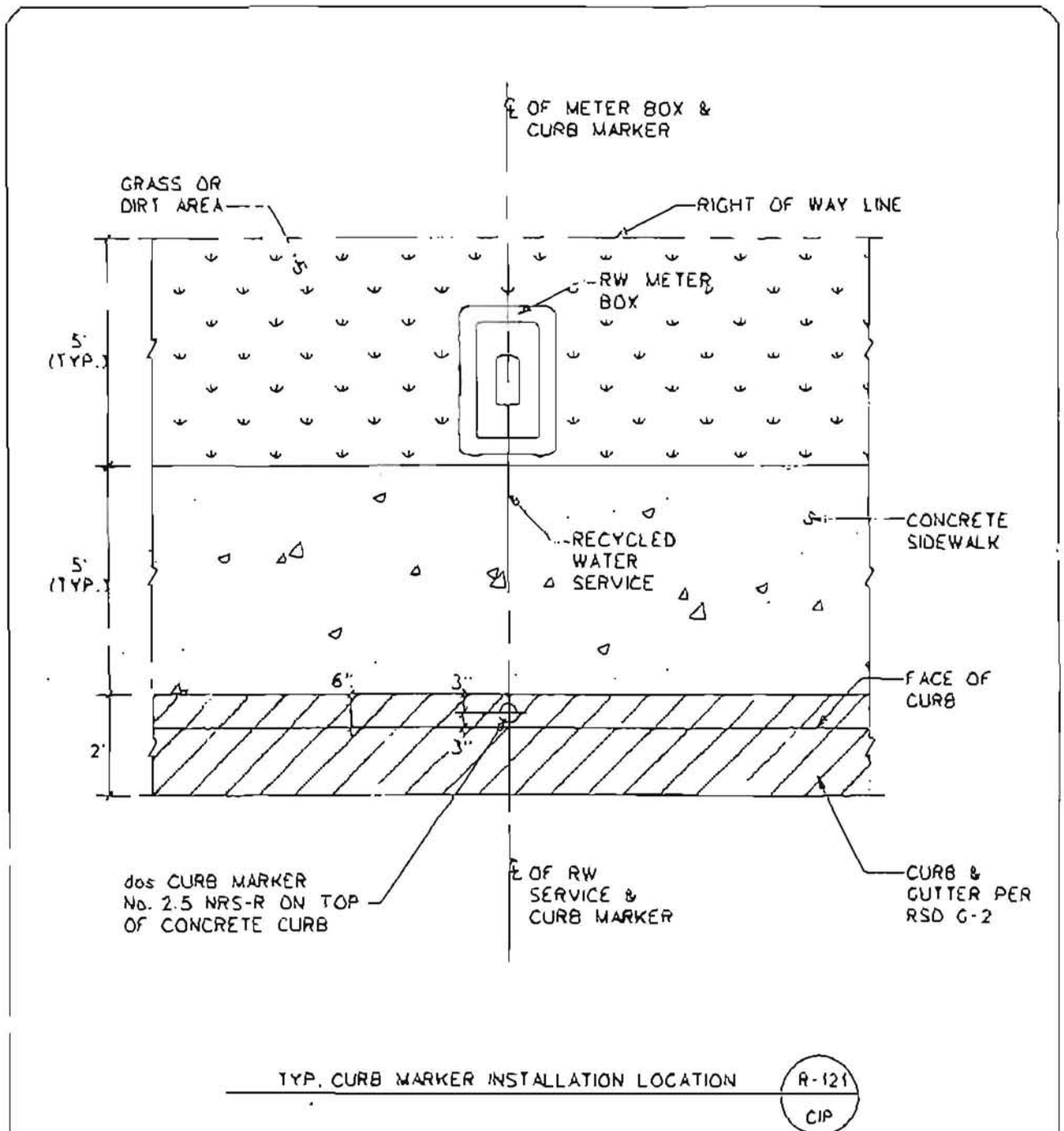
STANDARD  
DETAIL

CIP

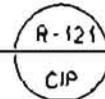
THRESHOLD  
BYPASS PIPING

RW-120





TYP. CURB MARKER INSTALLATION LOCATION



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**WATER DEPARTMENT**

City of San Diego



STANDARD  
DETAIL

CIP

TYPICAL CURB MARKER  
INSTALLATION LOCATION

RW-121

## Chapter 5

# ***ONSITE RECYCLED WATER FACILITIES***

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### **5.1 General**

All onsite recycled water facilities that benefit specifically from the use of recycled water are provided by the User or Customer at its own expense. The Customer, at its own expense, makes any modification to the potable water system on the premises required by the City, to permit the use of recycled water service, including the installation by the Customer of approved backflow preventers (BP). Onsite recycled water facilities are designed to accommodate the use of recycled water in areas where the City determines that recycled water will be supplied in the future, even though recycled water service is not immediately available when the design area is ready for construction. Provision must be made for connecting to the recycled water system, when it becomes available. In the interim, potable water is supplied to onsite facilities through an approved temporary potable water connection. Such temporary connection to the potable water system is provided at a minimum, an approved reduced pressure backflow prevention device installed by the User to the satisfaction of the City, the State of California Department of Health Services (DHS), and the County of San Diego Department of Environmental Health (DEH). For standard details on recycled water connections, refer to Chapter 4 of this book.

### **5.2 Identification of Onsite Pipes and Fittings**

New onsite pipelines must be identified as recycled water pipelines by using a purple color code that differentiates them from potable water pipelines.

All piping and valves must also be appropriately labeled or continuously taped with appropriate identification.

Approved use areas for recycled water service must also be posted with precautionary notices to warn the public.

When converting an existing potable water pipeline to recycled water usage, the potable water pipeline must be accurately located and tested in coordination with the Public Utilities Department and regulatory agencies, and the necessary actions taken to bring the water line and appurtenances into compliance with these Guidelines. If the existing pipeline is approved by the Public Utilities Department and the regulatory agencies, except for pipe identification, the line can be considered approved for recycled water service. If the acceptability of the existing line cannot be verified, the line must be uncovered and inspected, and deficiencies identified before use. However, all replacements of an existing recycled water irrigation system must be color-coded for identification in accordance with these Guidelines.

### **5.3 Pipeline Identification Tapes**

An identification or warning tape or tag with metallic backing must be installed on all recycled water pressure and/or non-pressure service pipelines. A purple tape with black lettering stating: "Caution: RECYCLED WATER – DO NOT DRINK" and "PELIGRO: AGUA IMPURA – NO BEBER" must be fastened to the top of the pipe. The tape must run continuously the entire length of the pipe and must be at least 3-inches wide (see Chapter 2 of this book for tape samples and colors).

### **5.4 Color-Code for Recycled Water Pipes**

The use of purple (Pantone 522) colored pipe, with the words "CAUTION: RECYCLED WATER –DO NOT DRINK" and "PELIGRO: AGUA IMPURA – NO BEBER" embossed or integrally stamped and/or marked on the pipe is an acceptable alternative to the warning tape fastened to the top of the pipe.

The lettering should be stamped on opposite sides of the pipe, repeated every 3 feet.

All temporary and permanent connections to a recycled water system must be identified in the manner described above to differentiate them from connections to a potable water system.

When potable water is being supplied to an area also being supplied with recycled water, the potable water main must also be identified. A color-coded tape prescribed by the Public Utilities Department with the words "CAUTION – DRINKING WATER LINE" and "CUIDADA: TUBERIA DE AGUA POTABLE" must be fastened to the top of the potable water pipe and run continuously the entire length of the pipe. This tape must be at least 3-inches wide. The Public Utilities Department determines the color code for potable water to differentiate it from recycled water.

### **5.5 Separation**

Refer to Chapter 2 for horizontal and vertical separations. Exceptions to the general rule of a 1-foot minimum vertical separation between potable and recycled water for onsite facilities follow.

- On irrigation systems where intermittently pressurized recycled water lines (service lines) serve sprinkler heads, the potable water line(s) may be placed under the recycled water service lines. No special construction requirements are necessary provided that the 1-foot vertical separation is maintained.
- On sites that use pressurized irrigation service lines with valve-in-head sprinklers, the potable water line(s) may be placed under the recycled water service lines, if additional protection is provided for the potable line. Common practices include sleeving or automatic flow control and/or shutoff devices that are installed and function properly on each lateral that cross a potable line.

## **5.6 Hundred Year Flood Clause**

### **5.6.1 Runoff and Erosion**

*Rules and Regulations for Recycled Water Use and Distribution within the City of San Diego* dated April 1996 states that all recycled water storage facilities, booster pumping stations, and pipelines owned and/or operated by recycled water users must be protected against erosion, overland runoff, and other impacts resulting from storms with 100-year frequency and 24-hour duration.

### **5.6.2 Peak Flood Levels**

The guidelines, cited in paragraph 5.6.1, also state that all recycled water storage facilities, booster pumping stations, and pipelines owned and/or operated by recycled water users must be protected against 100-year frequency peak stream flows as defined by the San Diego County flood control agency.

## **5.7 Submittals**

### **5.7.1 Customer's Plan and Specifications**

Construction Drawings prepared by a professional civil engineer, a mechanical engineer, or landscape architect registered in the state of California for the construction of onsite recycled water facilities are submitted to the City Public Utilities Department and DEH for review and approval. The Contract Documents must delineate the proposed recycled water service area, the proposed facility location, the sizes and types of all recycled water pipelines and service connections, and other onsite facilities. The Contract Documents must include the layout of existing potable water pipelines and facilities, including any areas from which recycled water must be specifically excluded.

### **5.7.2 Information on Customer's Contract Documents**

The following information is provided on the Contract Documents by every customer applying for a recycled water service meter:

- Application information specified in Article 3.2.1 and *Rules and Regulations for Recycled Water Use and Distribution within City of San Diego*, dated April 1996
- Meter size (inch diameter)
- Irrigated area to be served through the recycled water meter (square feet or acres)
- Peak flow required through the meter gallons per minute (gpm)
- Estimate of the yearly recycled water requirement (acre-feet or hundreds of cubic feet).

- Service pressure required at the meter as provided by the City pounds per square inch (psi).
- Topographic contours of the served by the zone served by the meter, or if not available, sufficient information to determine elevation differences in the area served by the meter
- Direction of overland drainage pattern
- Location of existing wells (if applicable)
- Boundary location of 100-Year Flood Plan (if applicable)
- Location of potable water pipelines and sanitary sewers within metered service area
- Location of storm drains within metered service area

### **5.7.3 Information to be Called Out on Customer's Drawings**

The drawings shall indicate whether there are or are not any drinking fountains and/or designated outdoor eating areas on this site. All public facilities such as comfort stations, drinking fountains, outdoor eating areas, etc., shall be protected from spray and/or misting by recycled water.

### **5.7.4 Information Required for Recycled Water Irrigation Systems**

If onsite facilities include a landscape irrigation system, the following data for the materials used in the irrigation system is included on the plans:

- A pipe schedule listing pipe sizes and materials of construction
- Valve types and/or sizes
- The following information for each type of sprinkler head:
  - Sprinkler radius (feet)
  - Operating pressure (psi)
  - Flow [gpm or gallons per hour (gph)]
  - Sprinkler pattern
  - Manufacturer, model number, and all pertinent information
- Drip irrigation information and all pertinent information
- Estimates of application rate, acres to be irrigated, soil texture and soil infiltration rate, and information on pressure requirement, hourly delivery rate, and the wetting pattern of sprinklers

### 5.7.5 Standard Notes for Inclusion on Customer's Drawings

Provide the following standard notes as applicable, on the recycled water improvement and irrigation drawings under the heading *Recycled Water Notes – City and County of San Diego*.

1. Forty-eight (48) hours before starting any excavation for onsite improvements, the CONTRACTOR must notify the City of San Diego, Water Management Services Department, Reclaimed Section at telephone number (619) 533-5469. The water hotline phone number is telephone number (619) 562-3906.
2. All work is done in accordance with City of San Diego *Rules and Regulations for Reclaimed Water Use and Distribution within the City of San Diego*, dated April 1996, and San Diego County Department of Environmental Health (DEH) Requirements.
3. All public facilities such as comfort stations, drinking fountains, outdoor eating areas, etc., must be prevented or shielded from spray and/or misting by recycled water.
4. No ponding, runoff, misting or overspray is permitted. Relocate or adjust all irrigation heads to prevent overspraying onto sidewalks, streets, private lots, and nondesignated use areas.
5. Non-designated use areas shall be protected from contact with recycled water, whether by windblown spray or by direct application through irrigation or other use. Lack of prevention, whether by design, construction practice, or system operation, is strictly prohibited.
6. Hose bibs are prohibited on recycled water systems.
7. Onsite cross connection between recycled water pipelines and potable water pipelines is strictly prohibited.
8. Quick coupling valves used in recycled water systems conform to the following:
  - a. Quick coupling valves can be 1-inch or 3/4-inch nominal size Nelson #7645 with brass construction and a normal working pressure of 150 psi or equal.
  - b. The valve cover must be permanently attached to the quick coupling valves. The valve cover is rubber or vinyl colored purple.
  - c. Locking covers are required.
9. No substitution of pipe materials from those specified is allowed without prior approval by the City of San Diego Public Utilities Department, DHS, and DEH.

10. Install approved, metallic-backed and stenciled warning tape over all pressure recycled water pipelines as described in Book 7 of the City of San Diego Public Utilities Department CIP *Reclaimed Water System Design Guidelines*. Stencil and color code (purple Pantone 522) all irrigation pipe. Orient the stenciling to the top of the trench.
11. Provide a minimum cover of all pipe and wire in accordance with Book 7 of the City of San Diego Public Utilities Department CIP *Recycled Water System Guidelines*.
12. The normal irrigation hours, with disinfected tertiary recycled water, are from 10:00 p.m. to 6:00 a.m., but may be modified by the local authority. Irrigation, with disinfected tertiary recycled water during public use periods, is under the supervision of the designated user supervisor. Irrigation, with water of lesser quality than disinfected tertiary recycled water must be reviewed and approved by DHS and DEH.
13. When potable water pipelines and recycled water pipelines cross, the recycled water pipeline is installed within a protective sleeve. The sleeve extends 10 feet from each side, from the centerline of the potable line, for a total of 20 feet.
14. Maintain separation between potable water, recycled water, and/or sewer pipelines according to Book 7 of the City of San Diego Public Utilities Department CIP *Reclaimed Water System Design Guidelines* and Standard Drawing RW-107. Install a sewer pipeline below a recycled water pipeline and a recycled water pipeline below a potable water pipeline.
15. Provide a minimum of 12 inches of vertical separation between potable water, recycled water, and sewer pipeline so that the potable water is on top of recycled and sewer pipelines and sewer pipelines are the bottom utility pipeline, in accordance Standard Drawing RW-107.
16. All public and private potable water mains, including fire mains and any water wells and water courses within the recycled water project, are shown on the plans.
17. The site irrigation systems shown on these documents use potable water until the City of San Diego makes recycled water available to the site.
18. Install purple-colored Pantone 522 material for all aboveground irrigation facilities per American Water Works Association (AWWA) Guidelines and Section 116815 of the California Health and Safety Code.
  - a. Valve and other on-grade boxes – integral color
  - b. Sprinkler heads – integral color plastic

19. Tag all valves and other below-grade facilities in boxes with permanent recycled water labels that identify the facility as "RECYCLED WATER — DO NOT DRINK" in English and "AVISO: AQUA IMPURA — NO TOMAR" in Spanish. Attach the label with either stainless steel wire or self-locking plastic ties.
20. The Customer or Contractor shall conduct a successful cross-connection control shutdown test and coverage test as directed by the City of San Diego Public Utilities Department and monitored by the San Diego County DEH before the site shall be approved for the use of any recycled water.
21. The design and location for RECYCLED WATER – DO NOT DRINK signs must be called out on the drawings
22. An annual cross-connection inspection is conducted by the City of San Diego subject to approval by the San Diego County DEH.
23. Before a pipeline is converted to recycled water, an onsite supervisor shall be designated in writing. This individual shall be familiar with plumbing systems on the property, the basic concepts of backflow and/or cross-connection protection, and the specific requirements of recycled water systems. The designated site supervisor shall attend the county water authority class for recycled water site supervisors. Copies of the site supervisor's certificate with 24-hour contact telephone numbers in the form shown below must be provided to the City of San Diego and the San Diego County DEH.

***In case of emergency, contact \_\_\_\_\_ at \_\_\_\_\_***

***After hours, contact \_\_\_\_\_ at \_\_\_\_\_***

24. Educate all maintenance personnel continuously of the presence of recycled water. Personnel must be informed that recycled water is meant for irrigation purposes or any DHS-approved nonpotable use only, and is not approved for drinking purposes, hand washing, cleaning of tools, etc. Given the high turnover rate of employees in the landscape industry, it is important this information be disseminated almost daily.
25. A physical separation shall be provided between adjacent areas of irrigation with recycled water and potable water. Separation is provided by concrete mow strips, chain fences, or other means approved by the City of San Diego and DEH.



## 5.8 Declaration of Responsible Charge

The following declaration of responsible charge must appear on the cover sheet of the drawings.

### Declaration of Responsible Charge

I hereby declare that I am the landscape architect of work for this project, and that I have exercised responsible charges over the design of this project as defined in Section 6703 of the Business and Professions Code and design is consistent with current standards.

I understand that the check of project drawings and specifications by the City of San Diego and the San Diego County Department of Environmental Health (DEH) is confined to a review only and does not relieve me, as the landscape architect of work, of my responsibilities for project design.

**Firm Name and Address:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Telephone No.** \_\_\_\_\_

**By:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
           Name

**Registration No.** \_\_\_\_\_

**Expiration Date:** \_\_\_\_\_

## 5.9 Recycled Water Inspection Procedures

### 5.9.1 General

This paragraph summarizes the inspection procedures for recycled water. More detailed information is contained in the most current *Recycle Water Plan Check and Inspection Manual* published by the County of San Diego DEH.

### 5.9.2 Coverage Test

Upon completion of the construction of any irrigation system, the system is inspected to determine its adequacy to meet health and safety concerns. The coverage test looks at overspray, misting, ponding, runoff, color coding, and signage. The City's Recycled Water (RW) Cross-Connection Specialist schedules the coverage test with the customer site supervisor and DEH. Any punchlist is finalized by the RW Cross-Connection Specialist. Changes from the approved design are marked on as-built drawings. A DEH representative must be an observer during the test.

### 5.9.3 Shutdown Test (Cross-Connection Control Test)

The cross-connection control shutdown test is based in law on Section 13521 and 13523 of the California Water Code, Sections 60314 and 60316 of the proposed Title 22 and Section 7604 of Title 17 of the California Code of Regulations (CCR) and Chapter 7, Sections 116800 and 116805 of the California Health and Safety Code.

Cross-connection control tests are conducted on all sites containing potable and recycled water systems. The individual responsible for overseeing the cross-connection control test must hold a current state of California recognized certification as a Cross-Connection Control Specialist. A complete cross-connection control test must be scheduled before the initial activation of the site's recycled water system and be retested at least once every four years thereafter for dual plumbed sites. Also, based on Section 60316 of proposed Title 22, a site walkthrough and record check must be scheduled annually for dual plumbed sites. Article 5 of Title 22 details the report requirements for dual plumbed sites. Section 7604 of Title 17 CCR refers to nondual plumbed sites. The frequency of the cross-connection control shutdown test and inspection of nondual plumbed sites is determined by the regulatory agency. A dual plumbed schedule for cross-connection control shutdown tests and inspections should be followed. These tests may be conducted by the water purveyor's cross-connection control specialist or a contract specialist with oversight by local or state health departments.

#### A. Shutdown Test Purpose

The purpose or reason for the test is to demonstrate that at the time of the test, there were no discoverable cross-connections between the use site potable water systems and the use site recycled water systems.

#### B. General Test Procedure

Shut off the recycled water meter(s), depressurize the recycled distribution system, and maintain a pressurized potable water system. Attach 24-hour pressure recorders to points in the recycled water system. If the recycled system repressurizes, it could be cross-connected to the potable water system.

Due to the possibility of check valves, the procedure is reversed. Pressurize the recycled distribution system and depressurize the potable water system. The test may take up to 48 hours to complete. If cross-connections are discovered during the test, the cross-connections must be eliminated before the recycled water distribution system is activated (for new systems) or reactivated (for existing systems). Shut down testing procedures and methodology can be found in the most current DEH's *Recycled Water Plan Check and Inspection Manual*.

#### C. Overspray and Runoff Testing

A recycled water overspray, ponding, runoff inspection, and a signage review are part of the cross-connection control test. This inspection should also be conducted on sites without potable water, such as landscape maintenance districts (LSMDs). On LSMDs, the inspection relates to the possibility of the inhalation of recycled water irrigation spray and

overspray and misting into nonuse areas, and excessive runoff into area storm drains. The inspection must also include the possibility of cross-connecting the irrigation system and other private potable water systems. The overspray, ponding, and runoff inspection is not necessary on sites that use only drip irrigation.

#### **D. New and Retrofit Site Considerations**

Cross-connection control tests and use site inspections are conducted on two types of recycled water use sites. The first type is new construction with complete sets of planning and inspection documents. The second is the retrofit with minimal or no planning and inspection documents. Although the basis for the test is the same for each type, the retrofit can pose additional challenges because of the lack of knowledge of the site and the existing plumbing layout. When dealing with retrofits, the site must be carefully inspected by the City's Reclaimed Water Specialist (RWS). Minimal plans should be available, either as existing as built or as developed by the purveyor. The site must be surveyed by the City's RWS and DEH before final submission of the site retrofit plans for review and approval by the City and DEH. The shut down testing will be conducted only after final site plan approval.

#### **E. Dual-Plumbing Systems**

The results of the cross-connection control test for dual-plumbed systems are compiled in a standard engineering report and distributed to all concerned parties. The specific requirements of the engineering report are contained in Section 60314 of proposed Title 22, CCR.

### **5.10 Procedures**

#### **5.10.1 Notification**

Notification to schedule the cross-connection control test depends on the agreement between the contractor or recycled water customer agency and the recycled water customer. Notification should occur at least two weeks before the actual cross-connection control test to allow adequate time for scheduling. The recycled water customer or contractor contacts and coordinates the test with all parties concerned.

Because a complete cross-connection control test directly impacts the site and any ongoing operations at that site, the Owner or customer at the site must be notified well in advance of the test. The City should make the Owner or customer aware of its responsibilities and obligations well in advance of the cross-connection control test. Test notification should consist of a letter explaining the purpose and general methodology of the test and the date, time, and duration of the test. A copy of the letter and a site map showing pressure recorder locations should be sent to the DEH. In an emergency, the contractor or RWS and DEH may perform testing at a site with 24-hours of notice given to the Owner.

### 5.10.2 Shutdown (Cross-Connection Control) Test General Considerations

Concerning the actual cross-connection control test, any devices that could repressurize the potable or recycled water systems during testing should be deactivated. Examples of these devices are water heaters, pump systems on cooling towers, heating systems, etc.; overhead plumbing that may become air locked during the depressurization and break free during the test; and any water uses during the test such as opening of hose bibs or the use of hand basins that may contribute to pressure changes in the system. There may be water cooled systems that cannot be shut down during the test. If so, cooling system water must be highlined from another available source, such as a fire hydrant.

A suggested list of equipment to have available for testing includes site plans, flashlight, notebook, tape measure, needle-nose pliers (to activate hose-bib vacuum breakers), paper cups, DEH's *Recycled Water Plan Check and Inspection Manual*, regulatory and guidance documents such as Title 22, and the DHS recommended policies relating to recycled water use.

The customer or contractor should provide 24-hour pressure recorders and shovels for potholing, if necessary.

The customer or contractor should ensure that someone is on site during testing who is familiar with the existing plumbing and/or irrigation systems. The Site Supervisor should be present during the testing. The customer or contractor must know how to operate the irrigation master control panel at the site.

Normally, the cross-connection control test is the last element to be completed before the site is converted to recycled water use. This approach minimizes the chance for construction personnel to create a cross-connection after the test is completed and before the system is converted to recycled water.

Cross-connection control test methods shall be in accordance with the DEH's *Recycled Water Plan Check and Inspection Manual*. If there is a need to modify any of the DEH's test methods, such as on very complicated sites or because multiple use sites must be converted at the same time, any such modifications shall be submitted to DHS and DEH for review and approval.

To minimize the impact of the test on the public, cross-connection control tests should be scheduled during periods of minimal water use. For example, tests can be scheduled during school vacation periods or from 11:00 p.m. to 7:00 a.m. at shopping centers. Similarly, residential and apartment complex potable water cross-connection control tests can be scheduled on weekend nights. If there is a threshold valve, it should be secured to isolate the building from the rest of the potable water system during the shut down test.

Frequently at commercial and industrial sites, potable water meters are secured (shut off) when buildings are empty. Before securing the water meter, check the meter tattle tail for signs of water flow. If there is flow into the building, it must be stopped before securing the meter. The reason for this action is that after the test, when the meter is reactivated, flow may lead to flooding for unknown reasons. A frequent cause of flow, after reactivation of the meter, is a stuck toilet tank fill float. If any water is flowing through the meter, the reason for the flow must be determined.

## Chapter 6

# ***RECYCLED WATER FOR CONSTRUCTION USE***

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### **6.1 Permits**

The use of recycled water for construction purposes must be approved by the City of San Diego Public Utilities Department and the County of San Diego Department of Environmental Health (DEH). The permit must be obtained before construction begins. Recycled water is obtained from a permanent water tanker filling station. The permit instructions and form are attached at the end of this chapter.

### **6.2 Construction Uses**

Recycled water for construction may only be used for soil compaction during grading operations, dust control, and consolidation and compaction of backfill in trenches for nonpotable water, sanitary sewer, storm drain, gas and electric pipelines. Recycled water may not be used for water jetting and consolidation or compaction of backfill in trenches for potable water pipelines.

### **6.3 Equipment**

Equipment operators must be instructed about the requirements stated here and the potential health hazards involved with the use of recycled water. Water trucks, hoses, drop tanks, etc., must be identified as containing recycled water not suitable for use as drinking water.

Recycled water may not be introduced into any potable water piping system. No unprotected connection may be made between equipment containing recycled water and any part of a potable water system.

### **6.4 Ponds for Storage**

Ponds used to store recycled water for construction must be fenced and posted to limit public access. Fences are constructed in accordance with Chapter 10, Article 1, Division 10 of the Municipal Code.

### **6.5 Equipment and Facilities Cleaning**

Any equipment or facilities such as storage ponds, tanks, temporary piping or valves, and portable pumps used with recycled water must be cleaned and disinfected before being removed from the approved use area for use at another jobsite. Disinfection and cleaning ensure the protection of public health in the event of any subsequent use approved by the DEH Representative. The disinfection process must be performed in the representative's presence.

The City must provide service connections equipped with recycled water meters for the use in construction with recycled water at locations convenient to the user, but at the discretion of the City.

## **6.6 Recycled Water or Service Outlet Security Fence**

Provide a secure fence that encloses the recycled water meter to prevent vandalism or unauthorized use of recycled water. This enclosure to have a recycled water “CAUTION: RECYCLED WATER – DO NOT DRINK” sign in English and Spanish.

**City of San Diego  
Public Utilities Department**

**Permanent Water Tanker Filling Station  
Recycled Water Service Guidelines**

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1. Notify and/or call the City of San Diego Public Utilities Department for information when applying for the Recycled Water Service at telephone number (619) 533-5469 or facsimile number (619) 533-5300.
2. A Recycled Water Filling Station is situated at the southeast corner of Scripps Poway Parkway and Cypress Canyon Road.
3. A Contractor and/or customer interested in using recycled water must complete an application for recycled water use according to City of San Diego Public Utilities Department rules and regulations, a copy of which is attached.
4. The City of San Diego Public Utilities Department notifies the DEH at telephone number (619) 694-2548 about the type of recycled water usage and customer information.
5. All vehicles used in transporting recycled water must be clearly marked with typical signage that reads: "CAUTION: RECYCLED WATER – DO NOT DRINK" in English and Spanish, and are required to undergo disinfection before potable water can be used.
6. The Contractor and/or customer must have a person knowledgeable in the safe and proper use of recycled water. Before the use of recycled water begins, the Contractor and/or customer and the City of San Diego representative must hold tailgate safety meetings.
7. The City of San Diego Public Utilities Department and/or the DEH may make periodic site inspections to ensure that state guidelines are being applied in a manner that does not jeopardize the safety of workers or the general public.
8. The Contractor and/or customer procures a construction meter and pays a fee and makes a deposit to the City of San Diego, Operations, at 2797 Caminito Chollas, Meter Shop, telephone number (619) 527-7449.
9. When the Contractor and/or customer returns the construction meter to the Meter Shop, the deposit is refunded.

**City of San Diego  
Public Utilities Department**

**Application for Recycled Water Use**

The User must complete the following: (please print or type)

User name: \_\_\_\_\_

Relationship to property: \_\_\_\_\_

Mailing address: \_\_\_\_\_

Telephone number: Office \_\_\_\_\_ Residence \_\_\_\_\_

Project/Site name: \_\_\_\_\_

Property owner(s): \_\_\_\_\_

Reclaimed Water Supervisor:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

24-hour contact telephone number: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

1. Type of use: (check each use)

<input type="checkbox"/> Landscape irrigation	<input type="checkbox"/> Construction use	<input type="checkbox"/> Impoundments
<input type="checkbox"/> Commercial use	<input type="checkbox"/> Groundwater recharge	<input type="checkbox"/> Others
<input type="checkbox"/> Industrial use	<input type="checkbox"/> Wildlife habitat	
<input type="checkbox"/> Agricultural use	<input type="checkbox"/> Recreational	

2. Estimate demand:      Total quantity: \_\_\_\_\_ HCF/yr  
    Max. at POC: \_\_\_\_\_ gpm (total)  
    Min. pressure: \_\_\_\_\_ psi  
    Hours/Day: \_\_\_\_\_  
    Days/Week: \_\_\_\_\_

3. Date desired to initiate service: \_\_\_\_\_

4. Duration of service (temporary, interim, construction use, or permanent): \_\_\_\_\_

5. Additional information: (Include special conditions affecting the service): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



6. Please include the following items:

1. Items to be submitted with the Initial Application:

- 1) Location and vicinity map showing the demarcation of the recycled water use area.
- 2) Check or money order for required fees made out to: the Treasurer of the City of San Diego as well as the form highlighted below.

***The Treasurer of the City of San Diego***

I, the User, have read and understand the City's Rules and Regulations for Recycled Water use and distribution and agree to restrict recycled water use for the purposes described in this application. I agree to use recycled water in accordance with these Rules and Regulations and all other applicable documents. I understand that recycled water may not be compatible with certain types of vegetation because of its chemical composition. I agree that the City will not be liable for damages that may occur to vegetation or for damages that may occur due to uses of recycled water for purposes not included in this application.

User's name: \_\_\_\_\_ Date: \_\_\_\_\_  
(print)

Signature: \_\_\_\_\_

# ***APPENDIX A***

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# Memorandum

Date: May 7, 2003

To: Regional and District Engineers

From: David P. Spath, Ph.D., P.E., Chief (*Original signed by Dave*)  
Drinking Water and Environmental Management  
601 North 7<sup>th</sup> Street, MS 216  
Sacramento, CA 95814  
(916) 322-2308

Subject: POLICY MEMO 2003-03: GUIDANCE FOR THE ALTERNATIVE USE  
OF POTABLE WATER IN RECYCLED WATER SUPPLY USE AREAS  
USING A "SWIVEL-ELL" PIPING ARRANGEMENT

## RESCINDS POLICY MEMO 95-004

### Introduction

This policy provides guidance to staff for applying the California regulations relating to cross-connection control (Title 17, California Code of Regulations, Sections 7583 et seq.). The practices outlined in this policy should be regarded as minimum conditions for providing backflow protection in the situations described. **NOTE that this policy updates and supersedes Policy Memo 95-004 to reflect current Water Recycling Criteria adopted in December 2002, and clarifies that this policy does not apply to dual-plumbed recycled water facilities.**

### Statement of Problem

Premises where recycled water is used for on-site non-potable uses may not utilize domestic water from a public water system as a supplemental source of water for the recycled water system unless the public water supply is isolated with an air-gap separation in conformance with Section 7604 of the California Code of Regulations (CCR). This regulatory requirement is based upon the potential for contamination of the public water supply from cross-connections created within a premises which utilizes recycled water for approved non-potable uses.

The Department has become aware of situations where recycled water is used for on-site non-potable uses and the potable supply is available to the premises as an emergency, alternative source of water in the event that the recycled water supply is temporarily unavailable. A swivel-ell type connection is utilized to preclude connecting both sources of supply to the use area at the same time. The swivel-ell is switched from the recycled water connection to the potable connection in an emergency and the procedure is reversed once the recycled supply is available. The potable supply pipeline must be protected by an approved reduced pressure principle backflow preventer. The potential exists for concurrent use of the recycled water and potable water connections in violation of Section 7604 of the CCR. Therefore, special precautions must be taken to prevent the creation of



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cross-connections in these situations. In no case will it be acceptable for the potable supply to be directly connected to a recycled water supply.

#### Legal Status

Section 7604(c)(1), CCR Title 17, requires that an air-gap separation be used for backflow protection for premises where the public water supply is used to supplement the recycled water supply and the two supplies can be used simultaneously.

However, this Section does not address the use of alternative sources of water when the recycled water supply cannot be used simultaneously; this is the situation to which this policy applies.

Section 60315 of the Water Recycling Criteria (CCR, T22, adopted December 2000, following issuance of the original Swivel-El Policy Memo 95-004) includes design requirements for "Dual Plumbed Recycled Water Systems" which specifically exclude using the public water supply as a backup or supplemental source of water for the recycled system. Therefore, this Policy is not applicable to Dual Plumbed Recycled Water Systems as defined by Section 60301.250 (Title 22).

#### Department Position

It is the opinion of the Drinking Water Program of the California State Department of Health Services that with proper safeguards, a swivel-ell type connection may be used when potable water is used as an alternative water supply to an on-site recycled water distribution system with the exception of dual-plumbed systems as specified in Section 60315. This is acceptable only in cases where there is an unplanned, short-term interruption of the recycled water service.

#### Directions to Department Staff

No concurrent use of the potable water supply and the recycled water supply will be allowed. Prior to construction of any facilities, written approval shall be obtained from the potable water purveyor and the Department. Water utilities proposing to use potable water as an alternative water supply to an on-site recycled water distribution system at a recycled water use area or facility must demonstrate to the Department that they can comply with the following:

1. Only disinfected, tertiary recycled water is used.
2. The domestic water supplier has a cross-connection control program containing all of the minimum elements required by Section 7584 of the CCR.

The program ordinance or rules of service must address the use of recycled water in these situations and must be acceptable to the Department.

3. Each on-site recycled water distribution system may only be supplied from a single recycled water feed line. There shall be no other inter-connections between the recycled water distribution system and potable water system within the use area or facility.
4. The swivel-ell connection, including the recycled water service, potable water service and the service riser to the facility or use area must be located above ground, color coded in accordance with Section 4049.54 and provided with appropriate signs on both the recycled water and domestic water facilities. Appropriate security precautions must be provided (e.g. locked gate valves, warning signs, etc.) to prevent interconnections, vandalism and unauthorized use. The potable water purveyor shall inspect each location on a minimum annual basis to verify that a switchover has not occurred without the purveyor's approval. Meters must be provided on both connections and records of water use maintained.
5. The potable connection must be protected by an approved Reduced Pressure Principle Backflow Prevention Assembly (RP). Facilities for the swivel-ell connection must be located downstream of this assembly. The need for internal protection must also be evaluated.
6. To avoid concurrent use, swivel-ell connections must be designed such that a tee connection or other prefabricated mechanical appurtenances cannot readily be substituted for the ell. The recycled water and potable water services should not approach the service riser at an angle of  $180^{\circ}$  (Figure 1).
7. A signed agreement between the public water supplier and recycled water supplier<sup>1</sup> that incorporates the following must be obtained:
  - (a) The RP on the potable water supply line must be tested in accordance with Section 7605 of the CCR immediately prior to a switchover from the recycled water supply to the potable water supply. The completed test report must be sent to the Department and potable water purveyor prior to activation.
  - (b) The potable water purveyor and Department must be notified within 24 hours of each switchover.
  - (c) The potable water purveyor shall supervise the switchover and activation of the potable water service and subsequent deactivation.
  - (d) Upon request, the potable water purveyor must follow up with a written report to the Department within 7 days following the switchover.

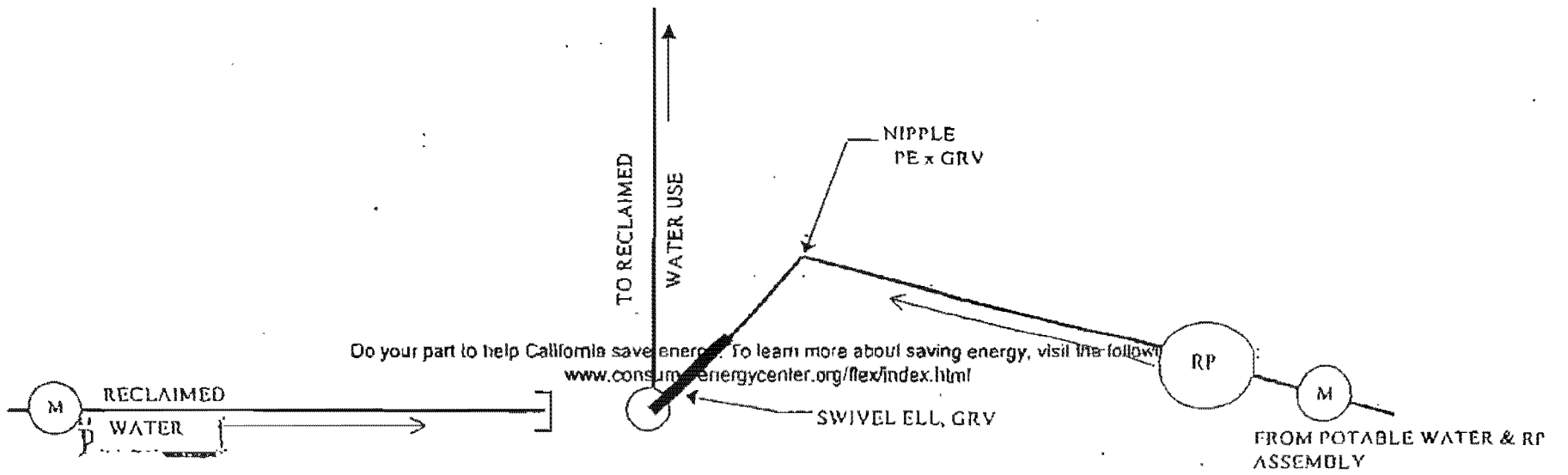
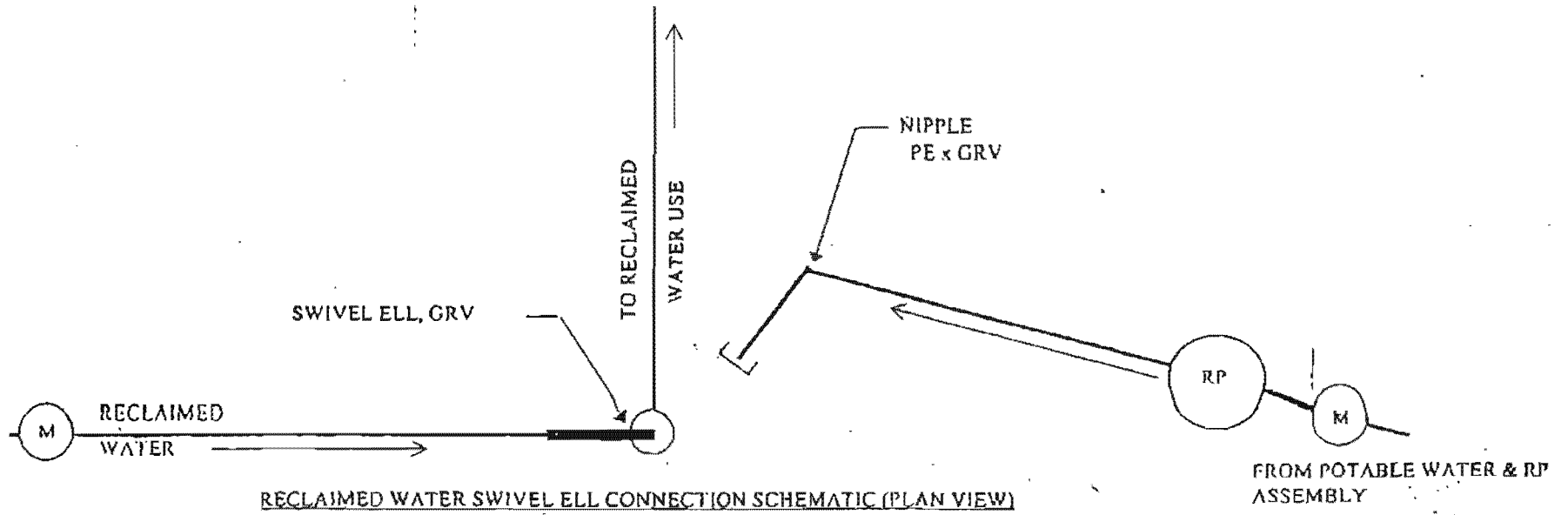
Note 1 - If a common agency has both water and recycled water operations then rules of service incorporating the following items must be in place.

This policy is intended for short-term emergency switch-overs, not to exceed 90 days.

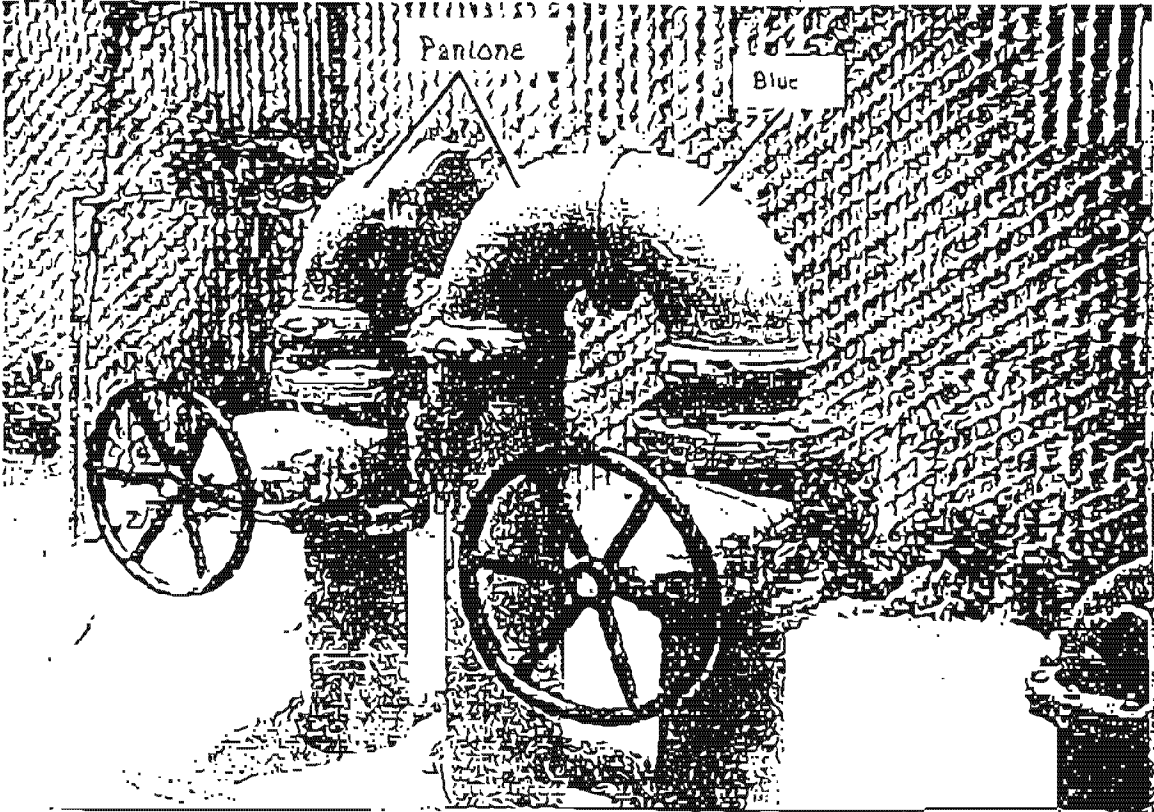
The potable water supplier will have the responsibility for documenting that all conditions of approval have been satisfied. The Department shall require installation of a permanent air-gap separation in accordance with Section 7504 of the CCR in the event that a cross-connection is made between the potable water supply and the on-site recycled water distribution system.

# Memorandum

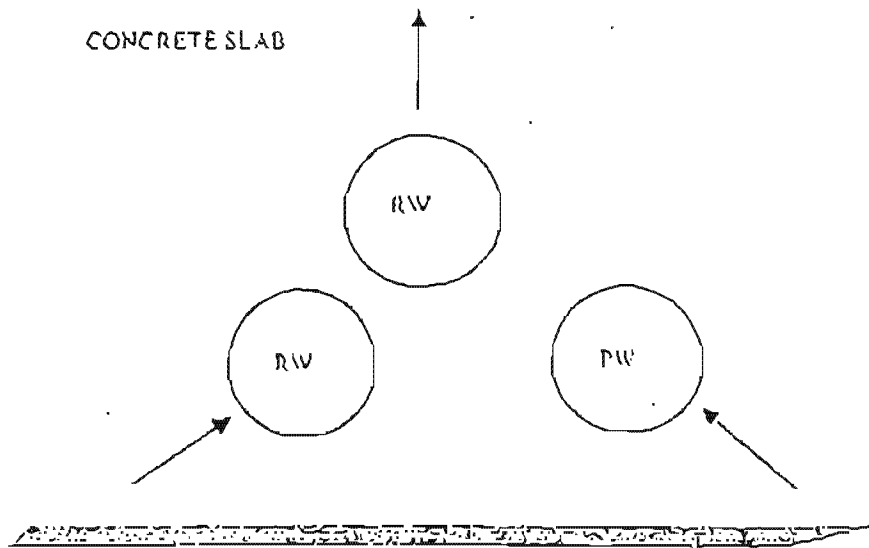
Figure 1 – Connection Schematics



# Memorandum

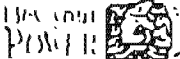


CONCRETE SLAB



EXAMPLE RECLAIMED AND POTABLE RISER LAYOUT  
(PLAN VIEW)

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# ***APPENDIX B***

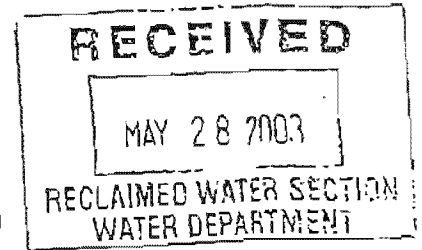
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**Memorandum**

Date: April 14, 2003

To: Regional and District Engineers

From: David P. Spath, Ph.D., Chief (*Original signed by Dave*)  
Drinking Water and Environmental Management  
601 North 7<sup>th</sup> Street, MS 216  
Sacramento, CA 95814  
(916) 322-2308



Subject: GUIDANCE MEMO NO. 2003-02: GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES

The purpose of this memo is to update guidance dated April 5, 1983 for consistency with proposed 2003 regulations. Should there be any modification to the proposed Water Works Standards that may impact the content of this guidance, the guidance will be amended accordingly.

**GUIDANCE: CRITERIA FOR THE SEPARATION OF  
WATER MAINS AND NON-POTABLE PIPELINES**

**BACKGROUND**

When buried water mains are in close proximity to non-potable pipelines, the water mains are vulnerable to contamination that can pose a risk of waterborne disease outbreaks. For example, sewers (sanitary sewer mains and sewage force mains) frequently leak and saturate the surrounding soil with sewage due to structural failure, improperly constructed joints, and/or subsidence or upheaval of the soil encasing the sewer. If a nearby water main is depressurized and no pressure or negative pressure occurs, that situation is a public health hazard that is compounded if an existing sewer is broken during the installation or repair of the water main. Further, failure of a water main in close proximity to other pipelines may disturb their bedding and cause them to fail. In the event of an earthquake or other disaster, simultaneous failure of all pipelines could occur.

The most effective protection against this type of drinking water contamination is adequate construction and separation of non-potable pipelines and water mains. The Waterworks Standards (Title 22, Chapter 16, Section 64572) provide separation criteria for new construction. However, when these criteria cannot be met, the risk of contamination can be reduced by increasing the structural integrity of pipe materials and joints, and ensuring minimum separation requirements are met. Therefore, the following guidance details construction criteria for the installation of water mains and non-potable pipelines to minimize the risk of contamination of drinking water.



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[www.consumerenergycenter.org/flex/index.html](http://www.consumerenergycenter.org/flex/index.html)

## DEFINITIONS

- **COMPRESSION JOINT** - A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.
- **CONTINUOUS SLEEVE** - A protective tube of high-density-polyethylene (HDPE) pipe with heat fusion joints or other non-potable metallic casing without joints into which a pipe is inserted.
- **DISINFECTED TERTIARY RECYCLED WATER** - Wastewater that has been filtered and subsequently disinfected in accordance with Section 60301.230, Chapter 3 (Water Recycling Criteria), Title 22, California Code of Regulations.
- **HOUSE LATERAL** - A sewer line connecting the building drain and the sanitary sewer main serving the street.
- **SUPPLY LINE** - Pipelines conveying raw water to be treated for drinking purposes in accordance with Section 64572 @, proposed Water Works Standards.
- **WATER MAIN** - Means any pipeline, except for user service lines, within the distribution system in accordance with Section 64551.70, proposed Water Works Standards.
- **RATED WORKING WATER PRESSURE** - A pipe classification system based on internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.
- **SANITARY SEWER MAIN** - A gravity sewer conveying untreated municipal wastewater.
- **SEWAGE FORCE MAIN** - A pressurized sewer conveying untreated municipal wastewater.

## APPLICABILITY

Note that the construction criteria presented in this document apply to house laterals that cross above a water main, but not to those house laterals that cross below a water main.

Water mains or non-potable pipelines that are 24-inches in diameter or larger may pose a higher degree of public health concern because of the large volumes of flow involved. Therefore, installation of water mains or non-potable pipelines 24-inches in diameter or larger should be reviewed and approved in writing by the Department on a case-by-case basis prior to construction.

In no case, should water mains and non-potable pipelines conveying sewage or other liquids be installed in the same trench.

## REGULATORY REQUIREMENTS

Any new development project in which all the underground facilities are being constructed for the first time must comply with the following regulatory requirements:

*Existing requirements:*

Section 64630. (Title 22 CA Code of Regulations) Water Main Installation

(c) Water mains shall be installed at least:

- (1) Ten feet (3 meters) horizontally from and 1 foot (0.3 meters) higher than sanitary sewer mains located parallel to the main.
- (2) One foot (0.3 meters) higher than sanitary sewer mains crossing the main.
- (3) Ten feet (3 meters), and preferably 25 feet (7.5 meters), horizontally from sewage leach fields, cesspools, seepage pits and septic tanks.

(d) Separation distances specified in (c) shall be measured from the nearest outside edges of the facilities.

(e) Where the requirements of (c) and (d) cannot be met due to topography, inadequate right-of-way easements, or conflicts with other provisions of these regulations, lesser separation is permissible if:

- (1) The water main and the sewer are located as far apart as feasible within the conditions listed above.
- (2) The water main and the sewer are not installed within the same trench.
- (3) The water main is appropriately constructed to prevent contamination of the water in the main by sewer leakage.

(f) Water mains shall be disinfected according to AWWA Standard C601-92 before being placed in service.

(g) Installation of water mains near the following sources of potential contamination shall be subject to written approval by the Department on a case-by-case basis:

- (1) Storage ponds or land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms.
- (2) Solid waste disposal sites.
- (3) Facilities such as storage tanks and pipe mains where malfunction of the facility would subject the water in the main to toxic or pathogenic contamination.

Although the following requirements have not yet been adopted, they should be within the next two years and should be used as guidance for future construction.

*Proposed requirements as of the date of this document:*

Section 64572. Water Main Separation

(a) New water mains and new supply lines shall be installed at least 10 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

- (1) Untreated sewage,
- (2) Primary or secondary treated sewage,
- (3) Disinfected secondary-2.2 recycled water (defined in section 60301.220),
- (4) Disinfected secondary-23 recycled water (defined in section 60301.225), and
- (5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

(b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

- (1) Disinfected tertiary recycled water (defined in section 60301.230), and
- (2) Storm drainage.

(c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.

(d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed perpendicular to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of fluid pipeline.

(e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is eleven feet or less.

(f) New water mains and new supply lines shall not be installed within 100 horizontal feet of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 feet of any cesspool, septic tank, sewage leach field, seepage pit, or groundwater recharge project site.

(g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe.

#### ALTERNATIVE CRITERIA FOR CONSTRUCTION

##### Water Mains, and Sewers and Other Non-potable Fluid-carrying Pipelines

When new water mains, new sanitary sewer mains, or other non-potable fluid-carrying pipelines are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install water mains, sanitary sewer mains, or other non-potable pipelines at a distance less than that required by the regulations [existing Section 64630 (proposed Section 64572)]. In such cases, through permit action, the Department may approve alternative construction criteria. The alternative approach is allowed under the proposed regulation Section 64551(c):

"A water system that proposes to use an alternative to the requirements in this chapter shall demonstrate to the Department how it will institute additional mitigation

measures to ensure that the proposed alternative would not result in an increased risk to public health."

Appropriate alternative construction criteria for two different cases in which the regulatory criteria for sanitary sewer main and water main separation cannot be met are shown in Figures 1 and 2.

- Case 1 - New sanitary sewer main and a new or existing water main; alternative construction criteria apply to the sanitary sewer main.
- Case 2 - New water main and an existing sanitary sewer main; alternative construction criteria may apply to either or both the water main and sanitary sewer main.

#### Case 1: New Sanitary Sewer Main Installation (Figures 1 and 2)

##### Zone Special Construction Required for Sanitary Sewer Main

A Sanitary sewer mains parallel to water mains shall not be permitted in this zone without prior written approval from the Department and public water system.

B If the water main paralleling the sanitary sewer main does not meet the Case 2 Zone B requirements, the sanitary sewer main should be constructed of one of the following:

1. High-density-polyethylene (HDPE) pipe with fusion welded joints (per AWWA C906-99);
2. Extra strength vitrified clay pipe with compression joints;
3. Class 4000, Type II, asbestos-cement pipe with rubber gasket joints;
4. PVC sewer pipe with rubber ring joints (per ASTM D3034) or equivalent;
5. Cast or ductile iron pipe with compression joints; or
6. Reinforced concrete pressure pipe with compression joints (per AWWA C302-95).

C If the water main crossing above the sanitary sewer main does not meet the Case 2 Zone C requirements, the sanitary sewer main should have no joints in Zone C and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99);
2. Ductile iron pipe with hot dip bituminous coating and mechanical joints (gasketed, bolted joints);

3. A continuous section of Class 200 (DR 14 per AWWA C900-97) PVC pipe or equivalent, centered over the pipe being crossed;
4. A continuous section of reinforced concrete pressure pipe (per AWWA C302-95) centered over the pipe being crossed; or
5. Any sanitary sewer main within a continuous sleeve.

D If the water main crossing below the sanitary sewer main does not meet the requirements for Case 2 Zone D, the sanitary sewer main should have no joints within four feet from either side of the water main and should be constructed of one of the following:

1. A continuous section of ductile iron pipe with hot dip bituminous coating; or
2. One of the Zone C options 1, 3, 4, or 5 above.

Case 2: New water mains Installation (Figures 1 and 2)

Zone Special Construction Required for Water Main

A No water mains parallel to sanitary sewer mains shall be constructed without prior written approval from the Department.

B If the sanitary sewer main paralleling the water main does not meet the Case 1 Zone B requirements, the water main should be constructed of one of the following:

1. HDPE pipe with fusion welded joints (per AWWA C906-99);
2. Ductile iron pipe with hot dip bituminous coating;
3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;
4. Class 200, Type II, asbestos-cement pressure pipe;
5. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97) or equivalent; or
6. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C302-99 or C303-95).

C If the sanitary sewer main crossing above the water main does not meet the Case 1 Zone C requirements, the water main should have no joints in Zone C and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99);

2. Ductile iron pipe with hot dip bituminous coating;
3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;
4. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97); or
5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C301-99 or C303-95).

- D If the sanitary sewer main crossing below the water main does not meet the requirements for Zone D Case 1, the water main should have no joints within four feet from either side of the sanitary sewer main and should be constructed as for Zone C.

#### Water Mains and Pipelines Conveying Non-potable Fluids

When the basic separation criteria cannot be met between water mains and pipelines conveying non-potable fluids, the requirements described above for sanitary sewer mains should apply. This includes the requirements for selecting special construction materials and the separation requirements shown in Figures 1 and 2. Note that not all construction materials allowed for sanitary sewer mains will be appropriate for other non-potable fluid lines. For example, certain plastic lines may not be appropriate for the transport of some fuel products. The selection of compatible materials of construction for non-potable fluids is a decision to be made by the project engineer.

#### Water Mains and Sewage Force Mains

- Sewage force mains shall not be installed within ten feet (horizontally) of a water main.
- When a sewage force main must cross a water main, the crossing should be as close as practical to the perpendicular. The sewage force main should be at least one foot below the water main.
- When a new sewage force main crosses under an existing water main, and a one-foot vertical separation cannot be provided, all portions of the sewage force main within eight feet (horizontally) of the outside walls of the water main should be enclosed in a continuous sleeve. In these cases, a minimum vertical separation distance of 4 inches should be maintained between the outside edge of the bottom of the water main and the top of the continuous sleeve.
- When a new water main crosses over an existing sewage force main, the water main should be constructed of pipe materials with a minimum rated working pressure of 200 psig or the equivalent.



### Water Mains and Tertiary Treated Recycled Water or New Supply Lines

The basic separation criteria for water mains and pipelines conveying tertiary treated recycled water or supply lines are a 4-foot horizontal separation where lines are running parallel and a 1-foot vertical separation (water line above recycled or supply line) where the lines cross each other.

When these criteria cannot be met, the Zone A criteria apply where lines are running parallel, and the Zone C and Zone D criteria apply where the lines cross each other as shown on Figures 1 and 2. For these situations, the Zone "P" criteria are in effect and prohibit construction less than 1 foot in parallel installations and less than 4 inches in vertical (crossing) situations.

For tertiary treated recycled water and new supply lines, the Zone B criteria (requirements for special pipe) do not apply as the basic separation criteria is a four-foot horizontal separation criteria for parallel lines. The tertiary treated recycled water lines should be constructed in accordance with the color-coding, and labeling requirements per Section 116815, California Health and Safety Code of Regulations.

### MISCELLANEOUS GUIDANCE

- More stringent requirements may be necessary if conditions such as high groundwater exist. HDPE or similar pipe may be required to provide flexibility to move without potential joint leaks.
- Sanitary sewer mains should not be installed within 25 feet horizontally of a low head (5 psig or less pressure) water main.
- New water mains and sanitary sewer mains should be pressure tested in accordance with manufacturer's specifications.
- When installing water mains, sewers, or other pipelines, measures should be taken to prevent or minimize disturbances of existing pipelines. Disturbance of the conduit's supporting base could eventually result in pipeline failure.
- Special consideration should be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage producing corrosive hydrogen sulfide.

NOTE: Dimensions are from the outside of the water main to the outside of the other pipeline, manhole, or sleeve.