City of Carlsbad

Engineering Standards

Volume 2
Potable and Recycled Water Standards

2022 Edition

CITY OF CARLSBAD ENGINEERING STANDARDS

VOLUME 2 – POTABLE AND RECYCLED WATER STANDARDS

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CHAPTER 1 – GENERAL REQUIREMENTS

1.1 INTRODUCTION

The City of Carlsbad (City) is located along the northern coast of San Diego County, thirty miles north of downtown San Diego. It is bordered to the north by the City of Oceanside, to the south by the City of Encinitas, and the east by the cities of Vista and San Marcos. Carlsbad has a combination of industrial, commercial, and residential development, including a large regional shopping center, an auto-retail center, a large industrial park area, and a regional airport. The City contains three lagoons, extensive agricultural areas, and large tracts of undeveloped land. The total area of the City of Carlsbad is approximately 40 square miles. The north/south transportation corridors in the City are Carlsbad Boulevard, Interstate Highway 5, and El Camino Real.

The Carlsbad Municipal Water District (District) is a subsidiary district of the City with the responsibility of supplying potable and recycled water. The District covers an area of 20,682 acres, approximately 32.3 square miles, and provides potable and recycled water to approximately 82 percent of the City's boundary. The southeast portion of the City is served by Olivenhain Municipal Water District (OMWD) and a small area to the east by Vallecitos Water District (VWD).

These Potable and Recycled Water Standards pertain to water service to lands and the planning, design, construction and inspection of water and recycled water improvements lying within the City of Carlsbad and within the District unless otherwise stated.

The City of Carlsbad is not responsible for the use of all, or any portion of, this document on projects or facilities built or administered by any other public agency or private entity. No representation or warranty of any kind is made concerning the accuracy, completeness, suitability, or utility of any information or product discussed in this document, and the City of Carlsbad assumes no liability arising from such use.

1.2 PROCURING WATER SERVICE

1.2.1 Availability of Service

The current boundaries of the District may be viewed on the water district map located at the following web address:

https://www.carlsbadca.gov/departments/utilities/water

To inquire about availability of water or recycled water service to a specific address within the District's service area, contact Customer Service and Utility Billing at (442) 339-2420. A search of the water purveyor may also be made by using the San Diego County Water Authority's Find Your Water District web page located at:

https://www.sdcwa.org/find-your-water-district/

Availability of service for potable and recycled water is subject to the policies and procedures set forth in these Potable and Recycled Water Standards and District ordinances. Facility design criteria shall conform with the District's Potable Water Master Plan and the Recycled Water Master Plan Update, latest editions. The master plans may be obtained at the following web page:

https://www.carlsbadca.gov/departments/community-development/land-development-engineering/engineering-codes-standards-policies

1.2.2 Preliminary Feasibility Investigation

In some instances, water and/or recycled water studies may be necessary to determine the types, locations and capacities of the facilities required to serve the proposed project. If required, a written agreement between the Developer and the District will be executed, whereby the estimated cost of the studies to be made by the District is deposited in advance. With District approval, the study may be prepared by the Developer's Engineer and approved by the District.

1.2.3 Plan Checking of Proposed Design

The Developer/Engineer shall submit a site plan showing the proposed potable water or recycled water and wastewater system layouts and must include flow demand (in GPM) for fire, domestic and irrigation systems, as applicable (see Rules and Regulations for Use of Recycled Water). The layouts shall be based on the capacities determined in the feasibility studies approved by the District. The Developer will be required to provide an initial fee deposit for discretionary plan reviews (if required), to establish conditions for the development and for plan checking in accordance with the City's latest adopted Master Fee Schedule, after which the preparation of improvement plans can begin.

1.2.4 Agreements, Bonding and Engineering Service Charges

Potable or recycled water system improvements shall be designed by the Developer's Engineer of Work and shall be subject to the review and approval of the District. Developer shall deposit the estimated fees for studies and plan reviews. Bonds will be required for the estimated costs of facilities upon completion of final review. Developer shall make final payment of any balance due or shall receive credit for any surplus deposits. The digital files for all maps and plans shall be submitted in accordance with the City's Standards for the Digital Submittal of Maps and Plans. The Plans will then be approved and signed by the City Engineer, which is hereby defined as the "City Engineer or designee," upon the completion of this process.

The Developer may be required to enter into agreements such as Subdivision supplements, relocation, extension, replacement and/or reimbursement agreements. The conditions are as set forth in Ordinance No. 45, Article VI as adopted on June 2, 2009, as amended.

1.2.5 Responsibility for Furnishing Materials and Installation

Installation of a development's potable and recycled water facilities and any other required facilities will be the obligation of the Developer at his expense. The Developer shall cause all installation work for public water and recycled water facilities to meet the District's "Standard Specifications for the Construction of Potable and Recycled Water Facilities", and upon final acceptance, convey the facilities to the District.

1.2.6 Guarantees

The Developer shall be responsible for all repairs and replacements of the facilities for a period of one year from the date of acceptance at no cost to the District. In the event of failure to comply with the aforementioned conditions, the District is authorized to proceed to have the defects repaired and made good at the expense of the Developer, who shall pay the costs and charges, including attorney fees and other incidental costs, immediately upon demand.

1.2.7 Occupancy Requirements

Upon successful completion of all inspections and tests, including cross connection testing where recycled water systems are on-site, the Developer may apply for temporary occupancy of a unit. The system must be completely installed, tested and deemed operational and accessible to the District's satisfaction, after which, a City of Carlsbad Notice of "Final Building Inspection" will be processed through the City and the District. After its approval, occupancy may occur.

1.2.8 Acceptance of System Procedures

Upon completion of the potable water system, the District will process and issue a "Letter of Acceptability" to the Developer. The units can be occupied thence forth. If the Developer has entered into a District Agreement, the District will also process an "Offer and Acceptance" notice. This requires the City Engineer's approval. After its execution, a copy will be sent to the Developer.

Upon completion of the potable and recycled water systems, the Developer shall furnish to District within fifteen days, a report of the actual cost of the water system, the "As Built" potable water improvement plan, a copy of the recorded easement, tract or parcel map and the electronic file of the street centerline, property boundaries, water system layout and other required features in accordance with the City's Standards for the Digital Submittal of Maps and Plans, or pay a fee to have the maps and plans digitized into AutoCAD format for inclusion in the Carlsbad Municipal Water District GIS system. The fee will be set by the District.

1.2.9 Severability

If any section, subsection, sentence, clause or phrase contained herein is for any reason found to be invalid or unconstitutional, such decision shall not affect the remaining portions of these Potable and Recycled Water Standards. The Board of Directors declares that it would have approved these Potable and Recycled Water Standards by section, subsection, sentence, clause, or phrase irrespective of the fact that any one or more of the sections, subsections, sentences, clauses or phrases be declared invalid or unconstitutional.

1.3 WATER CONNECTION CHARGES, DEPOSITS, AND ENGINEERING FEES

1.3.1 Fees, Charges, and Surcharges

A. Plan Check Deposits and Engineering Fees Paid by Developer:

1. If required by the District, deposit fees to conduct a hydraulic analysis to determine that all District criteria have been satisfied.

2. Deposit initial plan check fees as established by the current City of Carlsbad fee schedule.

3. Pay remaining balance of fees for District's engineering and processing prior to final approval.

4. Collection of reimbursement charges against the property, if required.

B. Charges and Surcharges Collected by City of Carlsbad at Issuance of Building Permit:

1. Connection fee charge.

2. San Diego County Water Authority surcharge for meter size.

1.3.2 Meter Installation Charge

Developers of all residential or commercial/industrial properties shall be required to pay the charges pertinent to the purchase and installation of the water meters. Developer shall make application using form E-27, Application – Water Meter Permit with the City of Carlsbad Finance Department ten (10) days prior to desired installation date. The Developer will submit a plan and/or description of the service location for the meter installation. The Carlsbad Municipal Water District, Meter Services, will install all potable and recycled meters (no exceptions). Meter and installation costs will be charged per the current City of Carlsbad fee schedule.

1.3.3 Inspection Charges

The Developer shall pay to the City of Carlsbad, the inspection fees as established in the City's latest adopted Master Fee Schedule.

1.3.4 Wet Taps and Connections to Existing Pipelines

Wet taps are allowed for 2" and smaller water services or appurtenances. Multiple taps on asbestos cement pipe (ACP) will require replacement of the affected ACP segment (between pipe joints) with PVC pipe. Wet taps are not allowed on steel pipelines. Connection work requiring a pipeline shutdown is subject to approval via a Utility Shutdown/Connection Request (form E-28) and a shutdown fee in accordance with the City's latest adopted Master Fee Schedule.

1.4 REGULATIONS REGARDING BACKFLOW PREVENTION DEVICES

The following provisions are intended to protect the potable water distribution system against actual or potential cross-connections to the user's recycled water system, whether undiscovered or unauthorized. These provisions are in addition to, not in lieu of, the controls and requirements of other regulatory agencies. These provisions are in accordance with Title 17 (Public Health) of the California Code of Regulations (CCR). These regulations are intended to protect the public potable water supply and are not intended to provide regulatory measures for the protection of users from the hazards of cross-connections within their own property.

Approved backflow prevention assemblies on the potable and recycled water services to the property shall be provided, installed, tested, maintained and, when required, replaced by the user at user expense. These assemblies shall be located on the property served immediately downstream of the meter. All devices used shall be readily accessible for testing and maintenance. See City of Carlsbad Engineering Standards, Volume 3, Standard Drawings and Specifications for additional backflow prevention requirements.

At their discretion, representatives of CMWD, City of Carlsbad, the County of San Diego Department of Environmental Health and Quality and any regulatory agency having jurisdiction may conduct property surveys where water or recycled water service is provided by the District. These surveys are to determine if any actual or potential cross-connections exist. The user shall provide full cooperation in facilitating these surveys. Where protection is required, backflow protection shall be provided for potable water service connections in accordance with CCR Title 17 and approved by the State Water Resources Control Board (or State Water Board) as follows:

- Each potable water service connection that supplies water to a parcel that has or will have a recycled water supply shall be protected against backflow by a reduced pressure principle (RP) assembly.

Water meters used for recycled water service shall be tagged or color-coded or otherwise distinguished as such in accordance with AWWA guidelines. These meters shall not be interchanged or used for potable water service after installation, meter testing or repairs have been performed.

The District will inspect, at least annually and test periodically, each site using recycled water for compliance with all District, State, and County regulations regarding the use of recycled water on-site. The testing and/or inspections will include, but not be limited to, the following:

- Coverage test
- Cross-connection tests on all dual-sourced systems at least once every four years or more frequently if required by the County of San Diego, Department of Environmental Health & Quality (DEHQ) and CMWD
- Review of recycled, potable, potable fire protection, and potable water used for irrigation systems
- Identification tags and labels
- Painted identification
- Covers, caps, signs
- Other items that indicate recycled water is being used
- Irrigation controller time schedule and controller charts
- Backflow protection
- All recycled and potable water-related appurtenances
- Site supervisor information is current

CHAPTER 2 – RULES AND REGULATIONS FOR USE OF RECYCLED WATER

2.1 GENERAL REQUIREMENTS AND CONDITIONS

2.1.1 Introduction

The City is dependent on imported water for domestic, agricultural, and industrial uses. The transport of this water requires tremendous energy input which contributes a considerable portion of the total cost to the end user. It is in the best interest of the City to promote and implement innovative water management strategies to conserve water and energy resources while still satisfying water needs of its customers.

The District operates and maintains a recycled water distribution network throughout its service area enabling it to provide tertiary treated recycled water for a variety of beneficial uses. This alternate supply allows large quantities of higher quality potable water to be made available for domestic use.

The production and use of water recycled from municipal wastewater is regulated by the California Regional Water Quality Control Board (RWQCB). California Water Code Sections 13510 and 13551 establishes a state policy to encourage the use of recycled water. Permission to use recycled water is based on the ability to adequately treat domestic wastewater to the point that the recycled water (effluent) meets the requirements of existing Title 22, Chapter 3 regulations of the California Administrative Code. Title 22 was promulgated by the State Department of Public Health to ensure proper health protection and specify the treatment degree to match the intended applications.

In accordance with waste discharge requirements for water recycling projects, the RWQCB requires that Rules and Regulations for facilities using recycled water be established.

A. Purpose

The purpose of these Rules and Regulations is to establish procedures, specifications, and limitations for the safe and orderly development and operation of recycled water facilities and systems in the City serviced area.

B. Goals

1. Achieve conservation of potable water supplies by using recycled water for the maximum public benefit.

2. Prevent direct human consumption of recycled water through:
   - Adherence to all applicable rules and regulations
   - Posting of warning signs by the user
   - Cross-connection/backflow prevention program

3. Control runoff of recycled water through monitoring of the installation and operation of all recycled water facilities and use areas.

C. Policy

It is the policy of the District that recycled water be used for any purposes approved for recycled water use, when it is economically, financially, and technically feasible, as mandated by Ordinance No. 43. The use of potable water for non-domestic uses shall be contrary to District policy, shall not be considered the most beneficial use of a natural resource and shall be avoided to the maximum extent possible.

2.1.2 Service Area

These Rules and Regulations pertain to recycled water service to lands and/or improvements lying within the legal boundaries of the City of Carlsbad and the District unless otherwise stated. The District shall provide recycled water service in accordance with these Rules and Regulations to all areas identified in the Carlsbad Water Reclamation Master Plan and subsequent revisions for the use of recycled water. Recycled water service shall be provided to the service area when related distribution facilities are completed, and service becomes available.

2.1.3 Determination of Recycled Water Use Area

A. General

1. The District may adopt a Water Reclamation Master Plan (Master Plan) designating current and potential areas for recycled water use. The Master Plan shall be in accordance with all regulatory agencies and encourage recycled water use. The Master Plan may be reviewed and updated as needed.

2. The District may review its Master Plan and recommend where recycled water should be provided in place of potable water. Where it is determined recycled water is, or will be available within five years, the District may request modifications to existing on-site water facilities and require construction of recycled water systems in new developments.

3. The District may enter into agreements with cities and/or other water agencies to determine recycled water use areas within the service area/jurisdiction of those entities.

B. Existing Potable Water Service

1. Upon adoption of these Rules and Regulations, and each update of the Master Plan, the District may make determinations of areas where existing potable water use should be converted to recycled water.

C. New Recycled Water Service

Upon submittal by applicant of a tentative map, land use permit, or request for recycled water service, the District shall review the Master Plan and make a preliminary determination if recycled water service should be provided to the area in question.

Based upon the Master Plan, and upon the designation of each recycled water service area or the commencement of the design of new recycled water facilities, the District shall make preliminary determinations as to which existing potable water customers shall be converted to the use of recycled water. Each water customer shall be notified of the basis for a

determination that conversion to recycled water service will be required, as well as the proposed conditions and of the need for a plan of implementation for such conversion.

2.1.4 Authorized Uses

In accordance with the goals of the City, as stated in these Rules and Regulations, the uses of recycled water include only those uses approved by the State Water Board and for which Title 22 of the California Administrative Code provides treatment requirements. Each such use will be considered for approval on a case-by-case basis. Prior to approval and at its discretion, the City or District may set forth specific requirements as conditions to providing service and/or require specific prior approval from the appropriate regulatory agencies.

2.1.5 Conditions of Service

Recycled water service shall be provided by the District only if approval for such service is obtained in the manner provided in these Rules and Regulations. Recycled water service shall be available, provided, and used in accordance with other codes, rules and regulations as listed in Sections 2.1.6 and 2.1.7.

If any of the following conditions are not satisfied, recycled water service may be revoked by the District after which all recycled water deliveries shall cease. Connection to a potable water system will not be allowed.

A. Financial

Conditions relating to service fees and billing shall be the same as established for the potable water system. Rates for recycled water service shall be decided by the agency.

B. Operational

1. Liability:

The City shall not be liable for any damage by water or resulting from:
- defective plumbing
- broken or faulty services of recycled water mains
- on-site facilities failures
- high or low pressure conditions
- interruptions of service

2. Service Basis:

Recycled water will be provided to the user in the conditions and quantity specified in the Water Service Agreement. Recycled water use will not be subject to the same restrictions as potable water during drought conditions.

The following guidelines have been established by the District in conjunction with the San Diego County Department of Environmental Health and Quality (DEHQ) Department. They are intended to provide the basic parameters for the use of recycled water in landscape irrigation. To operate your system in compliance with these guidelines you must:

a. Irrigate between the hours of 10:00 p.m. and 6:00 a.m. only. Watering outside this timeframe must be done manually with qualified supervisory personnel on site. No system shall at any time be left unattended during use outside the normal schedule.

b. Irrigate in a manner that will minimize run-off, pooling and ponding. The application rate shall not exceed the infiltration rate of the soil. Timers must be adjusted to be compatible with the lowest soil infiltration rate present. This procedure may be facilitated by the efficient scheduling of the automatic control clocks, (i.e., employing the repeat function to break up the total irrigation time into cycles that will promote maximum soil absorption).

c. Adjust spray heads to eliminate overspray onto areas not under the control of the customer (pool decks, private patios, streets and sidewalks, etc.).

d. Monitor and maintain the system to minimize equipment and material failure. Broken sprinkler heads, leaks, unreliable valves, etc., should be repaired as soon as they become apparent.

e. Educate all maintenance personnel on a continuous basis of the presence of recycled water. Personnel must be informed that recycled water is meant for irrigation purposes only and is not approved for drinking purposes, hand washing, cleaning of tools, etc. Given the high turnover rate of employees in the landscaping industry, it is important this information be disseminated on a frequent basis. The landscape contractor is solely responsible for educating each one of their employees.

f. Obtain prior approval of all proposed changes and modifications to any private facilities. Such changes must be submitted to and approved by the District and DEHQ and designed in accordance with District Standards.

g. An annual inspection will be done by the District. Copies of inspection reports will be forwarded to the DEHQ.

h. An on-site user/supervisor shall be designated in writing. This individual shall be familiar with plumbing systems within the property, with the basic concepts of backflow/cross connection protection, and the specific requirements of a recycled water system. Copies of the designation, with contact phone numbers shall be provided to the County of San Department of Environmental Health & Quality and the District.

In case of emergency contact:

_____ _____

(Name) (Tel. No.)

After hours contact:

_____ _____

(Name) (Tel. No.)

Failure to comply with any or all the above guidelines is a violation of the District's Rules and Regulations and will result in termination of service until the appropriate corrective steps have been taken.

2.1.6 California Regional Water Quality Control Board Conditions

A. "Provision will be made authorizing the Regional Board, the producer, the purveyor, or an authorized representative of these parties, upon presentation of proper credentials, to inspect the facilities of any recycled water user to ascertain whether the user is complying with the purveyor's rules and regulations."

B. "Provision will be made requiring recycled water users to designate a recycled water supervisor responsible for the recycled water system at each use area under the user's control. Recycled water supervisors should be responsible for the installation, operation, and maintenance of the irrigation system, enforcement of the purveyor's recycled water user rules and regulations, prevention of potential hazards, and maintenance of the recycled water distribution system plans in "as built" form." (Per Order No. 2001-352).

C. "Notification shall be given to recycled water users that the CMWD may initiate enforcement action against any recycled water user who discharges recycled water in violation of any applicable discharged prohibitions prescribed by the Regional Board or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in California Water Code Section 13050."

D. "Notification shall be given to recycled water users that the Regional Board may initiate enforcement action against the purveyor, which may result in the termination of the recycled water supply, if any person uses, transports, or stores such water in violation of the purveyor's rules and regulations or in a manner which creates conditions of pollution, contamination, or nuisance, as defined in California Water Code Section 13050."

E. "Pursuant to the Regional Board Regulations, a provision requiring all recycled water storage facilities owned and/or operated by recycled water users shall be protected against 100-year peak stream flows as defined by the San Diego County flood control agency, except as authorized by the Regional Board Executive Officer." (per Section C.1.j. of Order No. 91-60).

F. "Provisions shall be made requiring all recycled water storage facilities owned and/or operated by recycled water users to be protected against erosion, overland runoff, and other impacts resulting from a 100-year frequency, 24-hour storm, except as authorized by the Regional Board Executive Officer." (per Section D.1.k. of Order No. 91-60).

2.1.7 Other Applicable Codes, Rules, and Regulations

A. Other applicable guidelines, rules and regulations, ordinances and specifications that govern the use of recycled water include the latest adopted versions of the following:

Agency/Organization	Document #	Document Title
California Dept. of Public Health	Title 22 Division 4	Wastewater Reclamation Criteria
California Dept. of Public Health	Title 17	Regulation Relating to Cross-Connections
California-Nevada Section American Water Works Association	-	Guidelines for Distribution of Non-potable Water
Foundation for Cross-Connection Control and Hydraulic Research, School of Engineering University of Southern California	-	Cross-Connection Control Policy Handbook
State of California		California Plumbing Code

2.2 ADMINISTRATIVE REQUIREMENTS

2.2.1 Permit Application Process

A completed application for recycled water service must be submitted to the District by the owner, or authorized representative of the property which is intended to be served with recycled water. District approval shall be in addition to any other permits and conditions required by other regulatory agencies.

The District shall furnish the application form upon request by prospective users.

A. Applicant Information

1. The applicant shall supply information concerning:

- Applicant's relationship to the subject property as legal owner, tenant, or lessee
- Description of recycled water use on the property
- Legal description of property
- Technical information (listed on the application form)
- Total irrigated areas
- Special conditions (other items that could be of concern when using recycled water)
- A drawing of the property on one, 8-1/2 x 11 paper sheet, include/show:
  - Location of service connection, recycled and potable water main lines
  - Size of service connection
  - Use of area location
- Areas to be served with recycled water and areas excluded from recycled water service
- A brief description of all special construction requirements

2. The applicant shall agree, by signature on the application form, to comply with these rules and regulations and all other applicable and governing documents.

B. Application Package

1. Completed application form

2. Required drawing(s)
3. Required fees and deposits

C. Application Review

Upon receipt of a completed application package, the District shall review the material and respond within 45 calendar days of receipt of the application package. The District may request additional information it deems necessary. The District shall determine if the property to be served is in a suitable area for recycled water use, and if the necessary quantity and quality of recycled water can be made available to the applicant. The District may prescribe specific requirements for service which may concern:

1. Additional facilities to be constructed
2. Manner of construction
3. Financial responsibility
4. Use of recycled water

D. Application Approval

Upon successful completion of its review, the District shall submit the application package to the County of San Diego Department of Environmental Health & Quality and the State Water Board for their approval.

Upon approval of the application package by the San Diego County DEHQ and the State Water Board, the applicant will be requested to submit detailed construction plans (blueprints), the construction schedule and pay required fees to the City.

2.2.2 Conditions for Recycled Water Use

District approval, in the form of an agreement or permit, for Recycled Water Service shall be obtained by the user prior to receiving recycled water on any property.

Permits/Agreements to receive recycled water service shall be subject to the following conditions:

A. The applicant shall adhere to requirements prescribed by these rules and regulations and to all additional requirements prescribed by all governing agencies pertaining to recycled water service.

B. The applicant shall pay specified connection fees, service line charges and other charges prior to issuance of the permit.

C. In order to maintain acceptable working conditions throughout the recycled water system, the District may schedule operational hours for recycled water use. Such scheduling may involve programming deliveries to different users and/or to various portions of a single applicable constraint of all involved regulatory agencies, these Rules and Regulations, and the operating constraints of the affected users.

D. The District may temporarily suspend recycled water service at any time the recycled water quality at the District recycling plant does not meet the requirements of the regulatory agencies. Recycled water service would, in such case, be restored when the recycled water meets the governing requirements at the terminal point of the treatment plant. The District may provide

recycled water service from other approved sources. In addition, the District may provide potable water to the recycled water system to improve water reliability but is not required to do so.

E. The District may apply for and process all applicable regulatory agency permits. The cost and preparation of any study or report necessary to comply with the California Environmental Quality Act (CEQA) or other regulatory requirements shall be the responsibility of the applicant.

F. The use permit or agreement shall come into force after the project has been completely constructed, tested, and been approved by the involved agencies.

G. A copy of the current permit or agreement must be available for review at all times, clearly visible at the use site, and on file at the user's office.

H. The use permit or agreement shall include the following:

1. Name and address of owner and user

2. A statement that no changes in the proposed system will be undertaken without application for and issuance of an amended agency permit

3. A statement that the applicant recognizes potential penalties for violation of the rules and regulations of the District and any regulatory agencies

4. Specific quantity of recycled water to be used

I. The following must be identified:

- Average annual HCF used
- Maximum GPM needed at the POC as shown on the plans

1. Permitted/approved uses

2. Rate(s) charged for recycled water

3. Property location and estimated irrigated areas

J. The use permit shall stay in effect indefinitely, but shall be canceled if:

1. A change of ownership occurs

2. A change of user occurs

3. A change of recycled water use occurs

4. A violation of these rules and regulations occurs and results in a system shut-off

2.2.3 Contracts/Agreements

In lieu of a permit, the District may choose to enter into a contract or agreement with the applicant. All contracts for recycled water shall be subject to these Rules and Regulations. No applicant shall

be entitled to a contract unless authorized by the District. The terms and conditions of contracts authorized by the District shall be established by the District, in its sole discretion. Each contract must be in writing and be approved by the District to be valid. The District is not obligated by these rules and regulations to approve any contract.

2.2.4 Rates, Fees, Charges and Deposits

A. General

All rates and fees regarding recycled water service and their administrative costs shall be fixed and established by the District.

Applicants for recycled water service shall pay for the construction of facilities needed to deliver recycled water to the applicant's property. All fees and estimated construction costs shall be paid prior to construction.

B. Change of Rates or Charges

The District reserves the right to change the schedule of recycled water rates, service charges and any other charges, deposits, or fees at any time. These changes are subject to the terms of any existing recycled water service permits (and/or agreements) and will be made by appropriate action of the Board.

C. Temporary Service

The recycled water rate for all water sold through temporary meters shall be the same as the construction recycled water rate. The charges for recycled water sold through temporary meters shall be billed and paid on a monthly basis.

CHAPTER 3 – DESIGN PROCEDURES AND GUIDELINES

3.1 DESIGN PROCEDURES

3.1.1 Potable Water

The Developer will meet with the Engineering Department and bring a preliminary site plan showing the potable water system layout. Before submittal of layout, the Developer must, in sequence, do the following:

A. Meet with the City Fire Marshal and determine the requirements for fire protection equipment.

B. Prepare a colored recycled water use map (if recycled water is available) and submit to the City Planning Department for processing and approval.

C. Schedule a meeting with the Engineering Department for review, comment, and approval of the preliminary water system plan including potable water demands (GPM) prior to the preparation of mylar improvement plans.

The site plan to be used for the layout must show the existing and proposed underground utilities (sewer, electric, gas, storm drain, etc.), the paved areas, the slopes and signs and structures which will affect the potable water system layout. The project may be approved upon the express condition that building permits will not be issued for development of the subject property unless the water and sewer districts serving the development determine that adequate water service and sewer facilities are available at the time of application for such water service and sewer permits and will continue to be available until time of occupancy.

Existing water lines that will no longer be used shall be removed to the extent feasible. Pipe abandonment shall conform to City of Carlsbad Engineering Standards, Volume 3, Standard Drawings and Specifications, Chapter 5.

3.1.2 Recycled Water

The Developer will meet with the Engineering Department and bring a site plan showing the recycled water site use area and system layout in purple ink. Before submittal of layout the Developer must, in sequence, do the following:

A. Meet with his landscape designer and establish the irrigation demands (GPM) for all landscaped areas and establish the service connection point(s).

B. Obtain and consolidate the existing and proposed water system improvement plans onto the recycled water layout plan and include proposed connection points.

C. The site plan to be used for the layout must show the existing and proposed underground utilities (potable water, sewer, electric, gas, storm drain, etc.), paved areas, slopes and signs and structures which will affect the recycled water system layout.

3.2 PLANNING AND DESIGN CRITERIA

3.2.1 Water Flow Generation

The following domestic water supply demands are used in the development of the water system.

A. Residential

Average daily flow: Single Family, per dwelling unit - 450 GPD
Multi-Family, per dwelling unit - 185 GPD

B. Non-Residential

Average daily flow: 1,500 GPD/acre

C. Fire Flow

The Engineer of Work shall determine the required fire flow capacity and flow duration based on the latest California Fire Code, Table B105.1 and National Fire Protection Association standards adopted by the City. The Engineer of Work shall obtain approval of the project-specific fire flow criteria from the Fire Marshal. In case of conflict, the more stringent requirement shall apply. The following guidelines are for preliminary planning purposes only.

	Fire Flow (GPM)			
Fire Flow Calculation Area (SF)	Commercial/Residential No Sprinkler System	Commercial/Residential w/Auto Sprinkler System	Flow Duration (Hrs.)	Min. No. Hydrants
≤ 3,600	1,500/1,000	1,500/1,000	2	1 / 1
≤ 13,400	3,000	1,500	3	3 / 1
≤ 23,300	4,000	2,000	4	4 / 2
≤ 36,000	5,000	2,500	4	5 / 3
≤ 51,500	6,000	3,000	4	6 / 3
≤ 69,600	7,000	3,500	4	7 / 4
≥ 85,101	8,000	4,000	4	8 / 4

3.2.2 Facility Sizing Criteria

A. Water System Design Criteria

1. Minimum static pressure of 60 PSI.

2. Maximum static pressure of 125 PSI. Pressures up to 150 PSI may be allowed with specific approval of the City Engineer.

3. The elevation of the tank floor of existing or proposed tanks shall be the basis for determining the minimum static pressure. The elevation of the tank overflow shall be the basis for the maximum static pressure.

4. For pipelines served by pressure regulating stations, the pressure control valve set point of the supply station, as provided by the District, shall be the basis for determining the maximum static pressure.

5. Use existing pressure zones to the extent possible. A request for the creation of a new pressure zone shall be supported by a hydraulic study and approval shall be at the sole discretion of the District.

6. Pressure zone overlap (where one zone can be served by an adjacent zone) shall be included at the boundary of a new pressure zone when required by the District. In such case, the maximum elevation difference between the two zones shall not exceed 100 feet.

7. A regulated pressure zone shall be served by two or more pressure regulating stations. The distribution of hydraulic demands for each station shall assume one pressure regulating station is out of service.

8. Pressure regulating stations shall have not less than two pressure control valves. One of the valves shall be sized for the average day demand of the pressure zone. The total capacity of the pressure regulating station shall be the greater of a) maximum day demand plus fire flow or b) peak hour demand of the entire pressure zone.

B. Hydraulic analysis of the water system dynamic pressures shall meet the following requirements or as specified in the latest adopted Potable Water Master Plan:

1. Dynamic pressures shall be analyzed with reservoir levels half full.

2. Under peak hour demand and no fire flow, minimum pressure should be no less than 40 PSI and maximum pipeline velocity shall be 8 ft/s. Maximum head loss shall not exceed 10 feet/1000 feet of pipe.

3. Under maximum day demand plus fire flow:
   a. pumps shall be assumed to be off, and 100 percent of the fire flow requirement delivered from storage tanks,
   b. pressure in the system shall not be less than 20 PSI for the period of the fire incident (with reservoir levels half full),
   c. Maximum allowable pipeline velocity shall be 15 ft/s, and
   d. maximum allowable velocity through pressure regulating station control valves shall be 15 ft/s.

4. The maximum pressure drop between static and dynamic pressures shall not exceed 25 PSI.

5. At least two sources of water which can be independently isolated (generally from two different streets) should be available for each development (i.e., looped system). Dead-end water lines longer than 150 feet are generally not permitted without special approval. A water supply source served by a pressure regulating station that has only one pressure control valve will not satisfy the requirement for a redundant supply source.

6. Dead-end water lines are to serve no more than 18 residences. A looped water system is required for 19 or more residences or where required at the District's discretion.

Commercial/Industrial developments require looped water systems unless approved otherwise by the District and the Fire Marshal.

7. No more than one fire hydrant shall be allowed on a dead-end water line. Water systems requiring 2 or more fire hydrants shall be looped.

8. The minimum pipeline diameter for public water mains serving a hydrant, a fire service or more than four residences shall be 8 inches.

9. When water pipelines require upsizing due to hydraulic analyses or because the existing pipe materials do not meet District standards, the adjoining tees and valves at the ends of the affected pipe segment shall also be upsized or replaced to the diameter substantiated by hydraulic analyses and in accordance with District standards.

10. Approved double check detector assemblies (DCDAs) are required for all non-residential fire sprinkler systems, including schools and commercial developments, in accordance with CMWD standards. A higher degree of protection may be required depending on the degree of hazard in accordance with Title 17, CCR Section 7604.

3.2.3 Water Master Plan Peaking Factors

Average Day Demand (ADD)	1.0
Maximum Month Demand (MMD)	1.4 x ADD
Maximum Day Demand (MDD)	1.60 x ADD
Peak Hour Demand (PHD)	2.90 x ADD

3.3 LOCATION, TYPE AND SIZE OF WATER FACILITIES

3.3.1 Distribution Lines

Distribution lines are defined as 8-inch through 12-inch in diameter and shall be polyvinyl chloride (PVC) conforming to AWWA C900, DR 18 or DR 14 as shown on the Plans or where specified.

3.3.2 Transmission Mains

Transmission main pipe shall be either (PVC) conforming to AWWA C900 for 14- and 16-inch diameters or, for 18-inch and larger diameters, pipe and fittings shall be cement mortar-lined and tape coated steel with cement mortar shield conforming to AWWA C200, C205, C209 and C214. Steel pipelines shall be designed and constructed with cathodic protection in accordance with District standards.

3.3.3 Temporary Above Ground Piping (High Line)

High line piping, where shown on the Plans or required by the City Engineer, shall be furnished, installed, disinfected, connected, maintained, and removed by the Contractor per the requirements of Specification section 15000. All high line piping systems shall have a minimum pressure rating equal to 150 psi or the maximum working pressure of the water supply distribution system, whichever is greater. High line piping systems shall be fully restrained, and all components shall be NSF 61 approved.

3.3.4 Isolation Valves

Isolation valves shall be placed every 500 feet for potable water distribution lines and 1,000 feet for recycled water distribution lines and potable water transmission lines or every 58 feet of elevation difference, whichever occurs first.

3.3.5 Valves for 16-inch and Smaller Pipelines

Valves for potable and recycled water pipelines (16-inch and smaller) shall be resilient wedge gate valves per the Approved Materials List, Appendix C. In locations where 4-inch recycled water mains or services are allowed, the valve on the tee branch at the main shall be 6-inch.

3.3.6 Valves for 18-inch and Larger Pipelines

Valves for potable and recycled water pipelines 18 inches in diameter and larger shall be flanged butterfly valves per the Approved Materials List, Appendix C.

3.3.7 Valve and Appurtenance Locations

A. Water valves shall be placed on all branches of tees and crosses and with manual air release or blow-off assemblies, as appropriate (exception will be fire hydrant tees).

B. Fire hydrant locations and model type shall be established by the Fire Marshal and will be placed at common lot lines, end or beginning of curb returns and a minimum of five feet (5') from the edge of driveway.

C. Two-inch (2") manual air release or two-inch (2") blow-off assemblies shall be placed at all ends of pipelines (i.e., cul-de-sacs) as required.

D. Air-vacuum assemblies (AVA) shall be installed at pipeline high points and elevated dead-ends of the system. Minimum size of AVA shall be 2-inch.

3.3.8 Horizontal Location of Water Pipelines

A. Potable Water

Horizontal location: Centerline of potable main to face of curb shall be seven feet (7') and on the opposite side of the street from the recycled water main. Potable main shall be on the easterly side of a north-south street and on the southerly side of an east-west street.

B. Recycled Water

Horizontal location: Centerline of recycled main to face of curb shall be twelve feet (12') and on the opposite side of the street from the potable water main. Recycled main shall be on the westerly side of a north-south street and on the northerly side of an east-west street.

C. Horizontal Curvature / Bending

Neither longitudinal bending of the pipe or deflection of bell-and-spigot joints is allowed on PVC C900 pressure pipe. Joint deflection shall be accomplished with ductile iron fittings or deflection couplings designed for use with PVC C900 pipe. Deflection couplings shall be

selected from the Approved Materials List and actual deflection shall not exceed 80% of the manufacturer's written recommendations.

Generally, the maximum deflection requirement referenced above will provide 2° deflection per joint for a maximum of 4° total deflection at each deflection coupling. Deflection couplings are allowed on PVC C900 pipe for pipe sizes 4" through 12". Deflection on larger diameter PVC pipe shall use ductile iron mechanical joint sleeves, bend fittings or specialty couplings specifically designed to accommodate joint deflection.

D. Relocation

Any pipeline that would be situated, upon development or improvement of a property, beneath curbs/gutters, sidewalks, landscaped areas or less than 5 feet from subsurface structures or stormwater infiltration devices shall be replaced and relocated per current engineering design standards to a traveled lane in the public right-of-way and at least 5 feet away from such improvements.

3.3.9 Vertical Location of Water Pipelines

A. Potable Water

Vertical location:

1. 42 inches minimum cover, top of pipe to finish grade.

2. Potable water main shall be 12 inches above the recycled water main.

3. Exceptions may be allowed with special design and prior written approval to eliminate appurtenances or if field conditions pose an unavoidable conflict or constraint, with three feet (3') minimum cover at isolated locations.

4. In all cases, a minimum of 24 inches shall be required and maintained between the subgrade cut for roadway base material and top of pipe.

B. Recycled Water

Vertical location:

1. 54 inches minimum cover, top of pipe to finish grade.

2. The recycled water main shall be twelve inches (12") below the potable water main.

3. Exceptions may be allowed with special design and prior written approval to eliminate appurtenances or if field conditions pose an unavoidable conflict or constraint, with four feet (4') minimum cover at isolated locations.

4. In all cases, a minimum of thirty inches (30") shall be required and maintained between the subgrade cut of base material and top of pipe.

3.3.10 Separation Between Potable and Non-Potable Fluid Pipelines and Other Underground Utilities

The California Waterworks Standards (California Code of Regulations (CCR), Title 22, Division 4, Chapter 16, Section 64572) establish criteria for the separation of potable water mains and non-potable fluid pipelines.

A. Ten feet (10') minimum horizontal separation and one-foot vertical separation between potable water and any parallel pipeline conveying:

   1. Untreated sewage,

   2. Primary or secondary treated sewage,

   3. Disinfected secondary-2.2 recycled water,

   4. Disinfected secondary-23 recycled water, and

   5. Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

B. Four feet (4') minimum horizontal separation and one-foot vertical separation between potable water and any parallel pipeline conveying:

   1. Disinfected tertiary recycled water, 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 potable water main.

D. If crossing a pipeline conveying a fluid listed in A or B above, a new water main shall be constructed no less than 45-degrees to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of the non-potable fluid pipeline.

E. The vertical separation specified in A, B, and C above is required only when the horizontal distance between a water main and pipeline is less than ten feet.

F. New water mains shall not be installed within 100 horizontal feet of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 horizontal feet of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.

G. The minimum separation distances set forth herein shall be measured from the nearest outside edge of each pipe barrel.

H. With State Board approval, newly installed water mains may be exempt from the separation distances herein, except paragraph F, if the newly installed main is:

   1. less than 1320 linear feet,

   2. replacing an existing main, installed in the same location, and has a diameter no greater than six inches more than the diameter of the main it is replacing, and

3. installed in a manner that minimizes the potential for contamination, including, but not limited to:
    a. sleeving the newly installed main, or
    b. utilizing upgraded piping material per CCR Title 22, Section 64570 and as approved by the District.

I. The design pipeline profile drawings shall identify all utility crossings. Water, sewer, and recycled water shall be located vertically in the order of the higher quality, i.e., potable water shall be above recycled, and recycled above sanitary sewer.

J. Special situations not meeting the separation requirements shall require the approval of a variance from the California Water Works Standards and will require District and State approval.

K. Water services shall be located 10 feet horizontally from all other wet and dry utilities (i.e., fire hydrants, light standards, electrical transformers, sewer laterals, etc.). Where this is not practical, the minimum separation may be reduced to 5-feet with District approval.

3.3.11 Water Service, Meter and Appurtenances

A. Each separately owned parcel of property shall have a dedicated service and meter. For parcels with more than 4 dwelling units or multi-family developments, the District may require the parcel be served by at least one water service connection and master meter, or two water service connections and master meters for a looped water distribution system, as approved by the District.

B. The water service installation must be inspected and approved by the City Inspector before installation of the meter by the District.

C. Copper tubing shall be used for all 2” and smaller service laterals (minimum 1” to maximum 2”). Copper tubing size 1-1/2” is not allowed.

D. Existing 1” and 2” water services that are to be extended in length shall be removed and replaced from the water main to the meter unless otherwise approved by the District.

E. A water service or meter shall not be placed within any sidewalk or driveway area. Any non-conforming installations shall be removed completely and reinstalled in an approved location at the expense of the property owner.

F. Where meters and meter boxes must be located within slopes, the meters and boxes shall be installed parallel to the slope surface with the top of the meter box set 2” above soil grade.

G. All irrigation meters shall be paid for by the Owner/Developer. Payment will be made to the City of Carlsbad Finance Department. A meter application will be processed, after which the District’s Meter Services section will schedule the installation of the meter(s).

H. All non-residential water meters will require a reduced pressure principle (RP) backflow prevention device directly behind the meter.

I. Residential fire flow meters, as required by the Fire Marshal, shall be installed in accordance with the CMWD Standard Drawing for domestic water service connection with fire sprinkler system.

J. Water meters for residential units shall be 5/8" meters, except where the residential unit is larger than 3,500 square feet or the lot size is greater than ¼ acre, in which case a ¾" meter shall be required.

K. Non-residential water meters shall be sized in accordance with the California Plumbing Code, "Appendix A", and the requirements of the Carlsbad Municipal Code. The final meter size will be based on the applicant's projected demand and meter capacity as approved by the District.

L. Water services shall not be connected to transmission mains as defined herein without special approval of the District.

M. When new connections for water or fire services or appurtenances are proposed to ACP, the ACP shall be replaced with pipe material conforming with District standards. The limit of pipe replacement shall extend to the outermost limits of the affected ACP segments along the project frontage.

3.3.12 Easement Requirements

If an easement is required for construction and/or maintenance of potable water mains, the minimum width shall be 20 feet and the pipeline shall be in the center of the easement, unless otherwise determined by the District. An easement running parallel with common lot lines shall not be split to occur on two lots. Easements shall also be shown on the construction plans. The District will grant its consent to issue permits only after all required easements have been deeded and recorded to the District together with any necessary partial reconveyance or subordination agreements.

When facilities such as water service and meters, backflow prevention devices, air vacuum assemblies, etc., are to be located at back of sidewalk and/or curb in private streets, the minimum width and extension of the easement shall be five feet (5') beyond the facility.

CHAPTER 4 – CONSTRUCTION INSPECTION PROCEDURES

4.1 GENERAL REQUIREMENTS

A. The City Engineer shall have the right to inspect the work and materials at the place of manufacture during business hours. The manufacturer shall provide reasonable access to determine the progress and manner of the work and the character and quality of materials used.

B. All piping, fittings, valves and appurtenances shall be inspected for damage or defects in material and workmanship. All damaged or defective materials shall be rejected and removed from the job site.

C. Any damage to the system during testing or construction shall be reported to the Inspector. Appropriate methods of repair must be approved and re-inspected.

D. Repair of Developer's system for damage caused by others during construction shall be done under the Inspector's direction by a qualified contractor.

E. Repair of the District's public potable or recycled water systems will be done by or at the direction of District and the Inspector. All expenses will be Contractor's and/or Developer's responsibility.

F. All work performed without the Inspector's verification will be subject to rejection until plan and specification conformance can be verified by the Inspector.

G. All work shall be subject to inspection and shall be left open and uncovered until approved by the Inspector. Inspection hours: 7:00 a.m. to 3:30 p.m., Monday through Friday (excepting City/District holidays).

H. The Contractor shall not proceed with any subsequent phase of work until the previous phase has been inspected and approved by the Inspector.

4.2 INSPECTION PROCEDURES

4.2.1 Field Inspection

During construction, the City's Inspector will inspect the following items or phases:

A. All materials delivered to the site prior to installation.

B. Construction staking by surveyor for compliance with the plans.

C. Trench excavation, pipe bedding and excavation for thrust blocks.

D. Placement of pipe, fittings, and structures prior to backfill

E. Concrete placement for thrust blocks (Inspector must be present)

F. Placing and compacting the pipe zone backfill and placement of warning tape and tracer wire

G. Backfilling of the trench zone to grade. Compaction testing to be performed by governing agency in public right-of-way, and by soils engineer retained by the Developer and acceptable to the District in private streets and easements. Copies of test results shall be given to the Inspector for approval before final acceptance of the work.

H. All main line and fire hydrant valves shall be maintained to be accessible during construction. Valve nuts deeper than 48 inches of cover will require an extension.

I. Pressure testing and chlorination of all water mains, services and appurtenances.

J. Repaving trench cuts (if necessary).

K. Raising valve box covers to finish grade and painting.

L. Installation of service lines and meter boxes.

4.2.2 Interpretation of Specifications and Drawings

Figured dimensions of the drawings shall govern but work not dimensioned shall be as directed. Work not particularly shown or specified shall be the same as similar parts that are shown or specified or as directed. Details shall take precedence over scale drawings as to dimensioning and details of construction. Specifications shall govern as to material. Scale drawings, details, and specifications are intended to be fully cooperative and to agree. The Contractor shall be fully responsible for damage, defect or rework resulting from any discrepancy or apparent difference between the plans and specifications or by deficiency in work constructed by others when the Contractor proceeds with the work without instruction or clarification from the District.

4.2.3 Revision of Approved Plans

Contractor/Developer must obtain written approval of any plan or field changes and shall coordinate this approval through the City's Inspector.

4.2.4 Final Inspection

A. The final inspection will be performed when all items on the signed plans and related specifications are complete. This will be at the end of the project after all paving, sidewalks, barricade, street lights, etc. have been completed.

B. A punch list of incomplete items will be provided by the Inspector. When these items are cleared, and before final acceptance, the City's Inspector and the District's Operations Superintendent will make a final inspection of all work, accompanied by the Contractor's Superintendent or Foreman, to verify that:

1. All phases of the job are complete in accordance with plans and specifications.

2. Valve boxes are raised to finish grade and that all repairs are complete.

3. Angle meter stops, meters, and customer service valves are properly positioned, and all meter boxes are positioned and raised to proper grade and meters installed.

4. Backfill has passed all compaction testing.

5. Isolation valves are open unless specified to remain normally closed.

6. Line pressure testing and disinfection has been completed.

7. The jobsite is clean and cleared of all the Contractor's equipment and materials.

4.3 WATER SERVICE PRIOR TO ACCEPTANCE

The City Inspector may approve placing newly installed water lines into service after compaction has been approved by the governing agency and the lines have been pressure tested and disinfected. This partial acceptance shall be granted only upon written request from the Developer and subsequent approval by the City Engineer or his designated representative. Nothing in this section shall be construed as relieving the Developer of the responsibility for completing the work in its entirety, for making good any defective work and materials, for protecting the work from damage, and for being responsible for damage and for work as set forth in agreements, permits or other contract documents; nor shall such action by the District be deemed completion and acceptance, and such action shall not relieve the Developer of the guarantee provisions of the Agreement with the District.

CHAPTER 5 – REQUIREMENTS FOR ON-SITE (PRIVATE) RECYCLED WATER SYSTEMS

5.1 DESIGN REQUIREMENTS

5.1.1 Determination of Recycled Water Use

As set forth in the District's "Rules and Regulations for Use of Recycled Water", the District shall determine whether a given service will be furnished with recycled water or potable water. These water quality requirements as set forth in Title 22, Chapter 4 of the California Administrative Code are with the intent of the District to protect the Public Health, and with the availability and/or feasibility of making available recycled water facilities.

5.1.2 Requirements for Temporary Potable Water Service

As set forth in the District's "Rules and Regulations for Recycled Water Service", where recycled water is not immediately available for use when the design area is ready for construction and the District has determined that recycled water will be supplied in the future, the private facilities shall be designated to use recycled water.

The private system shall be designed and constructed to the District's Construction Specifications as set forth herein. Provisions shall be made as directed by the District and these specifications followed to allow for connection to the recycled water facilities when they become available. In the interim, potable water will be supplied to the recycled water facilities through a temporary potable meter connection. Until recycled water is available, potable water rates will be charged as set forth in the District's Rules and Regulations. A backflow prevention assembly acceptable to the State Water Board and County of San Diego DEHQ and the District will be required as a condition of potable water service. All potable or recycled water irrigation services shall have backflow prevention assemblies. The backflow prevention assembly shall be downstream of the meter and a part of the private facilities. When recycled water becomes available, the owner will make the connection to the private facility after a successful cross connection test and all other requirements are satisfied.

5.1.3 Prohibitions and Limitations

Design of private recycled water facilities shall conform to the following:

A. The recycled water system shall be separate and independent of any potable water system. Cross connections between potable water facilities and private recycled water facilities are forbidden.

B. Hose bibs on recycled water systems are forbidden.

C. Drinking fountains shall be protected from the spray or misting of recycled water (in a manner approved by the District Engineer).

D. Limit or prevent overspray, run-off or ponding.

E. Potable and recycled lines are to be separated horizontally by ten feet (10') or by a mow strip installed according to District requirements.

F. Recycled water shall not be used for any purpose other than the approved uses as set forth herein.

G. The system shall be designed to irrigate the designated area within the allowable time periods as set forth herein.

5.1.4 Control of Run-Off and Application Areas

The District encourages new and innovative methods of irrigation. The use of drip or subsurface irrigation may prove effective in the reduction of total water consumption and control of unnecessary run-off by containment of the water to the designated area.

In accordance with the requirements of the District's Rules and Regulations for control of run-off and for control of the areas to which recycled water is applied, the design of irrigation systems shall conform to the following:

A. The private recycled water facilities shall be designed to meet with the peak moisture demand of all plant materials used within the design area. The use of moisture sensors is encouraged.

B. Private recycled water facilities shall be designed to prevent discharge onto areas not under control of the customer. Appropriate sprinklers shall be used adjacent to roadways and property lines to confine the discharge from sprinklers to the design area.

C. The design of the private recycled water irrigation facilities shall provide for watering during the periods of minimal use of the service area. This is normally between the hours of 10:00 p.m. and 6:00 a.m. or as approved by the District. Consideration shall be given to allow a maximum dry out time before the design area will be used by the public.

D. The total time required to irrigate the design area shall not exceed 8 hours in any 24-hour period. Irrigation systems shall be designed to operate within this time requirement.

E. Recycled water shall be applied at a rate that does not exceed the infiltration rate of the soil. Where varying soil types are present, the design of the recycled water facilities shall be compatible with the lowest infiltration rate present. Copies of the Developer's soils test reports shall be made available to the District upon request.

5.1.5 Drinking Fountains

Exterior drinking fountains must be shown and called out on the recycled water system plans. If no exterior drinking fountains are present in the design area, it must be specifically stated on the plans that none exist. The potable water line supplying the drinking fountain must have warning tape installed and shall be so stated on the plans. Drinking fountains must be protected from the direct spray or misting of recycled water either by proper placement of the drinking fountain within the design area or with the use of a covered fountain approved for this purpose.

5.1.6 Guidelines for Recycled Water Use

The following guidelines have been established by the Carlsbad Municipal Water District in conjunction with the San Diego County Department of Environmental Health. They are intended to provide the basic parameters for the use of recycled water in landscape irrigation. To operate your system in compliance with these guidelines you must:

A. Irrigate between the hours of 10:00 p.m. and 6:00 a.m. only. Watering outside this time frame must be done manually with qualified supervisory personnel on-site. No system shall at any time be left unattended during use outside the normal schedule.

B. Irrigate in a manner that will minimize run-off, pooling and ponding. The application rate shall not exceed the infiltration rate of the soil. Timers must be adjusted to be compatible with the lowest soil infiltration rate present. This may be achieved with automatic control clocks by scheduling the total irrigation duration into repeated cycles of shorter duration to promote maximum soil absorption.

C. Adjust spray heads to eliminate overspray onto areas not under the control of the customer (pool decks, private patios, streets and sidewalks, etc.).

D. Monitor and maintain the system to minimize equipment and material failure. Broken sprinkler heads, leaks, unreliable valves, etc., should be repaired as soon as they become apparent.

E. Educate all maintenance personnel on a continuous basis of the presence of recycled water and the fact that it is not approved for drinking purposes. Given the high turnover rate of employees in the landscape industry, it is important this information be disseminated on a frequent basis.

F. Obtain prior approval of all proposed changes and modifications to any private facilities. Such changes must be submitted to, and approved by, the District Engineer and designed in accordance with District Standards.

G. An annual cross connection inspection will be done by the Carlsbad Municipal Water District.

H. An on-site user/supervisor shall be designated in writing. This individual shall be familiar with plumbing systems within the property, with the basic concepts of backflow/cross connection protection, and the specific requirements of a recycled water system. Copies of the designation, with contact phone numbers shall be provided to the San Diego County Department of Health Services and the Carlsbad Municipal Water District.

In Case of Emergency Contact: _____ @ _____

or After Hours Contact: _____ @ _____

Failure to comply with the above guidelines will be a violation of the District's Rules and Regulations and will result in termination of service until the appropriate corrective steps have been taken.

5.1.7 Private Recycled Water Notes

A. The installation of the irrigation water system shall conform to the regulations for the construction of irrigation water systems within the "CMWD" (Carlsbad Municipal Water District) and the accompanying plans and specifications.

B. All private, constant-pressure, recycled and potable water mainline piping installed on this project shall be identified in accordance with the "CMWD's" Regulations and the Irrigation Specifications (warning tape also required).

C. Constant-pressure recycled water piping shall be purple colored PVC as manufactured by Brownline, Inc. or approved equal.

D. Markings on the PVC pipe shall include the following:

"Caution Recycled Water, Nominal Pipe Size PVC-1120 [Pressure Rating in Pounds per Square Inch] at 73 Degrees Fahrenheit" and ASTM Designations such as 1785, 2241, 2672, 3139. Printing shall be placed continuously on two sides of the pipe.

E. Warning tape shall be used on all constant-pressure main line piping carrying potable water and recycled water.

F. Warning tape shall be a minimum 3 inches wide and shall run continuously for the entire length of all constant-pressure mainline piping. The tape shall be attached to the top of the pipe with plastic tape banded around the warning tape and the pipe every 5 feet on center. A second tape shall be installed continually over entire length of pipe 12 inches above the water line.

G. Notify the District seven days prior to the start of construction at (442) 339-2722.

H. As-built drawings of the sprinkler system must be submitted and approved by the District Engineer prior to final acceptance of the project. Failure to provide the drawings may result in the forfeiture of the contractor's standard retention fees.

I. All pressure main line piping from the recycled water system shall be installed to maintain 10 feet minimum horizontal separation from all potable water piping. Where recycled and potable water pressure main line piping cross, the recycled water piping shall be installed below the potable water piping in a Class 200 purple colored PVC sleeve which extends a minimum of 10 feet on either side of the potable water piping and provide a minimum vertical clearance of 12 inches. Conventional (white) PVC pipe may be used for sleeving material if it is taped with 3-inch-wide purple warning tape which reads "CAUTION RECYCLED WATER".

J. All recycled water sprinkler control valves shall be tagged with identification tags.

1. Tags shall be weatherproof plastic 3" x 4", purple in color with the words, "<u>WARNING RECYCLED WATER – DO NOT DRINK</u>" imprinted on one side, and "<u>AVISO IMPURA – NO TOMAR</u>" on the other side. Imprinting shall be permanent and black in color.

2. One tag shall be attached to each valve as follows:

   a. Attach to valve stem directly or with plastic tie-wrap or

   b. Attach to solenoid wire directly or with plastic tie-wrap or

   c. Attach to valve cover with existing valve cover bolt.

K. Adjust spray heads to eliminate overspray onto areas not under the control of the customer (pool decks, private patios, streets and sidewalk, etc.).

L. Refer to the irrigation specifications for a detailed description of all irrigation system site observation requirements. Failure to call for the required site observations may result in forfeiture of the contractor's standard retention fees.

M. Failure to comply with any or all of the above guidelines puts your system in violation of the District's Rules and Regulations and will result in suspension of service until corrective steps have been taken.

5.1.8 Plan Review Processing of Private (On-site) Recycled Water System Improvement Plans

Prior to preparation of improvement plans, the District, City, and County will require the Developer to prepare a preliminary, colored, recycled water area use site map for review and approval. The plan review process is as follows:

A. All improvement plans shall be submitted by applicant to the City of Carlsbad Planning Department, and City plan check fees collected.

B. Two sets of improvement plans with transmittal will be sent by the City Planning Department to the Carlsbad Municipal Water District, Engineering Division (any other submittal procedure is unacceptable).

C. The CMWD Engineering Division will review improvement plans and send plan check improvement plans to the County of San Diego, Department of Environmental Health & Quality.

D. DEHQ will review plans, make comments, collect initial plan check deposit and return improvement plans to the CMWD Engineering Division.

E. The CMWD Engineering Division will review and send improvement plans to the City Planning Department.

F. City Planning Department will review plans and have applicant make all corrections and send mylar signature sheet and redlined plan reviews to the CMWD Engineering Division for signature along with a set of corrected improvement plans.

G. The CMWD Engineering Division will review set of improvement plans and will sign the mylar sheet. Mylar signature sheet and corrected improvement plan set and redlined plan reviews will be sent to the County of San Diego DEHQ.

H. County of San Diego DEHQ will review the improvement plan set and sign mylar. The mylar signature sheet will be returned to the CMWD Engineering Division (DEHQ shall retain improvement plan set).

I. The CMWD Engineering Division, upon receipt of mylar, forwards it to the City Planning Department for signature approval.

J. After all agencies have signed the mylar signature sheet, the developer shall send a complete set of 3-mil reproducible mylars and three (3) sets of signed plans to the District. The District will forward one set to the County of San Diego DEHQ.

K. Revisions made on the approved plans shall be approved by the County of San Diego DEHQ and the District Engineer (or his designee) and so noted on plans prior to implementation in field.

5.1.9 Conversion of Recycled Water Service to Potable Water Supply

If due to any reason of system failure or use violations it becomes necessary to convert from a recycled water service to a potable water supply, it shall be the responsibility of the owner, applicant, or customer to pay for all costs for each conversion, by way of, but not limited to, the following items:

A. Submit proposed plans to the District and County of San Diego DEHQ.

B. Isolate the recycled water supply. Service shall be removed and plugged at the recycled water main or abandoned in a manner approved by the District Engineer.

C. All potable and recycled irrigation services shall have backflow prevention assemblies.

D. The removal of the special recycled water quick couplers, including the replacement of these with approved quick coupler valves for potable water systems.

E. Notifications to all personnel involved.

F. The removal of all warning labels.

G. The installation and disinfection of all potable water lines.

H. Completion of successful cross connection test and payment of any capacity fees due, as provided for in the District's "Rules and Regulations for Water and Recycled Water Service".

5.2 CONSTRUCTION SPECIFICATIONS

5.2.1 Introduction

A. It is the intention of these specifications to accomplish the work of installing a sprinkler system which will operate in an efficient and satisfactory manner according to workmanlike standards established for sprinkler operation. Notwithstanding is the fact that these specifications may be deficient in setting forth a complete detailed description for the work to be done. It shall be the responsibility of the contractor to install said sprinkler system in such a manner that it shall operate efficiently.

B. These specifications cover automatically controlled irrigation systems, including all trenching, backfilling and compacting; sleeves, installation of pipe, valves, irrigation heads, fittings, and all other appurtenances; connections to water services, testing; installation of controllers, electrical connections and wiring; adjustment of systems; necessary accessories as shown on the drawings and specific herein.

5.2.2 General Conditions

A. Requirements

1. All work and materials shall be in accordance with the California Plumbing Code, all state and local codes and regulations. Should the construction documents or instructions be at variance with the aforementioned rules and regulations, notify the Carlsbad Municipal Water District and await their instructions before proceeding with the work affected.

2. Manufacturer's Directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturer of articles used in this contract provide direction on materials or procedures not shown or specified in the drawings and specifications.

3. Manufacturer's Warranties: Manufacturer's warranties shall not relieve liabilities under guarantee. The Carlsbad Municipal Water District may at this option, require a manufacturer's warranty on any product proposed for use.

4. All work called for on the drawings by notes shall be furnished and installed whether or not specifically mentioned in the specifications. Do not install the sprinkler system or components when conflicts, obstructions or grade differences exist that might not have been considered in the design, or if discrepancies in the construction details, legend, or specific notes are discovered. All such conflicts, obstructions or discrepancies shall be brought to the attention of the Carlsbad Municipal Water District. In the event this is not done, the Contractor shall assume full responsibility for the necessary revisions.

5. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. The Contractor shall carefully investigate field conditions affecting the work and plan accordingly, furnishing all materials as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting and structures.

B. Protection from Damage

1. Protect work and materials from damage during construction and storage. PVC pipe and fittings shall be protected from direct sunlight.

2. Assume all responsibility for damage to existing construction and restore to its original condition should damage occur as a result of this work.

3. Contractor shall securely cover openings into system and cover apparatuses, equipment, and appliances both before and after being set in place to prevent obstruction in the pipes and prevent breakage, misuse, or disfigurement of the apparatuses, equipment or appliances.

C. Record Drawings

Record drawings shall be prepared and shall show all changes in the work constituting departures from the original contract drawings including those involving both constant-pressure and intermittent-pressure lines and appurtenances. All conceptual or major design changes, including any changes that may be affected by the requirements of these standard

specifications, shall be approved by the District before implementing the change in the construction contract. Failure to receive prior approval may result in termination of service.

Upon completion of each increment of work, all required information and dimensions shall be transferred to the record drawings. Facilities and items to be located and verified on the record drawings shall include the following:

1. Points of connection to the distribution system
2. Routing of sprinkler pressure lines
3. Gate valves
4. Sprinkler control valves
5. Quick-coupling valves
6. Routing of control wires
7. Other related equipment as specified by the District or the Owner

Changes and dimensions shall be recorded in a legible and workmanlike manner. Record construction drawings shall be maintained at the job site during construction.

The applicant, owner, or customer shall provide two (2) sets of irrigation improvement plans and complete set of as-built reproducible three (3) mil photo mylars.

Prior arrangements must be made with the District if water service is to be provided prior to as-built line submittal. Failure to provide record drawings will result in termination of service.

D. Controller Charts

Controller charts shall be prepared, approved by the District, and placed in the controllers before commencing service. Controller charts prepared as set forth below:

1. Provide two controller charts for each automatic controller showing the area covered by the controller. The chart shall be the maximum size the controller door will allow. One controller chart will be provided to the Carlsbad Municipal Water District.

2. The chart is to be a reduced drawing of the actual as-built system. The line weights and lettering on the original controller chart drawing shall be so drawn that the reduced chart is clearly, readable.

3. The chart shall be a blackline print with a different color used to show area of coverage for each station.

4. When completed and approved, the charts shall be hermetically sealed between two pieces of plastic, each piece being a minimum of ten (10) mils thick.

Failure to provide controller charts will result in termination of service.

E. Controller Access

The District reserves the right to have complete access to the controller clocks for reasons of monitoring and controlling system failures. The applicant, owner, or customer shall provide the District with two sets of all keys necessary for access to the controller clocks within the design area. The keys will then become the property of the District. If the system is converted

to a potable water supply as provided for herein, the keys will be returned to the owner. The District is not responsible for loss or damage to any controller.

Failure to provide keys will result in termination of service.

F. Conversion from a Potable to Recycled Water Supply

All irrigation facilities converting from a potable to a recycled water supply shall conform to the District's construction specifications as contained herein, including a successful cross connection test.

The facilities to be converted shall be investigated in detail including review of any record drawings, preparation of required reports, and determinations by the District of measures necessary to bring the system into compliance with these standard specifications. The applicant, owner, or customer shall pay all costs to convert the system at no cost to the Carlsbad Municipal Water District.

G. Guarantee

All work shall be guaranteed in writing for one (1) year from date of acceptance against all defects in materials, equipment and workmanship. Guarantee shall also cover repair or damage to any part of the premises resulting from leaks or other defects in material, equipment, and workmanship to the satisfaction of the Carlsbad Municipal Water District. Repairs if required shall be done promptly upon notification by project owner's representative, at no cost to the owner or at no cost to the Carlsbad Municipal Water District.

H. Existing Site Conditions

The contractor shall acquaint himself with all site conditions. Should utilities that are not shown on the plans be found during excavations or during subsequent examination of the site, the contractor shall promptly notify the owner's representative for instructions as to further action. The contractor shall be liable for any and all damages arising from failure to notify the owner of such discoveries.

5.2.3 Material Specifications

A. Summary

All materials throughout the system shall be new and in proper working condition. Refer to irrigation material legend, notes and detail drawings for specific equipment to be used. Substitutions will only be accepted when approved by the Carlsbad Municipal Water District. Equipment or materials installed or furnished without prior approval of the Carlsbad Municipal Water District may be rejected and the contractor required to remove such materials from the site at his expense.

B. Equipment to be Furnished

Supply as a part of the contract the following tools:

1. Two (2) keys for each automatic controller.

C. PVC Pressure Mainline Pipe and Fittings

All buried private piping in the recycled water system shall be installed with warning tape identifying it as recycled water except for intermittent pressure lines. Intermittent pressure lines (lines on the downstream side of a controller valve that will not be subject to constant pressure) may be excepted as long as it is apparent, due to line size and location as determined solely by the District Engineer or Inspector, that the lines are part of a recycled water sprinkler irrigation system.

Stenciled pipe, as specified below, will be accepted in conjunction with warning tape.

1. Pressure mainline piping for sizes 2" and larger shall be PVC Class 315 and shall be purple.

2. Pipe shall be made from an NSF approved Type 1, Grade 1, PVC compound conforming to ASTM D1784. All pipe must meet requirements as set forth in Federal Specifications PS-22-70, with an Appropriate Standard Dimension (S.D.R) - (Solvent Weld Pipe).

3. Pressure mainline piping for sizes 1½" and smaller shall be PVC Schedule 40 with solvent welded joints and shall be purple.

4. Pipe shall be made from NSF approved Type 1, Grade 1, PVC compound conforming to the ASTM D1785. All pipe must meet requirements as set forth in Federal Specification PS-21-70.

5. PVC solvent-weld fittings shall be Schedule 40, 1-2, 11-1 NSF approved conforming to ASTM D2466.

6. Solvent cement and primer for PVC solvent weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer.

7. All PVC pipe must bear the following markings:

    a. Manufacturer's Name
    b. Nominal Pipe Size
    c. Schedule or Class
    d. Pressure Rating in PSI
    e. NSF (National Sanitation Foundation) Approval
    f. Date of Extrusion

8. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable iron pipe size (I.P.S.), schedule and NSF certification marking.

9. All pipe shall have stenciling appearing on both sides of the pipe with the marking "RECYCLED WATER" in ¾" letters repeated every 12 inches.

D. PVC Non-Pressure Lateral Line Piping

1. Non-pressure buried lateral line piping shall be PVC Class 200 with solvent-weld joints and shall be purple.

2. Pipe shall be made from NSF approved, Type 1, Grade 11 PVC compound conforming to ASTM D1784. All pipe must meet requirements set forth in Federal Specification PS-22-70 with an appropriate Standard Dimension Ratio.

3. Except as noted in Paragraph C above, all requirements for non-pressure lateral line pipe and fittings shall be the same as for solvent-weld pressure mainline pipe and fittings, (primer not required).

4. All unsized end run lateral lines shall be ½" pipe.

E. Potable Water Piping

All PVC potable water piping installed within the same project limits as the private recycled water piping shall be installed in accordance with the uniform plumbing code and all other local governing codes, rules and regulations. The pipe shall be continuously and permanently marked with the manufacturer's name or trademark, nominal size, and schedule or class indicating the pressure rating. In addition, 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 ¾" letters repeated every 12 inches, and blue tape identifying it as a potable water line and stating "CAUTION: WATER LINE BURIED BELOW'.

F. Warning Tape

The plastic warning tape shall be prepared with silver printing on a purple field having the words, "CAUTION: RECYCLED WATER LINE BELOW'. The overall width shall be 3 inches.

Warning tape shall be installed directly on top of the pipe longitudinally and shall be centered. The warning tape shall be installed continuously for the entire length of the pipe and shall be fastened to each pipe length by plastic tape banded around the pipe with fasteners no more than 5 feet apart. Taping attached to the sections of pipe before laying in the trench shall have flaps sufficient for continuous coverage. All risers between the mainline and control valves shall be installed with warning tape. A second warning tape running continuously above piping to be installed 12 inches above recycled water line.

G. Brass Pipe Fittings

1. Where indicated on the drawings, use red brass screwed pipe conforming to Federal Specification #WW-P-35 1.

2. Fittings shall be red brass conforming to Federal Specifications #WW-P-460.

H. Automatic Controllers

1. Automatic controllers shall be of size and type shown on the plans.

2. Final location of automatic controllers shall be approved by the owner's authorized representative.

3. The 120-volt electrical power to the automatic controllers shall be shown on the plans.

I. Electric Control Valves

Use Rain Bird 100-PES-B/150-PES-B, 200-PES-B electric remote control scrubber valves or Rain Bird 100-PES-B-PRS/150-PES-B-PRS, 200-PES-B-PRS pressure regulating electric remote control scrubber valves. They shall be purple.

J. Electric Control Valve Box

1. Use 10” x 10-1/4” round box for all ball valves, Carson Industries #910-12B with purple bolt cover or approved equal. Extension sleeve shall be PVC-6” minimum size.

2. Use 9½” x 16” x 11” rectangular box for all electrical control valves, Carson Industries 14129-12B with purple bolt down cover or approved equal.

K. Sprinkler Heads

1. All sprinkler heads shall be of the same size, type and deliver the same rate of precipitation with diameter (or radius) of throw pressure, and discharge as shown on the plans and/or specified in these special provisions.

2. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than one-half (½”) inch size will be permitted in the initial backfill.

3. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn, planting, or other construction is necessary the contractor shall make all required adjustments without cost to the owner.

4. Riser nipples for all sprinkler heads shall be same size as the riser opening in the sprinkler body.

L. Potable Water

1. Potable Water - Quick coupling valves used in potable water systems shall be of the LUG thread type, have bras or yellow vinyl covers as manufactured by Rainbird, Hunter, Buckner or approved equal.

2. Recycled Water - Quick coupling valves used in recycled water systems shall have ACME type threads and purple colored locking covers permanently attached to the valve. Quick coupling valves shall be Nelson No. 7645, Hunter No. HV1004-KL-NP or approved equal.

M. Washdown Hydrants and Other Points of Public Access

All private 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), blow-off hydrants, discharge from strainers or backflow prevention devices, and other such facilities shall be restricted from public access.

N. Warning Labels

The District may require warning labels as approved by the District Engineer to be installed on designated facilities. Facilities such as: controller panels and washdown or blow-off hydrants of water trucks and temporary construction services where designated by the District Engineer or Inspector. The labels will notify that the system contains recycled water that is unsafe to drink.

5.2.4 Construction Methods

A. Layout

1. All work shall be laid out in accordance with plans and details as shown on the drawings. Locate irrigation apparatuses, equipment, etc. in planted area wherever possible.

2. If minor changes in location are required, or as directed by the owner's representative, work shall be accomplished by the contractor at no additional cost to the owner providing such changes ordered before items of work directly connected to the same area are installed, and providing no additional materials are required.

B. Excavating and Trenching

1. Perform all excavations as required for the installation of the irrigation system. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition, and in a manner satisfactory to the owner's representative.

2. Trenches shall be made wide enough to allow a minimum of two (2) inches between parallel pipe lines. Trenches for pipe lines shall be sufficiently deep to provide the minimum cover from finished grade as follows:

    a. 18" cover over mainlines
    b. 12" cover over PVC lateral lines
    c. 6" cover over poly tubing lateral lines
    d. 18" cover over sleeved lines under driveways

3. Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to even grade. Trenching excavation shall follow lay out indicated on drawings and as noted.

C. Utility Warning Tape

1. Install where shown on drawings and details.

D. Backfilling

1. The trenches shall not be backfilled until all required tests are performed. Trenches shall not be backfilled until all required observations are performed. Observations include sprinkler heads, all fittings, lateral and mainline pipe, valves, and direct burial wire. Trenches shall be carefully backfilled with the excavated materials approved for

backfilling consisting of earth, loam, sandy clay, sand or other approved materials free from large clods of earth or stones.

2. Backfill in landscaped areas shall be mechanically compacted to a dry density equal to 90% of adjacent undisturbed soil in planted areas. Backfill will conform to adjacent grades without dips, sunken areas, humps, or other surface irregularities.

3. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than one-half (1/2") inch in size will be permitted in the initial backfill.

4. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn or planting, or other construction is necessary, the contractor shall make all required adjustments without cost to the owner.

E. Trenching and Backfill Under Paving

1. Trenches located under surface improvements such as asphalt concrete or concrete paving will be installed and backfilled with a sand layer six inches (6") below the pipe and twelve inches (12") above the pipe and compacted in layers to 95% compaction using manual or mechanical tamping devices. Trenches for piping in unimproved areas shall be compacted to the same degree of compaction as the existing adjacent undisturbed soil and shall be left in a firm, unyielding condition. All trenches shall be flush with the adjoining grade. The sprinkler irrigation contractor shall set in place, cap and pressure test all piping under paving prior to the paving work.

2. Install no multiple assemblies in plastic lines, provide each assembly with its own outlet.

3. Install all assemblies specified herein in accordance with respective detail. In the absence of detail drawings or specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice with prior approval of the Carlsbad Municipal Water District.

4. Solvent weld PVC pipe fittings using solvents and methods recommended by the manufacturer of pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent. Clean off excess solvent. All welded joints shall be cured at least fifteen (15) minutes before moving or handling and twenty-four (24) hours before water is permitted in the pipe. All poly tubing fittings shall be of compression type. Insert fittings are not acceptable. Avoid kinking of poly tubing. Connection between tubing and fittings to be clean and free of dust and dirt.

5. Make all connections with threaded fittings using teflon tape. Take up with light wrench pressure.

F. Automatic Controller

Install per manufacturer's instructions. Remote control valves shall be connected to controller in numerical sequence as shown on the drawings.

G. High Voltage Wiring for Automatic Controller

1. 120-volt power connection to the automatic controller shall be provided by the irrigation contractor.

2. All electrical work shall conform to local codes, ordinances, and local authorities having jurisdiction.

H. Remote Control Valves

Install where shown on drawings and details. When grouped together, allow at least twelve inches (12") between valves. Install each remote control valve in a separate valve box. Each valve number shall be stenciled on valve box with white epoxy paint or heat branded.

I. Closing of Pipe and Flushing Lines

1. Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe and sprinklers. Leave in place until removal is necessary for the completion of installation.

2. Thoroughly flush out all water lines before installing heads and valves.

J. Sprinkler Heads

1. Install the sprinkler heads as designated on the drawings. Sprinkler heads to be installed in this work shall be equivalent in all respects to those itemized.

2. Spacing of heads shall not exceed the maximum indicated on the drawings. In no case shall the spacing exceed the maximum recommended by the manufacturer.

K. Hydrostatic Test – Open Trench

1. Request the presence of the City of Carlsbad Inspector at least forty-eight (48) hours in advance of testing. Test to be accomplished at the expense of the contractor and in the presence of the City of Carlsbad Inspector.

2. Center load piping with small amount of backfill to prevent arching or slipping under pressure. All fittings and couplings to be totally exposed.

3. Apply a continuous and static water pressure when welded plastic joints have cured at least twenty-four (24) hours. Mainline to be tested for four (4) hours at 125 PSI.

4. Repair leaks resulting from tests, and retest until system meets specified test.

L. Backfilling and Compacting

1. Initial backfill on all lines shall have no foreign matter larger than one-half (1/2") inch in size. Backfill shall be sufficiently damp to permit thorough compaction. Backfill for trenching shall be compacted to dry density equal to 90% of adjacent undisturbed soil and shall conform to adjacent grades, without dips, depressions, humps or other irregularities.

M. Settling of backfilled trenches, which may occur during the one-year period after final acceptance, shall be repaired by the contractor, including the complete restoration of all damaged planting, paving, or other improvements of any kind, to owner's satisfaction at no additional expense.

N. Temporary Repairs

The owner reserves the right to make temporary repairs as necessary to keep the sprinkler system in operating condition. The exercise of this right by the owner shall not relieve the contractor of his responsibilities under the terms of the guarantee as herein specified.

O. Adjusting the System

Adjust valves, alignment, and coverage of all sprinkler heads if it is determined that adjustment in the irrigation equipment or nozzle changes will provide more adequate coverage. Make all necessary changes prior to planting.

These changes or adjustments shall be made without additional costs. The entire system shall operate properly before any planting operations commence. Eliminate overspray onto walkways or paving.

P. Maintenance

1. The entire sprinkler irrigation system shall be under automatic operation for a period of seven (7) days prior to any planting.

2. The architect reserves the right to waive or shorten the operation period.

3. Provide security for the site which shall be included in the cost of installation.

Q. Clean-Up

Clean-up shall be done as each portion of work progresses. Refuse and excess dirt shall be removed from the site. All walks and paving shall be swept or washed down. Any damages sustained on the work of others shall be repaired to original conditions.

R. Site Observations

In all cases where observation of the irrigation system is required and/or where portions of the work are specified to be performed under the observation of the Carlsbad Municipal Water District, it will be the sole responsibility of the landscape contractor to notify the Carlsbad Municipal Water District two (2) working days in advance of the time such observations are required.

Failure to call for any one of the observations called for below will constitute immediate stoppage of all performance payment to the contractor.

Observations are required for the following:

1. Upon installation and testing of mainline.

2. Upon installation of lateral lines.

3. A complete operation test of entire system at final observation.

The required maintenance period for the system shall not begin until the final observation has been made and installation approved by the Carlsbad Municipal Water District.

S. Inspection

The Private Irrigation System shall be inspected by City of Carlsbad Planning Department. Prior to beginning of construction, a preconstruction conference shall be held with Planning Department Inspector.

5.3 OPERATIONAL REQUIREMENTS

The following details for user operational requirements that are use specific, such as for irrigation, are intended as examples of current use practice and are not intended to preclude other approved uses, which may require case-by-case specifications.

5.3.1 Specific Prohibitions

A. Runoff Conditions

Conditions that directly or indirectly cause runoff outside of the approved use area, whether by design, construction practice, or system operation, are prohibited.

B. Ponding Conditions

Conditions that directly or indirectly cause a ponding outside of or within the approved use area, whether by design, construction practice, or system operation, are prohibited. Temporary ponding caused by draining of system is allowed with prior District approval.

C. Direct Overspray Conditions

Any discharge of water directly onto areas other than that within the approved use area are prohibited.

D. Windblown Overspray Conditions

Conditions that directly or indirectly permit windblown spray to pass outside of the approved use area, whether by design, construction practice, or system operation, are prohibited.

E. Unapproved Uses

Use of recycled water for any purposes other than those explicitly approved in the currently effective agreement issued by the Carlsbad Municipal Water District and without the prior knowledge and approval of the District is prohibited.

F. Disposal in Unapproved Areas

Disposal of recycled water for any purposes, including approved uses, in areas other than those explicitly approved in the currently effective Use Permit issued by the District and without the prior knowledge and approval of the District, is strictly prohibited. Discharge of water from flushing or drainage of the recycled system shall be done either at the approved use site and in a manner that does not create ponding or runoff conditions, or to a sanitary sewer manhole, with the approval of the agency responsible for operation of the sanitary sewer. In no case shall the discharge of recycled water to a sanitary sewer cause the sewer to overflow or otherwise create a public health hazard or nuisance.

G. Cross Connections

Cross connections, as defined by the California Administrative Code Title 17, resulting from the use of recycled water or from the physical presence of a recycled water service, whether by design, construction practice, or system operation, are strictly prohibited.

H. Unprotected Drinking Fountains

All drinking fountains located within the approved use area designated by the Use Permit shall be protected by siting and/or a structure from contact with recycled water, whether by direct overspray, windblown overspray or by direct application through irrigation or other approved use. Lack of such protection, whether by design, construction practice, or system operation, is strictly prohibited.

I. Unprotected Public Facilities

Facilities that may be used by the general public, including but not limited to eating areas, eating surfaces, pools, spas, hardscape, and playground equipment, and located within the approved use area designated by the Use Permit, shall be protected by siting and/or a structure from contact with recycled water, whether by windblown overspray or by direct application through irrigation or other approved use. Lack of such protection is prohibited until review and concurrence by the Carlsbad Municipal Water District or on a case-by-case basis.

J. Hose Bibbs

Permanent installation of hose bibbs on any on-site recycled water system is strictly prohibited.

K. Fire Hydrants

Use or installation of fire hydrants on any on-site system that presently operates or is designed to operate with recycled water, regardless of the fire hydrant construction or identification, is subject to specific prior approval by the District on a case-by-case basis.

L. Hours of Operation

Irrigation with recycled water is restricted to the hours between 10:00 p.m. and 6:00 a.m., unless otherwise directed by the District.

5.3.2 On-site Irrigation Systems

A. Supervision

On-site irrigation systems at each use area under the user's control shall be under the management of an on-site supervisor designated by the user or the operator and approved by the Carlsbad Municipal Water District. On-site supervisors shall be responsible for the installation, operation, and maintenance of the irrigation system, enforcement of these Regulations, prevention of potential hazards, cross connections and maintenance of the recycled water system plans in record drawing form. The on-site supervisor, in the event of a contamination to the public potable water supply, shall be responsible for immediate notification of District. The on-site supervisor or his representative shall check all appurtenances on the on-site irrigation system to ensure proper operation.

The on-site supervisor or his representative shall be available during normal working hours at an address listed with the District for the purpose of hosting an inspection tour or for discussing operational aspects of the system. The on-site supervisor shall be able to effectively communicate with District personnel orally and in writing. The on-site supervisor or his representative shall be available via telephone at a number listed with the District for emergency off-hours contact. Where necessary, keys and/or lock combinations shall be issued to the District to provide access upon request.

B. Temporary Service Connection

A temporary service connection may be provided for on-site construction testing purposes. The temporary service connection consists of a meter and a backflow prevention assembly.

C. Service Startup

Following final District inspection and successful cross connection inspections and/or tests, the user shall request in writing regular service startup. District shall begin regular service within five working days of approval of service startup.

D. Periods of Operation

In order to maintain acceptable working conditions throughout the recycled water system, District may schedule recycled water use. Such scheduling may involve programming deliveries to different users and/or to various portions of a single user's on-site system. Any scheduling shall consider applicable constraints of all involved regulatory agencies, these Regulations, and the operating constraints of the affected users.

District may temporarily terminate recycled water service at any time recycled water at the terminal point of the supply source does not meet the requirements of the regulatory agencies. Recycled water service would, in such case, be restored when the recycled water meets the governing requirements at the terminal point of the supply source. District may provide recycled water service from other approved sources. In addition, approved air gap separations may be used to provide potable water to the recycled water system to ensure water service.

E. Confinement of Irrigation

The user shall be responsible for maintaining and controlling the system in order to minimize human contact and prevent consumption of recycled water and to control and eliminate direct spray, overspray, ponding and runoff. The user shall be responsible for any and all subsequent uses of the recycled water.

F. Pressure Testing (or other accepted alternative)

In order to determine the existence of any cross connections or backflow conditions into the potable water system, the District shall perform a pressure test where the potable and recycled water systems are isolated for a period of 24 hours or a time frame acceptable to the regulatory agency and the District.

G. Contamination

In the event of contamination or pollution of a potable water system due to a cross connection or other failure, the District shall be immediately notified, so that appropriate measures will be taken to correct the problem.

5.3.3 Recycled Water Use at Construction Sites

A. Supervision

The operation and surveillance of a construction water facility using recycled water at each use area under the user's control shall be managed by an on-site supervisor designated by the user or the operator and approved by the District. On-site supervisors shall be responsible for the installation, operation, and maintenance of the on-site facility, equipment, enforcement of these regulations, and prevention of cross connections and potential hazards. The on-site supervisor or his representative shall be available via telephone at numbers listed with the District for contact during working hours and after hours.

B. Application Control

Recycled water used for the purpose of soil compaction and dust control shall not be stored or applied in a manner which causes runoff, ponding or windblown overspray conditions. If such conditions occur, the method of application shall be altered to correct them and prevent any and all further ponding and runoff. Control valves on the water distribution vehicles and other controlling devices shall be properly employed to prevent the application of recycled water outside the approved use area onto surfaces including, but not limited to, street pavements, sidewalks and drainage courses.

C. Periods of Operation

The periods of operation of the construction water facilities, insofar as they depend on the supply of recycled water from the offsite system, shall be subject to regulation by the District in accordance with the needs of the entire recycled water distribution system.

D. Maintenance

A preventive maintenance program designed to ensure the continued operation of all system elements within the requirements of these Regulations shall be evidenced by the user and open to inspection by the District.

APPENDIX A

ABBREVIATIONS

The following list of abbreviations is for use in these Standard specifications and the Approved Plans:

ABBREVIATION	TERMS
A	Ampere/Area
AA	Aluminum Association
AASHTO	American Association of State Highway and Transportation Officials AB Anchor Bolt/Aggregate Base
ABAN	Abandoned
ABC	Asphalt Base Course
AC	Acre/Asphalt Concrete/Alternating Current
ACI	American Concrete Institute
ACP	Asbestos-Cement Pipe
ACU	Access Door
AE	Architect-Engineer
AFF	Above Finished Floor
AGG	Aggregate
AH	Access Hole
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
AL	Aluminum
AMB	Ambient
AMP	Ampere
ANG	Angle
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ARCH	Architecture/Architectural
ARV	Air-Release Valve
ARVV	Air-Release and Vacuum Valve
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPH	Asphalt
ASSY	Assembly
ASTM	American Society for Testing and Materials
ATS	Automatic Transfer Switch
AVA	Air Vacuum Valve Assembly
AVE	Avenue
AVG	Average
AWG	American Wire Gage
AWS	American Welding Society

ABBREVIATION	TERMS
AWWA	American Water Works Association
BB	Back-to-Back
BC	Beginning of Curve/Back of Curb/Bare Copper
BEG	Begin
BETW	Between
BF	Blind Flange
BHP	Brake Horsepower
BK	Back/Brake
BKR	Breaker
BL	Building
BLK	Block
BM	Bench Mark/Beam
BO	Blow-off
BOP	Bottom of Page
BOT	Bottom
BP	Baseplate
BRG	Bearing
BRNZ	Bronze
BTN	Button
BTU	British Thermal Unit
BUR CBL	Buried Cable
BV	Butterfly Valve
BW	Block Wall
C	Conduit/Celsius/Civil Drawings
CAB	Crushed Aggregate Base
CAP	Capacity
CB	Catch Basin/Circuit Breaker
CC	Cooling Coil
C-C	Center-to-Center
CCB	Concrete Block
CD	Cross Drain/Condensate Drain/Ceiling Diffuser
CEM	Cement
CF	Cubic Feet/Curb Face
CFH	Cubic Feet Per Hour
CFM	Cubic Feet Per Minute
CFS	Cubic Feet Per Second
CG	Construction Grade
C&G	Curb and Gutter
CHG	Change
CHKD PL	Checkered Plate
CI	Cast Iron
CIP	Cast In Place/Cast-Iron Pipe
CISP	Cast Iron Soil Pipe
CISPI	Cast-Iron Soil Pipe Institute
CJ	Construction Joint
CL	Centerline/Class/Clearance/Chlorine

ABBREVIATION	TERMS
CLR	Clear
CML	Cement-Mortar Lined
CML&C	Cement-Mortar Lined & Coated
CML&TC	Cement-Mortar Lined & Tape Coated
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CMU	Concrete Masonry Unit
CO	Cleanout/Conduit Only
COL	Column
COMM	Communication
COMP	Composite
COMPL	Complete
CONC	Concrete
CONN	Connection
CONST	Construct or Construction
CONT	Continuous
CONTR	Contractor
COORD	Coordinate/Coordinated
COP	Copper
COR	Corner
CORP	Corporation
CP	Cathodic Protection
CPLG	Coupling
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard, US Department of Commerce
CT	Center Top/Current Transformer
CTG	Coating
CTR	Center
CULV	Culvert
CU YD, CY	Cubic Yard
CYL	Cylinder
D	Degree of Curvature
DB	Direct Buried/Decibel
DBL	Double
DC	Direct Current
DEPT	Department
DET	Detail/Detour
DG	Decomposed Granite
DI	Drop Inlet
DIA	Diameter
DIAG	Diagonal
DIM	Dimension
DIMJ	Ductile-Iron Mechanical Joint
DIP	Ductile-Iron Pipe
DIPRA	Ductile-Iron Pipe Research Association
DISCH	Discharge
DIST	Distance
DMH	Drop Manhole
DN	Down

ABBREVIATION	TERMS
DR	Drain/Door
DSL	Diesel
DWG	Drawing
DWY	Driveway
E	East/Electrical Drawing
EA	Each
EC	End of Curve
ECC	Eccentric
ED	External Distance
EE	Each End
EF	Each Face/Exhaust Fan
EFF	Efficiency
EFL	Effluent
EGL	Energy Grade Line
EL	Elevation/Each Layer
E/L	Easement Line
ELEC	Electric
ELP	Elliptical
ENC	Encasement or Encased
ENCL	Enclosure
ENG	Engine
ENGR	Engineer
EOS	Equivalent Opening Size
EP	Edge of Pavement/Explosion Proof
EPA	Environmental Protection Agency (Federal)
EQ	Equation
EQL	Equal
ESMT	Easement
EST	Estimate or Estimated
ETC	And So Forth
EW	Each Way
EXC	Excavate or Excavation
EXP	Expansion
EXST	Existing
EXT	Exterior/Extension
F	Fahrenheit/Floor
FAB	Fabricate
FBRBD	Fiberboard
FC	Foot-Candle
FCO	Floor Cleanout
FCV	Flow Control Valve
FD	Floor Drain
FDN	Foundation
FE	Flanged End
Fed Spec	Federal Specification
FF	Finished Floor/Flat Face

ABBREVIATION	TERMS
FG	Finished Grade
FHY	Fire Hydrant
F&I	Furnish and Install
FIG	Figure
FIP	Female Iron Pipe thread
FIT	Fitting
FL	Floor/Flow Line
FLG	Flange
FM	Force Main/Factory Mutual
FMH	Flexible Metal Hose
FNSH	Finish
FOC	Face of Concrete
FPC	Flexible Pipe Coupling
FPM	Feet Per Minute
FPS	Feet Per Second
FS	Finished Surface/Floor Sink/Federal Specifications
FSTNR	Fastener
FT	Feet
FTG	Footing
FUT	Future
G	Gas/General Drawings
GA	Gage
GAL	Gallon
GALV	Galvanized
GB	Grade Break
GDR	Guard Rail
GR	Grooved End
GENL	General
GFI	Ground Fault Interrupter
GM	Gas Main
GND	Ground
GPD	Gallons Per Day
GPM	Gallons Per Minute
GR	Grade
GSKT	Gasket
GUT	Gutter
GV	Gate Valve
H	Humidistat/Horizontal
HARN	Harness
HB	Hose Bib
HD	Heavy Duty
HDC	High Deflection Coupling
HDPE	High-Density Polyethylene Pipe
HGL	Hydraulic Grade Line
HGT	Height
HMWPE	High-Molecular Weight Polyethylene
HORIZ	Horizontal
HP	Horsepower/High Pressure
HPT	High Point
HR	Hour/Handrail

ABBREVIATION	TERMS
HS	High Strength
HV	Hose Valve
HVAC	Heating, Ventilating and Air Conditioning
HW	Headwall/Hot Water
HWD	Helix Water District
HWL	High Water Level
HWY	Highway
HYDR	Hydraulic
HZ	Hertz (cycles per second)
I	Intersection Angle/Instrumentation Drawings
ICBO	International Conference of Building Officials
ID	Inside Diameter
IE	Invert Elevation
IN	Inches
INCL	Include
INL	Inlet
INSUL	Insulating
INSTL	Install or Installation
INTR	Interior/Intersection
INV	Invert
I/O	Inlet/Outlet
IP	Iron Pipe
IPS	Iron Pipe Size
IPT	Iron Pipe thread
IRR	Irrigation
JB	Junction Box
JCT	Junction
JN	Join
JT	Joint
KG	Kilogram
KM	Kilometer
KIPS	Thousands of Pounds
KV	Kilovolt
KW	Kilowatt
KWH	Kilowatt-Hour
KWHM	Kilowatt-Hour Meter
L	Length of Curve/Long/Landscaping Drawings
LATL	Lateral
LB	Pound
LCL	Local
LCWD	Leucadia County Water District
LF	Linear Foot
LNDSCP	Landscaping
LOCN	Location

ABBREVIATION	TERMS
LP	Light Pole
LPT	Low Point
LR	Long Radius
LS	Lift Station
LT	Left/Light
LWC	Lightweight Concrete
LWIC	Lightweight Insulating Concrete
LWL	Low Water Level
M	Mechanical Drawings
MATL	Material
MAX	Maximum
MB	Machine Bolt/Megabyte/Millibars
MC	Metal Channel
MCM	Thousand Circular Mils
MECH	Mechanical
MFR	Manufacturer
MG	Million Gallons/Milligram
MGD	Million Gallons Per Day
MH	Manhole
MHZ	Megahertz
MI	Malleable Iron/Mile
MIL	Military Specifications
MIL-	Military Specification (leading symbol)
MIN	Minimum
MIP	Male Iron Pipe thread
MISC	Miscellaneous
MJ	Mechanical Joint
MO	Motor Operator/Motor Operated/Masonry Opening
MOD	Modification
MON	Monument
MOT	Motor
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
MTD	Mounted
N	North/Neutral/Nitrogen
NA	Not Applicable
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
N & C	Nail and Cap
NC	Normally Closed
NE	Northeast
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFC	National Fire Code
NFPA	National Fire Protection Association

ABBREVIATION	TERMS
NIC	Not in Contract
NIP	Nipple
NO	Number/Normally Open
NOM	Nominal
NPT	National Pipe Taper
NRS	Non-Rising Stem
NSF	National Sanitation Foundation
NTS	Not to Scale
NW	Northwest
NWL	Normal Water Level
OA	Overall/Outside Air
OC	On Center/Overcurrent
OD	Outside Diameter
OE	Or Equal
OF	Outside Face
OFCI	Owner-furnished Contractor-Installed
OFCR	Owner-furnished Contractor-Relocated
OH	Overhead
OMWD	Olivenhain Municipal Water District
OPER	Operator
OPNG	Opening
OPP	Opposite
OSHA	Occupational Safety and Health Administration, US Department of Labor, as defined in the General Conditions
O TO O	Out to Out
OUTL	Outlet
OVFL	Overflow
OVHD	Overhead
P	Pole
PARA	Paragraph
PB	Push button/Pull Box
PC	Point of Curvature/Programmable Controller
PCA	Portland Cement Association
PCC	Point of compound curvature/Portland Cement Concrete
PE	Plain End/Polyethylene/Professional Engineer
PEN	Penetration
PG	Pressure Gage
PI	Point of Intersection
PJTN	Projection
PKWY	Parkway
PL	Plate/Property Line
PLATF	Platform
PLF	Pounds Per Lineal Foot
PNL	Panel
PO	Push-On
POB	Point of Beginning

ABBREVIATION	TERMS
POC	Point of Connection
POR	Portion
PP	Power Pole/Polypropylene
PPB	Parts Per Billion
PPM	Parts Per Million
PR	Pair
PRC	Point of Reverse Curve
PRESS	Pressure
PRL	Parallel
PRPSD	Proposed
PRVC	Point of Reverse Curve Vertical Curve
PSI	Pounds per Square Inch
PT	Point of tangency
PVC	Polyvinyl chloride
PVMT	Pavement
PVT	Private
Q	Rate of flow
QUAD	Quadrangle, Quadrant
R	Radius
R/W	Right-of-way
RC	Reinforced concrete
RCB	Reinforced concrete box
RCP	Reinforced concrete pipe
RCV	Remote control valve
REF	Reference
REINF	Reinforced or reinforcement
RES	Reservoir
ROW	Right-of-Way
RR	Railroad
S	Sewer or Slope
SCCP	Steel cylinder concrete pipe
SD	Storm drain
SDR	Standard dimension ratio
SDRSD	San Diego Regional Standard Drawings
SE	Sand Equivalent
SEC	Section, Second
SF	Square foot
SFM	Sewer Force Main
SI	International System of Units (Metric)
SPEC	Specifications
STA	Station
STD	Standard
STR	Straight
STR GR	Straight grade
STRUC	Structural/Structure

ABBREVIATION	TERMS
SW	Sidewalk
SWD	Sidewalk drain
SY	Square yard
T	Telephone
TAN	Tangent
TC	Top of curb
TEL	Telephone
TF	Top of footing
TOPO	Topography
TR	Tract
TRANS	Transition
TS	Traffic signal or transition structure
TW	Top of wall
TYP	Typical
UE	Underground Electric
USA	Underground Service Alert
VAR	Varies, Variable
VB	Valve box
VC	Vertical curve
VCP	Vitrified clay pipe
VERT	Vertical
VOL	Volume
VWD	Vallecitos Water District
W	Water, Wider or Width, as applicable
WATCH	Work Area Traffic Control Handbook
WI	Wrought iron
WM	Water meter
WPJ	Weakened plane joint
XCONN	Cross connection
XSEC	Cross section

APPENDIX B

DEFINITIONS

Wherever the following terms or pronouns occur in these Standard Specifications or in related documents, the intent and meaning shall be interpreted as follows:

A. **"Approved Plans"** shall mean the official plans, profiles, typical cross-sections, working drawings, detail drawings, or exact reproductions thereof, approved by the District and other appropriate government agencies, which show the locations, character, dimensions, and details of the work required to construct the specified public improvements.

B. **"Approved Materials List"** shall mean the listing of those materials reviewed, tested, and allowed for use by the District for installation of its facilities (which may include potable water, recycled water, and sewer facilities).

C. **"Board"** shall mean the Board of Directors of the Carlsbad Municipal Water District.

D. **"Contractor"** shall mean the independent person, firm, corporation or partnership with whom the District or Developer contracts for the performance of the work or any part thereof covered by the Approved Plans and these Standard Specifications. Instructions or information given by the District to the Contractor's superintendent or agent on the Project shall be considered as having been given to the Developer.

E. **"Developer"** shall mean the independent person, firm, corporation or partnership whose purpose is the development of property. The Developer shall, at all times be represented on the Project in person or by a duly designated agent (Contractor or Private Engineer). Instructions or information given by the District to the Contractor's superintendent or agent on the Project shall be considered as having been given to the Developer.

F. "**District"** shall mean Carlsbad Municipal Water District.

For the unique purpose of these Standard Specifications, District shall also refer to the District's representative(s) acting within the scope of the duties entrusted to them.

The District shall resolve any and all issues which may arise with regard to the quality or acceptability of approved materials furnished or work performed, to the manner of performance and rate of progress of the work and shall answer all questions relating to the interpretation of the Standard Drawings, the Approved Plans, the job specifications, if any, and these Standard Specifications as well as the acceptable fulfillment of the Contract on the part of the Developer.

G. **"Engineer"** shall mean the City Engineer or designee, or the Deputy City Engineer, acting either directly or through properly authorized agents, such agents acting severally within the scope of the duties entrusted to them.

H. **"Inspector"** shall mean the District's authorized agent whose duties shall include those defined elsewhere within these Standard Specifications, but who shall not direct the work being performed.

I. **"Engineer of Work"** or **"Private Engineer"** shall mean a Civil Engineer or Structural Engineer registered or licensed in California who is qualified to act as an agent of the Developer in preparing plans for facilities to be approved and accepted by the District and incorporated thereafter into the District's system.

J. **"Project"** or the **"Work"** shall mean the public improvement to be constructed in whole or part within the boundaries of the District.

K. **"Standard Drawings"** shall mean the standard details issued by the District for construction of District facilities (Volume 3).

L. **"Specifications"** shall mean the directions, provisions, and requirements contained in the General Conditions, the Standard Specifications, and any supplements thereof.

M. **"Submittal"** shall mean drawings, diagrams, illustrations, schedules, performance charts, reports, calculations, manuals, samples, brochures, and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier, or distributor and which illustrate some portion of the work.

N. **"Plans"** shall mean the drawings which show the character and scope of the work to be performed and which have been prepared or approved by the Engineer and are referred to in the Contract Documents.

REFERENCE STANDARDS

The reference standards of the organizations form a part of these Specifications to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise stated.

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
BACKFLOW PREVENTION DEVICE	Reduced Pressure Principal (RP) and Double Check Detector Assemblies (DCDA) for residential and commercial fire protection systems. OS&Y gate valves required for fire protection backflow assemblies.	List of Approved Backflow Prevention Assemblies, USC Foundation for Cross-Connection Control and Hydraulic Research, latest version
BACKFLOW PREVENTION DEVICE ENCLOSURE	Protective enclosure for backflow prevention devices. Models and sizing to be selected for the specific application. Stainless steel or paint coatings per APWA uniform color code for type of service.	Cover Your Brass Pipeline Products, Inc. StrongBox
BOLTS AND NUTS, CARBON STEEL	Hex-head machine, ASTM A307, cadmium/zinc plated, Grade per specification 15000-2.5.	
BOLTS AND NUTS, TYPE 316 SS	Hex-head machine, ASTM A193/A194, Grade per specification 15000-2.5.	
BONDING AGENT, EPOXY	Epoxy resin-based bonding agent for bonding new mortar or concrete to existing concrete	Sika Sikadur 32 Hi-Mod
CASING END SEAL	Styrene butadiene rubber (SBR) sheet end seal, 1/4" thick. Use seamless end seals for new installations with stainless steel bands.	Advanced Products & Sys. Calpico Cascade Waterworks CCI Piping Systems Pipeline Seal & Insulator Powerseal Raychem
CASING SPACER	Stainless steel casing spacer, center restrained type with PVC liner and non-metallic anti-friction runners	Advanced Products & Sys. Calpico, Inc. Cascade Waterworks CCI Piping Systems Pipeline Seal & Insulator Powerseal Raychem
CATHODIC TEST STATION BOX	Concrete body with ductile iron lid and lid ring. "CP TEST" shall be cast into the lid in 1" letters. For cathodic protection test stations, anode ground beds and insulated flange test stations.	Christy G5
CATHODIC WELDING	Exothermic weld kits for welding cathodic bond wires to steel pipelines	Cadweld, by Erico Products, Inc., Thermoweld by Continental Industries, Inc.
CHLORINE	Liquid (gas) or sodium hypochlorite solution. See Section 15041	
COATING, MASTIC	Cold applied coal tar or epoxy based single component, self-priming, heavy-duty protective exterior coating for buried concrete	Carboline Bitumastic 50 Devoe Devtar 5A Polykem 938 Tnemec HB Tnemecol 46-465, HB Tneme-Tar 46H-413
COATING, WATERPROOF	Epoxy resin based, cementitious, protective waterproofing for concrete.	Sika Top Seal 107 STO CR 241
COUPLING, C900 PVC, DEFLECTION	4" through 12" PVC for obtaining deflection only.	Westlake Pipe & Fittings Fluid-Tite
COUPLING, C900 PVC CLOSURE OR REPAIR	4" through 12" solid PVC for closure or repair	Westlake Pipe & Fittings Fluid-Tite

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
COUPLING, GROOVED	Use for above ground, ductile iron or steel pipe, restrained mechanical coupling joints, 3" or larger.	Grinnell #7001 Tyler 500 Vitaulic #44, #77
COUPLING, TRANSITION, FLEXIBLE	4" and larger steel or ductile iron construction for joining plain end pipe, epoxy coated with Type 304 or 316 stainless steel bolts and nuts. For use on AC, PVC, DI, or steel pipe. (Restrained couplings n/a for use on AC)	Ford FC1, FC2A, FC2W Mueller Hymax 2, Hymax Grip Romac 501, XR 501, Macro HP, Alpha Smith-Blair 411, 413
DISMANTLING JOINT	Liquid epoxy coating, NSF61 certified, restrained with tie rods, 150 psi working pressure.	Mueller Hymax Dismantling Joint Powerseal 3563 Romac DJ400
ELL – BURY	6" ductile iron bury ells, long radius, FLG x MJ/PO. Use short radius bury ells with District approval only.	Clow South Bay Foundry
ENCLOSURE – AIR/VACUUM VALVE	Enclosure for combination air-vacuum valve assembly, polyethylene. See "Valve Box" for below grade components. Color: Sandstone with blue color stripe (Potable) and purple color stripe (Recycled Water)	Pipeline Products: VCAS 1424 (2" valve) VCAS 1830 (4" valve) VCAS 2436 (6"-8" valves)
ENCLOSURE – WATER SAMPLE STATION	Enclosure for potable water sample station assembly, steel construction, galvanized.	Pipeline Products WTS-858G
EPOXY ADHESIVE	High-modulus, low viscosity, epoxy resin based adhesive suitable for grouting bolts or dowels	Sika Sikadur 31 and Sikadur 35
EXPANSION JOINT	Flexible expansion joint for water pipeline bridge crossings or other applications with pipeline movement (expansion/contraction and/or deflection).	Dresser 63 EBAA Iron Flex-Tend Romac FJ Restraint Smith-Blair 611, 612
FIRE HYDRANT	Standard 6" wet barrel, bronze fire hydrants with six-hole bolt pattern, 200 psi. Outlets: 4" x 2.5", 4" x 2.5" x 2.5" or 4" x 4" x 2.5"	Clow 2060,2065 Jones 3700, 3775 AVK 2422, 2472, 2492
FIRE HYDRANT (> 200 psi)	Full submittal required.	
FIRE HYDRANT EXTENSION SPOOL	Ductile or cast iron spool with integrally cast flanges (flange drilling to match hydrant) and machined or cast break-off grooves.	South Bay Foundry
FITTING, DUCTILE IRON	Flanged, mechanical joint or push-on tees, bends, crosses, reducers, adapters, etc., for ductile iron and PVC pipelines 4" and larger. Manufactured per AWWA C110, C111, C153 with double thickness cement mortar lining.	Sigma Corp. SIP Star Tyler Union American Pipe U.S. Pipe
FITTING, GROOVED	Ductile iron fittings for grooved end pipe, 4" through 24"	Grinnell Tyler G-B Victaulic
FITTING, PIPE RESTRAINT (Ductile Iron Pipe)	May be used in lieu of thrust blocks with District approval	EBAA Iron Series 1100 RomaGrip for Ductile Iron Sigma One-Lok SLDE for Ductile Iron Star Pipe – StarGrip Series 3000, 3100

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
FITTING, PIPE RESTRAINT (PVC Pipe)	May be used in lieu of thrust blocks with District approval	EBAA Iron Sigma One-Lok SLCE for PVC Star Pipe – StarGrip Series 4000, 4100, 4400
GASKET, FLANGE	1/8" thick full-face gasket for flat-faced flanges. Ring gasket for raised-face flanges. Aramid fiber bound with nitrile. No asbestos content. NSF 61 certified for potable water applications. Use Acrylonitrile Butadiene (nitrile, NBR) gaskets in environments potentially exposed to gasoline, petroleum products or hydrocarbons.	Garlock 3000 Klinger Thermoseal, Klingersil C-4401, Watersil Tripac 5000
GASKET, MECHANICAL JOINT, PUSH-ON, TRANSITION	Conforming to AWWA C111. Gaskets for use in potable water systems shall be NSF 61 certified, SBR (Styrene Butadiene rubber) or Acrylonitrile Butadiene (nitrile, NBR). Use NBR gaskets in environments potentially exposed to gasoline, petroleum products or hydrocarbons.	American Ductile Iron Pipe Ferguson Enterprises, PROSELECT Star Pipe Products Tyler Union
GASKET, JOINT RESTRAINT	Rubber ring type with stainless steel locking segments vulcanized into the gasket. For use on PVC casing pipe.	US Pipe Field Lok 350 RieberLok
GREASE	For bolt corrosion protection on buried bolts, NO-OX-ID type. NSF 61 certified for potable water applications.	Sanchem NO-OX-ID Dearborn Chemical
GROUT	Non-shrink, cement based grout for crack repair, flooring mortar, dowel grouting, crack sealing and general binding.	Sika Sikagrout 212 STO Epoxy Binder CR633 STO Epoxy Gel CR635 STO N-S Grout CR732
INSULATING BUSHING	Nylon, 1-1/4" x 1", 1-1/2" x 1", 2-1/2" x 2" Not to be used in buried service installations. Engineer approval required.	F.H. Mahoney
INSULATING UNION	For piping connections with dissimilar metals such as service or appurtenance connections up to 2” on steel mains, MNPT x MNPT. Submittal required.	HART Dielectric (Insulated) D-3232 Series, Class 3000
JOINT SEALING COMPOUND	Butyl rubber joint sealant for use on pre-cast concrete vault and manhole sections.	Press-Seal Corp., EZ-Stik Premium ConSeal Concrete Sealing Products, CS-102
LUBRICANT, PIPE GASKET	Rubber gasket lubricant for use on rubber gasket pipe joints, NSF 61 certified for potable water.	Whitlam Blue Lube
MARKER POST	3.5” diameter, HDPE, white, pipeline marker post with 3.75” domed, polyethylene color enhancer per APWA uniform color code for type of service.	Carsonite LineMarker (CLM)
LINK SEAL, MODULAR	For sealing pipe penetrations in concrete vault walls, floors and ceilings against the entry of water or soil. EPDM rubber, Type 316 SS hardware, 20 psi hydrostatic resistance. For oil resistance, use Nitrile rubber (NBR).	Garlock/GPT Industries Advance Products and Systems: Innerlynx
METER	Flow meter for potable or recycled water service or fire service backflow detectors.	Supplied by CMWD

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
METER BOX (1" Service & 2" Air Valve Assemblies)	12" x 20" x 12" polymer meter box and cover for 1" water services with 1" or smaller meters, and for angle stops for 2" air valve assemblies. Color: Gray for potable water and purple for recycled water.	Potable: Armorcast Box: A6000485-SA Cover: A6000484T-H15S Recycled: Armorcast Box: A6000485SA-PUR Cover: A6000484T-H15S-PUR
METER BOX (2" Service)	17" x 30" x 12" polymer meter box with 2-piece lid for 2" water service with 2" meter. Color: Gray for potable water and purple for recycled water.	Potable: Armorcast Box: A6001640PCX12 (in concrete surfaces) Box: A6001419SA (in soil surfaces) Cover: A6001947T-H15S Recycled: Armorcast Box: A6001640PCX12-PUR (in concrete surfaces) Box: A6001419SA-PUR (in soil surfaces) Cover: A6001947T-H15S-PUR
METER FLANGE	Brass meter flanges for 1-1/2" and 2" meters with slotted holes.	Ford CF Series Jones E-129 A.Y. McDonald 609F
MORTAR, REPAIR	Two component, low shrinkage, cement based with high compressive and bonding strength	Sika: Sika Top 122, 122 Plus, 123 STO CR 735, CR 740 Tnemec Series 217, 218
PAINT (Hydrants & Valve Boxes)	Paint for District (public) fire hydrants and valve box lids. Prime coat required on all above ground metal surfaces per Section 09900.	Sherwin Williams Steel Spec: Alkyd Safety Yellow (2 coats)
PAINT (Private Hydrants)	Paint for private fire hydrants. Prime coat required on all above ground metal surfaces.	Sherwin Williams Steel Spec: Alkyd, Safety Red (2 coats)
PAINT (Potable Water Appurtenances)	Paint for metallic backflow assemblies, vent pipes, meters, regulators, vault piping, air valves. Prime coat required per Section 09900.	Sherwin Williams Steel Spec: Alkyd, Sand Dune (2 coats)
PAINT (Recycled Water Appurtenances)	Paint for metallic backflow assemblies, vent pipes, meters, regulators, vault piping, air valves and valve box lids. Prime coat required per Section 09900.	Sherwin Williams Steel Spec: Alkyd, Purple, Pantone #522C (2 coats)
PIPE, COPPER TUBING	1" Type K Soft seamless rolled tubing. 2" Type K Soft seamless straight lengths. 1" and 2" Type K Rigid seamless straight lengths. Use Type K Soft with compression fittings.	Cerro Halstead Lee Mueller Phelps-Dodge
PIPE, DUCTILE IRON	For 4" and larger pipelines, manufactured per AWWA C111 C115, C150, C151. Double thickness cement mortar lining.	American Pipe McWane U.S. Pipe
PIPE, PVC AWWA C900	For 4" and larger pipelines and valve box casing. DR18 and DR14.	Diamond Plastics IPEX JM Eagle VinylTech Westlake Pipe & Fittings

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
PIPE, CML&TC STEEL	Cement mortar lined and tape coated with cement mortar overcoat. Steel cylinder per AWWA M11 and Section 15061. Submittal required.	American Northwest Pipe Co. Southland Pipe Corp. West Coat Pipe
PIPE SUPPORT	Fabricated steel construction and adjustable for support of piping and flanges. Heavy duty, finish per Spec 15000.	Pipeline Products, Models PS-250 through 600, Heavy Duty Eaton, B-Line Series B3088ST & B3093
POLYETHYLENE ENCASEMENT	Polyethylene sleeve per AWWA C105 for buried ductile iron or steel pipe, and for recycled water identification. Clear sleeve for potable water, purple for recycled water. 12-mil.	Northtown Company T. Christy Enterprises Trumbull Industries
POLYETHYLENE WRAP	Polyethylene sheet or tape wrap for buried fittings and valves, 8-mil. Clear for potable water, purple for recycled water.	Northtown Company T. Christy Enterprises Trumbull Industries
PRIMER, WAX TAPE	Surface primer for application of petrolatum wax tape.	Carboline Denso Paste Trenton Tem-Coat
SEALANT	Solvent-based rubber sealant for bonding metal, dries to a flexible seal. Solvent resistant.	3M Scotch-Seal 800
SERVICE SADDLE (DI Pipe)	Brass or bronze saddle with silicone bronze double straps, iron pipe thread outlet sizes 1" and 2", NSF 61 certified.	A.Y. McDonald 3826 Ford 202B Jones J-979 Mueller BR2B Romac 202B
SERVICE SADDLE (AC and C900 PVC Pipe)	Bronze or brass saddle with stainless steel, four bolt strap(s), iron pipe thread outlet sizes 1" and 2", NSF 61 certified. For installation on AC pipe, field verify pipe outside diameter.	A.Y. McDonald 3856 (PVC pipe only) Ford 202BS (PVC pipe only) Jones J-969 Mueller BR2S Romac 202BS
TAPE, OUTER WRAP	Adhesive plastic outer wrap for wax tape coating systems for buried service. For separation of tape coating system and soil.	Polyken 960 Trenton Poly-Ply
TAPE, UTILITY	10 to 50-mil x 2" wide general utility tape for corrosion protection of above and below ground pipes and fittings and pipe penetrations through concrete equipment pads.	Calpico Northtown Polyken 900 Scotchwrap 3M 50, 51
TAPE, WARNING/ IDENTIFICATION	6" wide, warning/identification (non-metallic) tape for buried pipelines and conduit runs with continuous warning per Section 15000 and Section 16640. Tape for recycled water shall be purple.	Calpico T. Christy Ent. Terra Tape Thor, ElastTec Northtown
TAPE WARNING/ IDENTIFICATION (Recycled Irrigation)	3" wide, warning/identification (non-metallic) tape for buried irrigation pipelines. Purple color with continuous warning "Caution Reclaimed Water Main Buried Below"	Calpico T. Christy Ent. Terra Tape Thor, ElastTec Northtown
TAPE, WAX (Above-ground)	Petrolatum saturated synthetic fabric tape for use on above-ground couplings, flanges, fittings, etc.	Trenton #2 Wax-Tape
TAPE, WAX (Underground)	Petrolatum saturated synthetic fabric tape for use on buried service couplings, flanges, fittings, etc. Primer and outer wrap required.	Carboline Densyl Tape Trenton #1 Wax-Tape and Wax-Tape Primer

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
TAPPING SLEEVE (AC, DI & C900 PVC Pipe)	Use on 6" to 12" wet taps, stainless steel construction, flanged outlet. No size-on-size taps. Submittal required.	Ford Style FAST PowerSeal 3480-AS or 3490-AS Romac SST/SST3 Smith Blair 663
VALVE – AIR/VACUUM (2-inch and smaller)	Reinforced nylon body and base	ARI D-040 (up to 250 psi) ARI D-021 (up to 150 psi, recycled water)
VALVE – AIR/VACUUM (3-inch and larger)	Epoxy lined and coated, stainless steel hardware. Model selection based on application. Submittal required for potable or recycled water service.	ARI D-060 HF, D-060-C HF NS, D-070 (potable)
VALVE – BUTTERFLY (150 psi)	18" and larger, AWWA C504, Class 150B. Thermosetting or fusion bonded epoxy lined and coated. ANSI/ASME B16.1 Class 125 FLG x FLG	M&H 1450, 4500 Mueller Lineseal III Pratt Groundhog
VALVE – BUTTERFLY (250 psi)	18" and larger, AWWA C504, Class 250B. ASTM A536 ductile iron body and disc, Type 316 SS disc edge. Thermosetting or fusion bonded epoxy lined and coated. ANSI/ASME B16.1, 250-lb drilling, FLG x FLG	M&H 1450, 4500 (Class 250) Mueller Lineseal XP 250 Pratt Triton HP-250
VALVE – CORPORATION STOP (MIP x COMP.)	Bronze, Compression x MIP thread ball valve (T-head only) 1"and 2" full opening.	Ford FB1100Q NL Jones E-1957G Mueller B-25028N AY McDonald 74704BQ
VALVE – CORPORATION STOP, (MIP x MIP)	Bronze, MIP x MIP Thread Ball Valve (T-Head only), 1" and 2", full opening.	Ford FB500 NL, Jones E-1943 Mueller B-2969N (2") Mueller B-20013N (1")
VALVE – GATE, RESILIENT WEDGE (RWGV)	4" through 16", non-rising stem, low zinc bronze or stainless steel stem, encapsulated wedge per AWWA C509 or C515, ductile iron body and bonnet, fusion bonded epoxy lined and coated and certified holiday-free. 250 psi rating.	American FC, Series 2500 AVK 45 Clow F-6100 Ductile Iron Kennedy KEN-SEAL II Mueller 2361, 2362 M&H Style 4067, 7000, 7068 U.S. Pipe Metroseal & Metroseal 250
VALVE – METER STOP, ANGLE (1-inch)	Brass angle meter stop (ball valve) with 90-degree lock wing, Compression inlet x Swivel Meter Nut outlet. No lead.	A.Y. McDonald 74602BQ Ford BA43-444WQ-NL Jones E-1963WSG Mueller B-24258N
VALVE – METER STOP, ANGLE (1-inch)	Brass angle meter stop (ball valve) with 90-degree lock wing, Flare inlet x Swivel Meter Nut outlet. No lead. Use with District approval only.	A.Y. McDonald 74602B Ford BA23-444W-NL Jones E-1964W Mueller B-24255N
VALVE – METER STOP, ANGLE (2-inch)	Brass angle meter stop (ball valve) with 90-degree lock wing, Compression inlet x Meter Flange outlet. No lead.	A.Y. McDonald 74602BQ Ford BFA43-777WQ-NL Jones E-1975WSG Mueller B-24276N
VALVE – METER STOP, ANGLE (2-inch)	Brass angle meter stop (ball valve) with 90-degree lock wing, Flare inlet x Meter Flange outlet. No lead. Use with District approval only.	A.Y. McDonald 74602B Ford BFA23-777W-NL Jones E-1973W Mueller B-24277N

APPENDIX C

APPROVED MATERIALS LIST
FOR POTABLE AND RECYCLED WATER FACILITIES

Item	Description	Manufacturer/Model
VALVE – METER STOP, STRAIGHT (2-inch and smaller)	Brass, straight, with locking tabs, 300 psi. No lead. 3/4" and 1": FIP inlet x Meter Swivel Nut outlet. 2": FIP inlet x Meter Flange outlet.	Jones 3/4" E-1903 Jones 1" E-1908, 2" E-1913 Ford 3/4" B13-332W Ford 1" B13-444W-NL Ford 2" BF13-777W-NL AY McDonald 76101MW w/SHDLB
VALVE – METER STOP, CUSTOMER SIDE	3/4" and 1" brass customer shut-off (ball) valve, Swivel Meter Nut inlet x FIP outlet, lockable tabs, with lever handle. No lead.	A.Y. McDonald 76101MW w/SHDLB Ford B13-332W w/HT34, B13-444W w/HT34 Jones E-1908W Mueller B-24351
VALVE – METER STOP, CUSTOMER SIDE	2" brass customer shut-off (ball) valve, Meter Flange inlet x FIP outlet, lockable tabs, with lever handle. No lead.	A.Y. McDonald 76101MW w/SHDLB BF13-777W w/HB-67S Jones E-1913W Mueller B-24337
VALVE – PRESSURE RELIEF AND SUSTAINING	Epoxy coated interior/exterior, stainless trim, bronze pilots, model specified for each project. Submittal required.	Cla-Val
VALVE BOX (Potable Water)	For gate valves & butterfly valves. Lids marked "CMWD" and "Water". Non-H20 traffic rated valve boxes to be used with District approval only.	E.J. Brooks Company (Brooks) Service 4-TT (Non-H20, indirect traffic applications only) J&R Concrete Products V4-T (Non-H20, indirect traffic applications only) South Bay Foundry SBF BMT00 (Direct H-20 traffic rating applications)
VALVE BOX (Normally Closed)	Lids marked "CMWD" and "Water"	Brooks Service 3-RT
VALVE BOX (Recycled Water)	Lid marked "CMWD" and "Recycled Water". See Standard Dwg W13.	South Bay Foundry SBF 1208N Bingham & Taylor Mark V (Domestic)
VALVE BOX (Potable & Recycled Water)	2" Blow-Off or Manual Air Release; 4" or 6" Blow-Off Assemblies. Lids marked "CMWD" and "Water" or "Recycled Water"	South Bay Foundry SBF 12" gate cap and frame
VALVE STEM EXTENSION (Fiberglass)	Use when depth to valve operating nut is greater than 7 feet. Three-part fiberglass valve extension.	Pipeline Products, Fiberplas FPU-210, FPT-200, FPL-220
VALVE STEM EXTENSION (Steel)	Use when depth to valve operating nut is between 5 and 7 feet. Round or square, 1-1/2" steel tube, welded construction, with top centering ring and AWWA 2" operating nuts at top and bottom. Galvanized finish.	Pipeline Products SX-908
WIRE, TRACER	#14 AWG solid copper UF type wire, with cross linked polyethylene insulation. Color: white or yellow.	Baron Cosberg Industries Paige Regency Wire
WIRE, TRACER CONNECTOR	Direct bury, waterproof, silicone-filled capsule tube with standard wire nut or silicone-filled wire nut connectors for tracer wire connections.	3M DBR-6 King Innovation, DryConn DBSR Yellow

APPENDIX D

APPROVED MATERIALS LIST
FOR SEWER FACILITIES

Item	Description	Manufacturer/Model
CASING END SEAL	6.25mm (1/4") thick styrene butadiene rubber sheet, one-piece end seal for new installations, 25mm (1") wide stainless steel bands. Zippered end seals with stainless steel bands may be used with prior approval. Submittal required.	Advance Products & Systems Cascade Calpico Pipeline Seal & Insulator Powerseal
CASING SPACER	Stainless steel casing spacer, center restrained position type with PVC liner and non-metallic, anti-friction runners. Submittal required.	Advance Products & Systems Cascade Powerseal Pipeline Seal & Insulator
CLEAN OUT, FRAME AND COVER	Frame and cover for sewer clean outs at end of sewer mains 8" diameter and smaller.	South Bay Foundry SBF-1240
COATING, EXTERIOR (Damp Proofing)	Exterior surface of manholes and vaults potentially exposed to ground water.	Carboline, Bitumastic 50 Kop-Coat, Bitumastic Super Service Black Tnemec, H.B. Tnemecol Series 46-465 Tremco Tremproof 250 or 260
COATING, INTERIOR (Manhole Rehabilitation)	Epoxy coating system for manhole interior.	Raven 405 Saueriesen Sewer Guard 210 & 210T Neopoxy NPR 5305 Tnemec 451 CPP Sprayliner Tnemec 454 CPP Trowel-Liner Quadex Structure Guard Epoxy
COUPLING, (Repair/Transition)	For repair or joining pipes of same or different outside diameters.	Fernco Gripper Gasket LLC, MaxAdaptor
ENCASEMENT, POLYETHYLENE	8 mil polyethylene wrap for buried service ductile iron pipe and fittings, AWWA C105.	Christy Northtown Trumbull
FITTINGS, PVC	Up to 15", wyes, bends, caps, and plugs, bell-and-spigot with rubber gaskets.	GPK IPEX Westlake Pipe & Fittings
FITTINGS, PVC (Restrained Joint)	C900 RJ, couplings, sweeps	Westlake Pipe & Fittings
FITTINGS, SADDLE (Flexible)	4" and 6" saddle wye or tee connection to sewer main.	ADS Inserta Tee DFW/HPI Fernco GPK Westlake Pipe & Fittings
GASKET	Gasoline-resistant rubber gaskets for bell-and-spigot sewer pipe and fittings.	Newby
LINER, CURED-IN-PLACE (Manhole Rehabilitation)	Cured-In-Place composite lining systems with structural fiberglass and impermeable membrane. Submittal required.	Poly-Triplex Technologies, Inc. Terre Hill Composites, Inc., Multiplexx PVCP
LINER, PVC (Manhole Rehabilitation)	PVC protective lining systems for concrete in municipal wastewater systems. Submittal required	T-Lock/Arrow-Lock PVC Lining Systems (a Northwest Pipe company) ArmorLok Inc.
MANHOLE, ADAPTER (Break-in)	Sanded manhole adapter for cast-in-place and break-in connections	GPK
MANHOLE, ADAPTER (Precast)	Rubber flexible connector for connection to cored or precast manholes	A-Lok, X-Cell and Inserta Lok NPC Kor-N-Seal
MANHOLE, FRAME & COVER (Composite, Locking)	38" frame and cover with Titus TwistLIFT lock, AASHTO M306-05 H-20 & H-25 & EN 124 D400 load rating, marked "SEWER" and "CITY OF CARLSBAD". Submittal required.	EJ

APPENDIX D

APPROVED MATERIALS LIST
FOR SEWER FACILITIES

Item	Description	Manufacturer/Model
MANHOLE, FRAME & COVER (Iron)	36" nominal diameter cast iron per ASTM A48, Class 30, with machined seat & lifting hole. Inner cover: 155 lbs. Outer cover: 320 lbs. Frame: 330 lbs. Marked "SEWER" and "CITY OF CARLSBAD."	Alhambra Foundry A-1325 South Bay Foundry SBF-1325
MANHOLE, FRAME ADJUSTING RING	For use in adjusting manhole frames and covers.	South Bay Foundry
MANHOLE (Precast Concrete, Rehabilitation Only)	Access manholes for sewer mains (base, risers, eccentric cone, grade rings) designed for H-20 loading. For rehabilitation only with an approved lining system. New manholes shall be polymer concrete.	Ameron B&W Precast Mar-Con Products Southwest Concrete Products Underground Precast Solutions
MANHOLE (Polymer Concrete)	Required for all new manholes. Polymer concrete base, shaft, eccentric cone and riser rings.	Armorock Olson Precast Company
PIPE, DUCTILE IRON (DIP)	For sewers with shallow cover/heavy loading, force mains and vault piping. Submittal required.	American Pipe McWane Ductile U.S. Pipe
PIPE, HDPE (Pressure)	Fused HDPE pipe for force mains or trenchless installation of gravity sewers, PE 4710, green stripe on exterior. DR per City Engineer approval.	Chevron Phillips Chemical/Performance Pipe JM Eagle
PIPE, PVC C900	15' deep or greater gravity sewer, DR 18 minimum wall thickness and City Engineer approval. Force mains, DR 14 minimum wall thickness.	Diamond Plastics Ipex JM Eagle VinylTech Westlake Pipe & Fittings
PIPE, PVC SDR 35 (Depths 5 to 15-ft) SDR 26 (Depths 15 to 30-ft) DR 14 or 18 (Special installations)	4" through 15" Diameter, ASTM D3034 gravity sewer pipe. 18" through 27" Diameter; ASTM F679, (T-I) gravity sewer pipe Use pressure-rated PVC pipe conforming with AWWA C900 for shallow or deep cover, pressure flow or trenchless installations.	Diamond Plastics Ipex JM Eagle VinylTech Westlake Pipe & Fittings
PIPE, PVC - RESTRAINED JOINT	PVC pipe with butt-fusion welded joints or restrained joint coupled or restrained joint integral bell. Engineer approval required.	Aegion/Underground Solutions (Fusible PVC C900) Westlake Pipe & Fittings (Certa-Lok RJ or RJIB C900, Certa-Flo gravity sewer)
PIPE, RCP	PVC lined. Submittal required.	
PUMP, SEWAGE (Non-clog)	Submittal required.	Flygt N-Pump Series
SEALANT (Manhole or vault joints)	Pre-formed, cold-applied, rope-like, butyl rubber adhesive gasket between precast manhole sections. Exterior joint wrap.	A-Lok Butyl Lok Concrete Sealants, Inc., ConSeal CS-102 Henry, Rub'R-Nek LTM Concrete Sealants, Inc., ConSeal CS-212
TAPE, WARNING/ IDENTIFICATION	Warning and identification tape (non-detectable), 6" wide, colored green with continuous warning: "CAUTION: SEWER LINE BURIED BELOW."	Calpico Type 1 Line-Tec Type B Christy Type 1 Terra Tape Standard 250 Thor Elast Tec Northtown
VALVE – AIR RELEASE & AIR/VACUUM VALVE (Sewage service)	Combination air release and air and vacuum valve for unscreened wastewater service. Type 316L stainless steel body, cover, trim and venting orifices, and hardware; HDPE floats. Submittal required.	A.R.I. Flow Control Accessories, D-020 International Valve Marketing, Vent-Tech SWG RF Valves, Vent-O-Mat RGX Series

APPENDIX D

APPROVED MATERIALS LIST
FOR SEWER FACILITIES

Item	Description	Manufacturer/Model
VALVE – PLUG (Non-lubricated)	AWWA C517 compliant, 100% port, non-lubricated, resilient-faced cylindrical plug eccentrically offset from the seat, flanged ends, worm-gear actuator for 6" and larger valves, 150 psi min. pressure rating. Fusion bonded epoxy lined and coated and certified holiday-free. Submittal required.	Dezurik Val-Matic Milliken
VALVE – CHECK, RUBBER FLAPPER	AWWA C508 compliant with ductile iron body and cover, Type 316 stainless steel bolting, flanged ends, 250 psi min. pressure rating. One-piece, NBR ASTM D2000-BG disc w/ stainless disc accelerator. Screw-type backflow actuator and mechanical disc position indicator. Fusion bonded epoxy lined and coated and certified holiday-free. Submittal required.	Val-Matic – Surgebuster
VALVE – CHECK, SWING	AWWA C508 compliant with ductile iron body and cover, NBR disc seat, aluminum bronze body seat, stainless steel shaft, flanged ends, 250 psi min. pressure rating, Type 316 stainless steel hardware. Closure control device: air cushion, lever and weight, lever and spring or oil-controlled per transient pressure analysis. Fusion bonded epoxy lined and coated and certified holiday-free. City Engineer approval and submittal required.	Dezurik-APCO – CVS-6000/6000A Val-Matic – Series 7800, 7900