PROCEDURAL GUIDELINES
AND
GENERAL DESIGN REQUIREMENTS

DEVELOPMENT SERVICES

IRVINE RANCH
WATER DISTRICT

IRWD PROCEDURAL GUIDELINES

REVISION LOG

REVISION NO.	DATE	DESCRIPTION
1	Jan. 1995	Miscellaneous revisions to pages
2	Oct. 1997	Added Sec. 2.3.4, Digital Submission Requirements,
		added waternotes, added sewer note, and other
		miscellaneous revisions
3	April 1999	Added new Section 5, Reclaimed Water, Withhold Lot
		Procedure, and miscellaneous other revisions
4	August 2008	Revised entire Section 5, “Design Criteria, Recycled Water Facilities”
5	August 2011	Section 5 (Appendix – A) Change to Letter – E
6	November 2011	Revised Sections 1 through 4

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GENERAL DESIGN REQUIREMENTS
FOR
IRVINE RANCH WATER DISTRICT

SECTION 1

GENERAL INFORMATION

1.1 Purpose

The purpose of these Procedural Guidelines and General Design Requirements Manual (Guidelines) is to provide IRWD consultants with a guide to the District procedure for processing domestic water, sewer, recycled water, and natural treatment system utility improvement plans. This Manual will also provide a listing of the general design criteria for each of the four types of systems the District operates and maintains; domestic water, sewer, recycled water, and natural treatment systems. These guidelines are to be used in conjunction with the latest versions of the District's "Rules and Regulations for Water, Sewer, Recycled Water Service and Natural Treatment Systems" (Rules and Regulations), and "Construction Manual" for preparing the plans for the various systems.

1.2 Availability of IRWD Service

Irvine Ranch Water District (IRWD) provides domestic water, sewer, and recycled water service to all properties within its service area boundaries. The District also maintains and operates Natural Treatment Systems (NTS) for treatment of storm water runoff. A customer may confirm IRWD's service to a specific property by visiting www.irwd.com and viewing the Water Improvement District and Sewer Improvement District maps, which reflect the Improvement Districts within IRWD. Service is provided to all properties within the current Improvement Districts. Alternatively, a customer may confirm service availability with IRWD's Department of Engineering and Construction's Development Services group, located at 15600 Sand Canyon Avenue, Irvine, California, or by calling (949)453-5300.

Larger projects may require the preparation of a service feasibility study or a Sub-Area Master Plan (SAMP) to determine whether the existing IRWD facilities are adequate to serve the needs of the proposed development at build out or if new IRWD facilities are required to be constructed to handle the additional demands. In these cases the developer will be responsible for the full cost of the study, if required by the District. The District reserves the right to perform the study.

1.3 Annexation to Existing Improvement Districts

Property not within the District and/or not within an Improvement District, and which is to be provided with service by IRWD, is subject to annexation by IRWD and/or Improvement Districts. Annexation to IRWD and/or Improvement Districts may in turn be subject to annexation to other agencies, e.g. Metropolitan Water District of Southern California, Orange County Water District, except as otherwise provided by agreement.

If the proposed development is not included in any of the existing IRWD Improvement Districts (ID), the developer must file a formal application for annexation to the nearest existing ID. The request for annexation must be submitted to the District General Manager's office for action by the IRWD Board of Directors. The request must be accompanied by a complete legal description of the property to be annexed, three (3) copies of the property map, and the appropriate fees as determined by the District. The applicant should allow a minimum of 120 days for processing the annexation request.

1.4 Verification of Service Availability

A request for service verification, addressed to the Director of Engineering and Construction, must be accompanied by an 8½" x 11" vicinity map and two (2) copies of the tentative tract map showing the proposed services and their points of connection to the existing IRWD facilities. Conceptual sizing of the water, sewer and natural treatment systems should be shown along with dwelling unit densities, demand, tributary area and loading calculations. The normal information required on tentative tract maps is also required.

1.5 Will Serve Letters

A "Will-serve" letter or "Statement of Certification" will be prepared by IRWD upon the developer's request for a development within the boundaries of existing IDs. These documents may be required by local jurisdictional agencies for processing tentative maps or development reviews.

Water supply assessments and water service verifications will need to be requested for developments of 500 dwelling units or more, in accordance with the California Water Code Section 10910.

1.6 Water and Sewer Utility Plan Processing

Any and all proposed utility improvements to serve a property or development must be reviewed and approved by IRWD. The utility improvements must be reflected on civil engineering plans and reviewed and approved through IRWD's Plan Approval Process. The IRWD Plan Approval Process is shown on the flow chart referenced as Figure 1. The specific information required for each of the submittals required during the process is included in Section 2, and the flow chart contains appropriate references for each sub-section.

1.6.1 General

The developer shall endeavor to have a "pre-design" meeting with Development Services to review the utility alignment concepts for their project prior to making a first plan submittal. The conceptual plans shall be based on IRWD's as-built documents.

1.6.2 Plan Check Submittals

The engineer shall submit one (1) full sized copy of the utility improvement plans, and one compact disk containing a single PDF file of the entire drawing set. When making subsequent plan submittals (after the first submittal), the engineer shall also return the preceding plan check with IRWD's comments. The engineer shall also submit other pertinent information to assist IRWD in reviewing the plan submittal, e.g. tract map, fire master plan, etc. Generally, IRWD endeavors to complete its review of first or second plan check submittals within 10 working days. Plan check submittal numbers three or more should be completed within 5 working days. There may be variances in this schedule due to a number of factors, and IRWD cannot guarantee these processing intervals, but they are general guidelines.

1.6.3 Fees, Bonds and Agreements

IRWD will calculate a project's plan check and inspection fees and connection fees just prior to the approval of the utility improvement plans. All fees must be paid prior to IRWD's approval of the plans. Fees for connection to IRWD facilities, usage charges, and other administrative fees are detailed in Exhibit "B" to the IRWD Rules and Regulations, also known as the IRWD Rates and Charges. A customer may visit www.irwd.com to view this document. Again, all applicable fees shall be paid by the applicant prior to the approval of plans, installation of individual services, or at other times as requested by the District (pending further District input). Since the fees are based on a project's quantities of water and sewer improvements, IRWD reserves the right to postpone the preparation of the agreements and bonds until such time when the quantities are finalized.

IRWD will also prepare bond estimates and agreements for transmittal to the engineer for the applicant's execution. The agreements and bonds must be executed and properly endorsed by the applicant and returned to the District before the final plans can be signed by the District.

1.6.4 Approval of Plans

IRWD's requirements for providing its plan approval include:

- Plan corrections are properly made pursuant to all IRWD plan comments, including appropriate written descriptive responses where it is requested.
- Submittal of a copy of the approved Fire Master Plan for the project site.
- Payment of the required IRWD fees
- Return of the executed and properly endorsed agreement and bonds.

1.6.5 Submittal of Approved Water and Sewer Improvement Plans

Upon IRWD's approval of the plans, they will be returned to the engineer. The engineer shall submit to IRWD one (1) full-sized set of prints on bond paper (blueprints) of the approved plans and two compact disks (CD). The first CD will contain the AutoCAD drawing files for the approved plan set. The second CD will contain a single PDF file of the entire approved plan set, i.e. reflecting the IRWD approval signatures. The PDF file will be of a quality high resolution since it will be made a part of IRWD's public electronic library of plans. Other digital submission criteria are described in Section 2.

1.7 Construction of Water and Sewer Improvements

Prior to the onset of construction activities for the water and sewer improvements, IRWD will strictly enforce the following two requirements:

- IRWD will only release the project for construction after the engineer makes the submittal of the approved water and sewer plans.

- The project contractor is required to schedule a pre-construction conference with IRWD's Construction Inspection.

The developer is responsible for the installation of all domestic water, recycled water and sewer facilities within and/or adjacent to his development to serve his development. All construction must meet the District's standards. When construction has been successfully completed and the project's final inspection has been performed, Development Services will issue a notice to the developer declaring the start of the one-year warranty period in which the developer is responsible for any and all repairs or replacements required to the installed facilities due to the following causes (but not limited to), material defects, improper contractor installation, etc.

1.8 Bill of Sale

Development Services will issue a Bill of Sale for the completed domestic water, recycled water and sewer facilities to the developer upon the completion of the warranty period. (Typically, a one year period.) The Bill of Sale will signify the developer's act of transferring the facilities to IRWD for maintenance. More information on the Bill of Sale is also contained in Section 2 of these Guidelines.

1.9 Meter Installation / Sewer Connection Requests

Meter requests are processed as shown in Figure 1. Meter requests must be made in writing and be accompanied by the appropriate IRWD-approved plans and required fees. The following information must be included in the letter of meter request:

- Meter address (physical street address) for each meter requested.
- Billing address for each meter requested. (Entity responsible for payment of the account)
- Type of service and purpose of the requested meter, e.g. domestic to building, recycled or domestic irrigation, fire line service.
- Service and meter size for each meter requested.
- Job site contact person and contact information (to coordinate the meter installation).

Additionally, when applying for a meter for use on an irrigation system (domestic or recycled water), the following is required:

- Landscape irrigation plan (for recycled water irrigation system) approved by IRWD's Recycled Water group (see Section 5).
- On-Site recycled water supervisor's name and contact information (responsible person for the daily operation of the completed irrigation system).
- Total irrigated area served by the requested meter, in either square feet or acre units.

The above information is required by Development Services to compose a meter application. Development Services will also assess the meter installation fee and forward the information to the applicant. The applicant will be notified to submit payment of the required fee and to execute the meter application.

Since meter applications can be completed and executed by the applicant well in advance of the actual meter installation, it is the applicant's responsibility to notify IRWD's Construction Inspection and "activate" the meter application, i.e. inform the inspector of the project readiness to have the meter installed.

Generally, a 10-working day timetable is required, from execution of the meter application to installation of the meter and establishment of the account.

When a sewer connection is required, and a lateral to the property in question, does not exist, the applicant will be responsible to prepare a plan for its construction, showing size, location, depth, slope and the location for the sewer clean-out. The applicant shall be responsible for the payment of sewer connection fees (set by IRWD for each area) and for the costs of construction.

1.10 Other Facilities

If required, the developer shall provide for and install the necessary power source for sewer lift stations, water booster pump stations and pressure regulating valves. The developer will also be responsible for applicable control systems, and related telephone and telemetry systems and cables. District standards for these installations must be followed with no substitutions allowed.

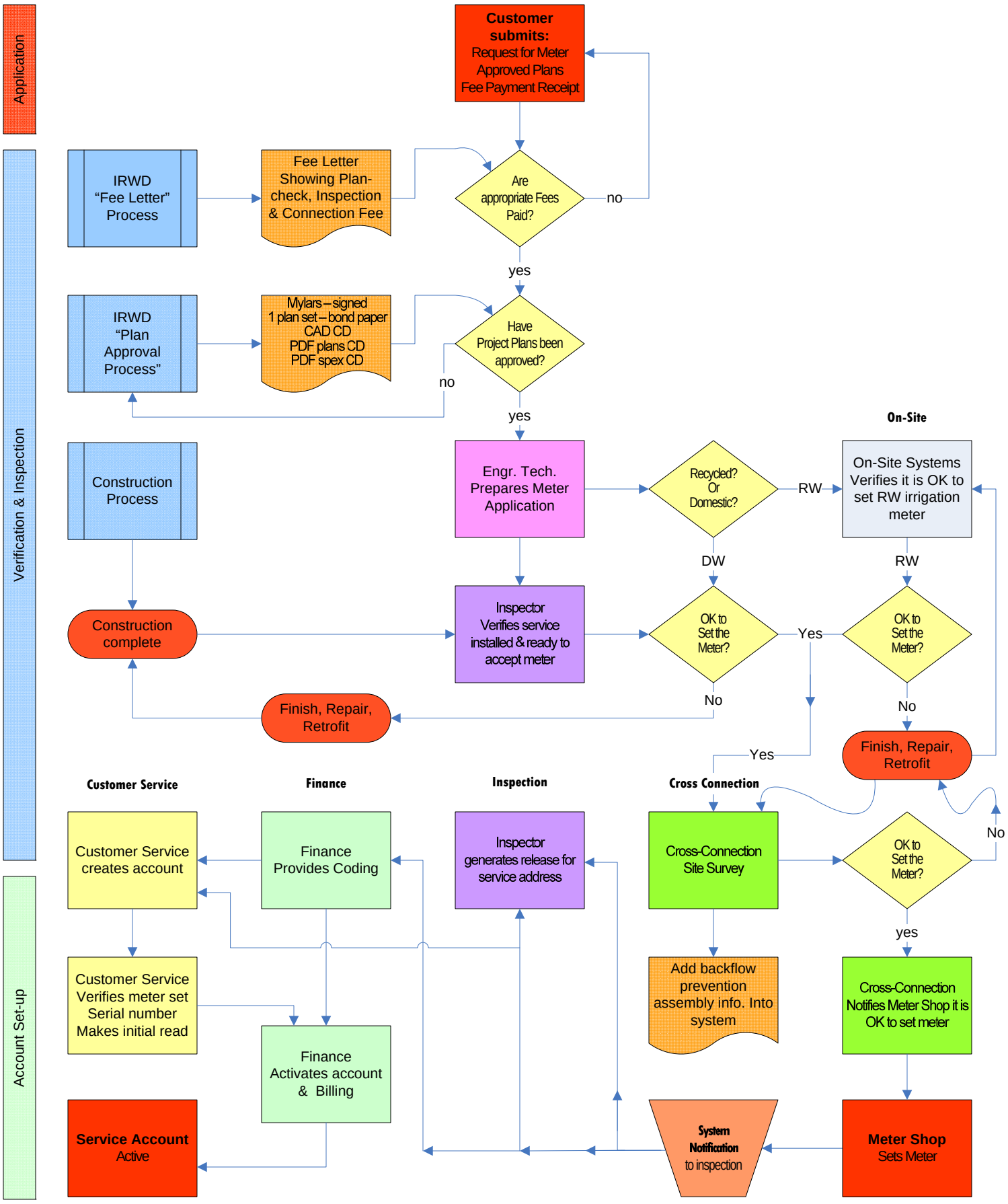
1.11 Natural Treatment System

Natural Treatment System (NTS) approvals are handled in a manner similar to Section 1.6 above. The developer is responsible for the installation of NTS facilities within and/or adjacent to his development to serve his development.

All construction must meet the District's standards. Refer to Section 6 of these Guidelines.

The developer shall be responsible for any and all repairs or replacements required to the installed systems for a period of one year from the date of formal acceptance by the District.

IRWD "Meter Application" Process



SECTION 2

DEVELOPMENT PLAN AND PERMIT PROCESSING PROCEDURES

2.1 Development Master Plans

Sewer and water lines 12-inch diameter and larger and recycled water lines 6-inch diameter and larger will be considered "capital" facilities and will be designed and constructed by the District unless timing or other considerations make it more feasible to allow the developer to install the facilities. In these cases, a reimbursement agreement may be entered into by the developer and the District to construct the facilities and reimburse the developer for the costs of constructing the "capital" facilities.

Sewer and water lines 10-inch diameter and smaller and recycled water lines 4-inch diameter and smaller will be considered "development" facilities and the cost of designing and constructing these facilities will be the responsibility of the developer. Once all the facilities are completed and accepted for maintenance by the District, they will be formally transferred by Bill of Sale (Figure 5, 6 and 7).

If, in the design of a development, a developer finds that he needs to increase the size of the in-tract facilities to 12-inch diameter or larger, that will not classify them as "capital" facilities. The "capital" facilities are generally defined in the District's Master Plans or in SAMPs.

2.1.1 Development Sewer Master Plan

One (1) set of tentative sewer master plans for the proposed development shall be submitted to the District for review at least thirty (30) days prior to the filing of the tentative map for the development, accompanied by a written request for an IRWD sewer "will serve" letter. The master plan will be reviewed by the District, taking into consideration the following:

A. Existing trunk sewer location, size and capacity.

B. Slope and size of proposed collection system and number of lots to be served.

C. District's sewer system master plan.

D. District's design criteria (Section 4).

Correction comments will be indicated on the development sewer master plan and returned to the developer's engineer.

2.1.2 Development Water Master Plan

One (1) sets of the tentative water master plan for the proposed development shall be submitted to the District for review at least thirty (30) days prior to the filing of the tentative map for the development, accompanied by a written request for an

IRWD water "will serve" letter. The master plan will be reviewed by the District, taking into account the following:

A. Existing water transmission main location and sizes.

B. The proposed points of connection and distribution system shown.

C. The estimated water demands calculated by the developer's engineer.

D. City and/or County fire flow requirements.

E. District's domestic water master plan.

F. District's design criteria for domestic water systems (Section 3).

Correction comments will be indicated on the development water master plan and returned to the developer's engineer.

2.1.3 Development Recycled Water Master Plan

(See Section 5).

2.1.4 Fire Department Approval

The developer's engineer shall obtain approval from the governing fire department for fire hydrant spacing and the proposed water main sizing for the fire flows for the tentative water master plan. After the first utility improvement plan check by the District, the developer's engineer must have the governing fire department sign the plans before submitting them for a second plan check.

Upon approval of the development master plans for sewer and water, one red-lined copy will be returned to the developer's engineer showing the District's comments and corrections.

2.2 Individual Tract Improvement Plans

2.2.1 First plan checks submittal requirements.

The developer/engineer shall submit the following items for first review of any residential, commercial, or industrial development:

A. One (1) set of utility improvement plans (bond paper); maximum size 24" x 36", without exception; plus one (1) set of the plans in electronic (PDF file) format on CD.

B. One (1) copy of tract/parcel map (bond paper) showing gross acreage, street names, and IRWD easements with provision for IRWD execution; plus one (1) set of the tract/parcel map in electronic (PDF file) format on CD.

C. One (1) set of grading plans (bond paper); plus one (1) set of the plans in electronic (PDF file) format on CD.

D. Engineer's quantity and cost estimates for water, sewer, and recycled water facilities.

E. Plan check and inspection fee deposit in the amount of five percent (5%) of engineer's cost estimate for water, sewer, and recycled water construction. The balance of the required fees will be collected at the time the agreements are processed. For smaller projects, a ten percent (10%) fee will be required at the time of first plan check submittal.

F. Transmittal letter from the developer's engineer requesting the commencement of District plan check procedure.

After first plan check, the District will return one (1) red-lined set of the utility improvement plans and the red-lined tract/parcel map to the developer's engineer for corrections.

2.2.2 Second (& Subsequent) Plan Check Submittal(s)

The developer/engineer shall submit the following items for second (and all subsequent plan-checks) of any residential, commercial, or industrial subdivision:

A. One (1) set of the revised utility improvement plans (bond paper) and one (1) set tract/parcel map (bond paper). The plans must be approved by the Orange County Fire Marshall (or Chief of the local fire authority having jurisdiction over the area of development) prior to the second plan check.

B. Check print from the first check.

When the plans are substantially complete, with only minor revisions remaining, the District may elect to compute the required sewer and water connection fees and any other inspection and engineering fees based on the District's current Rules and Regulations. The developer will be notified when the agreements and the fee invoice are available. One (1) red-lined set of plan check comments will be returned to the developer's engineer for corrections upon completion of any plan check.

The status of plans currently in for plan check can be obtained by contacting IRWD Development Services. The District will make a reasonable effort to meet a standard of fourteen (14) working days for the first plan check, ten (10) working days for the second plan check, and three (3) working days for each subsequent submittal. However the District does not guarantee, or imply to guarantee, that these turn-around goals will be met. The feasibility of meeting these turn-around goals will vary on a case by case basis. The extent of the corrections required on a plan set, and the current workload of the District may affect the previously stated time frames.

2.2.3 Required Easements

If an easement to the District is required for construction and/or maintenance of water, sewer, or recycled water facilities, the minimum easement width shall be ten (10) feet for domestic and recycled water facilities and fifteen (15) feet for sewers. Deep sewers or water lines will require wider easements equal to twice the facility depth rounded upward to the nearest five (5) feet. Easements shall be contained in single lots and shall not straddle lot lines. In the case of parallel facilities the easement width shall not overlap.

Two (2) copies of easement legal descriptions with accompanying sketch or plat shall be prepared by the developer's engineer and submitted to the District for review. Easements for facilities which will be transferred to the District may be shown on the tract or parcel map with the correct certificates for District acceptance. The legal description for the easements shall be in a form acceptable to the District and must be accompanied by a current title report to be checked by the District Engineer for accuracy. Dedicated easements must also be shown on the construction plans and the index map, without exception. Improvement plans for the District facilities will not be approved until all required easements have been dedicated to the District along with any necessary reconveyances or subordination agreements. Easement exhibits shall be 8½" x 11", or 8½" x 14" without exception.

Where facilities are to be located in private streets, the easement shall be a minimum of twenty (20) feet wide. In multi-family residential complexes or business parks, the developer may dedicate a "blanket easement" over all internal paved areas to IRWD as long as it covers the minimum area IRWD needs to access the facilities. The appropriate note shall be included on the tract map and the plans. Easements ten (10) feet wide and extending five (5) feet beyond all fire hydrants, water meter locations, and sewer sub-mains with clean-outs will also be required unless waived by the District.

Three (3) to five (5) foot to wide utility easements parallel to public streets may be required depending on street right-of-way width and sidewalk locations, and shall be determined by the District Engineer.

2.2.4 Improvement Plan Approval

Utility improvement plans must be approved by the District Engineer before any construction can start. Approval by the District Engineer will be contingent upon satisfying the following requirements:

A. All required corrections have been made on the utility improvement plans, and all systems are in conformance with the District's "Construction Manual", latest edition.

B. The water, sewer, and recycled water Developer/District agreement (Figure 4), has been executed by the developer and returned to the District.

C. The plans have been signed by the Orange County Fire Marshal (or Chief of the local fire authority having jurisdiction over the area of development).

D. All required easement documents have been executed and delivered to the District. Tract/parcel maps must be signed by the District prior to plan approval.

E. All required fees and charges have been paid by the developer.

F. All required payment and performance bonds have been posted with the appropriate entity.

G. All digital submission requirements have been met per section 2.3.4. of this manual.

When these requirements have been satisfied, the Mylar original title sheet, a clean blue-line set of plans and the latest check print shall be submitted to the District for approval. When the plans have been approved, the developer's engineer will be notified, and will provide the District with three (3) fully approved sets of the utility improvement plans. The approved plans shall constitute a "permit" to construct water, sewer, and/or recycled water facilities as referenced in the IRWD Rules and Regulations.

2.2.5 Bills of Sale (BOS)

Upon the satisfactory completion of construction and acceptance by the District Inspector, the facilities shall be conveyed to the District by means of a properly executed BOS. The BOS shall be accompanied by Cost of Construction Statements (CCS) reporting the actual cost of construction supplied by the developer. Forms for the BOS and CCS for the various facilities are shown as Exhibits "5, 6, 7, 8, 9, and 10". Completed forms should be submitted to the District within thirty (30) days of the completion of the final inspection and prior to the release of the final dwelling units along with one (1) "RECORD" mylar of the improvement plans and a CD with a PDF file of the plans plus a CD with the CAD files and plans for the street, water and sewer plans. Upon receipt of these

items, the District will approve the release of the bonds posted for construction of the sewer, water, and recycled water facilities.

2.3 Improvement Plan Requirements

All plans submitted to the District for plan checking and approval of water, sewer, or recycled water facilities will be submitted on 24" x 36" sheets and shall conform to the standards of the jurisdictional agency in which the improvements are located. The plans shall also contain the information detailed in the following subsections. A check list of the items to be reviewed is provided as Figure 12 for the Engineer's use. If all the items can be checked off as satisfied or N/A, the plan check corrections should be minor in nature.

2.3.1 Title Sheet

Title sheets for utility improvement plans shall contain the following information as a minimum:

A. Project identification, tract/parcel map number, project name, assigned plan check number (ie., IRWD's 4-digit Reference code), etc.

B. Location map showing general area with the project area clearly indicated and described in words. See Figure 3 for typical location map.

C. Standard water, sewer, and recycled water notes as shown in this manual.

D. An index map is required and must contain all the following information:

(1) Scale 1" = 100' (Scale of District's Atlas Maps).
(2) All existing and proposed water and sewer mains, fire hydrants, water valves, manholes, and clean-outs.
(3) The size and material of all mains.
(4) The direction of flow for all sewer lines and the number of all manholes and clean-outs.
(5) Lot lines for the proposed development, footprints of buildings, total square footage, and number of stories, as known and service stub locations for each lot.
(6) North arrow.
(7) Street names.
(8) Legend of symbols and lines.
(9) All proposed easements for District facilities.

E. Signature block for IRWD approval of sewer and water facilities in the form to be provided by the District, See Figure 1. Indicate which facilities are included on improvement plans.

F. Signature block for the Orange County Fire Marshal (or Chief of the local fire authority having jurisdiction over the area of development).

G. Benchmark description and latest elevation with datum information.

H. Basis of bearings.

I. Name, address, phone number, and contact person of the engineering firm preparing the plans.

J. Name, address, phone number, and contact person of the property owner or developer.

K. Index of sheets.

L. Quantity estimates and construction notes may appear on the second page of the plans, immediately behind the title sheet. Construction notes for water, sewer, and recycled water shall not be mixed together and shall appear under separate headings. Different number series shall be used for each type of facility.

M. Underground Service Alert notification block (Figure 2).

2.3.2 Second Sheet

Typically the second sheet of the plan set will have the following information:

A. Quantity estimates.

B. Standard notes.

C. Construction notes.

D. May contain the index map, if it will fit conveniently.

E. Street sections showing street widths to right-of-way and location of sidewalks, if they will fit conveniently.

F. Detail drawings, if they will fit conveniently.

2.3.3 Plan and Profile Sheets

All plan and profile sheets shall include the following information:

A. Scale. Horizontal scale shall be 1" = 20' or 1" = 40' and be clearly indicated. The vertical scale shall be 1" = 2' or 1" = 4' and be clearly indicated.

B. North arrow.

C. At least two (2) separate points of the utility system must be tied into the California Coordinate System, Zone VI, per the City of Irvine Horizontal Control System on file in the Orange County Surveyor's office in OCS A/SW IRV Book 13.

D. Plan and profile shall be on the same sheet for all sewer mainlines. Sewer lateral profiles may be shown on separate sheets.

E. Existing water, sewer, and recycled water facilities adjacent to the proposed development must be shown. Size and material of these facilities must be indicated.

F. Proposed and existing easements to be dedicated to the District for sewer, water, and recycled water facilities must be shown on the plan.

G. Proposed building or dwelling unit pad elevations must be shown.

H. Storm drain alignment shall be indicated in the plan view and all crossings of water, sewer, or recycled water facilities and the storm drain shall be shown in the storm drain profile. Where water lines cross over the storm drains the top of the storm drain and the bottom of the water line must be shown, along with the proposed depth of cover.

I. Provisions and requirements of Sections 3, 4, and 5 shall be adhered to in designing the various facilities.

2.3.4 Digital Submission Requirements

All engineers preparing improvement plans to submit to the District for plan check purposes will be required to submit a digital graphics file containing the boundary information, street centerline, curb and gutter, right-of-way, lot/parcel line, easements, domestic water, sewer, and recycled water facilities included in the plan. The date is to be submitted along with the final plan check materials. The digital file must contain one contiguous drawing of the entire pipeline. The District does not require plan and profile drawings to be submitted digitally.

Required Data

The following table indicates which features are required to be transmitted digitally and those which are desirable but not required:

A. Tract/Parcel Map Information

All Tract and Parcel Map information shall be submitted in digital format in accordance with the County of Orange requirements for digital submission (Ordinance 3809 and Digital Submission of Cadastral Surveys Information and Specifications). Media requirements and digital formats shall be as described herein.

B. Improvement Plans

Street Centerline	Centerline	Required
	Street Name	Required
	Bearings/Distance/Curve Data	
	Annotation	Optional
Curb and Gutter	Curb and gutter line	Required
	Descriptive Data	Required
	Bearings/Distance/Curve Data	
	Annotation	Optional
Right-of-Way	Right of Way Lines	Required
	Descriptive Data	Required
	Bearings/Distance/Curve Data	
	Annotation	Optional
Lot/Parcel Data	Lot Lines	Required
	Lot Numbers	Required
	Lot Bearings/Distances	
	Annotation	Optional
Easement Data	Easement Lines	Required
	Descriptive Data	Required
	Bearings/Distances/Curve Data	
	Annotation	Optional
Building/Structure Data	Building and/or Structural Footprints	Required
	Descriptive Data	Required
	Bearings/Distances/Curve Data	
	Annotation	Optional
Domestic Water Data	Domestic Water Mains	Required
	Domestic Water Laterals	Required
	All Associated Facilities (i.e. Valves, Fire Hydrants, Meters, etc.)	Required
	Descriptive Data	Required
	Bearings/Distance/Curve Data	

	Annotation	Optional
Sewer Data	Sewer Mains	Required
	Sewer Laterals	Required
	Associated Facilities (i.e. Manholes, Cleanouts, Lift Stations, etc.)	Required
	Descriptive Data	Required
	Bearings/Distance/Curve Data	
	Annotation	Optional
Recycled Water Data	Recycled Water Mains	Required
	Recycled Water Laterals	Required
	Recycled Water Laterals	Required
	Associated Facilities (i.e. Valves, Meters, etc.)	Required
	Descriptive Data	Required
	Bearings/Distance/Curve Data	
	Annotation	Optional

Data Layering Requirements

The data will be layered as a minimum into the following features:
Boundary Data
Street Centerline
Curb and Gutter Lines
Right-of-Way Lines
Lot/Parcel Lines
Easement Lines
Building/Structure Footprints
Domestic Water Mains
Domestic Water Service laterals
Domestic Water Appurtenances (i.e., Valves, Fire Hydrants, Meters)*
Sewer Mains
Sewer Laterals
Sewer Appurtenances (i.e., Manholes, Cleanouts, Lift Stations)*
Recycled Water Mains
Recycled Water Service Laterals
Recycled Water Appurtenances (i.e., Valves, Meters)*

* Facility appurtenances shall be represented as single distinct symbols or blocks, or separated into different layers.

Data Accuracy and Coordinate System

The accuracy of data submitted in accordance with these specifications will be consistent with data converted directly from COGO and may be used for computational purposes during the plan check and construction phase of the submitted project.

The coordinate system of data shall be the California Coordinate System (NAD 83) in accordance with County of Orange Ordinance 3809.

File Formats and Media Requirements

Digital files are acceptable in either an AutoCAD drawing file (DWG) format or a drawing exchange file (DXF) format. Digital files should be submitted on a Windows formatted CD.

Checking of Digital Data

The digital data will be checked for the following:

1. Correct layering
2. Verification that annotated and calculated data are consistent
3. Verification that digital and hard copy plans are consistent
4. Verification of correct coordinate system
5. Verification of a continuous pipeline shown in one drawing file. (Plan & profile digital files will not be accepted).
6. Verification that digital files do not contain unresolved line types, font files, and cross-references.

If the engineer does not have the capability to submit such files, the District's staff shall create the graphics file and recover the cost through plan check fees. The cost shall be determined by calculating 2% of the total bondable costs calculated for water and sewer facilities. This amount shall be added to the total cost of the Fee Summary Statement calculated by the Development Services Section.

2.4 Non-residential Application Requirements

2.4.1 Domestic Water Services

All services for non-residential developments must be equipped with approved backflow prevention devices; a double detector check assembly for fire lines and an RPPD backflow device for non-residential domestic water service. Refer to the IRWD Rules and Regulations for specific backflow prevention requirements.

Items required to make application for non-residential domestic water service are,

A. One (1) set of improvement plans with service lateral location highlighted.

B. One (1) set of plumbing plans showing the number of fixtures units.

C. A letter from the developer or his agent requesting a (size) meter, not to exceed (quantity) gpm, to serve (company name) at (address) and payment for the cost of installation.

Domestic water service for irrigation requires a site plan and a letter as described above. A request for domestic water service for irrigation must be approved by

the District Engineer. Where available, recycled water must used for irrigation service. (See Recycled Water Service Requirements, Section 5.1)

2.4.2 Fire Service Requirements

All fire service connections will be made through a double detector check valve assembly as shown in Standard Drawing W-16 and the plan check submittal package shall include a site utility plan showing:

A. Property lines and required easements.

B. Building footprint.

C. All on-site private fire hydrants.

D. Stamp or signature of Orange County Fire Marshal (or Chief of the local fire authority having jurisdiction over the area being developed).

E. Address of the building.

2.4.3 Public Fire Hydrant Requirements

Application for installation of public fire hydrants shall include a site utility plan showing:

A. Property lines and required easements.

B. Building footprint.

C. Location of public fire hydrant approved by the Orange County Fire Marshall (or Chief of the local fire authority having jurisdiction over the area being developed).

D. Payment of plan check and inspection fees. The owner or developer will bear the responsibility and cost of installing the fire hydrant after the plans are approved by IRWD.

2.4.4 Recycled Water Service Requirements

All requests for recycled water service must be accompanied by one set of landscape irrigation system plans which have been approved by the District's On-site Water Systems Group and payment of the cost of installing the requested service(s). There must be an address assigned to each recycled water service.

If recycled water is currently available, or will be available as determined by the District Engineer, it must be used for landscape irrigation as specified in the District Rules and Regulations. The District Engineer must approve any decision not to use available recycled water for landscape irrigation.

2.4.5 Additional Requirements, Standards & Fees for All Non-Residential Applications

A. All non-residential service applications must be accompanied by the appropriate plans, payment of the installation costs and the signature of the applicant or his authorized agent.

B. The District will install all domestic water, recycled water, and bypass meters for non-residential services without exception.

C. The submitted improvement plans must contain the following information and conform to the following criteria:

(1) Maximum size is 24" x 36".

(2) The appropriate IRWD standard notes must appear on the plans.

(3) Signature block for IRWD approval must be provided in the form required by IRWD (See Figure 1).

(4) Signature of the Orange County Fire Marshall, if applicable.

(5) Quantity and cost estimates for all proposed improvements.

D. Lump sum fixed fees will be determined by the District for each water service installation by IRWD personnel. These costs will be provided to the applicant so that the fees can be paid before the application is released for installation.

E. An administrative fee of ten percent (10%) of the cost to install the facilities will be required, exclusive of cost of meters, reduced pressure backflow assembly or double detector check valve assembly.

F. Water meter sizing standards:

Meter Size & Type (inches)	Maximum Demand (gallons per minute)
⅝" x ¾" disc	15
¾" disc	22
1" disc	37
1½" disc	75
1½" turbine	100
2" disc	120
2" single-jet	160
2" turbine	160
3" single-jet	350
3" turbine	350
4" single-jet	1,000
4" turbine	1,000
6" single-jet	1,500
6" turbine	2,000
8" single-jet	2,800
8" turbine	3,500
10" single-jet	3,400
10" turbine	5,500

G. Digital submission of all improvement plans in accordance with Section 2.3.4 of this manual.

2.4.6 Utility Plans Signed by Both District and City

Three (3) sets of fully approved water, sewer, and recycled water plans, as applicable, shall be furnished to IRWD at least two (2) working days prior to the pre-construction conference and commencement of work. Fully approved plans must be approved by both the District and the cognizant agency building authority for the proposed improvements.

2.4.7 Plan Approval Expiration Time Limit

Plans will be valid for a period of one (1) year from the date of District approval. If construction has not begun within that one year period, the approval of the plans becomes null and void. In this event, the District will require that the plans be re-checked and reserves the right to charge additional plan check fees and/or connection fees, at its sole discretion. No modifications will be allowed to the development which increases the number of units to be served by the system without additional approval by the District.

2.5 Inspection

All work shall be subject to inspection by the District and shall be left uncovered until approved by the District Inspector. The contractor shall not proceed with any subsequent phase of work until the previous phase has been inspected and approved by the District.

2.5.1 Notice to Start Construction

Notice shall be given to the District Inspector Manager at least 96 hours before starting construction. Signed utility plans must be delivered to the Chief Inspector at least four (4) working days before the contractor will be allowed to start construction.

2.5.2 Pre-Construction Conference

A pre-construction conference must be held at least **forty eight (48)** hours before the start of construction. The contractor's job foreman and/or job superintendent, the developer's engineer and the District Inspector must be present. The purpose of this meeting will be to answer any questions on District specification requirements, to obtain the contractor's construction schedule and emergency phone numbers, and to discuss any circumstances which may affect job installation.

2.5.3 Sewer Inspections

Inspection shall be made at the intervals listed below:

A. Trench excavation and bedding.

B. Placing of pipe, fittings, and structures.

C. Placing and compacting the pipe zone backfill.

D. Backfill of the balance of the trench to grade. Compaction tests to be taken by the cognizant building authority in public right-of-way and by private soils consultant retained by the developer and acceptable to the District in private streets and easements. Copies of test results shall be given to the District by the developer for approval before final acceptance of the work. Testing after backfill and compaction of all utilities is required and approval of the testing must be obtained before paving.

E. When manholes and mainline clean-outs are being raised to finish grade and the system is being balled and flushed. All sewer main lines 6" and larger are to be inspected by the District using a closed circuit television system. A video tape recording will be made of the inspection. (See Section 2.5.5 below for requirements.)

2.5.4 Water and/or Recycled Water System Inspections

Inspection shall be made at the intervals listed below:

A. Trench excavation and bedding.

B. Placing pipe, fittings, and structures; including warning tape on recycled water main and service lines.

C. Pouring all concrete anchors and kicker blocks.

D. Placing and compacting the pipe zone backfill.

E. Backfilling balance of trench to grade. Compaction test to be performed by cognizant building authority in public right-of-way and by private soils consultant retained by the developer and acceptable to the District in private streets and easements. Copies of test results shall be given to the District by the developer for approval before final acceptance of the work.

F. Pressure testing all mains and services.

G. Disinfecting of domestic systems and flushing of all water systems.

H. Re-paving trench cuts.

I. Raising valve box covers to finish grade and painting to District standards.

J. Fire hydrants painted and pads poured.

K. Installation of service lines, meter boxes, and water meters.

2.5.5 IRWD Sewer Line Closed-Circuit Television Inspection

After the completion of the in-tract and/or off-site sanitary sewer lines (6" and larger), they will be inspected by the District using a closed-circuit television system. Any deficiencies or violation of these specifications found during the TV inspections or any TV inspections during the warranty period shall be corrected immediately by the developer and/or contractor, at the direction of the District Engineer, at the sole expense of the developer and/or contractor. The fee schedule for the District TV inspection will be as shown in Schedule "B" of the District Rules and Regulations (Item 2-13).

A. The following work must be completed prior to television inspection by IRWD:

   (1) All sewer pipelines are installed and back-filled.
   (2) All structures are in place, all channeling is complete and pipelines are accessible from structures.

(3) All other underground facilities, utility piping and conduits are installed and their trenches compacted.
(4) Pipelines to be inspected have been balled and flushed. The contractor is to be responsible for pre-pulling a tag line through each section of pipeline and securing it at each manhole or other appurtenance. Tag lines shall be ¼" woven nylon rope, or equal, having a tensile strength of 1,200 lbs. minimum.
(5) Final air test has been completed and PVC lines have been mandrelled.

B. When the above work is complete, the developer and/or contractor shall request the District Inspector to establish a date for TV inspection. During this inspection, the contractor or his authorized representative must be present. A video tape of the TV inspection will be produced and kept on file by the District.

C. Inspection Standards

The following shall be considered defects in construction of the sewer pipelines and will require correction prior to final acceptance:

(1) Off grade - 0.08 foot, or greater, deviation from grade.
(2) Joint separations exceeding ¾-inch.
(3) Misaligned joints (none permitted on straight runs or on wrong side of pipe curves). Joint spaces exceeding ¾-inch on designed curves.
(4) Chips in pipe ends more than ¼" deep.
(5) Cracked or damaged pipe or evidence of presence of an external object bearing upon the pipe (rocks, roots, etc.).
(6) Dropped joints.
(7) Infiltration in excess of maximum permissible specified in the District Standard Specifications, Section 15043.
(8) Debris or other foreign object in the line.
(9) Other obvious deficiencies.

The developer/contractor shall be notified in writing of any deficiencies revealed by the TV inspection requiring repair, following which the developer/contractor shall excavate and make the necessary repairs.

D. TV Procedure

During the TV inspection The District will maintain a continuous log of the inspection. This log shall identify the pipe run being inspected by manhole-to-manhole pipe identification, the footages recorded, as measured from the center of the starting manhole, and by a description of the object or condition observed in the pipeline. Each log shall be marked with the date of the inspection run. Each entry on the log shall be consecutively numbered for positive identification in subsequent correspondence or references.

Upon the completion of the entire project (manhole-to-manhole run), the contractor or his authorized representative shall sign under the last entry of the log sheet to certify that he was present as an observer during the inspection. The contractor shall be given duplicate or reproduced copies of the log. The District shall retain the original log and the video tape of the inspection.

The following listed conditions or objects shall be entered in the log in the order encountered in the inspection:

(1) The presence of any debris or foreign objects in the pipe, indicating inadequate cleaning or construction.

(2) Improperly made pipe joints and the observed results of such. Inadequately butted, offset or other defect. Offsets at joints shall be within tolerances as elsewhere specified herein.

(3) Unsatisfactory conditions of pipe alignment.

(4) Defective pipe grade conditions where water stands or flow velocities are unacceptable due to variations in pipe grade.

(5) Location, quadrant of entry and condition of all service connections to the pipe.

(6) Any cracks, breaks or other defects in the pipe, even though such may have been patched prior to backfill and compaction.

Upon completion of the TV inspection, the District shall compare the logged results with job specifications and drawings to determine if all requirements, including the number and location of service connection stub-outs, have been met and the work is acceptable.

In the event that a complete manhole-to-manhole inspection cannot be made because of obstructions in the pipe, a re-inspection shall be scheduled when the contractor has removed or corrected such obstructions.

When, because of obstructions or workmanship by the contractor, the television camera should become lodged or wedged in the pipe in such a manner that it cannot be pulled out of the pipe in either direction, the contractor shall be responsible for its safe recovery and any associated costs. The contractor shall pay the District for the replacement or repair of any of the equipment damaged or lost as a result of having to be recovered by excavation.

E. Re-inspection

(1) The contractor and developer will be notified in writing to repair noted deficiencies.

(2) All breaking, cutting, and corrective work, including moving, removing, etc. of pipe, shall be done in the presence of the District Inspector.

(3) Those portions of the pipeline that have been corrected must be re-inspected by means of closed circuit television. Fees for re-inspecting the repaired sections are shown in Schedule "B" of the District Rules and Regulations (Item 2.13), a cancellation fee is also included.

(4) The procedure for re-inspection of defective work will be repeated until all deficiencies observed by television inspection have been corrected to the complete satisfaction of the District.

2.5.6 District Authority

The District shall have access to the work at all times during construction and shall be furnished with every reasonable facility for ascertaining full knowledge of the progress, workmanship, and character of materials used and employed in the work. No pipe, fittings, or other materials shall be installed or backfilled until inspected and approved by the District Inspector. The contractor shall give due notice in advance of backfilling to the District Inspector so that proper inspection may be provided.

Inspection of the work shall not relieve the contractor of any obligations to complete the work as prescribed by the standard specifications. Any known defective work shall be corrected before testing or final inspection will be permitted. Unsuitable materials may be rejected even if these materials have been previously overlooked by the District Inspector.

The District Inspector shall have the authority to suspend the work completely or in part for such time as it may deem necessary if the contractor fails to carry out instructions given by the District Inspector, or to perform any required provisions of the plans and specifications. The contractor shall immediately comply with a written order of the District Inspector to suspend the work completely or in part. The work shall be resumed when improper methods or defective work are corrected as ordered and approved in writing by the District Inspector.

2.5.7 Sewer Mains in Service Before Completion of Street Paving

The District Inspector will require the contractor to flush and/or ball all sewer mains before putting them into service. Balling, where required, shall be performed with a Wayne ball in a manner approved by the District Inspector. A sand trap shall be used at the lower manhole, and all foreign material shall be removed.

2.5.8 Final Sewer Inspection

All sewer mains installed by the developer shall have passed the District's TV inspection (see Section 2.5.5). Before final acceptance, the District Inspector reserves the option of requiring that the contractor flush and ball the sewer mains again even though the sewers may have been previously flushed and balled. The District Inspector will require the contractor's superintendent or foreman to be present during final inspection of new sewer mains. The District Inspector may check, but is not necessarily limited to, that:

A. Mirroring of sewer mains shows all bulkheads and plugs have been removed.

B. Concrete base and channels in manholes are smooth.

C. Manhole interiors are clean of all debris and excess concrete mortar.

D. All manhole concrete grade rings are adequately grouted and properly set.

E. Pavement around manhole cover has been properly joined at correct grades.

F. Required field tests have been made on all sewer main sections and manholes, particularly when sections of manholes had to be repaired.

G. Backfill has passed all compaction testing.

H. Lateral locations have been marked on curbs.

I. Mainline clean-outs are raised to grade, pads poured where called for, and painted to District standards.

2.5.9 Water, Recycled Water in Service Prior to Acceptance

The District Chief Inspector may approve putting newly installed water and recycled water into service after compaction has been approved by the cognizant building authority and the portions have been pressure tested, chlorinated, flushed, and potable water mains have passed the bacteriological test. This partial acceptance shall be granted only upon written request from the developer and subsequent approval by the District Chief Inspector. Upon this written approval for partial acceptance of facilities, the developer shall be relieved of the duty to maintain the portions so used or placed into operation provided, however, that nothing in this section shall be construed as relieving the developer of full

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 the agreement and other contractual 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 his Agreement with the District.

2.5.10 Final Water and Recycled Water Facilities Inspection

Before final acceptance, the District Inspector will make a final inspection of all

work, accompanied by the contractor's superintendent or foreman, to verify that:

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

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

C. Valves are referenced and the inspector has been given all reference measurements.

D. Right-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.

E. Fire hydrants are raised to proper grade, are in a vertical position, painted, and concrete pads are poured.

F. Backfill has passed all compaction testing.

G. System valves are turned and left open (except those specifically required to be normally closed), turns required for complete open/close cycle are recorded on the record drawings.

H. Domestic water lines have been chlorinated.

I. Line pressure testing and flushing have been completed.

J. The job site is clean and cleared of all the contractor's equipment and materials.

K. Service lateral locations have been marked on curbs.

2.5.11 Interpretation of Specifications and Detail 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. Full size details shall take precedence over scale drawings as to shape and details of construction. Specifications shall govern as to material. Scale drawings, full-size details, and specifications are intended to be fully cooperative and to agree; but should any discrepancy or apparent difference occur between plans and specifications, or should errors occur in projects being constructed by others affecting the work, and the contractor proceeds with the work affected without instruction from the District, he shall be fully responsible for any resultant damage or defect.

2.5.12 Release Given to Cognizant Building Authority

After final inspection requirements have been fulfilled, along with the requirements outlined in Sub-section 2.2.5, the District will provide notification of its final acceptance to the cognizant building authority to facilitate the release of the developer's bonds for water, sewer, and recycled water facilities. One unit of the development, to be agreed upon by the Developer and IRWD inspector, shall be held and not released for occupancy until all items on the punch list for final acceptance have been completed to the satisfaction of IRWD's inspector. The unit cannot be sold or occupied without a substitute unit being placed in the held category. **See Figure 13 for the Withheld Lot Consent Form, which will be included in all agreement packages, and Figure 14 for the Withheld Lot Release Letter to be used should the designated lot be sold prior to the completion of all punch list items.**

2.6 District Policy on Regenerative Water Softeners

The District has built and maintains a modern water reclamation plant to manufacture recycled water to be used for all approved uses. Wastewater collected from the IRWD sewage collection system is treated to the standards established by the State Health Department for irrigation water. Salts and minerals that are harmful to vegetation and agricultural crops must be kept out of the District sewer system to avoid being retained in the resultant recycled water. Therefore, the adopted **IRWD Rules and Regulations strictly prohibit the use of any regenerative or automatic water softener that can or may discharge saltwater or brine into the District sewer collection system.** Violators will be subject to penalties as identified in the District Rules and Regulations. Water softeners that are recharged at central plants may be used. Commercial installations of regenerative water softeners may be specifically permitted by the District only after approval of holding facilities that allow brine to be pumped and transported outside the District's sewer collection area.

2.7 Use of District Sewerage Facilities

The District has developed regulations governing the types of wastes that can be discharged into its sewers in order to protect the facilities of the District and their operations and to meet its Federal and State discharge requirements. The IRWD Rules and Regulations, Chapter 7 - Use of District Sewerage Facilities, including a separate supplement, sets forth these requirements. These provisions establish conditions under which certain users are required to obtain permits for use of District sewerage facilities. Developers whose sewage discharges require them to obtain a permit shall not be allowed to connect their facilities to the District's lateral sewers or mains until written notification is provided by the District allowing the connection. All users must comply with the discharge prohibitions established in the IRWD Rules and Regulations.

2.8 District's Regulation Regarding Cross-Connections

All potable water services shall be subject to the provisions of the IRWD Rules and Regulations, Section 4.10 - Water Backflow Prevention. The following summarizes those provisions:

Cross connections of any type that permit a backflow condition from any source or system other than that of the District's potable water mains to the potable water system are prohibited. A connection constituting a potential or actual backflow hazard will not be permitted unless a backflow device or air gap, which is approved by the California State Department of Health and local health agency and complies with Title 17 of the California State Administrative Code, is installed. Such an installation shall at all times be subject to inspection and regulation by the District for the purpose of avoiding possibility of backflow. The District has a cross-connection control officer who is available for consultation on any question regarding cross-connections.

The District will not provide water service to any premises unless the public water supply is protected as required by State, County, and District regulations. Besides special situations, backflow devices are required for the following instances as specified in Section 4.10.2 and Section 4.10.3 of the District Rules and Regulations:

a. All domestic water irrigation services.

b. All commercial domestic water services.

c. All industrial domestic water services.

d. All fire lines where the commercial or industrial buildings are over two stories in height.

e. All private domestic systems or fire line systems having two or more points of connection to District mains.

Backflow prevention devices shall be approved by the District and shall be installed by, and at the expense of, the customer. The customer shall have the device tested at least once a year by a tester certified by the Orange County Health Department and service such devices to maintain them in satisfactory operating condition and shall overhaul or replace such devices if they are found defective. Records of such annual tests, repairs, and overhauling shall be kept by the customer and copies forwarded to the District cross-connection control officer and local health agency.

Water service to any premises may be discontinued by the District, after notice, if a backflow prevention device required by the District Rules and Regulations is not installed, tested, and maintained; if any defect is found in an installed backflow prevention device; if it is found that the backflow prevention device has been removed or bypassed; or if unprotected cross-connections exist on the premises. Service will be restored only when such conditions or defects are corrected to the satisfaction of the District.

IRWD Rules and Regulations further define how water lines must be marked where multiple water systems are in use, and outline the duties and responsibilities of a property's water supervisor. Additional references for guidelines as to when, why, and what types of backflow and cross-connection control devices are approved may be found in:

A. Regulations Relating to Cross-Connections, California Administrative Code - Title 17 - Public Health.

B. Manual of Cross-Connection Control, published by Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, University Park, Los Angeles, California 90007.

2.9 Backflow Device Locations

Any commercial or industrial domestic water service will require that a Reduced Pressure Principle backflow device (RPPD) be installed immediately downstream of the water meter. The device must be installed in accordance with District Construction Manual. The assembly must be above ground and cannot be installed in an underground vault.

A fire service must have a Double Check (DC) backflow assembly with bypass meter as required in the District Construction Manual. These assemblies can be installed in such a manner as to be screened from view, but must be accessible to District personnel at all times. There must be 5 feet of clearance on all sides of the DC assembly installed above ground. In addition a 10 foot wide easement must be dedicated to the District from the public right-of way to the DC assembly. Double Detector Check assemblies may be installed in an approved vault underground as shown in the District Construction Manual with the appropriate easements.

FIGURE 1

IRVINE RANCH WATER DISTRICT

APPROVAL OF _____ FACILITIES

_____ _____

APPROVED BY DATE

_____ _____

SUPERVISED BY DATE

_____ _____

REVIEWED BY DATE

FIGURE 2

NOTICE TO CONTRACTOR

PURSUANT TO ASSEMBLY BILL 3019, NO EXCAVATION PERMIT IS VALID UNLESS THE FOLLOWING IS PERFORMED:

1. **UNDERGROUND SERVICE ALERT** HAS BEEN CONTACTED AND HAS PROVIDED INQUIRY I.D.#_____

2. THE UNDERSIGNED AGREES TO CONTACT AND OBTAIN AN INQUIRY I.D.# FROM **UNDERGROUND SERVICE ALERT** (1-800-422-4133) AT LEAST TWO (2) WORKING DAYS PRIOR TO THE COMMENCEMENT OF EXCAVATION

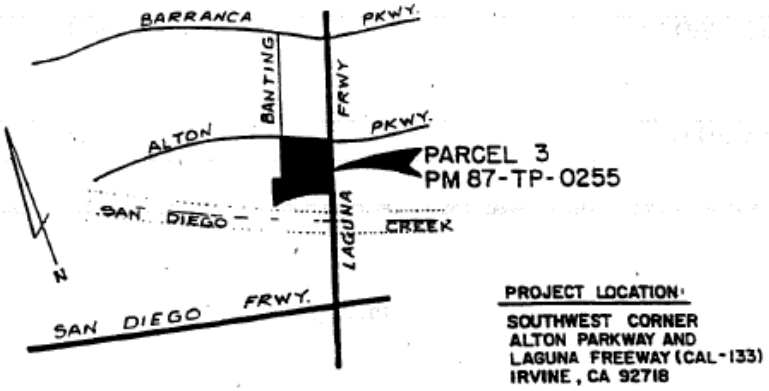
SIGNED_____ DATE _____

FIGURE 3.

REQUIRED FORMAT FOR VICINITY MAPS

NOTE: The project location must be clearly shown on the map and described in words. The verbal description of project location should include:

1) The Tract Map Number and Lot Number(s), or Parcel Map Number and Parcel Number(s), if applicable.
2) Official address if known, or location as described in terms of cross-streets.
3) City/Postal Zone, state and zip code.
4) If project is in unincorporated Orange County, state below in parentheses.



VICINITY MAP

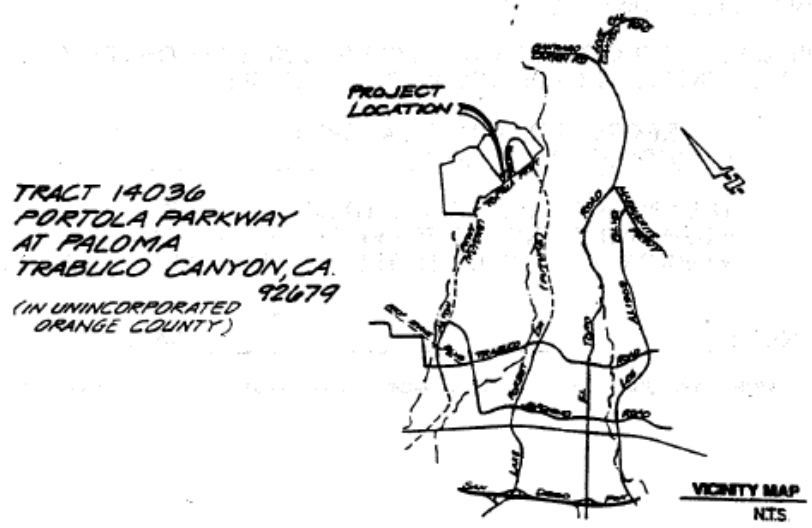


FIGURE 4

DATE: _____
W.O.: _____
*TRACT:*_____
I/D #: _____

APPLICATION FOR SERVICE AND AGREEMENT WITH

THE IRVINE RANCH WATER DISTRICT

The undersigned, hereinafter referred to as "Applicant", hereby requests the extension of:

[ ]	RESIDENTIAL	[ ]	POTABLE WATER, SEWER, AND RECYCLED WATER SERVICE
[ ]	COMMERCIAL/ INDUSTRIAL	[ ]	POTABLE WATER AND SEWER SERVICE
[ ]	BACKBONE	[ ]	POTABLE WATER SERVICE ONLY*
		[ ]	SEWER SERVICE ONLY*

(*) If permitted by District.

by the IRVINE RANCH WATER DISTRICT (hereinafter referred to as "District") in accordance with all of the terms and conditions of this Agreement and District's "Rules and Regulations for Water, Sewer, and Recycled Water Service" as amended from time to time (hereinafter referred to as "Rules and Regulations"), which are incorporated herein by this reference and made a part hereof as though fully set forth.

Applicant hereby applies for that service which can be provided by the facilities described below, to that certain real property located within District, in the County of Orange, State of California, consisting of approximately _____ acres and described as follows (metes and bounds description or as acceptable to District) the "Property":

Said property is to be used for the purpose(s) of:

Applicant hereby represents that Applicant is the _____ of said real property. Applicant estimates that the total service to be required of District upon ultimate development of said real property is as follows:

Potable Water: _____/ cubic-feet/second
Reclaimable Sewage:_____/ gallons/day

Upon acceptance of this Application executed by the Applicant, together with all fees and charges, plans and specifications, bonds, conveyance of necessary easements, and other items as may be required herein, District agrees to approve this Application in accordance with and subject to the terms and conditions herein set forth. District shall deliver to Applicant an executed copy hereof.

TERMS AND CONDITIONS

SECTION 1 - Applicant agrees to comply with the requirements of any and all applicable Federal, State and local statutes, ordinances, regulations and other requirements. District may, in its discretion, require specific prior approval of this Application by any Federal, State or local agency having jurisdiction over, or an interest in the operation of District's facilities.

SECTION 2 - Applicant shall adhere to the requirements prescribed by Rules and Regulations and to any additional requirements prescribed from time to time by the General Manager or Board of Directors of District, or both, to insure compliance with the Rules and Regulations. Applicant and its successors may be required to use recycled water based upon the sole discretion of District and shall meet all the requirements of the section entitled, "On-site Recycled Water Facilities" of the Rules and Regulations.

SECTION 3 - Applicant hereby agrees to build or cause to be built the following described facilities (hereinafter collectively referred to as "Facilities") and agrees to pay all costs of installation of same, including, but not limited to, cost of labor, materials, equipment, contractors' expense and profit, environmental studies, design, engineering, surveying, inspection, testing, plan check, land and easement acquisition, condemnation, attorney's fees, insurance and bond premiums.

(a) Water System Facilities:

(b) Sewer System Facilities:

(c) Recycled Water System Facilities:

SECTION 4 - Applicant agrees that Facilities shall be constructed in accordance with plans and specifications which shall comply with all applicable requirements of District's "Procedural Guidelines and General Design Requirements", latest edition, including, but not limited to, requirements as to information to be shown on the plans. Said document is on file at the office of District and is by this reference incorporated herein. Such plans and specifications shall be approved by District prior to construction of the Facilities. Such approval of the plans and specifications by District shall not constitute approval of this Application. The Facilities shall be constructed by a contractor licensed by the State of California to install said Facilities.

SECTION 5 - Applicant guarantees Facilities constructed under this Agreement against defects in workmanship and materials for a period of one (1) year after the date of acceptance of the Bill of Sale for the Facilities by District, as provided in Section 8. It is further agreed that the Facilities shall be restored to full compliance with the requirements of the plans and specifications described in Section 4, including any test requirements, if during said one (1) year period the Facilities or any portion thereof are found not to be in conformance with any

provisions of said plans and specifications. This guarantee is in addition to any and all other warranties, express or implied, with respect to the Facilities.

SECTION 6 - Applicant agrees to grant, or cause to be granted to District, without cost to District, all necessary easements for construction, installation, maintenance and access to the Facilities, across all privately owned lands to be traversed by the Facilities, which easements shall be in a location mutually acceptable to District and Applicant and in a form and condition of title satisfactory to District and shall be executed by all necessary parties having an interest in said lands.

SECTION 7 - Applicant agrees to provide to District, prior to acceptance of the Facilities as set forth in Section 8, a complete set of reproducible mylars of the approved plans and specifications for the Facilities.

SECTION 8 - Upon completion of the Facilities, Applicant agrees to execute and deliver to District a proper Bill of Sale, including a report of the actual costs of the Facilities on the standard form of District, which form is on file at the office of the District and is by this reference incorporated herein, and to substantiate such report with invoices and receipts acceptable to District. Applicant further agrees that such Facilities will become the property of District when said Bill of Sale is accepted by its Board of Directors or its duly authorized employee, evidencing acceptance of the Facilities. However, Applicant hereby disclaims in favor of District all right, title and interest in and to said systems, appurtenances and easements; and Applicant hereby covenants and agrees to execute and deliver to District any documents required to complete the transfer of the Facilities concurrently with the acceptance thereof by District; and Applicant hereby agrees that Applicant is holding any title to said Facilities, pending acceptance thereof by District, as trustee, acknowledging Applicant's obligation to complete said Facilities and transfer the same debt-free to District.

SECTION 9 - It is agreed that the above provisions shall not preclude the use of the Facilities by property owners within the developed area or outside of said development prior to such delivery of Bill of Sale to District, as long as the quantity and quality of said water and sewage is acceptable to District under its Rules and Regulations and written permission has been obtained from District by such property owners to connect to the Facilities or to existing facilities. Applicant agrees that the use of the Facilities by the Applicant, transferee or assignee of the Applicant, or others within District will not constitute acceptance of the Facilities by District.

SECTION 10 - Applicant agrees to indemnify and hold District, its agents, employees, officers, and representatives, free and harmless from and against any and all liabilities for death, injury, loss, damages, and expense, including reasonable attorneys' fees (collectively, the "Claims") to persons and/or property which may arise from the construction, installation or repair of the Facilities and which is proximately caused by any negligence of Applicant, its employees, agents or independent contractors, or by any act or omission for which Applicant, its employees, agents or independent contractors are liable without fault, except to the extent that such Claims are proximately caused by any negligent act or omission of District or the agents, employees, officers and representatives thereof or by any act or omission for which District or its agents, employees, officers and representatives are liable without fault.

SECTION 11 - Applicant shall submit, concurrently with this Application, payment and performance bonds on the standard forms of District, which forms are on file at the office of District and are by this reference incorporated herein, or as acceptable to District, in connection with the Facilities to be constructed, and for an amount to be determined by District.

SECTION 12 - Applicant hereby agrees to pay all administration and engineering fees (including inspection and plan check costs) calculated as a percentage of the total cost as estimated by District, as well as all of the following which may be applicable: potable water connection fees, sewer connection fees, special high-rise connection fees, high volume connection fees, television inspection of sewer line charges, interim potable water service line charges and sewer lateral charges and any other charges of District as provided for in the Rules and Regulations. The amount of such fees and charges shall be based on the applicable schedules of the Rules and Regulations in effect on the date when Applicant has submitted to District its completed Application, payment of all fees and charges, plans and specifications, bonds, conveyance of necessary easements, and other items which may be required herein prior to execution of this Application. Such fees and charges shall be set forth on Exhibit "A" hereto by District, which Exhibit is by this reference incorporated herein, and is subject to revision pursuant to any changes in the applicable schedules prior to the date the Application and all accompanying materials and payment are completed and submitted to District. Other than as provided herein, fees and charges are not subject to adjustment or refund.

SECTION 13 - Applicant agrees to accept such conditions of pressure and service as are provided for by District's system(s) at the location of all proposed connections thereto and to hold District harmless from and against any and all damages, liability and expense arising out of high or low pressure conditions with respect thereto or from interruptions of service.

SECTION 14 - Applicant agrees, if District employs an attorney to enforce this Agreement, to pay District for all attorneys' fees so incurred.

SECTION 15 - Applicant agrees to abide by the prohibitions of District against the use of self-regenerating water softeners connected to the sewer facilities of District.

SECTION 16 - Applicant agrees that the General Manager of District or his authorized representative may enter upon the hereinabove described property during reasonable hours for the purpose of ascertaining whether the provisions of this Agreement are being performed. Applicant shall not be responsible in any way for the failure of its successors or assigns to comply with any of the provisions of this Agreement.

SECTION 17- Applicant agrees that service shall be commenced only after the Facilities have been completed and transferred to District as provided in Section 8 and all required testing and inspection have been accomplished by District. Applicant is aware that contracts may not have been let for all necessary facilities of District in order that Applicant can actually receive service. Applicant further agrees that District shall not be obligated to Applicant or the successors of Applicant for service until such time as the necessary District facilities are actually completed.

SECTION 18 - Special conditions for service, if any:

(a) The terms and conditions of the below-designated addenda are made a part hereof as though fully set forth herein, and Applicant hereby acknowledges receipt of copies thereof:

[ ]	Addendum No. 1 -	Residential Potable Water, Sewer, and Recycled Water.
[ ]	Addendum No. 2 -	Residential Potable Water Only.
[ ]	Addendum No. 3 -	Residential Sewer Only.
[ ]	Addendum No. 4 -	Commercial/Industrial Potable Water, Sewer, and Recycled Water, or Sewer Only.
[ ]	Addendum No. 5 -	Backbone Facilities Only.
[ ]	Addendum No. 6 -	Connection Fees Paid by Unit.

(b) Other _____

SECTION 19 - This Application and Agreement shall inure to the benefit of, and be binding upon District, Applicant, the property owner named below (if different from Applicant) and their respective successors and assigns. Applicant agrees to make this Application and Agreement known to all developers, builders and ground lessees of residential, commercial and/or industrial improvements on the "Property".

IN WITNESS WHEREOF, the parties have duly caused their authorized signatures to be affixed hereto. SIGNATURES MUST BE PROPERLY NOTARIZED AND ACKNOWLEDGED.

APPLICANT:

PROPERTY OWNER:
(If different from Applicant)

_____ _____

By: _____ By: _____

By: _____ By: _____

Date: _____ Date: _____

(SEAL)

IRVINE RANCH WATER DISTRICT:

By: _____
Kevin L. Burton, P.E.
Director of Engineering & Construction

By: _____
Leslie Bonkowski
Secretary to the District

Date: _____

STATE OF CALIFORNIA)

) ss.

COUNTY OF ORANGE)

On _____, before me, _____, personally appeared KEVIN L. BURTON and LESLIE BONKOWSKI, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/here/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____ (Seal)

State of California

County of _____

On _____, before me, _____(here insert name and title of the officer, personally appeared _____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/here/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____ (Seal)

State of California

County of _____

On _____, before me, _____(here insert name and title of the officer, personally appeared _____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/here/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____ (Seal)

EXHIBIT "A"
APPLICATION AND AGREEMENT WITH
THE IRVINE RANCH WATER DISTRICT
FOR SERVICE

DATE: _____
W.O. NO.: _____
TRACT NO.: _____
I.D. NO.: _____

A. POTABLE WATER SERVICE FEES AND CHARGES

1. Administrative and Engineering

Bondable Cost $_____ @ __ % $_____

2. Water Connection Fees

[ ] Residential

units @ $_____ / unit $_____

[ ] Commercial

acres @ $_____ / acre $_____

[ ] Industrial

acres @ $_____ / acre $_____

3. Meter Charge

[ ] Residential

meter(s) @ $____ each $_____

[ ] Commercial/Industrial

meter(s) @ $____ each $_____

4. Interim Water Service Charge

pads @ $____ each $_____

5. Special High-rise Connection Fees

G.A.[1] [F.A.R.[2] X $_____) - $_____] $_____

6. High Volume Connection Fee $_____

TOTAL WATER SERVICE FEES AND CHARGES: $_____

EXHIBIT "A"
APPLICATION AND AGREEMENT WITH
THE IRVINE RANCH WATER DISTRICT
FOR SERVICE

DATE: _____
W.O. NO.: _____
TRACT NO.: _____
I.D. NO.: _____

B. SANITARY SEWER FEES AND CHARGES

1. Administrative and Engineering

Bondable Cost $_____ @ __% $_____

2. Sewer Connection Fees

[ ] Residential

units at $_____ / unit $_____

[ ] Commercial

acres @ $_____ / acre $_____

[ ] Industrial

acres @ $_____ / acre $_____

3. Sewer Sub-trunk TV Inspection

Total footage of 6-inch and larger sewer.

L.F. @ $___ / L.F. $_____

4. Special High-rise Connection Fees

G.A.[1] X [(F.A.R.[2] X $____) - $____] $_____

5. High Volume Connection Fee $_____

TOTAL SANITARY SEWER FEES AND CHARGES: $_____

EXHIBIT "A"
APPLICATION AND AGREEMENT WITH
THE IRVINE RANCH WATER DISTRICT
FOR SERVICE

DATE: _____
W.O. NO.: _____
TRACT NO.: _____
I.D. NO.: _____

C. RECYCLED WATER FEES AND CHARGES:

1. Administrative and Engineering

Bondable Cost $_____ @ ___% $_____

TOTAL RECYCLED WATER SERVICE FEES AND CHARGES: $_____

FEE SUMMARY

	***TOTAL DISTRICT FEES AND CHARGES**:	$_____
Less Prepaid Plan check Fees:	Potable Water	$_____
	Sewer	$_____
	Recycled Water	$_____
	TOTAL DUE AND PAYABLE:	$_____

- The amount set forth is based on District's schedules of fees and charges in effect on and the plans and specifications for the Facilities which have been submitted by Applicant, and such amount is subject to revision pursuant to any changes made in said schedules or in said plans prior to completion of this Application and all accompanying items required therein.

Rev. 2/93
AGR00010

FIGURE 5

Approved by Board of Directors IRVINE RANCH WATER DISTRICT

BILL OF SALE

WATER SYSTEM FACILITIES

For good and valuable consideration, receipt of which is hereby acknowledged, the undersigned does hereby transfer and convey to the Irvine Ranch Water District, a California Water District organized under State Law, and its successors and assigns, all right, title, and interest in and to the water installation, including pipelines, valves, service connections, fire hydrants, meters, and other appurtenances to said water installation, constructed, installed, and located in the property described below and further warrants that the same is free and clear of any encumbrances.

Said property is described as follows:

Executed this _____ day of _____, 20____.

Company or Corporation Name:

_____

By:_____

President

By:_____

Secretary

CERTIFICATE OF ACCEPTANCE

As per Resolution No. 1973-21 as set forth in the minutes of a meeting of the Board of Directors of the Irvine Ranch Water District held on June 19, 1973, the above Bill of Sale of Water System Facilities, dated _____, is hereby accepted by order of the Board of Directors of the Irvine Ranch Water District, a California Water District organized under State Law.

Date of Acceptance _____.

By:_____

General Manager
IRVINE RANCH WATER DISTRICT

FIGURE 6

Approved by Board of Directors IRVINE RANCH WATER DISTRICT

BILL OF SALE

SEWER SYSTEM FACILITIES

For good and valuable consideration, receipt of which is hereby acknowledged, the undersigned does hereby transfer and convey to the Irvine Ranch Water District, a California Water District organized under State Law, and its successors and assigns, all right, title, and interest in and to the sewer installation, including mains, manholes, laterals, and other appurtenances to said sewer installation, constructed, installed, and located in the property described below and further warrants that the same is free and clear of any encumbrances.

Said property is described as follows:

Executed this _____ day of _____, 20____.

Company or Corporation Name:

_____

By:_____
President

By:_____
Secretary

CERTIFICATE OF ACCEPTANCE

As per Resolution No. 1973-21 as set forth in the minutes of a meeting of the Board of Directors of the Irvine Ranch Water District held on June 19, 1973, the above Bill of Sale of Sewer System Facilities, dated _____, is hereby accepted by order of the Board of Directors of the Irvine Ranch Water District, a California Water District organized under State Law.

Date of Acceptance _____.

By:_____

General Manager
IRVINE RANCH WATER DISTRICT

FIGURE 7

Approved by Board of Directors IRVINE RANCH WATER DISTRICT

BILL OF SALE

RECYCLED WATER SYSTEM FACILITIES

For good and valuable consideration, receipt of which is hereby acknowledged, the undersigned does hereby transfer and convey to the Irvine Ranch Water District, a California Water District organized under State Law, and its successors and assigns, all right, title, and interest in and to the recycled water installation, including pipelines, valves, service connections, meters, and other appurtenances to said recycled water installation, constructed, installed, and located in the property described below and further warrants that the same is free and clear of any encumbrances.

Said property is described as follows:

Executed this _____ day of _____, 20____.

Company or Corporation Name:

_____

By:_____
President

By:_____
Secretary

CERTIFICATE OF ACCEPTANCE

As per Resolution No. 1973-21 as set forth in the minutes of a meeting of the Board of Directors of the Irvine Ranch Water District held on June 19, 1973, the above Bill of Sale of Recycled Water System Facilities, dated _____, is hereby accepted by order of the Board of Directors of the Irvine Ranch Water District, a California Water District organized under State Law.

Date of Acceptance _____.

By:_____

General Manager
IRVINE RANCH WATER DISTRICT

FIGURE 8

Approved by Board of Directors IRVINE RANCH WATER DISTRICT

COST OF CONSTRUCTION STATEMENT
WATER SYSTEM

Developer's Name: _____

Tract No.: _____ Date Prepared: _____

Item	Quantity	Unit Price	Total Cost
			$
		Subtotal	$_____
Design Engineering Cost (Proportioned to Water Design)		L.S.	
Survey - Staking Costs		L.S.	
Bonding Costs (Estimate)		L.S.	
Developer's Overhead Costs (Not to Exceed 10%)		L.S.	
		GRAND TOTAL INSTALLATION COST*	$_____

*Excludes fees paid directly to
Irvine Ranch Water District

Prepared by: _____

My signature as witnessed here below attests that under penalty of perjury, the above statement is true and correct to the best of my knowledge.

Date: _____ _____
Developer

_____
Official Title

FIGURE 9

Approved by Board of Directors IRVINE RANCH WATER DISTRICT

COST OF CONSTRUCTION STATEMENT
SEWER WATER SYSTEM

Developer's Name: _____

Tract No.: _____ Date Prepared: _____

Item	Quantity	Unit Price	Total Cost
			$
		Subtotal	$_____
Design Engineering Cost (Proportioned to Sewer Design)		L.S.	
Survey - Staking Costs		L.S.	
Bonding Costs (Estimate)		L.S.	
Developer's Overhead Costs (Not to Exceed 10%)		L.S.	
		GRAND TOTAL INSTALLATION COST*	$_____

*Excludes fees paid directly to
Irvine Ranch Water District

Prepared by: _____

My signature as witnessed here below attests that under penalty of perjury, the above statement is true and correct to the best of my knowledge.

Date: _____ _____
Developer

_____
Official Title

FIGURE 10

Approved by Board of Directors IRVINE RANCH WATER DISTRICT

COST OF CONSTRUCTION STATEMENT
RECYCLED WATER SYSTEM

Developer's Name: _____

Tract No.: _____ Date Prepared: _____

Item	Quantity	Unit Price	Total Cost
			$
		Subtotal	$_____
Design Engineering Cost (Proportioned to Recycled Water Design)		L.S.	
Survey - Staking Costs		L.S.	
Bonding Costs (Water Only) Estimate		L.S.	
Developer's Overhead Costs (Not to Exceed 10%)		L.S.	
		GRAND TOTAL INSTALLATION COST*	$_____

*Excludes fees paid directly to
Irvine Ranch Water District

Prepared by: _____

My signature as witnessed here below attests that under penalty of perjury, the above statement is true and correct to the best of my knowledge.

Date: _____ _____
Developer

_____
Official Title

FIGURE 11

TYPICAL IRVINE RANCH WATER DISTRICT FACILITY LAYOUT

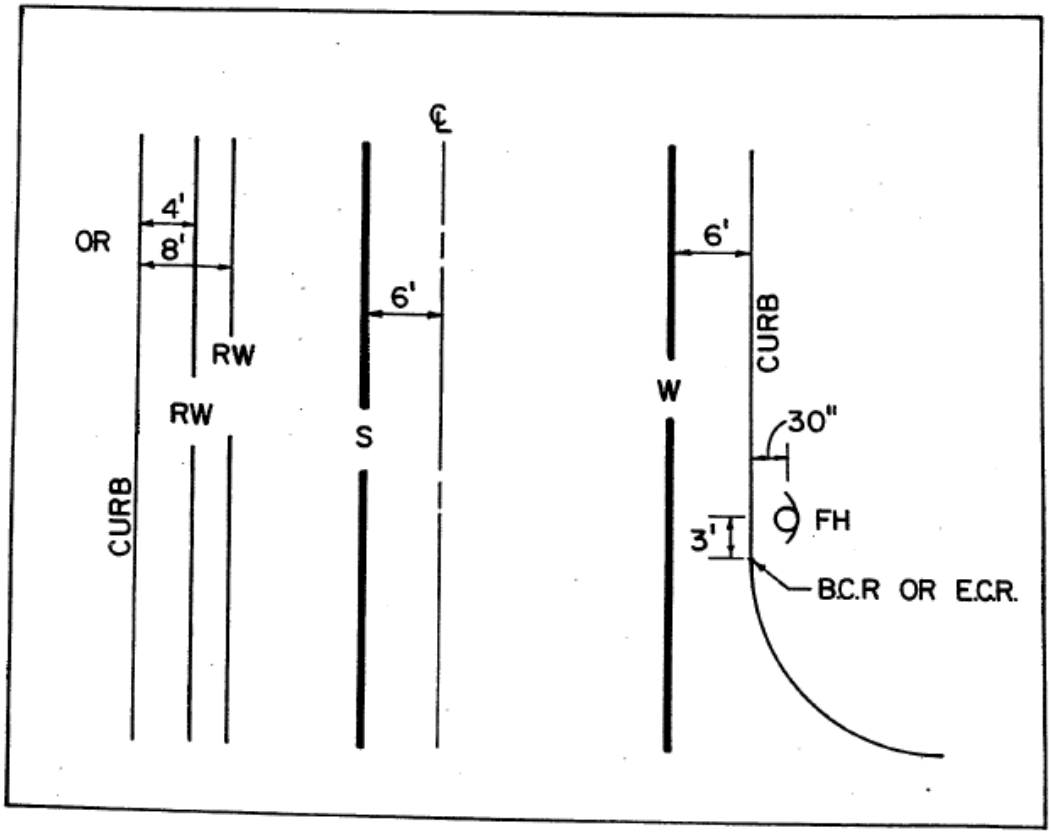


FIGURE 12

IRVINE RANCH WATER DISTRICT
CHECKLIST FOR PLAN CHECKING

TRACT OR P.M. NO.:_____

DESCRIPTION:_____

PLAN CHECKER ASSIGNED:_____

The satisfied items, where applicable, are indicated by checkmarks. Items not applicable, or not required, are indicated by "N/A" or "N/R". Unmarked items denote existing deficiencies which must yet be satisfied.

(*NOTE: An asterisk (*) denotes any newly adopted or recently modified IRWD requirement to be included in future IRWD publications*.)

PART A: ADMINISTRATIVE REQUIREMENTS

( ) A-01 3 blueline copies of public improvement plans (street/sewer/water/storm drain) submitted to

( ) A-02 2 blueline copies of the Subdivision (Tract or Parcel) Map submitted to IRWD for review, all pages intact?

( ) A-03 1 set of grading plans (for information purposes – 1st Check Only) submitted to IRWD? (Check pad elev vs. service elev in Zone-can minimum pressure be provided to each lot?)

( ) A-04 Engineer's estimate (of cost of proposed public sewer and water facilities) submitted?

( ) A-05 Plan check and inspection fees (5% of engineer's estimate) paid to IRWD?

( ) A-06 Base connection fees paid to IRWD?

( ) A-07 Meter fees paid to IRWD?

A-08* Supporting calculations submitted (for the following items)?

( ) a)_____
( ) b)_____
( ) c)_____

( ) A-09 Will serve letters:_____requested?_____Issued?

( ) A-10* Conceptual Project Review held with IRWD?

( ) A-11 Comprehensive legal description (metes and bounds, with exhibit diagram) submitted to IRWD for any newly proposed easements not already recorded on subdivision map?

( ) A-12* The applicant is responsible for obtaining street addresses from the City or County agency having jurisdiction, prior to making application for meters. Have street addresses been assigned for each proposed water meter and detector check location?

( ) A-13 (1) blueline prints, (1) record mylar copy, and digital diskette of "as-built" improvement plans, submitted to IRWD upon completion of all work?

( ) A-14* (1) blueline prints and (1) record mylar copy and digital diskette of the final recorded Tract/Parcel map submitted to IRWD upon recordation?

( ) A-15 Preparer aware that a letter of transmittal must accompany all submittals?

( ) A-16 Additional requirements satisfied (as follows)?

( ) a.)_____

( ) b.)_____

( ) c.)_____

( ) d.)_____

( ) e.)_____

( ) f.)_____

PART B: FORMAT REQUIREMENTS

( ) B-01 Plans submitted for review and approval of proposed construction must be blueline prints of public improvement drawings pertaining to the construction of underground utilities (i.e., sewer, water, storm drain) in a public street, public right-of-way, or dedicated IRWD easement. In general, architectural plans, grading plans, and on-site fire sprinkler plans are unacceptable for this purpose, but may be provided as additional information. Are the proper types of plans submitted?

( ) B-02* Does each sheet of plans have the signature and valid stamp of a Registered Professional Engineer (P.E. – Civil) or a Registered Civil Engineer (R.C.E.) licensed in the State of California?

( ) B-03* Are the originals to the plans prepared on 24" wide by 36" long plastic mylar sheets?

( )	B-04*	Do the plans clearly distinguish between existing facilities and proposed construction?
( )	B-05*	Do the plans clearly identify the type of project and the relative size or scale of the development?
( )	B-06*	Does each sheet have edge borders, minimum 1.5" on left side, and minimum 0.5" on the 3 remaining sides?
( )	B-07*	Are multiple sheet plans stapled or bound on the left hand side?
( )	B-08	Is the proposed construction depicted in conformance with the "IRWD PROCEDURAL GUIDELINES AND GENERAL REQUIREMENTS" and "CONSTRUCTION MANUAL" as well as the "IRWD RULES AND REGULATIONS"? Do the plans reference specific IRWD Standards when applicable?
( )	B-09*	If the plans are for a proposed Subdivision (Tract or Parcel) Map development, are the plans prepared on an official City or County titleblock mylar?
( )	B-10*	If the plans are for an IRWD Capital Project, are the plans prepared on an IRWD titleblock mylar?
( )	B-11*	Do all sheets have a preparer's logo block at the bottom, which includes the firm's name, address, city, state, zip code, phone number (with area code), and the name of a contact person?
( )	B-12	does the front sheet have standard Irvine Ranch Water District approval signature block for Domestic (Potable) Water Facilities, Sanitary Sewer Facilities, and Recycled Water Facilities, as applicable? (see Figure 1)
( )	B-13*	Does the front sheet provide a signature block for the Orange County Fire Marshall (or a signature block for the local City Fire Marshall if the City has its own fire department)?
( )	B-14	If the project involves building construction and/or installation of fire protection facilities (such as fire hydrants and detector check assemblies), the Fire Marshall must sign the plans before IRWD signs the plans (preferably before 2nd plan check with IRWD). Has the Fire Marshall signature been obtained?

( ) B-15* Does the front sheet have two title headings, one centered below the top margin, and the other located in a block on the lower right hand corner? (The title heading must be similar to that shown below, and must contain sufficient information to identify the project and the type of construction work being done.)

JOHN WAYNE RANCH

TRACT 99999

PUBLIC IMPROVEMENT PLANS

STREETS, SEWER, WATER, STORM DRAIN

( ) B-16* Are all sheets numbered sequentially and indicate the total number of sheets? (Example: Page 1 of 20, Page 2 of 20, Page 3 of 20, etc.)

B-17 On front sheet, are the following IRWD Standard Notes shown (when applicable)?

( ) a.) Domestic (Potable) Water Notes (Section 3.10 of IRWD Procedures Guide)?

( ) b.) Sanitary Sewer Notes (Section 4.14 of IRWD Procedures Guide)?

( ) c.) Off-Site Recycled Water Notes (Section 5.4 of the IRWD Procedures Guide)?

( ) B-18* On IRWD's Standard Notes, is IRWD's phone number correct? It should appear as either (949) 453-5300 or (949) 453-5615.

( ) B-19* On IRWD's Standard Notes, are the geographical references in agreement with where the project is located? (for example, the notes should not read as if the project is in the City of Irvine when the project is actually in the City of Tustin or the County of Orange. The phrase "City of Irvine or other appropriate agencies if outside the City of Irvine" should be replaced with a specific name, if in fact the project is outside the City of Irvine.)

( ) B-20* Are all misspellings and typos corrected? (Example: In IRWD's Standard Notes, the word "ENSCRIBED" should be spelled "INSCRIBED".)

( ) B-21* On every sheet, is there an approval section for "REVISIONS", with lines numbered 1, 2, 3, 4, etc. (with a triangle around each number), and vertical columns headed as "DESCRIPTION", "APPROVED BY", and "DATE"?

( ) B-22 Is there a fully completed "BASIS OF BEARINGS" information block near the bottom of the front sheet?

( ) B-23 Is there a fully completed "BENCHMARK" information block near the bottom of the front sheet?

( ) B-24* Are all lot lines and subdivision boundaries clearly shown?

( ) B-25* Are all existing and proposed easements clearly shown, including IRWD easements?

( ) B-26* Is there a fully completed "LEGAL DESCRIPTION OF PROPERTY" information block near the bottom of the front sheet?

( ) B-27 Does the front sheet provide a vicinity map with the project location clearly shown, giving names of adjacent cross street, nearest boulevards and nearest freeways?

( ) B-28* Does the front sheet clearly give the project location in writing? (See example below.)

The information shall include the following:

a.) The Tract Map Number and Lot Number(s), or Parcel Map Number and Parcel Number(s), or Assessor Parcel Number(s), as applicable.
b.) The official street address (if known, or location described in terms of cross-streets.
c.) City/Postal Zone, State and Zip Code.
d.) If located in Unincorporated Orange County, so state.

( ) B-29 Is there a City Engineer or County Engineer signature block, as applicable, near the bottom of the front sheet?

( ) B-30* Is there a fully completed "DEVELOPER" information block near the bottom of the front sheet? It shall provide the developer's name, address, city, state, zip code, phone number (with area code), and the name of a contact person.

( ) B-31* If the property owner is different than the developer, is there a legal owner information block near the bottom of the front sheet? It shall provide the owner's name, address, city, state, zip code, phone number (with area code), and the name of a contact person.

( ) B-32* Is there an 'UNDERGROUND SERVICE ALERT" section on the front sheet in accordance with Figure 2, Section 2 in Procedures Guide?

( ) B-33 On Sheet #1 (space permitting) or Sheet #2, is there an itemized materials list entitled "CONSTRUCTION NOTES"? each item shall be sequentially numbered, accurately described, and specify quantity, linear footage, area or volume. Items shall be broken down into the following categories:

1.) Domestic Water

2.) Recycled Water

3.) Sewer

( ) B-34 On Sheet #1 (space permitting) or Sheet #2, is there an "INDEX MAP" (Scale 1 inch = 100 feet) of the project site? It shall show names of all streets within and bordering the project, existing and proposed utilities, pipelines sizes, and type (material) of pipe. (see Section 2.3.1.D for full requirements.)

( ) B-35* If the project is for multi-family residential development, is there a descriptive information table on Sheet #2? The table shall list each assigned building number (#1, #2, #3, etc.), the proposed use of each building (e.g., rental apartment, condominium, recreation building, etc.), the number of stories of each building, the number of dwelling units of each building, the gross square footage of each building, the average square footage per dwelling unit, and the overall gross acreage of the property.

( ) B-36* If the project is for non-residential development, do the plans show the footprint of each building pad, along with descriptive information? The descriptive information shall include the building's proposed use, the building's gross square footage, the number of actual dwelling units (or the number of equivalent dwelling units (EDU's), and the gross acreage of the property.

( ) B-37* If the project is for multiple family residential development, do the plans clearly specify whether the project involves construction of rental apartments, condominiums, or townhomes?

( ) B-38 Are north arrows shown on all maps and drawings, including vicinity maps, index maps, and plan views? North arrows shall point vertically upward, where possible, and be aligned toward "True North", not "Magnetic North".

( ) B-39 Does Sheet #1 (space permitting) or Sheet #2 contain a legend which defines all shorthand nomenclature?

( ) B-40 Additional requirements satisfied (as follows)?

( ) a.)_____
( ) b.)_____
( ) c.)_____
( ) d.)_____
( ) e.)_____

PART C: REQUIREMENTS FOR DOMESTIC (POTABLE) WATER FACILITIES

( ) C-01* Is the preparer aware that public domestic water mains of 12-inch size and larger are considered "IRWD Capital Facilities", and must be coordinated with the IRWD Capital Projects Engineer? IRWD Capital Facilities shall be depicted on subdivision improvement plans as dashed lines, with the note "TO BE DESIGNED AND INSTALLED BY IRWD". Check SAMP

for sizes and verify service elevation versus pad elevation to confirm min. pressure for each lot.

( ) C-02* Is it stated whether the domestic water system within the project is "public" (IRWD owned and maintained) or "private" (property owner owned and maintained)? The jurisdictional boundary must be clearly delineated.

( ) C-03 If the domestic water system is "private", is it depicted as showing one or more master-meters for the entire site, located in the public right-of-way or in an IRWD easement at the property entrance?

( ) C-04* Are crossing (invert) elevations given when a domestic waterline crosses another pipeline?

( ) C-05 Are section views of all domestic water mains (which cross sewer mains) shown in the profile view of the sewer main?

( ) C-06 Do domestic water mains and water service laterals conform to IRWD Standards (with respect to following)?

( ) a.) Correct size (Mains: 6", 8", 10"; Service Laterals: 1", 2", 4", 6", 8", or 10").

( ) b.) Correct material (PVC C-900 Class 150 or 200 or DIP Class 51 for mains and large laterals; Copper for 1" and 2" laterals).

( ) c.) Acceptable radius of curvature of pipeline layout (for main lines, allowable curvature dependent on pipe size and material; service laterals must be straight).

( ) d.) Minimum amount of overhead cover (Public Facilities: 42" for residential, 48" for nonresidential; Private Facilities: governed by local building codes or by Uniform Plumbing Code).

( ) e.) Horizontal clearance with other utilities (minimum 10 feet from sewer, storm drain, recycled water, and hydrocarbon; otherwise, protective encasing or higher grade pipe material required).

( ) f.) Vertical clearance with other utilities (minimum 1 foot without joints, with domestic waterlines above all other pipelines). If storm drain must be above the domestic water, add the note "Center one joint of pipe underneath the Storm drain".

( ) g.) Distance off curb face (6 feet for domestic waterlines, where possible, but never at 4 feet).

( ) C-07* Are street station numbers shown for appurtenances coming off of main line (e.g., for fire hydrants, blow-offs, service laterals, valves, etc.) where applicable?

( ) C-08* Are easements for domestic water facilities properly sized? Domestic waterline easements to IRWD must be a minimum of 10 feet wide, and must provide at least 5 feet of clearance around all above-ground facilities.

Actual easement width shall be twice the average pipe depth, rounded upward to the nearest 5 feet.

( ) C-09* A minimum of 3 meters is required for manifolding domestic water meters. Otherwise, each meter must come off the main line with individual service laterals. Do the manifolds depicted on the plans each have a minimum of 4 meters?

( ) C-10* IRWD does not allow water service laterals connected to firelines. Do plans reflect this requirement?

( ) C-11 Are domestic water shut-off valves spaced such that no more than 2 fire hydrants are shut off at one time?

( ) C-12 Dead-end waterlines are limited to 28 dwelling units or 600 feet (whichever comes first). Otherwise a looped water system with at least 2 points of connection is required.

( ) C-13* Are service laterals for fire hydrants straight? They cannot be bent, curved, or elbowed.

( ) C-14* Do all non-residential domestic (potable) water service laterals have reduced pressure backflow devices on the customer side of the meter?

( ) C-15* Domestic water service laterals cannot be run across an adjacent property line (except under certain hardship cases). Is this requirement met?

( ) C-16 Each building must have at least one water service lateral, coming directly off the main line, or off of a manifolded service assembly. Is this requirement met?

( ) C-17 Water service laterals cannot come off of other water service laterals. Is this requirement met?

( ) C-18 On single-family residences water service laterals may be dimensioned from the property line or by street stations. Is this requirement met?

( ) C-19 Are the proper types of fire hydrants installed? (IRWD Std. W-5 for residential; IRWD Std. W-6 for commercial/industrial, to be in conformance with local zoning)

( ) C-20 On single family residences, water service laterals shall not go under driveway approaches. Is this requirement met?

( ) C-21 Are blow offs installed at the end of all mains and large water service stub outs? They are required for testing and flushing purposes.

( ) C-22 Are air vacuum release valves installed at all water main summits for 10-inch pipe and larger?

( ) C-23* Do fire hydrant spacing and coverage comply with IRWD Standard Section 3, Fig. 1, and with the requirements of the County of Orange Fire Marshal?

( ) C-24* If project is residential or medium to large-scale commercial/industrial, are there at least 2 points of connection to IRWD's water system?

( ) C-25 Are all existing IRWD domestic water facilities completely and correctly depicted?

( ) C-26 Are all existing and proposed points of connection to existing domestic water facilities properly depicted?

( ) C-27 Are all proposed domestic water facilities in conformance with the appropriate IRWD Subarea Master Plan?

( ) C-28* Are IRWD's conditions of approval on the subdivision map and "will-serve" letter satisfied?

( ) C-29 Cross-connections between recycled water facilities and potable water facilities are forbidden. Is this requirement complied with?

( ) C-30 Additional requirements satisfied (as follows)?

( ) a.)_____
( ) b.)_____
( ) c.)_____
( ) d.)_____

PART D: REQUIREMENTS FOR RECYCLED WATER FACILITIES

( ) D-01* Is the preparer aware that public recycled water mains of 6-inch size and coordinated with the IRWD Capital Projects Engineer? IRWD Capital Facilities larger are considered "IRWD Capital Facilities", and must be shall be depicted on the subdivision improvement plans as dashed lines, with the note "TO BE DESIGNED AND INSTALLED BY IRWD".

( ) D-02* Is it stated whether the recycled water system within the project is "public" (IRWD owned and maintained) or "private" (property owner owned and maintained)? The jurisdictional boundary must be clearly delineated.

( ) D-03 If the recycled water system is "private", is it depicted as showing one or more master meters for the entire site, located in a public right-of-way or in an IRWD easement at the property entrance?

( ) D-04 Recycled water for fire hydrants is prohibited. Are fire hydrants shown connected to the potable water system (instead of to the recycled water system)?

( ) D-05 Recycled water service laterals do not require reduced pressure principle (RPPD) backflow devices. Are recycled water service laterals called out w/o RPPD's?

( ) D-06 Is preparer of plans aware that watering of landscape areas requires the use of recycled water (where such facilities exist)? Plans must be shown to reflect landscape areas being served by recycled water, where recycled water is available.

( ) D-07* Are high-rise buildings using recycled water for toilet flushing, where recycled water is available? Buildings 55 feet and taller fall under this requirement.

( ) D-08 Are crossing invert elevations given when a recycled waterline crosses another pipeline?

( ) D-09 Are section views of all recycled water mains (which cross sewer mains) shown in the profile view of the sewer main?

D-10 Do recycled water mains and water service laterals conform to IRWD Standards (with respect to the following)?

- ( ) a.) Correct size (Mains: 4"; Service Laterals: 1", 2", 4").
- ( ) b.) Correct material (DIP Class 51, or PVC Class C-900 for mains and 4" laterals; Copper for 1" and 2" laterals).
- ( ) c.) Acceptable radius of curvature of pipeline layout (for main lines, allowable curvature dependent upon pipe size and material; service laterals must be straight).
- ( ) d.) Minimum amount of overhead cover (Public Facilities: 53' for 4", 60' for 6" and larger; Private Facilities: governed by local building codes or by Uniform Plumbing Code).
- ( ) e.) Horizontal clearance with other utilities (minimum 10 feet from storm drain, domestic water, and hydrocarbon; otherwise protective casing or higher grade pipe material required).
- ( ) f.) Vertical clearance with other utilities (minimum 1 foot without joints, with recycled waterlines below domestic waterlines).
- ( ) g.) Distance off curb face (4 feet or 8 feet for recycled waterlines, where possible, but never at 6 feet).

( ) D-11* Are street station numbers shown for all appurtenances coming off of main line (e.g., for blow offs, service laterals, valves, etc.) where applicable?

( )	D-12*	Are easements for recycled water facilities properly sized? Recycled waterline easements to IRWD must be a minimum of 10 feet wide, and must provide at least 5 feet of clearance around all above-ground facilities. Actual easement width shall be twice the average pipe depth, rounded upward to the nearest 5 feet.
( )	D-13*	A minimum of 3 meters is required for manifolding recycled water meters. Otherwise each meter must come off the main line with individual service laterals. Do the manifolds depicted on the plans each have a minimum of 3 meters?
( )	D-14*	Recycled water service laterals cannot be run across an adjacent property line (except under certain hardship cases). Is this requirement met?
( )	D-15	Water service laterals cannot come off of other water service laterals. Is this requirement met?
( )	D-16	Are air vacuum release valves installed at all water main summits for 8-inch pipe and larger?
( )	D-17	Are all existing IRWD recycled water facilities completely and correctly depicted?
( )	D-18	Are all existing and proposed points of connection to existing recycled water facilities properly depicted?
( )	D-19	Are all proposed recycled water facilities in conformance with the appropriate IRWD Subarea Master Plan?
( )	D-20*	Are IRWD's conditions of approval on the subdivision map and "will-serve" letter satisfied?
( )	D-21	Hose bibs on recycled water facilities are forbidden. Is this requirement complied with?
( )	D-22	Potable and recycled water facilities are not to be installed in the same trench (if horizontal separation is less than 10 feet). Is this requirement complied with?
( )	D-23	cross-connections between potable water facilities and non-potable water facilities (including sewer) are forbidden. Is this requirement complied with?
( )	D-24*	Are irrigation/landscape points of connection (P.O.C.'s) clearly identified and called out on the civil street improvement drawings?

D-25 Additional requirements satisfied (as follows)?

( ) a.)_____
( ) b.)_____
( ) c.)_____
( ) d.)_____

PART E: REQUIREMENTS FOR SEWER FACILITIES

( ) E-01* Is the preparer aware that public sewer mains of 12-inch size and larger are considered "IRWD Capital Facilities", and must be coordinated with the IRWD Capital Projects Engineer? IRWD Capital Facilities shall be depicted on subdivision improvement plans as dashed lines, with the note "TO BE DESIGNED AND INSTALLED BY IRWD".

( ) E-02* Is it stated whether the sanitary sewer system within the project is "public" (IRWD owned and maintained) or "private" (property owner owned and maintained)? The jurisdictional boundary must be clearly delineated.

( ) E-03 IRWD requires a terminal manhole (for 8-inch laterals and larger) or a terminal cleanout (for laterals smaller than 8-inch) at the property line or jurisdictional boundary of IRWD.

( ) E-04* Drop manholes are not allowed. Is this requirement complied with?

( ) E-05* Reverse horizontal curves are not allowed. Is this requirement complied with?

( ) E-06* Vertical concave or convex curves are not allowed. Is this requirement complied with?

( ) E-07* Slopes in excess of 45 degrees to the horizontal are not allowed. Is this requirement complied with?

( ) E-08* Trees and buildings are not allowed over sewer easements. Is this requirement complied with?

( ) E-09* Except in special cases, block walls are not allowed over sewer easements. Is this requirement complied with?

( ) E-10* Are crossing (invert) elevations given when a sanitary sewer line crosses another pipeline?

( ) E-11 Are section views of all pipelines crossing sewer mains shown in the profile view of the sewer main?

( ) E-12 Do sanitary sewer mains and laterals conform to IRWD Standards (with respect to the following)?

- ( ) a.) Correct size (Mains: 8", 10"; and Laterals: 4", 6").
- ( ) b.) Correct material (VCP< Polyethylene-lined DIP, or SDR-35 PVC).
- ( ) c.) Acceptable radius of curvature of pipeline layout (for main lines, allowable curvature dependent upon pipe size and material; service laterals must be straight).
- ( ) d.) Minimum amount of overhead cover (Public Facilities: 7 feet; Private Facilities: 6 feet under sidewalk, with 2 percent pipe slope up to property line or terminal cleanout).
- ( ) e.) Horizontal clearance with other utilities (Minimum 10 feet from domestic water, recycled water, storm drain, and hydrocarbon. Otherwise, protective encasement or higher grade pipe material required).
- ( ) f.) Vertical clearance with other utilities (minimum 1 foot without joints, with sewer lines being below all other pipelines).
- ( ) g.) Distance off street centerline (6 feet where possible, preferably at or near center of driving lane).

( ) E-13* Are sewer station numbers XX+XX.XX, independent of street station numbers, given for all appurtenances (e.g., manholes, laterals, etc.) along the path of the sewer line?

( ) E-14* Are easements for sewer facilities properly sized? Sewer easements to IRWD must be a minimum of 15 feet wide. Actual width should be twice the average pipe depth, rounded upward to the nearest 5 feet.

( ) E-15 Does each building have at least one (1) separate lateral coming off the main line?

( ) E-16* Sewer laterals cannot run across an adjacent property line (except under certain hardship cases, such as "landlocked" properties). Is this requirement met?

( ) E-17 Sewer laterals cannot come off of other sewer laterals. Is this requirement met?

( ) E-18 On single family residences, sewer laterals must be either stationed or dimensioned from the property line. Is this requirement met?

( ) E-19* On single family residences, sewer laterals and water service laterals should be at least 10 feet apart.

( ) E-20 A sampling manhole is required when a common sewer lateral has branches going to more than one building. A manhole is required at each junction point, along with an IRWD strip easement around the common lateral and manhole(s). Is this requirement met?

( ) E-21 If a sewer lateral serves one building only, is a cleanout (rather than a manhole) installed at the property line, or at the end of IRWD's sewer easement?

( ) E-22 Are all existing IRWD sewer facilities completely and correctly depicted?

( ) E-23 Are all existing and proposed points of connection to existing sewer facilities correctly depicted?

( ) E-24 Are all proposed sewer facilities in conformance with all applicable IRWD Master Plans?

( ) E-25* Are IRWD's conditions of approval on the subdivision map and "will-serve" letter satisfied?

E-26 Are elevation differentials across manholes correct?

( ) a.) 0.10 foot minimum for straight runs.
( ) b.) 0.20 foot minimum for right angle turns.

( ) E-27* Residential sewer laterals must have backflow prevention devices if the nearest upstream manhole rim elevation is higher than the pad elevation. Is this requirement complied with?

E-28 Additional requirements satisfied (as follows)?

( ) a.)_____
( ) b.)_____
( ) c.)_____
( ) d.)_____
( ) e.)_____
( ) f.)_____

PART F: REQUIREMENTS FOR SUBDIVISION (TRACT/PARCEL) MAPS

( ) F-01* Are streets appropriately labeled as "PUBLIC" or "PRIVATE"?

( ) F-02* Does the map have standard IRWD conveyance/acceptance and notary certificates?

( ) F-03* Does the map have the proper acknowledgements?

( ) F-04* Are IRWD easements shown properly sized?

( ) F-05* Do IRWD easements agree with those depicted on the improvement plans?

( ) F-06* Has a copy of the title report been submitted to IRWD?

( ) F-07* Have other legal descriptions of easements (recorded after subdivision map) been submitted for review?

( ) F-08* Have Tentative Map Conditions of Approval been submitted to IRWD for review?

( ) F-09* Have blue line copies, record (contact) mylar copy and digital diskette of the final recorded Tract/Parcel Map been submitted to IRWD?

F-10 Additional requirements satisfied (as follows)?

( ) a.)_____

( ) b.)_____

( ) c.)_____

( ) d.)_____

( ) e.)_____

( ) f.)_____

IRVINE RANCH WATER DISTRICT 15600 Sand Canyon Ave., P.O. Box 57000, Irvine, CA 92619-7000 (949) 453-5300

Figure 13

WITHHELD LOT CONSENT FORM

DEVELOPER'S NAME agrees that the occupancy release for one lot within Tract _____ can be withheld until all the punch list corrections for the water, sewer and recycled water improvements for Tract _____ have been completed. The actual lot, or unit, to be withheld will be agreed upon by the developer and IRWD Inspector. The withheld lot will be identified in the IRWD file and on the sales map so that it should not be sold or put in escrow until the punch list corrections have been made.

Should this lot somehow be sold and require occupancy before the punch list corrections have been completed, then the developer agrees to sign a letter which will authorize IRWD to file a claim against the Developer's Performance Bond for the project, if the punch list corrections have not been completed within thirty (30) days from the date of the occupancy release.

BY: (*Signature*)_____ DATE:
PRINT NAME & TITLE

FOR: (*Developers Name*)_____

TRACT NO._____ LOT NO._____

Figure 14

Developers Letterhead

TR _____

Ms. Janet Irey
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618-3102

Subject: Withheld Lot Release

Dear Ms. Irey:

In the development of TR _____, located in the _____ area, we find that the lot we agreed would not be sold until all the punch list corrections for the water and sewer improvements had been completed, has been sold and is scheduled to close escrow on ____ _____. This date is prior to the time all the remedial work will be complete and we request that an occupancy release be issued.

_____ agrees that IRWD may file a claim against the performance bond for TR _ _____ in the amount needed to correct the uncorrected punch list items at the end of thirty (30) days from the date of this letter. It is our intent to correct all the items, but should we be unable to complete the work, IRWD may deem it necessary to do the work and file a claim against the performance bond to pay for the work.

Should you have any questions, please feel free to call me at (____)_____-_____.

Yours truly,

cc: Your bonding company

SECTION 3

DESIGN CRITERIA, DOMESTIC WATER FACILITIES

The following sections are design criteria to be used in the design of domestic water systems. The developer and his engineer shall be responsible to ensure that designs submitted are consistent with the IRWD Rules and Regulations, Section 2 of this manual, and generally accepted standards of good engineering practice.

3.1 Main Line Sizes

The typical minimum size distribution main pipes shall be 8-inch AWWA C-900 PVC, SDR-14, Class 200, unless otherwise noted and approved. On short cul-de-sac dead-end mains 4-inch (with a maximum of ten (10) each, 1-inch services) or 6-inch (with more than ten (10) each, 1-inch service lines) lines may be allowed, however, 8-inch size main must be used to the last fire hydrant.

Developer facilities will be water mains 10-inch diameter and smaller, capital facilities will be water mains 12-inch diameter and larger as defined by the District's Master Plan or SAMP and will be designed and constructed by the District.

Developer facilities will be designed by the developer and transferred to the District upon satisfactory completion of final inspection by means of a "Bill of Sale", Figures 5 and 8 in Chapter 2.

3.2 Design Flows

All design flows shall be based on the demands indicated in the applicable local "Sub-Area Master Plan" (SAMP) and the Water Resources Master Plan. Where design flows are not covered by a current SAMP, consult with IRWD's Planning & Water Resources Department staff to review and calculate the developer's estimated water demands for the proposed development.

3.3 Depth of Cover

Distribution mains, 10-inch and smaller, shall have a minimum of 42 inches of cover between the top of the pipe and the finished street grade unless shown differently on the improvement plans or otherwise directed by the District Inspector due to unusual field conditions. Transmission mains, 12-inch and larger, shall have a minimum of 48 inches of cover between the top of the pipe and the finished street surface unless shown differently on the improvement plans or otherwise directed by the District representative due to unusual field conditions. **Storm drain systems must be designed with sufficient cover so that the water mains and service laterals can be built over the top of the storm drain mainline and laterals.**

3.4 Standard Location

Domestic waterline centerlines shall be located six (6) feet from the face of the curb for all pipelines 12-inches in diameter and smaller; and shall be eight (8) feet from the face of the curb for pipelines 16-inches in diameter and larger. **Water lines will not be allowed within easements in residential lots. There must be a separate lettered lot, minimum width 15 feet, if a water line needs to go outside the public street right-of-way from cul-de-sac to cul-de-sac or from cul-de-sac to open space of tract common area.**

Where water pipelines are designed to cross perpendicular beneath retaining walls or other structures (specific written permission required for each instance), the pipeline shall be constructed in a steel pipe casing of sufficient size and thickness (per IRWD's Construction Manual) and with a minimum vertical clearance of at least one (1) foot from the footing or structure itself.

3.5 Valve Arrangements

There shall be two control valves at each tee intersection of two distribution mains. If the two distribution mains cross there shall be three (3) valves and, at major distribution points, there shall be four (4) valves.

On long blocks, intermediate valves shall be installed so that no more than twenty-eight (28) dwelling units, six hundred (600) feet of main, or two (2) fire hydrants will be out of service at any time. Additional looping of main lines may be necessary to satisfy this condition and the arrangement of valves within the distribution system will be reviewed to identify the optimum network layout.

A valve must be placed at each end of an easement where a water line passes through easements outside the traveled streets.

3.6 Separation Criteria for Water, Sewer, and Recycled Water

3.6.1 Horizontal Separation

State Health Department regulations require a 10-foot minimum horizontal separation between domestic water and recycled water or sewer lines. There are special construction methods which may be used where this separation cannot be achieved. Refer to the District Construction Manual and District Standard Drawings therein. Separation other than the Health Department minimums must be approved by the District Engineer.

3.6.2 Vertical Separation

Water, sewer, and recycled water lines are typically located vertically from the street surface down in order of decreasing quality. Water will be the shallowest and sewer mains will be the deepest. Refer to the District Construction Manual and District Standard Drawings therein.

3.7 Fire Flow Requirements

The design requirements for fire flow will be determined by the Orange County Fire Authority (OCFA) or the appropriate local fire jurisdiction for the specific area under development. Any plan submitted for second plan check must have been reviewed and approved by the OCFA or the local fire jurisdiction. The signature of the OCFA Marshal or local fire department representative on the plans shall constitute the only form of accepted approval of the fire protection system provided.

3.8 Water Service Materials and Sizes

Approved materials and manufacturers for various service materials and connections are listed in the Standard Specifications sections contained in the District Construction Manual. The minimum domestic service size shall be 1-inch and made of copper tubing. Service sizes will be shown on the plan. Service sizes available are 2" (which shall be copper), 4", 6", 8" and 10"; no other sizes will be allowed.

3.9 Water Meters

All water meters will be furnished by the District subsequent to payment of all applicable fees and posting of all required bonds.

Temporary water meters (up to 3-inch in diameter) shall be applied for through the IRWD Customer Services Department. Larger (4-inch and greater) diameter temporary services shall be requested through the Development Services Section of the Engineering & Construction Department with a proper engineering plan set.

Refer to the District's "Procedure For Temporary Construction Meters".

3.10 IRWD Standard Domestic Water Notes

The following Standard Water Notes shall be included on all improvement plans for the installation of domestic water systems:

A. All water system work shall conform to the District's "Procedural Guidelines and General Design Requirements" and "Construction Manual", as last revised.

B. A pre-construction conference of representatives from affected utilities, agencies and the contractor shall be held on the job site (or a location approved by the District) at least forty-eight (48) hours prior to the start of work.

C. The District Engineering Office shall be called for inspection forty-eight (48) hours before start of work at (949) 453-5615 or (949) 453-5300.

D. The proposed water system is to be staked at a minimum 50-foot stationing if there are no existing curbs.

E. Water meters shall not be located within a driveway or sidewalk. All water service laterals shall be constructed perpendicular to the water main without bends or angles from the connection point on the main.

F. All main line valves shall be maintained so as to be accessible during tract development and construction. All valve stem tops having over 60-inches of cover require an extension meeting District standards.

G. In residential streets, the top of the pipe, 10-inches and smaller, shall be a minimum of 42-inches below the finished street surface and 48-inches below finished street surface for all pipe 12-inches in diameter and larger.

H. All fire hydrants shall be set with the bottom flange 4-inches above the concrete pad or sidewalk using one scored-spool as indicated in the Construction Manual and shall be located a minimum of 3 feet from the ECR or BCR at intersection.

I. All water mains 4-inches through 12-inches shall be SDR-14 or thicker and shall not be rated less than pressure class 200, AWWA C-900 PVC, unless otherwise approved by the District.

J. No “hot-taps” or other tie-in connections shall be made to existing District water mains prior to conducting and passing an approved pressure test and a bacteriological test on the new water distribution system.

K. Tapping sleeves, where called for on the plans, shall be pressure tested in an approved manner in the field, in the presence of the District representative, prior to tapping the main line. Tapping of the main line shall not proceed unless a District representative is present. Size on size taps of water mains are not allowed.

L. Where meters and meter boxes are located within slopes, the angle meter stops shall be located such that the meters and boxes are parallel and flush, with the finished surface. Wherever the surrounding grade exceeds eight (8%) percent, or in the opinion of the District representative, the adjacent slope is too great, a small retaining wall, clear of the meter box, shall be constructed to the satisfaction of the District representative.

M. Curb faces shall be inscribed with the letter “W” indicating locations of all domestic water services. Letter inscription shall be made using a 4-inch power tool wheel grinder.

N. Individual pressure regulators are required by the Uniform Plumbing Code if average static pressure in the main is 80 psi or more.

O. Curbs shall be inscribed with tie downs for all valve locations. Letter inscriptions shall be made using a 4-inch power tool wheel grinder.

P. The contractor shall expose all points of connection to the existing domestic water system for verification of horizontal and vertical location before construction.

Q. Final Inspection for waterlines must include water samples that will be tested for the presence of bacteria, conductivity, turbidity and odor. The turbidity must be less than 2.5 NTU and the odor must be less that 1.0 TON, not to include chlorine odor, to be acceptable. Two (2) consecutive "passing" samples are required for acceptance.

R. The contractor working on IRWD waterlines must have a C-34 license issued by the State Contractor's License Board or Class "A" General Contractors license (with special approval of the District, based upon actual water and sewer pipeline construction experience.)

S. Contractor shall obtain and show proof of a construction dewatering permit from the state of California, Regional Water Quality Control Board prior to the start of construction.

T. All butterfly valves 12-inches in diameter and larger shall be flanged and shall be bi-directionally tested with the operator installed in accordance with the District's requirements outlined in the Construction Manual.

3.11 Miscellaneous Standard Guidelines

A. Separate quantity estimates are to be included on the plans to indicate quantity of pipe, number of hydrants, valves, fittings, services, meter boxes, etc.

B. The plans shall show, in plan and profile views, the position of all other known existing underground utilities as well as proposed underground utilities. Vertical clearance at crossings shall be indicated by showing top of pipe and bottom of pipe elevations at the point of intersection.

C. Temporary flush-out assemblies shall be installed at the end of all mains and large service stub-outs for testing and flushing purposes.

D. Air and vacuum relief valves shall be installed at all high points of water mains in accordance with the District Construction Manual.

E. Water sample stations shall be provided for each contiguous water service area. Where there are separate pressure zones, a separate water sample station shall be provided for each zone in a location approved by the District.

F. Water mains to be constructed in landscape slopes and within easements shall be constructed with C-900 or C-905 class 200 PVC pipe. Slope anchors may be required in accordance with the District Construction Manual dependent upon the grades and local soil conditions. Thrust blocks will also be required at the angle points at both top and bottom of the slope.

SECTION 4

DESIGN CRITERIA SEWER FACILITIES

4.1 Size

The minimum size sewer mains shall be 8-inches in diameter.

Developer-sized and contributed facilities shall be sewer mains 10-inches in diameter and smaller, capital facilities shall be sewer mains 12-inches in diameter and larger as defined by the District's Master Plan or SAMP and shall be designed and constructed by the District.

Developer facilities will be designed and constructed by the developer and transferred or conveyed to the District upon satisfactory completion of final inspection by means of a "Bill of Sale". Refer to Figures 6 and 9 in Chapter 2.

4.2 Minimum and Maximum Slope

All sewers shall be designed and constructed to provide a mean velocity of not less than two (2) feet per second (fps) when flowing half-full at the estimated peak flow. Peak flows shall be calculated using Manning's formula with an "n" value of 0.013.

The maximum allowable slope shall be the slope which generates a maximum flow velocity of eight 8 fps at the peak flow rate. Peaking factors are shown on Figure 1 at the end of this section.

The maximum slope for sewer laterals is forty (40%) percent. The desirable maximum is ten (10%). The maximum slope for sewer main lines is twenty (20%) percent. The desirable maximum is ten (10%).

Minimum slopes by pipe size are per the following table:

Sewer Size (inches)	Minimum Slope s =
8	0.00400
10	0.00280
12	0.00220
15	0.00150
18	0.00120
21	0.00100
24	0.00080
27	0.00067
30	0.00058

These are absolute minimum slopes. Sewers should be designed to provide steeper slopes whenever possible up to the stated maximum slope.

Under special conditions, the engineer may request slopes of less than the minimums stated. The engineer must submit this request along with back-up data and calculations to show that the depth of flow at design average flow will be 0.3 of the pipe diameter or greater. The engineer must also submit computations to show the depths of flow at minimum and average rates of flow. The request shall also detail the reasons why the normal minimum slopes cannot be achieved. The request and supporting data will be reviewed by the District and the decision will be conveyed to the applicant.

4.3 Flow Design Criteria

The flow generation rates for residential sewer mains should be determined from the information in the SAMP (sub-area master plan) for the particular area being developed. In the absence of a SAMP, the developer's engineer should refer to the Water Resources Master Plan and consult with the IRWD Planning & Water Resources Department to determine appropriate flow generation rates for the development in question.

Similarly, commercial/industrial flow generation design criteria should be consistent with the SAMP for the particular area being developed. In the absence of a SAMP, the developer's engineer shall calculate appropriate generation rates for the specific development.

The design peak sewer flow rates for pipes shall be limited by the following ratios of depth of flow (d) to pipe diameter (D):

Limits of d/D for sewer pipes	≤ 12-inches	= 15-inches	≥ 18-inches
d/D	0.50	0.67	0.75

4.4 Standard Location and Alignment

In local, residential, industrial, major, and primary streets, and secondary highways, sewer mains are to be located at the centerline of the street. Where there is a center median, the sewer mains shall be located in the center of the driving lane nearest to the center of the street. Sewers shall not be located in landscaped median strips or parking lanes.

On curved streets, sewer mains shall be designed generally parallel with the centerline of the street by use of straight chord segments of sewer between manholes. Where curve radii for horizontal curves are so short that the resulting sewer manhole spacing is less than 300 feet, curved sewers will be considered by the District. Consult with the District's Engineering Department representative for acceptable alignments for curved sewers and a concurrent review of the other underground utility locations which might be affected by straight sewer segments on the proposed curved roadway.

A maximum horizontal separation between sewer and domestic water mains shall be achieved to meet the minimum separation requirements reflected in the District's Standard Drawings. See also Section 4.11 herein below.

Sewer mains that are constructed in a common trench with another utility will not be accepted by the District. Adequate horizontal and vertical spacing shall be maintained in accordance with District Standards.

Sewer lines in tracts will not be allowed within easements in residential lots. A separate lettered lot, minimum 20 feet wide, must be created for these situations. Lots may need to be wider than the minimum 20 feet where the sewer main is designed deeper than 10 feet.

4.4.1 Horizontal Curve Design Criteria

Where curved sewers are allowed, the following minimum radii will be used in the design of horizontal curves:

Vitrified Clay Pipe (VCP)

For Pipes Sized 6 thru 12 inches in Diameter					
Length of Pipe Joint (feet)	6'	5'	4'	3'	2'
Minimum Radius (feet)	175'	150'	125'	85'	57'

Polyvinyl Chloride Pipe (PVC)

Pipe Diameter (inches)	6"	8"	10"	12"
Minimum Radius (feet)	210'	280'	350'	420'

4.5 Stationing

Centerline stations for sewer mains shall be shown and will be independent of street stationing. All manholes are to be numbered and the numbers noted on the plans (example: MH No. 1). Sewer stations starts 00+00.00 at the downstream point of connection and increases upstream to the last manhole on a sewer line. Intersecting sewer lines shall be independently stationed from their downstream point of connection and increase upstream to the last manhole or terminal clean-out. Each line shall be independently labeled for identification as "Sewer Line A", "Sewer Line B", etc.

4.6 Minimum Depth

Minimum depth of cover from finish street grade to the top of sewer main pipe shall be seven (7) feet unless otherwise approved by the District.

Four inch (4") and six inch (6") diameter sewer laterals shall be installed so that there is a minimum of six (6) feet of cover as measured from the grade at the top of the curb to the top of the pipe where it crosses the curb line. At the time of construction, stakes shall be provided for location and grade of each sewer lateral.

4.7 Sewer Pipe Material

Under typical conditions for loading and cover, gravity sewers shall be either SDR-35 PVC or extra strength VCP as detailed in the IRWD Standard Specifications. Where conditions are such that the depth of cover over the sewer main will exceed 20 feet, the sewer main material shall be AWWA C-900 or C-905 PVC pipe (SDR 14) class 200 or thicker.

Sewer pipe material shall remain constant (continuous) between manholes. (Meaning that transitioning between pipe material types, such as VCP and PVC or other material changes, size changes, or pipe class changes, such as SDR-35 PVC and SDR-14 C-905, may only be done at manholes.)

All sewer force mains shall be PVC pipe meeting AWWA C-900 or C-905 and (SDR 14) class 200 pipe standards. Force main pipe shall have restrained joints wherever there are changes in grade (vertical direction) or alignment (horizontal direction) of more than five degrees (5°) and for the necessary length to prevent joint-movement or separation up and downstream of those deflections.

All sewer service laterals shall be either SDR-35 PVC or extra strength VCP pipe. The material used for construction of the sewer laterals shall match the materials of construction for the adjacent sewer main (to which they are connected).

A listing of the allowable types of sewer pipe material as per the current version of the District's Construction Manual follows:

SEWER PIPE TYPES BY SIZE RANGE

DIAMETER	GRAVITY SEWER
4-inch through 10-inch	Extra-Strength VCP PVC SDR-35 (Class 200 C-900 SDR-14*)
12-inch through 20-inch	Extra-Strength VCP PVC SDR-35 Class 200 C-900 & C-905 PVC, SDR-14
24-inch through 42 inch	Extra-Strength VCP Class 200 C-905 PVC SDR-18 (thru 36" dia.) CCFRPM Pipe (Hobas®) Polymer Concrete Pipe (Meyer®) Fiber-Reinforced Plastic
42-inch and larger	CCFRPM Pipe (Hobas®) Polymer Concrete Pipe (Meyer®) Fiber-Reinforced Plastic

Notes: *Class 200 C-900 or C-905 PVC pipe in special circumstances per Section 15064.
PVC SDR-35 - PVC gravity sewer pipe per Section 02715.
VCP - Vitrified clay pipe per Section 02710.
Polymer Concrete Pipe per ASTM D-6783-02 and Meyer & Amitech USA LTD. recommendations for installation.
Centrifugally Cast Fiberglass Reinforced Polymer Mortar (CCFRPM) Pipe per ASTM
D-3262 & D-4161 and Hobas Pipe USA, Inc. "Guide Specifications" and recommendations for installation.
Fiber Reinforced Plastic per Section 02715.

4.8 Manholes

4.8.1 Manhole Location Requirements

A manhole will be required at all:

A. Changes of direction or alignment; and,

B. Changes in grade or slope; and,

C. Ends of each sewer main; and,

D. Intersections of two (2) or more sewer mains; and,

E. Intersections of sewer laterals larger than six inches (6") in diameter; and,

F. Ends of sewer laterals, at the property (or easement) line where the lateral is eight inches (8") or larger.

G. Increments of sewer main distance where the adjacent manhole is 300 feet away for 8-inch sewer mains; or 400 feet away for 10-inch through 15-inch diameter sewers; or 500 feet away for 18-inch or larger diameter sewers.

4.8.2 Manhole Size & Type Requirements

Manholes shall be precast reinforced concrete with eccentric cone in accordance with the applicable District Standard Specifications and Standard Drawings.

Minimum manhole diameter shall be 48-inches. Larger diameter manholes are required as shown in the following tables:

MANHOLE DIAMETER SIZES (based on sewer sizes)

Sewer Diameter of Main (inches)	Maximum Branch Size (inches)	Manhole Shaft Diameter Minimum (inches)	Frame & cover Diameter (inches)
8" to 15"	10"	48"	30"
16" to 24"	12"	60"	30"
>24" to 36"	15"	72"	36"
>36"	21"	84"	36"

These are minimum manhole diameters based on the diameter of the main sewer passing through the manhole. Where branch sewer diameters are larger than the maximum listed in the table above, the diameter shall be increased to the next larger practicable size. There are additional requirements for larger diameter manholes where the sewer main is at greater depths.

The diameter requirements for manholes for various depths (measured from the top of pipe to the finished-surface) are as shown in the following table:

MANHOLE DIAMETER REQUIREMENTS
(based on sewer depth)

Depth of Cover Range (feet)	Manhole Shaft Diameter Minimum (inches)
0’ to15’	48”
>15’ to 22’	60”
>22’	72”

Manhole diameters based on depth shall be increased in size according to the previous table where the sewers passing through the manhole or the branch sewers are larger in diameter.

Manholes deeper than twenty (20’) feet shall have steel-reinforced concrete bases. Reinforcement shall be provided for the specific soils conditions at each deep manhole location. The reinforcement design shall be submitted to the District under the signature and stamp of a Licensed California Civil Engineer.

4.8.3 Manhole Frame & Covers

Manhole frame and covers shall be cast-iron in accordance with District Standard Specifications and Standard Drawings. The size shall be determined from the table in Section 4.8.2 herein above. Frame and covers shall be provided by the contractor as a “set”, such that they are matched for a snug and proper fit that will minimize movement and noise caused by traffic.

Temporary covers may be necessary in streets under construction. In these cases, the manhole shaft shall be left six (6) inches, minimum, below subgrade. A heavy metal plate, acceptable to the District’s Representative shall be provided to cover the manhole opening. Cleats shall be provided in at least four (4) points for the underside of the temporary cover to prevent the temporary cover from moving. These cleats shall extend a minimum of 3-inches from the cover plate and shall be welded to the plate.

Plywood shall be cut to the shape and size of the manhole base and placed on top of the base before the temporary cover is placed on the shaft. At the completion of final paving, each manhole shall be raised to final grade by the installation of grade rings, as necessary, and the installation of the permanent frame and cover assembly.

Whenever manholes are constructed in unpaved areas, they shall be set 0.2 feet above the adjacent finished-grade and shall have a concrete pad built around the manhole cover in accordance with the District Standard Drawings. Pads shall be larger than shown on the Standard drawing wherever the project improvement plans call for it.

4.8.4 Lined Manholes

The District has experienced substantial deterioration in our manholes at specific locations due to hydrogen sulfide gasses released from the sewage flow. In order to mitigate the problem on future sewers, the following criteria have been established to govern the requirement to line manholes:

A. If a segment of sewer has a slope of seven percent (7%) or greater, all the manholes on that segment shall be lined.

B. Wherever there is a change in slope, from steep to flat, of five percent (5%) or greater, the manhole at the grade change and the next manhole upstream shall be lined.

C. All manholes at the terminus of a force main shall be lined.

D. Refer to the District Standard Drawings and Standard Specifications for approved manhole liner materials.

4.9 Terminal Clean-outs & Clean-outs

Use of terminal clean-outs as shown in the District's Construction Manual shall be limited to the following instances unless approved otherwise by the District Engineer.

A. At the end of short sections of sewer main, less than 250-feet long, which will be extended in the **near** future.

B. At the end of all 6-inch commercial and industrial sewer lateral installations at the property line. All laterals which are 8-inch or larger shall have manholes (not terminal clean-outs) at the property line or easement boundary.

C. Special instances such as on a sewer lateral to a single family residential lot where the dwelling unit is set back more than 100-feet from the property line, where there is a large slope up to the building pad from the property line and a grade change in the lateral is necessary, or where the sewer lateral enters the rear of the lot from a public right-of-way.

D. On a lateral where the overflow level of the lowest wastewater fixture in the building is below the rim elevation of the uphill sewer manhole on the main line. In this situation the rim elevation of the clean-out installed at the property line shall be at

least 6-inches below the overflow elevation of the lowest waste water fixture on the lateral. A backflow prevention device is required on the lateral per Section 4.11 of the District Rules and Regulations.

4.10 Force Main Criteria

The size of sewer force mains shall be determined during the design phase of the project. Sizing shall be based on a comparative study of the construction cost and pumping costs and operational considerations for several alternative sizes. In no case shall a force main be less than 6-inches in diameter.

The capacity of the force main shall be the design peak flow from the pump station calculated from Manning's equation using n = 0.013. The nominal design velocity for a force main should be 3.0 fps, with minimum velocity of 2.0 fps, and a maximum of 6.0 fps.

The discharge shall be into a manhole with a smooth flow transition to a gravity sewer. The manhole shall be lined per the requirements of the District Standard Specifications.

4.11 Separation between Sewer and Water and Recycled Water Pipes

Horizontal and vertical separation between sewer mains and water and recycled water pipelines shall be provided in accordance with Section 3, Section 6 and the District Standard Drawings**.**

Similar consideration for pipeline separation shall also be given to other adjacent underground utility conduits with a goal of minimizing future impacts to the District's pipelines because of future construction or repair activity. The goal is to provide for a minimum of a 5 foot wall-to-wall pipe separation wherever practical.

4.12 Sewer Laterals

Sewer laterals ("lateral sewer") shall be constructed to the property line from the main sewer line. There shall be a separate lateral with clean-out for each individually owned building and each individually owned occupancy.

Sewer laterals shall have a minimum four inches (4") in diameter for single-family residential occupancy. Apartment, condominium and commercial developments shall have at least one (1) six-inch (6"), or one (1) eight-inch (8") lateral to serve each building in the development which contains more than one dwelling unit. Sewer laterals to any master-metered facility shall have a lateral which is a minimum six inches (6") in diameter. Guard and entry (shacks) or buildings shall be served by a separate sewer lateral with a minimum diameter of four inches (4").

The sewer laterals from the sewer main to the edge of the public right-of-way (at the property line) are public and are maintained by IRWD. Portions of the sewer lateral beyond the clean-out on private property to the building ("building sewer"), and inside the buildings are **private and are not maintained by IRWD. The private portions of sewer ("building sewer" and "building laterals")** are governed by the Uniform Plumbing Code and are under the jurisdiction of and enforced by the local building authority. Private portions of the sewer beyond the "lateral connection" clean-out **should be marked "private" on the improvement plans.**

4.13 Sewer Pump Stations (Lift Stations)

The District has established standard design guidelines for interim sewer pump (lift) stations where such lift stations are required to serve a development until a master planned sewer facility is constructed and operational. The District will make this plan available to the developer's engineer upon request. The engineer will revise the standard plan to meet the needs of the individual development.

The developer will be responsible to pay all the costs for design, construction, operation, eventual conversion to gravity sewer and demolition of the interim sewer pump station.

Design criteria for permanent master planned pump stations will be established by the District. Developers within the ID will pay all the costs to design and construct the permanent pump station.

4.14 Easements and right-of-way for Sewers

Sewers constructed outside of the public right-of-way shall be constructed within dedicated lettered lot tract parcels for residential developments. Sewers constructed outside the public right-of-way for commercial developments shall be constructed within dedicated utility easements granted to the District. Lettered lot and easements for sewers shall meet the following minimum criteria:

A. The minimum width for sewer lots/easements shall be fifteen (15') feet. Addition width shall be required for deeper sewers projecting the trench bottom depth at a 1:1 slope to the ground surface at the edge of the easement/lot boundary.

B. The shall be restrictions prohibiting trees within the easement. Low shrubbery and groundcover are accepted on a case-by-case basis. Depending upon maintenance and repair vehicle access capabilities of the District.

C. There shall be restrictions prohibiting buildings and structures from within the easement/lot.

D. Trees shall not be permitted anywhere within the sewer easement boundary. In some instances where paved sewer access is not required, a lawn or low ground-cover and small (well trimmed) shrubbery may be permitted, so long as it is consistent with the landscape plan approved by the District.

4.15 Standard Sewer Notes

The following notes must appear on the plans under Standard Sewer Notes.

A. The sewer system is to be installed by the developer. All sewer work shall conform to the District's "Procedural Guidelines and General Design Requirements" and "Construction Manual", as last revised.

B. The sewer contractor shall have a copy of the District's Construction Manual on the job.

C. The contractor shall obtain a City or County permit for work done on public right-of-way.

D. The District Engineering Office shall be called for inspection forty eight (48) hours before start of work at (949) 453-5615 or (949) 453-5300.

E. A pre-construction conference shall be held 48 hours before starting construction work.

F. The contractor shall expose all join points to the existing sewer system for verification of location and elevation before construction.

G. Stations shown as 0+00.00 are sewer stations and are independent of all other street and pipeline stations.

H. All laterals are to be staked by a surveyor before trenching and a complete set of cut sheets supplied to the District Representative.

I. All sewer manhole lids are to have "IRWD" cast thereon as shown in the District Standard Drawings.

J. The District will inspect and test the sewer collection system and lateral sewers to the lateral connection at property line clean-out, terminal clean-out or manhole. Privately owned sewer laterals, house laterals or building sewer laterals from the property line clean-out onto private property will be inspected and tested by the appropriate City or County building agency.

K. Infiltration and air testing of sewer lines shall be in accordance with the District's **"**Procedural Guidelines and General Design Requirements" and "Construction Manual", as last revised.

L. All sewer lines shall be cleaned via "Hydro-jet cleaner" or "Wayne Ball" in the presence of the District Representative before completion of all leakage tests.

M. Pipeline leakage tests shall be made in the presence of the District Representative, only after backfill has been completed, compaction tests on backfill have been made, and the backfill has been accepted by the District Representative and has received written certification from the geotechnical engineer.

N. All sewer main lines shall be inspected by the District and then shall be CCTV video inspected (by IRWD forces or an approved private contract company under the observation of the District Representative) using a high-resolution closed

circuit television system. A DVD video recording shall be made of the inspection and provided to the District Representative.

O. The contractor is to provide the District with an as-built set of construction plans.

P. Before final acceptance, the developer's engineer signing the plans shall furnish the District with a set of as-built mylars, a PDF scan of the red-line mark-up and an as-built CAD file of the sewer plan.

Q. Curbs shall be inscribed with an "S" indicating locations of all sewer laterals using a 4-inch power tool wheel-grinder.

R. Curbs shall be inscribed with tie downs for all manhole locations using a 4-inch power tool wheel-grinder.

S. The contractor working on IRWD sewer mains must have a C-34 license or a Class A Contractors license.

T. Manholes deeper than twenty (20') feet shall have steel-reinforced concrete bases. Reinforcement shall be provided for the specific soils conditions at each deep manhole location. The reinforcement design shall be submitted to the District under the signature and stamp of a Licensed California Civil Engineer.

Add the following notes to plans having <u>on-site</u> work which will be dedicated to the District:

U. Trench backfill, on all sewer and water to be dedicated to the District, shall be compacted to 90% relative density as determined by test method ASTM 1557. Tests will be required every two hundred (200') feet of trench and every two (2) feet of rise (backfill) or as determined by the District Representative. The developer shall submit written results of compaction testing to the District prior to acceptance. If the trench location is within dedicated street or future street right-of-way, compaction shall be as required by the local governmental agency having jurisdiction, but in no case, less than 90% relative compaction.

SECTION 5

DESIGN CRITERIA RECYCLED WATER FACILITIES

5.1 General

All potential uses of recycled water, including, but not limited to, uses for landscape irrigation systems, agricultural irrigation systems, industrial process systems, construction purposes, natural treatment system irrigation, recreational impoundment systems, cooling towers, flushing toilets and urinals, and trap primers in non-residential buildings, shall be reviewed by Irvine Ranch Water District (IRWD). If recycled water is to be used, the facilities shall be constructed in accordance with the procedures and requirements set forth below.

The IRWD recycled water program is supervised by the California Department of Public Health (CDPH) and the Orange County Health Care Agency (OCHCA). As set forth in the IRWD's "Rules and Regulations for Water, Sewer, and Recycled Water Service" (Rules and Regulations), IRWD shall determine whether a given service will be furnished with recycled water or potable water. The determination shall be in accordance with the standards of treatment and water quality requirements set forth in Title 22, Chapter 4 of the California Code of Regulations, with the intent of IRWD to work in conjunction with the health agencies to protect the public health, and with the availability and/or feasibility of making available recycled water facilities. All on-site facilities using recycled water will have an annual cross-connection test unless otherwise approved by the state and county health agencies on a case-by-case basis. Details of specific cross-connection tests can be found in subsequent portions of Section 5. All inspections and any cross-connection found are reportable to both state and county health agencies.

5.2 Design and Construction Criteria

The design criteria for recycled water facilities are separated into two categories. Off-site recycled water facilities typically consist of those recycled water facilities which are, or will be, owned, operated, and maintained by IRWD such as transmission or distribution mains in public rights of way and irrigation facilities for natural treatment systems. Typically these are facilities on the upstream side of the water meter. On-site recycled water facilities typically consist of facilities that will be owner, operated, and maintained by the customer, and are downstream of the water meter. IRWD typically constructs, operates, and maintains recycled water facilities, upstream of the water meter, which are 4-inch and larger.

5.3 Off-Site Recycled Water Facilities

5.3.1 Minimum Size

The typical minimum size distribution main shall be a 4-inch looped line. Smaller diameter mains may be individually approved by the District Engineer on dead-end mains or the possibility of future tie-ins with other mains. These mains shall be sized so that sufficient water is regularly drawn to prevent stagnation. Only 1-inch and 2-inch copper, and 4-inch Class 150 PVC are approved for service lines.

Developer facilities will be recycled water mains 4-inch diameter and smaller, capital facilities will be recycled water mains 6-inch diameter and larger as defined by IRWD's Master Plan or SAMP and will be designed and constructed by IRWD.

Developer facilities will be designed by the developer and transferred to IRWD upon satisfactory completion of final inspection. Capital facilities will be designed and constructed by IRWD in most cases.

Sizing of recycled water mains for irrigation of natural treatment systems will be determined by the developer and/or the District's consultant, but final approval by the District will be required. The developer shall be responsible for these facilities during the one-year establishment/monitoring phase, after which they will be turned over to the District. The developer shall also be responsible for applying for the recycled water meter for natural treatment system irrigation.

5.3.2 Approved pipe materials

C-900 PVC pipe, either Class 150 or 200, may be used for off-site water mains up to 10-inch in diameter. The pipe shall be purple in color and shall be marked in accordance with IRWD standards to warn anyone who sees it that there is recycled water in the pipe. AC or DIP may be used if properly marked with purple marking tape.

5.3.3 Minimum Cover Requirements

(A) The top of distribution mains, 4-inch and smaller, shall be a minimum of 42 inches below the finished street grade unless indicated otherwise on job plans or directed otherwise by the District Inspector because of unusual field conditions.

(B) The top of transmission mains, 6-inch and larger, shall be a minimum of 48 inches below the finished street grade unless indicated otherwise on job plans or directed otherwise by the District Inspector because of unusual field conditions.

5.3.4 Separation between Water, Sewer, and Recycled Water Lines

See Section 3.6 and IRWD Standard Drawing W-18.

5.3.5 Standard location

Off-site recycled water facilities shall typically be located either 4 feet or 8 feet from the curb face on the opposite side of the street from the potable water mains. Recycled water facilities for irrigation of natural treatment systems shall be installed in a location approved by the District and shall adhere to the separation requirements of Section 5.3.4.

5.3.6 Recycled Water Facilities for Natural Treatment Systems

All recycled water systems for irrigation of natural treatment systems shall conform to the requirements of Section 6 (Design of Natural Treatment Systems), in addition to the requirements of Section 5.3.

5.4 Standard Off-Site Recycled Water Notes

The following notes must appear on all plans for construction of off-site recycled water facilities and be identified as "Recycled Water Notes." In addition the Standard Water Notes shown in Section 3.10 of this Guide must appear on the plan as well

(1) All off-site recycled water systems shall be constructed in accordance with the requirements of the potable water systems.

(2) Recycled water pipe shall be purple PVC C-900 pipe, either class 150 or 200, marked as required by IRWD standards to identify it as recycled water. ACP or DIP may be used with the approval of IRWD but it must be marked with purple marking tape.

(3) All 1-inch and 2-inch copper services shall be wrapped continuously with purple marking tape from end to end.

5.5 On-Site Recycled Water Facilities

5.5.1 General

Design of all on-site facilities, including, but not limited to, those for landscape irrigation systems, agricultural irrigation systems, industrial process systems, cooling towers, construction purposes, toilet and urinal flushing in non-residential buildings, and recreational impoundment systems, shall conform to the provisions set forth herein and to any conditions, standards, and requirements set forth by IRWD in addition to these standard specifications.

5.5.2 Design of Recycled Water Facilities with Temporary Potable Water Service

Before design, the developer should obtain the following from IRWD:

A. Approval to use recycled water for the proposed system, as stated in the previous section.

B. Verification of locations and size of proposed points of connection (meter facilities).

C. Design pressures for the proposed facilities.

As set forth in the IRWD Rules and Regulations, where recycled water is not immediately available for use when the design area is ready for construction, and if IRWD has determined that recycled water will be supplied in the future, the on-site facilities shall be designated to use recycled water. The on-site system shall be designed and constructed to IRWD's construction specifications as set forth herein. Provisions shall be made as directed by IRWD 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 water connection. Until recycled water is available, potable water rates will be charges as set forth in the Schedule of Rates and Charges, Exhibit "B" to the IRWD Rules and Regulations. A

backflow prevention assembly, acceptable to OCHCA and IRWD, will be required as long as the on-site facilities area uses potable water. The backflow prevention assembly shall be downstream of the meter and a part of the on-site facilities. When recycled water becomes available, the backflow prevention assembly will be removed by the owner with coordination and approval of the IRWD On-Site Recycled Water Group, and the on-site facility reconnected to the meter. Contact the On-Site Recycled Water Group at 949-453-5300.

5.5.3 Backflow Prevention Assemblies and Signage

Backflow prevention assemblies will not be required on the on-site recycled water facilities using recycled water. However, in accordance with the section on water backflow prevention in the IRWD Rules and Regulations, "backflow protection assemblies may be required on the developer's, owner's, or customer's potable water service." All new common areas where recycled water is used and that are accessible to the general public shall be posted with conspicuous permanent signs that include the following wording in a size no less than 4 inches high by 8 inches wide: "RECYCLED WATER - DO NOT DRINK." Each sign shall also display an international symbol conveying the same warning.

5.5.4 Prohibitions and Limitations

Design of on-site 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 on-site recycled water facilities are prohibited.

(B) Hose bibs on recycled water facilities are prohibited.

(C) Drinking fountains shall be protected from the mist and spray of recycled water in a manner approved by the District Engineer, prior to installation.

(D) Overspray and runoff shall be limited or prevented.

(E) Potable and recycled water lines are not to be installed in the same trench.

(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 design area within the allowable time periods as set forth herein.

(H) On-site looped meters are prohibited.

(I) Designated outdoor eating areas shall be protected from overspray.

5.5.5 Control of Runoff and Application Areas

IRWD 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 runoff by containment of the water to the design area.

In accordance with the requirements of the IRWD Rules and Regulations for control of runoff and for control of the areas to which recycled water is applied, the design of irrigation systems shall conform to the following:

(A) The on-site recycled water facilities shall be designed to meet the peak moisture demand of all plant materials used within the design area. The use of moisture sensors is encouraged, but not mandatory.

(B) On-site recycled water facilities shall be designed to prevent discharge onto areas not under control of the customer. Part circle 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 on-site recycled water irrigation facilities shall provide for watering during the periods of minimal use of the service area. This is typically between the hours of 9 p.m. and 6 a.m., or as directed by the District Engineer. 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 9 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 IRWD upon request.

5.5.6 Minimum Depth to Top of On-Site Recycled Water Piping

For on-site recycled water piping, the minimum depth from finished grade to top of pipe (minimum cover) shall be as follows:

(A) Constant pressure lines 3 inches and larger: 24 inches

(B) Constant pressure lines 2-1/2 inches and smaller: 18 inches

(C) Intermittent pressure lines: 12 inches

Where piping is under paved areas, these dimensions shall be considered below subgrade.

5.5.7 Data Required on Plans

(A) Meter Data - The following information shall be supplied for each recycled water meter desired; information is to be provided and shown at each meter location:

a. The meter location and size (inches); meter address and civil station number.

b. The peak flow through the meter (gpm).

c. The (static) design pressure at the meter (psi).

d. The total area served through the irrigation meter (square feet or acres).

e. An estimate of the yearly water requirement through the meter (acre-feet).

(B) 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 a warning tape installed as provided in Section 5.10.8 herein and shall be so stated on the plans. Drinking fountains must be protected from the direct spray and mist of recycled water either by proper placement of the drinking fountain within the design area or the use of a covered fountain approved for this purpose.

(C) Irrigation Equipment Legend - For irrigation systems, a legend showing the pertinent data for the materials used in the system shall be recorded on the plans. The legend shall include a pipe schedule listing pipe sizes and materials of construction, a listing of valve types including quick-coupling valves, and the following information for each type of sprinkler head:

1. Manufacturer and model number.

2. Sprinkler radius (feet).

3. Operating pressure (psi).

4. Flow (gpm).

5. Sprinkler pattern.

(D) Site Use Information – All recycled water irrigation plans must have the following items shown, with responses provided in blanks indicated:

Regional Water Quality Control Board Required Information on Recycled Water Irrigation Plans

1. The average number of people at this use site on a daily basis.

_____

2. Boundaries to the proposed use site, footprint of any facilities on the premises, drinking water fountains, and any recycled water or potable water impoundment to be used.

_____

3. The person or persons responsible for the operation of the recycled water system at each use area.

4. The specific use to be made of the recycled water at each use area.

5. The methods to be used to ensure that the installation and operation of the recycled water system will not result in cross-connections between the recycled water and the potable water piping systems. Describe the pressure test done before the installation of the meter.

6. Pipe locations of both recycled water and potable water systems, or brief explanation for the exclusion of the system not shown.

5.6 Plan Check Procedure

The submittal of improvement plans for plan checking is to ensure that the proposed use of recycled water conforms to the approved uses as set forth herein.

5.6.1 Plan Check and Inspection

Completed construction drawings for all on-site and natural treatment system recycled water systems must be submitted to IRWD for plan checking and approval before construction. Ten working days should typically be allowed for plan check. Two blueprints of the plans, either 24-inch x 36-inch or 30-inch x 42-inch and two sets of the specifications (only the portion regarding the recycled water system) must be submitted. Submittals for recycled water for natural treatment systems shall include two sets of planting plans. If there are potable water systems within the design area, capture and add to the irrigation plans. If not, one set of blueprints and specifications of the potable water system facilities shall also be submitted. IRWD will review the plans and will return one set with any comments. After any comments have been incorporated into the plans and specifications, the originals of the plans should be submitted to IRWD for approval. IRWD will provide the signature block. After the originals have been approved, three (3) sets of blueprints and one compact disc (CD) shall be submitted to IRWD. The CD shall contain the approved plan set in a single PDF file with the pages arranged in correct order. The PDF file shall store and print out full sized signed documents to the actual drawing scale (size on size). The PDF file shall be submitted to IRWD as a Design set. The CD shall be labeled "Design Set" with plan check number and project name. Minor changes to the systems will be reviewed by the District Inspector (see Subsection 5.7 herein). If

major changes are made to the irrigation system, the owner, applicant, or customer shall provide a new CD showing the modifications to the system. The new CD shall be submitted to IRWD upon written request by the District Engineer.

IRWD shall be given the opportunity to inspect the construction of all on-site facilities and shall be notified two working days in advance of construction by the applicant, owner, or customer. The IRWD Engineering Office should be called at (949) 453-5300. In no case shall recycled lines be backfilled before inspection by the District Inspector.

If the on-site system or system for natural treatment system irrigation is installed prior to plan approval and/or inspection, all or any portion of the systems must be exposed and corrected as directed by the District Inspector in accordance with the standard specification. Failure to comply will result in termination of service as provided for in Section 14 of the IRWD Rules and Regulations.

Subsequent to plan approval, field conditions may dictate modifications to the on-site system either in material or in intended use. If directed by the District Inspector the owner, applicant, or customer shall perform all changes or modify the on-site system to bring the system or use into full compliance with these construction specifications and with the IRWD Rules and Regulations. If for any reason the system cannot be corrected or modified to the satisfaction of the District Inspector, the system will be subject to conversion to a potable water supply.

5.6.2 Coverage Test

The owner, applicant, or customer is responsible for controlling overspray and runoff on new systems or systems requesting conversion. To ensure that any overspray and runoff is in accordance with the IRWD Rules and Regulations, an inspection of the on-site system by IRWD is required. When the sprinkler system is completed and the planting installed, the owner or owner's representative shall contact IRWD's Engineering Department at (949) 453-5300 and arrange for a coverage test walk through. The owner or owner's representative must be in attendance and have persons capable of making system adjustments. If modifications to the system are required, other than minor adjustments, the owner will be notified in writing of the changes required. To avoid termination of service, the modifications must be made in a timely manner. All modifications to the system are the responsibility of the owner, applicant, or customer and said owner, applicant, or customer shall pay all costs associated with such modifications.

5.7 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 IRWD 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 will include, but are not necessarily limited to the following:

A. Point of connection.

B. Routing of sprinkler pressure lines.

C. Gate valves.

D. Sprinkler control valves.

E. Quick-coupling valves.

F. Routing of control wires.

G. Other related equipment as specified by the District Inspector 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. A set of record drawings shall be given to the on-site recycled water User Supervisor.

The applicant, owner, or customer shall provide a complete set of record drawings on CD in PDF format, as referenced in Section 5.6.1, to IRWD upon completion of construction. The CD shall be labeled as "Record Drawings" with plan check number and project name. Prior arrangements must be made with IRWD if water service is to be provided prior to record blue line submittal. Failure to provide record drawings will result in termination of service.

5.8 Conversion from a Potable Water to Recycled Water Supply

In general, as provided for in Section 5.4 of the IRWD Rules and Regulations, all irrigation facilities converting from a potable to a recycled water supply shall conform to IRWD's construction specifications as contained herein. IRWD will notify both state and county health agencies of the intent to convert and solicit their involvement throughout the process. The facilities to be converted shall be investigated in detail including review of any record drawings, preparation of required reports, and determinations by IRWD of measures necessary to bring the system into full compliance with these standard specifications. The applicant, owner, or customer shall pay all costs to convert the system.

5.9 Conversion of Recycled Water to a Potable Water Supply

As set forth in Section 14 of the IRWD Rules and Regulations, if due to any system failure, use violations, or reasons as determined by IRWD, it becomes necessary to convert from a recycled water supply to a potable water supply, it shall be the responsibility of the owner, applicant, or customer to pay all costs for such conversion, by way of, but not limited to, the following items:

A. After notifying state and county health agencies of IRWD's intention, isolate the recycled water supply, service shall be removed and plugged at the IRWD main or abandoned in a manner approved by the District Engineer. The onsite system will then be disinfected in accordance with the following procedures:

    1. Shock the system to be converted with 50 ppm of chlorine for 24 hours.

2. Measure the chlorine residual after 24 hours. If a residual greater than 25 ppm is maintained, then continue to the next step. If the residual is below 25 ppm, then re-chlorinate by returning to the previous step until the chlorine residual can be maintained above 25 ppm.

3. Flush the system with potable water and perform a standard bacteriological test. The final test results must be acceptable to IRWD before recharging the system.

B. Installation and immediate testing of approved backflow assemblies on any and all meter connections.

C. Removal of the special recycled water quick couplers and their replacement with approved quick coupler valves for potable water systems.

D. Notification to all personnel involved.

E. Removal of all warning labels.

F. Installation of all potable water lines and payment of all connection fees due, as provided for in the IRWD Rules and Regulations, Exhibit B.

5.10 Construction Specifications

5.10.1 Pipe Identification

All buried on-site piping in the recycled water system shall be purple-colored PVC pipe with stenciling identifying it as recycled water in accordance with the AWWA Guidelines for the Distribution of Non-potable Water. All recycled water main line piping under paved areas shall be installed in a Class 200 purple-colored PVC sleeve.

Standard PVC pipe completely wrapped with purple warning tape, as specified below, may be accepted as an alternative to stenciled purple-colored PVC pipe only on a project-by-project basis with prior written approval from the District Engineer. The color of the tape must be in accordance with the AWWA Guidelines for the Distribution of Non-potable Water.

A. Purple Pipe

Recycled water piping shall be purple-colored PVC. The pipe shall be identified as recycled water pipe by continuous marking. The markings shall include the following:

"CAUTION: RECYCLED WATER - DO NOT DRINK," nominal pipe size, PVC-1120, pressure rating in pounds per square inch at 73 degrees, and ASTM designations such as 1785, 2241, 2672, 3139. Printing shall be placed continuous on two sides of the pipe.

B. Warning Tape

The plastic warning tape shall be prepared with black printing on a purple field having the words, "CAUTION: RECYCLED WATER - DO NOT DRINK." The overall width shall be a minimum of 3 inches.

Warning (caution) tape shall be as manufactured by Thor Enterprises, Inc., P.O. Box 450, Sun Prairie, WI 53590 (1-800-USA-THOR or 1-602-837-7197) or approved equal.

Warning tapes shall be installed directly on the top of the pipe longitudinally and shall be centered. The warning tape shall be installed continuous 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 main line and control valves shall be installed with warning tape.

5.10.2 Quick-coupling Valves

A. Recycled Water

Quick-coupling valves used in recycled water systems shall conform to the following:

(1) Quick-coupling valves shall be constructed of brass with a purple rubber or vinyl cover, and shall have a 3/4 or 1-inch inlet.

(2) The cover shall have a warning with the following information:

(a) "RECYCLED WATER."

(b) "DO NOT DRINK" in English and Spanish.

(c) The international "Do Not Drink" symbol, such as a glass of water with a slash through it.

(3) The warning shall be permanently stamped or molded into the cover.

(4) Locking covers may be required.

(5) All recycled water quick-coupling valves shall be installed below grade in a round box designed for irrigation use.

B. Potable Water

(1) Quick-coupling valves used in potable water systems shall have a cover made of brass, metal, or yellow rubber or vinyl.

(2) Quick-coupling valves intended for recycled water use are not to be used on potable water systems.

5.10.3 Sprinklers

All on-site recycled water facilities shall have restricted public access so that the general public cannot draw water from the system. Facilities, such as wash down hydrants (typically found at tennis courts), blow-off hydrants, blowouts on strainers, and other such facilities, shall be restricted from public access. These facilities, both above and below grade, shall be housed in an approved lockable container and identified as for recycled water. A sign reading "CAUTION: RECYCLED WATER - DO NOT DRINK" shall be installed, and its size must be approved by the District Engineer. An alternative acceptable means of restricting public access is the use of valves that operate by means of a recessed key slot or by means of hexagonal heads (such as those typically found on fire hydrants). Other means of restricting public access may be approved by the District Engineer.

The above conditions may also apply to recycled water facilities for natural treatment system irrigation, as determined by the District.

5.10.4 Warning Labels

IRWD may require warning labels, as approved by the District Engineer, to be installed on designated facilities such as on controller panels, blow-off hydrants on 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.

5.10.5 Valve Boxes and Warning Tags

A. Boxes

(1) All gate valves, manual control valves, quick coupling valves, electrical control valves, pressure reducing valves, strainers for on-site recycled water systems shall be installed below grade in a valve box. All appurtenances shall be tagged as described below, B. Valve Tags

(2) Electrical and manual control valve boxes shall have a warning label permanently molded into or affixed onto the lid with rivets, bolts, etc. Warning labels shall be constructed of weatherproof material with the warning permanently stamped or molded into the label. The warning shall contain the following information:

(a) "RECYCLED WATER."

(b) "DO NOT DRINK" in English and Spanish.

(c) The international "Do Not Drink" symbol, such as a glass of water with a slash through it.

B. Valve Tags

All recycled water sprinkler control valves, strainers, pressure regulators, quick couplers, isolation valves shall be tagged with identification tags.

(1) Tags shall be weatherproof plastic, 3-inch x 4-inch, purple in color with the words "WARNING - RECYCLED WATER - DO NOT DRINK" imprinted on one side, and "AVISA - AGUA IMPURA - NO TOMAR" on the other side. Imprinting shall be permanent and black in color. Use tags as manufactured by T. Christy Enterprises or approved equal.

(2) One tag shall be attached to each appurtenance 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.

(d) Attach to the body of the relative appurtenance with a plastic tie-wrap.

5.10.6 Quick Couplers, Strainers, and Pressure Reducing Valves

A. Quick Couplers

Recycled water quick couplers must be purple and installed below grade in a valve box.

B. Strainers

Sprinkler irrigation systems shall have a Y or basket strainer located downstream of the meter. The strainer shall have a 30-mesh or finer screen. Strainers that have automatic backwash features will not normally be allowed unless it can be demonstrated to IRWD that the backwash water will not cause runoff and is disposed of in a manner approved by IRWD. The strainer drain valve shall operate with a recessed key slot.

C. Pressure-Reducing Valves

A pressure-reducing valve must be installed down-stream of the strainer for each system using recycled water, unless otherwise directed by IRWD.

D. Strainer and P.R.V. Boxes

All strainers and pressure-reducing valves shall be installed below grade in a rectangular box of sufficient size to easily allow repair or replacement of the unit(s).

E. Point of Connection (POC) Assembly

Install the POC assembly as follows, quick coupler immediately after the meter, strainer, pressure regulator, master valve (optional) and quick coupler. This POC assembly shall be installed below-grade and as near as possible to the meter or as directed by the On-Site Recycled Water Inspector.

5.10.7 Recycled Water Piping

A. General

All on-site recycled water piping shall be installed in accordance with the Uniform Plumbing Code and all other local governing codes, rules, and regulations. All piping shall be continuously and permanently marked with the manufacturer's name or trademark, nominal size, and schedule or class indicating the pressure rating. All on-site recycled water piping shall also be identified as conveying recycled water.

B. Minimal Requirements of Piping and Fittings

The minimum class or schedule of piping and fittings shall be as follows:

(1) Asbestos cement: Class 150, AWWA C3.

(2) Cast-iron fittings for ACP.: ANSI 21.10 and AWWA C110.

(3) Galvanized steel: Schedule 40, mild steel screwed pipe.

(4) Galvanized malleable iron fittings: ANSI B-16.3.1.

(5) Hard drawn copper Type K: ANSI H-26.1 and ASTM B 88.

(6) Wrought copper or bronze solder fittings: ANSI B.16.22.

(7) PVC constant pressure main line piping 2 inches and larger: Rubber-ring joint, PVC Class 200, or solvent weld joint, PVC Class 315.

(8) PVC constant pressure main line piping 1-1/2 inches and smaller: Solvent weld joint, PVC Schedule 40.

(9) PVC intermittent pressure lateral line piping: Solvent weld joint, PVC Class 200, Schedule 40.

(10) PVC fittings: PVC Schedule 40 solvent weld and factory manufactured, or Schedule 40 with rubber-ring joint.

(11) Tubing for drip irrigation systems: Manufactured from virgin polyethylene conforming to ASTM D 1248, Type II, Class C, or approved equals, such as Elastolene and Polybutylene.

(12) Electrical conduits for irrigation wiring: PVC Schedule 40.

(13) Above-ground irrigation pipe: Ultra-Violet Resistant (UVR) and clearly identified as recycled water pipe by continuous marking.

The markings shall include the following: CAUTION RECYCLED WATER – DO NOT DRINK.

C. PVC Piping

PVC plastic pipe fittings shall conform to the following:

(1) PVC plastic pipe and fittings shall be installed below grade.

(2) All PVC pipe shall be made from Grade I compound conforming to ASTM D 1784.

(3) All PVC Schedule 40 and Schedule 80 pipe shall be manufactured conforming to ASTM D 1785 and D 2466 and shall meet requirements set forth in Federal Specifications PS-21.

(4) All PVC Class 200, and Class 315 solvent weld and Ring-Tite pipe shall be manufactured conforming to ASTM D 2241 and meet requirements set forth in Federal Specification PS-22, with Standard Dimension Ration (SDR) for pressure rated pipe. Pipe shall be extruded from approved Class 12454-PVC with resin specifications conforming to ASTM D 1784 and rubber rings conforming to ASTM D 169.

(5) All pipe shall be homogeneous throughout, free from visible cracks, holes, or foreign materials. The pipe shall be free from blisters, dents, wrinkles or ripples, die, and heat marks.

(6) All PVC plastic pipe fittings shall be rigid PVC virgin Type I, minimum Schedule 40, with working pressure no lower than that of the pipe. Sockets shall be tapered to conform to the outside diameter of the pipe, as recommended by the pipe manufacturer. All Schedule 40 fittings shall conform to ASTM D 2466. Schedule 80 fittings shall conform to ASTM D 2464 and D 2467.

(7) All fittings shall be injection molded of an improved PVC fitting compound featuring high tensile strength, high chemical resistance, and high strength. The compound must meet the requirements described in ASTM D 1784 and D 2466, cell classification 13454B. Where threads are required for plastic fittings, they shall also be injected molded. All tees and ells shall be side gated.

(8) PVC solvent cement shall conform to ASTM D 2564.

5.10.8 Potable Water Piping

All PVC potable water piping installed within the same project limits as the on-site 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 have blue tape identifying it as a

potable water line and stating "CAUTION: WATER LINE BURIED BELOW." See Section 5.11, item G., for tape installation requirements.

5.11 Special On-Site Recycled Water Notes

The following special on-site recycled water notes are to be shown on all on-site recycled water system construction plans:

A. The installation of the irrigation water system shall conform to the regulations for the construction of irrigation water systems within IRWD and the accompanying plans and specifications.

B. All on-site recycled and potable water piping installed on this project shall be identified in accordance with the IRWD Rules and Regulations and the irrigation specifications.

C. Recycled water piping shall be purple PVC. Constant pressure main line piping 2" and larger: Rubber-ring joint, PVC Class 200; solvent weld joint: PVC Class 315. Constant pressure main line piping 1 ½" and smaller: PVC Schedule 40. Intermittent pressure lateral line piping: Solvent weld joint, PVC Class 200, Schedule 40.

D. Marking on the purple PVC pipe shall include the following:

"CAUTION: RECYCLED WATER - DO NOT DRINK," nominal pipe size, PVC-1120, pressure rating in pounds per square inch at 73 degrees, and ASTM designations such as 1785, 2241, 2672, 3139. Printing shall be placed continuously on two sides of the pipe.

E. All recycled water sprinkler control valves, isolation valves, quick couplers, and all appurtenances shall be tagged with identification tags.

(1) Tags shall be weatherproof plastic, 3-inch x 4-inch, purple in color with the words "WARNING - RECYCLED WATER - DO NOT DRINK" imprinted on one side, and "AVISO - AGUA IMPURA - NO TOMAR" on the other side. Imprinting shall be permanent and black in color. Use tags as manufactured by T. Christy Enterprises or approved equal.

(2) One tag shall be attached to each appurtenance 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.

(d) Attach to the body of the relative appurtenance with a plastic tie-wrap.

F. Warning tape shall be used on all constant pressure main line piping carrying potable water.

G. Warning tape shall be a minimum of 3 inches wide and shall run continuously for the entire length of all constant pressure main line piping. The tape shall be attached to the top of the pipe with plastic tape banded around the warning tape and the pipe every five feet on center.

H. Warning tape for the constant pressure potable water piping shall be blue in color with the words "CAUTION: BURIED WATER LINE BELOW" imprinted in minimum 1-inch high letters, black in color. Imprinting shall be continuous and permanent.

I. IRWD shall be notified two days prior to the start of irrigation construction at (949) 453-5300 and each workday thereafter until completion of project.

J. 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 5 feet on either side of the potable water piping. Provide a minimum vertical clearance of 6 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 - DO NOT DRINK."

K. The irrigation system must be designed to operate between the hours of 9:00 p.m. and 6:00 a.m. unless otherwise directed by the District Engineer.

L. All new common areas where recycled water is used and that are accessible to the general public shall be posted with permanent conspicuous signs that include the following wording in a sign no less than 4 inches high by 8 inches wide: “RECYCLED WATER – DO NOT DRINK”. Each sign shall also display an international symbol conveying the same warning.

M. Adjust spray heads to eliminate overspray onto areas not under the control of the customer, for example, pool decks, private patios, streets and sidewalks.

N. Contact the IRWD Engineering Department office two days prior to the irrigation system coverage test at (949) 453-5300 and arrange a walk through of the system.

O. Failure to comply with any or all of the above guidelines puts your system in violation of the IRWD Rules and Regulations, and will result in termination of service until the appropriate corrective steps have been taken.

P. Warning tape on recycled water constant pressure main line piping is only allowed on project-by-project approval from the District Engineer. If approved, it must follow these installation specifications.

(1) Warning tape shall be used on all constant pressure mains.

(2) Warning tape shall be a minimum of 3 inches wide and shall run continuously for the entire length of all constant pressure main line 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.

(3) Warning tape for the constant pressure recycled water piping shall be purple in color with the words "RECYCLED WATER - DO NOT DRINK" imprinted in minimum 1-inch high, black letters. Imprinting shall be continuous and permanent.

For single-family residences receiving recycled water, the following additional notes shall appear on the plans:

Q. All potable water piping outside of the structure shall be copper pipe, which shall have warning tape installed in accordance with items F, G and H above.

R. All recycled water piping shall be purple colored PVC pipe, which shall be marked in accordance with item D above.

S. An approved backflow prevention assembly conforming to the IRWD Rules and Regulations shall be installed on the downstream side of the potable water meter.

T. All quick couplers must be installed within 5 feet of the recycled water meter.

5.12 Guidelines for Recycled Water Use

The following guidelines have been established by IRWD in conjunction with OCHCA and Santa Ana Regional Water Quality Control Board. 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 9:00 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 runoff pooling and ponding.** The application rate shall not exceed the infiltration rate of the soil. Timers must be adjusted so as 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.** For example, pool decks, private patios, streets and sidewalks.

D. **Do not use quick couplers for wash down of hardscape.**

E. **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.

F. **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 that this information be disseminated on an almost daily basis. It is you, the landscape contractor, who is responsible for educating each and every one of your employees.

G. **Obtain prior approval for all proposed changes and modifications to any on-site facilities.** Such changes must be submitted to, and approved by, the IRWD Engineering office and designed in accordance with IRWD standards.

Failure to comply with any or all of the above guide-lines puts your system in violation of IRWD's Rules and Regulations, and will result in termination of service until the appropriate corrective steps have been taken.

IRWD feels that the benefits to be derived from the successful application of recycled water justify the operating requirements that have been established. If you have any questions, or if we can be of assistance, please do not hesitate to call our On-Site Recycled Water Group at (949) 453-5300.

5.13 Recycled Water for Construction Grading and Other Interim Use

The following are IRWD procedures and guidelines for the specific use of recycled water for construction grading, dust control, compaction and temporary reservoirs.

Recycled water is to be used **only for the above mentioned uses** and may not be used for any other purpose than stated above. There are **no exceptions**. If there is a need for water other than the above-approved uses, e.g., water to construction trailers, hand washes, hose bibs, and temporary sprinklers, one must obtain an approved potable water connection from IRWD.

(1) All construction connections shall be tagged with warning tags, as follows:

"WARNING - RECYCLED WATER - DO NOT DRINK"

"AVISO - AGUA IMPURA – NO TOMAR"

Use tags as manufactured by T. Christy Enterprises or approved equal. Tags shall be affixed to stationary tanks, water trucks, and all service points or any other inlet or outlet using recycled water.

(2) Water trucks, water tanks, or any other receptacle, including but not limited to pipe or hose used for storage or conveyance of recycled water, shall be dedicated solely to that use. Any use other than recycled water must be approved through IRWD and the health agencies.

(3) No fittings, hose or pipe, or any other appurtenance using recycled water shall connect to a potable water source.

(4) All PVC pipe extending from the point of connection shall be purple, and read: "CAUTION RECYCLED WATER." The PVC piping shall conform to all material specifications as set forth by IRWD.

(5) Any water truck, water tank, or other storage receptacle to be converted from recycled water to potable water shall be thoroughly cleaned and disinfected to the satisfaction of IRWD and the health agencies.

(6) Contact the IRWD On-Site Recycled Water Systems Office prior to connection at (949) 453-5300 and arrange for an inspection to ensure compliance with IRWD standards.

(7) Failure to comply with any or all of the above requirements places your construction site in violation of IRWD's Rules and Regulations, and will result in termination of service until the appropriate corrective steps have been taken.

5.14 Recycled Water for Full Yard Irrigation of Residential Lots

The following procedures are specific to design, approval, and use of recycled water for full yard irrigation of residential lots and are in addition to requirements for water use and recycled water facilities.

5.14.1 General

If recycled water is to be used for full yard irrigation of residential lots, the facilities shall be constructed in accordance with the procedures and requirements set forth below:

(1) The facilities constructed under this project are all new construction. No portion of this project constitutes the retrofitting of irrigation systems for recycled water use.

(2) Individual recycled water on-site facilities shall be designed, constructed and operated by the property owner or their agent. All of these facilities must be reviewed and approved by IRWD prior to installation. Any revisions to the individual recycled water systems shall be reviewed and approved prior to start of construction.

(3) Recycled water facilities are not available to the general public, but rather to a focused group of users who can be identified and communicated with effectively.

(4) Detailed plans and specifications for the irrigation systems of each single family dwelling with full yard irrigation system where recycled water is proposed for use, shall be reviewed and approved by IRWD and inspected during construction to assure compliance.

(5) From Section 5.11 of the IRWD "Procedural Guidelines for the Construction of Water, Sewer, and Recycled Water Facilities" (Procedural Guidelines), SPECIAL ON-SITE RECYCLED WATER NOTES must appear on the submitted and signed irrigation design drawings. The design and installation will reflect all requirements from those notes.

(6) No direct inter-connection between the potable water system and the recycled water system will be allowed.

(7) Hose bibs on recycled water facilities are forbidden.

(8) Recycled water will not be used for any other purpose except for irrigation.

(9) The public water system will be protected by an appropriate backflow prevention assembly at the potable water meter. An approved backflow assembly will be required on each residential potable water meter where recycled water will be used for full yard irrigation.

(10) All the piping system for the recycled water system will be constructed and maintained to be easily differentiated from the potable water piping system. The piping systems will be of different pipe materials.

(11) The recycled water system piping will be purple plastic pipe conforming to IRWD requirements and shall be clearly labeled.

(12) All exterior potable water lines shall be in copper and identified with blue warning tape as carrying potable water.

(13) Approved warning labels shall be installed on all recycled water controller panels located at single-family residences.

(14) Any outlets from the recycled water system shall not be accessible to the public and shall be clearly marked for worker protection.

(15) No piping system used for conveying recycled water shall be converted to potable water without prior written approval from CDPH, OCHCA, and IRWD.

(16) For each single family dwelling full yard irrigation system provided with recycled water, IRWD shall have a service agreement consisting of a water user management program setting forth operating procedures and responsibilities. Each single family dwelling full yard irrigation system shall have designated a User Supervisor, responsible for control of recycled water regulation requirements and cross-connections, who is typically the homeowner, but may be a member of a homeowner-retained landscape maintenance company. The name of the User Supervisor shall be provided upon request by IRWD to the state and county health agencies.

(17) After activation of recycled water service, an initial cross-connection test and inspection of both the entire potable water and full yard recycled water irrigation systems on the site will be conducted under the supervision of an AWWA- certified Cross-Connection Program Specialist employed by IRWD. The initial activation may be supervised by a health agency representative.

5.14.2 Construction Specifications

1. Pipe Identification

   All buried water user piping in the recycled water system shall be purple-colored PVC pipe with stenciling identifying it as recycled water in accordance with IRWD's Procedural Guidelines.

2. Purple Pipe

   Recycled water piping shall be purple-colored PVC. The pipe shall be identified as recycled water pipe by continuous marking. The markings shall include the following:

   "CAUTION: RECYCLED WATER - DO NOT DRINK," nominal pipe size, PVC-1120, pressure rating in pounds per square inch at 73 degrees, and

ASTM designations such as 1785, 2241, 2672, 3139. Printing shall be placed continuous on two sides of the pipe.

3. Warning Labels

Approved warning labels shall be installed on all recycled water controller panels located at single-family residences.

5.14.3 Initial Cross-connection Test For Individual Residential Lot Final Approval

Notify in written form, the state and county health agencies of the initial test date with intent that both agencies will attend. For the initial cross-connection test, recycled water will be used for the irrigation piping system. The procedures for the initial cross-connection test shall be as follows:

- Verify that the recycled water system is under pressure and operating normally. This is done by manually operating each valve and quick coupler attached to the recycled water system.
- Shut down the recycled water system at the meter service connection.
- Verify that the recycled water system does not have any pressure. This is done by opening a valve downstream of the recycled water connection to relieve pressure, closing the valve, then manually operating each valve and any quick couplers attached to the recycled water system.
- Verify that the potable water system to the lot is under pressure and operating normally. This step is done while the recycled water system is shut off at the meter. The test is accomplished by manually operating all fixtures being supplied by the potable water meter, both interior and exterior of the home.
- Shut down the potable water system at the backflow. Open the recycled system at the meter connection.
- Verify that the recycled water to the lot is under pressure and operating normally.
- Verify that the potable water system does not have any pressure. This is accomplished by opening a valve downstream of the potable water backflow to relieve pressure, closing the valve, then manually operating all fixtures on the interior and exterior of the house being supplied by the potable water meter.
- Open the potable water system at the backflow. The test is now complete.

5.14.4 Annual Cross-connection Test for Individual Residential Lots

Annual testing for cross-connections will be conducted on the recycled water system. IRWD shall notify the state and county health agencies of the outcome of the test(s). The annual cross-connection test shall in no case be less than 15 minutes and may be longer if site situations pose complications. The procedures for the annual cross-connection test shall be as follows:

1. Verify the water system is under pressure and operating normally. This is done by manually operating a valve or quick coupler attached to the recycled water system.

2. Leaving the valve or quick coupler open and running while shutting down the recycled water meter at the service connection. The recycled water system will be drained and remain inactive for 15 minutes.

3. At the end of the 15-minute shut down period, verify that the pressure in the recycled water system has completely dissipated through the open valve or quick coupler. A cross-connection is detected if the pressure has not completely dissipated, and the valve at the service connection is not leaking.

4. Open the recycled water service connection if a cross-connection was not detected.

5. The potable water shall remain pressured at all times during the annual recycled water shut down.

5.14.5 User Supervisor

IRWD shall be kept informed of the identity of the person responsible for the water piping systems on all premises covered by these regulations. At each premise a User Supervisor shall be designated. This User Supervisor shall be responsible for the installation and use of pipelines and equipment and for the prevention of cross-connections.

In the event of contamination or pollution of the potable water system due to a cross-connection on the premises, the local health officer and IRWD shall be promptly advised by the person responsible for the water system so that appropriate corrective measures may be taken.

(A) <u>User Supervisor Training Program</u>

If there is a non-resident owner, a local User Supervisor shall be appointed. For single-family residences that have a recycled water service connection, the owner shall be considered to be the User Supervisor unless otherwise indicated on the application for the service connection request. In the event that someone other than the owner is designated as the User Supervisor and this person is no longer associated with the property, the owner shall again be considered the User Supervisor until written notification is made to IRWD.

(B) <u>Water Service Termination</u>

When IRWD determines that water uses or conditions encountered by IRWD represent a clear and immediate hazard to IRWD's water supply that cannot be immediately abated, IRWD shall institute the procedure for discontinuing water use.

Conditions or water uses that create a basis for water service termination shall include, but are not limited to, the following:

1. Refusal to install a required backflow prevention assembly.

2. Refusal to test a backflow prevention assembly.

3. Refusal to repair a faulty backflow prevention assembly.

4. Refusal to replace a faulty backflow prevention assembly.

5. Direct or indirect connection between the potable water system and a sewer or recycled water system.

6. Unprotected direct or indirect connection between the potable water system and a system or equipment containing contaminants.

7. Unprotected direct or indirect connection between the potable water system and an on-site auxiliary water system.

8. A situation that presents an immediate health hazard to the potable water system, as determined by the health agency or IRWD.

9. At single-family residences where copper piping is not installed for the water service or purple PVC pipe not meeting IRWD Procedural Guidelines and General Design Requirements is not installed for the recycled water service.

10. IRWD will terminate service to a customer's premise after written notices have been sent specifying the corrective action needed and the time period in which it must be completed. If no action is taken within the allowed time period, water service may be terminated in accordance with Section 14 of the IRWD Rules and Regulations.

    IRWD will make reasonable effort to advise the water user of intent to terminate water service. Then, IRWD will terminate the water service and lock the service valve in the closed position. Water service will not be reinstated until correction of all violations has been approved by IRWD. Failure to correct the violations may result in permanent termination of water service in accordance with Section 14 of the IRWD Rules and Regulations.

ON-SITE FACILITIES

A. General

The operation and surveillance of on-site water distribution, sewer collection, and recycled water distribution facilities are the responsibility of the applicant, owner, or customer.

B. On-Site Recycled Water Facilities

Pursuant to Section 8.2 of the IRWD Rules and Regulations, the District Manager or authorized representatives of IRWD shall monitor and inspect the entire recycled water system, including on-site and off-site facilities, and for these purposes shall have the right to enter upon the customer's premises during reasonable hours.

The applicant, owner, or customer shall have the following responsibilities in relation to operation of on-site facilities:

1. To make sure that all operations personnel are informed and familiarized with the use of recycled water.

2. To furnish their operations personnel with maintenance instructions, controller charts, and record drawings to ensure proper operation in accordance with the on-site facilities design and these Rules and Regulations.

3. To notify IRWD of any and all updates or proposed changes, modifications, or additions to the on-site facilities, which changes shall require approval by IRWD and shall be designed and constructed according to the requirements, conditions, and standards set forth in IRWD's Rules and Regulations, including but not limited to Section 5.3 thereof. In accordance with the above referenced requirements, conditions, and standards, changes must be submitted to IRWD for plan check and approval prior to construction. The construction shall be inspected by IRWD, and revised record drawings shall be approved by IRWD. IRWD may, if it deems such to be in the best interest of IRWD, waive or modify any of the foregoing.

4. The recycled water facilities must be maintained in accordance with these Rules and Regulations including IRWD's Standard Specification. For example, but not by way of limitation, as stated in the design criteria section of the above referenced specifications:

    a. Cross-connections between potable water facilities and on-site recycled water facilities are forbidden.

    b. Hose bibs on recycled water facilities are forbidden.

    c. Drinking fountains and pools shall be protected from the spray of recycled water.

5. The operation and control of the on-site system shall prevent direct human consumption of recycled water and control and limit runoff. The applicant, owner, or customer shall be responsible for any and all subsequent uses of the recycled water. Operation and control measures to be utilized in this regard shall include, where appropriate, but not be limited to the following:

    a. On-site recycled water facilities shall be operated to prevent or minimize discharge onto areas not under control of the customer. Sprinklers shall be used adjacent to sidewalks, roadways, and property lines that confine the discharge from sprinklers to the design area.

    b. The operation of the on-site recycled water facilities shall be during the periods of minimal use of the service area. Consideration shall be given to allow a maximum dry-out time before the design area will be used.

    c. 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 and operation of the recycled water facilities shall be compatible with the lowest infiltration rate of the soil present.

    d. When the application rate exceeds the infiltration rate of the soil, automatic systems shall be utilized and programmed to prevent or minimize the ponding and

runoff of recycled water. The sprinkler shall not be allowed to operate for a time longer than the landscape's water requirement. If runoff occurs before the landscape's water requirements are met, the automatic controls shall be reprogrammed with additional watering cycles of shorter duration to meet the requirements. This method of operation is intended to control and limit runoff.

e. Report shall be made to IRWD of any and all failures in applicant, owner, or customer's system that cause an unauthorized discharge of recycled water.

6. Project shall comply with any and all applicable federal, state, and local statutes, ordinances, regulations, contracts, these Rules and Regulations, and all requirements prescribed by the District Manager and the Board. In the event of violation, all charges and penalties shall be applied and collected by IRWD.

RECYCLED WATER SYSTEMS

Authorized representatives of IRWD shall monitor and inspect the entire recycled water system including both on-site and off-site facilities. IRWD shall conduct monitoring programs, maintain a record as deemed necessary, and provide reports as requested by regulatory agencies. The District Manager or authorized representatives of IRWD, in carrying out these functions, shall have the right to enter the customer's premises during reasonable hours for the purpose of inspecting on-site recycled water facilities and areas of recycled water use and to ensure compliance with these Rules and Regulations. This shall include the provision that runoff shall be controlled and limited and the provision that cross-connections between potable water facilities and recycled water facilities do not exist.

For single-family residences receiving recycled water, the User Supervisor shall be responsible for providing access and cooperation to IRWD's representative so that IRWD's representative can perform an annual cross-connection inspection. This inspection shall include pressure testing of the recycled water system to verify that no cross-connections have been made. The permit holder will be responsible for correcting any work that violates IRWD regulations at their expense including any costs associated with repairing and testing the backflow assembly. In addition, if the permit holder changes, an AWWA-certified Cross-Connection Program Specialist from the Cross-Connection Control Group of IRWD will perform a cross-connection survey to verify that no cross-connections exist.

5.15 Interior Use of Recycled Water in Dual-Plumbed Buildings

This section is written to address the planning, design, construction, operation and maintenance procedures, and responsibilities relative to state approved applications in dual-plumbed water systems (potable water and recycled water) in buildings. The recycled water dual-plumbed systems provides water for cooling, toilet and urinal flushing, and floor drain trap priming. All other water demands in these buildings will be served from the potable water system.

This section is written in five parts to cover the five phases of development for a dual-plumbed building: planning, design, construction, start-up, and ongoing operation and maintenance.

This section addresses:

- The responsibilities and procedures of IRWD.

- The involvement of the state and county health agencies and the building authority.
- The responsibilities and procedures to be followed by building owners, developers, contractors, and building maintenance personnel.
- Rules and regulations for the use of recycled water.

It is the intent of this section to ensure the safe and effective use of recycled water, and thereby conserve California's precious water resources.

5.15.1 Planning Phase

The planning of dual-plumbed non-residential buildings is a combined effort of IRWD, the building department, state and county health agency representatives, local building developers, and engineers. The processing of a proposed non-residential building follows the steps listed below.

A. Conceptual Design Phase

During this phase of the project, the developer engages the services of their staff or outside consultant to determine the feasibility of constructing a building in the IRWD service area. An assessment of the available water, and sewer service is made, along with the establishment of the requirements for service. In addition, the associated costs of obtaining building department approval, permits, and development credits are determined.

Under IRWD Rules and Regulations, recycled water must be used for all approved uses if it is available, or in the determination of IRWD will be available in the near future. This requirement extends beyond landscape irrigation, to all other approved uses. Interior use of recycled water for flushing toilets and urinals, and priming floor drain trap primers, is an approved use.

B. Preliminary Design/EIR Phase

In conjunction with the preparation of preliminary design drawings for the project, the developer must secure sufficient development credits to build the building. In addition, a Conditional Use Permit (CUP) must be secured from the local regulatory agency. During the acquisition of the CUP, a Notice of Preparation (NOP) is prepared and distributed to all affected agencies, including IRWD. Upon the determination that the proposed building is in an area currently being served recycled water, scheduled for conversion to recycled water, or master planned for recycled water, IRWD will respond back to the NOP that for the project to be supplied with an adequate water and sewer system, the building must be dual-plumbed. This response is then incorporated into the Environmental Impact Report (EIR) as a required mitigation measure. For the building authority to approve the project, the developer must satisfy this mitigation measure with the installation of a dual-plumbed system.

C. Design Phase

All recycled water dual distribution systems are designed in accordance with the Uniform Plumbing Code and the provisions of joint IRWD and City of Irvine installation guidelines for non-potable water.

The plan processing sequence is detailed in Appendix A, Section B, which supports Section 5.15.

5.15.2 Design Phase

A. Recycled Water Use Specified

Recycled water supplied by IRWD, may be used to supply cooling, toilets, urinals, and to prime floor drain sewer traps in dual-plumbed buildings.

B. Approval to Use Recycled Water

Approval for the above uses shall be considered (as set forth in IRWD's Rules and Regulations) and determined by IRWD in consultation with the state and county health agencies.

C. Design Criteria: Off-Site Recycled Water

Design of all off-site recycled water facilities shall be as set forth in IRWD's Procedural Guidelines, except as modified for specific on-site projects requiring approved engineering reports.

D. Off-Site Plan Check and Approval

Off-site recycled water facility design plans shall be reviewed and approved in accordance with the procedures outlined in IRWD's Procedural Guidelines, as last revised.

E. Design Criteria: On-Site Recycled Water Facilities

Design of all on-site recycled water facilities shall conform to the Uniform Plumbing Code as adopted by the responsible building authority and the following prohibitions and limitations:

1. The recycled water system shall be separate and independent of any potable water system.

2. Cross-connections between any potable water system and the on-site recycled water system are strictly forbidden.

F. On-Site Plan Check and Approval

The on-site recycled water facility construction plans shall be reviewed and approved in accordance with the procedures outlined in IRWD's Procedural Guidelines and General Design Requirements.

G. Service Agreement with IRWD

During IRWD's review of water utility plans for any development, the developer shall enter into a standard water service agreement with IRWD as set forth in Section 2 of IRWD's "Procedural Guidelines."

5.15.3 Construction Phase

A. Pre-Construction Conference

Before plumbing construction begins, the developer's contractor shall arrange a pre-construction conference at which will be present the developer's contractor job superintendent, the plumbing contractor, and IRWD's On-Site Recycled Water Inspector. The purpose of this meeting will be to explain IRWD's inspection process, review IRWD's construction specifications, and discuss the construction schedule and any known circumstances that might affect job installation.

B. Inspection

1. The on-site recycled water and potable water systems shall be subject to inspection by IRWD and shall be left open and uncovered until approved by IRWD's On-Site Recycled Water Inspector, who should be contacted at IRWD's offices.

2. If any part of an on-site water system is to be installed and concealed within walls, ceilings, floors, or below grade prior to plan check approval and/or inspection, that part must be exposed for inspection approval by IRWD before closure. If any portion is completed without IRWD's inspection and approval, that portion not inspected will be re-exposed at the sole cost of the developer.

3. IRWD on-site inspection approval be secured subsequent to final approval of the water systems by the responsible building authority, and issuing of a final use approval.

C. Record Log

IRWD's On-Site Recycled Water Inspector will maintain a record log of all inspections for the building project. The record log will become a permanent part of IRWD's file for that project. The record log will consist of:

1. Photographs - Photographs will be taken of the completed recycled water facilities on each floor of the building to document proper installation. Each photo will include a sign, which clearly indicates the name of the project, floor level, and the date of the inspection. The developed photographs will be placed in clear plastic sleeves and kept in IRWD's project file.

2. Inspection Reports - A written record of each inspection will be kept on a special, triplicate, carbonless-transfer inspection report form prepared by IRWD. All original copies will become a part of IRWD's project file. Copies of all inspection reports will be provided to the contractor's job superintendent, the various health agencies, and the responsible building authority, as requested.

D. Construction Specifications

Construction specifications for all on-site building recycled water systems shall be as set forth in Appendix A, Section C, entitled, "Information Required on Plans."

5.15.4 Start-Up Phase

A. Initial Water Service

The on-site building recycled water system shall initially be filled, pressure tested, and operated with potable water.

B. Cross-Connection Testing

The following testing sequence will be used as the initial procedure for all buildings that will have the internal recycled water system connected to IRWD's recycled water supply, or when recycled water conversion occurs a substantial amount of time after the building is occupied, or under certain other subsequent circumstances.

If the internal recycled water system is ready to be connected to IRWD's recycled water supply, before the building can be occupied, and before the responsible building authority will issue final use approval, the recycled water system must pass a thorough cross-connection test. If the building is already occupied and a substantial amount of time has elapsed between building occupation and ultimate recycled water conversion, this same testing procedure will be used. Also, during the building's subsequent operation and maintenance under circumstances discussed in Section 5.15.5-A, this same testing procedure will be used.

The cross-connection test will be conducted under the supervision of an AWWA-certified Cross-Connection Control Program Specialist from the On-Site Recycled Water Management Section of IRWD. The test will be performed in the presence of representatives of the state and county health agencies, representatives of the responsible building authority, and representatives of the building owner.

Duration of shutdown shall be determined by IRWD, State and County Health Department based on site conditions prior to commencement of testing. At no time will the deactivation period be less than 1 hour or more than 24 hours. IRWD will coordinate scheduling the test. Procedures for the cross-connection test will be as follows:

1. The recycled water to the building will be shut off at the recycled water meter. Verify potable water system is pressurized by randomly testing

fixtures. The recycled water riser will be drained, and the recycled water system will remain de-activated for a period of up to 24 hours.

2. At the end of the de-activation period, test all recycled and potable water fixtures for cross-connection, floor-by-floor, by operating each fixture and checking for flow or no flow in all restrooms, and where there are recycled and potable water supplied fixtures.

3. If there is no flow detected in any of the fixtures (indicating no cross-connection), reactivate the recycled water riser.

4. The potable water to the building will be shut off at the back-flow assembly. The potable water riser will be drained, and the potable water system will remain de-activated for a period of up to 24 hours.

5. At the end of the de-activation period, test all potable and recycled water fixtures for cross-connection, floor-by-floor, by operating each fixture and checking for flow or no flow in all restrooms, and where there are potable and recycled water supplied fixtures.

6. If there is no flow detected in any of the fixtures (indicating no cross-connection), reactivate the potable water riser.

7. For new installations only, disconnect the recycled water riser from the potable water pipeline, remove the reduced-pressure principle backflow prevention assembly (RPPA) at the potable water connection, and connect the recycled water riser to IRWD's recycled water supply.

IRWD will provide written verification of successful test results to the state and county health agencies and the building authority.

C. Response to Confirmed Cross-connection

In the event that a cross-connection is discovered other than during routine cross-connection testing, the appropriate response will be immediately implemented. The most appropriate procedure and its application will be based on specific circumstances of the discovered cross-connection. This will be mutually determined by IRWD staff and health agency representatives. Required water quality samples will be collected by IRWD personnel, chlorine residual tests will be performed on site by IRWD personnel, and bacteriological testing will be performed by a state-certified laboratory. The following procedures describe the minimum appropriate response:

1. If a cross-connection is found by building personnel, the User Supervisor will immediately notify building management of the cross-connection. Building management will immediately notify building tenants not to drink or otherwise use the potable water, post "Warning: Do Not Drink" signs at all potable water fixtures and equipment, and notify IRWD personnel of the cross-connection.

2. Immediately after notifying building management of the cross-connection,

the User Supervisor will shut off the recycled water at the meter and begin draining the recycled water riser.

3. Immediately after the recycled water begins to drain from the building, the User Supervisor will shut off the potable water at the meter and drain the potable water riser.

4. IRWD will immediately notify both the state and county health agencies, followed by a written notice within 24 hours. At this juncture, IRWD staff and health agency representatives, upon their mutual review, may choose to tailor the remaining procedures to the specific circumstances of the discovered cross-connection.

5. Uncover and disconnect the cross-connection(s).

6. Turn on the potable water at the meter, and once the building is repressurized with potable water, check all potable water fixtures for pressure and check all recycled water fixtures for no pressure.

7. If no additional cross-connections are found, turn on the recycled water at the meter and repressurize the building, and proceed to step 8.

   If an additional cross-connection is found, turn off the potable water at the meter and drain the potable water riser. Uncover and disconnect the cross-connection(s). After the cross-connection is disconnected, begin again with step 6 through step 16.

8. Turn off the potable water at the meter, depressurize the potable water system at the riser and check all potable water fixtures for no pressure and verify water pressure at all of the recycled water fixtures.

9. If no additional cross-connections are found, repressurize the potable water system, and proceed to step 10.

   If an additional cross-connection is found, turn off the recycled water at the meter and drain the recycled water riser. Uncover and disconnect the cross-connection(s). After the cross-connection is disconnected, begin again with step 6 through step 16.

10. Remove water filter cartridges, etc., from filters on the potable water system.

11. Flush the potable water system before shock chlorination.

12. Shock the potable water system until at least 50 ppm of chlorine residual is available at each outlet. If at least 25 ppm of chlorine residual is not available at each outlet after 24 hours, repeat steps 11 and 12, otherwise proceed to step 13.

13. Flush the potable water system after 24 hours until a normal chlorine residual is detected, and perform standard bacteriological testing.

14. After acceptable bacteriological results are obtained, retest the building following procedures listed in Section 5.15.4-B.

15. Obtain final approval from IRWD, state and county health agencies, and the building authority to begin using the potable water.

16. After the conclusion of the cross-connection incident, IRWD will prepare a "Cross-Connection Incident Report," which includes an explanation of the nature of the cross-connection, and appropriate plans to minimize reoccurrence of a similar cross-connection. Copies of this report will be sent to the state and county health agencies.

If a cross-connection is discovered during routine cross-connection testing (pressure test) being done by building personnel, IRWD staff and health agency representatives, the following procedures describe the minimum appropriate response:

1. If the cross-connection is found during the pressure test, the recycled water system will ordinarily already be depressurized.

2. The User Supervisor will immediately shut off the potable water at the meter and begin draining the potable water riser. At the same time the User Supervisor will ensure that tenants are notified not to drink or otherwise use the potable water, and ensure that "Warning: Do Not Drink" signs are posted at all potable water fixtures and equipment.

3. Uncover and disconnect the cross-connection(s).

4. Continue the sequence of procedures from Section 5.15.4-C, steps 6 through 16 above, to complete the response to the confirmed cross-connection(s).

D. Final Approval and Activation of Recycled Water Service

When all requirements listed below have been met, the on-site building recycled water system will then be filled and placed into operation with recycled water under the supervision of representatives of IRWD's On-Site Recycled Water Section.

1. Both the potable and recycled on-site systems must have received plan approval, and must have been constructed and passed inspection as set forth in the provisions of Section 5.15.

2. Both the potable and recycled on-site systems must have passed the initial cross-connection test.

3. Final approval to use recycled water must be received from CDPH or OCHCA.

4. After health agency approvals, all signs must be posted in restrooms, equipment rooms, and plumber's closets, and all recycled water control

valves and appurtenances must be sealed and/or tagged as set forth in this section. Signs, seals, and tags shall be installed under the supervision of IRWD.

5. Before recycled water is put into service, the IRWD On-Site Recycled Water Inspector shall meet with the developer's/owner's designated User Supervisor for building maintenance to discuss operating procedures and responsibilities, as specified in Section 5.15.5-E.

5.15.5 Ongoing Operation and Maintenance

A. Inspection and Testing Frequencies

Ongoing operation and maintenance of dual-plumbed buildings with interior use of recycled water includes both cross-connection control inspection and testing. Inspections will occur annually, with procedures as described below. Testing will occur as often as annually but no less often than once every four years upon approval by state and local health agencies, with procedures as described below.

Determination of cross-connection control testing frequency will be based on a combination of factors: particular facility construction and recycled water use features, established facility inspection and testing performance history, cooperation by on-site staff and/or representatives, and ongoing evaluation by IRWD staff in concert with state and county health agency representatives. The initial testing frequency will not be less than annual. Subsequent lower or higher frequencies will be based on the above-noted factors and mutually declared and documented by IRWD staff and health agency representatives at the close of the previous testing event.

Water system de-activation duration during testing will depend generally on testing frequency. For annual testing frequencies, a 1-hour water system de-activation will generally be adequate. For testing frequencies of greater than one year, a 1-hour water system de-activation will generally be adequate. Alternative water system de-activation duration will be used only by mutual consent of IRWD staff and health agency representatives.

B. Cross-Connection Testing

All buildings with interior recycled water systems will undergo a cross-connection test in accordance with the determinations of Section A above. In addition, prior to commencing the cross-connection test, a dual system inspection will be conducted by the District's Cross-Connection Control Group Inspector and the building authority in the presence of representatives of the state and county health agencies and representatives of the building owner, as follows:

1. Check meter location of the recycled water and potable water systems; verify that no modifications have been made, or cross-connections are visible.

2. Check the potable water RPPA.

3. Check all pumps and equipment, equipment room signs, and exposed piping in the equipment room.

4. Check all recycled water control valves to make sure that seals are still in place and intact. Check all valve control door signs to verify that none has been removed.

5. Check all restroom entrance signs to make sure they are in place and visible.

6. Check all plumber's closets and verify that all signs are in place.

The following testing sequence will be used for buildings that will have the internal recycled water system connected to IRWD's recycled water supply <u>after</u> the building is occupied and when a substantial amount of time has <u>not elapsed</u> between building occupation and ultimate recycled water conversion, or under certain subsequent circumstances requiring a 1-hour system de-activation. For those subsequent circumstances requiring cross-connection testing with a 24-hour system de-activation, the procedures of Section 5.15.4-B will be followed.

After the building is occupied, but before the internal recycled water system can be connected to IRWD's recycled water supply, the recycled water system must pass a thorough a cross-connection test. Buildings that have been previously approved for internal recycled water use, and have been tested for cross-connections will also use this same testing procedure, under circumstances discussed in Section 5.15.5-A.

All testing will be conducted under the supervision of an AWWA-certified Cross-Connection Program Specialist from the Cross-Connection Control Group of IRWD. The test will be performed in the presence of representatives of the state and county health agencies, representatives of the responsible building authority, and representatives of the building owner. IRWD will coordinate the scheduling of the test. Procedures for the cross-connection test will be as follows:

1. The recycled water to the building will be shut off at the recycled water meter. The recycled water riser will be drained, and the recycled water system will remain de-activated for a period of 1 hour.

2. At the end of the 1-hour shutdown period, test all recycled and potable water fixtures for cross-connection, floor-by-floor, by operating each fixture and checking for flow or no flow in all restrooms, and where there are recycled and potable water supplied fixtures.

3. If there is no flow detected in any of the fixtures (indicating no cross-connection), reactivate the recycled water riser.

4. The potable water to the building will be shut off at the back-flow assembly. The potable water riser will be drained, and the potable water system will remain de-activated for a period of 1 hour.

5. At the end of the 1-hour shutdown period, test all potable and recycled water fixtures for cross-connection, floor-by-floor, by operating each

fixture and checking for flow or no flow in all restrooms, and where there are potable and recycled water supplied fixtures.

6. If there is no flow detected in any of the fixtures (indicating no cross-connection), reactivate the potable water riser.

7. For new installations only, disconnect the recycled water riser from the potable water pipeline, remove the reduced pressure principle backflow prevention assembly (RPPA) at the potable water connection, and connect the recycled water riser to IRWD's recycled water supply.

IRWD will provide written verification of successful test results to the state and county health agencies and the building authority within 30 days. This verification will be accompanied by the declaration, mutually agreed upon among IRWD and the health agencies, of subsequent testing frequency for the subject site.

C. Emergency Response to Confirmed Cross-connection

In the event that a cross-connection is discovered, the procedures detailed in Section 5.15.4-C will be immediately followed.

D. Cross-Connection Inspection

In addition to the detailed cross-connection control testing described herein, annual inspection of all buildings with dual-plumbed systems will be performed by IRWD's Cross-Connection Control Group. This will consist of at a minimum, visual inspection of pump rooms, pressure reducing stations, all bathrooms, signs, tags, etc. A visual inspection of all potable water use areas will be conducted. Other elements of the annual inspection may consist of, but are not necessarily limited to, the following specific items:

1. Run random water sample tests (laboratory samples) on recycled water and potable water.

2. Check walls for visible repairs that might indicate that plumbing changes may have occurred.

3. Check plumber's closets to see if valve seals have been broken.

4. Check with the User Supervisor to ask whether any routine operations or maintenance work has been performed on plumbing systems.

IRWD personnel will keep a record of all inspections, which will become a part of IRWD's project file for each related building.

E. User Supervisor Responsibilities

Each building provided with recycled water for the flushing of toilets, urinals, and floor drain trap priming shall have a User Supervisor designated by the owner/developer to maintain strict control over interior recycled water usage. IRWD will provide the name of this person to the responsible building authority and to the state and county health agencies. The User Supervisor is responsible for the following:

1. Maintaining strict control over the building's water systems.

2. Controlling cross-connections.

3. Immediately informing IRWD's Cross-Connection Control Group at (949) 453-5300 of any water system failures or emergency shut downs.

4. Informing IRWD's Cross-Connection Control Group in advance of scheduled shutdowns for system maintenance.

5. Informing and providing IRWD's Cross-Connection Control Group with plans for proposed changes to the plumbing systems.

Throughout Section 5.15 the position "User Supervisor" shall mean either an individual so designated by the owner/developer or one or more other individuals acting in the same defined capacity and having the same defined responsibilities, in all cases representing the owner/developer.

F. Non-Compliance

Failure to comply with the IRWD Rules and Regulations, and with the provisions of Section 5.15, shall constitute a basis for terminating recycled water service to the building for all approved uses. The specific procedures and conditions for the termination of recycled water service are contained in the service agreement and in the IRWD Rules and Regulations.

G. IRWD Records

IRWD will maintain a database and written records of all dual-plumbed non-residential buildings in the IRWD service area in order to document, track, and schedule all tests. Reports will be provided to the state and county health agencies and the responsible building authority for all dual-plumbed facilities in the IRWD service area.

5.16 Recycled Water for Wetland and Adjacent Riparian Areas

5.16.1 Wetland and Riparian Areas

In wetland and riparian areas adjacent to wetland areas, low output non-spray irrigation is preferred over spray irrigation or flood irrigation. Drip irrigation is required for all container plants one gallon or larger. Spray and flood irrigation may be approved on a case by case basis after review of the reasons for utilizing spray or flood irrigation.

1. Spray irrigation is allowed above the bankfull line or maximum operating level.
2. Spray irrigation must be directed away from creeks and ponds tributary to the storm drainage system.
3. Flood irrigation will be allowed in those areas that are physically isolated from the drainage system.
4. Permanent physical barriers such as root stop shall be used in areas where runoff into water courses may occur.
5. Root stop and other physical barriers installed as temporary barriers shall be removed when the project receives final acceptance.

5.16.2 Irrigation Systems

The irrigation system for wetland and riparian areas adjacent to wetland areas will be designed to minimize actual and potential discharge of irrigation water into the drainage system.

1. All pressurized irrigation lines must have a manual isolation valve located in an area that drains away from the wetland or watercourse. A master valve with or without connection to an irrigation controller is a manual isolation valve. Manual isolation valves must be accessible and clearly marked.
2. All irrigation controllers will have a logic control to shut off irrigation lines that are broken, have missing sprinklers, or otherwise deliver more than a set flow rate.
3. If the project is a Natural Treatment System (NTS) project or adjacent to a NTS project, refer to the NTS guidelines for additional requirements

5.16.3 Plan Requirements

Plans shall describe the irrigation system and its operation and detail the environmental setting, to ensure proper operation and maintenance of the irrigation system.

1. All plans will show the centerline and bankfull lines of streams.
2. All plans will show the low operating and maximum fill elevations of ponds.
3. Plan notes will show that all irrigation will be turned off during the rainy season (Oct-Mar).
4. Plan notes will delineate irrigation procedures.
5. Manual attended irrigation is allowed during the rainy season when needed.
    - Non-pressurized irrigation lines must be used below the high water line.

5.16.4 Reporting Requirements

Upon plan approval, the IRWD will submit a letter report to the Regional Water Quality Control Board describing the project and how environmental and regulatory concerns are addressed in a manner consistent with State of California regulations and the IRWD Rules and Regulations. The report will contain the following elements:

1. The report will contain a physical description of the project, the sources of water entering the project, the sources of water leaving the project and identification of downstream water courses all the way to the ocean.
2. In addition to pictures and other graphics, the report will provide a narrative of the location of the project identifying natural and manmade landmarks which locate the project.
3. The report will identify any environmental and regulatory concerns and how such concerns are addressed.
4. The report will include a statement that the project has been reviewed and determined to be consistent with State of California regulations and the IRWD Rules and Regulations.

5.17 Recycled Water for Wetland and Adjacent Riparian Areas

In wetland areas or riparian areas adjacent to wetland areas, low output/non-spray irrigation is preferred to over spray irrigation or flood irrigation. Low output/non-spray irrigation is required for all container plants one gallon and larger. Spray and flood irrigation may be approved on a case by case basis after review of the reasons for utilizing spray or flood irrigation.

A. General Design; parameters shall be, but not limited to, the following criteria:

1. Spray irrigation is allowed above the bankfull line or maximum operating level.
2. Spray irrigation must be directed away from creeks, ponds and slopes tributary to the storm drainage system.
3. Flood irrigation will be allowed in those areas that are physically isolated from the drainage system.
4. Permanent physical barriers such as root stop shall be used in areas where runoff into water courses may occur.
5. Root stop and other physical barriers installed as temporary barriers shall be removed when the project receives final acceptance.

B. Accidental Discharge Control: the irrigation system for wetland areas or riparian areas adjacent to wetland areas will be designed to minimize actual and potential discharge of irrigation water into the storm drainage system.

1. All pressurized irrigation lines must have an isolation valve located in an area that drains away from the wetland or watercourse. A master valve with or without connection to an irrigation controller is an isolation valve. Isolation valves must be accessible and clearly marked.
2. All irrigation controllers will have a logic control to shut off irrigation lines that are broken, have missing sprinklers, or otherwise deliver more than a set maximum flow rate.

C. Plans; shall describe the irrigation system and its operation and describe the environmental setting, to ensure proper operation and maintenance of the irrigation system.

1. All plans will show the centerline, flow direction and bankfull lines of streams.
2. All plans will show the low operating and maximum fill elevations of ponds.
3. Plan notes will delineate irrigation procedures.
4. Plan notes will show that all irrigation activities will be manually turned off during the rainy season (Oct-Mar).
5. Manual attended irrigation is allowed during the rainy season when needed.
6. Continuously pressurized main or feed irrigation lines shall not be allowed below the high water line. Only intermittently pressurized laterals that can be isolated manually during the rainy season.

D. A letter report will be prepared and submitted to the Regional Water Quality Control Board describing the project and how environmental and regulatory concerns are addressed in a manner consistent with State of California regulations and the IRWD Rules and Regulations. The report will contain the following elements:

1. The report will contain a physical description of the project, the sources of water entering the project, the sources of water leaving the project and identification of downstream water courses all the way to the bay or ocean.
2. In addition to pictures and other graphics, the report will provide a narrative of the location of the project identifying natural and manmade landmarks which locate the project.
3. The report will identify any environmental and regulatory concerns and how such concerns are addressed.
4. The report will include a statement that the project has been reviewed and determined to be consistent with State of California regulations and the IRWD Rules and Regulations.

APPENDIX A

PLAN CHECK PROCEDURES FOR ON-SITE BUILDING RECYCLED WATER SYSTEMS

A. Purpose of the Plan Check

Submittal of the plan check is intended to ensure that the proposed use of recycled water conforms to the approved uses of recycled water in the IRWD service area. The owner, applicant, or customer is solely responsible for all provisions set forth in IRWD's Section 5.15, "Interior Use of Recycled Water in Non-Residential Buildings," as well as those of the responsible building authority. It is not the purpose of the plan check process to guarantee that all requirements have been met. If, during field inspection, the installation and/or material does not meet IRWD standards, the owner, applicant, or customer shall modify the system, as directed by IRWD, in order to bring the system into full compliance with IRWD's design and construction standards.

B. Plan Check

1. Completed plumbing plans for all buildings with initial approval to use special plumbing systems to convey recycled water for toilet and urinal flushing and floor drain sewer trap priming must be submitted to IRWD, and approved by the On-Site Recycled Water Management Section.

2. The Owner shall submit two sets of plumbing plans, details, and specifications showing the on-site building recycled water and potable water systems.

3. IRWD will review the plans and make comments, if required. The Owner will be notified by telephone when the first check set is complete and ready for pickup.

4. If necessary, a second check will be performed to assure revisions have been incorporated into the plans, details, and specifications.

5. When all revisions have been incorporated, IRWD will request by telephone that the originals be delivered for approval.

6. The Owner will be notified by telephone when plans have been signed and are ready for pickup.

7. The Owner shall provide IRWD with one 11” x 17” signed copy, and one compact disc (CD) containing the electronic file. The CD shall contain the approved plan set with project name captured in the format and in a single PDF file with the pages arranged in correct order. The PDF file shall store and print out full sized signed documents to the actual drawing scale (size on size). These shall be entered into IRWD's project record.

C. Information Required on Plans

The following notes are to be shown on all on-site building plumbing plans for recycled water and potable water dual-plumbed systems:

IRVINE RANCH WATER DISTRICT

SPECIAL ON-SITE RECYCLED WATER NOTES FOR DUAL-PLUMBED BUILDINGS

A. The installation of the on-site building recycled water system shall conform to the regulations for the construction of such systems within IRWD; the accompanying plans and specifications, and all applicable codes, ordinances, and amendments of the building authority.

B. Before plumbing construction begins, the developer's contractor shall arrange a pre-construction meeting with IRWD's On-Site Recycled Water Inspector and the plumbing contractor; the District Inspector should be contacted at (949) 453-5300.

C. The on-site recycled water and potable water systems shall be subject to inspection by IRWD and shall be exposed until approved by the On-Site Recycled Water Inspector, who should be contacted at (949) 453-5300.

D. At the owners expense an in-line 5 to 7.5 micron filter is required down stream of the recycled water meter and inside the building or secured covered structure; the manufacturer’s name, size, and type shall be called out on the plans.

E. All piping within buildings shall be Type L copper pipe and shall be continuously wrapped with purple colored mylar tape.

F. The internal recycled water identification wrapping tape shall be a nominal 0.005-inch thick, with a minimum width of two inches. The tape shall be fabricated of polyvinyl chloride with a synthetic rubber adhesive, and a clear polypropylene protective coating. The tape shall be purple (Panatone Color No. 249C), and shall be imprinted in nominal 1/2-inch high, black, upper case letters, with the words, "CAUTION: RECYCLED WATER, DO NOT DRINK." The lettering shall be imprinted in two parallel lines, such that after wrapping the pipe with a one-half width overlap, one full line of text is visible.

G. All below grade recycled water piping shall be identified with warning tape. The warning tape shall be an inert plastic film with a minimum thickness of 4 mils. The tape shall be purple (Panatone Color No. 249C), and shall be permanently imprinted in black, upper case letters, with the words, "CAUTION: RECYCLED WATER, DO NOT DRINK." The overall width of the tape and the height of the letters shall correspond to the size of the pipe as follows:

    1. 6-inch and larger pipe shall have 6-inch wide tape with minimum 1 7/8-inch high letters.

    2. 8-inch and larger pipe shall have 12-inch wide tape with minimum 3 1/2-inch high letters.

H. The below grade warning tape shall be:

    1. Installed directly on the top of the pipe longitudinally.

2. Installed continuously for the entire length of the pipe.

3. Fastened to the pipe by plastic adhesive tape banded around the warning tape and pipe at no more than five-foot intervals.

I. All recycled water control valves within buildings shall be lever handle ball valves equipped with a locking feature and shall be located at 48-inches above finished floor. All mechanical equipment that is appurtenant to the recycled water system shall also be painted to match the mylar wrapping tape.

J. Both the potable and recycled water system risers within the buildings shall be equipped with a manual drain, and an air/vacuum relief valve which will allow the entire riser to be drained. Both sources shall drain to sewer.

K. No cross-connections between recycled water and potable water of any kind shall be made with or without mechanical backflow prevention.

L. All recycled water risers within the building, including appurtenances such as air/vacuum relief valves, pressure reducing assemblies, etc., shall be installed in the opposite end of the bathroom from the potable water risers, or opposite walls as applicable, and where feasible.

M. Recycled water piping and potable water piping within the walls, ceilings, or floors will NOT be installed with parallel runs.

N. No stub-outs beyond the plumbing core will be permitted from the recycled water system.

O. Recycled water lines running parallel to potable water lines shall be installed at least ten feet horizontally from potable water lines **where possible and unless exposed**. Where potable and recycled water lines cross the recycled water lines should cross a minimum of one foot below potable water lines. Where separations cannot be maintained, an effective separator, which may consist of, but is not necessarily restricted to, a single sheet of standard drywall, or aluminum sheeting, is to be installed within the wall between recycled water and potable water headers. The effective separator shall extend the full width of the wall section, and be a minimum of three feet in length centered on the piping headers.

P. No changes or connections shall be made to either piping system without approval by the District's On-Site Recycled Water Inspector.

Q. An initial cross-connection test must be successfully completed by IRWD before the building can be occupied. To schedule the test, the developer's contractor should contact IRWD's On-Site Recycled Water Group at (949) 453-5300.

R. All restrooms using recycled water for toilets, urinals, and trap primers will be identified with signs in accordance with the requirements of IRWD and the responsible building authority. At a minimum, the signs will contain 1/2-inch high letters of a highly visible color on a contrasting background. At least one sign shall be installed in each bathroom location. The location will be such that the sign is visible to all users, and the location will be approved by IRWD and the responsible building authority. The signs will have the following text:

"TO CONSERVE WATER, THE RESTROOMS IN THIS BUILDING USE RECYCLED WATER FOR FLUSHING TOILETS AND/OR URINALS."

S. Each equipment room containing recycled water equipment shall have a sign posted in both English and Spanish with the following wording in one-inch high white letters on a purple background:

"CAUTION
RECYCLED WATER
CAUTION DO NOT DRINK

NOTICE
CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM"

This sign shall be installed in a location that is visible to anyone working on or near recycled water equipment.

T. Each recycled water control valve within a wall shall have its access door into the wall equipped with a warning sign approximately six inches square with wording in 1/2-inch white letters on a purple background. The size, shape, and format of this sign shall be substantially the same as the equipment room signs. The signs shall be attached in the access doorframe by means of two short lengths of bands, and shall hang in the center of the access doorframe. A Spanish language version of the sign shall be installed on the inside of the access door. This sign requirement will be applicable to any and all access doors, hatches, etc.

U. Each lever handle ball control valve, or appurtenance, shall be sealed in a manner approved by IRWD after the recycled water system has been approved and placed into operation. The type of seal shall be, as applicable, either a plastic and wire snap-off padlock seal, or a plastic pull-tie seal and tag, which, if broken after system approval, shall be deemed conclusive evidence that the recycled water system has been accessed. The seals shall have serial numbers. The seals will be supplied by IRWD or by other arrangements acceptable to IRWD.

V. The dual-plumbed plumbing plans and Tenant Improvement Plans shall have the Tenant Improvement Water Note placed on the Title Page of each plan:

Tenant Improvement Water Note: For proper cross-connection testing of this dual-plumbed building, all angle-stop valves serving refrigerator ice-makers, stand-alone ice-makers, domestic type dishwashers, coffee makers and all other appliances, devices or apparatus not regularly classed as plumbing fixtures, served by potable water, must be readily accessible and shall have an extra port (Test Port) with a threaded cap.
An exposed manifold serving multiple angle-stop valves will require only one test port. All flexible lines shall not be concealed and must be visible. If the flexible lines for these appliances exceed ten feet, copper pipe must be used.
(See Irvine Ranch Water District Tenant Improvement Water Note Drawing)
The Test Port shall be used for cross-connection testing only and shall be so tagged or labeled to prevent its use for any other purpose.
See Irvine Ranch Water District Procedural Guidelines Section 5.15.4, B2 & B5 and Section 5.15.5 B2 & B5 for details on dual-plumbed building cross-connection testing procedures.
Tenant Improvements on recycled water systems are prohibited unless approved in writing by the Irvine Ranch Water District.

W. Tenant Improvement water stub-outs are only allowed on the domestic water system and must have a valve, threaded cap and identified as domestic water.

X. Recycled water for cooling will serve only the make-up water to the cooling towers. The cooling system shall comply with the following:
    1. A drift eliminator shall be used whenever the cooling system is in operation.
    2. A biocide shall be used to treat the cooling system recirculating water.