

- 1.4-2 Certified soil test and percolation test results and any proposed construction document revisions shall be submitted to the City. Written approval of revised construction documents is required prior to the installation of plantings and irrigation systems.
- 1.4-3 Soil amendments are to be used when needed to improve water retention in the soil, to improve the functional structure of the soil for greater water infiltration and percolation, to balance pH, and to optimize plant growth.

1.5 INSTALLATION CRITERIA

- 1.5-1 All drainage shall comply with the Storm Water Standards of the Land Development Manual.
 - 1.5-5.01 All planting areas shall be designed to effectively handle all drainage onsite.
 - 1.5-5.02 Concentrated flows shall be handled on-site using low impact development practices.
- 1.5-2 Only trees which are not self-supporting shall be staked or guyed.
- 1.5-4 Herbaceous groundcovers shall be planted with triangular spacing at a distance that will typically ensure 100 percent coverage within one-year of installation.
- 1.5-5 For irrigated areas, the rate of seed application shall be sufficient to typically provide 100 percent coverage within six months of installation.
- 1.5-6 All required planting areas shall be covered with mulch (organic or inorganic) to a minimum depth of 3 inches, excluding slopes requiring revegetation. All exposed soil areas without vegetation shall also be mulched to this minimum depth.

1.6 MAINTENANCE CRITERIA

- 1.6-1 Trees shall be watered deeply, but infrequently, to promote deeper rooting, and shall be fertilized as required by sound horticultural practices.
- 1.6-2 Plants shall be pruned in accordance with professional trimming standards to maintain their intended shapes and sizes, and to insure the health of the specimen and the safety of the public.
- 1.6-2 Tree guys and stake ties shall be inspected and adjusted periodically, and removed when necessary, to insure that they are adequately surrounding the tree without girdling trunks or branches.
- 1.6-4 Plants shall be pruned to avoid blocking walks, passageways and sight distance views for vehicular traffic.

- 1.6-5 Dead plants shall be replaced, damaged branches shall be removed, and overgrown areas shall be thinned by the selective removal of unnecessary plants.
- 1.6-6 Shrubs and vines used for screening trash enclosures and service areas shall be pruned to maximize screening while allowing access to the storage/service areas.
- 1.6-7 Shrubs, trees, and vines for screening adjacent properties shall be kept pruned so they do not interfere with pedestrian traffic and do not encroach excessively onto the adjacent property.
- 1.6-8 Trees shall be selected based upon the site characteristics including soil type, soil area, drainage, and adjacent improvements. Trees selected should grow to maturity without impacts to sidewalks, curbs, and other public improvements.

1.7 STREETS RIGHTS-OF-WAY AND OPEN SPACES MATERIAL GUIDELINES

All planting in street rights-of-way and those in open space areas that are to be maintained by the City, either directly or by administered contract shall comply with this section.

1.7-1 Plant Selection

- 1.7-1.01 In areas of existing development without an approved street tree plan¹, the tree selection(s) shall match the existing, permitted, predominate species unless the species is not listed in the Street Tree Selection Guide (www.sandiego.gov/street-div/pdf/treeguide.pdf).
- 1.7-1.02 In newly developing areas without an approved street tree plan, tree selection shall be coordinated to achieve continuity.
- 1.7-1.03 Plant selection shall be limited to those species which are considered relatively disease and pest-free and require minimal trimming to be maintained in a safe and attractive condition.
- 1.7-1.04 Substitutions of plant material in the street rights-of-way must be approved by the City Manager.
- 1.7-1.05 The planting of trees such as Cinnamomum, Ficus, Fraxinus, Schinus and other species with surface root systems that tend to damage sidewalks shall not typically be used in public rights-of-way. They will only be considered under appropriate site conditions and where maintenance responsibilities have been assigned to the satisfaction of the City Manager.
- 1.7-1.06 High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians.

¹ Street tree plans, if adopted, are located in the applicable community plan. If there is no adopted street tree plan contact the City Arborist for the appropriate tree.

1.7-2 Installation Criteria

1.7-2.01 Per Section 1.4, Site Preparation Criteria, a soil percolation test shall be performed by filling a 12"x 12"x 12" square hole with water, waiting 12 hours, and then completely refilling. All percolation test operations shall be conducted in the presence of a licensed landscape architect, contractor, civil engineer or related professional. If all the water is not absorbed within 12 hours of the second filling, tree installations shall include the following:

- 150 cubic feet of topsoil to a maximum depth of three feet.
- A four-inch minimum diameter perforated drain line connected to a storm drain or sump. When connecting to a storm drain, a cleanout shall be installed at the connection to allow inspection of sources of non-storm water discharges caused by excessive irrigation.
- Sumps when approved, shall be a minimum 12 inches in diameter and extend four feet below the planting trench depth. A minimum three-inch diameter pipe with removal cap on top shall be extended to the surface for inspection.
- A subsurface irrigation system.

1.7-2.02 Non-biodegradable root barriers shall be installed around new trees in the public right-of-way to direct tree root growth downward and away from adjacent sidewalks, curbs, gutters, driveways, and other public improvements. Root barriers may be eliminated where the combination of tree species, soil type, soil area, and drainage conditions can be shown to afford equivalent protection against tree root damage to public improvements.

1.7-3 Maintenance Criteria

1.7-3.01 Trees with a low spreading branch structure shall typically not be used in the street rights-of-way, and individual specimens shall be selected, planted, and pruned, if necessary, such that major scaffold branches are at least 8 feet above the finish surface or finish grade, as measured at the trunk.

1.7-3.02 Trees shall be positioned and kept maintained so that any branches that extend out over dedicated street rights-of-way have a minimum of 14 feet 6 inches of clearance above the surface of the street.

1.7-4 Public Improvements Adjacent to Existing Trees

1.7-4.01 Sidewalk, curb, gutter or driveway renovation or replacement within four feet of an existing tree shall be performed following procedures that would protect

the existing tree. These procedures could include root pruning, modification to the alignment of the proposed public improvement, erecting temporary barriers during construction, or modification to the construction detail of the improvement. Where the combination of existing conditions and the proposed public improvement would preclude tree preservation, trees that are removed should be replaced with new street trees.

- 1.7-4.02 Public improvement work adjacent to existing trees shall be performed in accordance with the provisions of the public right-of-way permit.

1.8 WATER FEATURES

- 1.8-1 Manmade water features including pools, spas, ponds, lakes, waterfalls, fountains, artificial streams and similar features where water is artificially supplied are subject to the regulations for high water use landscape features.
- 1.8-2 Recirculating water systems shall be used as a source for water features.
- 1.8-3 Where available, recycled water shall be used as a source for manmade water features with the exception of pools and spas and similar features that are prohibited from using recycled water by state law.
- 1.8-4 Constructed wetlands that are non-irrigated and that are used for on-site wastewater treatment or stormwater best management practices are not water features and are not subject to the MAWA Water Budget calculation formula in Section 2.6.

SECTION II: IRRIGATION SYSTEMS

2.1 GENERAL REQUIREMENTS

Irrigation systems shall be designed, constructed, and managed to maximize overall irrigation efficiency within the limits established by the MAWA Water. The following standards establish the minimum requirements for irrigation systems.

- 2.1-1 The minimum design, installation and maintenance criteria herein shall not be considered as specifications.
- 2.1-2 Material or processes other than those indicated herein may be used if sufficient data is presented to show that the material or process is equivalent or better in performance and intent, and meets or exceeds all design and performance tests with all equivalent features.
- 2.1-3 All required irrigation systems and all irrigated areas shall be automatically controlled. Temporary systems may be an exception.
- 2.1-4 All required irrigation systems shall be maintained in working condition as approved. Any equipment or material needing replacement is to be replaced immediately with equipment or material of the same type and performance standards as the originally approved irrigation system.
- 2.1-5 Irrigation systems (valve systems, piping and pressure regulators) shall be designed to deliver water to hydrozones based on the moisture requirements of the plant grouping.
- 2.1-6 Water meters. Dedicated (separate) landscape water meters shall be installed for all new development as listed in Table 2 prior to occupancy or final inspection approval.
- 2.1-7 Submeters. A landscape irrigation submeter shall be installed for development as listed in Table 2 prior to a certificate of occupancy or final inspection approval.

**TABLE 2
LANDSCAPE WATER METER
APPLICABILITY**

Type of Water Meter	Type of Development Proposal	Landscape Area² Threshold
Dedicated Landscape Irrigation Meter	New development (excluding single dwelling unit development and commercial production of crops and livestock)	1,000_s.f. and greater
Landscape Irrigation Submeter	New single-dwelling unit development	All
	Improvements to the following existing development, that do not have a dedicated landscape irrigation meter, that require a building permit and landscape review consistent with Section 142.0402: <ul style="list-style-type: none"> • Multiple-dwelling units development - common landscape area only • Commercial • Industrial 	1,000 s.f. and greater

2.2 TYPES OF SYSTEMS

2.2-1 Temporary Systems

Temporary systems shall operate for a period sufficient to establish plant material and to provide vegetative cover that prevents soil erosion. The amount of irrigation must be adjusted when warranted by site conditions.

2.2-2 On-Grade Systems

2.2-2.01 On-grade piping shall not be allowed where subject to adjacent pedestrian traffic or vandalism.

2.2-2.02 On-grade piping is allowed for temporary systems and irrigation in the brush management zones.

2.2-2.03 Permanent on-grade systems in brush management zones shall utilize metal pipe and fittings. Irrigation heads and nozzles may be plastic.

² For purposes of this calculation the landscape area means the entire premises less the area of building footprints, non-irrigated portions of parking lots, driveways, hardscapes (as defined in §113.0103 of the Land Development Code), and areas designated for habitat preservation or brush management Zone 2.

2.2-2.04 Selective watering of introduced native materials in native areas, irrigation of highly erosive or extremely rocky soils, and areas where trenching would disturb or loosen unstable material may be approved for on-grade installation by the City Manager.

2.2-2.05 All on-grade lines shall be secured to slopes every 10 feet. The ends of all laterals shall also be staked. Stakes shall be installed so as not to create a safety hazard.

2.2-3 Spray Systems

2.2-3.01 Spray heads of different manufacturers or of different basic types (bubbler, stream, standard, low gallonage, impact, etc.) shall have consistent operating characteristics on any single lateral circuit.

2.2-3.02 Spray heads on the same lateral circuit shall be balanced for matched precipitation rates within five percent from the average for any different arcs of coverage or operating radii.

2.2-3.03 Specially designed, adjustable nozzles shall be used for odd shaped areas, while still maintaining even application rates.

2.2-4 Drip Systems

2.2-4.01 All components shall be of non-corrosive materials.

2.2-4.02 Except for temporary installations, all lateral piping shall be installed below the finish grade of the planting area. Emitter distribution tubing (downstream of emitters) may be installed on finish grade if covered by mulch.

2.2-4.03 System equipment shall be installed below grade in locking access sleeves or meter boxes.

2.2-4.04 Drip tubing systems with embedded, factory installed, or integral bi-wall small orifice type emitters shall be designed such that there is a maximum emission rate differential of no more than five percent along the entire length of tubing.

2.2-4.05 The design of drip systems shall provide balanced water supply to plant materials of different sizes irrigated by a common lateral line.

2.2-4.06 All drip systems shall be adequately filtered and regulated per the manufacturer's recommended specifications.

- 2.2-4.07 All systems shall be capable of flushing out accumulated particulate matter. System designs shall provide a means for servicing such flushing requirements with a minimum of erosion or disruption to the surrounding landscape.
- 2.2-4.08 Pressure gauges shall be included in the design at critical points such as filtration equipment, fertilization equipment, regulators, or pressure compensating valves.
- 2.2-4.9 Systems shall be designed for the mature size of plant material to be irrigated, including the eventual rooting pattern of the planting. A minimum of 50 percent of the root structure of the plant material is to be irrigated at all stages of growth, up to and including full mature size. All necessary equipment for mature plant size irrigation shall be installed initially. Future outlets for tubing shall be capped or otherwise sealed until needed.
- 2.2-4.10 Emitters shall be protected from soil or root incursion and easily accessible. Metal rods may be required at emitters for easy location with a metal detector.

2.2-5 Special Systems

Special systems shall be allowed at the discretion of the City Manager.

2.3 DESIGN STANDARDS

2.3-1 Water Supply

Water supply shall be clean, free of suspended particles, algae, or chemicals that may form insoluble precipitates in the equipment or may be detrimental to plantings.

2.3-2 Water Service

2.3-2.01 Individually assessed areas and lots that will be individually owned shall have separately metered and controlled irrigation systems. Irrigation shall be confined to the individual areas without overspray onto adjacent areas or across property lines.

2.3-2.02 City approved backflow prevention units are required on all irrigation systems. Installation shall comply with all applicable health and safety codes.

2.3-3 Electrical Service

Electrical service point of connection for the irrigation system controllers shall be indicated and referenced on the irrigation plans.

2.3-4 Scheduling and Circuiting

- 2.3-4.01 Each circuit shall be capable of meeting the minimum needs of the mature plant material during peak demands within a weekly irrigation schedule.
- All irrigation systems shall include a weather-based or soil moisture-based irrigation controller.
 - Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent.
- 2.3-4.02 Lateral systems shall be divided by exposure (sun vs. shade, etc.), elevation, and by type of irrigation application equipment (drip, spray, etc.).
- 2.3-4.03 Where the plant material has differing watering needs, such as very low, low, medium, and high water use plants, separate systems shall be designed to give each plant-type area adequate minimum amounts of water. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and lawns.

2.3-5 Control Systems

- 2.3-5.01 Automatic control systems shall accommodate all aspects of the design, including multiple schedules, repeat cycles, and moisture sensing and rain sensing override devices (or weather based adjustment) as required.
- 2.3-5.02 Control mechanisms for moisture-sensing systems shall be accommodated within the controller enclosure.
- 2.3-5.03 Controller units shall be enclosed in secure, weather and vandal resistant, locking housings manufactured expressly for that purpose or located within a structure. Controller cabinets shall not be installed within an irrigation spray pattern.

2.3-6 Valves

- 2.3-6.01 Emergency Shutoff Valves
- Globe or ball valves shall be provided at points of connection and loop or zone isolation points.
 - For manifold remote control valves, the globe or ball valve shall equal the size of the largest control valve in the manifold.
 - For all slope areas, globe or ball valves shall be located on the main line upstream from the control valves and adjacent to the slope area. Valve box lids shall be marked "Emergency Shutoff."

- Main line flow sensors shall be installed to prevent irrigation runoff resulting from system damage, broken irrigation lines, or faulty valves. Residential landscape areas less than 5,000 square feet are exempt.

2.3-6.02 Zone Control Valves

- Globe or ball valves shall be installed to divide the irrigation system into controllable units, and to avoid draining long runs of piping for system repairs.
- Globe or ball valves shall isolate all looped portions of mainline networks.

2.3-6.03 Remote Control Valves

- Control valves shall be manifold where feasible, and installed in individual valve boxes.
- Valves shall be of slow closing design, and automatically close in the event of power failure.
- Valves shall be sized to provide adequate pressure differential for proper operation.

2.3-6.04 Quick Coupling Valves/Hose Bibs

Quick coupler valves or hose bibs shall be spaced at 100-foot intervals, maximum, and as needed to logically service areas.

2.3-6.05 Special Valves

- Anti-drain valves shall be installed on all irrigation systems without integral check valves on any areas where the cross-slope gradient of the lateral system exceeds ten feet. If any portion of the lateral system requires anti-drain valves, the lateral system shall be designed to maintain consistent operating pressures.
- Excess flow shutoff valves shall be installed with all irrigation spray heads located at the top of permanently revegetated slopes and within two feet of a public sidewalk.

2.3-7 Piping Only

The materials in Table 3 may be used for required landscape irrigation systems.

**TABLE 3
ACCEPTABLE PIPE MATERIALS**

LOCATION	USE	MATERIAL	TYPE	NOTES
Below Grade	Pressure Mains	Copper	Type "L"	Any Size
		P.V.C.	Class 315	2"
		P.V.C.	Sch. 40	1-1/2"
		Red Brass		Threaded
	Lateral Lines	Copper	Type "L"	Any Size
		* Galvanized Iron	Sch. 40	Threaded
		Polyethylene	Uv-resistant	Drip Systems
		P.V.C.	Class 315	1/2"
		P.V.C.	Class 200	3/4"
		P.V.C.	Sch. 40	Any Size
		Red Brass		Threaded
	Fittings	Cast Iron	Class 250	Short Body
		Copper	Type "L"	Any Size
		* Galvanized Iron	Sch.40	Threaded
		Nylon or A.B.S.	Specialty	Drip Systems
		P.V.C.	Sch.40	Any Size
		Red Brass		Threaded
Above Grade	Pressure Mains	* Copper	Type 'L'	Any Size
		* Galvanized Iron	Sch. 40	Threaded
		* Red Brass		Threaded
	Lateral Lines	Copper	Type "L"	Any Size
		Galvanized Iron	Sch. 40	Threaded
		Polyethylene	Uv-resistant	Drip Systems Mulch Required
		* P.V.C.	Uvr-sch. 40	Any Size
		* P.V.C.	Class 315	2"
		* P.V.C.	Sch. 40	<2"
	Fittings	Copper	Type "L"	Any Size
		Galvanized Iron	Sch. 40	Any Size
		Molded Plastic	Uv-resistant	Drip Systems
	Above Grade	Fittings	* P.V.C.	Uvr-sch. 40
* P.V.C.			Sch. 40	Any Size
Red Brass				Threaded

* Temporary Systems Only.

2.3-8 Runoff and Overspray

All irrigation systems shall be designed to avoid runoff, seepage, and overspray onto adjacent property, non-irrigated areas, walks, roadways, or structures. Systems requiring flushing shall accommodate flushing without erosion, disturbance to planting areas, or discharge into the storm drain system

2.3-9 Pressure Constraints

- 2.3-9.01 Irrigation systems shall be designed to operate correctly at the lowest available operational pressure expected during the year and shall withstand water system surges.
- 2.3-9.02 Pressure differential within lateral piping circuits shall not exceed 20 percent of the designed operating pressure of the equipment on that circuit.
- 2.3-9.03 Pressure regulating devices shall be installed on any systems with a static inlet pressure at the point of connection greater than 80 psi unless specifically approved by the City Manager. Pressure shall be regulated to a pressure adequate to operate the equipment at designed pressures with all incidental and line losses included.
- 2.3-9.04 Where the pressure within the system exceeds 80 psi (due to elevation drops, etc.), a pressure reducing valve shall be used to reduce pressure to design levels.

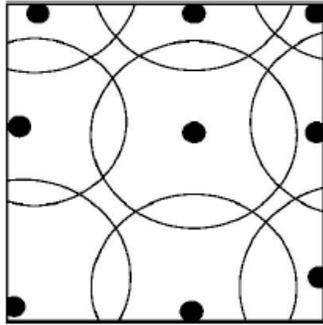
2.3-10 Velocity Constraints

Irrigation system piping shall be sized such that velocities remain below five feet per second.

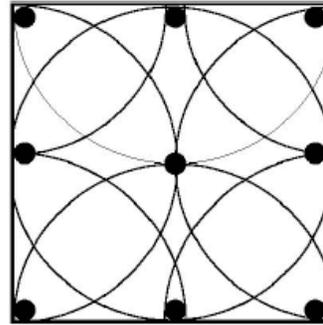
2.3-11 Coverage

- 2.3-11.01 Spray heads in turf areas and all stream, strip or square spray type heads shall be spaced 50 percent of the maximum rated diameter of coverage (Figure 2-2).

**FIGURE 2-1
SPRAY DIAMETER IN
SHRUBS/GROUNDCOVER**



**FIGURE 2-2
SPRAY DIAMETER IN
TURF AREA**



2.3-11.02 Only low volume irrigation or subsurface irrigation shall be used to irrigate turf areas that are within 24 inches of an impermeable surface unless the surface is constructed to allow the water to drain entirely into a landscaped area.

2.3-12 Equipment Protection

2.3-12.01 Any irrigation equipment located within 12 inches of pedestrian and vehicular use areas shall be located entirely below grade or otherwise adequately protected from potential damage.

2.3-12.02 All heads located within 12 inches of pedestrian and vehicular use areas shall be pop-up type.

2.3-12.03 Pop-up heads shall be installed with swing joints or other flexible assembly.

2.3-12.04 In-line wire splices shall be made only in pull boxes, with waterproof sealing packets.

2.3-12.05 Swing joints shall be installed in lines at all abrupt changes of grade.

2.3-13 Water Conservation Performance Standards and Requirements

The following standards apply to all projects for which landscaping is required and to special landscape situations such as slopes, fire hazard areas, and transitional landscapes:

2.3-13.01 For all areas, the water delivery rate of the irrigation system shall be matched to the slope gradient and the percolation rate of soil.

2.3-13.02 Slopes with a gradient of 3:1 or steeper and greater than 6 feet in height that are irrigated with an overhead spray system must have a precipitation rate no greater than 0.65 inches per hour.

- 2.3-13.03 The irrigation system shall deliver water efficiently and uniformly and shall be appropriate to the needs of the plant materials. Recommended reference materials for irrigation systems design are listed in **Appendix "A"**.
- 2.3-13.04 Over watering as evidenced by soggy soils, continually wet pavement, standing water, runoff in street gutters and other similar conditions shall be prevented.
- 2.3-13.05 All devices such as tensiometers, moisture sensors and rain sensing devices are subject to City approval.
- 2.3-13.06 Moisture sensors shall be installed per manufacturer's recommendations.
- 2.3-13.07 All automatic irrigation controllers and moisture sensing systems shall be adjusted seasonally and as weather and plant conditions warrant.
- 2.3-13.08 Twenty-four hour pressure recording information and the date of the recording shall be indicated on the irrigation plans.
- 2.3-13.09 When the pressure reading is either less than 40 psi, more than 5 years old or is not available, the pressure shall be calculated from the hydraulic grade line zone (contact Water Utilities) and the site elevation. The calculated pressure, meter elevation and hydraulic gradient shall be indicated on the plans.
- 2.3-13.10 When the actual measured or calculated minimum pressure is below 40 psi, irrigation systems, except for drip and other low flow systems, shall include compensating design or equipment modifications.
- 2.3-13.11 New development, in areas where reclaimed water is available and suitable for irrigation, shall provide a separate water distribution system so that only reclaimed water is used for irrigation.
- 2.3-13.12 Systems requiring flushing shall accommodate flushing without discharge into the storm drain system.
- 2.3-13.13 Alternative irrigation systems that may be used to augment water for landscape purposes include:
- Graywater systems may be used when installed consistent with the Department of Water Resources Graywater Guide and upon permit approval and inspection by San Diego County Department of Environmental Health.
 - Rain water harvesting may be used to augment irrigation systems provided that the systems used to harvest and store the water are designed to prevent intrusion of trash, insects, and animals.

2.4 INSTALLATION STANDARDS

2.4-1 Trench Widths

Trenches for irrigation pressure lines shall be excavated wide enough to allow a minimum of four inches between parallel pipe lines and eight inches from lines of other trades. Lines shall not be installed parallel and directly over one another. Maintain three inches vertical clearance between crossing irrigation lines; minimum transverse angle is 45 degrees.

2.4-2 Pipe Depths

**TABLE 4
PIPE DEPTHS**

LINE TYPE	LOCATION	SIZE	DEPTH	ZONE		
				COM	IND	RES
Pressure Main	Within Landscape	<3" I.D.	18 inches	•	•	•
		3" I.D.	24 inches	•	•	•
		4" I.D.	30 inches	•	•	•
Pressure Main	Under Vehicular Paving	<3" I.D.	30 inches			•
		<3" I.D.	36 inches	•	•	
		3" I.D.	36 inches	•	•	•
Non-Pressure Lateral	Within Landscape	<3" I.D.	12 inches	•	•	
		3" I.D.	18 inches	•	•	
Non-Pressure Lateral	Under Vehicular Paving	<3" I.D.	24 inches			•
Non-Pressure Lateral	Under Vehicular Paving	<3" I.D.	30 inches	•	•	
		3" I.D.	30 inches	•	•	

2.4-3 Sleeving

2.4-3.01 All pipe and wire under vehicular paving shall be installed in PVC Schedule 40 sleeves. Sleeves shall be at least twice the diameter of the pipe or wire bundle to be enclosed, with a minimum two-inch size, and shall extend 12 inches beyond each edge of pavement.

2.4-3.02 Sleeving shall be marked at each end at the time of installation with a painted spot on the back face of the curb or other similar marking.

2.4-4 Marking Tape

Metallic backed locating tape shall be installed along the entire length of the sleeve, 12 inches directly above the sleeve. Tape shall be marked "IRRIGATION" in two inch capital letters every three feet along the tape.

2.4-5 Backfill

2.4-5.01 Backfill material shall be clean and free of debris, large rocks and objects with sharp edges.

2.4-5.02 Finish grade of all trenches must conform to adjacent grades without dips, sunken areas, humps or other irregularities.

2.4-6 Landscape Irrigation Submeter

2.4-6.01 A landscape irrigation submeter shall be installed after the domestic water meter in development required to install the submeter in Table 2 (Landscape Water Meter Applicability).

2.4-6.02 An irrigation mainline from the landscape irrigation submeter shall be extended to the rear yard of new single dwelling unit development.

2.5 STREET RIGHTS-OF-WAY AND OPEN SPACE IRRIGATION SYSTEMS

2.5-1 Water Services

2.5-1.01 Center islands, open space areas and street rights-of-way shall have separate meters and services unless they are part of the same maintenance assessment district, whereby, they may share the same meter and service.

2.5-1.02 All water services shall have a City-approved backflow device installed above ground. A guard fence or steel enclosure will be installed if the device is located within five feet of a pedestrian travel way.

2.5-1.03 There shall be no sharing of water with private property.

2.5-1.04 Street water mains shall be shown and identified along with the water meter and service connection. The meter address and I.D.# shall be shown on the irrigation plan.

2.5-2 Electrical Services

2.5-2.01 The location of the following must be shown on the construction drawings:

- Source of electrical power;
- Service entry pedestal with approved detail;
- Conduits and wire conductors with sizes;
- Electrical meter;
- Safety-socket box;
- Circuit breaker enclosure;
- Irrigation controller and enclosure.

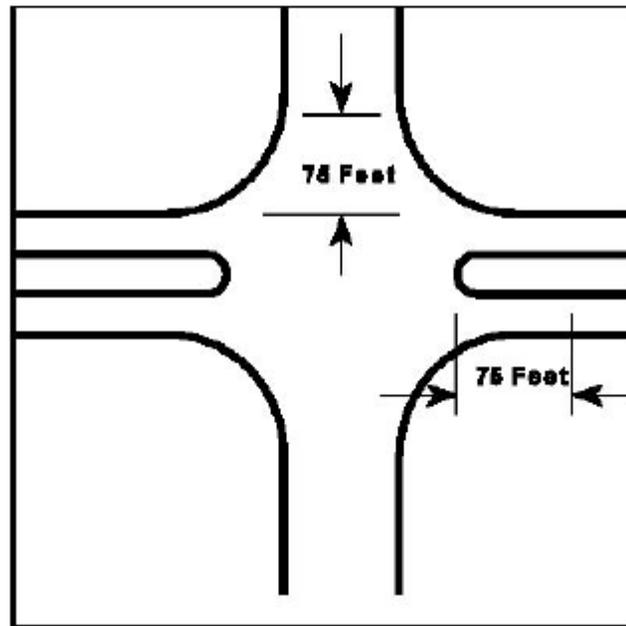
2.5-2.02 In cases where the electric power service is unknown at time of plan check, a note must be added stating that it will be placed on the plans during the "As Built" phase.

2.5-2.03 Center islands, open space areas and rights-of-way shall have their own irrigation controllers unless they are part of the same maintenance assessment district, whereby, they may share the same controller. The controller shall not be located in the center island.

2.5-3 Only materials and equipment that are on the Park and Recreation Department's Approved Irrigation Materials List" (**Appendix "D"**) shall be used. Installation shall be per the San Diego Regional Standard Drawings unless otherwise approved.

2.5-4 Mainline and lateral piping may cross public streets as long as they are placed in sleeves and do not cross within 75 feet of any intersection (**Figure 2-3**).

**FIGURE 2-3
MAINLINE & LATERAL PIPING CROSSING PUBLIC STREETS**



- 2.5-5 Heads with low precipitation rates shall be used whenever possible.
- 2.5-6 Non-spray type irrigation systems shall be used whenever practical for all plantings in the street right-of-way.
- 2.5-7 Drip systems, when approved for use in the street right-of-way, shall use rigid PVC laterals installed below grade with schedule 80 risers and access caps/sleeves for servicing the emitters, and with self-flushing type emitters.
- 2.5-8 Pressure reducing valves shall be installed above grade in conjunction with the backflow unit, or below grade in valve boxes.
- 2.5-9 Check valves shall be installed where lateral piping rises in grade from the control valve.
- 2.5-10 Remote control valves are to be installed in manifold wherever possible. Each remote control valve will have a straight through globe valve (of the same size) installed with it upstream. Remote control valves installed in manifold will have one globe valve (of the same size as the largest remote control valve) installed upstream of the manifold. All manifold connections are to be red brass (see San Diego Regional Standard Drawing SDI-103).
- 2.5-11 One-inch size quick coupling valves, each with its own one-inch straight through globe valve installed upstream, will be installed and spaced no further than 200 feet apart. The

need for quick coupler systems in the open space areas shall be determined on a case-by-case basis. The smallest diameter pipe to serve a quick coupler shall be 1 1/2 inches.

- 2.5-12 In-line globe valves will be used to allow sectional shutdown of the systems. All globe valves are to be labeled as to size and with an arrow leader pointing to the symbol (Example: 1 1/2" G.V.).
- 2.5-13 All irrigation controllers are to be installed in steel enclosures. Controllers will be installed "freestanding" as per San Diego Regional Standard Drawing I-17 (not bolted to the enclosure wall). Enclosure shall be located at a prime observation area with good access and free from irrigation overspray. While the electric power service and controller enclosure may be shared between different assessment districts, each district shall have their own controller(s). Controllers are not to be interconnected.
- 2.5-14 A minimum of two spare wires are to be installed from the controller to the furthest single valve or cluster of valves in each separate wire run. Pull boxes will be shown and labeled wherever wire splicing is necessary. All control wires shall be color coded as per Supplemental Irrigation Specifications (**Appendix "C"**).
- 2.5-15 Each and every sprinkler head (except for drip-type systems) shall have an anti-drain/excess flow valve installed below the head as part of the riser assembly unless the sprinkler head is equipped with an internal check valve.
- 2.5-16 All pressure pipe to be installed underground shall be Schedule 40 P.V.C. for 1 1/2-inch diameter and smaller, and PVC Class 315 for 2-inch diameter and larger.
- 2.5-17 All pressure pipe installed above ground in open space areas shall be galvanized steel Schedule 40 pipe or Schedule 40 UV resistant pipe.
- 2.5-18 All lateral, non-pressure pipe shall be Schedule 40 PVC, 3/4-inch minimum.

2.6 WATER BUDGET

- 2.6-1 All new development with a landscape area of 500 square feet or greater must demonstrate compliance with a MAWA Water Budget unless exempted in Section 2.6-2.
- 2.6-2 The following developments are exempt from the requirements of Section 2.6-1
 - 2.6-2.01 Landscape that is part of a registered historic site (local, state or federal);
 - 2.6-2.02 Ecological restoration projects without permanent irrigation;
 - 2.6-2.03 Botanical gardens and arboretums open to the public; and
 - 2.6-2.04 Mined-land reclamation projects without permanent irrigation.

2.6-3 The MAWA Water Budget is calculated using the following calculation formula (see calculation worksheets in Appendix E):

$$\text{MAWA Water Budget} = (\text{ETo})(0.62)[(\text{ETAF} \times \text{LA}) + ((1-\text{ETAF}) \times \text{SLA})] = \text{gallons per year}$$

$$\text{For residential landscape areas} = (\text{ETo})(0.62)[(0.55)(\text{LA}) + (0.45)(\text{SLA})]$$

$$\text{For non-residential landscape areas} = (\text{ETo})(0.62)[(0.45)(\text{LA}) + (0.55)(\text{SLA})]$$

Legend for MAWA Water Budget Calculation Formula

Symbol	Description of Symbol
ETo	Evapotranspiration (inches per year)
0.62	Conversion factor to gallons
ETAF 0.55 for residential landscape areas; 0.45 for non-residential landscape areas	Evapotranspiration Adjustment Factor
LA	Landscape Area (square feet)
1- ETAF 0.45 for residential landscape areas; 0.55 for non-residential landscape areas	Additional Evapotranspiration Adjustment Factor for Special Landscape Areas and Reclaimed Water
SLA	Special Landscape Area (square feet)

2.6-4 The Estimated Total Water Use (ETWU) shall not exceed the MAWA Water Budget as calculated in Section 2.6-3.

2.6-5 The ETWU is calculated using the following calculation formula (see calculation worksheets in Appendix E):

$$\text{ETWU} = [(\text{ETo})(0.62)][(\text{PF} \div \text{IE} \times \text{HA}) + \text{SLA}] = \text{gallons per year}$$

Legend for Estimated Total Water Use (ETWU) Calculation Formula

Symbol	Description of Symbol
ET _o	Evapotranspiration (inches per year)
0.62	Conversion factor to gallons
PF	Plant Factor
HA	Hydrozone Area (square feet)
IE	Irrigation Efficiency (0.81 for Drip System devices) (0.75 for Overhead Spray devices)
SLA	Special Landscape Area (square feet)

2.7 LANDSCAPE IRRIGATION AUDIT

Development subject to Section 2.6 – MAWA Water Budget, shall be subject to the following audit requirements.

- 2.7-1 A landscape irrigation audit is intended to verify that all irrigation systems, plant materials, and landscape features have been installed and operate as approved.
- 2.7-2 All landscape irrigation audits shall be conducted by a professional authorized by the State to perform this work.
- 2.7-3 The professional that conducts the landscape irrigation audit shall certify that all irrigation systems, plant materials, and landscape features have been installed and operate as approved, and shall submit that certification to the City prior to occupancy and use.