

# Water-Efficient Landscape & Irrigation Standards Plan Submittal Check List

Revised August 10, 2016



Fill out and mail, fax or email to:  
Civil Engineering Division– Land Development Section  
1685 Main Street  
Santa Monica, CA 90401  
Fax 310.393.4425  
sm.engineering@smgov.net

## **PROJECT INFORMATION**

Date:	Plan Check #:
Project Street Address:	Zip Code:
Applicant Name/Title:	Company Name:
Applicant Street Address:	City, State and Zip Code:
Applicant Telephone Number:	Applicant Email:
Property Owner Name (or designee)/Title	Company Name:
Property Owner Street Address:	Property Owner City, State and Zip Code:
Property Owner Telephone Number:	Property Owner Email:

**1. Is this a new development project (new construction involving demolition of 50% or more of exterior walls) or new landscape after receiving of Certificate Of Occupancy (COO) (check one):**

- New Development Project
- New Landscape for a project that has received its COO

**2. Project type (check one):**

- Single-family
- Multi-family
- Commercial [Commercial/Business, Mixed-Use Development, Institutional (school, hospital, etc.)]

**3. Are any of the following special landscapes included in the project? (Check all that apply):**

- Recreational turfgrass area dedicated to active play such as parks, sports fields, and golf courses.
- Edible landscapes such as vegetable garden or orchard.
- Water feature irrigated with approved alternative water supply.

**4. Landscape areas may be watered by hand, manual or automatic irrigation systems.**

**Permanent irrigation systems are not required. Is a permanent automated irrigation system being installed?**

- Yes
- No (Landscapes installing new plant material but without a permanent, automated irrigation system, where water is accessed only through a hose bib or quick coupler connection, are not required to submit a hydrozone matrix, an irrigation plan, or an irrigation detail and specifications plan. On the Landscape Planting Plan add this note: *“No permanent, automated irrigation system to be installed. Any future irrigation system installation will require a full landscape plan submittal for City of Santa Monica review and approval prior to installation.”*)

**5. For individual single-family dwellings not installing a new permanent automated irrigation system, is new landscape plant material being installed?**

- Yes
- No (Individual single-family dwellings installing no new landscaping, other than mulch and artificial turf, and no new irrigation system, shall be required only to submit a construction plan with this note: *“No new permanent, automated irrigation system to be installed. A minimum 3 inch (3”) layer of mulch shall be applied on all exposed soil surfaces of existing planting areas except in turf areas, over creeping or rooting groundcovers, or in direct seeding applications, where mulch is not appropriate. Any revisions to approved plans will require re-submittal and approval and must comply with the current Water-Efficient Landscape and Irrigation Standards. Call (310) 458-8405 to schedule a final inspection.”*)

**Does the landscape plan set include the following plans?** (Please note: Do not include landscape plants, hardscape, or irrigation systems within the parkway on the plan set. Include title block information for all plans.)

- Cover Sheet with Required Plan Submittal Notations\***
- Landscape Plan \*** (may be submitted on separate sheets as a construction plan, landscape planting plan, landscape planting details and specification plan, and landscape elevations)
- Irrigation Plan \*\*** (may be submitted on separate sheets as an irrigation plan, irrigation details and specification plan, and hydrozone matrix)

\* Must bear the signature of a licensed architect, licensed landscape architect, licensed landscape contractor, licensed engineer or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.)

\*\* Must bear the signature of a certified irrigation designer, licensed architect, licensed landscape architect, licensed landscape contractor, licensed engineer or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

**Cover Sheet and Notations Checklist- include all of these items on your cover sheet plan:**

- Include a sheet index legend.
- Include signatories' company name, address, telephone number, and email.
- Include Parkway Declarations:
  - “All existing sprinklers and spray heads shall be removed in the parkway.”
  - “The installation of new sprinkler irrigation systems are prohibited in the parkway.”
  - “The installation of any irrigation system in the parkway shall not damage the roots of the street tree.”
  - “No mulch shall be applied within six inches (6”) of the base of a street tree.”
  - “No plant material shall be installed within twenty-four (24”) inches of the base of a street tree.”
  - “The property owner adjacent to the parkway assumes liability for any improvements to the parkway area.”
- Submitted plans must include the following general notations:

- “An open-trench inspection by City staff is required prior to covering below grade pipes, laterals, and mains. The designer of the landscape, or their designee, and general contractor, or their designee, performing the installation must be present at the open- trench inspection. For open-trench inspections, call the Office of Sustainability and the Environment at (310) 458-8405.”
- “Prior to final Inspection installer shall test the irrigation system to verify that it meets the approved design and specifications.”
- “Prior to final Inspection installer must program the irrigation controller.”
- “A final inspection by City staff is required prior to Certificate of Occupancy to ensure that the system was built to approved plans and specifications. For final inspections, call the Office of Sustainability and the Environment at (310) 458-8405. The following items will be required at final inspection prior to the issuance of a Certificate of Occupancy:
  - Post-installation soil test results which must contain the percentage (%) of organic matter; may also include but is not limited to soil texture; infiltration rate or soil texture infiltration rate table; pH; total soluble salts; sodium; and recommendations determined by laboratory test. Exception: Landscapes contained entirely in planters or containers are exempt from this requirement.
  - A detailed irrigation controller map must be installed inside or near the irrigation controller with at minimum a description for each zone including: plant material, watering device, valve or station number, run time for peak demand month and precipitation rate.
  - Irrigation schedules including establishment period start and end dates, must be posted inside the irrigation controller housing unit by the installer.”
- “Electronic submission of an As-Built set of plans to the City is required if requested by City inspector.”
- “Prior to construction of landscaped area or irrigation, the contractor must obtain and review a copy of the Water-Efficient Landscape and Irrigation Standards.”
- “All landscaping and irrigation systems must comply with all local, state, and federal laws and regulations.”
- “The irrigation system must comply with all local, state, and federal laws and regulations.”
- “The irrigation designer or landscape architect or landscape designer shall perform one or more site observations during system installation to check for adherence to the design, including that the proper installation of the backflow prevention assembly, main line, laterals, valves, sprinkler heads, drip irrigation equipment, control wire, controllers, and sensors meets the intent of the irrigation design plan as designed and approved.”
- Submitted plans must include the following construction notation:
  - “Areas designated as mulch on approved landscape plans, including areas covered by wood chips, gravel, stone, decomposed granite, and areas designated as artificial turf on approved landscape plans cannot be replaced with turfgrass or high water use plants as defined in the current edition of the Water Use Classification of Landscape Species (WUCOLS), once mulch or artificial turf has been installed.”
  - For single-family homes only installing new landscaping, submitted construction plans must include the following declaration signed by the project applicant: “The landscape for this property must be built to the approved landscape plans within this approved building plan set. Any revisions to approved plans will require re-submittal

and approval and must still comply with the current Water-Efficient Landscape and Irrigation Standards. Any areas of landscape not completed at time of the close of the building construction permit must be covered with a minimum 3 inch (3”) layer of mulch. This includes all exposed soil surfaces of existing planting areas except in turf areas, over creeping or rooting groundcovers, or in direct seeding applications, where mulch is not appropriate. Future landscape installations for incomplete landscape installations must be to the approved landscape plans. I, \_\_\_\_\_, (project applicant) have read and understand the terms of this statement.”

- Submitted plans must include the following landscape notation:
  - “Turfgrass, including existing plant material, is not allowed on slopes greater than twenty-five percent (25%) where the toe of the slope is adjacent to an impermeable hardscape and where twenty-five percent (25%) means one foot (1’) of vertical elevation change for every four feet (4”) of horizontal length (rise divided by run x 100 = slope %).”
  - “Plant material listed in the current Invasive Plant Inventory for the southwest region by the California Invasive Plant Council or listed for the South Coast region by the PlantRight organization are prohibited, including existing plant material, except for known non-fruiting, non-invasive, sterile varieties, cultivars or selections.”
  - Individual single-family dwellings installing no new landscaping, other than mulch and artificial turf, and no new irrigation system, shall be required only to submit a landscape plan with this note: “No new permanent, automated irrigation system to be installed. A minimum 3 inch (3”) layer of mulch shall be applied on all exposed soil surfaces of existing planting areas except in turf areas, over creeping or rooting groundcovers, or in direct seeding applications, where mulch is not appropriate. Any revisions to approved plans will require re-submittal and approval and must comply with the current Water-Efficient Landscape and Irrigation Standards. Call (310) 458-8405 to schedule a final inspection.”

**Landscape Plan Checklist- include all of these items on your landscape plan:**

- North Arrow
- Scale
- Base plan information
  - Proposed or existing building footprint (identified)
  - Proposed or existing shade structures (identified)
  - All proposed or existing hardscape (identified in Legend as new or to remain and appropriately hatched) such as:
    - Steps and Entries
    - Driveways
    - Pathways (e.g. concrete, stone, decomposed granite, gravel)
    - Retaining Walls
    - Patios, pads
    - Pools, spas
    - Permanent amenities (e.g. barbecues, fire pits, built-in seating)
  - Raised Planting Beds (curbs and mow strips)
  - All existing hardscape to remain (identified)

- Landscape areas (planting areas identified as “PA” and shown without plant material)
- All additional permeable surfaces identified (e.g. gravel path or mulch area or artificial turf)
- All proposed or existing gates and fences (identified in Legend as new or to remain)
- Arrows indicating slope and percentage
- Include the following measurements in square feet:
  - Parcel Size (i)
  - Combined area of all building footprints (ii)
  - Total impermeable hardscape (Do not include impermeable surfaces less than 5’ wide where there is permeable material on both sides) (iii)
  - Total pool, spa and pond surface area (iv)
  - Total water feature(s) surface area and indicate the type of alternative water source used, i.e. greywater, rainwater, if applicable (v)
  - Total permeable/landscape area [(i-ii-iii-iv-v)=(vi)]
  - Total permeable hardscape area (decomposed granite, gravel, artificial turf, mulch, permeable pavers) (vii)
  - Total planted area (vi-vii) = (viii)
    - Total irrigated planted areas (must be reflected in the hydrozone matrix)
    - Total non-irrigated planted areas (i.e., hand watered planted areas; does not include mulch, decomposed granite or other non-planted permeable surfaces))
  - Include the following measurements in square feet and as a percentage of the total permeable/landscape area (vi) for irrigated and non-irrigated planting areas using plant factors as defined by the current edition of the Water Use Classification of Landscape Species (WUCOLS) for both new and existing plant material
    - a. Total turfgrass and high water use plant material
    - b. Total moderate water use plant material
    - c. Total low and very low water use plant material
    - d. Total edible plant material (do not include in a-c,e)
    - e. Total planted area irrigated with an approved alternative water supply (do not include in a-d)
- Legend of symbols and abbreviation if not on title block.
- Call-outs or a numbering system to identify the elements drawn in the plan with the Legend
- Designated insect habitat, if applicable.

**Landscape Plan Design Checklist – incorporate these regulations into your landscape plan design:**

- Any new outdoor water feature installed in any landscaped area shall:
  - Use a water recirculation system;
  - Not have any water that is sprayed into the air visibly land outside the water features; and
  - Not have any water spray or run onto surrounding landscape or impermeable hardscape areas.
- The total cumulative surface area of all water features on a site may not exceed 25 square feet unless the feature uses water from an approved alternative water source and delivery system.
- Existing water features may be repaired but the cumulative surface area may not increase.

## **Landscape Plan Checklist- include all of these items on your landscape plan:**

- Include a legend that clearly indicates the following for all plant material new and existing:
  - Plant species including both the botanical and common name
  - Planting Size/Form (Gallon, Box, Seed, Sod, etc.)
  - Quantity
  - Location
  - Water use needs or plant factor as defined by the current edition of the Water Use Classification of Landscape Species (WUCOLS).
- Specify any non-fruiting, non-invasive, sterile varieties or cultivars of plants invasive plants, specify this on the plans.
- For Mixed-Use Development Projects and Institutional Landscapes projects with recreational turfgrass, clearly designate areas on the planting plan.

## **Landscape Planting Detail and Specification Checklist- include all of these items on your landscape detail and specification plan:**

- Specify soil amendments as necessary; mulch type, depth, and location.
- Include detail drawings showing proper installation and spacing of plant material.
- Include specifications indicating installation procedures.
- Include landscape maintenance schedule.
- Construction Notes: Instructions to Contractor
- Hardscape details

## **Landscape Design Checklist – incorporate these regulations into your design:**

### **Hydrozoning**

- Plants shall be grouped together into hydrozones based on similar watering needs.
- Groundcovers, shrubs, lawns, and trees must be on separate irrigation valves.

### **Turf and High Water Need Plants**

- For single-family and multi-family homes only, the total maximum area permitted for installation of turfgrass and high water need plants defined for Region 3 in the current edition of the Water Use Classification for Landscape Species (WUCOLS) issued by the California Department of Water Resources (DWR) is twenty percent (20%) of the total landscaped area, including existing plant material. Alternative documentation of water use from horticultural researchers at academic institutions or professional associations as approved by DWR may be presented for plants not listed in WUCOLS.
- For commercial properties that are not Institutional or Mixed-Use Development projects, turfgrass and high water need plants, including existing plant material, defined for Region 3 in the current edition of the Water Use Classification for Landscape Species (WUCOLS) issued by the Department of Water Resources (DWR) are prohibited, excluding areas watered by graywater, captured rain on site or other approved alternative water sources. Alternative documentation of water use from horticultural researchers at academic institutions or professional associations as approved by DWR may be presented for plants not listed in WUCOLS.
- For Institutional and Mixed-Use Development projects only, recreational turfgrass areas are allowed. High water use plants as listed in WUCOLS (except for turfgrass) are not permitted.

- ❑ For single-family and multi-family homes only, the total cumulative landscape area of all high and moderate water using plants, including existing plant material, shall not exceed forty percent (40%) of the total landscape, excluding edibles and areas watered with an approved alternate water supply.
- ❑ For all commercial properties, the total maximum area permitted for installation of moderate water need plants, including existing plant material, defined for Region 3 in the current edition of the WUCOLS issued by the Department of Water Resources is thirty percent (30%) of the total landscaped area, excluding edibles and areas watered with recycled water or other approved alternative water sources. Alternative documentation of water use from horticultural researchers at academic institutions or professional associations as approved by DWR may be presented for plants not listed in WUCOLS.
- ❑ Turfgrass, including existing plant material, is not allowed on slopes greater than twenty-five percent (25%) where the toe of the slope is adjacent to an impermeable hardscape and where twenty-five percent (25%) means one foot (1') of vertical elevation change for every four feet (4") of horizontal length (rise divided by run x 100 = slope %).
- ❑ Plant material listed in the current Invasive Plant Inventory for the southwest region by the California Invasive Plant Council or listed for the South Coast region by the PlantRight organization are prohibited, including existing plant material, except for known non-fruiting, non-invasive, sterile varieties, cultivars or selections.

#### **Amendments and Mulch Requirements**

- ❑ Incorporate compost at a rate of a minimum of four cubic yards (4 yd<sup>3</sup>) per one thousand square feet (1000 ft<sup>2</sup>) of permeable area shall be incorporated to a depth of six inches (6") into the soil. Soils with greater than six percent (6%) organic matter in the top six inches (6") of soil are exempt from adding compost and tilling. A post installation soil test must show a six percent (6%) organic matter content or greater.
- ❑ A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, over creeping or rooting groundcovers, or in direct seeding applications where mulch is not appropriate. To provide habitat for beneficial insects and other wildlife, up to five percent (5%) of the landscape area may be left without mulch. Designated insect habitat must be clearly identified on the construction or landscape plan.
- ❑ No mulch shall be applied within six inches (6") of the base of trees.
- ❑ No plant material shall be installed within twenty-four (24") inches of the base of a tree.
- ❑ Areas designated as mulch on approved landscape plans, including areas covered by wood chips, gravel, stone, decomposed granite, and areas designated as artificial turf on approved landscape plans cannot be replaced with turfgrass or high water use plants as defined in the current edition of the Water Use Classification of Landscape Species (WUCOLS), once mulch or artificial turf has been installed.

#### **Landscape Elevation Drawing Plan Checklist – include these items on your landscape elevation drawings (*optional for single-family homes*):**

- ❑ Provide at planting and at two-year growth.
- ❑ Provide at minimum one elevation from street or front of dwelling or unit and one elevation from the side of dwelling or unit.

## **Irrigation Plan Checklist – include these items on your irrigation plan:**

- Include point of connection, water supply type (potable, greywater, rainwater, recycled, etc.).
- Include all parts and their make and model, including but not limited to: master valves, flow sensors, manual shut off valve, pressure regulators, valves, backflow prevention devices, filters, piping and piping depth, pressurized main lines and lateral lines, drip irrigation components and drip irrigation layout.
- For Institutional Landscapes and Mixed-Use Development projects with recreational turfgrass and overhead irrigation, where sprinklers are proposed, include sprinkler heads showing head-to-head coverage and include calculations demonstrating a maximum of 1.0 inch per hour precipitation or application rate for those areas.
- Include water source, maximum and minimum static pressure reading at source, service line type and size, meter type model and size, date information is obtained, source of information and who it is obtained by and from.
- Commercial properties and residential landscape properties over 5000 square feet must provide pressure loss calculations.
- If automating the system, include automatic irrigation controller and sensor(s) information.
- Identify (outline and letter) each hydrozone group, according to watering needs, on the irrigation plan. Irrigation design shall accommodate hydrozones accordingly. For example; separate zones may be required for trees, shrubs, flowers, shady or sunny areas, drip irrigation and/or sprinklers. Indicate hydrozones for each valve and the area of the landscape being irrigated.
- Include a hydrozone matrix information table that includes irrigated planting areas arranged into hydrozones according to watering needs. Each valve will be assigned a single hydrozone. Describe for each zone the following:
  - the square footage
  - percentage of total permeable/landscape area (for trees use box size at planting)
  - percentage of slope at finished grade
  - average plant factor - calculated based on the proportions of the respective plant water uses and their plant factor (moderate, low, very low); high plant factor plants, such as turfgrass, cannot be mixed with lower plant factor plants and must be on their own separate hydrozone; when specifying grass seed mix product, the species with the highest plant factor will determine the plant factor for that hydrozone
  - hydrozone basis
  - hydrozone description - indicates the type of planting (turf, shrubs, trees, etc.) and if it is an edible or alternative water supply zone
  - exposure or micro-climate
  - irrigation method
  - irrigation emission devices (including manufacturer / model / number)
  - device flow rate
  - zone pressure
  - precipitation rate
  - zone gallons per minute
  - controller station number

- Include this legend with the matrix:

PLANT TYPE	
WUCOLS	
Code	Rating
T	Turf
H	High
M	Medium
LVL	Low, Very Low
O	Other

HYDROZONE BASIS	
PL	Plant Type
IR	Irrigation Method
SU	Sun Exposure
SO	Soil Type
SL	Slope
O	Other

IRRIGATION METHOD	
D	Drip
S	Small Rotor
L	Large Rotor
B	Bubbler
M	Microspray
O	Other

**Irrigation Detail and Specification Checklist- include all of these items on your irrigation detail and specification plan:**

- Include reference notes and schedule.
- Include detail drawings showing proper installation of irrigation system.
- Include specifications indicating installation procedures.
- Include irrigation maintenance schedule.
- Include establishment period irrigation schedule with start and end dates, and include established landscape irrigation schedule. Schedule should take into account the parameters used to program the specified irrigation controller.
- Include City’s recommended tree watering guidelines chart.

Tree Trunk Width Size	Recommended Water Volume	Watering Frequency Based on Species	Months	
			April to October	November to March
Newly Planted (less than 5")*	10 to 20 Gallons	Newly Planted Tree	Weekly	Bi-Weekly
Average Street Tree (16")*	160 gallons	Minimal	Once or Twice a Month	None
Small (5" to 12")*	80 gallons	Minimal	Once or Twice a Month	None
		Moderate	Twice to Three Times a Month	Once a Month
		High	Weekly	Once to Twice a Month
Medium (13" to 21")*	160 gallons	Minimal	Once or Twice a Month	None
		Moderate	Twice to Three Times a Month	Once a Month
		High	Weekly	Once to Twice a Month
Large (22" to 30")*	260 gallons	Minimal	Once or Twice a Month	None
		Moderate	Twice to Three Times a Month	Once a Month
		High	Weekly	Once to Twice a Month
Very Large (31" and Over)*	310 gallons	Minimal	Once or Twice a Month	None
		Moderate	Twice to Three Times a Month	Once a Month
		High	Weekly	Once to Twice a Month

\* Width of Tree Trunk at four feet from ground level

## Irrigation Design Checklist – incorporate all of these regulations into your design:

### General Irrigation Requirements

- All existing sprinklers and spray heads shall be removed except in recreational turfgrass areas for Institutional and Mixed-Use development project landscapes.
- The installation of new sprinkler irrigation systems are prohibited, including parkways.  
Exception:
  - Micro-sprays not exceeding thirty gallons per hour (30 gph) may be used on areas solely dedicated to edible plants.
  - Institutional and Mixed-Use Development Landscapes with Recreational Turfgrass Areas
    - Must be designed and installed in such a manner that a precipitation rate of one inch (1”) per hour is not exceeded unless using approved alternate water supply irrigation system.
    - Sprinklers shall have a minimum operational lower quarter distribution uniformity of seventy-five percent (75%).
    - No sprinklers shall be located within twenty-four inches (24”) of any trees or impermeable hardscape, including but not limited to sidewalks, driveways, alleys, streets, walkways, fencing.
    - Irrigation shall not runoff nor overspray onto impermeable surfaces including but not limited to buildings, fencing, property line, public right-of-way.
    - Sprinkler heads on the same valve shall have matched precipitation rates.
    - Sprinkler heads with or without multi-stream, multi-trajectory rotating nozzles, shall have built-in pressure regulation in the body or stem or shall have pressure regulating swing joints.
    - Sprinkler heads shall have swing joints or other riser-protection components.
    - Sprinkler heads must have a minimum of head-to-head coverage (minimum of fifty percent (50%) of diameter). Wind de-rating, if used, should be based on wind criteria for the time period that the system is normally operated.
- If installing new irrigation zones or systems, drip irrigation is required for all plant material.  
Exception:
  - Sub-surface tree bubblers emitting half a gallon per minute (0.5 gpm) or less may be used for trees of a size twenty-four inch (24”) box or larger. A maximum of two (2) bubblers per tree. Bubblers must have fixed emission outputs and cannot be variable or adjustable.
- Hoses used for irrigation shall be equipped with an automated, shut off nozzle.
- Hose bibbs shall be equipped with a built-in pressure vacuum breaker.
- Drip irrigation and bubblers and sprinklers (if applicable) must be on separate valves.
- Trees shall be irrigated on a separate valve unless the tree is located in a planter or container.
- Graywater irrigation systems must conform to Chapter 16 of the California Plumbing Code.
- Root vegetables shall not be irrigated with graywater.
- Alternate water supply irrigation systems must conform to all local, state, and federal laws and regulations.
- Low-head drainage is prohibited. Anti-drain valves or check valves in drip emitter devices are required to prevent low-head drainage.
- Static water pressure, dynamic or operating pressure and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be

conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

- Specify pressure regulation to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance. If the water pressure is below the recommended pressure of the specified irrigation devices, the installation of a pressure regulating device is not required.
- Pressure regulation may include a single master pressure regulator and may be used for the entire system if the dynamic pressure at each emission device has the same manufacturer's recommended pressure range for optimal performance. It must be located after the master backflow prevention device, if present.
- A single large capacity master filter may be used but must be located after the master backflow prevention device and master pressure regulator, if present.
- Label all types of water proposed including potable and alternative water supplies per local, state and federal laws and regulations.
- Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply.
- A master shut-off valve is required for all automatic irrigation systems except in systems that make use of technologies that allow for the individual control of sprinklers that are individually pressurized in a system equipped with low pressure shut down features. A master shut off valve shall be installed as close as possible to the point of connection of the water supply but upstream from the remote control valve(s) which control(s) water flow into the irrigation zones.
- Cross-Connection Prevention (Backflow Prevention) as required by SMMC Section 7.12.370.
- Dedicated landscape water service meters shall be installed on all commercial landscapes and residential landscape areas greater than five thousand square feet (5,000 ft<sup>2</sup>).
- A flow sensor that detects high flow conditions created by system damage or malfunction is required for all automatic irrigation systems.
- Valve boxes are required for all commercial landscapes and must be large enough to service irrigation equipment inside and be installed over a layer of coarse stone or gravel while maintaining an air space between valves and the layer of stone.
- Specify main and lateral pipe sizes that will result in the velocity of water moving through these pipes at a rate not exceeding five feet (5') per second for pipes under three inch (3") in diameter and not exceeding seven feet (7') per second for pipes three inch (3") or greater in diameter.
- Use Schedule 40 or Class 315 solvent weld-type PVC pipe for mains, below grade laterals, or piping under roadways. Class 125 pipe is not permitted.
- IPS flexible PVC pipe or flexible HDPE pipe may be substituted for rigid PVC pipe below grade in lateral lines only to avoid underground obstructions encountered during trenching or tunneling.
- Use Schedule 40 UV resistant PVC, Schedule 80 PVC or metal piping for all above grade pipes.
- Pipe in the same trench must be laid side-by-side and not overlapped. Provide three inch (3") vertical and horizontal clearance between irrigation lines and six inch (6") clearance between lines of other work. Do not install parallel lines directly over any other line.
- PVC fittings must be of the same chemical compound as pipe on which they are installed.
- PVC cement must be have the proper adhesive value for the pipe on which it is used.
- Backfill shall not have rocks or debris greater than half inch (1/2") in size next to the pipe.

- Trench or tunnel depth must be sufficient to obtain a minimum depth of cover over the installed pipe and control wire which conforms to the City code. Where pipe and/or conduit are placed below paving or hardscape the minimum burial depths are:
  - Pressure Lines  $\leq 2$  inches in landscaping 12"
  - Pressure Lines  $> 2$  inches in landscaping 18"
  - Pressure Lines under non-vehicular paving 18"
  - Pressure Lines under vehicular paving 24"
  - Non-pressure Lines  $\leq 2$  inches in landscaping 12"
  - Non-pressure Lines  $> 2$  inches in landscaping 12"
  - Non-pressure Lines under non-vehicular paving 12"
  - Non-pressure Lines under vehicular paving 18"
  - Conduit in landscaping 12"
  - Conduit under non-vehicular paving 18"
  - Conduit under vehicular paving 24"
- Under vehicle paving or sidewalks, install a sleeve made of permanent rigid material (PVC Sch 40 or Class 160) that is twice the size of the pipe it will hold and should extend one foot (1') beyond the edge of the hard surfaces.
- Properly identify any applicable alternative water supply discharge piping, system components and area(s) of distribution.
- Automatic Irrigation Controller Requirements per the California Green Building Standards Code (Cal Green).
- Drip irrigation shall have a minimum operational emission uniformity of eighty-one percent (81%).
- Drip irrigation emitters shall emit no more than two gallons per hour (2 gph).
- Multi-outlet emitters are prohibited.
- Only container plantings, raised beds, and edible plant areas irrigated with micro-spray may use one quarter inch (1/4") or one-eighth inch (1/8") solid tubing (also referred to as "spaghetti tubing").
- Drip irrigation valve assemblies are required for each drip irrigation zone and must include:
  - Anti-siphon valve, if a master backflow protection device is not specified;
  - In-line remote control valves only if there is a master backflow prevention device at the point of connection;
  - Pressure regulator, if a master pressure regulator for the entire irrigation system is not specified;
  - Filter with a one hundred-fifty to two hundred (150 – 200) mesh, wye or tee filter, if a master filter for the entire irrigation system is not specified;
  - Pressure regulator and remote control valve must have a minimum flow rate that is lower than the zone flow rate.
- A flushing mechanism for each drip irrigation zone is required.
- For sub-surface drip irrigation zones, an operational indicator is required.
- Wire stakes shall be U-shaped galvanized steel wire stakes and shall be installed at minimum every three feet (3').
- Drip tubing shall be made of polyethylene or PVC.