

City of Corona



Landscape Design Guidelines for Residential Development

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1. PURPOSES

- A. The City of Corona has established landscape design guidelines for residential developments in order to create pleasant and attractive neighborhoods throughout the City. The City believes that proper landscaping in residential properties promotes a sense of community, creates a more pleasant living and working environment, and promotes water and resource conservation, including but not limited to, storm water retention/percolation and best management practices. The landscape design guidelines complement the mandatory site development regulations contained in the City's Zoning Ordinance and Specific Plans.
- B. The primary purpose of these landscape design guidelines is to provide procedural and design guidance for project applicants proposing landscape installation or landscape rehabilitation projects that are subject to the requirements of the Corona Municipal Code Section 17.70.070. This document is also intended for use and reference by City staff and/or consultants in reviewing and approving designs and verifying compliance with the Corona Municipal Code Section 17.70.070 regulations that are at least as effective as the Department of Water Resources Model Water Efficient Landscape Ordinance.
- C. The landscape design guidelines will be utilized during the City's plan review process to accomplish the goals of:
 - Ensuring the highest level of resource conservation including water conservation, ground water recharge, and green waste reduction;
 - Promoting the design, installation and maintenance of water-efficient landscaping, water use management and water conservation through the use of water-efficient landscaping, functional and limited use of turf grass, and aggressive use of water conserving irrigation technology and management;
 - Reducing the water demands from landscapes without a decline in the landscape quality or quantity in a manner that conserves regional water resources, by ensuring that landscape projects are not unduly water-needy and that irrigation systems are appropriately implemented to minimize water waste;
 - Retaining flexibility and encouraging creativity through appropriate design;
 - Complying with state guidelines by requiring that landscapes not exceed a maximum water demand of seventy percent (70%) of its reference evapotranspiration (ET_o) or any lower percentage as may be required by state legislation;
 - Eliminating water waste from overspray and/or runoff;
 - Establishing procedural and design requirements for water efficient landscaping that are at least as effective in conserving water as the Department of Water Resources Model Water Efficient Landscape Ordinance in compliance with California Government Code section 65591 et seq.

2. APPLICABILITY

- A. Unless otherwise specified within an approved Specific Plan for a single family, duplex, and multi-family residential development, these landscape design guidelines shall apply to the following landscape projects in the City of Corona:

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1. Developer installed landscaping in new construction projects which have a proposed landscaped area equal to or greater than 2,500 square feet, and are otherwise subject to:
 - a. A discretionary approval of a landscape plan, or
 - b. A ministerial permit or building permit for a landscape or water feature;
 2. Developer installed landscaping in rehabilitation projects which:
 - a. Have a proposed landscaped area equal to or greater than 2,500 square feet,
 - b. Propose to rehabilitate fifty percent (50%) or more of the existing landscaped area, and
 - c. Are otherwise subject to:
 - i. A discretionary approval of a landscape plan, or
 - ii. A ministerial permit or building permit for a landscape or water feature;
 3. Homeowner installed landscaping in new construction projects which have a proposed landscaped area equal to or greater than 5,000 square feet, and are otherwise subject to:
 - a. A discretionary approval of a landscape plan, or
 - b. A ministerial permit or a building permit for a landscape or water feature;
 4. All homeowner installed landscaping in rehabilitation projects which:
 - a. Have a proposed landscaped area equal to or greater than 5,000 square feet,
 - b. Propose to rehabilitate fifty percent (50%) or more of the existing landscaped area, and
 - c. Are otherwise subject to:
 - i. A discretionary approval of a landscape plan, or
 - ii. A ministerial permit or building permit for a landscape or water feature.
- B. These landscape design guidelines do not apply to:
1. Registered local, State, or federal historical sites;
 2. Ecological restoration projects that do not require a permanent irrigation system;
 3. Mined-land reclamation projects that do not require a permanent irrigation system;
 4. Plant collections, as part of botanical gardens and arboretums open to the public;
 5. Landscape rehabilitation projects and/or new construction projects that require a temporary overhead spray system;

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6. Cemeteries; and
 7. Any other new construction project and landscape rehabilitation project not listed in Municipal Code section 17.70.070(A)(3).
- C. On-site and off-site landscaping with automatic irrigation is required for all developer, property owner, association, or property manager single-family, duplex, and multi-family residential projects subject to the provisions of Section 17.70.070 of the Corona Municipal Code (Landscaping, Fences, Walls, and Hedges) and these landscape design guidelines. The landscape design guidelines are to be administered by the Community Development Department under the guidance of the Community Development Director. Any decisions of the Community Development Director concerning implementation of these guidelines may be appealed to the Planning Commission. The Planning Commission's decision may be further appealed to the City Council.
- D. Except where the context of such words or phrases clearly indicate a different meaning or construction, the definitions of those certain words, terms, and phrases provided in Section 17.70.015 and 17.70.070(A)(2) of the Corona Municipal Code, shall have the same meanings herein.
- E. Other regulations affecting landscape design, installation, and maintenance practices are potentially applicable and should be consulted for additional requirements. These regulations include but may not be limited to:
1. City specific plans, master plans, general plan, or similar land use and planning documents;
 2. Corona Municipal Code Chapter 13.26 (Water Conservation);
 3. Corona Municipal Code Chapter 13.28 (Recycled Water);
 4. Corona Municipal Code Chapter 13.27 (Storm Water Management and Discharge);
 5. Corona Municipal Code Chapter 15.36 (Grading Regulations);
 6. Corona Municipal Code Title 17 (Zoning);
 7. California Government Code sections 65591 et seq.;
 8. National Pollutant Discharge Elimination System Permit for the City of Corona's Municipal Separate Storm Sewer System; and
 9. Any conditions of approval for a specific project.

3. CERTIFICATION FOR WATER CONSERVING LANDSCAPES

- A. In accordance with recommendations and guidelines put forth in state Assembly Bills 2717 and 1881 (California Government Code sections 65591 et seq.), the City of Corona is committed to landscaping that is attractive and professionally designed, that incorporates low water using plant material that is adapted to the inland region of Southern California, and to efficient irrigation systems and technology engineered to maximize water conservation. Landscape architects and landscape professionals are expected to make every effort to conserve water in design decisions and choices. As such, each conceptual landscape plan and each set of landscape development plans must contain a "Water Conservation Certification Statement" on the title sheet that reads as follows:

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I hereby certify, as the landscape architect/licensed landscape professional of record that the information provided herein meets the requirements and standards as outlined in the Corona Municipal Code Section 17.70.070 and the adopted design guidelines for the development of this project.”

This statement must be signed and dated with the appropriate license stamp on the title sheet of the project landscape plans and shall be included in the City of Corona Community Development Department Landscape Certification Form, attached hereto as Exhibit F, and by this reference incorporated herein.

- B. The commitment to water conserving landscapes includes the utilization of a free guide published by the Department of Water Resources entitled: A Guide to Estimating Water Needs of Landscape Plantings in California. This guide is subtitled, The Landscape Coefficient Method and WUCOLS III (Water Use Classifications of Landscape Species). This guideline is available from the: Department of Water Resources, Bulletins and Reports, P.O. Box 942836, Sacramento, CA 92436-0001, (916) 653-1097, and www.water.ca.gov.

4. SUBMITTAL REQUIREMENTS

A. Project Review Submittal

1. For any residential landscape project subject to Section 17.70.070 of the City of Corona Municipal Code and these landscape design guidelines, at the time of Development Plan Review (DPR) or Project Review Committee (PRC), the project applicant/developer shall submit to the Community Development Department a conceptual landscape plan depicting all areas to be planted and irrigated in the proposed residential development.
2. It is recommended that the scale be no greater than 1" = 20' (scale may vary due to size of project).
3. The illustrations shall include paving materials, finishes, plant palettes with WUCOLS III water needs category, notes, call-outs, details and sections, and a water conservation statement, as required pursuant to Section 3A hereof, to communicate the project's design.
4. The design submittal shall include notes confirming the use and specific type of low precipitation automatic irrigation technology and the total square footage of the area to be landscaped and irrigated. All existing utilities must also be identified on the submittal.

B. Construction Plans and Specifications

- C. At the time of plan check, five sets of detailed construction landscape and irrigation plans are required to be submitted to the Building Division for routing to all other departments.
- D. It is recommended that the scale used on plans be 1" = 20' (scale may vary due to size of project).
- E. All landscape plans for Community Facilities Districts (CFD), Landscape Maintenance Districts (LMD), and/or public rights-of-way shall be submitted to the Public Works Department.
- F. Wall and fence plans shall be submitted to the Building Division separately. The wall and fence plans should be submitted for building plan check simultaneously with the landscape plans.

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- G. Street trees are specified by City Staff at DPR and shall be specified on the on-site landscaping plans in accordance with the Standard Plan format. All street trees are to be 24 inch boxes or larger.

5. LANDSCAPE DESIGN

All landscaping shall include a combination of water conserving trees, shrubs, sub-shrubs, vines, groundcover, and accent lighting (if desired or conditioned). In addition, it is highly encouraged to utilize low impact development (LIDs) methods including porous paving, storm water cisterns, extensive bioswales, and roof gardens. Hardscape and any site amenities including boulders, recycling fountains, walls, art/sculptures, fences and benches shall be included on the plans.

6. PLANTING PLAN REQUIREMENTS

- A. Plants shall be selected based on their required level of maintenance, durability, mature widths and heights, and water requirements and must be listed in WUCOLS III with a water needs category of Very Low, Low, or Moderate (except bioswales, which may contain plant material having a "High" water need.) Except when utilized in conjunction with the aforementioned bioswale, plants listed as High in WULCOLS are prohibited.
- B. In order to specify plant species other than those listed in WUCOLS III as a Medium or less water user, the project applicant must provide the Community Development Director with the following:
 - 1. A plant species description, picture, and water requirements from Western Sunset Garden Book or other comparable source; and
 - 2. A written explanation of why the plant should be used in light of the need to conserve water.
- C. All landscaped planters must contain shredded wood mulch to retain moisture, suppress weeds, and moderate soil temperature. The mulch depth, type, and maintenance frequency must be noted on the plans.
 - 1. All planters (non-slope) must be mulched with a minimum of three inches (measured after settling) of organic wood mulch. Areas of planted groundcover shall be mulched with a minimum of one and a half inches of organic wood mulch. Slope planting with point to point drip or subterranean irrigation requires a minimum of four inches of organic wood mulch.
 - 2. Color enhanced mulches are prohibited.
 - 3. Mulch may be omitted for native re-vegetation projects upon the recommendation of the project biologist and/or the landscape architect or landscape professional with valid reasons.
 - 4. A two inch (2") layer of decomposed granite or crushed rock or gravel mulch may be substituted for organic wood mulch when appropriate to the overall landscape design and as approved by the Community Development Director after reviewing a physical sample.
- D. Turf is not permitted in multi-family residential projects unless it is in an area utilized for functional or recreational use that has been approved as part of the project review. See the discussion regarding "Turf" section 7(D)(4) of these landscape design guidelines for additional information regarding turf in single family and duplex residential projects.
- E. Plants shall be grouped and irrigated on separate valve zones (hydrozones) based on their water use requirements, slope aspect, and sun/shade micro-climates. Hydrozones are to be labeled and numbered on the plan.
- F. Self-clinging or climbing vines may be required on garden (non-retaining) and trash enclosure walls.

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G. Planting plans shall include:

1. A Planting Legend, including plant symbol, genus, species, common name, container size, mature width and height, on-center spacing, quantity of each type of plant by container size, water needs from WUCOLS III, Region 4 (VL, L, or M), Hydrozone Number as labeled on the plan, planting detail call out, and remarks;
2. Labels for all existing trees and vegetation that will either remain or be removed;
3. The location of street lights;
4. Property lines, limit-of-work lines, streets, and street names;
5. Labels for all buildings, driveways, sidewalks, bio-swales, storm water management best management practices, and other hardscape features;
6. Topographic elevation lines and spot elevations to determine slope, which may be screened back, but must remain legible; and
7. A plan note that requires a post grading agronomic soil analysis and the requirement that contractors amend the soil in accordance with the recommendations of the report.

H. The planting plans shall be designed in a manner that provides that:

1. No shrubs or trees shall be planted closer than the diameter of plant width to any sidewalks, V-ditches, walls or pedestals unless otherwise dictated by field conditions;
2. All soil next to curbs and sidewalks shall be graded at two inches below the finished surface; and
3. Soil amendments shall be added to all planting areas with gradients 2:1 and less in accordance with post grading soil analysis recommendations.

7. FRONT YARD LANDSCAPE

- A. Builders and developers shall provide professionally designed front yard landscapes for new construction in order to provide an enhanced image and view of homes. The following landscape design guidelines shall guide the landscape architect or landscape professional in the implementation and creation of a neighborhood landscape theme for new construction landscape projects. Homeowner installed landscape projects shall also follow these landscape design guidelines for their front yards. In general, the front yard landscape should reflect the character of the architectural style of the home, which includes plant varieties, color, texture of plant material, diversity, and form.
- B. Pursuant to the City of Corona's commitment to water conserving landscapes, all residential landscape plans must utilize and specify plants listed in WUCOLS Guideline for Region 4 (South Inland Valley) that have a water need of medium or lower. Except for landscaping in bioswales, plants listed as high in WUCOLS are prohibited.
- C. Generally, a mixture of plant materials and paving should be distributed as follows: 40% turf (single family and duplex developments only), 30% shrubs, 30% hardscape (excludes driveway), and two trees. Less turf is always recommended. For multifamily residential developments, the use of shrubs, hardscape and trees shall be increased in place of turf since turf is prohibited in this type of development.
- D. The front yards shall conform to the following criteria:

1. Trees

At least two trees (min. 24 inch box) in addition to the required street trees are to be planted per front yard. Alternatively, three 15 gallon size trees can be used in place of the two 24 inch

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box trees where the size of the front yard area allows for such. Corner lots are unique situations and shall have an additional requirement of 1 gallon vines at 10 feet o.c. installed against the street side yard wall.

- The front yard trees shall be planted in informal clusters, creating movement throughout the entire street. Mature tree size and scale should be considered.
- All 24 inch box trees shall be double staked and 15 gallon trees shall be single staked. All trees shall be tied to stakes with a rubber "cinch tie" or equal. All trees in turf areas shall require arbor guards.

2. Hardscape (30%, excluding driveways)

Hardscape in the front yard may consist of the following materials:

- decorative rocks (minimum 3 inches in diameter);
- boulders;
- garden walkways;
- decorative pavers and stepping stones;
- fountains and statues (re-circulating); and
- mulch.

Hardscape materials not listed above are subject to the approval of the Community Development Department.

3. Shrubs (30%)

- Shrubs should be chosen for their ability to reinforce the neighborhood character, which includes plant varieties, color, texture of plant material, diversity, and form.
- A minimum shrub area shall be at least 15% of the total front yard area.
- The minimum shrub specifications shall be 5 gallon size for background/foundation and 1 gallon size for foreground.
- If the planting area allows only a single row, the minimum size shall be 5 gallon. (Refer to Exhibits "A" and "B").
- Each typical front yard shall have a minimum of three 15 gallon accent shrubs, vines, or espaliers, in order to minimize any exposed walls from the streetscape view. This is in addition to the shrubs mentioned above.
- Shrubs are to be spaced a maximum of 75% of their mature growth, i.e., *Raphiolepis Indica* "Pinkie," 4 inch dia. mature size-spaced at 3 feet o.c. (Refer to Exhibit "A").
- All shrub areas shall have ground cover planted at a maximum of 8" o.c. triangular spaced, from rooted cuttings or liners. A wider spacing can be considered for 4 inch pots or 1 gallon sizes.
- A three (3) inch layer of shredded mulch is required under all shrub masses without groundcover.
- One agronomic soils test shall be submitted for each tract at the conclusion of finish grading. The soils lab's recommendations shall be used for both soil conditioning and plant backfill mix.

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- All landscape areas shall be finished with no less than eight (8) inches of amended topsoil.

4. Turf (40%)

- Live turf is limited to warm season types and shall not exceed 40% of the total front yard landscaped area on single family homes and duplexes.
- In single family and duplex residential developments, if turf area is reduced to 30% of the front yard landscaped area or less, then shrubs and ground cover areas shall be increased accordingly.
- Live turf is prohibited in multi-family residential developments and may only be used in functional and/or recreation use areas with the approval of the Community Development Department.
- Artificial or synthetic turf is allowed as defined in Section 17.70.015 of the Corona Municipal Code and must be installed per manufacture's recommendations including a six inch by six inch concrete mow curb separating the synthetic turf from the adjacent shrub planting. Approved turf areas shall not exceed a slope of four feet horizontal to one foot vertical (4:1).

5. Parkways

Water efficient landscaping is required for all new construction and rehabilitation projects for residential parkways. A combination of water efficient plants, permitted types of hardscapes, and cedar mulch shall be installed in the parkway. For additional information regarding parkway planting, please refer to the *City of Corona Residential Parkway Landscape Conversion Guidelines*.

- Live turf is prohibited in all new residential parkways. Artificial turf may be permitted in place of live turf. Approval will be on a case-by-case basis.
- Only water efficient ground covers and shrubs as prescribed by the city's Public Works Department that grow no taller than 18 inches are permitted.
- Street trees shall be planted per City of Corona street tree standards. Please contact the Parks and Community Services Department for more information regarding allowable types of street trees and size.
- Fire hydrants shall have a 3-foot (on center) clear area surrounding them, where no planting shall be permitted. This area shall be covered in mulch.
- Concrete, non-pervious pavers, or metal grates are prohibited.
- Pervious decorative pavers are permitted.
- Colored mulch is prohibited. Only cedar mulch, natural colored mulch, or bark is permitted (3 inches minimum depth).
- Decorative rock, red rock, colored rocks, or pea gravel that are less than 3 inches are prohibited.
- Colored rocks are prohibited regardless of size of rock.
- Rocks that are 3 inches or larger are permitted (not grouted in place).
- All rock, bark, and mulch shall be flush to the curb.
- No structures except mailboxes and utilities are allowed in the parkway.

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- For existing residential developments, if converting an existing overhead sprinkler system to a water wise drip irrigation system, please visit the following link: <http://www.irrigationtutorials.com/dripguide.htm>

8. SLOPES

All natural and manufactured slopes over 4 feet in height with slopes between 1-1/2:1 to 4:1 (horizontal to vertical) shall be planted and automatically irrigated. Plant materials, quantities, planting design, and irrigation design shall be as per the items listed below. Slopes shall be landscaped with appropriate planting for immediate erosion control.

- A. As a minimum tree planting requirement, all landscaped rear yard or side yard slopes shall have a minimum of two 15 gallon trees;
- B. One 15 gallon tree or larger, for each 400 square feet of slope. No less than 50% of the trees shall be evergreen trees;
- C. Two shrubs for each sixty-four square feet of slope area. The ratio shall be 60% 1 gallon size and 40% 5 gallon size;
- D. Jute netting shall not be used for slope erosion control on residential production slopes unless otherwise specified by the Civil Engineer. Jute netting can be used on commercial/industrial slopes with City approval;
- E. Groundcovers: Rooted cuttings shall be planted at 12 inch o.c. minimum and 24 inch o.c. maximum (triangular spaced), depending on the variety of ground cover used;

9. REAR YARD LANDSCAPE

All landscape projects installed in rear yards and subject to these landscape design guidelines shall comply with the following requirements:

- A. The landscape project shall utilize and specify plants listed in WUCOLS Guideline for Region 4 (South Inland Valley) that have a water need of medium or lower. Except for landscaping in bioswales, plants listed as high in WUCOLS are prohibited.
- B. Live turf in single family and duplex residential developments is limited to warm season types.
- C. Live turf is prohibited in multi-family residential developments and may only be used in functional and/or recreation use areas with the approval of the Community Development Department.
- D. Artificial or synthetic turf is allowed as defined in Section 17.70.015 of the Corona Municipal Code and must be installed per manufacture's recommendations including a six inch by six inch concrete mow curb separating the synthetic turf from the adjacent shrub planting. Approved turf areas shall not exceed a slope of four feet horizontal to one foot vertical (4:1).
- E. The total landscaped area for the property shall comply with the water budget requirements set forth in Section 11 hereof.

10. DRAINAGE AND IRRIGATION

Pursuant to current state law, the City requires all water conservation practices to be implemented through landscape design. Water efficient landscapes and proper irrigation designs, along with the selection and use of water friendly plant material and efficient irrigation is required.

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Drainage

- A. All landscape and hardscape areas shall have positive drainage away from structures.
- B. Install a 3-foot wide sidewalk from driveway to side yard fence (Refer to Exhibit "B").
- C. Where side yard drainage swales are affected by improvements, an underground drainage system shall be used.
- D. All landscape and hardscape shall comply with the applicable requirements of Corona Municipal Code Chapter 13.27 (Storm Water Management and Discharge).

Irrigation

- A. All yards shall be automatically irrigated.
- B. All irrigation system(s) shall be professionally designed and installed to achieve maximum water efficiency and to provide 100% head-to-head coverage.
- C. High efficiency irrigation methods including drip, point to point, subterranean, and micro spray technology shall be used for all shrubs and trees.
- D. Where turf is allowed, overhead spray may be used. Match precipitation rotor heads only shall be used and shall be designed and installed with minimal overspray onto paved surfaces, structures, and non-vegetated areas. The design shall be head-to-head coverage.
- E. Irrigation systems shall be zoned according to plant water use, slope aspect, and sun/shade microclimate. If low water use plants (that can also survive/flourish with medium water application are used within a medium water use hydrozone, they must be counted as medium water use in the irrigation water budget calculations.
- F. All slopes less than eight feet in height shall be irrigated utilizing point-to-point drip irrigation. Rotors or rotary head irrigation is permitted on slopes over eight feet in height and subject to the following standards:
 - 1. Rotor heads adjacent to roads, sidewalks, paths, trails, and/or concrete drainage swales shall be set back two (2) feet and maintained to prevent overspray.
 - 2. Check valves shall be utilized to prevent low head drainage.
 - 3. Irrigation plans shall be designed based on hydrozones and watering schedules to prevent run-off.
 - 4. All sprinkler heads shall have a minimum irrigation efficiency rating of 0.75.
 - 5. Slopes steeper than 4:1 shall not be irrigated with an irrigation system with a precipitation rate exceeding 0.75 inches per hour. Heads shall have matched precipitation rates unless otherwise directed by the manufacturer's recommendations.
 - 6. The sprinkler spacing shall be designed to achieve the highest possible distribution uniformity.
 - 7. Rotors or rotary nozzles shall be installed as follows with the slope sections being maintained on separate zones:
 - a. Top of slope – half-heads
 - b. Middle of slope – full heads
 - c. Bottom of slope – half-heads
 - 8. Bottom of slope rotors and rotary nozzles shall be designed as pop-up heads with swing joints. All other rotor heads shall be staked.

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- G. Irrigation systems shall be installed with a rain shut off sensor.
- H. Irrigation systems shall be installed with smart irrigation controller(s). The smart irrigation controller(s) shall have the following attributes:
 - 1. Real-time, weather based program adjustment capability;
 - 2. On-site weather station or external ETo input;
 - 3. Rain sensors shall be placed within an unobstructed natural rainfall area and located above the irrigation spray pattern;
 - 4. Master valve (or simultaneous operations);
 - 5. Flow sensor;
 - 6. Multiple start times; and
 - 7. Minimum of two programs.
- I. Irrigation systems shall be installed using only low precipitation irrigation.
- J. Irrigation systems shall be scheduled so that the irrigation precipitation rate does not exceed the infiltration rate of the soil.
- K. A baseline irrigation schedule shall be provided on the plans for the six-month initial plant establishment period. The project applicant shall adjust the schedule to meet site specific requirements and use the baseline schedule to set the weather based controller. The schedule currently in effect shall be posted in the controller, and shall include the current water alert stage, watering windows, and watering guidelines in effect pursuant to Chapter 13.26 of the City of Corona Municipal Code.
- L. A second baseline irrigation schedule shall be provided on the plan which incorporates the specific water needs of the plants throughout the post-establishment calendar year. The project applicant shall adjust the schedule to meet site specific requirements and use the baseline schedule to set the weather based controller. The schedule currently in effect shall be posted in the controller.
- M. The irrigation schedules shall include the recommended irrigation days per week, number of cycles per day, minutes of run times per cycle, and estimated amount of applied irrigation water, expressed in gallons per month and gallons per year.
- N. The irrigation controller shall be operational and set to real-time weather prior to the completion of the 90-day maintenance period of the installing contractor.
- O. Pressure loss calculations shall be taken into consideration for the valve with longest run and highest water demand.
- P. The Irrigation Plan shall be prepared at the same scale as the Planting Plan and, at a minimum, shall identify the following:
 - 1. The location and size of service lateral(s) and water meter(s);
 - 2. The point of connection (POC) location, static pressure at POC, and stated source (Name and phone number) of static pressure;
 - 3. The total flow rate (gallons per minute) and designed operating pressure (psi) for each overhead spray and/or bubbler circuit, and total flow rate (gallons per hour) and design operating pressure (psi) for each drip and low volume irrigation circuit;
 - 4. The location, size, and type of all irrigation components including, but not limited to, smart controller, central controller (backflow prevention device, ball valves, anti-drain check valves, pressure supply (main) line, lateral lines, pipe sizing, valves, spray heads, rotors, drip, low volume irrigation equipment, gallons per minute, pressure regulators, and pumps;

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5. The Hydraulic Calculations including Type of Water (Potable or Recycled), Point of Connection #, Water Information Source, Water Meter Size, Flow Available, Static Pressure at POC, Elevation Change, Service Line size, Length of Service Line, Pressure Available, Critical Station Flow, Flow at POC, Residual Flow Available, Pressure Required at Critical Station, Pressure Loss for; fittings, main line, POC to Valve elevation, backflow, Water Meter, Critical Station at POC, Pressure Available, and Residential Pressure Available;
6. The precipitation rate (inches per hour) for each spray type circuit;
7. An irrigation legend with the symbol, manufacturer name, model number (or non-proprietary description for publicly funded projects), separate symbols for irrigation equipment with different spray patterns, spray radius, and precipitation rate;
8. The location, size, and type (high, medium, low; square footage; shrubs, turf, slope, etc.) of each hydrozone;
9. Topographic elevation lines to determine slope;
10. Te irrigation system details for assembly and installation; and
11. Calculation for the project's landscape Water Budget. (See Section 11, "Water Budget Requirements" of these landscape design guidelines.)

11. WATER BUDGET REQUIREMENTS

Water budgets are used to assist designers and governing authorities. They are a tool to verify compliance with the state requirements for water conservation and they assist with water demand management. A water budget determines how much water a particular landscape needs over a specified period of time. The Maximum Annual Water Allowance (MAWA) is calculated and compared to the Estimated Annual Water Use (EAWU) to verify that the project landscaping is not exceeding the allowed water use.

The City of Corona uses the formula and tables included in Figure 1, attached hereto and by this reference incorporated into these landscape design guidelines, to determine water budgets. Figure 1, the information provided below, and the sample worksheet following, are designed to assist the project applicant in calculating a Water Budget for inclusion in his/her Irrigation Plan.

- A. Maximum Annual Water Allowance and Evapotranspiration
- B. Rate (ET_o). ET_o, or Annual Reference Evapotranspiration Rate, is the quantity of water evaporated from adjacent soil surfaces and transpired by plants in terms of inches for a particular climate zone. Your total square footage of landscape and ET_o are essential components of the MAWA formula.
- C. The reference ET_o for Corona (i) is 56.37; (ii) is taken from the California Irrigation Management Information System (CIMIS) Station #44 at UCR; and (iii) has been entered into the Landscape Water Budget Formula.
- D. Estimated Annual Water Use (EAWU). The formula for EAWU is calculated for each hydrozone separately, and then the total of all hydrozones is divided by the Irrigation System Operation Efficiency (IS). In addition to the square footage of each hydrozone, the EAWU calculation relies on several other key factors. One is the average Plant Factor (PF) that is established by the WUCOLS III for plants that are considered high, medium, low, and very low based on their water requirements. For purposes of the Water Budget Formula, turf is considered to have a high (H) water requirement. Refer to Chart 2 in Exhibit D (Factors Used in Water Budget Formula), attached hereto and by this reference incorporated herein, to establish the PF for each hydrozone and enter the number in Space D of the Water Budget Formula on Figure 1. Plant categories used in the calculation must be from WUCOLS III, Regional Zone 4 for Corona.

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- E. Another key factor in calculating EAWU is the Irrigation Efficiency (IE). The IE is derived from measurements and estimates of the irrigation application method performance within controlled environmental conditions. Chart 3 of Exhibit D provides the IE factor to be used in Space F of the Water Budget Formula on Figure 2.
- F. The final factor in calculating EAWU is the Irrigation System Operation Efficiency. This number is derived from the efficiency of the controller. Since “smart” controllers are required by ordinance, the IS factor shall be 0.85. This figure has been inserted in the Water Budget Formula for you.
- G. To finalize the Water Budget Calculations, add together the EAWU for each hydrozone within the proposed project. This will be the Sub-Total WAWU. Next, divide this number by .85 (IS for Smart Controllers). The resulting number will be the Total EAWU. Subtract the Total EAWU number from the MAWA. The resulting number must be positive. If the number is negative, then adjustments will need to be made to the planting plan (e.g. use more plant types that consume less water) and /or the Irrigation Plan (e.g. use more efficient application methods).
- H. A water budget formula shall be completed and included on all Irrigation plans submitted to the City of Corona for plan check. A blank Water Budget Form is provided as Figure 2 and also may be downloaded from the City’s web site at [DiscoverCorona.com/CityDepartments/CommunityDevelopment/LandscapeForms/Water Budget Form](http://DiscoverCorona.com/CityDepartments/CommunityDevelopment/LandscapeForms/WaterBudgetForm).

12. CERTIFICATION AND FINAL LANDSCAPE INSPECTION

- A. Landscape Inspection Certification Forms and Certificate of Completion, attached hereto as Exhibit F and by this reference incorporated herein, shall be completed by the Landscape Architect or landscape professional of record. The Landscape Certification Form is available at www.DiscoverCorona.com. The Landscape Architect or landscape professional shall visit the site to ensure landscape work has been completed in substantial compliance with the approved plans, Section 17.70.070, and these landscape design guidelines. Please see page 20 for minimum standards for inspections under “Typical Front Yards, Rear Yards, Slopes, and Models.”
- B. Final approval is required by the City's landscape inspector. Installation of all landscape materials and any irrigation system must be complete before the City's landscape inspector inspects lots a landscape project.

13. MAINTENANCE

- A. The developer shall guarantee individual front yards/, slopes, parkways, and rear yards for a minimum of 90 days after completed installation.
- B. On-site trees shall be guaranteed for a period no less than six (6) months.

14. MODEL HOME PLANTING

Pursuant to state law, the City encourages all water conservation practices through the use of water efficient landscapes and proper irrigation design. This is achieved by the selection and use of water friendly plant material, reduced turf areas and irrigation schedules.

- A. Each model home shall display different landscape designs and materials for each residential model.
- B. Model homes shall be used as a way to demonstrate and encourage water conservation.
- C. Signs and exhibits shall be posted at one for each model home to demonstrate water conservation through its landscape design concept. Written information shall be provided to all homebuyers. The signage and literature shall clearly state the design concept, materials

Landscape Design Guidelines for Residential Development

and water efficient practices implemented to achieve this concept. Written information shall be available in the sales office.

- D. New homeowners shall be given a brochure/handout explaining optimal settings for their irrigation system(s), current water alert stage, watering windows, and watering guidelines in effect pursuant to Chapter 13.26 of the City of Corona Municipal Code. This will encourage efficient watering and provide common water conservation practices to the homeowner.
- E. New homeowners shall also be given a brochure/handout explaining how to care for the species located on their property.
- F. If the development contains CC&Rs, a condition shall be incorporated into any related project approval prohibiting the use of water-intensive landscaping and requiring the use of low water use landscaping pursuant to the provisions of this section in connection with common area/open space landscaping. Additionally, such a condition shall also require the CC&Rs to incorporate provisions concerning landscape irrigation system management and maintenance including but not limited to annual audits.

15. TYPICAL FRONT YARDS, REAR YARDS, SLOPES, AND MODELS

The following list of items shall be used to acknowledge the completion of landscape work in substantial compliance with the City approved plans, specifications, and landscape design guideline requirements (including but not limited to the landscape fine grading, landscape drains and drainage, irrigation systems, landscape planting and general site clean-up):

- A. a visual field inspection of the irrigation systems and components prior to backfill and complete installation;
- B. an irrigation coverage test;
- C. verification of soils test analysis and soil preparation for all planting areas.;
- D. observation of all plant material prior to installation;
- E. inspection of planting locations, details and installation as per approved plans;
- F. observation of finish grading, drainage swales and side yard drains, including drains under side yard areas;
- G. an overall field review of all plan items, including but not limited to the following items: backfill mix for all plants, plant fertilizer tablets, water basins for all plants, mulch in all planters, proper tree staking, hydroseed mix batch ticket, (90) day maintenance compliance form, and completion of the "Landscape Certification & Inspection Form"; and
- H. observation of the overall site appearance including removal of all construction debris, trash, paint rinse water, stucco over-spray, broken plant material, large rocks, etc.

EXHIBIT A

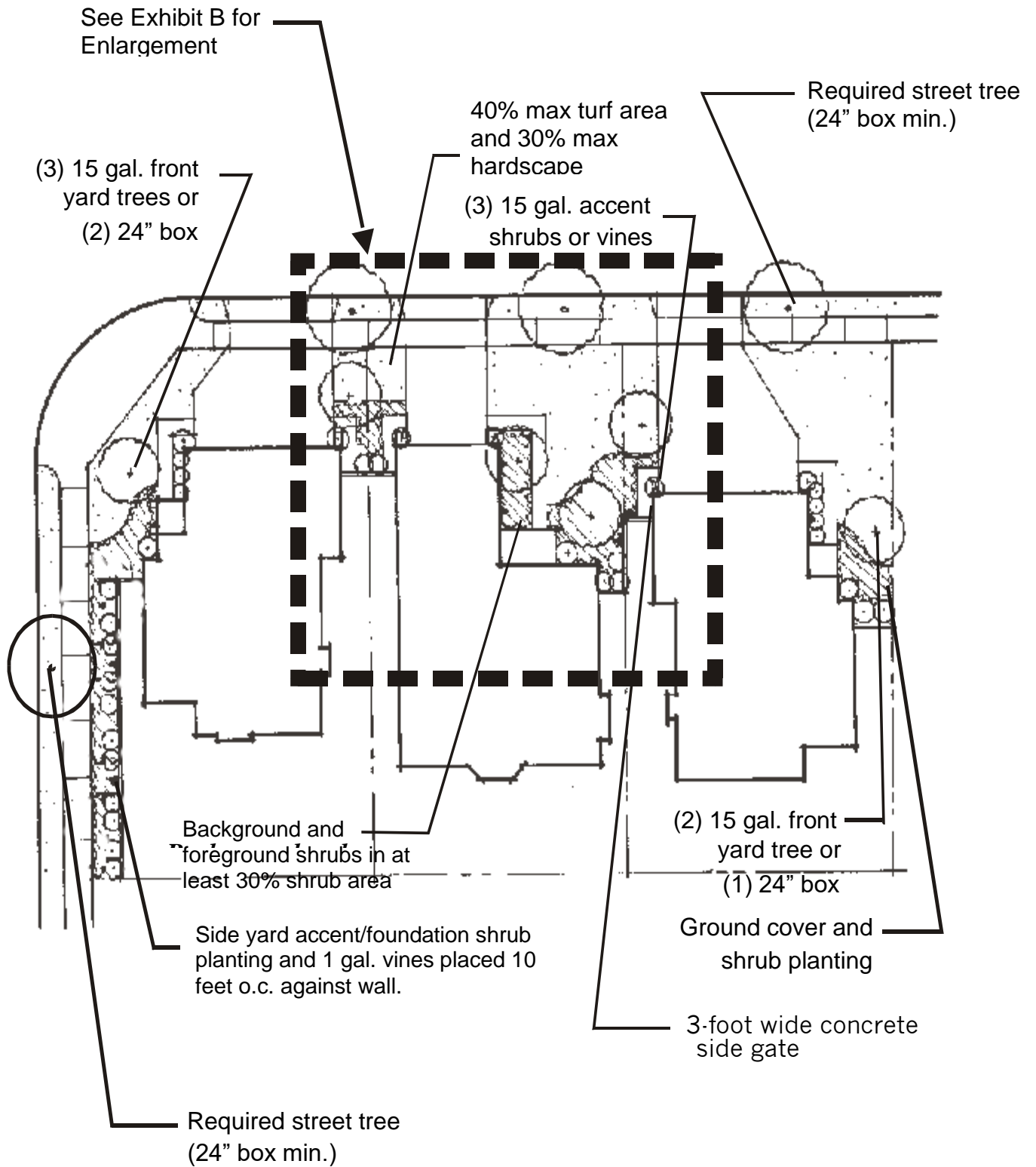


EXHIBIT B

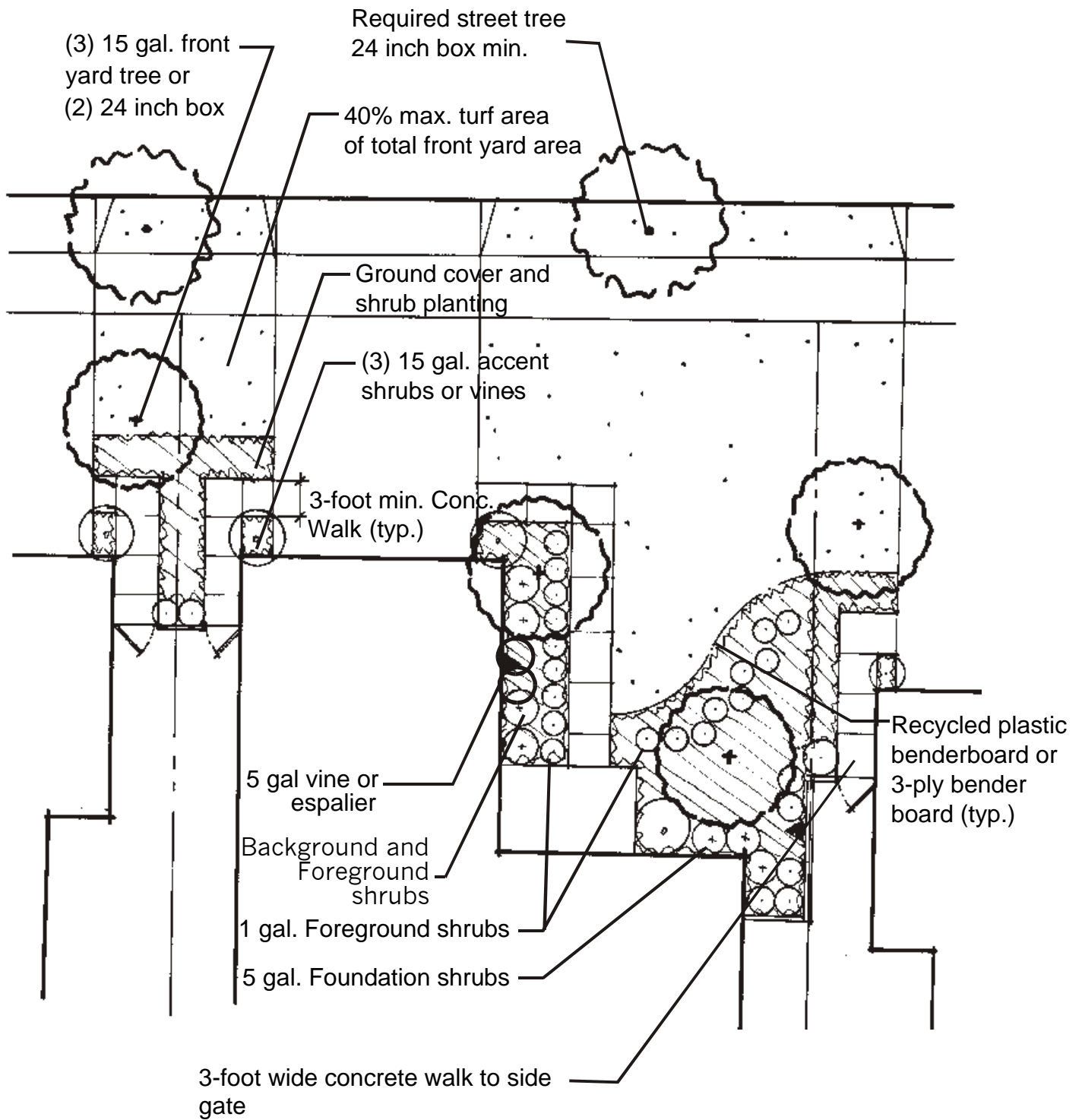
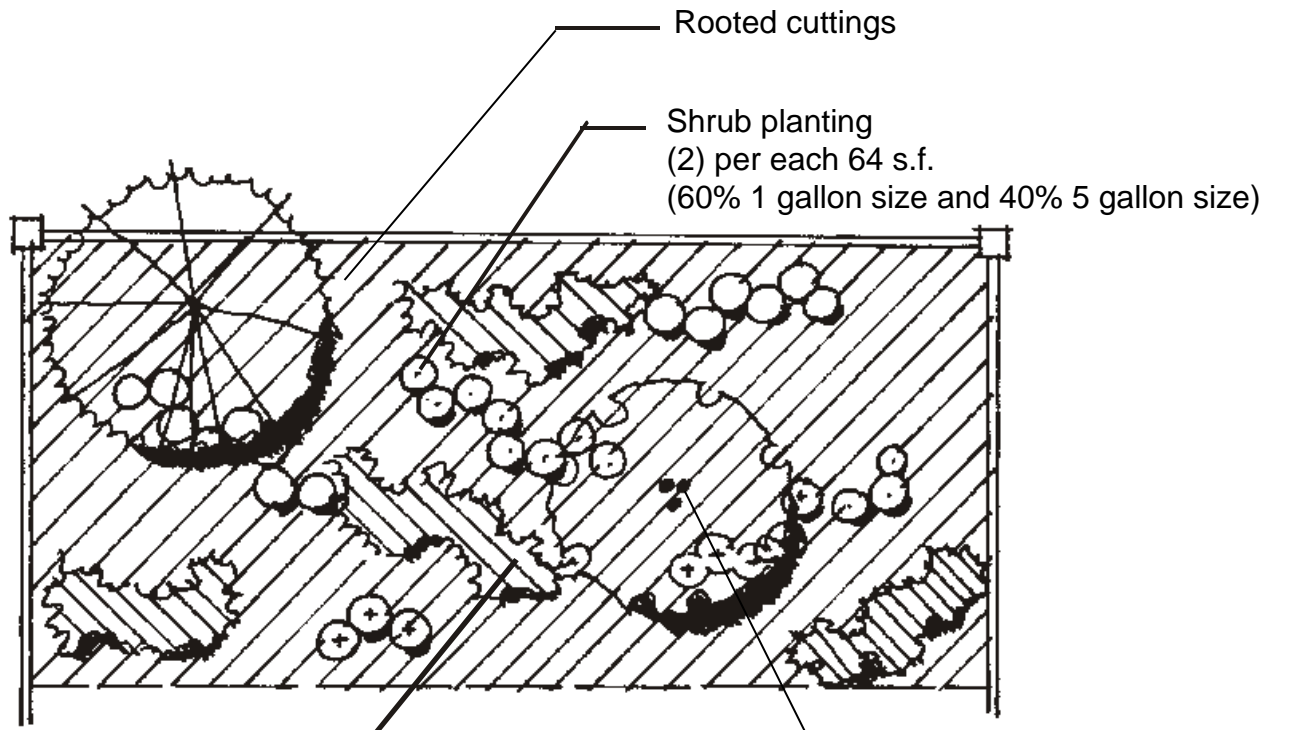


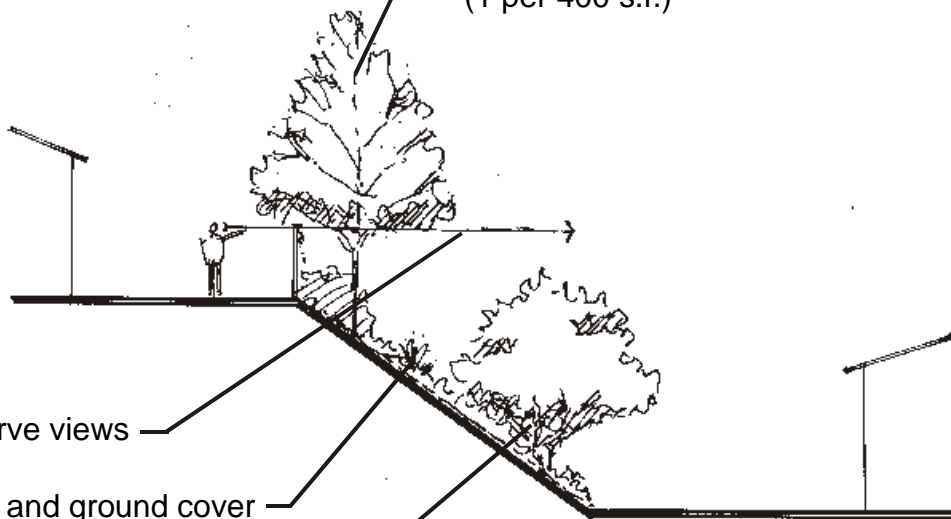
EXHIBIT C



Random shrub and ground cover masses

Trees (15 gallon size min.) (1 per 400 s.f.)

Trees (15 gallon size min.) (1 per 400 s.f.)



Preserve views

Shrub and ground cover planting in random masses.

Broad canopy trees at toe of slope

EXHIBIT D

FACTORS USED IN WATER BUDGET FORMULA

CHART 1: THE ETO FOR CORONA IS
56.37 AND HAS BEEN ENTERED IN THE
LANDSCAPE WATER USE CALCULATION SHEET

CIMIS Station	Name	Reference ETo
44	UC Riverside (Riverside)	56.37

CHART 2: DETERMINING YOUR PLANT FACTOR (PF)
INSERT YOUR PLANT FACTOR IN SPACE D OF THE
LANDSCAPE WATER USE CALCULATION SHEET

Plant Category	Average PF
High	0.8
Medium	0.5
Low	0.2
Very Low	0.1

CHART 3: LOCATING YOUR IRRIGATION EFFICIENCY (IE) FACTOR
INSERT YOUR NUMBER IN SPACE F OF THE
LANDSCAPE WATER USE CALCULATION SHEET

Application Method	IE Factor
Drip	0.90
Bubblers	0.85*
MP Rotators	0.75
Rotors	0.75
Microsprays	0.70
Spray Heads	0.60

*With proper run times

EXHIBIT E

LANDSCAPE WATER USE CALCULATION SHEET

1 MAXIMUM ANNUAL WATER ALLOWANCE (MAWA)

INPUT the total square footage of landscape = x .62
 Corona Historic ETo x .8
 MAWA = gal / yr
 748
 MAWA = ccf

2 ESTIMATED ANNUAL WATER USE (EAWU)

Hydrozone #1

INPUT square footage of hydrozone = INPUT Plant Factor = (low)
 INPUT hydrozone irrigation efficiency =
 EAWU = gal / yr

Total your Hydrozones

+ + + =

Finding Total (EAWU)

SubTotal EAWU =	<input type="text" value="H"/>	cu ft / yr
Input Irrigation System Operation Factor	0.85	
Total EAWU =	<input type="text" value="I"/>	

Finding Your Total Allowance

MAWA - EAWU = } cu ft / yr
(this number must be positive)

For Landscape Architect's Use in Design

EXHIBIT F

CITY OF CORONA
Community Development
Department
(951) 736-2262 Phone
(951) 279-3550 Fax

CITY OF CORONA COMMUNITY DEVELOPMENT DEPARTMENT

LANDSCAPE CERTIFICATE OF COMPLETIONS AND INSPECTION FORM

(NOTE: Must be kept on site by Project Superintendent)

DATE: _____ TRACT: _____

ADDRESS: _____ LOTS: _____

Landscaping and irrigation are to be installed in substantial compliance with approved plans. Some field modifications to hardscape, overheads, trap fencing, slopes and/or related landscape as directed by the project proponent may be acceptable upon approval by the City of Corona Community Development Department.

Items 1-9 need to be completed by the Landscape Architect of record or Licensed Contractor prior to final inspection by City Inspector. The City of Corona Landscape Inspector will conduct the final landscape inspection of items 6 through 9. Final landscape inspections shall be coordinated with the Landscape Inspection Coordinator at (951) 736-2262, 48 hours prior to requested inspection date.

Date/Initials Landscape Architect	Date/Initials City Inspector	Field Observation
1. _____ / _____	N.A.	Irrigation system prior to backfill
2. _____ / _____	N.A.	Soil Preparation
3. _____ / _____	N.A.	Observation of plant material prior to installation
4. _____ / _____	N.A.	Finish grade prior to seeding, sod or groundcover installation
5. _____ / _____	N.A.	Irrigation coverage test
6. _____ / _____	_____ / _____	Water Conservation Assessment Program" Items are installed
7. _____ / _____	_____ / _____	Fences and walls are constructed and installed per the approved fence and wall plans
8. _____ / _____	_____ / _____	<u>Approved</u> set of landscape plans issued by the city and job card on site
9. _____ / _____	_____ / _____	Compliance with approved landscape plan*

The person identified below hereby certifies that the landscape and irrigation design, plans, and specifications for the identified landscape project comply with and have been installed in substantial conformance with the approved landscape and irrigation design, plans, and specifications, and the requirements of the City of Corona Water Efficient Landscape Regulations (Chapter 17.70 of the City of Corona Municipal Code) and the Landscape Design Guidelines of the City of Corona for the efficient use of water and an irrigation audit has been performed. I am a professional appropriately licensed in the State of California to provide professional landscape design services. The information I have provided in this Certificate of Completion is true and correct and is hereby submitted in compliance with the Landscape Design Guidelines for Residential Development.

City of Corona Inspector (Print)

Landscape Architect or Licensed Contractor (Print)
Lic. No. _____

City of Corona Inspector (Signature)

Landscape Architect or Licensed Contractor (Signature)

Date: _____

Date: _____

FIGURE 1 WATER BUDGET FORMULA AND CHARTS

INSTRUCTIONS FOR FILLING OUT WATER BUDGET FORMULA

1. To find MAWA

STEP 1: Calculate your total square footage of the landscape area and insert that number into Space A. (Round the number to the nearest hundred).

STEP 2: The Reference Evapotranspiration for Corona is 56.37. Insert 56.37 in Space B.

STEP 3: Multiple $A \times .62 \times B \times .8$, put the answer in Space C and divide by 748. This gives you your MAWA in gallons.

2. To find EAWU for each Hydrozone

STEP 1: Find your plant factor (CHART 2) for the hydrozone remembering to use the highest plant factor per hydrozone. If you have medium and a low in the same hydrozone, the factor is medium. Place that number in Space D.

STEP 2: Calculate your square footage for the hydrozone (Round to the nearest hundred) and put number in Space E. Next, insert the hydrozone irrigation efficiency number from (CHART 3) into Space F.

STEP 3: Multiple ET_o (from Chart 1) $\times D \times E \times 0.62$, then divide that number by $F \times 748$. This will give you the EAWU number for Space G.

STEP 4: Repeat steps 1-3 for each hydrozone.

STEP 5: Add all G's and put number into Space H.

STEP 6: Divide H by .85 and that will give you your Total EAWU (Space I). This is the irrigation system operating efficiency.

STEP 7: To find J, Subtract I (EAWU) from MAWA and that will give you the total water use for the project. The resulting number must be positive.

BE SURE TO RUN EAWU CALCULATION FOR EACH HYDROZONE WITHIN YOUR PROJECT.

FIGURE 2

The following blank work sheet may be modified as-needed for each project and shall be included On all Irrigation Plan submittals.

1 Maximum Annual Water Allocation (MAWA)	
INPUT the total square footage of landscape =	[] x .62
INPUT the Hist. ETo for the area =	[] x .8
	MAWA = [] gal / yr
	748
	MAWA = []
2 Estimated Annual Water Use (EAWU)	
Hydrozone # 1	INPUT Plant Factor = [] (<i>Turf</i>)
INPUT square footage of hydrozone =	[]
INPUT hydrozone irrigation efficiency =	[]
FAWU =	[] cu ft / yr
Hydrozone # 2	INPUT Plant Factor = [] (<i>High</i>)
INPUT square footage of hydrozone =	[]
INPUT hydrozone irrigation efficiency =	[]
EAWU =	[] cu ft / yr
Hydrozone # 3	INPUT Plant Factor = [] (<i>Med</i>)
INPUT square footage of hydrozone =	[]
INPUT hydrozone irrigation efficiency =	[]
EAWU =	[] cu ft / yr
Hydrozone # 4	INPUT Plant Factor = [] (<i>Low</i>)
INPUT square footage of hydrozone =	[]
INPUT hydrozone irrigation efficiency =	[]
EAWU =	[] cu ft / yr
Hydrozone # 5	INPUT Plant Factor = [] (<i>Very Low</i>)
INPUT square footage of hydrozone =	[]
INPUT hydrozone irrigation efficiency =	[]
EAWU =	[] cu ft / yr
	SubTotal EAWU = [] cu ft / yr
	Input Irrigation System Operation Factor 0.85
	Total EAWU =
	MAWA - EAWU = [] cu ft / yr
	(this number must be positive)