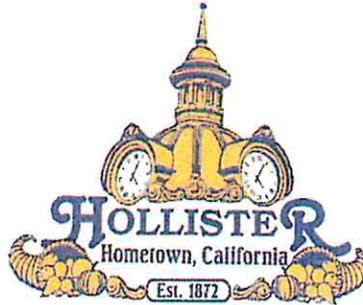


LANDSCAPE APPLICATION PACKAGE



City of Hollister
DEVELOPMENT SERVICES DEPARTMENT
375 Fifth Street
Hollister, CA 95023
(831) 636-4360 Fax (831) 634-4913

Application Procedure

Background

Revised Model Water Efficient Landscape Ordinance (MWELo) 12/1/2015.

A Landscape Application Package is required if your project falls under one of the following categories

- 1.) New construction projects with an aggregate landscape area of 500 square feet or larger that requires a building or landscape permit, plan check, or design review;
- 2.) Rehabilitated landscape projects with an aggregate landscape area of 2,500 square feet or larger that requires a building or landscape permit, plan check, or design review; or
- 3.) Existing landscapes (limited to MWELo Chapter 2.7 §493, 493.1, 493.2); and New and rehabilitated cemeteries (limited to MWELo Chapter 2.7 §492.4, 492.11, 492.12); and
- 4.) Existing cemeteries (limited to MWELo Chapter 2.7 §493, 493.1, 493.2).
- 5.) Registered local, state or federal historical sites are exempt from the MWELo.

To view the MWELo go here:

<http://www.water.ca.gov/wateruseefficiency/landscapeordinance/>

NOTE: On April 1, 2015, the Governor issued an Executive Order that, in part, directs the State Board to impose restrictions on water suppliers to achieve a statewide 25 percent reduction in potable urban usage through February, 2015; require commercial, industrial, and institutional users to implement water efficiency measures; prohibit irrigation with potable water of ornamental turf in public street medians; and prohibit irrigation with potable water outside newly constructed homes and buildings that is not delivered by drip or microspray systems; With California still experiencing severe drought despite recent rains, on February 2, 2016 the State Water Board adopted an extended and revised emergency regulation to ensure that urban water conservation continues in 2016. The regulation extends restrictions on urban water use through October 2016 while providing urban water suppliers more flexibility in meeting their conservation requirements. It also directs staff to report back on additional flexibility once more complete water supply information is known in April.

Emergency Water Conservation Regulation:

http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml

STEP #1 Submittal of Landscape Application Package

Prepare drawings and obtain necessary calculations and documents to complete the Landscape Application Package and submit to the Planning Department at 339 Fifth St. All fees are due at time of submittal. The documents and calculations required are listed with project plan requirements and the project application portion of this packet.

STEP #2 City review of application

Staff will have the project reviewed and contact the applicant in writing whether the project has been approved or further items need to be addressed concerning the project submittal; therefore, the project is subject to a corrections letter. The applicant must address the items listed in the corrections letter and resubmit the corrected drawings prior to approval by the Planning Department.

STEP #3

Receive approval from the Planning Department that project plans are complete for the landscape installation to commence.

STEP #4

Submit a copy of the Water Efficient Landscape Worksheet (including the Water Budget Calculation) to the local water purveyor that your project will be receiving service. Obtain a receipt showing proof of the submittal.

STEP #5

After project installation, the applicant must provide an irrigation audit report conducted by a certified landscape irrigation auditor. The applicant will then submit the irrigation audit report with the Certificate of Completion to the City of Hollister Planning Department within 30 days of the completed landscape project installation.

**City of Hollister
DEVELOPMENT SERVICES DEPARTMENT
375 Fifth Street
Hollister, CA 95023
(831) 636-4360 Fax (831) 634-4913**

**LANDSCAPE APPLICATION PACKAGE GUIDELINES AND
REQUIREMENTS**

Please read and follow these guidelines carefully

Please prepare 3setsof plans, one electronic plan submittal, one application and other required information listed below and return them to the Planning Department. The checklist provided is intended to aid applicants in providing the required information to determine the completeness of your application. Plans that do not provide all of the necessary data from the checklist, in the required order, will be considered incomplete and be returned for revision. Applications will only be accepted for processing if they are complete and consist of the following:

PROJECT INFORMATION PLAN

- All sheets shall be drawn on 24' x 36"paper and folded to approximately 10" x 12".
- All sheets shall be numbered in proper sequence and numbers located on the lower right hand side of each page.
- All sheets shall be dated.
- All plans shall be drawn to scale.
- All sheets shall have a North Arrow.
- All sheets shall be given a sheet title. Continuing

A.) The Water Efficient Landscape Plan Application Package shall include the following six (6) elements:

- 1.) Project information;
 - a. Date
 - b. Project applicant
 - c. Project address (if available, parcel and/or lot number(s))
 - d. Total landscape area (square feet)
 - e. Project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)
 - f. Water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well
 - g. Checklist of all documents in Landscape Documentation Package
 - h. Project contacts to include contact information for the project applicant and property owner.
 - i. Applicant signature and date with statement, "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package".
- 2.) Water Efficient Landscape Worksheet; (See page 11 of application form)
 - a. Hydrozone information table (See page 11 of application form)
 - b. Water budget calculations (See page 10 of application form)
 1. Maximum Applied Water Allowance (MAWA)
 2. Estimated Total Water Use (ETWU)
- 3.) Soil management report. 15.22.090
 - a. Submit soil samples to a laboratory for analysis and recommendations.
 1. Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.
 2. The soil analysis shall include:
 - a. Soil texture;
 - b. Infiltration rate determined by laboratory test or soil texture infiltration rate table;
 - c. PH;
 - d. Total soluble salts;
 - e. Sodium;
 - f. Percent organic matter; and
 - g. Recommendations.
 - b. The project applicant, or his/her designee, shall comply with one of the following:
 1. If significant mass grading is not planned, the soil analysis report shall be submitted to the City of Hollister as part of the Landscape Application Package; or
 2. If significant mass grading is planned, the soil analysis report shall be submitted to the City of Hollister as part of the Certificate of Completion.

3. The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments to the design plans.
4. The project applicant, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the City of Hollister with Certificate of Completion.
- 4.) Landscape Design Plan
- 5.) Irrigation Design Plan
- 6.) Grading Design Plan

For landscape installations, compost at a rate of a minimum of four cubic yards per 1,000 square feet of permeable area shall be incorporated to a depth of six inches into the soil. Soils with greater than 6% organic matter in the top 6 inches of soil are exempt from adding compost and tilling.

A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to 5% of the landscape area may be left without mulch. Designated insect habitat must be included in the landscape design plan as such

LANDSCAPE DESIGN PLAN

The plan shall include the following information and labeled accordingly:

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Scale

Sheet title

Page number

Planting schedule

(See Attached schedule provided by the Development Services Department.)

1. Delineate and label each hydrozone by number, letter, or other method;
2. Identify each hydrozone as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation; (See City of Hollister Example planting legend attached)

1. Identify Special Landscape Areas

a. any recreational areas?

b. any areas permanently and solely dedicated to edible plants?

c. any areas irrigated with recycled water? (if applicable)

4. Identify type of mulch and application depth;

5. Identify soil amendments, type, and quantity;

6. Identify type and surface area of water features;
7. Identify hardscapes (pervious and non-pervious);
8. Identify location and installation details of any applicable storm water best management practices that encourage on-site retention and infiltration of storm water. Storm water best management practices are required in the landscape design plan and examples include, but are not limited to:
 - a. Infiltration beds, swales, and basins that allow water to collect and soak into the ground;
 - b. Constructed wetlands and retention ponds that retain water, handle excess flow, and filter pollutants; and
 - c. Pervious or porous surfaces (e.g., permeable pavers or blocks, pervious or porous concrete, etc.) that minimize runoff.
 - d. Friable soil is required in planted areas to maximize water retention and infiltration. Four yards of compost per 1000 square feet of area must be incorporated. Other recommended measures for increasing onsite storm water retention are listed in the Ordinance.
11. Identify any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);
12. The adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping.
13. Contain the following statement:

“I have complied with the criteria of the ordinance and applied them for the efficient use of water in the landscape design plan”; and
14. Bear the signature of a licensed landscape architect, licensed landscape contractor, 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.)

(1) Plant Material

(A) Any plant may be selected for the landscape, providing the Estimated Total Water Use in the landscape area does not exceed the Maximum Applied Water Allowance. Methods to achieve water efficiency shall include one or more of the following:

1. protection and preservation of native species and natural vegetation;
2. selection of water-conserving plant, tree and turf species, especially local native plants;
3. selection of plants based on local climate suitability, disease and pest resistance;
4. selection of trees based on applicable local tree ordinances or tree shading guidelines, and size at maturity as appropriate for the planting area; and
5. selection of plants from local and regional landscape program plant lists.
6. selection of plants from local Fuel Modification Plan Guidelines.

(B) Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use, as specified in Section 492.7(a)(2)(D).

(C) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. Methods to achieve water efficiency shall include one or more of the following:

1. use the Sunset Western Climate Zone System which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;
2. recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure [e.g., buildings, sidewalks, power lines]; allow for adequate soil volume for healthy root growth; and
3. consider the solar orientation for plant placement to maximize summer shade and winter solar gain.

(D) Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).

(E) High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians (including turf).

IRRIGATION DESIGN PLAN

The plan shall include the following information and labeled accordingly:

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Scale

Sheet title

Page number

For the efficient use of water, an irrigation system shall meet all the requirements listed in

The Water Efficient Landscape Ordinance (section 15.22.110) and the manufacturers' recommendations.

The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

Equipment in the irrigation design plan shall include:

- 1.) Integral or auxiliary sensors (rain, freeze, wind, etc.) that suspend or alter irrigation during a period of high wind, freezing weather or rain.
- 2.) Automatic irrigation controllers with either evapotranspiration or soil moisture sensor data.
- 3.) Irrigation systems are required to have pressure regulators and master shut-off valves.
- 4.) All irrigation emission devices must meet the national standard stated in the Ordinance to ensure that only high efficiency sprinklers are installed.

- 5.) Backflow prevention devices (except single family residences). Please contact the City of Hollister Engineering Department at (831) 636-4340 for permit requirements.
 - 6.) High flow sensors to detect malfunction or high flow conditions.
 - 7.) Check valves or anti-drain valves are required for all irrigation systems.
 - 8.) Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to high traffic areas.
 - 9.) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.
 - 10.) The project applicant shall inquire information from their local water purveyor about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.
 - 11.) Dedicated landscape water meters or submeters are required for residential landscapes over 5000 square feet and non-residential landscapes over 1000 square feet.
 - 12.) Flow sensors that detect and report high flow conditions due to broken pipes and/or popped sprinkler heads are required for landscape areas greater than 5000 square feet.
 - 13.) The minimum width of areas that can be irrigated is 10 feet; areas less than 10 feet must be irrigated with subsurface drip or other technology that produces no over spray or runoff. Median strips cannot be landscaped with high water use plants, precluding the use of cool season turf. Also because of the requirement to irrigate areas less than ten feet wide with subsurface irrigation or other means that produces no runoff or overspray, the use of cool season surf in parkways is limited.
- Irrigation design requirements:
- 1.) Manual shut-off valves shall be located as close as possible to the point of connection of water supply.
 - 2.) The irrigation design conforms to the hydrozones of the landscape design plan and at a minimum the irrigation efficiency criteria in the 'Maximum Applied Water Allowance' based on the Water Efficient Landscape Worksheet in the application form.
 - 3.) Irrigation near non-permeable surfaces:
 - a.) Eliminate overspray to non-permeable surface
 - b.) Narrow or irregularly shaped areas, including turf, less than eight (8) feet in width in any direction shall be irrigated with subsurface irrigation or low volume irrigation system.
 - c.) Within 24 inches of a non-permeable surface
 - Overhead must set back at least 24 inches
 - Drip, drip line or other non-spray irrigation allowed
 - Alternative design to prevent runoff to hardscapes

4.) Slopes greater than 25%

a.) Precipitation rate of irrigation system shall be 0.81 for drip irrigation and 0.75 for overhead spray or less.

5.) Hydrozone

a.) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

b.) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

c.) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.

d.) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

-plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or

-the plant factor of the higher water using plant is used for calculations.

e.) Individual hydrozones that mix high and low water use plants shall not be permitted.

f.) On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation and correlated to a Hydrozone Information Table provided by the City of Hollister. On the irrigation design plan, designate the areas irrigated by each valve and assign a number to each valve. Use this valve number in the Hydrozone Information Table provided by the City of Hollister.

This table can also assist with the irrigation audit and programming the controller. (See page 11 of Landscape Application Package)

6.) Low volume irrigation is required in mulched planting areas.

7.) Sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations and minimize overspray.

8.) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

The irrigation design plan shall contain:

1.) Location and size of separate water meters for landscape;

2.) Location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices; (create legend where applicable, also see sample City provided legend attached)

3.) Static water pressure at the point of connection to the public water supply;

4.) Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;

5.) Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion. Attach Schedule of landscape and irrigation maintenance.

6.) Attach Parameters for setting the irrigation schedule on controller. Parameters used to set the automatic controller shall be developed and submitted for each of the following:

- a.) The plant establishment period;
- b.) The established landscape; and
- c.) Temporarily irrigated areas.

Each irrigation schedule shall consider for each station all of the following that apply:

- a.) Irrigation interval (days between irrigation);
- b.) Irrigation run times (hours or minutes per irrigation event to avoid runoff);
- c.) Number of cycle starts required for each irrigation event to avoid runoff;
- d.) Amount of applied water scheduled to be applied on a monthly basis;
- e.) Application rate setting;
- f.) Root depth setting;
- g.) Plant type setting;
- h.) Soil type;
- i.) Slope factor setting;
- j.) Shade factor setting; and
- k.) Irrigation uniformity or efficiency setting.

7.) Recycled water irrigation systems as specified in Section 15.22.180 Recycled Water; (if applicable) A separate water meter for the use of recycled water where it is available for any property other than a single family residence. If recycled water is available, the irrigation system shall be designed to use recycle water for decorative water features and irrigation unless a written exemption has been granted by the City of Hollister or Sunnyslope Water District.

8.) Incentives for Graywater Usage: Landscapes under 2500 square feet that are irrigated entirely with graywater or captured rainwater are subject only to the irrigation system requirements of Appendix D, Prescription Compliance Option (MWEL0).

8.) Contain the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan"; and

9.) The signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system.

(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.)

GRADING DESIGN PLAN

The plan shall include the following information and labeled accordingly:

North Arrow

Scale

Sheet title

Page number

For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading plan shall be submitted as part of the Landscape Application Package. **A comprehensive grading plan prepared by a civil engineer for other local agency permits satisfies this requirement.**

1.) The project applicant shall submit a landscape grading plan that indicates finished configurations and elevations of the landscape area including:

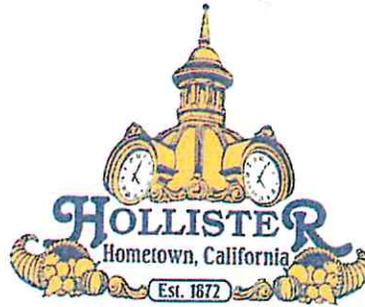
- a.) Height of graded slopes;
- b.) Drainage patterns;
- c.) Pad elevations;
- d.) Finish grade; and
- e.) Storm water retention improvements, (if applicable.)

2.) **The grading design plan shall contain the following statement:**

“I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the grading design plan” and will bear the signature of a licensed professional as authorized by law.

POST-CONSTRUCTION STORM WATER MANGEMENT REQUIRMENTS

Insert here



CITY OF HOLLISTER
DEVELOPMENT SERVICES DEPARTMENT
375 FIFTH STREET
HOLLISTER, CA 95023
831-636-4360
831-634-4913FAX
LANDSCAPE APPLICATION PACKAGE

PLEASE READ AND COMPLETE THIS APPLICATION FORM CAREFULLY

THIS APPLICATION IS FOR (CHECK THE APPROPRIATE BOX):

- New Landscape Construction (Commercial or Industrial)
- New Landscape construction (Residential equal or greater than 500 square feet)
- Development of a lot in a subdivision where the combined where the combined lots are equal to or greater than 500 square feet.
- Rehabilitation of landscape equal or greater than 2,500 square feet (Homeowner or Professional)
- Other

1. Applicant(s): _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone#: _____ FAX#: _____ Email: _____

2. Property Owner(s): _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone#: _____ FAX#: _____ Email: _____

3. Property Location: _____

4. Assessor's Parcel#: _____

5. Size of Landscape Area (acres or square feet): _____

6. Zoning District: Present: _____ Proposed (if applicable): _____

7. General Plan Designation: _____

8. Describe proposed project:

9. Soil Management Report: (check the appropriate box)

Mass grading is not planned and report is included with this application

Mass grading is planned and the soil management report with the certificate of completion

10. Recycled Water:

Not proposed at this time

Recycled water will be used. Recycled Water Use Permit# _____

11. Certification: The facts, maps and documents submitted herewith are true, correct and accurate to the best of my knowledge. If request is granted, I (we) agree that the provisions of City and State Law will be completed with and the conditions, if any, upon which the permit is granted will be carefully observed.

Date

Owner's Signature

Date

Applicant's Signature

Staff Use Only

Received by: _____

Date: _____

SECTION B. WATER BUDGET CALCULATIONS

Maximum Applied Water Allowance (MAWA) & Estimated Total Water Use (ETWU)

MAWA.

(1) In calculating the Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU), a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Appendix A of the MWELO. For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999.

(b) Water budget calculations shall adhere to the following requirements:

(1) The plant factor used shall be from WUCOLS or from horticultural researchers with academic institutions or professional associations as approved by the California Department of Water Resources (DWR). The plant factor ranges from 0 to 0.1 for very low water using plants, 0.1 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

(3) All Special Landscape Areas shall be identified and their water use calculated as shown in Appendix B.

(4) ETAF for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

NOTE:

Authority cited: Section 65595, Government Code; and sections 11 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Section 65596, Government Code; and section 11, Governor's Exec. Order No. B-29-15 (April 1, 2015)

For a Water Budget Calculator to calculate MAWA and ETWU go to:

<http://www.water.ca.gov/wateruseefficiency/landscapeordinance/>

LID Plant Guidance for Bioretention

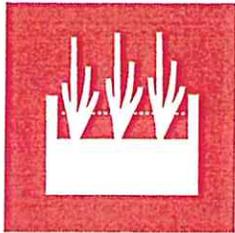
Low Impact Development

This Technical Assistance Memo (TAM) provides plant selection guidance for the most common bioretention features, such as bioretention swales, flow-through planters and rain gardens. Bioretention systems are low impact development (LID) features that use landscaped areas to slow, treat, retain and infiltrate stormwater runoff, mimicking the natural, pre-development hydrology of a site.

The intent of this TAM is to offer designers, municipalities, developers and homeowners with guidelines for selecting plants for bioretention areas, including a list of appropriate species for the Central Coast. Bioretention systems look like regular landscaped areas, but are designed (engineered) to manage stormwater runoff created by urbanization. Specifying the appropriate plants and soil mix for a bioretention system is critical to its function.

This step-by-step guidance is specific to LID landscapes and will take you from plant selection and layout to installation and on-going maintenance. This guidance is intended to accompany standard landscape methods and point out areas where LID methods may differ.

Step 1: LID Type and Plant Selection

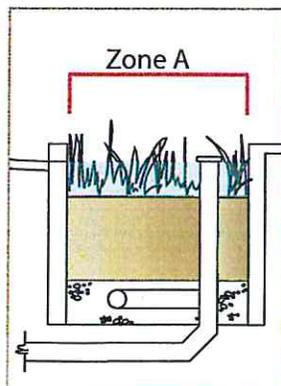


Surface grade and **ponding area** of a bioretention structure are the first factors to consider when choosing which plants to specify. Is the soil surface of the structure sloped or uniform? Stormwater planters and some rain gardens have uniform surface grades. In these designs, ponding will be equal across the structure and all plants will have the same conditions (Zone A). In bioretention swales and some rain gardens, soil surface is sloped, resulting in differing planting conditions across the structure (Zones A and B). Plants located at the bottom where ponding occurs, will have different requirements than those placed on the sideslopes, which

receive runoff, but not ponding. A third planting area may occur outside of Zones A and B, on the upper edges of rain gardens and bioswales. This area is not a functional component of the bioretention area, and therefore can be treated as a traditional landscape area.



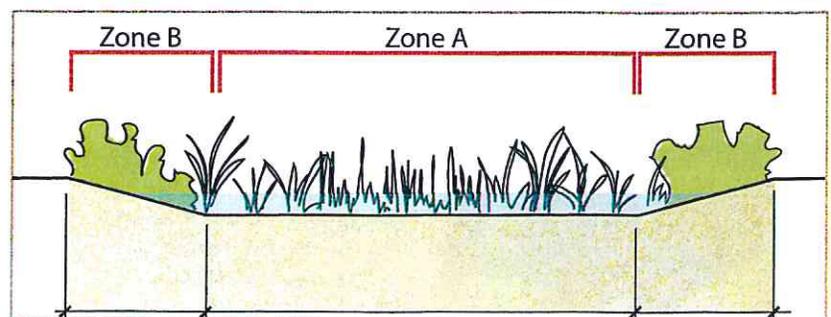
Source: A+BE Landscape Architects



Varying slope and ponding levels: Varying slope and ponding levels: This bioretention planting area has sloped edges. Plants in the bottom area will be inundated during storms (Zone A). Those planted on the sideslopes are above the level of ponding, but will experience seasonally wet conditions (Zone B).



Source: Rana Creek

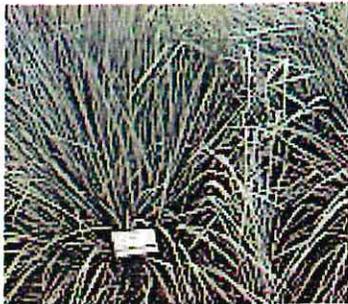


Uniform surface grade: This stormwater planter has a flat bottom with consistent depth of ponding across the structure. All of the plants selected for this design must be tolerant of periodic inundation (Zone A).

Step 2: Plant Species Selection



Once the plant zones are identified (Zone A only or both Zone A and Zone B) for a structure, the plants may be selected. This TAM includes a plant list for bioretention areas (Table 1). There exist other LID plant lists for California and the Central Coast, but this “short list” was refined based on the following criteria: 1) Tolerant of varied moisture conditions (wet and dry), 2) tolerant of varied soil types and growing conditions, 3) available in Central Coast plant nurseries, 4) low maintenance requirements, 5) are not invasive weeds, 6) do not have aggressive/invasive root systems, and 6) exhibit an attractive appearance. When selecting plants from a list, additional site-specific information, such as tolerance to high and low temperatures, coastal conditions and prevailing winds should be considered. In addition, project specific aspects of the design, for example right-of-way vegetation height limits, approved street and parking lot tree lists and fire hazard landscape requirements may further influence selection. Although this plant list includes some non natives, using native plants is highly recommended because of the wide range of benefits they offer (food and forage for native wildlife, adaptation to local climate, low/no water use once established). Knowledge of invasive species is constantly evolving. To avoid specifying noxious plants on a project, check the California inventory at www.cal-ipc.org. Local agencies may also track potential invasives for your area.



Leymus condensatus 'Canyon Prince': This selection grows to 3' and is tolerant of a wide range of conditions, including drought, seasonal wet conditions, poor soils and some shade.



Achillea millefolium: A native perennial that attracts pollinators and is tolerant of poor soils, seasonal flooding and deer. Available in many flower colors.



Muhlenbergia rigens: A native grass with dense bright, grey-green, evergreen foliage. It tolerates a range of soils, sun to part-shade, seasonal flooding and drought.



Juncus patens: An easy to grow native rush. It tolerates poor drainage, flooding, drought and shade. A strong performer in bioretention areas, more drought tolerant than J. effusus.

Step 3: Soil Specification for Biofiltration



Specifying the correct soils for bioretention areas is critical in order to achieve stormwater objectives and plant health. Soils must balance three primary design objectives: 1) High enough infiltration rates to meet surface water draw down requirements, 2) infiltration rates that are not so high that they preclude pollutant removal function of soils and 3) soil composition that supports plant establishment and long-term health.

Landscape design documents for LID projects must include a bioretention soil specification that specifies the exact materials to be used in the mix (aggregates and compost), the percent of each material included in the mix, how they are to be placed (i.e. in 8" to 12" lifts) and the soil mix depth. Sample bioretention soil specifications and detailed information on BMP design and construction may be found in the LID documents listed under Additional Resources in this TAM.



Organic Compost: A main ingredient of biofiltration soil mixes, compost is the product of natural decomposition of organic wastes by bacteria, fungi, worms and other beneficial organisms. Compost increases the soil's water holding capacity and improves soil structure, nutrient levels and biology, all of which support plant health.

► GENERAL BIORETENTION SOIL SPECIFICATION

Bioretention soils should meet the following criteria.

1. General Requirements
Bioretention soil shall achieve a long-term, in-place infiltration rate of at least 5 inches per hour. Bioretention soil shall also support vigorous plant growth.

Bioretention Soil shall be a well-blended mixture of mineral aggregate and compost, measured on a volume basis. Bioretention soil shall consist of two parts compost (approximately 35 to 40 percent) by volume and three parts Mineral Aggregate (approximately 60 to 65 percent), by volume. The mixture shall be well blended to produce a homogeneous mix.

Bioretention Soil Mix:

Construction documents for any LID project should include specifications for the bioretention soil mix that define the ratio of materials in the mix, and the content, gradation, quality analysis and other requirements for each of the materials. Specifications will also provide guidelines for blending and placement of the soil mix.

Table 1. Plants for Bioretention Areas¹

Zone A: Periodic inundation, area ponds following storm events (24 - 72 hours).

Zone B: Above area of ponding, side slope areas receive runoff, but are never inundated.

Common Name	Scientific Name	Zone(s)	Height/ Width	Light	Notes:	Climate Zones ²
Trees						
Western Redbud	<i>Cercis occidentalis</i>	B	20'/20'	sun	small tree or large shrub, tolerates clay, winter wet, drought, flowers stronger with frost	all but coastal
Desert Willow	<i>Chilopsis linearis</i>	B	25'/30'	sun	tolerates alkaline soil, sand, clay, seasonal flooding and drought, not coastal condition	all, but 1A-3A
Western Sycamore	<i>Platanus racemosa</i>	B	40'-80'/40'-70'	sun	tolerates sand and clay soils, seasonal flooding, needs space to grow, avoid underground water/sewer pipes	all, but 1A-3A
Coast Live Oak	<i>Quercus agrifolia</i>	B	25'-60'/40'-70'	sun - shade	tolerates drought and winter wet conditions, mature trees produce significant litter limiting understory plantings, need space to grow	all, but 1A-3A
Large Shrubs						
Toyon, Christmas Berry	<i>Heteromeles arbutifolia</i>	B	8'-20'/8'-20'	sun-pt shade	tolerates sand, clay and serpentine soils, seasonal water with good drainage	all, but 1A-3A
Pacific Wax Myrtle	<i>Myrica californica</i>	B	10'-30'/10'-30'	sun-pt shade	large shrub or small tree, tolerates coastal conditions, sand, clay and seasonal inundation	all, but 1A-3A
Western Elderberry	<i>Sambucus mexicana</i>	B	10'-30'/8'-20'	sun-pt shade	large shrub to tree, tolerates clay, seasonal flooding and drought, good wildlife food source	all, but 1A-3A
Shrubs and Subshrubs						
Coyote Brush	<i>Baccharis pilularis</i>	B	wide variation	sun	adaptable evergreen shrub, provides quick cover and bank stabilization, tolerant of coastal conditions, alkaline soil, sand, clay and seasonal wet	all, but 1A-3A
California Wild Rose	<i>Rosa californica</i>	A,B	3'-6'/spreads	sun-pt shade	tolerates a wide variety of soils, seasonal flooding and some drought, spreads aggressively, avoid edges of walkways because of thorns	all
Perennials						
Yarrow	<i>Achillea millefolium</i>	B	1'-3'/2'	sun-pt shade	tolerates alkaline soil, sand, clay, seasonal wet conditions, foot traffic and deer, will self sow	all
Beach Strawberry	<i>Fragaria chiloensis</i>	B	2'-4'/spreads	sun-pt shade	vigorous spreading groundcover, tolerates sand, clay, wet conditions, prefers good drainage	all, but 1A-3A
Douglas Iris	<i>Iris douglasiana</i>	B	1.5'-3'/spreads	sun - shade	tolerates sand, clay and serpentine soils, seasonal wet (but not soggy) soils and drought	all, but 1A-3A
Hummingbird Sage	<i>Salvia spathacea</i>	B	1'-3'/4'-5'	pt sun-pt shade	low growing perennial, tolerates clay, winter wet, summer drought, prefers light shade, provides nectar for birds and insects, does well under oaks	all, but 1A-3A
Bog Sage	<i>Salvia uliginosa*</i>	B	3'-6'/spreads	sun	quick growing, spreading perennial, tolerates wet to dry, cut back winter, divide rhizomes	all, but 1A-3A
Blue-eyed Grass	<i>Sisyrinchium bellum</i>	B	6"-1'/6"-1'	sun	a semi-evergreen perennial, tolerates sand, clay, seasonal wet soils and deer, dormant in summer, but can be delayed with supplemental irrigation	all, but 1A-3A
California Goldenrod	<i>Solidago californica</i>	B	1'-4'/1'-4'	sun-pt shade	tolerates poor soils, seasonal wet and drought, can spread aggressively if over irrigated	all, but 24
Grasses and Grass-like Plants						
Berkeley Sedge, Grey Sedge	<i>Carex divulsa*</i>	A,B	12"-18"/12"-18"	sun-pt shade	tolerates foot traffic, some drought and boggy soils	all, but 1A-3A
California Meadow Sedge	<i>Carex pansa</i>	A,B	6"-12'/spreads	sun - shade	good lawn substitute, tolerates wide range of growing conditions, seasonal inundation, drought, foot traffic and mowing	all, but 1A-3A
Clustered Field Sedge	<i>Carex praegracilis</i>	A	1'/spreads	sun-pt shade	useful lawn substitute and bank stabilizer, good planted in masses, tolerates wide range of growing conditions, foot traffic and mowing, may look weedy when mixed with other plants	all, but 1A-3A
San Diego Sedge	<i>Carex spissa</i>	A	3'-6'/2'-5'	pt sun-shade	a large grass, tolerates alkaline soil, clay, serpentine, seasonal inundation, and deer	all, but 1A-3A
Small Cape Rush	<i>Chondropetalum tectorum*</i>	A,B	2'-3'/3'-4'	sun-pt shade	A tough, attractive reed-like plant, tolerates boggy or clay soils and drought once established, <i>Chondropetalum elephantinum</i> is a much larger species	all, but 1A, 2A, 3A, 7
Molate Red Fescue	<i>Festuca rubra 'Molate'</i>	A,B	8"-12'/spreads	pt sun-shade	a tufted, spreading bunchgrass, good lawn substitute, provides erosion control, tolerates wet conditions, but looks best with regular water, tolerates drought once established	all
Soft Rush	<i>Juncus effusus</i>	A	2'-3'/2'-3'	sun-pt shade	tolerates poor drainage, heavy soils, needs more supplemental water than <i>Juncus patens</i>	all
Wire Grass, Blue Rush	<i>Juncus patens</i>	A	1'-2'/1'-2'	sun - shade	strong performance in bioretention areas, tolerates poor drainage, seasonal inundation, drought, shade	all, but 1A-3A
Canyon Prince Wild Rye	<i>Leymus condensatus 'Canyon Prince'</i>	B	2'-3'/spreads	sun-pt shade	tolerates drought, wet, but not soggy soils, looks best with supplemental irrigation, spreads by rhizomes	all, but 1A-3A
Deer Grass	<i>Muhlenbergia rigens</i>	B	4'-5'/4'-6'	sun-pt shade	a large grass, tolerates sandy and clay soils, seasonal inundation, best when cut back annually to remove old thatch	all, but 1A-3A

¹ See: www.centralcoastlidi.org for a photo gallery of the plants in this list.

² Refers to Sunset Western Garden Book Climate Zones. The Central Coast includes Zones 1A, 2A, 3A, 7, 9, and 14-24. www.sunset.com/garden/climate-zones

* Indicates non native species. Non natives are only recommended for use in urbanized settings and should not be used on sites in proximity to natura areas.



Step 4: Plant Establishment and Care

Like traditional landscapes, LID planting areas require care and ongoing maintenance for optimal health. Due to the functional nature of LID landscapes and their connectivity to natural receiving water bodies, there are some differences between conventional landscape maintenance and LID maintenance.

Irrigation is an important aspect of any landscape establishment. Typically new plantings need two to three years of irrigation to become established. After that period, native plants will need little to no supplemental irrigation to survive. Plants may enter a dry season dormancy, which affects their appearance. Where this "dry look" is not desired, summer irrigation may be utilized. Systems should include a weather-based controller to avoid watering



during wet weather. Because bioretention soils are formulated to infiltrate, irrigation application rates must be properly designed to avoid overwatering and prevent potential discharges via underdrains.

Compost Mulch (1" - 2") should be applied to bioretention areas to retain moisture, prevent erosion and suppress weed growth. Reapply annually as the mulch breaks down. Use a specified compost mulch and avoid bark mulches that can float during storm events.

Fertilizer should not be used in bioretention areas. Instead, a compost top dressing or application of compost tea can be used to introduce nutrients and beneficial microorganisms

to the soil. Apply compost mulch once per year in spring or fall or spray apply compost tea once per year between March and June.

Synthetic herbicides and pesticides should not be used in bioretention areas because of their potential toxicity risk to aquatic organisms. There are a variety of natural methods and products that can be used to control weeds and pests. See the technical manuals included under Additional Resources.

Plant Establishment and Care (cont.)



Source: SRF Design Company

Provide extra support to trees planted in bioretention areas, especially in high wind areas. They should be securely staked during establishment and inspected once or twice a year and following storm events. Stakes should be removed as soon as they are no longer needed to stabilize the tree (between one and two years).

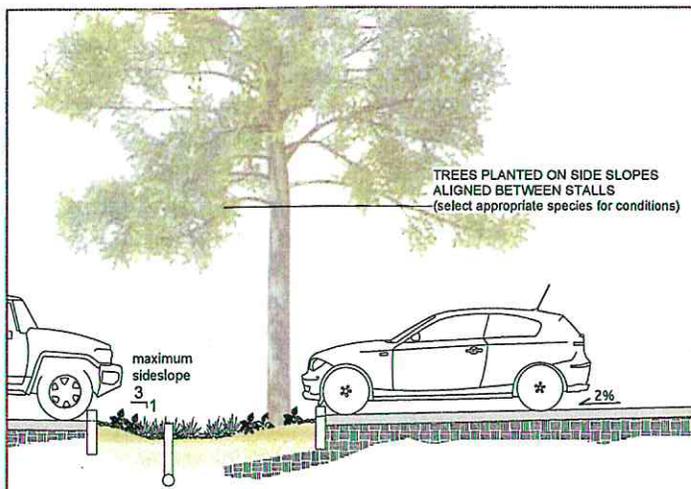
Weeds compete with plants for nutrients, water and sunlight. They should be regularly removed, with their roots, by hand pulling or with manual pincer-type weeding tools. Care should be given to avoid unnecessary compaction of soils while weeding.

Replace plants that die due to unsuitable plant conditions, disease, underwatering or other unforeseen issues. Dead and dying plants must be removed and replaced to avoid spreading disease, establishment of weeds in bare areas and reduced LID function. Before replacing with the same species, determine if another species may be better suited to the conditions.

Tree Placement Guidance

Including trees in bioretention areas provides additional aesthetic and performance benefits. Following these guidelines will maximize their success and survival:

- Provide sufficient landscape width (a rule of thumb is 8' min.)
- Locate trees on the side slopes (Zone B), not in areas that pond (Zone A). Trees improperly located, in narrow planters that pond, are unlikely to thrive and may eventually fail.
- Select trees that will tolerate seasonally wet soils.
- Do not specify trees with invasive roots.



Guidelines for Municipalities

Project managers who are preparing RFPs or bid packages for public projects that include bioretention systems should clearly define expectations for the following:

- Bioretention soil mix specification
- Guidance for plant species selection
- Appropriate plant zone placement
- Operations and maintenance protocols

To assist in defining vegetative requirements for LID projects, Central Coast municipalities may use this TAM as a reference or attachment to their project description.

Plant Nurseries

This is a partial list of Central Coast nurseries who regularly stock the plants included in this TAM.

- Central Coast Wilds, Santa Cruz
831-459-0656
www.centralcoastwilds.com
- Last Pilitas, Santa Margarita
805-438-5992
www.laspilitas.com
- Native Sons, Arroyo Grande
805-481-5996
www.nativesonsnursery.com
- Rana Creek, Carmel Valley
831-659-3820
www.ranacreeknursery.com
- San Marcos Growers, Santa Barbara
805-683-1561
www.sanmarcosgrowers.com
- Santa Barbara Natives, Santa Barbara
805-698-4994
www.sbnatives.com



Source: Los Pilitas Nursery

Additional Resources

- The Low Impact Development Manual for Southern California: Technical Guidance and Site Planning Strategies
<http://www.casqa.org/LID/tabid/186/Default.aspx>
- The California Stormwater Quality Association (CASQA) BMP Handbook for New Development and Redevelopment
<http://www.cabmphandbooks.com/>
- Contra Costa Clean Water Program (C3 Guidebook)
<http://www.cccleanwater.org/c3.html>
- City of Santa Barbara: Storm Water BMP Guidance Manual
http://www.santabarbaraca.gov/Resident/Major_Planning_Efforts/Storm_Water_Management_Program/

For additional resources on bioretention plant guidance:

www.centralcoastlidi.org

For questions or to contact the Central Coast Low Impact Development Initiative:

info@centralcoastlidi.org



UC Davis LID Initiative

LEGAL DISCLAIMER: This Technical Assistance Memo (TAM) is intended as guidance only and should not be used as a substitute for site specific design and engineering. Applicants are responsible for compliance with all code and rule requirements, whether or not described in this TAM.

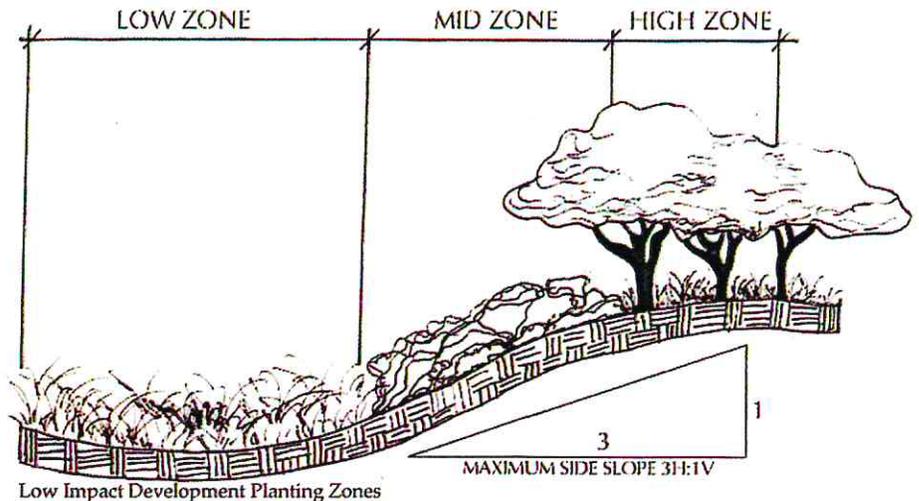
Appendix G

LID Planting Zones and Plant List

Low Impact Development Planting Zones

Planting zones refer to the planted areas in drainage features of Low Impact Development (LID) practices and flood control detention basins. LID practices include vegetated swales and bioretention basins. Plants are an integral element of their function. The plants in these zones facilitate natural infiltration of surface runoff, increase evapotranspiration, reduce the heat-island effect of urbanized areas, and reduce the rate, volume, and pollutant loading of urban runoff that ultimately ends up in local streams, rivers, estuaries, and the Monterey Bay. For the drainage features to function optimally, numerous plant characteristics have been considered in indicating the appropriate plant species for the three plant zones such as: water requirements, tolerance for inundation, root and leaf structure and a species' ability to filter pollutants. The plant zone guidelines and planting list can also be utilized for the revegetation, restoration, and bank stabilization of local streams, rivers, and estuaries.

In all instances, native plant species are recommended since they are adapted to the Central Coast climate and generally require less water and fertilization. Non-native invasive plant species are discouraged as water can quickly spread their occurrence and alter downstream habitats. Likewise turf grasses are discouraged for LID drainage features since they require large amounts of supplemental water, fertilizers and regular maintenance.



Low Impact Development Planting Zones

LOW ZONE – The low zone is an area where runoff temporarily ponds in response to a rain event or dry weather flows such as upgradient washing or irrigation activities. The low zone should be designed to drain and not hold standing water for more than 72 hours. However, it may be inundated for extended periods of time during the rainy season. Water tolerant plants with dense root structure and/or vegetative cover provide maximum pollutant filtration, discourage erosion and slow water runoff velocities (in drainage features that cross-drain, such as bioswales). Native grasses and groundcovers are recommended for these areas.

MID ZONE – The mid zone is an area that slows the storm water runoff as it flows into the drainage feature. Water passes through and saturates this area, but will not stand there for extended periods of time during typical storm events. The plants for this zone must tolerate periods without water and periodic inundation. The plants in the mid zone should provide a root structure to prevent erosion of the side slope.

HIGH ZONE – The high zone is an area that creates the top of the bank of the drainage facility. Water will not stand in this zone. Deep roots give natural base structure to the edge of the drainage facility. These plants must be tolerant of extended periods without water and occasional saturation.

Low Impact Development (LID) Plant List
 Developed for the City of Salinas, California

Botanical Name	Common Name	Low Zone**	Mid Zone**	High Zone**	Small planting Strips (<5' wide)	Large planting areas (>5' wide)	Green Roofs	Tolerates Prolonged Saturation	Tolerates Periodic Flooding	Tolerates Prolonged Dry Periods	Requires Good Drainage	Tolerates Mowing	Wind Tolerant	Notes
TREES														
<i>Acer circinatum</i>	Vine maple		X	X	X	X			X	X				Needs some shade
<i>Acer macrophyllum</i>	Big-leaf maple		X	X		X		X	X				X	Clay tolerant
<i>Aesculus californica</i>	Buckeye			X		X		X	X	X			X	Clay tolerant
<i>Alnus rhombifolia</i>	White alder		X	X		X		X	X					Keep protected from prevailing winds
<i>Alnus rubra</i>	Red alder		X	X		X		X	X					
<i>Cercis occidentalis</i>	Western redbud		X	X	X	X		X	X	X				
<i>Fraxinus latifolia</i>	Oregon ash		X	X		X		X						
<i>Juglans californica</i> var. <i>hindsii</i>	Black walnut			X		X		X	X	X				
<i>Populus fremontii</i>	Western cottonwood			X		X		X					X	Water loving, aggressive roots, fast growing
<i>Prunus lyonii</i>	Catalina cherry			X	X	X		X	X	X			X	Clay tolerant
<i>Pseudotsuga menziesii</i> ssp. <i>menziesii</i>	Coast Douglas fir			X		X		X	X				X	
<i>Salix coulteri</i>	Coulter willow	X	X	X		X		X	X				X	
<i>Salix laevigata</i>	Red willow	X	X	X	X	X		X	X				X	
<i>Salix lasiolepis</i>	Arroyo willow	X	X	X	X	X		X	X				X	
<i>Sambucus mexicana</i>	Elderberry		X	X	X	X		X	X	X			X	Clay tolerant
<i>Umbellularia californica</i>	California bay laurel			X		X		X	X				X	Needs large scale planting area
SHRUBS														
<i>Baccharis douglasii</i>	Marsh baccharis	X	X	X	X	X		X	X	X				
<i>Baccharis pilularis</i>	Coyotebrush			X	X	X		X	X				X	
<i>Baccharis salicifolia</i>	Mulefat		X	X		X		X	X	X			X	
<i>Cornus stolonifera</i>	Red-twig dogwood	X	X	X	X	X		X	X				X	Clay tolerant
<i>Fremontodendron californica</i>	Flannelbush			X		X					X	X		High zone, needs to dry between waterings
<i>Carrva elliptica</i>	Silk tassel			X	X	X				X				Clay tolerant with drainage
<i>Gaultheria shallon</i>	Salal				X	X			X					Prefers shade
<i>Mimulus aurantiacus</i>	Stickey monkey flower		X		X	X	X			X				
<i>Mimulus cardinalis</i>	Scarlet monkey flower	X	X		X	X	X	X	X				X	Clay tolerant
<i>Rhamnus californica</i>	Coffeeberry		X	X		X	X			X	X		X	Low water requirements
<i>Ribes sanguineum</i>	Pink-flowering currant		X	X	X	X		X	X	X			X	Clay tolerant
<i>Ribes speciosum</i>	Fuchsia-flowering gooseberry		X		X			X	X				X	Clay tolerant, prefers shade
<i>Ribes viburnifolium</i>	Catalina perfume		X	X	X	X		X	X	X			X	Extremely drought tolerant in clay soils
<i>Rosa californica</i>	California wild rose		X	X		X		X	X	X				Can be invasive, likes moisture
<i>Rubus parvifolius</i>	Thimbleberry					X		X	X				X	

* Plant species are considered native to California. California native selections are suggested to limit impact on native habitats downstream.
 **Refer section drawing for planting zones.

Low Impact Development (LID) Plant List
 Developed for the City of Salinas, California

Botanical Name	Common Name	Low Zone**	Mid Zone**	High Zone**	Small planting strips (<5' wide)	Large planting areas (> 5' wide)	Green Roofs	Tolerates Prolonged Saturation	Tolerates Periodic Flooding	Tolerates Prolonged Dry Periods	Requires Good Drainage	Tolerates Mowing	Wind Tolerant	Notes
GRASSES, GROUNDCOVERS, FERNS, & BULBS														
Achillea millefolium	Yarrow		X	X	X	X	X				X		X	Clay tolerant
Aquilegia formosa	Western columbine	X			X	X		X	X	X				Clay tolerant with drainage and organic matter
Bromus carinatus	California brome		X	X	X		X			X				
Calamagrostis Karl Foerster	Feather reed grass	X	X		X	X		X	X	X			X	
Calamagrostis nutkaensis	Calamagrostis nutkaensis		X		X	X	X		X	X			X	
Calochortus albus	Globe lilies		X		X	X			X	X			X	
Carex globosa	Globe sedge	X	X		X	X	X	X	X	X			X	
Carex obnupta	Slough sedge	X	X		X			X	X				X	Needs moisture
Carex pansa	Sand dune sedge	X	X		X	X	X		X		X		X	Needs sandy soil
Carex tumulicola/ Carex divulsa	Berkeley sedge/ Gray sedge	X	X	X	X	X	X	X	X	X	X		X	Clay tolerant
Castilleja miniata	Indian paintbrush		X	X	X	X	X			X	X		X	
Deschampsia caespitosa	Tufted hair grass		X		X	X	X		X	X	X		X	Needs irrigation
Dudleya caespitosa	Dudleya		X	X	X	X	X		X	X			X	
Eleocharis macrostachya	Common spike rush	X	X		X	X	X	X	X				X	Sand to clay tolerant
Eschscholzia californica	California poppy		X	X	X	X	X			X	X		X	
Festuca californica	California fescue		X	X	X	X	X		X	X			X	Do not plant in low zone
Festuca idahoensis	Western fescue	X	X		X	X	X		X	X			X	Do not plant in low zone
Festuca rubra	Red fescue	X	X		X	X	X	X	X	X	X		X	Needs irrigation
Fragaria chiloensis	Beach strawberry		X		X	X	X		X	X	X		X	
Heuchera micrantha	Coral bells		X	X	X	X	X		X	X	X		X	
Iris douglasiana	Douglas iris		X		X	X	X		X		X		X	
Juncus effusus	Common rush	X	X		X	X		X	X	X			X	
Juncus patens	California grey rush	X	X		X	X		X	X	X			X	
Leymus triticoides	Creeping wildrye	X	X		X	X	X		X	X		X	X	Fast spreading, clay tolerant
Melica imperfecta	California melic		X	X	X	X	X		X				X	
Mulhenbergia rigens	Deer grass		X	X	X	X	X		X	X			X	Clay tolerant
Polystichum minutum	Sword fern		X		X	X			X					Prefers shade or part shade
Salvia ssp.	Sage		X	X	X	X	X		X	X			X	Higher zones, predominantly dry zones
Scirpus cernuus	Fiber optic grass	X	X		X	X	X	X	X	X			X	Prefers sandy soil
Sedum ssp.	Stonecrop		X		X	X	X			X	X		X	
Sisyrinchium bellum	Blue-eyed grass		X	X	X	X	X			X		X	X	
Satureja douglasii	Yerba buena	X	X		X	X	X		X				X	Clay tolerant, part shade

Vines

Clematis ligusticifolia	Clematis	X	X		X	X		X	X	X	X			
Lonicera involucrata	Twinberry honeysuckle		X	X	X	X			X				X	
Vitis californica	California wild grape	X	X	X	X	X			X	X	X		X	Needs partial sun, do not plant at low point

* Plant species are considered native to California. California native selections are suggested to limit impact on native habitat. [dotmstream.com](#)
 ** Refer section drawing for planting zones.

Low Impact Development Planting Guidelines

DESIGN CRITERIA

There are numerous conditions to consider when choosing plant species to be used in LID drainage features. Many of the criteria are found in species that tolerate the various and (sometimes) disparate conditions in their native habitats. For example, the plant species need to tolerate periods of flooding as well as extended dry periods without supplemental irrigation. California native plant species are highly recommended as they are best adapted to the local climate.

The LID plant palette is intended to serve as a baseline for plant species selection for LID drainage features. Other plant species may be proposed for use in LID drainage features; the City will have the right to permit or deny their use. The following planting criteria and characteristics are to be considered when proposing other species for LID drainage features:

- The planting zones where the plant species are to be planted (Low, Mid, High, see Planting Zones)
- The size of the planting area and the size of the plant species at maturity
- California native or easily naturalized plant species are preferred
- Non native invasive species should not be used
- Drought tolerant / low-supplemental irrigation requirements
- Tolerant of season flooding/inundation
- Low maintenance requirements
- Adaptability

As an element of a drainage feature, LID plant selections should aim to control erosion and wick water from soils. Accordingly, groundcovers and grasses that quickly cover exposed soils are the best choices for the low zone (see Planting Zones). Trees and large shrubs are best planted in the high zone where their roots can absorb the infiltration. Low shrubs, grasses and groundcovers may be used in the mid zone depending on the slope, soil type, and drainage patterns (sheet flow vs. concentrated flow, or flooding).

If a planted LID drainage feature receives a concentrated flow, energy dispersion devices will be required at the entry point to deter damage or erosion to the planted areas. Examples of erosion protection/energy dissipation designs include cobblestones, gabions, small hardscaped areas, or other approved devices.



Gabion for Energy Dispersion (i.e. erosion control)

PLANT LAYOUT

The following shall be considered when planting LID drainage features:

- The smallest practical area of land should be exposed at any one time during development. Mulching or other protective erosion control measures should be used temporarily to protect exposed areas.
- Vegetation should be installed as soon as possible in the development after the land is exposed.
- Plants should be planted in staggered rows to ensure that plants grow together for maximum soil coverage.

Low Impact Development Planting Guidelines

SOIL TESTING

A soils report shall be prepared prior to planting. The report shall be prepared by a qualified soils specialist or laboratory. The report shall be submitted to the City as part of the landscape and irrigation plans for final approval. Soil samples should be collected after grading operations are complete. Since surface soils are highly variable in the alluvial plain of the Salinas Valley, a sufficient number of soils samples shall be collected to account for variations that may be present in the areas to be planted. The report should include:

- Native soil composition
- Infiltration rates
- A texture test
- Cation exchange capacity
- An agricultural suitability analysis
- Recommended amendments for planted species to thrive

The following list includes some qualified soil testing laboratories in the region:

Perry Soil Laboratory, 424 Airport Blvd., Watsonville, CA 95076, T: (831) 722-7606
Soil and Plant Laboratory, Inc., 352 Matthew Street, Santa Clara, CA 95052, T: (408) 727-0330

AMENDMENTS

Prior to planting the recommended amendments shall be added as described in the soils report. A copy of the soils report shall be attached to the irrigation schedule provided to the owner and/or operator of the project.

MULCH

After planting, exposed soils shall be covered with mulch to discourage erosion. Mulch should only be maintained until plant growth has covered the majority of the exposed soil. Biodegradable erosion control mats and materials may also be used to provide same function as mulch.

Mulch should be large enough in size to be easily cleaned away from drain inlets and not fit through the openings of drain grates. Mulch shall be free of sticks and other debris. Always hold mulch away from root crown. Acceptable mulch types include:

- Nitrogen fortified bark (1" to 2" diameter)
- Redwood bark (1" to 2" diameter)
- Chipped gravel, crushed stone, or cobbles (1/2" – 2 1/2" diameter)
- 50/50 blend of top soil and aged compost

"Gorilla Hair" (shredded redwood bark) will not be permitted by the City of Salinas as it causes an impervious layer that encourages mold growth in Salinas's soils.

MAINTENANCE

Native plant species naturally reduce the need for maintenance. These species will minimize pests and disease problems, require less fertilizer, reduce the need for excessive pruning and conserve water. Woody plants require less maintenance once established while perennials adjust to their new environment quickly but may require more care over the long run.

Care requirements should be considered when choosing plant species for LID drainage features. Trash and debris should be cleaned out of LID planting areas periodically, especially after large storm events. Drain inlets shall be cleaned out periodically.



Bioretention basin along an urban roadway.

Low Impact Development Plant List Development

PROCESS

The LID plant list was developed through a research process. Characteristics of LID drainage features such as bioswales, bioretention basins, rain gardens and tree filters were considered. Key local factors such as the climate, soils, and biodiversity of Salinas, California provided further parameters for development of appropriate plants. Preference was given to plants native to the Central Coast region for their compatibility with sensitive downstream habitats and to keep exotics from spreading and invading those habitats. Documents and conversations with and documents from other municipalities such as the Cities of Livermore, Oakland, and Santa Monica, California, The City of Seattle, Washington and The City of Portland, Oregon provided valuable guidance and insight towards successful implementation, operations and maintenance of LID drainage features.

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