

City of Albany



COMMUNITY DEVELOPMENT DEPARTMENT POLICY DRAINAGE FOR RESIDENTIAL PROJECTS WITH ONE OR TWO UNITS REVISED JANUARY 4, 2018

- A. California Residential Code Requirement** - Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings. Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection that does not create a hazard. (Code references: CRC R300.2, CRC R401.3, CalGreen 4.106.3)
- B. Allowable Methods of Conveyance** – Approved point of collection is face of curb in the public right-of-way. In order of preference, the following are allowable methods of conveying surface or subsurface drainage:
1. Collect and convey surface and subsurface drainage via gravity flow, in an underground drain pipe, placed outside the structure, to the point of collection.
 2. The City will consider, on a case-by-case basis, subject to review of design, placement of above-grade drain pipe on the exterior wall of a structure in order to achieve gravity flow to point of collection.
 3. If other alignments are not feasible, a drain pipe may be placed inside a crawl space, basement, or other visible location of a structure if necessary to achieve gravity flow.
 4. Conveyance of drainage to a landscape area in compliance with Bay Area Stormwater Management Agency Association (BASMA) guidelines. Situation where the BASMA standards may be considered:
 - a. Relatively flat site
 - b. Treatment system has adequate size and depth
 - c. Treatment system is setback from structures and property lines
 - d. Treatment system is separate from foundation drainage
 - e. Soils are properly prepared
 - f. Reasonable plan to handle overflow
 5. If gravity flow is not feasible, and landscape solution does not meet *BASMA* standards, surface and subsurface drainage shall be conveyed to face of curb via a **mechanical pump**. Pump system must be designed to City standards.
- C. Exceptions** - Exceptions to requirement for drainage improvements:
1. Drainage plan not required if gravity flow through neighboring property is allowed subject to a written agreement with neighboring property owner and documented via recorded easement.

2. Drainage plan not required if applicant can show via calculations of impervious surface area that there will be inconsequential increase in storm water runoff volume to a particular property. As a general rule of thumb, inconsequential is defined as less than a 5% increase. The use of this exception is at the City's discretion and subject to an analysis of the relevant site-specific considerations associated with upstream or downstream properties.

D. Submittal requirement - A gravity flow drainage plan must show the following information for both existing conditions and proposed conditions:

- Property lines;
- Site topography and direction of surface flow;
- Roof plan and location of rain leaders;
- Location of drainpipe including size, length, vertical height/slope, and location of cleanouts
- Show detail of discharge pipe under sidewalk in compliance with City standards
- Show areas of hardscape and soft scape;
- Calculation of pervious and impervious lot coverage.

Additional requirements for pump system – Submersible type sump pump required with primary and backup system, audible alarm, and battery backup.

- Provide pump manufacturer specifications, model number, and horsepower. Show documentation that proposed pump has proper gallons per minute capacity for proposed pipe size, length, and vertical height.
- Show location and size of basin.
- Show location and type of check-value on discharge pipe
- Show dedicated GFCI outlet for sump pump that is connected to its own electrical circuit.

APPLICABLE CODE REFERENCES **2016 CRC**

R300.2 Grading and paving. Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings in accordance with the California Green Building Standards Code, Chapter 4, Division 4.1.

R401.3 Drainage. Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection that does not create a hazard. Lots shall be graded to drain surface water away from foundation walls. The grade shall fall a minimum of 6 inches (152 mm) within the first 10 feet (3048 mm). Exception: Where lot lines, walls, slopes or other physical barriers prohibit 6 inches (152 mm) of fall within 10 feet (3048 mm), drains or swales shall be constructed to ensure drainage away from the structure. Impervious surfaces within 10 feet (3048 mm) of the building foundation shall be sloped a minimum of 2 percent away from the building.

R405.1 Concrete or masonry foundations. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Drainage tiles, gravel or crushed stone drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall discharge by gravity or mechanical means into an approved drainage system. **2016 CAL GREEN**

4.106.3 Grading and paving. Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales
2. Water collection and disposal systems
3. French drains
4. Water retention gardens
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

RAIN GARDENS

Stormwater Control for Small Projects



Bay Area Stormwater

Management Agencies



Large Residential Rain Garden

Rain gardens are landscaped areas designed to capture and treat rainwater that runs off roof and paved surfaces. Runoff is directed toward a depression in the ground, which is planted with flood and drought-resistant plants. As the water nourishes the plants, the garden stores, evaporates, and infiltrates rainwater into the soil. The soil absorbs runoff pollutants, which are broken down over time by microorganisms and plant roots.

Rain gardens are a relatively low-cost, effective, and aesthetically pleasing way to reduce the amount of stormwater that runs off your property and washes pollutants into storm drains, local streams, and the San Francisco Bay. While protecting water quality, rain gardens also provide attractive landscaping and habitat for birds, butterflies, and other animals, especially when planted with native plants.

- A front or backyard can work well for a rain garden, especially in areas where the slope naturally takes the stormwater.

Is a Rain Garden Feasible for My Project?

Rain gardens are appropriate where the following site characteristics are present:

- Rain gardens should be installed at least 10 feet from building foundations. The ground adjacent to the building should slope away at a 2% minimum slope. A downspout extension or "swale" (landscaped channel) can be used to convey rain from a roof directly into a rain garden. Rain gardens can also be located downstream from a rain barrel overflow path.
- Rain gardens should be at least 3 feet from public sidewalks (or have an appropriate impermeable barrier installed), 5 feet from property lines, and in an area where potential overflow will not run onto neighboring properties.
- The site should have well-drained soil and be relatively flat. Soil amendments can improve infiltration in areas with poor drainage. Add about 3 inches of compost to any soil type and till it in to a depth of about 12 inches.

Approved August 23, 2012 -- corrected November 27, 2012

How Large Does My Rain Garden Need to Be?

A general recommendation for a garden with a 6-inch ponding depth is to size the rain garden to approximately 4% of the contributing impervious area. Your soil type will affect how the rain garden should be sized because the water infiltration rate depends on the soil type; rain gardens should be larger in areas with slower infiltration. The following table can be used as general guidance.

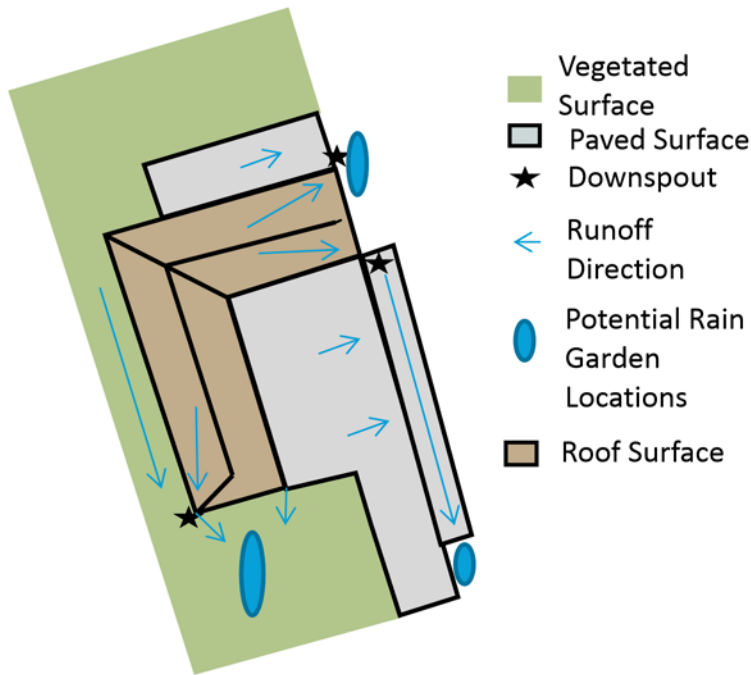
Contributing Area (sq. ft.)	Rain Garden Area (sq. ft.)
500 – 700	24
701 – 900	32

901 – 1,100	40
1,101 – 1,300	48
1,301 – 1,500	56
1,501 – 2000*	70

*Projects adding roof or other impervious areas in excess of 2,000 sq. ft. should add 20 sq. ft. of rain garden surface area per every 500 sq. ft. of additional area.

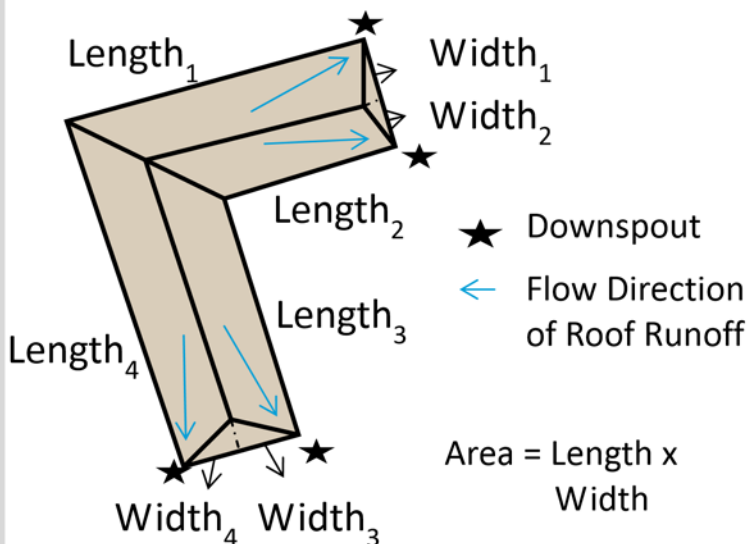
How to Plan and Install a Rain Garden

Select a Location and Plan for Overflow



- Before choosing the location of your rain garden, observe how rainwater is distributed across your home and yard. The ideal rain garden location is a flat or gently sloped area and is down slope from a runoff source.
- Site your garden at least 10 feet away from any structures (unless an impermeable barrier is used) and 5 feet from property lines.
- Avoid siting your garden over underground utilities and septic systems, near large trees, or next to a creek, stream or other water body.
- Your rain garden will overflow in large storms. Therefore, all garden designs should include an overflow system. One option is to build the perimeter of the garden so that it is perfectly level and to allow water to gently spill over the top during large storms. Another option is to build in a spillway that connects to another landscaped area, or the storm drain system.

Plan the Size of Your Rain Garden

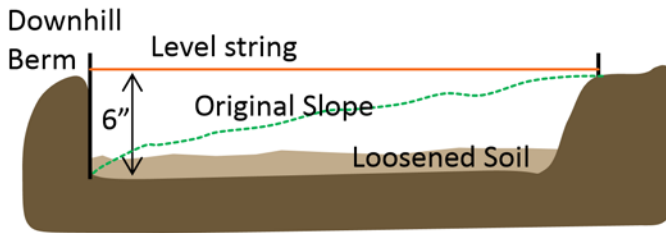


- Once you have determined where your garden will be sited, look at the surrounding area and identify which surfaces will contribute runoff to the garden. Is it all or just a part of the roof, patio, or driveway?
- Estimate the roof area by measuring the length and width of the building foundation and adding a few inches for the overhang. Multiply the length times the width to determine the contributing area. Once you have calculated the area of each contributing surface, add them up to obtain the total contributing area.
- Refer to the chart on page 1 to identify the size of the rain garden you will need to manage runoff from the contributing area.

If you do not have the space, budget, or interest in building a garden of this size, you may consider capturing some of your roof runoff in rain barrels to reduce the amount of runoff, or discharge the overflow to another landscaped area.

How to Plan and Install a Rain Garden

Install your Rain Garden



- Once you have selected a site and planned the size of your rain garden, lay out the shape using a string or tape to define the outline of where you will dig.
- If the yard is level, dig to a depth of 6-inches and slope the sides. If the site is sloped, you may need to dig out soil on the uphill side of the area and use the soil to construct a small berm (a compacted wall of soil) along the down slope side of the garden.
- Use a string level to help level the top of the garden and maintain an even 6-inch depth.
- Once the garden is excavated, loosen the soil on the bottom of the area so you have about 12 inches of soft soil for plants to root in. Mix in about 3 inches of compost to help the plants get established and improve the water-holding capacity of the soil.
- If water enters the garden quickly, include a layer of gravel or river rock at the entry points to prevent erosion.

Select Appropriate Plants



California Fuchsia



Common Rush



White Sage



Douglas Iris

You can design your rain garden to be as beautiful as any other type of garden. Select plants that are appropriate for your location and the extremes of living in a rain garden

Site Considerations:

- How much light will your garden receive?
- Is your property near the coast or located in an inland area (this affects sun and temperature)?
- Are there high winds near your home?

Recommended plant characteristics:

- Native plants adapted to local soil and climate,
- Drought tolerant,
- Flood tolerant,
- Not invasive weedy plants,
- Non-aggressive root systems to avoid damaging water pipes,
- Attracts birds and beneficial insects.

*Contact municipal staff to obtain a full list of recommended plants, provided in the countywide stormwater guidance.

Design Checklist

When installing a rain garden, the following design considerations are recommended.

- ❑ Locate the rain garden at least 10 feet from home foundation, 3 feet from public sidewalks, and 5 feet from private property lines. If rain gardens need to be located closer to buildings and infrastructure, use an impermeable barrier.
- ❑ Locate the rain garden to intercept and collect runoff from a roof downspout or adjacent impervious area.
- ❑ Size the rain garden appropriately based on the soil type and drainage area (see Page 1).
- ❑ Do not locate the rain garden over septic systems or shallow utilities. Locate utilities before digging by calling Underground Service Alert at 811 or (800) 227-2600.
- ❑ Locate the rain garden on a relatively flat area, away from steep slopes. If you plan on moving a large quantity of soil, you may need a grading permit. Contact your local municipality for further assistance.

Maintenance Considerations

Once a rain garden is installed, the following steps will help the garden function effectively.

Health and weeds should be removed as often as necessary.

- ❑ Apply about 2 inches of mulch and replace as needed. Mulch with a material that will not float away such as compost or a larger sized hardwood mulch (avoid microbark, for example).
- ❑ Areas of erosion should be repaired. Further erosion can be prevented by stabilizing the eroding soil with ground cover or using energy dispersion techniques (e.g., splashblock or cobbles) below downspouts. Avoid using synthetic fertilizers or herbicides in your rain garden because these chemicals are water pollutants.

this fact sheet. Contra Costa County is acknowledged for an image used in the fact sheet. The City of Los Angeles and Geosyntec Consultants are acknowledged for providing text, formatting and various images used in Page 4.

- ❑ Rain gardens should be irrigated periodically (as needed) during dry months, especially while plants are being established. Plants should be inspected for
- ❑ Consider installing an underdrain to enhance infiltration in very clayey soils. Contact municipal staff for guidance on how to properly install an underdrain.
- ❑ An overflow should be incorporated in the rain garden to move water that does not infiltrate to another pervious area and away from the home's foundation or neighboring property.
- ❑ Drought and flood resistant native plants are highly recommended and a variety of species should be planted. Avoid invasive plants. Contact municipal staff for a list of plants appropriate for rain gardens from the applicable countywide stormwater guidance. A list of invasive species may be found at the California Invasive Plant Council website (www.calipc.org).

- ❑ Standing water should not remain in a rain garden for more than 3 days. Extended periods of flooding will not only kill vegetation, but may result in the breeding of mosquitos or other vectors.

