

ILLINOIS URBAN MANUAL PRACTICE STANDARD

Rain Garden

(feet)

Code 897



Source: Kendall County Soil and Water Conservation District

Definition

Rain gardens are small, shallow, flat-bottomed depressions constructed to temporarily hold and infiltrate stormwater allowing stormwater to soak into the ground onsite rather than leaving a property as runoff.

Designed to be periodically inundated with water for short periods of time, rain gardens are planted with vegetation tolerant of being periodically wet and dry.

Purpose

Rain gardens are constructed to:

- Retain stormwater runoff and facilitate infiltration;
- Improve water quality by trapping sediment and debris;
- Remove other pollutants through the biological, chemical and physical properties of plants, microbes and soils;
- Create a unique landscape feature and provide habitat for wildlife such as birds and insects including pollinators.

Conditions Where Practice Applies

In developed areas, impervious and compacted surfaces increase stormwater runoff significantly. Rain gardens capture runoff from rooftops, driveways, sidewalks, lawns and other impervious and compacted surfaces.

This practice applies to small drainage locations and locations with soils that will allow adequate infiltration unless constructed with engineered soil and/or an underdrain system.

Criteria

Regulations

Plan, design and construct stormwater runoff practices to comply with applicable federal, state and local laws and regulations.

Utilities and Permits

The landowner and/or contractor shall be responsible for locating all buried utilities (Dial 811 to call JULIE) in the project area, including drainage tiles and other structural measures.

The landowner shall obtain all necessary permissions from regulatory agencies, including, but not limited to, local, state and federal units of government, or document that no permits are required.

Vegetation Selection

Stabilize all areas disturbed by construction with vegetation as soon as possible after construction and in accordance with IUM Practice Standard [PERMANENT VEGETATION 880](#).

Select vegetation tolerant of the site conditions, particularly moisture and sun exposure conditions, in which the vegetation will be planted. A plant selection guide can be found in [TABLE 897-1](#). If the rain

garden is expected to receive pollutants, select vegetation tolerant of those pollutants.

Location and Design

- Locate the rain garden so that the drainage area is less than 2 acres with any impermeable portion of drainage area no greater than 1 acre.
- Locate the rain garden where soil remains stable when saturated.
- Locate the rain garden to avoid damage to any structures or negative impacts to wastewater treatment systems or wells. Rain gardens shall be a minimum of 25 feet from private sewage disposal systems and wells. Avoid areas within a source water protection area for public drinking water supply.
- Rain gardens shall be located a minimum of 10 feet away from any utilities or building structure to prevent infiltrating water from seeping into the foundation. A minimum of 35-40 feet separation is preferred.
- Direct outflow from the rain garden away from any building foundation.
- The bottom of the rain garden shall be flat, not exceeding 0.5% slope, to facilitate distribution of stormwater runoff and maximize infiltration.
- Rate and volume of overflow from the rain garden must not cause downstream erosion.
- Stormwater must be directed to the rain garden through means such as topography, swales, or tile connected to downspouts.
- Soil surface where runoff water will enter the rain garden must be stable. Include measures such as rock to dissipate energy where concentrated flow is expected.
- Include pretreatment or pollution removal areas such as grass filters or settling areas when runoff is expected to contribute excessive sediment, trash, debris or other pollutants such as salt or oil that would be damaging to the system. These areas must be adequately designed to handle

the expected load capacity. Locate and build such areas so they are easy to access and maintain.

- Provide, at minimum, 2 feet of soil between the bottom of the rain garden and fractured bedrock or high water table. The target separation should be 3 feet. Where there is an increased risk of groundwater pollution, an impermeable liner or layer of compacted earth may be used to separate the rain garden and the water table where there is an increased risk of groundwater pollution.
- Rain gardens are typically between 3 and 9 inches deep, but never exceeding 12 inches in depth.
- Mound excavated material on the downhill side of the rain garden no higher than 1 foot above the bottom of the rain garden.
- Side slopes within the ponding area must be 3:1 (H:V) or flatter. Slopes of any mounded spoil outside of the ponding area must be 5:1 or flatter.
- Design the rain garden to dewater within 48 hours or less. The target dewatering time shall be 24 hours or less. Locations with existing soils that do not meet the criteria above may need a designed underdrain or soil amendment.
- Design the rain garden to drain completely between designed storm events. Any runoff directed to the rain garden, such as runoff from downspouts, lawns and paved surfaces must be intermittent. Sump pumps which discharge continuously shall not be directed to the rain garden.

Considerations

- Illinois rain events are typically 1 inch or less. Designing the rain garden to capture the first 1 inch of runoff will capture a significant amount of stormwater runoff flowing to the rain garden thus treating the pollutants coming into the rain garden. The first flush of runoff carries with it the majority of the pollutants from a storm event.
- Soils with a hydrologic group designation of A or B, a USDA soil textural classification of:

- Sand
- Loamy sand
- Sandy loam
- Loam

or an infiltration rate of at least 1 inch per hour are preferable for rain gardens. Soils with slower infiltration rates shall be amended or modified to increase infiltration. When appropriate, install underdrains where the soils have infiltration rates of $\frac{1}{2}$ inch per hour or less. For soils information see USDA Web Soil Survey.

- Avoid compaction in infiltration areas during construction, including compaction from foot traffic. Ensure that any impermeable layer in the infiltration area of the rain garden is removed or broken up prior to planting on sites where compaction has occurred, particularly where construction equipment has been used to construct the rain garden.
- It is important to note, rain gardens shall not be used to control construction site erosion. Additionally, any sediment which builds up over time shall be removed from the rain garden.
- Sediment deposition can create a crust on the surface of the rain garden which will begin to limit infiltration. It is important to note removal of sediment build-up over time is necessary.
- Rain garden size typically ranges from 100 to 300 square feet in area, commonly 10-30% of the drainage area.
- Avoid construction of rain gardens on slopes greater than 12%.
- Rain gardens should not be located upslope from any building foundation from which runoff is being collected such as from downspouts.
- To adequately establish vegetation, select plants based on sun exposure, soils and moisture availability at the proposed site location. If the rain garden is expected to receive pollutants select plants tolerant of those pollutants. Road salts can be of particular concern.
- Vegetation placed in the infiltration area of the rain garden must be tolerant of periodically dry and periodically inundated conditions.

- Vegetation selection and placement is crucial to a successful rain garden. Select vegetation based on position and associated moisture regime within the rain garden.

Position	Moisture Tolerance
Low	Moist to Average
Medium	Average Moisture
High	Average to Dry

- It is important to note rain gardens are not intended to retain permanent water. Avoid plants that prefer saturated or wet conditions.
- Rain gardens can be located in areas of shade, partial sun or full sun. Partial sun and full sun, however, are preferable due to the availability of a larger selection of plant material. Areas beneath trees should also be avoided to prevent root damage to trees.
- Ensure an adequate growing medium for vegetation. Specified soil mixes or natural topsoil must be of sufficient depth to support the root zone of the desired vegetation.
- Deep rooted native vegetation should be used and will improve soil infiltration over time. Native vegetation will typically perform better without added fertilizers.
- Consider including species beneficial for pollinators. Pollinator habitat areas consist of a sufficient variety of plant species to sustain the target pollinators throughout the growing season.
- Consider grouping plants and including signage to facilitate maintenance.
- Successful plant establishment is most easily accomplished during spring and fall when soil moisture is readily available. During vegetation establishment ensure adequate maintenance resources and watering capabilities exist.
- Seeding is not recommended as seeds can be washed away and are slow to establish. Plant the infiltration area of the rain garden with dormant or actively growing nursery stock. Ensure that trees and other vegetation will not hinder water from entering the rain garden, create traffic or safety issues, or

obstruct utilities.

- Mulch vegetation after planting to suppress weeds and conserve moisture. Use shredded hardwood mulch or equivalent non-floatable mulch. Spread mulch evenly to a maximum depth of 3 inches. Ensure clearance of mulch around new plantings to facilitate watering and air exchange. Where phosphorous levels are a concern, discontinue adding mulch once plants are established.
- Consider diverting water or lowering the rain garden outlet until vegetation is established. Remove the diversion or complete construction of outlet to design depth when plants grow taller than ponding depth.
- Consider temporarily fencing around the rain garden to protect plantings if herbivore pressure exists.
- A single rain garden will not significantly impact flooding issues or water quality problems in a community. However, the cumulative impact of rain gardens in conjunction with other stormwater management practices has the potential to tangibly affect flooding, stream flow, local groundwater recharge and water quality concerns.

Plans and Specifications

Plans and specifications for installing a rain garden shall be in compliance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following items:

1. Rain garden location
2. Grade, depth, width, length and side slope grade
3. Rain garden cross-section
4. Material specifications
5. Construction specifications

All plans shall include the installation, inspection and maintenance schedules with the responsible party identified.

Operation and Maintenance

An operation and maintenance plan shall be provided for the rain garden to include at a minimum:

- Periodic inspections during vegetative establishment and immediately following significant rainfall events.
- Prompt repair or replacement of damaged components such as areas subject to wear or erosion, as well as, failed plantings.
- Periodic inspection to remove accumulated sediment and debris.
- Rain garden vegetation will require regular watering and weeding during plant establishment.
- Prune trees and shrubs as needed. Weed rain garden to control unwanted vegetation. Annually, in early spring, remove or mulch in place the previous year's herbaceous growth which has died back.

References

- Bannerman, Roger, and E. Considine, 2003. Rain Gardens: A How-to Manual for Homeowners. University of Wisconsin Extension Publication GWQ037 or Wisconsin Department of Natural Resources Publication PUB- WT-776 2003. Madison, WI.
- Iowa Stormwater Partnership, Rain Gardens: Iowa Rain Garden Design and Installation Manual. 2008. eBook.
- Natural Resources Conservation Service, Conservation Practice Standard Stormwater Runoff Control: CODE 570. 2013.
- Schmidt, Rusty, Dan Shaw, and David Dods, The Blue Thumb Guide to Raingardens. Waterdrop Innovations, LLC, 2007. Print.
- USDA-NRCS, Pollinator Biology and Habitat: Technical Note 23. 2008.
- USDA Web Soil Survey, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov>

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