Rain Gardens

Practice Note: **LB 204 - June 2006**

Rain gardens are especially suited to small catchment areas and are primarily designed to treat stormwater quality. Stormwater quantity can only be managed if the rain garden has been specifically designed with additional detention storage (see Figure 204.1).

4.1 Description

Rain gardens look and function like any other garden except they treat runoff and are designed with 100mm layer of mulch, 600 to 1000mm of planting soil, and vegetation (grasses and shrubs). In heavy soils, an underdrain must be incorporated into the design of a rain garden to provide adequate drainage during wet weather. Filter fabric is required to prevent the adjacent soil migrating into the planting soil and to stop planting soil getting into the underdrain material. Please see ARC's technical publication "Stormwater Treatment Devices – Design Guideline Manual" (TP10) for specific design details.

To manage stormwater quantity in rain gardens an additional storage volume (with an orifice controlled outlet) has to be provided over and above the volume required to manage the quality (see Figure 204.1). For Rain Garden Water Quality Design refer ARC TP10 Guidelines.

4.2 Benefits

Well-designed rain gardens can treat stormwater quality and quantity for small impervious areas (up to 1,000m^2). Stormwater quantity management can be achieved when 300mm depth of temporary detention is provided above the 150mm depth required for treating water quality. This can reduce the peak storm water flows to greenfields levels for all Annual Recurrence Intervals (ARIs) up to 10 years.

4.3 Considerations

Rain gardens will need long-term maintenance.

In rain gardens, the permeability of the planting soil may reduce with clogging of organic and fine silt and clay particles. This will increase the amount of time water ponds on the surface. Maintaining the vegetation is essential. During dry periods the underdrain in the rain garden may cause the rain garden to dry out. Watering the vegetation on an as needed basis helps ensure a healthy condition and appearance.

For stormwater quantity management the orifice controlled outlets will also require careful maintenance and screening to prevent blocking during and after rainfall events.

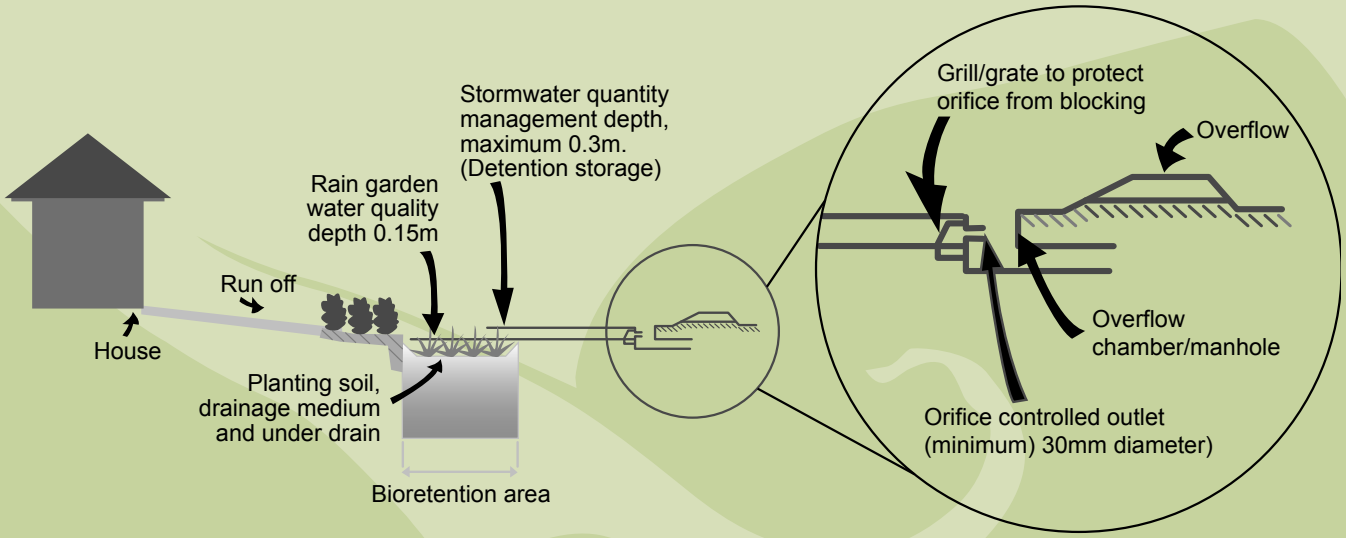

Figure 204.1 (not to scale)
Note: For rain garden water quality design refer ARC TP10 guidelines.

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If the rain garden is in an area of geotechnical concern, an impervious membrane may be required.

4.4 What to do?

Rain gardens should be planted:

- next to impervious surfaces so that grass area draining to the rain garden is minimal;
- as separating strips in car parking areas; instead of raised gardens, provide a rain garden which will treat runoff from hard surfaces, while adding to aesthetics; and
- in small public reserves to treat neighbouring properties, up to a maximum catchment area of 6,000m^2. Long-term maintenance will be carried out by the council or a body corporate.

In all cases, a protected overland flow path is required to safely carry away excess flows during heavy rainfall or storms.

Having worked out the site's impervious surface area (see Practice Note LB102) and the preferred depth of the rain garden, the size of the rain garden can be calculated using Figure 204.2, which is based on ARC TP10. All construction guidelines are also given in TP10. If the catchment hard surface area is greater than the range of Figure 204.2, then a design should be carried out based on ARC TP10 guidelines.

For small rain gardens, a conservative design can be obtained by calculating the "Equivalent Impervious Surface Catchment Area" (= Impervious Surface Area in catchment + 50% of Grass Area in catchment) and using Figure 204.2 to calculate the required rain garden area. It is desirable to minimise the grass catchment area draining to the treatment device.

To manage water quantity, a 300mm detention depth and an orifice outlet protected by a screen, must be provided as shown in Figure 204.3. The orifice diameters shown in Table 204.1 applies for impervious surface catchment areas of up to 200m^2. Any intermediate values may be obtained by interpolation. Figure 204.3 shows the preferred schematic arrangement at the orifice.

Impervious surface catchment area (m^2)	Orifice diameter (mm)
50	16
100	23
200	33

Table 204.1

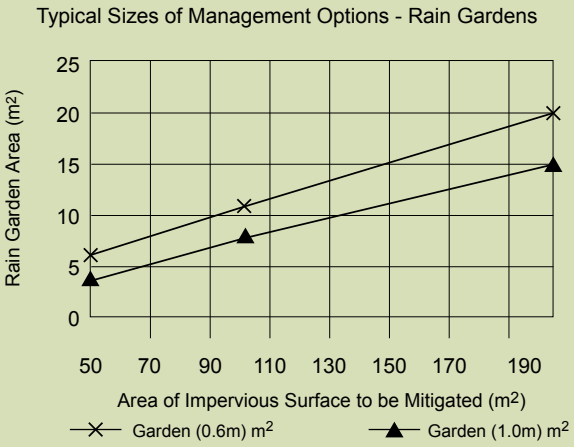

Figure 204.2

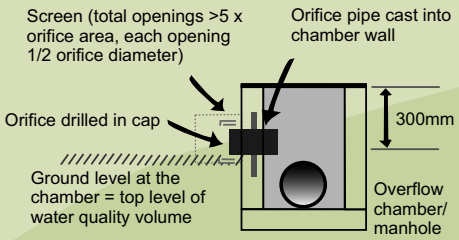

Figure 204.3: Preferred schematic arrangement at the orifice (not to scale)

Responsibilities and maintenance

In terms of the Council's By-laws, the owner is responsible for the on-going operation and maintenance of all on-site stormwater management devices, and the renewal there-of at the end of their useful life. On-site stormwater management devices should be operated and maintained in accordance with the approved operations and maintenance manuals, copies of which may be obtained from the Council. On-site stormwater management devices will be inspected periodically by the Council or their authorised agents for compliance with the owners' maintenance obligations.

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