

Description

An extended dry basin is a shallow landscaped depression with a flat bottom that collects and holds stormwater runoff, allowing pollutants to settle and filter out as the water infiltrates into the ground or is discharged to an approved location. An extended dry basin has two or more cells (the first cell is the forebay). An inflow pipe conveys stormwater into the basin where it is temporarily stored. Extended dry basins may infiltrate stormwater where soils have high infiltration rates, or may overflow to an approved discharge point.

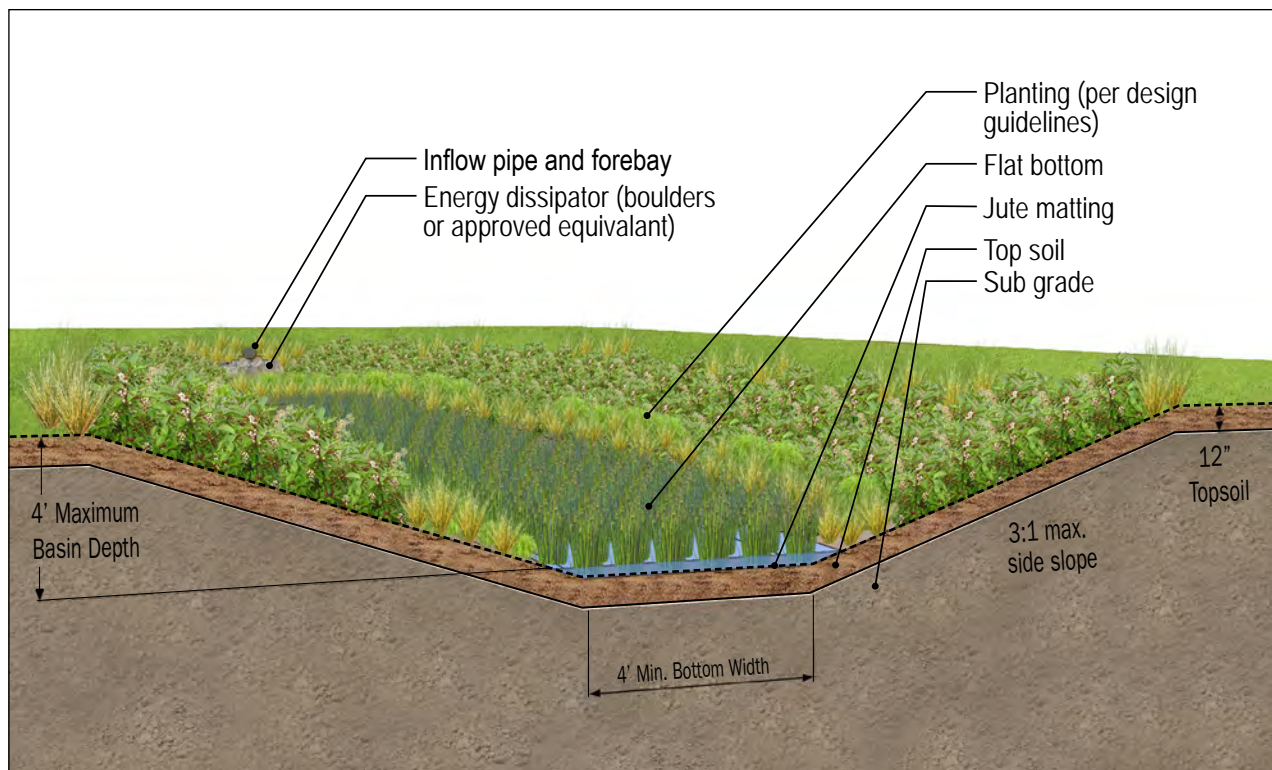
- Y - Public System Approvable
- Y - Quantity for Conveyance
- Y - Hydromodification Approach
- N - Water Quality Treatment Approach

Application & Limitations

Extended dry basins may help fulfill a site's landscaping area requirement. This type of water quality facility is approved to treat stormwater from all types of impervious surfaces, including private property and the public right-of-way, rooftops, parking lots and streets.



Home Depot, Glenn Widing Drive, North Portland



Design Factors

Sizing

Sizing of the detention basin is determined by the volume of runoff and the detention period required for treatment. At a minimum, the detention basin must accommodate the water quality design storm and be sized for a 48-hour drawdown time.

The minimum water quality detention volume is equal to (1) x the water quality volume (WQV). The outlet orifice size is determined by the following equation:

$$D = 24 * [(Q/ (C[2gH]^{0.5}) / \pi)]^{0.5}$$

Where:

$$D \text{ (in)} = \text{diameter of orifice } Q(\text{cfs}) = WQV(\text{cf}) / (48 * 60 * 60) \text{ } C = 0.62$$

$$H(\text{ft}) = 2/3 \times \text{temporary detention height to centerline of orifice}$$

Geometry/Slopes

An extended dry basin has two or more cells. The first cell, the forebay, is at least 10% of the entire surface area and constitutes 20% of the treatment volume. The minimum width of the bottom of the extended dry basin is 4 feet, and the permanent pool depth is 0.4 feet and covers the entire bottom of the basin. The maximum depth of the water quality pool, not including the permanent pool, is 4 feet unless otherwise limited by the jurisdiction.

The maximum side slopes of the basin treatment area are 3H: 1V (33.33%); the minimum freeboard is 1 foot above the 25-year design water surface elevation.

Piping for Extended Dry Basins

Incoming flows are pretreated using a water quality manhole in accordance with the District Standards. Other pretreatment may include proprietary devices, filter strip, trapped catch basin or methods approved by the District or the city. An approved outlet structure is provided for all flows.

Setbacks

Check with the local building department to confirm site-specific requirements.

Soil Amendment/Mulch

If required, place 3/4" to 2-inch river run rock 2.5 to 3 inches deep where sustained flow is anticipated. River rock (if required), topsoil and high density jute or coconut matting extend to the top of the treatment area. Topsoil and low density jute matting extend to the edge of the water quality tract or easement area.



Washington County

Design Factors (continued)

Vegetation

The entire facility area (side slopes and treatment areas) is planted with vegetation appropriate for the varying planting conditions within the extended dry basin. Planting conditions vary from saturated soil to relatively dry, and several planting zones should be considered. The flat bottom of the extended dry basin to the top of the 0.4 foot permanent pool is a saturated zone and will be consistently inundated with water. The saturated zone should be planted with rushes, sedges and other wetland species (oxygenators) that are well suited to water-saturated, oxygen-deprived (anaerobic) planting conditions.

The side slopes above the permanent pool depth will vary from wet at the bottom to relatively dry near the top where inundation rarely occurs. This moisture gradient will vary depending upon the designed maximum water depth, basin depth and side slope steepness. This wet-to-moist transition zone from the top of the permanent pool to the designed high-water line or top of freeboard should be planted with sedges, rushes, perennials, ferns and shrubs that can tolerate occasional standing water and wet-to-moist planting conditions. The areas above the designed high water line and immediately adjacent to the extended dry basin will not be regularly inundated. The dry zone should be planted with self-sustaining, low maintenance grasses, perennials and shrubs suitable for the local climate and site.

The use of native plants is encouraged, but appropriate, adapted non-invasive ornamentals are acceptable for added aesthetic and functional value upon approval. All vegetation should be densely and evenly planted to ensure proper hydrological function of the extended dry basin. For a complete list of allowable plants, refer to page 76.

Plant Spacing

A) Extended Dry Basins in tracts or easements less than 30 feet wide are planted as follows to achieve the specified per acre densities:

- i. Treatment area = 6 plugs per square foot (min. 1-inch diameter by 6-inch tall)
- ii. Total number of shrubs per acre = area in square feet x 0.05
- iii. Groundcover = plant and seed to achieve 100% coverage

B) Extended Dry Basins in tracts or easements 30 feet wide or more are planted as follows to achieve the specified per acre densities:

- i. Treatment area = 6 plugs per square foot (min. 1-inch diameter by 6-inch tall)
- ii. Total number of trees per acre = area in square feet x 0.01
- iii. Total number of shrubs per acre = area in square feet x 0.05
- iv. Groundcover = plant and seed to achieve 100% coverage



Home Depot, Glenn Widing Drive, North Portland



Washington County

Required Maintenance Period

- Water-efficient irrigation should be applied for the first two years after construction of the facility, particularly during the dry summer months, while plantings become established. Irrigation after these two years is at the discretion of the owner.
- If public, the permittee is responsible for the maintenance of the extended dry basin for a minimum of two years following construction and acceptance of the facility.

Long-Term Maintenance

If private, the property owner will be responsible for ongoing maintenance per a recorded maintenance agreement (see page 88 for example maintenance agreement).

For detailed Operation and Maintenance Plans that describe proper maintenance activities please refer to page 91.

All publicly maintained facilities must have a public easement.

References

Clean Water Services Design and Construction Standard.