

Waterbury Filing No. 1 & 2
Operations and Maintenance Manual
Extended Detention Basin, Diversion Swale E-E & Grass Buffers
County Job No. PUDSP-21-005

Extended detention basins have low to moderate maintenance requirements. Routine and non-routine maintenance is necessary to assure performance, enhance aesthetics, and protect structural integrity. Dry basins can result in nuisance complaints if not properly designed or maintained. Bio-degradable pesticides may be required to limit insect problems. Frequent debris removal and grass-mowing can reduce aesthetic complaints. If a shallow wetland or marshy area is included, mosquito breeding and nuisance odors could occur if the water becomes stagnant.

4 Way Ranch Metropolitan District No. 2
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1. Waterbury Filing No. 1 & 2 Extended Detention Basins, Diversion Swale E-E & Grass Buffers Maintained by 4-Way Ranch Metropolitan District.

There are 3 Extended Detention Basin on the Waterbury Filing No. 1 & 2 property that 4-Way joint Ventures owns and maintains. The following are details of this detention basin. Attached to this manual is a map showing the detention basin location.

Extended Detention Basin Pond 1– Extended Detention Basin with WQCV. This full spectrum detention basin will be built in 2022. The final drainage report for Waterbury Filing No. 1 & 2 covers the drainage calculations for this pond.

Extended Detention Basin Pond 2– Extended Detention Basin with WQCV. This full spectrum detention basin will be built in 2022. The final drainage report for Waterbury Filing No. 1 & 2 covers the drainage calculations for this pond.

Extended Detention Basin Pond 3– Extended Detention Basin with WQCV. This full spectrum detention basin will be built in 2022. The final drainage report for Waterbury Filing No. 1 & 2 covers the drainage calculations for this pond.

Diversion Swale E-E- This Swale will be built in 2022. The final drainage report for Waterbury Filing No. 1 & 2 covers the drainage calculations for this swale.

Grasse Buffer- These Grass Buffers will be used as Receiving Pervious Areas and built in 2022. The final drainage report for Waterbury Filing No. 1 & 2 covers the Runoff Reduction calculations for these Receiving Pervious Areas (RPA).

2. Access

The Extended Detention Basin Pond 1 can be accessed from the Saybrook Road. There is a gravel access ramp on the east corner of the Extended Detention Basin.

The Extended Detention Basin Pond 2 & 3 can be accessed from the end of Sunken Meadow Drive with a maintenance road to both. There is a gravel access ramp on the east corner of the Extended Detention Basin 3.

The Swale E-E can be accessed from the end of Megansett Way Public ROW with a maintenance road to both. There is a temporary access at the end of the roadway.

The Grass Buffers (Receiving Pervious Area RPA) can be accessed through the homeowner's yard

3. Inspections

Inspection and Frequency

- Annually inspect detention basin to insure that the basin continues to function as initially intended. The annual inspection should evaluate the forebay, pond side slopes, inflow channel, the spillway condition, the depth of sediment in the forebay, outlet structure, trash rack, downstream channel, and the condition of the downstream face of the pond. A site survey will be the best indication of excessive sediment buildup and degradation of the spillway. In addition, an inspection of the vegetation on the berm, inside the detention area and the downstream face of the spillway should be conducted. Any bare areas should be noted and repaired using native grasses. Any sloughing or erosion of the embankment should be noted and repaired. Items to record will include any items inspected and the mowing frequency of the vegetation on the facility.
- Just before annual storm seasons (that is, April and May) and following significant rainfall events, inspect for litter and debris that may plug outlets. Of notable importance, the inspections should also include the water quality orifice plate and trash rack to ensure plugging has not occurred.
- A baseline survey should be performed at the time of construction and comparison surveys conducted every ten to twenty years after to monitor overall performance of the pond. Results of inspections should be recorded and kept at a central location for review and recording by the district.

Inspection Personnel

A qualified engineer, surveyor, or certified storm water inspector should conduct inspections of the facility.

4.0 Operations

No specific operating instructions are required.

5.0 Maintenance

Maintenance of the Extended Detention Basin shall be in accordance with the guidelines included in Table EDB-1, below.

Table EDB-1		
Required Action	Maintenance Objective	Frequency of Action
Lawn mowing and lawn care	Occasional mowing to limit unwanted vegetation. Maintain irrigated turf grass as 2 to 4 inches tall and nonirrigated native turf grasses at 4 to 6 inches.	Routine – Depending on aesthetic requirements.
Debris and litter removal	Remove debris and litter from the entire pond to minimize outlet clogging and improve aesthetics. Outlet structure trash racks should be clear of any blockage.	Routine – Including just before annual storm seasons (that is, April and May) and following significant rainfall events.
Erosion and sediment control	Repair and revegetate eroded areas in the basin and channels.	Nonroutine – Periodic and repair as necessary based on inspection.
Structural	Repair pond inlets, outlets, forebays, low flow channel liners, and energy dissipators whenever damage is discovered.	Nonroutine – Repair as needed based on regular inspections.
Inspections	Inspect basins to insure that the basin continues to function as initially intended. Examine the outlet for clogging, erosion, slumping, excessive sedimentation levels, overgrowth, embankment and spillway integrity, and	Routine – Annual inspection of hydraulic and structural facilities. Also check for obvious problems during routine maintenance visits, especially for plugging of outlets.

	damage to any structural element.	
Nuisance control	Address odor, insects, and overgrowth issues associated with stagnant or standing water in the bottom zone.	Nonroutine – Handle as necessary per inspection or local complaints.
Sediment removal	Remove accumulated sediment from the forebay, micro-pool, and the bottom of the basin.	Nonroutine – Performed when sediment accumulation occupies 20 percent of the WQCV. This may vary considerably, but expect to do this every 10 to 20 years, as necessary per inspection if no construction activities take place in the tributary watershed. More often if they do. The forebay and the micro-pool will require more frequent cleanout than other areas of the basin, say every 1 or 2 years.

Maintenance of the Grass Buffers and Swales (Receiving Pervious Areas & Diversion Swale) shall be in accordance with the guidelines included in Table RPA-1, below.

Table RPA-1		
Required Action	Maintenance Objective	Frequency of Action
Inspection	Check for sediment accumulation and rill and gully development. Inspect vegetation for uniform coverage.	Routine – at least twice annually for uniform cover and traffic impacts.
Debris and litter removal	Remove litter and debris to prevent rill and gully development from preferential flow paths around accumulated debris, enhance aesthetics, and prevent	Routine This should be done as needed based on inspection, but no less than two times per year.

	floatables from being washed offsite.	
Aeration	Aeration is done by punching holes in the ground using an aerator with hollow punches that pull the soil cores or "plugs" from the ground. Holes should be at least 2 inches deep and no more than 4 inches apart.	Routine – Should be performed at least once per year when the ground is not frozen.
Mowing	When starting from seed, mow native/drought-tolerant grasses only when required to deter weeds during the first three years. Following this period mowing of native/drought tolerant grass may stop or be reduced to maintain a length of no less than six inches.	Routine – Mowing of manicured grasses may vary from as frequently as weekly during the summer, to no mowing during the winter.
Added Fertilizer, Herbicide, and Pesticide Application	Use the minimum amount of biodegradable nontoxic fertilizers and herbicides needed to establish and maintain dense vegetation cover that is reasonably free of weeds. Fertilizer application may be significantly reduced or eliminated by the use of mulch-mowers, as opposed to bagging and removing clippings. To keep clippings out of receiving waters, maintain a 25-foot buffer adjacent to open water areas where clippings are bagged. Hand-pull the weeds in areas with limited weed problems.	Nonroutine – Frequency of fertilizer, herbicide, and pesticide application should be on an as-needed basis only and should decrease following establishment of vegetation.
Sediment removal	For Grass Buffers: Using a shovel, remove sediment	Nonroutine – Remove sediment as needed based

	<p>at the interface between the impervious area and buffer</p> <p>For Grass Swales: Remove accumulated sediment near culverts and in channels to maintain flow capacity. Spot replace the grass areas as necessary.</p>	<p>on inspection. Frequency depends on site-specific conditions. For planning purposes, it can be estimated that 3 to 10% of the swale length or buffer interface length will require sediment removal on an annual basis. Reseed and/or patch damage areas in buffer, sideslopes and/or channel to maintain healthy vegetative cover. Over time, and depending on pollutant load, portion of butter/sale may need to be rehabilitated due to sediment deposition. Periodic sediment removal will reduce the frequency of revegetation required. Expect turf replacement for the buffer interface area every 10 to 20 years.</p>
<p>Irrigation Schedule and Maintenance</p>	<p>Check for broken sprinkler heads and repair them, as needed. Do not overwater. Signs of overwatering and/or broken sprinkler heads may include soggy areas and unevenly distributed areas of lush growth. Completely drain and blowout the irrigation system before the first winter freeze each year. Upon reactivation of the irrigation system in the spring, inspect all components and replace damaged parts, as needed.</p>	<p>Adjust irrigation schedules throughout the growing season to provide the proper irrigation application rate to maintain healthy vegetation. Less irrigation is typically needed in early summer and fall, with more irrigation needed during July and August. Native grass should not require irrigation after establishment, except during prolonged dry periods when supplemental, temporary irrigation may aid in maintaining healthy vegetation cover.</p>