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Lacamas Shores

HOMEOWNER ASSOCIATION INTERIM TRAIL, OPEN SPACE, WETLAND AND STORM DRAINAGE MAINTENANCE MANUAL

Lacamas Shores Homeowner's Association interim guidelines for the maintaining the Bio-swale and storm water systems, trails, and Open Space to City of Camas Standards

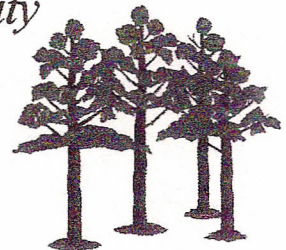


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Storm Water System

Chapter One Storm Ponds, Biofiltration Swale and Level Spreader Outlet

A biofiltration swale is a long, gently sloped, vegetated ditch designed to filter pollutants from stormwater. Grass is the most common vegetation used.¹ Groomed biofilters planted in grasses must be mowed regularly during the summer to promote growth and pollutant uptake. Be sure not to cut below the design flow elevation (maintenance personnel must be made aware of this requirement.²)

A Level Spreader Outlet ensures storm water is evenly distributed to the open space area. This prevents concentrated flow in a localized area.

Maintenance is of primary importance if storm water systems are to continue to function as originally designed. The following specific guidelines apply to the Lacamas Shores detention ponds, biofiltration swale and level spreader outlet :

1. Remove any debris in bio swale and conveyance swale as well as any that may be floating in the wet pond.
2. If there are any low areas in the berm, build back up, seed and cover with plastic or erosion net.
3. Replace any rocks that have washed out of outfalls.
4. Ensure inlet and outlet pipes are free of any debris or sediment build up.
5. Water levels permitting, remove dead plants from wet pond.
6. Generally reseed any area that is lacking or sparse in vegetation.
7. If swales are mowed, don't leave the grass clippings in the swale.
8. Make sure outlet grates are free of debris.
9. Make sure maintain 4 feet of gravel around the level spreader outlet. Keep the drain rock free of mud, leaves and other debris.

Vegetation

If a shallow marsh is established, then periodic removal of dead vegetation will be necessary. Since decomposing vegetation can release pollutants captured in the wet pond, especially nutrients, it may be necessary to harvest dead vegetation annually prior to the wet season. Otherwise the decaying vegetation can export pollutants out of the pond and also can cause nuisance conditions to occur.³

Sediment

Maintenance of sediment traps and attention to sediment accumulation within the pond is extremely important. Sediment deposition should be continually monitored in the basin. Owners and maintenance authorities should be aware that significant concentrations of heavy metals (e.g., lead, zinc, and cadmium) as well as some organics such as pesticides, may be expected to accumulate at the bottom of these treatment facilities. Testing of sediment,

¹ 1998 Surface Water Design Manual 6.1.1 9/1/98

² Stormwater Management Manual for the Puget Sound Basin III-6-7 February 1992

³ Stormwater Management Manual for the Puget Sound Basin III-4-20 February 1992

especially near points of inflow, should be conducted regularly to determine the leaching potential and level of accumulation of hazardous material before disposal. **For disposal procedures, refer to Volume IV disposal requirement for catch basin and pond sediments.**⁴

Nuisance Conditions

The presence of wet ponds and marshes in established urban areas is perceived by many people to be undesirable. They are often thought of as mud holes where mosquitoes and other insects breed. If the wet pond has a shallow marsh established the pond can become a welcomed addition to an urban community. Constructed fresh water marshes can provide miniature wildlife refuges, and while insect populations are increased, insect predators also increase, often reducing the problem to a tolerable level. Advice from the University of Washington suggests that in the Puget Sound Lowlands, the extra breeding habitat provided by any wet ponds would not be significant. Nevertheless, local governments and homeowners associations may wish to temporarily drain wet ponds during late spring and summer if there is sufficient concern. However, it is imperative that vegetation in shallow marsh areas not die off during draindown periods. Otherwise, the pollutant removal effectiveness of the wet pond can be severely impacted./ In addition, the decaying vegetation can create nuisance conditions⁵.

Specific Maintenance Requirements for Detention Ponds

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
I. Ponds - General	Trash and Debris	Any trash or debris which exceeds 1 ft ³ /1000 ft ² (equal to the volume of a standard size office garbage can). In general, there should be no evidence of dumping.	Trash and debris cleared from site.
	Poisonous vegetation	Any poisonous vegetation which may constitute a hazard to maintenance personnel or the public, e.g., tansy, poison, stinging nettles, devils club.	No danger of poisonous vegetation where maintenance personnel or the public might normally be. Coordinate with the county health department.
	Pollution	1 gallon or more of oil, gas or other contaminants <u>or</u> any amount found that could: 1) cause damage to plant, animal, or marine life 2) constitute a fire hazard. 3) be flushed downstream during storms or 4) contaminate ground water.	No contaminants present other than a surface film. Coordinate with the county health department.
	Unmowed grass/ground cover	In residential areas, mowing is needed when the cover exceeds 18 inches in height. Otherwise, match facility cover with adjacent ground cover and terrain as long as there is no decrease in facility function.	When mowing is needed, grass or ground cover should be mowed down to 2 inches. A dense grass cover must be maintained on slopes, and in dry ponds on the bottom as well.

⁴ Stormwater Management Manual for the Puget Sound Basin III-4-21 February 1992

⁵ Stormwater Management Manual for the Puget Sound Basin III-4-21 February 1992

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
<p>Side Slopes of Pond</p> <p>Storage Area, Sediment Trap</p> <p>Pond Dikes</p> <p>Emergency Overflow, Spillway</p> <p>II. Debris Barriers - General</p> <p>Metal</p> <p>III. Fencing- General</p>	Rodent holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes	Rodents destroyed and dam or berm repaired.
	Insects	When insects such as wasps or hornets interfere with maintenance activities	Coordinate with the County health department Insects destroyed or removed from site. Coordinate with people who remove wasps for anti-venom production.
	Tree growth	Tree growth does not allow maintenance access or interferes with maintenance activity. If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood.
	Erosion	Eroded damage > 2 inches deep where cause of damage is still present or where there is potential for continued erosion	Slopes should be stabilized with appropriate erosion control best management practices (BMP's) e.g. seeding, plastic covers, riprap.
	Sediment	Accumulated sediment that exceeds 10% of the designed sediment trap depth, or every three years	Sediment cleaned out to designed pond shape and depth; reseeded if necessary to control erosion.
	Settling	Any part of dike which has settled 4 inches lower than the design elevation	Dike should be built back to the design elevation.
	Rock missing	Only 1 layer of rock above native soil in an area $\geq 5 \text{ ft}^2$ or any exposure of native soil.	Replace rock to design standards.
	Trash and debris	Trash or debris that is plugging $\geq 20\%$ of the openings in the barrier	Barrier clear to receive capacity flow.
	Damaged/missing bars	<p>Bars are bent out of shape ≥ 3 inches</p> <p>Bars or entire barrier is missing.</p> <p>Bars are loose and rust is causing 50% deterioration to any part of the barrier.</p>	<p>Bars in place, not bent $\geq \frac{3}{4}$ inch.</p> <p>Bars in place according to design.</p> <p>Repair or replace barrier to standards.</p>
	Missing or broken parts	<p>Any defect in the fence that permits easy entrance to the facility</p> <p>Parts broken or missing.</p>	<p>Parts in place to provide adequate security.</p> <p>Broken or missing parts replaced.</p>
Erosion	Erosion ≥ 4 inches deep and 12-18 inches wide permitting an opening under the fence.	No opening under the fence ≥ 4 inches in depth.	

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Wire Fence	<p>Damaged parts</p> <p>Deteriorated paint or protective coating</p> <p>Openings in fabric</p>	<p>Posts out of plumb more than 6 inches</p> <p>Top rails bent more than 6 inches</p> <p>Fabric) \geq 1 foot out of design alignment.</p> <p>Missing or loose tension wire</p> <p>Extension arm missing, broken or bent out of shape more than 1 1/2 inches.</p> <p>Part(s) that have a rusting or scaling condition which has affected structural adequacy.</p> <p>Openings in fabric are such that an 8 inch diameter ball could fit through</p>	<p>Post plumb within 1 1/2 inches.</p> <p>Top rail free of bends \geq 1 inch.</p> <p>Fence is aligned and meets design standards</p> <p>Tension wire in place & holding fabric</p> <p>Extension arm in place with no bends larger than 3/4 inch.</p> <p>Structurally adequate posts or parts with a uniform protective coating.</p> <p>No openings in fence.</p>
IV. Gates - General	<p>Damaged missing members</p>	<p>Missing gate or locking device.</p> <p>Broken or missing hinges such that the gate cannot be easily opened and closed by maintenance personnel.</p> <p>Gate is out of plumb \geq 6 inches and \geq 1 foot out of design alignment.</p> <p>Missing stretcher bar, stretcher band and ties.</p>	<p>Gates and locking devices in place..</p> <p>Hinges intact and lubed, gate working freely.</p> <p>Gate is aligned and vertical.</p> <p>Stretcher bar, bands and ties in place.</p>
V. Access Roads Easements- General	<p>Trash and debris</p> <p>Blocked roadway</p> <p>Settlement, potholes mushy spots, ruts</p> <p>Vegetation in surface</p> <p>Erosion damage</p> <p>Weeds and brush</p>	<p>Exceeds 1 ft³ /1000 ft² or the amount that would fill a standardize garbage can.</p> <p>Debris which could damage vehicle tires.</p> <p>Obstructions which reduce clearance above road surface to < 14 feet.</p> <p>Any obstructions restricting access to a 10-12 foot width for a distance of \geq 12 feet or any point restricting access to a < 10 foot width</p> <p>When any surface exceeds 6 inches in depth and 6 ft² in area. In general, any surface defect which prevents or hinders maintenance access.</p> <p>Weeds growing in the road surface that are \geq 6 inches tall and < 6 inches apart within a 400 ft² area.</p> <p>Erosion within 1 foot of the roadway \geq 8 inches wide & 6 inches deep.</p> <p>Weeds and brush exceed 18 inches in height or hinder maintenance access.</p>	<p>Trash & debris cleared from site.</p> <p>Roadway free of such debris.</p> <p>Roadway overhead clear to 14 feet high</p> <p>Obstruction moved to allow at least a 12 foot access route.</p> <p>Road surface uniformly smooth with no evidence of potholes, settlement, mushy spots or ruts.</p> <p>Road surface free of weeds taller than 2 inches.</p> <p>Shoulder free or erosion & matching the surrounding road.</p> <p>Weeds and brush cut to 2 inches in height or cleared in such a way as to allow maintenance access</p>

Wetlands and Open Spaces

Chapter Two Managing Wetlands and Open Spaces in a newly Developing Area⁶

The guidelines in this manual are based on two principles that are recognized to create the most effective environmental management: (1) the best management policies for the protection of wetlands and other natural resources are those that prevent or minimize the development of impacts at potential sources; and (2) the best management strategies are self-perpetuating, that is they do not require periodic infusions of capital and labor. To apply these principles in managing wetlands in a newly developing area, carry out the following steps.

1. Promote the conservation of forest cover.
2. Maintain natural storage reservoirs and drainage corridors including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies to discourage the clearing, filling, and channelization of these features.
3. Manage stormwater not only to prevent flooding and stream channel erosion, but also to maintain to the maximum extent possible, the pre-development hydroperiod, hydrodynamics, and water quality in the wetlands of the urbanizing watershed.
4. Establish and maintain buffers surrounding wetlands as required by local regulations or as recommended by the Puget Sound Water Quality Authority's draft wetland guidelines. Also maintain interconnections among wetlands and other natural habitats to allow for wildlife movements.
5. Establish effective erosion control programs to reduce the sediment loadings to receiving waters to the maximum extent possible. No pre-existing wetland or other water body should ever be used for the sedimentation of solids in construction-phase runoff.
6. Stimulate public awareness of and interest in wetlands and other water resources in order to establish protective attitudes in the community. This program should include:
 - a. Education regarding the use of fertilizers and pesticides, automobile maintenance, the care of animals to prevent water pollution, and the importance of retaining buffers.
 - b. Descriptive signboards adjacent to wetlands and open spaces informing residents of the wetland type, its functions, and the protective measures being taken.
 - c. If beavers are present in a wetland, educate residents about their ecological role and value, and take steps to avoid human interference with beavers.
7. Take specific management measures to avoid general urban impacts on wetlands and open spaces e.g., littering and vegetation destruction. Discourage access by vehicles. Fences should not be used because they interfere with wildlife movements.
8. To the maximum extent possible, avoid the removal or damage of nurse logs and snags which form important wildlife habitats. Replace any such materials that are removed or damaged under the guidance of a qualified wildlife biologist.

⁶ Stormwater Management Manual for the Puget Sound Basin III 5-6 February 1992

TRAILS

Chapter Three

Managing Trails

General Guidelines for Trail Maintenance⁷

You should establish a mechanism for tracking citizen complaints and maintenance requests. From a liability standpoint, this is critical. Once an agency or association has been "put on notice" concerning a particular safety-related maintenance problem, it must correct the problem within a reasonable period of time or else it will be considered negligent.

Woodland Paths

Woodland paths vary from wilderness trails that are seldom used, to trails through meadows and prairies on packed-down grass and woodland trails on packed down leaves.

If the trail needs any maintenance at all, it is normally a spring cleanup to pick up winter damage or to ensure that the path is visible and the trails are all open.

Gravel Trails

Gravel trails are located where foot traffic is moderate, but where service and police access is necessary. A bridle trail is a variation of the gravel trail.

Management of gravel trails consists of grading, correcting drainage, and replacing the surface layer as needed.

Paved Trails

Paved trails carry the greatest number of users.

Paved trails are usually good for at least 20 years before a new surface is required. If bicycles are allowed on the trail a minimum shoulder of 3 feet is necessary for recovery when bikes momentarily lose control. The shoulder can be grass or gravel.

Specific Maintenance requirements for Trails.⁸

Signs and Traffic Markings

Inspect signs for both motorists and trail users and keep them in good condition. Make sure any pavement markings are clear and prominent.

Sight Distance and Clearance

Do not allow sight distances, especially those leading up to crossings and curves, to be impaired by vegetation. Trim trees, shrubs, and tall grass to meet sight-distance requirements based on a 20-mile-per-hour trail design speed. Also, maintain adequate clearances on the sides of the trail and overhead. Trim tree branches to allow room for seasonal growth.

⁷ Parks by Leonard Phillips McGraw-Hill pg. 43, 44, 45

⁸ Trails for the Twenty-First Century Island Press pg. 154, 155

Surface Repair

Patch or grade the trail surface on a regular basis. Ensure that finished patches are flush with the trail surface. Remove ruts and take steps to avoid their recurrence.

Drainage

Repair any trail damage from seasonal washouts and silt or gravel washes. Identify the source of the drainage problem and take steps to remedy it. Clean all culverts, catch basins, and other drainage structures at least once a year.

Sweeping and Cleaning

Keep the trail free of debris, including broken glass and other sharp objects. Pick up litter and empty trash cans. Remove any fallen trees, loose gravel, leaves, and stray branches. If nearby roads are swept mechanically, make sure material is not thrown onto the trail. Frequently sweep trail edges, especially if they are made of loose material like bark or gravel.

Vegetation

Mow trail shoulders and other selected areas. Spot prune and remove encroaching vegetation. Contact City of Camas Public Works before using any herbicides. Care must be taken not to pollute nearby wetlands and streams with these contaminants.

Structural Deterioration

Inspect structures annually to ensure they are in good condition. Pay special attention to wood foundations and posts to determine whether rot or termites are present.

Illumination

Make necessary lighting improvements, especially at busy road crossings and in tunnels. Keep lights clean and replace fixtures as required to maintain desired luminescence.