OPAL Community Land Trust
Wild Rose Meadow
Overview of Storm Water Management on the Property
March 2010

WHAT IS STORMWATER?

Storm water is water that originates during precipitation, snowmelt or runoff from water that is not absorbed into the ground and then enters the storm water system. Any water that does not soak into the ground becomes surface runoff, which either flows directly into surface waterways or is channeled into storm sewers, which eventually discharge to surface waters.

The two major goals of storm water management are to:

1. reduce the volume of runoff water
2. reduce potential contaminants that the water is carrying

The Wild Rose Meadow Storm Water Management Plan is a complex system that will require neighborhood maintenance as noted in the italicized *MAINTENANCE ITEM* noted in this document.

LOW IMPACT-DEVELOPMENT FEATURES:

Because impervious surfaces do not allow rain to infiltrate into the ground, more runoff is generated on developed land than on undeveloped land. OPAL designed Wild Rose Meadow in order to minimize the amount of impervious surfaces and to maximize the degree to which water is absorbed back into the ground where it can re-charge the aquifer (an area underground that holds water that is then be tapped through wells). The methods used in the design are called "Low Impact Development." Low Impact measures at Wild Rose Meadow include:

1. porous pavement road surfaces and parking areas (at the north end);
2. drivable pervious trails;
3. compost-amended soils in landscaped areas;
4. bio-retention cells and swales to provide water quality treatment for runoff from conventional roadway and parking areas;
5. removal, preservation, amendment and replacement of all topsoil disturbed during construction.*

HOW THE WATER FLOWS:

All water runoff at Wild Rose Meadow is funneled towards the 55,000-gallon detention tank located in the common area between the South Cluster and the West Cluster. This funneling of runoff happens through a series of underground pipes, natural swales and grading.

We'll start by describing the flow of runoff from the East and West Clusters:

** For those who are interested, the design is described in detail in a document by Herrera Environmental Consultants stored in the OPAL office entitled "Drainage Report: Mount Baker Road Single-Family Housing Low Impact Development Project, Originally submitted December 7, 2007, supplemented July 10, 2008."*

East and West Clusters

The main storm sewer pipe for the East and West Clusters starts at the far end of the East Cluster footpath at the manhole located at the edge of Lot #4. This storm sewer pipe runs directly west from the manhole, under the path, all the way to Rosehip Road, crosses under the road and continues to the western edge of the parking lot, at which point you will see a catch basin. To this point, the pipe is a 12" solid pipe with many connections as it makes its way west.

All of the homes in the East and West Cluster, except for Lots# 3, 4, 5, 6 and 7, have center facing down spouts that have been directly tied into the main storm sewer pipe. The downspouts on the backside of these houses use splash blocks because the soils in these locations are capable of absorbing the controlled drainage of rainwater from the roof.

Lots #3, 4, 5 and 6 have enough natural incline and sufficient depth of top soil above the ground water table that it was not necessary to tie them into the main storm sewer pipe. Basically, the water runs downhill and is absorbed into the ground and eventually finds its way to the water table.

The two parking lots in the East Cluster are constructed of pervious asphalt, which is a porous paving material that permits rain and storm water runoff to percolate through it, rather than flood surrounding areas. It also acts as a filter to trap and remove pollutants from rain runoff. *[MAINTENANCE ITEM: pervious surfaces should be cleared of needles and debris on a regular—perhaps annual—basis using a vacuum system.]*

Behind Lots # 8, 9 and 10, there is a designated rain garden, which is 8' wide and 4' deep and is filled with gravel that collects the water and holds it until it can dissipate slowly into the ground water table. If you look at the rain garden it has been skillfully designed by Robin Kucklick to look like a dry streambed. These three houses have their rear splash blocks directed towards this rain garden. *[MAINTENANCE ITEM: This area should not be altered—no fill or dirt. Plants need to be plants that can handle being saturated intermittently.]*

The parking lot for the West Cluster has been graded to direct all water flow towards the catch basin, which is located at the beginning of the path. The path for the West Cluster is a porous gravel walkway, with a mat underneath the gravel that allows water to seep into the 12" perforated under drain pipe. This perforated pipe has holes that allow any excess ground water to flow into the pipe. Basically any water that the ground cannot hold will enter this pipe and start its travels to the detention tank. *[MAINTENANCE ITEM: It is important that all pathways, under which the perforated pipe is located, remain clear of weeds, debris and any unnatural impactions to ensure that runoff can drain through the path and into the pipe.]*

The perforated pipe runs directly west, takes a ninety-degree turn to the south at the manhole between Lots #15 and 17, runs to the end of the path at the manhole between Lots # 17 and 16. At this point, the perforated pipe directs any water into the bio-swale.

A bio swale is a low-gradient basin system, which contains a vegetative cover and is used to maintain and clean runoff during storm events. For many months of the year this particular swale will be dry. At the south end of this bio swale there is a solid pipe that runs west/southwest underneath the common area and connects into the detention tank system.

South Cluster:
Runoff for the South Cluster is handled in the same manner, but with some minor variations. The South Cluster predominantly uses only perforated pipes, which are located beneath the two paths that lead directly from the parking lots. As stated above, it is important to keep these pathways clear of weeds, debris or any type of impaction that would prohibit runoff from seeping through the path.

The perforated pipe for the northern group of homes in the South Cluster runs from their parking lot to a manhole between Lots# 22 and 25, takes a ninety-degree turn to the north and connects with the main pipe that flows from the smaller bio swale mentioned earlier to the detention tank.

The perforated pipe for the southern group of houses in the South Cluster runs from the parking lot to a manhole between Lots #27 and 32, takes a ninety-degree turn to the north, but quickly changes direction at the manhole located at the edge of Lot #29 and flows to the west. The pipe at this point is a solid pipe, instead of the perforated pipe. At the western edge of Wild Rose Meadow this pipe takes another ninety-degree turn to the north and flows directly to the detention tank system.

All of the downspouts for the houses in the South Cluster are directly tied into the perforated pipes.

The southernmost parking lot in the South Cluster has been graded to direct the runoff into the road, where it will flow into a culvert that will direct it into a small bio swale. The northernmost parking lot has been graded to direct any water runoff south directly into a small bio swale that is adjacent to the parking lot.

All runoff from Rosehip Road is directed either northwest or southwest into a series of culverts, which then flows into one of the small bio swales. The road has been specifically graded to deter any runoff east into the neighbor's property. *[MAINTENANCE ITEM: bioswales need to be maintained with grasses and not allowed to fill up with silt so that they may do their job of filtering the water.]*

The runoff from the southern parking lot and road flows into a small bio swale, which then leads into the pond. The pond was originally dug by a previous owner of the property—possibly Jim Ropkey in the late 1980s or early 1990s. As part of the wetland mitigation plan for the property (described in a different document), OPAL extended the pond and added many wetland plants to this area. All of these plants help to filter water and, at the same time, provide precious wildlife habitat.

At the west end of this pond is a small culvert that is connected to a larger bio swale that runs through the eastern edge of the neighboring Oberon Wood property. This bio swale connects to the detention tank by flowing into the pipe that runs north/south at the western edge of the property. *[MAINTENANCE ITEM: This bioswale has a mix of wetland plants and should be maintained as a wetland buffer area.]*

DETENTION TANK SYSTEM

So, now, water that has not been absorbed somewhere else along the way in the Wild Rose Meadow storm water system, has made its way to the detention tank. What happens to it? Where does it go?

The purpose of the detention tank system is to prevent soil erosion and flooding by holding water, allowing silt to settle, and then distributing the water at a measured level over time. The detention tank is buried five feet underground and is fairly good size: 4' tall, 80' long and 40' wide. There are six inspection ports, or access points, on the tank that allow a person to check the depth of water. The detention "tank" is actually constructed of plastic milk-crate like boxes that interlock to form a rigid cube, which is then enclosed inside of a rubber sealed pond liner.

Wild Rose Meadow residents will reuse the water in this tank for watering the garden and orchard area via a solar pump. Additionally, any excess water in the detention tank, usually found during the winter months, flows through a pipe that runs directly north from the detention tank, under the vegetable garden, to connect with an Outlet Control Structure, located at the very North West corner of Wild Rose Meadow.

The Outlet Control Structure releases this excess water in a controlled manner into a drainage pipe that runs under Twigs Lane. *[MAINTENANCE ITEM: The outlet control structure, all catch basins and the detention tank should be monitored for sediment build-up. Sediment may need to be vacuumed out once per decade or perhaps less frequently.]*

At the point that runoff water leaves Wild Rose Meadow it is then considered storm water. At the junction of Twigs Lane and North Beach Road is a catch basin where the water is then dispersed into the road side drainage ditch on the east side of North Beach Road. This ditch runs north and water in the ditch eventually travels either into the wetland at the northwest end of the airport, or into the channel off of North Beach. It is incumbent upon OPAL and residents of Wild Rose Meadow to assure that this storm water meets the county's standards for quality and quantity. If well maintained, the stormwater system at Wild Rose Meadow will achieve this goal.