In-Depth:
Pervious Pavements

Cascade Meadow
Wetlands & Environmental Science Center

Function

We included pervious pavements in the design at Cascade Meadow because they balance the site's storm water management needs, costs, aesthetics, and education goals.

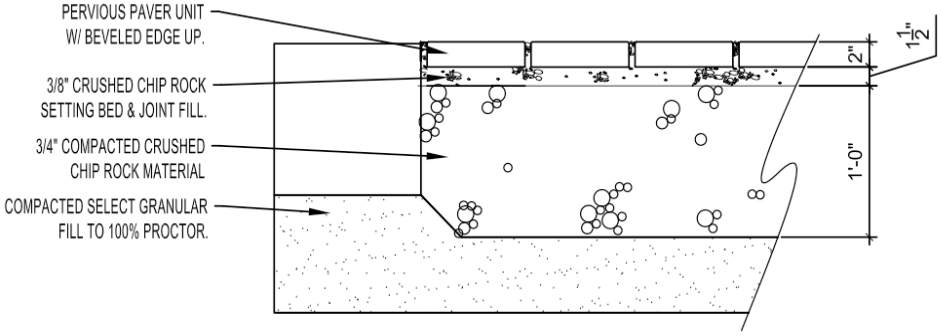
The pervious pavers and pervious concrete areas are part of a larger storm water management plan that

- Mitigates hydrologic/hydraulic changes on-site so post-construction conditions are equal to or better than pre-construction conditions.
- Promotes infiltration, controls discharge rates, and prevents pollution from runoff in order to protect the adjacent wetland and the South Branch of Cascade Creek, which is impaired because the turbidity levels exceed state water quality standards.

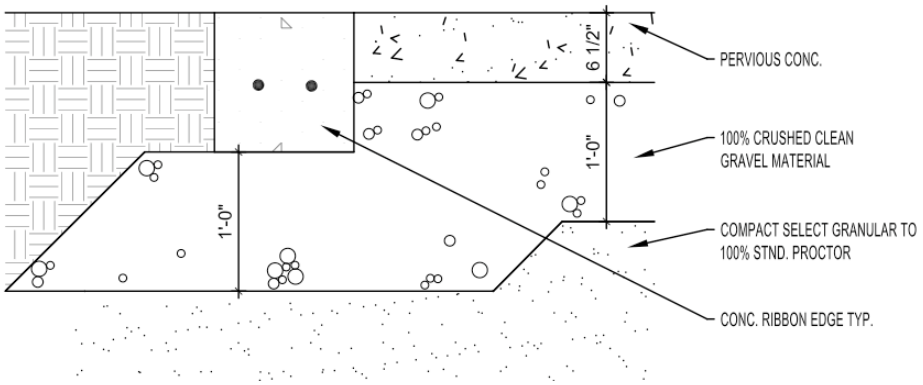
Infiltration recharges both shallow and deep groundwater systems, which supply our drinking water. It also prevents runoff, erosion, and pollution during small storm events. Together with the other storm water design features, the pervious pavements at Cascade Meadow provide for 100% *infiltration* of a 2-year storm event (approx. 2.8 inches of rainfall over a 24-hour period). This high rate of infiltration results in 80-100% reduction in total suspended solids (soil/dirt) and total phosphorus for 2-year storm events.

The two types of pervious pavements:

Pervious pavers are set with granular-filled gaps that allow storm water infiltration into a natural or constructed permeable substrate such as sand. They are suitable for patios, walkways, driveways, and parking lots.



Pervious concrete is formed from a careful mixture of small rocks, water, and binding materials. With no sand in the mixture, the particles bind together into a system of highly permeable interconnected voids. This type of concrete is most commonly used in smaller projects like trails, sidewalks, driveways and parking lots that do not need to bear the constant weight of heavy loads.



Pervious concrete is made without sand so that water can pass through its pores.

Construction

In order for engineered designs to be successful, contractors must carefully read and follow the specifications or the pavement will not function as intended. When infiltration is needed, each of these steps is critical:

1. Fence off the area to prevent compaction by construction equipment and install a silt fence to prevent runoff from draining into the site.
2. If specified, removed impermeable native soils. At Cascade Meadow the clay soils were removed and replaced with permeable soils (sand).
3. Purchase the specified materials (no substitutes!) and place them in the proper sequence (no shortcuts!) and the correct thicknesses (no skimping!).

Installed costs for the pervious pavers were slightly higher than for impervious pavers used elsewhere ($13/ft^2 compared to $11/ft^2). The higher cost was due to the choice of paver material and associated substrate preparation costs. Installed costs for the pervious concrete pavement were about twice that of regular concrete ($16/ft^2 compared to $8/ft^2) because of added site preparation and sub-grade material costs.

If maintained properly, the lifespan of both pervious pavers and pervious concrete is expected to equal traditional approaches. Over time, a full lifecycle cost analysis will be possible and will take into account initial construction costs, maintenance costs, the value of on-site storm water management, and the resulting prevention of surface waters impairment.

Maintenance

For both pervious pavers and pervious concrete, performance will be reduced if the pores clog. For that reason, it's important to prevent flow from debris-causing features (such as mulched beds or sandy areas) onto the pervious surface. Winter sanding should also be avoided. Finally, debris should be removed with regular sweeping, and pervious concrete should periodically be vacuumed to remove small particles that have filtered into the pore spaces.

Learn More

Cascade Meadow's website provides lots of additional information about various sustainability technologies. Visit www.cascademeadow.org for more details, and watch the website's Events page to learn about upcoming workshops and events that can help answer your sustainability questions.

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