

PERVIOUS, POROUS, AND PERMEABLE STORMWATER SOLUTIONS



CITY OF
Oak Harbor
WHIDBEY ISLAND, WASHINGTON

City Council Workshop

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INTRODUCTIONS

- Alex Warner, City Engineer
- Jon Pollock, Engineering Tech

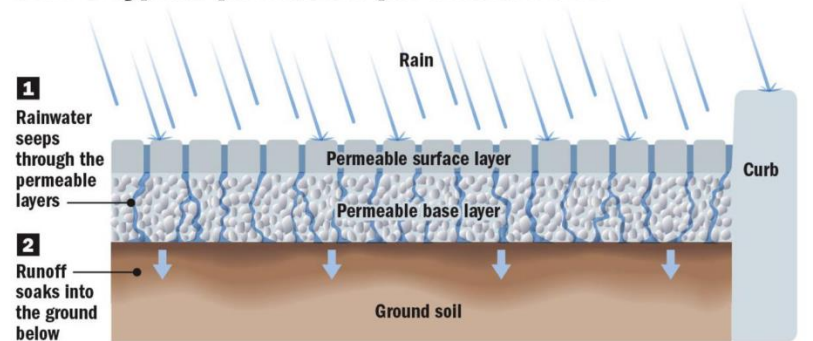
As requested, this is an informational discussion of pervious, porous, and permeable surfaces, the pros and cons for utilizing these in stormwater management, and feasibility.

DEFINITIONS

- Pervious – admitting passage or entrance, accessible.
- Porous – having many small holes or voids.
- Permeable – allowing passage across or through.
- In relation to stormwater, the terms are nearly identical in meaning, which is to allow water to pass through.



How a typical permeable pavement works



HISTORY

- The 2019 edition of the Stormwater Management Manual for Western Washington was adopted by the City Council in 2022 in Ord. 1945 in 12.30.310 OHMC.
- This action was required by the Dept. of Ecology's NPDES permit for the Stormwater System that the City maintains. The permit also requires all development and redevelopment to adhere to certain requirements for managing stormwater.
- Pervious, Porous, and Permeable Surfaces are all included as Best Management Practice (BMP) T5.15 "Permeable Pavements" in the Manual and are to be considered as part of Minimum Requirement 5 – On Site Stormwater Management.

Stormwater Management Manual
for Western Washington



July 2019



Publication Number 19-10-021

BMP T5.15: PERMEABLE PAVEMENTS

When to use...

- When a project triggers Minimum Requirement 5, AND:
 - The BMP is the first feasible option in the List Method for the specific Surface Type; or,
 - Is feasible under the Low-Impact Development Performance Standard method.

When not to use...

- If it is a roadway project.
- If the infeasibility criteria are met.
- If there is a significant risk of transporting ground contamination (i.e. Gas Stations, landfills, or other sites under cleanup and restoration plans).
- Others

BMP T5.15: PERMEABLE PAVEMENTS

Needs Maintenance

- Because these surfaces typically have large voids to allow water to pass through, so too can:
 - Sediments (dirt, sand)
 - Organics (fir needles, seeds, moss).
- If proper maintenance is not routinely applied, the surface can fail.



Navy Federal

BMP T5.15: PERMEABLE PAVEMENTS

Costs



Veteran's Memorial Park

- Permeable Pavements cost between \$40-\$200 per square foot to install appropriately for just the wearing course (top layer).
- Pervious Pavers are the most expensive of the options, with permeable asphalt being the least costly.
- There is added cost involved to ensure the sub-grades and underdrains are installed appropriately that are highly variable.

BMP T5.15: PERMEABLE PAVEMENTS

Many Existing Uses in Oak Harbor

- Whidbey Island Plaza – Parking area, partial porous concrete.
- North Water Tank – access road, permeable asphalt.
- Scenic Heights Trailhead Park – Parking area, porous concrete.
- Veterans Memorial Park – Architectural Wall and plaza, pervious pavers.
- Navy Federal Credit Union – Parking and driveway, porous concrete.
- Fort Nugent Park - Football Bleacher Path, porous concrete,

BMP T5.15: PERMEABLE PAVEMENTS

Helpful for some...

- Where it is feasible, it can be a cost-effective means to manage stormwater on-site of a development...
 - Stormwater Detention (Vaults and Ponds) can be excessively costly and are sized based on the area of hard surfaces the vault or pond must serve.
 - Bio-Retention and other Infiltration BMPs may be too space-hungry to deploy effectively in some applications.
 - Allows for treatment of large areas of hard surfaces.



Whidbey Island Plaza

BMP T5.15: PERMEABLE PAVEMENTS

... but not a panacea for all.



Fort Nugent Park

- However, where it is not feasible, using permeable surfaces may be more costly and harmful to the environment.
 - Groundwater levels may be too close to the surface resulting in contamination of wetlands from pollutants.
 - Infiltration Rates vary among soil types and may not support transport of the water into the ground.
 - Greater than 6% slopes result in higher wearing of the surface requiring more frequent replacement, as does higher traffic volumes
 - Continuous ongoing maintenance to keep voids clear of sediments, otherwise run-off overwhelms other systems.

CURRENT CITY APPROACH

Public Projects

- Research our public projects thoroughly, including all measures to comply with our Stormwater Permit.
- Deploy pervious surfaces in areas where it is feasible according to the manual's criteria; AND,
 - When doing so is not expected to be cost prohibitive (Be a Good Steward of the Public Money).
 - When doing so would benefit the greater environment (Be a Good Steward of the Public Health).



Scenic Heights Trailhead

CURRENT CITY APPROACH

Private Development

- In keeping with our Stormwater Permit, require all development to adhere to the 2019 Stormwater Management Manual.
 - Requires extensive geotechnical investigations to inform stormwater design.
 - Allows developer flexibility to meet the requirements of the manual without mandating use of methods and materials that cannot or should not be used.
 - Ensures uniformly equal treatment of all applicants for development.



Whidbey Island Plaza

MANDATING PERVIOUS/PERMEABLE SURFACES

Pros

- Promotes stormwater infiltration (this is already highly incentivized in the existing Ecology stormwater manual)

Cons

- Ties the hands of engineers for creative solutions
- May violate Ecology's infeasibility criteria
- May create site and downstream flooding
- Unnecessarily increases development costs

MANDATING PERVIOUS/PERMEABLE SURFACES

Feasibility

- The City may implement stormwater requirements above and beyond the requirements of the State Dept. of Ecology. This would be accomplished through adopting an amendment to the Oak Harbor Municipal Code, and therefore it is technically feasible.
- Staff does not recommend implementing this mandate for the reasons outlined in this presentation.

QUESTIONS/DISCUSSION



- Staff is available to take some questions or elaborate further if desired.