



Land Use Planning & Zoning Department

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Land Development Code Enforcement County Surveyor GIS Land Information

Administrative Policy – “Treated Impervious Surfaces”

As it relates to the Green Lake County Shoreland Zoning Ordinance

Research shows that as impervious surfaces increase in the watershed of a lake or stream, water quality generally declines. Impervious surface limitations in shoreland zones aim to prevent this by requiring mitigation or treatment of runoff from new development that exceed the impervious surfaces standards. Research also shows that the first $\frac{3}{4}$ of an inch of runoff from impervious surfaces generally carries the majority of associate pollutants.

For larger development sites, local storm water codes generally require compliance with a series of storm water performance standards related to peak flows, total suspended solids, runoff volumes and other related discharge standards. To demonstrate compliance, developers usually obtain the services of a professional engineer to conduct complex hydrologic modeling using tools such as SLAMM or a TR-55 based program, and to prepare detailed site grading plans. All of this is a time consuming and expensive process.

For smaller sites, such as those usually associated with shoreland areas, hydrologic modeling is not necessary if the landowner simply infiltrates the first $\frac{3}{4}$ of an inch of runoff. A Green Lake County analysis of this method shows it will result in exceedance of the following storm water discharge standards on most sites:

- Capture 80% of the total suspended solids (i.e. sediment / water quality standard)
- Infiltrate 90% of the predevelopment runoff volume (i.e. runoff volume standard) See Infiltration Calculation to follow...

Infiltration Calculation:

The calculation of the amount of infiltration required is based on the runoff after development occurs. The amount of infiltration required is determined by the pre-development infiltration, versus post development, the design storm (2 year – 24 hour rain event) and the soil type. See below:

Knowns:

- Low density residential impervious surfaces of less than 40%,
- Post development infiltration must be $\geq 90\%$ of Pre-development Infiltration,
- 2-year / 24 hour storm event (i.e. Design Storm) = 2.7 inches of rain,
- RCN (Runoff curve number) for Type B soils (typical to GL County) = 70 % (or 0.7)

Calculations:

- Pre-development infiltration = [Design Storm x (1-RCN)] = [2.7" per day x (1-0.7)] = 0.81"
- Post development infiltration required = (0.90 x 0.81") = 0.73" of rain

Therefore, based on the above calculation, when the first $\frac{3}{4}$ of an inch of runoff volume from the area of impervious surface is either infiltrated or treated through a storm water best management practice (BMP) following State or County technical standards, the impervious surface can be excluded from the impervious surfaces calculation.

The next step is to calculate how much volume the $\frac{3}{4}$ of an inch of runoff equates to relative to the impervious surface causing the runoff. The following calculation is to be used:

Volume Calculation:

The calculation of the runoff volume to treat or infiltrate is simply the area of the impervious surface IS to be excluded multiplied by the RD runoff depth (3/4 inch or 0.06 feet).

For example: (1,000 sqft IS) x (0.06 ft RD) x (7.48 gals per ft³) = 450 gallons (total volume to infiltrate).

Section 338-49 "Treated impervious surfaces" of the County Shoreland Zoning Ordinance provides for impervious surfaces, that can be documented to show that stormwater runoff is treated by devices such as stormwater ponds, constructed wetlands, infiltration basins, rain gardens, bio-swales or other engineered systems, to be excluded from the impervious surfaces calculations under Section 338-46.

A property owner is entitled to this exception only when a sufficient (appropriately sized) treatment system or treatment device is treating the runoff from the impervious surface. To qualify for the exemption property owners shall submit a complete land use permit application to be reviewed by the Land Use Planning & Zoning Department. The application shall include the following:

***For Rain Gardens (Only)**

- 1). Land use permit application Per Section 338-63.B. of the Green Lake County Shoreland Zoning Ordinance.
- 2). Rain gardens shall be a minimum of 6 inches deep and sized based on the impervious area (ft²) multiplied by 0.25 (GLC control factor). For example: for 600ft² of impervious area... the size of a rain garden equates to 150ft². The installation and maintenance of any rain garden shall be performed in accordance with WDNR Publication: PUB-WT-776, 2003 "Rain Gardens: A How-to Manual for Homeowners".
- 3). A rain garden specific site plan, indicating and illustrating sizing & design calculations, site & soil characteristics, rain garden distance to downspout, and rain garden dimensions as well as planting layout.

***For All Other Devices or Systems**

- 1). Land use permit application Per Section 338-63.B. of the Green Lake County Shoreland Zoning Ordinance.
- 2). Calculations showing how much runoff is coming from the impervious surface area. Applicants are to use a run-off depth of ¾ of an inch as provided in the infiltration calculation on the previous page.
- 3). Documentation that the run-off from the impervious surface is being treated by a proposed treatment system or treatment devices shall be submitted by a professional engineer or other qualified professional.

***In either of the cases described above the property owner shall establish and provide to the Land Use Planning and Zoning Department, prior to land use permit issuance, an implementation and maintenance schedule for the treatment system or device. An enforceable obligation to maintain the treatment system or device shall be a part of this schedule and shall be evidenced by an instrument recorded in the office of the Green Lake County Register of Deeds.**