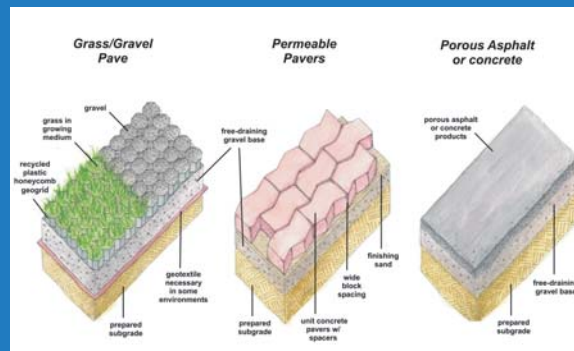
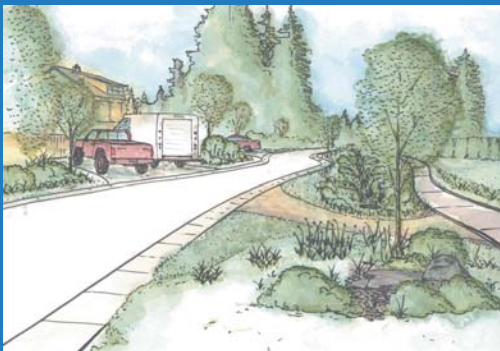


AN ECONOMIC RATIONALE FOR

INTEGRATED STORMWATER MANAGEMENT

6.1 Water Balance Model

A Resource for Urban and Rural Land Development in BC

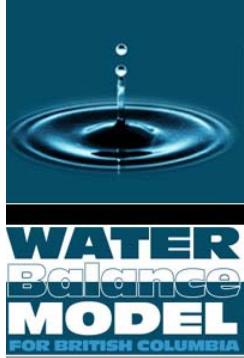


Project research and content provided by the Small Towns Initiative, Landscape Architecture Program, UBC.

Project funding provided by the Ministry of Water, Land and Air Protection, Vancouver Island Region.



6.1 Water Balance Model



The [Water Balance Model](#) (WBM) for British Columbia is an on-line tool that helps users to gauge the potential for developing or redeveloping communities while maintaining the original hydrologic condition. Using rainfall volume as a performance target to quantify the effectiveness of various stormwater source control strategies, the model gives users a convenient pre-design planning tool that they can access over the Internet. The model evaluates the effectiveness of applying different stormwater [source controls](#) under different development conditions.

The Water Balance Model project has been funded by an Inter-Governmental Partnership comprised of members from all levels of government in BC. Formed in 2002 as an outcome of a GVRD- sponsored project on the effectiveness of rainwater source control, the desire was to develop an internet-based, public-domain scenario modeling tool for rainwater management. The model is an extension of [Stormwater Planning: A Guidebook for British Columbia](#), a provincial guidance document that presents a science-based methodology for setting performance targets.

“Land Development and Watershed Protection can be Compatible”

Inter-Governmental Partnership

Urban Development Institute	Real Estate Foundation of	BC Water and Waste
		

One of the project goals is to help design engineers ‘think outside the pipe’ when developing sites and neighbourhoods. The objective is that stormwater volume reduction will be seamlessly integrated with land use planning and site development practices.

“think outside the pipe”

IGP Vision - To promote changes in land development practices so that:

- ☂ The built environment will preserve and/or restore the natural water balance over time
- ☂ Performance targets will be achieved for runoff volume and flow rate reduction at the source, *where rain falls*



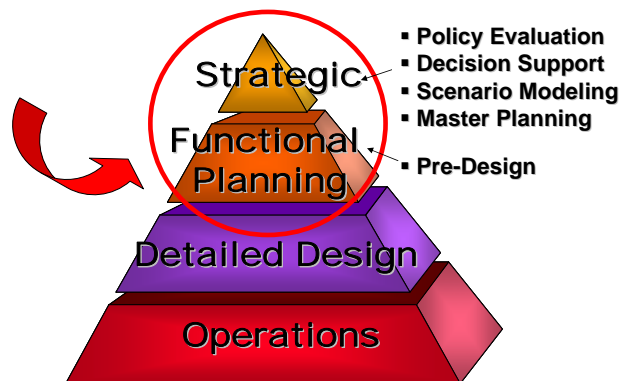
How it Works

The WBM provides a continuous simulation of the runoff from a development (or re-development) area, or from a watershed (or sub-catchment) with multiple land uses, given the following inputs:

- ☛ **Continuous rainfall data** (time increment of one hour or less) and **evapo-transpiration data** (daily) over a long period of record (at least a year). Historic rainfall data can be modified to create climate change scenarios.
- ☛ **Site design parameters** for each land use type being modeled (e.g. road width, rooftop coverage, surface parking coverage, population density).
- ☛ **Source control information** for each land use type, including:
 - extent of source control application (e.g. % of road and % of building lots with a certain types of source controls)
 - source control design parameters (e.g. area and depth of infiltration facilities, soil depth for green roofs or absorbent landscaping, volume of rainwater re-use cisterns)
- ☛ **Soils information**, including surface soil parameters (e.g. maximum water content, vegetation rooting depth)

Where the Model Fits in the Development Process

The key value to developers in using the Water Balance Model is that the model can help move projects through the approval process. The model improves communication about stormwater management issues and allows designers to communicate ideas effectively within the design team and with regulators. The water balance model is a pre-design tool that is best suited in a decision support or policy evaluation role at the strategic or functional planning stages.



Source Stormwater Planning: A Guidebook for BC

The following link provides an example illustrating how the Water Balance Model can be used to guide land planning and design decisions about source controls for low impact development.

<http://www.waterbalance.ca/sql/tutorial/Demonstration.html>