



**Design with Nature:
Rainwater Management is at the
Heart of Green Infrastructure**

**Cowichan Valley Regional District
Duncan, December 2006**

Province of British Columbia
Ministry of Environment, Lands and Parks
**VANCOUVER ISLAND
SATELLITE IMAGE MAP**

Kim A Stephens, MEng, PEng

**Program Coordinator, Water Sustainability Action Plan for BC
Water Sustainability Committee of the BC Water & Waste Association**

The Water Sustainability Action Plan for BC....



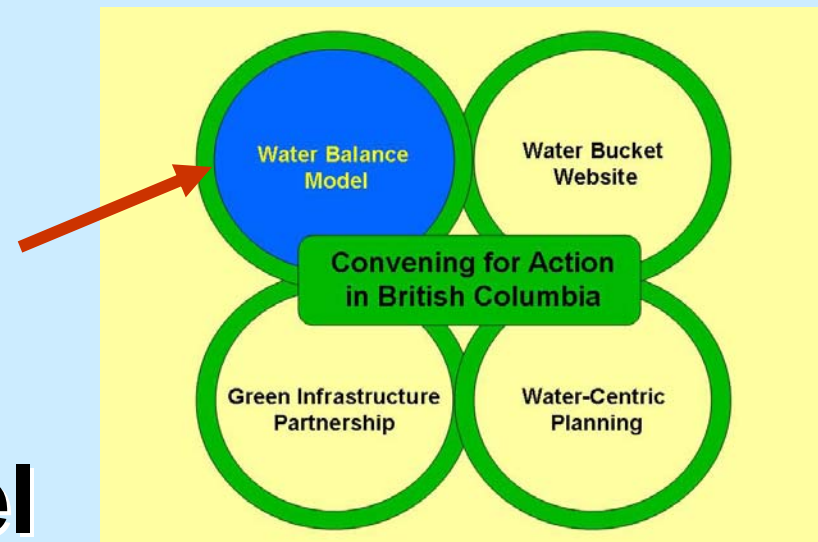
... provides a partnership umbrella for
an array of *on-the-ground* initiatives that promote
a 'water-centric' approach to community planning

A 'Design with Nature' approach to community design means...

- Develop compact, complete communities
- Increase transportation options
- Reduce the loads on water, waste and energy systems
- **Protect and restore urban 'green' space**
- **Strive for a lighter 'hydrologic footprint'**
- **Achieve higher levels of receiving water protection**



Anybody with a computer and Internet connection can access the Water Balance Model





Water Balance Model Outcomes:

Visualize the 'how to' details
of source control implementation

Model scenarios

at the site, neighbourhood and
watershed scales

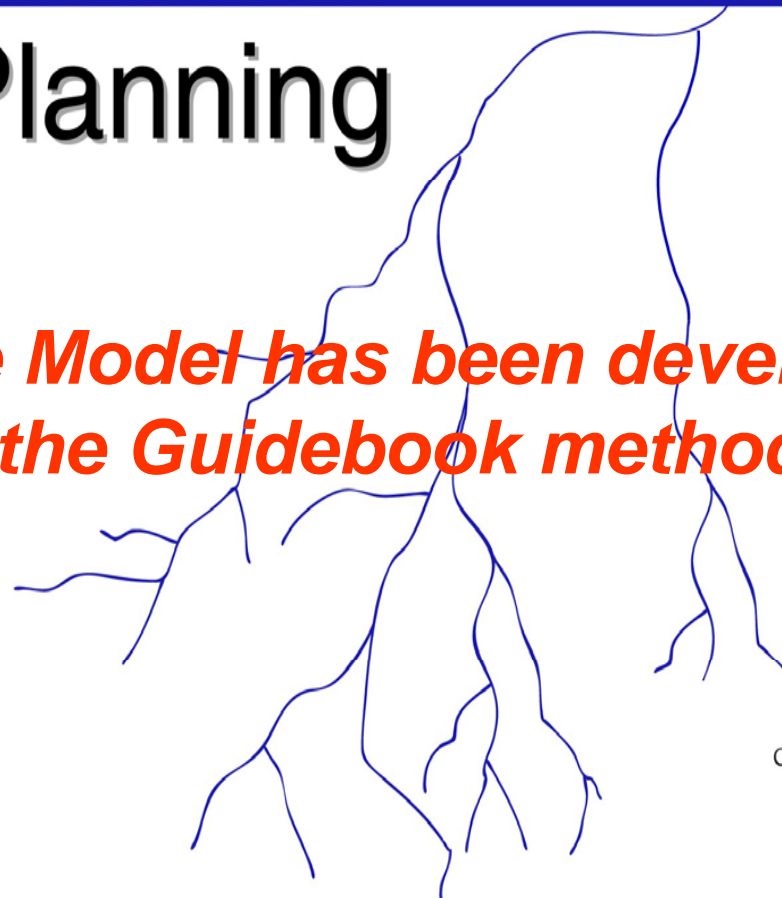
Make decisions through a
defensible, interactive, and
transparent process



A GUIDEBOOK FOR BRITISH COLUMBIA

Stormwater Planning

The Water Balance Model has been developed as an extension of the Guidebook methodology



An aerial photograph of a residential development nestled within a dense forest. The houses are scattered across the landscape, with winding roads connecting them. The greenery is prominent, suggesting a focus on environmental protection.

Guidebook Premise: Land Development and Watershed Protection can be Compatible

Policy Level Development Objectives

Science-Based Understanding
of Development Impacts

Site Design Practices that achieve Objectives



WATER
Balance
MODEL
FOR BRITISH COLUMBIA

Inter-Governmental Partnership: 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 rainwater runoff volume and flow rate reduction at the source, *where rain falls*

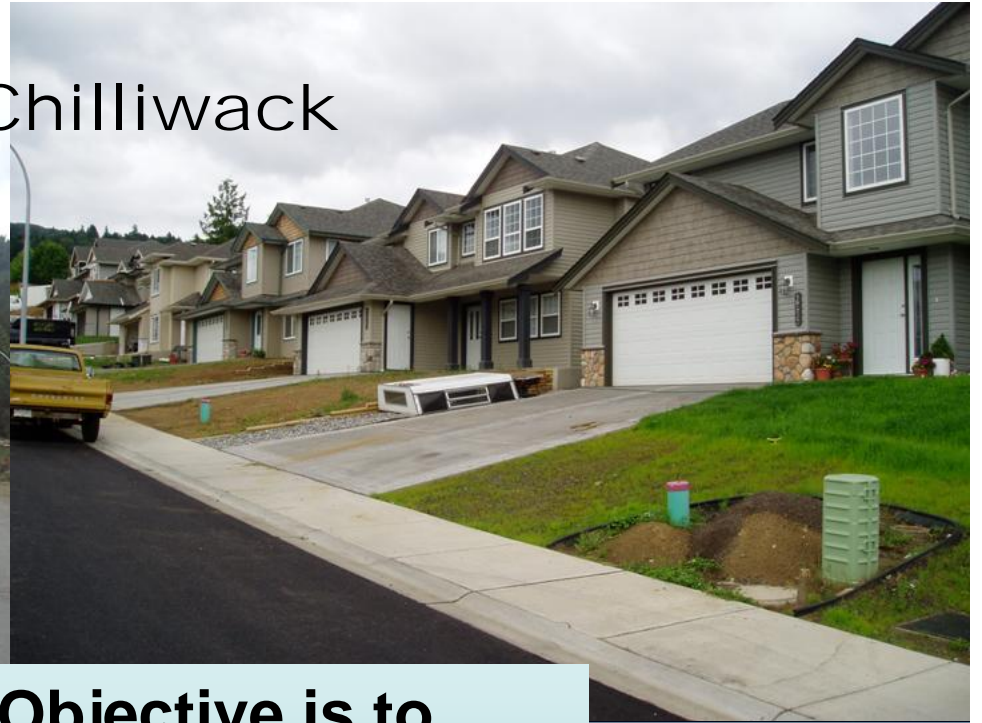


WATER Balance MODEL FOR BRITISH COLUMBIA

The Partnership has broad provincial and national representation



City of Chilliwack



The Design Objective is to Infiltrate the First 30mm of Rainfall

age at Sardis Park



11. 2. 2002



11. 2. 2002

Flood Overflows in Some Areas are Chronic Because

An aerial photograph showing a large, rectangular area of water that has flooded a field. The water is a murky, greyish-brown color. Surrounding the flooded area are several houses with grey roofs, some of which are partially submerged. The background shows rolling green hills under a hazy sky. The overall scene depicts a rural area experiencing significant flooding.

- Too Much Runoff Volume
- Culvert Constrictions Cause Backwatering
- Pump Station is a Bottleneck

21. 10. 2003

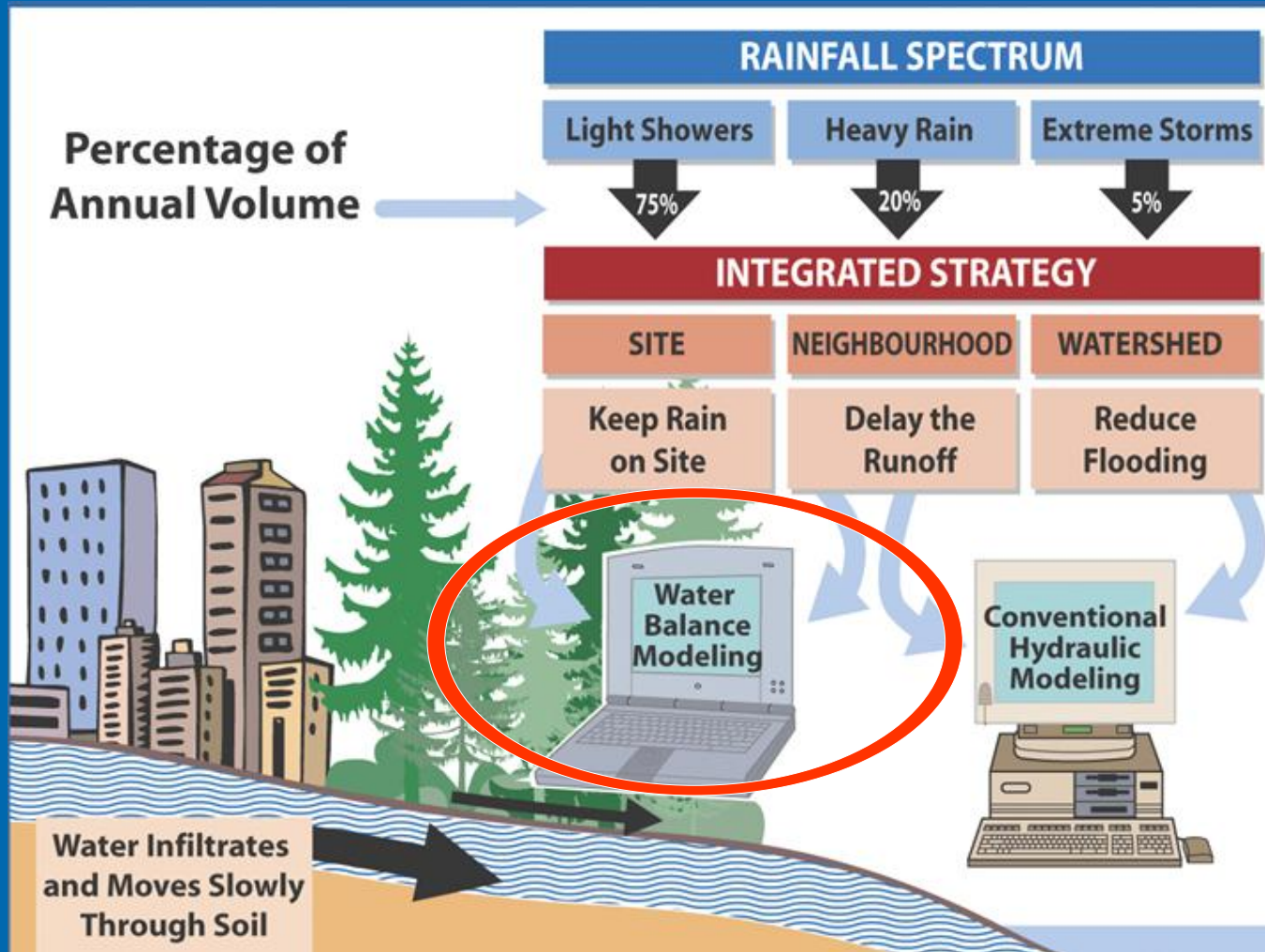


“Sustainable Subdivision Design is Part of the Flooding Solution”

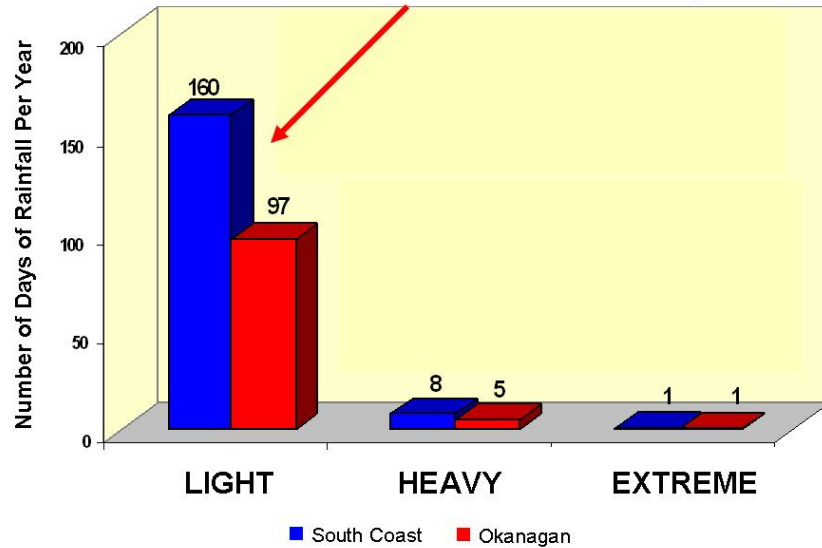
The Home Depot in Courtenay has a deep well injection system designed for the first 20mm of rainfall



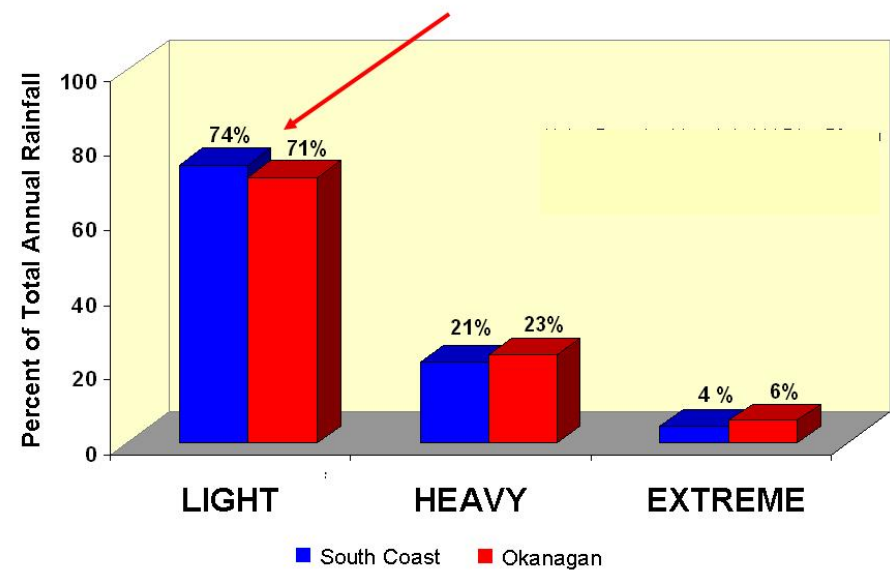
The Water Balance Methodology at a Glance



The 'Light Shower' Category Accounts for Most of the Rainfall Days



Light Showers Account for Most of the Annual Rainfall Volume

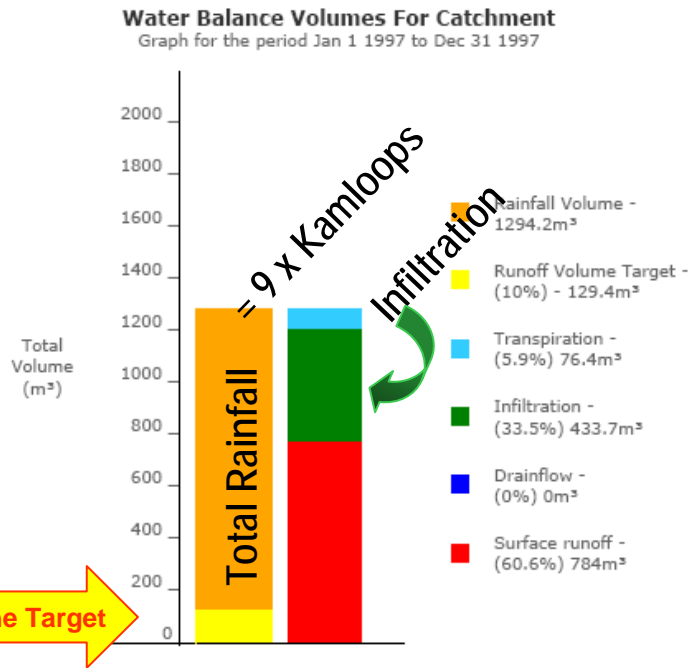




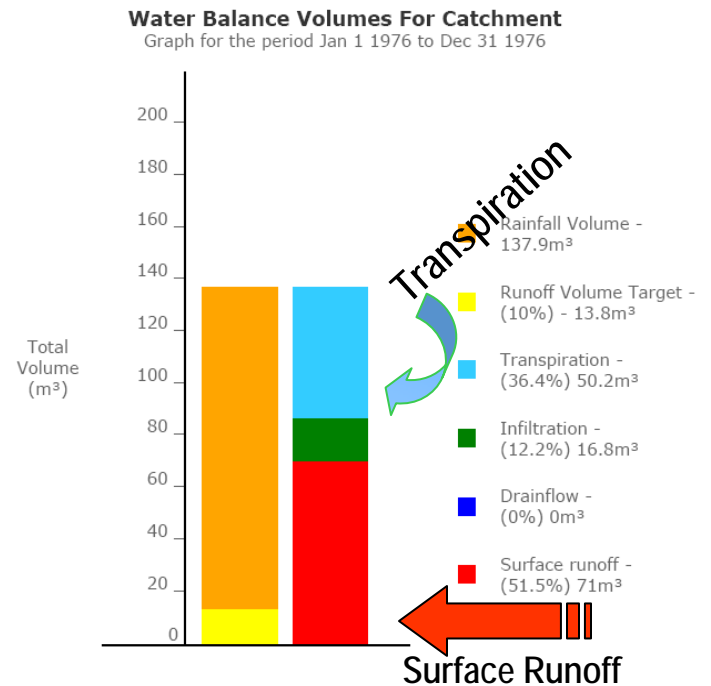
WATER Balance MODEL FOR BRITISH COLUMBIA

It enables users to test the achievability of Performance Targets

Single Family Residential Example – Regional Comparison



North Vancouver



Kamloops



**A Key Consideration is Understanding
How Water Moves Through Soil**



KEY MESSAGE #1:
The Water Balance Model enables changes in land development practices...

**...by quantifying the benefits –
in terms of reducing **rainwater runoff volume**
- of installing source controls under different
land use, soil and climate conditions**



KEY MESSAGE #2:

Water Balance Model promotes Integration of Perspectives

- **Planners:** Tool for Better Use of Space
- **Engineers:** Tool for Pre-Design
- **Landscape Architects:** Tool for Green Solutions
- **Ecologists:** Tool for Watershed Function
- **Educators:** Tool for Social Marketing



KEY MESSAGE #3:

How the Water Balance Model can be used to make better decisions:

- **Local Governments** -
when communicating with the public
- **Planners and Engineers** –
when setting performance targets
- **Developers and their Consultants** -
when testing scenarios
- **Environmental Agencies** -
when monitoring watershed health

We have partnered with UBC to develop a 'Tree Canopy Module' and implement an applied research program to populate the model with data



Dr. Markus Weiler



WATER
Balance
MODEL
FOR BRITISH COLUMBIA

Coming Next Spring.....

Integration with QUALHYMO
will provide engineers with “one-stop shopping” for:

Stream Erosion

Water Quality

Rainwater Storage Routing

Drainage Area Flow Routing

Snowmelt Runoff

Practitioners will be able to correlate runoff volume and stream health

