An aerial photograph of a watershed area, overlaid with a blue semi-transparent map that shows the flow paths of water from various points across the terrain. The terrain is a mix of green (vegetation) and brown (bare earth or urban areas). The blue overlay highlights the network of streams and rivers that drain the area.

Stormwater Planning: A Guidebook for British Columbia

Integration of Stormwater Management with Land Use Planning

**Capture Rain Where It Falls to
Protect Watershed Health**

Oregon Association of Clean Water Agencies
Annual Stormwater Summit - Eugene, Oregon

May 29th 2002

The Guidebook is the product of an Inter-Governmental Partnership

- Government of Canada
- Province of British Columbia
- Greater Vancouver Regional District
- Nanaimo Regional District
- Local Government Case Studies



**To reduce RISK,
HOW can we make urban development function
hydrologically like NATURAL systems?**

Guidebook Structure

A - The Problem (Why?):

B - Integrated Solutions (What?):

Setting Priorities. Setting Performance Targets.

C - The Process (How?):

Defining roles, methods, means and timing for making
the move from planning to action

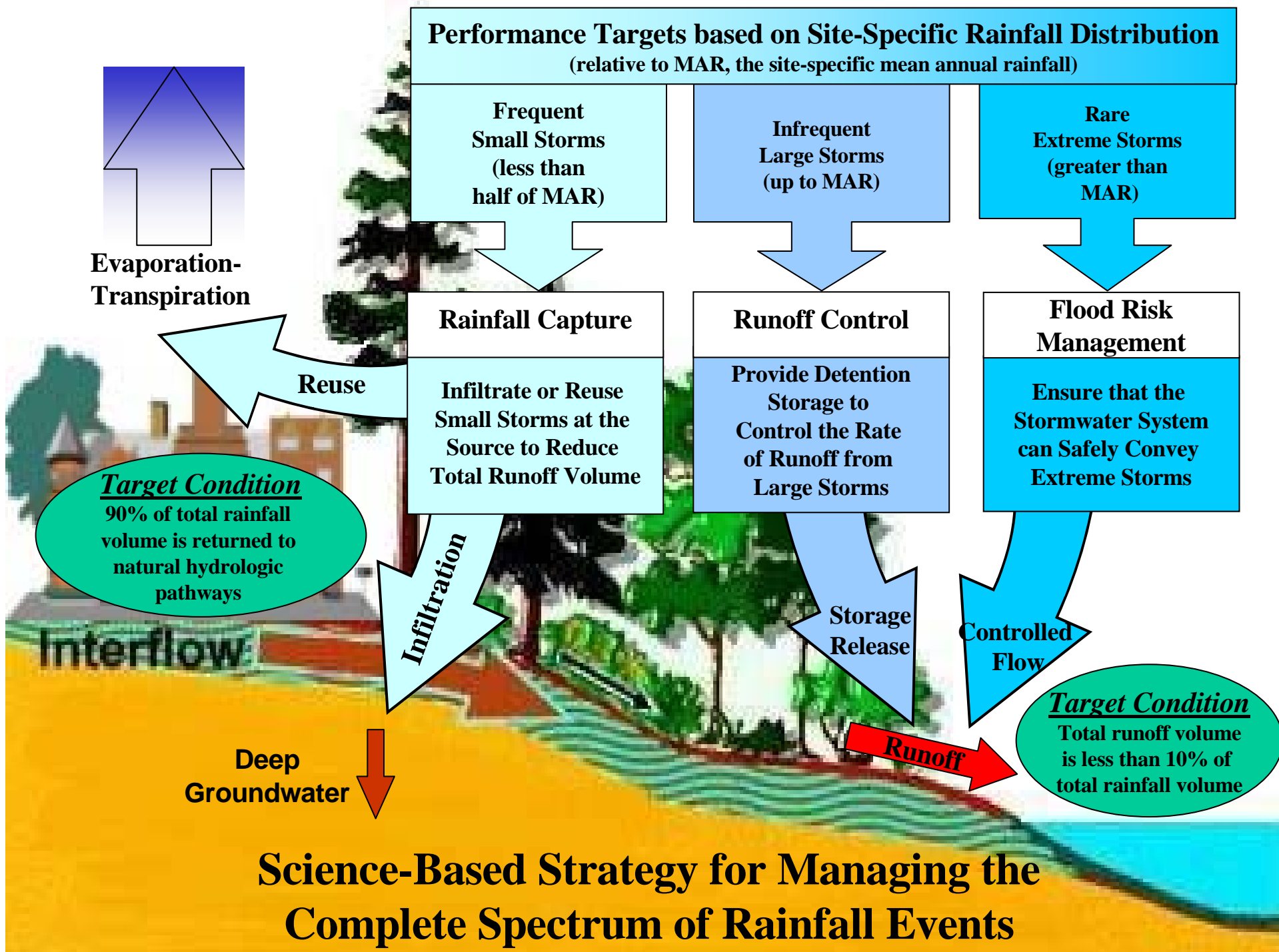
Land Development and Watershed Protection can be Compatible

Policy Level Development Objectives

Science-Based Understanding of Development Impacts

Site Design Practices that achieve Objectives





A photograph showing a person's hands pointing to a small stream in a grassy field. The person is wearing a dark watch and a ring. The stream is a narrow channel of water flowing through the grass. The background is a dense field of green and brown grass.

Having a Performance Target provides the starting point for...

- Working backwards to figure out how to model hydrologic performance at both the site and watershed scales
- Determining what information is needed to evaluate long-term effectiveness of source control options

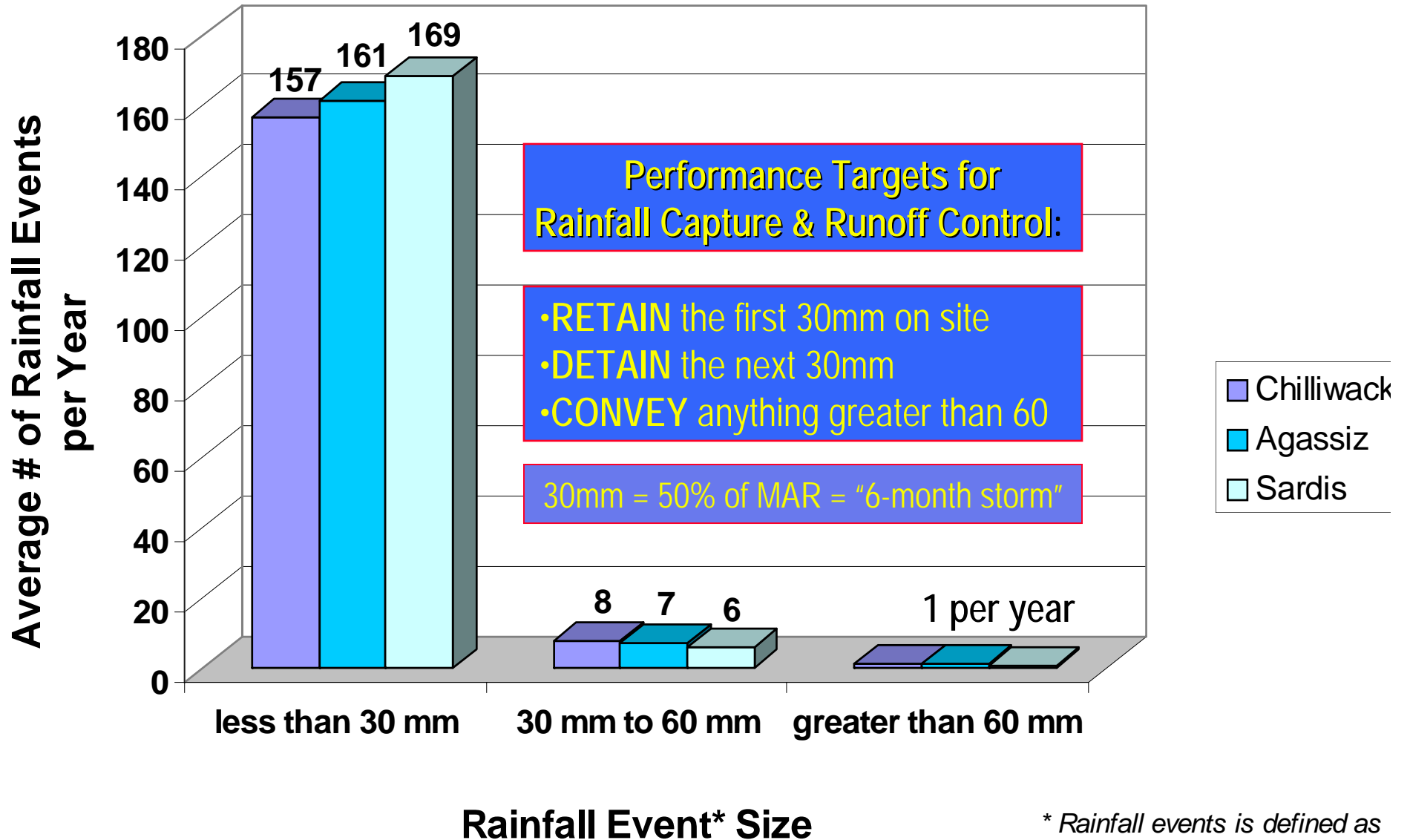


What the Target Condition for a 'Healthy Watershed' Means

Manage runoff volume so that an urban watershed behaves as though it has less than 10% impervious area

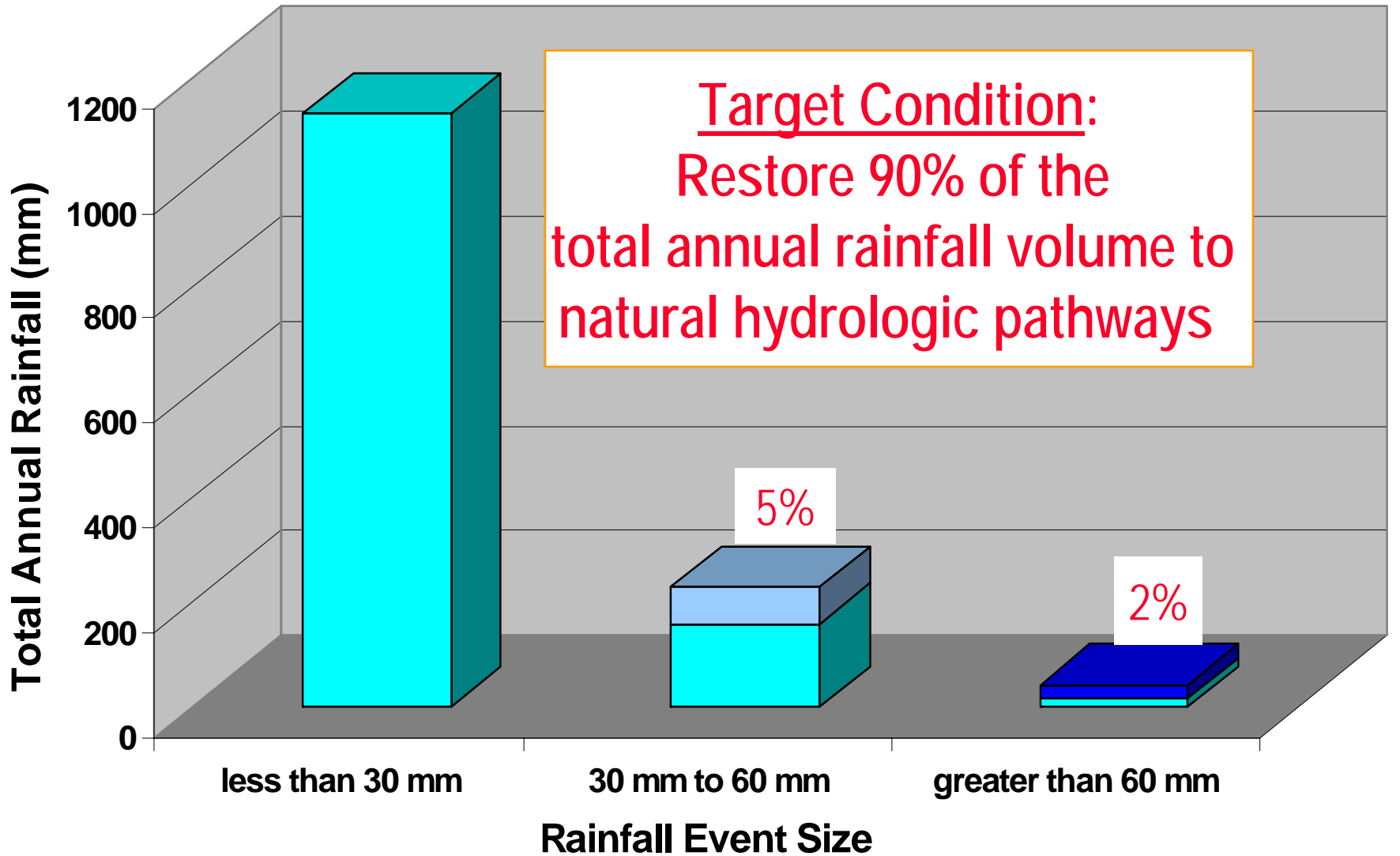
Distribution of Number of Annual Rainfall Events

Chilliwack Region



* Rainfall events is defined as total daily rainfall depth (24 hrs)

Distribution of Annual Rainfall Volume (Sardis)



 Rainfall Capture Volume (93%)

 Runoff Control Volume (5%)

 Flood Control Volume (2%)



North Shore Mountains



Stanley Park

Burnaby Mtn

Brunette Basin

Greater Vancouver Region

Blaine

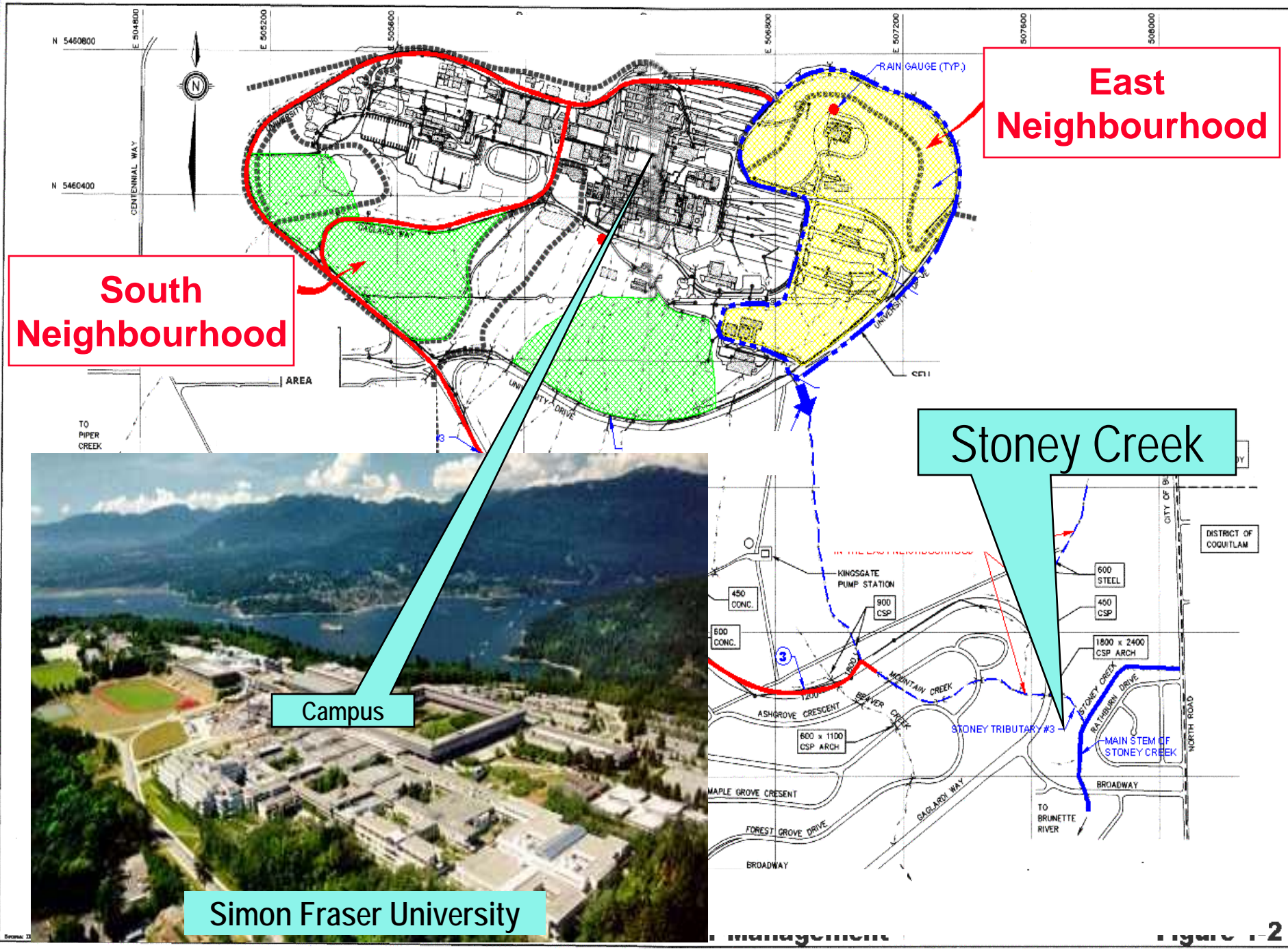
United States





Competing Expectations

- 10,000 people on 20% of the original land area.
- densities of 40 to 80 units/acre (e.g. 10-storey buildings)
- a sustainable, compact and complete community.
- *no increase in stormwater runoff !*
- *no loss of downstream fish habitat !*



East Neighbourhood

South Neighbourhood

Stoney Creek

Campus

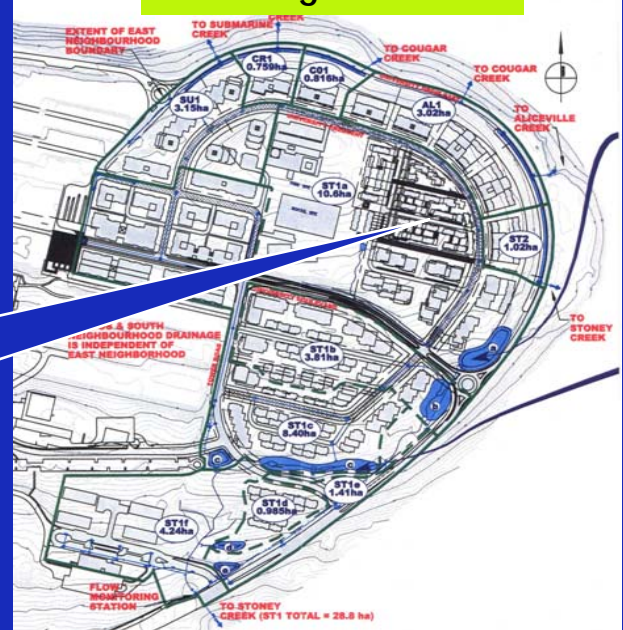
Simon Fraser University



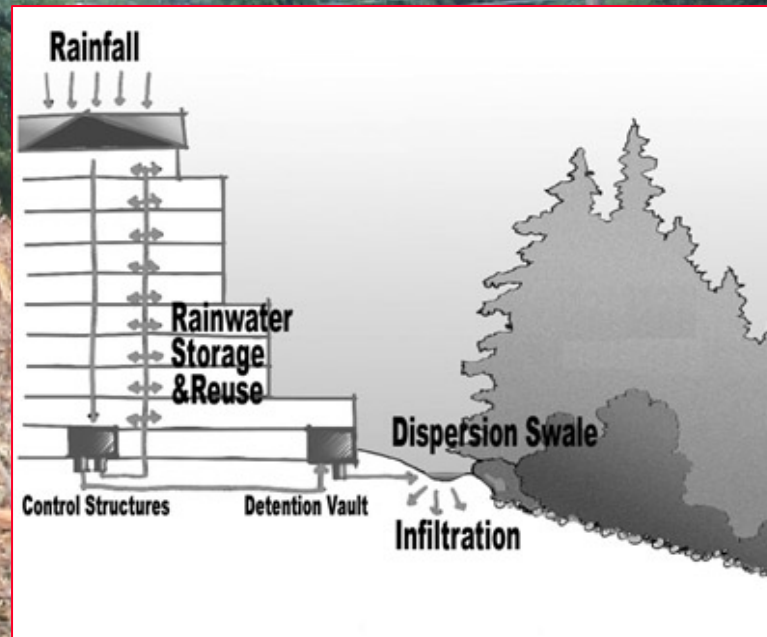
Burnaby Mountain



East Neighbourhood

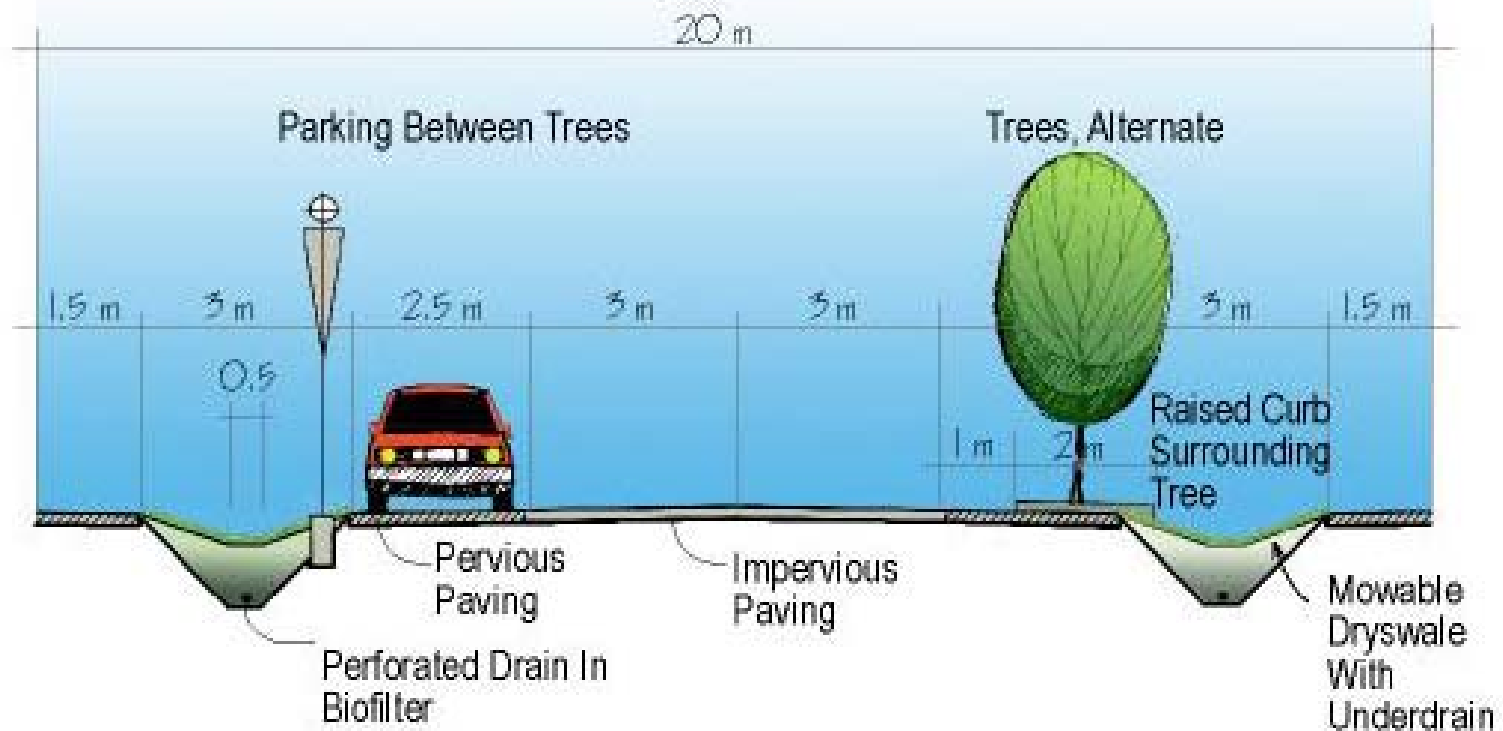


The First Subdivision:
UniverCity Highlands



- First road right-of-way clearing completed in August 2001
- Construction of roads and utilities to start in June 2002

2001. 9. 17



Self-Mitigating 'Green Road' at Burnaby Mountain

An aerial photograph of a university campus. In the foreground, there are several large, modern academic buildings with flat roofs and green spaces. A prominent feature is a large, oval-shaped athletic field with a red track. The campus is surrounded by dense green forests. In the middle ground, a large, winding lake or fjord is visible, with a small island in the center. The background consists of dark, forested mountains under a clear blue sky with a few wispy clouds. The overall scene is bright and scenic.

Environmental Achievements

- Land Exchange = Density Transfer
- Walking and Transit Oriented Community
- Performance Monitoring & Adaptive Management

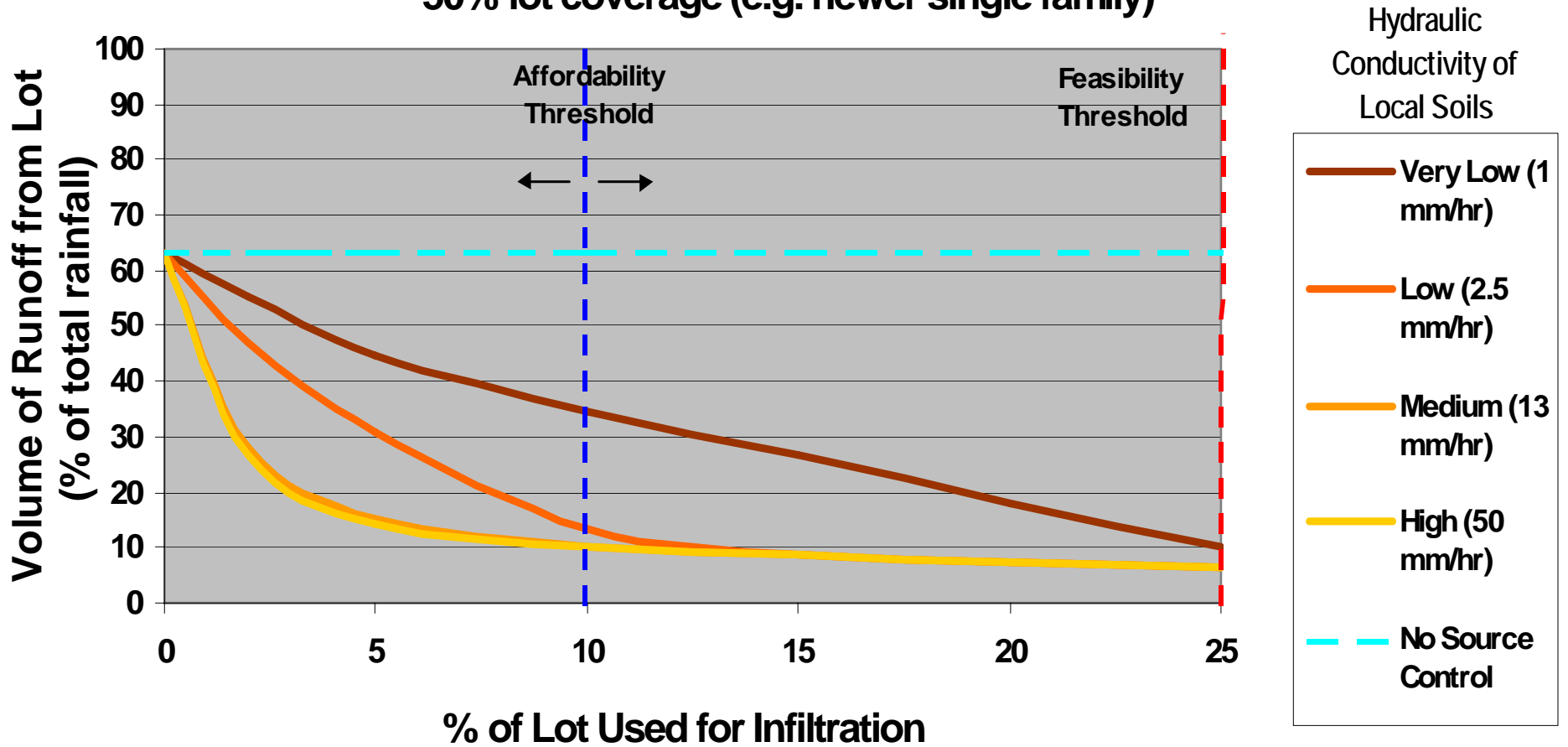
Greater Vancouver Regional District Project Goal

Evaluate *Hydrologic Performance* of various source control options, particularly the ability to reduce runoff volume at the source

The Project Deliverables 'Add Depth' to the Stormwater Planning Guidebook

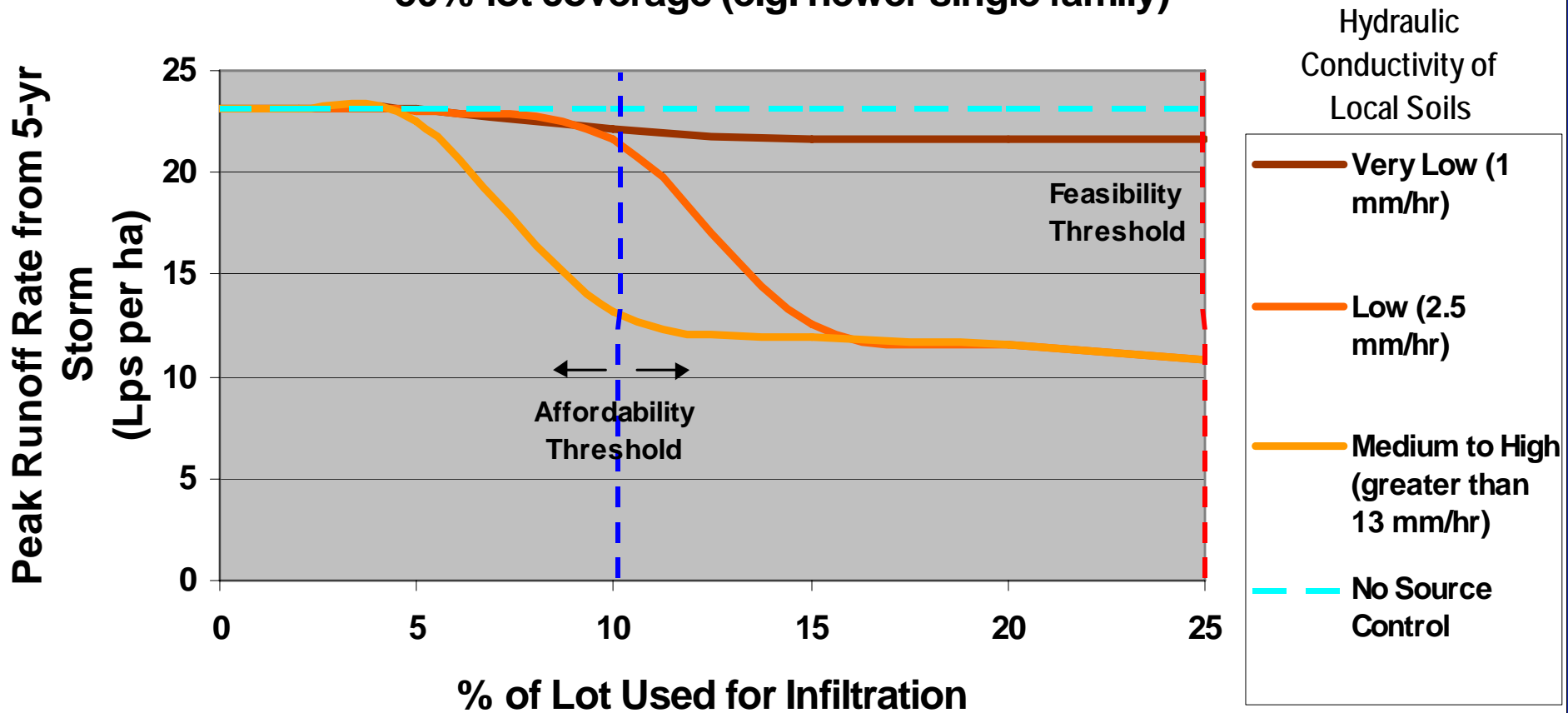
Infiltration Facility Performance (Runoff Volume Reduction)

50% lot coverage (e.g. newer single family)



Infiltration Facility Performance (Runoff Rate Reduction)

50% lot coverage (e.g. newer single family)



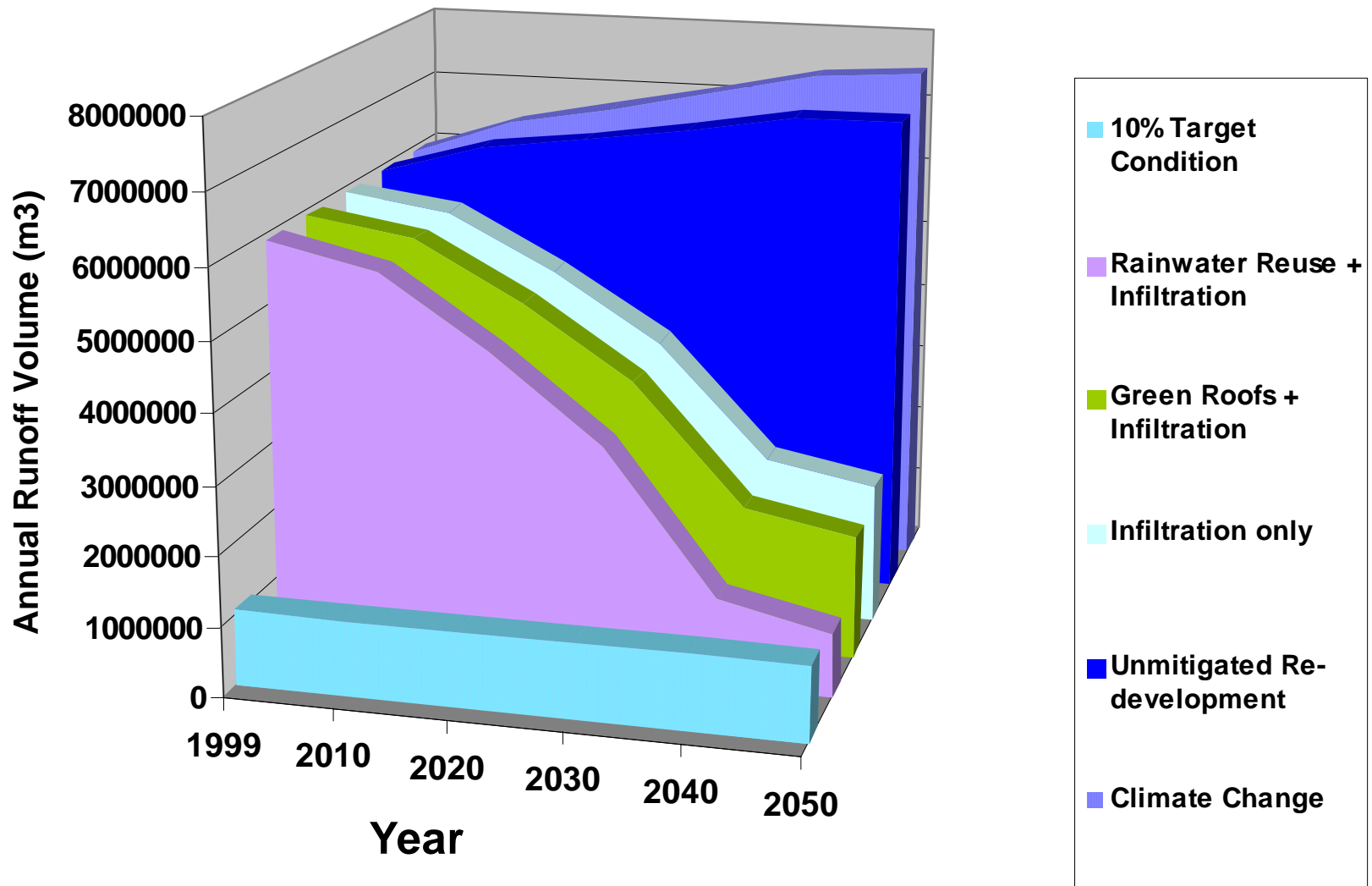


Application of the Water Balance Methodology
to Greater Vancouver Watersheds

United States

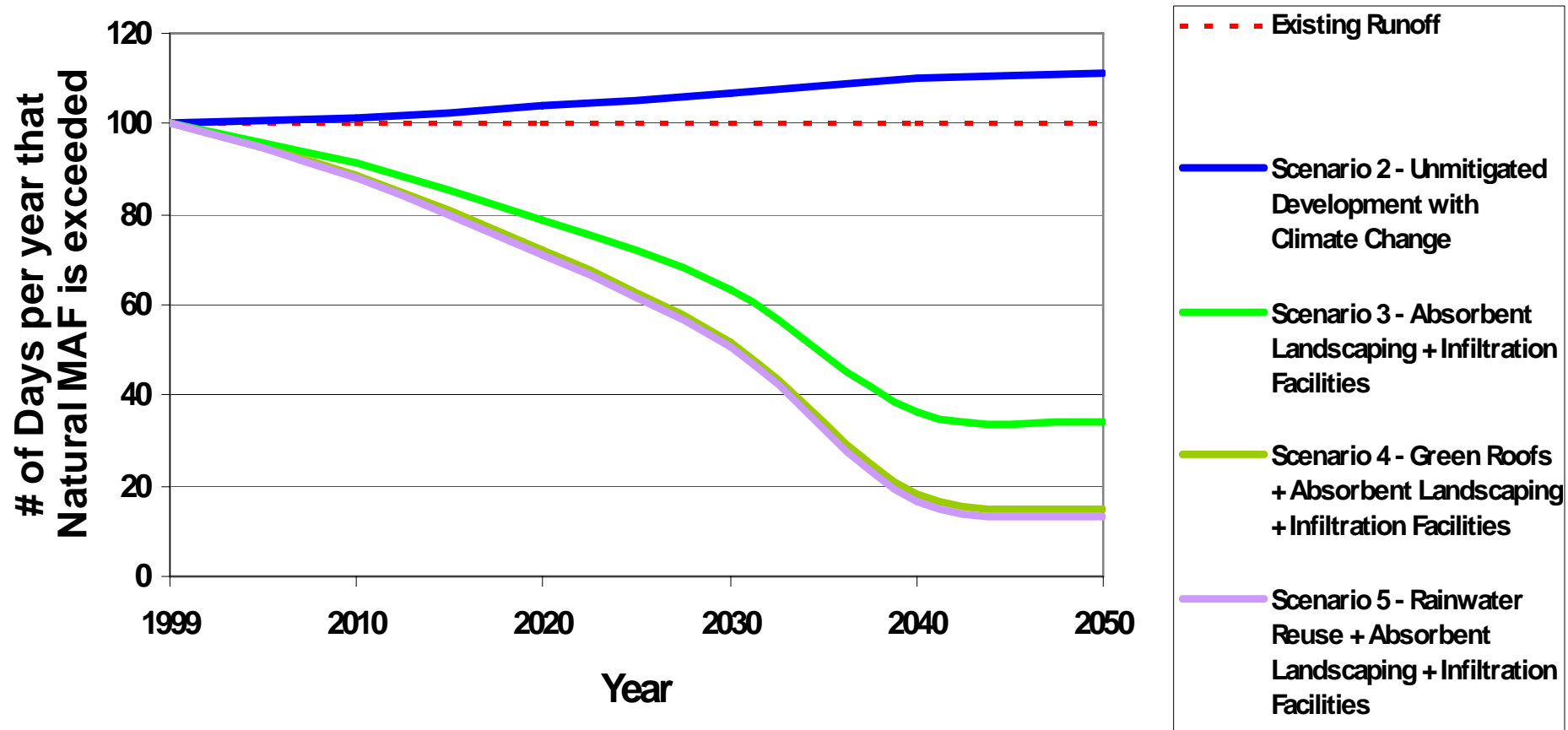
Quibble Creek Watershed Retrofit Scenarios

Runoff Volume Reduction



Quibble Creek Watershed Retrofit Scenarios

Reduction in Frequency of Runoff Events Exceeding Natural MAF



Providing Developers with Guidance

Stormwater Planning: A Guidebook for BC

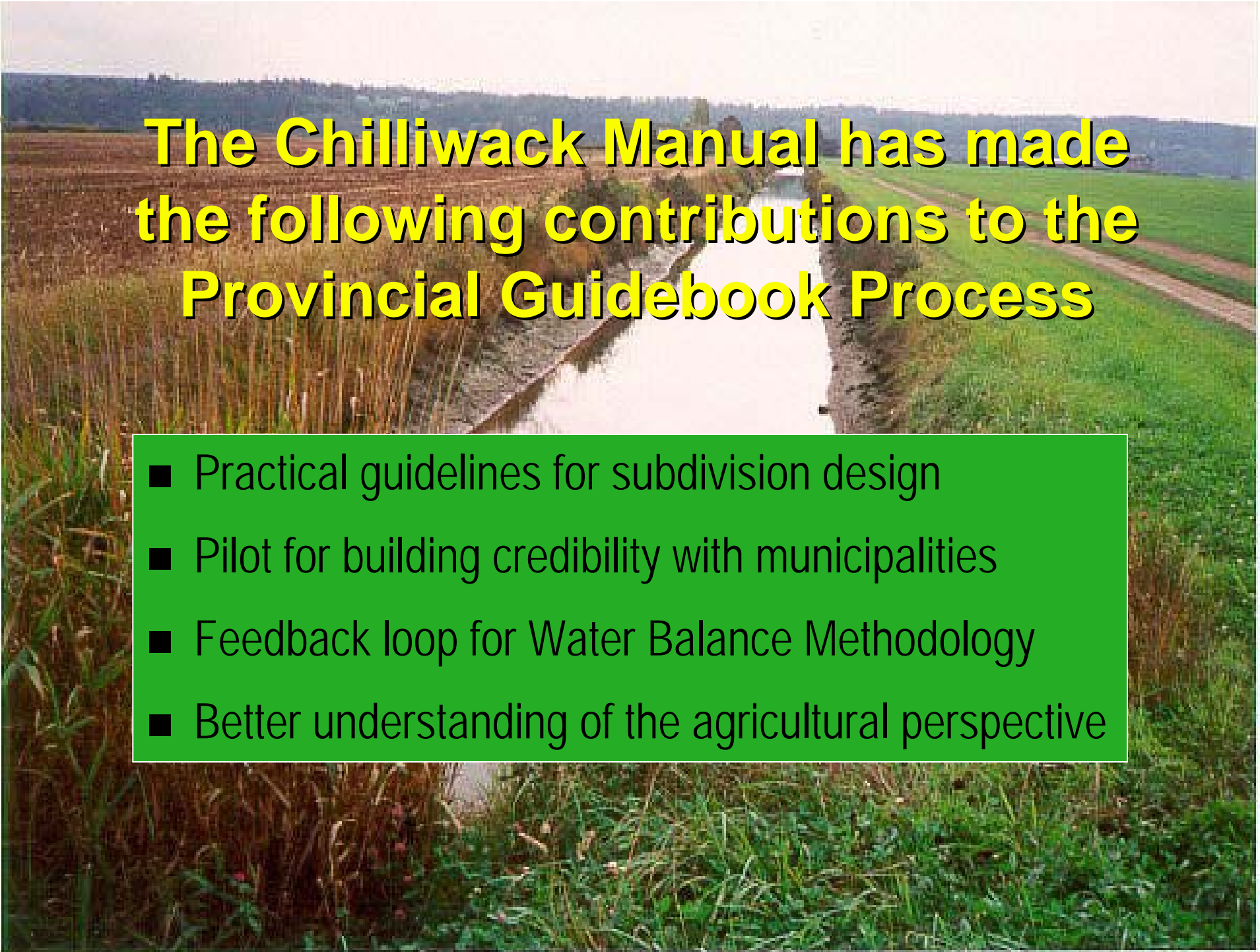


Chilliwack Policy and Design Criteria Manual



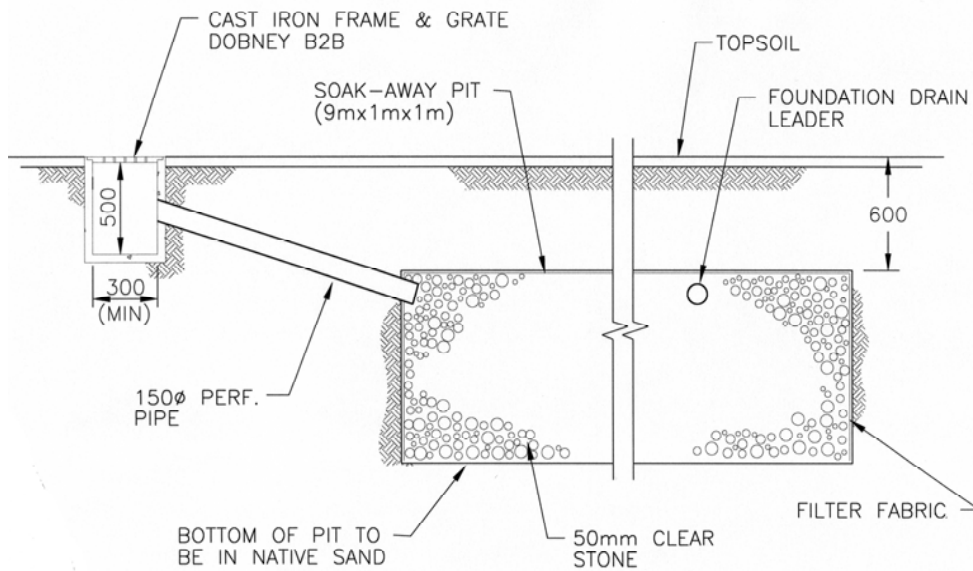
Design Guidelines for Developers

Chilliwack is a landscape of streams, more than 600 kilometers.



The Chilliwack Manual has made the following contributions to the Provincial Guidebook Process

- Practical guidelines for subdivision design
- Pilot for building credibility with municipalities
- Feedback loop for Water Balance Methodology
- Better understanding of the agricultural perspective



TYPICAL SOAK-AWAY PIT
SCALE: NTS



Existing Site

29.8.2001

On-lot soakaway pits to maintain pre-development water balance



Forest will be replaced with 22 lot subdivision

Marble Hill Subdivision

And in conclusion, the Street System and the Stream System are One System!

Local streets are the branch tips in the tree of the watershed.

Treat them as one!



Guidebook Availability:

As of June 2002, on the BC Ministry of Water, Land and Air Protection - Municipal Pollution Prevention website:

http://wlapwww.gov.bc.ca/epd/epdpa/mpp/mpp_home.htm

Under "Stormwater" (the big pipe!)

