Using “Sky Water”
For Gardening... and

- A rapidly growing interest in rainwater for urban gardens
- How much can I collect and use?
- What’s involved? What does it look like?
- How can I build one?
- Using rainwater indoors – more need for clean water & disinfection

RDN Green Building Workshop Qualicum Beach. June 18, 2011

Prepared by Bob Burgess
The Rainwater Connection
THE RAINWATER CONNECTION

- 10 Years of designing, building and servicing rainwater systems.
- R&D time averaging 350 hrs/year
- Testing, development and manufacturing of components
- Engineer approved Rainwater Permits for Potable Systems
- Actively promoting rainwater use thru’ presentations, workshops, demonstration projects
Connected Barrels and Small Pump

Link together with garden hose.

Pump if you need over 1 psi of pressure
Urban and Rural Residences

Long payback periods, but reducing our water footprint
Large Scale Irrigation Systems

The Rainwater Connection has recently installed 5 Garden Systems with 16,000 – 40,000 imp. gallon cisterns (73 – 182 m³)
Rainwater Harvesting
For City Gardens
One Way to Conserve Water

• Demand for increasingly expensive, treated water doubles (or triples) during the summer
• Reducing total outdoor water use (Conservation) is THE first step
• Backyard collection and storage of rainwater is the next step (alternative supply & reduced Peak Hour Demand)
## How Much Can I Collect

From Roof Area 93m² (1,000 SF) and Cistern 4.5m³ (1,000 gal) Rain Supply May – Sept. 16.4m³ (3,600 gal) October 8.2m³ (1,800 gal) For Power Washing?
Adding Piped Water to Your Tank Without Adding to Peak Hour Demand

• Double or triple your outdoor water supply when the tank runs low
• Add 100-200 gallons during the night (timer or slow drip)
• Garden Water quality improves in the tank (vents chlorine & warms up)
• Delays need for upgrades to water pipe sizing, water treatment and pumping infrastructure
Rainwater Harvesting is a perfect companion to gardening

- Natures watering agent (PH, temperature, chlorine free)
- Environmental stewardship in your own backyard (ZERO Peak Hour Demand)
- Freedom from watering restrictions
- A fun adjunct to gardening (keeping the kids involved)
Important Features

- Debris removal on way to tank
- Diversion away from tank to drain
- Secondary water source
- Dark coloured tank
- Tank placement for easy cleaning
- Tank overflow to drain
- Gravity or pumped distribution
Important Features

- Piped water Here
- Coloured Tank
- Sloped or Level?
- Water Cleaning
- Diversion
- Overflow To Drain
- Pump
CASE EXAMPLES

GOOD DESIGN + MAINTENANCE = GOOD QUALITY WATER

- System Features
- Installation Costs
RDN Church Road Transfer Station
Administration Building

First class rainwater catchment system, and 2,346L (516 gal) slimline tank to water green roof. Piped water fill option.
Garden Water Systems with Tanks

Optional Features

- Extra Water Cleaning Devices
- Water level indicator
- “Designer Tank” or Low Profile
- Winterized exit
- Tank Drain
- Coloured catchment piping
Salt Spring Island Garden System
Water for vegetable garden from new shed

- Gutterglove on gutters
- Diverter valve & overflow to rock pit under garden

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>1,500 L (335 imp gal) tank</td>
<td>$780</td>
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<tr>
<td>Gutterglove covers</td>
<td>$410</td>
</tr>
<tr>
<td>Pipe &amp; fittings</td>
<td>$340</td>
</tr>
<tr>
<td>Pump and fittings</td>
<td>$750</td>
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<tr>
<td><strong>TOTAL PARTS</strong></td>
<td><strong>$2,280</strong></td>
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<td>Design and owners manual</td>
<td>$530</td>
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<tr>
<td>Installation labour (21hrs.)</td>
<td>$1,260</td>
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<tr>
<td><strong>TOTAL PROJECT COST</strong></td>
<td><strong>$4,070</strong></td>
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Mayne Island Subdivision Home

Gutter Dam and “Gutter Glove” direct to flushing/Diverter valve, and across to the fence.
Mayne Island Subdivision Home - Continued

Along the Fence and into the 1,500 gal (6,800 litre) Can West semi burial tank and Grundfos MQ3 pump

Gutter Guard  $650
Catchment      $1,250
Cistern        $1,850
Tank Fittings  $900
Pump           $900
TOTAL          $5,550
Dual Pumping Garden Water System
Salt Spring Island

Rainwater pumped from big rain barrel to two 1,250 gallon poly tanks – with on-demand pressure pump to garden

Catchment: $1,600
Tanks: $2,000
Pump: $800

$4,400
Victoria West Project
80% of Irrigation Water and Storm Water Management

Catchment from 1/3 roof, First Flush Diverter & Overflow

Drainage to Rock Pit to control storm water
Pump to plants in summer & to 2nd rock pit in winter
Vic West Project (Continued)

Cleanable, uphill pipe to tank

4.5m³ (1,000 gallon) leg tank (55” tall by 9’6” long)  $1,400

Total Project Cost  $5,200
Rainwater as Part of the Landscaping
Tofino, BC

Rain chain to “streambed”. Hidden filter box & underground pipe to tank in crawl space.
Basic Rainwater Cleaning System with options

- Leaf Eater
- Leaf Catcher
- Cleanout
- Mini Debris Trap
- Uphill Catchment Pipe
- Flexible Pipe To Tank
- Water To Tank
- Possible Gutter Covers
- Flusher Diverter Valve
- Debris Collects Here
- Lexan Debris Box
Simple Garden Water System
Thetis Island

2160 gallons (9,800 Litres) storage from Shed Roof of 145 SF or 13m²

Gravity flow to garden

Premier 1200 & Premier 960 Tanks $2,300
Thetis Garden System

Leaf trap, uphill sloped pipe & Diverter
Parts: $140  3 hrs Labour

Tank Fittings:
• Overflow
• Valved Connecting Manifold pipe
• Emerg Water Exit / Drain
• Sight Tube
$800 (parts & labour)
Galiano Island Garden Water
Gardening Water from $\frac{1}{2}$ garage to two 7.5m$^3$ tanks

Simple diverter/flusher and uphill pipe to lined tank basket

- Tanks (1,660 gal) $2,300
- Tank fittings: $470
- Catchment Parts: $260
- Pump: $680
- TOTAL PARTS: $3,710

- Design $255
- Install Labour (15 hours) $950
- TOTAL PROJECT COST $4,915
The Galiano Island “Tuffy” Liner

Cleans to 200 microns
Lasts 3-4 months
$11.00 each
Pumps... Briefly

Grundfos MQ3
On-demand, High Volume Pump

On-demand, RV style pump. Low volume, and no run dry protection
Barrel or Tank with Automatic Pumping and Tank Refill

Conservepump Garden System

• Pump to drip water system
• Soil moisture sensor control
• Automatic tank top up
Strathcona Gardens Demo Project
Off the Grid Orchard Irrigation System

Water from 470 SF (44m²) roof delivered to orchard with no electronic pump.

< Gutter guard
Uphill catchment
Pipe with diverter
< “Day Barrel
On Left”

Banjo Filter to top of Premier 1950Gal > (8,900litre) tank.
Tofino Demo Project
Triple Cleaning Catchment and First Flush Diverter

Single Downspout; Debris Pail, Horizontal Catchment Pipe; FFD, and pair of Screen mesh filters

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<td>Labour</td>
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<td>Total</td>
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</table>
Cortes Island Cottage

Recycled Milk Tank
Debris Box
First Flush Diverter
Pair of Banjo Strainers
Bilge pump to upper deck
THE RAINWATER CONNECTION
Super Cleaners

Cleans water from 5,000 sq. ft. of roof to 250 microns
RDN Church Road Transfer Station

6,500 SF roof area of two transfer buildings supplies 18,900L (4,165 gal) tank for outdoor washing.
RAINWATER, a clean, sustainable alternative

Prepared by Bob Burgess
SUPPLEMENTARY SLIDES
Storage
The Heart of any West Coast Rainwater Harvesting System
Types of Storage
Above Ground Poly Tanks

Premier 1200 and 3,300 gal tanks

Premier 1660 set 14” into ground
Types of Storage
Above Ground Poly Tanks

200; 125, and 500 gal Leg Tanks

Premier Box Tank
400 in foreground
HSBC Bank, North Vancouver

1,320L (290 gal) tank provides 80% of their toilet water demand
Types of Storage
Above Ground Poly Tanks

“Tank Farm” of 4 tanks of 2,400 gal.

New Premier Slimline 340
Polyethylene Semi Burial Tanks

Rectangular, Semi Burial Tanks work well in crawl spaces
Semi Burial - CONTINUED

Or semi buried in 2 ft. deep hole with soil mounded up over

<table>
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<tr>
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<tbody>
<tr>
<td>Tanks</td>
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<tr>
<td>Water Lines</td>
<td>$700</td>
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</table>
Concrete Cisterns

Concrete Cistern Under Garage

or under the house?

$1.80 - $2.30 per gallon
Steel Cisterns

Corrugated Steel Tank with Polypropylene Liner

16,000 gal. behind trellis

12,000 gal. in woods

$1.40 - $2.00 per gallon
Steel Cistern

12,000 imp. gal (55m³)
Steel Cistern

12,000 imp. gal (55m$^3$) Partly backfilled into hill
Bolt-in-place Construction with Liner

5,000 – 20,000 gallons
Steel Cistern
Polypropylene “Bag” Liner

36 mil Polypropylene
NSF 61 Rated
Steel Cistern Roofs

Fabric roof under shed

Wood-frame and steel roof with inspection hatch
Steel Cistern ~ Wood & Metal Roof

Rated for BC snow loads

Full Venting Around Perimeter