Innovative Marina Designs

Lighter

Greener

Smarter

Cleaner

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Pollutants, Life Cycle and Re-cycle,Relationships
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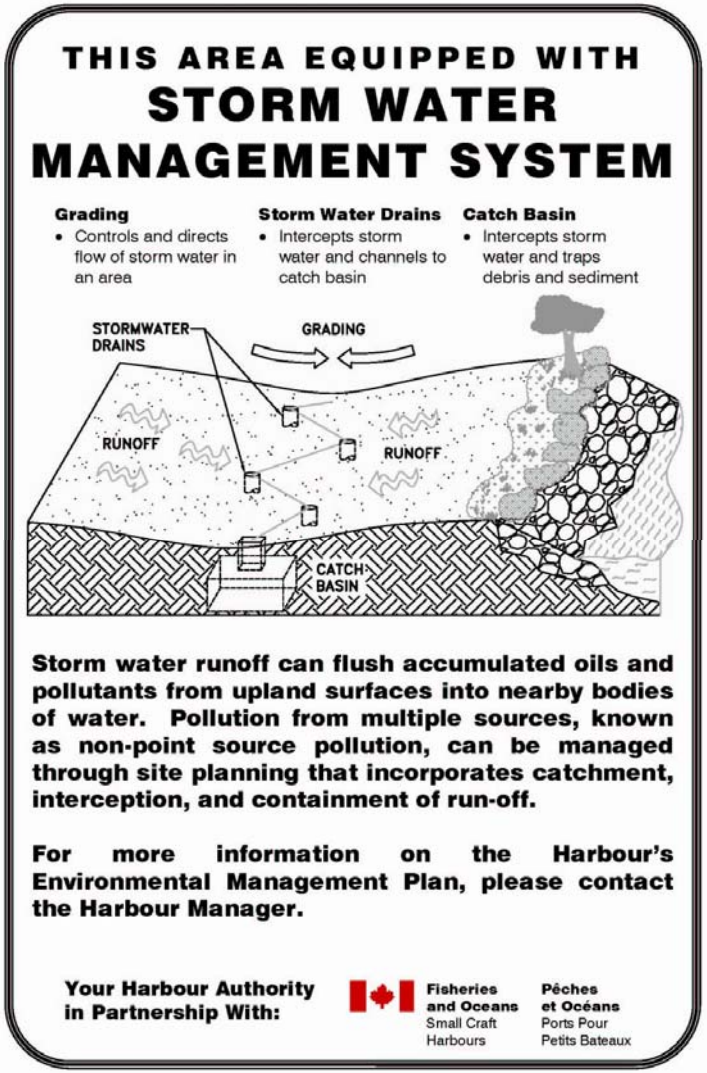
Non-Point Source Pollution

- External
  - Surface run-off
  - Drains
- Internal
  - Parking lots
  - Work and Storage Yards
  - Buildings
  - Clients

Non-Point Source Pollution

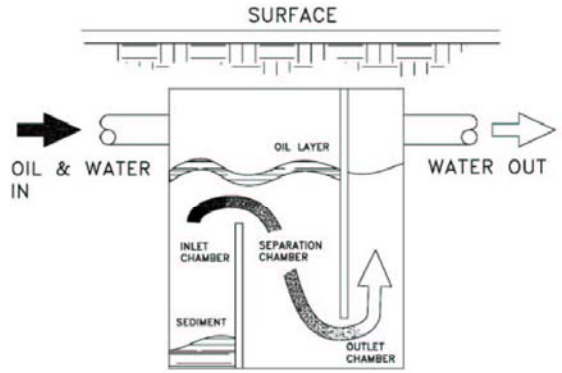
- Remedies
  - Re-route external supply
  - Intercept
  - Containment

Intercept


THIS AREA EQUIPPED WITH
STORM WATER MANAGEMENT SYSTEM
Grading
• Controls and directs flow of storm water in an area
Storm Water Drains
• Intercepts storm water and channels to catch basin
Catch Basin
• Intercepts storm water and traps debris and sediment
STORMWATER DRAINS
GRADING
RUNOFF
RUNOFF
CATCH BASIN
Storm water runoff can flush accumulated oils and pollutants from upland surfaces into nearby bodies of water. Pollution from multiple sources, known as non-point source pollution, can be managed through site planning that incorporates catchment, interception, and containment of run-off.
For more information on the Harbour's Environmental Management Plan, please contact the Harbour Manager.
Your Harbour Authority in Partnership With:
Fisheries and Oceans
Small Craft Harbours
Pêches et Océans
Ports Pour Petits Bateaux

Intercept

THIS SITE EQUIPPED WITH OIL-WATER SEPARATOR



- Oil – Water separator installed below ground in line with storm water drain
- Multiple chambers separate oil, fuel, debris, and particles from the water flow
- Operation is passive – Using only gravity, diffusion, and density characteristics of water – No power is required
- Periodic cleaning to remove sediments and oils maintains functionality

An Oil-Water Separator intercepts the flow of water through a Storm Water pipe system. A series of baffled chambers separates sediments and oils from the water, improving the quality of the water that exits the system.

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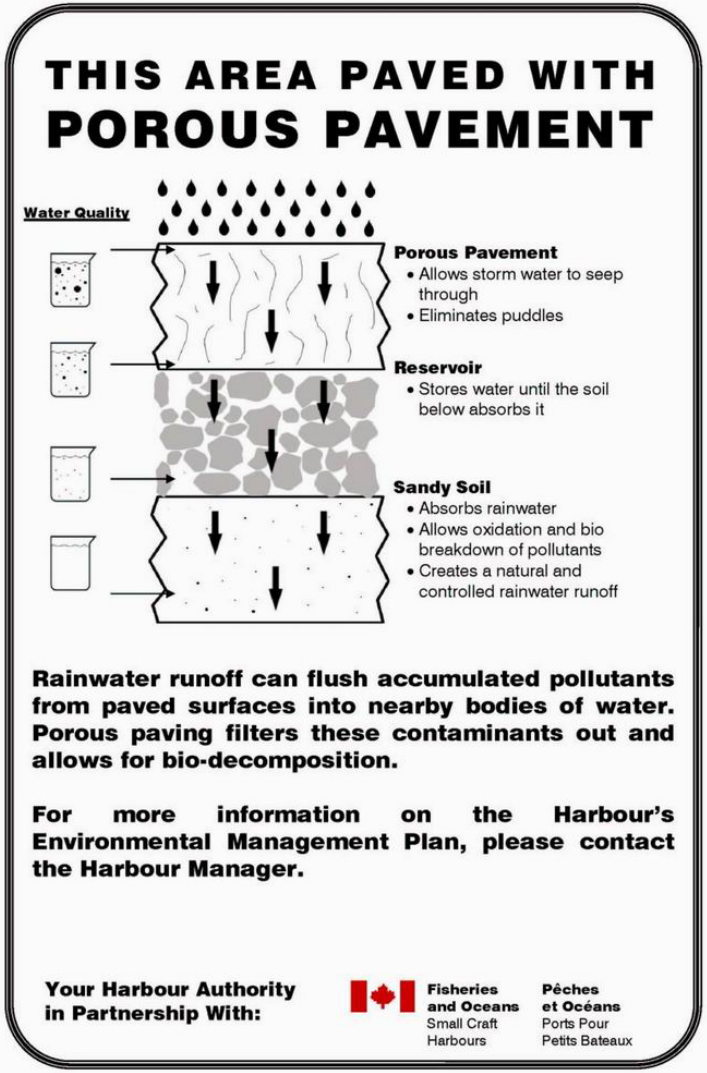
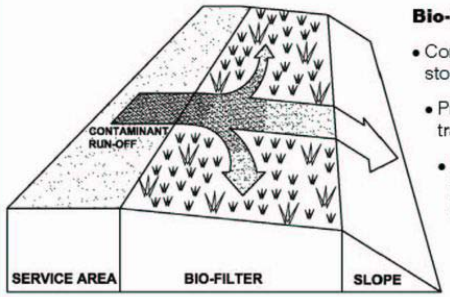
Pêches et Océans Ports Pour Petits Bateaux

Sub Base Filtering



Edge Treatment

THIS AREA UTILIZES BIO-FILTRATION



Bio-filter

- Controls the overflow of storm water
- Promotes the breakdown of trapped pollutants
- Native plants are used to provide a natural and low maintenance buffer zone
- Intercepts particulates

Bio-filtration helps remove contaminants potentially contained in water run-off.

Over time, plants and organisms oxidize and break down pollutants before they can enter the ocean ecosystem.

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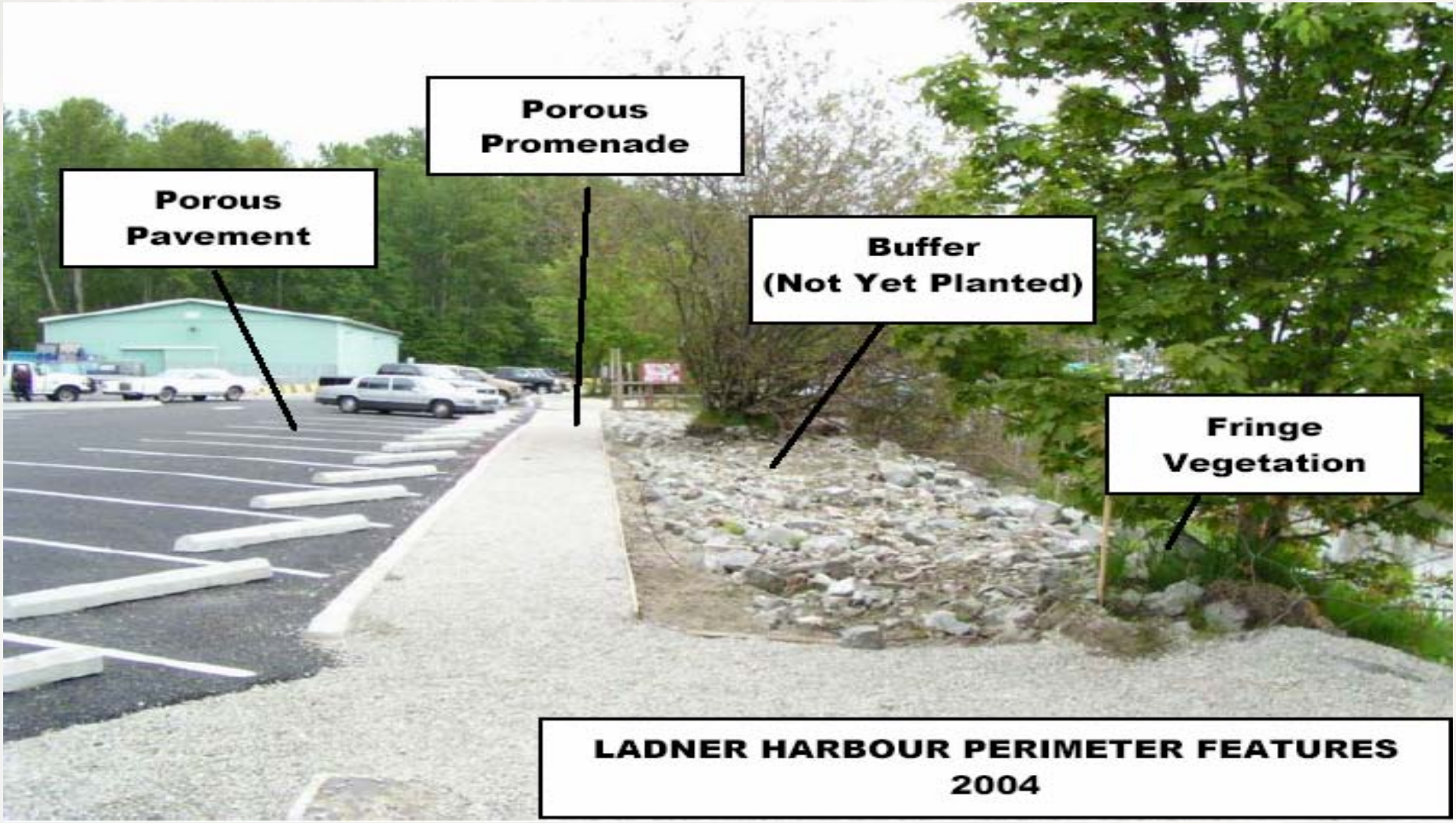
Edge Treatment and Porous Pavement



Life Cycle Winners

- Recycled Materials
- Recycle Structures
- Inert material relative to salt water
- All long term low cost opportunities

Recycled Materials

- Commercially available products of all kinds

Recycled Objects

- Steel Box Beams for Floating Breakwaters
- 180 ft of breakwater <$100,000 life 40 years?

Floating Box Beam Deep Bay B.C.

- 220 ft 6ft x 8ft for <$150,000 Expected life 40 yrs?

What about railway cars?

- 27 ft of breakwater for < $ 90,000 Expected life 40 yrs?

How about a fiberglass pulp silo

- 27 ft of Breakwater < $60,000 !!! Life > 40,100 yrs inert?

Just Pick'm Up

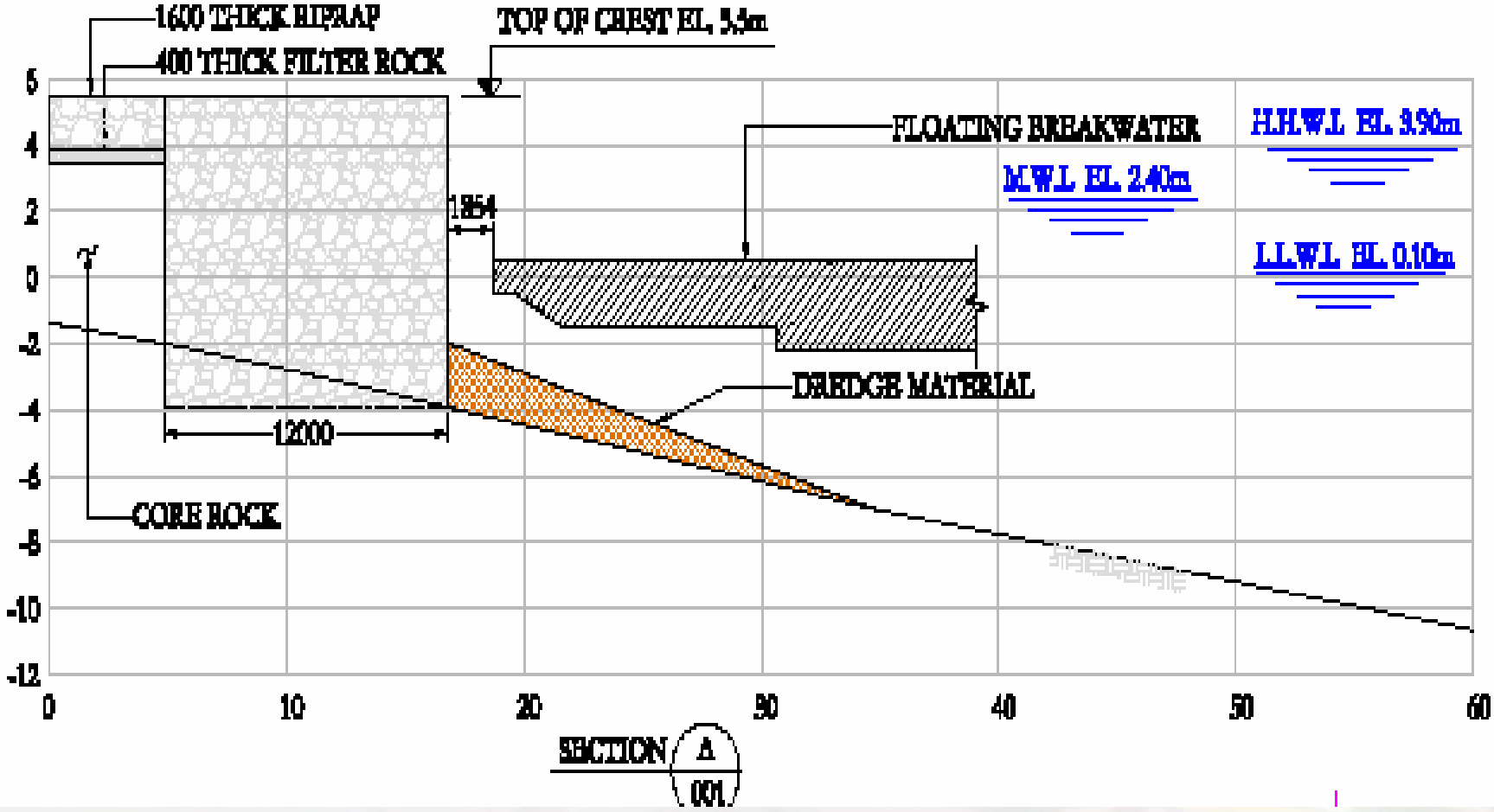
Tow'm Yourself

Put'm in Place

And Fill'm


A Harbor at Work
Fish Plant and Coast Guard Base
Storage and Work Compound
Recreation Beach
Habitat Compensation Reef
Haul-out & Dry Storage
Boat Launch Parking
French Creek Harbour
Vancouver Island B.C.

Extending Wave Protection but not the Footprint



How about Old Shipping Containers

- 8ft x 8ft x 10ft with Rock and Concrete < $35,000
- Expected life 60 yrs

Inert Material

- Recycled Plastics
- HDPE products
- UHMW
- FRP products
- Synthetic Ropes

A Floating Breakwater with no Structural Steel

- Expected life 200yrs? 25ft x 460ft no joints

Non-Steel Mooring Systems vs. Piles

- Tendered steel pile mooring system bids closed this January between $450,000 and $600,000 on the Cowichan Bay Floating Breakwater project. Steel piles have a life of 60yrs+- if cared for.

- Project was re-tendered utilizing synthetic ropes. Final costs will be less than $150,000 and may outlast the steel by several times with minimal or no maintenance expected.

- The Lund breakwater mooring system was installed in 1986. All of the synthetic part is in full working order. All of the 32mm (1 1/4 in) has just been replaced at a cost of $150,000 and only represents < 10% of the mooring system by length.

Life Cycle

- It is absolutely critical to consider life cycle costs and premature replacement of facilities to minimize detrimental affects on the environment and pocket book!

Relationships

- Who are you sharing your facility with?
- So then who are your partners?
- Do you really treat them as partners?

Try all these guys

- Federal Agencies on all kinds of legislation.
- State Agencies on all kinds more legislation.
- Municipalities with more legislation.
- Your physical neighbors.
- Your clients
- Your bank
- Your insurance company
- Oh yes and maybe other financial partners.

Relationships

- A positive working environment is enhanced by:
- Trust
- Respect and concern for partners goals and objectives
- A pro-active approach to achieve win win conclusions

Environmental Management Plans

- An inventory of potentially dangerous material in the Harbor
- An inspection program and schedule for prevention
- Details regarding capital projects planned to improve the Harbor
- *Has a plan on how the operation is going to maintain a positive relationship with partners.*
- Has a plan to deal with mishaps.


Maintain this beautiful shoreline
but still find a way to work in it.