Sustainable Street Design

David Desrochers – Streets Design Engineer
City of Vancouver

CITY OF VANCOUVER POLICY

“Ultimately, the City’s objective should be to incorporate enhanced sustainability into all the City Operations as a ‘way of doing business’”

-City of Vancouver
Corporate Management Team
SOMEONE
SHOULD

Former Minister of Western Economic Diversification and Minister of Sport, Stephen Owen
SCOPE OF PRESENTATION

1.0 Materials Testing Lab?
2.0 Country Lanes
3.0 Crown Street
  3.1 Project Background
  3.2 Phase I
    3.2.1 Construction
    3.2.2 Grand Opening
  3.3 Phase II Construction
  3.4 Finances and Funding
  3.5 Project Monitoring

1.0 Materials Testing Lab

A Mindset Change Analogy:
The City of Vancouver’s Materials Testing Lab Building
  - Constructed from as much “SALVAGED MATERIAL” as economically reasonable

Challenge:
  To overcome people’s resistance to change
Materials Testing Lab
Obstacles to overcome:

2.0 Materials Lab

Construction Process

2.0 Materials Lab
Finished Product

Interior

Exterior

National Yard – LEED Gold
Mavericks

- Who's Thomas Mueller?
- Kim Stephens

2.0 Country Lanes

Country Lane Inspiration

- Concrete strip driveway
- 'Natural' Country Lane
Country Lane Demonstration Locations

Lane south of 700 E 27th Ave.
Lane east of 2100 Maple St.
Lane south of 2700 Yale St.

First Country Lane – L/S 700 E 27th Ave.

Design Features:
- Formed concrete driving strips and lane entrances
- Permeable paver driveway connections and lane entrances
- Sodded structural grass centre strip
- Seeded structural grass edge strips
- Small flower gardens
First Country Lane
Community Paver Laying Event

First Country Lane
Annual Community BBQ
Second Country Lane – L/E 2100 E 27th Ave.

Design Features:
• Gravel-filled structural grass driving strips
• Permeable paver lane entrances
• Broken concrete driveway connections
• Pre-grown structural grass
• Planting area protected by granite boulders

Third Country Lane – L/S 2700 Yale St.

Design Features:
• Dry-mix roller compacted concrete driving strips
• Granite cobble lane entrances
• Gravel-filled structural grass driveway connections
• Seeded structural grass
Third Country Lane
Salmon Etching – by Sculptor George Rammell

Country Lane Awards

APWA 2003 Technical Innovation Award
CAMA USFilter 2003 Environmental Award
3.0 Crown Street

Vancouver’s First Environmentally Sustainable Street

Federation of Canadian Municipalities Representative, Jim Green
### Change
from genesis to mainstream....

<table>
<thead>
<tr>
<th>Creating Change</th>
<th>Leading Change</th>
<th>Implementing Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genesis</td>
<td>Innovation</td>
<td>Early majority</td>
</tr>
<tr>
<td>Idea</td>
<td>Early adopters</td>
<td>Late majority</td>
</tr>
<tr>
<td>Invention</td>
<td>Fast followers</td>
<td>Mainstream</td>
</tr>
<tr>
<td></td>
<td>Performance tuners</td>
<td>Laggards</td>
</tr>
</tbody>
</table>

Derived from Senge (1991); Gladwell (2000) and Oracle Corporation (2005)

### Project Development

- Alexandra Steed
- Michelle Harris
- Andrew Wiens
- Wally Konowalchuk
- Bridgid Kudzius
- Carolyn Drugge
- Otto Kaufmann
- James Sykora
- Jonathan Helmus
- Ryan Desrochers (in training)

3.0 Crown Street Background
Pre-construction condition

3.0 Crown Street Background
Project Goals

- Provide residents with a functional new street, beautified with landscaping and architectural finishes.
- Nurture the salmon habitat south of the project by allowing water to infiltrate the ground and filtering runoff with a network of vegetated swales and retention ponds.

Public Consultation

Four surveys
Three public meetings
Countless phone calls and emails

- Parking
- Traffic
- Landscaping

At the end of the public process, We had 90% support!
3.2 Phase I

3.2.1 Phase I Construction

- Heavy Civil
  November 2004
- Landscaping
  February 2005

Former Vancouver Mayor Campbell and James McElligott

3.2.1 Phase I Construction

Phase I Construction

- Swales
- Detention ponds
- Granite weirs
- Structural grass
- Structural soil
- Landscaping
- Meandering road
- Recycled sidewalk

former Federal MP, Stephen Owen

Sustainable Streetscapes and Fish Habitat Enhancement Demonstration Project
Innovative Technologies

- Structural Grass Road Edges

4.2.1 Phase I Construction

Innovative Technologies

- Structural Grass Parking Spots

3.2.1 Phase I Construction
3.2.1 Phase I Construction

Innovative Technologies

- Structural Soil

3.2.1 Phase I Construction

Innovative Technologies

- Vegetated Swales

3.2.1 Phase I Construction
Innovative Technologies

- Detention Ponds (larger storm events)

3.2.1 Phase I Construction

Innovative Technologies

- Recycled Concrete Walks

3.2.1 Phase I Construction
Project Benefits

**INCREASED**
- Water quality
- Infiltration
- Wildlife habitat
- Traffic calming
- Aesthetics
- Stream base flows

**REDUCED**
- Stream peak flows
- Heat island effect

3.2.1 Phase I Construction

Crown St. Resident, Clair Healy

Project Benefits

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- Stream peak flows
- Heat island effect

3.2.1 Phase I Construction

Local Resident
3.2.2 Grand Opening
Saturday July 30th (The Long Weekend)

Other Features
Saturday July 30th (The Long Weekend)

Other Features
3.3 Phase II Construction

Completion in one week ....

- Culvert replacement
- Pedestrian walkway
- Creek viewing area
- Surface treatment
### Phase II: Wildlife Habitat

<table>
<thead>
<tr>
<th>Species</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sculpin</td>
<td>22</td>
</tr>
<tr>
<td>Lamprey</td>
<td>16</td>
</tr>
</tbody>
</table>

Species catalogued during fish salvage (15 metre section of each stream)

### Phase II: Wildlife Habitat

<table>
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<tr>
<th>Species</th>
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<tbody>
<tr>
<td>Cutthroat Trout</td>
<td>71</td>
</tr>
<tr>
<td>Coho Salmon</td>
<td>215</td>
</tr>
</tbody>
</table>

3.4 Fish
Phase II Construction

3.3 Phase II Construction

Former Vancouver City Mayor, Larry Campbell
3.4 Finances and Funding

- The Federation of Canadian Municipalities, Green Municipal Funds - $560 K.
- Streets Capital Budget - $705 K
- Residents - $50 K
- Musqueam Indian Band - $33 K
- Small grant from the Greater Vancouver Regional District for flow monitoring equipment

Summary of Costs

- Can you put a price on the benefits?
## Cost Summary

- Street excavation and construction…….. $370K
- Landscaping and granite highlights…….. $190K
- Engineering consultant.................. $180K
- Swale grading and construction........ $70K
- Structural grass.......................... $60K
- Street lights................................ $50K
- Gravel pathway........................... $20K

- Total Phase I Cost........................... $940K

- Protecting Vancouver’s Last Wild Salmon Stream
  ............................................................. priceless

### 3.4 Fun Finances

## Chucky Returns
Danielle Desrochers, Celebrity Chanteuse

Popularity

**Media Interest**
- Vancouver Courier
- Vancouver Sun
- Dose Magazine
- Province Newspaper
- Shared Vision Magazine
- West Ender Newspaper
- GVT
- World Journal
- MetroNews
- Infrastructure Guide
- Canadian Consulting Engineering Magazine
- Infrastructures Construction Magazine (French and English)
- Many, many websites

**Tours**
- University of British Columbia
- Museum of Anthropology
- Musqueam Indian Band
- City of North Vancouver
- Busby and Associates Architects
- Kerr Wood Leidal Consulting Eng.
- Climate Change Action Group
- Finnish Municipal Engineers
- ND Lea Consultants Ltd.

3.4 Fun Finances
The City of Vancouver and the University of British Columbia are enthusiastically devoted to advancing and developing environmentally sustainable practices both locally and globally.

Monitoring Program

A cooperative monitoring plan, between the City of Vancouver and The University of British Columbia, for the Crown Street Project, will study the following:

- Turbidity
- Suspended Solids
- Conductivity
- Trace Metals
- Oil and Grease
- PAH's
- Rainfall
- H2O table levels
- Flow
Crown Street will be monitored in partnership with the University of British Columbia over a 5 year period.
Pictures

[Image of a green area with trees and a path]

Pictures

[Image of a road with a concrete structure and plants]
Pictures