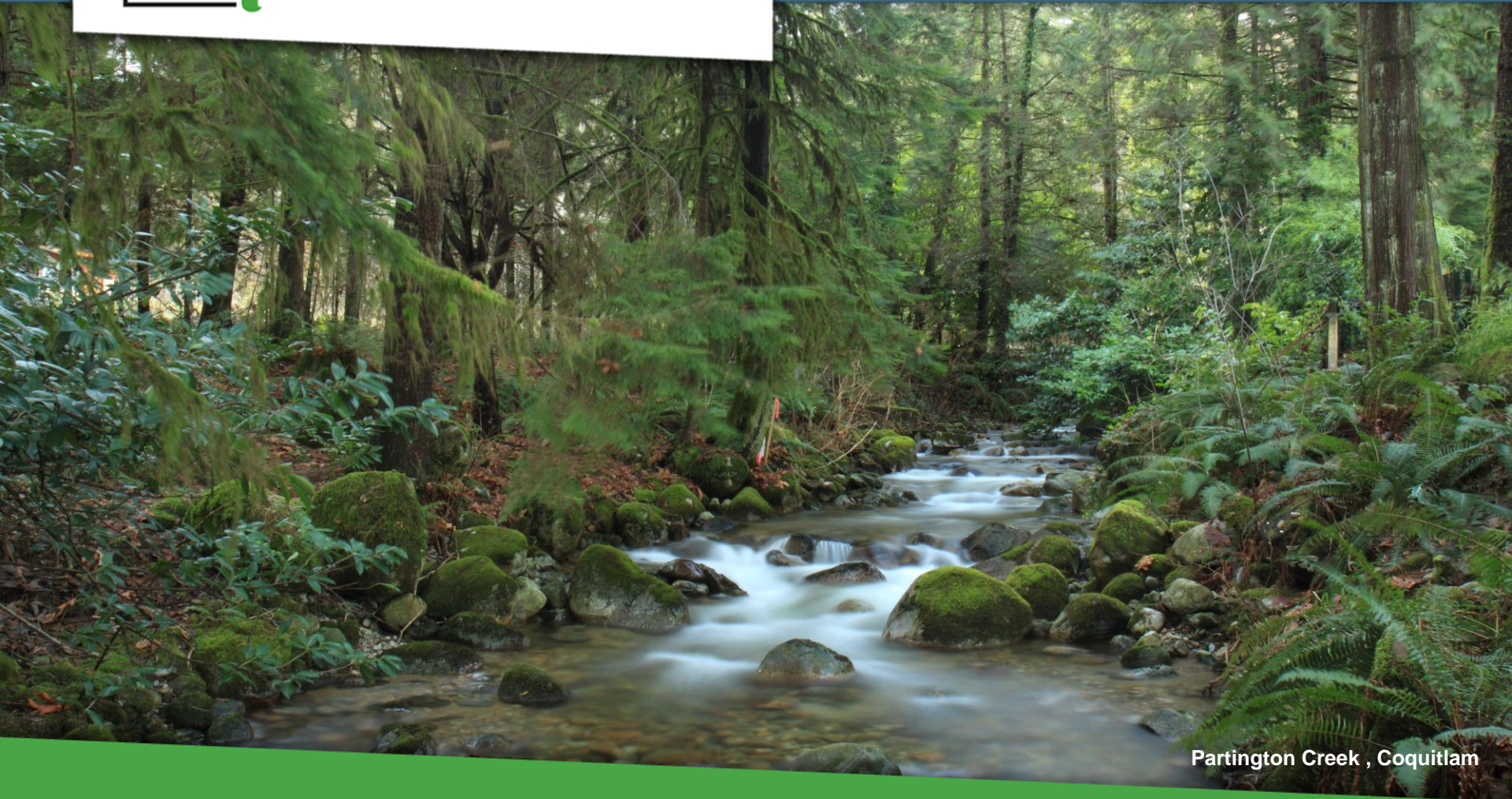




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Partington Creek , Coquitlam

Source Controls in Poorly Draining Soils

Laurel Morgan, M.Sc., P.Eng., P.E.



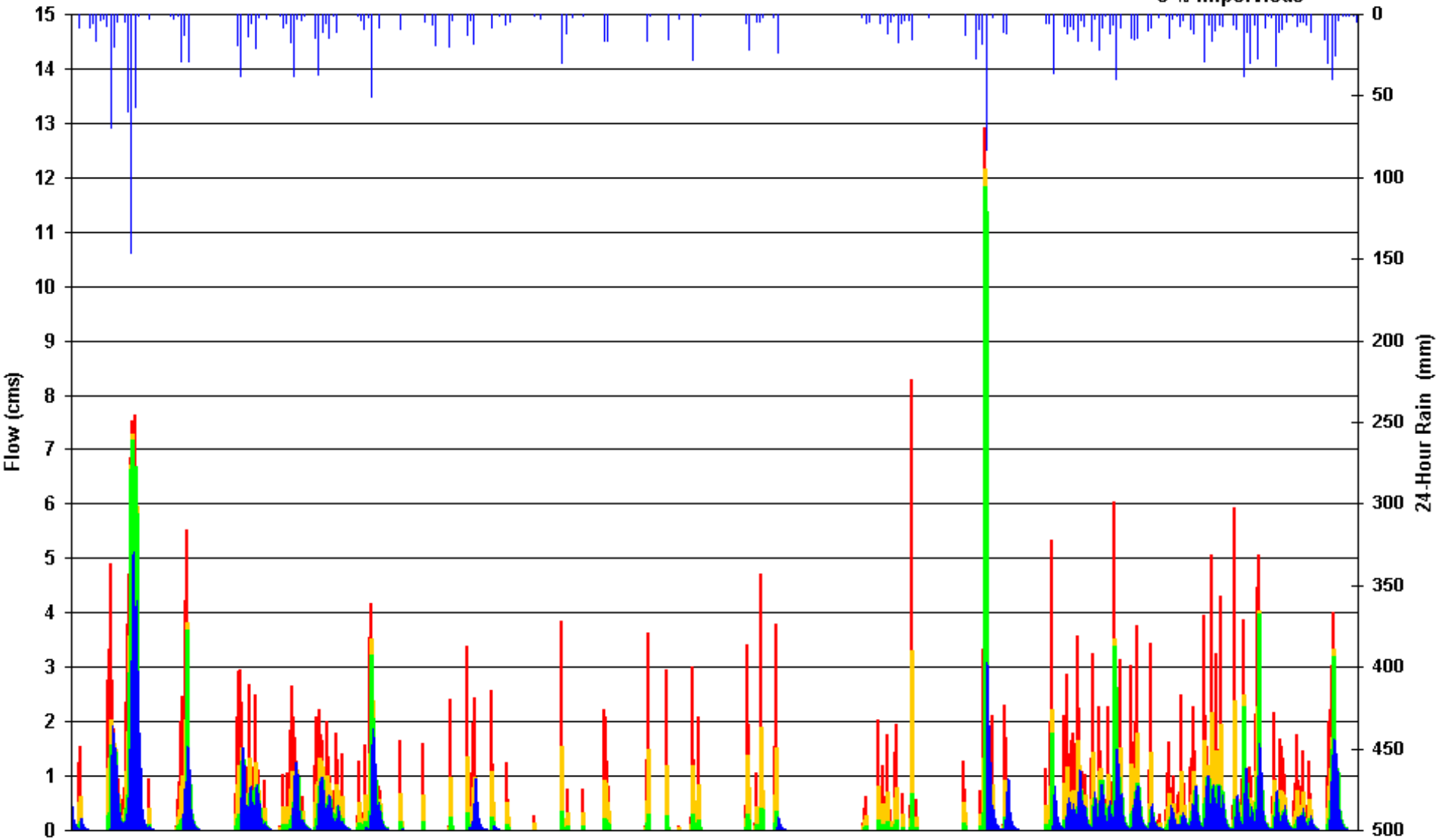
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What?



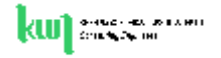
SIMULATED TYPICAL-YEAR HYDROGRAPHS

- 80% Impervious
- 40% Impervious
- 10% Impervious
- 0% Impervious



Time (30 Minute Interval, January to January)

Hydrographs taken from XP-SWMM rainfall-runoff simulation for Thain Creek drainage basin using 1968 North Vancouver rainfall data



Design Criteria

Flow Volume Reduction	Flow Rate Control	Water Quality Treatment
<p><i>Capture Frequently Occurring Rainfall</i></p>	<p><i>Slow Runoff</i> <i>Reduce Peak Flows</i></p>	<p><i>Reduce TSS & Contaminants</i></p>
<ul style="list-style-type: none">• 50% - 70% of 2-year event	<ul style="list-style-type: none">• 6-month• 2-year• 5-year	<ul style="list-style-type: none">• 90% Average Annual Runoff• 80% of TSS

An aerial photograph of a mountainous region. In the background, there are large, rugged mountains with patches of snow. The middle ground shows a town with a grid-like street pattern. A thick red outline is drawn around a large portion of the town and the surrounding hillsides. A smaller red circle is drawn around a specific area within the town. Two red lines point from the text boxes to the red outline and the red circle respectively.

Integrated Stormwater
Management Plans

Site Specific Design



Silver Ridge Development

Profile

Soil: Till Soils

Lot Grades: Steep (5% -25%)

Elevation: Range from 3.5 m to 60 m

Annual Precipitation: 2300 mm

Environment: Greenfield Development to Fish Habitat & ESA (Bog)

Treatment (90% of avg. annual rain)

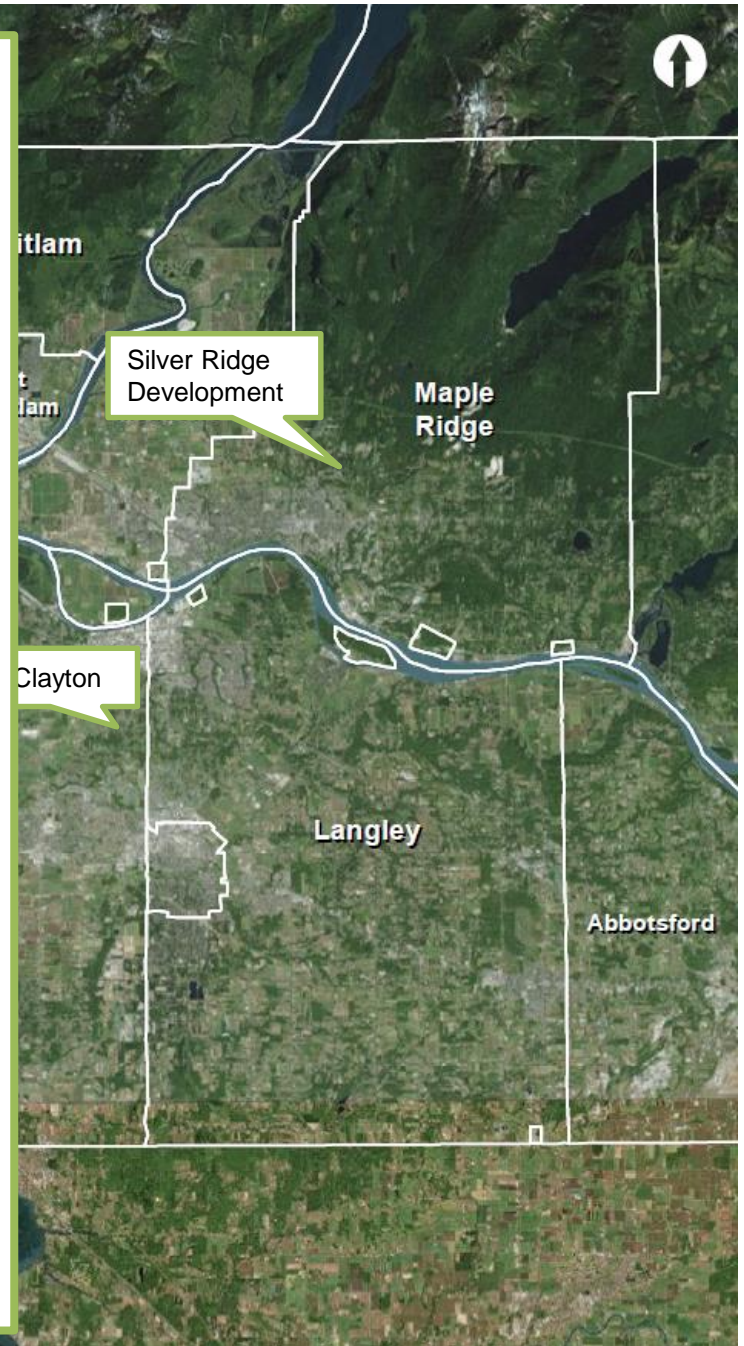
Roadside Rain Gardens (Road)

Disconnected Roof Leaders (on Lot)

Absorbent Landscaping (on Lot)

Rock Pits (on Lot)

Detention Pond (Catchment)





Silver Ridge Development

**Water Quality Monitoring 8 yrs after Construction
(2012-2014)**

WQ TREATMENT – Mature Roadside Rain Gardens

Statistically Significant:

92% Reduction in TSS (strong)

Reduction in Metals (strong)

Reduction in TKN, TP, TOC (weak)



East Clayton Development

Profile

Soil: Clay Soils

Elevation: Range from 66 m to 78 m

Annual Precipitation: 1500 mm

Environment: Development on Agricultural Land drains to **North Creek**

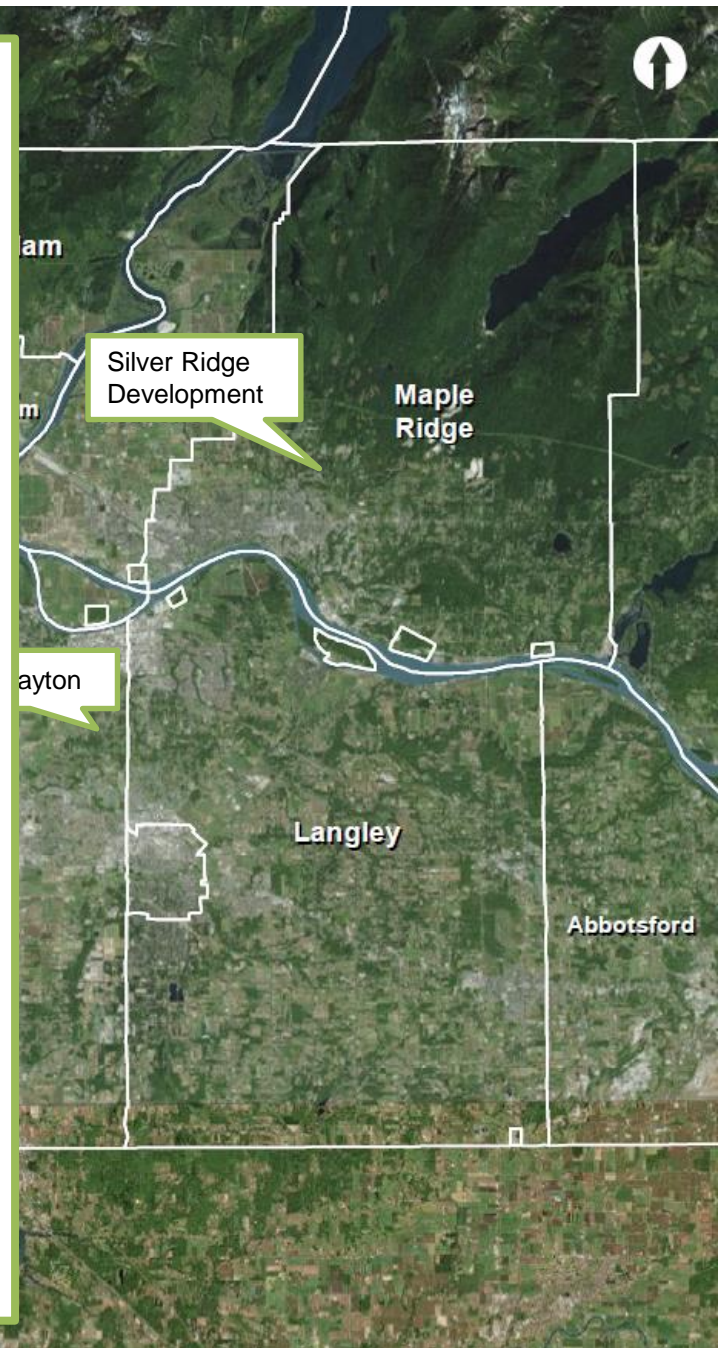
Treatment (Pre-Development with Curb & Gutter)

Disconnected Roof Leader (on Lot)

Absorbent Landscaping (on Lot)

Rock Trench (on Lot)

Detention Pond (Catchment)





East Clayton Development

3 years of Monitoring 2003-2006

VOLUME REDUCTION AND DETENTION.

Lessons Learned:

Infiltration Rate/Exfiltration Rate: 0.8 mm/hr

Rock Trench Design: Effective Detention

Absorbent Landscape: **Effective Volume Reduction**

Support for Surrey Policy:

Disconnected Roof Leader to Absorbent Soils



Wagg Creek Watershed City of North Vancouver

Area: 500 ha (1240 acre)

Land Cover:

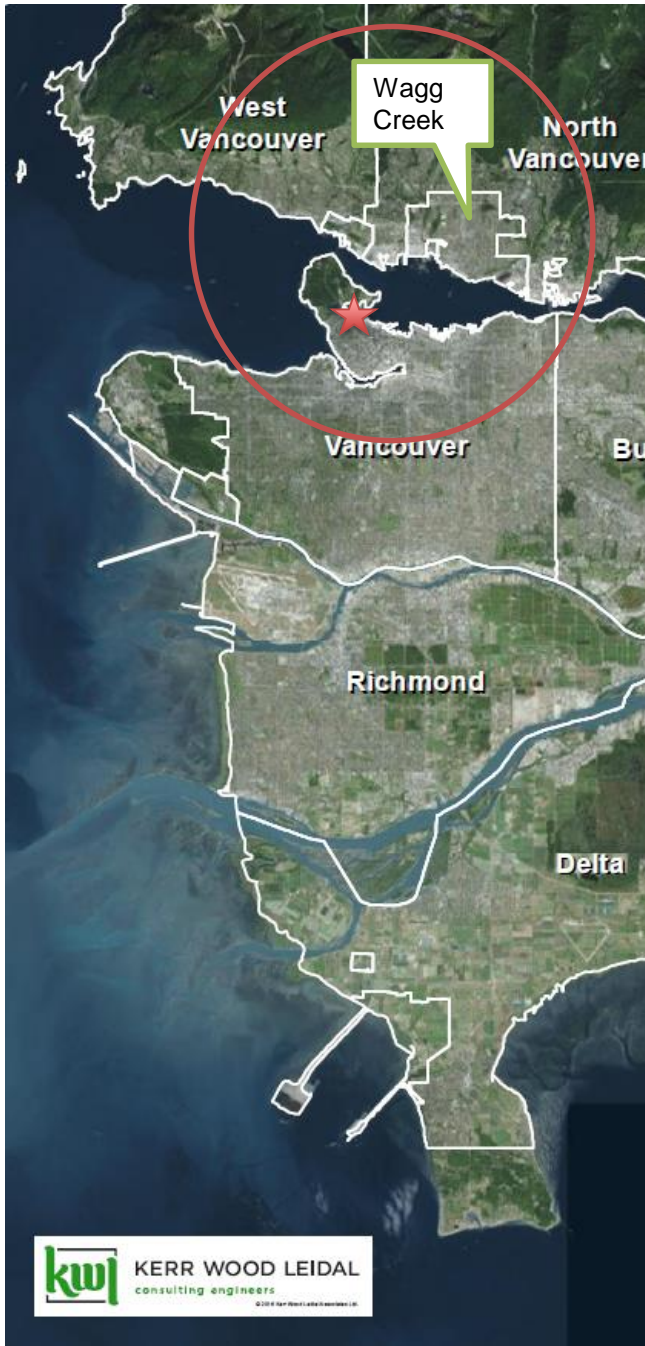
Fully Urbanized & Developing
45% TIA (1999) to 76% TIA (2030)

Environment:

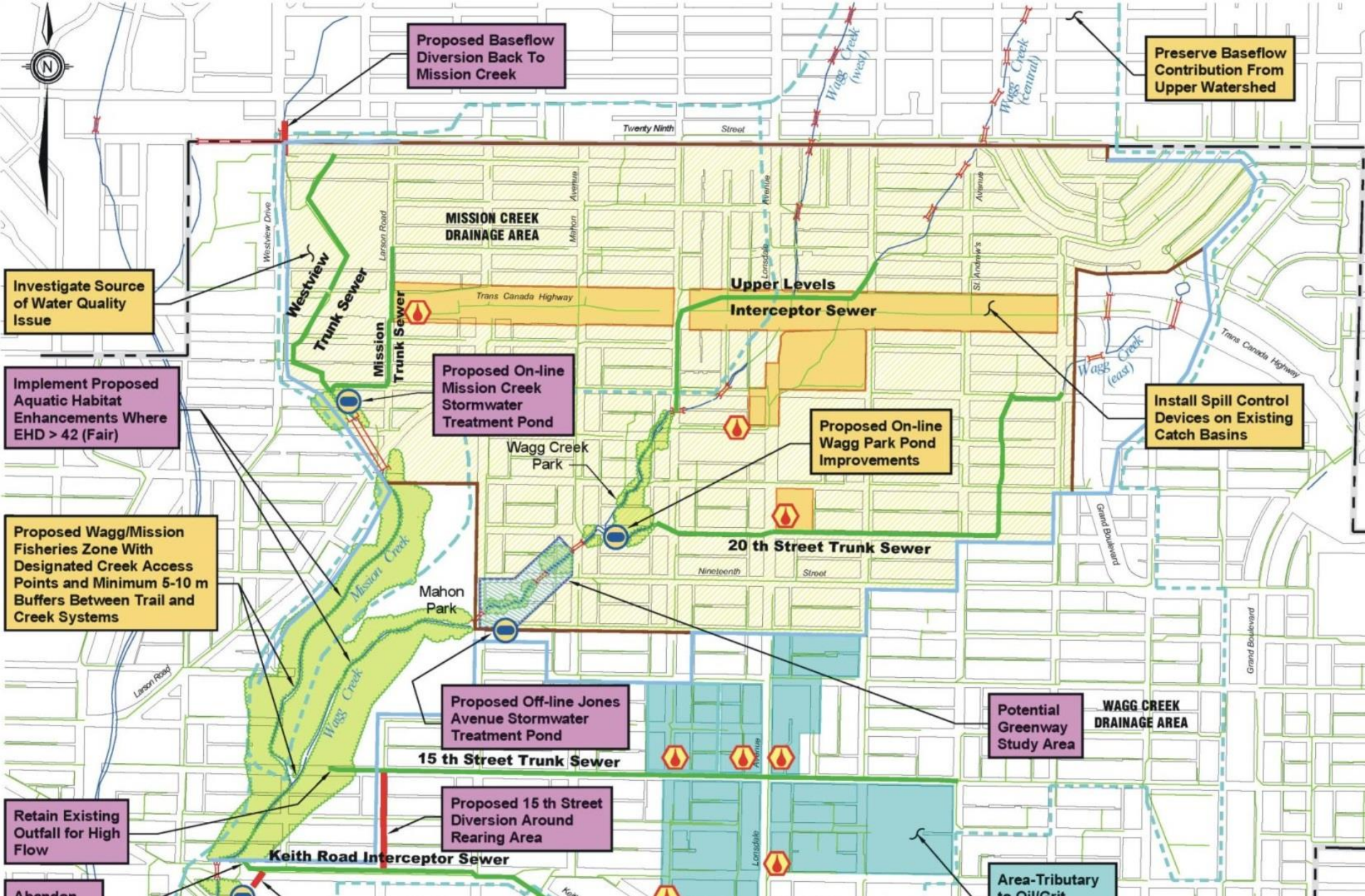
Moderate-Excellent Habitat Sections
& Fish Presence

Initiatives

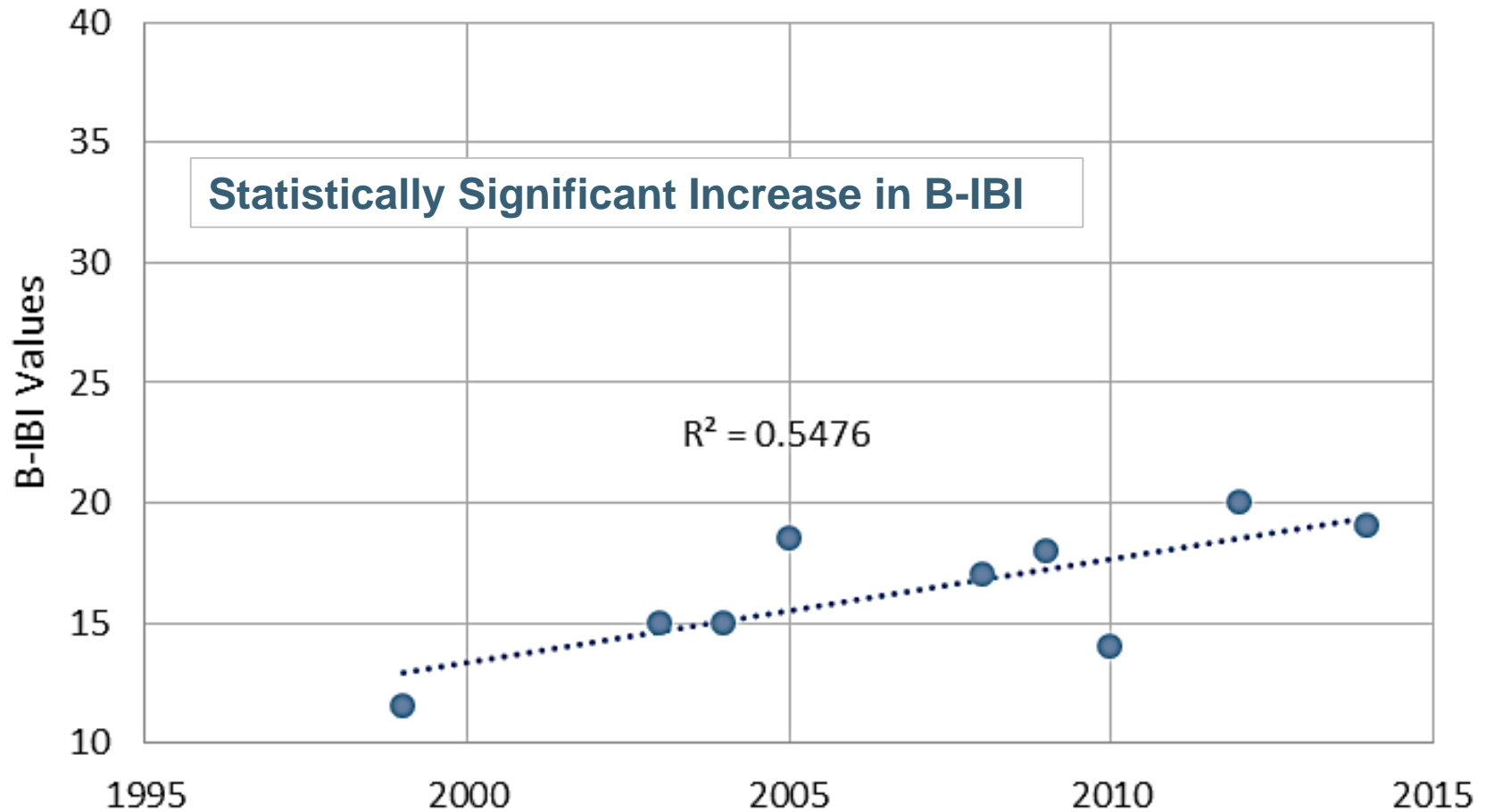
1999 Stormwater Management Strategy
2016 ISMP
B-IBI & Flow Monitoring since 1999



Wagg Creek 1999 Plan



Wagg Creek: Benthic Index of Biotic Integrity





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Questions?

