Road Controlling Authorities Forum

Road Controlling Authorities Forum (New Zealand) Incorporated

with assistance from

New Zealand Water and Wastes Association

presents

Managing Stormwater and Road Run-off Tools, Techniques and Devices

nzwwa

New Zealand Water & Wastes Association

Waiora Aotearoa

Techniques, tool and devices: what works, where, and how?

- Robyn Simcock, Landcare
- Mark Megaughin, URS
- Keith Caldwell/ Sue-Ellen Fenelon, Beca

Road Controlling AUTHORITIES FORUM (NZ) INC

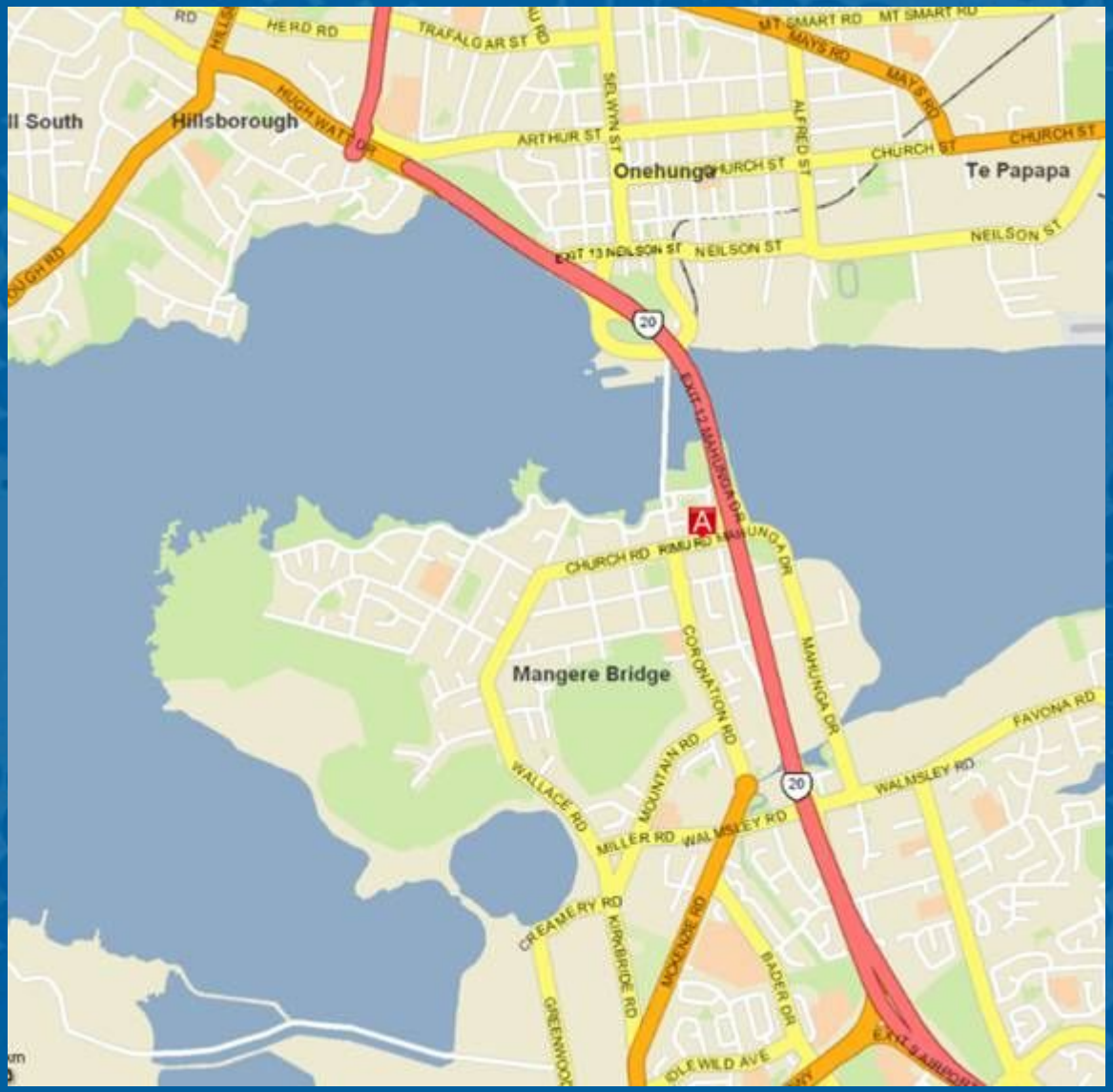
nzwwa New Zealand Water & Wastes Association Wai ora Aotearoa

Larger Designs and Stormwater Issues

Large Roading/Stormwater Projects

- Manukau Harbour Crossing
- Grafton Gully
- Pegasus

Manukau Harbour Crossing



Manukau Harbour Crossing

- 5km of motorway – 6/8 lanes, new harbour bridge, two others upgraded
- Consent requires that 95% of existing roadway and 99% of new roadway be treated
- Space constraints across most of the alignment
- Tidal considerations
- Combination of swales, ponds and wetlands

Grafton Gully

Grafton Gully

- Connects the Northwestern and southern motorways with the Ports of Auckland and lower CBD
- First alliancing project in NZ –"Freeflow"
- Environmental Policy often far in excess of best practice
- Winner of the Arthur Mead Award 2004

The Arthur Mead award is " Given to an Auckland branch member whose submission for a predominantly engineering work best exemplifies care for, and consideration of, environmental values".

Grafton Gully – Stormwater Treatment

- Aucklands largest structural stormwater quality improvement device
  (10m wide, 2.5m high, 85m long, capable of holding 1.2 million litres)
- Designed so that carparks and/or buildings could be built over the top
- Maintenance a key focus

Grafton Gully – Stormwater Treatment

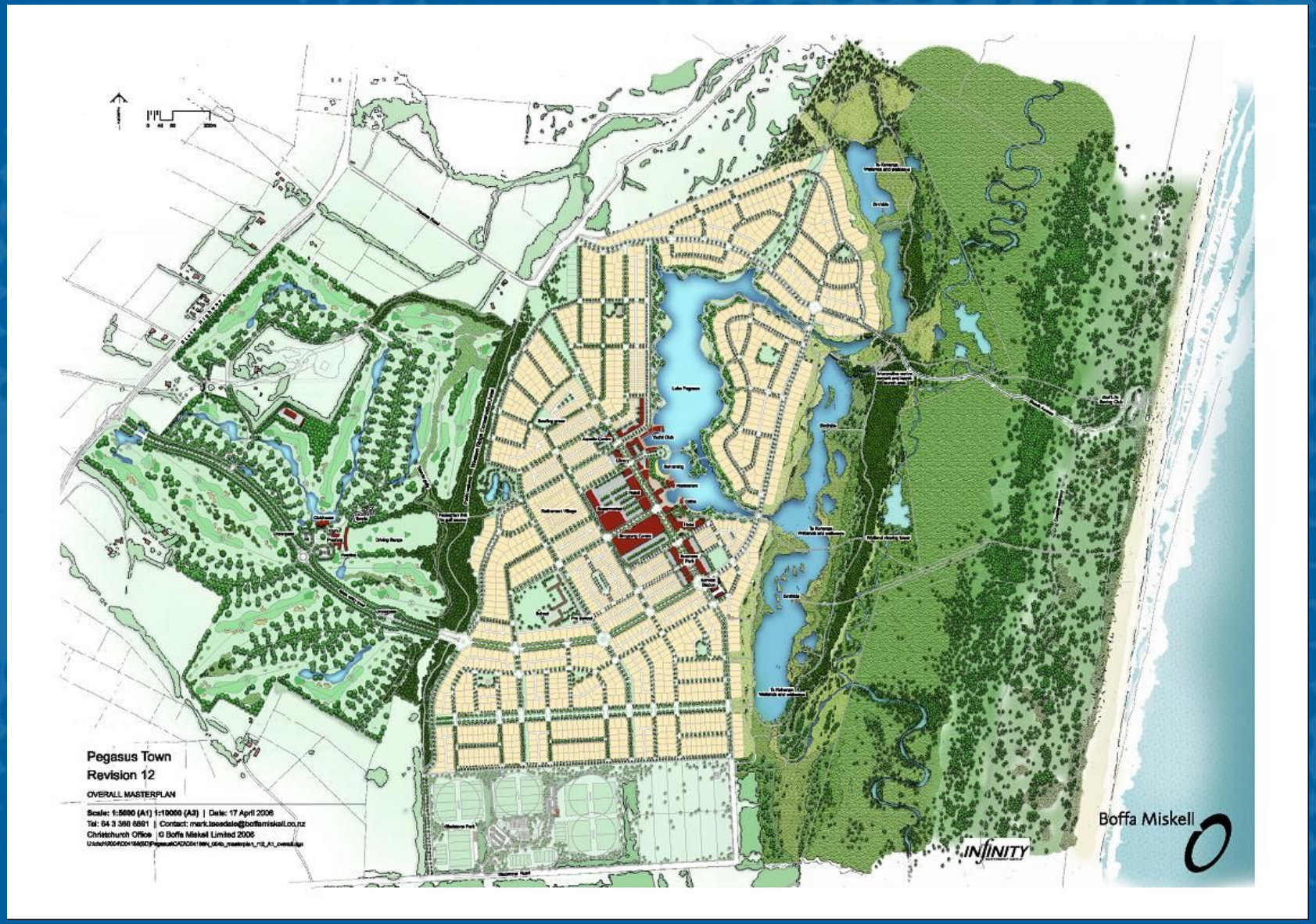
Grafton Gully – Stormwater Treatment

Grafton Gully – Stormwater Treatment

To provide effective maintenance, the design incorporated:

- Hydrocarbon Baffles
- Manholes, lids and hatches to allow access
- A protection weir around the outlet for dewatering.
- Spill management capability

Pegasus Town



Pegasus Town

Pegasus Town

- 290 hectare new town North of Christchurch
- 3051 residential allotments
- Commercial area of approximately 9 hectares
- A 200 room hotel
- A school for 150 students
- A large wetland – known as the Eastern Conservation Management Area (ECMA)
- An area set aside for preservation of archaeological sites – known as the Western Conservation Management Area (WCMA)

Mapleham

- 102 residential allotments – average size 2000 m2,
- 18-hole golf course and driving range,
- Golf club house, and
- Gymnasium complex
- A separate subdivision south of the Mapleham development comprising 15 residential lots

Statistics

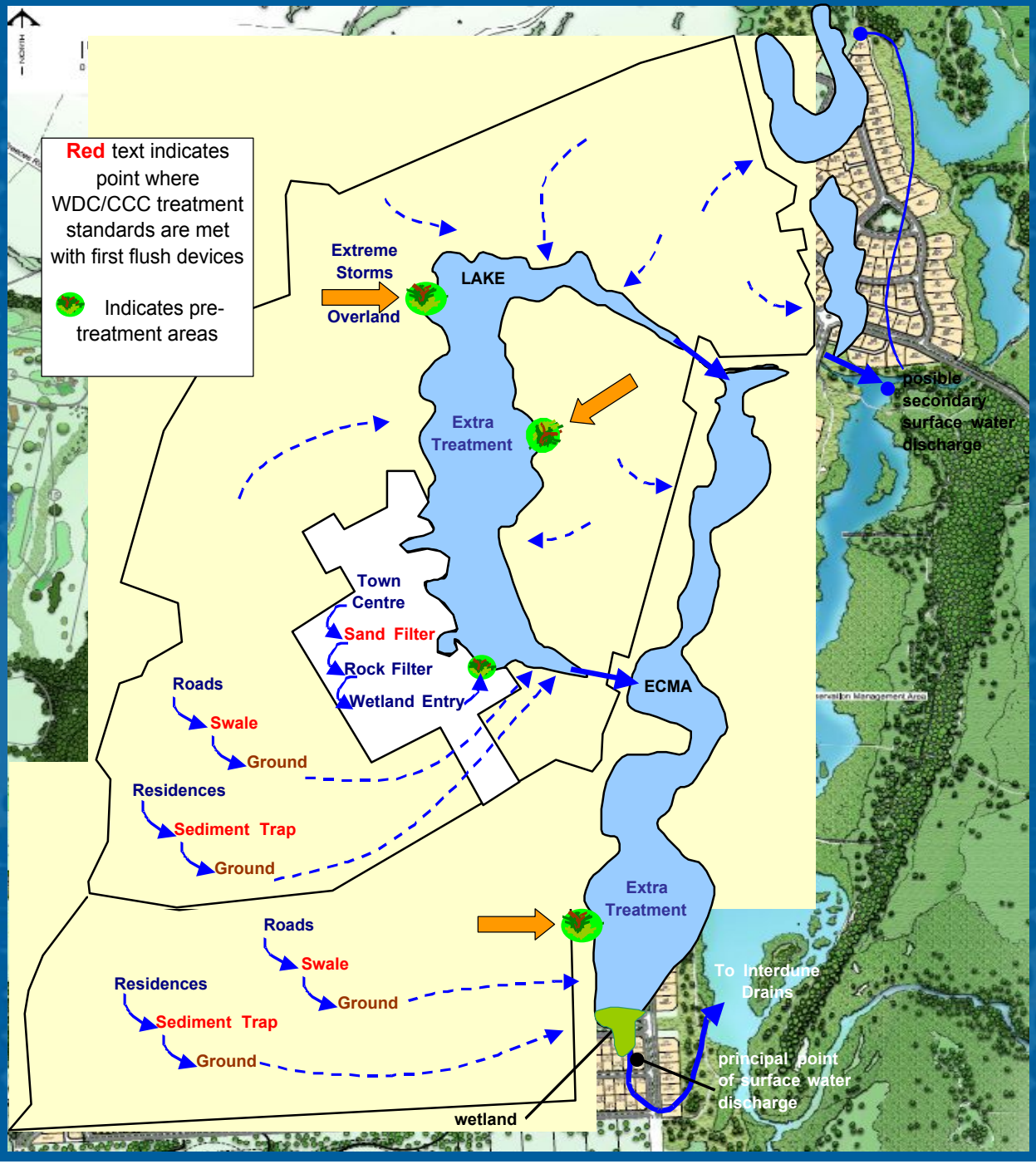
- Earthworks – 1,600,000 m^3
- Roading – 25 km
- Sewer – 30 km, 8 Pump Stations
- Water – Wells, treatment, reservoir, 50 km reticulation
- $180M site works
- 5 Year programme

Stormwater Innovation

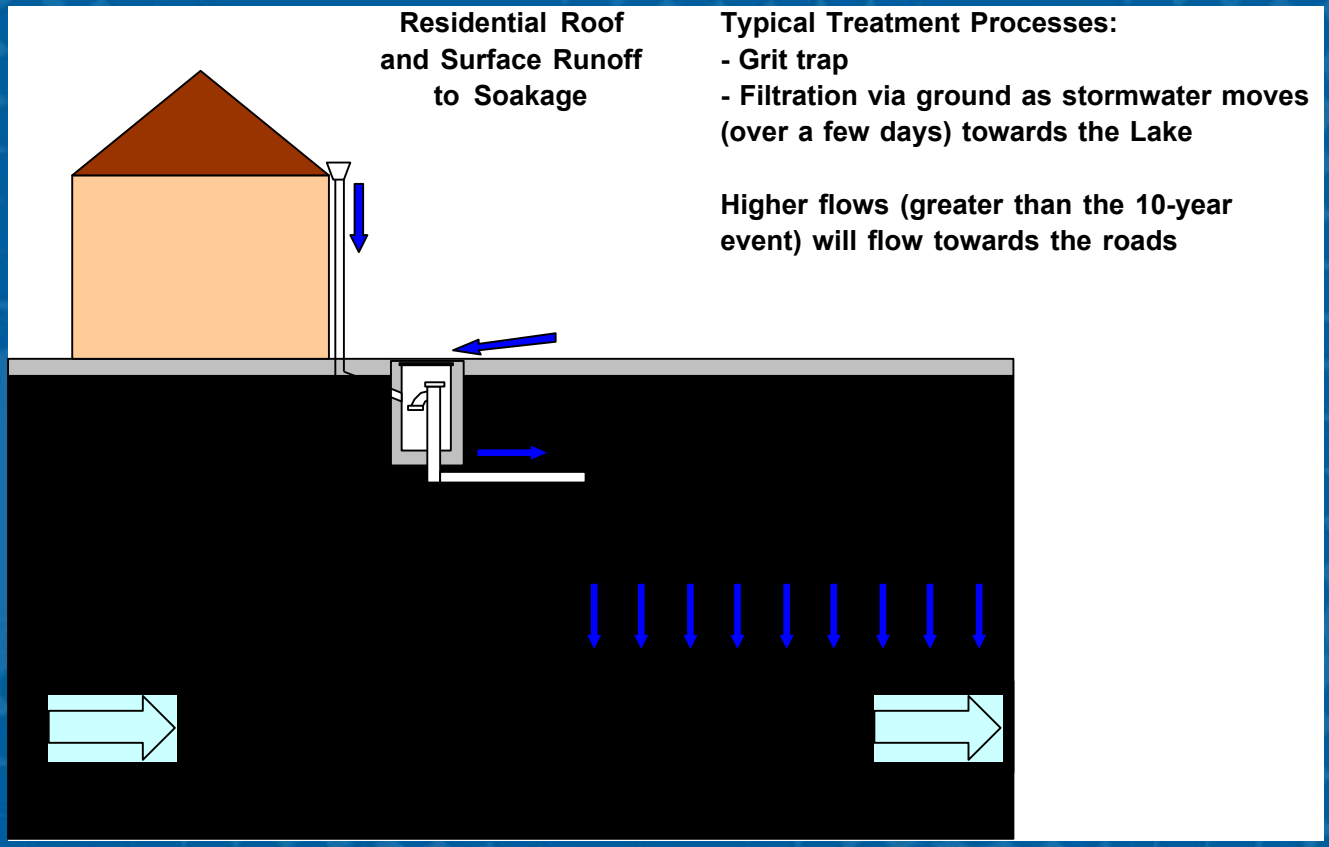
- Downstream flood risk
- Original Solution
  - 1:100 year storm to ground
  - Loss of land or major in ground storage
- Our solution
  - Enlarged lake to provide storage
  - 1:10 year storm to ground
  - Pipes in town centre
  - Up to $8M saving/no land lost
  - “Selling” campaign results in few submissions

Stormwater Treatment

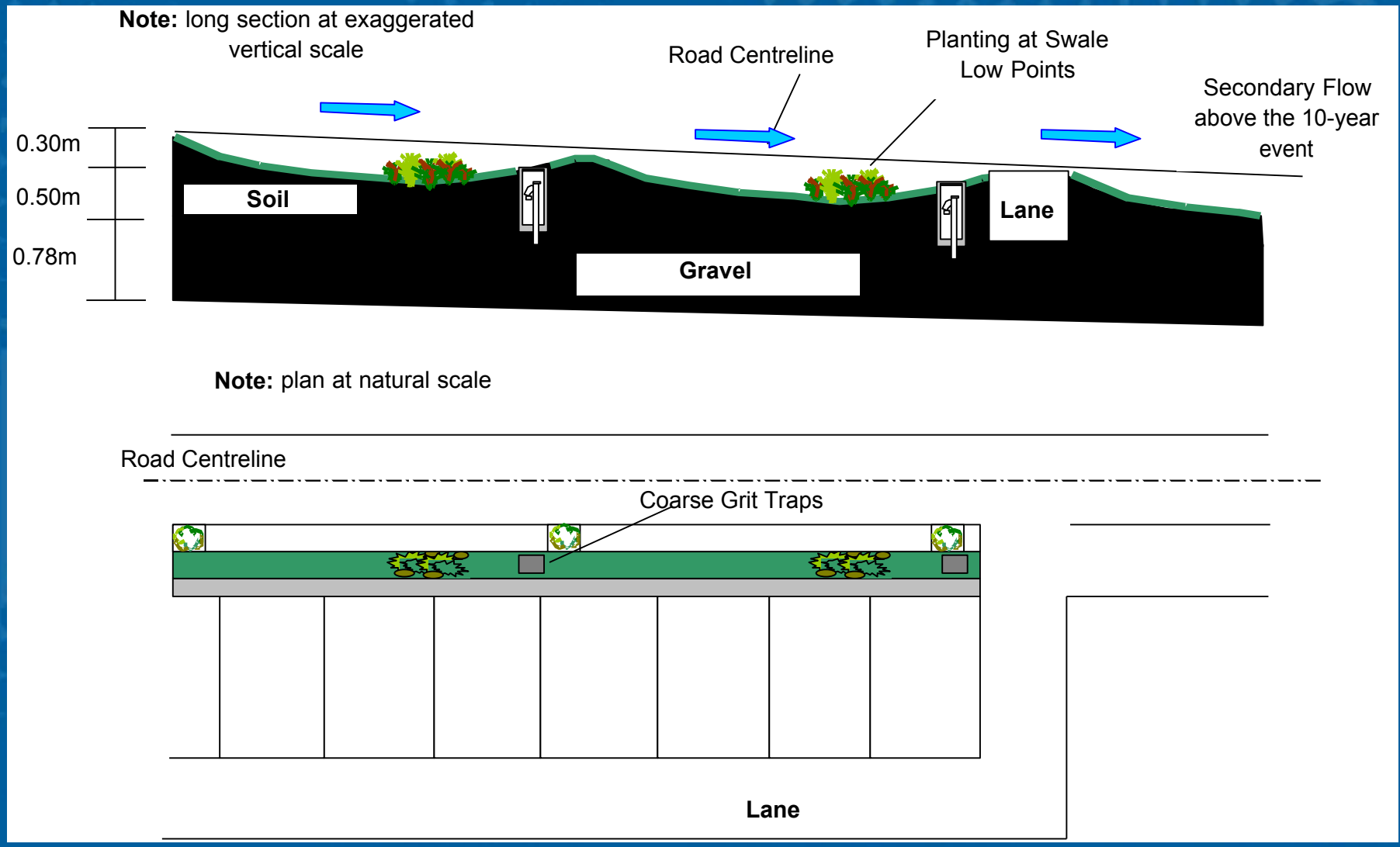
- Manage up to the 100-year storm
- 10-year runoff discharged to ground for Roads and Residences.
- Roads use planted swales prior to discharge to ground
- Treatment Train approach for further quality enhancement:
  - In ground
  - Lake
  - ECMA
- Town Centre runoff is collected and treated using sand filters
- Secondary flow is directed along roads, into the Lake or ECMA via small wetland pre-treatment areas.


Red text indicates point where WDC/CCC treatment standards are met with first flush devices
Indicates pre-treatment areas
Extreme Storms
Overland
LAKE
Extra Treatment
posible secondary surface water discharge
Town Centre
Sand Filter
Rock Filter
Wetland Entry
ECMA
Roads
Swale
Ground
Residences
Sediment Trap
Ground
Extra Treatment
Roads
Swale
Ground
Residences
Sediment Trap
Ground
To Interdune Drains
principal point of surface water discharge
wetland

Residential Runoff Treatment and Disposal to Ground



Longsection and Plan of Roadside Swales



Mapleham Stormwater Management