Stormwater Group
WATER NEW ZEALAND

International Experience Exchange Webinar Series

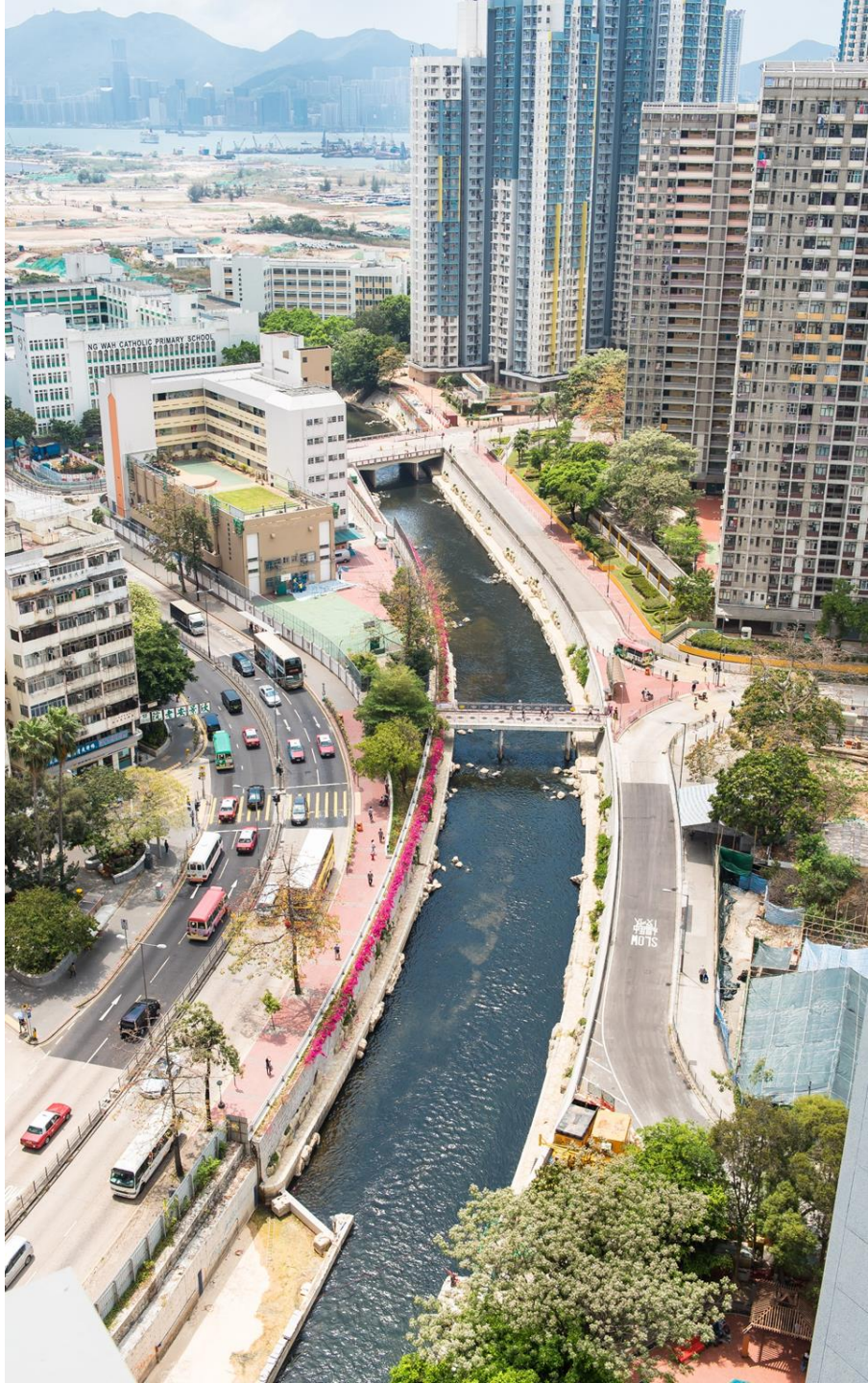
Kai Tak River – Revitalising the Water into an Urban Green River Corridor in Hong Kong

Presenter: Jason Lee (Senior Project Manager, Auckland Council)

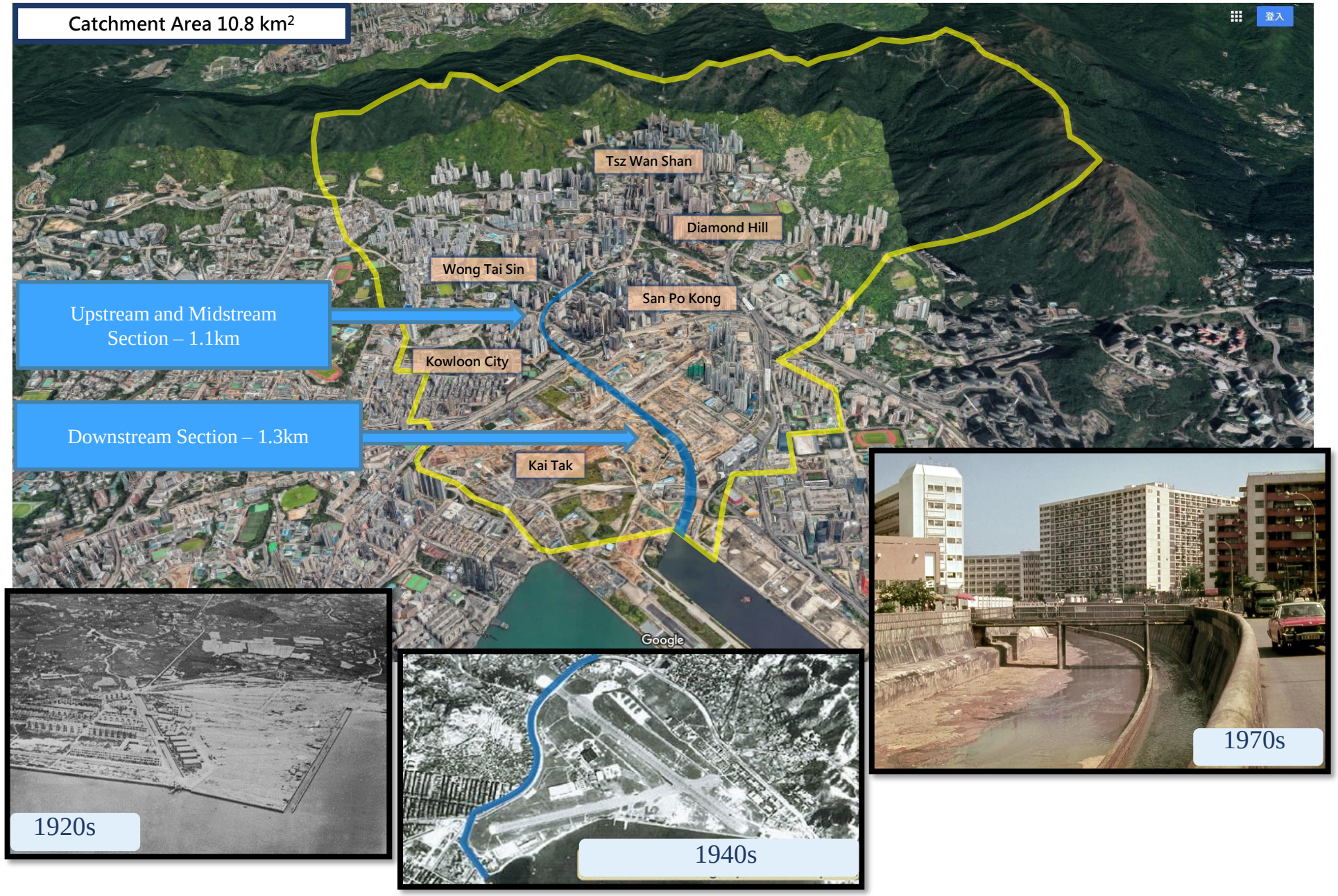
water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Agenda

1. Purpose of the Project
2. Construction Challenges
3. Hard landscape
4. Soft landscape
5. Fish shelters and flow deflectors

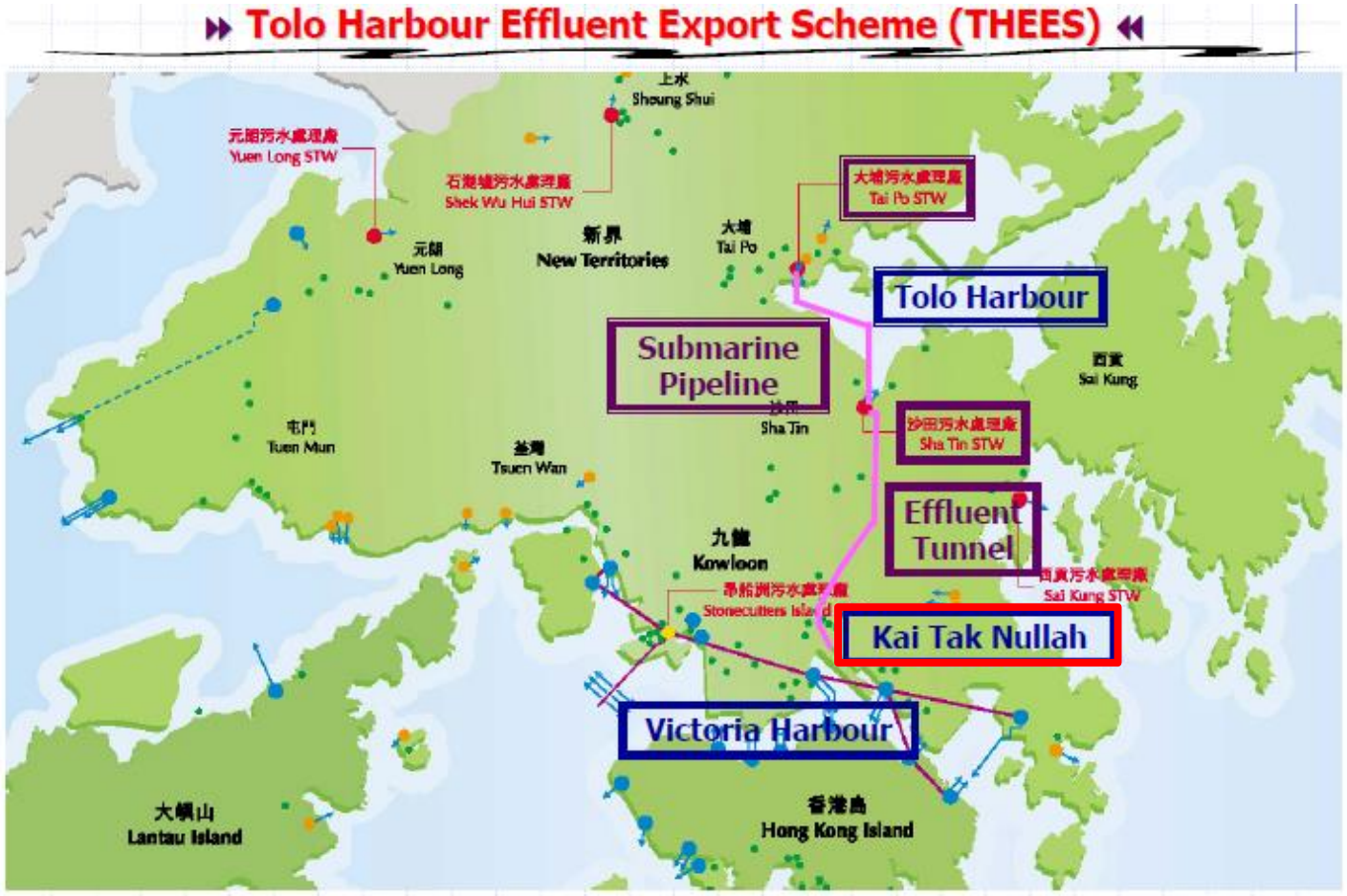


Project Background



Improved water quality

THEES diverts the discharge of the treated effluent of Shatin and Tai Po sewage treatment plants from the Tolo Harbour to Victoria Harbour (in 1998)

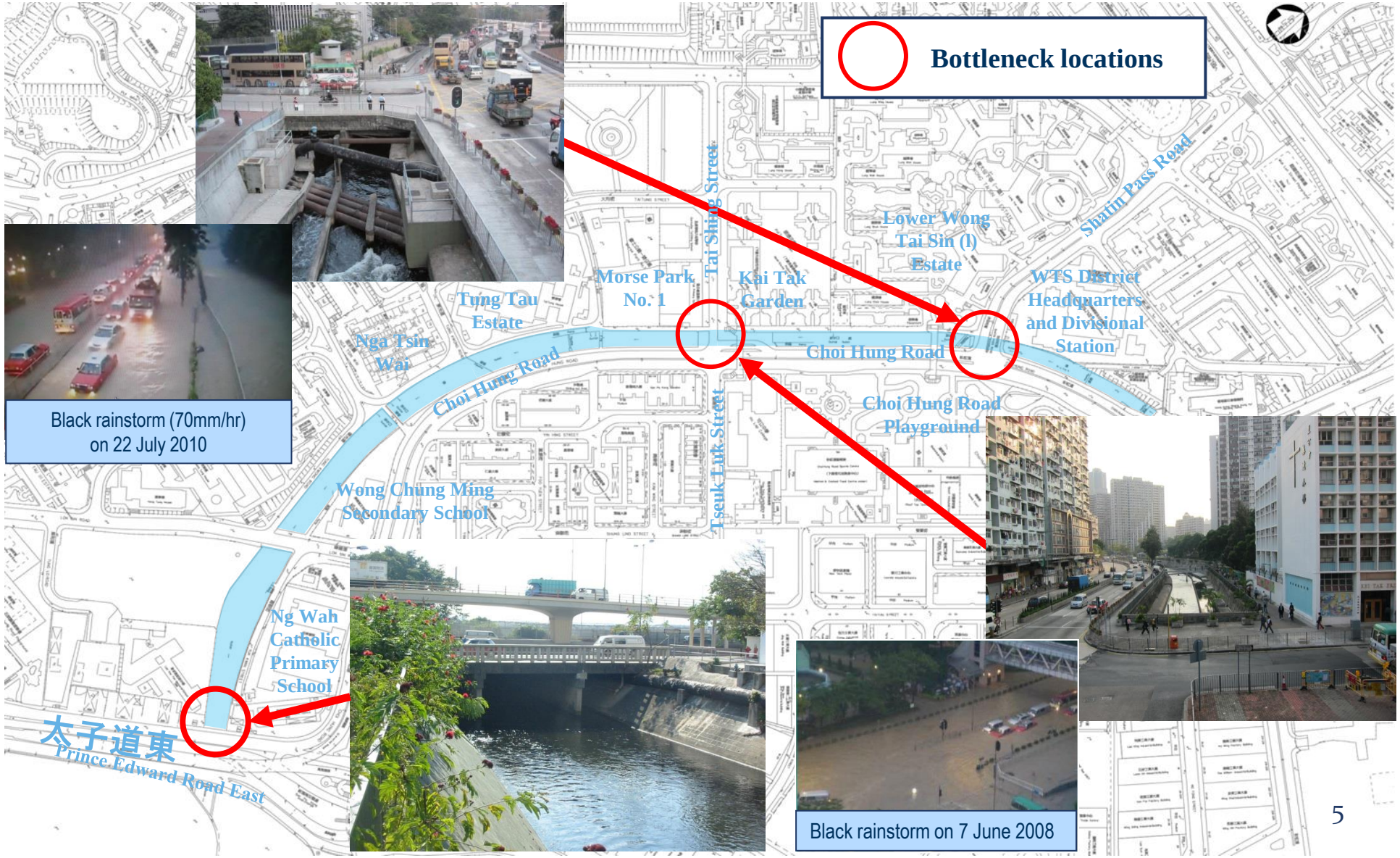


Double benefits:

- Avoid “red tides” (or algal bloom) in Tolo Harbour
- Provide flow of flushing water to heavily polluted Kai Tak Nullah

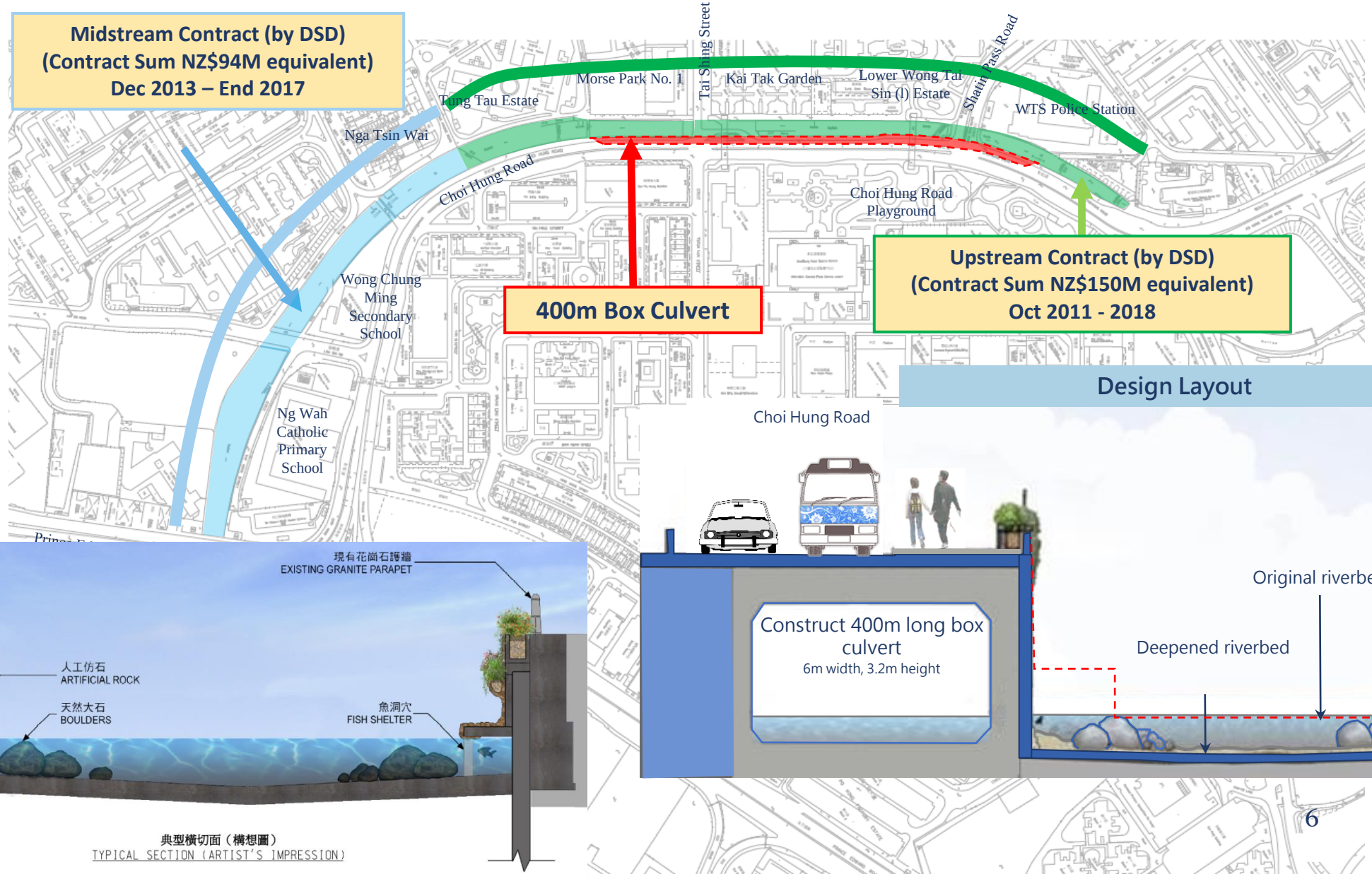
Purpose of the Project

Total length 1.1 km. Conveys stormwater and secondary treated wastewater



Works Scope of Upstream and Midstream Contracts

Midstream Contract (by DSD)
(Contract Sum NZ$94M equivalent)
Dec 2013 – End 2017



Design Layout

Past Flooding Incidents

Black rainstorm on 30.3.2014
Max. rainfall : 104 mm/hr

Black rainstorm on 8.5. 2014
Max. rainfall : 85 mm/hr

Amber rainstorm on 26.9 2015
Max. rainfall : 103 mm/hr

Amber 黃 **AMBER RAINSTORM SIGNAL**

Exceeding 30 millimetres in an hour, and is likely to continue.

Red 紅

RED RAINSTORM SIGNAL

Exceeding 50 millimetres in an hour, and is likely to continue.

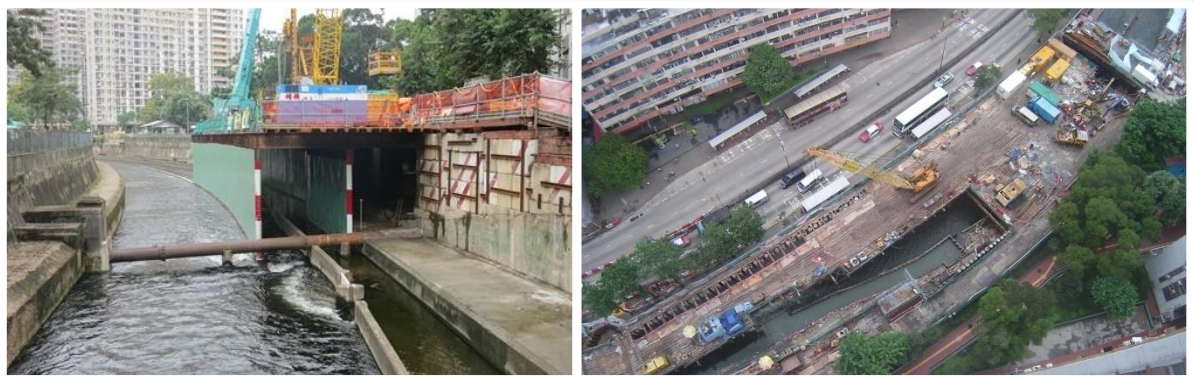
Black 黑 **BLACK RAINSTORM SIGNAL**

Exceeding 70 millimetres in an hour, and is likely to continue.

Flooding Incident on 26.9.2015

Works in River

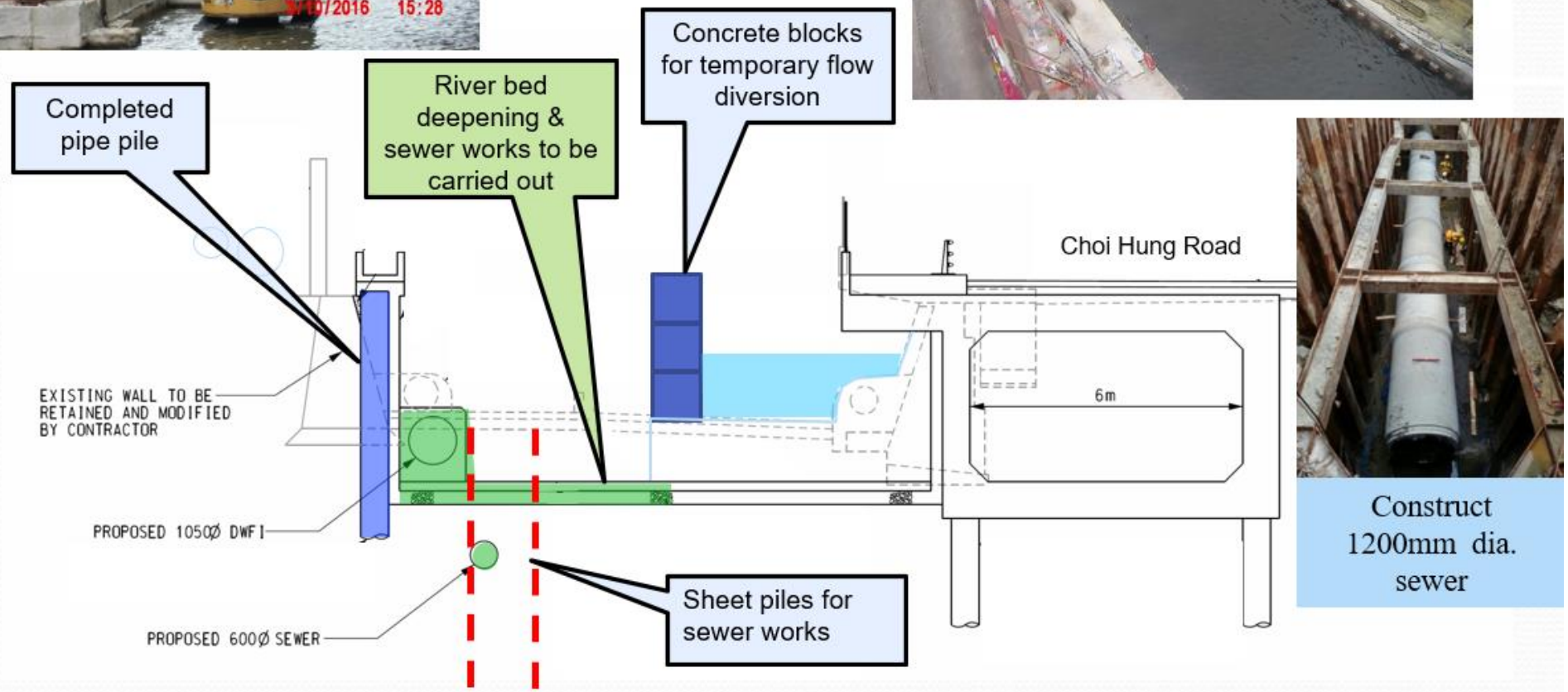
In wet season, hydraulic capacity of the river should not be less than that of the existing in any case



Erect temporary steel platform for piling works

Construction Challenges -Works in River

Work in Dry Season (Sewer pipe laying and nullah bed deepening)



Construct 1200mm dia. sewer

Blue Green Infrastructure

Blue-Green Infrastructure

- Blue refers to rivers and water bodies, whereas green refers to greening landscapes.
- Build a drainage layout in urban areas that interweaves the natural environment with community characteristics and contemporary functions.

Decked Nullah in the Past

- Using “decking approach” before development of Blue Green Infrastructure concept, to handle the hygiene problem (odour and mosquito problem) generated from the open nullah

Pros:
- Efficient method to resolve odor and mosquito problem of the nullah (Put everything underground)
- Provide space for other land use (i.e convert the nullah into pedestrian walkway)

Why don’t we apply the decking method to Kai Tak River

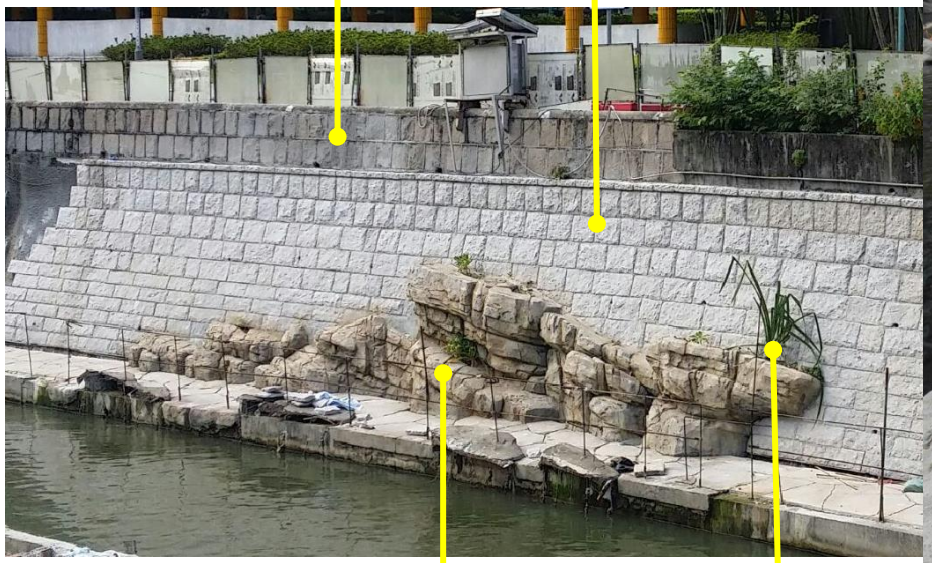
TWO reasons:
1. Strong public aspiration to transform the nullah into pleasant and green river corridor
2. Non-stop river flow in Kai Tak River

Tonkin Street Nullah

Tai Hang Nullah

Hard landscape

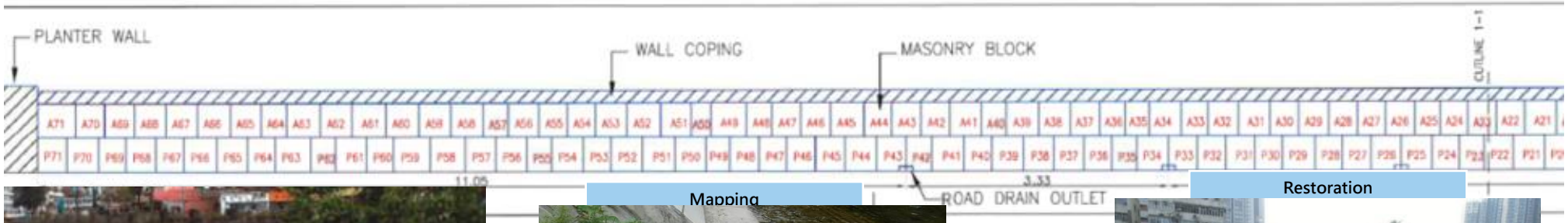
Mock-up Panel of River Bank



Public Aspiration – Preservation of masonry parapet wall

Existing masonry parapet wall will be retained in view of strong public aspiration.

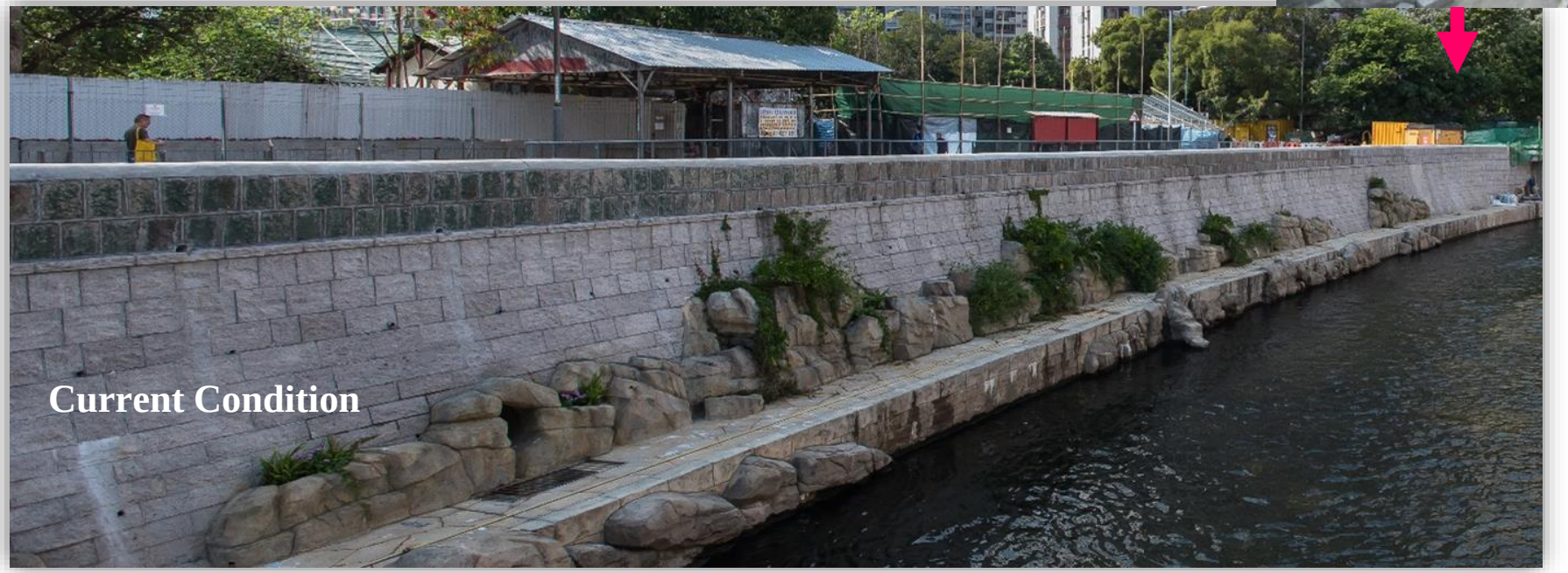
Restoration of Masonry Parapet



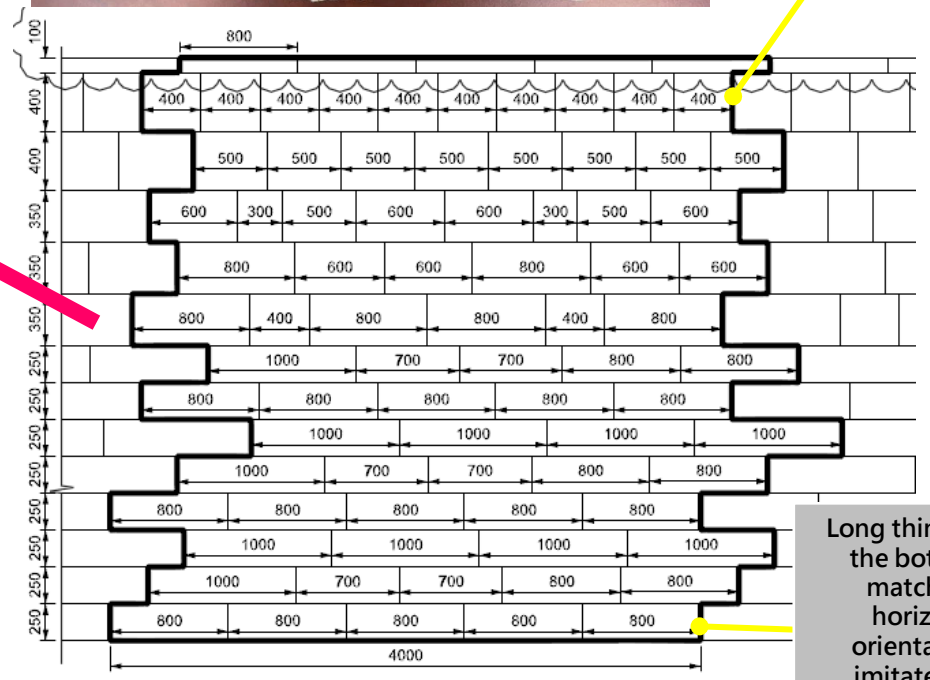
MASONRY WALL PHOTO (B360-B370)

Mapping

Restoration



Granite Wall



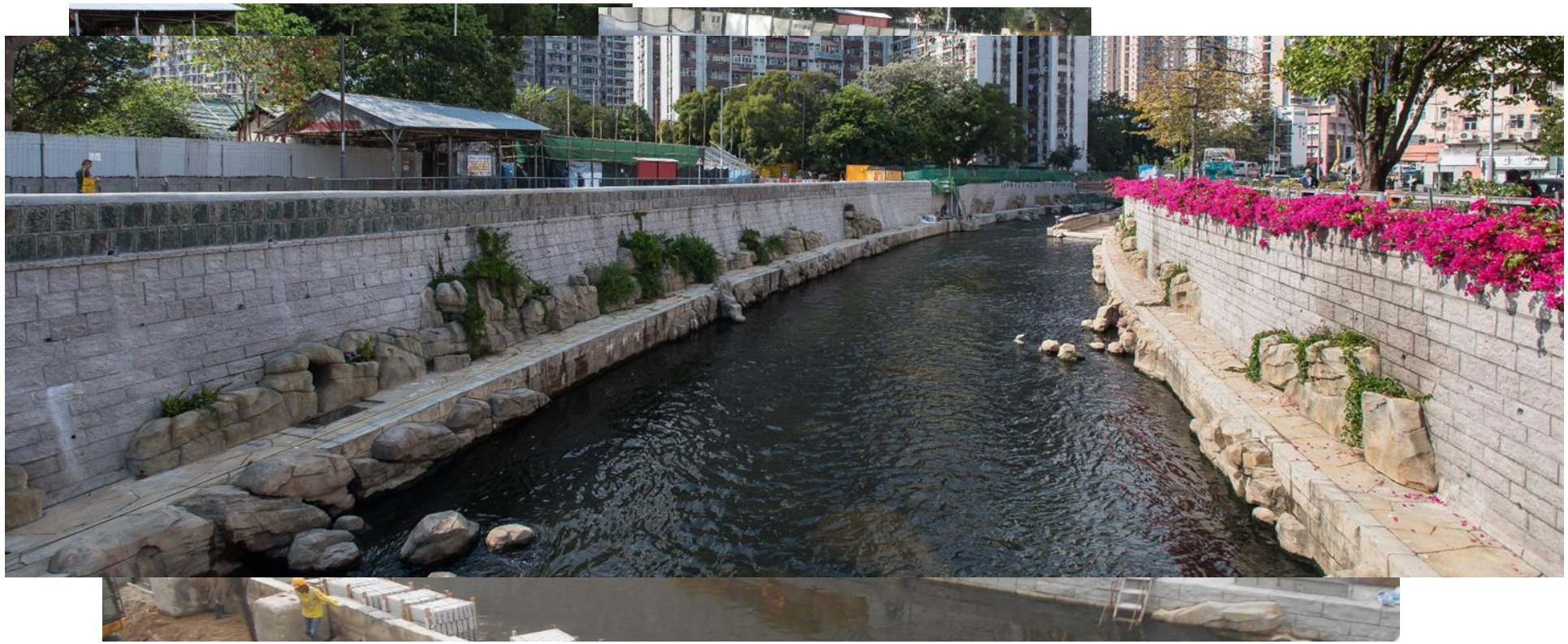
Square blocks on top to match with "vertical manner" of existing masonry blocks

Long thin block at the bottom to match with horizontal orientation of imitated rock

Artificial Rock

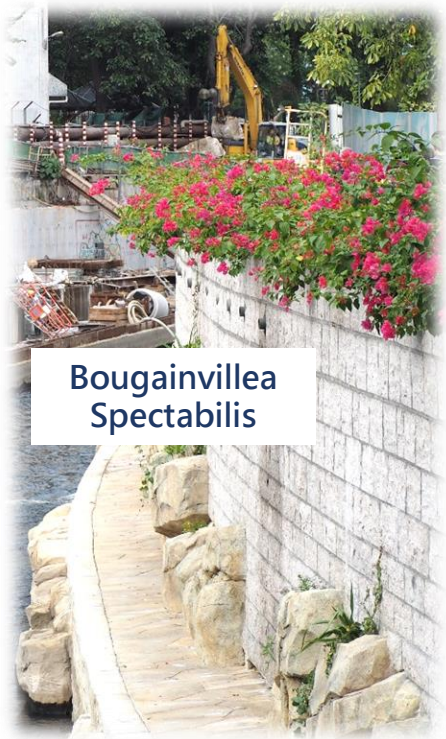
Imitated Rock Mock-up

Current Condition



Green River Corridor Revitalization Elements

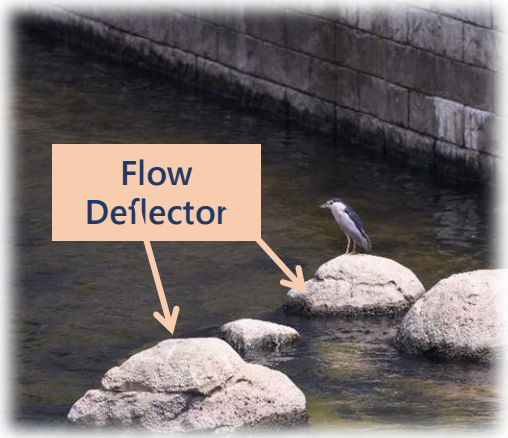
1 Roadside Planter



2 River Bank Landscape

3 Submerged Planter

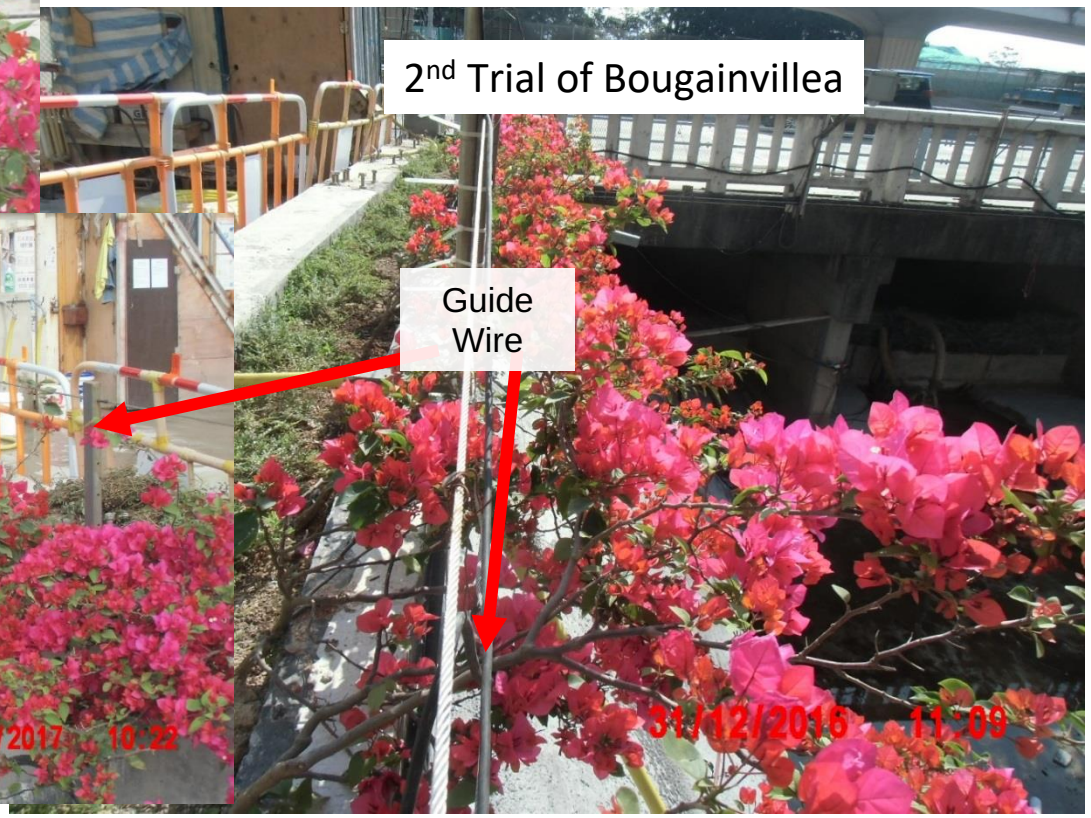
4 Fish Shelter & Flow Deflector



Soft landscape

Roadside Planters

Mature Plants with Fine Twigs were used in the 2nd Trial, with better Landscape effect



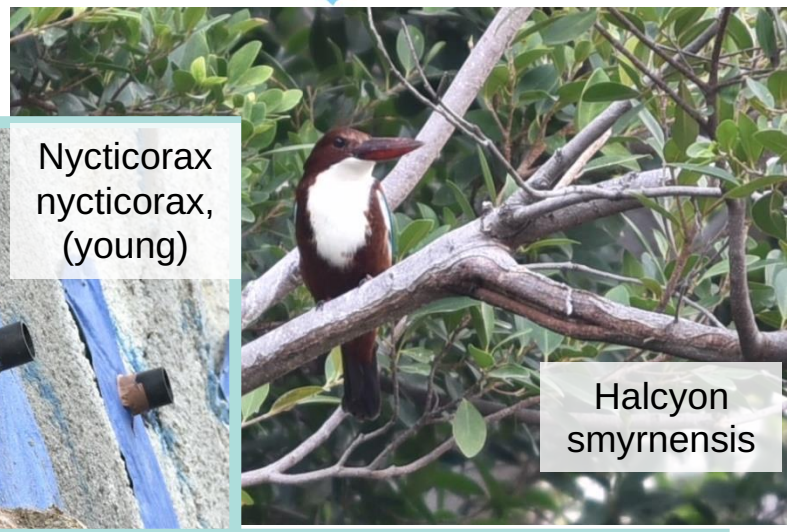
Condition of Roadside Planters

Condition of On-site Mockup Pocket Planters
Pocket Planters

Submerged Planters

Birds Found on Site

Egretta garzetta



Halcyon smyrnensis

Nycticorax nycticorax

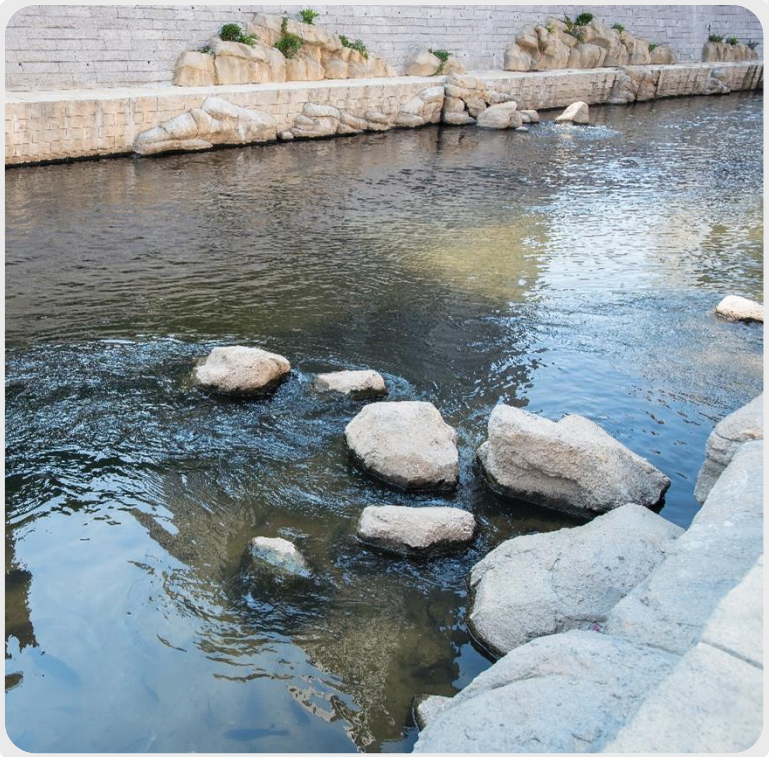
Nycticorax nycticorax, (young)

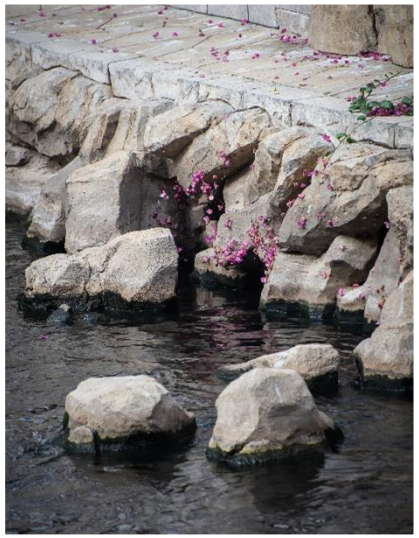
Ardea alba

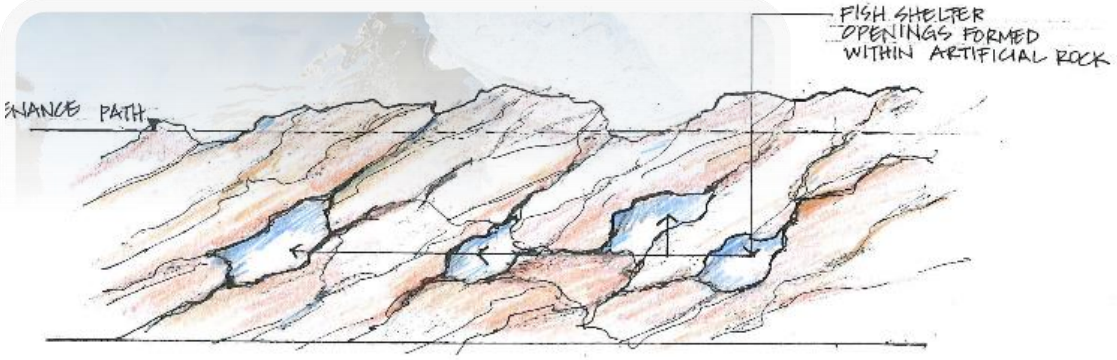
Ardea cinerea

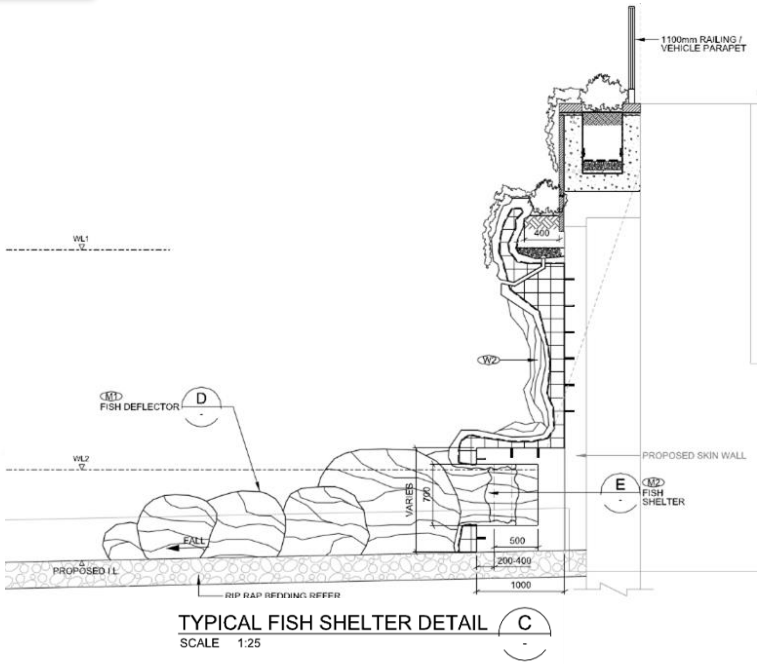
Fishes Found on Site

Fish Shelter and Deflector









Existing View before Works

Kai Tak Nullah

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Thank you!

Acknowledgement to
Atkins China Limited (Hong Kong)

water
NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Design parameters

- Colebrook-White Friction Factor (Ks) = 3mm is applied for both bottom and top portions of existing drainage pipes and box culverts, and the box culverts aligned parallel to the Kai Tak Nullah (Choi Hung Road section)
- Colebrook-White Friction Factor (Ks) = 300mm and 30mm are used for the bottom and top portion respectively for the rehabilitated Kai Tak Nullah (Choi Hung Road section);
- Colebrook-White Friction Factor (Ks) = 1.5mm is used for both bottom and top portions of proposed conventional drain pipes and box culverts,;
- Manning Coefficient (n) = 0.03 is used for proposed grassed channels.

Index	Nullah Surface Type	Location Type	n
A1	Concrete	Bed	0.016
A2	Concrete Bed with Deflectors	Bed	0.025
B1	Artificial Rock	Bank	0.068
B2	PermeableGreen Wall	Bank	0.030
B3	Granite Tiles	Bank	0.025
B4	Patterned Concrete	Bank	0.027
B5	Edge Trailing Planting	Bank	0.030