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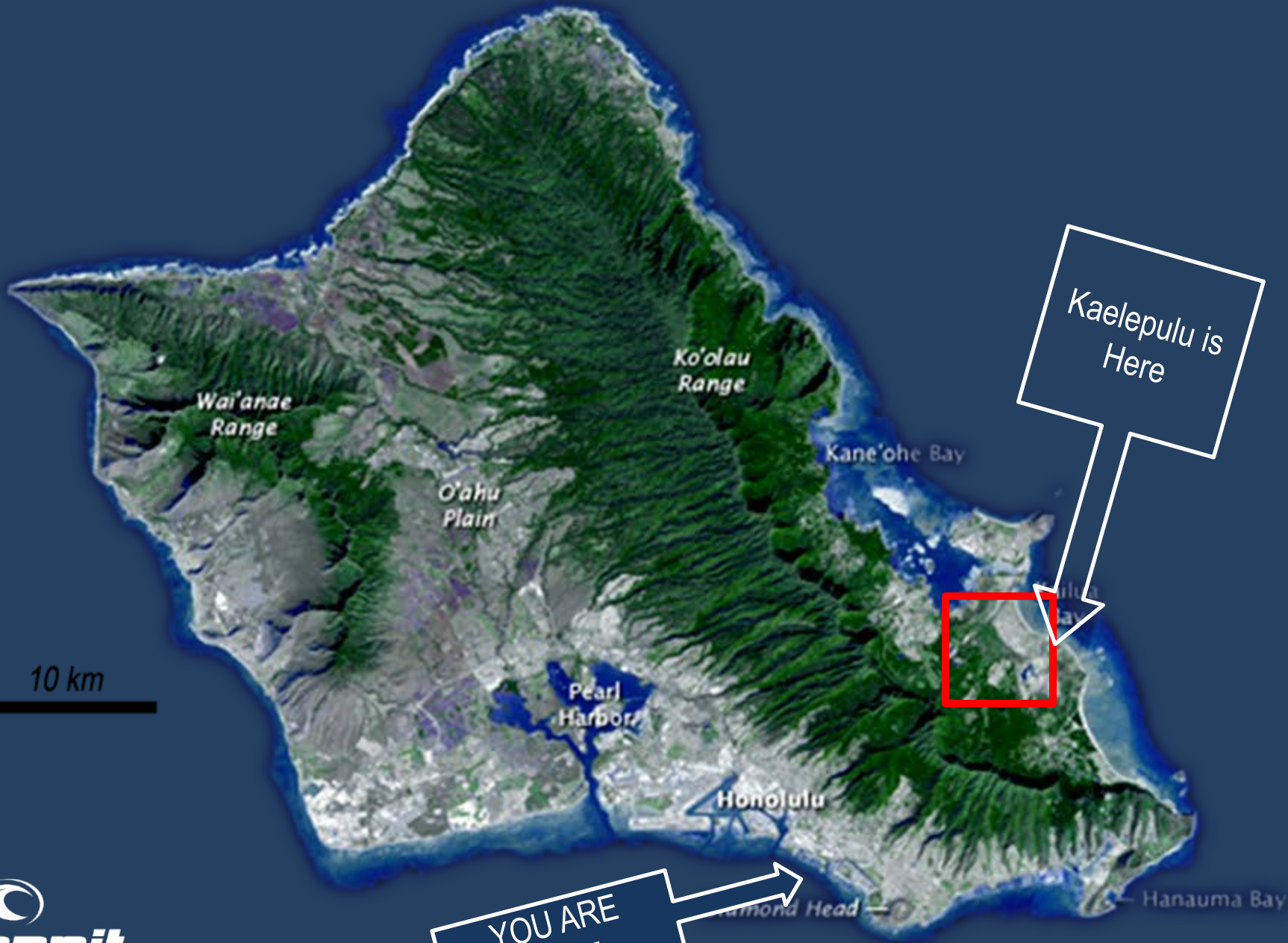
Robert Bourke, Natalie Waters, and Jordon Moniuszko
Water Resource Sustainability Issues on Tropical Islands
December, 2015



oceanit

Estuary Rehabilitation

Stream Flow Restoration to Kaelepulu Estuary



▲
N 10 km

YOU ARE
HERE

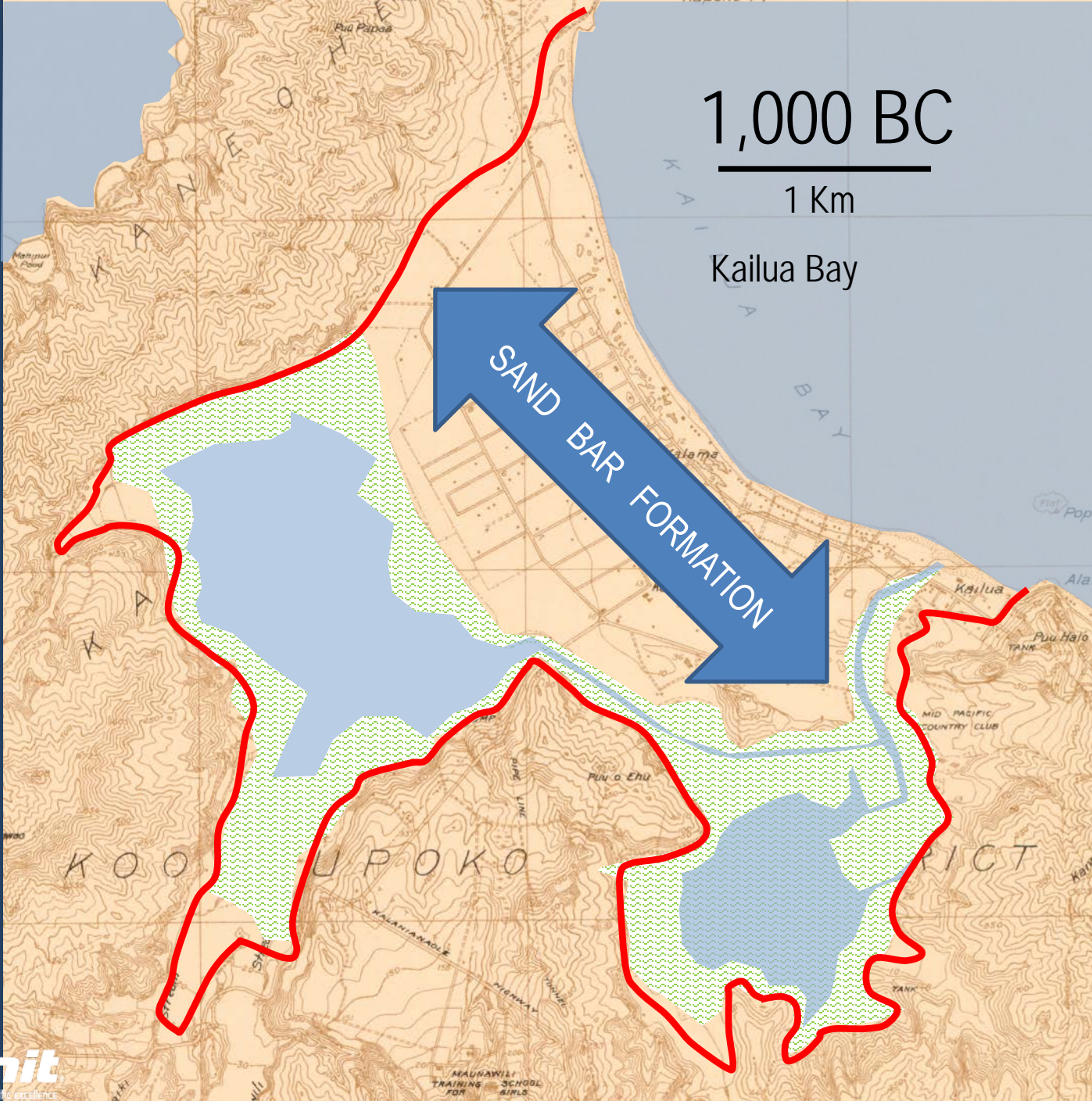
Kaelepulu is
Here

1,000 BC

1 Km

Kailua Bay

SAND BAR FORMATION



1928

1 Km

Kailua Bay

Kawai Nui
Swamp

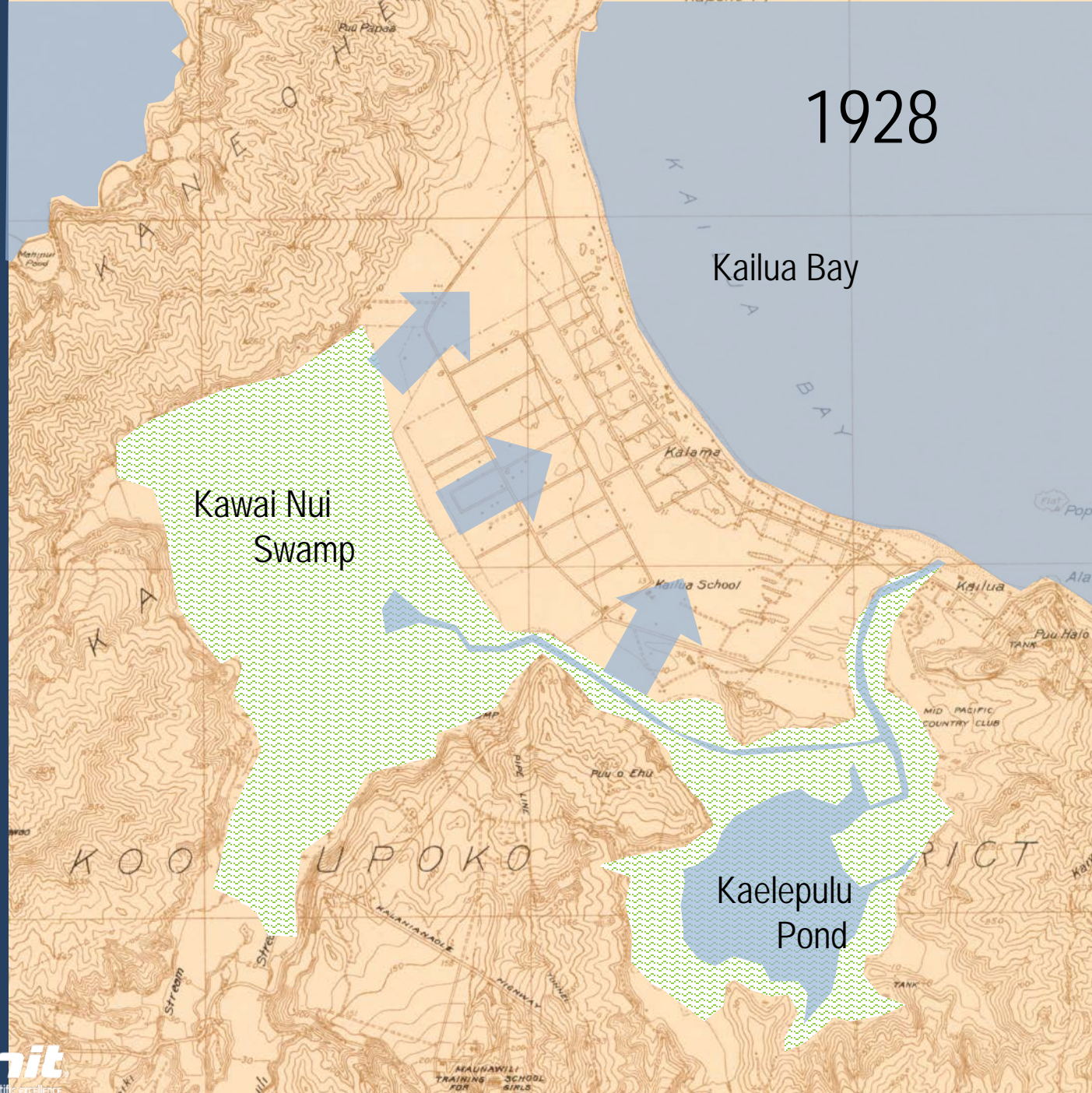
Kaelepulu
Pond

1928

Kailua Bay

Kawai Nui
Swamp

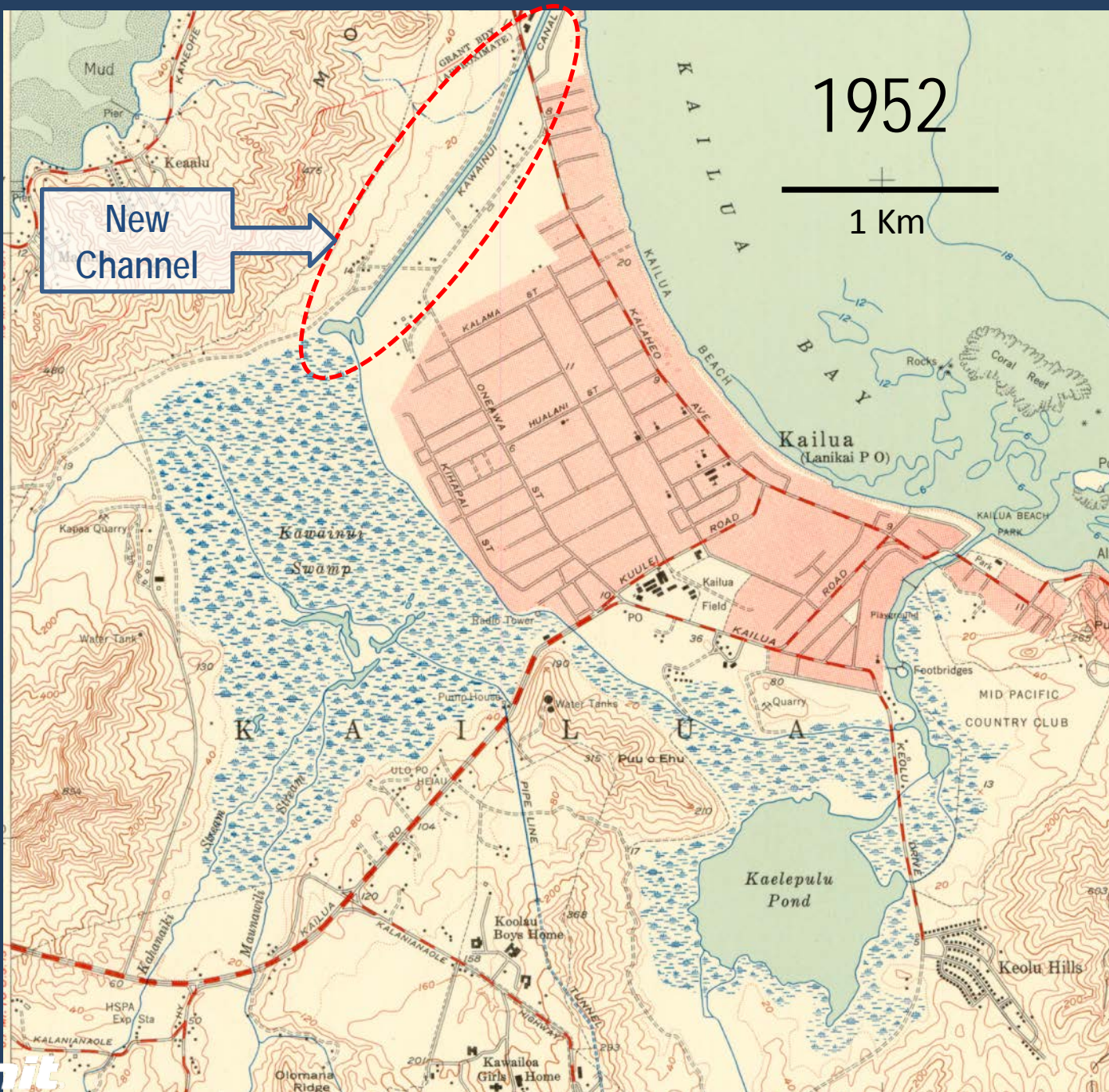
Kaelepulu
Pond

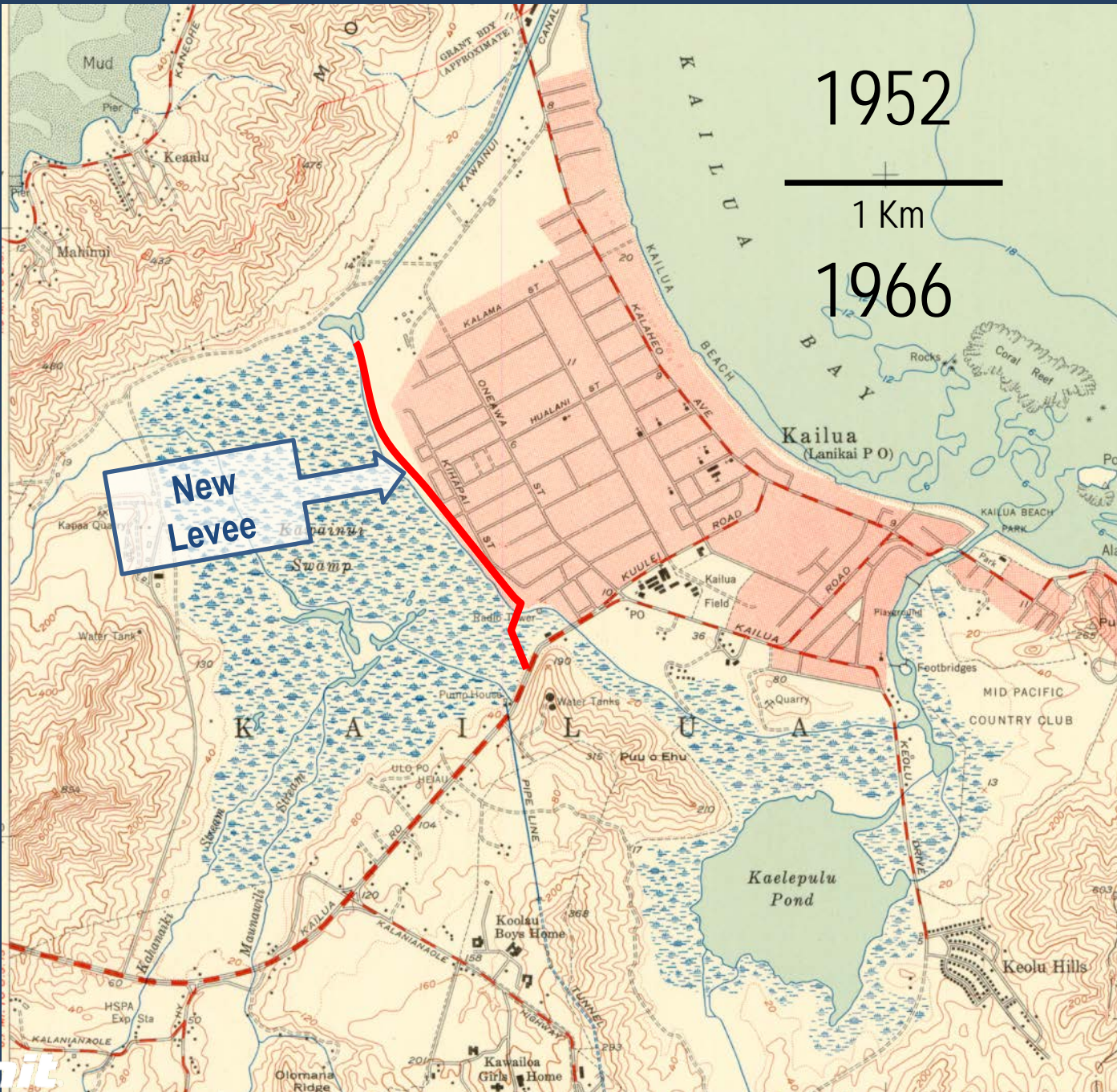


1952

1 Km

New Channel



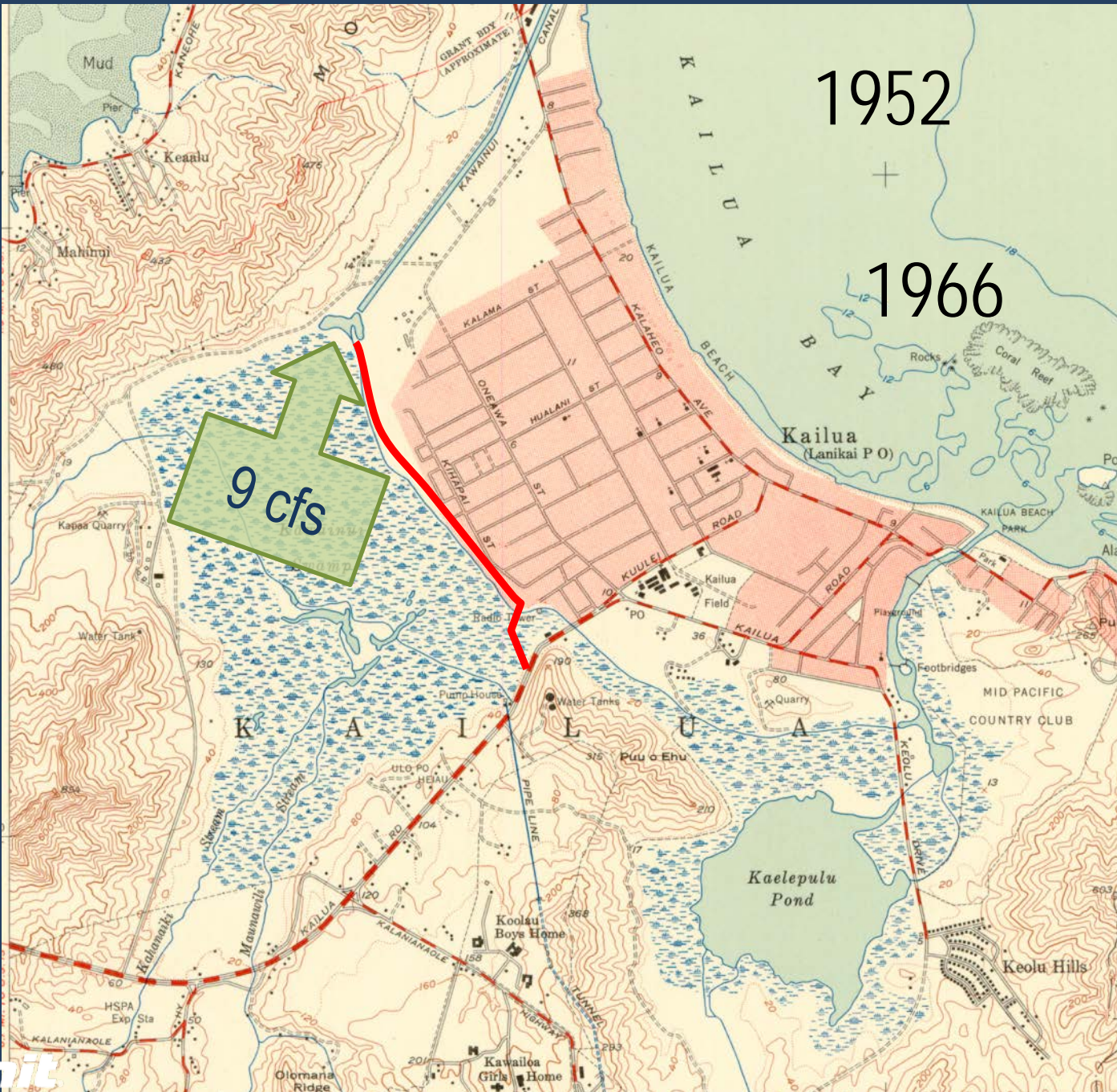


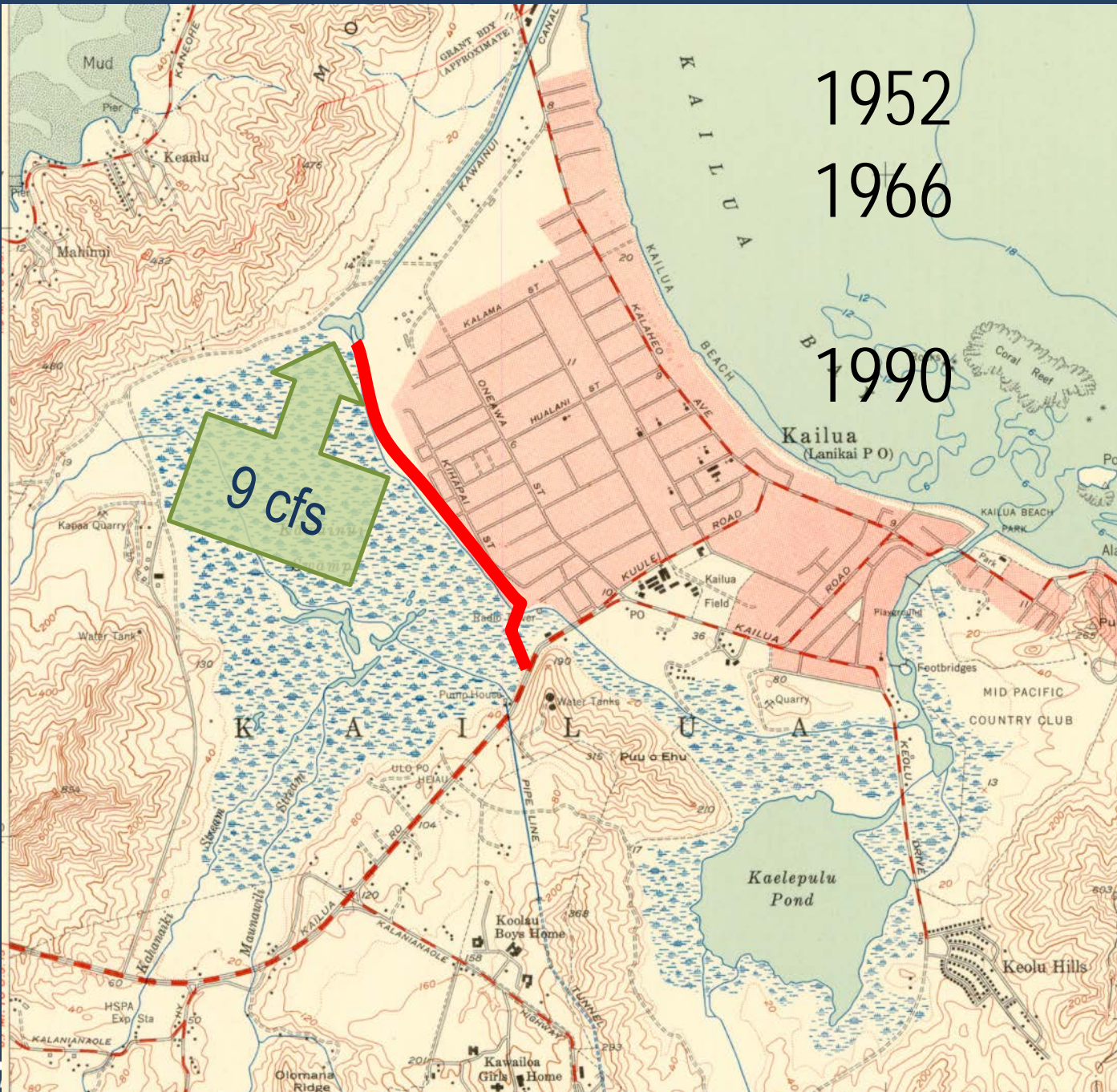
1952

1 Km

1966

New Levee





1952

1966

1990

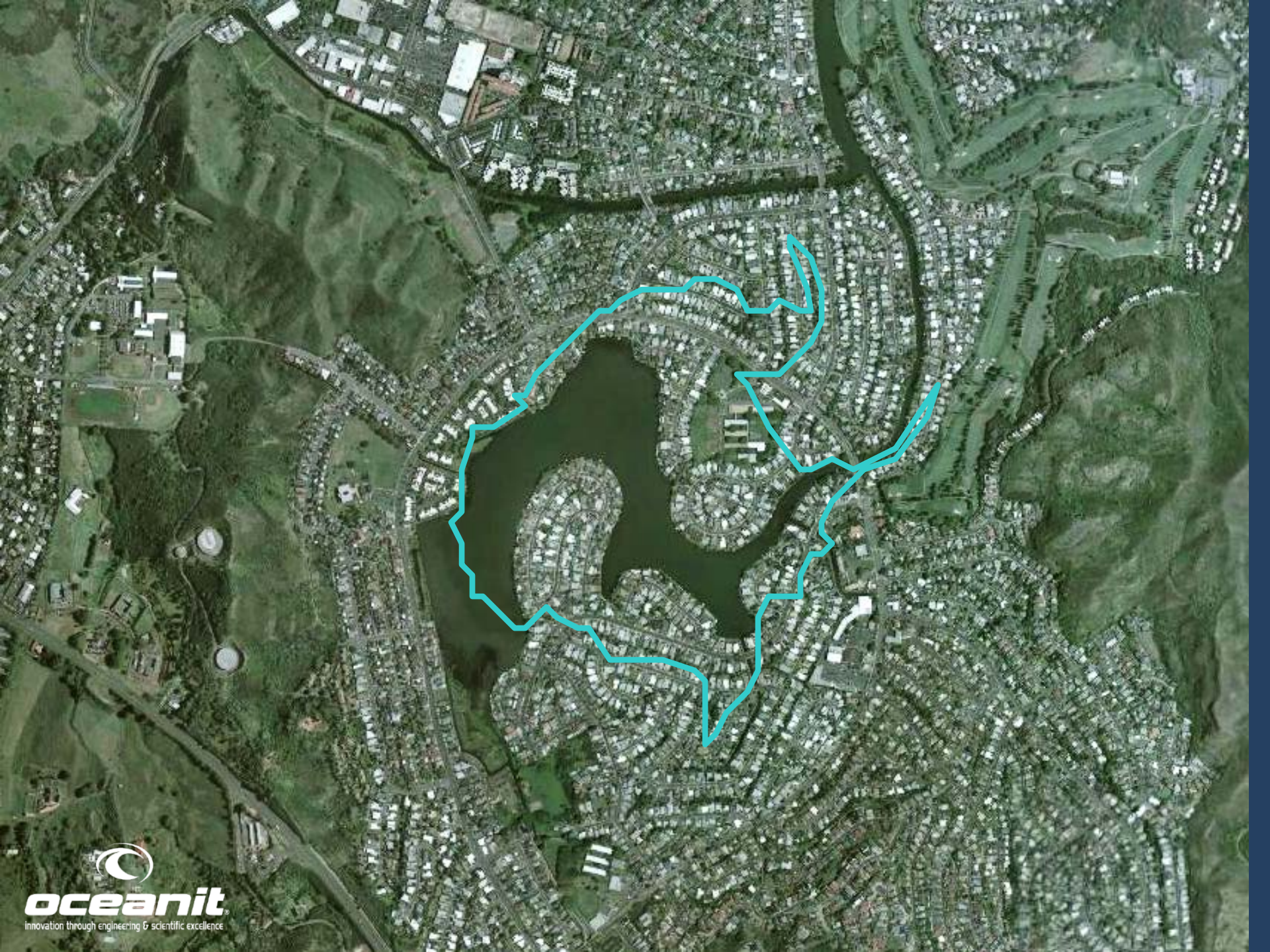
9 cfs



1958

2682

2600



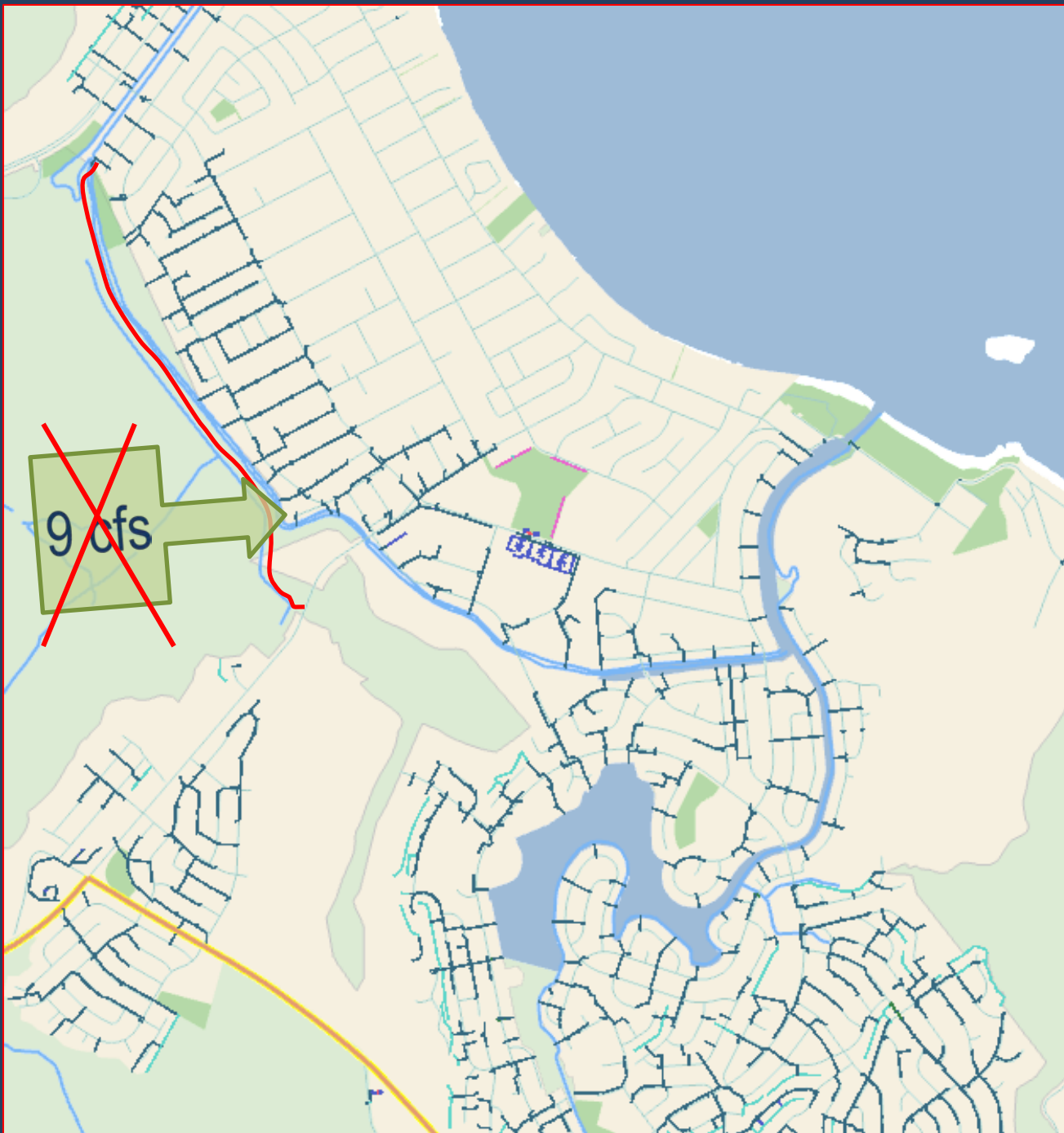




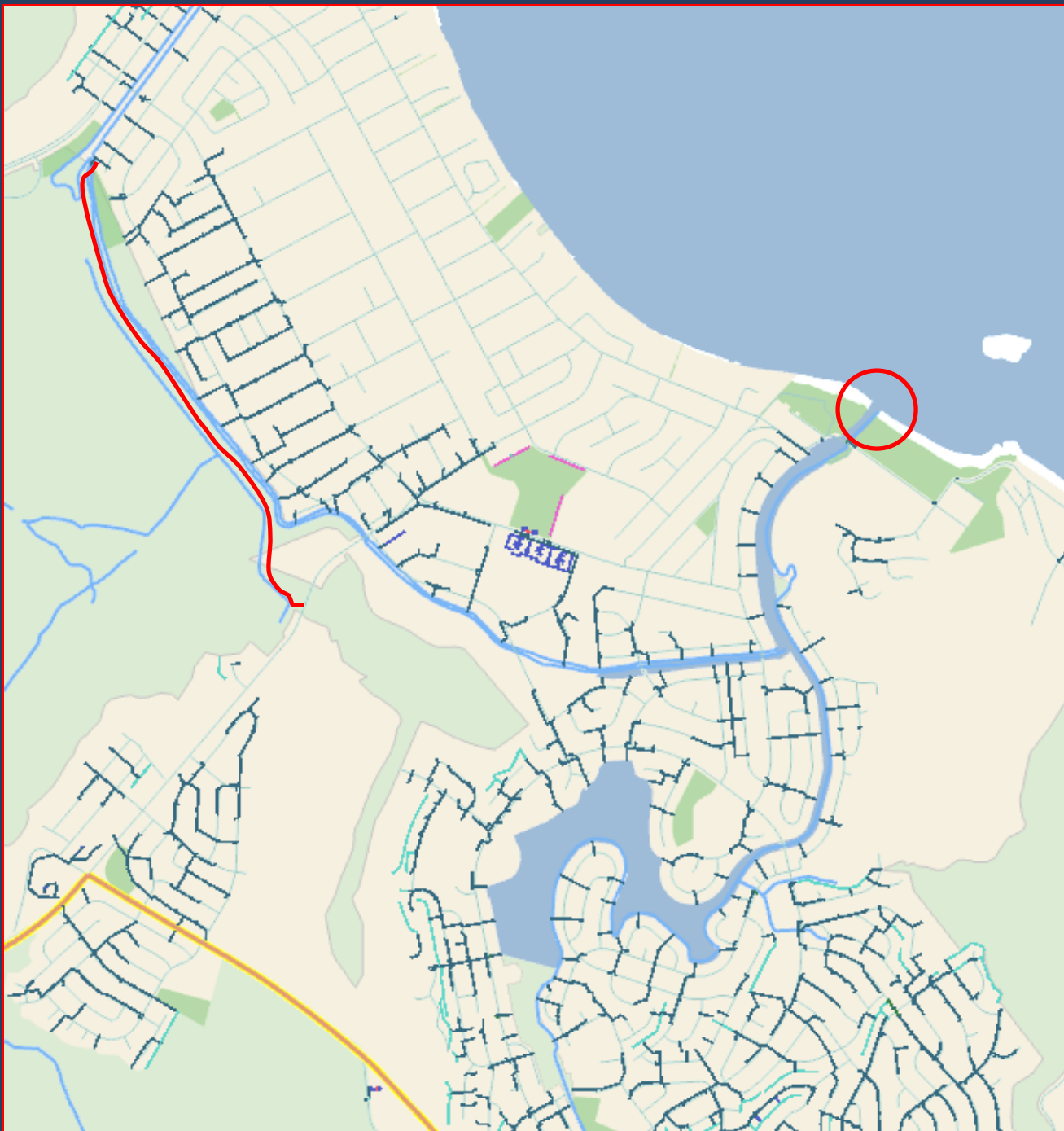




ESTUARY CHALLENGES

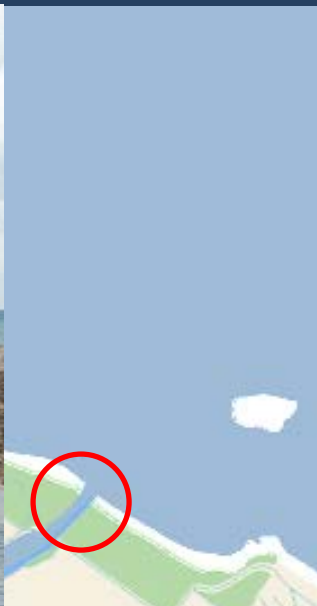


- EXCISED FROM HEADWATER FLOWS
- DECREASED STREAM MOUTH EXCHANGE
- BATHYMETRY CHANGES
- URBAN STORM WATER FLOWS
- INVASIVE SPECIES



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ESTUARY IS ONLY EXPOSED TO TIDAL FLOW ON A PERIODIC BASIS



MANUAL OPENING OF STREAM MOUTH ON ~MONTHLY SCHEDULE BY C&C HONOLULU

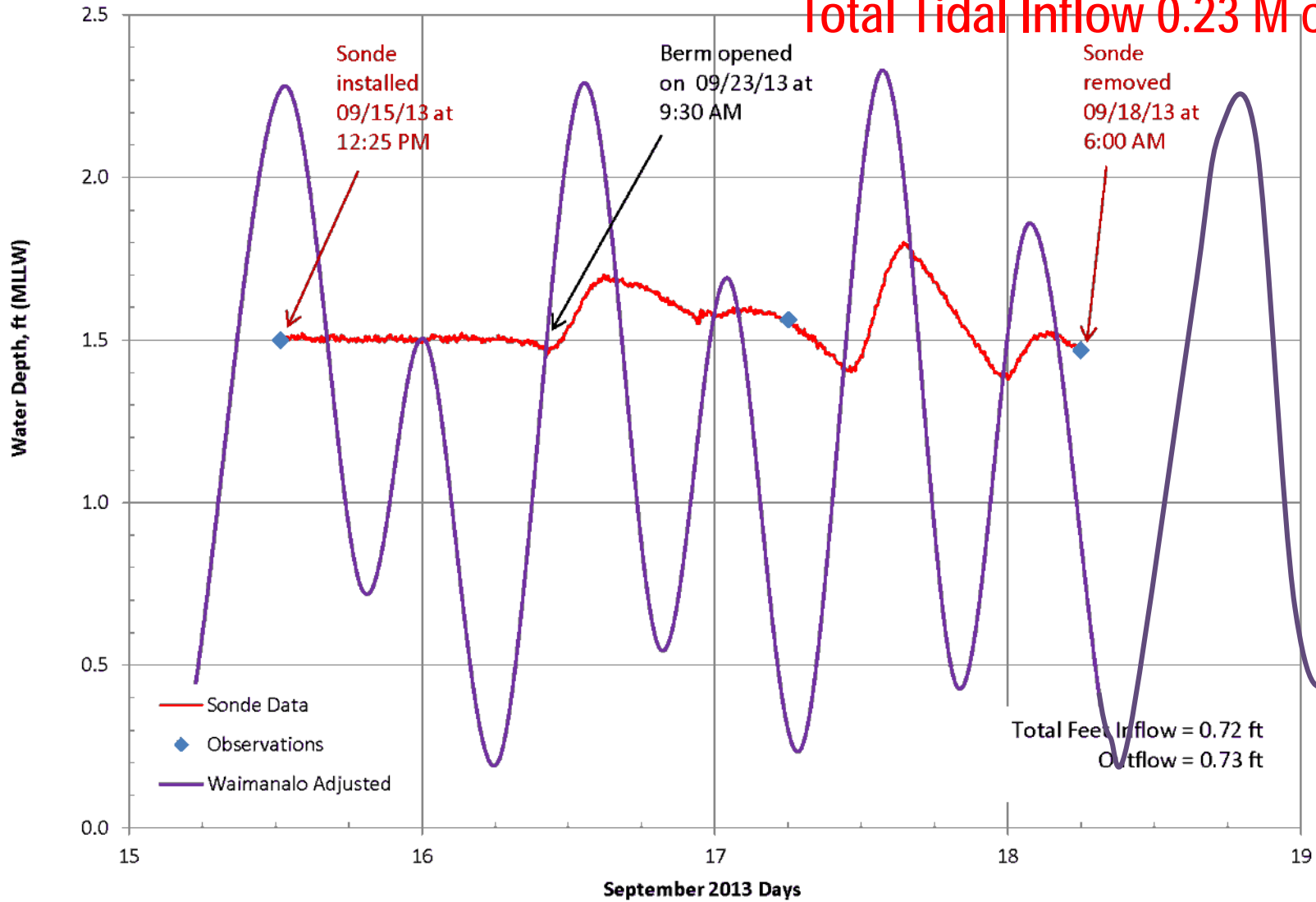




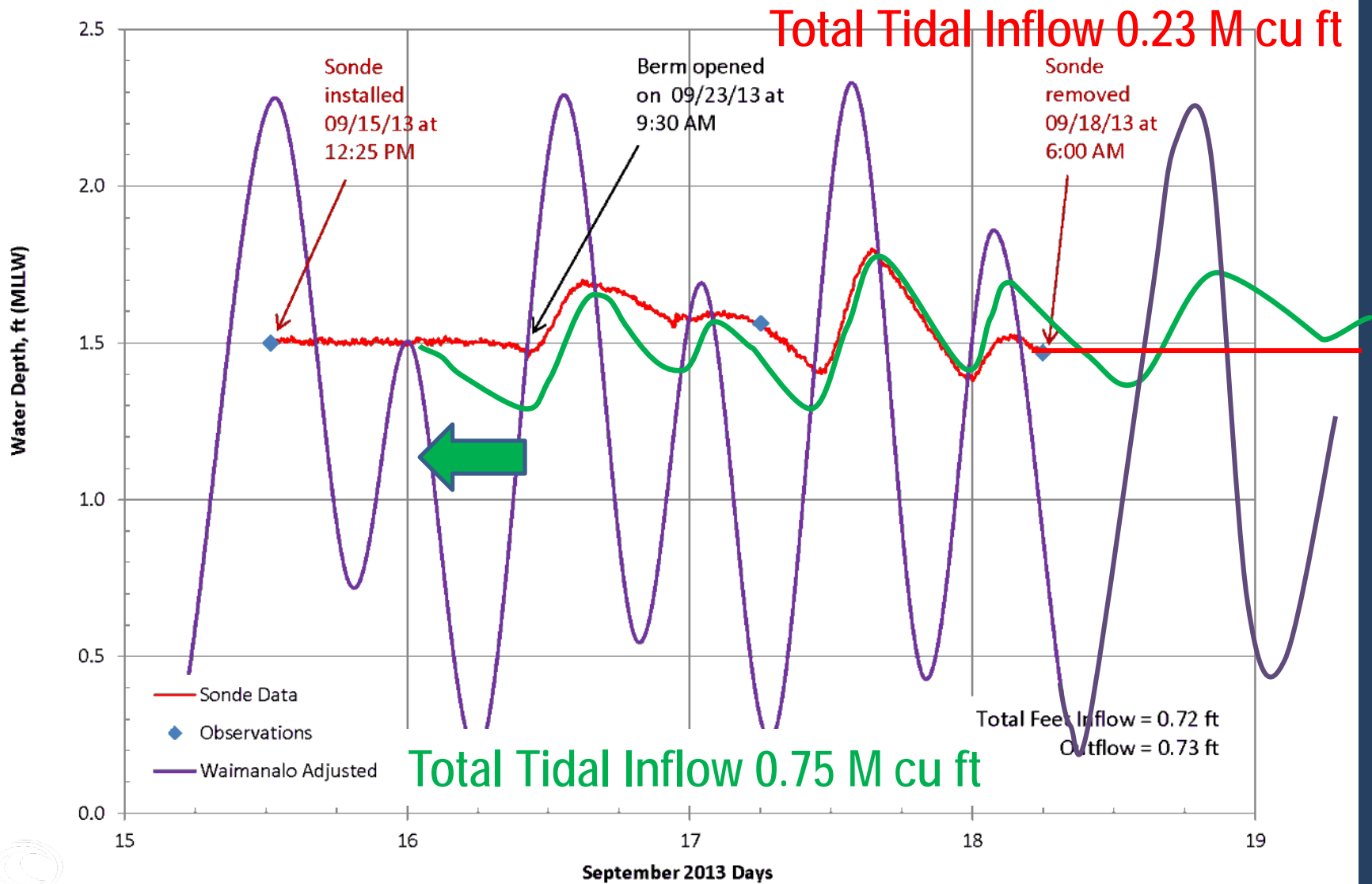


Water Levels in Kaelepulu Stream

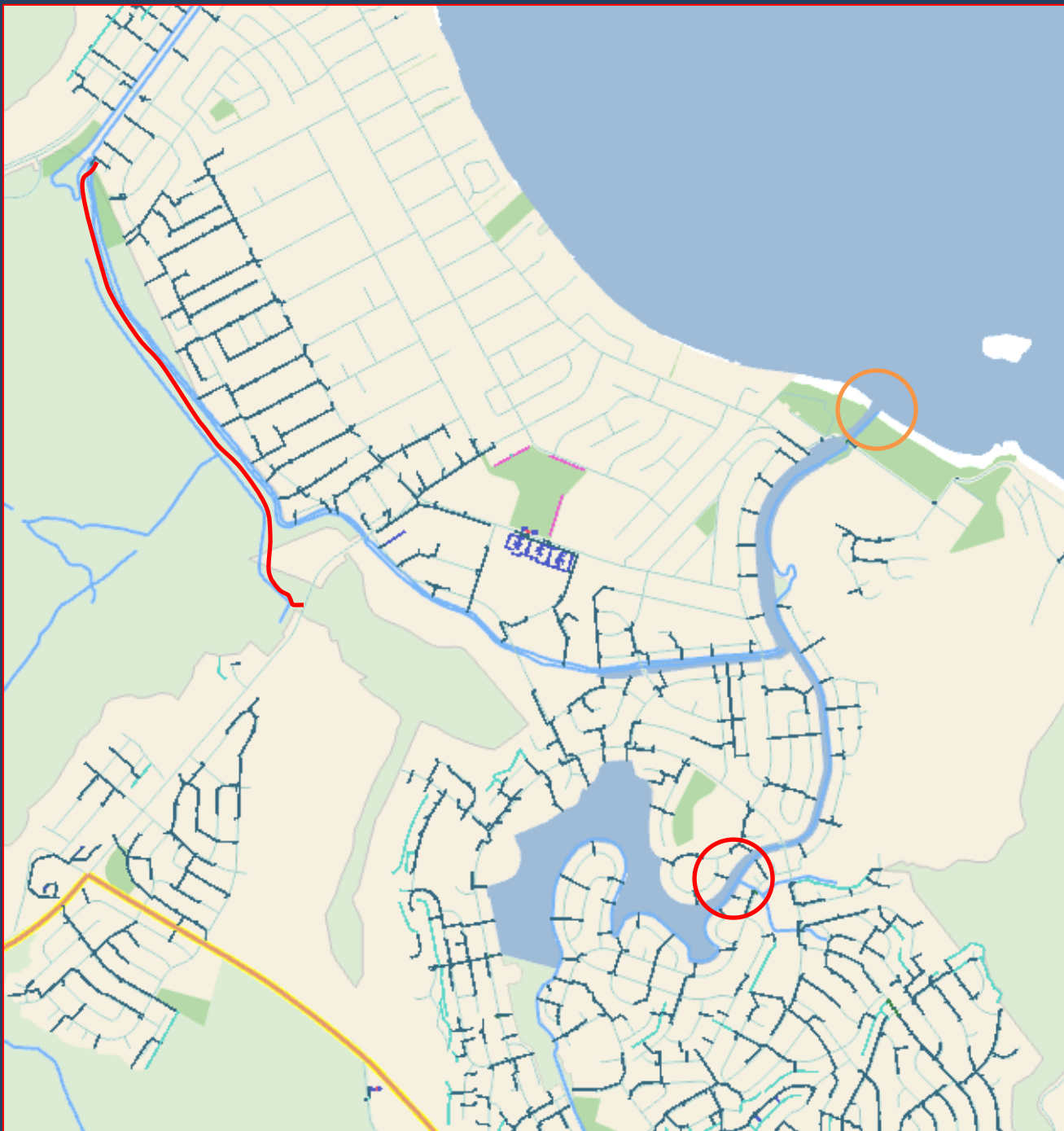
Total Tidal Inflow 0.23 M cuft



Timing of Stream Mouth Opening to Maximize Initial Outflow Results in an Increase of Total Exchange



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SHOALING OF
STREAM
CHANNEL AT
POND
OUTFLOW
INHIBITS TIDAL
FLOW OF SALT
WATER TO THE
POND