



Sustainable Communities  
Sharing Knowledge

stream

Gareth Francis – Opus  
International Consultants  
The Tides of Change – Tauranga Inner  
Harbour Coastal Erosion Study

## Back Ground

- Brought about due to:
  - Instability at Omokoroa
  - Sedimentation through the Inner Harbour
  - Instability in Tauranga
- Three Partners: Same Problem
- Infrastructure and private property at risk
- No legal requirement
- No Policy to act

## WBOPDC Response

- Omokoroa significant erosion issues
  - Causing significant issues
- Other sites too
  - Parks
  - Private
  - Maori land
- Which ones to address first
- Need to Create a policy
  - Address infrastructure and private property

## Towards a Policy

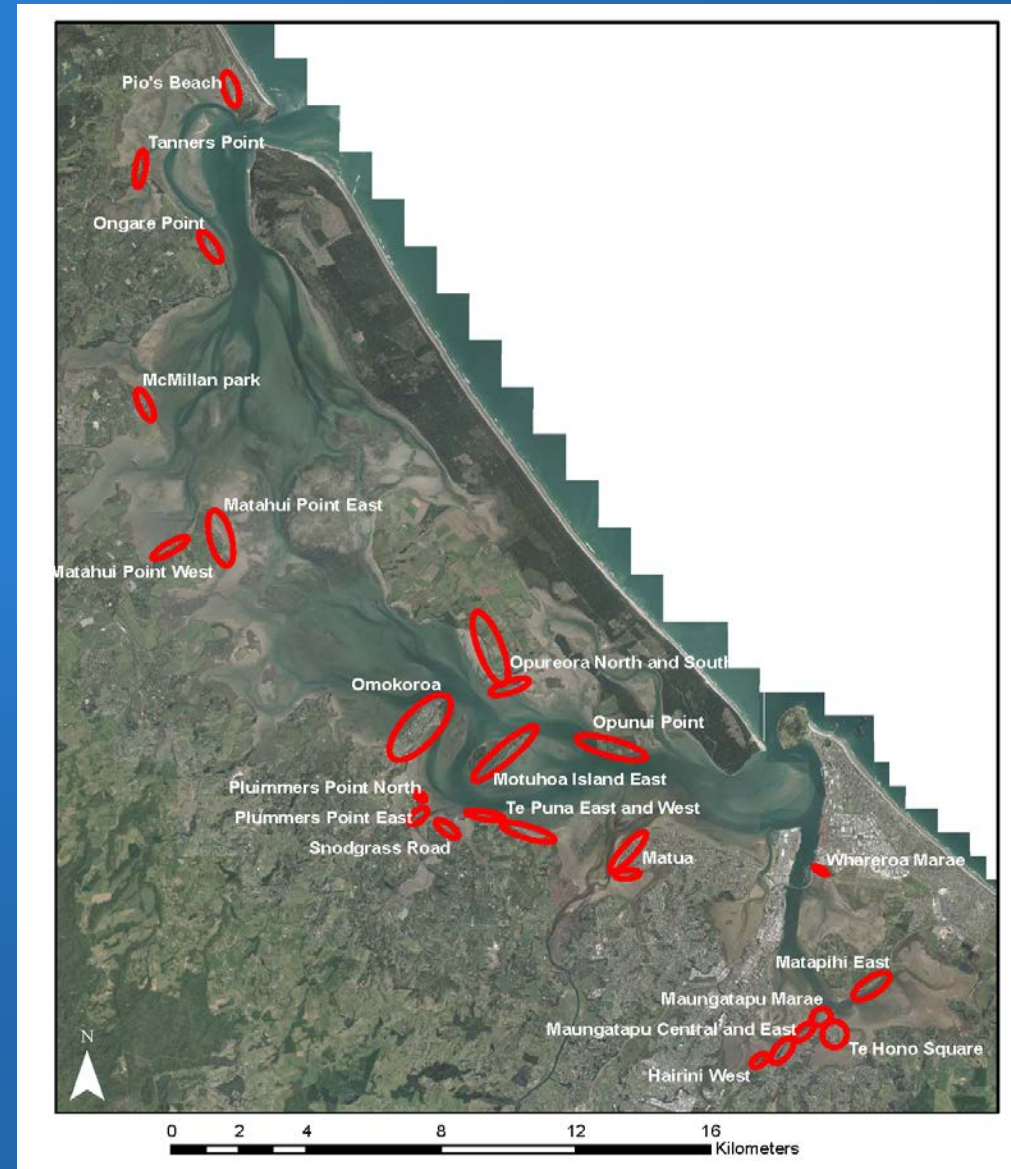
- Collate current information
- Reports from 40 years ago to now
- Create definitive report
- Address
  - Rate of erosion around harbour
  - Risks to property
  - Cost benefit of doing work
  - 100 year event

## Approach

- Best use of previous data/reports
- High-level rapid assessment
- Staged approach
  - Stage 1 – Coastal erosion mechanisms and rates
  - Stage 2 – Costs and benefits
  - Stage 3 - Selection of management options and prioritisation

# Sustainable organisational change through asset management

- Harbour coast line = 250km
- Impracticable to do whole harbour
- 25 sites selected based on known areas of concern and existing data



## Site Characterisation

- Failure type or shore type
  - Function of geology, slope height, failure mechanism
- Rainstorm Impact
  - Duration v intensity
- Wave Power – Based on current understanding
  - Current design level – 1.48m RL (Tauranga Standard Port)
  - 2115 design level – 2.42m RL
- Wave run-up

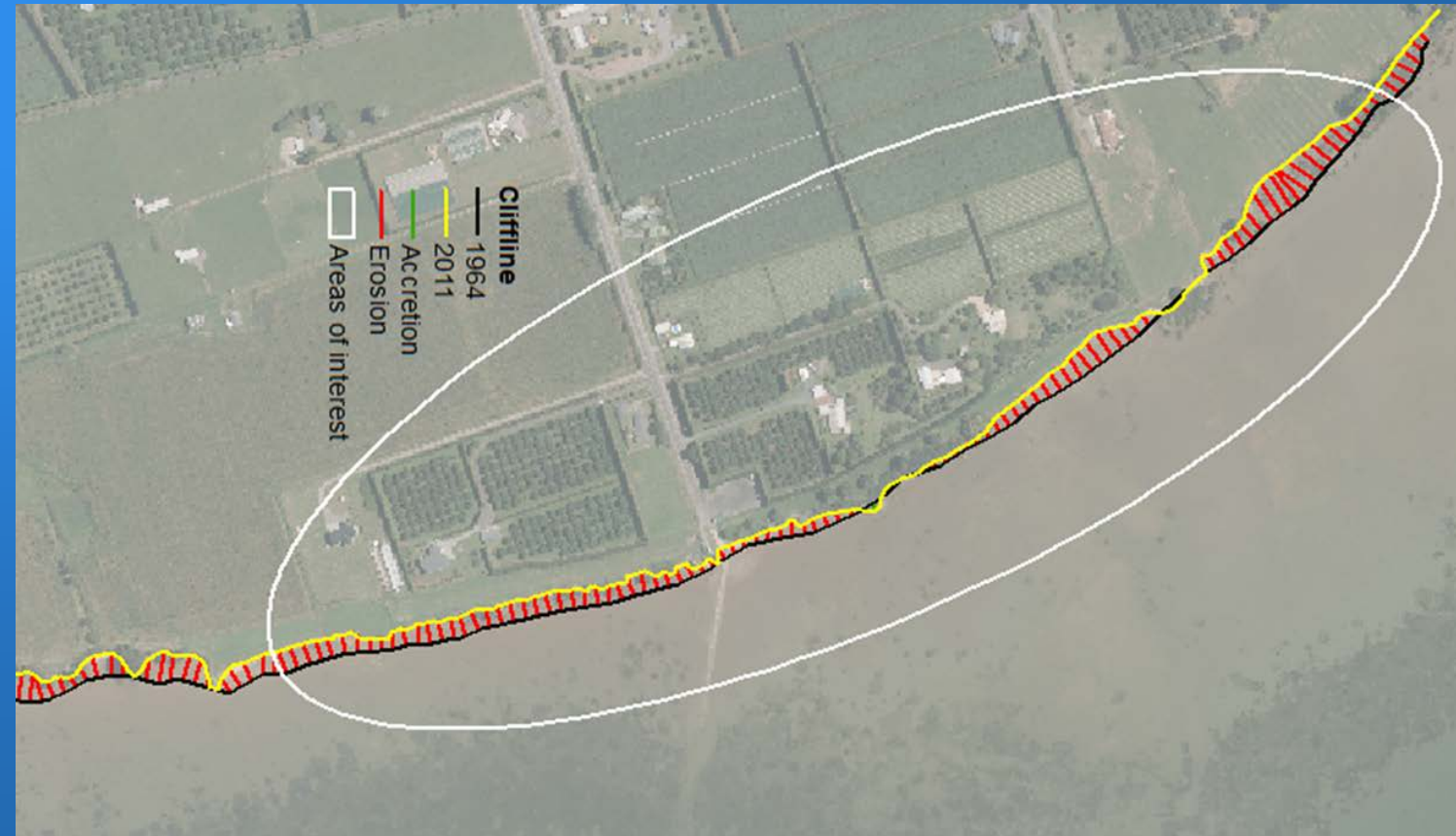
## Development of Erosion Rates

- Use of aerial photography
- Measured differences based on longest time scale
- Adjustments
- Rate of erosion per year



## Erosion Rates

- McMillan Park



## Erosion Estimates developed for:

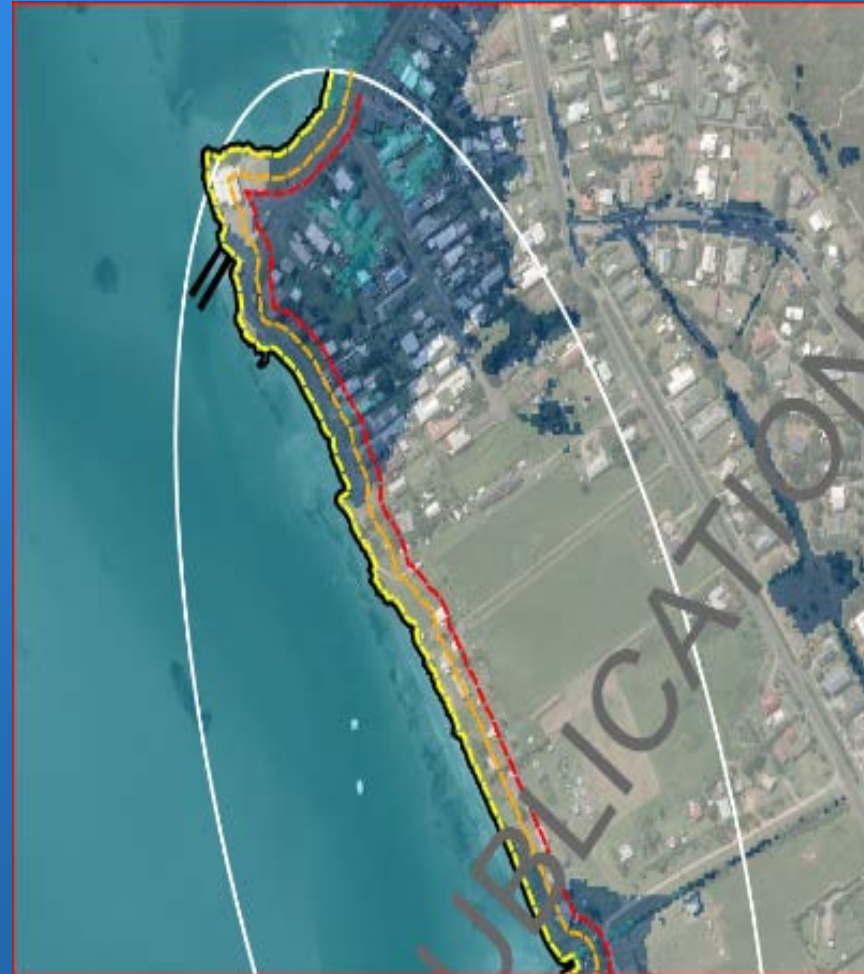
- Short term 20 year period – current erosion rate
- Long term 100 year period – current erosion rate
- Long term 100 year with climate change
  - Based on current understanding climate change equates to rise in sea level of approximately 1m.

## Erosion Extent Forecasts – McMillan Park



## Inundation Risk

- Sea level rise of 1m will cause significant flooding
- Dominant in some areas



## Risk Designation

- 3 categories (H,M,L)
- Based on financial loss within erosion zone
- Does not consider:
  - Flood risk
  - Cultural values
  - Environmental values
  - Heritage values



## Risk Mapping – McMillan Park



## Risk Mitigation Measures

- Coastal erosion measures
  - Timber seawall, Armoured revetment, Groynes, submerged breakwaters
- Slope stability measure
  - Essentially drainage driven

## Costs

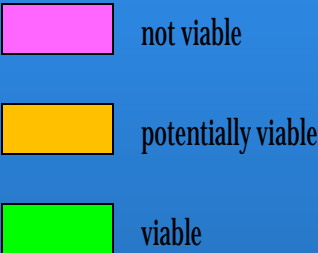
- Capital cost
- Operational and maintenance
- Present value and discounting

## Whole life costs

Indicative cost of measures	Design and consents	Works cost	Maintenance		Total PV Cost	Rounded PV Cost
	(\$k/100m)	(\$k/100m)	annual (\$k/100m)	PV over 100yrs (\$k/100m)	(\$k/100m)	(\$k/100m)
Timber seawall	50	250	13	169	469	<b>470</b>
Rock armour revetment (sheltered)	20	100	5	67	187	<b>190</b>
Rock armour revetment (exposed)	60	300	15	202	562	<b>570</b>
Groynes (rock)	70	350	18	236	656	<b>660</b>
Submerged breakwaters (sheltered)	10	50	3	34	94	<b>100</b>
Mangrove planting	6	30	2	20	56	<b>60</b>
Cliff top drainage	10	50	3	34	94	<b>100</b>



## Financial Viability



Financial viability of capital works options by site	PV damage (\$k)	Timber seawall	Rock armour revetment (sheltered)	Rock armour revetment (exposed)	Groynes (rock)	Submerged breakwaters (sheltered)	Mangrove planting	Cliff top drainage
	PV Cost (\$k)	470	190	570	660	100	60	100
Pio's Beach	117	not viable	potentially viable	not viable	not viable	viable	viable	viable
Tanners Point	220	not viable	viable	potentially viable	potentially viable	viable	viable	viable
McMillan Park	70	not viable	not viable	not viable	not viable	potentially viable	viable	potentially viable
Matahui Point West	82	not viable	not viable	not viable	not viable	potentially viable	viable	viable
Matahui Point East	38	not viable	not viable	not viable	not viable	potentially viable	potentially viable	potentially viable
Omokoroa West	325	potentially viable	viable	not viable	not viable	viable	viable	viable
Omokoroa East tip	28	not viable	not viable	not viable	not viable	potentially viable	potentially viable	potentially viable
Omokoroa East Mid	317	potentially viable	viable	not viable	not viable	viable	viable	viable
Plummers Point Road – North	20	not viable	not viable	not viable	not viable	not viable	potentially viable	not viable
Plummers Point Road – East	23	not viable	not viable	not viable	not viable	not viable	potentially viable	not viable
Snodgrass Road	321	potentially viable	viable	not viable	not viable	viable	viable	viable
Motuhoa Island East	4	not viable	not viable	not viable	not viable	not viable	not viable	not viable
Opunui Point	1	not viable	not viable	not viable	not viable	not viable	not viable	not viable
Opureora	39	not viable	not viable	not viable	not viable	potentially viable	potentially viable	potentially viable
Matua	653	viable	viable	viable	potentially viable	viable	viable	viable
Hairini West	109	not viable	potentially viable	not viable	not viable	viable	viable	viable
Maungatapu West	364	potentially viable	viable	not viable	not viable	viable	viable	viable
Maungatapu Marae	192	not viable	viable	not viable	not viable	viable	viable	viable
Matapihi East	16	not viable	not viable	not viable	not viable	not viable	potentially viable	not viable
Whareroa Marae	19	not viable	not viable	not viable	not viable	not viable	potentially viable	not viable
Te Puna	32	not viable	not viable	not viable	not viable	potentially viable	potentially viable	potentially viable

## Prioritisation

Location	Risk - 20 yr	Risk - 100 yr	PV Damages (\$k/100m)	Priority
Pio's Beach			117	9
Tanners Point			220	7
McMillan Park			70	11
Matahui Point West			82	10
Matahui Point East			38	13
Omokoroa West			325	4
Omokoroa East tip			28	15
Omokoroa East Mid			317	6
Plummers Point Road – North			20	-
Plummers Point Road – East			23	-
Snodgrass Road			321	1
Motuhoa Island East			4	-
Opunui Point			1	-
Opureora			39	12
Matua			653	2
Hairini West			109	8
Maungatapu West			364	3
Maungatapu Marae			192	5
Matapihi East			16	-
Whareroa Marae			19	-
Te Puna			32	14

QUESTIONS?