

CRITICAL OPEX SPEND - Authorisation Request

Kapowairua to Tapotupotu Track (part of Te Paki Coastal Track)

Context / Purpose

What is the critical work proposed to remediate Cyclone damage	Damaged section of boardwalk crossing the Waitahora Lagoon. Engineer inspection to understand damage, assess all the structure and others that were submerged while lagoon was flooded and options to reinstate. Remediation options required for section that was damaged to prevent likelihood of occurring again. (Note this request only covers assessment & remediation recommendation not rebuild).
DOCM Link to Cyclone Damage Assessment	
Recovery category?	Reinstate / Retreat / Reimagine

Procurement Requirements / Financials

What are the Key Services or Material Components to be purchased?	Item / Service	Internal Personnel hours required (state No. hrs)	Staff Capacity Allowance Confirmed Y/N	Proposed Supplier External	Indicative Date of Spend	Est. Cost (External Supplier) excl GST
	Engineer Assessment, Options Report	40	y	Frame Group	By g30 June 2023	\$7,600
TOTAL						\$7,600

Benefits

List potential benefits that will be realised with the successful implementation of the project / works remediation. Key strategic drivers / alignment	<ul style="list-style-type: none"> • Track to thirdly reporting standard. • Safety of visitors and staff • Visitor experience is to visitor expectations. <ul style="list-style-type: none"> ➢ 90% of New Zealanders' lives are enriched through connection to our nature and heritage. ➢ 90% of visitors rate their experiences on public conservation lands and waters as exceptional. ➢ 90% of New Zealanders think the impacts of visitors on public conservation lands and waters are very well managed.
--	---

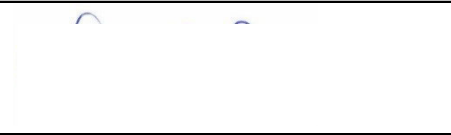
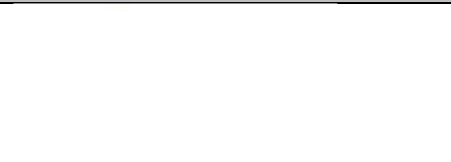

Funding

Proposed Funding Request	FY 22/23 May	FY 22/23 June	Total
Operating / OPEX	\$7,600.00		\$7,600.00
Operating Contingency	\$760.00		\$760.00
TOTAL OPEX	\$8,360.00		\$8,360.00

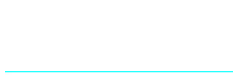
Assurance – Planners, Senior Visitor Advisor, Senior Heritage Advisor or BIO Technical Advisor

- ✓ Have you spoken to the relevant technical advisor about this work and sought the assurance?
- ✓ Have you spoken to the relevant Planner?

Endorsement – Operations Manager; Regional Planning Manager; Business Accountant

Name	DOC Title	Signature	Date
Meirene Hardy-Birch	Operations Manager		22/5/23
Comments:			
Name	DOC Title	Signature	Date
Catherine Munro	Regional Planning Manager		22/5/23
Comments:			
Name	DOC Title	Signature	Date
Angelika Thorn	Business Accountant		22/05/23
Comments:			

Approver – Regional Director of Operations

Name	DOC Title	Signature	Date
Sue Reed-Thomas	Director Operations		24/5/23
Comments:			

Date: 28th March 2024

To: Te Hiku Conservation Board

CC: Phelan Pirrie and Sue Reed Thomas

From: Meirene Hardy-Birch

Subject: Kaitaia District, Operations Manager Report to Te Hiku Conservation Board

1. Place – Manawataawhi, Te Paki

Te Rerenga Wairua infrastructure challenges

In early May 2023, Cape Reinga was hit by a weather bomb - a few months after Cyclones Hail and Gabrielle had been through. There were massive downpours of rain in a very short period which created flooding throughout the area. Resulting in significant damage including road slips, culvert damage, track damage, and a slip that took out part of the viewing area around the iconic lighthouse at Cape Reinga/Te Rerenga Wairua and the closure of this iconic site and associated tracks and camps.



Te Rerenga Wairua works site



Engineering assessments were completed within a week, which enabled the track to partially reopen while plans were made to undertake repairs. The inspections identified three areas of substantial work that needed immediate attention: Cape Reinga/Te Rerenga Wairua, Tapotupotu, and Te Paki Stream Roads. Cases were immediately put to the Cyclone Recovery Taskforce to access the budget to get work underway.

A local iwi contractor was brought in to do further engineering design and undertake repair work. Staff worked with the Procurement team to get contracts and exemptions in place as quickly as possible so work could start before further damage could occur since more rain was falling. Part of the work was to future-proof the sites by adding improved water control measures.

The engineers identified that water had accumulated and created saturated soil which caused the slip to the side of the lighthouse as per the photos. The area had been previously identified as a potential slip problem area and with the extreme volumes, it was enough to cause the slip.

The volume was also impacted by water coming off the walking track, and that volume and force only increased the pressure. As a result, new cut-off drains and grates were introduced to the track to alleviate the likelihood of this occurring again in the future.

The slip itself was cleaned up and drainage metal, with fill, was added into stepped/benched areas as per the engineers' design. A Geo mat was placed under the metal and fill, on top of the benched areas before compaction took place.

Once the groundworks were signed off, the stone wall was reconstructed on foundations closer to the lighthouse which has a rock base and should not be a concern in the future. The stone wall along the track was also extended to ensure that people stayed on the designated track.

The work was completed in early December 2023 and the site - which sees approximately 250,000 visitors annually - was fully reopened before the busy Christmas period.

2. Place – Parengarenga, Aupouri, Kaimaumau, Karikari Kaimahi learning about Coastal Dune Restoration

This year I resourced 16 kaimahi from across Te Hiku to attend the Coastal Restoration Trust of New Zealand annual conference. Held at Maketū marae in Kāwhia from 20 to 22 March and was co-hosted by Te Taiao o Kāwhia Moana and Onepu Charitable Trust.

The purpose of the annual conference is to bring together the knowledge, experience, and up-to-date research of coastal restoration. It provides opportunities for local groups to benefit from the conference – and there is also plenty of opportunity for local businesses and organizations from around the country to sponsor the event and be involved.



Maketū marae in Kāwhia



Kaimahi learning about pingao



Kaimahi learning about dunes

Some of the highlights of the conference include:

- Inspired our local communities to work more within the coastal restoration space.
- Attendees experienced site visits to a range of coastal ecosystems on the western Waikato Coast.
- Networked with like-minded individuals who work within the coastal environment.
- Kaitiaki o Tokerau showcased their mahi within the coastal space during Regional Round-up Presentations.
- One member of the Kaitiaki o Tokerau participated in a public forum panel discussion regarding Vehicles on Beaches.
- Listened to korero on climate change, sea level rise, and wave climate.

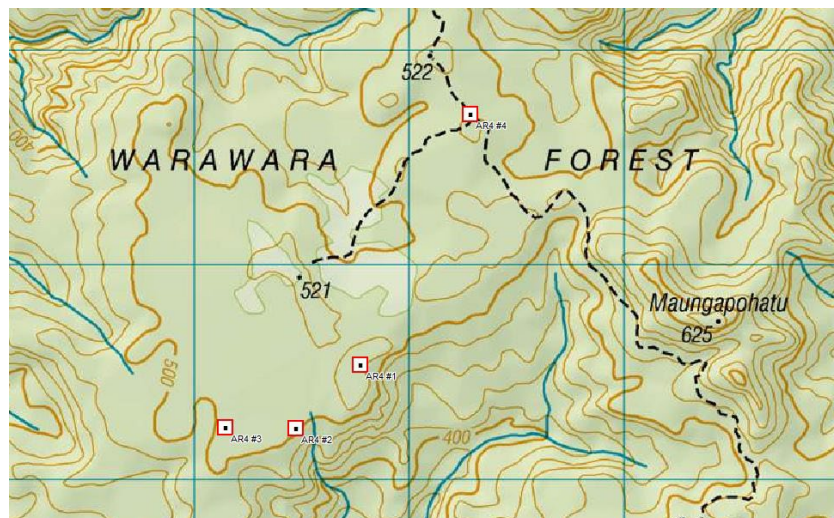
The take aways for our attendees:

- Te Hiku kaimahi are already working within the coastal restoration space – the conference helped build their knowledge around restoration and climate change.
- Kaimahi realized the connection to a healthy coastal area is to have a healthy catchment - Ki Uta ki Tai – Mountains to the Sea.
- Kaimahi connected and networked with other hapu/ community groups and discussed common issues and solutions.

- All over Aotearoa communities are dealing with the same issues: dune restoration, vehicles on beaches, species protection, and climate change.
- DOC can help support our kaimahi on the ground with our time, support, and technical knowledge.

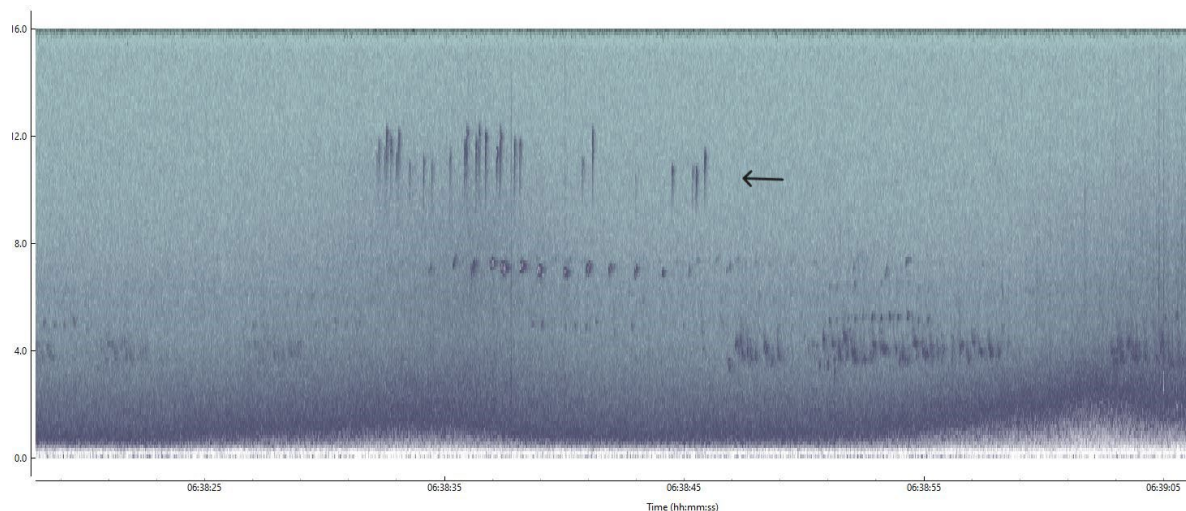
3. Place – Ahipara, Herekino, Ratea, Warawara Warawara Forest Monitoring

During the months of February and March the team have been working with the Warawara Kaitiaki to undertake possum, rat and titipounamu monitoring. The results of possum and rat data is still being processed and will be released in April. 4x Acoustic recording devices (AR4s) were placed during 7 days of fine weather to record titipounamu.



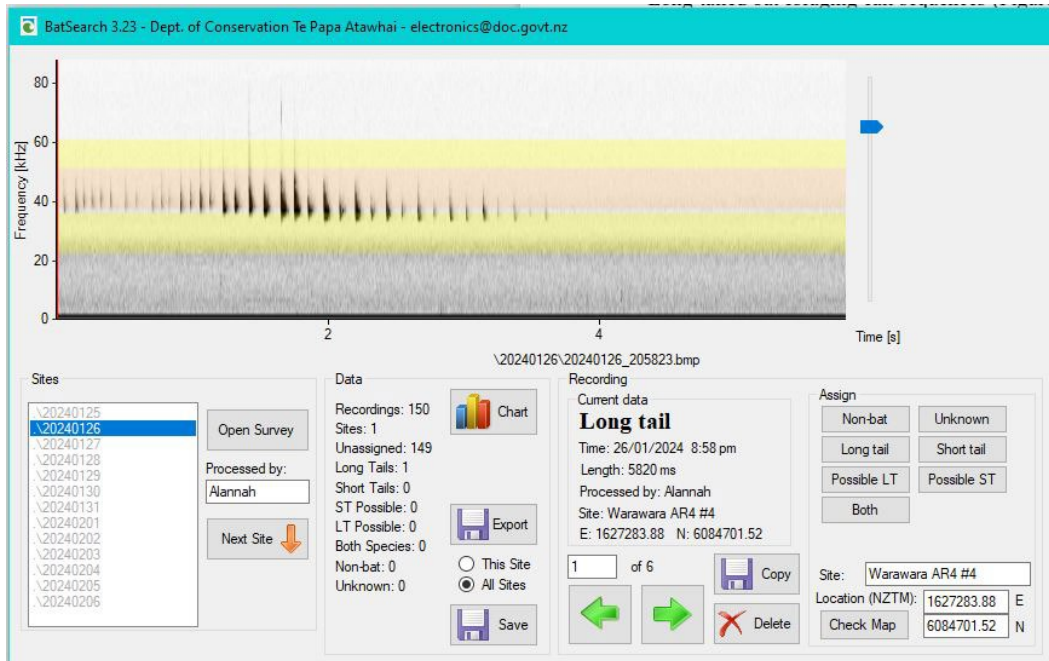
Location points of AR4's

3x devices were placed along the plateau in known titipounamu territories and 1x device was placed along the road to target a flight path for the long-tailed bats. The recordings were analysed and the presence of both titipounamu and long-tailed bats have been confirmed on all four devices. Not short tailed bats were recorded.



Titipounamu spectrogram

Bat activity was highest along the roadside, but still present within the plateau too. Titipounamu were mostly present on the plateau devices, however, they were not as active as other forest birds in the area, this may be typical of their behaviour.



Long-tailed bat echolocation

Measuring the abundance of both species is difficult for separate reasons: tītipounamu hold & protect their own territories, so the same birds that are present now in a certain area will be the same birds there in future. Measuring the fledgling success could be a better option to confirm the success of the operation for the birds. Bats fly sporadically chasing insects, so analysing bat echolocation spectrograms (or bat “passes”) does not give an accurate representation of the population; the same bat may be flying back & forth, or there may be separate bats leaving a roost and travelling to feeding sites. The only way to measure population increases/declines is to locate their roosting trees and set up cameras to capture exit/entry footage, or mark & recapture the bats year after year.



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TB
Site Name:	Pandora	Tag Number:	023978
Structure Name:	Bridge # 1	Structure Type:	Red Br - Pale
Grid Reference:		Length (m):	5.8
Width (m):	1.0	Height (m):	2.75

Fall Height (m)	4.1	Upstream	2.2	Downstream
-----------------	-----	----------	-----	------------

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input checked="" type="checkbox"/>
	A - (infill mesh, vertical palings)	<input type="checkbox"/>
	B - (top, mid and bottom rails)	<input type="checkbox"/>
	C - (top and mid rails)	<input type="checkbox"/>
	D - (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

	None	<input type="checkbox"/>
	A - (infill mesh, vertical palings)	<input type="checkbox"/>
	B - (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C - (top and mid rails)	<input type="checkbox"/>
	D - (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Load Restriction:	—
-------------------	---

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 - 81	<input type="checkbox"/>
	1982 - 91	<input type="checkbox"/>
	1992 - 99	<input type="checkbox"/>

2014

Known Built Date:	2014
-------------------	------

Est. Remaining Life:	All components very poor - 4%	<input type="checkbox"/>
	Core components poor - 12%	<input type="checkbox"/>
	Secondary components poor - 20%	<input type="checkbox"/>
	All components deteriorating - 40%	<input type="checkbox"/>
	All components reasonable - 60%	<input checked="" type="checkbox"/>
	Near new - 80%	<input type="checkbox"/>
New (less than 5 years old) - 100%	<input type="checkbox"/>	

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)	- No cyclone damage.
--	----------------------

Condition Assessment Checklist	Notification Type/Priority	Short Text	Long Text (What, Where, Why, How, When?)
<input type="checkbox"/> Visual, hands-on, safely accessible components only. 1. Initial Overview Plumb, straight and level.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
2. Component Condition Broken, bent, loose, cracked, missing, rotten, corroded.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical	N/A	
<input type="checkbox"/> Barrier System Intact, rigid. <input type="checkbox"/> Decking Anti-slip mesh intact, full-width. <input type="checkbox"/> Beams <input type="checkbox"/> Sub-frame <input type="checkbox"/> Foundations <input type="checkbox"/> Fixings <input type="checkbox"/> Vegetation clearance <input type="checkbox"/> Visitor/environment impacts Graffiti, rockfall, landslide. <input type="checkbox"/> Visitor information Prominent load restriction signage both ends.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
<input type="checkbox"/> Cables Broken wires/sprags <input type="checkbox"/> Cable hardware Locking wire on rigging screws and shackles, Densotape on rigging screw barrels only, nuts on rigging screw bolts. <input type="checkbox"/> Cable anchors <input type="checkbox"/> Cable support towers	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
<input type="checkbox"/> 3. Final Overview All the above, true-left, true-right, upstream, downstream, above, below, all-round.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TB
Site Name:	Pardora	Tag Number:	023 976
Structure Name:	Panor Br (#12)	Structure Type:	Peed. Br - Pole
Grid Reference:		Length (m):	9.3
Width (m):	0.95	Height (m):	5.5 5.5

Fall Height (m)	4.3	Upstream	5.5	Downstream
-----------------	-----	----------	-----	------------

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

	None	<input type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Load Restriction:	—
-------------------	---

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 – 81	<input type="checkbox"/>
	1982 – 91	<input type="checkbox"/>
	1992 – 99	<input type="checkbox"/>

Known Built Date:	2014
-------------------	------

Est. Remaining Life:	All components very poor – 4%	<input type="checkbox"/>
	Core components poor – 12%	<input type="checkbox"/>
	Secondary components poor – 20%	<input type="checkbox"/>
	All components deteriorating – 40%	<input type="checkbox"/>
	All components reasonable – 60%	<input checked="" type="checkbox"/>
	Near new – 80%	<input type="checkbox"/>
	New (less than 5 years old) – 100%	<input type="checkbox"/>

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)

No cyclone damage

Condition Assessment Checklist	Notification Type/Priority	Short Text	Long Text (What, Where, Why, How, When?)
<input type="checkbox"/> Visual, hands-on, safely accessible components only. 1. Initial Overview Plumb, straight and level.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine High Serious Critical		
2. Component Condition Broken, bent, loose, cracked, missing, rotted, corroded.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine High Serious Critical		
<ul style="list-style-type: none"> • Barrier System Intact, rigid. • Decking Anti-slip mesh intact, full-width. • Beams • Sub-frame • Foundations • Fixings • Vegetation clearance • Visitor/environment impacts Graffiti, rockfall, landslide. • Visitor information Prominent load restriction signage both ends. 	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine High Serious Critical	<p style="text-align: center; color: blue; font-size: 2em;">N/C</p>	
<ul style="list-style-type: none"> • Cables Broken wires/sprags • Cable hardware Locking wire on rigging screws and shackles, Densotape on rigging screw barrels only, nuts on rigging screw bolts. • Cable anchors • Cable support towers 	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine High Serious Critical		
3. Final Overview All the above, true-left, true-right, upstream, downstream, above, below, all-round.	<input type="checkbox"/> Maintenance Special Inspection <input type="checkbox"/> Routine High Serious Critical		



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TB
Site Name:	Pandora	Tag Number:	023975
Structure Name:	Br # 3	Structure Type:	Ped Br - Pole
Grid Reference:		Length (m):	4.75
Width (m):	1.04	Height (m):	2.3

Fall Height (m)	2.3	Upstream	2.8	Downstream
-----------------	-----	----------	-----	------------

Fall Surface	Benign	<input type="checkbox"/>	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input type="checkbox"/>	B – (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>	Natural	<input type="checkbox"/>

Load Restriction: —

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 – 81	<input type="checkbox"/>
	1982 – 91	<input type="checkbox"/>
	1992 – 99	<input type="checkbox"/>

Known Built Date: 2014

Est. Remaining Life:	All components very poor – 4%	<input type="checkbox"/>
	Core components poor – 12%	<input type="checkbox"/>
	Secondary components poor – 20%	<input type="checkbox"/>
	All components deteriorating – 40%	<input type="checkbox"/>
	All components reasonable – 60%	<input checked="" type="checkbox"/>
	Near new – 80%	<input type="checkbox"/>
New (less than 5 years old) – 100%	<input type="checkbox"/>	

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)

No cyclone damage

Condition Assessment Checklist		Notification Type/Priority		Short Text	Long Text (What, Where, Why, How, When?)
<ul style="list-style-type: none"> Visual, hands-on, safely accessible components only. 		<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
<p>1. Initial Overview Plumb, straight and level.</p> <p>2. Component Condition Broken, bent, loose, cracked, missing, rotten, corroded.</p> <ul style="list-style-type: none"> • Barrier System Intact, rigid. • Decking Anti-slip mesh intact, full-width. • Beams • Sub-frame • Foundations • Fixings • Vegetation clearance • Visitor/environment impacts Graffiti, rockfall, landslide. • Visitor information Prominent load restriction signage both ends. 		<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
<ul style="list-style-type: none"> • Cables Broken wires/sprags • Cable hardware Locking wire on rigging screws and shackles, Densotape on rigging screw barrels only, nuts on rigging screw bolts. • Cable anchors • Cable support towers <p>3. Final Overview All the above, true-left, true-right, upstream, downstream, above, below, all-round.</p>		<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TR
Site Name:	Pandora	Tag Number:	023974
Structure Name:		Structure Type:	Boardwalk
Grid Reference:		Length (m):	3.15
Width (m):	0.82	Height (m):	0.85

Fall Height (m)	0.6	Upstream	1.6	Downstream
-----------------	-----	----------	-----	------------

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input checked="" type="checkbox"/>
	Unfavourable	<input type="checkbox"/>
	Hazardous	<input type="checkbox"/>

	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input checked="" type="checkbox"/>
	A - (infill mesh, vertical palings)	<input type="checkbox"/>
	B - (top, mid and bottom rails)	<input type="checkbox"/>
	C - (top and mid rails)	<input type="checkbox"/>
	D - (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

	None	<input type="checkbox"/>
	A - (infill mesh, vertical palings)	<input type="checkbox"/>
	B - (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C - (top and mid rails)	<input type="checkbox"/>
	D - (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Load Restriction:

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 - 81	<input type="checkbox"/>
	1982 - 91	<input type="checkbox"/>
	1992 - 99	<input type="checkbox"/>

Known Built Date: 2014

Est. Remaining Life:	All components very poor - 4%	<input type="checkbox"/>
	Core components poor - 12%	<input type="checkbox"/>
	Secondary components poor - 20%	<input type="checkbox"/>
	All components deteriorating - 40%	<input type="checkbox"/>
	All components reasonable - 60%	<input checked="" type="checkbox"/>
	Near new - 80%	<input type="checkbox"/>
	New (less than 5 years old) - 100%	<input type="checkbox"/>

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)

No cyclon damage

Condition Assessment Checklist		Notification Type/Priority		Short Text	Long Text (What, Where, Why, How, When?)
<p>Visual, hands-on, safely accessible components only.</p> <p><u>1. Initial Overview</u> Plumb, straight and level.</p> <p><u>2. Component Condition</u> Broken, bent, loose, cracked, missing, rotten, corroded.</p> <ul style="list-style-type: none"> • Barrier System Intact, rigid. • Decking Anti-slip mesh intact, full-width. • Beams • Sub-frame • Foundations • Fixings • Vegetation clearance • Visitor/environment impacts Graffiti, rockfall, landslide. • Visitor information Prominent load restriction signage both ends. • Cables • Broken wires/sprags • Cable hardware Locking wire on rigging screws and shackles, Densotape on rigging screw barrels only, nuts on rigging screw bolts. • Cable anchors • Cable support towers <p><u>3. Final Overview</u> All the above, true-left, true-right, upstream, downstream, above, below, all-round.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input checked="" type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical	<p>Lifting Mech.</p> <p>Staple down loose mech @ RH end.</p>	
	<input type="checkbox"/>	<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
	<input type="checkbox"/>	<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
	<input type="checkbox"/>	<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		
	<input type="checkbox"/>	<input type="checkbox"/> Maintenance <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Routine <input type="checkbox"/> High <input type="checkbox"/> Serious <input type="checkbox"/> Critical		



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TB
Site Name:	Pandora	Tag Number:	005957
Structure Name:		Structure Type:	Boardwalk
Grid Reference:		Length (m):	3.05
Width (m):	0.82	Height (m):	1.2

Fall Height (m)	0.95	Upstream	1.45	Downstream
-----------------	------	----------	------	------------

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input checked="" type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

	None	<input type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Load Restriction:	—
-------------------	---

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 – 81	<input type="checkbox"/>
	1982 – 91	<input type="checkbox"/>
	1992 – 99	<input type="checkbox"/>

Known Built Date:	2014
-------------------	------

Est. Remaining Life:	All components very poor – 4%	<input type="checkbox"/>
	Core components poor – 12%	<input type="checkbox"/>
	Secondary components poor – 20%	<input type="checkbox"/>
	All components deteriorating – 40%	<input type="checkbox"/>
	All components reasonable – 60%	<input checked="" type="checkbox"/>
	Near new – 80%	<input type="checkbox"/>
	New (less than 5 years old) – 100%	<input type="checkbox"/>

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)	No cyclone damage
--	-------------------

Condition Assessment Checklist
<ul style="list-style-type: none"> <input type="checkbox"/> Visual, hands-on, safely accessible components only. <input type="checkbox"/> 1. Initial Overview Plumb, straight and level. <input type="checkbox"/> 2. Component Condition Broken, bent, loose, cracked, missing, rotten, corroded. <input type="checkbox"/> • Barrier System Intact, rigid. <input type="checkbox"/> • Decking Anti-slip mesh intact, full-width. <input type="checkbox"/> • Beams <input type="checkbox"/> • Sub-frame <input type="checkbox"/> • Foundations <input type="checkbox"/> • Fixings <input type="checkbox"/> • Vegetation clearance <input type="checkbox"/> • Visitor/environment impacts Graffiti, rockfall, landslide. <input type="checkbox"/> • Visitor information Prominent load restriction signage both ends. <input type="checkbox"/> • Cables Broken wires/sprags <input type="checkbox"/> • Cable hardware Locking wire on rigging screws and shackles, Densotape on rigging screw barrels only, nuts on rigging screw bolts. <input type="checkbox"/> • Cable anchors <input type="checkbox"/> • Cable support towers <input type="checkbox"/> 3. Final Overview All the above, true-left, true-right, upstream, downstream, above, below, all-round.

Notification Type/Priority		Short Text	Long Text (What, Where, Why, How, When?)
1	Maintenance Special Inspection		214
	Routine High Serious Critical		
2	Maintenance Special Inspection		
	Routine High Serious Critical		
3	Maintenance Special Inspection		
	Routine High Serious Critical		
4	Maintenance Special Inspection		
	Routine High Serious Critical		
5	Maintenance Special Inspection		
	Routine High Serious Critical		



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TR
Site Name:	Pandora	Tag Number:	005956
Structure Name:		Structure Type:	Concrete Red Bridge Timber
Grid Reference:		Length (m):	3.1
Width (m):	0.9	Height (m):	1.09

Fall Height (m)	0.98 1.0	Upstream	1.1	Downstream
-----------------	---------------------	----------	-----	------------

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input checked="" type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

	None	<input checked="" type="checkbox"/>
	A – (infill mesh, vertical palings)	<input type="checkbox"/>
	B – (top, mid and bottom rails)	<input type="checkbox"/>
	C – (top and mid rails)	<input type="checkbox"/>
	D – (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Load Restriction:	—
-------------------	---

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 – 81	<input type="checkbox"/>
	1982 – 91	<input type="checkbox"/>
	1992 – 99	<input type="checkbox"/>

Known Built Date:	2014
-------------------	------

Est. Remaining Life:	All components very poor – 4%	<input type="checkbox"/>
	Core components poor – 12%	<input type="checkbox"/>
	Secondary components poor – 20%	<input type="checkbox"/>
	All components deteriorating – 40%	<input type="checkbox"/>
	All components reasonable – 60%	<input checked="" type="checkbox"/>
	Near new – 80%	<input type="checkbox"/>
	New (less than 5 years old) – 100%	<input type="checkbox"/>

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)	<p>- No Cyclone Damage</p> <p>- Barriers Ok for BCA</p>
--	---

Condition Assessment Checklist	Notification Type/Priority		Short Text	Long Text (What, Where, Why, How, When?)
<p><i>Visual, hands-on, safely accessible components only.</i></p> <p>1. <u>Initial Overview</u> Plumb, straight and level.</p> <p>2. <u>Component Condition</u> Broken, bent, loose, cracked, missing, rotten, corroded.</p> <ul style="list-style-type: none"> • Barrier System Intact, rigid. • Decking Anti-slip mesh intact, full-width. • Beams • Sub-frame • Foundations • Fixings • Vegetation clearance • Visitor/environment impacts Graffiti, rockfall, landslide. • Visitor information Prominent load restriction signage both ends. • Cables Broken wires/sprags • Cable hardware Locking wire on rigging screws and shackles. Densotape on rigging screw barrels only, nuts on rigging screw bolts. • Cable anchors • Cable support towers <p>3. <u>Final Overview</u> All the above, true-left, true-right, upstream, downstream, above, below, all-round.</p>	<input type="checkbox"/>			
	<input type="checkbox"/>			
	<input type="checkbox"/>			
	<input type="checkbox"/>			
	<input type="checkbox"/>			
	<input type="checkbox"/>			
	<input type="checkbox"/>			
	<input type="checkbox"/>			



DOC Outdoor Visitor Structure Inspection

Date:	24/5/23	Inspection By:	TR
Site Name:	Pandora	Tag Number:	023973
Structure Name:	Whangakea Sm	Structure Type:	Red Br - Pole
Grid Reference:		Length (m):	9.3
Width (m):	0.94	Height (m):	2.4 2.65

Fall Height (m)	2.65	Upstream	2.65	Downstream
-----------------	------	----------	------	------------

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Fall Surface	Benign	<input type="checkbox"/>
	Favourable	<input type="checkbox"/>
	Unfavourable	<input checked="" type="checkbox"/>
	Hazardous	<input type="checkbox"/>

Barrier Type	None	<input type="checkbox"/>
	A - (infill mesh, vertical palings)	<input type="checkbox"/>
	B - (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C - (top and mid rails)	<input type="checkbox"/>
	D - (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Barrier Type	None	<input type="checkbox"/>
	A - (infill mesh, vertical palings)	<input type="checkbox"/>
	B - (top, mid and bottom rails)	<input checked="" type="checkbox"/>
	C - (top and mid rails)	<input type="checkbox"/>
	D - (top rail only)	<input type="checkbox"/>
	Natural	<input type="checkbox"/>

Load Restriction:	—
-------------------	---

Estimated Built Period:	Pre -1971	<input type="checkbox"/>
	1972 - 81	<input type="checkbox"/>
	1982 - 91	<input type="checkbox"/>
	1992 - 99	<input type="checkbox"/>

Known Built Date:	2014
-------------------	------

Est. Remaining Life:	All components very poor - 4%	<input type="checkbox"/>
	Core components poor - 12%	<input type="checkbox"/>
	Secondary components poor - 20%	<input type="checkbox"/>
	All components deteriorating - 40%	<input type="checkbox"/>
	All components reasonable - 60%	<input checked="" type="checkbox"/>
	Near new - 80%	<input type="checkbox"/>
New (less than 5 years old) - 100%	<input type="checkbox"/>	

Asset Status:	Open	<input checked="" type="checkbox"/>
	Closed	<input type="checkbox"/>
	Removed	<input type="checkbox"/>
	Destroyed	<input type="checkbox"/>

Comments (Not work required, PTO for condition assessment)	No cyclen damage. - Main Stream Bridge
--	---

From: s.9(2)(a)
To: Laree Furniss; Nicholas Fowler
Cc: s.9(2)(a)
Subject: RE: Plan for Wednesday/Thursday
Date: Monday, 12 June 2023 1:25:24 pm
Attachments: [image002.jpg](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image008.png](#)
[image009.png](#)
[image010.png](#)
[image011.png](#)
[image012.png](#)
[image013.png](#)
[Waitahora Reinga Pandora Report 12.6.23 Final.pdf](#)
[Pandora Track Eng Insp Records.pdf](#)

Hi Laree, Nick,

Please find attached our report covering the items visited during our visit of 24-25 May. I have attached the Pandora Track Engineering inspection record sheets as a separate PDF because you may want to send these to a DOC engineer for entry of the data into your new Asset Management System. I head away on leave next Tuesday.

Both Jonathan and Shahram are familiar with the report and if necessary will may be able to answer any questions while I am away. They are copied into this email so you have their contact details) I will be clearing emails while away so if you have hard questions that draw on my knowledge of the history of the sites, I may be able to respond while I'm away.

Thanks for the opportunity to assist you in the assessment of these sites.

Regards, s.9(2)(a)



s.9(2)(a)

A(Exec), Fellow ENZ

Principal Consultant

 09 638 7221 s.9(2)(a)
 s.9(2)(a) @frame.co.nz
 Level 1, 24 York Street, Parnell, Auckland, 1052
 www.frame.co.nz

From: Laree Furniss <lfurniss@doc.govt.nz>

Sent: Monday, May 22, 2023 4:38 PM

To: s.9(2)(a) @frame.co.nz; Nicholas Fowler <nfowler@doc.govt.nz>

Subject: Plan for Wednesday/Thursday

Kia ora s.9(2)(a) and Nick,

Here's the plan for Wednesday/Thursday from our chat today and also talking to Ngati Kuri (NK) this afternoon, please check and let me know if I've missed anything, got times wrong or order of events wrong;

Wednesday 24th May

9:30-9:45am - Nick will pick up s.9(2)(a) from Kerikeri airport and travel north to meet team at Pandora Gate

12:15pm – everyone meet at Pandora road gate with LUV's (1x DOC, 1x NK) undertake JSA and then access Pandora road and check bridges and structures along track from pandora campsite to top of ridge.

2:30-3:00 - Return to Pandora gate.

3:00pm – Nick and s.9(2)(a) head to Cape Reinga and look at Lighthouse track, others can accompany if they wish to.

4:30pm – Nick and s.9(2)(a) return to Kaitaia for the night

6:15pm – arrive Kaitaia.

Thursday 25th May

7:30 – leave Kaitaia

9:00 – everyone meet Kapowairua/Spirits Bay Campground for JSA then LUV x2 plus 2 kayaks head towards Waitahora Lagoon boardwalk.

9:45- 12:00 – undertake inspection of boardwalks and track

12:00 - return to Kapowairua

12:15 – s.9(2)(a) and Nick head south to Kerikeri airport

- Kaitaia DOC staff – Phil (Brownie) Brown and Cam Smith, Brownie will be LUV driver.
- Ngati Kuri – TBC
- s.9(2)(a) from NK also suggested bringing waders if you have them because the lagoon is currently drained of water and there might not be enough water to kayak through.
- Cam is going to sort a probe from Kaitaia hire that can be retracted.

Let me know any changes and I'll flick through to NK as well.

Thanks Laree.

Laree Furniss

Senior Ranger Heritage & Visitor | Kaitiaki Matua, (Āo Hākinakina/Āo Tuku Iho)
Department of Conservation | Te Papa Atawhai

DDI: s.9(2)(a)

Kaitaia Office

25 Matthews Ave | PO Box 569 | Kaitaia 0441

T: +64 9 408 6014

www.doc.govt.nz



Caution - This message and accompanying data may contain information that is confidential or subject to legal privilege. If you are not the intended recipient you are notified that any use, dissemination, distribution or copying of this message or data is prohibited. If you received this email in error, please notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

From: [Nicholas Fowler](#)
To: [s.9\(2\)\(a\)](#); [Laree Furniss](#); [Shelley Lyford](#); [s.9\(2\)\(a\)](#)
Subject: RE: Te Paki Track and Mangawhai Walkway
Date: Monday, 9 October 2023 7:19:11 am
Attachments: [image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image008.png](#)
[image009.png](#)
[image010.png](#)
[image011.png](#)

Thanks [s.9\(2\)\(a\)](#). That is so helpful.

Hopefully you are able to link in but sure we will catch you soon either way.

Nick

From: [s.9\(2\)\(a\)](#)
Sent: Friday, October 6, 2023 4:32 PM
To: Nicholas Fowler <nfowler@doc.govt.nz>; Laree Furniss <lfurniss@doc.govt.nz>; Shelley Lyford <slyford@doc.govt.nz>; [s.9\(2\)\(a\)](#)
Subject: RE: Te Paki Track and Mangawhai Walkway

Hi Nick, Laree, Shelly, [s.9\(2\)\(a\)](#)

Not sure I'll be able to attend the meeting next Tuesday [s.9\(2\)\(a\)](#)

I am familiar with both the above sites, so here are my thoughts:

Te Paki/Lake Ngakeketa Track.

- It is not clear what the intended purpose of the new track is? Is it to provide access from the new camp/toilets near the lake to the dunes for dune surfing? or is it to provide access to the roadend carpark/dune surfing operator? or is it to provide a scenic walk along the lake edge?
- This area is extremely dynamic and the dunes change. The large dune has advanced significantly since 1985 when I first visited the area. These changes will continue.
- Any track or boardwalk (Option 2) on the western side of Lake Ngaketeta is very prone to inundation by sand dune encroachment, or inundation by water if Te Paki Stream is further blocked by sand. I don't recommend this option.
- The "existing shortcut" (yellow line) ends at a steep unstable dune face. Visitor access onto this will accelerate sand drift into the lake and cause infilling and blockage to the stream channel. It is not a good place to attract visitors to.
- The "Existing Option 1" seems like the best general route, but as marked it's a bit up and down. It could be improved.
- This is a relatively short track. If you agree that a lake side boardwalk is not viable, then there is probably no need for Brian to do a site visit, and I'm sure Drew could mark out and design a track from the new campground/toilets to the road end carpark.
- If any small boardwalks are required, they are likely to be < 1.5m high, so no BC required, and Drew could collect the site info. The ground conditions will be predictable (dune sand for as far down as you would ever want to dig)

Out of scope [redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

Hope this is useful. I'll join the meeting if I can.
Regards, [redacted]

s.9(2)(a)
Principal Consultant



HELPING AOTEAROA NEW ZEALAND ACCESS,
ENJOY AND PROTECT THE GREAT OUTDOORS



09 638 7221



s.9(2)(a)



s.9(2)(a)



Level 1, 24 York Street, Parnell, Auckland, 1052



www.frame.co.nz



From: Nicholas Fowler <nfowler@doc.govt.nz>

Sent: Thursday, October 5, 2023 2:37 PM

To: Laree Furniss <lfurniss@doc.govt.nz>; Shelley Lyford <slyford@doc.govt.nz>; s.9(2)(a)
s.9(2)(a)

Subject: Aerial shot of Te Paki

Good afternoon all.

Here is a shot of the Te Paki area in question with some initial thoughts of track locations for debate. They are a rough indication of what I was shown on a previous visit to enable a talking point for discussion on Tuesday. Yell out if there is anything major but as I say just for discussion initially.

Nick

Caution - This message and accompanying data may contain information that is confidential or subject to legal privilege. If you are not the intended recipient you are notified that any use, dissemination, distribution or copying of this message or data is prohibited. If you received this email in error, please notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

Site Assessment Form – Post Weather Event

1. Site/Track/Hut/Structure Waitahora Lagoon Boardwalk	2. Operational Period Date: 11/5/23 Time:	VRM assessment
3. Location (FLOC)	4. Site detail/asset description i.e. Great Walk or BCA Te Paki Coastal Track - Icon	
6. Assessment (include details on risk matrix from JSA, risk details, links to photos and or further site comments)		
<p>A section of the boardwalk that crosses Waitahora Lagoon and is part of the Kapowairua to Pandora Track section of the Te Paki Coastal Track has been washed out. Lagoon had been flooded previously.</p>		
		
7. Action taken at site i.e closed track with signage (be specific and take photos)		
<p>Track closed, no safe alternative route.</p> <p>Signs in place and alert on webpage.</p>		
8. Action Required/recommendations i.e. further assessments, remedial works		
<p>Engineering assessment.</p>		

Site Assessment Form – Post Weather Event

9. Any influencing factors i.e ease of access

1.5 hours walk to site from Kapowairua Campsite.

10. Prepared by: Laree

Date/Time: 11/5/23

From: [Tim Cross](#)
To: [Laree Furniss](#)
Cc: [Richard Oneroa](#); [Georgia Smith](#); [Mariah Mane](#)
Subject: Tapotupotu Boardwalk
Date: Tuesday, 21 March 2023 8:17:33 am
Attachments: [IMG_4953.jpg](#)
[IMG_4954.jpg](#)
[IMG_4951.jpg](#)

Hi Laree,

I visited this site accompanied by Richard Oneroa on Wednesday 8th March. Approximately 20m of this boardwalk at the campsite end was damaged in the recent cyclone. Several sections of decking and joists have become separated from the supporting piers underneath, and have also displaced lengthwise away from the start by 350 to 400mm. The piers all appear intact with no damage. The decking and joists are also relatively undamaged, just out of position and no longer attached to the piers.

Repair of this structure should be quite straightforward. It should be possible to pull each section back into its original position then refix back onto the piers under. You could use either a small digger or a Turfor winch/Chain hoist to pull the boardwalk back the required amount. If using a winch there is a mature Manuka tree around 7m from the start of the boardwalk that could be used as an anchor.

Note: The maximum digger size that can be safely supported by this design of boardwalk is 900kg. If you pull the section closest to the campsite back into position make sure the joist-bearer fixings (as below) have been fitted before driving the digger across it.

I would recommend removing the existing joist-bearer fixings (one or two skew nails plus 1 wire dog). A more robust fixing would be a 100x4.0 FH Stainless steel skew nail plus a stainless steel CT160 cleat at each joist-bearer crossing (4 per pier). Each CT160 cleat should be fixed with 8/45x3.3 flat head annular groove Stainless Steel Nails

regards

Tim Cross

ENGINEER - Structures



Cyclone Damage Inspections Pandora Track, Cape Reinga and Waitahora Lagoon

Prepared for Department of
Conservation (DOC)
June 2023



Department of
Conservation
Te Papa Atawhai



Level 1, 24 York Street,
Parnell, Auckland 1052

PO Box 105105
Auckland City, Auckland 1143



(09) 638-7221



office@frame.co.nz



frame.co.nz

Job Details

DOC
Cyclone Damage Inspections
Pandora Track, Cape Reinga, Waitahora Lagoon
Frame Group Job Number: 23-048

Document Control Record

Revision Number	Date	Revision Details / Status	Initials and Signature			
			Prepared by	Checked by	Reviewed by	Approved by
A	12-06-2023	Final	s.9(2)(a)			

Key

Initials	Name	Title
s.9(2)(a)		Principal Consultant
		Senior Engineer
		Managing Director

Report Contents

Section Number	Section Content	Page
1	Executive Summary	4
2	Pandora Track	5
3	████████████████████	7
4	Cape Reinga Lighthouse site and Access Track	9
5	Waitahora Lagoon Boardwalk	15
Appendix 1	Engineers Ongoing Inspection reports (7)	

1. Executive Summary

This report prepared by Frame Group Limited (**Frame Group**) for the Department of Conservation (**DOC**) provides the assessment of cyclone damage at four sites in the Far North. An inspection visit was made 24-25 May 2023, accompanied by DOC Senior Works Officer, Nick Fowler, and assisted at each site by local DOC staff and members of Ngati Kuri.

Recent cyclone events have caused extremely high rainfalls in the Far North, particularly in the first week of May 2023 when rainfall intensities in some localities exceeded 20mm per hour and well over 50mm in a 12-hour period. This rainfall has triggered ground settlement and landslides and has resulted in elevated water levels in streams and wetlands. These effects have the potential to seriously impact walking track infrastructure and structures. The impacts at the locations inspected and covered by this report are summarised as follows:

- Pandora Track: No damage to structures or track except for one windfall. Engineering ongoing inspections were carried out on seven structures for recording into DOC asset management system.
- Pandora Access Road: Drainage cut-outs are clogged and as a result the road is suffering from significant erosion. Urgent remedial work to the drainage is recommended, and road reshaping is recommended next summer when conditions are drier.
- Cape Reinga Lighthouse: The slip at the lighthouse is most likely the result of water ingress into fill material that was poorly placed during the work carried out in the vicinity in 2003. We will peer review the proposed remedial work schedule that is to be prepared by Far North Roding when it is available. We believe that the remedial works should include retreat of the paved area and wall from the edge of the steep slope, proper placement of imported material in the settled area and improvement of access track drainage.
- Waitahora Lagoon Boardwalk: The boardwalk was fully inundated during the visit, but some damage to the structure was evident. It is evident that the lagoon characteristics have changed since the boardwalk was constructed in 2012, with elevated water levels in the lagoon becoming more frequent. We recommend seeking specialist advice on the likely future effects of climate change on the Waitahora Lagoon and if ongoing frequent elevated water levels are likely to continue, consideration be given to an alternative Te Pahi Coastal Track route crossing the wetland further inland.

Frame Group can provide further investigation and design assistance with the implementation of remedial work at the above sites if required.

2. Pandora Track

This track, constructed in 2012, forms part of the four-day Te Pahi Coastal Track and is on the link from the Whangakea/Pandora campsite at the western end of Piwhane/Spirits Bay to the Tapotupotu Bay Campsite. The upper end of the track was accessed using a side-by-side Light Utility Vehicle (LUV) provided by DOC. The Pandora track sidles up the valley to the west of the campsite, climbing steadily to reach the main ridge over about 1.5km. The track crosses the main Whangakea Stream and several smaller tributary streams on small timber bridges. The bridges are robust timber pole beam bridges with barriers, founded on concrete encased embedded piles or concrete footings doweled onto sound rock. There are also several boardwalks that are conventional timber joist boardwalks on concrete encased embedded piles.

All the structures on this track are free from storm damage. None appear to have been inundated with floodwater or damaged by windfall or erosion. A full DOC Engineering Ongoing Inspection was undertaken for each the following seven structures:

- 023973 9.3m long Whangakea Stm pedestrian bridge
- 005956 3.1m long pedestrian bridge
- 005957 3.05m long boardwalk
- 023974 3.15m long boardwalk
- 023975 4.75m long pedestrian bridge
- 023976 9.3m long pedestrian bridge (Puriri Bridge)
- 023978 5.8m long pedestrian bridge

Only one notification was recorded, this being the need for loose deck mesh stapling on bridge 023974. Inspections are recorded on forms and are appended for entry into the asset management system by a DOC Engineer. A windfall was noted on the track at GPS1578295E 6187461N, a distance of approximately 400m down from the ridge. Maximum trunk size approximately 200mm.



Figure 1: All pole bridges in good condition



Figure 2: Deck mesh lifting on bridge 023974



Figure 3: Windfall on track below ridge

3. Out of scope

[Redacted text block]

[Redacted text block]

[Redacted text block]



[Redacted text block]



Figure 5: Surface water is bypassing drainage cut-outs



Figure 6: Blocked cut-outs result in water flowing some distance down the road causing extreme erosion.

4. Cape Reinga Lighthouse site and Access Track

4.1 Background

The Cape Reinga lighthouse is located on a prominent basalt rock outcrop at the end of the ridge above Te Rerenga Wairua/Cape Reinga. The lighthouse tower was constructed in 1941 on a small flat area at the end of a 400m long access road from the carpark at the northern end of SH1. In 2003, the lighthouse keeper houses and the post office at the carpark area were removed and excavation work was undertaken by DOC in the immediate vicinity of the lighthouse to remove rock mounds on the western side and using this excavated material as fill to raise the low area to the east of the lighthouse. This area was then paved with stone pavers in 2005 and provided with a low stone perimeter wall to contain visitors and provide security from falling down the steep slopes to the sea. During the implementation of this paving and wall installation, a decision was made by DOC staff to extend the paved area out over the filled area to the east, and to incorporate a garden within the paved area. At the same time, the access track to the lighthouse was re-shaped to correct previous settlement and was provided with a durable chip sealed surface.

In 2008, as part of the relocation of the Cape Reinga road end carpark and major upgrade of SH1, the lighthouse access track was extended by approximately 400m in length on a new formation alignment from the new carpark, and the whole access track length was provided with kerbs, drainage catch pits and new chip seal surfacing. This work was designed and managed by Meritec Consultants Ltd as part of the NZTA funded SH1 upgrade project.

By 2013, cracking had appeared in the paved area on the eastern side of the lighthouse, showing as settlement and displacement outward in the area of the previously placed fill. An investigation by Tonkin and Taylor Ltd (T&T) geotechnical engineers in July 2013 attributed the cracking in the lighthouse area to settlement of the “non-engineered” fill overlying the sand deposits that cover the basalt base rock in this vicinity. The T&T report indicated this movement and cracking was likely to continue over time. Whilst they indicated the rate of consolidation may slow, they suggested the lateral creep may continue. Similarly, T&T reported on the newly appeared cracking in the sealed access track, in both the original section as well as the section constructed in 2008. They attributed this cracking to also be caused by slow lateral creep of the underlying soils. Crack filling repairs were undertaken on the road surface and at the paved area at the lighthouse in late 2013.

A report by Frame Group in January 2014 titled “Cape Reinga Lighthouse Track and Paved Area Remedial Options” outlined the options for remediation of both the lighthouse area and the access track. These options ranged from doing minimal crack sealing to options involving installation of extensive retaining walls. The options presented were consistent with the recommendations in the 2013 T&T report. The option of “do nothing” other than crack repair was opted for by DOC on the basis that catastrophic failure of the access track or lighthouse paved area was unlikely.



Figure 7: Cape Reinga Lighthouse area in 2003 showing the original rock mound to the west of the lighthouse and the low ground to the east.



Figure 8: The lighthouse area in Nov 2005 after removal of the rock mound, filling of the eastern side, paving and wall installation.



Figure 9: The lighthouse area in late 2013 showing the extent of paving and wall over the previously placed fill to the east (right) of the lighthouse.



Figure 10: Evidence of cracking and settlement of the paving over the filled area after repairs had been undertaken in late 2013.

4.2 Recent Slip at Lighthouse

During a severe rain event in early May 2023, a section of the paved area and wall on the eastern side of the lighthouse collapsed. The underlying sand and fill material has flowed for over 30m down the slope leaving part of the paving undercut and part of the wall suspended. From our investigation, the collapse appears to be the result of several factors including:

- saturation of the underlying sand and “non-engineered” fill immediately to the east of the main lighthouse area, probably due to the prolonged wet weather, but exacerbated by the garden area providing a permeable entry point for rainwater into the underlying soils;
- ongoing settlement and lateral movement of the fill and sand layer under the eastern portion of the paved area at the lighthouse; and
- surface stormwater flowing down the sealed access track into the lighthouse area during a high intensity downpour, entering any open cracks in the paving on the eastern side, as well as flowing over the edge of the paving and scouring the slip path.

Examination of the kerb and channel and drainage catch pits on the access track from the carpark to the lighthouse area suggests that during very intense rainfall, surface water may have been channelled for a distance of over 600m or more down the sealed access track, all the way to the lighthouse area. Several of the catch pits are blocked or are configured ineffectively to enable them to remove surface water from the sealed path. Some catch pit drains appear to be deliberately blocked off.



Figure 11: Failed section of paving and wall on the eastern side of the lighthouse area.



Figure 12: A significant amount of soil material has flowed down the steep slip path from under the collapsed wall and paving area.

4.3 Remedial Options

We understand that DOC, in association with Ngati Kuri, has engaged a local engineer/contractor to advise on a solution, and that Frame Group will be asked to provide a peer review of the proposed works. Our visit to the site was for the purpose of familiarisation, and to provide the benefit of our knowledge of the history of the development work that has been undertaken at this site over the past 20 years. Based on our site visit, we make the following comments and recommendations with respect to remedial work options.

- The failed area is in the location of fill that was known to be settling. The paving area and wall extend well beyond what was intended in the original wall design in 2003. We believe consideration should be given to retreating the paved area and wall back from the unstable edge onto the area where there is stable basalt at or near the ground surface under the paving.
- The grass garden is probably providing an entry point for water to saturate the fill under the paving. Removal of the garden area and paving this is recommended.
- Improvement of the surface drainage on the access track is recommended. Whilst there are several catch pits for surface water, these are poorly configured or blocked. There may be merit in installing additional drainage points, and cross path grates in selected locations, especially at the low points at the wall area about 60 metres above the lighthouse and also at the dip in the access track immediately before the stone paved area at the lighthouse. Given the greater intensity of recent storm events,

higher capacity drainage to remove stormwater from the paved access track is essential.

- The several small drainage pipes from the stone paved area at the lighthouse should be extended further down the slope, well below the lighthouse level, and be fitted with diffusers to ensure they do not cause scouring of the highly sensitive sandy soil.
- The incised slip gully will need to be stabilised to prevent further erosion. The upper section will need to be re-formed with proper benching and then placement and compaction of suitable imported fill material before re-construction of the wall and paved area. It would be best to avoid the need for specific retaining wall structures in this area, but stability analysis of the proposed fill construction is recommended to ensure it has a sufficient factor of safety against repeat failure. The lower part of the slip gully should be remediated with protective matting and planting.

When we are provided with the proposed remedial plan, we will provide a peer review and appropriate further comment.

5. Waitahora Lagoon Boardwalk

5.1 Background

The Waitahora Lagoon boardwalk is part of the Te Pahi Coastal Track. It provides access from the Te Horo Beach coastal sand dunes across the shallow lagoon to the manuka/kanuka covered hills immediately to the south of the lagoon. The lagoon boardwalk was selected as a route option in 2011 after consideration of other options for creating this section of the Te Pahi Coastal Track between the Kapowairua (Spirits Bay) Campsite and the Whangakea/Pandora Campsite.

The coastal dunes along Te Horo Beach are separated from the inland hills by a large wetland area and the extensive shallow tidal Waitahora lagoon area. The wetlands extend well inland, hence the traditional walking route west from the Kapowairua Campground was to walk along the stable ground on the back of the coastal dune all the way to the mouth of the Waitahora Lagoon which could be safely crossed on foot at low tide levels, provided the water flows out of the lagoon were moderate to low. In certain conditions however, the outlet of the lagoon is extremely hazardous and can consist of unstable soft sand and swift flows that would drag anyone out to sea if they attempt to cross. With the development of the Te Pahi Coastal Track as a promoted DOC multi-day walk (potentially a Great Walk) it was necessary to address the hazard of the lagoon entrance crossing.

A report titled “Te Pahi Track – Waitahora Lagoon Section Feasibility” prepared by Frame Group in May 2011 considered three options for establishment of a safe Te Pahi Coastal Track at Waitahora Lagoon. These options included an 80m span suspension bridge over the lagoon entrance, a boardwalk across the lagoon, and an inland route option crossing the several fingers of wetland. A bridge across the lagoon entrance was the lowest cost option, but because of the extremely dynamic nature of the sandy site and the vulnerability of any bridge at this location to damage from storm surge and changing dune conditions, this option was rejected. It was known that on occasions the entrance to the Waitahora Lagoon becomes blocked off by westward littoral sand drift along the beach causing rising water levels in the lagoon, however it was indicated by locals that this occurred typically only once every 10 years, and for a brief time period only. A blockage of the entrance had occurred in early 2011, with water levels in the lagoon rising to more than one metre above normal high tide level before bursting through the sand blockage and naturally clearing the entrance to restore normal tidal water level fluctuation in the lagoon.

The third option of crossing the wetlands further inland offered less risk of being affected by lagoon water level rise, but the length of boardwalk required for this option was greater, hence the estimated cost for this option was 20% higher.

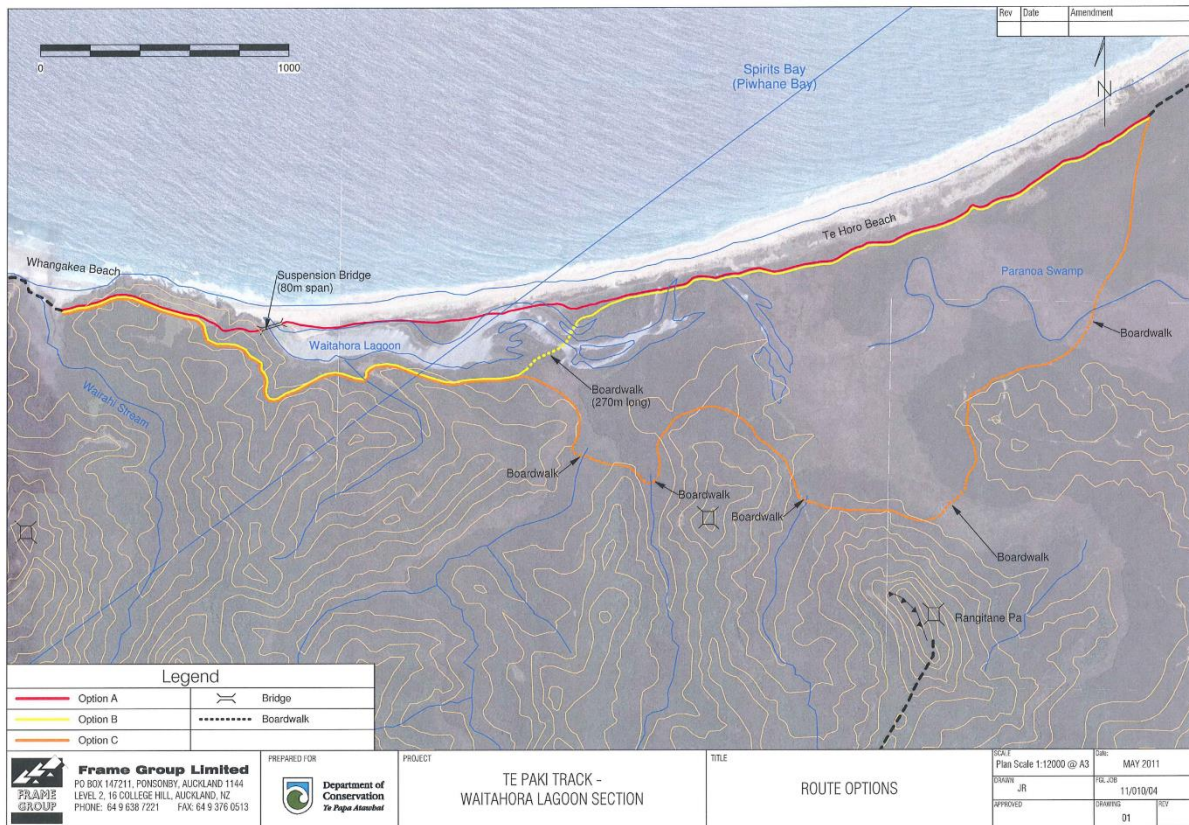


Figure 13: Route Options from the 2011 Frame Group Feasibility Report

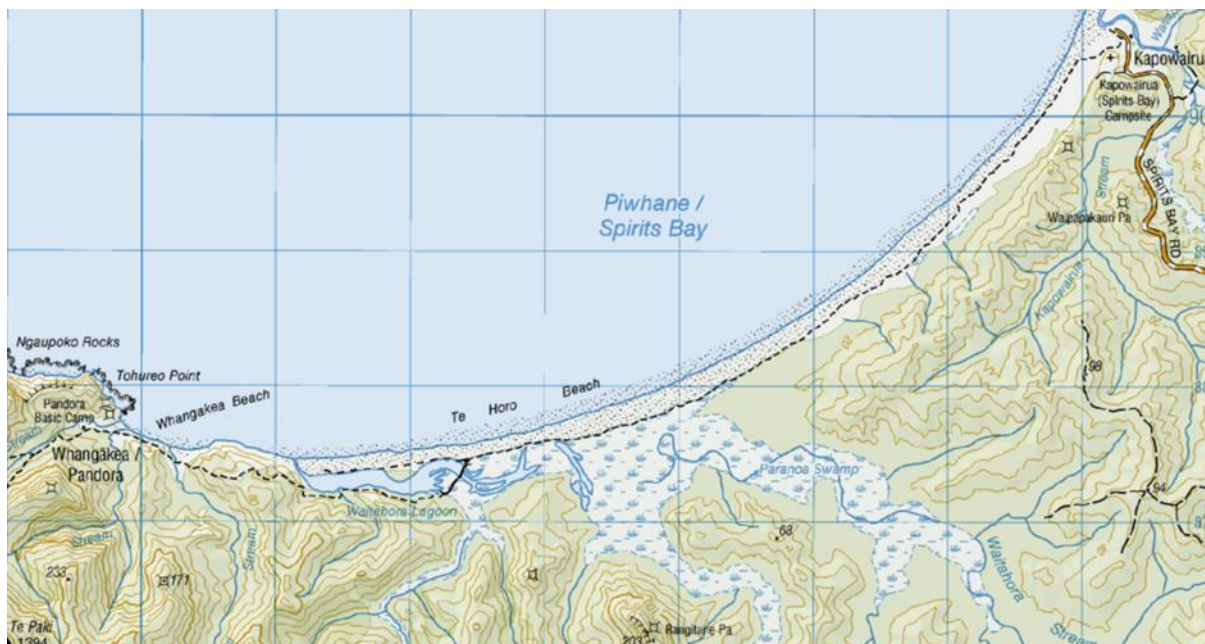


Figure 14: Te Paki Trail between Kapowairua and Whangakea/Spirits Bay showing the current boardwalk location across the Waitahora Lagoon boardwalk

The Waitahora lagoon boardwalk option was selected by DOC as the preferred solution. Surveys at the time of design found a route for a 270m long boardwalk that crossed at a stable part of the Waitahora Lagoon where the maximum water depth at high tide would be approximately 1.8m, meaning that the maximum boardwalk deck height above the bed would

be 2.3m, which allowed the boardwalk to be constructed without barriers because unprotected fall heights up to 3.0m are permitted on BCC classified tracks. The boardwalk was designed with pile sets at 2.5m spacing, with joists and deck spanning between pile sets. Piles were embedded into the underlying sand using a “water jetting” installation method and they were left extending 600mm above the deck level so that the position of the boardwalk could be identified, even if water was over the deck.

During the construction of the boardwalk, the lagoon entrance became blocked by sand and water level rose to approximately 0.5m above the boardwalk deck level. The buoyancy effect of the water lifted the freshly installed piles out of the sandy lagoon bed, and floating vegetation drifting down the lagoon applied lateral pressure causing the boardwalk to be deformed. A design modification was made that consisted of adding pairs of “duck bill” ground anchors into the underlying sand, with stainless steel cables that anchor the boardwalk down at the intended level, as well as providing improved lateral stability against debris pressure. The boardwalk was re-levelled and completed with the added anchors. It has remained in position since it was completed in 2012 and despite being occasionally submerged, it has not suffered damage. Reports suggest that inundation by water has been more frequent in recent years.



Figure 15: Waitahora Lagoon Boardwalk inundated during construction. Note raised piles and accumulated debris.



Figure 16: Waitahora lagoon Boardwalk soon after completion in 2012

5.2 Cyclone Damage

During the early 2023 cyclone events, the entrance to the Waitahora Lagoon became blocked with sand, following periods of extreme rainfall in the Waitahora catchment. Water levels in the lagoon rose to unprecedented levels, estimated to be up to 2m above boardwalk deck level. It appears the level remained high for some time, resulting in drowning of large areas of raupo and other wetland plants. In May after water levels fell as a result of the lagoon entrance clearing, a 10m section of boardwalk was noted as missing. Three pile sets appear to have been washed out in the section of lagoon where the channel is deepest. It is likely that this channel carried the fastest flow and also probably had an accumulation raft of floating dead vegetation debris. The high lateral load has either pulled out the anchors or broken the anchor cables.



Figure 16: Drone view of Waitahora Lagoon Boardwalk in mid May showing missing 10m section.

Following the period of high inundation, the lagoon entrance appears to have cleared, thus draining the lagoon so that water levels are again following normal tide water level cycles. At the time of our inspection on 25th May however, the lagoon water level was again at a very high level, completely inundating the boardwalk except for the top 100mm of the piles, meaning that the deck was 500mm under water. Fortunately, Thomas from Ngati Kuri was able to conduct a drone survey of the boardwalk path as well as the lagoon entrance during our visit. It appears that the original lagoon entrance is now fully blocked by dune sand and a new entrance has formed about 200m further east, but at the time of inspection, this was not fully open to the sea. This change in lagoon entrance location vindicates the original decision in 2011 not to construct a bridge over the lagoon entrance. The lagoon water level appeared to be rising slowly on the day of the inspection, and will continue to do so until it overtops the entrance sand level and scours out a new discharge channel. Once this happens, the water level will follow tide cycle levels until it becomes blocked again.



Figure 17: Waitahora lagoon boardwalk at the time of inspection 12.44pm 25 May 2023. Water depth over the boardwalk deck approximately 0.5m.

Given the recent events, the lagoon water level characteristics appear to be far more dynamic than they have been in the past. This is almost certainly a result of climate change. Slight rises in sea level and storm surge will give rise to re-adjustment of the lagoon physiology. Sustained severe storm swells, especially from a north east direction are likely to cause increased littoral drift, resulting in the entrance blocking off more frequently. As the effects of climate change deepen, the behaviour of the lagoon may change even more markedly. It is possible that frequent and prolonged inundation may become the norm. If this is the case, the Waitahora Lagoon Boardwalk may be inaccessible for long periods of time, and it is likely to suffer further damage from floating debris rafts. Floating debris could impact at any point over the boardwalk length because the debris position in the lagoon is influenced by prevailing wind as well as current. During the 2012 inundation the debris was in the northernmost channel, however the recent debris accumulation appears to have been in the deeper mid channel. There may be merit in engaging the services of a coastal process specialist to advise on the possible future changes in the Waitahora Lagoon under the effects of climate change.

Given the increased volatility in lagoon water level, it may be time to re-consider whether the boardwalk lagoon crossing is the best long term option for maintaining a viable Te Paki Coast Track connection between Kapowairua and Whangakea/Pandora. If the boardwalk is inaccessible for much of the time, and unreliable for maintaining the continuity of the track, it may be necessary to re-consider implementation of Option 3 of the Frame Group May 2011 report. It may be possible to recover the current boardwalk joists, decking, bearers and piles for re-use on the wetland boardwalk crossings, provided lagoon levels fall for a sufficient period to allow them to be removed.

Because the lagoon boardwalk could not be crossed at the time of the inspection, and the lagoon was too deep to cross, the track section along the lagoon edge from the end of the long boardwalk to the eastern end of the lagoon could not be checked. Most of this track is likely located above the highest level that the lagoon water rose to, but some parts may have been affected by elevated water levels or localised erosion. The boardwalks on this section of track have not been checked for damage.

5.3 Recommendation

The following recommendations are made with respect to the Waitahora Lagoon Boardwalk.

- Seek specialist coastal engineering advice on the likely future dynamics of the Waitahora Lagoon as climate change effects become more severe.
- Review the feasibility of options for reinstating reliable and sustainable connectivity for the Te Pahi Coastal Track over this section. This may involve re-considering the inland option with wetland crossings.
- If the existing Waitahora Lagoon boardwalk is not viable for future track connection, recover and stockpile the existing boardwalk components for re-use.
- Prepare design details for an alternative route or prepare design details for the remediation of the existing boardwalk.

BE(Civil)Hons, MBA(Exec), Fellow ENZ

Principal Consultant

Appendix 1: Engineers Ongoing Inspection Record Sheets (7)