23 Taupo Bay

Description and geomorphology

Taupo Bay is located on the east coast of Northland, approximately 35 km north of Kerikeri.

The north east facing shoreline forms a pocket beach embayment which is approximately 1 km long. Taupo Bay is situated between Okiore Point in the north and another Castle Peak headland in the south.

The site has a sandy beach comprising fine to medium sand. The beach has a minimal berm width in the north and the berm increases toward the south to approximately 10 m above the high tide line. The berm area above the high tide line along the northern 100 m of the site comprises large pebble sediment sourced from the adjacent cliff shoreline (refer to Site Photograph A).

The dune vegetation is sparse over the northern half of the site. The back shore is relatively low and a recent erosion scarp exists. The dune is well vegetated at the southern end with spinifex and a foredune is developing. The dune heights range from approximately RL 4 to 7 m along the site. The backshore is developed with some houses situated only 5 m landward of the dune toe.

The Taupo Creek mouth is located at the southern end of the site. A relatively large intertidal spit has formed at this end of the beach, which forces the stream flow north along the base of the Castle Peak headland. Some recent erosion is evident on the inside of the spit shoreline.

Local considerations

A stormwater outfall and boat ramp access point are located at the northern end of the site which has a local effect on the shoreline position. There are no erosion protection structures at this site.

Coastal Erosion Hazard Assessment

The site is split into four cells based on differences in dune height and geomorphology.

Site Photograph A (north)

Site Photograph B (centre)

Site Photograph C (south)

All cells are characterised as nonconsolidated beach type.

Adopted component values are presented within Table 23-1. Short-term erosion values range

from 5 to 15 m and long-term trends are generally variable.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 23-1 to Figure 23-4.

Coastal Erosion Hazard Zone widths are presented within Table 23-2 to 23-4 and Figure 23-5. CEHZ1 values range from 26 to 28 m, CEHZ2 values from 54 to 70 m and CEHZ3 from 68 to 90 m. CEHZ's have been mapped in agreement with the calculated values.

Figure 23-6 shows the available historic shorelines for Taupo Bay.

Table 23-1 Component values for Erosion Hazard Assessment

Site		**23. Taupo**			
Cell		23A	23B	23C	23D
Cell centre (NZTM)	E	1664775	1664911	1665172	1665243
	N	6127805	6127427	6127179	6127096
Chainage, m (from N/W)		0-250	250-880	880-990	990-1060
Morphology		Dune	Dune	Dune	Inlet
Short-term (m)	Min	5	5	5	5
	Mode	10	10	10	10
	Max	15	15	15	15
Dune/Cliff elevation (m above toe or scarp)	Min	2.9	3.8	4.7	4.7
	Mode	3.3	5.1	5.1	5.1
	Max	4.6	6.4	5.5	5.5
Stable angle (deg)	Min	30	30	30	30
	Mode	32	32	32	32
	Max	34	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	0.05	0.05	0.1	0.1
	Mode	-0.05	0	0	0
	Max	-0.1	-0.05	-0.1	-0.1
Closure slope (beaches)	Min	0.033	0.033	0.033	0.033
	Mode	0.026	0.026	0.02	0.02
	Max	0.02	0.02	0.013	0.013
SLR 2080 (m)	RCP 2.6	0.16	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51	0.51
SLR 2130 (m)	RCP 2.6	0.28	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17	1.17

2020	2080	2130

Figure 23-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 23A

2020	2080	2130

Figure 23-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 23B

2020	2080	2130

Figure 23-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 23C

2020	2080	2130

Figure 23-4 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 23D

Table 23-2 Coastal Erosion Hazard Zone Widths for 2020

Site		23. Taupo			
Probability of CEHZ (m) Exceedance		A	B	C	D
	Min	-8	-8	-9	-9
	99%	-9	-10	-10	-10
	95%	-9	-11	-11	-11
	90%	-10	-11	-11	-11
	80%	-11	-12	-12	-12
	70%	-12	-13	-13	-13
	66%	-12	-13	-13	-13
	60%	-12	-13	-14	-14
	50%	-13	-14	-14	-14
	40%	-13	-15	-15	-15
	33%	-14	-15	-15	-15
	30%	-14	-15	-15	-15
	20%	-15	-16	-16	-16
	10%	-16	-17	-17	-17
	5%	-16	-17	-18	-18
	1%	-17	-19	-18	-18
	Max	-18	-20	-19	-19

Table 23-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		23. Taupo															
Cell		23A				23B				23C				23D			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-11	-13	-16	-22	-13	-14	-18	-23	-11	-12	-16	-22	-10	-12	-16	-22
	99%	-14	-16	-21	-27	-15	-16	-21	-27	-14	-16	-20	-27	-14	-16	-20	-27
	95%	-16	-18	-22	-29	-16	-18	-22	-29	-16	-18	-23	-30	-16	-18	-23	-30
	90%	-17	-19	-24	-30	-17	-19	-23	-30	-17	-19	-24	-31	-17	-19	-24	-31
	80%	-19	-20	-25	-32	-18	-20	-24	-31	-19	-21	-26	-33	-19	-21	-26	-33
	70%	-19	-21	-26	-33	-19	-21	-25	-32	-20	-22	-27	-35	-20	-22	-27	-35
	66%	-20	-22	-26	-33	-19	-21	-26	-32	-20	-22	-28	-35	-20	-22	-28	-36
	60%	-20	-22	-27	-34	-20	-21	-26	-33	-21	-23	-28	-36	-21	-23	-28	-36
	50%	-21	-23	-28	-34	-20	-22	-27	-34	-22	-24	-29	-38	-22	-24	-29	-38
	40%	-22	-24	-28	-35	-21	-23	-27	-34	-22	-25	-31	-39	-22	-25	-31	-39
	33%	-22	-24	-29	-36	-21	-23	-28	-35	-23	-26	-31	-40	-23	-26	-31	-40
	30%	-23	-24	-29	-36	-22	-24	-28	-35	-23	-26	-32	-41	-24	-26	-32	-41
	20%	-23	-25	-30	-37	-22	-24	-29	-36	-25	-27	-33	-43	-25	-27	-33	-43
	10%	-25	-27	-31	-39	-24	-26	-30	-38	-26	-29	-35	-45	-26	-29	-36	-46
	5%	-26	-28	-32	-40	-24	-26	-31	-39	-27	-30	-37	-48	-28	-30	-37	-48
	1%	-27	-29	-34	-42	-26	-28	-33	-41	-30	-33	-40	-52	-30	-33	-40	-52
	Max	-30	-32	-38	-46	-28	-30	-36	-45	-33	-36	-45	-58	-34	-37	-46	-59
	CEHZ1	-26				-26				-28				-28			

Table 23-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		23. Taupo															
Cell		23A				23B				23C				23D			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-14	-19	-33	-43	-14	-18	-32	-42	-10	-14	-28	-38	-10	-15	-29	-39
	99%	-18	-23	-37	-48	-17	-22	-37	-47	-15	-20	-36	-47	-15	-20	-36	-47
	95%	-20	-26	-41	-52	-19	-24	-39	-50	-18	-24	-40	-52	-18	-24	-40	-52
	90%	-22	-27	-43	-54	-21	-26	-41	-52	-20	-26	-43	-55	-20	-26	-43	-55
	80%	-24	-29	-45	-56	-22	-27	-43	-54	-23	-29	-46	-59	-23	-29	-46	-59
	70%	-25	-30	-46	-58	-23	-28	-44	-56	-24	-31	-49	-62	-24	-30	-49	-62
	66%	-26	-31	-47	-59	-23	-29	-45	-56	-25	-31	-50	-64	-25	-31	-50	-64
	60%	-26	-32	-48	-60	-24	-29	-45	-57	-26	-32	-51	-66	-26	-32	-51	-65
	50%	-27	-33	-49	-61	-25	-30	-47	-59	-27	-34	-54	-69	-27	-34	-54	-68
	40%	-28	-34	-50	-63	-26	-31	-48	-60	-29	-35	-56	-72	-29	-35	-56	-72
	33%	-29	-35	-51	-64	-26	-32	-49	-61	-30	-37	-58	-74	-30	-37	-58	-74
	30%	-30	-35	-52	-65	-27	-32	-49	-62	-30	-37	-59	-75	-30	-37	-59	-75
	20%	-31	-36	-54	-67	-28	-33	-51	-64	-32	-39	-62	-79	-32	-39	-62	-79
	10%	-33	-38	-56	-70	-29	-35	-53	-66	-35	-42	-66	-85	-35	-42	-67	-86
	5%	-34	-40	-58	-72	-30	-36	-54	-68	-36	-44	-70	-90	-37	-45	-70	-90
	1%	-36	-42	-61	-76	-32	-38	-57	-72	-40	-49	-77	-99	-40	-49	-77	-99
	Max	-40	-47	-68	-83	-36	-42	-62	-78	-48	-58	-90	-114	-48	-58	-89	-113
	CEHZ2	-58				-54				-70				-70			
	CEHZ3	-72				-68				-90				-90			

Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.
Northland 0.4m Rural Aerial Photos (2014-2016).

A4 SCALE 1:5,000

0 0.1 0.2 (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
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NORTHLAND REGIONAL COUNCIL

Coastal Erosion Hazard Assessment

Taupo Bay

Site: 23

FIGURE No. Figure 23-5

Rev. 1

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Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.
Northland 0.4m Rural Aerial Photos (2014-2016).

A4 SCALE 1:5,000

0 0.1 0.2 (km)

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NORTHLAND REGIONAL COUNCIL

Historic Shorelines

Taupo Bay

Site: 23

FIGURE No. Figure 23-6

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