33 Tamaterau

33.1 Description and geomorphology

Tamaterau is a low-lying coastal terrace on the northeast shore of Whangarei Harbour and is located approximately 13 km from the harbour mouth. Figure 33.1 shows the site and its division into five coastal cells for the purpose of assessing coastal erosion hazards. Photos of select coastal cells are presented in Figure 33.2.

The site extends for 2.5 km alongshore and includes the main township (Figure 32.1). The township is built on a low-lying coastal plain that extends inland for up to 250 m to the base of a hillslope with underlying geology of Waipapa greywacke. At least four stream channels flow from the hillslope to the coast at Tamaterau and it is likely that sediment deposition from these channels has assisted in forming the low-lying coastal terrace over the Holocene. The township and site extend for the length of the coastal terrace and are bounded at either end by greywacke cliffs.

Beach sediments at Tamaterau are a mixture of fine to medium sand, with bands of shell marking recent high tide locations. Rounded pebbles are also common along the lower beach profile.

The coastal edge at Tamaterau has a section of sloping beach or scarped grass berm. A significant portion of the coast (Cell B and E) is fronted by private property, including private boat ramps and fences that double as seawalls. All other cells typically have public reserve space with a steep intertidal beach transitioning into grass reserve. Seaward of the beach, a tidal flat extends for 200-300 m before reaching a tidal harbour channel. The coast is exposed to wind-waves generated by the prevailing southwesterly winds with a maximum fetch of 3-6 km to the south and west. Wave interaction with the shoreline is limited to high tide and is significantly regulated by fetch and depth limited nearshore environment.

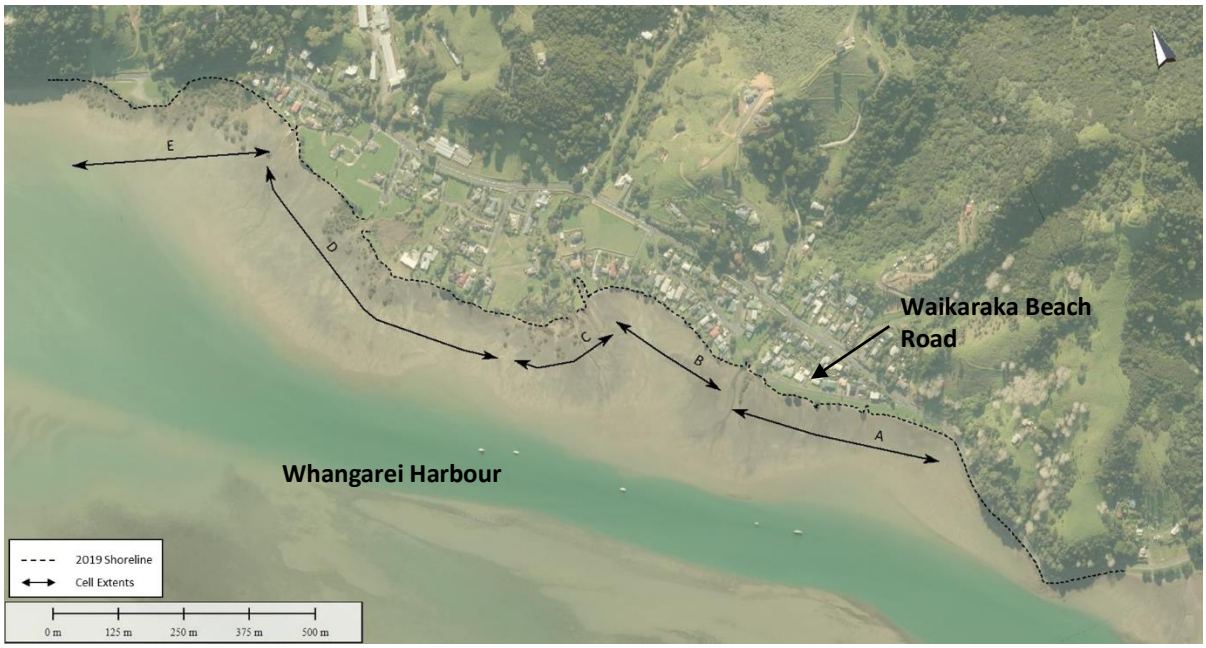


Figure 33.1: Map showing 2019 shoreline position and cell extents with background aerial imagery from 2014.

33.2 Local considerations

A significant portion of the coastal edge is defined by property boundaries, with some property margins defined by a private seawall or boat ramp. These private coastal protection structures are considered to be informal and are therefore not included as engineered structures in this hazard

assessment. The public reserve at the south end of the site is accessed by Waikaraka Beach road and is used for launching boats because there is no boat ramp. Mangrove removal along the developed shoreline likely has a local influence on shoreline morphology and stability at Tamaterau.

Figure 33.2: Photos from Tamaterau site visit on 23/01/2020.

33.3 Component values

The site is split into five cells. All cells are categorised as low-lying estuarine coastal terrace and divisions were based on changes in shoreline orientation, stream influence and development local shoreline modifications.

All cells have an underlying geology of coastal and alluvial sediments deposited in the Holocene, and are therefore considered to be unconsolidated. The short-term component for assessing hazards is based on the impact of a single or sequence of storms and was assessed the method outlined in

Table 4.6 in the main methodology of T+T (2020). Coastal response to future sea level rise was calculated using a geometric projection of the upper, lower and total beach slope, where the beach slope is measured between the vegetation edge and tidal flat. Representative slopes were identified for the site based on a series of LiDAR extracted profiles taken at locations with no or limited scarping as indicated by site photos. Slopes were assessed at all cells and a representative min, mode and max were selected for the entire site.

Analysis of historic aerial images indicates that the shoreline has been reasonably stable for the last 80 years, although a slight net trend of erosion is present in most cells. The trend of local accretion near influence by stream discharge was omitted from the adopted long-term rates because ongoing sediment supply to these sections is uncertain and detection of features in historic photos is not certain. The average long-term rate adopted for each cell ranged between -0.05 and -0.1 m/yr, with maximum rates between -0.1 and -0.2 m/yr.

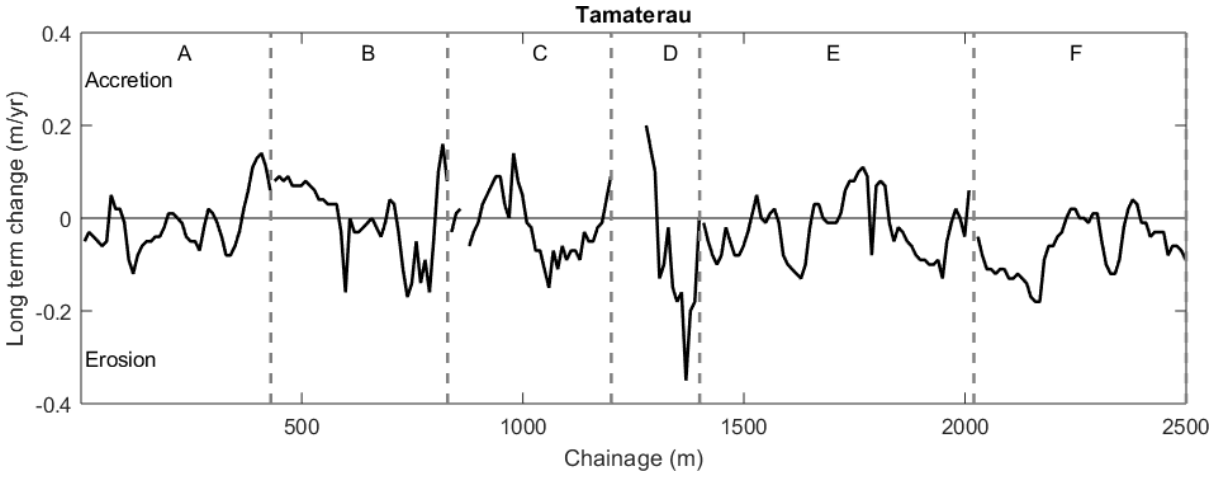


Figure 33.3: Rate of long-term shoreline change along the site showing each cell.

Table 33.1: Component values for Erosion Hazard Assessment

Site		33. Tamaterau				
Cell		33A	33B	33C	33D	33E
Cell centre (NZTM)	E	1726699	1726470	1726269	1725985	1725768
	N	6040153	6040405	6040520	6040781	6041226
Chainage, m (from E)		1-390	400-760	840-960	970-1580	1590-2060
Morphology		Estuarine coastal terrace				
Short-term (m)	Min	2	2	2	2	2
	Mode	4	4	4	4	4
	Max	6	6	6	6	6
Dune/Cliff elevation (m above toe or scarp)	Min	0.8	0.8	0.8	0.8	0.6
	Mode	1.3	1.3	1.2	1.2	1.3
	Max	2.6	2.3	1.8	1.4	2.1
Stable angle (deg)	Min	30	30	30	30	30
	Mode	32	32	32	32	32
	Max	34	34	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	-0.14	-0.12	-0.20	-0.10	-0.15
	Mode	-0.07	-0.06	-0.10	-0.05	-0.07
	Max	0.00	0.00	0.00	0.00	0.00
Closure slope (beaches) / Cliff response factor	Min	0.06	0.06	0.06	0.06	0.06
	Mode	0.1	0.1	0.1	0.1	0.1
	Max	0.14	0.14	0.14	0.14	0.14

Table 33.2: Adopted sea level rise values (m) based on four scenarios included in MfE (2017) adjusted to 2019 baseline

Coastal type	Year	RCP2.6M	RCP4.5M	RCP8.5M	RCP8.5+
Unconsolidated beach[1]	2080	0.16	0.21	0.33	0.51
	2130	0.28	0.42	0.85	1.17

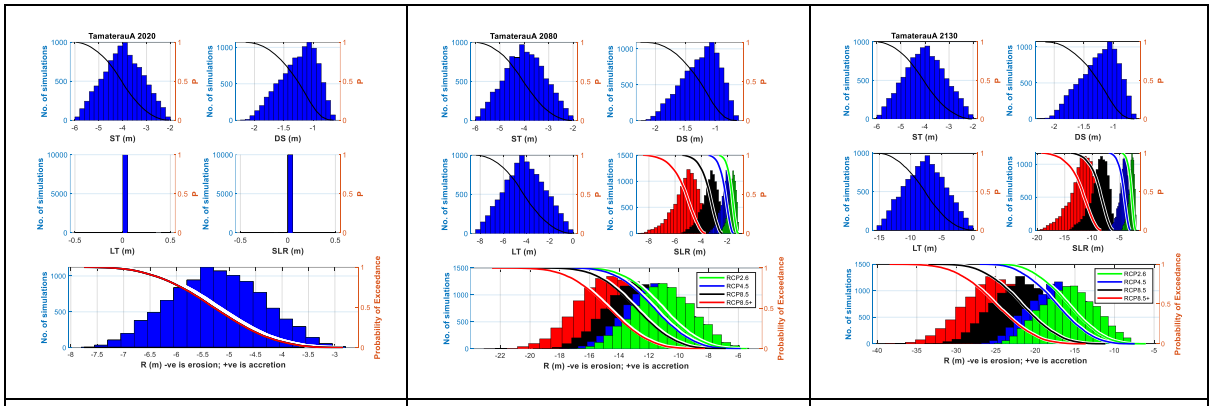
[1]Adjusted to remove the influence of historic SLR (2.2 mm/year) on long-term rates of shoreline change

33.4 Coastal erosion hazard assessment

Histograms of individual components and resultant CEHZ distances computed using a Monte Carlo technique are shown in Figure 33.4 to Figure 33.8. Coastal Erosion Hazard Zone widths are presented within Table 33.3 to Table 33.5 and mapped in Figure 33.9.

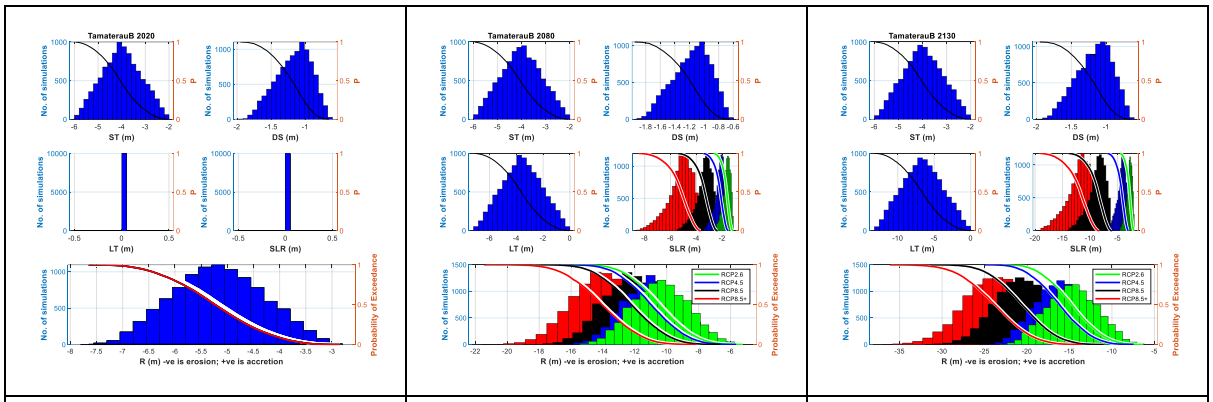
CEHZ1 values range from 11 to 13 m, CEHZ2 values from 25 to 33 m with Cell D being rounded up to the minimum value of 25 m for coastal terraces. CEHZ3 values range from 28 to 36 m.

Figure 33.9 shows the available historic shorelines for Tamaterau.



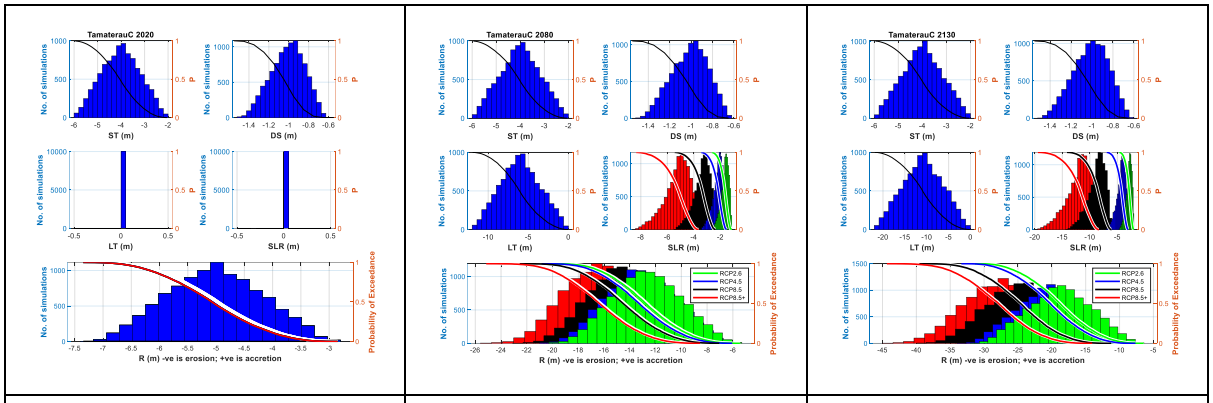
2020	2080	2130

Figure 33.4: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 33A



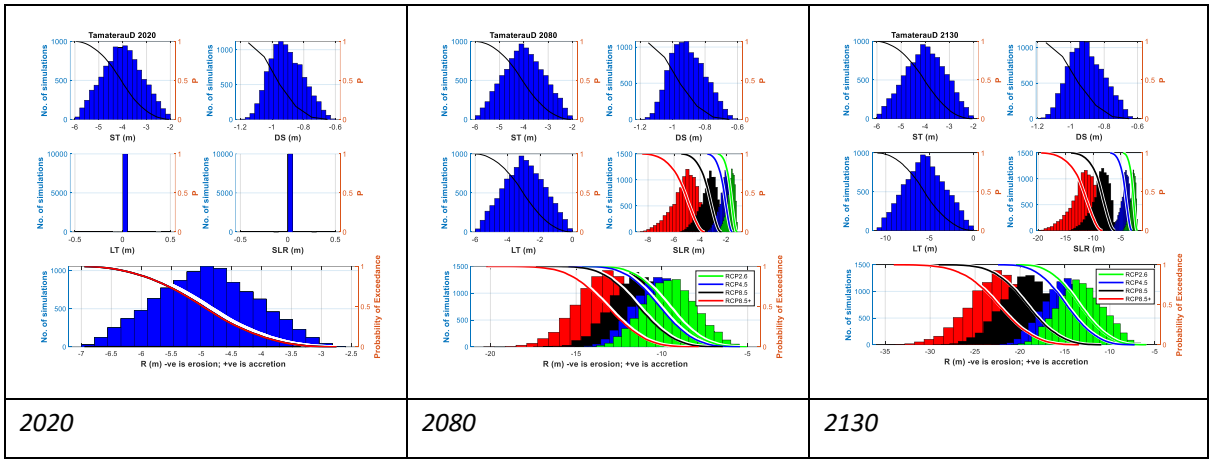
2020	2080	2130

Figure 33.5: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 33B



2020	2080	2130

Figure 33.6: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 33C



2020	2080	2130

Figure 33.7: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 33D

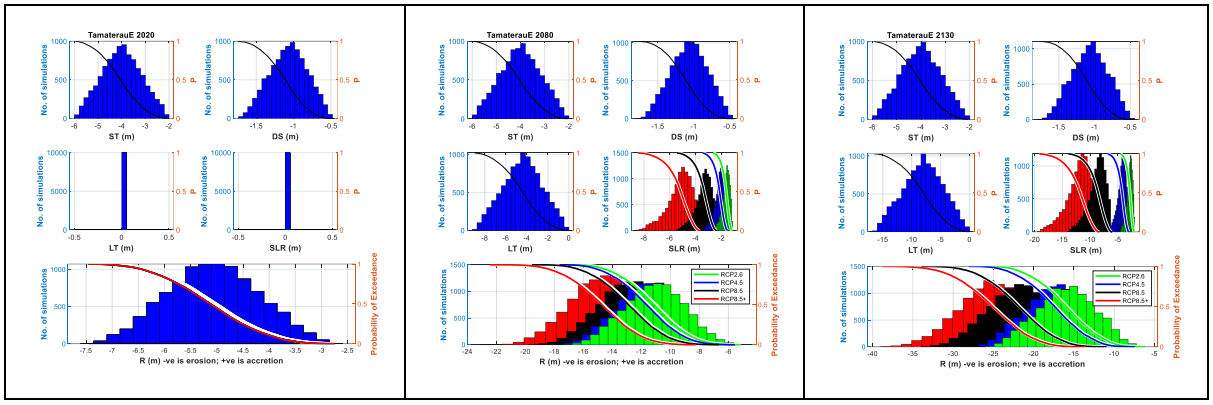


Figure 33.8: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 33E

Table 33.3: Coastal Erosion Hazard Zone Widths (m) Projected for 2020

Site		33. Tamaterau				
	Cell	33A	33B	33C	33D	33E
Probability of CEHZ (m) Exceedance	Min	-3	-3	-3	-3	-3
	99%	-3	-3	-3	-3	-3
	95%	-4	-4	-4	-4	-4
	90%	-4	-4	-4	-4	-4
	80%	-4	-4	-4	-4	-4
	70%	-5	-5	-5	-4	-5
	66%	-5	-5	-5	-5	-5
	60%	-5	-5	-5	-5	-5
	50%	-5	-5	-5	-5	-5
	40%	-5	-5	-5	-5	-5
	33%	-6	-6	-5	-5	-5
	30%	-6	-6	-5	-5	-6
	20%	-6	-6	-6	-6	-6
	10%	-6	-6	-6	-6	-6
	5%	-7	-7	-6	-6	-6
	1%	-7	-7	-7	-7	-7
	Max	-8	-8	-7	-7	-7

Table 33.4: Coastal Erosion Hazard Zone Widths (m) Projected for 2080

Site		33. Tamaterau																			
Cell		33A				33B				33C				33D				33E			
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+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-5	-6	-7	-8	-5	-6	-7	-8	-5	-6	-7	-9	-5	-5	-6	-8	-5	-6	-7	-8
	99%	-7	-7	-8	-10	-7	-7	-8	-10	-7	-7	-9	-10	-6	-7	-8	-9	-7	-7	-8	-10
	95%	-8	-8	-10	-11	-8	-8	-9	-11	-8	-9	-10	-12	-7	-7	-9	-10	-8	-8	-9	-11
	90%	-8	-9	-10	-12	-8	-9	-10	-12	-9	-10	-11	-13	-8	-8	-9	-11	-8	-9	-10	-12
	80%	-9	-10	-11	-13	-9	-9	-11	-12	-10	-11	-12	-14	-8	-9	-10	-12	-9	-10	-11	-13
	70%	-10	-11	-12	-14	-9	-10	-11	-13	-11	-12	-13	-15	-9	-9	-10	-12	-10	-10	-12	-14
	66%	-10	-11	-12	-14	-10	-10	-11	-13	-12	-12	-13	-15	-9	-9	-11	-12	-10	-11	-12	-14
	60%	-11	-11	-12	-14	-10	-10	-12	-13	-12	-13	-14	-16	-9	-10	-11	-13	-11	-11	-12	-14
	50%	-11	-12	-13	-15	-10	-11	-12	-14	-13	-13	-14	-16	-10	-10	-11	-13	-11	-12	-13	-15
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	1%	-15	-16	-17	-20	-14	-15	-16	-18	-18	-19	-20	-22	-13	-13	-15	-17	-16	-16	-18	-20
	Max	-17	-18	-20	-23	-16	-17	-19	-21	-20	-21	-23	-25	-15	-15	-17	-20	-17	-18	-20	-22
	CEHZ1	-12				-11				-13				-11				-12			

Table 33.5: Coastal Erosion Hazard Zone Widths (m) Projected for 2130

Site		33. Tamaterau																			
Cell		33A				33B				33C				33D				33E			
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+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-6	-7	-11	-14	-6	-7	-11	-14	-6	-8	-11	-14	-6	-7	-11	-13	-6	-7	-11	-14
	99%	-9	-10	-14	-17	-8	-10	-14	-16	-9	-10	-14	-17	-8	-9	-13	-16	-9	-10	-14	-16
	95%	-10	-12	-16	-19	-10	-11	-15	-18	-11	-13	-17	-20	-9	-11	-14	-17	-10	-12	-16	-19
	90%	-11	-13	-17	-20	-11	-12	-16	-19	-13	-14	-18	-21	-10	-11	-15	-18	-11	-13	-17	-20
	80%	-13	-14	-18	-22	-12	-14	-18	-21	-15	-16	-20	-24	-11	-13	-17	-20	-13	-14	-19	-22
	70%	-14	-15	-20	-23	-13	-15	-19	-22	-16	-18	-22	-25	-12	-13	-18	-21	-14	-15	-20	-23
	66%	-14	-16	-20	-23	-13	-15	-19	-22	-17	-18	-23	-26	-12	-14	-18	-21	-14	-16	-20	-23
	60%	-15	-16	-21	-24	-14	-15	-20	-23	-18	-19	-23	-27	-13	-14	-18	-22	-15	-16	-21	-24
	50%	-16	-17	-22	-25	-15	-16	-21	-24	-19	-20	-25	-28	-13	-15	-19	-22	-16	-17	-22	-25
	40%	-17	-18	-23	-26	-15	-17	-21	-25	-20	-21	-26	-29	-14	-15	-20	-23	-17	-18	-23	-26
	33%	-17	-19	-23	-27	-16	-17	-22	-25	-21	-22	-27	-30	-14	-16	-20	-24	-18	-19	-24	-27
	30%	-18	-19	-24	-27	-16	-18	-22	-26	-21	-23	-27	-31	-15	-16	-21	-24	-18	-19	-24	-27
	20%	-19	-20	-25	-28	-17	-19	-23	-27	-23	-24	-29	-32	-15	-17	-22	-25	-19	-21	-25	-29
	10%	-20	-22	-27	-30	-19	-20	-25	-28	-25	-27	-31	-35	-17	-18	-23	-27	-21	-22	-27	-31
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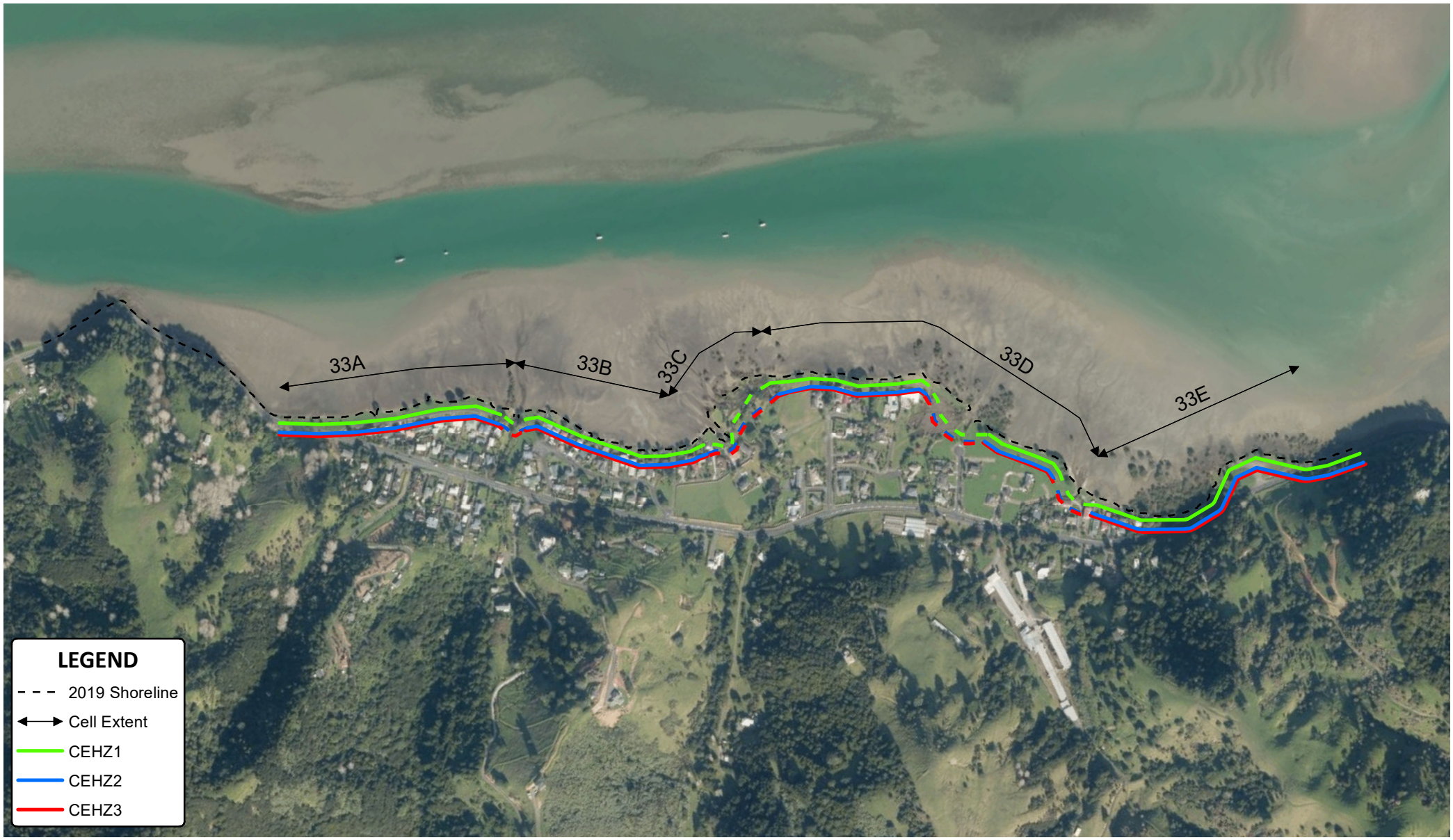
	1%	-23	-25	-30	-34	-21	-22	-28	-32	-29	-30	-35	-39	-19	-20	-26	-30	-24	-25	-31	-35
	Max	-25	-27	-34	-38	-23	-25	-31	-36	-31	-33	-40	-44	-20	-22	-29	-34	-26	-28	-34	-39
	CEHZ2	-28				-26				-33				-25				-28			
	CEHZ3	-32				-30				-36				-28				-32			



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

A4 SCALE 1:9,000

0 0.1 0.2 0.3 0.4 0.5 (km)

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Coastal Erosion Hazard Assessment
Tamaterau
Site: 33

FIGURE No. Figure 33-9

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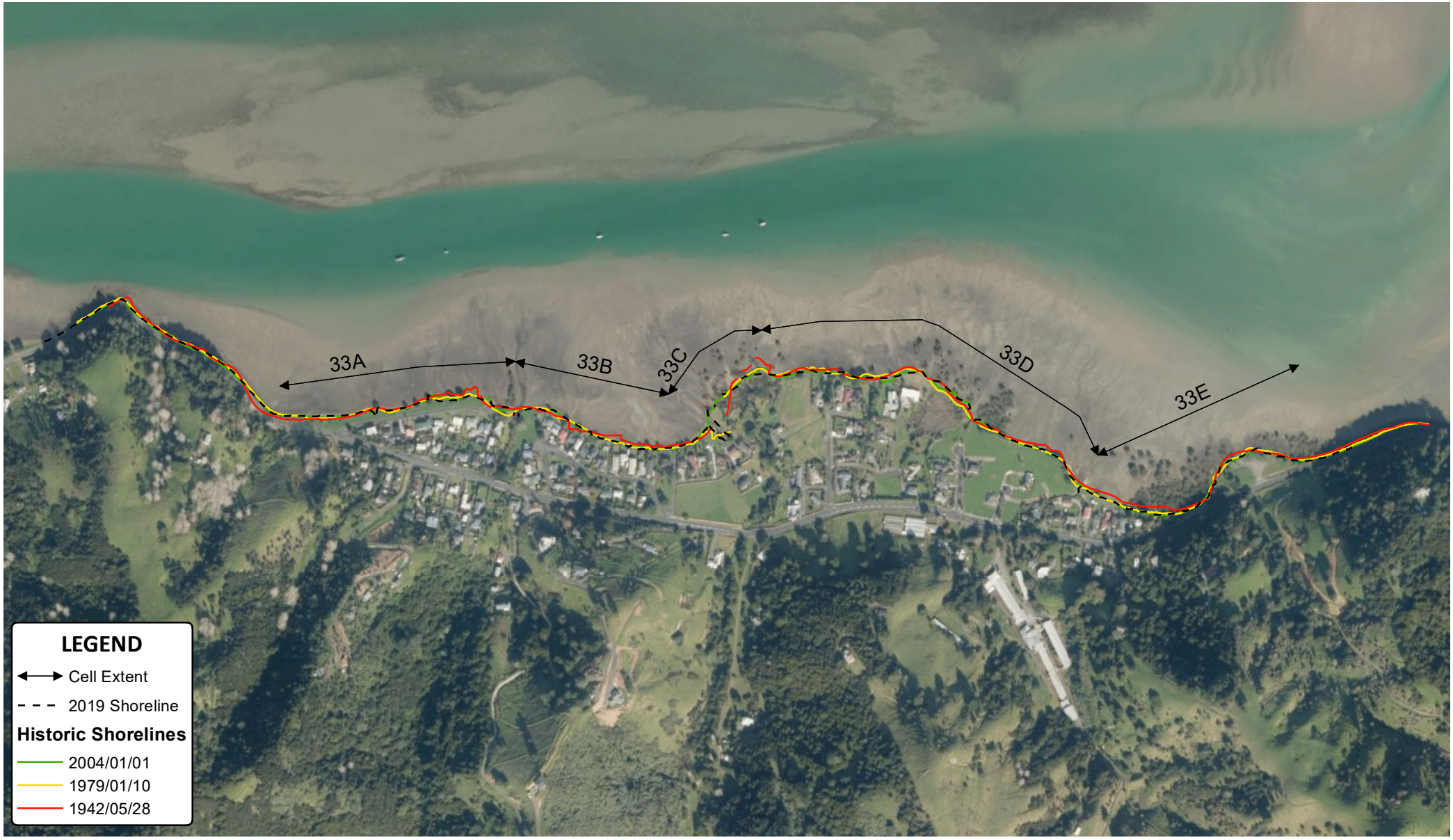

Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.
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PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Tamaterau
Site: 33

FIGURE No. Figure 33-10

Rev. 1

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