4 Marsden Point

Description and geomorphology

The Marsden Point site is located at the north end of Bream Bay, approximately 20 km south of Whangarei.

The site is situated between the North Port reclamation around Marsden Point down to the Ruakaka township at the southern extent. The Marsden Point site includes a north facing shoreline located inside the harbour entrance which is approximately 1.6 km long and an east facing open coast shoreline that is approximately 5 km long.

The harbour shoreline is a sandy beach dune system. The dunes are relatively low lying and well vegetated with spinifex and pingao. The sandy beach comprises fine sand fronted by intertidal flats which range in width between 30 m and 200 m out to the entrance channel.

The open coast section of the site has a sandy beach comprising fine sand. The beach has a minimal berm width of approximately 5 m above the high tide line. The site has a dune system that is relatively high with crest elevations of between RL 5 to 13 m along the open coast. The dune elevations increase toward the north. The dune face is generally over steep with recent erosion scarps located at the northern end of the open coast shoreline. Dune vegetation exists along the dune crest (spinifex). The lower half of the dune face is re-building with limited vegetation present.

Local considerations

The offshore ebb tide delta has a significant control on the shoreline position adjacent to the entrance to the Whangarei Harbour. Large variations in shoreline position have occurred over the last 60 years in this area of up to 80 m. Changes to the ebb tide delta may result in relatively rapid changes to shoreline position in this area, which may vary from historic trends.

There are no erosion protection structures at this site. The site is bounded at the north western end by the North Port reclamation, which shelters the shoreline from the westerly direction in this area. Two stormwater outlets exist on the open coast shoreline, which have a relatively minor effect on the shoreline position.

Site Photograph A (south)

Site Photograph B (centre)

Site Photograph C (north)

Coastal Erosion Hazard Assessment

The site is split into seven cells based on differences in dune height and geomorphology. All cells are characterised as nonconsolidated beach type. Adopted component values are presented within Table 4-1. The short-term

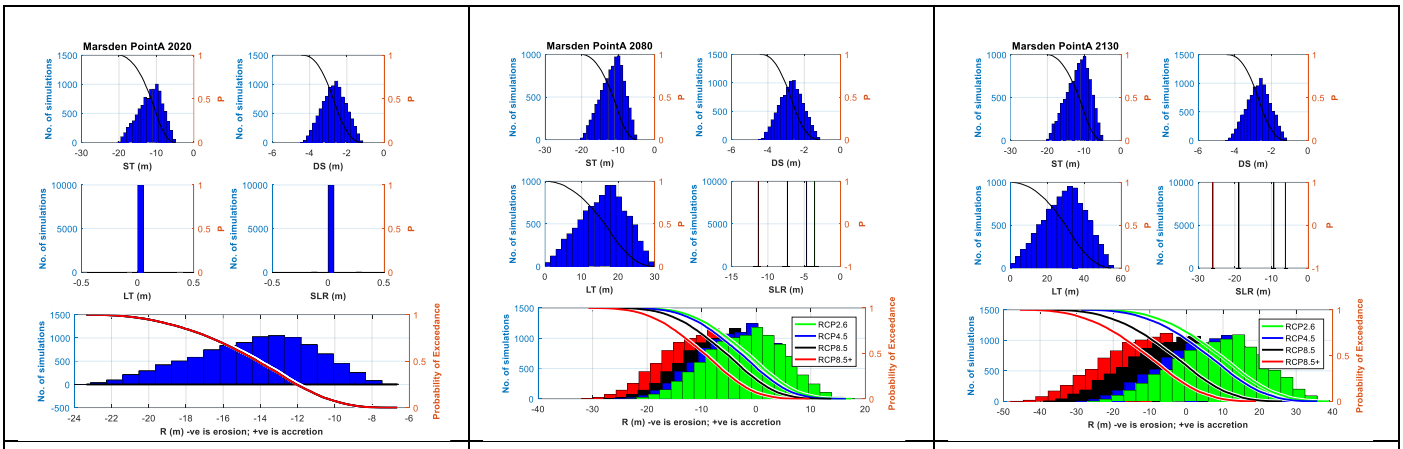
erosion component increases to the south. The long-term shoreline trends are accretionary in the north within the harbour, becoming highly erosional along cells B and C on the open coast, likely due to changes in the ebb tidal delta and channels, and becoming stable to the south.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 4-1 to Figure 4-7. Coastal Erosion Hazard Zone widths are presented within Table 4-2 to 4-4 and Figure 4-8. CEHZ1 values range from 10 to 75 m. CEHZ2 values range from 25 m within the harbour mouth to 174 m. CEHZ3 values range from 31 to 199 m. Large open coast values are due to the long-term erosion trends at Cells B and C and also the very flat offshore profile associated with the ebb tidal delta which results in large recession distances with sea level rise. CEHZ's have been mapped in agreement with the calculated values.

Figure 4-9 shows the available historic shorelines for Marsden Point.

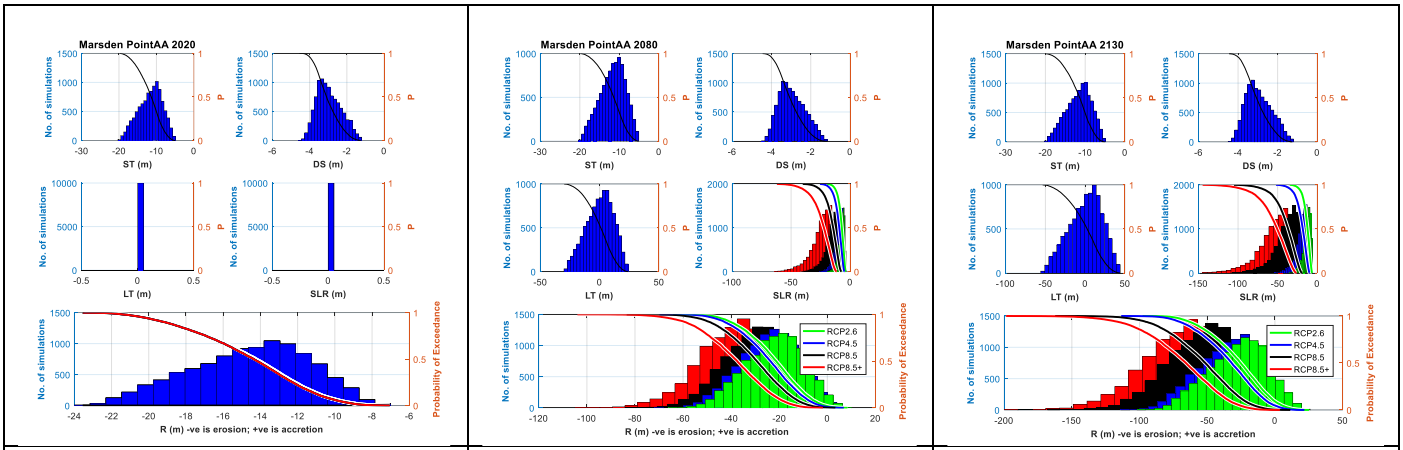
Table 4-1 Component values for Erosion Hazard Assessment

Site		4. Marsden Point						
Cell		4A	4AA	4B	4C	4D	4E	4F
Cell centre (NZTM)	E	1735472	1735472	1735472	1734590	1733854	1733041	1733041
	N	6033104	6033104	6033104	6031419	6030598	6029315	6029315
Chainage, m (from N/W)		0-1280	1280-1850	1850-2670	2670-4020	4020-4900	4900-6350	6350-7160
Morphology		Estuary Bank	Dune	Dune	Dune	Dune	Dune	Dune
Short-term (m)	Min	5	5	5	10	10	10	10
	Mode	10	10	10	20	20	20	20
	Max	20	20	20	30	30	30	30
Dune/Cliff elevation (m above toe or scarp)	Min	1.5	1.5	3.0	7.0	4.7	5.2	5.9
	Mode	3.3	4.3	4.4	8.9	6.8	7.2	7.2
	Max	5.3	5.3	7.0	13.0	10.2	9.9	8.8
Stable angle (deg)	Min	30	30	30	30	30	30	30
	Mode	32	32	32	32	32	32	32
	Max	34	34	34	34	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	0.5	0.4	-0.6	-0.15	0.25	0	0.2
	Mode	0.3	0.1	-0.8	-0.45	0.15	-0.1	0
	Max	0	-0.5	-1	-0.6	0	-0.2	-0.1
Closure slope (beaches)	Min	0.045	0.045	0.045	0.045	0.045	0.045	0.045
	Mode	0.045	0.019	0.019	0.019	0.019	0.019	0.019
	Max	0.045	0.008	0.008	0.008	0.008	0.008	0.008
SLR 2080 (m)	RCP 2.6	0.16	0.16	0.16	0.16	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33	0.33	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51	0.51	0.51	0.51	0.51
SLR 2130 (m)	RCP 2.6	0.28	0.28	0.28	0.28	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42	0.42	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85	0.85	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17	1.17	1.17	1.17	1.17



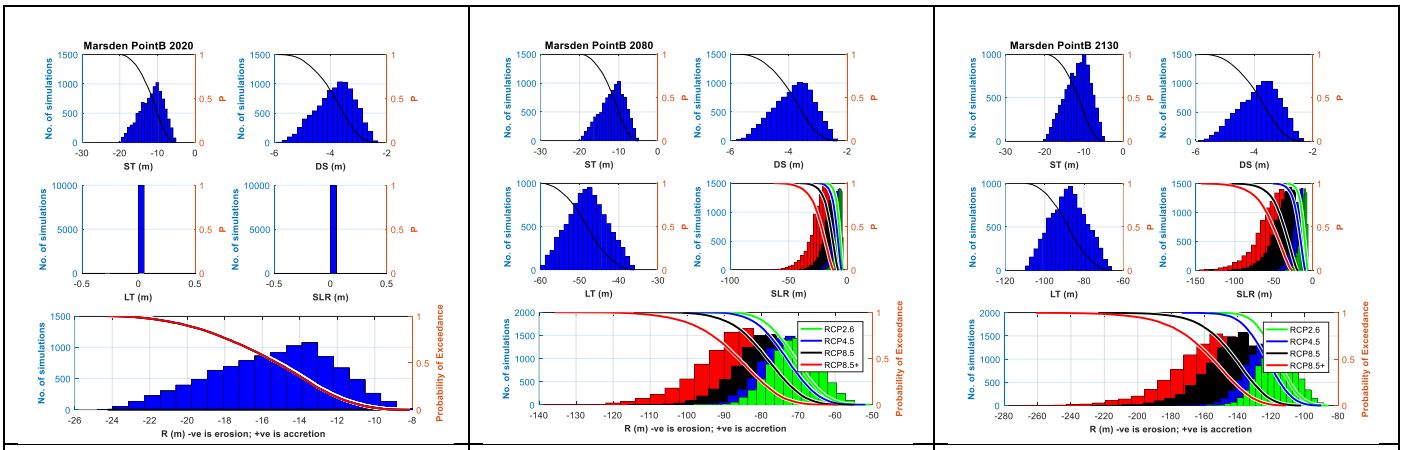
2020	2080	2130

Figure 4-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 4A



2020	2080	2130

Figure 4-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 4AA



2020	2080	2130

Figure 4-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 4B

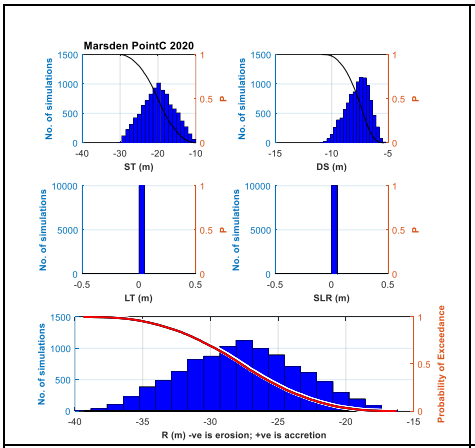
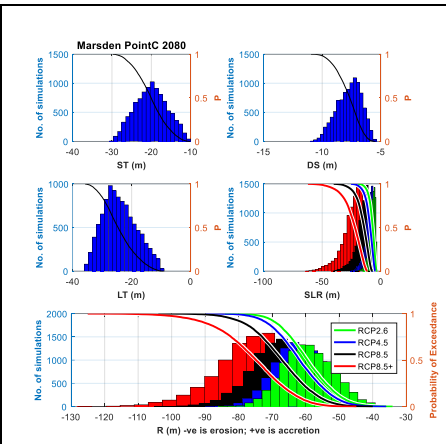
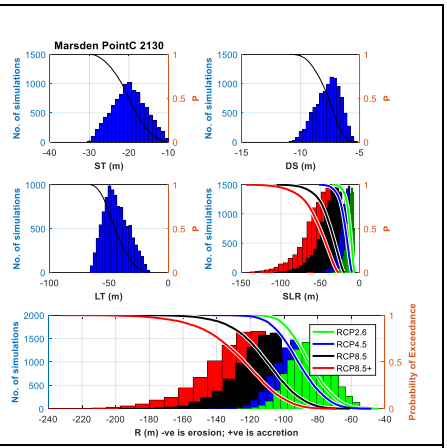
		
2020	*2080*	*2130*

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

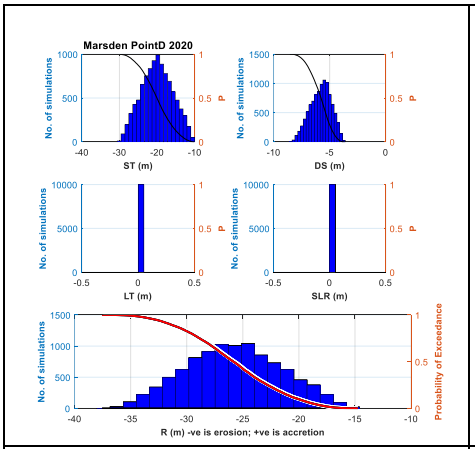
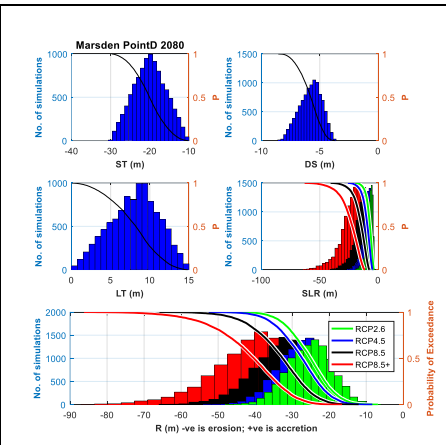
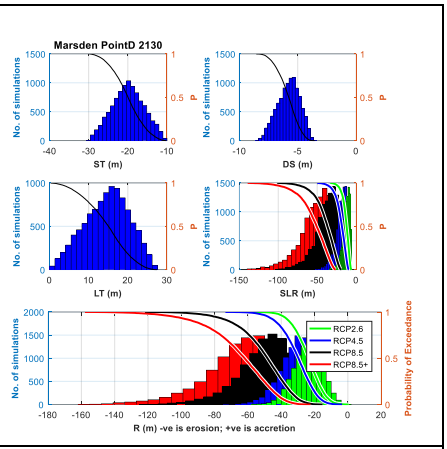
		
2020	*2080*	*2130*

Figure 4-5 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 4D

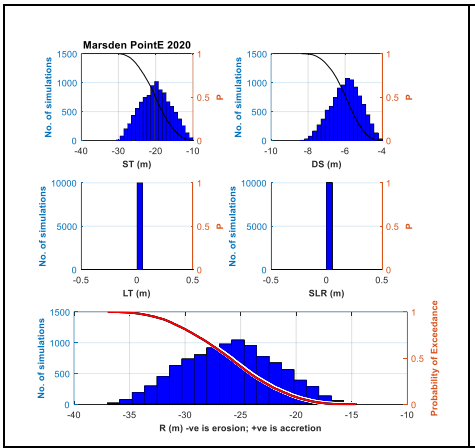
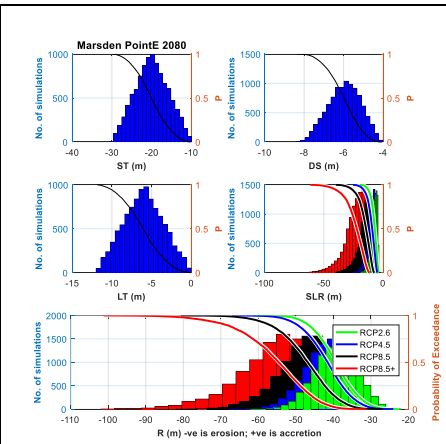
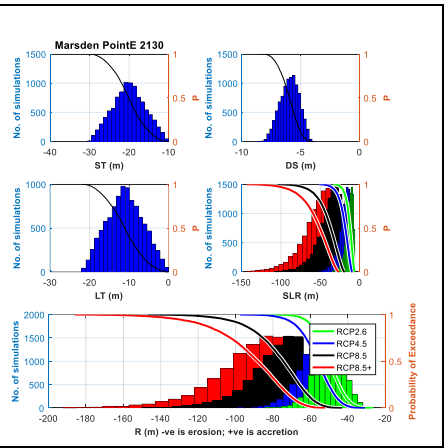
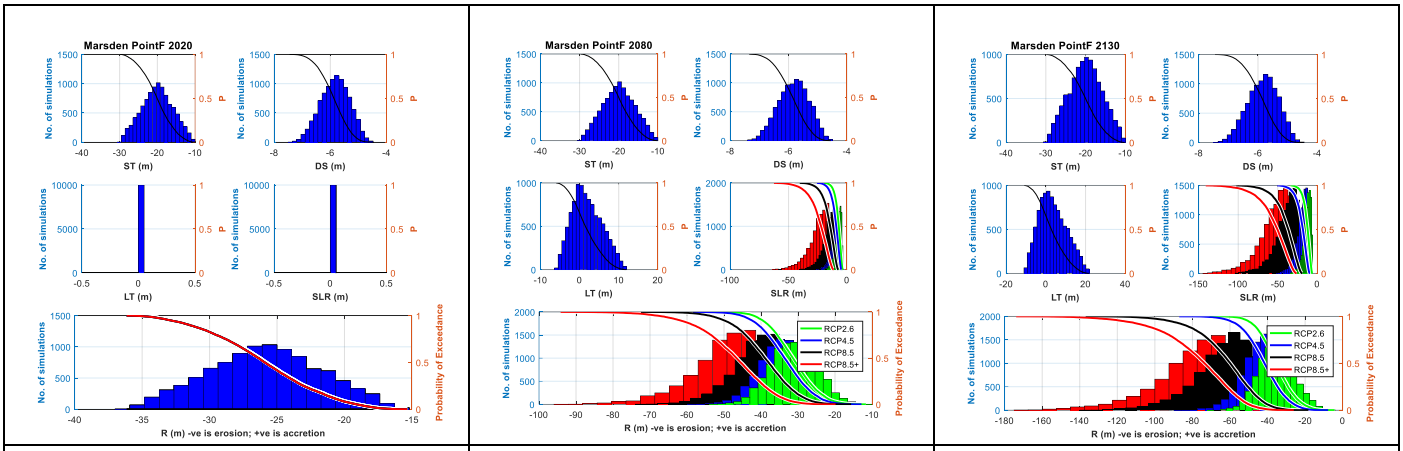
		
2020	*2080*	*2130*

Figure 4-6 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 4E



2020	2080	2130

Figure 4-7 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 4F

Table 4-2 Coastal Erosion Hazard Zone Widths for 2020

Site		4. Marsden Point						
Probability of CEHZ (m) Exceedance		A	AA	B	C	D	E	F
	Min	-7	-7	-8	-16	-15	-15	-15
	99%	-8	-9	-10	-19	-17	-17	-17
	95%	-10	-10	-11	-21	-19	-19	-19
	90%	-10	-11	-12	-22	-20	-20	-20
	80%	-12	-12	-13	-24	-22	-22	-22
	70%	-12	-13	-13	-25	-23	-24	-24
	66%	-13	-13	-14	-26	-24	-24	-24
	60%	-13	-13	-14	-27	-25	-25	-25
	50%	-14	-14	-15	-28	-26	-26	-26
	40%	-15	-15	-16	-29	-27	-27	-27
	33%	-16	-16	-17	-30	-28	-28	-28
	30%	-16	-16	-17	-30	-28	-28	-28
	20%	-17	-18	-18	-31	-30	-30	-30
	10%	-19	-19	-20	-33	-31	-31	-31
	5%	-20	-20	-21	-35	-33	-33	-33
	1%	-22	-22	-23	-37	-35	-35	-34
	Max	-23	-24	-25	-40	-37	-37	-36

Table 4-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		4. Marsden Point																									
Cell		4A				4AA				4B				4C				4D				4E				4F			
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+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	18	16	14	10	8	7	3	-2	-51	-52	-55	-59	-34	-36	-40	-45	-7	-8	-12	-17	-23	-24	-27	-31	-12	-13	-16	-20
	99%	12	11	8	4	2	0	-4	-10	-57	-59	-62	-68	-42	-43	-48	-53	-13	-14	-18	-23	-28	-29	-33	-38	-17	-19	-23	-28
	95%	9	8	5	1	-4	-6	-10	-16	-60	-62	-66	-72	-47	-48	-53	-59	-16	-18	-22	-27	-30	-32	-36	-42	-21	-23	-27	-33
	90%	7	6	3	-1	-7	-9	-14	-20	-63	-65	-69	-75	-49	-51	-56	-62	-18	-20	-24	-30	-32	-34	-38	-44	-23	-25	-30	-36
	80%	4	3	0	-4	-11	-13	-18	-26	-65	-67	-72	-78	-53	-55	-59	-66	-20	-22	-27	-33	-35	-37	-41	-48	-26	-28	-33	-39
	70%	2	1	-2	-6	-15	-17	-22	-30	-67	-69	-74	-81	-55	-57	-62	-69	-22	-24	-29	-36	-36	-39	-43	-50	-28	-30	-35	-42
	66%	1	0	-3	-7	-16	-19	-24	-32	-68	-70	-75	-82	-56	-58	-63	-71	-23	-25	-30	-37	-37	-39	-44	-51	-29	-31	-36	-43
	60%	0	-1	-4	-8	-18	-20	-26	-34	-69	-71	-76	-84	-57	-60	-65	-72	-24	-26	-31	-38	-38	-40	-45	-52	-30	-32	-37	-44
	50%	-2	-3	-5	-9	-21	-24	-29	-37	-71	-73	-78	-86	-59	-62	-67	-75	-25	-27	-33	-40	-39	-41	-47	-55	-31	-34	-39	-47
	40%	-4	-5	-8	-12	-25	-27	-33	-41	-73	-75	-80	-89	-61	-64	-69	-78	-27	-29	-35	-43	-41	-43	-49	-57	-33	-35	-41	-49
	33%	-5	-6	-9	-13	-27	-30	-35	-44	-74	-76	-82	-91	-63	-65	-71	-80	-28	-30	-36	-45	-42	-44	-50	-59	-34	-37	-42	-51
	30%	-6	-7	-10	-14	-28	-31	-37	-46	-74	-77	-83	-92	-63	-66	-72	-80	-28	-31	-37	-46	-42	-45	-51	-60	-35	-37	-43	-52
	20%	-8	-9	-12	-16	-33	-35	-41	-51	-76	-79	-85	-95	-66	-68	-74	-84	-30	-33	-40	-49	-44	-47	-53	-63	-37	-39	-45	-55
	10%	-11	-12	-15	-19	-39	-41	-47	-58	-79	-82	-89	-101	-69	-72	-78	-90	-33	-36	-43	-55	-47	-50	-57	-69	-39	-42	-49	-61
	5%	-14	-15	-17	-21	-43	-46	-52	-64	-82	-85	-93	-106	-71	-74	-82	-95	-35	-38	-47	-61	-49	-52	-61	-74	-41	-45	-53	-66
	1%	-18	-19	-22	-26	-50	-53	-62	-76	-86	-89	-99	-116	-76	-79	-89	-106	-39	-44	-55	-72	-52	-57	-67	-85	-46	-50	-60	-77
	Max	-23	-24	-27	-31	-64	-70	-83	-104	-96	-101	-114	-136	-84	-90	-104	-125	-48	-53	-66	-86	-61	-67	-81	-101	-53	-58	-72	-94
	CEHZ1	-10				-24				-75				-63				-30				-44				-36			

Table 4-4 Coastal Erosion Hazard Zone Widths Projected 2130

Site		4. Marsden Point																									
Cell		4A				4AA				4B				4C				4D				4E				4F			
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+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	39	36	26	19	25	22	11	4	-86	-90	-102	-111	-44	-48	-61	-69	0	-3	-15	-22	-27	-31	-43	-52	-4	-8	-18	-26
	99%	33	29	20	13	14	9	-5	-15	-93	-98	-111	-120	-57	-62	-75	-84	-7	-11	-23	-31	-34	-38	-50	-59	-14	-19	-31	-40
	95%	27	24	15	8	5	0	-16	-26	-99	-104	-118	-128	-64	-69	-84	-94	-11	-16	-29	-38	-38	-43	-56	-65	-20	-25	-39	-49
	90%	24	21	11	4	-1	-7	-23	-34	-103	-108	-123	-133	-68	-74	-89	-100	-14	-18	-32	-42	-40	-45	-59	-69	-23	-28	-43	-53
	80%	19	16	6	-1	-8	-14	-31	-44	-107	-113	-128	-140	-74	-80	-96	-107	-17	-22	-37	-48	-44	-49	-64	-74	-27	-33	-48	-59
	70%	15	12	3	-4	-14	-20	-38	-51	-111	-116	-133	-145	-78	-84	-101	-113	-19	-25	-41	-53	-46	-51	-67	-79	-30	-36	-52	-64
	66%	14	11	2	-6	-16	-22	-41	-54	-112	-118	-135	-147	-80	-86	-103	-115	-20	-26	-42	-54	-47	-52	-69	-81	-32	-37	-54	-66
	60%	12	9	0	-7	-20	-26	-45	-59	-114	-120	-137	-150	-82	-88	-106	-118	-21	-27	-45	-57	-48	-54	-71	-83	-33	-39	-56	-69
	50%	9	6	-3	-11	-25	-32	-51	-66	-116	-123	-141	-155	-85	-92	-110	-124	-24	-30	-48	-62	-50	-56	-74	-88	-35	-42	-60	-74
	40%	6	3	-7	-14	-31	-38	-58	-74	-119	-126	-146	-161	-88	-95	-114	-129	-26	-32	-52	-67	-52	-58	-78	-93	-38	-44	-64	-79
	33%	3	0	-9	-16	-36	-43	-64	-80	-121	-128	-149	-165	-91	-97	-118	-133	-27	-34	-55	-71	-53	-60	-81	-97	-39	-46	-67	-83
	30%	2	-1	-10	-17	-38	-45	-67	-82	-122	-129	-151	-167	-92	-98	-119	-135	-28	-35	-56	-73	-54	-61	-83	-99	-40	-47	-68	-85
	20%	-2	-5	-14	-22	-47	-53	-75	-92	-126	-133	-157	-175	-95	-102	-125	-143	-31	-39	-62	-80	-56	-64	-88	-107	-43	-50	-74	-92
	10%	-8	-11	-20	-27	-57	-64	-88	-107	-130	-139	-166	-187	-100	-108	-134	-156	-35	-44	-71	-93	-60	-69	-97	-119	-47	-55	-83	-105
	5%	-11	-15	-24	-31	-65	-73	-98	-120	-134	-143	-174	-199	-103	-112	-143	-167	-38	-48	-80	-105	-63	-73	-106	-131	-50	-60	-92	-117
	1%	-18	-21	-31	-38	-77	-85	-118	-146	-141	-153	-192	-223	-111	-121	-160	-190	-45	-57	-97	-128	-69	-82	-123	-155	-57	-69	-109	-141
	Max	-26	-29	-38	-45	-98	-114	-162	-199	-157	-173	-224	-261	-127	-143	-194	-233	-58	-74	-122	-158	-83	-98	-147	-186	-71	-87	-137	-174
	CEHZ2	-25				-98				-174				-143				-80				-106				-92			
	CEHZ3	-31				-120				-199				-167				-105				-131				-117			

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

A4 SCALE 1:25,000

0 0.2 0.4 0.6 0.8 1 (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
www.tonkintaylor.co.nz

DRAWN	JJOU	May.20
CHECKED		
APPROVED		
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SCALE (AT A4 SIZE)	1:25,000	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Coastal Erosion Hazard Assessment
Marsden Point
Site: 4

FIGURE No. Figure 4-8

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 1:25,000

0 0.2 0.4 0.6 0.8 1 (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
www.tonkintaylor.co.nz

DRAWN	JJOU	Jun.20
CHECKED		
APPROVED		
ARCFILE	1012360_Historicv2.mxd	
SCALE (AT A4 SIZE)	1:25,000	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Marsden Point
Site: 4

FIGURE No. Figure 4-9

Rev. 1

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