

## Rates of coastal erosion and accretion in New Zealand

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### ABSTRACT

Rates of coastal erosion and accretion for New Zealand are calculated for the period since early European colonisation. Methods used for calculating rates from cadastral plans, vertical aerial photographs and field measurements are described, evaluated, and illustrated with examples. The most natural reference line for measurements of shoreline changes and for defining the seaward boundary of land is the seaward limit of land vegetation. Measurements made from air photographs and plans at scales larger than 1:4000 have errors less than  $\pm 1$  m. As scales become small, errors increase proportionately. Along depositional shorelines, erosion and accretion generally occur at 0.5–4.0 m.y<sup>-1</sup>. Maximum erosion and accretion rates are 25.4 m.y<sup>-1</sup> at North Kaipara Head and 68.9 m.y<sup>-1</sup> at Farewell Spit respectively. Cliff recession generally occurs at 0.25–1.0 m.y<sup>-1</sup> with maximum rates of 2.25 m.y<sup>-1</sup> for mudstone cliffs at Cape Turnagain and 3.46 m.y<sup>-1</sup> for conglomerate cliffs at Ngapatiki.

### INTRODUCTION

Coastal erosion is the process of removal of material at the shoreline which leads to loss of land as the shoreline retreats landward. Accretion is the product of deposition of material at the shoreline which leads to gain of land as the coast advances seaward.

In this study, basic information collected by the author has been resolved into rates of coastal erosion and accretion (Appendix 1). Calculated rates cover the period since early European colonisation of New Zealand. Useful sources of information available for this type of study are listed in the references at the end of the text. Information was gathered between 20 March 1975 and 16 October 1977 from around New Zealand. Except for Fiordland and parts of the Marlborough Sounds, a systematic reconnaissance was completed of all accessible parts of the coast of the two main islands of New Zealand.

Objectives of this paper are to make available existing New Zealand data on rates of coastal erosion and accretion (Appendix 1), to list sources of basic information, and to briefly illustrate, with examples, methods used for calculating rates. Patterns of coastal erosion and accretion around New Zealand will be dealt with elsewhere.

### THE SHORELINE

By definition, the shoreline, or seaward boundary of any land, is the intersection of a specified plane of water with the beach (Allen 1972). In New Zealand the seaward boundary of any land is defined in Section 35 of the Crown Grants Act, 1908 as "... the line of high-water mark at ordinary tides". This line is interpreted as the mean of all high tides occurring "in the ordinary course of nature throughout the year", and is generally termed "mean high-water mark" (MHWM) (Kelly 1971). The shoreline shown on hydrographic charts, cadastral and topographic maps of New Zealand is MHWM (Mr W. Watson, Cartographic Branch, Department of Lands and Survey, Wellington pers. comm.).

By law, the land surveyor is required to make tidal observations every day for 365 days when fixing the seaward boundary of any land (Adams 1971). It is impractical, however, to determine MHWM by this method and then to trace that level along the coast by spirit levelling (Mr N. C. Gardiner, Chief Surveyor (rtd), Department of Lands and Survey, Wellington, pers. comm.). In practice, therefore, MHWM is usually estimated from the position of natural markers such as the seaward limit of land vegetation, a line of driftwood, or a "wetted" line along the beach. Over the past century land surveyors in New Zealand have adopted seven different "shorelines" to represent the seaward boundary of any land (Fig. 1). The seaward limit of land vegetation has been the most commonly preferred 'shoreline' (Figs 1 & 2).

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## METHODS

In this study, changes in the position of the coast over the past century were determined from cadastral plans, hydrographic charts, vertical aerial photographs, field measurements, and information supplied by people living near the coast. Rates were calculated by dividing the amount of horizontal shoreline displacement by the time interval between each successive survey; negative values (-) are erosion and positive (+) are accretion.

Aerial photographs were studied at Head Office, Department of Lands and Survey, Wellington, which holds copies of all aerial photographs of New Zealand dating from about 1934 to the present day. Cadastral plans dating from mid 19th century were studied in district offices of the Department of Lands and Survey around New Zealand, each of which holds a complete set of plans for its respective Land District. Hydrographic charts dating from 1842 were studied at the Hydrographic Branch of the Royal New Zealand Navy in Auckland. Rates have been

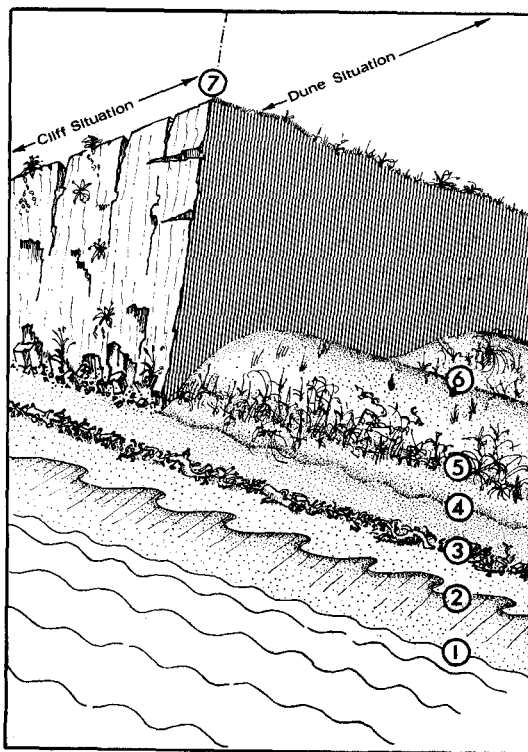


FIG. 1—Seven reference lines used by New Zealand land surveyors to define the shoreline (MHW) on cadastral plans over the century 1870–1970: 1—Geodetic MHW (average height of the high-tides over an 18.6 y period); 2—“Wetted” line; 3—Driftwood line; 4—Toe of foredune or cliff; 5—Vegetation line; 6—Crest of beach ridge or foredune; and 7—Top edge of cliff.

summarised from relevant publications and from unpublished sources of information including New Zealand Government Reports, consultant's reports, and theses on coastal processes. For Appendix 1, 72% of the observations listed were gathered directly by the author, and 28% are from published and unpublished material.

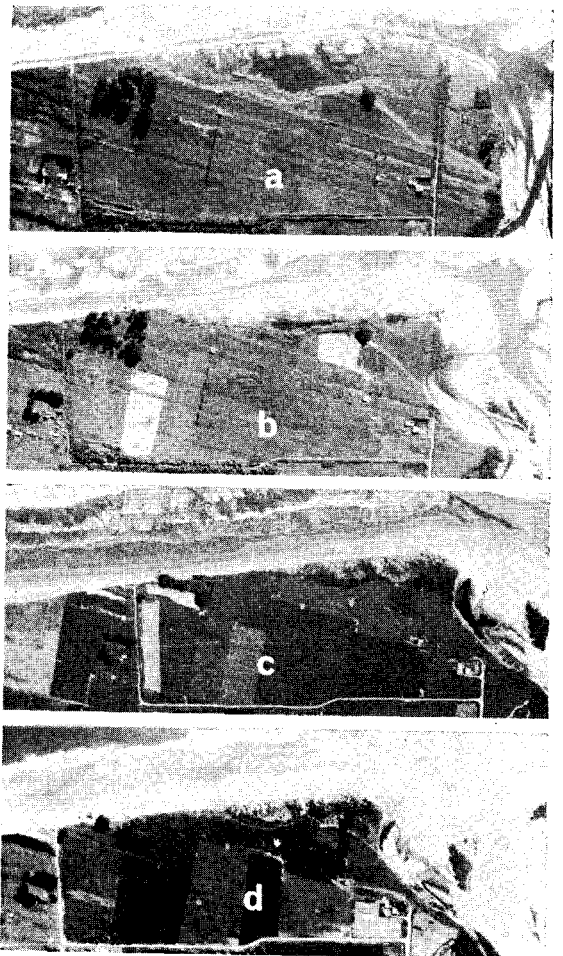


FIG. 2—Waimangaroa River mouth (west coast, South Island) and associated southern coast, 1943–1976. Coastal erosion is occurring along 10 km of coast either side of the mouth.

- a—Run 796, photo 4, 25 May 1943.
- b—Run 858, photo 13, 12 April 1955.
- c—Run SN 3777, Photo G/1, 25 November 1974.
- d—Run SN 2983, Photo L/1, 5 October 1976.

The left hand road leading to the coast in each photograph was used for measurements (see Table 2). The proximity of the group of macrocarpa trees to the coast reflects the amount of erosion with time. Note the truncation of the right hand road leading to the coast by river erosion. (Aerial photographs published by permission of Department of Lands and Survey, N.Z.).

## ERRORS

Three possible sources of error may affect the accuracy of rate calculations from plans or aerial photographs. Firstly, successive cadastral plans of the same locality may adopt different criteria for seaward boundaries (Fig. 1). Secondly, errors inherent in aerial photographs, such as relief displacements and distortion away from the photo-centre, may falsify measurements (Kirk 1975). Thirdly, measurement errors may be made by the individual.

The first possibility is dealt with by referring to the surveyor's field book or traverse book and clarifying his definition of MHW, and then by consistently using the same reference shoreline (Fig. 1) at each locality for all measurements. In the present study the reference shoreline was taken as the vegetation line along depositional coasts and the top edge of cliffs along steeply cliffed coasts. The second possibility of error may be controlled by establishing a base line of known length on each successive aerial photograph as near to the photo-centre as possible.

The third possibility may be calculated if the accuracy of measurements is known; it is generally the most significant source of error. All measurements made in this study on aerial photographs and survey plans have an estimated accuracy of  $\pm 0.25$  mm. Based on this, errors have been calculated for various scales (Table 1). As scale decreases, errors increase and measurement error becomes highly significant with shoreline displacements of only a few metres. The most accurate measurements are achieved from plans and photographs at scales greater than 1:4000. Small shoreline displacements of 2–5 m become insignificant in terms of error at scales between 1:8000 and 1:16 000.

## EXAMPLES

Methods used in this study for the calculation and evaluation of rates are illustrated by four examples.

## AERIAL PHOTOGRAPHS

Figure 2 shows the Waimangaroa River mouth, 15 km northeast of Westport, west coast, South Island (see Fig. 6). A baseline was established for 620 m along the section of road sub-parallel to the coast from the northern road junction to the right-angled corner to the south. The scale of each photograph was calculated using the baseline length established on cadastral plans. Distances were measured along the southern beach road from the south end of the baseline to the seaward limit of land vegetation. Results were converted to metres using the scale for each photograph. Rates were calculated by dividing these values by the time interval in years and decimals between successive survey flights. Errors based on an order of accuracy of measurements on each aerial photograph of  $\pm 0.25$  mm were then calculated. The results show that between 1945 and 1976 (33 y) about 74 m of coast has been lost by erosion at Waimangaroa at a net rate of  $2.2 \pm 0.1 \text{ m.y}^{-1}$  (Table 2).

Changes in position of the shoreline at Waimangaroa since 1876 are summarised in Fig. 3. There has been a net retreat of 235 m over the past 100 y (Item 027, Appendix 1). Past shoreline positions were plotted from cadastral plans made in 1876 and 1925 and from vertical aerial photographs shown in Fig. 2.

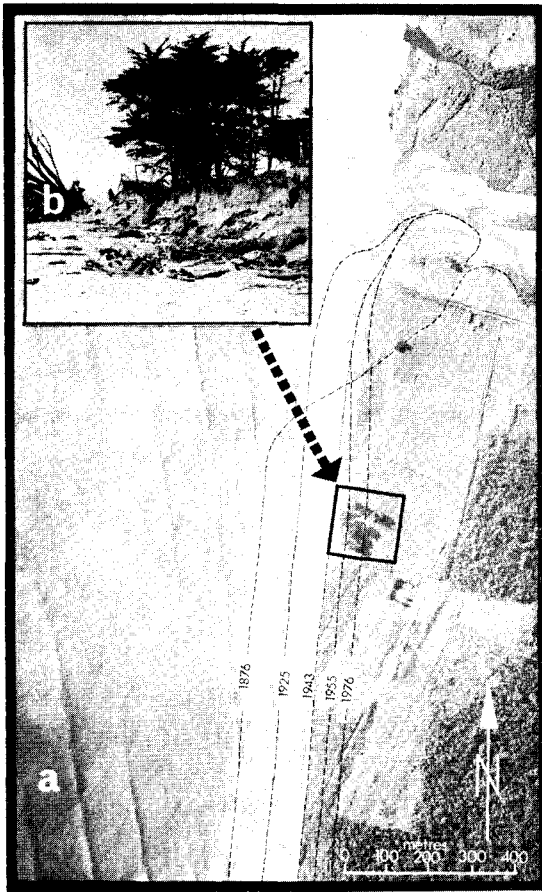


FIG. 3—*a*—Shoreline changes along the Waimangaroa coast (west coast, South Island) 1876–1976, plotted on aerial photographs taken in 1945. The oblique strike of Holocene dune belts to the present coastline is evidence that this coast is in the process of realigning. *b*—Ground photograph taken 12 February 1977 looking north towards the group of macrocarpa trees (Fig. 2; fallen trees in the background are evident on Fig. 2*d*). The erosion scarp shown is characteristic of actively eroding depositional coasts. (Aerial photographs published by permission of Department of Lands and Survey, N.Z.).

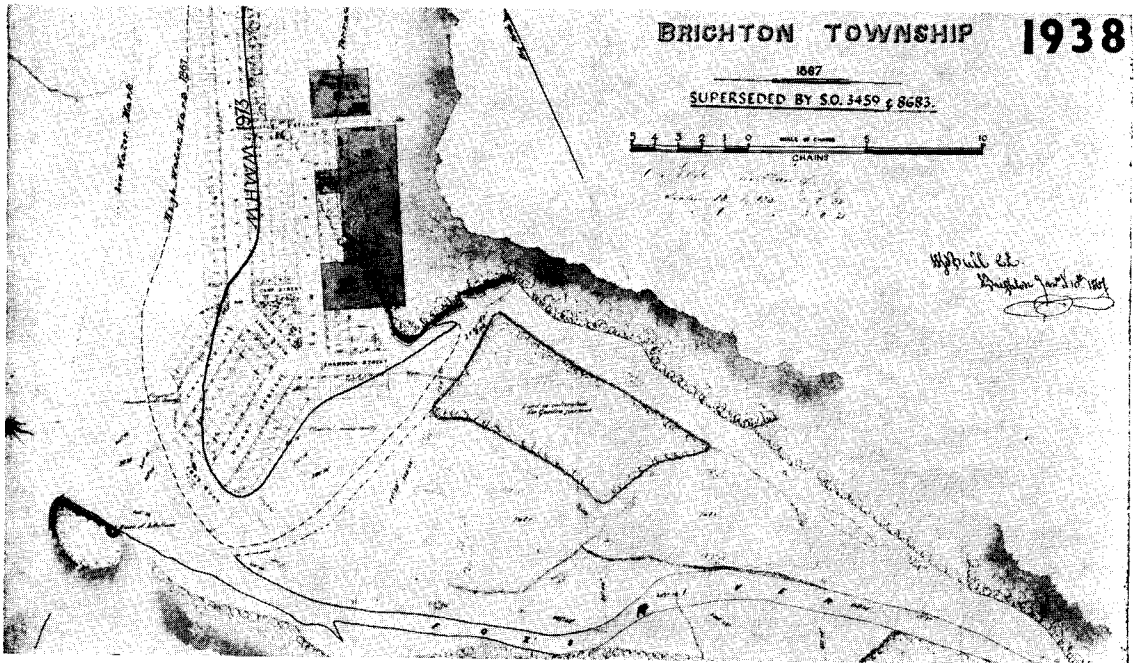


FIG. 4—Survey Office plan 1938 of Brighton, west coast, South Island. The 1973 position of MHWM (vegetation line) was plotted by the author from aerial photographs. Coastal erosion has resulted in a retreat of the shoreline along 7 km of this coast. The amount of erosion from 1867 to 1973 was measured directly from the line scale on the original plan. (Plan published by permission of the Department of Lands and Survey, N.Z.).

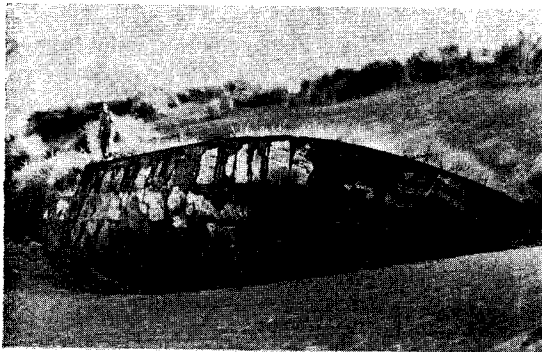


FIG. 5—Two examples of field measurements from reference points dating past shorelines. (Upper) — Stern view of *Fusilier* on Santoft beach (Fig. 6) 20 March 1975, landward of recently constructed foredune. The wreck dates the approximate position of MHWM in 1884. Amount of accretion was measured from the wreck to present-day MHWM. (Lower) — Concrete gun-emplacement at Kaitoke beach (Fig. 6) 21 March 1975, outflanked by coastal erosion exposed on the beach during low-water spring tides. It marks the 1940 position of the second dune in from the sea. The amount of erosion was measured from the gun-emplacement to the position of the present-day secondary dune.

CADASTRAL PLANS

Cadastral plans show surveyed land boundaries, including MHWM, for describing and recording ownership. Those held by the Department of Lands and Survey are of three kinds: transfers of Crown Land are recorded on Survey Office plans (S.O.s), Public Land on Deposited Plans (D.P.s), and Maori Land on Maori Land plans (M.L.s).

The 1867 survey office plan (S.O. 1938) shown in Fig. 4 is of the gold mining town of Brighton at the mouth of the Fox River between Westport and Greymouth, west coast, South Island (see Fig. 6). In the 1870s, Brighton boasted a casino, billiard saloons, and 53 pubs (Nolan 1975). Today no trace of this town of several thousand people is left. A combination of coastal erosion and the passing of the gold rush have led to its destruction.

TABLE 1—Measurement errors on plans of various scales based on a plan measurement accuracy of ±0.25 mm.

| Scale     | Measurement Error (m) |
|-----------|-----------------------|
| 1:100 000 | ±25                   |
| 1:63 360  | ±16                   |
| 1:31 680  | ± 8                   |
| 1:15 840  | ± 4                   |
| 1:7920    | ± 2                   |
| 1:6000    | ± 1.5                 |
| 1:3960    | ± 1.0                 |
| 1:2000    | ± 0.5                 |
| 1:1000    | ± 0.25                |
| 1:792     | ± 0.2                 |

The 1867 position of MHWM shown on the plan represents the vegetation line. Aerial photographs taken in 1973 were used to plot this same line on the old plan using proportional dividers and geographic fixed points common to both plan and aerial photographs. Shoreline changes indicate 50–76 m of coastal erosion over a period of 106 y (Items 021 & 022, Appendix 1).

FIELD MEASUREMENTS

Field measurements were made from a known reference point or line dating a past shoreline to the present day shoreline. Two examples are shown in Fig. 5. Figure 5 (upper) shows the wreck of *Fusilier* on Santoft beach, Wellington west coast (Fig. 6). This steel barque of 404 tons was wrecked in 1884, settling between low- and high-water marks. Over the 97 y since the wreck the coast has built out about 100 m at a net rate of 1 m.y<sup>-1</sup> (Item 113, Appendix 1). A foredune has been constructed and is engulfing the wreck.

Fig. 5b shows a World War II concrete gun-emplacement at Kaitoke Beach, Wanganui (Fig. 6) that has been outflanked by coastal erosion. In 1940, it was constructed on the second dune in from the sea and is now well seaward of the foredune. The coast has retreated by 70 m at a net rate of 2 m.y<sup>-1</sup> over the past 37 y (Item 114, Appendix 1).

TABLE 2—Calculation of rates of coastal erosion from measurements made from aerial photos of the Waimangaroa coast (Fig. 2) with two examples of calculation of errors (*R* = rate; *D* = horizontal distance; *T* = survey interval).

| Flight Date | Photo-scale | Horizontal Distance ( <i>D</i> , m) | Measurement Error (m) | Survey Interval ( <i>T</i> , y) | Net Erosion (m) | Rate ( <i>R</i> , m.y <sup>-1</sup> ) | Net Rate (m.y <sup>-1</sup> ) |
|-------------|-------------|-------------------------------------|-----------------------|---------------------------------|-----------------|---------------------------------------|-------------------------------|
| 25/ 5 /43   | 1:6630      | 285.1                               | ±1.66                 |                                 |                 |                                       |                               |
| 12/ 4 /55   | 1:6460      | 248.1                               | ±1.62                 | 11.90                           | -37.0           | -3.1 ± 0.3                            |                               |
| 25/11/75    | 1:6810      | 218.6                               | ±1.70                 | 19.55                           | -29.5           | -1.5 ± 0.2                            |                               |
| 5/10/76     | 1:6710      | 211.4                               | ±1.68                 | 1.89                            | - 7.2           | -3.8 ± 1.8                            | 2.2 ± 0.1                     |

EXAMPLES

$$\begin{aligned}
 \text{(a) } D &= (285.1 \pm 1.66) - (248.1 \pm 1.62) \text{ m} \\
 &= -37 \pm 3.28 \text{ m} \\
 R &= \frac{D}{T} = \frac{-37 \text{ m} \pm 8.9\%}{11.9 \text{ y}} \\
 &= -3.11 \text{ m} \pm 8.9\% \\
 \therefore R &= -3.1 \pm 0.3 \text{ m.y}^{-1}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } D &= (285.1 \pm 1.66) - (211.4 \pm 1.68) \text{ m} \\
 &= -73.7 \pm 3.34 \text{ m} \\
 R &= \frac{-73.7 \text{ m} \pm 4.5\%}{33.34 \text{ y}} \\
 &= -2.21 \text{ m} \pm 4.5\% \\
 \therefore R &= -2.2 \pm 0.1 \text{ m.y}^{-1}
 \end{aligned}$$

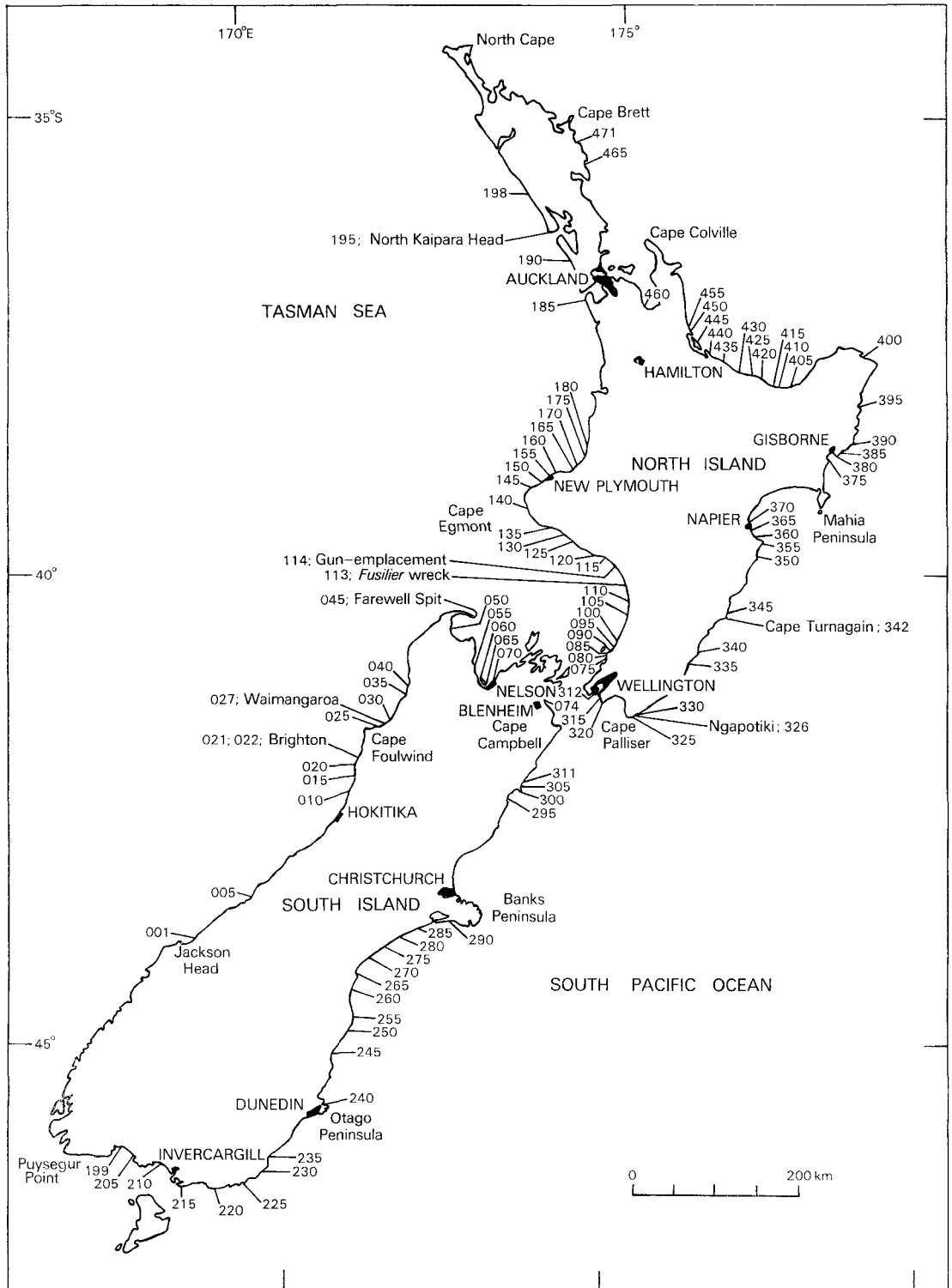


FIG. 6—General location of every fifth item in Column A of Appendix 1. Aerial photographs, survey plans, and field books for determining rates of coastal movement are held in Lands and Survey district offices in the cities and towns named.

## CONCLUSIONS

Rates of erosion or accretion may be determined for any locality around the New Zealand coast from either cadastral plans or vertical aerial photographs held in offices of the Department of Lands and Survey.

The seaward limit of land vegetation is the most natural reference line to use for defining the seaward boundary of land on the open coast.

Measurements of shoreline changes made from aerial photographs and plans at scales larger than 1:4000 generally have errors less than  $\pm 1$  m. Errors increase proportionately as scales become small so that small shoreline displacements of 2–5 m become insignificant at scales between 1:8000 and 1:16 000.

Along depositional shorelines in New Zealand erosion and accretion has generally occurred at rates of 0.5–4.0 m.y<sup>-1</sup>. The highest accretion rate recorded was 68.9 m.y<sup>-1</sup> at Farewell Spit (Item 045, Appendix 1), whereas the maximum erosion rate recorded was 25.4 m.y<sup>-1</sup> at North Kaipara Head (Item 195, Appendix 1).

Cliff recession has generally occurred at 0.25–1.0 m.y<sup>-1</sup> with maximum rates recorded of 2.25 m.y<sup>-1</sup> for mudstone cliffs at Cape Turnagain (Item 342, Appendix 1) and 3.46 m.y<sup>-1</sup> for conglomerate cliffs at Ngapotiki (Item 326, Appendix 1).

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APPENDIX 1—(Overleaf) Rates of coastal erosion and accretion around the New Zealand coast tabulated for 471 localities. Key to columns: (A) = localities numbered consecutively as shown on Fig. 6; (B) = locality names; (C) = NZMS 1 grid reference; (D) = land forms, their age of formation, and lithology of material forming the coast at each locality and (E) = texture of beach sediments (for abbreviation in (D) and (E) see Appendix 2)

Column (F) = survey years, information on significant erosion events, tectonic movements, establishment of coastal subdivisions, and aggregate mining of beaches; (G) = land gained from accretion (+) or lost from erosion (–) is tabulated as a horizontal distance in metres for each locality; (Items 312, 313, 314, and 324 record land gained by tectonic uplift from the 1855 Wellington earthquake); (H) = rates of erosion/accretion ( $\text{m.y}^{-1}$ ) for each survey interval; (I) = net rate ( $\text{m.y}^{-1}$ ) for entire survey period; and (J) = references (numbers listed correspond with those in reference list at the end of the text, and addresses of local informants are held by the author).

| (A)  | (B)              | (C)                    | (D)                                  | (E)   | (F)   | (G)                                | (H)                                       | (I)                              | (J)                        |
|------|------------------|------------------------|--------------------------------------|-------|---|------------------------------------|---|----------------------------------|----------------------------|
| ITEM | LOCALITY         | N Z M S 1<br>GRID REF. | LITHOLOGY<br>AND AGE                 | BEACH | SURVEY INTERVAL<br>(y)  | ACCRETION(+) OR<br>EROSION(-) (m)  | RATES<br>(m.y <sup>-1</sup> )             | NET RATE<br>(m.y <sup>-1</sup> ) | DATA<br>SOURCE             |
| 001  | JACKSON'S BAY    | S86/680035             | H <sub>3</sub> d                     | S     | 1904-1920<br>1920-1962<br>1962-1974                           | -50<br>-200<br>-100                | -3.13<br>-4.76<br>-8.34                   | -5.0                             | 71<br>3<br>71              |
| 002  | JACKSON'S BAY    | S87/807137             | H <sub>3</sub> d                     | S/G   | 1962-1975   | +10                                | +0.77                                     | +0.77                            | 71                         |
| 003  | BRUCE BAY        | S78/300463             | H <sub>3</sub> d                     | S/G   | 1935-1975   | -30                                | -0.75                                     | -0.75                            | 3                          |
| 004  | BRUCE BAY        | S78/335482             | H <sub>3</sub> d                     | S/G   | 1884-1928<br>1925-1950  | -120<br>-100                       | -2.73<br>-4.0                             | -3.33                            | 71<br>71                   |
| 005  | HUNTS BEACH      | S78/350525             | H <sub>3</sub> r/s                   | G/S   | 1930-1975   | -300                               | -6.67                                     | -6.67                            | 3                          |
| 006  | GILLESPIES BEACH | S70/507690             | H <sub>3</sub> r                     | G     | 1945-1975   | -20                                | -0.67                                     | -0.67                            | 61                         |
| 007  | WAITANA          | S57/263270             | H <sub>3</sub> r/d                   | S/G   | 1945-1975   | -250                               | -8.3                                      | -8.3                             | 3                          |
| 008  | POKITIKA         | S50/519559             | H <sub>3</sub> r/d                   | S/G   | 1867-1914<br>1914-1953<br>1956-1975                           | -20<br>+61<br>+25                  | -0.43<br>+1.39<br>+1.47                   | +0.61                            | 71<br>71<br>71             |
| 009  | GREYMOOUTH       | S44/723890             | H <sub>3</sub> r                     | G     | 1930-1944<br>1944-1968  | +68<br>0                           | +6.29<br>0                                | +2.32                            | 71<br>71                   |
| 010  | GREYMOOUTH       | S44/734906             | H <sub>3</sub> r                     | G     | 1888-1910<br>1910-1971  | -20<br>-50                         | -0.91<br>-0.82                            | -0.83                            | 71<br>71                   |
| 011  | GREYMOOUTH       | S44/743942             | Ld                                   | G     | 1910-1935<br>1935-1971  | -14<br>-24                         | -0.56<br>-0.67                            | -0.62                            | 71<br>71                   |
| 012  | GREYMOOUTH       | S44/745958             | Ld                                   | G     | 1888-1936   | -30                                | -0.63                                     | -0.63                            | 71                         |
| 013  | RAPAHOE TRIG D   | S44/766974             | H <sub>3</sub> r                     | G     | 1882-1901<br>1901-1929<br>1929-1975                           | 0<br>-50<br>-60                    | 0<br>-1.79<br>-1.30                       | -1.18                            | 71<br>71<br>71             |
| 014  | RAPAHOE          | S44/772985             | H <sub>3</sub> r & Ak<br>S73r.-M/ST. | G     | 1950-1975   | -60                                | -2.4                                      | -2.4                             | 71                         |
| 015  | BARRY TOWN       | S44/823098             | H <sub>3</sub> r/s                   | G     | 1930-1975   | -100                               | -2.22                                     | -2.22                            | 71                         |
| 016  | BARRY TOWN       | S37/825112             | H <sub>3</sub> r/s                   | G     | 1930-1975   | -160                               | -3.56                                     | -3.56                            | 71                         |
| 017  | BARRY TOWN       | S37/826121             | H <sub>3</sub> r/s                   | G     | 1930-1975   | -140                               | -3.11                                     | -3.11                            | 71                         |
| 018  | BARRY TOWN       | S37/827130             | H <sub>3</sub> r/s                   | G     | 1930-1975   | -90                                | -2.0                                      | -2.0                             | 71                         |
| 019  | BARRY TOWN       | S37/831177             | H <sub>3</sub> r                     | G     | 1930-1975   | -140                               | -3.11                                     | -3.11                            | 71                         |
| 020  | BARRY TOWN       | S37/832187             | H <sub>3</sub> r                     | G     | 1930-1975   | +110                               | +2.44                                     | +2.44                            | 71                         |
| 021  | TIROMORANA       | S37/896393             | H <sub>3</sub> r/d                   | S/G   | 1867-1973   | -76                                | -0.72                                     | -0.72                            | 46                         |
| 022  | TIROMORANA       | S37/897395             | H <sub>3</sub> r/d                   | S/G   | 1867-1973   | -50                                | -0.47                                     | -0.47                            | 46                         |
| 023  | NINE MILE BEACH  | S30/963593             | H <sub>3</sub> d                     | S     | 1950-1975   | -60                                | -2.4                                      | -2.4                             | 3                          |
| 024  | CARTERS BEACH    | S24/078753             | H <sub>3</sub> d                     | S     | 1880-1919<br>1919-1968  | +853<br>+160                       | +21.88<br>+3.26                           | +11.51                           | 29<br>29                   |
| 025  | NORTH BEACH      | S24/087753             | H <sub>3</sub> d                     | S     | 1880-1919<br>1919-1968  | +954<br>+500                       | +24.46<br>+10.2                           | +16.52                           | 29<br>46                   |
| 026  | FAIRDOWN         | S24/175757             | H <sub>3</sub> d                     | S     | 1867-1884<br>1884-1905<br>1905-1921<br>1921-1955<br>1955-1968 | 0<br>-128<br>-88<br>-104<br>+76    | 0<br>-6.09<br>-5.49<br>-3.06<br>+5.83     | -2.42                            | 46<br>46<br>46<br>46<br>46 |
| 027  | WAIMANGAROA      | S24/217790             | H <sub>3</sub> d                     | S/G   | 1876-1925<br>1925-1943<br>1943-1955<br>1955-1974<br>1974-1976 | -79<br>-82<br>-37<br>-29.5<br>-7.2 | -1.61<br>-4.56<br>-3.11<br>-1.51<br>-3.81 | -2.35                            | 46<br>46<br>18<br>18<br>18 |

| (A) | (B)                            | (C)        | (D)   | (E) | (F)       | (G)                 | (H)    | (I)    | (J) |
|-----|--------------------------------|------------|---|-----|-----------|---------------------|--------|--------|-----|
| 028 | NTH WAIMANGAROA                | S24/228800 | H <sub>3</sub> d                                | G/S | 1890-1905 | -125                | -8.33  |        | 16  |
|     |                                |            |   |     | 1905-1921 | -99                 | -6.19  |        | 16  |
|     |                                |            |   |     | 1921-1943 | -51                 | -2.32  |        | 16  |
|     |                                |            |   |     | 1943-1973 | -35                 | -1.17  | -3.73  | 36  |
| 029 | JONES CREEK                    | S24/245815 | H <sub>3</sub> d                                | S/G | 1904-1968 | -170                | -2.66  | -2.66  | 46  |
| 030 | NGAKAWAU                       | S24/338901 | H <sub>3</sub> r                                | G   | 1899-1931 | +40                 | +1.25  |        | 46  |
| 031 | HECTOR                         | S24/344908 | H <sub>3</sub> r                                | G   | 1931-1968 | -19                 | -0.51  | +0.30  | 46  |
|     |                                |            |   |     | 1873-1894 | 0                   | 0      |        | 46  |
| 032 | NIKAU                          | S24/385978 | H <sub>3</sub> e/r                              | G   | 1894-1968 | +61                 | +0.82  | +0.64  | 46  |
|     |                                |            |   |     | 1897-1975 | -40                 | -0.51  | -0.51  | 46  |
| 033 | NIKAU                          | S24/391992 | H <sub>3</sub> e/r                              | G   | 1902-1975 | -32                 | -0.44  | -0.44  | 46  |
| 034 | MOKIHINIJI TRIG AP. S17/394002 |            | H <sub>3</sub> e                                | G   | 1875-1888 | -11                 | -0.85  |        | 46  |
|     |                                |            |   |     | 1888-1947 | -11                 | -0.19  |        | 46  |
|     |                                |            |   |     | 1947-1975 | -9                  | -0.32  |        | 46  |
|     |                                |            |   |     | 1975-1977 | -8                  | -6.67  | -0.38  | 19  |
| 035 | LITTLE WANGANUI                | S18/512165 | H <sub>3</sub> d                                | S   | 1879-1891 | -6                  | -0.5   |        | 46  |
|     |                                |            |   |     | 1891-1901 | -4                  | -0.36  |        | 46  |
|     |                                |            |   |     | 1901-1968 | -80                 | -1.19  | -1.01  | 46  |
|     |                                |            |   |     |           |                     |        |        |     |
| 036 | LITTLE WANGANUI                | S18/516175 | H <sub>3</sub> d                                | S   | 1879-1891 | +68                 | +6.18  |        | 46  |
|     |                                |            |   |     | 1891-1901 | -94                 | -8.55  |        | 46  |
|     |                                |            |   |     | 1901-1968 | -57                 | -0.85  | -0.93  | 46  |
|     |                                |            |   |     |           |                     |        |        |     |
| 037 | TE NAMU                        | S18/522187 | H <sub>3</sub> d                                | S   | 1879-1891 | +3                  | +0.25  |        | 46  |
|     |                                |            |   |     | 1891-1926 | -50                 | -1.43  |        | 46  |
|     |                                |            |   |     | 1926-1955 | -81                 | -2.79  |        | 46  |
|     |                                |            |   |     | 1955-1963 | -8.6                | -1.06  |        | 18  |
|     |                                |            |   |     | 1963-1968 | -6.4                | -1.39  |        | 18  |
|     |                                |            |   |     | 1968-1974 | -2.8                | -0.41  |        | 18  |
|     |                                |            |   |     | 1974-1977 | -2.2                | -0.96  | -1.76  | 19  |
|     |                                |            |   |     |           |                     |        |        |     |
| 038 | TE NAMU                        | S18/527214 | H <sub>3</sub> d                                | S   | 1879-1891 | 0                   | 0      |        | 46  |
|     |                                |            |   |     | 1891-1926 | -18                 | -0.51  |        | 46  |
|     |                                |            |   |     | 1926-1936 | -30                 | -3.0   |        | 46  |
|     |                                |            |   |     | 1936-1968 | -75                 | -2.34  | -1.38  | 46  |
| 039 | TE NAMU                        | S18/530225 | H <sub>3</sub> d                                | S   | 1879-1891 | 0                   | 0      |        | 46  |
|     |                                |            |   |     | 1891-1926 | -32                 | -0.91  |        | 46  |
|     |                                |            |   |     | 1926-1936 | -24                 | -2.4   |        | 46  |
|     |                                |            |   |     | 1936-1972 | -65                 | -1.81  | -1.30  | 46  |
| 040 | KONGAHU SCHOOL                 | S18/535253 | H <sub>3</sub> d                                | S   | 1891-1926 | -12                 | -0.34  |        | 46  |
|     |                                |            |   |     | 1926-1936 | -28                 | -2.8   |        | 46  |
|     |                                |            |   |     | 1936-1968 | -67                 | -2.09  | -1.39  | 46  |
|     |                                |            |   |     | 1937      | SCHOOL MOVED INLAND |        |        |     |
| 041 | KARAMEA                        | S12/549367 | H <sub>3</sub> d                                | S   | 1867-1968 | +90                 | +0.89  | +0.89  | 46  |
| 042 | KARAMEA                        | S12/552398 | H <sub>3</sub> d                                | S   | 1938-1968 | +100                | +3.33  | +3.33  | 46  |
| 043 | KARAMEA                        | S12/553419 | H <sub>3</sub> d                                | S   | 1938-1968 | +140                | +4.67  | +4.67  | 46  |
| 044 | FAREWELL SPIT                  | S1/398182  | H <sub>3</sub> d                                | S   | 1851-1938 | 0                   | 0      |        | 16  |
|     |                                |            |   |     | 1938-1964 | +2471               | +95.04 |        | 46  |
|     |                                |            |   |     | 1964-1970 | +92                 | +15.33 |        | 18  |
|     |                                |            |   |     | 1970-1975 | 0                   | 0      | +20.5  | 18  |
| 045 | FAREWELL SPIT                  | S1/398182  | H <sub>3</sub> m                                | S   | 1851-1938 | +6993               | +80.38 |        | 16  |
|     |                                |            |   |     | 1938-1964 | +792                | +30.46 | +68.89 | 46  |
|     |                                |            |   |     | 1851-1938 | +72.5               | +0.88  |        | 16  |
|     |                                |            |   |     | 1938-1964 | +270                | +10.38 | +3.03  | 46  |
|     |                                |            |   |     | 1938-1964 | -64                 | -2.46  | -2.46  | 46  |
|     |                                |            | WIDENING OF SPIT OVER ENTIRE LENGTH             |     |           |                     |        |        |     |
|     |                                |            | WIDENING OF SPIT OVER LAST 2/3 LENGTH           |     |           |                     |        |        |     |
|     |                                |            | EROSION OF INSIDE OF SPIT OVER FIRST 1/3 LENGTH |     |           |                     |        |        |     |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A) | (B)                             | (C)         | (D)                | (E) | (F)       | (G)   | (H)    | (I)   | (J) |
|-----|---------------------------------|-------------|--------------------|-----|-----------|-------|--------|-------|-----|
| 046 | TRIG H                          | S1/159231   | H <sub>3</sub> d   | S   | 1870-1923 | -19   | -0.36  |       | 46  |
|     |                                 |             |                    |     | 1923-1938 | +10   | +0.67  |       | 46  |
|     |                                 |             |                    |     | 1938-1964 | +57   | +2.19  | +0.51 | 46  |
| 047 | PAKAUWAI                        | S3/099135   | H <sub>3</sub> d   | S/G | 1895-1914 | -400  | -21.0  |       | 3   |
|     |                                 |             |                    |     | 1914-1975 | -150  | -2.45  | -6.88 | 19  |
| 048 | PAKAUWAI                        | S3/102125   | H <sub>3</sub> d   | S   | 1940-1975 | -10   | -0.3   | -0.3  | 3   |
| 049 | WAIKATO                         | S3/094097   | H <sub>3</sub> d   | S   | 1925-1975 | -20   | -0.4   | -0.4  | 3   |
| 050 | WAIKATO                         | S3/092080   | H <sub>3</sub> d   | S   | 1940-1975 | -100  | -2.88  | -2.88 | 3   |
| 051 | AWAROA BAY                      | S9/416801   | H <sub>3</sub> r/d | S   | 1850-1963 | +100  | +0.88  | +0.88 | 30  |
| 052 | ONETAHUTI BAY                   | S9/426770   | H <sub>3</sub> r/d | S   | 1850-1890 | +80   | +2.0   |       | 30  |
|     |                                 |             |                    |     | 1890-1954 | +100  | +1.55  |       | 38  |
|     |                                 |             |                    |     | 1954-1963 | +20   | +2.22  | +1.77 | 38  |
| 053 | SANDY BAY                       | S9/389626   | H <sub>3</sub> d   | S   | 1842-1888 | +40   | +0.87  |       | 30  |
|     |                                 |             |                    |     | 1888-1942 | +40   | +0.74  |       | 38  |
|     |                                 |             |                    |     | 1944-1954 | +30   | +3.0   | +0.96 | 38  |
| 054 | KAITERITERI                     | S9/397587   | H <sub>3</sub> r   | S   | 1842-1930 | +50   | +0.57  |       | 30  |
|     |                                 |             |                    |     | 1930-1944 | 0     | 0      | +0.49 | 30  |
| 055 | KINA                            | S14/433411  | W <sub>1</sub> r   | G   | 1961-1975 | -6    | -0.43  | -0.43 | 3   |
| 056 | KINA                            | S14/435408  | W <sub>1</sub> r   | G   | 1961-1975 | -3    | -0.21  | -0.21 | 3   |
| 057 | RUBY BAY                        | S14/454347  | H <sub>3</sub> r   | G   | 1912-1945 | 0     | 0      |       | 45  |
|     |                                 |             |                    |     | 1945-1964 | -22   | -1.16  | -0.42 | 46  |
| 058 | RUBY BAY                        | S14/456343  | H <sub>3</sub> r   | G   | 1912-1964 | -26.2 | -0.5   | -0.5  | 45  |
| 059 | RUBY BAY                        | S14/461338  | H <sub>3</sub> r   | G   | 1912-1964 | -45.5 | -0.87  | -0.87 | 45  |
| 060 | RUBY BAY                        | S14/466333  | H <sub>3</sub> r   | G   | 1970-1975 | -10   | -2.0   | -2.0  | 13  |
| 061 | MAPUA                           | S14/467334  | H <sub>3</sub> r   | G/S | 1912-1961 | -37.7 | -0.77  | -0.77 | 46  |
| 062 | MAPUA                           | S14/472329  | H <sub>3</sub> d/r | G/S | 1912-1961 | +81.7 | +1.67  | +1.67 | 45  |
| 063 | RABBIT ISLAND                   | S14/473321  | H <sub>3</sub> r/d | S   | 1923-1967 | -50   | -1.14  | -1.14 | 46  |
| 064 | RABBIT ISLAND                   | S14/479322  | H <sub>3</sub> d   | S   | 1923-1967 | +37   | +0.84  | +0.84 | 46  |
| 065 | RABBIT ISLAND                   | S14/493316  | H <sub>3</sub> d   | S   | 1923-1967 | 0     | 0      | 0     | 46  |
| 066 | RABBIT ISLAND                   | S14/505310  | H <sub>3</sub> d   | S   | 1923-1967 | +50   | +1.14  | +1.14 | 45  |
| 067 | RABBIT ISLAND                   | S14/514307  | H <sub>3</sub> d   | S   | 1923-1967 | +10   | +0.23  | +0.23 | 46  |
| 068 | RABBIT ISLAND                   | S14/527303  | H <sub>3</sub> d   | S   | 1923-1967 | -50   | -1.14  | -1.14 | 45  |
| 069 | RABBIT ISLAND                   | S20/545293  | H <sub>3</sub> d   | S   | 1923-1967 | -84   | -1.91  |       | 46  |
|     |                                 |             |                    |     | 1967-1975 | -25   | -3.13  | -2.1  | 19  |
| 070 | RABBIT ISLAND                   | S20/554283  | H <sub>3</sub> d   | S   | 1923-1967 | -380  | -8.64  | -8.64 | 46  |
| 071 | TAHUNANUI BEACH                 | S20/597287  | H <sub>3</sub> d   | S   | 1850-1969 | +445  | +3.74  | +3.74 | 31  |
| 072 | TAHUNANUI BEACH                 | S20/588287  | H <sub>3</sub> d   | S   | 1948-1971 | -73   | -3.17  |       | 18  |
|     |                                 |             |                    |     | 1971-1975 | -10   | -2.5   |       | 18  |
|     |                                 |             |                    |     | 1975-1977 | -32   | -13.33 | -3.93 | 18  |
|     |                                 |             |                    |     | 1850-1943 | +658  | +7.08  |       | 47  |
| 073 | BOULDER BANK                    | S14/613310  | H <sub>3</sub> r   | G   | 1943-1944 | +43   | +35.83 |       | 47  |
|     |                                 |             |                    |     | 1944-1950 | +84   | +13.33 |       | 47  |
|     |                                 |             |                    |     | 1950-1954 | +21   | +5.25  |       | 47  |
|     |                                 |             |                    |     | 1954-1956 | +36   | +18.0  |       | 47  |
|     |                                 |             |                    |     | 1956-1957 | +26   | +26.0  |       | 47  |
|     |                                 |             |                    |     | 1957-1958 | +7    | +7.0   |       | 47  |
| 074 | CLOUDY BAY                      | S22/320100  | H <sub>3</sub> r   | G/S | 1924-1970 | +55.2 | +1.2   | +1.2  | 54  |
|     |                                 |             |                    |     | 1894-1940 | -12   | -0.26  |       | 70  |
| 075 | CENTENNIAL INN -<br>PAEKAKARIKI | N160/485570 | H <sub>3</sub> d   | G   | 1940-1977 | -6    | -0.16  | -0.22 | 19  |
|     |                                 |             |                    |     |           |       |        |       |     |

(STORM SURGE SEPTEMBER 11-13, 1976)

-1)

19

| (A) | (B)                | (C)         | (D)              | (E) | (F)   | (G)   | (H)   | (I)   | (J) |
|-----|--------------------|-------------|------------------|-----|---|-------|-------|-------|-----|
| 076 | PAEKAKARIKI        | N160/48957E | H <sub>3</sub> d | G   | 1894-1897                                   | -7    | -2.3  |       | 70  |
|     |                    |             |                  |     | 1897-1906                                   | -6    | -0.67 |       | 70  |
|     |                    |             |                  |     | 1906-1926                                   | -18   | -0.9  |       | 70  |
|     |                    |             |                  |     | 1926-1940                                   | +21   | +1.5  |       | 70  |
|     |                    |             |                  |     | 1940-1958                                   | -50   | -2.78 |       | 70  |
| 077 | PAEKAKARIKI        | N160/491579 | H <sub>3</sub> d | E   | 1926-1941                                   | -9    | -0.6  |       | 70  |
|     |                    |             |                  |     | 1941-1963                                   | 0     | 0     |       | 70  |
|     |                    |             |                  |     | 1963-1977                                   | 0     | 0     | -0.18 | 19  |
|     |                    |             |                  |     | 1907 FIRST SUBDIVISION OF PAEKAKARIKI COAST |       |       |       |     |
| 078 | PAEKAKARIKI PARADE | N160/495587 | ROAD FILL        |     | 1907-1976                                   | 0     | 0     |       | 70  |
|     |                    |             |                  |     | 1976-1977                                   | -2    | -2    | -0.03 | 19  |
| 079 | PROFILE 3          | N160/500596 | H <sub>3</sub> d | S/G | 1874-1968                                   | +48   | +0.51 |       | 70  |
|     |                    |             |                  |     | 1968-1977                                   | -1    | -0.14 | +0.46 | 19  |
|     |                    |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976          | -1)   |       |       | 19  |
| 080 | TRIG BEACH         | N156/506613 | H <sub>3</sub> d | G/S | 1874-1968                                   | +32   | +0.34 | +0.34 | 70  |
| 081 | TRIG D             | N156/512624 | H <sub>3</sub> d | G/S | 1874-1968                                   | +17   | +0.18 | +0.18 | 70  |
| 082 | PROFILE 4          | N156/508618 | H <sub>3</sub> d | G/S | 1874-1943                                   | +26   | +0.38 |       | 70  |
|     |                    |             |                  |     | 1943-1948                                   | -13.8 | -2.76 |       | 18  |
|     |                    |             |                  |     | 1948-1952                                   | +1.2  | +0.3  |       | 18  |
|     |                    |             |                  |     | 1952-1966                                   | +4.4  | +0.31 |       | 18  |
|     |                    |             |                  |     | 1966-1973                                   | -2.9  | -0.41 |       | 18  |
|     |                    |             |                  |     | 1973-1977                                   | +3.0  | +0.75 | +0.17 | 18  |
|     |                    |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976          | 0)    |       |       | 19  |
| 083 | PROFILE            | N156/513633 | H <sub>3</sub> d |     | 1874-1943                                   | -5    | -0.07 |       | 70  |
|     |                    |             |                  |     | 1943-1948                                   | -9.7  | -1.94 |       | 18  |
|     |                    |             |                  |     | 1948-1952                                   | +3.9  | +0.98 |       | 18  |
|     |                    |             |                  |     | 1952-1966                                   | -4.4  | -0.31 |       | 18  |
|     |                    |             |                  |     | 1966-1973                                   | -10.2 | -1.46 |       | 18  |
|     |                    |             |                  |     | 1973-1977                                   | -3.0  | -0.75 | -0.28 | 18  |
|     |                    |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976          | -2.5) |       |       | 19  |
|     |                    |             |                  |     | 1906 FIRST SUBDIVISION OF RAUMATI COAST     |       |       |       |     |
| 084 | PROFILE 6          | N156/516649 | H <sub>3</sub> d | S   | 1874-1880                                   | -50   | -8.33 |       | 70  |
|     |                    |             |                  |     | 1880-1920                                   | +29   | +0.73 |       | 70  |
|     |                    |             |                  |     | 1920-1968                                   | -5    | -0.10 |       | 70  |
|     |                    |             |                  |     | 1968-1977                                   | -11   | -1.22 | -0.36 | 19  |
|     |                    |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976          |       |       |       |     |
| 085 | PROFILE 7          | N156/518666 | H <sub>3</sub> d | S   | 1874-1880                                   | -40   | -6.67 |       | 70  |
|     |                    |             |                  |     | 1880-1943                                   | +35   | +0.56 |       | 70  |
|     |                    |             |                  |     | 1943-1952                                   | +12.4 | +1.38 |       | 18  |
|     |                    |             |                  |     | 1952-1958                                   | -25   | -4.17 |       | 18  |
|     |                    |             |                  |     | 1958-1977                                   | -6    | -0.32 | -0.23 | 18  |
|     |                    |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976          | -6)   |       |       | 19  |
| 086 | PROFILE 8          | N156/518682 | H <sub>3</sub> d | S   | 1874-1880                                   | +40   | +6.67 |       | 70  |
|     |                    |             |                  |     | 1880-1905                                   | +20   | +0.8  |       | 70  |
|     |                    |             |                  |     | 1905-1952                                   | -24   | -0.51 |       | 70  |
|     |                    |             |                  |     | 1952-1958                                   | +2.2  | +0.37 |       | 18  |
|     |                    |             |                  |     | 1958-1966                                   | +4.4  | +0.55 |       | 18  |
|     |                    |             |                  |     | 1966-1973                                   | +5.2  | +0.74 |       | 18  |
|     |                    |             |                  |     | 1973-1977                                   | +5.3  | +1.33 | +0.52 | 18  |
|     |                    |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976          | -4)   |       |       | 19  |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A)  | (B)            | (C)         | (D)              | (E) | (F)                                | (G)  | (H)   | (I)   | (J) |
|--|----------------|-------------|------------------|-----|------------------------------------|------|-------|-------|-----|
| 087  | PROFILE 9      | N156/519694 | H <sub>3</sub> d | S   | 1880-1905                          | +143 | +5.72 |       | 70  |
|  |                |             |                  |     | 1905-1968                          | +52  | +0.83 | +2.22 | 70  |
|  |                |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976 | -4)  |       |       | 19  |
| 088  | PROFILE 10     | N156/523708 | H <sub>3</sub> d | S   | 1880-1905                          | +119 | +4.76 |       | 70  |
|  |                |             |                  |     | 1905-1968                          | +52  | +0.83 | +1.94 | 70  |
|  |                |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976 | -1)  |       |       | 19  |
| 1920 FIRST SUBDIVISION OF PARAPARAUMU COAST    |                |             |                  |     |                                    |      |       |       |     |
| 089  | KENAKENA TRIG  | N156/527744 | H <sub>3</sub> d | S   | 1880-1892                          | +22  | +1.83 |       | 70  |
|  |                |             |                  |     | 1892-1905                          | +73  | +5.62 |       | 70  |
|  |                |             |                  |     | 1905-1968                          | +96  | +1.51 | +2.16 | 70  |
| 090  | KENAKENA POINT | N156/527714 | H <sub>3</sub> d | S   | 1877-1892                          | +60  | +4.0  |       | 12  |
|  |                |             |                  |     | 1892-1914                          | +60  | +2.73 |       | 12  |
|  |                |             |                  |     | 1914-1940                          | +40  | +1.54 | +2.54 | 12  |
| 091  | PROFILE 11     | N156/532717 | H <sub>3</sub> d | -S  | 1880-1968                          | +171 | +1.94 | +1.94 | 70  |
|  |                |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976 | -1)  |       |       | 19  |
|  |                |             |                  |     |                                    |      |       |       |     |
| 092  | PROFILE 12     | N156/548727 | H <sub>3</sub> d | S   | 1880-1898                          | +26  | +1.44 |       | 70  |
|  |                |             |                  |     | 1898-1923                          | -40  | -1.6  |       | 70  |
|  |                |             |                  |     | 1923-1968                          | +71  | +1.58 |       | 70  |
|  |                |             |                  |     | 1968-1977                          | -8   | -0.89 | +0.51 | 19  |
|  |                |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976 | -2)  |       |       | 19  |
| 093  | PROFILE 13     | N157/556733 | H <sub>3</sub> d | S   | 1880-1898                          | +121 | +6.72 |       | 70  |
|  |                |             |                  |     | 1898-1923                          | +32  | +1.28 |       | 70  |
|  |                |             |                  |     | 1923-1948                          | +4   | +0.16 |       | 70  |
|  |                |             |                  |     | 1948-1968                          | +24  | +1.2  |       | 70  |
|  |                |             |                  |     | 1968-1976                          | -8   | -1.0  |       | 19  |
|  |                |             |                  |     | 1976-1977                          | -2   | -2.0  | +1.76 | 19  |
| (STORM SURGE SEPTEMBER 11-13, 1976 -3)         |                |             |                  |     |                                    |      |       |       |     |
| 1923-1924 FIRST SUBDIVISION OF WAIKANA E COAST |                |             |                  |     |                                    |      |       |       |     |
| 094  | WAIKANA E      | N157/563739 | H <sub>3</sub> d | S   | 1880-1924                          | +116 | +2.64 |       | 70  |
|  |                |             |                  |     | 1924-1948                          | +13  | +0.54 |       | 70  |
|  |                |             |                  |     | 1948-1968                          | +45  | +2.25 |       | 70  |
| 095  | PROFILE 14     | N157/569745 | H <sub>3</sub> d | S   | 1880-1898                          | +120 | +6.67 |       | 70  |
|  |                |             |                  |     | 1898-1957                          | +18  | +0.31 |       | 70  |
|  |                |             |                  |     | 1957-1968                          | +18  | +1.64 |       | 70  |
| 096  | PROFILE 15     | N157/578757 | H <sub>3</sub> d | S   | 1880-1908                          | +80  | +2.85 |       | 70  |
|  |                |             |                  |     | 1908-1957                          | +38  | +0.77 |       | 70  |
|  |                |             |                  |     | 1957-1968                          | +51  | +4.64 |       | 70  |
| 097  | TRIG M         | N157/584765 | H <sub>3</sub> d | S   | 1880-1908                          | +14  | +0.5  |       | 70  |
|  |                |             |                  |     | 1908-1964                          | +34  | +0.61 |       | 70  |
|  |                |             |                  |     | 1964-1968                          | +33  | +8.25 |       | 70  |
| 098  | PROFILE 16     | N157/589772 | H <sub>3</sub> d | S   | 1914-1964                          | +17  | +0.34 |       | 70  |
|  |                |             |                  |     | 1964-1968                          | +17  | +4.25 |       | 70  |
|  |                |             |                  |     | 1968-1976                          | -6   | -0.75 |       | 19  |
| 099  |                |             |                  |     | 1976-1977                          | -2   | -2.0  | +0.41 | 19  |
|  |                |             |                  |     | (STORM SURGE SEPTEMBER 11-13, 1976 | -6)  |       |       | 19  |
|  |                |             |                  |     |                                    |      |       |       |     |

| (A)                                     | (B)                | (C)         | (D)                | (E) | (F)       | (G)    | (H)    | (I)    | (J) |
|---|--------------------|-------------|--------------------|-----|-----------|--------|--------|--------|-----|
| 099                                     | TRIG T             | N157/608808 | H <sub>3</sub> d   | S   | 1879-1918 | +19    | +0.66  |        | 70  |
|   |                    |             |                    |     | 1918-1968 | +100   | +2.0   | +1.34  | 70  |
| 100                                     | TE HORD            | N157/615823 | H <sub>3</sub> d/r | G/S | 1879-1918 | 0      |        |        | 70  |
|   |                    |             |                    |     | 1918-1968 | +60    | +1.2   | +0.67  | 70  |
| 1918 FIRST SUBDIVISION OF TE HORD COAST |                    |             |                    |     |           |        |        |        |     |
| 101                                     | SIMS ROAD          | N157/623840 | H <sub>3</sub> r   | G   | 1880-1968 | +67    | +0.76  | +0.67  | 70  |
| 102                                     | SWAMP ROAD         | N157/629855 | H <sub>3</sub> r   | G   | 1880-1968 | +67    | +0.76  | +0.76  | 70  |
| 103                                     | OTAKI BEACH        | N157/637873 | H <sub>3</sub> r/d | S/G | 1870-1930 | +60    | +1.0   | +1.0   | 12  |
| 104                                     | 'HYDERABAD' WRECK  | N152/712092 | H <sub>3</sub> d   | S   | 1878-1975 | +20    | +0.26  | +0.26  | 19  |
| 105                                     | WAITARERE BEACH    | N152/730180 | H <sub>3</sub> d   | S   | 1842-1972 | +350   | +2.69  | +2.69  | 70  |
| 106                                     | WAITARERE BEACH    | N152/732198 | H <sub>3</sub> d   | S   | 1842-1972 | +460   | +3.54  | +3.54  | 70  |
| 107                                     | MANAWATU MOUTH NTH | N148/736208 | H <sub>3</sub> d   | S   | 1842-1889 | +1720N | 36.6   |        | 31  |
|   |                    |             |                    |     | 1889-1962 | -3200S | -43.84 | 12.33S | 70  |
| MOUTH MIGRATION N(+) AND S(-)           |                    |             |                    |     |           |        |        |        |     |
| 108                                     | FOXTON BEACH       | N148/737238 | H <sub>3</sub> d   | S   | 1842-1962 | +70    | +0.58  | +0.58  | 31  |
| 109                                     | FOXTON BEACH       | N148/739253 | H <sub>3</sub> d   | S   | 1889-1953 | 0      | 0      | 0      | 42  |
| 110                                     | HIMATANGI          | N148/742290 | H <sub>3</sub> d   | S   | 1889-1962 | +300   | +4.11  | +4.11  | 42  |
| 111                                     | HIMATANGI          | N148/747320 | H <sub>3</sub> d   | S   | 1889-1971 | +50    | +0.61  | +0.61  | 42  |
| 112                                     | TANGIMDANA         | N148/748347 | H <sub>3</sub> d   | S   | 1889-1943 | +20    | +0.37  | +0.37  | 42  |
| 113                                     | 'FUSILIER' WRECK   | N143/702615 | H <sub>3</sub> d   | S   | 1884-1975 | +90    | +1.0   | +1.0   | 19  |
| 114                                     | KAITOKE BEACH      | N138/566809 | H <sub>3</sub> d   | S   | 1940-1975 | -70    | -2.0   | -2.0   | 19  |
| 115                                     | KAITOKE BEACH      | N138/559816 | H <sub>3</sub> d   | S   | 1940-1975 | -56    | -1.6   | -1.6   | 19  |
| 116                                     | WANGANUI AIRPORT   | N138/500823 | H <sub>3</sub> d   | S   | 1940-1975 | -50    | -1.43  | -1.43  | 19  |
| 117                                     | STH WANGANUI       | N137/530840 | H <sub>3</sub> d   | S   | 1879-1894 | -60    | -4.0   |        | 41  |
|   |                    |             |                    |     | 1894-1921 | -60    | -2.22  |        | 41  |
|   |                    |             |                    |     | 1921-1942 | -120   | -5.45  |        | 41  |
|   |                    |             |                    |     | 1942-1962 | +90    | +4.5   | -1.81  | 41  |
| 118                                     | CASTLECLIFF        | N137/514847 | H <sub>3</sub> d   | S   | 1879-1894 | +50    | +3.33  |        | 7   |
|   |                    |             |                    |     | 1894-1921 | +100   | +3.70  |        | 7   |
|   |                    |             |                    |     | 1921-1942 | +200   | +9.09  |        | 7   |
|   |                    |             |                    |     | 1942-1962 | +100   | +5.00  |        | 7   |
|   |                    |             |                    |     | 1962-1970 | +10    | +1.25  | +5.05  | 7   |
| 119                                     | KAI IWI BEACH      | N137/440917 | Wm                 | S   | 1876-1893 | -25.5  | -1.5   |        | 14  |
|   |                    |             |                    |     | 1893-1916 | -9.9   | -0.43  |        | 14  |
|   |                    |             |                    |     | 1942-1953 | -7.6   | -0.69  |        | 7   |
|   |                    |             |                    |     | 1953-1963 | -4.6   | -0.46  |        | 7   |
|   |                    |             |                    |     | 1963-1969 | -4.    | -0.69  | -0.56  | 7   |
| 120                                     | OKEHU              | N137/414931 | Wm                 | S   | 1904-1954 | -16    | -0.32  | -0.32  | 70  |
| 121                                     | MAXWELL            | N137/395938 | Wm                 | S   | 1904-1954 | -20    | -0.4   | -0.4   | 70  |
| 122                                     | TRIG T             | N137/379942 | Wm                 | S   | 1904-1954 | -36    | -0.72  | -0.72  | 70  |
| 123                                     | PATEA              | N136/053053 | H <sub>3</sub> d   | S   | 1872-1905 | +60    | +1.82  |        | 67  |
|   |                    |             |                    |     | 1905-1976 | -60    | -0.85  | 0      | 19  |
| 124                                     | PATEA              | N136/050053 | H <sub>3</sub> d   | S   | 1872-1905 | -32    | -1.0   |        | 67  |
|   |                    |             |                    |     | 1905-1939 | +59    | +1.74  |        | 67  |
|   |                    |             |                    |     | 1939-1976 | +76    | +2.05  | +0.99  | 19  |
| 125                                     | POWER HOUSE ROAD   | N129/985105 | Wm                 | S   | 1901-1976 | -4     | -0.05  | -0.05  | 67  |
| 126                                     | MANUTAHU ROAD      | N129/953148 | Wm                 | S   | 1874-1927 | -22    | -0.42  | -0.42  | 67  |
| 127                                     | MANAWAPOU          | N129/930180 | Wm                 | S/G | 1874-1953 | -48    | -0.61  |        | 67  |
|   |                    |             |                    |     | 1953-1976 | -20    | -0.87  | -0.67  | 19  |
| 1940 EXTRACTION OF 14,000m GRAVEL       |                    |             |                    |     |           |        |        |        |     |
| 128                                     | MANAWAPOU          | N129/922192 | Wm                 | S/G | 1874-1953 | -42    | -0.53  |        | 67  |
|   |                    |             |                    |     | 1953-1976 | -23    | -1.0   | -0.64  | 19  |

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## APPENDIX 1 — (Continued)

| (A) | (B)             | (C)         | (D)              | (E) | (F)   | (G)   | (H)   | (I)   | (J) |
|-----|-----------------|-------------|------------------|-----|---|-------|-------|-------|-----|
| 129 | SIGGS TRIG      | N129/864234 | Wm               | G/S | 1908-1958   | -30   | -0.6  | -0.60 | 67  |
| 130 | HAIKOTO ROAD    | N129/796267 | Wm               | G/S | 1902-1930   | -9    | -0.32 | -0.32 | 67  |
| 131 | OHAWE BEACH     | N129/778275 | Wm               | G/S | 1871-1966   | -60   | -0.63 | -0.63 | 67  |
| 132 | OHAWE BEACH     | N129/773277 | H <sub>3</sub> m | G/S | 1871-1959   | -51   | -0.58 |       | 67  |
|     |                 |             |                  |     | 1959-1966   | -9    | -1.29 | -0.63 | 25  |
| 133 | RAINE ROAD      | N129/764277 | Wm               | G/S | 1940-1976   | -40   | -1.11 | -1.11 | 39  |
|     |                 |             |                  |     | 1945-1960 EXTRACTION OF 36,600m <sup>3</sup> GRAVEL |       |       |       | 39  |
| 134 | WINKS TRIG      | N129/723284 | H <sub>2</sub> J | G/S | 1872-1976   | 35    | -0.34 | -0.34 | 67  |
| 135 | NORMANBY ROAD   | N129/678288 | H <sub>2</sub> J | G/S | 1879-1930   | -8    | -0.16 | -0.16 | 67  |
| 136 | GLEN ROAD       | N129/655294 | H <sub>2</sub> J | G/S | 1912-1947   | 0     | 0     | 0     | 67  |
| 137 | PIHAMA          | N128/498372 | H <sub>3</sub> J | S/G | 1920-1976   | 0     | 0     | 0     | 67  |
| 138 | PUNEHU          | N120/493377 | H <sub>3</sub> J | S/G | 1920-1976   | -5    | -0.09 | -0.09 | 67  |
| 139 | DANUJI          | N118/382505 | H <sub>3</sub> d | S   | 1881-1950   | 0     | 0     | 0     | 67  |
| 140 | WRITANA         | N118/360597 | H <sub>3</sub> d | S   | 1880-1937   | +40   | +0.70 |       | 67  |
|     |                 |             |                  |     | 1937-1959   | +50   | +2.27 | +1.14 | 67  |
| 141 | TIPORA          | N118/358604 | H <sub>3</sub> d | S/G | 1880-1937   | +42   | +0.74 |       | 67  |
|     |                 |             |                  |     | 1937-1959   | -20   | -0.91 | +0.28 | 67  |
| 142 | TIPORA TRIG V   | N118/355610 | H <sub>3</sub> d | S   | 1880-1937   | +22   | +0.39 |       | 67  |
|     |                 |             |                  |     | 1937-1959   | -12   | -0.55 | +0.13 | 67  |
| 143 | WAREA RIVER     | N118/698372 | H <sub>3</sub> r | G   | 1881-1953   | +14   | +0.19 | +0.19 | 67  |
| 144 | STENT ROAD      | N108/370703 | H <sub>3</sub> r | G   | 1881-1953   | +20   | +0.28 | +0.28 | 67  |
| 145 | STENT ROAD      | N108/372710 | H <sub>3</sub> r | G   | 1881-1953   | +10   | +0.14 | +0.14 | 67  |
| 146 | LEITH ROAD      | N108/463813 | H <sub>2</sub> J | G   | 1892-1975   | 0     | 0     | 0     | 67  |
| 147 | AHU AHU ROAD    | N108/516842 | H <sub>3</sub> d | S   | 1865-1961   | +20   | +0.21 | +0.21 | 67  |
| 148 | OKARA           | N108/525843 | H <sub>3</sub> d | S   | 1865-1961   | +64   | +0.67 | +0.67 | 67  |
| 149 | OKARA           | N108/531845 | H <sub>3</sub> d | S   | 1865-1961   | +32   | +0.33 | +0.33 | 67  |
| 150 | HAREHAWE STREAM | N108/598905 | H <sub>2</sub> J | S   | 1925-1975   | 0     | 0     | 0     | 67  |
| 151 | NEW PLYMOUTH    | N109/658927 | H <sub>2</sub> J | S   | 1842-1901   | -10   | -0.17 |       | 67  |
|     |                 |             |                  |     | 1901-1921   | -10   | -0.5  |       | 67  |
|     |                 |             |                  |     | 1921-1944   | -9    | -0.39 | -0.28 | 67  |
|     |                 |             |                  |     | 1944 SEAWALL BUILT, CLIFFS STABILISED               |       |       |       | 30  |
| 152 | NEW PLYMOUTH    | N109/664926 | H <sub>3</sub> d | S   | 1842-1921   | -86   | -1.09 | -1.09 | 67  |
| 153 | FITZROY BEACH   | N109/668929 | H <sub>3</sub> d | S   | 1842-1958   | -68   | -0.59 | -0.59 | 67  |
| 154 | FITZROY BEACH   | N109/672933 | H <sub>3</sub> d | S   | 1842-1958   | -67   | -0.58 | -0.58 | 67  |
| 155 | FITZROY BEACH   | N109/675937 | H <sub>3</sub> d | S   | 1842-1958   | -100  | -0.86 | -0.86 | 67  |
| 156 | FITZROY BEACH   | N109/679942 | H <sub>3</sub> d | S   | 1842-1958   | +9    | +0.08 | +0.08 | 67  |
|     |                 |             |                  |     | 1881-1887 NEW PLYMOUTH HARBOUR BREAKWATER BUILT     |       |       |       | 30  |
| 157 | BELL BLOCK      | N109/710966 | H <sub>3</sub> d | S/G | 1907-1974   | -28   | -0.42 | -0.42 | 67  |
| 158 | WILLS ROAD      | N109/724967 | H <sub>2</sub> J | G/S | 1852-1945   | -23.5 | -0.25 |       | 67  |
|     |                 |             |                  |     | 1945-1950   | -11.9 | -2.38 |       | 18  |
|     |                 |             |                  |     | 1950-1957   | 0     | 0     |       | 18  |
|     |                 |             |                  |     | 1957-1970   | -9.02 | -0.69 |       | 18  |
|     |                 |             |                  |     | 1970-1976   | -0.92 | -0.15 | -0.37 | 18  |
| 159 | PUKETAPU TRIG   | N109/730972 | H <sub>2</sub> J | G/S | 1917-1945   | -20.0 | -0.71 |       | 67  |
|     |                 |             |                  |     | 1945-1950   | -12.3 | -2.5  |       | 18  |
|     |                 |             |                  |     | 1950-1957   | 0     | 0     |       | 18  |
|     |                 |             |                  |     | 1957-1964   | -9.6  | -1.37 |       | 67  |
|     |                 |             |                  |     | 1964-1970   | -2.7  | -0.41 |       | 18  |
|     |                 |             |                  |     | 1970-1976   | -0.44 | -0.07 | -0.76 | 18  |
|     |                 |             |                  |     | 1937-1948 GRAVEL EXTRACTION WILLS ROAD TO PUKETAPU  |       |       |       | 3   |
| 160 | AIRPORT         | N109/742982 | H <sub>2</sub> J | G/S | 1917-1964   | -45   | -0.96 | -0.96 | 67  |
| 161 | AIRPORT         | N109/747990 | H <sub>2</sub> J | G/S | 1917-1964   | -15   | -0.32 | -0.32 | 67  |



| (A) | (B)              | (C)         | (D)               | (E) | (F)  | (G)   | (H)  | (I)    | (J)  |
|-----|------------------|-------------|-------------------|-----|--|---|--|--------|--|
| 162 | WAITARA          | N99/800006  | H <sub>3</sub> d  | S/G | 1913-1958  | -130  | -2.89  | -2.89  | 67   |
| 163 | OTARADA ROAD     | N99/835005  | H <sub>3</sub> d  | S/G | 1919-1975  | -24   | -0.43  | -0.43  | 67   |
| 164 | STH ONAERO       | N109/910000 | Tt<br>M/ST.-S/ST. | S   | 1882-1937  | -30   | -0.55  | -0.55  | 67   |
| 165 | STH ONAERO       | N99/921003  | Tt<br>M/ST.-S/ST. | S   | 1882-1931  | -6  | -0.12  | -0.12  | 67   |
| 166 | NTH ONAERO       | N99/927003  | Tt<br>M/ST.-S/ST. | S   | 1883-1958  | -40   | -0.53  | -0.53  | 67   |
| 167 | NTH ONAERO       | N99/934004  | Tt<br>M/ST.-S/ST. | S   | 1883-1958  | -80   | -1.07  | -1.07  | 67   |
| 168 | URENUI           | N99/951006  | H <sub>3</sub> e  | S/G | 1970-1975  | -30   | -6.0   | -6.0   | 19   |
| 169 | BROWN TRIG       | N99/968017  | Tt<br>M/ST.-S/ST. | S   | 1883-1958  | 0   | 0  | 0      | 67   |
| 170 | OLD NTH ROAD     | N99/976024  | Tt<br>M/ST.-S/ST. | S   | 1883-1960  | -17.5   | -0.23  | -0.23  | 67   |
| 171 | OLD NTH ROAD     | N99/983030  | Tt<br>M/ST.-S/ST. | S   | 1883-1980  | -12.5   | -0.16  | -0.16  | 67   |
| 172 | CARRS ROAD       | N99/987033  | Tt<br>M/ST.-S/ST. | S   | 1883-1975  | -24.0   | -0.26  | -0.26  | 67   |
| 173 | CARRS ROAD       | N99/990037  | Tt<br>M/ST.-S/ST. | S   | 1883-1975  | -30.0   | -0.33  | -0.33  | 67   |
| 174 | MIMI TRIG        | N99/999047  | Tt<br>M/ST.-S/ST. | S   | 1880-1975  | -36   | -0.38  | -0.38  | 67   |
| 175 | PUKEARUHE ROAD   | N99/045110  | Tt<br>M/ST.-S/ST. | S   | 1866-1988  | -30   | -0.29  | -0.29  | 67   |
| 176 | PARIKARIWA POINT | N99/061123  | Tt<br>M/ST.-S/ST. | S   | 1955-1975  | -10   | -0.5   | -0.5   | 3  |
| 177 | MONUMENT         | N99/070126  | Tt<br>M/ST.-S/ST. | S   | 1937-1969  | -12   | -0.38  | -0.38  | 67   |
| 178 | PARININIHI TRIG  | N99/095151  | Tt<br>M/ST.-S/ST. | S   | 1880-1975  | -180  | -1.89  | -1.89  | 67   |
| 179 | WHITE CLIFFS     | N100/118191 | Tt<br>M/ST.-S/ST. | S   | 1955-1975  | -40   | -2.0   | -2.0   | 3  |
| 180 | RAPANUI STREAM   | N100/135238 | Tt<br>M/ST.-S/ST. | S   | 1896-1966  | -8  | -0.11  | -0.11  | 67   |
| 181 | MOHAKATINO       | N91/150305  | Tt<br>M/ST.-S/ST. | S   | 1888-1974  | -43   | -0.5   | -0.5   | 67   |
| 182 | MOHAKATINO       | N91/151313  | Tt<br>M/ST.-S/ST. | S   | 1888-1974  | -8  | -0.09  | -0.09  | 67   |
| 183 | MANUKAU BARRIER  | N46/098258  | H <sub>3</sub> d  | S   | 1853-1919<br>1919-1969   | +115<br>-240  | +1.74<br>-4.8  | -1.08  | 31<br>31   |
| 184 | MANUKAU BARRIER  | N46/082291  | H <sub>3</sub> d  | S   | 1853-1919<br>1919-1969   | +110<br>-408  | +1.67<br>-8.16   | -2.57  | 31<br>31   |
| 185 | MANUKAU BARRIER  | N46/077300  | H <sub>3</sub> d  | S   | 1853-1919<br>1919-1969   | +120<br>-384  | +1.82<br>-7.68   | -2.28  | 31<br>31   |
| 186 | MANUKAU BARRIER  | N46/065330  | H <sub>3</sub> d  | S   | 1853-1919<br>1919-1969   | +336<br>-614  | +5.09<br>-12.28  | -2.40  | 31<br>31   |
| 187 | MANUKAU BARRIER  | N46/064354  | H <sub>3</sub> d  | S   | 1853-1919<br>1919-1969   | +672<br>-960  | +10.18<br>-19.2  | -2.48  | 31<br>31   |
| 188 | WHATIPU          | N41/024375  | H <sub>3</sub> d  | S   | 1844-1853<br>1953-1890<br>1890-1910<br>1910-1919<br>1919-1930<br>1930-1940<br>1940-1954<br>1954-1960<br>1960-1968<br>1968-1974 | 0<br>+280<br>0<br>-180<br>-100<br>+500<br>+710<br>+20<br>+10<br>+80 | 0<br>+7.57<br>0<br>-20.0<br>-9.09<br>+50.0<br>+50.71<br>+3.33<br>+1.25<br>+13.33 | +10.15 | 42<br>42<br>42<br>31<br>42<br>42<br>42<br>42<br>42<br>42 |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A) | (B)                     | (C)         | (D)                | (E) | (F)       | (G)   | (H)    | (I)    | (J) |
|-----|-------------------------|-------------|--------------------|-----|-----------|-------|--------|--------|-----|
| 189 | TRIG X                  | N41/018399  | H <sub>3</sub> d   | S   | 1844-1890 | +380  | +8.26  |        | 42  |
|     |                         |             |                    |     | 1890-1910 | 0     | 0      |        | 42  |
|     |                         |             |                    |     | 1910-1919 | -20   | -2.22  |        | 31  |
|     |                         |             |                    |     | 1919-1940 | +90   | +4.29  |        | 42  |
|     |                         |             |                    |     | 1940-1960 | +60   | +3.0   |        | 42  |
| 190 | MURIWAI BEACH           | N41/951616  | H <sub>3</sub> d   | S   | 1960-1968 | +320  | +40.0  |        | 42  |
|     |                         |             |                    |     | 1968-1974 | 0     | 0      | +6.38  | 42  |
|     |                         |             |                    |     | 1971-1975 | -50   | -12.5  | -12.5  | 3   |
| 191 | MURIWAI BEACH           | N41/943648  | H <sub>3</sub> d   | S   | 1971-1975 | -20   | -5.0   | -5.0   | 3   |
| 192 | STH KAIPARA HEAD        | N33/688042  | H <sub>3</sub> d   | S   | 1852-1926 | -772  | -10.43 |        | 72  |
|     |                         |             |                    |     | 1926-1966 | +1235 | +30.88 | +4.06  | 72  |
| 193 | PAPAKANUI SPIT          | N33/744110  | H <sub>3</sub> d   | S   | 1852-1926 | +309  | +4.18  |        | 72  |
|     |                         |             |                    |     | 1926-1942 | +875  | +54.69 |        | 72  |
|     |                         |             |                    |     | 1942-1952 | +663  | +66.3  |        | 72  |
| 194 | KAIPARA HEAD LIGHTHOUSE | N33/657158  | H <sub>1</sub> d   | S   | 1952-1966 | +160  | +11.43 | +17.61 | 72  |
|     |                         |             |                    |     | 1926-1960 | -250  | -7.35  | -7.35  | 72  |
|     |                         |             |                    |     |           |       |        |        |     |
| 195 | NTH KAIPARA HEAD        | N32/583146  | H <sub>3</sub> d   | S   | 1852-1879 | -772  | -28.59 |        | 72  |
|     |                         |             |                    |     | 1879-1926 | -1111 | -23.64 |        | 72  |
|     |                         |             |                    |     | 1926-1943 | -617  | -36.29 |        | 72  |
|     |                         |             |                    |     | 1943-1960 | -247  | -14.53 | -25.44 | 72  |
| 196 | NTH KAIPARA HEAD        | N32/550159  | H <sub>3</sub> d   | S   | 1852-1926 | +586  | +7.92  |        | 72  |
|     |                         |             |                    |     | 1926-1943 | +926  | +54.45 |        | 72  |
|     |                         |             |                    |     | 1943-1960 | +123  | +7.24  | +15.14 | 72  |
| 197 | NTH KAIPARA BARRIER     | N27/500350  | H <sub>3</sub> d   | S   | 1962-1972 | +15   | +1.5   | +1.5   | 57  |
| 198 | BAYLYS BEACH            | N23/263685  | H <sub>2</sub> d   | S   | 1915-1976 | -60   | -0.98  | -0.98  | 3   |
| 199 | TE WAEWAE BAY           | S175/692263 | H <sub>3</sub> r   | S/G | 1889-1963 | 0     | 0      | 0      | 64  |
| 200 | TE WAEWAE BAY           | S175/696261 | H <sub>3</sub> r   | G/S | 1889-1901 | +24   | +2.0   |        | 64  |
|     |                         |             |                    |     | 1901-1926 | +70   | +2.8   |        | 64  |
|     |                         |             |                    |     | 1926-1963 | +24   | +0.65  |        | 64  |
|     |                         |             |                    |     | 1963-1976 | 0     | 0      | +1.36  | 18  |
| 201 | TE WAEWAE BAY           | S175/736237 | H <sub>3</sub> b   | G   | 1946-1963 | -17   | -1.0   |        | 18  |
|     |                         |             |                    |     | 1963-1976 | -35   | -2.69  | -1.73  | 18  |
| 202 | TE WAEWAE BAY           | S175/752224 | H <sub>3</sub> b   | G   | 1946-1963 | -20   | -1.18  |        | 18  |
| 203 | TE WAEWAE BAY           | S175/757212 | H <sub>3</sub> r   | G   | 1963-1976 | -40   | -3.08  | -2.0   | 18  |
|     |                         |             |                    |     | 1946-1963 | -5    | -0.29  |        | 18  |
| 204 | DREPLIKI                | S175/824147 | Wm<br>M/ST.        | G/S | 1963-1976 | +5    | +0.38  |        | 18  |
|     |                         |             |                    |     | 1976-1977 | -10   | -10.0  | -0.32  | 19  |
|     |                         |             |                    |     | 1884-1928 | 0     | 0      |        | 64  |
| 205 | DREPLIKI                | S175/817125 | Wm<br>M/ST.        | S   | 1928-1977 | 0     | 0      | 0      | 19  |
|     |                         |             |                    |     | 1909-1969 | 0     | 0      | 0      | 64  |
| 206 | KAWAKAPUTA BAY          | S176/920047 | H <sub>3</sub> d   | S   | 1884-1963 | +20   | +0.25  | +0.25  | 64  |
| 207 | COLAC BAY               | S176/996065 | H <sub>3</sub> d   | S   | 1881-1963 | +55   | +0.67  | +0.67  | 64  |
| 208 | RIVERTON                | S176/076071 | H <sub>3</sub> r/d | S/G | 1858-1966 | +30   | +0.28  | +0.28  | 64  |
| 209 | RIVERTON                | S176/100089 | H <sub>3</sub> r/d | S/G | 1858-1966 | 0     | 0      | 0      | 64  |
| 210 | FERRY ROAD              | S176/223033 | H <sub>3</sub> d   | S   | 1863-1963 | +80   | +0.8   | +0.8   | 64  |
| 211 | ORETI BEACH             | S181/249988 | H <sub>3</sub> d   | S   | 1926-1963 | +50   | +1.35  | +1.35  | 64  |
| 212 | ORETI BEACH             | S181/270938 | H <sub>3</sub> d   | S   | 1907-1963 | +200  | +3.57  | +3.57  | 64  |
| 213 | ORETI BEACH             | S182/280916 | H <sub>3</sub> d   | S   | 1907-1963 | +250  | +4.46  | +4.46  | 64  |
| 214 | TOETODES BAY            | S182/483777 | H <sub>3</sub> r   | G   | 1888-1969 | +5    | +0.06  | +0.06  | 64  |
| 215 | TRIG A                  | S182/507785 | H <sub>3</sub> r   | G   | 1888-1947 | -30   | -0.51  | -0.51  | 64  |

| (A) | (B)              | (C)         | (D)                | (E) | (F)       | (G)  | (H)    | (I)   | (J) |
|-----|------------------|-------------|--------------------|-----|-----------|------|--------|-------|-----|
| 216 | WAITUNA TRIG     | S182/632831 | H <sub>3</sub> r   | G/S | 1889-1906 | -10  | -0.59  |       | 64  |
|     |                  |             |                    |     | 1906-1966 | -24  | -0.4   | -2.26 | 64  |
| 217 | TOETDES BAY      | S182/703830 | H <sub>3</sub> d   | S   | 1875-1928 | -28  | -0.53  |       | 64  |
|     |                  |             |                    |     | 1928-1965 | +68  | +1.84  | +0.44 | 64  |
| 218 | TOETDES BAY      | S182/733821 | H <sub>3</sub> d   | S   | 1928-1952 | +40  | +1.67  |       | 64  |
|     |                  |             |                    |     | 1952-1969 | +40  | +2.35  | +0.51 | 18  |
| 219 | WAIPAPA          | S183/813734 | H <sub>3</sub> d   | S   | 1888-1935 | -38  | -0.81  |       | 64  |
|     |                  |             |                    |     | 1935-1948 | +65  | +5.0   |       | 64  |
|     |                  |             |                    |     | 1948-1967 | -30  | -1.58  | -0.04 | 18  |
| 220 | WAIPAPA          | S183/858734 | H <sub>3</sub> d   | S   | 1888-1935 | -66  | -1.40  |       | 64  |
|     |                  |             |                    |     | 1935-1948 | +170 | +13.08 |       | 64  |
|     |                  |             |                    |     | 1948-1967 | -30  | -1.58  | +0.94 | 18  |
| 221 | HALDANE BAY      | S183/950732 | H <sub>3</sub> d   | S   | 1894-1967 | +50  | +0.68  | +0.68 | 64  |
| 222 | PORPOISE BAY     | S183/995734 | H <sub>3</sub> d   | S   | 1894-1948 | +60  | +1.11  | +1.11 | 64  |
| 223 | PORPOISE BAY     | S183/994745 | H <sub>3</sub> d   | S   | 1894-1958 | +24  | +0.38  |       | 64  |
|     |                  |             |                    |     | 1958-1977 | +16  | +0.84  | +0.48 | 19  |
| 224 | PORPOISE BAY     | S183/001754 | H <sub>3</sub> d   | S   | 1894-1948 | +60  | +1.11  |       | 64  |
| 225 | WAIPATI BEACH    | S184/203789 | H <sub>3</sub> d   | S   | 1894-1977 | 0    | 0      | +0.72 | 19  |
|     |                  |             |                    |     | 1897-1967 | +50  | +0.71  | +0.71 | 51  |
| 226 | WAIPATI BEACH    | S184/215801 | H <sub>3</sub> d   | S   | 1897-1967 | -70  | -1.0   | -1.0  | 51  |
| 227 | TAHAKOPA BAY     | S184/309862 | H <sub>3</sub> d   | S   | 1894-1967 | +357 | +3.84  | +3.84 | 51  |
| 228 | TAHAKOPA BAY     | S184/323867 | H <sub>3</sub> d   | S   | 1894-1967 | +153 | +1.64  | +1.64 | 51  |
|     |                  |             |                    |     | 1889-1933 | -60  | -1.36  |       | 51  |
| 230 | CATLINS          | S184/500967 | H <sub>3</sub> d   | S   | 1933-1967 | 0    | 0      | -0.77 | 51  |
|     |                  |             |                    |     | 1865-1891 | 0    | 0      |       | 51  |
|     |                  |             |                    |     | 1891-1948 | -360 | -6.32  |       | 51  |
| 231 | SURAT BAY        | S184/518972 | H <sub>3</sub> d   | S   | 1948-1951 | +109 | +36.33 |       | 18  |
|     |                  |             |                    |     | 1951-1975 | -134 | -5.58  |       | 18  |
|     |                  |             |                    |     | 1975-1977 | -85  | -42.5  | -4.20 | 19  |
|     |                  |             |                    |     | 1891-1948 | +119 | +2.09  |       | 51  |
| 232 | MOLYNEUX BAY     | S179/557100 | H <sub>3</sub> r   | S   | 1948-1951 | -13  | -4.33  |       | 18  |
|     |                  |             |                    |     | 1951-1975 | +6   | +0.25  | +1.33 | 18  |
|     |                  |             |                    |     | 1847-1962 | 0    | 0      |       | 51  |
| 233 | MOLYNEUX BAY     | S179/572122 | H <sub>3</sub> b   | S/G | 1962-1977 | -80  | -5.33  | -0.62 | 19  |
|     |                  |             |                    |     | 1847-1962 | +380 | +3.30  | +3.30 | 51  |
| 234 | MOLYNEUX BAY     | S179/590142 | H <sub>3</sub> r/d | S/G | 1847-1962 | +290 | +2.52  | +2.52 | 51  |
| 235 | MOLYNEUX BAY     | S179/611155 | H <sub>3</sub> r/d | S/G | 1847-1962 | +145 | +1.26  | +1.26 | 51  |
| 236 | MOLYNEUX BAY     | S179/630165 | H <sub>3</sub> r/d | S/G | 1847-1962 | +70  | +0.61  | +0.61 | 51  |
| 237 | ALLANS BEACH     | S164/315714 | H <sub>3</sub> d   | S   | 1939-1969 | +300 | +10.0  | +10.0 | 42  |
| 238 | WICKLIFFÉ BAY    | S164/346775 | H <sub>3</sub> d   | S   | 1867-1888 | -166 | -7.9   |       | 51  |
|     |                  |             |                    |     | 1888-1952 | -3   | -0.05  |       | 51  |
| 239 | PIPIKARETU BEACH | S164/357804 | H <sub>3</sub> d   | S   | 1952-1972 | +63  | +3.15  | -1.01 | 51  |
|     |                  |             |                    |     | 1876-1972 | +239 | +2.28  | +2.28 | 51  |
| 240 | PENGUIN BEACH    | S164/354820 | H <sub>3</sub> d   | S   | 1867-1972 | +133 | +1.27  | +1.27 | 51  |
| 241 | PURAKANUI BAY    | S164/252878 | H <sub>3</sub> d   | S   | 1891-1975 | +435 | +5.18  | +5.18 | 51  |
| 242 | WARRINGTON       | S155/232906 | H <sub>3</sub> d   | S   | 1862-1968 | +30  | +0.28  | +0.28 | 51  |
| 243 | WAIKUAITI        | S155/295033 | H <sub>3</sub> d   | S   | 1861-1968 | +20  | +0.19  | +0.19 | 51  |
| 244 | WAIKUAITI        | S155/302037 | H <sub>3</sub> d   | S   | 1861-1968 | +14  | +0.13  | +0.13 | 51  |
| 245 | KAKANUI          | S136/485554 | H <sub>3</sub> r   | S   | 1957-1977 | -100 | -5.0   | -5.0  | 19  |
| 246 | DAMARU           | S136/544653 | H <sub>3</sub> r   | S   | 1860-1971 | +63  | +0.56  | +0.56 | 51  |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A) | (B)             | (C)         | (D)               | (E) | (F)                             | (G)    | (H)   | (I)   | (J) |
|-----|-----------------|-------------|-------------------|-----|---------------------------------|--------|-------|-------|-----|
| 247 | DAMARU          | S137/565687 | H <sub>2a</sub>   | G   | 1861-1939                       | -50.9  | -0.65 |       | 51  |
|     |                 |             |                   |     | 1939-1945                       | -8.5   | -1.42 |       | 44  |
|     |                 |             |                   |     | 1945-1954                       | -2.1   | -0.23 |       | 44  |
|     |                 |             |                   |     | 1954-1959                       | -2.1   | -0.42 |       | 44  |
|     |                 |             |                   |     | 1959-1964                       | -0.3   | -0.06 |       | 44  |
|     |                 |             |                   |     | 1964-1967                       | -0.3   | -0.10 |       | 44  |
|     |                 |             |                   |     | 1967-1970                       | -0.3   | -0.10 |       | 44  |
|     |                 |             |                   |     | 1970-1971                       | -0.3   | -0.18 |       | 44  |
|     |                 |             |                   |     | 1871-1973                       | -0.4   | -0.29 |       | 44  |
|     |                 |             |                   |     | 1973-1974                       | -0.7   | -0.47 |       | 44  |
|     |                 |             |                   |     | 1974-1976                       | -1.5   | -1.07 | -0.58 | 44  |
| 248 | DAMARU          | S137/566688 | H <sub>2a</sub>   | G   | 1861-1939                       | -35.7  | -0.46 |       | 51  |
|     |                 |             |                   |     | 1939-1945                       | -8.2   | -1.37 |       | 51  |
|     |                 |             |                   |     | 1945-1954                       | -8.2   | -0.91 |       | 44  |
|     |                 |             |                   |     | 1954-1959                       | -3.4   | -0.68 |       | 44  |
|     |                 |             |                   |     | 1959-1964                       | -0.6   | -0.12 |       | 44  |
|     |                 |             |                   |     | 1964-1967                       | -0.3   | -0.10 |       | 44  |
|     |                 |             |                   |     | 1967-1970                       | -0.6   | -0.20 |       | 44  |
|     |                 |             |                   |     | 1970-1971                       | -0.3   | -0.18 |       | 44  |
|     |                 |             |                   |     | 1971-1973                       | -0.2   | -0.14 |       | 44  |
|     |                 |             |                   |     | 1973-1974                       | -1.4   | -0.93 |       | 44  |
|     |                 |             |                   |     | 1974-1976                       | -0.6   | -0.43 | -0.50 | 44  |
| 249 | STH WAITAKI FAN | S137/615732 | H <sub>2a</sub>   | G   | 1955-1972                       | -9.8   | -0.59 | -0.59 | 18  |
| 250 | STH WAITAKI FAN | S137/650775 | H <sub>2a</sub>   | G   | 1955-1972                       | -32.5  | -1.97 | -1.97 | 18  |
| 251 | STH WAITAKI FAN | S128/671803 | H <sub>2a</sub>   | G   | 1943-1969                       | -39.9  | -1.55 | -1.55 | 18  |
| 252 | STH WAITAKI FAN | S128/683828 | H <sub>3a</sub>   | G   | 1943-1969                       | -20.8  | -0.81 | -0.81 | 18  |
| 253 | NTH WAITAKI FAN | S128/706900 | H <sub>2a</sub>   | G   | 1943-1969                       | -37.9  | -1.47 | -1.47 | 18  |
|     |                 |             |                   |     | (STORMS JUNE 18, AUGUST 2, 1974 | -6.0)  |       |       | 10  |
| 254 | NTH WAITAKI FAN | S128/714939 | H <sub>2a</sub>   | G   | 1943-1969                       | -45.5  | -1.76 | -1.76 | 18  |
| 255 | NTH WAITAKI FAN | S128/717975 | H <sub>2a</sub>   | G   | 1943-1969                       | -34.6  | -1.34 |       | 18  |
|     |                 |             |                   |     | 1974-1977                       | -7.3   | -2.59 | -1.24 | 13  |
| 256 | NTH WAITAKI FAN | S128/718005 | H <sub>2a</sub>   | G   | 1943-1969                       | -9.7   | -0.38 | -0.38 | 18  |
| 257 | WAIHAO RIVER    | S128/717059 | H <sub>3r</sub>   | G   | 1899-1958                       | -27.1  | -0.45 |       | 13  |
|     |                 |             |                   |     | 1958-1963                       | -18.3  | -3.56 | -0.68 | 13  |
| 258 | WAINOMO         | S119/709189 | H <sub>3b</sub>   | G   | 1953-1977                       | -8.8   | -0.38 | -0.38 | 18  |
| 259 | MAKIHIMI        | S119/706231 | H <sub>3r</sub>   | G   | 1953-1977                       | -4.6   | -0.20 | -0.20 | 18  |
| 260 | ST ANDREWS      | S119/734354 | H <sub>2a</sub>   | G   | 1877-1957                       | -20.1  | -0.25 |       | 3   |
|     |                 |             |                   |     | 1957-1968                       | -5.5   | -0.5  | -0.28 | 13  |
|     |                 |             |                   |     | (STORMS JUNE 18, AUGUST 2, 1974 | -6.0)  |       |       | 10  |
| 261 | PATITI POINT    | S111/796495 | H <sub>3r</sub>   | G/S | 1879-1967                       | -80    | -0.91 | -0.91 | 42  |
| 262 | TIMARU          | S111/792503 | H <sub>3r</sub>   | G/S | 1879-1967                       | +150   | +1.70 | +1.70 | 42  |
| 263 | TIMARU          | S111/793518 | H <sub>3r</sub>   | G/S | 1879-1967                       | +500   | +5.68 | +5.68 | 42  |
| 264 | CARDLINE BAY    | S111/782524 | H <sub>3d</sub>   | S   | 1879-1967                       | +300   | +3.41 | +3.41 | 42  |
| 265 | BENVENUE        | S111/778534 | H <sub>3r</sub>   | G/S | 1879-1967                       | -375   | -4.26 | -4.26 | 42  |
| 266 | WASHOVKE        | S111/793563 | H <sub>3b</sub>   | G/S | 1865-1934                       | -170   | -2.46 |       | 13  |
|     |                 |             |                   |     | 1934-1956                       | -126.6 | -5.75 |       | 18  |
|     |                 |             |                   |     | 1956-1967                       | -33.3  | -3.03 |       | 18  |
|     |                 |             |                   |     | 1967-1973                       | -12.6  | -2.10 | -3.17 | 19  |
| 267 | SEAFORTH        | S111/816595 | H <sub>3r/a</sub> | G/S | 1865-1932                       | -100   | -1.49 |       | 13  |
|     |                 |             |                   |     | 1932-1967                       | -140   | -4.0  |       | 13  |
|     |                 |             |                   |     | 1967-1977                       | -80    | -8.0  | -3.21 | 13  |
| 268 | STH OPIHI       | S111/850635 | H <sub>3r/b</sub> | G/S | 1870-1958                       | -121   | -1.37 |       | 40  |
|     |                 |             |                   |     | 1967-1977                       | -40    | -4.0  | -1.62 | 13  |

| (A) | (B)                | (C)         | (D)                | (E) | (F)       | (G)   | (H)    | (I)   | (J) |
|-----|--------------------|-------------|--------------------|-----|-----------|-------|--------|-------|-----|
| 269 | BROWNS BEACH       | S111/905688 | H <sub>3</sub> r/s | G/S | 1870-1958 | -60   | -0.68  |       | 40  |
|     |                    |             |                    |     | 1967-1977 | -40   | -4.0   | -0.99 | 13  |
| 270 | NTH ORARI          | S102/947726 | H <sub>2</sub> a   | G/S | 1900-1958 | -50   | -0.86  |       | 40  |
|     |                    |             |                    |     | 1939-1967 | -9.7  | -0.35  | -0.65 | 18  |
| 271 | NTH ORARI          | S102/975747 | H <sub>2</sub> a   | G/S | 1939-1967 | -8.6  | -0.31  | -0.31 | 18  |
| 272 | NTH RANGITATA      | S103/045798 | H <sub>2</sub> a   | G/S | 1939-1961 | -6.0  | -0.27  |       | 18  |
|     |                    |             |                    |     | 1961-1977 | -7.0  | -0.44  | -0.34 | 19  |
| 273 | BEACH ROAD         | S103/077822 | H <sub>2</sub> a   | G/S | 1939-1965 | -19.1 | -0.73  | -0.73 | 18  |
| 274 | TWENTYONE ROAD     | S103/110844 | H <sub>2</sub> a   | G/S | 1939-1965 | -23.7 | -0.91  | -0.91 | 18  |
| 275 | NTH HINDS          | S103/145865 | H <sub>2</sub> a   | G/S | 1939-1965 | -6.0  | -0.23  | -0.23 | 18  |
| 276 | TANSEY'S ROAD      | S103/198895 | H <sub>2</sub> a   | G/S | 1941-1965 | -13.1 | -0.55  | -0.55 | 18  |
| 277 | STH ASHBURTON      | S103/255925 | H <sub>2</sub> a   | G/S | 1941-1965 | -9.1  | -0.38  | -0.38 | 18  |
| 278 | NTH ASHBURTON      | S103/285943 | H <sub>2</sub> a   | G/S | 1941-1976 | -23.8 | -0.68  | -0.68 | 18  |
| 279 | WAKAMUI            | S103/327968 | H <sub>2</sub> a   | G/S | 1942-1976 | -28.6 | -0.84  | -0.84 | 18  |
| 280 | SEAVIEW            | S103/363989 | H <sub>2</sub> a   | G/S | 1942-1976 | -23.3 | -0.69  | -0.69 | 18  |
| 281 | SEAFIELD ROAD      | S92/414020  | H <sub>2</sub> a   | G/S | 1942-1976 | -46.2 | -1.36  | -1.36 | 18  |
| 282 | CORBETTS ROAD      | S92/443035  | H <sub>2</sub> a   | G/S | 1942-1976 | -11.4 | -0.34  | -0.34 | 18  |
| 283 | KYLE ROAD          | S93/472052  | H <sub>2</sub> a   | G/S | 1942-1976 | -14.6 | -0.43  | -0.43 | 18  |
| 284 | MAINWARING'S ROAD  | S93/537083  | H <sub>2</sub> a   | G/S | 1942-1976 | -21.2 | -0.62  | -0.62 | 18  |
| 285 | STH RAKAIA         | S93/603110  | H <sub>3</sub> r   | G/S | 1942-1976 | +12.1 | +0.36  | +0.36 | 18  |
| 286 | RAKAIA ROAD        | S93/665134  | H <sub>3</sub> r   | G   | 1943-1975 | -21.0 | -0.66  | -0.66 | 18  |
| 287 | McEVEDYS ROAD      | S93/703151  | H <sub>3</sub> r   | G   | 1943-1975 | -66.6 | -2.08  | -2.08 | 18  |
| 288 | McEVEDYS ROAD      | S93/703151  | H <sub>3</sub> r   | G   | 1931-1945 | -0.64 | -0.05  |       | 33  |
|     |                    |             |                    |     | 1945-1962 | -15.5 | -0.91  |       | 33  |
|     |                    |             |                    |     | 1962-1965 | -1.5  | -0.51  |       | 33  |
|     |                    |             |                    |     | 1965-1967 | -3.1  | -1.53  | -0.58 | 33  |
| 289 | TAUMUTU            | S93/752163  | H <sub>3</sub> r   | G   | 1943-1975 | -98.3 | -3.07  | -3.07 | 18  |
| 290 | BIRDLINGS FLAT     | S94/067201  | H <sub>3</sub> r/d | G/S | 1862-1952 | +50   | +0.56  |       | 4   |
|     |                    |             |                    |     | 1952-1966 | 0     | 0      | +0.48 | 4   |
| 291 | OKAINS BAY         | S85/375356  | H <sub>3</sub> d   | S   | 1870-1970 | +230  | +2.3   | +2.3  | 11  |
| 292 | SUMNER             | S84/114514  | H <sub>3</sub> d   | S   | 1928-1930 | +18   | +9.0   |       | 52  |
|     |                    |             |                    |     | 1930-1950 | +20   | +1.0   |       | 52  |
|     |                    |             |                    |     | 1950-1977 | -40   | -1.48  | -0.04 | 49  |
| 293 | CLIFTON            | S84/108518  | H <sub>3</sub> d   | S   | 1849-1928 | 0     | 0      |       | 52  |
|     |                    |             |                    |     | 1928-1930 | +110  | +55.0  |       | 52  |
|     |                    |             |                    |     | 1930-1936 | +12   | +2.0   |       | 52  |
|     |                    |             |                    |     | 1936-1950 | +152  | +10.86 |       | 52  |
|     |                    |             |                    |     | 1950-1977 | -116  | -4.3   | +1.23 | 19  |
| 294 | SOUTHSHORE         | S84/105535  | H <sub>3</sub> d   | S   | 1920-1963 | +120  | +2.79  | +2.79 | 6   |
| 295 | DARD BEACH         | S56/805786  | H <sub>3</sub> d   | S   | 1942-1974 | +18.3 | +0.59  | +0.59 | 34  |
| 296 | DARD BEACH         | S56/806793  | H <sub>3</sub> d   | S   | 1942-1974 | +3.7  | +0.12  | +0.12 | 34  |
| 297 | STH KAIKOURA       | S49/890885  | H <sub>3</sub> d/r | G/S | 1942-1974 | +25.0 | +0.81  | +0.81 | 34  |
| 298 | STH KAIKOURA       | S49/902890  | H <sub>3</sub> d/r | G/S | 1942-1974 | +15.2 | +0.49  | +0.49 | 34  |
| 299 | STH KAIKOURA       | S49/927898  | H <sub>3</sub> d/r | G/S | 1942-1974 | 2.4   | +0.08  | +0.08 | 34  |
| 300 | STH KAIKOURA       | S49/950902  | H <sub>3</sub> d/r | G/S | 1942-1974 | 13.8  | +0.45  | +0.45 | 34  |
| 301 | STH KAIKOURA       | S49/963890  | H <sub>3</sub> d/r | G/S | 1942-1974 | 15.2  | +0.48  | +0.48 | 34  |
| 302 | KAIKOURA PENINSULA | S49/972875  | L<br>S/ST.-M/ST.   | G   | 1942-1974 | -10.7 | -0.33  | -0.33 | 34  |
| 303 | KAIKOURA PENINSULA | S49/988883  | H <sub>3</sub> r   | G   | 1942-1974 | -3.1  | -0.10  | -0.10 | 34  |
| 304 | KAIKOURA PENINSULA | S49/985853  | H <sub>3</sub> r   | G   | 1942-1974 | -15.2 | -0.47  | -0.47 | 34  |
| 305 | NTH KAIKOURA       | S49/972902  | H <sub>3</sub> r   | S/G | 1942-1974 | -11.3 | -0.35  | -0.35 | 34  |
| 306 | NTH KAIKOURA       | S49/969950  | H <sub>3</sub> r   | G/S | 1942-1974 | +27.5 | +0.69  | +0.69 | 34  |
| 307 | NTH KAIKOURA       | S49/987980  | H <sub>3</sub> r   | G/S | 1942-1974 | +11.3 | +0.35  | +0.35 | 34  |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A) | (B)                   | (C)         | (D)                  | (E) | (F)       | (G)                                   | (H)   | (I)   | (J) |
|-----|-----------------------|-------------|----------------------|-----|-----------|---------------------------------------|-------|-------|-----|
| 308 | NTH MAIMOURA          | S49/005995  | H <sub>3</sub> r     | G/S | 1942-1974 | +40.9                                 | +1.32 | +1.32 | 34  |
| 309 | HAPUKU                | S49/027013  | H <sub>3</sub> r     | G   | 1942-1974 | +30.5                                 | +0.98 | +0.98 | 34  |
| 310 | HAPUKU                | S49/031024  | H <sub>3</sub> r     | G   | 1942-1974 | +18.3                                 | +0.59 | +0.59 | 34  |
| 311 | MANGAMAUU             | S49/029041  | H <sub>3</sub> r     | G   | 1942-1974 | -5.2                                  | -0.17 | -0.17 | 34  |
| 312 | HUE-TE-TAKA PENINSULA | N164/369148 | H <sub>3</sub> r     | G   | 1855-1947 | +15                                   | +0.16 | +0.16 | 65  |
| 313 | PALMER HEAD           | N164/378148 | H <sub>3</sub> r     | G   | 1855-1947 | +100                                  | +1.09 | +1.09 | 65  |
| 314 | PETONE BEACH          | N164/434287 | H <sub>3</sub> d     | S/G | 1840-1956 | +270                                  | +2.33 | +2.33 | 65  |
|     |                       |             |                      |     | 1855      | EARTHQUAKE ADVANCED SHORELINE 30-100m |       |       | 65  |
| 315 | PENCARROW             | N164/407138 | H <sub>3</sub> r     | G/S | 1855-1941 | +13                                   | +0.15 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | +6                                    | +0.18 | +0.16 | 21  |
| 316 | PENCARROW             | N164/405129 | H <sub>3</sub> r     | G/S | 1855-1941 | +9                                    | +0.10 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | +39                                   | +1.18 | +0.40 | 21  |
| 317 | KOHANGAPIRIPIRI       | N164/412122 | H <sub>3</sub> r     | G   | 1855-1941 | +5                                    | +0.06 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | +77                                   | +2.33 | +0.69 | 21  |
| 318 | KOHANGATERA           | N164/418110 | H <sub>3</sub> r     | G   | 1855-1956 | +15                                   | +0.15 | +0.15 | 65  |
| 319 | FITZROY BAY           | N164/424106 | H <sub>3</sub> r/d   | G   | 1855-1941 | +18.5                                 | +0.22 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | +4                                    | +0.12 | +0.19 | 21  |
| 320 | BARING HEAD           | N164/426068 | H <sub>3</sub> r     | G   | 1855-1941 | +52                                   | +0.60 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | -30                                   | -0.91 | +0.18 | 21  |
| 321 | WAINUIOMATA           | N164/438064 | H <sub>3</sub> r     | G   | 1941-1974 | -15                                   | -0.45 | -0.45 | 21  |
| 322 | ORONGORONGO           | N164/446061 | H <sub>3</sub> r     | G   | 1855-1941 | +28                                   | +0.32 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | +25                                   | +0.77 | +0.45 | 21  |
| 323 | ORONGORONGO           | N164/455055 | H <sub>3</sub> r     | G/S | 1855-1941 | +12                                   | +0.14 |       | 21  |
|     |                       |             |                      |     | 1941-1974 | 0                                     | 0     | +0.10 | 21  |
| 324 | TURAKIRAE HEAD        | N164/464038 | K-O<br>GLUKE         | G   | 1855-1975 | +37                                   | +0.31 | +0.31 | 21  |
|     |                       |             |                      |     | 1855      | EARTHQUAKE UPLIFT 2.45m ABOVE MHW     |       |       | 65  |
| 325 | NGAPOTIKI             | N168/871859 | H <sub>3</sub> r     | G   | 1944-1973 | -269.3                                | -9.45 | -9.45 | 18  |
| 326 | NGAPOTIKI             | N168/867858 | H <sub>3</sub> m     | G   | 1944-1973 | -98.7                                 | -3.46 | -3.46 | 18  |
| 327 | NGAPOTIKI             | N168/863853 | H <sub>3</sub> m/r   | G   | 1944-1973 | -22.3                                 | -0.79 | -0.79 | 18  |
| 328 | WHITE ROCK            | N168/915880 | H <sub>3</sub> r     | G/S | 1944-1973 | -20.1                                 | -0.71 | -0.71 | 18  |
| 329 | WHITE ROCK            | N168/925880 | H <sub>3</sub> r     | G/S | 1944-1973 | -20.7                                 | -0.73 | -0.73 | 18  |
| 330 | TE KAUHAU POINT       | N168/939874 | Mh-Dt<br>S/ST.-M/ST. | G   | 1944-1973 | -12.2                                 | -0.43 | -0.43 | 18  |
| 331 | TE KAUHAU POINT       | N168/940877 | Mh-Dt<br>S/ST.-M/ST. | G   | 1944-1973 | -6.9                                  | -0.24 | -0.24 | 18  |
| 332 | TE KAUHAU POINT       | N168/943878 | Mh-Dt<br>S/ST.-M/ST. | G   | 1944-1973 | -7.5                                  | -0.26 | -0.26 | 18  |
| 333 | GLENBURN              | N166/336207 | H <sub>3</sub> r/d   | S   | 1974-1977 | -10                                   | -3.33 | -3.33 | 3   |
| 334 | FLAT POINT            | N166/424270 | H <sub>3</sub> d     | S   | 1927-1967 | -100                                  | -2.5  |       | 3   |
| 335 | MAIWHATA RIVER        | N163/451330 | H <sub>3</sub> m     | G   | 1962-1977 | -40                                   | -2.67 | -2.67 | 3   |
| 336 | HOMEWOOD              | N163/463361 | S<br>M/ST.           | G/S | 1957-1977 | -20                                   | -2.0  | -2.0  | 3   |
| 337 | HOMEWOOD              | N163/486383 | S<br>M/ST.           | G/S | 1957-1977 | -2                                    | -0.1  | -0.1  | 3   |
| 338 | RIVERSDALE BEACH      | N168/525455 | H <sub>3</sub> d     | S   | 1903-1953 | +52                                   | +1.06 |       | 69  |
|     |                       |             |                      |     | 1953-1972 | -35                                   | -1.84 |       | 69  |
|     |                       |             |                      |     | 1972-1974 | -17                                   | -8.5  | 0     | 69  |
| 339 | ORUI                  | N163/549515 | H <sub>3</sub> m/r   | S/G | 1970-1977 | -40                                   | -5.7  | 5.7   | 3   |
| 340 | CASTLEPOINT           | N159/667687 | P<br>M/ST.           | S   | 1962-1977 | -1.6                                  | -0.31 | -0.31 | 3   |
| 341 | CAPE TURNAGAIN        | N155/028178 | H <sub>3</sub> d     | S   | 1943-1975 | -60                                   | -1.88 | -1.88 | 18  |
| 342 | CAPE TURNAGAIN        | N155/035181 | Wo<br>M/ST.          | G   | 1943-1975 | -72                                   | -2.25 | -2.25 | 18  |
| 343 | CAPE TURNAGAIN        | N155/043187 | Wo<br>M/ST.          | G   | 1943-1975 | -24                                   | -0.75 | -0.75 | 18  |
| 344 | CAPE TURNAGAIN        | N151/045216 | Wo<br>M/ST.          | G   | 1943-1975 | -52                                   | -1.63 | -1.63 | 18  |

| (A) | (B)            | (C)         | (D)                            | (E) | (F)       | (G)                             | (H)    | (I)   | (J) |
|-----|----------------|-------------|--------------------------------|-----|-----------|---------------------------------|--------|-------|-----|
| 345 | CAPE TURNAGAIN | N151/049230 | Mo<br>M/ST.                    | G   | 1943-1975 | -60                             | -1.88  | -1.88 | 18  |
| 346 | CAPE TURNAGAIN | N151/041243 | Mo<br>M/ST.                    | G   | 1943-1975 | -36                             | -1.13  | -1.13 | 18  |
| 347 | WHANGAEHU      | N151/041256 | T<br>M/ST.                     | G/S | 1943-1975 | -36                             | -1.13  | -1.13 | 18  |
| 348 | WHANGAEHU      | N151/048272 | T<br>M/ST.                     | G/S | 1943-1975 | -12                             | -0.38  | -0.38 | 18  |
| 349 | WAIMARAMA      | N142/405981 | Mt(I)<br>M/ST.                 | G   | 1937-1952 | -13.5                           | -0.9   |       | 26  |
|     |                |             |                                |     | 1952-1972 | -12.8                           | -0.64  |       | 26  |
|     |                |             |                                |     | 1972-1976 | -7.5                            | -1.5   | -0.85 | 26  |
| 350 | WAIMARAMA      | N142/403983 | H <sub>3</sub> d               | G/S | 1937-1952 | -3.3                            | -0.22  |       | 26  |
|     |                |             |                                |     | 1952-1972 | -6.7                            | -0.34  |       | 26  |
|     |                |             |                                |     | 1972-1976 | -2.2                            | -0.55  |       | 26  |
|     |                |             |                                |     | 1976-1977 | -9.7                            | -13.86 | -0.55 | 26  |
|     |                |             |                                |     | 1965      | COASTAL SUBDIVISION ESTABLISHED |        |       | 3   |
| 351 | WAIMARAMA      | N142/402987 | H <sub>3</sub> d               | G/S | 1937-1952 | -28.2                           | -1.88  |       | 26  |
|     |                |             |                                |     | 1952-1972 | +3.0                            | +0.15  |       | 26  |
|     |                |             |                                |     | 1972-1976 | -5.4                            | -1.35  |       | 26  |
|     |                |             |                                |     | 1976-1977 | -2.4                            | -3.43  | -0.79 | 26  |
| 352 | WAIMARAMA      | N142/400991 | H <sub>3</sub> d               | S   | 1972-1976 | -6.8                            | -1.7   | -1.7  | 26  |
| 353 | WAIMARAMA      | N142/406977 | Mh+Mt(I)<br>M/ST.-S/ST.-CONGL. | G   | 1964-1977 | -3.4                            | -0.26  | -0.26 | 43  |
| 354 | WAIMARAMA      | N142/400020 | H <sub>3</sub> d               | S   | 1904-1977 | +5.1                            | +0.07  | +0.07 | 43  |
| 355 | HAUPOURI       | N135/467159 | Pm<br>M/ST.                    | -   | 1930-1977 | -10                             | -0.21  | -0.21 | 24  |
| 356 | KIDNAPPERS     | N135/455205 | W <sub>2</sub> m<br>CONGL.     | G/S | 1950-1976 | -5.0                            | -0.19  | -0.19 | 18  |
| 357 | KIDNAPPERS     | N135/438199 | W <sub>2</sub> m<br>CONGL.     | G/S | 1937-1976 | -16.0                           | -0.41  | -0.41 | 18  |
| 358 | KIDNAPPERS     | N135/419208 | W <sub>2</sub> m<br>CONGL.     | G/S | 1937-1976 | -8.0                            | -0.21  | -0.21 | 18  |
| 359 | CLIFTON        | N135/410210 | H <sub>3</sub> r               | G   | 1936-1948 | -0.6                            | -0.05  |       | 20  |
|     |                |             |                                |     | 1948-1963 | -14.0                           | -0.93  |       | 20  |
|     |                |             |                                |     | 1963-1974 | -50.1                           | -4.55  | -1.7  | 18  |
| 360 | CLIFTON ROAD   | N135/411210 | H <sub>3</sub> r               | G   | 1931-1933 | -6.72                           | -3.36  |       | 43  |
|     |                |             |                                |     | 1933-1937 | -8.4                            | -2.1   |       | 43  |
|     |                |             |                                |     | 1937-1949 | -41.16                          | -20.58 |       | 43  |
|     |                |             |                                |     | 1949-1957 | -17.64                          | -2.26  |       | 43  |
|     |                |             |                                |     | 1957-1974 | -9.24                           | -0.54  | -1.92 | 43  |
| 361 | TE AWANGA      | N135/388221 | H <sub>3</sub> r               | G   | 1948-1963 | -16.0                           | -1.07  |       | 20  |
|     |                |             |                                |     | 1963-1969 | -6.8                            | -1.13  |       | 20  |
|     |                |             |                                |     | 1969-1976 | -18.0                           | -2.57  | -1.46 | 28  |
| 362 | EAST ROAD      | N135/369240 | H <sub>3</sub> r               | G   | 1936-1948 | +2.0                            | +0.17  |       | 20  |
|     |                |             |                                |     | 1948-1963 | -24.0                           | -1.6   |       | 20  |
|     |                |             |                                |     | 1963-1969 | -2.0                            | -0.33  |       | 18  |
|     |                |             |                                |     | 1969-1974 | -7.4                            | -2.4   |       | 18  |
|     |                |             |                                |     | 1974-1976 | -10.6                           | -5.3   | -1.05 | 19  |
| 363 | HAUMDNA        | N135/361256 | H <sub>3</sub> r               | G   | 1936-1948 | -4.0                            | -0.33  |       | 20  |
|     |                |             |                                |     | 1948-1963 | -14.6                           | -0.97  |       | 20  |
|     |                |             |                                |     | 1963-1964 | +21.2                           | +21.2  |       | 20  |
|     |                |             |                                |     | 1964-1969 | -15.9                           | -3.18  |       | 18  |
|     |                |             |                                |     | 1969-1974 | -13.3                           | -2.66  |       | 18  |
|     |                |             |                                |     | 1974-1976 | -4.6                            | -2.3   | -0.78 | 19  |
| 364 | OUTFALL        | N135/353276 | H <sub>3</sub> r               | G   | 1936-1948 | -18.0                           | -1.5   |       | 20  |
|     |                |             |                                |     | 1948-1963 | -30.0                           | -2.0   |       | 20  |
|     |                |             |                                |     | 1963-1969 | +108.2                          | +18.03 |       | 18  |
|     |                |             |                                |     | 1969-1974 | -166.7                          | -33.34 | -2.79 | 18  |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A) | (B)                | (C)         | (D)                 | (E) | (F)             | (G)    | (H)    | (I)   | (J) |
|-----|--------------------|-------------|---------------------|-----|-----------------|--------|--------|-------|-----|
| 365 | AMATOTO            | N134/338312 | H <sub>3</sub> F    | G   | 1936-1948       | +4.0   | +0.33  |       | 20  |
|     |                    |             |                     |     | 1948-1962       | +6.0   | +0.43  |       | 20  |
|     |                    |             |                     |     | 1962-1964       | +2.6   | +1.3   |       | 20  |
|     |                    |             |                     |     | 1964-1969       | +10.6  | +2.12  |       | 20  |
|     |                    |             |                     |     | 1969-1972       | +6.8   | +2.27  |       | 20  |
| 366 | AMATOTO            | N134/335336 | H <sub>3</sub> F    | G   | 1972-1974       | -19.3  | -9.65  | +0.28 | 18  |
|     |                    |             |                     |     | 1936-1948       | +3.0   | +0.25  |       | 20  |
|     |                    |             |                     |     | 1948-1962       | +4.0   | +0.29  |       | 20  |
|     |                    |             |                     |     | 1962-1969       | +8.3   | +1.19  |       | 20  |
|     |                    |             |                     |     | 1969-1972       | +1.7   | +0.52  |       | 18  |
| 367 | SOUTHERN HAMME BAY | N134/335336 | H <sub>3</sub> F    | G   | 1972-1974       | -29.2  | -14.6  | -0.32 | 18  |
|     |                    |             |                     |     | 1939-1940       | +19.05 | +33.42 |       | 43  |
|     |                    |             |                     |     | 1940-1941       | -42.29 | -34.38 |       | 43  |
|     |                    |             |                     |     | 1941-1942       | +17.72 | +15.41 |       | 43  |
|     |                    |             |                     |     | 1942-1943       | +11.43 | +13.45 |       | 43  |
|     |                    |             |                     |     | 1943.75-1943.96 | +8.57  | +40.81 |       | 43  |
|     |                    |             |                     |     | 1943-1946       | +16.19 | +6.11  |       | 43  |
|     |                    |             |                     |     | 1946-1948       | +4.38  | +2.67  |       | 43  |
|     |                    |             |                     |     | 1948-1950       | +8.57  | +4.49  |       | 43  |
|     |                    |             |                     |     | 1950-1952       | -21.72 | -7.78  |       | 43  |
| 368 | NAPIER             | N134/335378 | H <sub>3</sub> F    | G/S | 1952-1954       | +4.76  | +3.75  | -1.88 | 43  |
|     |                    |             |                     |     | 1936-1969       | +13.0  | +0.39  |       | 18  |
| 369 | NAPIER             | N134/337394 | H <sub>3</sub> F    | G/S | 1969-1974       | -23.7  | -4.74  | -0.28 | 18  |
|     |                    |             |                     |     | 1882-1906       | +50.0  | +2.08  |       | 45  |
|     |                    |             |                     |     | 1906-1936       | +20.0  | +0.67  |       | 37  |
|     |                    |             |                     |     | 1936-1969       | +18.5  | +0.56  |       | 18  |
| 370 | WEST SHORE         | N124/303407 | H <sub>3</sub> F/d  | S/G | 1969-1974       | -16.5  | -3.3   | +0.78 | 18  |
|     |                    |             |                     |     | 1936-1974       | -29.1  | -0.77  | -0.77 | 18  |
| 371 | BAY VIEW           | N124/298473 | H <sub>3</sub> F    | G   | 1936-1974       | -28.7  | -0.76  | -0.76 | 18  |
| 372 | WHIRINAKI          | N124/312523 | H <sub>3</sub> F    | G   | 1934-1972       | -29.1  | -0.77  | -0.77 | 18  |
| 373 | TANGIOI            | N124/342577 | H <sub>3</sub> F    | G   | 1931-1934       | +20.0  | +6.67  |       | 19  |
|     |                    |             |                     |     | 1934-1972       | -28.7  | -0.76  | -0.21 | 18  |
| 374 | MURIWAI BEACH      | N107/320294 | H <sub>3</sub> d    | S   | 1886-1975       | +290   | +3.26  | +3.26 | 42  |
| 375 | WAIKANAE BEACH     | N98/330330  | H <sub>3</sub> d    | S   | 1886-1910       | +19    | +0.79  |       | 42  |
|     |                    |             |                     |     | 1910-1942       | +44    | +1.38  |       | 42  |
|     |                    |             |                     |     | 1942-1975       | +20    | +0.61  | +1.07 | 42  |
| 376 | WAIKANAE BEACH     | N98/346347  | H <sub>3</sub> d    | S   | 1886-1910       | +18    | +0.75  |       | 42  |
|     |                    |             |                     |     | 1910-1942       | +15    | +0.47  |       | 42  |
|     |                    |             |                     |     | 1942-1975       | +47    | +1.42  | +0.90 | 42  |
|     |                    |             |                     |     | 1886-1910       | +16    | +0.67  |       | 42  |
| 377 | ABATTOIRS          | N98/370362  | H <sub>3</sub> d    | S   | 1910-1942       | +22    | +0.69  |       | 42  |
|     |                    |             |                     |     | 1942-1975       | +27    | +0.67  | +0.67 | 42  |
|     |                    |             |                     |     | 1886-1926       | +35    | +0.88  |       | 42  |
| 378 | TITIRANGI          | N98/405353  | H <sub>3</sub> d    | S   | 1926-1975       | +10    | +0.20  | +0.51 | 42  |
|     |                    |             |                     |     | 1886-1975       | -62    | -0.70  | -0.70 | 42  |
| 375 | TUAMOTU            | N98/425327  | Dw-Lwh<br>M/ST.     | G   | 1886-1975       | -62    | -0.70  | -0.70 | 42  |
| 380 | SPONGE BAY         | N98/440326  | Sb-c<br>S/ST.-M/ST. | G   | 1887-1976       | -49.8  | -0.56  | -0.56 | 23  |
| 381 | TUAHINE POINT      | N98/444323  | Sb-c<br>S/ST.-M/ST. | G   | 1887-1976       | -20.5  | -0.23  | -0.23 | 23  |
| 382 | WAINUI BEACH       | N98/447335  | H <sub>3</sub> d    | S   | 1887-1976       | -17.8  | -0.20  | -0.20 | 23  |
| 383 | WAINUI BEACH       | N98/452347  | H <sub>3</sub> d    | S   | 1889-1976       | 0      | 0      | 0     | 23  |
| 384 | WAINUI BEACH       | N98/460356  | H <sub>3</sub> d    | S   | 1914-1976       | +8.1   | +0.13  | +0.13 | 23  |
| 385 | WAINUI BEACH       | N98/470364  | H <sub>3</sub> d    | S   | 1921-1976       | -1.1   | -0.02  | -0.02 | 23  |
| 386 | MAKARORI BEACH     | N98/503386  | H <sub>4</sub> d    | S   | 1891-1976       | +11.1  | +0.13  | +0.13 | 62  |



| (A) | (B)             | (C)         | (D)              | (E) | (F)       | (G)   | (H)    | (I)   | (J) |
|-----|-----------------|-------------|------------------|-----|-----------|-------|--------|-------|-----|
| 387 | TATAFOURI BEACH | N98/521395  | H <sub>3</sub> d | S   | 1896-1976 | 0     | 0      | 0     | 62  |
| 388 | TURIHAWA BEACH  | N98/532412  | H <sub>3</sub> d | S   | 1920-1976 | +22.4 | +0.40  | +0.40 | 62  |
| 389 | POIUA BEACH     | N98/570436  | H <sub>3</sub> d | S   | 1915-1955 | -7.6  | -0.19  |       | 62  |
|     |                 |             |                  |     | 1955-1975 | -11.8 | -0.59  | -0.32 | 62  |
| 390 | WHANGARA BEACH  | N98/607492  | H <sub>3</sub> d | S   | 1896-1975 | +1.6  | +0.02  | +0.02 | 62  |
| 391 | TOLAGA BAY      | N89/688710  | H <sub>3</sub> d | S   | 1896-1976 | +68.0 | +0.85  | +0.85 | 62  |
| 392 | TOLAGA BAY      | N89/682726  | H <sub>3</sub> d | S   | 1896-1976 | +27.2 | +0.34  | +0.34 | 62  |
| 393 | KAIUA BAY       | N90/705802  | H <sub>3</sub> d | S   | 1906-1976 | +4.2  | +0.06  | +0.06 | 62  |
| 394 | ANAUARA BAY     | N89/691883  | H <sub>3</sub> d | S   | 1910-1976 | -1.32 | -0.02  | -0.02 | 62  |
| 395 | TOHOMARU BAY    | N81/7701010 | H <sub>3</sub> d | S   | 1896-1976 | +64.0 | +0.80  | +0.80 | 62  |
| 396 | HAUTAI BEACH    | N63/908570  | H <sub>3</sub> d | S   | 1912-1976 | +30.1 | +0.47  | +0.47 | 62  |
| 397 | HAUTAI BEACH    | N63/885590  | H <sub>3</sub> d | S   | 1912-1976 | +39   | +0.61  | +0.61 | 62  |
| 398 | KAWA KAWA BAY   | N63/767617  | H <sub>3</sub> r | G   | 1900-1975 | +75   | +1.0   | +1.0  | 42  |
| 399 | KAWA KAWA BAY   | N63/747628  | H <sub>3</sub> r | G/S | 1900-1975 | +130  | +1.73  | +1.73 | 42  |
| 400 | KAWA KAWA BAY   | N63/732643  | H <sub>3</sub> r | S/G | 1900-1975 | +84   | +1.12  | +1.12 | 42  |
| 401 | HICKS BAY       | N62/698677  | H <sub>3</sub> d | S   | 1916-1976 | +48   | +0.80  | +0.80 | 62  |
| 402 | OPAPE           | N70/838218  | H <sub>3</sub> d | S   | 1945-1964 | +25   | +1.32  |       | 27  |
|     |                 |             |                  |     | 1964-1971 | -68   | -9.71  | -1.65 | 27  |
| 403 | OMARUMUTU       | N70/820215  | H <sub>3</sub> d | S   | 1945-1964 | +32   | +1.68  |       | 27  |
|     |                 |             |                  |     | 1964-1971 | -50   | -7.14  | -0.69 | 27  |
| 404 | LOWER WAIUA     | N70/800212  | H <sub>3</sub> d | S   | 1945-1964 | -8    | -0.42  |       | 27  |
|     |                 |             |                  |     | 1964-1971 | +15   | +2.14  | +0.27 | 27  |
| 405 | TIRIHANGA       | N69/780209  | H <sub>3</sub> d | S   | 1945-1964 | -15   | -0.80  |       | 27  |
|     |                 |             |                  |     | 1964-1971 | +25   | +3.57  | +0.38 | 27  |
| 406 | HIKUAU BEACH    | N69/750207  | H <sub>3</sub> d | S   | 1945-1964 | -30   | -1.58  |       | 27  |
|     |                 |             |                  |     | 1964-1971 | +22   | +3.14  | -0.31 | 27  |
| 407 | HIKUAU BEACH    | N69/722706  | H <sub>3</sub> d | S   | 1886-1976 | +50   | +0.56  | +0.56 | 19  |
| 408 | OPOTIKI         | N69/720206  | H <sub>3</sub> d | S   | 1945-1964 | -20   | -1.05  |       | 27  |
|     |                 |             |                  |     | 1964-1971 | +14   | +2.0   | +0.32 | 27  |
| 409 | WAIOTAHU BEACH  | N69/680206  | H <sub>3</sub> d | S   | 1945-1971 | +8    | +0.31  | +0.31 | 27  |
| 410 | WAIOTAHU BEACH  | N69/655207  | H <sub>3</sub> d | S   | 1945-1971 | +15   | +0.58  | +0.58 | 27  |
| 411 | WAIOTAHU SPIT   | N69/630208  | H <sub>3</sub> d | S   | 1945-1971 | -47   | -1.81  | -1.81 | 27  |
| 412 | OHUWA           | N69/610211  | H <sub>3</sub> d | S   | 1945-1971 | -30   | -1.15  | -1.15 | 27  |
| 413 | OHUWA           | N69/601212  | H <sub>3</sub> d | S   | 1890-1908 | +100  | +5.56  |       | 55  |
|     |                 |             |                  |     | 1908-1938 | -100  | -3.33  |       | 55  |
|     |                 |             |                  |     | 1938-1945 | +20   | +2.86  |       | 22  |
|     |                 |             |                  |     | 1945-1948 | -20   | -6.67  |       | 8   |
|     |                 |             |                  |     | 1948-1959 | +95   | +8.64  |       | 22  |
|     |                 |             |                  |     | 1959-1970 | -80   | -7.27  |       | 22  |
|     |                 |             |                  |     | 1970-1976 | -15   | -2.5   | 0     | 22  |
| 414 | OHUWA SPIT      | N69/588209  | H <sub>3</sub> d | S   | 1867-1878 | -61   | -5.43  |       | 22  |
|     |                 |             |                  |     | 1878-1909 | -5    | -0.16  |       | 22  |
|     |                 |             |                  |     | 1909-1945 | -120  | -3.29  |       | 22  |
|     |                 |             |                  |     | 1945-1959 | -25   | -1.29  |       | 22  |
|     |                 |             |                  |     | 1959-1965 | -35   | -6.09  |       | 22  |
|     |                 |             |                  |     | 1965-1970 | -40   | -8.60  |       | 27  |
|     |                 |             |                  |     | 1970-1971 | -12   | -7.59  |       | 22  |
|     |                 |             |                  |     | 1971-1976 | -48   | -10.71 | -3.15 | 22  |
| 415 | OHUWA SPIT      | N69/563218  | H <sub>3</sub> d | S   | 1886-1945 | +50   | +0.85  |       | 22  |
|     |                 |             |                  |     | 1945-1976 | +70   | +2.26  | +1.33 | 22  |
| 416 | OCEAN ROAD      | N69/540223  | H <sub>3</sub> d | S   | 1944-1977 | +30   | +0.91  | +0.91 | 27  |
| 417 | OHUWA BEACH     | N69/500234  | H <sub>3</sub> d | S   | 1944-1977 | +23   | +0.70  | +0.70 | 27  |
| 418 | OHUWA BEACH     | N69/470247  | H <sub>3</sub> d | S   | 1953-1976 | +80   | +3.48  | +3.48 | 19  |

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## APPENDIX 1 — (Continued)

| (A) | (B)             | (C)        | (D)              | (E) | (F)       | (G)    | (H)    | (I)   | (J) |
|-----|-----------------|------------|------------------|-----|-----------|--------|--------|-------|-----|
| 419 | WHAKATANE       | N69/440272 | H <sub>3</sub> d | S   | 1944-1961 | +15    | +0.68  |       | 27  |
|     |                 |            |                  |     | 1961-1974 | -30    | -2.31  | -0.5  | 27  |
| 420 | WHAKATANE       | N69/425278 | H <sub>3</sub> d | S   | 1886-1962 | +20    | +0.26  | +0.26 | 56  |
| 421 | ORINI           | N69/400292 | H <sub>3</sub> d | S   | 1944-1961 | +15    | +0.88  |       | 27  |
|     |                 |            |                  |     | 1961-1974 | +26    | +2.0   | +1.37 | 27  |
| 422 | GOLF COURSE     | N69/386297 | H <sub>3</sub> d | S   | 1886-1968 | +100   | +1.22  |       | 56  |
|     |                 |            |                  |     | 1968-1976 | +60    | +7.5   | +1.78 | 19  |
| 423 | AIRPORT         | N69/360306 | H <sub>3</sub> d | S   | 1944-1961 | +20    | +1.18  |       | 27  |
| 424 | RANGITAIKI      | N68/320314 | H <sub>3</sub> d | S   | 1961-1974 | +14    | +1.08  | +1.13 | 27  |
|     |                 |            |                  |     | 1944-1963 | +43    | +2.26  |       | 27  |
| 425 | RANGITAIKI      | N68/302319 | H <sub>3</sub> d | S   | 1963-1974 | +22    | +2.0   | +2.17 | 27  |
|     |                 |            |                  |     | 1886-1962 | +101   | +1.33  | +1.33 | 56  |
| 426 | TARAWERA        | N68/270331 | H <sub>3</sub> d | S   | 1944-1963 | +30    | +1.58  |       | 27  |
|     |                 |            |                  |     | 1963-1974 | +20    | +1.82  | +1.67 | 27  |
| 427 | TARAWERA        | N68/232338 | H <sub>3</sub> d | S   | 1886-1962 | +101   | +1.33  | +1.33 | 56  |
| 428 | MATATA          | N68/200347 | H <sub>3</sub> d | S   | 1943-1963 | +12    | +0.6   |       | 27  |
|     |                 |            |                  |     | 1963-1973 | 0      | 0      | +0.4  | 27  |
| 429 | HERERU ROAD     | N68/170359 | H <sub>3</sub> d | S   | 1943-1963 | +14    | +0.7   |       | 27  |
|     |                 |            |                  |     | 1963-1974 | +8     | +0.73  | +0.71 | 27  |
| 430 | PIKOMAI         | N68/130376 | H <sub>3</sub> d | S   | 1943-1963 | -34    | -1.7   |       | 27  |
|     |                 |            |                  |     | 1963-1974 | -8     | -0.73  | -1.35 | 27  |
| 431 | OTAMARAKAU      | N68/080402 | H <sub>3</sub> d | S   | 1943-1963 | +10    | +0.5   |       | 27  |
|     |                 |            |                  |     | 1963-1974 | 0      | 0      | +0.32 | 27  |
| 432 | RODGERS ROAD    | N68/030433 | H <sub>3</sub> d | S   | 1943-1963 | +28    | +1.4   |       | 27  |
|     |                 |            |                  |     | 1963-1977 | -28    | -2.0   | 0     | 27  |
| 433 | PUKEHINA BEACH  | N68/990463 | H <sub>3</sub> d | S   | 1943-1963 | +19    | +0.95  |       | 27  |
|     |                 |            |                  |     | 1963-1977 | -19    | -1.36  | 0     | 27  |
| 434 | LITTLE WAIHI    | N68/945500 | H <sub>3</sub> d | S   | 1943-1977 | -13    | -0.39  | -0.38 | 27  |
| 435 | MARKETU         | N59/915505 | H <sub>3</sub> d | S   | 1948-1960 | -90    | -7.5   |       | 27  |
|     |                 |            |                  |     | 1960-1974 | -22    | -1.57  | -4.31 | 27  |
| 436 | KAITUNA         | N58/870520 | H <sub>3</sub> d | S   | 1948-1960 | +20    | +1.67  |       | 27  |
|     |                 |            |                  |     | 1960-1974 | +5     | +0.36  | +0.96 | 27  |
| 437 | PAPAMOA BEACH   | N58/820550 | H <sub>3</sub> d | S   | 1948-1960 | +28    | +2.33  |       | 27  |
|     |                 |            |                  |     | 1960-1974 | +15    | +1.07  | +1.65 | 27  |
| 438 | DOMAIN ROAD     | N58/760577 | H <sub>3</sub> d | S   | 1943-1960 | -8     | -0.47  |       | 27  |
|     |                 |            |                  |     | 1960-1974 | +14    | +1.0   | +0.19 | 27  |
| 439 | TE MAUNGA       | N58/710607 | H <sub>3</sub> d | S   | 1943-1959 | -15    | -0.94  |       | 27  |
|     |                 |            |                  |     | 1959-1974 | -15    | -1.0   | -0.97 | 27  |
| 440 | OMANU           | N58/680634 | H <sub>3</sub> d | S   | 1943-1959 | -18    | -1.13  |       | 27  |
|     |                 |            |                  |     | 1959-1974 | +8     | +0.53  | -0.32 | 27  |
| 441 | MAUNGANUI       | N58/655657 | H <sub>3</sub> d | S   | 1943-1959 | -18    | -1.13  |       | 27  |
|     |                 |            |                  |     | 1959-1974 | -8     | -0.53  | -0.84 | 27  |
| 442 | MOUNT MAUNGANUI | N58/654653 | H <sub>3</sub> d | S   | 1852-1954 | -70.1  | -0.69  | -0.69 | 42  |
| 443 | MATAKANA ISLAND | N58/635650 | H <sub>3</sub> d | S   | 1852-1901 | -24.4  | -0.41  |       | 42  |
|     |                 |            |                  |     | 1901-1927 | +158.5 | +6.1   |       | 42  |
|     |                 |            |                  |     | 1927-1948 | +61.0  | +2.9   |       | 42  |
|     |                 |            |                  |     | 1948-1954 | +292.6 | +48.77 |       | 42  |
|     |                 |            |                  |     | 1954-1970 | -70.1  | -4.38  | +3.54 | 31  |
| 444 | MATAKANA ISLAND | N58/625667 | H <sub>3</sub> d | S   | 1852-1901 | +167.6 | +3.42  |       | 42  |
|     |                 |            |                  |     | 1901-1927 | -128.0 | -4.92  |       | 42  |
|     |                 |            |                  |     | 1927-1948 | +61.0  | +2.9   |       | 42  |
|     |                 |            |                  |     | 1948-1954 | +61.0  | +10.17 |       | 42  |
| 445 | MATAKANA ISLAND | N58/600692 | H <sub>3</sub> d | S   | 1954-1970 | -57.9  | -3.62  | +0.88 | 31  |
|     |                 |            |                  |     | 1943-1977 | +62    | +1.82  | +1.82 | 27  |

| (A) | (B)               | (C)               | (D)              | (E) | (F)   | (G)    | (H)    | (I)   | (J) |
|-----|-------------------|-------------------|------------------|-----|---|--------|--------|-------|-----|
| 446 | MATAKANA ISLAND   | N58/550752        | H <sub>3</sub> d | S   | 1948-1960   | +35    | +2.92  |       | 27  |
|     |                   |                   |                  |     | 1960-1974   | +8     | +0.57  | +1.65 | 27  |
| 447 | MATAKANA ISLAND   | N58/516800        | H <sub>3</sub> d | S   | 1948-1960   | -14    | -1.17  |       | 27  |
|     |                   |                   |                  |     | 1960-1974   | +55    | +3.93  | +1.56 | 27  |
| 448 | KATIKATI          | N54/483844        | H <sub>3</sub> d | S   | 1902-1966   | +127.9 | +2.0   | +2.0  | 31  |
| 449 | BOWENTOWN         | N53/472862        | H <sub>3</sub> d | S   | 1948-1969   | +10    | +0.48  |       | 27  |
| 450 | ATHENREE          | N53/459880        | H <sub>3</sub> d | S   | 1969-1977   | -54    | -6.75  | -1.52 | 27  |
|     |                   |                   |                  |     | 1948-1969   | -73    | -3.48  |       | 27  |
| 451 | WAIHI BEACH       | N53/448899        | H <sub>3</sub> d | S   | 1969-1977   | -12    | -1.5   | -2.93 | 27  |
|     |                   |                   |                  |     | 1948-1969   | -28    | -1.33  |       | 27  |
| 452 | WAIHI BEACH       | N53/448899        | H <sub>3</sub> d | S   | 1969-1977   | 0      | 0      | -0.97 | 27  |
|     |                   |                   |                  |     | 1957-1964   | -43.5  | -10.88 |       | 63  |
| 453 | WAIHI BEACH       | N53/448899        | H <sub>3</sub> d | S   | 1961-1964   | +24.0  | +8.0   | -2.79 | 63  |
|     |                   |                   |                  |     | 1942-1963   | -46.1  | -2.25  |       | 18  |
|     |                   | (MHWL)            |                  |     | 1963-1964   | +66.0  | +68.75 |       | 18  |
|     |                   |                   |                  |     | 1964-1969   | -53.0  | -10.29 |       | 18  |
|     |                   |                   |                  |     | 1969-1975   | +9.5   | +1.71  | -0.73 | 18  |
|     |                   |                   |                  |     | 1963-1964   | -6.5   | -6.77  |       | 18  |
|     |                   |                   |                  |     | 1964-1969   | -7.9   | -1.53  |       | 18  |
|     |                   | (VEGETATION LINE) |                  |     | 1969-1975   | -1.6   | -0.29  | -1.37 | 18  |
|     |                   |                   |                  |     | 1929-1939   | +34.5  | +3.45  |       | 63  |
|     |                   |                   |                  |     | 1939-1957   | 0      | 0      |       | 63  |
|     |                   |                   |                  |     | 1957-1965   | -24.0  | -3.0   | +0.29 | 63  |
| 455 | WAIHI BEACH       | N53/440912        | H <sub>3</sub> d | S   | 1942-1963   | +15.7  | +0.77  |       | 18  |
|     |                   |                   |                  |     | 1963-1964   | +42.4  | +44.17 |       | 18  |
| 456 | WAIHI BEACH       | N53/428933        | H <sub>3</sub> d | S   | 1964-1969   | -55.8  | -10.83 |       | 18  |
|     |                   |                   |                  |     | 1969-1975   | +9.2   | +1.65  | +0.36 | 18  |
| 457 | WAIHI BEACH       | N53/426936        | H <sub>3</sub> d | S   | 1929-1948   | +33.0  | +1.74  | +1.74 | 63  |
|     |                   |                   |                  |     | 1942-1963   | -1.3   | -0.06  |       | 18  |
|     |                   |                   |                  |     | 1963-1964   | +6.6   | +6.88  |       | 18  |
|     |                   |                   |                  |     | 1964-1969   | -13.0  | -2.52  |       | 18  |
|     |                   |                   |                  |     | 1969-1975   | +3.5   | +0.63  | -0.13 | 18  |
|     |                   |                   |                  |     | 1919-1929   | +72.0  | +7.2   | +7.2  | 63  |
|     |                   |                   |                  |     | 1942-1963   | -12.2  | -0.56  |       | 18  |
|     |                   |                   |                  |     | 1963-1964   | +34.2  | +35.63 |       | 18  |
|     |                   |                   |                  |     | 1964-1969   | -30.5  | -5.92  |       | 18  |
|     |                   |                   |                  |     | 1969-1975   | +2.0   | +0.36  | -0.20 | 18  |
|     |                   |                   |                  |     | 10. APRIL - 1968 WAIHINE STORM ERODED 14-15m DUNE |        |        |       | 35  |
|     |                   |                   |                  |     | 1961 ERODED 13m FOREDUNE                          |        |        |       | 35  |
| 458 | BUFFALO BEACH     | N44/200633        | H <sub>3</sub> d | S   | 1930-1969   | -40    | -1.03  | -1.03 | 3   |
| 459 | KUAOTUNU          | N40/215761        | H <sub>3</sub> d | S/G | 1974-1977   | -3.7   | -1.23  | -1.23 | 53  |
| 460 | MIRANDA           | N48/810248        | H <sub>3</sub> r | G/S | 1934-1957   | -80.5  | -3.5   | -3.5  | 59  |
| 461 | MANGATAWHIRI SPIT | N34/300213        | H <sub>3</sub> d | S   | 1871-1934   | +60    | +0.95  |       | 60  |
|     |                   |                   |                  |     | 1934-1953   | +32    | +3.56  | +1.28 | 60  |
| 462 | MANGATAWHIRI SPIT | N34/294225        | H <sub>3</sub> d | S   | 1871-1934   | +40    | +0.63  |       | 60  |
|     |                   |                   |                  |     | 1934-1953   | +15    | +1.67  |       | 60  |
|     |                   |                   |                  |     | 1953-1973   | -5     | -0.5   |       | 5   |
|     |                   |                   |                  |     | 1973-1976   | -7     | -2.33  | +0.41 | 5   |

Continued on next page.

## APPENDIX 1 — (Continued)

| (A) | (B)               | (C)        | (D)             | (E) | (F)       | (G)  | (H)    | (I)   | (J) |
|-----|-------------------|------------|-----------------|-----|-----------|------|--------|-------|-----|
| 463 | MANGATAMHIRI SPIT | N34/292238 | H <sub>3d</sub> | S   | 1871-1934 | +40  | +0.63  |       | 60  |
|     |                   |            |                 |     | 1934-1950 | -76  | -12.67 |       | 60  |
|     |                   |            |                 |     | 1950-1953 | +18  | +6.0   |       | 60  |
|     |                   |            |                 |     | 1953-1961 | +15  | +1.88  |       | 60  |
|     |                   |            |                 |     | 1961-1963 | +33  | +16.5  |       | 60  |
|     |                   |            |                 |     | 1963-1973 | -53  | -5.3   |       | 5   |
| 464 | MANGATAMHIRI SPIT | N34/293250 | H <sub>3d</sub> | S   | 1871-1934 | 0    | 0      |       | 60  |
|     |                   |            |                 |     | 1934-1942 | 0    | 0      |       | 60  |
|     |                   |            |                 |     | 1942-1950 | 0    | 0      |       | 60  |
|     |                   |            |                 |     | 1950-1953 | -40  | -13.33 |       | 60  |
|     |                   |            |                 |     | 1953-1961 | -65  | -8.13  |       | 60  |
|     |                   |            |                 |     | 1961-1963 | +20  | +10.0  |       | 60  |
| 465 | NGUNGURU SPIT     | N20/023080 | H <sub>3d</sub> | S   | 1942-1959 | -20  | -1.18  |       | 60  |
|     |                   |            |                 |     | 1959-1963 | 0    | 0      | -0.95 | 60  |
|     |                   |            |                 |     | 1963-1966 | -45  | -15.0  |       | 5   |
|     |                   |            |                 |     | 1966-1968 | -45  | -27.5  |       | 5   |
|     |                   |            |                 |     | 1968-1973 | -60  | -15.0  |       | 5   |
|     |                   |            |                 |     | 1973-1996 | -30  | -10.0  | -2.52 | 5   |
| 466 | WHANAKI SPIT      | N16/973218 | H <sub>3d</sub> | S   | 1942-1951 | +20  | +2.22  |       | 60  |
|     |                   |            |                 |     | 1951-1961 | -20  | -2.0   |       | 60  |
|     |                   |            |                 |     | 1961-1963 | 0    | 0      | 8     | 60  |
| 467 | OKUPE BEACH       | N16/935300 | H <sub>3d</sub> | S   | 1880-1970 | +20  | +0.22  | +0.22 | 9   |
| 468 | OKUPE BEACH       | N16/935307 | H <sub>3d</sub> | S   | 1880-1970 | +150 | +1.67  | +1.67 | 9   |
| 469 | OKUPE BEACH       | N16/936314 | H <sub>3d</sub> | S   | 1880-1970 | +20  | +0.22  | +0.22 | 9   |
| 470 | MIMIWHANGATA BAY  | N16/923314 | H <sub>3d</sub> | S   | 1880-1970 | +6   | +0.07  | +0.07 | 9   |
| 471 | MIMIWHANGATA BAY  | N16/927325 | H <sub>3d</sub> | S   | 1880-1970 | -4   | -0.04  | -0.04 | 9   |

APPENDIX 2—Standard abbreviations for Quaternary and older lithologies. Abbreviations marked with an asterisk are adopted from observations during field work and are not recorded on N.Z. Geological Survey geological maps. Others are adopted from N.Z. Geological Survey Quaternary geological maps of N.Z. (1973a, b) and from Folk (1968).

| PLEISTOCENE                       |                 |                 | HOLOCENE           | LANDFORM   | LITHOLOGY  |
|-----------------------------------|-----------------|-----------------|--------------------|--|--|
| Lower                             | Middle          | Upper           |                    |  |  |
| ..                                | H <sub>1d</sub> | H <sub>2d</sub> | H <sub>3d</sub>    | Dune   | Sand   |
| ..                                |                 | ..              | *H <sub>3r</sub>   | Beach ridge  | Gravel   |
| ..                                |                 | ..              | *H <sub>3b</sub>   | Barrier ridge  | Gravel and sand  |
| ..                                |                 | ..              | *H <sub>3r/d</sub> | Beach ridge and dune                                       | Gravel and sand  |
| Wm                                |                 | H <sub>2m</sub> | H <sub>3m</sub>    | Cliff  | Marine and estuarine deposits                                |
| W <sub>1f</sub>                   |                 | H <sub>2a</sub> | H <sub>3a</sub>    | Cliff  | Alluvial and glacial outwash fans                            |
| ..                                |                 | H <sub>2j</sub> | H <sub>3j</sub>    | Cliff  | Lahar deposits A   |
| ..                                |                 | ..              | H <sub>3s</sub>    | Cliff  | Swamp and lacustrine deposits                                |
| ..                                |                 | ..              | H <sub>3t</sub>    | Cliff  | Till   |
| Lithologies older than Quaternary |                 |                 |                    | { M/ST. Mudstone<br>S/ST. Sandstone<br>CONGL. Conglomerate | Consolidated mud<br>Consolidated sand<br>Consolidated gravel |
| Present day beaches               |                 |                 |                    | { G. (> -1.0 φ)<br>S. (< -1.0 φ)                           | Unconsolidated gravel<br>Unconsolidated sand                 |