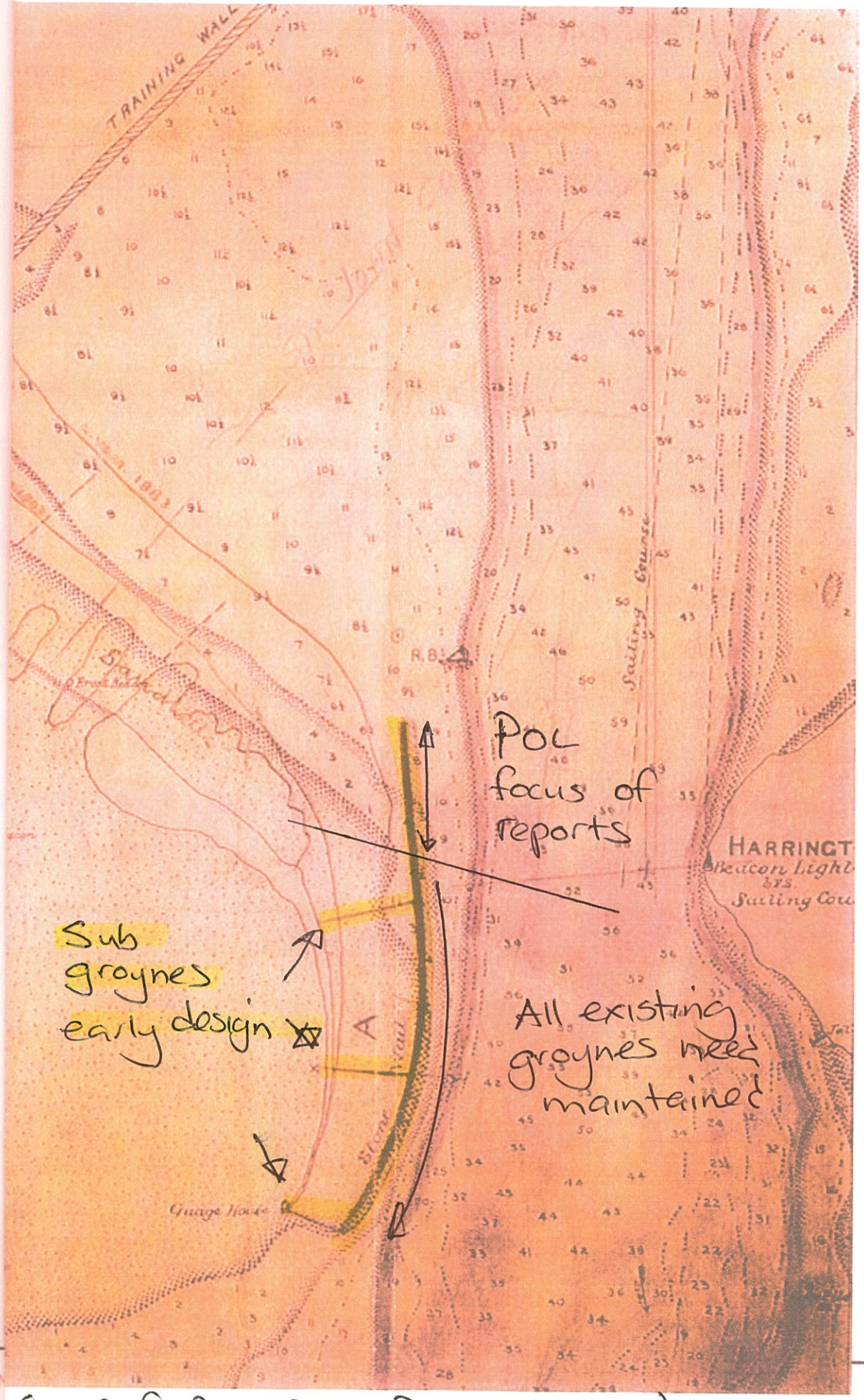
ARAMOANA LEAGUE EROSION / BACKWASH CONCERNS

"Area of Significant Conservation Value"
District Plan


Wagon Bay erosion


Wagon Bay erosion

1904 original design



(* Ref Rene Bakx POL Aug 2014)

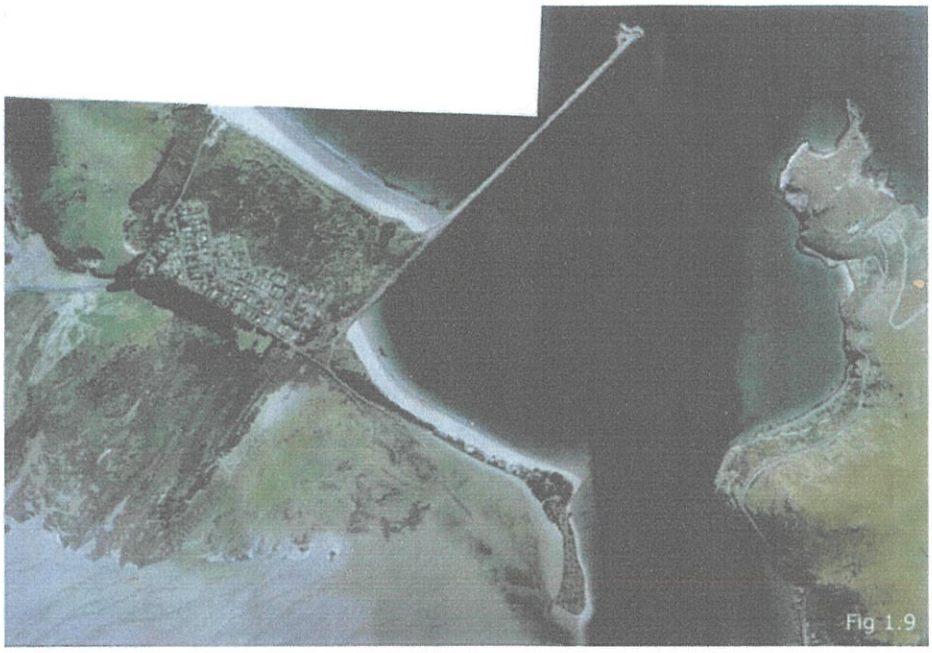


Figure 1.9 – Aerial photograph showing the Long Mac, together with several of the remnant secondary groynes

In a paper presented to the Otago Institute, Technological Branch, (entitled "Sand Movements in Otago harbour") Blair Mason reported that;

> "a rubble wall was constructed along the spit . . . Groynes were run at intervals from the shore at high water mark out to this wall. The most northerly of these groynes effectively arrested and accumulated most of the wave – borne sand. When the accumulated sands rose above the level of high water, sand catching fences were constructed of a sufficient height to raise the level about 6ft above high water mark. Marram grass (Arundo arenaria) was then planted to fix the sand, followed by the Californian Lupin. These now grow luxuriantly where a few years ago the water ran 10ft deep. The foreshore is now continually being made up and extended, and in the process of time all that was lost in land by the effect of the mole will be regained. The quantity of wind-borne drift now entering the harbour is small. Sand brought in by the flood must do so at a depth between the rocky buttress of Harington Point on the one hand and the stone wall (which has 12ft of water alongside) on the other, where it is subject to the greater scouring effect of the ebb current. One may, therefore confidently expect that the sands about the channel near Harington Point will decrease in quantity to a minimum."

Sub Groynes x 3.?

The most northerly structure remains evident today, refer Figure 1.9, and appears to have been constructed to a similar height as the Long Mac. The figure clearly shows the build-up of sediment that has occurred on the upstream, or Shelly Beach side of this secondary groyne. Several, largely sand covered rubble mounds are also evident further along "The Spit" toward the jetty.

* (ref Rene Bakx POL Aug 2014)

5.

area are not sharply defined, perhaps indicating the tidal nature of the sand area. However the sand extends up harbour to about Otafelo Point (similar to the extent of tidal sand flats shown on the 1997 1:50 000 Topographic Map. A chart by Barnicoat and Davison, dated 1844 (in Maling 1996) shows a large area of sand flats with a "native village" sited on an area above high tide at the eastern end of the spit. A chart by J.L. Stokes dated 1850 (McLean 1985) shows a continuous landform (denoted as sand hills) extending south from Aramoana, separating the "sandy flat partly covered at high water" from the open sea. Johnstone (1997) presents a series of charts and aerial photographs for the period from 1879 to 1997. The 1879 chart shows a low tide sand flat with an island of sand at the eastern end near the main harbour channel.

These early charts identify the dynamic nature of the sand flats and spit prior to construction of the mole. The landform may have been developing as a more permanent feature of the harbour but shipping reports noted by McLintock (1951) and McLean (1985) indicate that the channel into the harbour was not stable, and that its depth and position were changeable. It is likely that there were exchanges of sand between the spit area and the outer and inner bars of the main harbour channel. Construction of the mole was carried out to stabilise the depth and position of the channel, and by 1896 the position of the outer bar had shifted seaward, leaving a safer navigable course.

McLintock (1951, pp 50-55) notes that changes to the spit beach were due to the construction of the mole in 1885, and that by 1905, 30 acres of the spit eastward of the mole had disappeared, "and had left but a narrow and precarious ridge of sand" (McLintock 1951, p54). It should be noted, that there is no evidence of a ridge of sand (or sand dunes) prior to 1885.

?Sub Groynes re instated less dredging

McLintock goes on to describe the necessity for the construction of the straight "rubble wall" extending northward along the spit opposite Harrington Point. The purpose of this wall was to guide the flood and ebb tidal currents so that sediment wasn't carried into the harbour channel. Groynes and scrub fences also helped to build up sand onto South Spit Beach. Marram and lupins were also planted. McLintock notes the results as follows:

> Part of the land recovered from the sea, and over which, in 1906, there was 10 feet of water, is now occupied by the pilots' houses and gardens. The sands composing such lands would otherwise have been wind- or water-borne into the harbour with detriment to the maintenance of the channel depths.
>
> The rubble wall on the one hand, and the natural rocky buttresses of Harrington Point on the other, with deep water in between, constitute a sure defence against the influx of water-borne sands, while sand fixing processes ashore have stopped the former serious sweeping across the spit and into the channel, of wind-borne sands. To the stoppage of these wind- and water-borne sands is attributed in large measure the continued improvement of the main channel at the bend. (p55)

The charts collated by Johnstone from 1925, 1941-43, 1950 show little mapped change to the South Spit Beach (labelled North Spit). However aerial photographs

(* Ref Alan Sutherland / Tony Dick. 1998)

6.

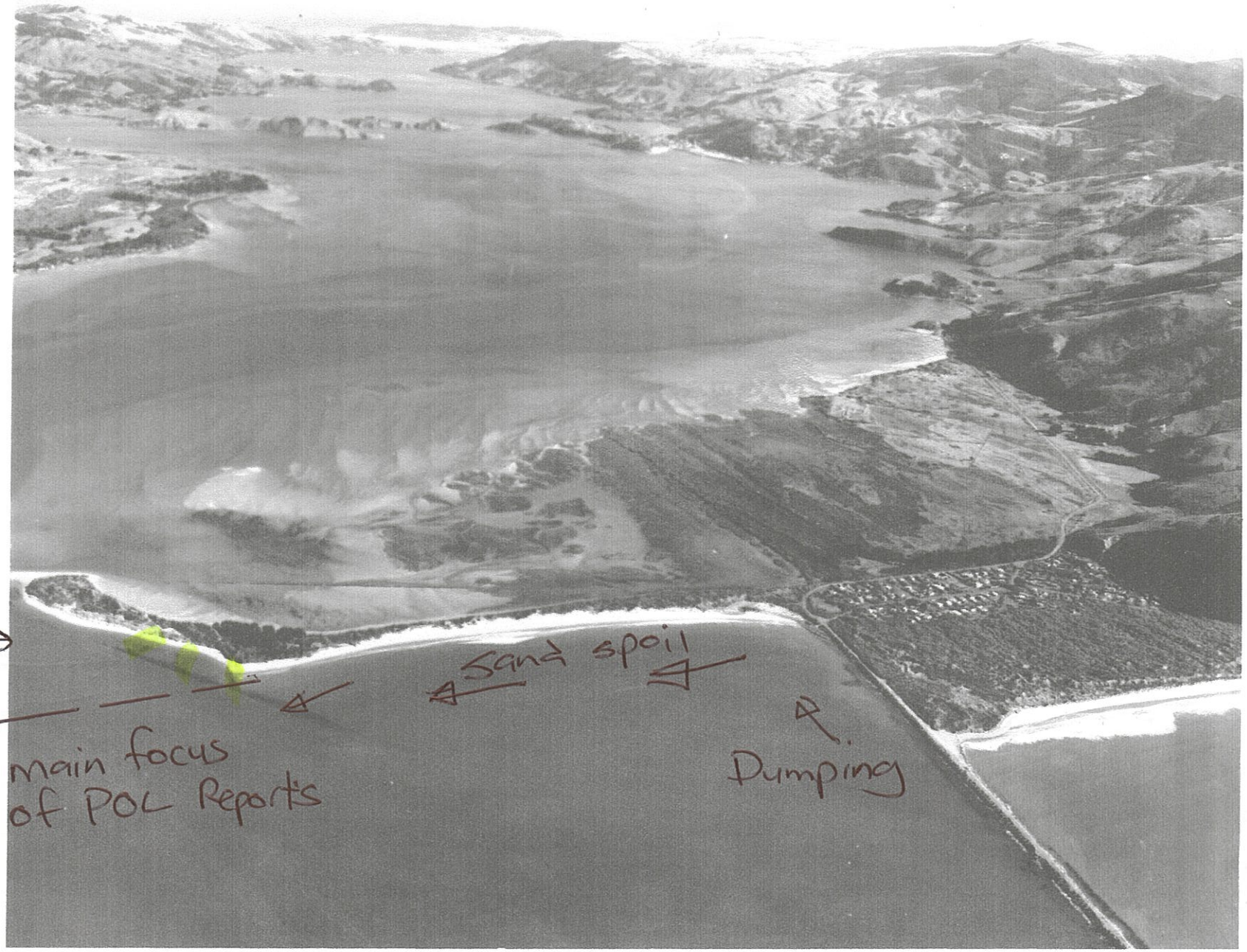
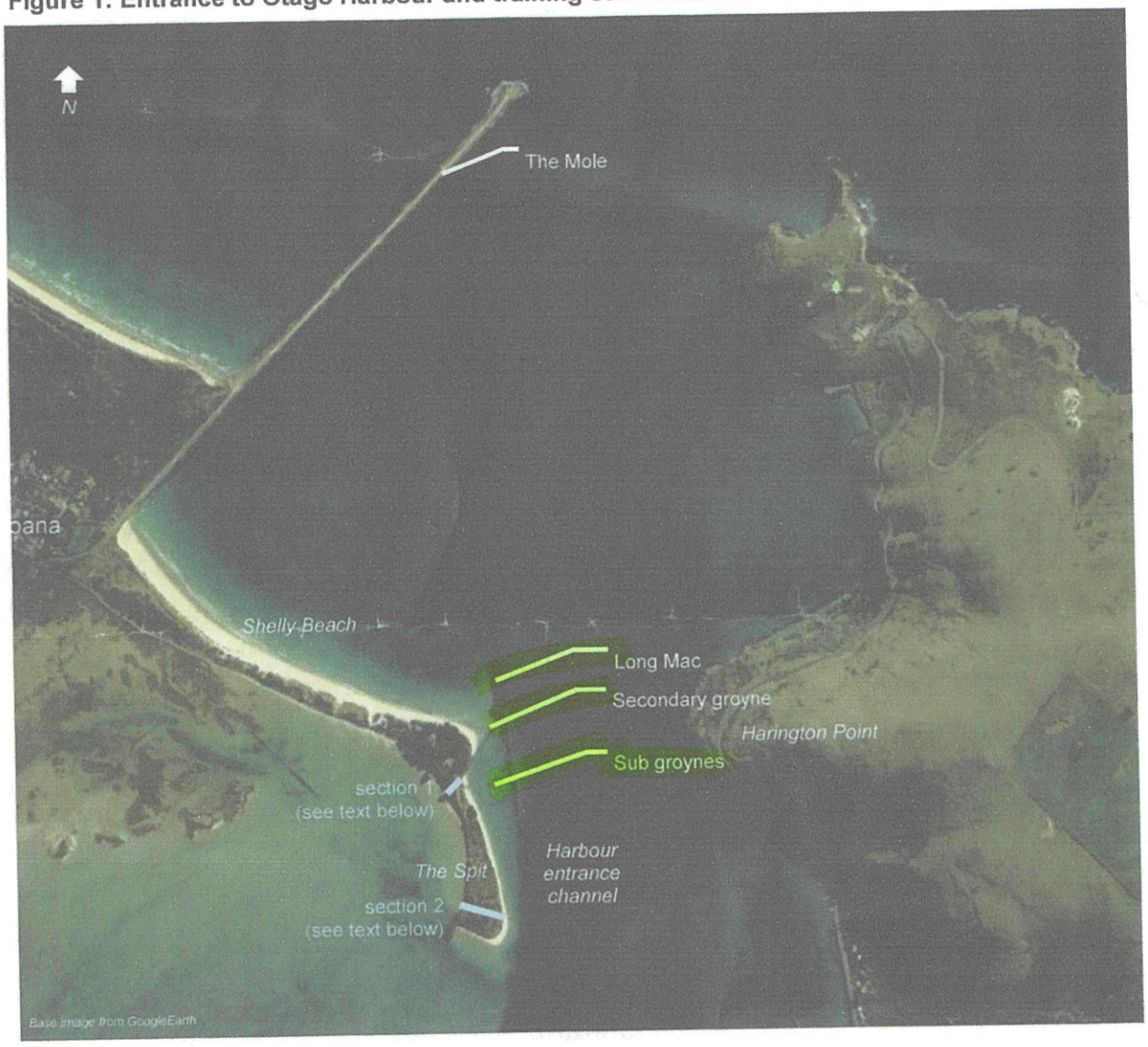

Sub groynes never maintained
Sand spoil
main focus of POL Reports
Dumping

Figure 1: Entrance to Otago Harbour and training structures



- Aerial photographs indicate of the order of 10m reduction in the width of the Spit at the northern end (section 1 in Figure 1) and of the order of 5m at the southern end (section 2 in Figure 1), over the past 12 years. From reports and anecdotal information, it appears that the shoreline of the Spit has periodically accreted and eroded. This does not appear to notably affect the functioning of the Long Mac itself. The landward extent of the secondary (northernmost) groyne is not documented and outflanking is not been recorded in the literature available, however it may be prudent to monitor any potential for this over time.

k (ref POL Beca report 11 June 2019)

Conclusions

① Reports (3 reports received by league) are focused on spoil drift / channel operation not specfic on erosion

② No information on whole groyne system being Maintained to orginal design ie long mac full length Nth to South, 2ndry groyne, Sub groynes to protect dune from tidal / Back wash erosion.

DOC: must lead, provide, assit, issue consents to help POL.

↓

(DCC, ORC) (ORC have a coastal erosion expert can peer review)

POL: maintain existing assets ie long mac entire groyn System Dunes created by OHB (Otago harbour Board) now POL need to protect by maintainn groynes.

Whats at Stake.

Imminent break through of dunes Speaial Ecological Area of National importance. under threat.