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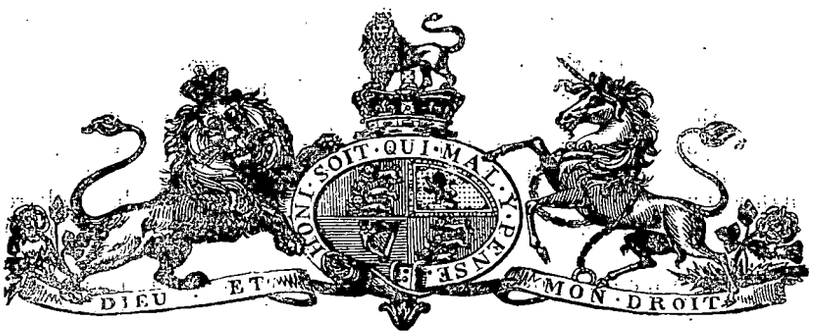
PARLIAMENT OF TASMANIA.

PROPOSED NEW HARBOUR AT WYNYARD:

REPORT BY C. NAPIER BELL, M. INST. C.E.

Presented to both Houses of Parliament by His Excellency's Command.



REPORT ON PROPOSED NEW HARBOUR AT WYNYARD.

By C. Napier Bell, *M. Inst. C.E.*

April, 1890.

Sir,

Acting under your instructions, I examined the site of the harbour proposed to be constructed, and plans of which were furnished to me.

Taking advantage of low water on the 1st and 2nd instant, I had a good opportunity of seeing the reefs surrounding the entrance and the bay outside. I also examined the shore and reefs to the east and west of the locality for some distance.

The Engineer-in-Chief having placed the services of Mr. Sale at my disposal, I directed him to extend the survey so as to fix various reefs not shown on the plans, and to fix the position of a sunken rock near the entrance, and another in the track of vessels coming from the eastward.

The site of the harbour is a little over half a mile to the east of the mouth of the Inglis River. It is a small cove, nearly enclosed by reefs of rock, with a narrow entrance which has 14 feet of water at low water spring tide, deepening to 18 feet a quarter of a mile out, and then to 30 feet and over.

From what I could see of the coast in the neighbourhood, and from evidence given me by persons well acquainted with the locality, there is no appearance of any fixed set or drift of shore currents which might have the effect of burying the works in sand or drifting it round the enclosing walls into the entrance. There is, however, a considerable accumulation of sand in the bay into which the Inglis enters, probably derived from the wear of the Table Cape sandstones, and from sandy land through which the river runs near the coast. The river, I am told, discharges mud, but very little sand, in times of flood.

The construction of a west breakwater over the reefs will probably cause an accumulation of sand in the corner formed by it and the beach; but if this took place to a large extent, it could be prevented from drifting towards the entrance by building a rubble wall over the reef at right angles to the breakwater, and the enclosed space thus formed would retain the drift accumulations of many years.

On the east side there is at present no evidence of a tendency to accumulate sand; and if a breakwater were built, the waves of easterly gales would have the effect of driving the sand back on the beach.

The only other danger of this nature would be that the waves in heavy weather might drive the sand of the sea-bottom in towards the entrance, and form a bar of shoal water across it. At present there is a depth of 12 to 14 feet at the entrance; and the waves of moderate height which occur here would have little influence in disturbing the bottom at this depth.

I do not anticipate any danger of the entrance shoaling or silting up from the construction of the proposed works to a greater extent than an occasional dredging might easily remedy; but it is not to be overlooked that there is always some risk of injurious changes from drift sand taking place in a small closed harbour with its entrance near the beach.

The original plans show an opening to be left in the west wall over a natural channel in the reefs near the shore, with the object of causing a scour in the harbour to clear it of sand. I do not think a small opening into a large basin is capable of causing sufficient current in the latter to clear it of sand, although it would scour and keep clear the opening itself.

A plan shown me, drawn by Mr. W. Reid Bell, provides for scouring the harbour of drift sand by leaving the eastern reef with no wall built on it, allowing the sea at high water to wash over it, and next providing on the west side, near the shore, an opening 240 feet wide furnished with hinged shutters, which would open to an easterly and close to a westerly current. The principle, I presume, on which this is supposed to act is that in strong easterly winds the waves would wash over the eastern reef at high water, and filling the harbour slightly higher than the sheltered water to leeward on the outside, would cause a current to flood through the openings near the shore.

I think the action anticipated by this construction would be of doubtful effect, because if meant to wash out the sand already in the harbour it would more certainly be effected by dredging; if intended to keep accumulations from the outside of the west wall, its effect would be uncertain, as the channel and its gates might be buried by sand in westerly weather and have to be periodically dug out; and if intended to clear away sand driven into the entrance of the harbour from the sea bottom, I doubt if the current caused by the openings would have sufficient power to reduce a bar of sand thrown up at the mouth of the harbour unless the bottom inside the harbour were kept disturbed by the waves, which would be at variance with the usefulness of the harbour for vessels, and, as I said above, slow accumulations of sand, if they occur, must be dealt with by occasional dredging.

Considering the small size of this harbour and the narrowness of the entrance and the channel leading to the proposed wharf in rough weather, I should consider it unsuitable for any but small vessels, and that large steamers would incur some risk in navigating it. There is good depth of water outside and in the entrance, but there is a sunken rock, said to be an acre in extent, with four feet of water on it at low water, which lies in front of the entrance and 1600 feet from it. The width of entrance between the breakwater and the reef in the course a vessel would take is 340 feet, and there is a rock on the beach directly in front of a vessel entering and 600 feet from the entrance, while the sandy beach is about 840 feet from the entrance at low water. The proposed wharf is placed on the edge of the inside reef, and between it and the beach the passage is narrow and the turn so sharp that a large steamer would probably have to stop just inside the entrance of the harbour and warp round to the wharf with lines, which could be easily done in fine weather, but when blowing fresh it would be very awkward; also, if a steamer should come in with too much headway she would run on the beach if not well under control.

The objections on account of the smallness of the harbour, and of the risks attending the entrance in rough weather, would to some extent be obviated if the narrow entrance and crooked turns were brought under shelter, which would be done if the breakwaters were extended further seaward; there would then be more room to bring up and turn or stop in sheltered water. I have shown on the plans the position of such extended breakwaters, but I have not sufficient information at hand to enable me to give any precise estimate of the cost.

The quarry from which it is proposed to get stone for the work is situated about a mile from the harbour. It is black basalt of the hardest kind, and must be systematically and carefully quarried to ensure getting stone of sufficiently large size for the protection of the slopes of the rubble breakwaters wherever they stand exposed to heavy waves. If the quarry should fail to yield large rock, which I have no reason to fear, then it must be sought elsewhere; otherwise, concrete blocks would have to be used for the purpose, which, of course, would greatly increase the cost.

The original plans show the ends of the breakwater to be of concrete blocks, built upright. In this position this is necessary, because the entrance is so narrow that the slopes of a rubble mound would encroach upon the necessary width. In the position I have shown, with the breakwaters extended further seaward, the width is ample, and the breakwaters can be made of rock in the form of an embankment, the slopes protected with heavy rock of from 1 to 10 tons weight, and this form of construction is much more economical.

The harbour would be of little use for the ordinary class of coasting steamers unless a considerable amount of dredging were done to get sufficient depth of water at the proposed wharves. The steamers now frequenting the North-west ports draw from 13 to 15 feet, and the dredging should be deep enough to allow them to be always waterborne. The present depth is from 9 to 2½ feet.

By extending the breakwater as shown this harbour would be a fairly good one, but for large steamers it would always be inconvenient from its cramped position at the wharves, and the care required to navigate it. The sunken rock at the entrance is a danger which requires attention and careful handling of a ship. For small vessels this would make a good and useful harbour. Large steamers, however, might object to call at a port which requires extra care in navigating, for small

quantities of cargo, and if the place were subsequently connected by rail with a better port where larger cargoes were procurable, it might be found that steamers refused to call except at a rate of freight which would give the railway the advantage, and so far the outlay on the port would be useless.

If I might be allowed to offer an opinion on this question, my impression is that there is always some risk attending the construction of artificial harbours, both from the dangers of the sea and also from the uncertain course of trade; of this I have seen many examples, and I think if trade can be served equally well by railway it will generally be found more satisfactory to have a few good ports connected in this way.

I have the honor to be,
Sir,
Your obedient Servant,
C. NAPIER BELL, *M. Inst. C.E.*

The Hon. the Minister of Lands and Works.

Wynyard New Harbour.—Design for extended Breakwater.

Estimate for Breakwaters only, and not including Wharves or Dredging for Berthage accommodation.

East and west breakwaters.....	£25,500
Railway plant, tools, &c., less resale when finished ...	5300

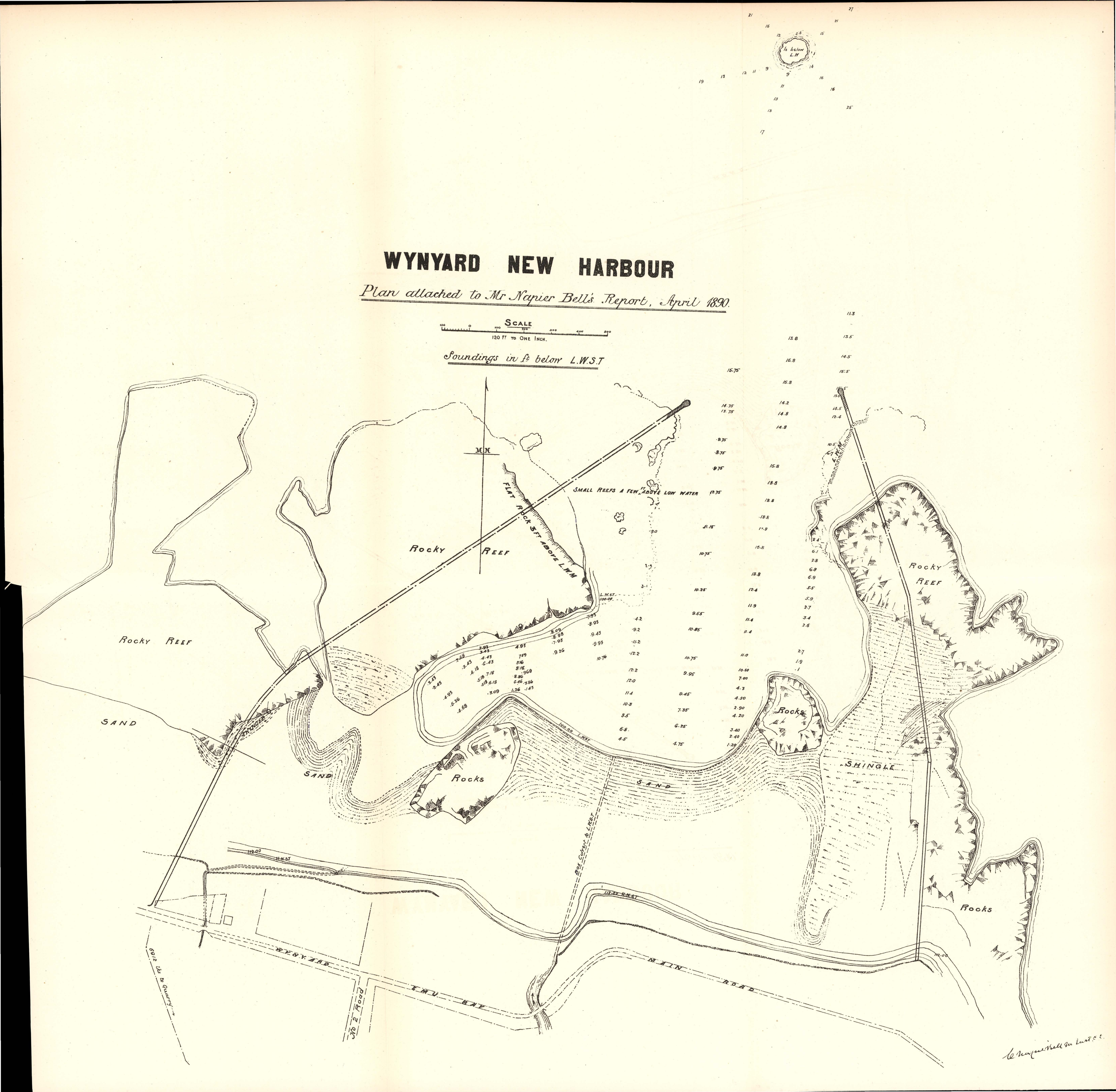
WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.

WYNYARD NEW HARBOUR

Plan attached to Mr Napier Bell's Report, April 1890.

SCALE
120 FT TO ONE INCH.

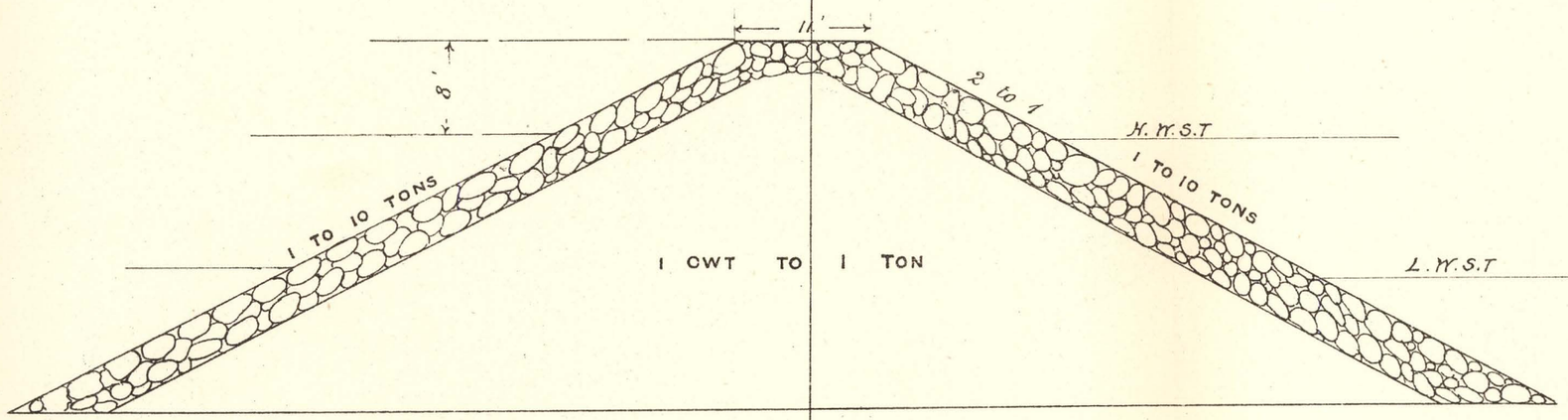
Soundings in ft below L.W.S.T

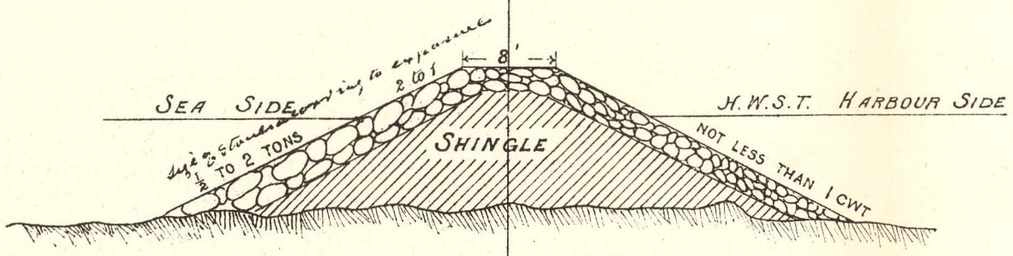


WYNYARD NEW HARBOUR

Plan attached to Mr Napier Bell's Report, April 1890.

EXPOSED SECTIONS





SECTION ON REEF

EXPOSED ENDS

Stone on Slopes - 1 to 10 tons. Filling 1 cwt to 1 ton
On Reef " - 1/2 " 1 ton Filling shingle or small stone

Napier Bell M.Inst.C.E.