

the remainder, being locked up by Act of Parliament, could only be made available by a similar Act, and with the consent of the ratepayers. The total amount of loan-money made available for works to date, is consequently £105,000.

I was therefore given to understand, by the Board, that the only assets which could be counted on as at present available for construction works were as follows: (1) The unexpended balance of the £105,000, above mentioned, which is only £5,220; (2) materials in hand, available for further works, to the value of £6,851; and (3) plant and machinery, which would possibly fetch, if sold, about £11,390: Total, £23,461. The details of these items are shown in appendix herewith, marked A.

The length of the work required is 2,450ft., a considerable portion of which, at outer end, would necessarily be very much exposed.

The outer 1,100ft. of existing work cost £48,821, exclusive of £36,283 for plant and machinery. The inner work cost, as near as possible, £4 a foot. This for 1,350ft. comes to £5,400. Total, exclusive of plant and machinery, for a length of 2,450ft. (corresponding with the length of the work now required), £54,221.

It was therefore, of course, at once evident, that the assets above mentioned, amounting nominally to £23,461—even supposing that they can all be realised—are, in comparison with the cost of the existing work, relatively very inadequate for the work required; and that the task of designing structures which would be strong enough to act, while at the same time keeping within the funds stated to be available, must consequently be an exceedingly difficult one—something, in fact, of the character of endeavouring to make bricks without straw. It seemed just possible, however, that the actually necessary work could be done for the sum mentioned, so designs were taken in hand accordingly, and, being now completed, are enclosed herewith.

Extent and Character of Works now designed.

The works which I have now designed are outlined in red on drawing herewith, sheet 2, the details of the principal structures being shown on sheet 3. They commence at the intersection of Raungi Street with Customhouse Street, in the Town of Gisborne, and run out from thence in a direction about south-west by south, for a distance of 1,800ft., thence curving into a nearly due south direction for a further distance of 650ft. (total 2,450ft.), and terminating at a point, which, in view of the general direction of the heaviest seas, is calculated to be slightly outside the shelter of the existing concrete mole. Further details as to the character of the various structures, will be found in appendix herewith marked B.

I had contemplated using the soft rock known as “papa” for some of the cribwork filling, in order to save expense, but ultimately decided not to. The saving would not amount to much, and the rock from quarry is of course much preferable.

The small concrete blocks, indicated on drawing, are intended to be attained by blasting or splitting the concrete blocks now on hand, so far as they will go. After they are all used the balance required could be moulded to sizes indicated.

The total estimated cost of these works, including £2,000 for contingencies, is £21,000.

I should have preferred it if the work could have been kept more to the west, thus leaving more room within the harbour available for further shipping-accommodation in the future. This, however, would have entailed its being more exposed to the action of the sea, and would consequently have involved its being stronger and more costly, which the available funds would not admit of.

The underlying principle of the whole design is, of course, to get a wall on west side *projecting out beyond the shelter of the existing eastern mole*. I have assumed that a wall completely under the shelter of the existing work would do no good at all, as the sand would completely surround it, and still pile up against the existing mole as it does at present. *This is the great evil of the existing site, namely, that in order to get any useful result it involves two walls, the second of which must, for a considerable portion of its length, be nearly, if not quite, as strong as the first.* It is consequently a very expensive site to deal with, and hence, *inter alia*, my reason for saying above, that I could not recommend any extension of the existing works, as the cost would probably be excessive in view of the results which would be likely to be attained.

It is somewhat doubtful if the extreme outer portion of the work as designed is quite strong enough. If not, it will have to be supplemented with further concrete blocks. This is not directly provided for in estimate, but would probably be covered by the £2,000 included for contingencies.

Presuming that an eastern wall is carried out beyond the end of the western one, as now designed, it is anticipated that the south-easterly forces will prevail over the western ones at the end of it, as they do now at the end of the existing mole; and that, therefore, no sand will come into the harbour round the end of the new work.

If these anticipations are realised, there seems every reason to expect that a compact and convenient, though of course a small harbour, will result, with a depth at entrance of from 10ft. to 12ft. at low water, and 15ft. to 17ft. at high water.

Following on that, it is assumed, as indicated on drawing herewith sheet 2, that the channel between the letters N and M would be cleared to a depth of, say, about 10ft. to 12ft. below low-water level, throughout the extent defined by red hatching. This would probably be largely done by the river itself, when the harbour becomes protected from the western forces. The scouring action of the river, after harbour is enclosed, could also be considerably assisted by a row of piles, say, 3ft. to 6ft. apart centres, along the line indicated by strong red dots from I to J on same drawing. A timber wharf 650ft. in length (K to L), with swinging basin at lower end of it, which is likewise indicated on same drawing, would also probably be a desirable work to undertake in the future. Pending construction of wharf, a pile-facing from K to L, similar to that suggested from I to J, would be desirable, to assist the scouring action of the river. Such portions of the area indicated as the river will not scour out to the required depth would of course have to be dredged.