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MADRAS RECORD OFFICE.

Government of Madras.

MARINE **DEPARTMENT.**

G.O. No 119-20 Marine Press
~~Mis.~~

Dated 26th February 1896.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

MARINE DEPARTMENT.

Read—the following papers :—

G.O. No. 190, Marine, dated 1st July 1895.

From H. LE FANU, Esq., I.C.S., Chairman, Harbour Trust Board, Madras, to the Secretary to Government, Public Works Department (Marine), dated Madras, 20th November 1895, No. 3258.

Referring to the report of the Committee appointed under G.O., No. 47, Marine, dated 9th February 1895, to consider the whole question of improving the means which the Madras Harbour provides for working the trade of the port, I have the honour to submit, for the information and for favour of the orders of Government, an extract of the proceedings of the Trustees of the Harbour at a meeting held on Friday, the 1st instant, together with the plan and estimates referred to.

2. It is unnecessary for me to refer in detail to the various plans and suggestions which have been considered by the trustees, and I need only observe that nautical objections were raised to Scheme "A. 1" which the Committee had no opportunity of considering.

3. To meet these objections, the plan herewith submitted was prepared, and has been approved by the Board as carrying out, in principle, the recommendations of the Committee, while at the same time obviating the nautical objections to a boat-basin extending across the harbour on its western side in shallow water.

4. I submit herewith printed copies of the letters from the Presidency Port Officer, the Deputy Conservator, and the three Harbour Masters, which detail these objections; and they may be summed up as a unanimous protest from the officers responsible for the berthing and the safety of the ships in the harbour against any curtailment of the enclosed water area.

5. It has been found by the Board to be practically impossible to avoid some encroachment upon the harbour, in giving effect to the recommendations of the Committee, with which, in principle, the trustees agree; and it will be observed that the plan now submitted differs only in detail. The entrance to the canal remains as approved by the Committee and the boat-basin is also provided, but upon a smaller scale.

6. The reason for reducing the size of the boat-basin is that, on careful consideration of the actual requirements of the trade of the port, the trustees have decided that one of the area now shown will be sufficient. The Committee could not, of course, go into details, and the trustees, in doing so, have considered it expedient to reduce the area, because the smaller basin now recommended will be sufficient for all requirements for a long time to come.

7. In deference to the unanimous wish for deeper water inside the harbour, not only of all nautical officers connected with it, but of many experienced commanders of steamers constantly visiting the port, provision has been made for dredging at a cost of Rs. 2,19,069. This deepening of the harbour will permit of three additional berths being laid down within the present area, besides a deep water berth

alongside the canal entrance and the boat-basin, and will give the trustees ample time for considering the necessity for any extension in the form of expensive docks in the future. The proposal commends itself to the trustees, as it makes the most of the existing enclosed area, and practically completes the harbour according to the original design. This deepening, of course renders it necessary to found the walls of the boat-basin and canal entrance at a lower level; but the Board trust that Government will approve this extra expenditure, as it would not be sound policy to construct any permanent works within the harbour of such a nature as to prevent the eventual full utilization of the space available for shipping. The Board considers that the plan now forwarded represents the final plan for the present harbour, and would submit that if the canal is to be connected with the harbour, its entrance should be constructed in accordance with this final plan.

8. As the canal entrance is chiefly required in the interests of Government and of the Madras drainage schemes, and is not necessary so far as the harbour is concerned, the trustees are not in a position to recommend Government to sanction the cost from Harbour funds. All that is urgently required at the present time is a boat-basin, and improved facilities for handling cargo; and though the trustees are prepared to deepen the harbour, at a moderate cost as provided in the estimate, they are not prepared to spend any large sum on this work until the necessity of providing additional berths is more urgent than is now the case. The deep water berth alongside the canal entrance would, no doubt, be useful for landing horses and for the landing and embarkation of troops, but in this Government is quite as much interested as the Board. It may also be useful for landing coal, but in this case other satisfactory arrangements could be made which would not involve so large an expenditure. The Board therefore trusts that Government will, as is the custom when municipalities propose extensive improvements, be pleased to make either a liberal grant towards the total cost of the scheme, viz., Rs. 20,80,651 or an annual contribution to Harbour funds. It appears to the Board that the improvements to the Madras Harbour may be regarded as necessary in the interest of the development of the country, and of the railways, which depend largely on Madras being made a cheap port. Any policy which would tend to place additional burdens on shipping visiting the port is, therefore, to be deprecated.

For the above reasons the Board trusts that Government will be pleased to make a contribution of one-half of the cost of the proposed improvements, which sum may, it is suggested, be given in three equal annual instalments. The estimated cost of the present proposals does not, it should be remembered, represent the whole sum which the Board will have to provide, as a large amount will be required to modify the existing traffic arrangements, and to generally remodel and improve the Board's property.

9. With regard to Custom House sheds and enclosure round the boat-basin, the Board awaits the orders of Government upon paragraph 15 of the Committee's report, recommending that the custody of goods landed be transferred from the Customs Department to the Trust, as at Calcutta and Bombay.

It may not, perhaps, be out of place here to express my personal opinion that I see no difficulty whatever in acceding to this request of the Chamber of Commerce; for, under the orders of Government, the Collector of Sea Customs is, by reason of his office, as such, also the Chairman of the Board, and it would, therefore, appear that it should be more easy to carry such an arrangement into effect at Madras than at other ports, where these two offices are not held by the same person.

10. The third item in the estimate is one of Rs. 54,369 for repairing the south wall of the harbour, to prevent sand from entering the water area through the spaces between the blocks of which the wall is built. These repairs are now found to be absolutely necessary, and are due partly to faulty design and partly to defective construction, which was unavoidable, as the Superintendent of the Works had practically to race the sand, which accreted almost as fast as the wall could be built, and the blocks could not, therefore, be placed in position with the precision which was afterwards possible when, the accretion of sand having been outstripped, and the surf passed, comparatively deep water was reached.

11. Should Government approve and sanction the proposals now submitted, the question of improved railway communication could then be taken into consideration.

12. I also submit a plan and estimate for a proposed groyne projecting into six fathoms of water, with its centre at a distance of 1,250 feet south of the south pier, to prevent further accretion of sand against that arm, at an estimated cost of Rs. 3,91,355; the necessity for this groyne is explained in the accompanying letter from the Board's Engineer, and its construction would be approved by the trustees solely because it is said to be necessary on engineering grounds provided that the opinion of Government Experts coincides with the views of the Board's Engineer.

Enclosures.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the Offices of the Board on Friday, the 1st day of November 1895.

* * * * *

6. Read memorandum, dated 31st October, by the Chairman, communicating the plan for harbour improvements discussed at the last meeting and estimates for—

	Rs.
(*a*) The canal section	8,69,734
(*b*) The boat-basin	6,27,181
(*c*) Repairs to the south arm to prevent the sand entering the harbour	52,765
(*d*) Deepening the harbour to provide five additional berths ...	2,04,547
Total ...	*17,54,227
Less anticipated recovery on sale of additional plant required ...	*70,000
Net Total ...	16,84,227

The trustees discussed this plan and the estimates, the Board's Engineer being present to explain details.

Resolved—(*a*) That the plan for the canal entrance is approved. The Board presumes that Government will pay the cost of construction.

(*b*) The boat-basin plan and estimate is approved and sanctioned. The question of providing Custom-house sheds, enclosed yards, and warehouses will stand over until Government has passed orders upon paragraph 15 of the report of the Special Committee appointed under G.O. No. 47, Marine, dated 9th February 1895.

(*c*) The repairs to the south wall being, as explained by the Engineer, work rendered absolutely necessary in connection with the reconstruction of the harbour by original defective construction, the estimate is approved and will be submitted to Government.

(*d*) The dredging necessary to deepen the harbour towards the foreshore upon the west is sanctioned and the estimate approved.

A trustee intimated that he considered it would have been better to postpone the Board's decision until Commander Powell, R.I.M., and Mr. Ashpitel, A.M.I.C.E., were present, but as no member supported his objection, and the feeling of the Board was that the time had arrived when a decision could be given, he acquiesced in the foregoing resolutions.

* * * * *

* Tools and plant since redistributed—*vide* abstract of estimates, page 8. The original estimates have been altered accordingly.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the Offices of the Board on Friday, the 8th day of November 1895.

* * * * *

5. The Board discussed an estimate † submitted by the Engineer for Rs. 3,96,424 for constructing 1,250 feet south of the south arm of the harbour, a groyne projecting into six fathoms of water to prevent further accretion of sand against the south pier.

Resolved that, as the construction of this groyne has become, as explained by the Engineer, an urgent necessity owing to the rapid accretion of sand to the south of the harbour, the estimate be submitted to Government.

(True Extract.)

(Signed) C. PINSENT,
Secretary, Harbour Trust Board.

† Altered to Rs. 3,91,355 in redistribution of tools and plant—*vide* abstract of estimates, page 8.

HARBOUR IMPROVEMENTS.

(A).—*Canal Section at North-West Corner of Harbour.*

Four-hundred lineal feet of break-water with parapet, and five fathoms at low water alongside, 540 lineal feet of deep-water quayage with revetted surf bank, up to high-water mark.

Nine-hundred and ten lineal feet low-level wharf from entrance to canal, or north wharf along canal, and 850 lineal feet of low-level wharf, or south wharf of canal, &c.

Quantity.	Sub-head of work.	Rate.	Per.	Total.
		Rs. A. P.		Rs.
23,165 tons ..	Rubble in base deposited	1 8 0	Ton.	34,747
30,634 c. yards ..	Concrete in break-water and parapet	11 0 0	C. yds.	3,36,974
1,638 do. ..	Do. do. filling	15 0 0	do.	24,570
4,879 do. ..	Do. do. wharf walls	11 0 0	do.	53,867
1,332 do. ..	Do. do. do. do. filling and capping ..	15 0 0	do	19,980
146,800 do. ..	Sand dredging, deposited as filling	0 4 0	do.	36,700
3,107 Sqrs. ..	Laterite hard and new roadway to south	6 8 0	Square	20,196
	Establishment, office	..	Sum.	28,000
	Do. works	..	do.	87,000
800 L. feet ..	Parapet along north pier, surf bank and portion of north pier (of old blocks, labour only)	1 8 0	L. feet.	1,200
650 do. ..	Connecting canal, from wharfage to west side of Beach Road Bridge of Public Works Department (D. P. W. Estimate)	110 0 0	do.	71,500
	Add proportionate cost of tools and plant estimate (*f*) ..	..	..	37,566
	Total of Canal Section at North-West corner of Harbour	..	..	7,52,300

(B).—*Boat-Basin in South-West Corner of Harbour.*

Four hundred lineal feet of break-water and parapet, with low-level wharf, 60 feet wide forming east wall of boat-basin. Six hundred lineal feet of low-level wharf along present south pier when lowered; 290 lineal feet low-level wharf of west bank of basin, and 540 lineal feet of quay 50 feet wide, providing a high-level deep water quay on north side, and a low-level wharf inside boat-basin.

Quantity.	Sub-head of work.	Rate.	Per.	Total.
		Rs. A. P.		Rs.
20,388 tons ..	Rubble in base deposited	1 8 0	Ton.	30,582
30,634 c. yards ..	Concrete in break-water and parapet	11 0 0	C. yds.	3,36,974
1,638 do. ..	Do. do. do. filling	15 0 0	do.	24,570
3,263 do. ..	Do. do. wharf walls	11 0 0	do.	35,893
888 do. ..	Do. do. do. filling and capping	15 0 0	do.	13,320
	Removing top blocks from south pier, and adding a concrete capping, to form a low-level wharf	..	Sum.	11,600
146,800 do. ..	Sand dredging, deposited as filling	0 4 0	C. yards.	36,700
3,468 squares ..	Laterite Hard	6 8 0	Square.	22,542
	Establishment. { Office .. .. .. 28,000 / Works .. .. .. 87,000 }	..	Sum.	1,15,000
	Add proportionate cost of Tools and Plant Estimate (*f*)	..	..	36,377
	Total of Boat-Basin ..	..	..	6,63,558

(C).—*Repairs to South Pier old wall to prevent sand washing through into the Harbour, and removal of the Sand Bank.*

Quantity.	Sub-head of work.	Rate.	Per.	Total.
		Rs. A. P.		Rs.
1,371 c. yards ..	Concrete deposited below water along south pier to make the old walls sand tight, from boat-basin break-water, to steps at south pier	15 0 0	C. yards.	20,565
420 frames ..	Labour in removing sand and fixing frames	30 0 0	frames	12,600
3,400 tons ..	Rubble backing deposited	1 8 0	Ton.	5,100
50,000 c. yards ..	Sand dredging and removing sand bank	0 4 0	C. yds.	12,500
	Add proportionate cost of Tools and Plant Estimate (*f*).	..	..	3,604
	Total cost of removing Sand Bank along South Pier and making old wall sand tight ..	..	..	54,369

(D).—*Deepening Harbour to provide five additional berths in fair weather, or three additional berths at all times of the year.*

Quantity.	Sub-head of work.	Rate.	Per	Total.
		Rs. A. P.		Rs.
818,186 cubic yards.	Sand dredging to five fathoms below low water ..	0 4 0	C. yard.	2,04,547
	Cost of deepening harbour after the canal and boat sections are built	..	..	2,04,547
	Add proportionate cost of tools and plant, estimate (*f*) ..	..	..	14,522
	Total cost of deepening Harbour ..	..	..	2,19,069

Abstract of Estimate.

(*a*)	Canal section at north-west corner of harbour	7,52,300
(*b*)	Boat-basin at south-west corner of harbour	6,63,558
(*c*)	Repairs to south pier to prevent sand entering the harbour	54,369
(*d*)	Deepening the harbour to provide five additional berths	2,19,069
(*e*)	Proposed groyne south of the harbour	3,91,355
	Total cost of Harbour Improvements including Canal Section, Boat-basin, deepening harbour for increased berthage, making south pier wall sand tight, and protective groyne	20,80,651

Madras,
30th October 1895.

(Signed) A. LEE POGSON,
Engineer, Harbour Trust Board.

Estimate (E) for proposed groyne projecting into six fathoms of water with its centre at a distance of 1,250 feet south of the south pier to prevent further accretion of sand against the south pier.

Quantity.	Sub-head of work.	Rate.	Per	Amount.
		Rs. A. P.		Rs.
152,120 tons ..	Rubble tipped from wagons	1 8 0	Ton.	2,28,180
3,600 c. yards ..	Concrete blocks in capping	11 0 0	C. yd.	39,600
800 ,, ..	Do. on surface between block	15 0 0	..	12,000
3,600 ,, ..	Labour and fuel in placing blocks in position	2 0 0	..	7,200
	Establishment { Office, Rs. 21,000 .. .. .. / Works, Rs. 63,000 .. .. .. }	..	Sum.	84,000
	Add proportionate cost of tools and plant, estimate (*f*) ..	..	..	20,375
	Total ..	..	..	3,91,355

Madras,
8th November 1895.

(Signed) A. LEE POGSON,
Engineer, Harbour Trust Board.

Estimate (*f*).

Tools and Plant.

	Rs.
Sand pump	50,000
Repairs to machinery and new locos	70,000
New 10-ton steam crane	20,000
New block moulds	10,000
Rails and sleepers	5,000
Iron and timber moulds for making south pier sand tight ...	2,000
Mixed gauge line for groyne	12,444
Block moulds for groyne	5,000
Repairs to rolling-stock	8,000
Total ...	1,82,444
Deduct recovery due to sale of tools and plant	70,000
Grand Total ...	1,12,444

Madras,
20th November 1895.

(Signed) A. LEE POGSON,
Engineer, Harbour Trust Board.

From A. LEE POGSON, Esq., Engineer, Harbour Trust Board, Madras, to the Chairman, Harbour Trust Board, Madras, dated 20th November 1895, No. 643.

I now have the honour to forward a large scale plan showing the proposed groyne, with its centre line at a distance of 1,250 feet south of the south pier, and projecting into six fathoms of water.

2. In October 1893 the sand showed signs of entering the harbour through the south pier, in consequence of the accretion of sand to the south of the south pier, and I then suggested the construction of a rubble mound groyne, capped with concrete blocks, to arrest the sand further south and so prevent its further banking up against the south pier, the result of which will eventually be the shallowing of the entrance to the harbour.

3. Unfortunately, during 1894, and until July 1895, the state of the sea has been too rough for accurate soundings to be taken outside the harbour.

4. In August 1895 accurate soundings were obtained, which, when compared with those of 1893, show a great change in the depth of water, outside the south pier, to have taken place in the last two years, and the depth of water at the harbour entrance is now temporarily or otherwise less by two feet beyond doubt. Although, in January 1895, when preparing for setting the south pier caisson, no change in the depth of the entrance had taken place, as the annual accreting action had not commenced, the time has now come when I am of opinion that immediate action must be taken to arrest the sand drifting up from the south by the construction of a groyne, as shown upon the accompanying tracing. If the accretion of sand increases each year, the groyne will have to be extended into deeper water; but for the present I consider a groyne running out to the six fathoms contour line to be sufficient.

5. When comparing the soundings along the survey line No. 10 on the plan taken in 1893 with those repeated again at the same month of the year in 1895, the following shallowing or change in depth of roadstead is shown:—

Depth in 1893.			Depth in 1895.		
3′	9″	in 1893 has shallowed to high water mark in 1895.			
6′	0″	,,	6′	0″	,,
9′	0″	,,	4′	3″	,,
12′	0″	,,	6′	0″	,,
15′	0″	,,	8′	6″	,,
18′	0″	,,	12′	0″	,,
21′	0″	,,	15′	6″	,,
24′	0″	,,	16′	0″	,,
27′	0″	,,	19′	0″	,,
30′	0″	,,	21′	0″	,,
33′	3″	,,	24′	3″	,,
36′	0″	,,	28′	0″	,,
39′	0″	,,	32′	0″	,,
42′	0″	,,	39′	6″	,,
45′	0″	,,	43′	9″	,,

6. From the above it will be seen that beyond doubt the advance of sand from the south threatens to reduce the depth of water at the harbour entrance, and, as the shallowing in the roadstead extends to sea as far as the 7½ fathoms line, no groyne could reach that depth of water before the accreting action will return, or commence again next year. All therefore that can be done is to arrest the sand for the present, at a minimum depth required for the entrance, and, as soon as there is any sign of further shallowing at the end of the proposed groyne, it must be extended from time to time into deep water until no further sand passes it each year. By this means a minimum section of the groyne can be kept to, which means a saving in cost, and the harbour entrance can be maintained at a desired depth. Otherwise it would appear, from the latest soundings, that the entrance must continue to shallow, if the groyne is not constructed.

7. There would appear to be no other alternative but to construct the groyne to arrest the sand to the south of the harbour, as, without the groyne, no amount of dredging in the open roadstead would be able to cope with the large amount of sand drifting up the coast.

8. The work should be started as soon as possible, so as to be well advanced before the change of the monsoon, when the accretion of sand will recommence. Therefore, pending the sanction of the estimate, I would ask for permission to secure the necessary sleepers and rails amounting to Rs. 9,000, to enable me to lay the lines in anticipation of sanction.

From H. LE FANU, Esq., I.C.S., Chairman, Harbour Trust Board, Madras, to the Presidency Port Officer, Madras, dated 25th July 1895, No. 133 C.

I have the honour to forward, herewith, a copy of the Proceedings of the Harbour Improvements Committee, together with the report to Government, and copy of G.O. passed thereon, No. 190, Marine, dated 1st July, and will feel obliged if you would favour the Trustees with your views upon the proposed boat-basin, inside the harbour, as affecting the shipping. I further request that you will favour the Harbour Trust Board with your views as to what should be done. The Marine Department has not yet spoken, but it is plain that the first step, in any undertaking of the kind, is to ascertain what the requirements, present and future, of your department are. Subsequent proposals must be worked out so as to fit in with your views, as the harbour is primarily a *harbour*, and boat-basins, &c., are secondary considerations.

From Commander W. POWELL, R.I.M., Presidency Port Officer, Madras, to the Chairman, Harbour Trust Board, Madras, dated 6th August 1895, No. 1761/730 M.

In reply to your No. 133 C., dated 25th July 1895, I have the honour to say that, as regards the proposed improvements to the harbour, I have always been of opinion that anything that would take off or in any way interfere with the present available water space of the harbour should be avoided.

2. To increase its berthing space dredging should, I think, be undertaken from the 3½ fathom line to the 2½ line which would give berths for four more steamers of the draught that usually come here. I believe the Board's Engineer has an objection to dredging in the harbour; but, with all due deference to his professional knowledge, an important matter like this should not, I think, be decided by a single opinion.

3. I have always thought that two jetties, light and strong iron screw pile ones, to avoid silt, should be built in from the north arm for coal discharging, &c.

4. Some time before the special Committee was appointed, Mr. Pinsent, the Board's Secretary, put before it a plan for a boat-basin, warehouses, &c., opening from the south wall. I prefer this to any of the other proposals: When the matter was discussed, the then Chairman and members of the Board decided that nothing should be considered, in the way of improvements, until the harbour was completed and had stood the test of a heavy cyclone.

5. Mr. Pinsent's plan commended itself to me as being self-contained and not interfering with the harbour. Should the trade of Madras ever warrant docks being made, the key for them will be there, in the boat harbour of his plan.

6. If the jetties on the north arm are constructed, I believe they would well meet the present requirements. It must be remembered that Madras is not a terminal port, the only vessels that discharge a full cargo are coal and oil ones, and they seldom, if ever, load here. The rest of the trade might be called dribbling.

From C. PINSENT, Esq., Secretary, Harbour Trust Board, Madras, to the Deputy Port Conservator, Madras, dated 25th July 1895, No. 132 C.

I am directed to forward, and have the honour to enclose herewith, a copy of the report of the Harbour Improvements Committee, and also of the G.O. thereon, No. 190, Marine, dated 1st July, and am to request that you will favour the Chairman with your views, and obtain those of the Commanders of vessels frequenting the port, to enable him to place same before the Board.

From Commander C. HEWETT, R.I.M., Deputy Conservator of the Port of Madras, to the Chairman, Harbour Trust Board, Madras, dated 30th July 1895, No. 1273.

In reply to your No. 132 C., dated 25th instant, forwarding plans and report of the Harbour Improvements Committee, I have the honour to remark as follows:—

1. The Committee have apparently unanimously approved of Mr. Pogson's A-1 scheme, which provides—

(*a*) for a canal entrance with covered arm at the north-west side of the harbour;
(*b*) for a boat-basin in the south-west corner of the harbour.

The latter of these two proposals seriously affects the question of the safety and convenient berthing of ships in the future.

The present system is to try and give ships an all-round clear swinging space in case of stern fasts carrying away, but this is only possible at moorings Nos. 2, 3 and 4, owing to the

increased length of vessels now visiting the port. A further increase in length of vessels in the near future is evident, judging by the launches now taking place at home, and by the speech of Sir T. Sutherland at the last general meeting of the P. and O. Co.

2. One of the advantages claimed by Mr. Pogson is, that *more* vessels could be berthed. This I think is doubtful, as we require bow as well as stern moorings laid down, and each mooring should be, as in Colombo, 600 feet apart, to allow space for the largest ships with a margin for working. The boat-basin wall, which will run from the south arm to overlay the pier, would, in my opinion, create a very nasty backwash, when any swell is running into the harbour, and I have grave doubts as to whether we could get stern fasts to hold under these circumstances; the plan also shows the stern fasts to the wall, this is objectionable, as in a seaway something would go either the bollards of ships or ropes.

3. My own ideas about improvements in the Madras Harbour are, that taking into consideration the enormous cost of enclosing the present water area, and the uncertainty of what would happen in a severe cyclone, the following improvements are all that the present trade of the port requires :—

(*a*) The harbour dredged back to give a depth of 22 feet L.W.T. on the present 2 fathoms line, to enable us to berth four more light draft vessels, two on each side of the pier, inside the present moorings.

(*b*) Two light iron jetties, one on the north arm and one on the south, to land coal, troops, horses, native passengers, &c.

(*c*) A boat-basin in the north-west corner, in connection with the canal, the construction of which, I understand, has been approved of by Government.

4. I believe the Engineer states it is impossible to dredge back without a wall across the harbour; but this could be referred to a Committee of Engineers, who would, I have no doubt, overcome the difficulty. To the lay mind it seems unnecessary, having once secured your harbour, to fill it in again by way of improvements.

5. I have asked the Harbour Masters for their opinions, and they agree with me. It is difficult to get an opinion from Masters of vessels frequenting the port, as the question does not concern them personally; but I have asked Mr. Baddeley, who will be acting for me while on privilege leave, to obtain their views if possible.

From C. PINSENT, Esq., Secretary, Harbour Trust Board, Madras, to the Deputy Port Conservator, Madras, dated 5th August 1895, No. 139 C.

I have the honour to acknowledge the receipt of your letter, dated 30th July, No. 1273, and am directed to request that you will obtain, for the information of the Board, from each of the Harbour Masters, in writing, their opinions regarding proposed harbour improvements, as affecting ships, under their charge, entering and leaving the harbour.

From H. C. TAYLOR, Esq., Harbour Master, Madras, to the Deputy Conservator of the Port, Madras, dated 8th August 1895.

With reference to the Secretary's letter, No. 139 C., dated 5th August 1895, asking for my opinion, of the effect the proposed harbour improvements would have on steamers entering and leaving the harbour—

I have the honour to report that I have perused the minutes of the Committee meeting, and examined the litho-plans as approved.

And I am of the opinion that our present small area of smooth water, within the harbour groynes, has been obtained by great expense and labour, and any enclosed boat-basin, or obstructive wall, built to the east of our present high water mark, would be suicidal policy.

And if any wall built has a sloping base, of rubble to the east, and a steamer in moving tail on to it, by dragging her anchor, or from any other cause, the effect would be disastrous, and much more damage done than under present conditions.

The steamers visiting this port are every month increasing in length and size, and even now we require the harbour to be dredged, and buoys Nos. 1, 2, 3, 4 and 5 placed further west to safely berth nine steamers.

There is at present no spare space, and, in my opinion, the berths are far too small for the larger class of steamers.

The Engineer states there will be room for eleven steamers in the reduced space; I beg to differ from him, if he means eleven of the larger class, as their rudders and propellers would be in dangerous proximity to the walls all round, and it is quite impossible to get in eleven large ones at one time.

We might be able to berth eleven steamers, but they, to lie safe, must be moored by their chain cables, both head and stern, and I question if the Commanders would permit that in the present untried state of the harbour.

With such a lot of spare ground all round the harbour, I fail to see why the enclosed water space should be encroached upon to build sheds and boat-basins.

From NORMAN CORFIELD, Esq., Senior Harbour Master, Madras, to the Deputy Conservator of the Port of Madras, dated 10th August 1895.

In reply to the Secretary, Harbour Trust Board, letter No. 139 C., dated 5th August 1895, I beg to offer my opinion respecting the berthing of steamers, after the proposed scheme of constructing a wall across the enclosed water area, as per plan A-1 by Mr. Pogson, is completed.

To dredge to a minimum depth of 30 feet close to the wall, will give more water area and enable nine steamers to be berthed with safety, as the stern moorings of No. 1 to 5 can be placed further to the west, making swinging room for steamers berthed in No. 6 and 9 berths, as steamers are of such a length that, at present, should the stern fast part, they cannot possibly swing clear of one another.

I consider that to build any kind of wall, or obstruction, within the enclosed harbour, would be a serious mistake, and would prevent further development in the future. As to water area: we are aware ships are increasing in length, many being 450 feet, so that in the near future the present harbour will be too small, unless dredged towards the beach, and removing the T end of pier, thus making room for another tier of five steamers.

If it is simply required for the accommodation of boats, and to facilitate the landing of cargo from boats, any of the plans might be adopted, either to the north in connection with the proposed canal, or within the accumulation of sandy foreshore to the south of the harbour.

From G. A. EVANS, Esq., Harbour Master, Madras, to the Deputy Conservator of the Port of Madras, dated 24th September 1895.

I have the honor to acknowledge the receipt of the Secretary's letter No. 194 C., dated 23rd September 1895, requesting a report from me on the proposed improvements of the Madras Habour, plan No. A-1.

I am of opinion that it would be a mistake to curtail the water area available for ships as shown in the plan.

It would be impossible to place eleven large steamers as noted. Moreover, ships could not be moored to any rigid object, owing to the heavy swell.

The north and south boat-basin wall would, I fear, cause a very nasty backwash, which would considerably inconvenience boats lying alongside the inner tier of ships, and make the discharging of cargo into these boats dangerous and slow.

There would, I consider, be much risk in bringing large vessels so close to a groyne when a heavy swell is running into the harbour; and this danger would be increased by strong easterly winds. It is not necessary to remind you that our first study must be the vessels' safety.

We have to remember that ships are yearly increasing in length, and we have only a limited space to cope with that increase, one-third of which this plan takes from us. I am therefore adverse to this obstruction to future development of the harbour. We cannot proceed further north, south or east; our only hope, therefore, is to dredge out to the westward, in order to cope with the future possible advancement of the shipping trade to this port.

If it is necessary to have a boat-basin, group 1 or 3 appear to me to be the most practical for all concerned.

Note by the Chief Engineer, Public Works Department.

The proposals now submitted by the Harbour Trust Board are in effect identical with those proposed by the Committee appointed at the beginning of last year, except that they provide for a boat basin of a rather smaller size than that proposed by the Committee, and for increasing the available area of the harbour by dredging.

2. As regards the former alteration, I can see no objection whatever to the adoption of the Board's proposals; the latter are in a better position to judge regarding details of this nature than the Committee could be, and, if they are satisfied that the dimensions suggested are sufficient, there seems no reason why their view should not be accepted.

3. The proposal to dredge the western portion of the harbour is one to which no possible exception can be taken from an engineering point of view; the question

is purely a financial one, as to whether the additional accommodation to be obtained is worth the Rs. 2,19,000 to be expended in obtaining it, and of this the Trustees are the best judges.

4. I am however not at all satisfied as to the necessity for so large an expenditure as Rs. 7,52,300 for the protection of the canal entrance.

5. It is obviously absurd that the cost of this work should be actually more than the whole cost of the boat basin, and it will be noted that the estimate for the cost of this portion of the work attached to the Committee's report, which estimate like the present one was prepared by the Board's Engineer, amounted to only Rs. 3,62,379, or less than half the present estimate.

6. I am bound to say that I am not at present satisfied of the necessity for any such expensive works as are provided in even the smaller of these estimates, merely for the purpose of keeping the canal entrance open.

7. It seems to be assumed that this entrance will silt up, if not covered, in the manner proposed; I am not at all satisfied that this will be the case, and believe that even with the harbour in its present condition, a very small amount of dredging, if any, will be required to keep the canal mouth sufficiently deep for the traffic which will have to pass through it, and the risk of silting will be still smaller if the western portion of the harbour is dredged as now proposed.

8. So far as the canal entrance is concerned, I do not believe that any thing more is necessary than a short length of wall running out from the shore, parallel with the northern arm of the harbour, into about three fathoms of water; this certainly should not cost more than one lakh, and this sum, together with the Rs. 71,500 for the connecting canal and a proportionate charge for establishment, or say Rs. 2,00,000 in all, is the most that is properly debitable to the canal.

9. The additional wharfage accommodation provided by the arrangements shown on the plan will be of great value and may very well be worth the additional expenditure which it will involve, but the benefit will be entirely to the harbour, and there seems no reason why Government should be asked to pay for it.

10. This is entirely independent of the question raised in the latter part of paragraph 8 of the Chairman's letter, whether Government should give a substantial contribution towards the cost of the general improvements; personally I am of opinion that money could not be better spent, and entirely concur in the view that the "improvements to the Madras harbour may be regarded as necessary in the interest of the development of the country and of the railways, which depend largely on Madras being made a cheap port; any policy which would tend to place additional burdens on shipping visiting the port is therefore to be deprecated," but the question is not an engineering one. So far as the connection of the harbour with the canal is concerned, a grant of Rs. 2,00,000 is the most that can be demanded.

11. The provision for improving the southern arm so as to prevent sand from entering is, in my opinion, eminently necessary; it is only of late that I have become aware of the condition of this arm, and can only say that the sooner it is corrected the better.

12. I must confess that I am not satisfied of the necessity, or indeed of the desirability, of the proposed groyne to the south of the harbour; the matter was mentioned to me verbally some time ago, and I said then that it seemed desirable if there were no other means of preventing the entry of sand through the present south arm, this entry being so serious an evil that it should be stopped at any cost. If, however, this entry can be stopped by the measures now proposed, which I see no reason to doubt, the groyne is not necessary for this purpose, and I have grave doubts as to whether it is required for stopping the accretion of sand along the south arm; this latter is not in itself so serious an evil as to justify any expensive measures for its prevention, and the prospect of any obstruction to the entrance of the harbour (a very different matter) seems to be very remote.

13. I must confess that I look with extreme distrust upon the construction of groynes upon a coast like that of Madras, and with the effect of the harbour (which, as a whole, is nothing but a big groyne) upon the coast to the north before our eyes, I should hesitate to advocate the construction of another groyne to the south of the harbour.

14. If the proposed groyne were connected at its eastern end with the south wall of the harbour, so as to completely enclose the space between it and the latter, it would form an excellent dock or inner harbour, to be entered by an opening in the present south wall, and probably no better mode of forming docks could be adopted; but this is a different matter from the open groyne, the construction of which I cannot at present recommend.

(Signed) J. PENNYCUICK, Col., R.E.,
4th January 1896. Chief Engineer, P.W.D.

Order—No. 119, Marine, dated 26th February 1896.

With the letter recorded above, the Chairman of the Harbour Trust Board forwards an extract of Proceedings of the Trustees dealing with the proposals of the Committee appointed by Government to consider the question of improvements to the Madras harbour. The following estimates are submitted for the approval of Government:—

	Rs.
A. Canal entrance and connected works	7,52,300
B. Boat basin at south-west corner of harbour	6,63,558
C. Repairs to south pier to prevent ingress of sand	54,369
D. Deepening the harbour to provide additional berths for ships.	2,19,069
E. Groyne south of the harbour	3,91,355
Total ...	20,80,651

2. His Excellency the Governor in Council agrees with the Chief Engineer in his objections to the proposed south groyne, and must therefore withhold his assent to this work, pending the reference * which has been made to the Secretary of State on the subject. He is also disposed to agree in the opinion that, so far as the protection to the canal entrance is concerned, a sum of Rs. 2 lakhs will cover the cost of such works as are necessary on this account, but the Chief Engineer for Irrigation will scrutinise the estimate of Rs. 7,52,300 for the canal entrance and connected works and after ascertaining the exact amount chargeable to the canal on account of the entrance into the Harbour, will include this sum in the canal estimate. The balance will be chargeable to harbour works. As with this necessary addition to the canal estimate, the total amount will exceed the limit of sanction allowed to the Local Government under Provincial funds, the sanction of the Secretary of State will be needed to the entire estimate, and no portion of the the connected works can therefore, pending the receipt of such sanction, be undertaken by the Harbour Works Engineer. The other works brought forward are approved, subject to the Board being able to raise the necessary funds.

* G.O. No. 529 W., dated 11th February 1896.

3. The Board has submitted separate proposals for raising a loan by means of debentures, and this question is now under consideration in the Financial Department. On orders being passed on these proposals, the financial position will be more clearly understood. Meanwhile, the work of repairing the south wall so as to prevent the ingress of sand should be taken up at once, as it is most important that further deposits of sand inside the harbour should be stopped as soon as possible.

4. The question of the transfer of the custody of goods landed from the Customs Department to the Harbour Trust, alluded to in paragraph 9 of the Chairman's letter, will be referred to the Revenue Department for consideration. The matter is brought forward in paragraph 15 of the Committee's report recorded with G.O. No. 190, Marine, dated 1st July 1895.

5. The suggestion of a groyne on the position shown in the accompanying sketch will be remitted to the Harbour Works Engineer for his remarks. A groyne in this position would perhaps better stop the drift of sand than one running parallel to the harbour wall. It would probably have the effect of diverting the deposit to the southwards altogether away from the harbour mouth.

[Here enter No. 120, Marine, dated 26th February 1896.]

(True Extract.)

(Signed) D. McNEIL CAMPBELL, Colonel, R.E.,
Joint Secretary to Government.

To the Chairman, Harbour Trust Board, with sketch.
" Financial Department.
" Revenue Department.
" Examiner, Public Works Accounts.
" Chief Engineer for Irrigation.

Endorsement—No. 120, Marine, dated 26th February 1896.

Copy of the above, with copy of the Despatch to the Secretary of State, forwarded to the Government of India, Public Works Department.

(By order.)

(Signed) D. McNEIL CAMPBELL, Colonel, R.E.,
Joint Secretary to Government.

Erd. T. K. Narayana Aiyangar.
Spare Copies

Govt. of {1896} Madras.

MARINE.

Dated February, 26th.

Recd. *Encl.*

G.O. Nos. 119, 120, 26th Feb. 1896.

FEBRUARY.

Madras Harbour

Forwarding copy of Proceedings according conditional approval to certain works recommended by the Committee appointed to consider the improvements requisite to complete the —, with copy of the despatch to the Secretary of State.

16

No. $\frac{2}{119}$, MARINE, 26TH FEBRUARY 1896.

MARINE DEPARTMENT.

LETTER—to

THE RIGHT HONOURABLE THE SECRETARY OF STATE FOR INDIA.

MY LORD,

In continuation of our despatch No. $\frac{2}{529}$ W., dated 11th February 1896, forwarding the progress report on the Madras Harbour Works for the quarter ending 30th September 1895, we have the honour to transmit the accompanying copy of our Proceedings No. 119, Marine, dated 26th February 1896, according conditional approval to certain works recommended by the Committee specially appointed to consider the improvements requisite to complete the harbour. It will be observed that it is also proposed to construct a canal connecting the harbour with the Buckingham canal with the primary object of increasing the circulation of water into the Cooum for cleansing this river, while at the same time a direct connection will be obtained with the harbour for boats navigating the Buckingham canal. The works requisite to effect an entrance to the harbour are to be carried out under the supervision of the Harbour Works staff—Provincial funds contributing a sum which is now estimated at 2 lakhs of rupees as the share chargeable to the canal estimate. Your Lordship will observe that the whole scheme has been approved by us, subject to the Harbour Trust Board being able to raise the necessary funds which they purpose doing by means of debentures.

2. The construction of the canal cannot be taken up until the estimate is duly sanctioned by competent authority. It is understood that it will amount to a sum which will be beyond our powers of sanction. In this case the project will be duly laid before your Lordship in our Public Works Department.

We have the honour to be,

My Lord,

Your Lordship's most obedient, humble servants,

(Signed) WENLOCK.

(,,) H. W. BLISS.

(,,) J. GROSE.

FORT ST. GEORGE,
26th February 1896.

GOVT. OF FORT ST. GEORGE.

MARINE (1896) *DEPARTMENT.*

LETTER to the Right Honourable the Secretary of State for India.

Dated February 26th,

No. $\frac{2}{119}$ of 1896.

FORWARDING, with remarks, copy of Proceedings according conditional approval to certain works recommended by the Committee appointed to consider the improvements requisite to complete the Madras Harbour.

Harbour Trust Board Office,

No. 3258. *Madras, 20th November 1895.*

FROM

H. LE FANU ESQ., I. C. S.,
CHAIRMAN, HARBOUR TRUST BOARD,
Madras.

TO

THE HON'BLE COL. JOHN PENNYCUICK, R. E., C. S. I.,
SECRETARY TO GOVERNMENT,
Public Works Department (Marine).

SIR,

Referring to the report of the Committee appointed under G. O., Marine, No. 47, dated 9th February 1895, to consider the whole question of improving the means which the Madras Harbour provides for working the trade of the Port, I have the honor to submit for the information and for favour of the orders of Government, an extract of the proceedings of the Trustees of the Harbour at a meeting held on Friday, the 1st instant, together with the plan and estimates referred to.

2. It is unnecessary for me to refer in detail to the various plans and suggestions which have been considered by the Trustees, and I need only observe that nautical objections were raised to Scheme "A. 1" which the Committee had no opportunity of considering.

3. To meet these objections the plan herewith submitted was prepared, and has been approved by the Board as carrying out, in principle, the recommendations of the Committee, while at the same time obviating the nautical objections to a boat-basin extending across the Harbour on its western side, in shallow water.

4. I submit herewith printed copies of the letters from the Presidency Port Officer, the Deputy Conservator, and the three Harbour Masters, which detail these objections; and they may be summed up as a unanimous protest from the officers responsible for the berthing and the safety of the ships in the Harbour against any curtailment of the enclosed water area.

5. It has been found by the Board to be practically impossible to avoid some encroachment upon the Harbour, in giving effect to the recommendations of the Committee, with which, in principle, the Trustees agree; and it will be observed that the plan now submitted differs only in detail. The entrance to the canal remains as approved by the Committee and the boat-basin is also provided, but upon a smaller scale.

6. The reason for reducing the size of the boat-basin is that, on careful consideration of the actual requirements of the trade of the Port, the Trustees have decided

that one of the area now shown will be sufficient. The Committee could not, of course, go into details, and the Trustees, in doing so, have considered it expedient to reduce the area, because the smaller basin now recommended will be sufficient for all requirements for a long time to come.

7. In deference to the unanimous wish for deeper water inside the Harbour, not only of all nautical officers connected with it, but of many experienced Commanders of steamers constantly visiting the Port, provision has been made for dredging at a cost of Rupees 2,19,069. This deepening of the Harbour will permit of three additional berths being laid down within the present area, besides a deep water berth alongside the canal entrance and the boat-basin, and will give the Trustees ample time for considering the necessity for any extension in the form of expensive docks in the future. The proposal commends itself to the Trustees, as it makes the most of the existing enclosed area, and practically completes the Harbour according to the original design. This deepening, of course renders it necessary to found the walls of the boat-basin and canal entrance at a lower level; but the Board trust that Government will approve this extra expenditure, as it would not be sound policy to construct any permanent works within the Harbour of such a nature as to prevent the eventual full utilization of the space available for shipping. The Board considers that the plan now forwarded represents the final plan for the present Harbour, and would submit that if the canal is to be connected with the Harbour, its entrance should be constructed in accordance with this final plan.

8. As the canal entrance is chiefly required in the interests of Government and of the Madras drainage schemes, and is not necessary so far as the Harbour is concerned, the Trustees are not in a position to recommend Government to sanction the cost from Harbour Funds. All that is urgently required at the present time is a boat-basin, and improved facilities for handling cargo; and though the Trustees are prepared to deepen the Harbour, at a moderate cost as provided in the estimate, they are not prepared to spend any large sum on this work until the necessity of providing additional berths is more urgent than is now the case. The deep water berth alongside the canal entrance would, no doubt, be useful for landing horses and for the landing and embarkation of troops, but in this Government is quite as much interested as the Board. It may also be useful for landing coal, but in this case other satisfactory arrangements could be made which would not involve so large an expenditure. The Board therefore trusts that Government will, as is the custom when Municipalities propose extensive improvements, be pleased to make either a liberal grant towards the total cost of the scheme, *viz.*, Rupees 20,80,651 or an annual contribution to Harbour Funds. It appears to the Board that the improvements to the Madras Harbour may be regarded as necessary in the interest of the development of the country, and of the Railways, which depend largely on Madras being made a cheap Port. Any policy which would tend to place additional burdens on shipping visiting the Port is, therefore, to be deprecated.

For the above reasons the Board trusts that Government will be pleased to make a contribution of one half of the cost of the proposed improvements, which sum may, it is suggested, be given in three equal annual instalments. The estimated cost of the present proposals does not, it should be remembered, represent the whole sum which

the Board will have to provide, as a large amount will be required to modify the existing traffic arrangements, and to generally remodel and improve the Board's property.

9. With regard to Custom House Sheds and enclosure round the boat-basin, the Board awaits the orders of Government upon para. 15 of the Committee's report, recommending that the custody of goods landed be transferred from the Customs Department to the Trust, as at Calcutta and Bombay.

It may not, perhaps, be out of place here to express my personal opinion that I see no difficulty whatever in acceding to this request of the Chamber of Commerce; for, under the orders of Government, the Collector of Sea Customs is, by reason of his office, as such, also the Chairman of the Board, and it would, therefore, appear that it should be more easy to carry such an arrangement into effect at Madras than at other Ports, where these two offices are not held by the same person.

10. The third item in the estimate is one of Rs. 54,369 for repairing the south wall of the Harbour, to prevent sand from entering the water area through the spaces between the blocks of which the wall is built. These repairs are now found to be absolutely necessary, and are due partly to faulty design and partly to defective construction, which was unavoidable, as the Superintendent of the works had practically to race the sand, which accreted almost as fast as the wall could be built, and the blocks could not, therefore, be placed in position with the precision which was afterwards possible when, the accretion of sand having been outstripped, and the surf passed, comparatively deep water was reached.

11. Should Government approve and sanction the proposals now submitted, the question of Improved Railway Communication could then be taken into consideration.

12. I also submit a plan and estimate for a proposed groyne projecting into six fathoms of water, with its centre at a distance of 1,250 feet south of the South Pier, to prevent further accretion of sand against that arm, at an estimated cost of Rs. 3,91,355; the necessity for this groyne is explained in the accompanying letter from the Board's Engineer, and its construction would be approved by the Trustees solely because it is said to be necessary on engineering grounds provided that the opinion of Government Experts coincides with the views of the Board's Engineer.

I have the honor to be,

Sir,

Your obedient servant,

H. Stevens.

Chairman,

Harbour Trust Board.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a Meeting held at the Offices of the Board on Friday, the 1st day of November 1895.

* * * * *

6. Read memorandum, dated 31st October, by the Chairman, communicating the plan for Harbour improvements discussed at the last meeting and estimates for—

		Rs.
(*a.*)	The canal section	8,69,734
(*b.*)	The boat-basin...	6,27,181
(*c.*)	Repairs to the south arm to prevent the sand entering the Harbour	52,765
(*d.*)	Deepening the Harbour to provide five additional berths	2,04,547
	Total ...	17,54,227 *
	Less anticipated recovery on sale of additional plant required...	70,000 *
	Nett Total ...	16,84,227

The Trustees discussed this plan and the estimates, the Board's Engineer being present to explain details.

Resolved—(*a.*) That the plan for the canal entrance is approved. The Board presumes that Government will pay the cost of construction.

(*b.*) The boat-basin plan and estimate is approved and sanctioned. The question of providing Custom-house sheds, enclosed yards, and warehouses will stand over until Government has passed orders upon paragraph 15 of the report of the Special Committee appointed under G. O., No. 47, Marine, dated 9th February 1895.

(*c.*) The repairs to the south wall being, as explained by the Engineer, work rendered absolutely necessary in connection with the reconstruction of the Harbour by original defective construction, the estimate is approved and will be submitted to Government.

(*d.*) The dredging necessary to deepen the Harbour towards the foreshore upon the west is sanctioned and the estimate approved.

A Trustee intimated that he considered it would have been better to postpone the Board's decision until Commander Powell, R. I. M., and Mr. Ashpitel, A. M. I. C. E., were present, but as no member supported his objection, and the feeling of the Board was that the time had arrived when a decision could be given, he acquiesced in the foregoing resolutions.

* * * * *

* Tools and plant since redistributed *vide* abstract of estimates page 8. The original estimates have been altered accordingly.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a Meeting held at the Offices of the Board on Friday, the 8th day of November 1895.

* * * *

5. The Board discussed an estimate * submitted by the Engineer for Rupees 3,96,424 for constructing, 1,250 feet south of the south arm of the Harbour, a groyne projecting into 6 fathoms of water to prevent further accretion of sand against the South Pier.

Resolved that, as the construction of this groyne has become, as explained by the Engineer, an urgent necessity owing to the rapid accretion of sand to the south of the Harbour, the estimate be submitted to Government.

(True Extracts.)

C. PINSENT,
Secretary,
Harbour Trust Board.

* Altered to Rs. 3,91,355 in redistribution of tools and plant, *vide* abstract of estimates page 8.

HARBOUR IMPROVEMENTS.

(a).—Canal Section at North-West Corner of Harbour.

400 lineal feet of Break-water with Parapet, and 5 fathoms at Low water alongside, 540 lineal feet of deep-water quayage with revetted Surf Bank, up to High-water mark. 910 lineal feet Low Level wharf from entrance to Canal, or North wharf along Canal, and 850 lineal feet of Low Level wharf, or South wharf of Canal, &c.

Quantity.	Sub-head of work.	Rate. Rs.	A.	P.	Per.	Total. Rs.	A.	P.
23,165 Tons...	Rubble in base deposited	1	8	0	Ton.	34,747	0	0
30,634 C. yds.	Concrete in Break-water and Parapet ...	11	0	0	C. yds	3,36,974	0	0
1,638 do.	Do. do. Filling	15	0	0	do.	24,570	0	0
4,879 do.	Do. do. Wharf walls	11	0	0	do.	53,867	0	0
1,332 do.	Do. do. do. do. Filling and Capping	15	0	0	do.	19,980	0	0
1,46,800 do.	Sand dredging, deposited as filling ...	0	4	0	do.	36,700	0	0
3,107 Sqrs.	Laterite Hard and new Roadway to South...	6	8	0	Square	20,196	0	0
	Establishment, Office	...	...	...	Sum.	28,000	0	0
	Do. works	...	...	...	do.	87,000	0	0
800 L. ft.	Parapet along North Pier, Surf Bank and portion of North Pier (of old Blocks, labour only)	1	8	0	L. ft.	1,200	0	0
650 do.	Connecting Canal, from Wharfage to west side of Beach Road Bridge, of P. W. Department; (D. P. W. Estimate)... ...	110	0	0	do.	71,500	0	0
	Add proportionate cost of tools and plant estimate (*f*)	...	...	...	...	37,566	0	0
	Total of Canal Section at North-West corner of Harbour, Rupees	...	...	...	...	7,52,300	0	0

HARBOUR IMPROVEMENTS—(Continued.)

(b).—Boat Basin in South-West Corner of Harbour.

400 lineal feet of Break-water and Parapet, with Low level wharf, 60 feet wide, forming East wall of Boat-Basin. 600 lineal feet of Low level wharf along present South Pier when lowered; 290 lineal feet Low Level wharf of West Bank of Basin, and 540 lineal feet of Quay 50 feet wide, providing a High Level deep-water Quay on north side, and a Low Level wharf inside Boat-Basin.

Quantity.	Sub-head of work.	Rate. Rs.	A.	P.	Per.	Total. Rs.	A.	P.
20,388 Tons.	Rubble in Base deposited	1	8	0	Ton.	30,582	0	0
30,634 C. yds.	Concrete in Break-water and Parapet ...	11	0	0	C. yds.	3,36,974	0	0
1,638 do.	Do. do do. do. Filling ..	15	0	0	do.	24,570	0	0
3,263 do.	Do. do. wharf walls	11	0	0	do.	35,893	0	0
888 do.	Do. do. do. Filling and Capping.	15	0	0	do.	13,320	0	0
	Removing top blocks from South Pier, and adding a concrete capping, to form a low level wharf				Sum.	11,600	0	0
1,46,800 C. yds.	Sand dredging, deposited as filling ...	0	4	0	C. yds.	36,700	0	0
3,468 Squares.	Laterite Hard	6	8	0	Square	22,542	0	0
	Establishment... { Office ... 28,000 / Works ... 87,000 }	...	...	...	Sum.	1,15,000	0	0
	Add proportionate cost of Tools and Plant Estimate (*f*)	...	...	...	...	36,377	0	0
	Total of Boat-Basin, Rupees ...	...	...	...	...	6,63,558	0	0

(c).—Repairs to South Pier old wall, to prevent sand washing through into the Harbour, and removal of the Sand Bank.

1,371 C. yds.	Concrete deposited below water along South Pier to make the old walls sand tight, from Boat-Basin Break-water, to steps at South Pier	15	0	0	C. yds.	20,565	0	0
420 frames.	Labour in removing sand and fixing frames..	30	0	0	frames	12,600	0	0
3,400 Tons.	Rubble backing deposited	1	8	0	Ton.	5,100	0	0
50,000 C. yds.	Sand dredging and removing Sand Bank...	0	4	0	C. yds.	12,500	0	0
	Add proportionate cost of Tools and Plant Estimate (*f*)...	...	...	...	...	3,604	0	0
	Total cost of removing Sand Bank along South Pier and making old wall sand tight	...	...	...	Rs.	54,369	0	0

HARBOUR IMPROVEMENTS—(Continued.)

(d).—Deepening Harbour to provide five additional berths in fair weather, or three additional berths at all times of the year.

Quantity.	Sub-head of work.	Rate. Rs.	A.	P.	Per.	Total. Rs.	A.	P.
8,18,186 C. yds.	Sand dredging to 5 fathoms below low water	0	4	0	C. yds.	2,04,547	0	0
	Cost of deepening Harbour after the Canal and Boat Sections, are built Rs....	...	...	...	...	2,04,547	0	0
	Add proportionate cost of Tools and Plant Estimate (*f*)...	...	...	...	...	14,522	0	0
	Total cost of deepening Harbour. Rupees...	...	...	...	...	2,19,069	0	0

ABSTRACT OF ESTIMATE.

(*a*).	Canal Section at North-West corner of Harbour	7,52,300	0	0
(*b*).	Boat-Basin at South-West corner of Harbour	6,63,558	0	0
(*c*).	Repairs to South Pier to prevent sand entering the Harbour	54,369	0	0
(*d*).	Deepening the Harbour to provide 5 additional berths	2,19,069	0	0
(*e*).	Proposed groyne south of the Harbour	3,91,355	0	0
	Total cost of Harbour Improvements including Canal Section, Boat-Basin, deepening Harbour for increased berthage, making South Pier wall sand tight, and protective groyne ... Rupees ...	20,80,651	0	0

MADRAS HARBOUR WORKS OFFICE, 30*th October* 1895.

A. LEE POGSON, M. I. C. E., *Engineer, Harbour Trust Board.*

Estimate (E) for proposed groyne projecting into 6 fathoms of water with its centre at a distance of 1,250 feet south of the South Pier, to prevent further accretion of sand against the South Pier.

Quantity.	Sub-head of work.	Rate. Rs.	A.	P.	Per.	Amount. Rs.	A.	P.
1,52,120 Ton.	Rubble tipped from wagons	1	8	0	Ton.	2,28,180	0	0
3,600 C. yds.	Concrete Blocks in capping	11	0	0	C. yd.	39,600	0	0
800 „	Do. on surface between Block ...	15	0	0	...	12,000	0	0
3,600 „	Labour and fuel in placing Blocks in position	2	0	0	...	7,200	0	0
	Establishment { Office 21,000 ... ... / Works 63,000 ... ... }	...	...	...	Sum.	84,000	0	0
	Add proportionate cost of Tools and Plant Estimate (*f*)	...	...	...	...	20,375	0	0
	Total Rupees ...	...	...	...	...	3,91,355	0	0

MADRAS HARBOUR WORKS OFFICE, 8*th November* 1895.

A. LEE POGSON, *Engineer, Harbour Trust Board.*

ESTIMATE (*f*.)

Tools and Plant.

	Rs.
Sand pump...	50,000
Repairs to machinery and new locos.	70,000
New 10 ton steam crane	20,000
New block moulds	10,000
Rails and sleepers	5,000
Iron and timber moulds for making South Pier sand tight	2,000
Mixed gauge line for groyne	12,444
Block moulds for groyne	5,000
Repairs to rolling stock	8,000
Total ...	1,82,444
Deduct recovery due to sale of tools and plant ...	70,000
Grand Total ...	1,12,444

MADRAS HARBOUR WORKS, 20*th November* 1895.

A. LEE POGSON, *Engineer, Harbour Trust Board.*

No. 643.

From

THE ENGINEER,

HARBOUR TRUST BOARD,

Madras.

To

THE CHAIRMAN,

HARBOUR TRUST BOARD,

Madras.

Madras, 20th November 1895.

SIR,

I now have the honor to forward a large scale plan showing the proposed groyne, with its centre line at a distance of 1,250 feet south of the South Pier, and projecting into 6 fathoms of water.

2. In October 1893 the sand showed signs of entering the Harbour through the South Pier, in consequence of the accretion of sand to the south of the South Pier, and I then suggested the construction of a rubble mound groyne, capped with concrete blocks to arrest the sand further south and so prevent its further banking up against the South Pier, the result of which will eventually be the shallowing of the entrance to the Harbour.

3. Unfortunately, during 1894, and until July 1895, the state of the sea has been too rough for accurate soundings to be taken outside the Harbour.

4. In August 1895 accurate soundings were obtained, which, when compared with those of 1893, show a great change in the depth of water, outside the South Pier, to have taken place in the last two years, and the depth of water at the Harbour entrance is now, temporarily or otherwise, less by two feet beyond doubt. Although, in January 1895, when preparing for setting the South Pier Caisson, no change in the depth of the entrance had taken place, as the annual accreting action had not commenced, the time has now come when I am of opinion that immediate action must be taken to arrest the sand drifting up from the south by the construction of a groyne, as shown upon the accompanying, tracing. If the accretion of sand increases each year, the groyne will have to be extended into deeper water; but, for the present, I consider a groyne running out to the 6 fathoms contour line to be sufficient.

5. When comparing the soundings along the survey line No. 10 on the plan taken in 1893 with those repeated again at the same month of the year in 1895, the following shallowing or change in depth of Roadstead is shown:—

DEPTH IN 1893.			DEPTH IN 1895.		
3′	9″	in 1893 has shallowed to High water mark in 1895.			
6′	0″	,,	6′	0″	,,
9′	0″	,,	4′	3″	,,
12′	0″	,,	6′	0″	,,
15′	0″	,,	8′	6″	,,
18′	0″	,,	12′	0″	,,
21′	0″	,,	15′	6″	,,
24′	0″	,,	16′	0″	,,
27′	0″	,,	19′	0″	,,
30′	0″	,,	21′	0″	,,
33′	3″	,,	24′	3″	,,
36′	0″	,,	28′	0″	,,
39′	0″	,,	32′	0″	,,
42′	0″	,,	39′	6″	,,
45′	0″	,,	43′	9″	,,

6. From the above, it will be seen that, beyond doubt the advance of sand from the south threatens to reduce the depth of water at the Harbour entrance, and, as the shallowing in the Roadstead extends to sea as far as the 7½ fathoms line, no groyne could reach that depth of water before the accreting action will return, or commence again next year. All therefore that can be done is to arrest the sand for the present, at a minimum depth required for the entrance, and, as soon as there is any sign of further shallowing at the end of the proposed groyne, it must be extended from time to time into deep water until no further sand passes it each year. By this means a minimum section of the groyne can be kept to, which means a saving in cost, and the Harbour entrance can be maintained at a desired depth. Otherwise, it would appear, from the latest soundings, that the entrance must continue to shallow, if the groyne is not constructed.

7. There would appear to be no other alternative but to construct the groyne to arrest the sand to the south of the Harbour, as, without the groyne, no amount of dredging in the open Roadstead would be able to cope with the large amount of sand drifting up the coast.

8. The work should be started as soon as possible, so as to be well advanced before the change of the Monsoon, when the accretion of sand will recommence. Therefore, pending the sanction of the estimate, I would ask for permission to secure the necessary sleepers and rails amounting to Rupees 9,000, to enable me to lay the lines, in anticipation of sanction.

I have the honor to be,
Sir,
Your most obedient servant,
A. LEE POGSON,
Engineer, Harbour Trust Board.

Madras Harbour Trust,

25th July 1895.

No. 133 C.

From

H. LE FANU, Esq., I. C. S.,
Chairman, Harbour Trust Board,
Madras.

To

COMMANDER W. POWELL, R. I. M.,
Presidency Port Officer,
Madras.

Sir,

I have the honor to forward herewith a copy of the proceedings of the Harbour Improvements Committee, together with the report to Government, and copy of G. O. passed thereon, No. 190, Marine, dated 1st July; and will feel obliged if you would favour the Trustees with your views upon the proposed boat-basin, inside the Harbour, as affecting the shipping. I further request that you will favour the Harbour Trust Board with your views as to what should be done. The Marine Department has not yet spoken; but it is plain that the first step, in any undertaking of the kind, is to ascertain what the requirements, present and future of your Department are. Subsequent proposals must be worked out so as to fit in with your views, as the Harbour is primarily a *Harbour*, and boat-basins &c., are secondary considerations.

I have the honor to be,
Sir,
Your obedient servant,
H. LE FANU,
Chairman,
Harbour Trust Board.

Presidency Port Office,

No. $\frac{1761}{730}$ M. Madras, *6th August 1895.*

To

THE CHAIRMAN,
Harbour Trust Board,
Madras.

Sir,

In reply to your No. 133 C, dated 25th July 1895, I have the honor to say that, as regards the proposed improvements to the Harbour, I have always been of opinion that anything that would take off or in any way interfere with the present available water space of the Harbour should be avoided.

2. To increase its berthing space, dredging should, I think, be undertaken from the $3\frac{1}{2}$ fm. line to the $2\frac{1}{2}$ line which would give berths for four more steamers, of the draught that usually come here. I believe the Board's Engineer has an objection to dredging in the Harbour; but, with all due deference to his professional knowledge, an important matter like this should not, I think, be decided by a single opinion.

3. I have always thought that two jetties, light and strong iron screw pile ones, to avoid silt, should be built in from the north arm for coal discharging &c.

4. Some time before the special Committee was appointed, Mr. Pinsent, the Board's Secretary, put before it a plan for a boat-basin, warehouses, &c., opening from the south wall. I prefer this to any of the other proposals:—When the matter was discussed, the then Chairman and members of the Board decided that nothing should be considered, in the way of improvements, until the Harbour was completed, and had stood the test of a heavy Cyclone.

6. Mr. Pinsent's plan commended itself to me, as being self-contained, and not interfering with the Harbour. Should the trade of Madras ever warrant docks being made, the key for them will be there, in the Boat Harbour of his plan.

6. If the jetties on the north arm are constructed, I believe they would well meet the present requirements. It must be remembered that Madras is not a terminal Port, the only vessels that discharge a full cargo are coal and oil ones, and they seldom if ever load here. The rest of the trade might be called dribbling.

I have the honor to be,
Sir,
Your obedient servant,
WALTER POWELL,
Commander, R. I. M.,
Presidency Port Officer.

Madras Harbour Trust.

Secretary's Office,

No. 132 C. *25th July 1895.*

From

THE SECRETARY,
Harbour Trust Board,
Madras.

To

THE DEPUTY PORT CONSERVATOR,
Madras.

Sir,

I am directed to forward, and have the honor to enclose herewith, a copy of the report of the Harbour Improvements Committee, and also of the G. O. thereon No. 190; Marine, dated 1st July, and am to request that you will favour the Chairman with your

views, and obtain those of the Commanders of vessels frequenting the Port, to enable him to place same before the Board.

I have the honor to be,
Sir,
Your obedient servant,
C. PINSENT,
Secretary,
Habour Trust Board.

Port Office,
Madras,

No. 1273. *30th July 1895.*

From

THE DEPUTY CONSERVATOR OF THE PORT
of Madras.

To

THE CHAIRMAN,
Harbour Trust Board,
Madras.

Sir,

In reply to your No. 132 C, dated 25th instant, forwarding plans and report of the Harbour Improvements Committee, I have the honor to remark as follows:—

1. The Committee have apparently unanimously approved of Mr. Pogson's A 1 scheme, which provides:—

(*a*) for a canal entrance with covered arm, at the North-West side of the Harbour.

(*b*) for a boat-basin, in the South-West corner of the Harbour.

The latter of these two proposals seriously affects the question of the safety, and convenient berthing of ships, in the future.

The present system is to try and give ships an all round clear swinging space in case of stern fasts carrying away, but this is only possible at moorings Nos. 2, 3 and 4, owing to the increased length of vessels now visiting the Port. A further increase in length of vessels in the near future is evident, judging by the launches now taking place at home, and by the speech of Sir T. Sutherland, at the last general meeting of the P. and O. Co.

2. One of the advantages claimed by Mr. Pogson is, that *more* vessels could be berthed. This, I think, is doubtful, as we require bow as well as stern moorings laid down, and each mooring should be, as in Colombo, 600 feet apart, to allow space for the largest ships with a margin for working. The boat-basin wall which will run from the south arm to overlay the Pier, would, in my opinion, create a very nasty backwash, when any swell is running into the Harbour, and I have grave doubts as to whether we could get stern fasts to hold, under these circumstances: the plan

also shews the stern fasts to the wall, this is objectionable, as in a seaway something would go either the bollards of ships or ropes.

3. My own ideas about improvements in the Madras Harbour are, that taking into consideration the enormous cost of enclosing the present water area, and the uncertainty of what would happen in a severe Cyclone, the following improvements are all that the present trade of the Port requires.

(*a.*) The Harbour dredged back to give a depth of 22 feet L. W. T. on the present 2 fms. line, to enable us to berth 4 more light draft vessels, two on each side of the Pier, inside the present moorings.

(*b.*) Two light iron jetties, one on the north arm and one on the south, to land coal, troops, horses, native passengers, &c.

(*c.*) A boat-basin in the north-west corner, in connection with the canal, the construction of which, I understand, has been approved of by Government.

4. I believe the Engineer states it is impossible to dredge back without a wall across the Harbour; but this could be referred to a Committee of Engineers, who would, I have no doubt, overcome the difficulty. To the lay mind it seems unnecessary, having once secured your Harbour, to fill it in again by way of improvements.

5. I have asked the Harbour Masters for their opinions, and they agree with me. It is difficult to get an opinion from Masters of vessels frequenting the Port, as the question does not concern them personally; but I have asked Mr. Baddeley who will be acting for me while on privilege leave to obtain their views if possible.

I have the honor to be,
Sir,
Your most obedient servant,
CHARLES HEWETT,
Commander, R. I. M.,
Deputy Conservator of the Port.

Madras Harbour Trust,
Secretary's Office,

No. 139 C. *5th August 1895.*

From

THE SECRETARY,
Harbour Trust Board,
Madras.

To

THE DEPUTY PORT CONSERVATOR,
Madras.

Sir,

I have the honor to acknowledge the receipt of your letter, dated 30th July, No. 1273; and am directed to request that you will obtain, for the information of the

Board, from each of the Harbour Masters, in writing, their opinions regarding proposed Harbour Improvements, as affecting ships, under their charge, entering and leaving the Harbour.

I have the honor to be,
Sir,
Your obedient Servant,
C. PINSENT,
Secretary,
Harbour Trust Board.

HARBOUR MASTER'S OFFICE,
8th August 1895.

To
THE DEPUTY CONSERVATOR OF THE PORT,
Madras.

SIR,

With reference to the Secretary's letter No. 139 C, dated 5—8—95 asking for my opinion, of the effect the proposed Harbour Improvements would have on steamers entering and leaving the Harbour :—

I have the honor to report that I have perused the minutes of the Committee meeting, and examined the Litho-Plans as approved.

And I am of the opinion that our present small area of smooth water, within the Harbour Groynes, has been obtained by great expense and labour, and any enclosed boat-basin, or obstructive wall, built to the east of our present High water mark, would be suicidal policy.

And if any wall built has a sloping base, of rubble to the east, and a steamer in moving tail on to it, by dragging her anchor, or from any other cause, the effect would be disastrous, and much more damage done than under present conditions.

The steamers visiting this Port, are every month increasing in length and size, and even now, we require the Harbour to be dredged, and buoys Nos. 1, 2, 3, 4 and 5 placed further west to safely berth nine steamers.

There is at present no spare space, and, in my opinion, the berths are far too small for the larger class of steamers.

The Engineer states there will be room for eleven steamers in the reduced space ; I beg to differ from him, if he means eleven of the larger class, as their rudders and propellors would be in dangerous proximity to the walls all round, and it is quite impossible to get in eleven large ones at one time.

We might be able to berth eleven steamers, but they, to lie safe, must be moored by their chain cables, both head and stern, and I question if the Commanders would permit that, in the present untried state of the Harbour.

With such a lot of spare ground, all round the Harbour, I fail to see why the enclosed water space should be encroached upon, to build sheds and boat-basins.

I have the honor to be,
Sir,
Your most obedient servant,
H. C. TAYLOR,
Harbour Master.

HARBOUR MASTER'S OFFICE
MADRAS,
10th August 1895.

To
THE DEPUTY CONSERVATOR OF THE PORT.

SIR,

In reply to the Secretary, Harbour Trust Board, Letter No. 139 C, dated 5th August 1895, I beg to offer my opinion respecting the berthing of steamers, after the proposed scheme of constructing a wall across the enclosed water area, as per plan A 1 by Mr. Pogson is completed.

To dredge to a minimum depth of 30 feet close to the wall, will give more water area, and enable nine steamers to be berthed with safety, as the stern moorings of No. 1 to 5 can be placed further to the west, making swinging room for steamers berthed in No. 6 and 9 berths, as steamers are of such a length that, at present, should the stern fast part, they cannot possibly swing clear of one another.

I consider that to build any kind of wall, or obstruction, within the enclosed Harbour, would be a serious mistake; and would prevent further development in the future. As to water area : we are aware ships are increasing in length, many being 450 feet so that in the near future the present Harbour will be too small, unless dredged towards the Beach, and removing the T end of Pier, thus making room for another tier of five steamers.

If it is simply required for the accommodation of boats, and to facilitate the landing of cargo from boats, any of the plans might be adopted, either to the north in connection with the proposed canal, or within the accumulation of sandy fore-shore to the south of the Harbour.

I have the honor to be,
Sir,
Your obedient servant,
NORMAN CORFIELD,
Senior Harbour Master.

HARBOUR MASTER'S OFFICE,
MADRAS,
24th September 1895.

To

THE DEPUTY CONSERVATOR OF THE PORT,
Madras.

SIR,

I have the honor to acknowledge the receipt of the Secretary's letter No. 194 (C), dated 23rd September 1895, requesting a report from me on the proposed improvements of the Madras Harbour, Plan No. AI.

I am of opinion that it would be a mistake to curtail the water area available for ships as shown in the plan.

It would be impossible to place eleven large steamers as noted. Moreover, ships could not be moored to any rigid object, owing to the heavy swell.

The north and south boat-basin wall would, I fear, cause a very nasty backwash, which would considerably inconvenience boats lying alongside the inner tier of ships, and make the discharging of cargo into these boats dangerous and slow.

There would, I consider, be much risk in bringing large vessels so close to a Groyne when a heavy swell is running into the Harbour; and this danger would be increased by strong easterly winds. It is not necessary to remind you that our first study must be the vessels' safety.

We have to remember that ships are yearly increasing in length, and we have only a limited space to cope with that increase, one-third of which this plan takes from us. I am therefore adverse to this obstruction to future development of the Harbour. We cannot proceed further north, south or east; our only hope therefore is to dredge out to the westward, in order to cope with the future possible advancement of the shipping trade to this Port.

If it is necessary to have a boat-basin Group 1 or 3 appear to me to be the most practical for all concerned.

I have honor to be,
Sir,
Your most obedient servant,

G. A. EVANS,
Harbour Master.

Marine Current No: 927.

wrgd

PUBLIC WORKS DEPARTMENT.
(MARINE).

FROM

THE CHAIRMAN,
HARBOUR TRUST BOARD,
MADRAS.

TO

THE SECRETARY TO GOVERNMENT,
Public Works Department,
(*Marine.*)

DATED 20th November 1895.

DESPATCHED 22nd „

RECEIVED 23rd „

ENCLOSURES ~~PLAN AND~~ one TRACING.

No. 3258.

119-20 M-

SUBJECT.

MADRAS HARBOUR.

Submitting for favour of orders, plans and estimates for canal entrance, boat basin, dredging, and repairs to south wall, and for a protective groyne.

No. 47 d/9-2-95 marine ✓
- 190 - 1-7-95 ✓
- 239 - 7.8.95 ✓
" 529 D d/24.8.95 ✓
" 297 d/8.10.95 Marine

—

- 1305 W d/8.6.95. ✓
- 3417 C d/12.11.95. ✓
- 3798 C d/3.12.95. ✓
" 1084 J/A d/14.12.95 ✓

2/529 W d/11-2-96
529-30 W d/11-2-96.

43

P. W. Dept

No 8

Note by the Chief Engr
Mad

The proposals now submitted by the Harbour Trust Board are in effect identical with those proposed by the Committee appointed at the beginning of last year, except that they provide for a boat basin of a rather smaller size than that proposed by the Committee, and for increasing the available area of the Harbour by dredging.

2. As regards the former alteration. I can see no objection whatever to the adoption of the Board's proposals; the latter are in a better position to judge regarding details of this nature than the Committee could be, and if they are satisfied that the dimensions suggested are sufficient there seems no reason why their view

should

should not be accepted.

3. The proposal to dredge the western portion of the Harbour is one to which no possible exception can be taken from an engineering point of view; the question is purely a financial one, as to whether the additional accommodation to be obtained is worth the Rs 2,19,000 to be expended in obtaining it, and of this the Trustees are the best judges.

4. I am however not at all satisfied as to the necessity for so large an expenditure as Rs 7,52,300 for the protection of the Canal entrance.

5. It is obviously absurd that the cost of this work should be actually more than the whole cost of the Inner basin, and it will be noted that the estimate for the Cost of

21P

45

report, which estimate like the present one was prepared by the Board's Engineer, amounted to only Rs 3,62,379, or less than half the present estimate.

6. I am bound to say that I am not at present satisfied of the necessity for any such expensive works as are provided in even the smaller of these estimates, merely for the purpose of keeping the Canal entrance open.

7. It seems to be assumed that this entrance will silt up if not covered in the manner proposed; I am not at all satisfied that this will be the case, and believe that even with the harbour in its present condition, a very small amount of dredging, if any, will be required to keep the Canal mouth sufficiently deep for the traffic which will have to pass through it, and the risk of silting will be still smaller if the western portion of the harbour

21

this portion of the work, attached to the Committee's report

harbour is dredged as now proposed.

8. So far as the Canal entrance is concerned, I do not believe that any thing more is necessary than a short length of wall running out from the shore, parallel with the northern arm of the harbour, into about three fathoms of water; this certainly should not cost more than one lakh, and this sum, together with the Rs 71,500 for the connecting Canal, and a proportionate charge for establishment, or say Rs 2,00,000 in all is the most that is properly debitable to the Canal.

9. The additional wharfage accommodation provided by the arrangements shown on the plan will be of great value and may very well be worth the additional expenditure which it will involve, but the benefit will be entirely to the Harbour

220 47

Harbour, and there seems no reason why Government should be asked to pay for it.

10. This is entirely independent of the question raised in the latter part of para 8 of the Chairman's letter, whether Govt. should give a substantial Contribution towards the Cost of the general improvements; personally I am of opinion that money could not be better spent, and entirely concur in the view that the "improvements "to the Madras Harbour may "be regarded as necessary "in the interest of the "development of the country "and of the Railways, which "depend largely on Madras "being made a cheap port. "any policy which would "tend to place additional "burdens on shipping "visiting the Port is therefore "to be deprecated," but the question is not an engineering one. So far as the connection with the Canal is

is concerned, a grant of Rs 200,000, is the most that can be demanded.

11. The provision for improving the Southern arm so as to prevent sand from entering is in my opinion eminently necessary; it is only of late that I have become aware of the condition of this arm, and can only say that the sooner it is corrected the better.

2. I must confess that I am not satisfied of the necessity, or indeed of the desirability of the proposed groyne to the south of the harbour; the matter was mentioned to me verbally some time ago, and I said then that it seemed desirable if there were no other means of preventing the entry of sand through the present south arm, this entry being so serious an evil that it should be stopped at any cost. If however this entry can be ~~If~~ stopped by the

measures

u?

measures now proposed, which I see no reason to doubt, the groyne is not necessary for this purpose, and I have grave doubts as to whether it is required for stopping the accretion of sand along the south arm; this latter is not in itself so serious an evil as to justify any expensive measures for its prevention, and the prospect of any obstruction to the entrance of the harbour (a very different matter) seems to be very remote.

13. I must confess that I look with extreme distrust upon the construction of groynes upon a coast like that of Madras, and with the effect of the harbour (which as a whole is nothing but a big groyne) upon the coast to the north before our eyes, I should hesitate to advocate the construction of another groyne to the south of the harbour.

14. If the proposed

Groyne

groyne were connected at its eastern end with the south wall of the harbour, so as to completely enclose the space between it and the latter; it would form an excellent dock or inner harbour, to be entered by an opening in the present south wall, and probably no better mode of forming docks could be adopted, but this is a different matter from the open groyne, the construction of which I cannot at present recommend.

S E.W.
4.1

CEMPS
6/96

51

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

240

READ the following

Letter from the Chairman H.T. Board (H.E. No. 3258 d/20 Nov. 1895)
Note by the Chief Engineer P.W.D. (d/4 Jany 96)

With the letter recorded above the Chairman of the Harbour Trust Board forwards an extract of Proceedings of the Trustees of the harbour dealing with the proposals of the Committee appointed by Government to consider the question of improvements to the Madras harbour. The following estimates are submitted for the approval of Govt:—

W
24/Jan

A. Canal entrance and connection at N.W. corner of harbour with d. works . . . Rs. 7,52,300
B. Boat basin & S.W. corner of harbour . . . . . " 6,63,558
C. Repairs to South Pier to prevent ingress of sand . 57,360
D. Deepening the harbour

(40—1,000—21-4-94.)

to provide additional
berths for ships ..... Rs 2,19,069
E. Groyne south of the
harbour ..... " 3,91,355
Total Rs 20,80,651

2. His Excellency the Governor in Council agrees with the Chief Engineer in his objections to the proposed south groyne, and must therefore withhold his assent to this work. He is also disposed to agree in the opinion that so far as the protection to the Canal entrance is concerned a sum of Rs 2 lakhs will cover the cost of such works as are necessary on this account. The question of providing this amount from Provincial funds will be considered in the Financial Dept. The other works brought forward are approved, subject to the Board being able to raise the necessary funds,

3. The Board has submitted separate proposals for raising a loan by means of debentures, and this question is now under consideration in the Financial Department. On orders being passed on these proposals the financial position will be more clearly understood. Meanwhile, the work of repairing the south wall so as to prevent the ingress of sand should be taken up at once, as it is most important that further deposits of sand inside the harbour should be stopped as soon as possible.

4. The question of the transfer of the custody of goods landed from the Customs Department to the Harbour Trust, alluded to in para 9 of the Chairman's letter, will be referred to the Revenue Dept. for consideration. The matter is brought forward in para 15 of the Committee's report recorded with G.O. No 190 Marine, dated 1st July 1895.

5. The Harbour Works Engineer will be requested to submit a drawing showing the

pending the reference which has been made further by the Secretary of State on the subject.

The papers have been sent back from Marine Dept
C.B.
14/1/95

Omit [ ]
N

gradual accretion of sand to the south of the Harbour at a fixed time of each year. It is believed that such a drawing would show that the rate at which the sand accretion is forming alongside the Southern groyne is decreasing. But however slowly the accretion may extend, it must in course of time reach the point at which the south ~~groyne~~ takes a decided bend to the northward. When this is reached the sand will be swept past the curve and deposited in the mouth of the harbour, and some remedial measures will have to be taken, either by shifting the entrance to the N.E., or otherwise. The suggestion of a groyne on the position shown in the accompanying sketch will be remitted to the Harbour Works Engineer for his remarks. A groyne in this position would perhaps better stop the drift of sand than one running parallel to the Harbour wall. It would probably have the effect of diverting the deposit to the southwards altogether away from the harbour mouth.

Improvements to the Madras Harbour

arm
arm

probably will be
WS

Chairman Harbour Trust Board, with sketch
Financial Dept. with copy of letter by the Hon'ble Mr. Bliss
Revenue Dept.
Examiner P.W. Accts

The Hon'ble Chief Secretary
Financial Dept for favour of
Counter initials.

15/1/96

P.W. Department.

To

The Right Honorable-
The Secretary of State
for India.

My Lord,

In continuation of our Despatch No. dated forwarding the progress report on the Madras Harbour Works fot the quarter ending 30th September 1895 we have the honor to transmit the accompanying copy of our Proceedings No. dated according conditional approval to certain works recommended by the Committee specially appointed to consider the improvements requisite tp complete the harbour. It will be observed that it is also proposed to construct a canal connecting the harbour with the Buckingham Canal with the primary object of increasing the circulation of water in the latter. The works requisite to effect an entrance to the harbour are to be carried out simultaneously with the harbour improvements and under the supervision of the Harbour Works Staff. Provincial funds contributing a sum of which is now estimated at 2 lakhs of Rupees as the share chargeable to the canal estimate. Your

Lordship

In the Press

28 Jan

29/1/96

29/1/96

Comments/reports to accompany

not the object more " of providing
the circulation of water into the Cooum
or cleansing this river, while at the
same time a direct connection will be obtained
for vessels navigating the Buckingham Canal
with the harbour".

WS

"of 2 lakhs of rupees" for "which
estimated at 2 lakhs of rupees"
maybe able to get off more lightly
WS

Lordship will observe that the whole scheme has been approved by us subject to the Harbour Trust Board being able to raise the necessary funds which they purpose doing by means of debentures. Meanwhile, the construction of the canal, outside harbour limits, will be actively prosecuted should no immediate objection be raised on engineering groundsby the Consulting Engineer in Englandto the canal entrance within harbour limits.

27/6/96

CHSB 27/6

Madras Harbour Improvements - Despatch to the Secretary of State regarding—

Emergent

C.S. Vide 27/1.R29/1.

51

P. W. Dept

Read

Letter from the Chairman, Harbour Trust Board. W 3258 J/ 20.11.95

note by the Chief Engr P. W. Dept. J

For Orders.

The Harbour Trust Board now send us their proposals as to what they would wish to see done in order to complete the Madras Harbour - and how what Col. Pennycuick says - I think we may approve of them from a purely engineering point of view - with the exception of the southern groyne - the necessity for which is not only disputed challenged by Col. P - but he goes further - and maintains that its construction is decidedly dangerous. Tho' only a layman I was myself much puzzled by the proposal to construct this groyne; in order to prevent any further accumulation of sand through the southern arm - as full provision is made for this particular work in addition, viz: 52,765 Rs. This work is most emergent - and I think should be sanctioned at once. The provision of funds for the other works is however a matter of considerable moment. It will be observed that the H. F. B. boldly ask us for 10 Lakhs right off. The C. E. points out that Govt. cannot well be expected to find the large amount now put down for the works proposed in order to connect the canal for the harbour. He says that 2 lakhs will amply cover this - and this point requires therefore the immediate attention of the Financial Dept.

How much further the Financial Dept. can assist the H. F. B. to carry out their scheme I do not know - but I suppose no one can dispute the broad statement that the Madras Presidency will be much benefited by having a really good and cheap harbour at Madras - and I am at present at a loss to know how the H. F. B. can find the money

CHSB 6/96

W 4.1

MM 25

for the works which we can approve. These would be:-

1. The boat basin	627181	
2 Repairs to South arm	52,765	
3. Deepening the harbour	204547	
	884493	(we finding the other 2 lakhs)
4. Wharfs on canal section	669734	1534227 *
Less recovery on plant sold	Grand Total	70000
Say	~~341193~~	1464227

~~800000~~

15
or some ~~16~~ lakhs. as their original proposal involves an outlay of some 10 lakhs on their part, presumably they will have some difficulty in raising this amount. But if GOI provides only a base entrance from the harbour and nothing for the wharfs etc. shown on the plan, this part of the scheme would leave a good deal still to be done, to make a good job. I would however in the first instance tell the A.S.D. that we are advised that the groyne should not be constructed, and that he cannot sanction it; and that as we are satisfied that the canal can be constructed to connect with the harbour at an outlay of 2 lakhs - as proposed by the C.E. we are not prepared to provide more than that amount - but that in other respects we approve their proposals, subject to their being able to raise the necessary funds. What about the custom house sheds etc. referred to in para 9. of the Chairman's letter of Nov. 20. 1895 and in sec 16) of the Standing Proceedings Nov. 1. 1895?

6

HG

HW

* These figures do not include the protection groyne shown on the plan & the 18 inch cast iron pipe line. Plant sold on this account to be credited for the reserve of 70000 is taken in Col

Madras Harbour improvements

The fact, in my opinion, is that the design of a boat basin in the S.W. corner of the harbour is all wrong. What is really wanted is a boat basin in the N.W. corner of the harbour where it would cover the canal entrance. This was my original idea & the more I think of it the more I think it the best

WS

JG 12/1/96

Port will have to build them - but they will not cost very much - only sheds &c as new ships will not be required, not a new Custom House

WS

See also separate sheet WS

See below WS

JG

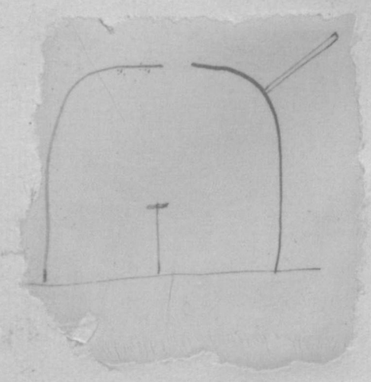
59

this a pity that these papers have been circulated separately from the file dealing with the H.T.B.'s proposal & since a large loan & pay off its debt & the S. of S. & to provide funds for the works required for the completion of the harbour by the provision of boat basins &c. I enquired on that file, & I was (at least to my own satisfaction) that the H.T.B. could safely raise a loan of 70 lakhs — By "safely" I mean with a practical assurance of being able to pay interest on the loan during its currency & finally to pay off the capital amt. until I see what views is taken of this proposal by my hon: colleagues, it is unnecessary & would further the financial aspect of the question now before us, except to say that I see no prospect whatever of Govt being able to give the H.T.B. any assistance whatever beyond the provision of the 2 lakhs which, it is now calculated, will be the cost of completing the proposed canal & of providing it with the harbour and of providing it with a suitable entrance

On this point I may say that I am very glad to see that Col: Pennycuick has adopted my views —

As regards the new groyne now proposed to the S. of the harbour, I entirely agree with Col: P. — If it was proposed to construct this work as part of a floating dock scheme, as part of a floating dock scheme, it would be a different matter — A floating dock scheme will cost

doubt be some day taken up. But we need not consider it at present. In the meantime, what I should like to see would be ~~a plan~~ a drawing showing the gradual increase of the sand accretion to the S. of the harbour at a fixed time of year. I don't much believe in drawings comparing the position in March of one year with that in July of another year. I believe if such a drawing as I say were prepared it would show that the rate at which the sand accretion is forming alongside the S. groin is a decreasing rate - nevertheless, however slowly the accretion may increase, and although it increases at a decreased rate, in time, of course, it must reach the end of the South groin - or, rather, the point at which the South groin takes a decided bend to the North ward - When this is reached, there will, I can easily understand, be a question of the sand which is swept past the corner of the S. groin being deposited in the mouth of the harbour; but what I should like to know is whether, when that point is reached, the most potent protection to the mouth of the harbour against the deposit of sand would not be a groin run out to the S.E. from the head of the S. groin; as shown by the double line in the sketch in the margin. Imagine that it could be demonstrated that a port of a groin in that position would do better stop the drift of sand than three feet of Mr. Pogson's proposed groin; and that it would have the further effect of giving a twist to the current which would have the effect of diverting the deposit of sand



to the southwards, altogether away from the Harbour mouth.

Another argument against Mr. Pogson's proposed ~~groin~~, or indeed any new groin is that it is quite possible that the experience of the next few years may lead to the closing of the existing harbour mouth & the opening of the N.E. mouth of the harbour, which has been so much discussed & so often recommended, in which case no new groin will be needed.

As to the question of funds — I think when I calculated that the H.T.B. could afford to raise 70 lakhs, I overlooked the fact that they have about 10 lakhs in hand in Sept. last year.

WB
10/1/96

[C. 25]
300—5-10-95

Financial Department.

C No.

FOR ORDERS.

Print out of the question to give another annna to this canal work in the budget of 96-97. If so the purposes on, savings become available, and if by that time the sanction of the S. of S. has been rec'd to the proposed works within the harbour, we will do what we can to make a grant to the H. T. B. But nothing more can be provided in the budget.

I should like a clear statement from the P.W.D. as to whether it is proposed to begin the Canal work before the S. of S. sanctions the proposed entrance into the harbour — I have been given to understand that the rules are positive that no such works are to be put in hand without such sanction — we should be in a pretty position if we spent a lot of money on the canal & others were forbidden to open it into the harbour. I printed

The accompanying file, which has just come to Financial for counter. initials (for the first time) is submitted to the Hon'ble Member with reference to para 2 of the draft order in the Marine Dept, where Fuil. is asked to consider the question of providing a sum of two lakhs as a grant to the H. T. Board in connection with the Canal into the Harbour. The budget has been made up and though it may be possible to make a grant from general savings in 1896-7, it is impossible to find the required amount now or to make provision for it in the Budget unless the grants under other heads are reduced. The papers are subd. to Hon. in the

stage as his decision on the point may affect the budget.

C.S. 16.1.95

Please see the telephone message to & from P. W.D. It is impossible to alter things now. All that can be done is to try and find savings during the year but it is not likely that there would amount to a couple of lakhs.

H
16/1/96

Grant of 2 lakhs for Harbour Canal

FOR ORDERS.

H. E. THE GOVERNOR.
THE HON'BLE MR. H. W. BLISS, C.I.E.
THE HON'BLE MR. J. GROSE.

Returned to the Marine Department. The undersigned counter-initials subject to the remarks of the Hon'ble Mr. Bliss C. I. E. Please return this note with the copy of the order to Financial

Fredrick Rice
Chief Secretary

C.S.
17.1.95

this and the other draft but have not rec'd. a reply.

The draft-order in Marine Board's recently being in hyperisme. It is same extent based on minute of 15/1/96 with which H.E. may not agree.

H
17/1/96.

P. W. Dept.

Proceedings, Revenue Dept., Mis/R No. 145 d/15 Jany. 1896.

Note for the Honorable Mr. Bliss C.I.E.

The legal position is clear, of course. But I had an idea that the S. of S. had laid down some rule on the subject of new works in the harbour but cannot trace that, in his position of finding the funds, he might have some say with effect, even if not legally — apparently I was wrong- I am glad of it

H
21/1/96

With reference to the Honorable Member's note attached to C No. 459 — attention is invited to Section 25 of the Harbour Trust Act and Schedule A mentioned therein, from which it will be observed that the property in the Harbour, and appurtenances thereto, is vested by law in the Harbour Trust Board. The Consulting Engineer in England has thus no legal power of interference, though, as adviser to the Secretary of State, he may raise

The Hon'ble Mr Bliss C.I.E.

Works on the Madras Harbour

objections on engineering grounds, if any such exist. There is no reason, however, to suppose that any objection on these grounds will be put forward.

2. A copy of the order on the Board's proposals for Harbour improvements is being forwarded to the Secretary of State for information. and the advice of the Chief Consulting Engineer is being asked on the question of the proposed groyne to the south of the Harbour designed to arrest the drifting of sand. None of the other works seem to present any grave engineering difficulties.

18/1/96

W

K.S. Hon. 18/1 R 22/1.

Note to accompany draft order on the Madras Harbour Improvements Scheme.

With reference to the remarks of the Honorable Mr Bliss, written in the Financial Department, in connection with this draft order, it is submitted that it has already, in a separate note, been pointed out to the Honorable Member that under the Harbour Trust Act the Harbour, and all the property attached thereto, is vested in the Board, but that, of course, the Secretary of State has the power of refusing sanction to any work connected with the Harbour

I have already explained, with ref^ce to this separate note, that I was under the impression that the S. of S. had ordered that no work in the Harbour was to be carried out in the harbour without his sanction. It appears that this is not the case, so no more need be said

JP 22/1/96

W

24 Jan

which he may object to. It is, therefore, quite within his power to veto the construction of the Canal entrance, but there is nothing appeared to shew that there is any likelihood of his doing so, nor has such a contingency ever been contemplated. The Honorable Member now raises the question, and seems to think that sanction of the Secretary of State must be obtained previous to the work being undertaken.

The estimate for the canal has already been sanctioned in G.O. No. 1084 A dated 14 Dec 1895, and a grant of 6 lakhs has been provided for the work in 1896-97. The

Canal will, of course be quite useless, unless the entrance to the Harbour is also made. If, therefore, the Government consider that the prior sanction of the Secretary of State to the Harbour Improvements Scheme is essential, the order sanctioning the Canal must at once be held in abeyance, and the whole scheme for the purification of the Town be postponed.

L C
21/11/96

W

C 1858
2/1 96

R S

(2) His Excellency the Governor
(1) The Hon'ble Mr. Bliss C. I. E.
(3) The Hon'ble Mr. Grose C. I. E.

The Harbour Canal
Entrance, and other improvements

71

No. , MARINE, FEBRUARY 1896.

GOVERNMENT OF MADRAS.

MARINE DEPARTMENT.

Read again G.O. N° 190, Marine dated 1st July 1895 passing orders on the Report of the Committee appointed to consider the question of Improvements to the Madras Harbour.

READ also the following papers :—

From H. LE FANU, Esq., I.C.S., Chairman, Harbour Trust Board, Madras, to the Secretary to Government, Public Works Department (Marine), dated Madras, 20th November 1895, No. 3258.

Referring to the report of the Committee appointed under G.O., No. 47, Marine, dated 9th February 1895, to consider the whole question of improving the means which the Madras Harbour provides for working the trade of the port, I have the honour to submit, for the information and for favour of the orders of Government, an extract of the proceedings of the Trustees of the Harbour at a meeting held on Friday, the 1st instant, together with the plan and estimates referred to.

2. It is unnecessary for me to refer in detail to the various plans and suggestions which have been considered by the trustees, and I need only observe that nautical objections were raised to Scheme "A. 1" which the Committee had no opportunity of considering.

3. To meet these objections, the plan herewith submitted was prepared, and has been approved by the Board as carrying out, in principle, the recommendations of the Committee, while at the same time obviating the nautical objections to a boat-basin extending across the harbour on its western side in shallow water.

4. I submit herewith printed copies of the letters from the Presidency Port Officer, the Deputy Conservator, and the three Harbour Masters, which detail these objections; and they may be summed up as a unanimous protest from the officers responsible for the berthing and the safety of the ships in the harbour against any curtailment of the enclosed water area.

5. It has been found by the Board to be practically impossible to avoid some encroachment upon the harbour, in giving effect to the recommendations of the Committee, with which, in principle, the trustees agree; and it will be observed that the plan now submitted differs only in detail. The entrance to the canal remains as approved by the Committee and the boat-basin is also provided, but upon a smaller scale.

6. The reason for reducing the size of the boat-basin is that, on careful consideration of the actual requirements of the trade of the port, the trustees have decided that one of the area now shown will be sufficient. The Committee could not, of course, go into details, and the trustees, in doing so, have considered it expedient to reduce the area, because the smaller basin now recommended will be sufficient for all requirements for a long time to come.

7. In deference to the unanimous wish for deeper water inside the harbour, not only of all nautical officers connected with it, but of many experienced commanders of steamers constantly visiting the port, provision has been made for dredging at a cost of Rs. 2,19,069. This deepening of the harbour will permit of three additional berths being laid down within the present area, besides a deep water berth

alongside the canal entrance and the boat-basin, and will give the trustees ample time for considering the necessity for any extension in the form of expensive docks in the future. The proposal commends itself to the trustees, as it makes the most of the existing enclosed area, and practically completes the harbour according to the original design. This deepening, of course renders it necessary to found the walls of the boat basin and canal entrance at a lower level; but the Board trust that Government will approve this extra expenditure, as it would not be sound policy to construct any permanent works within the harbour of such a nature as to prevent the eventual full utilization of the space available for shipping. The Board considers that the plan now forwarded represents the final plan for the present harbour, and would submit that if the canal is to be connected with the harbour, its entrance should be constructed in accordance with this final plan.

8. As the canal entrance is chiefly required in the interests of Government and of the Madras drainage schemes, and is not necessary so far as the harbour is concerned, the trustees are not in a position to recommend Government to sanction the cost from Harbour funds. All that is urgently required at the present time is a boat-basin, and improved facilities for handling cargo; and though the trustees are prepared to deepen the harbour, at a moderate cost as provided in the estimate, they are not prepared to spend any large sum on this work until the necessity of providing additional berths is more urgent than is now the case. The deep water berth alongside the canal entrance would, no doubt, be useful for landing horses and for the landing and embarkation of troops, but in this Government is quite as much interested as the Board. It may also be useful for landing coal, but in this case other satisfactory arrangements could be made which would not involve so large an expenditure. The Board therefore trusts that Government will, as is the custom when municipalities propose extensive improvements, be pleased to make either a liberal grant towards the total cost of the scheme, viz., Rs. 20,80,651 or an annual contribution to Harbour funds. It appears to the Board that the improvements to the Madras Harbour may be regarded as necessary in the interest of the development of the country, and of the railways, which depend largely on Madras being made a cheap port. Any policy which would tend to place additional burdens on shipping visiting the port is, therefore, to be deprecated.

For the above reasons the Board trusts that Government will be pleased to make a contribution of one-half of the cost of the proposed improvements, which sum may, it is suggested, be given in three equal annual instalments. The estimated cost of the present proposals does not, it should be remembered, represent the whole sum which the Board will have to provide, as a large amount will be required to modify the existing traffic arrangements, and to generally remodel and improve the Board's property.

9. With regard to Custom House sheds and enclosure round the boat-basin, the Board awaits the orders of Government upon paragraph 15 of the Committee's report, recommending that the custody of goods landed be transferred from the Customs Department to the Trust, as at Calcutta and Bombay.

It may not, perhaps, be out of place here to express my personal opinion that I see no difficulty whatever in acceding to this request of the Chamber of Commerce; for, under the orders of Government, the Collector of Sea Customs is, by reason of his office, as such, also the Chairman of the Board, and it would, therefore, appear that it should be more easy to carry such an arrangement into effect at Madras than at other ports, where these two offices are not held by the same person.

10. The third item in the estimate is one of Rs. 54,369 for repairing the south wall of the harbour, to prevent sand from entering the water area through the spaces between the blocks of which the wall is built. These repairs are now found to be absolutely necessary, and are due partly to faulty design and partly to defective construction, which was unavoidable, as the Superintendent of the Works had practically to race the sand, which accreted almost as fast as the wall could be built, and the blocks could not, therefore, be placed in position with the precision which was afterwards possible when, the accretion of sand having been outstripped, and the surf passed, comparatively deep water was reached.

11. Should Government approve and sanction the proposals now submitted, the question of improved railway communication could then be taken into consideration.

12. I also submit a plan and estimate for a proposed groyne projecting into six fathoms of water, with its centre at a distance of 1,250 feet south of the south pier, to prevent further accretion of sand against that arm, at an estimated cost of Rs. 3,91,355; the necessity for this groyne is explained in the accompanying letter from the Board's Engineer, and its construction would be approved by the trustees solely because it is said to be necessary on engineering grounds provided that the opinion of Government Experts coincides with the views of the Board's Engineer.

Enclosures.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the Offices of the Board on Friday, the 1st day of November 1895.

* * * * *

6. Read memorandum, dated 31st October, by the Chairman, communicating the plan for harbour improvements discussed at the last meeting and estimates for—

	Rs.
(*a*) The canal section	8,69,734
(*b*) The boat-basin	6,27,181
(*c*) Repairs to the south arm to prevent the sand entering the harbour	52,765
(*d*) Deepening the harbour to provide five additional berths ...	2,04,547
Total ...	*17,54,227
Less anticipated recovery on sale of additional plant required ...	*70,000
Net Total ...	16,84,227

The trustees discussed this plan and the estimates, the Board's Engineer being present to explain details.

Resolved—(*a*) That the plan for the canal entrance is approved. The Board presumes that Government will pay the cost of construction.

(*b*) The boat-basin plan and estimate is approved and sanctioned. The question of providing Custom-house sheds, enclosed yards, and warehouses will stand over until Government has passed orders upon paragraph 15 of the report of the Special Committee appointed under G.O., No. 47, Marine, dated 9th February 1895.

(*c*) The repairs to the south wall being, as explained by the Engineer, work rendered absolutely necessary in connection with the reconstruction of the harbour by original defective construction, the estimate is approved and will be submitted to Government.

(*d*) The dredging necessary to deepen the harbour towards the foreshore upon the west is sanctioned and the estimate approved.

A trustee intimated that he considered it would have been better to postpone the Board's decision until Commander Powell, R.I.M., and Mr. Ashpitel, A.M.I.C.E., were present, but as no member supported his objection, and the feeling of the Board was that the time had arrived when a decision could be given, he acquiesced in the foregoing resolutions.

* * * * *

* Tools and plant since redistributed—*vide* abstract of estimates, page 8. The original estimates have been altered accordingly.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the Offices of the Board on Friday, the 8th day of November 1895.

* * * * *

5. The Board discussed an estimate † submitted by the Engineer for Rs. 3,96,424 for constructing 1,250 feet south of the south arm of the harbour, a groyne projecting into six fathoms of water to prevent further accretion of sand against the south pier.

Resolved that, as the construction of this groyne has become, as explained by the Engineer, an urgent necessity owing to the rapid accretion of sand to the south of the harbour, the estimate be submitted to Government.

(True Extract.)

(Signed) C. PINSENT,
Secretary, Harbour Trust Board.

† Altered to Rs. 3,91,355 in redistribution of tools and plant—*vide* abstract of estimates, page 8.

HARBOUR IMPROVEMENTS.

(A).—*Canal Section at North-West Corner of Harbour.*

Four-hundred lineal feet of break-water with parapet, and five fathoms at low water alongside, 540 lineal feet of deep-water quayage with revetted surf bank, up to high-water mark.

Nine-hundred and ten lineal feet low-level wharf from entrance to canal, or north wharf along canal, and 850 lineal feet of low-level wharf, or south wharf of canal, &c.

Quantity.	Sub-head of work.	Rate.	Per.	Total.
		Rs. A. P.		Rs.
23,165 tons ..	Rubble in base deposited	1 8 0	Ton.	34,747
30,634 c. yards ..	Concrete in break-water and parapet	11 0 0	C. yds.	3,36,974
1,638 do. ..	Do. do. filling	15 0 0	do.	24,570
4,879 do. ..	Do. do. wharf walls	11 0 0	do.	53,867
1,332 do. ..	Do. do. do. do. filling and capping ..	15 0 0	do	19,980
146,800 do. ..	Sand dredging, deposited as filling	0 4 0	do.	36,700
3,107 Sqrs. ..	Laterite hard and new roadway to south	6 8 0	Square	20,196
	Establishment, office	..	Sum.	28,000
	Do. works	..	do.	87,000
800 L. feet ..	Parapet along north pier, surf bank and portion of north pier (of old blocks, labour only)	1 8 0	L. feet	1,200
650 do. ..	Connecting canal, from wharfage to west side of Beach Road Bridge of Public Works Department (D. P. W. Estimate)	110 0 0	do.	71,500
	Add proportionate cost of tools and plant estimate (*f*) ..	..	..	37,566
	Total of Canal Section at North-West corner of Harbour	..	..	7,52,300

(B).—*Boat-Basin in South-West Corner of Harbour.*

Four hundred lineal feet of break-water and parapet, with low-level wharf, 60 feet wide forming east wall of boat-basin. Six hundred lineal feet of low-level wharf along present south pier when lowered; 290 lineal feet low-level wharf of west bank of basin, and 540 lineal feet of quay 50 feet wide, providing a high-level deep water quay on north side, and a low-level wharf inside boat-basin.

Quantity.	Sub-head of work.	Rate.	Per.	Total.
		Rs. A. P.		Rs.
20,388 tons ..	Rubble in base deposited	1 8 0	Ton.	30,582
30,634 c. yards ..	Concrete in break-water and parapet	11 0 0	C. yds.	3,36,974
1,638 do. ..	Do. do. do. do. filling	15 0 0	do.	24,570
3,263 do. ..	Do. do. wharf walls	11 0 0	do.	35,893
888 do. ..	Do. do. do. filling and capping	15 0 0	do.	13,320
	Removing top blocks from south pier, and adding a concrete capping, to form a low-level wharf	..	Sum.	11,600
146,800 do. ..	Sand dredging, deposited as filling	0 4 0	C. yards.	36,700
3,468 squares ..	Laterite Hard	6 8 0	Square.	22,542
	Establishment. { Office .. .. .. 28,000 / Works .. .. .. 87,000 }	..	Sum.	1,15,000
	Add proportionate cost of Tools and Plant Estimate (*f*)	..	..	36,377
	Total of Boat-Basin ..	..	..	6,63,558

(C).—*Repairs to South Pier old wall to prevent sand washing through into the Harbour, and removal of the Sand Bank.*

Quantity.	Sub-head of work.	Rate.	Per.	Total.
		Rs. A. P.		Rs.
1,371 c. yards ..	Concrete deposited below water along south pier to make the old walls sand tight, from boat-basin break-water, to steps at south pier	15 0 0	C. yards.	20,565
420 frames ..	Labour in removing sand and fixing frames	30 0 0	frames.	12,600
3,400 tons ..	Rubble backing deposited	1 8 0	Ton.	5,100
50,000 c. yards ..	Sand dredging and removing sand bank	0 4 0	C. yds.	12,500
	Add proportionate cost of Tools and Plant Estimate (*f*).	..	..	3,604
	Total cost of removing Sand Bank along South Pier and making old wall sand tight ..	..	..	54,369

(D).—*Deepening Harbour to provide five additional berths in fair weather, or three additional berths at all times of the year.*

Quantity.	Sub-head of work.	Rate.	Per	Total.
		Rs. A. P.		Rs.
818,186 cubic yards.	Sand dredging to five fathoms below low water ..	0 4 0	C. yard.	2,04,547
	Cost of deepening harbour after the canal and boat sections are built	..	..	2,04,547
	Add proportionate cost of tools and plant, estimate (*f*) ..	..	..	14,522
	Total cost of deepening Harbour ..	..	..	2,19,069

Abstract of Estimate.

(*a*)	Canal section at north-west corner of harbour	7,52,300
(*b*)	Boat-basin at south-west corner of harbour	6,63,558
(*c*)	Repairs to south pier to prevent sand entering the harbour	54,369
(*d*)	Deepening the harbour to provide five additional berths	2,19,069
(*e*)	Proposed groyne south of the harbour	3,91,355
	Total cost of Harbour Improvements including Canal Section, Boat-basin, deepening harbour for increased berthage, making south pier wall sand tight, and protective groyne	20,80,651

Madras,
30th October 1895.

(Signed) A. LEE POGSON,
Engineer, Harbour Trust Board.

Estimate (E) for proposed groyne projecting into six fathoms of water with its centre at a distance of 1,200 feet south of the south pier to prevent further accretion of sand against the south pier.

Quantity.	Sub-head of work.	Rate.	Per	Amount.
		Rs. A. P.		Rs.
152,120 tons ..	Rubble tipped from wagons	1 8 0	Ton.	2,28,180
3,600 c. yards ..	Concrete blocks in capping	11 0 0	C. yd.	39,600
800 ,, ..	Do. on surface between block	15 0 0	..	12,000
3,600 ,, ..	Labour and fuel in placing blocks in position	2 0 0	..	7,200
	Establishment { Office, Rs. 21,000 .. .. .. / Works, Rs. 63,000 .. .. .. }	..	Sum.	84,000
	Add proportionate cost of tools and plant, estimate (*f*) ..	..	..	20,375
	Total ..	..	..	3,91,355

Madras.
8th November 1895.

(Signed) A. LEE POGSON,
Engineer, Harbour Trust Board.

Estimate (*f*).

Tools and Plant.

	Rs.
Sand pump	50,000
Repairs to machinery and new locos	70,000
New 10-ton steam crane	20,000
New block moulds	10,000
Rails and sleepers	5,000
Iron and timber moulds for making south pier sand tight ...	2,000
Mixed gauge line for groyne	12,444
Block moulds for groyne	5,000
Repairs to rolling-stock	8,000
Total ...	1,82,444
Deduct recovery due to sale of tools and plant	70,000
Grand Total ...	1,12,444

Madras,
20th November 1895.

(Signed) A. LEE POGSON,
Engineer, Harbour Trust Board.

From A. LEE POGSON, Esq., Engineer, Harbour Trust Board, Madras, to the Chairman, Harbour Trust Board, Madras, dated 20th November 1895, No 643.

I now have the honour to forward a large scale plan showing the proposed groyne, with its centre line at a distance of 1,250 feet south of the south pier, and projecting into six fathoms of water.

2. In October 1893 the sand showed signs of entering the harbour through the south pier, in consequence of the accretion of sand to the south of the south pier, and I then suggested the construction of a rubble mound groyne, capped with concrete blocks, to arrest the sand further south and so prevent its further banking up against the south pier, the result of which will eventually be the shallowing of the entrance to the harbour.

3. Unfortunately, during 1894, and until July 1895, the state of the sea has been too rough for accurate soundings to be taken outside the harbour.

4. In August 1895 accurate soundings were obtained, which, when compared with those of 1893, show a great change in the depth of water, outside the south pier, to have taken place in the last two years, and the depth of water at the harbour entrance is now temporarily or otherwise less by two feet beyond doubt. Although, in January 1895, when preparing for setting the south pier caisson, no change in the depth of the entrance had taken place, as the annual accreting action had not commenced, the time has now come when I am of opinion that immediate action must be taken to arrest the sand drifting up from the south by the construction of a groyne, as shown upon the accompanying tracing. If the accretion of sand increases each year, the groyne will have to be extended into deeper water; but for the present I consider a groyne running out to the six fathoms contour line to be sufficient.

5. When comparing the soundings along the survey line No. 10 on the plan taken in 1893 with those repeated again at the same month of the year in 1895, the following shallowing or change in depth of roadstead is shown:—

Depth in 1893.		Depth in 1895.	
3′	9″ in 1893 has shallowed to high water mark in 1895.		
6′	0″	6′	0″
9′	0″	4′	3″
12′	0″	6′	0″
15′	0″	8′	6″
18′	0″	12′	0″
21′	0″	15′	6″
24′	0″	16′	0″
27′	0″	19′	0″
30′	0″	21′	0″
33′	3″	24′	3″
36′	0″	28′	0″
39′	0″	32′	0″
42′	0″	39′	6″
45′	0″	43′	9″

6. From the above it will be seen that beyond doubt the advance of sand from the south threatens to reduce the depth of water at the harbour entrance, and, as the shallowing in the roadstead extends to sea as far as the 7½ fathoms line, no groyne could reach that depth of water before the accreting action will return, or commence again next year. All therefore that can be done is to arrest the sand for the present, at a minimum depth required for the entrance, and, as soon as there is any sign of further shallowing at the end of the proposed groyne, it must be extended from time to time into deep water until no further sand passes it each year. By this means a minimum section of the groyne can be kept to, which means a saving in cost, and the harbour entrance can be maintained at a desired depth. Otherwise it would appear, from the latest soundings, that the entrance must continue to shallow, if the groyne is not constructed.

7. There would appear to be no other alternative but to construct the groyne to arrest the sand to the south of the harbour, as, without the groyne, no amount of dredging in the open roadstead would be able to cope with the large amount of sand drifting up the coast.

8. The work should be started as soon as possible, so as to be well advanced before the change of the monsoon, when the accretion of sand will recommence. Therefore, pending the sanction of the estimate, I would ask for permission to secure the necessary sleepers and rails amounting to Rs. 9,000, to enable me to lay the lines in anticipation of sanction.

From H. LE FANU, Esq., I.C.S., Chairman, Harbour Trust Board, Madras, to the Presidency Port Officer, Madras, dated 25th July 1895, No. 133 C.

I have the honour to forward, herewith, a copy of the Proceedings of the Harbour Improvements Committee, together with the report to Government, and copy of G.O. passed thereon, No. 190, Marine, dated 1st July, and will feel obliged if you would favour the Trustees with your views upon the proposed boat-basin, inside the harbour, as affecting the shipping. I further request that you will favour the Harbour Trust Board with your views as to what should be done. The Marine Department has not yet spoken, but it is plain that the first step, in any undertaking of the kind, is to ascertain what the requirements, present and future, of your department are. Subsequent proposals must be worked out so as to fit in with your views, as the harbour is primarily a *harbour*, and boat-basins, &c., are secondary considerations.

From Commander W. POWELL, R.I.M., Presidency Port Officer, Madras, to the Chairman, Harbour Trust Board, Madras, dated 6th August 1895, No. 1761/730 M.

In reply to your No. 133 C., dated 25th July 1895, I have the honour to say that, as regards the proposed improvements to the harbour, I have always been of opinion that anything that would take off or in any way interfere with the present available water space of the harbour should be avoided.

2. To increase its berthing space dredging should, I think, be undertaken from the 3½ fathom line to the 2½ line which would give berths for four more steamers of the draught that usually come here. I believe the Board's Engineer has an objection to dredging in the harbour; but, with all due deference to his professional knowledge, an important matter like this should not, I think, be decided by a single opinion.

3. I have always thought that two jetties, light and strong iron screw pile ones, to avoid silt, should be built in from the north arm for coal discharging, &c.

4. Some time before the special Committee was appointed, Mr. Pinsent, the Board's Secretary, put before it a plan for a boat-basin, warehouses, &c., opening from the south wall. I prefer this to any of the other proposals: When the matter was discussed, the then Chairman and members of the Board decided that nothing should be considered, in the way of improvements, until the harbour was completed and had stood the test of a heavy cyclone.

5. Mr. Pinsent's plan commended itself to me as being self-contained and not interfering with the harbour Should the trade of Madras ever warrant docks being made, the key for them will be there, in the boat harbour of his plan.

6. If the jetties on the north arm are constructed, I believe they would well meet the present requirements. It must be remembered that Madras is not a terminal port, the only vessels that discharge a full cargo are coal and oil ones, and they seldom, if ever, load here. The rest of the trade might be called dribbling.

From C. PINSENT, Esq., Secretary, Harbour Trust Board, Madras, to the Deputy Port Conservator, Madras, dated 25th July 1895, No. 132 C.

I am directed to forward, and have the honour to enclose herewith, a copy of the report of the Harbour Improvements Committee, and also of the G O thereon, No. 190, Marine, dated 1st July, and am to request that you will favour the Chairman with your views, and obtain those of the Commanders of vessels frequenting the port, to enable him to place same before the Board.

From Commander C. HEWETT, R.I.M., Deputy Conservator of the Port of Madras, to the Chairman, Harbour Trust Board, Madras, dated 30th July 1895, No. 1273.

In reply to your No. 132 C., dated 25th instant, forwarding plans and report of the Harbour Improvements Committee, I have the honour to remark as follows:—

1. The Committee have apparently unanimously approved of Mr. Pogson's A-1 scheme, which provides—

(*a*) for a canal entrance with covered arm at the north-west side of the harbour;
(*b*) for a boat-basin in the south-west corner of the harbour.

The latter of these two proposals seriously affects the question of the safety and convenient berthing of ships in the future.

The present system is to try and give ships an all-round clear swinging space in case of stern fasts carrying away, but this is only possible at moorings Nos. 2, 3 and 4, owing to the

increased length of vessels now visiting the port. A further increase in length of vessels in the near future is evident, judging by the launches now taking place at home, and by the speech of Sir T. Sutherland at the last general meeting of the P. and O. Co.

2. One of the advantages claimed by Mr. Pogson is, that *more* vessels could be berthed. This I think is doubtful, as we require bow as well as stern moorings laid down, and each mooring should be, as in Colombo, 600 feet apart, to allow space for the largest ships with a margin for working. The boat-basin wall, which will run from the south arm to overlay the pier, would, in my opinion, create a very nasty backwash, when any swell is running into the harbour, and I have grave doubts as to whether we could get stern fasts to hold under these circumstances ; the plan also shows the stern fasts to the wall, this is objectionable, as in a seaway something would go either the bollards of ships or ropes.

3. My own ideas about improvements in the Madras Harbour are, that taking into consideration the enormous cost of enclosing the present water area, and the uncertainty of what would happen in a severe cyclone, the following improvements are all that the present trade of the port requires :—

(*a*) The harbour dredged back to give a depth of 22 feet L.W.T. on the present 2 fathoms line, to enable us to berth four more light draft vessels, two on each side of the pier, inside the present moorings.

(*b*) Two light iron jetties, one on the north arm and one on the south, to land coal, troops, horses, native passengers, &c.

(*c*) A boat-basin in the north-west corner, in connection with the canal, the construction of which, I understand, has been approved of by Government.

4. I believe the Engineer states it is impossible to dredge back without a wall across the harbour; but this could be referred to a Committee of Engineers, who would, I have no doubt, overcome the difficulty. To the lay mind it seems unnecessary, having once secured your harbour, to fill it in again by way of improvements.

5. I have asked the Harbour Masters for their opinions, and they agree with me. It is difficult to get an opinion from Masters of vessels frequenting the port, as the question does not concern them personally ; but I have asked Mr. Baddeley, who will be acting for me while on privilege leave, to obtain their views if possible.

From C. PINSENT, Esq., Secretary, Harbour Trust Board, Madras, to the Deputy Port Conservator, Madras, dated 5th August 1895, No. 139 C.

I have the honour to acknowledge the receipt of your letter, dated 30th July, No. 1273, and am directed to request that you will obtain, for the information of the Board, from each of the Harbour Masters, in writing, their opinions regarding proposed harbour improvements, as affecting ships, under their charge, entering and leaving the harbour.

From H. C. TAYLOR, Esq., Harbour Master, Madras, to the Deputy Conservator of the Port, Madras, dated 8th August 1895.

With reference to the Secretary's letter, No. 139 C., dated 5th August 1895, asking for my opinion, of the effect the proposed harbour improvements would have on steamers entering and leaving the harbour—

I have the honour to report that I have perused the minutes of the Committee meeting, and examined the litho-plans as approved.

And I am of the opinion that our present small area of smooth water, within the harbour groynes, has been obtained by great expense and labour, and any enclosed boat-basin, or obstructive wall, built to the east of our present high water mark, would be suicidal policy.

And if any wall built has a sloping base, of rubble to the east, and a steamer in moving tail on to it, by dragging her anchor, or from any other cause, the effect would be disastrous, and much more damage done than under present conditions.

The steamers visiting this port are every month increasing in length and size, and even now we require the harbour to be dredged, and buoys Nos. 1, 2, 3, 4 and 5 placed further west to safely berth nine steamers.

There is at present no spare space, and, in my opinion, the berths are far too small for the larger class of steamers.

The Engineer states there will be room for eleven steamers in the reduced space ; I beg to differ from him, if he means eleven of the larger class, as their rudders and propellers would be in dangerous proximity to the walls all round, and it is quite impossible to get in eleven large ones at one time.

We might be able to berth eleven steamers, but they, to lie safe, must be moored by their chain cables, both head and stern, and I question if the Commanders would permit that in the present untried state of the harbour.

With such a lot of spare ground all round the harbour, I fail to see why the enclosed water space should be encroached upon to build sheds and boat-basins.

From NORMAN CORFIELD, Esq., Senior Harbour Master, Madras, to the Deputy Conservator of the Port of Madras, dated 10th August 1895.

In reply to the Secretary, Harbour Trust Board, letter No. 139 C., dated 5th August 1895, I beg to offer my opinion respecting the berthing of steamers, after the proposed scheme of constructing a wall across the enclosed water area, as per plan A-1 by Mr. Pogson, is completed.

To dredge to a minimum depth of 30 feet close to the wall, will give more water area and enable nine steamers to be berthed with safety, as the stern moorings of No. 1 to 5 can be placed further to the west, making swinging room for steamers berthed in No. 6 and 9 berths, as steamers are of such a length that, at present, should the stern fast part, they cannot possibly swing clear of one another.

I consider that to build any kind of wall, or obstruction, within the enclosed harbour, would be a serious mistake, and would prevent further development in the future. As to water area : we are aware ships are increasing in length, many being 450 feet, so that in the near future the present harbour will be too small, unless dredged towards the beach, and removing the T end of pier, thus making room for another tier of five steamers.

If it is simply required for the accommodation of boats, and to facilitate the landing of cargo from boats, any of the plans might be adopted, either to the north in connection with the proposed canal, or within the accumulation of sandy foreshore to the south of the harbour.

From G. A. EVANS, Esq., Harbour Master, Madras, to the Deputy Conservator of the Port of Madras, dated 24th September 1895.

I have the honor to acknowledge the receipt of the Secretary's letter No. 194 C., dated 23rd September 1895, requesting a report from me on the proposed improvements of the Madras Habour, plan No. A-1.

I am of opinion that it would be a mistake to curtail the water area available for ships as shown in the plan.

It would be impossible to place eleven large steamers as noted. Moreover, ships could not be moored to any rigid object, owing to the heavy swell.

The north and south boat-basin wall would, I fear, cause a very nasty backwash, which would considerably inconvenience boats lying alongside the inner tier of ships, and make the discharging of cargo into these boats dangerous and slow.

There would, I consider, be much risk in bringing large vessels so close to a groyne when a heavy swell is running into the harbour ; and this danger would be increased by strong easterly winds. It is not necessary to remind you that our first study must be the vessels' safety.

We have to remember that ships are yearly increasing in length, and we have only a limited space to cope with that increase, one-third of which this plan takes from us. I am therefore adverse to this obstruction to future development of the harbour. We cannot proceed further north, south or east ; our only hope, therefore, is to dredge out to the westward, in order to cope with the future possible advancement of the shipping trade to this port.

If it is necessary to have a boat-basin, group 1 or 3 appear to me to be the most practical for all concerned.

Note by the Chief Engineer, Public Works Department.

The proposals now submitted by the Harbour Trust Board are in effect identical with those proposed by the Committee appointed at the beginning of last year, except that they provide for a boat basin of a rather smaller size than that proposed by the Committee, and for increasing the available area of the harbour by dredging.

2. As regards the former alteration, I can see no objection whatever to the adoption of the Board's proposals ; the latter are in a better position to judge regarding details of this nature than the Committee could be, and, if they are satisfied that the dimensions suggested are sufficient, there seems no reason why their view should not be accepted.

3. The proposal to dredge the western portion of the harbour is one to which no possible exception can be taken from an engineering point of view ; the question

is purely a financial one, as to whether the additional accommodation to be obtained is worth the Rs. 2,19,000 to be expended in obtaining it, and of this the Trustees are the best judges.

4. I am however not at all satisfied as to the necessity for so large an expenditure as Rs. 7,52,300 for the protection of the canal entrance.

5. It is obviously absurd that the cost of this work should be actually more than the whole cost of the boat basin, and it will be noted that the estimate for the cost of this portion of the work attached to the Committee's report, which estimate like the present one was prepared by the Board's Engineer, amounted to only Rs. 3,62,379, or less than half the present estimate.

6. I am bound to say that I am not at present satisfied of the necessity for any such expensive works as are provided in even the smaller of these estimates, merely for the purpose of keeping the canal entrance open.

7. It seems to be assumed that this entrance will silt up if not covered, in the manner proposed; I am not at all satisfied that this will be the case, and believe that even with the harbour in its present condition, a very small amount of dredging, if any, will be required to keep the canal mouth sufficiently deep for the traffic which will have to pass through it, and the risk of silting will be still smaller if the western portion of the harbour is dredged as now proposed.

8. So far as the canal entrance is concerned, I do not believe that any thing more is necessary than a short length of wall running out from the shore, parallel with the northern arm of the harbour, into about three fathoms of water; this certainly should not cost more than one lakh, and this sum, together with the Rs. 71,500 for the connecting canal and a proportionate charge for establishment, or say Rs. 2,00,000 in all, is the most that is properly debitable to the canal.

9. The additional wharfage accommodation provided by the arrangements shown on the plan will be of great value and may very well be worth the additional expenditure which it will involve, but the benefit will be entirely to the harbour, and there seems no reason why Government should be asked to pay for it.

10. This is entirely independent of the question raised in the latter part of paragraph 8 of the Chairman's letter, whether Government should give a substantial contribution towards the cost of the general improvements; personally I am of opinion that money could not be better spent, and entirely concur in the view that the "improvements to the Madras harbour may be regarded as necessary in the interest of the development of the country and of the railways, which depend largely on Madras being made a cheap port; any policy which would tend to place additional burdens on shipping visiting the port is therefore to be deprecated," but the question is not an engineering one. So far as the connection of the harbour with the canal is concerned, a grant of Rs. 2,00,000 is the most that can be demanded.

11. The provision for improving the southern arm so as to prevent sand from entering is, in my opinion, eminently necessary; it is only of late that I have become aware of the condition of this arm, and can only say that the sooner it is corrected the better.

12. I must confess that I am not satisfied of the necessity, or indeed of the desirability, of the proposed groyne to the south of the harbour; the matter was mentioned to me verbally some time ago, and I said then that it seemed desirable if there were no other means of preventing the entry of sand through the present south arm, this entry being so serious an evil that it should be stopped at any cost. If, however, this entry can be stopped by the measures now proposed, which I see no reason to doubt, the groyne is not necessary for this purpose, and I have grave doubts as to whether it is required for stopping the accretion of sand along the south arm; this latter is not in itself so serious an evil as to justify any expensive measures for its prevention, and the prospect of any obstruction to the entrance of the harbour (a very different matter) seems to be very remote.

13. I must confess that I look with extreme distrust upon the construction of groynes upon a coast like that of Madras, and with the effect of the harbour (which, as a whole, is nothing but a big groyne) upon the coast to the north before our eyes, I should hesitate to advocate the construction of another groyne to the south of the harbour.

14. If the proposed groyne were connected at its eastern end with the south wall of the harbour, so as to completely enclose the space between it and the latter, it would form an excellent dock or inner harbour, to be entered by an opening in the present south wall, and probably no better mode of forming docks could be adopted; but this is a different matter from the open groyne, the construction of which I cannot at present recommend.

4th January 1896. (Signed) J. PENNYCUICK, Col., R.E.,
Chief Engineer, P.W.D.

Order—No. Marine, dated February 1896.

With the letter recorded above, the Chairman of the Harbour Trust Board forwards an extract of Proceedings of the Trustees dealing with the proposals of the Committee appointed by Government to consider the question of improvements to the Madras harbour. The following estimates are submitted for the approval of Government:—

		Rs.
A. Canal ~~section at north-west corner of harbour~~ entrance and connected works	... ...	7,52,300
B. Boat basin at south-west corner of harbour	... ...	6,63,558
C. Repairs to south pier to prevent ingress of sand	... ...	54,369
D. Deepening the harbour to provide additional berths for ships.		2,19,069
E. Groyne south of the harbour		3,91,355
Total	...	20,80,651

2. His Excellency the Governor in Council agrees with the Chief Engineer in his objections to the proposed south groyne, and must therefore withhold his assent to this work, pending the reference which has been made to the Secretary of State on the subject. He is also disposed to agree in the opinion that, so far as the protection to the canal entrance is concerned, a sum of Rs. 2 lakhs will cover the cost of such works as are necessary on this account. The question of providing the amount from Provincial funds will be considered in the Financial Department. The other works brought forward are approved, subject to the Board being able to raise the necessary funds.

3. The Board has submitted separate proposals for raising a loan by means of debentures, and this question is now under consideration in the Financial Department. On orders being passed on these proposals, the financial position will be more clearly understood. Meanwhile, the work of repairing the south wall so as to prevent the ingress of sand should be taken up at once, as it is most important that further deposits of sand inside the harbour should be stopped as soon as possible.

4. The question of the transfer of the custody of goods landed from the Customs Department to the Harbour Trust, alluded to in paragraph 9 of the Chairman's letter, will be referred to the Revenue Department for consideration. The matter is brought forward in paragraph 15 of the Committee's report recorded with G.O. No. 190, Marine, dated 1st July 1895.

5. The suggestion of a groyne on the position shown in the accompanying sketch will be remitted to the Harbour Works Engineer for his remarks. A groyne

The commencement of the works connected with the Harbour Entrance will also depend on the amount of the Estimate which may possibly be found to be in excess of the sanctioning power of the Local Govt.

in this position would perhaps better stop the drift of sand than one running parallel to the harbour wall. It would probably have the effect of diverting the deposit to the southwards altogether away from the harbour mouth.

(True Extract.)

J. S. Campbell Col. R.E.
Joint ~~Under~~ Secy. to Govt.

To the Chairman, Harbour Trust Board, with sketch.
" Financial Department, with copy of note by the Hon'ble Mr. Bliss.
" Revenue Department.
" Examiner, Public Works Accounts.
" Presidency Pathapeir
" C Esq. D.

X

Copy of the above with Copy of the Despatch to the S. of S. forwarded to the Govt. of I. Marine Dept.

Ed. T. K. Narayana Aiyangar.
Spare Copies

87

MARINE DEPARTMENT.

LETTER—to

THE RIGHT HONOURABLE THE SECRETARY OF STATE FOR INDIA.

MY LORD,

In continuation of our despatch No. , dated , forwarding the progress report on the Madras Harbour Works for the quarter ending 30th September 1895, we have the honour to transmit the accompanying copy of our Proceedings No. , dated , according conditional approval to certain works recommended by the Committee specially appointed to consider the improvements requisite to complete the harbour. It will be observed that it is also proposed to construct a canal connecting the harbour with the Buckingham canal with the primary object of increasing the circulation of water into the Cooum for cleansing this river, while at the same time a direct connection will be obtained with the harbour for boats navigating the Buckingham canal. The works requisite to effect an entrance to the harbour are to be carried out ~~simultaneously with the harbour improvements and~~ under the supervision of the Harbour Works staff—Provincial funds contributing a sum which is now estimated at 2 lakhs of rupees as the share chargeable to the canal estimate. Your Lordship will observe that the whole scheme has been approved by us, subject to the Harbour Trust Board being able to raise the necessary funds which they purpose doing by means of debentures. Meanwhile, the construction of the canal, outside harbour limits, will be actively prosecuted, should no immediate objection be raised on engineering grounds by the Consulting Engineer in England to the canal entrance within harbour limits, and the estimate be found to be within the sanctioning power of the Local Govt. should

We have the honour to be,
My Lord,
Your Lordship's most obedient, humble servants,

(Signed) WENLOCK.
(„) H. W. BLISS.
(„) J. GROSE.

(By order.)

J. S. Campbell Col, R.E.,
Joint Secretary to Government.

FORT ST. GEORGE,
February 1896.

GOVT. OF FORT ST. GEORGE.

MARINE (1896) *DEPARTMENT.*

(Copy.)

"Proof" of Despatch and order on the Madras Harbour Improvements is submitted for final approval. It will be noticed that the first portion of para 5 of the original draft order has been omitted in compliance with His Excellency's instructions.

12/2/96 W

LETTER to the Right Honourable the Secretary of State for India.

Dated ,

No. of 1896.

Note

Some additions in manuscript have since been made with reference to a draft order in the Irrigation Branch which is being submitted by Colonel Brockman.

with this show the whole expenditure can be kept below 10 lakhs! 12/2/96 W.

I had overlooked this order - on wh. I have since noted, q.v. W

14/2/96

14/2/96

I approve the despatch and order - but I do not know how my hon. colleagues propose to get over the words in the despatch - "Provincial funds contributing a sum wh. is now estimated at 2 lakhs of rupees, as the share chargeable to the canal estimate". Nor as to the last words in M.S. in the despatch - and also in the order. I see nothing for it - but to go up boldly for sanction for the whole scheme - wh. must, in my opinion - be held to include the canal from the harbour right through & as at present advised this will come to me more than 10 lakhs - we must get sanction. To manipulate the figures can of course be done - but it

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No. MARINE, FEBRUARY 1896.

MARINE DEPARTMENT.

LETTER—to

2/529 W

THE RIGHT HONOURABLE THE SECRETARY OF STATE FOR INDIA. 11th February 1896.

MY LORD,

In continuation of our despatch No. , dated , forwarding the progress report on the Madras Harbour Works for the quarter ending 30th September 1895, we have the honour to transmit the accompanying copy of our Proceedings No. , dated , according conditional approval to certain works recommended by the Committee specially appointed to consider the improvements requisite to complete the harbour. It will be observed that it is also proposed to construct a canal connecting the harbour with the Buckingham canal with the primary object of increasing the circulation of water into the Cooum for cleansing this river, while at the same time a direct connection will be obtained with the harbour for boats navigating the Buckingham canal. The works requisite to effect an entrance to the harbour are to be carried out under the supervision of the Harbour Works staff—Provincial funds contributing a sum which is now estimated at 2 lakhs of rupees as the share chargeable to the canal estimate. Your Lordship will observe that the whole scheme has been approved by us, subject to the Harbour Trust Board being able to raise the necessary funds which they purpose doing by means of debentures.

2. The construction of the canal cannot be taken up until the estimate is duly sanctioned by competent authority. It is understood that it will amount to a sum which will be beyond our powers of sanction. In this case the project will be duly laid before your Lordship in our Public Works Department.

We have the honour to be,
My Lord,
Your Lordship's most obedient, humble servants,

(Signed) WENLOCK.
(„) H. W. BLISS.
(„) J. GROSE.

(By order.)

Colonel, R.E.,
Joint Secy. to Government.

FORT ST. GEORGE,
February 1896.

(b) 6 Spare copies of the Chairman's letter No. 3258 dated 20th November 1895

(c) My office Copy of the plan referred to in para 1 of the Engineer's letter No. 643 dated 20th November 1895. The other tracing will follow, as soon as it can be made from the office copy with the Engineer.

I have the honour to
be
Your obed't. Servant

Wardell
Chairman
Harbour Trust Board

Marine Current No: 198

MARINE DEPARTMENT.

Encls 3 (three)
S.S. C of Encls 1 & 2.
Recd: 25.2.96

FROM

THE CHAIRMAN,
HARBOUR TRUST BOARD,
MADRAS.

TO

THE SECRETARY TO GOVERNMENT,
Marine Department.

DATED 25th February 1896

DESPATCHED

RECEIVED

ENCLOSURES Thirteen.

No. 4529

SUBJECT.

Harbour Improvements

Forwarding plans &c called for in telephonic message dated 24th Feby '96

SCOTTISH PRESS.

95

Madras Harbour Trust.

No. 4212

SECRETARY'S OFFICE,
25th February 1896

From

THE SECRETARY,
HARBOUR TRUST BOARD,
Madras.

To

Col D McNeil Campbell R.E.
Secretary to Govt
Marine Dept

Sir

I am directed to acknowledge the receipt of your telephonic message of this date, and to forward, as requested therein, three copies of the Harbour Improvements Committee's report, and three copies of the Chairman's letter No 3258 dated 20th December 1895, with lithographed plans annexed to each

I have the honour to be
Sir
Your obedient Servant

Secretary

Marine Current No: 11

Encls 2 (2 sets)

Recd: 10.2.96

Office Copy

97

List of Plans accompanying Despatch
No. 2 / 119 Marine dated 26th February 1896.

Number of Plan.		
1.	Plan A.I	Approved by the Harbour Improvements Committee.
2.	,, A.I with extension.	
3.	,,	are the various proposals and suggestions considered by the Committee.
4.	,,	
5.	,,	
6.	,,	
7.	,,	
8.	,,	
9 / 16		

Note. Plans 1 to 8 are bound with the Harbour Improvements Committee's Report.

11 ~~9.~~ This plan is the one approved by the Harbour Trust Board as carrying out in principle the recommendations of the Harbour Improvements Committee, and at the same time obviating the -- nautical objections raised to Plans A.I and A.I with extension.

12 ~~10.~~ This is the large scale plan referred to in para 1 of the -- letter of the Harbour Trust Board's Engineer No. 643 dated -- 20th November 1895 and in para 12 of the Chairman's letter No 3258 dated 20th November 1895.

13. ~~11.~~ This is the sketch referred to in para 5 of G.O.No. 119 Marine dated 26th February 1896.

99

Marine

PUBLIC WORKS DEPARTMENT.

No 119 Marine dy 26th Feby 1896

PROCEEDINGS OF THE MADRAS GOVERNMENT.

again

READ the following

G.O. No. 190 Marine dated 1st July 1895.

Madras:—

Letter from the Chairman H.J.B. (H.L. No. 3258 dy 20 Nov: 1895)

Note by the Chief Engineer P.W.D. (dy 4 Jan: 1896)

(abroad type).

1P

With the letter recorded above, the Chairman of the Harbour Trust Board forwards an extract of Proceedings of the Trustees dealing with the proposals of the Committee appointed by Government to consider the question of improvements to the Madras Harbour. The following estimates are submitted for the approval of Govt:—

W 17 Feb

	Rs.
A. Can & entrance and connected works	7,52,300
B. Boat basin at south-west corner of harbour	6,63,558
C. Repairs to South pier to prevent ingress of sand	57,369
D. Deepening the harbour to provide additional berths for ships	2,19,069
E. Groyne south of the harbour	3,91,353
Total Rs.	20,50,651

(40—1,000—21-4-94.)

deposits of sand inside the harbour should be stopped as soon as possible.

4. The question of the transfer of the custody of goods landed from the Customs Department to the Harbour Trust, alluded to in paragraph 9 of the Chairman's letter, will be referred to the Revenue Dept. for consideration. The matter is brought forward in paragraph 15 of the Committee's report recorded with G.O. No. 190, Marine, dated 1st July 1895.

5. The suggestion of a groyne on the position shewn in the accompanying sketch will be remitted to the Harbour Works Engineer for his remarks. A groyne in this position would perhaps better stop the drift of sand than one running parallel to the harbour wall. It would probably have the effect of diverting the deposit to the southwards altogether away from the harbour mouth.

(H.E.

1/4/96

To,
The Chairman, H.P.B. with sketch.
" Financial Dept. ~~with copy of note by the Hon. Mr Bliss.~~
" Revenue Dept.
" Examiner P.W. Accts
" Chief Engineer for Irrig.

2/3/96

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(H.E. No. 120 Marine dt 26 July 95)

W/17 Feb

To The Secretary to the Govt of India - Works Dept.

Copy of the above with copy of the despatch to the Secretary of State forwarded to the Government of India Public Works Marine Department.

Received 2/3/96

(H.E. No. 2/119 (Marine) dt 26-2-96)

To,
The Right Honble,
The Secretary of State for India.

W

My Lord,

In continuation of our despatch No. 2/529 dated 11th July/95, forwarding the progress report on the Madras Harbour Works for the quarter ending 30th September 1895, we have the honor to transmit the accompanying copy of our Proceedings No. dated , according conditions approved

to certain works recommended by the Committee specially appointed to consider the improvements requisite to complete the harbour. It will be observed that it is also proposed to construct a canal connecting the harbour with the Buckingham Canal, with the primary object of increasing the circulation of water into the Cooum for cleansing this river, while at the same time a direct connection will be obtained with the harbour for boats navigating the Buckingham Canal. The works requisite to effect an entrance to the harbour are to be carried out under the supervision of the Harbour Works staff. Provincial funds contributing a sum which is now estimated at 2 lakhs of Rupees as the

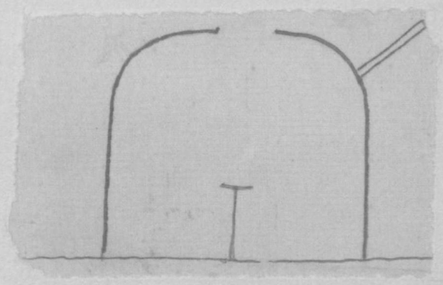
share chargeable to the canal estimate. Your Lordship will observe that the whole scheme has been approved by us, subject to the Harbour Trust Board being able to raise the necessary funds which they purpose doing by means of debentures.

2. The construction of the Canal cannot be taken up until the estimate is duly sanctioned by competent authority. It is understood that it will amount to a sum which will be beyond our powers of sanction. In this case the project will be duly laid before Your Lordship in our Public Works Dept.

15/2/98

E. Stanley

Sketch to accompany the Proceedings



16-7-10

1896 Madras.

~~PUBLIC WORKS.~~

Marine.

Dated

Rcd. Ans.

26 Feby 6 119-20

Madras Harbour

Orders according Conditional Approval to certain works recommended by the Committee appointed to consider improvements requisite to complete the —.

Forwarding Copy of Proceedings according Conditional Approval to certain works recommended by the Committee appointed to consider the improvements requisite to complete the —, with Copy of the Despatch to Secretary of State.

Forwarding with remarks Copy of Proceedings according Conditional Approval to certain works recommended by the Committee appointed to consider improvements requisite to complete the Madras Harbour.

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