Marine (1898) Department.

G.O., No. 775 Mar

DATED 9 Sep '98

Papers reqd from [illegible]
to be sent [illegible]
Collector [illegible]

[Despatch Abstract.]

Erosion by the Sea of the foreshore to the North of the Madras Harbour

Determining the liability of the Harbour Trust Board in regard to the ——, offering Suggestions as to the proposed protective ~~[illegible]~~ Works and intimating that Govt will endeavour to afford some assistance as soon as the State of the Govt finances renders it possible to do so.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
	647	Marine	26.7.98				

[To be substituted for G.O. of same number and date.]

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.
X 1569 ~~366~~	365	Marine	3.5.00				

Government (1898) of Madras.

MARINE.

Recd. } 1898. *Enclosures*

Regd. *Spare copies*

G.O., No. 775, 9th September 1898.

SEPTEMBER.

Erosion by the Sea of the Foreshore to the North of the Madras Harbour

Determining the liability of the Harbour Trust Board in regard to the —, offering suggestions as to the proposed protective works, and intimating that Government will endeavour to afford some assistance as soon as the state of the Provincial finances renders it possible to do so.

submits there seems little. If any danger

GOVERNMENT OF MADRAS.

MARINE DEPARTMENT.

Read—again the following paper:—

G.O., No. 647, Marine, dated 26th July 1898.

Read—also the following papers:—

From the Government Solicitor, dated 29th July 1898, No. 308.
" Chairman, Harbour Trust Board, dated 5th August 1898, No. 1688.
" " " " 11th " " " 1756.

Order—No. 775, Marine, dated 9th September 1898.

The correspondence read above relates to the liability of the Madras Harbour Trust Board for the damage caused by the erosion of the foreshore to the north of the harbour.

2. His Excellency the Governor in Council has taken the opinion of the Advocate-General, Madras, on the legal questions involved. The general conclusion arrived at is that, if it can be proved that the harbour works are the cause of, or contributory to, the erosion now going on, the Harbour Trust is liable, and should in its own interests take immediate steps to prevent the continuance of such erosion.

3. The Board has also taken the opinion of the Advocate-General, Bengal, who has arrived at a similar conclusion. He further advises that the monies acquired by the Board can be legally applied for the purpose of extending the present revetment, of repairing and maintaining either the present or the extended revetment, or of taking other precautionary measures to prevent erosion to property not vested in the Trustees, and of compensating owners of property for damage caused by such erosion.

4. As regards the cause of the erosion, the Government is advised that this is due to—

(1) occasional attacks by the sea;
(2) the constant presence of the harbour groynes, the latter being the main cause.

Such being the case, the responsibility of the Board for the greater portion of the damage done admits of no dispute, and under section 68 of the Harbour Trust Act, Government is empowered to compel the Board to repair the existing revetment and extend it within port limits.

5. In G.O., No. 524, Marine, dated 20th June 1898, an estimate submitted by the Chairman, Harbour Trust Board, for repairing the existing revetment, amounting to Rs. 64,879, was sanctioned for immediate execution; and in the execution of the work the Harbour Trust Board was requested to attend to certain suggestions made by the Chief Engineer, namely, that—

(1) the stone used for renewing the revetment should not measure less than 2 cubic feet and should be packed at a proper slope;
(2) the revetment should have its toe protected by bags of Portland cement concrete or by blocks.

Acting on these suggestions the Chairman, Harbour Trust Board, has submitted with his letter No. 1756, dated 11th August 1898, read above, an estimate amounting to Rs. 6,10,162 for a protective revetment with concrete blocks forming a continuous sea wall from immediately north of Clive's Battery to the north end of the present loose rubble protection, and forwarded at the same time an extract of Proceedings of the Harbour Trust Board, in which the Board notes that its Engineer does not consider the proposed section and method of construction any better than the present rubble protection. The Chairman also asks for orders on the Board Engineer's suggestion that large and small rubble should be used together and not large stone only. With regard to this latter question, Government observes that the Chief Engineer's suggestion to use large stone only in the renewal of the revetment was due to the fact that he considered that the proportion of small stone in the present revetment was too great, and that sufficient small stone was already present to fill interstices. It was intended that the new large stone and the old small stone should be used together. As, however, the Board is responsible for the protection of the foreshore, Government will leave it to them to repair the revetment as they may be advised by their Engineer, but would suggest that in the corner formed by the shore and the N. groyne of the harbour, which is peculiarly exposed to the attacks of the sea in the north-east monsoon, and for so far up the shore as valuable buildings extend, it will in the long run be more economical so to construct the revetment, or other protection, that it shall be capable of withstanding a violent attack of the sea.

6. The Government is further advised that the Board is legally liable to the Municipality for all damage done by the sea to the sewage farm outside port limits. In its own interests and in those of the sanitation of Madras, the Board is accordingly recommended to lose no time in protecting the sewage farm from further erosion, it being apparently certain that there is no other possible site for it.

7. In view of the restricted resources of the Harbour Trust Board and the large demands upon them, His Excellency in Council will endeavour to afford them some assistance as soon as the state of the Provincial finances renders it possible for him to do so.

(True Extract.)

(Signed) W. B. deWINTON,
Secretary to Government.

To the Chairman, Harbour Trust Board, with ten plans.
" Government Solicitor.
" Accountant-General.
" Examiner, Public Works Accounts.
" Local and Municipal Department.
" Financial Department.

Exd. T. K. Narayana Aiyangar.

110/6

Government (1898) of Madras.
MARINE.

Recd. } 1898. *Enclosures*
Regd. *Spare copies*

G.O., No. 775, 9th September 1898.

SEPTEMBER.

3P

Erosion (by the sea) of the (foreshore) ~~Sea~~ to the North of the Madras Harbour

Determining the liability of the Harbour Trust Board ~~for damage caused by the~~ in regard to the protection of the sewage farm from further ~~erosion,~~ — ~~and~~ offering suggestions ~~in~~ as regard to the proposed protective ~~revetment and the~~ works, and ~~a promise of help from Provincial Funds being also held out~~ intimating that Govt. will endeavour to afford some assistance as soon as the state of the Provincial finances renders it possible to do so.

GOVERNMENT OF MADRAS.

MARINE DEPARTMENT.

Read—again the following paper:—

G.O., No. 647, Marine, dated 26th July 1898.

Read—also the following papers:—

From the Government Solicitor, dated 29th July 1898, No. 308.
" Chairman, Harbour Trust Board, dated 5th August 1898, No. 1688.
" " " " 11th " " " 1756.

Order—No. 775, Marine, dated 9th September 1898.

The correspondence read above relates to the liability of the Madras Harbour Trust Board for the damage caused by the erosion of the foreshore to the north of the harbour.

2. His Excellency the Governor in Council has taken the opinion of the Advocate-General, Madras, on the legal questions involved. The general conclusion arrived at is that, if it can be proved that the harbour works are the cause of, or contributory to, the erosion now going on, the Harbour Trust is liable, and should in its own interests take immediate steps to prevent the continuance of such erosion.

3. The Board has also taken the opinion of the Advocate-General, Bengal, who has arrived at a similar conclusion. He further advises that the monies acquired by the Board can be legally applied for the purpose of extending the present revetment, of repairing and maintaining either the present or the extended revetment, or of taking other precautionary measures to prevent erosion to property not vested in the Trustees, and of compensating owners of property for damage caused by such erosion.

4. As regards the cause of the erosion, the Government is advised that this is due to—

(1) occasional attacks by the sea;
(2) the constant presence of the harbour groynes, the latter being the main cause.

Such being the case, the responsibility of the Board for the greater portion of the damage done admits of no dispute, and under section 68 of the Harbour Trust Act, Government is empowered to compel the Board to repair the existing revetment and extend it within port limits.

5. In G.O., No. 524, Marine, dated 20th June 1898, an estimate submitted by the Chairman, Harbour Trust Board, for repairing the existing revetment, amounting to Rs. 64,879, was sanctioned for immediate execution; and in the execution of the work the Harbour Trust Board was requested to attend to certain suggestions made by the Chief Engineer, namely, that—

(1) the stone used for renewing the revetment should not measure less than 2 cubic feet and should be packed at a proper slope;
(2) the revetment should have its toe protected by bags of Portland cement concrete or by blocks.

Acting on these suggestions the Chairman, Harbour Trust Board, has submitted with his letter, No. 1756, dated 11th August 1898, read above, an estimate amounting to Rs. 6,10,162 for a protective revetment with concrete blocks forming a continuous sea wall from immediately north of Clive's Battery to the north end of the present loose rubble protection, and forwarded at the same time an extract of Proceedings of the Harbour Trust Board, in which the Board notes that its Engineer does not consider the proposed section and method of construction any better than the present rubble protection. The Chairman also asks for orders on the Board Engineer's suggestion that large and small rubble should be used together and not large stone only. With regard to this latter question, Government observes that the Chief Engineer's suggestion to use large stone only in the renewal of the revetment was due to the fact that he considered that the proportion of small stone in the present revetment was too great, and that sufficient small stone was already present to fill interstices. It was intended that the new large stone and the old small stone should be used together. As, however, the Board is responsible for the protection of the foreshore, Government will leave it to them to repair the revetment as they may be advised by their Engineer, but would suggest that in the corner formed by the shore and the N. groyne of the harbour, which is peculiarly exposed to the attacks of the sea in the north-east monsoon, and for so far up the shore as valuable buildings extend, it will in the long run be more economical so to construct the revetment, or other protection, that it shall be capable of withstanding a violent attack of the sea.

6. The Government is further advised that the Board is legally liable to the Municipality for all damage done by the sea to the sewage farm outside port limits. In its own interests and in those of the sanitation of Madras, the Board is accordingly recommended to lose no time in protecting the sewage farm from further erosion, it being apparently certain that there is no other possible site for it.

7. In view of the restricted resources of the Harbour Trust Board and the large demands upon them, His Excellency in Council will endeavour to afford them some assistance as soon as the state of the Provincial finances renders it possible for him to do so.

(True Extract.)

Under Secretary to Government.

To the Chairman, Harbour Trust Board, with ten plans.
" Government Solicitor.
" Accountant-General.
" Examiner, Public Works Accounts.
" Local and Municipal Department.
" Financial Department.

Exd. T. K. Narayana Aiyangar.

H.C.

Who is the docket clerk in this case?

R.S.
4 Nov. 98

R.K.

Kindly have the original of G.O. 775 Marine d/9th Septr 1898 put up.

Maj
4/11/98

C.A.W.

The clerk concerned is S. Ramaswamy Iyer.

Maj
4/11/98

H.C.

Send the original.

R.S.
4 Nov 98

C.A.W.

Original submitted herewith. Kindly see flag (W)

Maj
4/11/98

The paper should be reprinted with the docket worded as those on the printed copy of G.O. in the file. The Docket Clerk will in future adopt the words of " Govt. orders as

---

Confidential

Marine (1898) Department.

CURRENT No. 990

From The Govt. Solicitor

Order

No. 308

Dated 29 July } 1898
Received } 2 August }
Registered }
Enclosures 5
Spare copies

SUBJECT.

Further opinion of the Advocate General as to the power of Govt. to compel the Harbour Trust Board to extend or repair the revetment north of the Madras Harbour

47

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

for as possible -

C.S.

ACW
4-11-98.

D.W.

Ramasawmy Iyer to note
C.S. to arrange for reprinting
the G.O.

attended to

Noted
S.R.
4.11.98

5.11.98

Confidential

No. 308

Madras, 29th July 1898.

From,
Ernest Barclay
Government Solicitor
MADRAS

638

To,
The Secretary to Government
Marine Department
Ootacamund

Sir,

With reference to the Order of Government No 647, Marine dated 26th instant I forward herewith, in original, the further - opinion of the Advocate General on the question submitted and return the papers sent to me.

I have the honor to be,
Sir,
Your Obedient Servant
Ernest Barclay
Government Solicitor

48

submits there [illegible]s li[illegible],if any,danger o[illegible]

Confidential

Further opinion

1 By Section 5 of Act II of 1886 the propertie specified in Schedule A are vested in the Harbo Trust Board. Among the properties specified in the Schedule is "all the foreshore lying within the limits of the port". It is quite clear from the further papers with which I have been fu -nished that the existing revetment is within the limits of the port, but the difficulty I felt was with regard to the wording of the Schedule "all the foreshore", and to the fact that the existing revetment was not originally constructed by the Harbour Board. However, since writing my opinion of June 12th I have visited the *locus in quo*. I have now no doubt, having seen the revetment, that the effec of Section 68 of the Act and the words "all the foreshore lying within the limits of the port", was to vest the revetment in the Harbour Board.

2. I still feel some doubt as to whether, under Section 68, the Government can compel the Harbour Board to extend the revetment in the

manner suggested. But, on the whole I have come to the conclusion that the words of Section 68 are sufficiently wide to confer this power on Government. As to the power of Government to compel the Harbour Board to repair the existing revetment I now entertain no doubt.

C. Arnold White
Advocate General

Madras
29th. July
1898.

Enc 5
990 28

Marine (189~~7~~8) Department.

CURRENT No. 1005

Order

From
The Chairman,
Harbour Trust Board,
Madras.

No. 1688

Dated 5—8—98
Despatched " — " — "
Received 8-8-98
Enclosures 2 — " —
Spare copies "

SUBJECT.

Protective revetment north of the Harbour.

Replying to G.O.Marine No.576 dated 4th July and forwarding copy of opinion by the Advocate General Bengal regarding the liability of the Harbour Trust Board for erosion of land by the sea north of the Harbour.

51

submits there seems little, if any, danger of [illegible]

BACK PAPERS.

G. O.	No.	Department.	Date.

FURTHER PAPERS.

G. O.	No.	Department.	Date.

Harbour Trust Office.

MADRAS, 5th August 1898.

No. 1688 65 P

FROM

J.N.Atkinson Esq, I.C.S.,

CHAIRMAN, HARBOUR TRUST BOARD,

MADRAS.

To

W.B.deWinton Esq,

SECRETARY TO GOVERNMENT,

Marine Department.

Sir,

In reference to G.O. Marine No.576 dated 4th July 1898 I have the honour to forward herewith copy of the case submitted by the Board's solicitors to the Advocate General Bengal, and of his opinion thereon, in regard to the liability of the Harbour Trust Board for erosion of land by the sea north of the Harbour.

2. Government will observe that Counsel's opinion assumes "that the theory of Government as to the originating cause of the damage done to property at Royapuram is the correct one". The theory of Government referred to is that the Harbour is wholly and solely responsible for the damage; and this theory it is submitted, cannot be correct unless it be the case that the erosion which from time immemorial has been going on along the Coromandel Coast (in Tanjore District as conspicuous at Tranquebar; in South Arcot District, as seen at Cuddalore, and Alamparai Fort; in Chingleput, as seen at the Seven Pagodas; and at Madras itself, as proved by the continued efforts of Government by groynes and bulwarks to protect the Fort and Town) ceased suddenly in or about 1876 when the Harbour works were commenced, and that in place thereof a fresh process of erosion due to entirely distinct causes, viz the Harbour works, commenced at that date.

52

3.

668

3. I have the honour to request that Government will now pass orders on the questions whether the Harbour Trust is to be held responsible to maintain the existing revetment, and to make good damage to the Municipal Sewage Farm.

I have the honour to be,
Sir,
Your Obedient Servant,

J. W. Atkinson
Chairman,
Harbour Trust Board.

Secy.

53 J.E.

submits there seems little, if any, danger of undermining at so low a

Copy of the Case submitted by the [illegible] Solicitors to the Advocate-General. [illegible]

The Madras Harbour was commenced in the year I876 by Government.

In the year I880 a portion of the village of Royapuram appeared to be endangered by the attack of the sea, and the Government at its own expense built and continued for some time to build a revetment along the foreshore to the North of the Harbour in front of Royapuram accepting the theory which was at once advanced that the originating cause of the danger to Royapuram lay in the Harbour Works in that the current when passing from South to North in front of the Harbour formed an eddy round that structure and was thus directed on to the beach to the North with such force as to cause an erosion at Royapuram.

We have thought it desirable to state what in the opinion of the Trustees of the Harbour of Madras (hereinafter called the Trustees) was the theory on which Government acted in building the revetment in the first instance but the question whether that theory was a correct one or not is of course one for the decision of experts.

In I881 Harbour funds for the first time and subsequently up, to the time the Trustees took possession of the Harbour were debited by Government not only with the cost of protecting property from actual erosion by the erection of a revetment but in the purchase of land which had been partially washed away or which was threatened with erosion by the sea.

The Trustees were appointed by Act II of I886 the Madras Harbour Trust Act I885 and since their appointment they have, following the policy adopted by Government, and under orders of Government, expended large sums in continuing and repairing the revetment and in purchasing lands partially washed away or threatened erosion by the sea.

Under Section 25 of the Act the following property became vested in the Trustees.

I. The North and South arms of the Harbour with the area enclosed therein & all the foreshore lying within the limits of the Port as defined in this Act excepting only that piece of ground situated east of the Beach Road being known as the Custom House Iron Yard and now in the occupation of the Emigration Department and also the piece of ground situated east of the same road occupied by the office of the Deputy Commissioner of Police and

6858

2. The pier the jetties constructed and the moorings laid down by Government and any line of railway constructed by the Government for the purposes of the Harbour within the aforesaid limits.

The Port is defined as follows:-

To the North A line running due east from the pillar which marks the extreme north western limit of the said port to 10 fathoms of water.

To the South A line running due east from the pillar which marks the extreme south western limit of the said port to 10 fathoms of water.

To the East A line running from north to south and connecting the eastern most points of the two before mentioned lines defining the northern and southern limits of the said port and

To the West Within the limits of the artificial Harbour a line marked by boundary pillars running from north to south and connecting the shore ends of the Harbour groynes abutting on the Municipal Road and without the limits of the artificial Harbour a line running parallel to the waters edge between the northern and southern limits at 50 yards above high water mark, spring tides provided that between a line running due east from the Military boundary pillar near Messrs Parry & Co's office on the North and the mouth of the Cooum River on the south the western limit shall be the waters edge itself.

Vide Notification Marine Department Fort St. George Gazette June 1886 page 525.

The revetment in question is within the limits of the Port but not of the Harbour as defined by the Act.

Under Section 33 of the Act the rents income and property&c and all monies acquired by the Board shall be applied inter alia as follows:-

(3) The execution and maintenance of works undertaken and

(6) Generally for the purposes of this Act.

Section 60 provides that the Board may execute such works as they determine to be necessary or expedient for the purposes of the said Harbour.

Section 2 Sub sec.3 defines the Harbour as "the artificial

15

Harbour at Madras consisting of the enclosing groynes and the enclosed space and the corresponding foreshore east of the Beach Road and all buildings structures or appliances provided &c.

Section 6I of the Act defines what "such works" referred to in section 60 are to consist of!

Section 68 provides for the consequences in the event of the Trustees allowing any work constructed by them or vested in them under the Act to fall into disrepair or if they do not complete any work commenced by them, or do not proceed to carry out effectually any works or repairs which are necessary. in the opinion of the Governor in Council for the purposes of this Act.

Section 87 provides for the limitation of suits and that the Board or any of its officers and servants shall not be liable for any act bona-fide done or ordered to be done by them in pursuance of this Act.

On perusal of the Act Counsel will, we think, observe that no liabilities other than those provided for by section 29 attached to the Trustees when the Act came into force, though they are debited with the sum of Rs.2.83,891 (Vide schedule B to the Act) which was the sum expended by Government on the revetment up to the time the Trustees were appointed.

Counsel is requested to advise.

I. Assuming the theory of Government as to the originating cause of the damage done to property at Royapuram as stated above is the correct one, are the Trustees liable for the damage.

2. If so can the Trustees legally devote any part of the monies acquired by them for the purposes of extending the present revetment, of repairing and maintaining either the present or the extended revetment, of taking other precautionary measures to prevent the erosion to property not vested in the Trustees by the sea and of compensating owners of property for damage caused by such erosion? The revetment will be of no benefit to the Harbour except in so far as, if the Trustees are considered liable for the damage, the maintaining &c, of the revetment may assist to minimize such damage.

3. Are the Trustees by reason of their having extended and repaired the revetment and of their having paid compensation to owners of lands alleged to have been damaged by erosion by the sea estopped now

from denying their liability to maintain the revetment and pay reasonable compensation.

If Counsel should answer question 2 in the negative then he is requested to advise on the two following questions.

4. Have the persons who are or were Trustees when the moneys were expended for the revetment become liable in any way for the misusance of the funds, and if so to whom.

As regards this question we may mention that the Trustees send in their administration report with full a/cs showing the purposes for which moneys have been expended year by year to Government and the a/cs are duly audited by a Government official.

5. What action should be taken by the Trustees in the event of Government ordering them to repair or extend the revetment under section 68? If Government so ordered the Trustees and the latter in pursuance of such order expended moneys in the repairing or extending the revetment would the Trustees, all or any of them, be liable and if so to what extent and to whom for the misusance of such moneys?

submits there seems little, if any, danger of determining at so low a

Genl / Mas 1005/98

OPINION.

ANSWER TO QUESTION (I) Assuming that the theory of Government as to the originating cause of the damage done to property at Royapuram is the correct one and regard being had to the fact that the liability of the Harbour Trust for the sums expended by Government on the revetment up to the time the Trustees were appointed under Act II (Madras) of 1886 is provided for by Section 29 and Schedule B of that Act. I have only to consider the liability of the Trustees after the passing of that Act. I am of opinion that under the General law the trustees are liable for the continuance of the cause of the damage done to the property at Royapuram.

ANSWER TO QUESTION (2) I am of opinion that the Trustees can legally devote a part of the monies acquired by them for the purposes of extending the present revetment, of repairing and maintaining either the present or the extended revetment, of taking other precautionary measures to prevent erosion to property not vested in the Trustees by the sea and of compensating owners of property for damage caused by such erosion. It is true that these are works not contemplated by or included in Sections 60 and 6I of the Madras Act II of I886 yet under Section 33 of that Act the Trustees have power out of the monies acquired to apply monies for "the extension and maintenance of works undertaken" and "generally for the purposes of that Act" The revetment in question was a "work" undertaken by the Trustees on their coming so to speak into existence after the passing of that Act in I886 and the Trustees can legally apply monies towards it. I also consider that the taking of precautionary measures is only carrying out the purposes of that Act. It has been held that a limited construction must not be put on the word "purposes" (see Attorney General Vs. Mayor of Brecon IO Ch.D.204 and 215). The Trustees also can clearly compensate owners of property for damage caused by erosion as they are under the law liable to pay for the damage caused by their acts.

The other questions do not arise in the view I take of the question No. (2).

(Signed) C.G.Paul,
Advocate General of Bengal.
19th July 1898.

Marine Current No. 1024/98

Marine (1897 8) Department.

CURRENT No. 102

The Hon Sir Henry Bliss K.C.I.E.

For Orders 76 P.

This proposal to return this estimate with reference to the orders passed in G.O. + request that it may be re-submitted on the lines directed therein. Meanwhile the Chairman H.T.B. may ~~be~~ informed that there is no objection to the use of sufficient small stone to fill interstices. The fault of the existing revetment is that it contains much too large a proportion of small stone.

H. Bliss

S: P
preserved note

This may be done at once. But with reference to the amendment of the estimate, I should like to see the G.O. referred to which is not put up. Reading ss. 64, 68 & 69 of the Act together, I think Govt. have the power to order estimates sent up by the Bd. to be altered as it thinks fit. But it seems to me a rather dangerous thing to take an entirely new departure in matters of this sort. Apparently the style of work proposed by the Ch. is very much more expensive than the work hitherto executed & it seems to me that it would be rather risky to embark at once on this more [illegible] work for the whole length of the [illegible]

18.8.98

This referred to is specially [illegible] in the Draft G.O. in the linked file

[illegible]
2.9.98

+ note
The Go. referred to was sent to the Finl. Dept. for c i [illegible] in the G. [illegible]
It has not yet come back
[illegible]
20/8

From
The Chairman,
Harbour Trust Board,
Madras.

No. 1756

Dated 11—8—'98

Despatched " — " — "

Received 13—8—98

Enclosures 11 (+1 plan) ~~Plan, Estimate, resolution & copies of correspondence~~

Spare copies

SUBJECT.

Submitting for information and orders of Government a tracing showing a typical cross section and estimate for a protective revetment north of the Harbour with concrete blocks.

64

submits there seems little,if any,danger of undermining at so low a

BACK PAPERS.

G. O.	No.	Department.	Date.
G.O.	524	Mar	20-6-1898
G.O.	426	W	16-9-189
Res. to G.O.	No 4/426 W		16-2-91

…ying some experiments on short
…ther. However, let me see the missing

KS
23/8/98

77P

The G.O. has been sent to Madras by Financial & has not yet returned. It merely requested the H.T.B. to submit proposals with estimate for protecting the foreshore, so as to give the Bd's Engineer the opportunity of submitting his own proposals which could be altered or amended by Govt. — I am not at all wedded to my own proposals &, in the light of the estimate now submitted, I fear they are likely to prove beyond our means. That is why I proposed in the G.O. above referred to to give the Bd a free hand … estimate …

FURTHER PAPERS.

G. O.	No.	Department.	Date

78P

After discussing the matter with Mr deWinton, I find that the G.O. he referred to in his note of 18/8/98 hasn't yet issued — I therefore think that the safest way will be to say that Mr Wilson has correctly understood the C.E.'s suggestion as to the use of stone of all sizes up to 2 c.ft.; that Govt. will leave it to the Bd. to ~~[illegible]~~ … upon the revetment as they may be advised by their Engr.; but would suggest that in the corner formed by the shore & the N. groyne, which is peculiarly exposed to attacks of the sea in the N.E. monsoon, and for so far up the shore as valuable buildings extend, it will in the long run be more economical so to construct the revetment that it shall be capable of withstanding such a sudden attack of the sea as occurred last Dec. —

KS
2/9/98

I don't see my way clearly in this matter & should like to speak to the C.E. about it

KS
26/8/98

Marine Current No 1024/98

Harbour Trust Office,

MADRAS, 11th August 1898.

No. 1756

73P

FROM

J.N.Atkinson Esq I.C.S.,

CHAIRMAN, HARBOUR TRUST BOARD,

MADRAS.

To

W.B.deWinton Esq,

SECRETARY TO GOVERNMENT,

Marine Department.

Sir,

In continuation of correspondence ending with my letter No.1141 dated 10th June I have the honour to submit herewith for the information of Government, and for favour of orders, a tracing showing a typical cross section, and an estimate amounting to Rs 6,10,162 for a protective revetment with concrete blocks forming a continuous sea wall from immediately north of Clive's Battery to the north end of the present loose rubble protection. This estimate has been prepared by the Board's Engineer, and has been considered by the Trustees. A copy of the Board's resolution accompanies these papers.

G.O. 524 Mar
20.6.98
Flag A

Whoever may have to pay for the work, it is presumed that it will be carried out by the Board's Engineer; orders are therefore requested on his suggestion that large and small rubble should be used together, and not large stone only.

I have the honour to be,

Sir,

Your Obedient Servant,

J. N. Atkinson

Chairman,

Harbour Trust Board.

C.P.

Secy.

[illegible] 60

Estimate for a Sea Wall along existing Protective Revetment.

E 120.
50,000—12-7-7.

ESTIMATE FORM.—Detail Measurements..

Detail of Work.	Number.	Measurements in Feet.			Area or Contents.	Total Quantity of each, description of Work.
		Length.	Breadth.	Depth.		
1	2	3	4	5	6	7
Estimate for laying a Sea wall in front of the existing Protective Revetment and filling in backing with rubble stone to protect the foreshore and property North of the Madras Harbour						
Cost of removing the All round Titan Crane to site of, Commencement of Works						
Supervising and gang labour in removing and travelling the Crane along the Beach Road						Rs. as. p 350-10-6
Labour in cleaning, carrying, laying and fleeting rails						300-0-0
Labour in making up and packing the Roadway ready for the Titan lines						250-0-0
300. Cft. Teakwood runners fitted with double Titan steel rails @ 4/-/.	1	200'	18"	12"	300	1200-0-0
150. Broad gauge sleepers (Erool wood) @ 4/-/. each	150	8½'	10'	5"		712-8-0
						2813-2-6
Add 5 % Contingencies						140-13-6
Total cost of travelling the All round Titan Crane, from the South Pier to site of Work.						2954-0-0
Add Labour in returning crane to works after completion of work.						945-0-0
Total Cost of removal, and return of Crane, after carrying out the work						Rs. 3899-0-0

ESTIMATE FORM.—Detail Measurements

Detail of Work.	Number.	Measurements in Feet. Length.	Breadth.	Depth.	Area or Contents.	Total Quantity of each description of Work.
1	2	3	4	5	6	7
Cost of 1 Lineal foot of revetment or sea wall as per accompanying section						
Concrete in Block work	1	18'	1	6	4 cyds @ Rs 11/-/-	Rs 44-0-0
10⅓ Tons, Large & small rubble as backing packed at 1/9/- per ton						Rs 16-2-4
Labour in dredging into present Revetment to found the 30 Ton block at 4 ft below Do: H. M. S. level at Rupees 2 per Ll ft.						Rs 2-0-0
Setting the concrete blocks with the All Round Titan Crane per Ll ft						1-8-0
Labour in supervision, and levelling up the foundation to receive the blocks					@ 1/8/-	1-8-0
						65-2-4
Add 1½ percent for use of Tools and Plant						0-15-8
Do 5 percent Contingencies on above						3-4-1
Total Cost per Ll ft of revetment after completion of present Estimate						69-6-1
Add cost per Ll ft of present estimate pending sanction, (Estimate relating to revetment proper viz Rs 61790 (Rs 64152) for 7025 ft) - - - - - - -						8-12-9
Total Cost per Ll.ft of the proposed revetment or concrete sea wall backed with stone, complete, including the work already proposed						Rs 78-2-10

Madras Harbour Trust Board }
July 1898

A. Lee Pogson
Engineer, Harbour Trust Board

[illegible]

Estimate for a Sea Wall along existing Protective Revetment.

ESTIMATE FORM.—Abstract.

Quantity.	Description of Work.	Rate.	Per	Amount	Total.
1	2	3	4	5	6
		RS.		RS.	RS.
	Cost of building a wall to protect the foreshore from the Boatshed to Carlton House, protecting the Madras Railway station, Railway stores, Biden Home, The new Dutch Oil depôt at Royapuram, Shand's Cotton Press and Carlton House.				
2590. Ll ft	Of Sea Wall	78-2-10	Ll ft	202478-10-4	
	Add cost of travelling & returning the All Round Titan Crane, to works			3899-0-0	
A	Cost of building Sea Wall up to North end of Carlton House.				206377-10-4
	Or, for protecting the whole length of the present revetment, with a concrete and stone sea wall, from Boatshed to Carlton House, as above			206377-10-4	
B 5165 Ll ft	From Carlton House to extreme end of present revetment of sea wall	78-2-10	Ll ft	403784-10-2	
	Total for the complete sea wall throughout the length of the present revetment				610162-4-6

Grand Total of Estimate .. 610162-4-6

STATION Madras Harbour Trust Bd }
Date 26th July 1898. }

A. Lee Pogson
, Executive Engineer.

(E. No. 132.)

50,000—12-2-97.

Circle—

Division— Madras Harbour Trust.

District— Madras.

Taluk (or Estate in case of Estate Works.)

Enclo. to No. 453

ESTIMATE FORM.—Abstract.

Financial Head—

Budget Head—

Departmental Head— Protective Works

Main Head— Capital account

Sub-Head— Sea Wall.

Project of which the work forms part— Protective Works.

Section—

Name of Work— Constructing a Concrete Sea Wall North of Harbour

Amount of Estimate, Rs.— A = 206377-10-4
B = 403784-10-2

To be carried out by—

REFERENCES.

Estimate accompanying Engineer's letter No. 453 dated 26th July 1898.

Enc 2
Mar 10/24 158

No.363

From,
The Engineer,
Harbour Trust Board.

To,
The Chairman,
Harbour Trust Board,
MADRAS.

Madras Ist July I898.

Sir,

× G.O. 524 Mar 9
Hoy-A

I have the honour to acknowledge the receipt of G.O.No.II4I dated 20th June I898,received under your endorsement No.265 E; dated 22nd June I898,directing that the repairs to the revetment should be proceeded with at once,and have the honour to inform you that the line of rails is now laid,and that I have a large quantity of stone ready for delivery,which will commence on Wednesday the 6th July when the new Locomotives will be delivered by the South Indian Railway Company.

2. Before the work is proceeded with I wish to be placed in possession of clear orders,as to how the work is to be carried out,as a suggestion has been made that the revetment be sloped and packed with large stone at a slope of I to I,and set in Portland Cement concrete with,certain toe blocks &c.I presume the proposal refers to the suggestions made,as sketched out by Mr Wilson,forwarded under your endorsement No.259 E dated 20th June I898.

3. As Mr Wilson is not aware what form a cross section of the revetment,takes below sea level,and how far the toe of the revetment extends to sea,I submit a true section at II00 feet on the revetment,which is a very fair section of the work throughout.

4. The section suggested,cannot be carried out,as it would be impossible to excavate below water level in a surf, or level down the rubble stone;or place a toe block as proposed,by any machinery or labour, due to the constant heavy seas breaking along the revetment;and as to setting the rubble stone in cement concrete,such work is impossible unless the water is absolutely calm.

5.

5. The slope proposed is also too steep, as the sea has shown us what a slope the revetment now stands at, and anything steeper will be washed down to the present slope.

6. ✓ The section suggested, is therefore as unsuitable for a marine work as it well could be, and is only suitable for river or canals &c.

7. Apparently the idea is that the wave striking the revetment does the damage, this is not so, but it is the receding wave which sucks the stone away with it, unless the slope of the stone is so gradual and compact, that the water can only roll back over it, hence the reason the toe of the revetment having travelled so far seawards. It has long been known that it is the return or sucking action of waves which damages such works; large bags of concrete are more costly than stone, and have been thrown about as easily as the stone itself, and even concrete bloc weighing ten times the weight of the toe blocks now proposed, have been sucked out of Marine Works; and with the same action here, the section proposed, even if it could be built, would be wrecked in the first heavy sea, and be no more protection to the land behind it than if simple rubble stone had been used at a much less cost.

8. The real toe of the revetment extends to 195½ feet from the oil godowns; and there, is where the toe should be placed to prevent the whole mass of stone from being drawn, or sliding down seawards, which movement appears to be the result of the sand being scoured away from the toe in deep water, in passing up the coast.

9. I have no doubt that the whole section bodily slides gradually into deeper water, as the sand is eroded away or leaves the toe of the revetment at about 195½ feet from shore, and therefore the costly work now proposed nearer shore, would not stop this sliding action, and the work proposed would only mean unnecessarily using concrete, where stone would suit equally as well at a much less cost, as it must eventually, or so long as erosion goes on, (whether of concrete or stone) all disappear into the sea; while, if the work was of stone, it could be fed with additional stone, but if concrete is used, it will require a complete new line of blocks and revetment each time repairs are necessary.

10. I have been for days watching the action of the sea at the revetment, with a view to carrying out the suggestions made, if possible, but find that it cannot be carried out, and I cannot suggest anything

more satisfactory or lasting than repeating the stone revetment as formerly carried out, with large and small stone, and when necessary, feeding it with additional stone, as the sea draws it down; this was the opinion of Mr Parkes and Sir A.Rendel after he had seen the work for x himself, I must therefore ask for permission to proceed with the work as formerly, or beg that a section may be sanctioned by Government, with orders in detail as to how it can be successfully carried out, as the Board should not be held responsible for the failure of any expensive concrete work.

II. I must also ask for definite and very early orders as to the size of the rubble to be used, if any change is to be made, as stone of not less than 2 cubic feet has been specified, which is in my opinion, and from past experience, a mistake, and is not now used in any Marine works. ?

I2. The use of all large stone, without any small stone, to fill in the interstices between the large stones, will simply mean that the sand will be sucked through the revetment from behind it, and as soon as this backing of sand, has disappeared in this way, subsidence must take place, and later on breaches occur. We have a good example of what sand can get through by wave motion, in the South Pier, where the holes are considerably smaller than the interstices left in rubble not smaller than 2 cubic feet, nothing but a compact mass of stone will answer the purpose.

I3. The work was originally started, and tried with large stone only, known as "boulders"; but it was soon found that sand leaked through it, large and small stone was therefore used, as in the Rubble Bases, to form a compact mass of stone.

I4. The proportions of large and small stone should be such that the smaller stone, will thoroughly fill in the interstices between the large boulders, and thereby form the compact mass necessary which alone will prevent the sand from passing through the revetment.

I have &c,

Signed A.Lee Pogson,

Engineer, Harbour Trust Board.

Emly
mar 10/24/58

№ 298E
4-7-98

Returned to the Engineer. Is it possible that the section taken was on site of one of the groynes formerly put out? Another section midway between the site of any two of the former groynes would be advisable.

The breach at Shand's Press should be filled in at once, with whatever stone is at hand. The rest of the work can await further orders. An early reply to above query is requested.

Signed J.N.Atkinson,
Chairman,
4-7-98.

Gw 5 / [illegible] 10 Jul 98

No.377

From,

The Engineer,
Harbour Trust Board,
MADRAS.

To,

The Chairman,
Harbour Trust Board,
MADRAS.

Madras 4th July I898.

Sir,

I have the honour to return my letter No.363 dated Ist July,in original,bearing your endorsement No.298 E of this date,and in reply have the honour to state that in fixing on the position of the section of the revetment I have submitted,I carefully avoided the positions of any of the old groynes,and the section taken was over 80 feet to the north edge of the nearest groyne,and in other places I have found stone at about the same distance from the shore.

2. On the first opportunity,and when there is no swell,I will take another section exactly between two of the original groynes,but it is a most difficult survey to make as a boat cannot live in the swell,and the soundings have to be taken from a catamaran.

3. As ordered I will proceed at once to fill up the breach at Shand's Press with large and small stone mixed-i.e.whatever I had already quarried before the receipt of the order for large stone,but final orders should be issued as soon as possible,so that I can continue with the work,as my two Locos;I am glad to say arrive tomorrow morning (Tuesday)

I have &c,

Signed A.Lee Pogson,
Engineer,Harbour Trust Board.

No 1490
5-7-98

Chairman's endorsement

Forwarded to Mr Wilson for remarks on the Engineer's letter No.363 dated I-7-98.

Signed J.N.Atkinson,
5-7-98.

submits there seems litt ,if any,danger of undermining at so low a

Em 6 / Mar 10/11/58

Public Works Secretariat,
Irrigation Branch,

Ooty,
7th July 1898.

To,

The Chairman,
Harbour Trust Board.

Sir,

With reference to your endorsement No.1490 dated 5th instant regarding revetment North of the harbour I have the honour to request that I may be supplied with the following information as early as possible.

(I) The lengths of the two pieces of revetment
  (a) that first put down
  (b) the further extension.

(2) The total quantity of stone put down in each length and cost with dates of commencement and the last date that maintenance stone was put down prior to the current year.

What I want to arrive at is the amount of money spent on the revetment each year since it was first put down until the present year so cost of railways &c should be included.

(3) The amount spent in repairing the hole made this year at Shand's press.

The question as to what kind of section should be adopted for the revetment depends to a large extent on cost. I therefore want to make out what it has cost per annum up to this year.

I have &c,
Signed F.J.Wilson,
Local Consulting Engineer.

No.310 E

9-7-98.

Copy forwarded to the Board's Engineer for compliance.

(By Order)

Signed C.Pinsent,
Secretary,
Harbour Trust Board.

No.410

---

submits there [illegible] litt[illegible], if any, danger o[illegible] [illegible]mining at so low a

Gen 7
Mar 10/11/68

No.4I0

From,
The Engineer,
Harbour Trust Board,
MADRAS.

To,
The Chairman,
Harbour Trust Board,
MADRAS.

Madras I3th July I898.

Sir,

In reply to your endorsement No.3I0 E, dated 9th instant, calling for information as to the original cost of revetment, length &c, I have the honour to reply as follows:-

I. Length of the original revetment or first portion put down up to February I89I ---------------------= 3700 L.ft.

II. Second length or "Extension" commenced in May I89I and completed in June I894.----------------= 3325 L.ft.

The total quantity of stone put down in each length with cost from time to time is shown in detail in the statement herewith.

The cost of the recent repairs in December I897 and January I898, is also shown therein as Rs 2238-I5-7.

I have &c,
Signed A.Lee Pogson,
Engineer, Harbour Trust Board.

Ootacamund,
I3th July I898.

From,
F.J.Wilson Esq,
Local Consulting Engineer,
Madras Harbour Trust Board.

To,
The Chairman,
Madras Harbour Trust Board,

Sir,

With reference to your endorsement No.I490 dated the 3rd instant and in continuation of my letter asking for information as to the cost of the maintenance of the present revetment north of the Harbour, I have the honour to say that as it is of some importance that the subject of your letter should be settled at the earliest possible date that I have determined not to wait for this information but to deal with the Engineer's letter at once with such information as I have at hand.

2. The number of the G.O. referred to by Mr Pogson has apparently been misquoted and is No.524 Marine dated 20th June 1898. Mr Pogson is mistaken in thinking that the instructions conveyed in this order have any reference to a section drawn out by me, although a section submitted by me to the Board with my note of the 22nd February last and to which Mr Pogson alludes would meet with the suggestions contained in the order. In that note I gave my reasons for thinking it possible that the system of throwing stone down and allowing it to take its own slope could be improved upon and I suggested that some such section as I drew out might be tried in the first 2000 feet of revetment. As Mr Pogson has taken it upon himself to say that this section is only suitable for a river or canal I may say that it is almost an exact copy of the sea face of the redamation embankment at Leith constructed in connection with Leith docks and of which works Sir Alexander Rendell was the Engineer in Chief. My idea was that it was worth considering whether it would not really be cheaper in the end and more satisfactory to put down at once such a protective face as would withstand the attacks of the sea, rather than to continue throwing in stone which it was clear would not withstand these attacks and which form a constant source of expenditure not only for maintenance of the revetment itself but for damage to valuable property in its rear. The suggestions to which attention is directed in the G.O. under reference appear to have the same object. Mr Pogson is apparently of opinion that no improvement can be made in the system adopted up to now to protect the foreshore and says he can suggest nothing more satisfactory, but it seems to me that this system which has resulted in a breach, made in a day, and damage to property behind the revetment for which a claim of Rs 30.000 has been made is eminently unsatisfactory and that his opinion is not backed up with sufficiently obvious reasons to render it wise to abandon any attempt at improvement. Mr Pogson himself says that for efficiency the slope of the stone should be so compact that the water can only roll back over it and that concrete blocks ten times the weight of the toe blocks shown in my section have been sucked

out

the toe would get undermined, but judging from the section that is now out of Marine works, and I understand his agreement to be, that as you cannot obtain to sufficient compactness and weight of blocks that it is better to use simple rubble which will be cheaper and more easily replaced. I think that in a work of this description he must be a very bold man indeed who will venture to positively predict the result of this or that treatment. In November 1890 Sir Alexander Rendell said with reference to the revetment, "Madras has the disadvantage of having practically "no tidal rise so that there is but little slope to be paved where "paving is so useful, I mean between high and low water mark-all that "can be done is to throw in hard material so that it may may be dragged "down by the sea at its pleasure. If this process be unsuccessful as I "feared it might be when I was on the spot, it may be necessary to deposit a line or lines of large blocks of concrete somewhat similar to "the wave breakers used outside the breakwaters along and probably also "at right angles to the shore, at of course a heavy expense. This matter "is in my opinion the gravest relating to the Harbour at present."

PMG No 426 W of 16" Feb:/91

3. Colonel Pennycuick the Chief Engineer thought that concrete blocks x could have no such superiority as to justify their enormous expense, and that there was no danger to the portion of the shore protected by the then existing revetment, but that its maintenance must be accepted as a constant source of expenditure and that it would require frequent feeding for some years to come. This was over seven years ago and unless it be assumed that the maintenance of the revetment has been wrongfully neglected we have practical proof that there is danger to the foreshore as evidenced by the damage to Shand's Press. The next building to go might be Carlton House, the Biden Home or Messrs Arbuthnot & Co's new kerosine oil depot. I prefer to assume, however, that no reliance can be placed on the protection afforded by a loose rubble bank at so short a distance from these buildings in the event of such waves as occurred last December. It is this action of the sea that is to be feared, that is, the sudden onslaught which may cause a breach in a night and not any gradual subsidence or movement of the stone due to travel of sand northwards or from whatever cause. The latter action can no doubt be met by constant feeding of the bank with rubble, but if the bank so formed can be so completely damaged as was the case last December, we must face one of two alternatives either (I) we must accept the risk of damage to the valuable property behind the revetment or (2) we must go the expense of some

x Ex. G. [illegible] 16.2.91 parag of Chief Engr's note form of protection as will reduce this risk to a minimum. To determine which of the two alternatives is the better it is only necessary to examine what each can be expected to involve.

4. As regards the first alternative we have first the risk of damage to the buildings I have mentioned, which may occur on the occasion of a storm. I gather from a letter of the Chairman's that we have already spent some Rs 7,98,038 on the existing revetment. We have spent some Rs 2,000 in closing the breach at Shand's Press; another estimate of Rs 64,879 is before us and a claim for Rs 30,000 has been made on account of the damage to Shand's Press itself. The total of this is Rs 8,94,917 and I make out roughly from the plan of the revetment in the Administration Report of 1895-96 that it extends over a length of about 7,250 feet. This therefore represents an expenditure of about Rs 123 per foot run. It should be possible to make out how much of this amount is likely to be an annually recurring charge. The amount of the present estimate Rs 64,879 and Rs 2,000 for repairing breach amounts to about Rs 9 per foot.

5. As regards the second alternative, there can be little doubt that putting aside the question of expense a section could be devised which would render a sudden breach such as occurred in December last next to impossible. Sir Alexander Rendel himself has suggested a line or lines of concrete blocks similar to the wave breaker blocks, and this would probably be the best way although the most expensive. Mr Pogson objects to the section I suggested on the ground of the difficulty of execution in putting in the toe. This difficulty no doubt exists; it might possibly be overcome by digging a trench in the revetment with a Priestman's grab depositing the stone so excavated on the sea-side of the trench to protect the trench from the breaking waves - if necessary blocks might be temporarily placed on the top of this stone again until the toe was made. The blocks forming the toe could be made large enough so that their tops would be uncovered at low water to enable the rest of the work being proceeded with. Another of Mr Pogson's objections to such a section is that the toe would get undermined, but judging from the section that he now submits there seems little, if any, danger of [illegible]mining at so low a

concrete blocks [illegible] hat such

per foot run [illegible] f the blocks were such [illegible] f rubble out at Port Said it

[illegible] has be[illegible] ont think the fewer be paved with rubble for 195 feet and at a slope of about 1 in 7 up to M.S.L. Above M.S.L. the slope is much steeper. The Plymouth breakwater consists of a mound of rubble which has a very flat sea slope at low water level, but above low water the slope is protected with pitching set in cement in accordance with the generally accepted theory that it is between high and low water level that a rubble bank most requires special protection. I am inclined to think therefore that with a long flat slope rubble below low tide level such as is shown on Mr Pogson's section and which he says is general a built revetment of solid concrete or stone set in concrete or sufficiently large blocks founded from some feet below low water and the top of the bank should be sufficient to prevent accidents such as occurred to Shands Press. Any gradual subsidence or disturbance of such a revetment could and should be remedied in time. There remains the question of expense. On this point I have not got a sufficient figures to give a definite opinion but as I have said above, the present estimate represents an expenditure of about Rs 9 per foot. How long will it be before another estimate of like amount will be required? In other words what may we expect the annual maintenance with the system to amount to. If we say three years, then the amount would be Rs 3 per foot run and this takes no account of possible damage to buildings. So far as I can make out again, we have spent about Rs 123 per foot run in the revetment in some 18 years this amounts to nearly Rs 7 per foot run per annum? At 4½ per cent an annual expenditure of Rs 3 per foot run represents capital of Rs 66 per foot run or one rupee per foot run annually represents a capital expenditure of Rs 22 per foot run at the same rate. Assuming Rs 3 per foot run to represent the annual maintenance with a loose rubble face and if a stronger section could be designed which would probably reduce maintenance to one rupee per foot run or less, then such a section would not really cost more to those responsible for the upkeep of the revetment if it did not cost more than [illegible] per foot run and in addition (and this is the important point) the risk to property in rear would be reduced to a minimum. A row of cement concrete blocks would probably no[illegible] hat such [illegible]re than from Rs 33 to Rs 40 per foot run [illegible] f the blocks were ma[illegible] f rubb[illegible] out at Port Said it [illegible] has be[illegible] sent think tthe fewer [illegible] of Portland cement [illegible] [illegible]d it and Government has expressed an opinion as to the class of work that should now be done, any detailed proposal now made should either be in accordance with this opinion or be supported by sufficient reasons to deviate from it. To admit of Mr Pogson's proposal to adhere to the old system of feeding the revetment being sanctioned it seems to me that he should support his proposal with figures somewhat in the manner that I have indicated above, to show that it could reasonably be expected to be considerably cheaper than any thing more substantial. As I have said above I think that the result of adopting one course or another must be to a certain extent a matter of uncertainty until we have had practical experience, our experience of the old system seems to me to have been unsatisfactory but as Mr Pogson holds a contrary opinion I think he should draw out and determine a rate per running foot for different classes of section comparing these with the cost of the present section including upkeep and then the orders of Government might be asked for.

6. My own opinion is that a section that might be considered sufficiently good for those parts of the revetment behind which there is no property of any special value would not be suitable for the other parts behind which there is such property. Even if an examination of the cost of different classes of section goes to show that the old system is the cheapest I would advocate another section being tried at any rate on a selected length of revetment. As regards the part of the revetment where there is no property of special value in rear I should be inclined as I have already recommended in a note of February last to leave the sea face at the slope of about 4 to I that it has adopted by itself except in irregular bays which should be filled up and pile additional stone in rear of the existing face. As regards the specification for the size of stone to be used it seems to me obvious that the intention of the Government order is that the bulk of the stone to be used should not contain less than 2 cubic feet, as all packed stone revetments consist of large stones the interstices of which are filled with small stone. It has to be decided to what extent packing is to be done on this part of the revetment. I think unless a regular packed revetment face is intended in which case each stone would be fitted into its place that a certain amount of discretion [illegible] left to the Engineer who carries out the work. I think [illegible] [illegible] stone and the fewer [illegible] left [illegible]

of Portland cement [illegible]

its own section by the action of the sea, I think it would be even economical in the long run to pack stone into these interstices which appear to be sources of weakness. The only other point which appears to me to call for remarks is the statement on the section submitted by Mr Pogson that the height of a wave on a calm day was measured as 8 ft above sea level. The depths of the sea at different points are given to the nearest inch. I presume Mr Pogson does not mean that the waves are never less than 8 ft in height but without a note of explanation the information given on the section might be misunderstood.

I have &c,
Signed F.J.Wilson,
Local Consulting Engineer.

No.336 E

Madras Harbour Trust,
Secretary's Office.
18th July 1898.

From,
The Secretary,
Harbour Trust Board,
Madras.

To,
The Engineer,
Harbour Trust Board.

Sir,

I am directed to forward and have the honour to enclose herewith copy of letter from the Board's Local Consulting Engineer dated Ootacamund 13th July and am to request that you will "draw out and determine a rate per running foot for different classes of section comparing these with the cost of the present section including upkeep" vide the concluding portion of para 5.

I have &c,
Signed C.Pinsent,
Secretary, Harbour Trust Board.

No.453

From,
The Engineer,
Harbour Trust Board,
MADRAS.

To,
The Chairman,
Harbour Trust Board,
MADRAS.

Madras 20th July 1898.

Sir,

I have the honour to acknowledge the receipt of your letter No.336 E, dated 18th instant, forwarding a letter dated 13th instant, from Mr F.J.Wilson, reporting further upon the proposed section of the protective works.

2. The section proposed by Mr Wilson is marked "Section at 1100 feet" and as it was sent to me in connection with the work, I presumed it would not have been drawn out, had it not been intended for the work, and I therefore pointed out its unsuitability for the work. For the work for which the original Leith Section was designed by Sir Alexander Rendel it suited, but Sir A.Rendel would never have suggested such a section for the Madras revetment, where there is little or no range of tide. What can be built at Leith cannot be built at Madras.

3. I have the plans of the Leith Harbour and Docks before me, and the reclamation embankment is high and dry at low water spring tides, in fact the low water line is as far as 600 to 1400 feet away and clear of the embankment, which is also protected by the Martello tower rocks, Middle Craig and East Craig banks, and therefore there can be no comparison between the two works. The Leith work could be carried out on dry land at low water, and concrete of any description used, whereas such a work is impossible at Madras.

4. Mr Wilson's proposal to adopt a new form of revetment or sea wall is apparently for two reasons.

First, Expenditure on maintenance.

Second, the breach made in the revetment for which a claim of [illegible] has been made.

of Portland cement [illegible]
[illegible] d. it

[illegible] 8 / [illegible] 98

5. To the first objection, the reply is that there has until now practically been no maintenance expenditure necessary on the revetment works for the past four years and the expenditure now, is as low as the rate of Rs 8-12-0 per L.foot of revetment, or Rs 2-3-2 per L.feet per annum, while any massive concrete work would require regular attention, cost no less in maintenance, and when damage did come about, the cost of repairs, would be enormous, and therefore I repeat that the stone revetment cannot be improved upon.

6. Regarding the second objection, "a breach made in a day" and a claim of Rs 30,000, it is my opinion that if the sea caused the breach in the stone revetment by striking its eastern face, a breach would have been as easily made in any concrete block revetment, as in stone work, as at present; and if the sea is thought to have caused the breach, how was it that with the same force of sea throughout the revetment, other breaches did not take place. The cause of the breach was not due to failure of the revetment, but to the bursting of the drain, and the seas thereby getting in behind the revetment; and in the same manner, or under the same conditions any sloping section of stone pitching &c would I consider, also be breached. Nothing but massive block work can withstand an attack of the sea from the shore side.

7. As to claim of Rs 30,000 this has been dealt with in my letter No.144 dated 12th May 1898 wherein I submitted an estimate for rebuilding or restoring the building to what it was before the breach took place, for Rs 3946-only.

8. I think any form of revetment, introducing mass or concrete work will be a mistake, and only so much money unnecessarily expended, unless it is for the reasons given in para 17 and then only, if placed, as shown in the section I have proposed, for such a work; otherwise I would, if more than an ample margin of safety is thought advisable, and funds are available for the work, outlay, half the sum of what it would cost to build a concrete work; in depositing on excess quantity of stone instead.

9. As to the permanency of concrete work on a moving foundation, let any one now look at the Railway jetty head, and be told that it was a huge mass of concrete blocks and well built; and he will soon be convinced which of the two systems is most suitable, and easily repaired,

ement should "not be

e in adding [illegible] tle stone to prevent undermining

3. He s

of Portland cement

displaced in this manner, the cost of replacing them becomes heavy, and if they are moved out of reach of a Titan Crane, other blocks must be built, equal in cost, to a new revetment; but I think if placed as I have proposed, they will move with the stone, without being overthrown.

10. In 1884 by orders from England, by way of experiment, sixteen-thirty ton concrete blocks were made at the shore end of the North Pier on the sea, or wave breaker side, built in Situ, upon a levelled up large rubble base, when the sea was absolutely calm.

11. To protect these blocks and to prevent movement, there was a large quantity of stone placed in front of the blocks, but not-withstanding this precaution, three months later, there was a heavy sea on, and these 16 huge 30 Ton blocks were all but four scattered in every direction by being sucked or drawn away by the return waves, sliding them over the large stone; with the result that they caused such a confused sea after being displaced, as to undermine and open the centre point of the North Pier. Since then the remaining four blocks have also gone.

12. As these blocks proved that they did not settle or lower themselves into the rubble, and notwithstanding that they were built direct upon the rubble, so as to give them a firm hold to the stone, and were nevertheless washed away by the sea, I propose in my section accompanying this letter to excavate into the rubble, and to place the blocks below the level of the now consolidated stone, as well as to add a substantial toe or footing of stone in front of the line of blocks, and to set the upper block back, so as to prevent it falling forward, if undermined.

13. As Mr Wilson thinks I am "bold" in stating what will happen to blocks placed upon a stone mound, I produce 3 original photographs (to be returned) which show what happened to the sixteen 30 ton blocks mentioned above. The stone thrown up was large stone, and one of the boulders was weighed and found to weigh 16 cwts 2 qrs.

14. My remark that the slope should be gradual, and of compact stone for the water to roll back over it, does not mean that a sufficient compactness cannot be obtained with stone at a suitable or natural slope, but when a slope of 1 to 1 is proposed, and that of stone, and small blocks; such a work will certainly not allow the water to merely roll back over it w wing the blocks out of position, with the receding

should "not be

3. He s

of Portland cement

d it

15. The maintenance of the revetment has not been neglected, but it has from gradual settlement now become necessary to feed it with additional stone this year.

16. Because the revetment was breached due to a faulty drain, it does not mean that the revetment would not have been breached at the same spot by the drain, had there been twice the quantity of stone around the drain. In my opinion as the drain was the cause of the breach, and as the building can be rebuilt for Rs 3946-and not Rs 30,000 I would advise feeding the revetment with stone only in the manner proposed, as the present system of revetment has not proved faulty; or put in double the quantity of stone, by doubling the present estimate, and watch the results of a storm, rather than spend Rs 6,10,162 over a system, which I do not consider, is in any way superior to the present one, in the same position.

17. If it is thought advisable to advance the foreshore, so as to keep the sea at a greater distance from the more valuable property, now so near the edge of the revetment, it is another matter altogether, and with this object in view, I submit a section for the work, which I can see my way to success-fully carry out at Madras.

18. With reference to para 4, the length of the revetment and cost of constructing the same, since 1878 has been given in my letter No. 410 dated 13th instant, and the cost of the present maintenance comes out at Rs 8-12-9 per running foot for this year, or as there has been no maintenance necessary since 1894- 4 years, the annual cost of maintenance has been only Rs 2-3-2 per annum, per foot run.

19. Para 5- Mr Wilson writes "Mr Pogson objects to the section I suggested &c" and therefore as the section was intended for the revetment, I not only pointed out the difficulty of putting in the toe blocks, but the unsuitability of the section, and slope, to the work, with the fact that the work could not be grouted with cement as suggested, due to there not being a sufficient rise and fall of tide, and never quiet enough water at Madras to allow the cement to set, while at Leith where the section is copied from, all conditions are favourable for its execution in the original form and strength, adopted for that work.

20. With reference to underm[illegible]ing, or the toe blocks lowering them-[illegible]y, my opinion is, as I have already reported, that the vetment should "not be less [illegible] level [illegible]

3. He s[illegible] eawards on [illegible]

of Portland cement [illegible]

[illegible] d it

Original sloping sea bottom, and that the blocks would not sink into the consolidated stone, and therefore if the lower portion of the section or toe blocks, slide forward, undermining must take place, and then the whole steep slope of I to I pitched stone work, must tumble to pieces; if it had not previously been drawn down by the waves. Although the bottom of the sea is well paved with stone, I do not believe the stone is stationary, otherwise further stone would not be drawn into the sea each year, and this movement shows that the stone has no-where yet come to a state of rest, and so long as this action exists any form of mass concrete work, should be of the largest blocks, so placed as not to be overturned by undermining and with means provided for feeding the sea face with fresh stone as soon as the toe of stone is drawn away seawards from the bottom blocks, while if the whole revetment is sliding seawards, as I believe it is, the blocks should be so built, so that the whole line of blocks can move bodily seawards with the stone beneath it, without displacing them.

2I. To meet these conditions, as well as overcome the difficulty of carrying out the work in a constant rough sea, I submit the accompanying section, with the estimated cost at Rs 78-I0-2 per L. ft which includes the maintenance estimate now awaiting sanction.

22. I have shown the estimate in two sections viz.

Estimate A. The cost of a sea wall, from the Boat shed, on a line parallel and about 50 feet east of the present revetment railway lines &c, up the north end of the Carlton House compound, to protect and widen the Beach roadway in front of the Royapuram Railway Station, Railway stores, Biden Home, Dutch oil Company's new works, Shand's Press, and Carlton House at--- Rs 2,0 6,378

Estimate B. The cost of continuing the sea wall to the extreme end of the present Revetment at Cassimode ---------------------------------- Rs 4,03,784

Total cost of Sections A and B for forming a sea wall in front of the entire length of the existing Revetment -------------------- Rs 6,I0,I62

The cost of the annual maintenance of such a sea wall, I estimate will be [illegible]minin[illegible]s the present system viz Rs 2-3-2

affected

,my opinion is

r for

"vetment should "not be less

level

3. He

of Portland cement.

The information asked for is therefore-

The original revetment of large and small stone ,has cost	Rs 65-9-I0 per foot run
Maintenance of above,(present estimate pending sanction) if spread over the past four years.	Rs 2-3- 2 " " "

The proposed sea wall of concrete blocks with stone backing,and a stone toe for feeding purposes,along the whole length of the revetment,will therefore cost ------Rs 6,I0,I62 or $\frac{1}{3}$ of this sum if only built as far as Carlton House.

The cost of maintenance in feeding the stone toe, when it disappears from time to time,will probably be, the same as at present,as the stone will be drawn away from the toe,at the same rate as it is now drawn away from the revetment,and therefore the cost will probably be,for the whole length as above per annum --------------------Rs I7,045 as maintenance is the same in both systems.

23. The width of the revetment shown,or distance between the buildings and the east face of the concrete blocks,is necessary to permit of the all round Titan revolving,in dredging and setting the blocks.It is also advisable,if blocks are to be used,to place them at the distance shown so as to prevent the buildings from being reached by the spray,by the surf breaking upon the new concrete block sea wall.

24. With reference to para 6. As regards the section considered necessary to prevent a breach in the revetment from wave action alone,I am of opinion that what is necessary in one part of the revetment is equally necessary everywhere,regardless of the value of property behind it.

25. With reference to the size of stone no orders have yet been received as decisive,and I must soon know how I am to proceed with the work.

26. The G.O.directed that the stone to be used for "renewing the re-"vetment should "not be less ... ld be packed at a pro ... per

3. He s

of Portland cement

d it

Mr Wilson may consider the intention of the G.O.I have received smaller stone cannot be used to fill in the interstices, which Mr Wilson now points out should be filled in with smaller stone.

28. Before smaller stone can therefore be used, I must receive orders upon the G.O. modified accordingly.

29. Regarding "packing the stone at a proper slope" it is simply impossible to do anything by manual labour, other than to roll the stone into position, until it disappears below the water level and finds its own slope, and the impossibility of further moving a large boulder, after it has reached the water's edge, can any day be seen by the way men are thrown about by every wave that breaks upon the revetment, and therefore no attempt at packing the stone to a uniform slope can be made. The sooner small stone is permitted to be mixed with the larger stone the better, as the sand can now be seen being sucked through the large interstices in the large stone, for want of small stone being mixed with it.

30. On the section submitted, I showed a wave as measured 8 feet high, just before it broke, so as to point out the difficulties to be overcome incarrying out any such work. Ofcourse every wave is not 8 feet high, but even on a calm day at uncertain times, such a wave rolls in, and any work being carried out in trying to slope the revetment or put in concrete work would be swept away several times a day; but between such waves, there are never less than waves four feet high which renders manual labour impossible, and therefore the only method I can suggest for carrying out the work is by means of the All Round Titan Crane. As to the existence of such waves along the revetment, I shall be glad at any time to take any one on a catamaran, and to measure the wave with him. Between such waves, and the ordinary ones rolling in an unexceptionally calm day, accurate soundings can be obtained, but such occasions are very rare, and I may say that I waited some days before I was able to take the section submitted. Where the actual waves are, the depth is taken by levelling from shore, hence the depths of the sea being able to be given "to the nearest inch".

I have &c,

July 27th 1898.

To,

The Chairman,

Harbour Trust Board.

Sir,

With reference to your endorsement No.1276 dated 26th July 1898,I have the honour to suggest that the correspondence may now be submitted to Government for orders.I dont think there is really any great difference of opinion between Mr Pogson and myself I quite agree with him as to the use of small stone to fill up the interstices of the large stone.The question on which a decision is required is that referred to in the 17th para of Mr Pogson's last letter viz whether it is advisable to use a more expensive and stronger section of revetment in front of the more valuable property in rear of the existing revetment.The section to effect this purpose now proposed by Mr Pogson ought I think to be suitable, although he does not go down so deep as I originally proposed.The bottom of the blocks in the section is only 1 ft below L.W.I.S.tides whereas I proposed 2½ ft below the same datum.I think it probable that the ill success of the blocks put down at the North pier may be partly attributed to their not being carried down into the rubble as is now proposed.As to the rate of Rs 78-10-2 per ft I observe that this includes the maintenance estimate of Rs 64,000 odd but as the full amount of rubble filling required has been allowed for according to the section it appears to me that this should be omitted.Omitting this the rate is Rs 69-6-1 per lin.ft,and by slightly reducing the size of the blocks and bringing them closer in shore the rate could further be reduced.I observe also that a rate of Rs 11 per cubic yard has been allowed for the blocks themselves [illegible] the Harbour estimates show that some of the wave-breaker blocks were made for Rs 9-5-7 per cubic yard.So perhaps some saving on this rate might be made.

Mr Pogson I notice is of opinion that this form of section will not cause any saving in maintenance and that the present rate of maintenance may be taken at Rs 2 per ft.per year.I would point out that a saving of

in the Harbour Board.

3. He [illegible]

of Portland cement [illegible]

damage done at Shands Press is Rs 35,000 but even taking Mr Pogson's estimate of the cost of damage (nearly Rs 4000) this would nearly double the maintenance allowance for the first section for a year. The compound wall of Carlton House has been recently knocked down this also does not seem to have been taken into account.

I have the honour to be,
Sir,
Your most Obedient Servant,
S/d F.J.Wilson,
Local Consulting Engineer.

(True Copies)

HARBOUR TRUST
MADRAS 10.AUG.98
SECRETARY'S OFFICE

C. Pinsent
Secretary,
Harbour Trust Board.

3. Has not pre

of Portland cement

d. it

745.P

EXTRACT of Proceedings of the TRUSTEES OF THE HARBOUR OF MADRAS, at a Meeting held at the Offices of the Board on Friday **the** 5th **day of** August **1898.**

4. Letter from the Board's Engineer No.453 dated 26th July, submitting cross section, and estimate amounting to Rs 6,10,162 for a protective revetment north of the Harbour with concrete blocks forming a continuous sea wall extending to the end of the present revetment having been circulated was discussed together with note remarking thereon by the Board's Local Consulting Engineer.

Resolved that the tracing of cross section and estimate, with connected papers be submitted to Government for orders, as the Board contends that it is not responsible for the upkeep of the protective revetment.

The Board notes that its Engineer does not consider the proposed section and method of construction any better than the present rubble protection.

(True Extract)

HARBOUR TRUST
MADRAS 11.AUG.98
SECRETARY'S OFFICE

C. Pinsent
Secretary,
Harbour Trust Board.

---

in the Harbour Board.

3. [illegible] of Portland cement [illegible]

Urgent

Confidential

[43 / 509]

Marine DEPARTMENT.

C. No. 990 of '98

(2) HIS EXCELLENCY THE GOVERNOR.
(1) THE HON'BLE SIR HENRY BLISS, K.C.I.E.
(3) THE HON'BLE MR. Arundel ~~GROSE, C.I.E.~~

SUBJECT.

Further Opinion of the Advocate General as to the power of Govt. to compel the Harbour Trust Board to extend or repair the revetment nor of the Madras Harbour.

75 P

FOR ORDERS.

× Flag — H

As suggested in His Excellency's note× dated 19th July 1898, the Advocate General has been furnished with further information as to the exact limits of the port, and his opinion has been asked as to whether, with this information before him, he is of opinion that the Government is not fully empowered to take action under section 68 of the Madras Harbour Trust Act, so far as the foreshore within port limits, which is vested in the Harbour Trust Board, is concerned.

2. He replies that he has now no doubt that the effect of section 68 of the Act and the words "all the foreshore lying within the limits of the port" ~~was~~ is to vest the revetment in the Harbour Board.

3. He [illegible]

[illegible] of Portland cement [illegible]

[illegible] d. it

extend the revetment in the manner proposed. But on the whole, he comes to the conclusion that the words of section 68 are sufficiently wide to confer this power on Government.

4. As to the power of Government to compel the Harbour Board to repair the existing revetment, he now entertains no doubt whatever.

R.S.

5. I propose therefore to issue an order in terms of Para 12 (1) (2) (3) of my Note of 25.6.98, except that instead of the last sentence of (2) the Board might be permitted to submit an estimate for what they consider necessary which can then be approved or amended by Govt.

Bell
2-8-98

Flag H

Yes – let draft be circ^d ~~before~~ for approval

HB AH
3/8/98

Yes. I think the order should mention our proposal to pay, as an act of grace, one-third of the cost. This would help to smooth matters, and if the concession is to be made, it may be as well that it should be made at once.

A.S.H.
5.8.98

AH
6.8.98

Urgent

Marine DEPARTMENT.

Liability of the Madras H.T. Bd. for damage caused by the erosion of [illegible] to the north of the harbour

Papers to be read in Proceedings :—

Again G.O., dated 189 , No.

Again G.O., dated 26th July 1898, No. 647, Marine.

Quote

Current No. 990 of 1898, dated 29th July, from the Govt. Solicitor No 308

" " 1005 " 1898, " 5th Augt, " the Chairman, H.T. Bd. No 1688

" " 1024 " 1898, " 11th Augt, " —— Do —— 1756

79 P

ORDER. 775 Marine 9th September 1898

The correspondence read above relates to the liability of the Madras Harbour Trust Board for the damage caused by the erosion of the foreshore to the north of the harbour.

2. His Excellency the Governor in Council has taken the opinion of the Advocate General, Madras, on the legal questions involved. The general conclusion arrived at is that if it can be proved that the harbour works are the cause of, or contributory to, the erosion now going on, the Harbour Trust is liable, and should [illegible] its own [illegible] its toe protected by bags of Portland cement [illegible] it

(2) His Excellency the Governor
(1) The Hon. Sir Henry Bliss KCIE
(3) The Hon. Mr Arundel

To Financial Dept. for favour of C.U. with regard to Para 7 now amended as per instructions of Hon. Member

I think this satisfactorily disposes of the case – I have ascertained from Mr. [illegible] that he is not indisposed to [illegible] the exact measures to be taken to the harbour Engr., with whose conclusion he unequivocally concurs; and it is of course important that Govt. should not order the H.T.B. to carry out the work in a particular way, unless they are manifestly going wrong, for fear that if the work should prove ineffectual, the trustees should turn upon Govt. & say "you compelled us to spend money on what has proved to be a mistake – now repay us."

HB
5/9/98

A.94
7.9.98

such erosion.

3. The Board has also taken the opinion of the Advocate× General, Bengal, who has arrived at a similar conclusion. He further advises that the monies acquired by the Board can be legally applied for the purpose of extending the present revetment, of repairing and maintaining either the present or the extended revetment, or of taking other precautionary measures to prevent erosion to property not vested in the Trustees, and of compensating owners of property for damage caused by such erosion.

× Since received C. No [illegible]

4. As regards the cause of the erosion, the Government is advised that this is due to

(1) occasional attacks by the sea
(2) the constant presence of the harbour groynes, the latter being the main cause.

Such being the case, the responsibility of th[illegible] [illegible]ard for

---

808

I w^d say instead of "can" "is empowered to"
It is merely a verbal change to soften the intimation!
AH

Flag A

dispute, and under Section 68 of the Harbour Trust Act, Government ~~can~~ compel the Board to repair the existing revetment and extend it within Port limits.

5. In G.O. No. 524 Marine dated 20th June 1898 an estimate submitted by the Chairman Harbour Trust Board for repairing the existing revetment, amounting to Rs 64,879, was sanctioned for immediate execution; and in the execution of the work the Harbour Trust Board was requested to attend to certain suggestions made by the Chief Engineer, namely, that

(1) the stone used for renewing the revetment should not measure less than 2 c.ft and should be packed at a proper slope.
(2) the revetment should have its toe protected by bags of Portland cement [illegible] [illegible]d it

Acting on these suggestions the Chairman Harbour Trust Board has submitted with his letter No 1756 dated 11th August 1898, read above, an Estimate amounting to Rs 6,10,162 for a protective revetment with concrete blocks forming a continuous sea wall from immediately North of Clive's Battery to the north end of the present loose rubble protection, and forwarded at the same time an extract of Proceedings of the Harbour Trust Board, in which the Board notes that its Engineer does not consider the proposed section and method of construction any better than the present rubble protection. The Chairman also asks for orders on the Board Engineer's suggestion that large and small rubble should be used together and [illegible] large stone only. With [illegible]

*C No 1024 (Flag I)

---

81 P

LCP

Government observes that the Chief Engineer's suggestion to use large stone only in the renewal of the revetment was due to the fact that he considered that the proportion of small stone in the present revetment ~~is~~ was too great, and that sufficient small stone ~~is~~ was already present to fill interstices. It was intended that the new large stone and the old small stone should be used together. As, however, the Board is responsible for the protection of the foreshore, Government will leave it to them to repair the revetment as they may be advised by their Engineer, but would suggest that in the corner formed by the ~~stone~~ shore and the N. Groyne of the harbour, which is peculiarly exposed to the attacks of the sea in the N.E. monsoon, and for so far up the shore as valuable [illegible] extend it —

in the long run be more economical so to construct the revetment, or other protection, that it shall be capable of withstanding a violent attack of the sea.

6. The Government is further advised that the Board is legally liable to the municipality for all damage done by the sea to the sewage farm outside port limits. In its own interests and in those of the sanitation of Madras, ~~it~~ the Board is accordingly recommended to lose no time in protecting the sewage farm from further erosion, it being apparently certain that there is no other possible site ~~[illegible]~~ for it. ~~If the Board accepts this recommendation the estimates for this portion of the work should be submitted at the same time and [illegible] of the [illegible] [illegible] to~~

[illegible] large stone only. [illegible]
possibility [illegible]

---

82 P

5P

The Chairman, H. T. Bd.,[5] with plans. 10
" Government Solicitor[3]
" Accountant General[3]
" Examiner, P. W. Accounts[4]
" Local & Municipal Dept[7]
" Financial Dept 7

20/9/98

H. E. will see from these notes that at the present moment we have no choice but to be indefinite & cannot make any definite promise, as he wished.

A.2.4.

Copy to Mr Wilson
revised orders issued
17/11/98

68

7. In view of the restricted resources of the Harbour Trust Board and the large demands upon them, His Excellency in Council will endeavour to afford them some assistance as soon as the state of the Provincial finances renders it possible for him to do so.

9.9.98

2/9/98.

2.9.98

Note.

For the substitution of the last para for the original decision to contribute $\frac{1}{3}$ of the cost from Provincial funds please see notes by Financial Department.

Flag. M

2.9.98

X

para 8
para 5
para 6

833P Note.

The financial condition of the Harbour Trust Board, as shown in G.O.No.247 Marine dated 2nd April 1898 is not very flourishing:-

	Lakhs.
Opening balance 1-4-98.	7.96
Receipts.	5.76
Charges.	8.23
Closing balance 31-3-99	5.49

with a debt of 47.79 lakhs, which will slightly be reduced by the sale proceeds of unserviceable tools and plant during the course of the year. The Trust is labouring under special difficulties at present owing to the reduction in the rates of porterage and the discontinuance of the annual contribution from Provincial Funds on account of light house improvements &c.

para 5

Provincial Funds are however in a worse position and until the programme for the ensuing year is definitely settled, no hope can be held out of funds being provided to the extent required (1.56 lakh) even in 1900-01.

22/5/98

84P

C.S.

The Marine draft order is sent ~~for c.i~~ to Financial for c.i with reference ‘ , , which [illegible] Provincial to contribute 1/3d

P.T.O

IV

of the cost of the works undertaken to prevent the continuance of the erosion of the foreshore to the north of the harbour. From para 13 of the Secy's note in G.D. 647 Marine of 26. 7. 98 this contribution will apparently amount to 1'56 lakhs. It is submitted that it is not possible for Provincial to commit itself to this amount.

Cn.S.
25/8/98

Certainly it cannot pledge itself to 1.56. or to any definite sum whatever at present. in my opinion.

25/8/8

70. Marine
P.W.D. u.o.

I presume there will be no objection to Provl. pledging itself to repay the H.T.B $\frac{1}{3}$ cost of protective work whenever funds permit. It will probably be possible to devote some of the P.W. grant for next year, if not for this, to the work

W. B. [illegible]

...nancial Deptt u.o. 27. 8-98

Better say merely this:-
"7. In view of the restricted resources of the H.T.B. & the large demands upon them, H.E. in C. will endeavour to afford them some assistance as soon as the state of the Provl. finances renders it possible for him to do so".-

That will commit us to nothing definite, which is right, because apparently we cannot say anything definite.-

H.S

This won't do, I am afraid. If a grant is made it must come from Finl. - The P.W.D. must spend its grants itself.

H.S
2/9/98

Financial Dept

C.S.

With reference to the last note in the Marine Dept. it is submitted that all savings in the P.W grant this year will be required (1) for Famine and Plague expenditure or (2) for re-establishing the Provincial balances. In the present state of uncertainty as regards (1) it seems inadvisable for Provincial to pledge itself to anything

Cn.S.
28. 8. 98.

I think so.

29/8/8

To Marine Dept (u.o.)

70

DW

I think you wished to see this file before it was sent on to

W.

The Govt. Solicitor's reply has come under confidential cover.

Ch
18/6/98

S.A.W

I will go thro' the file after the Ad. Genl has given his opinion on the matter

AGK
18-6-98.

DW

The Advocate Genl's opinion is in the confidential cover. The letter is addressed to W officially, not by name, & it may therefore be opened by you, if thought fit.

Ch
18/6/98

C.A.W.

I cannot find the limits of the Port of Madras anywhere defined according to Act XII of 1875 (Indian Ports Act)? If so please let me see.

I have kept the file with me.

W

The limits are defined in G.O. 94 Marine d/ 13 Feb 83 attached, but how far they extend north & south of the harbour walls is not clear from the notification. I believe they go a considerable distance on either side of the walls.

R.S.
23 June 98

G.O. 94 Mar d 13-2-83 under Ports Act
G.O. 276 Mar d 1-6-86 under H.T. Act

Urgent

Liability of the Madras H.T. Bd for damage caused by the erosion of the sea to the north of the harbour.

~~PUBLIC WORKS~~ Marine DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

(2) His Excellency the Governor
(1) The Hon Sir Henry Bliss K.C.I.E.
(3) The Hon Mr Arundel

Quote

READ Again the following

G.O.No.647 Marine dated 26th July 1898.

Read also

Letter from the Government Solicitor, No. 308, dated 29th July 1898.

Letter from the Chairman, Harbour Trust Board, No. 1688 d/5th August 98.

Fair

The Financial Dept for favour of concurrence initials with reference to para 7.

The correspondence read above relates to the liability of the -- Madras Harbour Trust Board for the damage caused by the erosion of the foreshore to the north of the harbour.

2. His Excellency the Governor in Council has taken the opinion of the Advocate General, Madras, on the legal questions involved. The general conclusion arrived at is that if it can be proved that the harbour works -- are the cause of, or contributory to, the erosion now going on, the Harbour Trust is liable, and should in its own interests, take immediate -- steps to ~~repair and extend the revetment~~ prevent the continuance of such erosion.

3. The Board has also taken the -- opinion[*] of the Advocate General, Bengal, who has arrived at a similar conclusion. He further advises that the monies acquired by the Board can be legally applied for the purpose of

[*] Since received - C. No 1005-

(40—4,000—14-5.)

of extending the present revetment, of repairing and maintaining either the present or the extended revetment, or of taking other precautionary measures to prevent erosion to property not vested in the Trustees, and of compensating owners of property for damage caused by such erosion.

4. As regards the cause of the erosion, the Government is advised that this is due to

(1) that this is mainly due to the harbour groynes, and that the Board is thus chiefly responsible for the erosion ~~so~~ caused, and

(2) that the existing revetment, being within port limits, is vested in the Board, and that the Government is empowered under Section 68 of the Harbour Trust Act to compel the Board to repair and extend it within the limits of the port, as defined under that Act.

(1) the occasional attacks of the sea

(2) the constant presence of the Harbour groynes, the latter being the main cause: & Such being the case, the responsibility of the Board for the greater portion of the ~~damage~~ damage done admits of no dispute, and under Section 68 of the H.T. Act, Govt. can compel the Bd to repair the existing revetment & extend it within port limits

5. His Excellency the Governor in Council requests, therefore, that the Harbour Trust Board will, as soon as practicable, submit for the approval of Government, an estimate of the cost of carrying out the requisite work, in such a substantial manner that the protection henceforth afforded to the foreshore will be adequate & lasting, & not, as hitherto, liable to be destroyed by any chance storm.

6. The Government is further advised that the Board is legally liable to the Municipality for all damage done by the sea outside port limits to the sewage farm. In its own interests and in those of the sanitation of Madras, it is accordingly recommended to lose no time in protecting the sewage farm from further erosion, it being apparently certain that there is no other possible site for it. If the Bd accepts this recommendation the estimates for this portion of the work should be submitted at the same time & be of the same permanent nature.

7. As an act of grace, His Excellency-in-Council is prepared to contribute from ~~Local~~ Provincial Funds, one-third of the cost of the work undertaken under these orders.

C.S.

7. In view of the fact that erosion was to some extent in progress before the construction of the Harbour, & that the latter cannot therefore be accurately termed the sole cause thereof, H.E. in Council is pleased, as an act of grace, to contribute from Provl Funds one third of the cost of the work undertaken under these orders.

The Chairman, H.T. Bd., with plans.
,, Government Solicitor.
,, Accountant General.
,, Examiner, P.W. Accounts.
,, Local & Municipal Dept.
,, Financial Dept.

Fair copy

Urgent

X/ Liability of the Madras H. T. Bd for damage caused by the erosion of the sea to the north of the Harbour.

Marine ~~Public Works~~ Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

(2) His Excellency the Governor
(1) The Hon. Sir Henry Bliss KCIE
(3) The Hon Mr Arundel

Read again the following

G.O.No.647 Marine dated 26th July 1898.

Read also

Quote

Letter from the Government Solicitor, No.308, dated 29th July 1898.

Letter from the Chairman, Harbour Trust Board, No.1688 d/5th August 98.

Letter from the Chairman Harbour Trust Board No 1756 d/11 August 98

Rewrite

(To The Financial Dept for favour of counterinitials with reference to para 7.)

The correspondence read above relates to the liability of the -- Madras Harbour Trust Board for the damage caused by the erosion of the foreshore to the north of the harbour.

2. His Excellency the Governor in Council has taken the opinion of the Advocate-General, Madras, on the legal questions involved. The general conclusion arrived at is that if it can be proved that the harbour works are the cause of, or contributory to, the erosion now going on, the Harbour Trust is liable, and should in its own interests, take immediate steps to prevent the continuance of such erosion.

3. The Board has also taken the opinion[x] of the Advocate General, --- Bengal, who has arrived at a similar conclusion. He further advises that the monies acquired by the Board can be

x Since received. C No 1005

(40—4,000—14-3-95.)

be legally applied for the purpose of extending the present revetment, of repairing and maintaining either the present or the extended revetment, or of taking other precautionary measures to prevent erosion to property not vested in the Trustees, and of compensating owners of property for damage caused by such erosion.

4. As regards the cause of the erosion, the Government is advised that this is due to

(1) occasional attacks by the sea

(2) the constant presence of the Harbour groynes, the latter being the main cause.

Such being the case the responsibility of the Board for the greater portion of the damage done admits of no dispute, and under Section 68 of the Harbout Trust Act, Government can compel the Board to repair the existing revetment and extend it within Port limits.

5. His Excellency the Governor-in-Council requests, therefore, that the Harbour Trust Board will, as soon as practicable, submit for the approval of Government, an estimate of the cost of carrying out the requisite work in such a substantial manner that the protection henceforth afforded to the foreshore will be adequate and lasting, and not, as hitherto, liable to be destroyed by any chance storm.

6. The Government is further advised that the Board is legally liable to the Municipality for all -- damage done by the sea to the --- sewage farm outside port limits. In its own interests and in those of the sanitation of Madras, it is accordingly recommended to lose no -- time in protecting the sewage farm from further erosion, it being apparently certain that there is no -- other possible site for it. If the Board accepts this recommendation the estimates for this portion of the work should be submitted at the same time and be of the same permanent nature.

7. In view of the fact that erosion was to some extent in progress before the construction of the Harbour, and that the latter cannot, therefore, be accurately termed the sole cause thereof, His Excellency in Council is prepared, as an act of grace, to contribute from ~~Port~~ Provincial Funds one-third of the cost of the work undertaken under these orders.

The Chairman, H.T.Bd., with plans.
,, Government Solicitor.
,, Accountant General.
,, Examiner, P.W. Accounts.
,, Local & Municipal Dept.
,, Financial Department.

8.8.98

For 7 see sep sheet

5. In G.O. No 526 Mar: of 20 June 1898 an estimate submitted by the Chairman Harbour Trust Board for repairing the existing revetment, amounting to Rs 64,879 was sanctioned for immediate execution, and in the execution of the work the H.T.B. was requested to attend to certain suggestions made by the Chief Engr namely that

(1) the stone used for renewing the revetment should not measure less than 2 cft & should be packed at a proper slope.

(2) the revetment should have its toe protected by a row of P. cement concrete blocks.

Acting on these suggestions the Chairman H.T.B. has submitted with his letter No 1756 of 11 Aug 1898, read above, an estimate amounting to Rs 6,10,162 for a protective revetment with concrete blocks forming a continuous seawall from immediately North of Clive's Battery to the north end of the present loose rubble protection, and forwarded at the same time an estimate (see over)

~~from~~ of Proceedings of the H.T.B. in which the Board notes that its Engineer does not consider the proposed section & method of construction any better than the present rubble protection.

The Chairman also asks for orders on the Board Engineer's suggestion that large & small rubble should be used together & not large stone only. With regard to this latter question Govt. observe that the C.E.'s suggestion to use large stone only was due to the fact that the proportion of small stone in the general of the ~~estimate~~ in the present estimate ~~was~~ is too great & that sufficient small stone is already present to fill interstices. It was intended that the large stone & the small stone should be used together. As however, the Board is responsible for the protection of the foreshore H.E. Government will leave it to them to alter the estimate as they may be advised by their Engineer, but would suggest that in the corner formed by the shore & the N. groyne of the Battery, which is peculiarly exposed to the attacks of the sea in the N.E. monsoon, & for its nearness of the shore to valuable buildings to some extent, it will in the long run be more economical to construct the revetment, or other protection, that it shall be capable of withstanding ~~such an sudden~~ a violent attack of the sea.

W

C. No 1024

D.W.

For orders.

The estimate is within the sanctioning power of Govt.

The incidence of the charge as between Govt. & the Board is forming the subject of a separate order.

R.S.
16 Aug 98

C.A.W.

I put up drafts for W's approval

ASW
16.8.98.

Will write for orders in file. The G.O. referred to is the one lately drafted for approval

16.8.98

Seen

A.W.
20.8.98.

W
16 Aug 98

D.W.
C.A.W.

With his letter No 1356, dated 11 Aug. 1898, the Chairman of the Harbour Trust Board submits an estimate, amounting to Rs 6,10,162, for a protective revetment with concrete blocks, so as to form a continuous sea wall from immediately north of Clive's Battery to the north end of the present rubble protection.

2. From the papers forwarded with the Chairman's letter, it is apparent that the Board's Engineer is of opinion that the present system of rubble protection has not proved faulty, and ~~states~~ that the cause of ~~its~~ the breaching of the revetment, during last N.E. monsoon, was not due to the direct impact of the sea, but was caused by the bursting of a drain in rear of the revetment, which was consequently attacked from the land side. He further states that he does not advocate protection of the foreshore on the system of the estimate now submitted for the sanction of Govt., which he does not consider to be in any way superior to the existing

system of protection by loose rubble stone, except for the special purpose of advancing the foreshore, so as to keep the sea at a greater distance from valuable property. For this special purpose he submits a typical section.

3. The question of the erosion north of the harbour is one which will require very careful investigation as regards its cause, the extent to which protection is the giving ~~method~~, the best method of protection, & the incidence of its cost; ~~this one~~ nd is one which, in the opinion of the undersigned, shd be relegated to a special Committee, which shd be empowered to take evidence, & to examine the records. It is probable that, as anticipated by Mr A. Krudel, the efficient rotection of the foreshore, will eed very heavy outlay, ~~this~~ & it is t likely the adequately secured by the ethod now proposed by Mr Pogson.

4. The undersigned is therefore unable to recommend the stimate of Rs 6,10,162 for the anction of Govt., & recommends that, until the Committee has sued its report, the present system loose-rubble protection, which is uitable for the ~~flat~~ slope shown the section, be continued, large one, with its inte filled up with smaller stone, being thrown in where necessary, & allowed to assume its own slope.

ACK
16.8.98.

Order.

The Govt. accepts the conclusions of the Chief Engr. & the necessary estimate shd be forwarded by the Chairman for the protection of the foreshore on the existing system, the work being forthwith put in hand.

2. The Committee will meet in Madras on the return of the Govt from the hills, & its composition will form the subject of a separate G.O.

3. The Chief Engr. should have a careful précis made of the whole history of the erosion north of the harbour, which, together with certain specific points ~~for~~ will be laid before the Committee for ~~an~~ enquiry and report.

ACK
16.8.98.

C.A.W.

On inquiry in the Financial Dept, it has been ascertained that the Marine file about the erosion of the Madras Harbour was sent on the 9th August 1898 to the Budget Clerk to note, and that it has not as yet come back. I have asked the Financial Referencer just to remind the Budget Clerk about it.

CMR
19-8-98

C.A.W.

H.C. says that he does not remember to have noted any technical matter in the draft order sent to the Finl: Dept for c.i. but Mr Ramaswami Iyr states that, in the addition made by the Secretary to the original draft there were some hints about the lines on

---

C. No 1024 500

H.C.

Please enquire about the draft G.O. in the Financial Dept. The Hon'ble wishes to see it.

23 Aug 98

C.A.W.

The paper was sent ~~to~~ by the Finl Deptt to the Budget clerk at Madras who has not returned it as yet.

May
23/8/98

W

Submitted for information. The draft G.O. provided for a contribution to the Harbour Trust of a portion of the requisite outlay on the revetment, and had thus to be countersigned in the Financial Dept. It was sent on the 8th inst. and has not yet been returned. The papers seem to have been sent to Madras.

23 Aug 98

See note within
24 8 98

Circ. to Hon.

C. No 1005
990

C.A.W.

I presume it will suffice if Provl pledges itself to repay the H.T.B. $\frac{1}{3}$ of the cost of the protective works 'whenever funds permit'. There is no reason that I know of why we shouldn't devote some of the P.W. grant of next year towards it.

26.8.98

M

There seems no objection to this course. A great deal of money has been spent for many years past on buildings in the Mofussil, and it seems time that the

---

Marine C. No 1024

C.A.W.

The Financial Dept. returned, on the 26th August 1898, the Marine Dept. draft on the subject of erosion of the Madras Harbour with a note to say that that Dept. would not commit itself to an outlay of Rs 15,000. On the same day, the file was sent back to the Financial Dept. with a reply to the effect that it would be sufficient if Provincial pledged itself to repay the Harbour Trust Board $\frac{1}{3}$ of the cost of the protective works; and if not the cost might be met from the P.W.D Provincial grant of the next year.

The file has not yet come back.

CMR
29.8.98

Let me see it when it does, & [illegible]

[illegible] 25 Aug 98 [illegible]

29 Aug 98

Capital of the Presidency should have something done for it by Govt.

26 Aug 98

Yes I quite agree & so does H.E.

26.8.98

---

7. In view of the restricted resources of the M.C.s & the large demands upon them, H.E. in Council will endeavour to afford them some assistance as soon as the state of the Provl. finances renders it possible for him to do so -

2.9.98

Note. In the substitution of the last para in the original decision ~~[illegible]~~ to contribute $\frac{1}{3}$ of the cost from Provincial funds please see notes by Finance Dept Flag.