M.S.O. 1—5000—16-12-47

MADRAS RECORD OFFICE.

Government of Madras.

DEPARTMENT.

G.O. No.	Press Mis.
Dated	19

Not to be folded or roughly handled

No. 8. Read the following letter from Colonel C. E. FABER, Chief Engineer; to H. FORBES, Esq., Acting Secretary to Government, D. P. W., dated 2nd February 1857, No. 9949.

SIR,

1. I have the honor to forward copy of a very interesting letter, No. 386, dated 16th Ultimo, from the Superintendent of the East Coast Canal, reporting fully on the effects of the late storms on the Canal embankments, and pointing out the general principles which it appears advisable should be followed for the future, in laying out new portions of the Canal, applying his conclusions directly to the Kistnapatam, project to be undertaken in the ensuing year.

Para 2. 2. The Superintendent states that on inspecting the embankments between the lock at Shadiencoopum and Madras, it appeared that the floods had over-topped them, and excepting in spots where they were overgrown with creepers, had reduced them, to one half their former height. A few small breaches had been made in places, and some of the drainage escapes had been turned by a rush of water round their wings. An estimate for the requisite repairs which was forwarded on the 10th Instant is about to be submitted to Government and the work is now being executed under the Superintendence of Mr. Konig.

Para 3. 3. The embankments at Amalric's cut off at the southern most point of the Pulicat lake, being sufficiently high, had suffered but little, but a new shed which Mr. Konig was engaged in erecting, near the site of a lock, to be constructed, was half destroyed. At this point of the Canal the repairs have already been executed.

Para 4. 4. The embankments at the Kotapillay and Mc. Dowells' cut offs, where the ground is moderately high, had escaped intact.

Para 5. 5. The Eastern embankment of the small cut, made to shorten the passage from the Pulicat lake, in which the rush of water, before the opening of the Bar is stated to have been very great, has almost entirely disappeared. A slight silting up which has taken place along the western side of the Channel, the Superintendent anticipates will be cleared away by the scour, effected by the Bar remaining open with this, for the present at all events he does not propose to do any thing, as the traffic will not be interrupted, observing that after May, a small sum may be expended from the estimate proposed for the general improvement of the Navigation between Madras and Streehurrycottah, to remedy any defect that may by that time be developed.

Para 6. 6. In referring to the almost entire destruction of the embankment which had nearly been completed for the road from Shadiencoopum to Trivatore, on the sanctioned estimate of Rupees 4,720-7-7* the Superintendent observes that the difficulties of constructing a road across the Red hill drainage are greater than were supposed, and he recommends, should it seem worth while to go on with the work, that a much grater section be given to the embankment and more water way to the bridge which is to span the drainage channel.

* Extract Minutes Consultation No. 565, dated 25th April 1856.

7. The Superintendent who states that he has not yet had time to investigate all the circumstances of the case satisfactorily, recommends that for the present the matter may be kept in abeyance. Directions will be given to the Superintendent to take the earliest opportunity of completing his enquiries and inspections, and to report fully on the measures he would advocate for adoption.

Para 7. 8. In the 1st Section and in the northern portion of the 2nd Section of the Sadras Canal, where the ground is high, the damage done has been very trifling.

Para 8. 9. About 8 miles South of the Adyaur, opposite the village of Karapaukum, a drainage to the west during the December storm, having received a great accession of water, broke entirely across the Canal, cutting a channel of 80 feet in width, and in one place from 9 to 10 feet deep, very little silt was brought into the Canal, and the repairs are to be immediately executed by Mr. Kennedy.

10. The Superintendent is to report further on Lieutenant Chamber's proposition for carrying this drainage into the Covelong backwater over a 2nd Class escape, which he is of opinion, requires some modification.

11. Along the 22 miles of Canal passing more or less through shallow backwaters, from a point 9 miles South of the Adyaur, to Yedyoor 3¼ miles from Sadras only a slight quantity of earth being furnished by the excavations, the embankments throughout which were very low were over-topped by the floods, and entirely destroyed. The Canal does not appear to have suffered much from silt, a result attributed to the scour, which lasted for days during the escape of the flood water through the open bar.

Para 9.

12. From Yedyoor to Sadras, where the ground is again high, the embankments have not been damaged.

Para 10.

13. In para. 12 the Superintendent observes that the Canal works have probably been subjected to as severe a trial, as they are ever likely to undergo, and in para. 13 notices as the main features of the effects of the late storms.

"That without exception the deep cuttings and high banks have stood the test of an ex-
"traordinary flood, while the small weak banks, formed from the debris of the shallow ones have
"in a great measure melted away and even in a few cases left hardly a trace behind."

14. In para. 14 is noticed the evident necessity of allowing to the embankments such dimensions as will ensure them from destruction by floods, and 2 Sections are given of embankments calculated to meet the requirements of Canals of 30 and 60 feet width of sole, the level of the sole to be in all cases 3'6" below and the minimum height of the embankments 8' above mean Sea level.

15. On this data the Superintendent observes that only such backwaters should be allowed to form part of the East Coast Canal as have a full depth of 3' 6" below mean tide and that even then, unless the deep water extend for at least 4 miles the economy of using them is doubtful, as the cost of the locks they entail would be equivalent to cutting (vide Sections) 6 miles of a Canal 30 feet wide or 4 miles of one 60 feet wide at sole. The conclusion arrived at and in which I fully concur is, that in laying out future new lines of Canal, it will be advisable not to enter the shallow lagoons excepting in extremely rare cases, but at the same time, to avoid an unnecessary depth of cutting to keep generally along their margins.

Para 16.

16. The Superintendent in concluding his letter, requests permission for introducing the principles he advocates, on the new Kistnapatam line, and being myself satisfied of their soundness, I have no hesitation in recommending them to the favorable consideration of Government.

No. 9. ORDER THEREON, No. 370; dated 26th February 1857.

The Chief Engineer submits an interesting report from Lieutenant Sankey, Superintendent of the East Coast Canal, on the effects of the storms of November and December last, on the Canal embankments between Pulicat and Sadras.

2. The effects of the floods on the embankments are described by Lieutenant Sankey in paras. 2 to 12 of his Report, and are re-capitulated by the Chief Engineer. The main features of those effects are, that while deep cuts and high banks have withstood the floods, the small weak banks formed from the excavations of the shallower cuts have in a great measure melted away, and in a few cases have left hardly a trace behind. From these results, Lieutenant Sankey argues (para. 14) in favor of allowing such dimensions to embankments as will effectually protect them from floods, and gives two sections of embankments calculated to meet the requirements of Canals of 30 and 60 feet width of sole; the level of the sole being in all cases 3' 6" below, and the minimum height of the embankments 8 above mean sea level. The general conclusion at which he arrives, is the impossibility of making use of shallow backwaters for the East Coast Canal, except in cases where they have a full depth of 3' 6" below mean tide, and the line of deep water extends to a distance of at least 4

miles. The Chief Engineer expresses himself satisfied as to the soundness of the principles advocated by Lieutenant Sankey; and the Right Honorable the Governor in Council authorizes their application to the Kistnapatam line of Canal, as recommended. At the same time he would remark, that it did not need the late storms to prove the necessity of strong embankments to a Canal crossing the drainage of a country. But the experience which has now been acquired, will be valuable in showing the section required to withstand the effects of the monsoon.

(Signed) H. FORBES,
Acting Secretary to Government.

F-386.

From,

Lieutenant R. H. Sankey, Engineers,

Superintendent of the E. C. Canal.

To,

The Chief Engineer,

Department of Public Works,

Fort Saint George.

Sir,

Having carefully inspected the Canal from Pulicat to Madras, I have the honor to bring to your notice a few facts in addition to those contained in my Communications as per margin, regarding the effects of the storms of the 19th & 20th November, and 8th 9th and 10th December, and to state the general principles which it seems to me should be followed for the future in laying out new portions of the Eastern Coast Canal, applying the conclusions directly to the Nellapatam project, the carrying out of which will form one of my principal duties in the coming year 1857/58.—

Letters Nos. 320 and 322 of 26 and 27. November 1856
Summary for Nov.r/56

2 In the communication above alluded to I reported an extraordinary rise of water from 6 to 6½ feet all around the Shediencoopum Works on the 19th and 20th November and estimated the damage then inflicted at Rupees 1,300. On viewing the Canal banks between that point and Madras it appears that the flood for the most part overtopped them and distributed the materials to such an extent as to leave them only

only half their former height, excepting in spots overgrown with creepers. A few small breaches were made in places and some of the drainage escapes burned by a rush of water round the wings. An occasional estimate has already been forwarded and Mr. Konig is actively engaged in executing them.—

10th Jan.y 1857 No. 330

3 At Amalica's Cut off (Southernmost point of the Pulicat Canal) the embankments being higher than the flood, suffered little, but the new shed which Mr. Konig was engaged in erecting to aid in the Construction of a Lock, was half destroyed. All necessary repair has already been executed.

4 The Katanpillay and Mr. Dowells cut offs being through moderately high ground, and consequently having high embankments have escaped intact.

5 At Pulicat the Small cut made to shorten the passage from the lake has suffered considerably. On the first burst of the storm, and previous to the opening of the Pulicat bar an enormous rush of water must have taken place down this cut, it is not therefore surprising that the eastern embankment which was low and weak almost entirely disappeared. A slight silting up has taken place along the west side of the Channel but I am in hopes that the Scour effected by the bar remaining may carry away the material thus deposited; the traffic not being interrupted, we may leave the matter for the present to time. After May a Small Sum expended out of the Estimate sanctioned for the general improvement of the Navigation between Madras and Tiruchurry Colab

Ex. Trans. Cons. No. 1635 of 12th Sept.r

will Remedy any defect may then appear.

6 Before quitting the Northern Canal, I am anxious to bring to your notice the state of the road joining Tiruttoor and Thediancoppum Village, for the Construction of which the Sum of Rupees 1720—7—7 was lately sanctioned. Mr. Konig had almost Completed the embankment for the roads to its full proposed height 6 feet, when the flood came and swept nearly every particle away. I feel the difficulties of establishing a road across the Red Hill drainage, are greater than were supposed, and would strongly recommend, should it seem worth while to go on with the work, that a much greater Section be given to the embankment, and a larger waterway to the bridge, which is to span the drainage Channel. Not having time to investigate all the circumstances of the Case Satisfactorily, I beg that for the present the matter may be left in abeyance. The Villagers are enabled to go on foot from one place to another without any inconvenience, and therefore they may easily do without the luxury of a Cart Road for a short time.

Ex. Trans. Cons. No. 565 of 25th April 1856.

7 On the 1st Section of the Madras Canal, the injuries inflicted by the storm as reported in my letter as per Margin were of the most trifling nature. The same may be said of the Northern portion of Section No. 2 which like Mr. Kennedy's is through higher ground than the remainder of the line.

Letter No. 320 of 26th November 1856.

About

8 About 8 miles South of the Adyaur opposite the Village of Karapaukum, a drainage to the west having received a great accession of water from the downfall, of 8th 9th & 10th December, and probably from some tanks having burst their bunds, broke through both west and east embankments Cutting a channel 80 feet in width and in one place 9 to 10 feet deep. Very little silt was however brought into the new Channel, and Mr. Kennedy will at once undertake the necessary temporary repairs. Lieutenant Chambers had proposed leading the drainage into the Covelong backwater over a 2nd Class bridge which was to have been built this season. I think some slight modification of his plan will have to be adopted, but this is a point can be determined better on my return from the north.

9 For 22 miles as you are aware the Madras Canal runs more or less through shallow backwaters, the Stretch being included between a point 9 miles South of the Adyaur, and Yedyoor 3½ Miles from the Village of Sadras. Only a slight quantity of earth being furnished by the Channel, the embankments were low and weak throughout, they were therefore easily surmounted by both floods and the material dispersed. As far as I have as yet been enabled to determine, the Channel has not suffered much from silt brought in, a result no doubt attributable to the Scour which lasted for days during the escape of the flood water through the open bars.

10 From Yedyoor to Sadras being through moderately high ground, the Canal banks have stood well.

11 An examination of the ruins of the Sadras Arch elicited no new facts, besides those already reported, as to the course of its fall. Being engaged now in framing an estimate for its reconstruction, I

may

17

P. W. D.

No. 370

Extract from the Minutes of Consultation

Under date the 26th February 1857.

Read the following

letter from the Chief

Engineer

Here under 2d Feby./57 No 9949

The Chief Engi-

=neer submits an interes-

=ting report from Lieute-

=nant Tankey, Superi-

=intendent of the East

Coast Canal, on the ef-

=fects of the storms of

November and December

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=bankments between

Pulicat and Sadras.

The effects of

the floods on the em-
bankements are des-
cribed by Lieutenant
Lankey in paras 2 & 12
of his report, and are
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Chief Engineer. The e-
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deep cuts and high e-
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the floods, the small e
weak banks formed
excavations
from the debris of the
shallower cuts have
in a great measure
melted away, and in
a few cases have left
hardly a trace behind.
From these results
Lieutenant Lankey
argues (para 14) in
favor of allowing suc-

may omit all further remarks here as to its present state.

12 The floods whose effects I have endeavoured concisely, though I fear tediously to describe, subjected our works to perhaps as severe a trial as they are likely ever to undergo. Considered in this light, the skill with which they have been conducted in years which afforded no standard whatever to the Engineer of the power of resistance necessary to be given to the banks, is most apparent. I do not therefore think, I in the least take away from the merit due to the general design of the Canals as hitherto executed, by saying in some few points the principle of construction appears to me requiring alteration.—

13 The main features of the effects I have above described are, that without exception the deep cuttings and high banks have stood the test of an extraordinary flood, while the small weak banks formed from the debris of the shallower ones have in a great measure melted away, and even in a few cases left hardly a trace behind.

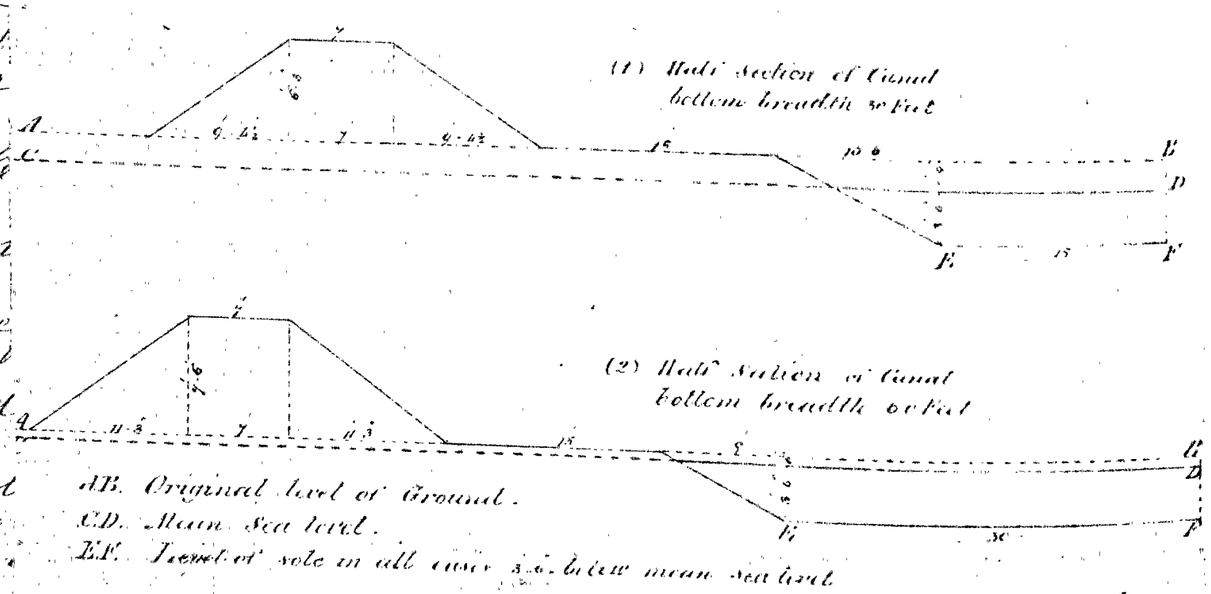
14 Banks are of such self evident necessity in the working of a Canal, that their conservation, is of the first importance; in their construction, therefore dimensions should be given capable of effectually shielding them from destruction by any flood which might possibly occur. The minimum height which I should judge requisite for such banks is 8 feet above the mean Sea level, or about 2 feet more than the rise of water which took place lately, with a breadth at top of 7 feet, and slopes of 1½ to 1. In order to obtain earth for the formation of banks of these dimensions sufficient section must be given to the Channel. The first glance will show that assuming the bottom breadth of the Canal even

20

below mean tide, and

the

20 Yards in working through a shallow Lagoon, no adequate quantity of earth can be obtained, in fact the only Sections which will answer are the following, which are calculated for bottom breadths of 10 & 20 Yards severally



In the first Section where the bottom breadth of the Canal is taken at 10 Yards, in order that the area of the Channel may equal that of the banks, the minimum height of which has been already assumed the natural level of the ground A B, must be 1'-9" above mean Sea level - A slight calculation shews this; and in the same way if the bottom breadth be taken at 20 Yards, the natural level of the ground through which the Channel is run, must at least be 6 inches above the mean level of the Sea.

15 There are many conclusions to be drawn from this besides the one which I have now in view, for instance the Comparative expensiveness of opening the line only 10 Yards wide at first, and not giving it the full one of 20 Yards by which a great saving might be made in the quantity of excavation, equal

to 17600 Cubic Yards a mile costing at least 1000 Rupees but I have not time at present to go into all these points.

16 The object I have in view is clearly to demonstrate the impossibility of making use of shallow backwater for the E. C. canal, and that it is only when they have a full depth of 3'-6" below mean tide they ought to form part of our line - Even in this latter case unless the line of deep water be so long as to save the expense of 10 miles of inland cutting it is doubtful if any gain be made, for the expense of locks at each end of the deep part of the backwater (works whose necessity cannot be for a moment doubted) would in the Aggregate swallow up 40,000 Rupees equivalent to six miles of a Canal 10 Yards wide and 4 Miles of one 20 Yards cut as above proposed.

17 In laying out new lines I would for the future in accordance with the above Conclusions avoid going into the backwater excepting in extremely rare cases at the same time to avoid too deep diggings it will be necessary to keep generally along their margins.

18 I beg that I may be allowed to introduce these principles on the new Kistnapatam line should you consider them sound - In carrying them out I shall more than likely have to submit a Supplementary Estimate, as I see by the original Estimate that Lieutenant Chambers had proposed making use of part of the Doogoorshpatam backwater &c. in the same manner as in the Madras Canal - Requesting your indulgence for the length of this Report.

I have &c.
Sig.d C. A. Hankey
Supt. of the E. C. Canal

E. C. Canal Office,
Ennore,
16th January 1857.
Examined & Recorded

A True Copy
A. Foster Colonel.
Chief Engineer.

below mean tide, and
the

Copy in G. & L. E. 1st Sept. 1857. No 7

Page 14

Enclosure in a letter from the Chief Engineer D. O. W.

To,

The Secretary to Government

C. W. D.

Dated 2nd February 1857.

Received

No 1949

P.W. 2457/57

Copy of a letter from the Superintendents of the E. C. Canal - Reporting on the effects of the late Storms on the Canal embankments, and pointing out the general principles for carrying out new portions of the Canal for the future.

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the experience which has now been acquired will be valuable in showing the section required to withstand the effects of the monsoon.

J Cotgrave

J Copies to the Chief Engr.
Dec. 27.

C. S. J. in c. G. L. to C
of 1st April 1857. No 7

Public Works 1857 Dep.t
Do to Com.s D. Moreh.

Pat.a 14

No 370.

Extract Mins of Com.s
of 26th February 57.

From Chief Eng.r 20th May 57 & No 1852
in No 11 May

Authorizing the application
to the Historical Com.ee of Land
of certain principles advocated
by Lieutenant Pantey Superintend.t
of the C. C. Canal.

No 849.

Lot July 0223