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MADRAS RECORD OFFICE.

Government of Madras.

public works **DEPARTMENT.**

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*Proceedings of the Madras Government, Public Works Department,
15th April 1864.*

No. 374. Read the following letter from Major-General S. O. E. LUDLOW, Consulting Engineer Irrigation and Canal Company, to Colonel C. A. ORR, R. E., Secretary to Government, Public Works Department, dated Camp at Kurnool, 14th March 1864, No. 171:—

SIR,

1. I have the honor to submit for Government sanction the two following Estimates:—

No. 45. Revised and additional Estimate for the construction of miles 1 to 18 (being the 1st Section) of the main Canal amounting before alteration by me to Rupees 3,05,830, but after alteration to Rupees 3,64,917.

No. 46. Additional Estimate for masonry works on the (above mentioned) 1st Section (not including Anicut and head works) and amounting to Rupees 31,860.

2. The sums originally sanctioned for the first 1 to 18 miles of Canal and the masonry works on that section in Estimate No. III, sanctioned by Government under date 31st May 1861, was Rupees 4,60,000. The following being an abstract of it:—

	RS.	A.	P.	
Earth excavation	31,959	2	3	
Rock do.	1,97,103	14	6	
Embankment	1,68,903	11	1	
	3,97,966	11	10	
Deduct value of Stores	20,000	0	0	
				3,77,966 11 10
11 Culverts	19,985	2	10	
9 Calingulahs	21,448	9	0	
1 Bridge	6,453	11	2	
6 Tunnels	413	14	0	
Alteration of road	2,698	2	0	
8 Iron Ferry Boats	4,800	0	0	
				55,799 7 0
Special superintendence and sundries	26,233	13	2	
Total	4,60,000	0	0	

3. From this it appears that the excavation and embankment of the 1st Section of the Canal, for which the revised Estimate No. 45 is now submitted, were originally estimated at Rupees 3,97,966-11-10, to which sum should be added Rupees 22,543, being its proportion of sundries, making the total cost of this part of work as originally estimated Rupees 4,20,509-11-10. From this a deduction was made of Rupees 20,000, the supposed value of store to be furnished by the excavation, but as no part of this sum has yet been realized it cannot now be taken into account when comparing the actual with the estimated cost.

4. The additional sum now applied for to complete the work is Rupees 3,05,830 including Rupees 8,000 for the repair of a breach in the 6th mile and Rupees 95,692-8-0 for revetments, neither of which formed a part of the original Estimate. Deducting these, there remains a sum of Rupees 2,02,138, which represents the additional cost of excavation and embankments on the 1st Section, showing an excess in these items of 48 per cent. on the original Estimate.

5. In paragraphs 3, 4 and 5 of his letter No. 22, dated 9th February, the Chief Engineer accounts for this excess:—First, by a deduction of one-fifth in quantity having been made in the original Estimate on the supposition that the earth in bank would occupy much more space than it did in pit, which expectation, for the reasons stated, was not realized. Second, owing to greater breadth and slopes than were anticipated having to be given in the banks on account of the nature of the soil. Third, owing to rock having been found where earth which would have been available for embankment was counted on.

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6. If proper care be taken to consolidate the earth in the formation of a bank the soil will, I believe, occupy nearly as much space in the bank as in the pit. So large a deduction as was made from the Estimate (one-fifth) for expansion was not therefore admissible.

7. The slopes allowed were doubtless too steep, $1\frac{1}{2}$ base to 1 height. The earth could not stand at that angle and additional soil had to be used to make them up where they slipped.

8. But these reasons will not fully account for the large excess which there will be when the work is completed. The total quantity of embankment (including gravel and earth excavation) in the original Estimate was 14,49,680 cubic yards. The quantity in the revised Estimate is 22,94,646 cubic yards, the difference being 8,44,966 cubic yards. This large excess would seem to be in a great measure due to the insufficiency of the section originally allowed. A comparison of the original average sections with the revised ones will, I think, prove this to be so. The results are as follow in the 13th mile (4th to 16th and part of 18th) where the principal embankments occur :—

	Original Section.	Revised Section.
Cubic yards in embankment	13,24,113	19,20,341
Section in square yards	58	87
Height	16 feet.	19 $\frac{3}{4}$ feet.
Breadth at top	10 "	12 $\frac{3}{4}$ "

9. The quantity of rocky excavation will fall short of that allowed in the Estimate. The quantities being as follow :—

Original Estimate, cubic yards	...	8,49,671
Revised do. do.	...	7,02,651
Difference		1,47,020

10. There has been some excess in rates, earth-work estimated, on an average, at Annas 2 Pice 2-6 per yard has cost Annas 2 Pice 5-6, and rocky excavation estimated at Annas 3 Pice 8-5 has cost Annas 4 Pice 8-7, but considering the difficult nature of the work the rates at which it has been done cannot be considered as otherwise than moderate.

11. In the accompanying drawing the average sections which it is now intended to give to each mile of the bank where the canal is in embankment and also the maximum section in each mile are shown. The top of the bank is to be nowhere less than 6 feet above high water line, and where the bank is high or exposed will have additional height given to it up to a limit of 3 feet more.

12. The breadth at top varies from 10 feet to 15 feet in the average sections, and from 12 feet to 18 feet in the high and exposed parts.

13. These dimensions I consider to be sufficient, but think that the slopes on the water side should be longer, and I would give them an average of 2 to 1. There will be an addition to the Estimate on this account of 1,70,483 cubic yards, which at Annas 2 Pice 6 per yard will come to Rupees 26,638.

14. There is a large item included in the revised Estimate of Rupees 95,692-8-0 for rough stone revetment, for which no provision was originally made. As far as the interior bank is concerned the quantity of this pitching is ample, but about 2,000 yards in length of the exterior side of the bank principally in the 4th mile will require to be similarly protected from the action of the river in very high freshes, and I have added an item on the account of Rupees (6,000) six thousand.

15. The average rate allowed for pitching is only Annas 9 Pice 3 $\frac{1}{2}$ per yard. This, judging from the difficulty of procuring stone in places and the steadily increasing cost of labor, is I think likely to be exceeded before the work is finished, but as there is some probability of a saving in quantity I shall not propose any increase to the Estimate on this account.

16. The banks of the Canal where they approach the Hindri Aqueduct will in addition to this dry stone revetment require to have a facing of stone set in lime. This is necessary on account of their great height, the depth of water and the quality of the soil there. It is necessary to add an item of Rupees 15,500 to the Estimate on this account.

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17. In the revised Estimate an allowance of Rupees 5 per cent. only has been made for minor superintendence and sundries, but as I have reason to know that the expenditure on this account has hitherto considerably exceeded that rate I have allowed Rupees 7 $\frac{1}{2}$ per cent.

18. The Estimate No. 45 with the above noticed additions will then be :—

	RS.	A.	P.
Additional cost of three first miles	54,459	9	2
Do. up to 18th mile	1,33,115	1	9
Repair of breach in the 6th mile	8,000	0	0
Revetting interior banks	95,716	8	0
Additional earthwork for increase of slopes	26,638	0	0
Revetment on river side	6,000	0	0
Rubble in lime revetment to banks in upper approach to Aqueduct	15,500	0	0
Total	3,39,429	2	11
7 $\frac{1}{2}$ per cent. for superintendence and sundries.	25,487	13	1
Grand total of supplemental Estimate No. 45 as revised	3,64,917	0	0

19. The original Estimate being as above shown Rupees 4,00,509-11-10 the excess of cost will be 91 per cent. on that sum.

20. In paragraph 1 of his letter No. 22, Colonel Cotton says that the first Estimate, No. 45, shows the work done and expenditure already incurred on each mile, but the Estimate gives no information whatever on this point. I have ascertained otherwise however that about 2,50,000 of earthwork and excavation, remain to be done, besides the additional Rupees 1,70,471 added by me to the Estimate, and it will take some six months with the working party they now have on this part of the line to finish this.

21. Of the dry stone pitching about one-seventh of the whole quantity allowed in the revised Estimate, without my addition, is completed, and as this work goes on very slowly, it will be a long time, I fear, before it is completed, and until it is so the banks cannot be pronounced to be quite safe. It is therefore a matter requiring the immediate and serious attention of the Company's Officers.

22. I shall next notice the 2nd Estimate, No. 46, which is a supplemental one (amounting to Rupees 31,860) for the completion of the masonry works on the 1st Section.

23. The amount originally sanctioned for these works (vide Estimate No. III, above given)

	RS.	A.	P.
* Masonry works in mile 1 and 3..	12,317	15	6
No. 1 Calingulah ..	2,201	1	9
" 2 Do. ..	2,359	13	0
" 3 Do. ..	389	3	5
" 4 Do. ..	2,913	11	3
" 5 Do. ..	2,201	1	9
" 6 Do. ..	3,583	11	3
" 7 Do. ..	1,986	6	3
" 8 Do. ..	912	6	7
" 9 Do. ..	4,901	1	9
" 9 Culvert ..	1,290	14	0
" 10 Do. ..	4,064	10	0
Add sundries	39,122	0	6
Total ..	2,624	0	0
	41,746	0	0

was Rupees 55,799-7-0, to which adding for sundries Rupees 3,690-13-0 gives a total of Rupees 59,490-4-0, on which the supplemental sum now asked for would be an increase of about 50 per cent. But the increased expenditure has really all occurred on a smaller number of works, vide list in margin,* and is therefore about 80 per cent. on the amount of the original Estimate.

24. The Chief Engineer in paragraph 8 of his letter says, with reference to the excess on these works, that the extra work is chiefly for foundations and aprons found necessary where the ground was opened.

25. This explanation does not, in my opinion, satisfactorily account for so great an excess, but as said in my first report, all these works have been so completely changed and built so entirely different from the original plans that no satisfactory explanation of the excess can be given until plans of the works as actually built have been furnished, which has not yet been done.

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" 10 Do. ..	4,064	10	0
Add sundries	39,122	0	6
Total ..	2,624	0	0
	41,746	0	0

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25. This explanation does not, in my opinion, satisfactorily account for so great an excess, but as said in my first report, all these works have been so completely changed and built so entirely different from the original plans that no satisfactory explanation of the excess can be given until plans of the works as actually built have been furnished, which has not yet been done.

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26. Finally the sanction of Government is now required for the following supplemental Estimates:—

	Rs.
No. 45, for completion of first 17½ miles of canal...	3,64,917
No. 46, for completion of masonry works on do....	31,860
Making a total of	3,96,777

Three lacs ninety-six thousand seven hundred and seventy-seven, which represents the total additional outlay required on this part of the work, the original Estimate for which was Rupees 4,60,000 being an increase on that sum of 86 per cent.

No. 375. ORDER THEREON, 15th April 1864, No. 1,074.

1. With the foregoing letter, the Consulting Engineer Irrigation and Canal Company submits a supplemental Estimate No. 45, for the construction of the first Section, 18 miles, of the main Canal, amounting to Rupees 3,64,917; and an additional Estimate, No. 46, of Rupees 31,860 for minor masonry works on the same Section.

2. The original sanction for the former work was, inclusive of minor superintendence and sundries, Rupees 4,00,510, and for the latter, Rupees 59,490, or together Rupees 4,60,000. The present application raises the aggregate amount to Rupees 8,56,877, being an increase of 86 per cent.

3. The additional charge on account of excavation and embankment is given, by the Company's Officers, at Rupees 2,02,138. The reasons assigned for this excess are stated in paragraph 5 of Major General Ludlow's letter, and the Government concurs with him in the opinion expressed in paragraph 8, that they do not sufficiently account for the extra cost.

4. The Consulting Engineer considers it necessary, however, that a further sum of Rupees 26,638 should be allowed for additional earthwork to increase the interior slope of the embankment, and that besides the new item of Rupees 95,692-8-0 for the inner revetments an outlay of Rupees 6,000 will have to be incurred in providing, similarly, for the protection of the exterior portion of the bank exposed to the action of the river in high freshes; and another of Rupees 15,500 for facing the revetment with stone set in lime in the upper approach to the Hindri Aqueduct. He also raises the rate for minor superintendence and sundries from 5 to 7½ per cent., making, with Rupees 8,000 for the repair of a breach in the 6th mile, the aggregate supplemental sum required for excavation and embankment Rupees 3,64,917, or 91 per cent., on the original sanction of Rupees 4,00,510.

5. For the completion of the minor masonry works on the section, an increase equivalent to nearly 50 per cent. on the first sanction is asked for; but comparing the expenditure with the original estimated cost of the particular works on which it has been incurred, the excess is found to be about 80 per cent. In this case, also, the Consulting Engineer considers—and the Government thinks correctly—that the explanation afforded does not satisfactorily account for the excess. Major General Ludlow is of opinion that until the plans on which the works in question have been actually built have been furnished, no satisfactory explanation can be given.

6. The Governor in Council sanctions both Estimates; and in so doing desires that Major General Ludlow will specially address the Agent on the subject of paragraph 21 of the letter recorded at the head of these Proceedings, and press the necessity for every exertion being made to push forward the work of dry stone pitching in the first section.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Consulting Engineer Irrigation and Canal Company.
" Agent for do. do.
" Secretary and Treasurer Bank of Madras.

Exd. S. T. Augustin.

Consulting Engineer's Office
N. 171
Camp at Kurnool
14th March 1864.

From

Major General J. C. Ludlow

Consulting Engineer V. B. B.

on tour of inspection, Kurnool.

Colonel C. A. Orr, R. E.

Secretary to Government.

O. W. D.

Chepauk

I have the honor to submit for Govern-

ment sanction the two following estimates.

N. 45 Revised and additional Estimate for the

construction of miles 1 to 18 (being the 1st

Section) of the main Canal amounting before

alteration by me to Rupees 3,05,830 but after

alteration to Rupees 3,64,917—

N. 46 Additional Estimate for masonry works

on the (above mentioned) 1st Section (not

including Arnicut and Head works) and

amounting to Rupees 31,860—

2 The sums originally sanctioned for the

first 1 to 18 miles of canal and the masonry

known that Section in Estimate N III sanctioned
by Government under date 31st May 1861 was
Rupees 26000. The following being an abstract of it.

Earth Excavation	31759-2-3
Rock	27103-11-6
Embankment	168903-11-1
Water carrying Pipes	397766-11-10
Detached value of Stones	20000
11 Calicut	19985-2-10
9 Calicut	29668-9
1 Bridge	6453-11-2
6 Bridges	413-11
Alteration of Road	2698-2-0
8 Iron Ferry Boats	1500
Special Superintendence and Sundries	26233-13-2
Total Rupees	460000

From this it appears that the excavation
and embankment of the Section of the Canal
for which the revised estimate N 5 is now sub-
mitted were originally estimated at Rs 397766-11-10
to which sum should be added Rupees 22543-
being its proportion of Sundries making
the total cost of this part of work
as originally estimated Rupees 420309-11-10
From this a deduction was made of Rs 20000
the

the supposed value of stones to be furnished by
the excavation but as no part of this sum
has yet been realized it cannot now be taken
into account when comparing the actual with
the estimated cost.

The additional sum now applied for to
complete the work is Rupees 305830 including
Rupees 8000 for the repair of a breach in the 6 mile
and Rs 95692-8 for settlements neither of which
formed a part of the original estimate. Deducting
these, there remains a sum of Rupees 202138
which represents the additional cost of excavation
and embankments on the Section showing
an excess in these items of 48 per cent on
the original estimate.

In paras 3, 4 and 5 of his letter N 22
dated 9 February the Chief Engineer accounts
for this excess by a deduction of Rs 15 in 100
having been made in the original estimate on the
supposition that the earth in bank would
occupy that much more space than it did
in pit which expectation for the reasons stated
was not realized. 2nd Caving to greater breadth
and

25830
5692
522

and slopes than were anticipated having to be given in the Banks on account of the nature of the soil. 3rd Owing to rock having been found where earth which would have been available for embankment was wanted.

6 If proper care be taken to consolidate the earth in the formation of a Bank the soil will behave nearly as much space in the Bank as in the pit. So large a deduction as was made from the estimate (15th) for expansion was not therefore admissible.

7 The slopes allowed were doubtless too steep - 1 1/2 base to 1 height. The earth could not stand at that angle and additional soil had to be used to make them up where they slipped.

8 But these reasons will not fully account for the large excess which there will be when the work is completed. The total quantity of embankment (including gravel and earth excavation) in the original estimate was 14,496.80 ^{Cubic Yards}. The quantity in the revised estimate is 22,916.46 ^{Cubic Yards} the difference being 8,419.66 ^{Cubic Yards}. This large excess would seem to be in a great measure due to the inefficiency of the section originally

originally allowed. A comparison of the original average sections with the revised ones will I think prove this to be so. The results are as follow in the 13th with (4th to 16th and part of 18th) where the principal embankments occur.

	Original Section	Revised Section
Cubic Yards in embankment	13,241.13	19,203.41
Pit in Grave-yards	58	87
Height	16 ft 1 1/2 in	12 ft 1 1/2 in
Breadth at top	20 ft	12 ft 1 1/2 in

9 The quantity of rocky excavation will fall short of that allowed in the estimate. The quantities being as follow.

Original Estimate, Cubic Yards	8,496.41
Revised	7,026.51
Difference	1,469.90

10 There has been some error in rates earthwork estimated on an average at 2.25 ^{per cu yd} has cost 2-5 1/2 and rocky excavation estimated at 3-8.5 has cost 4-8 1/2 but considering the difficult nature of the work the rates at which it has been done cannot be considered as otherwise than moderate.

11 In the accompanying drawing the average sections which it is now intended to give to each mile of the Bank where the canal

is in embankment and also the maximum section in each mile are shown. The top of the bank is to be nowhere less than 6 feet above high water line and where the bank is high or exposed, will have additional height given to bring it to a limit of 3 feet more.

12 The breadth at top varies from 10 to 15 in the average sections and from 12 to 18 in the high and exposed parts.

13 These dimensions I consider to be sufficient but think that the slopes on the water side should be longer and I would give them a margin of 2 to 1.

There will be an addition to the estimate on this account of 170,283 cubic yards which at 2 1/2 per yard will come to Rs. 26,638.

14 There is a large item included in the revised estimate of 95,692-8 for rough stone revetment for which no provision was originally made. As far as the interior bank is concerned the quantity of this pitching is ample but about 2000 yards in length of the exterior side of the bank will require to be similarly protected from the action of the river in very high freshes and I have added an item on the account of

of Rupees (6000) six thousand 11 81

15 The average rate allowed for pitching is only 9-3 1/2 per yard. This judging from the difficulty of procuring stone in places and the steadily increasing cost of labor is I think likely to be exceeded before the work is finished but as there is some probability of a saving in quantity I shall not propose any increase to the estimate on this account.

16 The banks of the canal where they approach the Hindy aqueduct will in addition to this dry stone revetment require to have a facing of stone set in lime. This is necessary on account of their great height, the depth of water and the quality of the soil there. It is necessary to add an item of Rupees 15,500 to the estimate on this account.

17 In the revised estimate an allowance of Rupees 5 per cent only has been made for minor Superintendence and Sundries but as I have reason to know that the expenditure on this account has hitherto considerably exceeded that rate I have allowed 10 per cent.

The Estimate No 5 with the above noted additions will then be.

Additional cost of 3 first miles	52459-9-2
Do up to 18 mile	133115-1-9
Repair of breach in the 6 mile	8000-0-0
Paving interior banks	95716-8-0
Additional work for increase of slopes	26638-0-0
Pavement on River side	6000-0-0
Rubble in lime pavement to banks in upper approach to Spedest	15500-0-0
<hr/>	
Total Rupees	339629-2-11
7 1/2 per cent for Superintendence & Sundries	25487-13-1

Grand Total of Supplemental Estimate No 5 as revised 365117

19 The Original estimate being as above shown 200509-11-10 the excess of cost will be 91 per cent on that sum.

20 In para 1 of his letter No 22 Colonel Cotton says that the first estimate No 5 shows the work done and expenditure already incurred on each mile but the estimate gives no information whatever on this point. I have ascertained otherwise however that about 250000 of earthwork and excavation remain to be done besides the additional 370471 added by me to the estimate and it will take some

some 6 months with the working party they now have on this part of the line to finish the 21

Of the dry stone pitching about 1/2 of the whole quantity allowed in the revised estimate without my addition, is completed and as this work goes on very slowly it will be a long time before it is completed and until it is so the banks cannot be pronounced to be quite safe. It is therefore a matter requiring the immediate & serious attention of the Company's Officers.

22 I shall next note the 2nd section No 6 which is a supplemental one (amounting to Rupees 31800) for the completion of the masonry works in the 1st section.

23 The amount originally sanctioned for these works (vide Estimate No III above given) was Rupees 55722-2-0 to which adding for sundries Rupees 3690-0-0 gives a total of Rupees 59412-2-0 on which the Supplemental sum now asked for would be an increase of about 50 per cent.

24 But the increased expenditure has really all occurred on a smaller number

50 per cent.

of works vide list on margin and is therefore about 80 percent on the amount of the original estimate.

Masonry works in mile	12317-15-6
1st Bahigalah	2201-1-9
2nd "	2359-13-
3rd "	389-3-5
4th "	2913-11-8
5th "	2201-1-9
6th "	3583-11-3
7th "	1986-6-3
8th "	912-6-7
9th Bahigalah	4901-1-9
10th "	1290-11-
	4064-10-
	39122-6

24 The Chief Engineer in para 8 of his letter says with reference to the escape in these works that the extra work is chiefly for foundation and drains found necessary when the ground was opened.

Add drains 2624-
Total Rs. 41746-

25 This explanation does not in my opinion satisfactorily account for so great an escape but as said in my first Report all these works have been so completely changed and built so entirely different from the original Plans that no satisfactory explanation of the escape can be given until plans of the works as actually built have been furnished which has not yet been done.

26 Finally the sanction of Government is now required for the following Supplemental Estimate.

Rs. 5 For completion of first 1 1/2 miles of Canal 364917
 Rs. 6 For completion of masonry works on Dr. 34880
 Making a total of Rupees (396777)
 Three

Three Lacs Ninety Six thousand Seven hundred and Seventy Seven which represents the total additional outlay required on this part of the work. The original estimate for which was Rupees 4,00,000 being an increase on that sum of 86 per cent.

I have the honour to be,
 Sir,
 Yours most Obedient
 J. D. Hudson

J. D. Hudson Esq. Esq.
 Consulting Engineer S. C. C.

50 per cent.

Proceedings of the Madras Government
Under date 15th July 1864
Read the following

Forwards for sanction supplemental Estimate for the first 17 1/2 Miles of the allain Canal amounting to Rs 3,67,777.

With the foregoing letter, the Consulting Engineer submits a supplemental estimate, No. 171, for the construction of the first section - 18 miles - of the main canal amounting to Rs 3,64,917 and an additional estimate, No. 26, of Rs 3,1860 for minor masonry works on the same section. The original estimate for the former work was, inclusive of minor superintendence & sundries Rs 4,00,500 - ~~that~~ and for the latter Rs 59,490 - or together Rs 4,60,000. The present application raises the aggregate amount to Rs 3,56,777 being an increase of 86 per cent.

Estimate No. III sanctioned in Perm. of Govt. d. 1076 dated 31st May 1864.

This should I think, be reported home at an early date.

no. 1074-15th July 1864
17th July 1864
19th July 1864
20th July 1864
21st July 1864
22nd July 1864
23rd July 1864
24th July 1864
25th July 1864
26th July 1864
27th July 1864
28th July 1864
29th July 1864
30th July 1864
31st July 1864

Forwards for sanction supplemental Estimate for the first 17 1/2 Miles of the allain Canal amounting to Rs 3,67,777.

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3 The additional charge on account of excavation and embankment is given by the Company's Officers, at Rs 202,138. The reasons assigned for this excess are stated in a letter of Major Genl Ludlow's letter, and the Govt concurs with him in their opinion expressed in para 8. That they do not differ with the estimate for the extra cost.

The Consulting Engineer considers it necessary however, that a further sum of Rs 26,638 should be allowed for additional earthwork for increase of slope of the embankment, and that besides the new item of Rs 95,692.80 for the masonry on the interior walls of the canal an outlay of Rs 6000 will have to be incurred in providing

for the completion of the masonry works on the section increase equivalent to nearly 50 per cent on the first section marked for, but

* with Rs 8000 for the repair of a breach in the 6th mile,

similarly, for the protection of the exterior portion of the bank exposed to the action of the river in high freshes; and another of Rs 15,500 for facing the revetment with stone set in lime in the upper approach to the Hindia Aqueduct. He also raises the rate for minor superintendence and sundries from 5 to 7 1/2 per cent, and knows the aggregate supplemental sum required for excavation and embankment Rs 3,64,917, or 91 per cent on the original amount of Rs 4,00,570.

of 1880-81

A vertical strip of a document page, likely a list or index, showing names and dates. The text is heavily obscured by noise and artifacts, making it largely illegible. Some faint, repeating patterns of text are visible, possibly indicating a list of entries.

J. L. Ludlow will
 specially address
 the Agent on the
 subject of para 21
 of the letter recorded
 at the head of these
 proceedings, and
 press the necessity
 for every exertion being
 made to push for-
 ward the work of
 dry stone pitching
 in the first section

J. L. Ludlow
 in

To the Consulting Engr. H. C. [unclear] with 2 letters and estimate, 1st
 Agent J. H. [unclear]
 Genl. [unclear] [unclear]
 Return Enclosures
 Date 10th April

Copy in a letter to England
27 July 1864.

126
707 1864 Dep't
Pres. of Gov't for April

5 1074
Pres. of the Alameda
2/15 April/64

Estimates amounting
to \$3,967,777 for the con-
struction of the first section,
18 miles, of the Irrigation &
Canal Company main canal,
and for minor masonry &
works on the same.

No 374...375