M.R.O. 1—10,006—23-2-50.

(1) Number of pages _____

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(3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No. / B.P. ~~No.~~	1350	Press / ~~Mis.~~	Original
Dated	21-5-	1874 -195-	

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department, 21st May 1874.

Read the following:—

No. 255.

No. 428. *Note by the Chief Engineer for Irrigation.*

In a letter No. 442 of the 28th July last, the District Engineer, Tanjore, reported that the levels on which the Ponnavassel Project,* sanctioned in G. O., No. 2,881, of the 6th December 1872, was prepared, had been found to be incorrect, a difference of about 2 feet in the ground level having been discovered. This error affected principally the 4th to 8th miles of the channel, the ground being lower than had been supposed, and the quantity of earthwork required consequently materially greater than that included in the estimates. Major Oakes showed that supplemental sanction to the extent of Rupees 2,070 would be needed.

* Rupees 19,500.

2. Inquiry was then made as to the person responsible for the error, and the District Engineer reported* that the contour levels had been taken by a temporary Surveyor named Rungasawmy, and the working sections by Mr. Supervisor Stephens, while the project was prepared by Captain Montgomerie.

No. 477, dated 4th August 1873.
* No. 573, 1st September.

3. Reference was made to the latter officer for explanations, and on the receipt of his reply,* Captain Mead, who had in the meantime become District Engineer of Tanjore, and who had been up to the time of his joining the district entirely unconnected with the work, was requested to report on all the points raised by Captain Montgomerie, and with his letter of the 30th December last, No. 963, he has furnished revised estimates in detail as well as sections of the ground.

No. 598, 8th September.
* About 12th September.

4. It may be remarked that the levels of the head sluice sill and of the aqueduct at the Munniyaur have been retained at 190·00 and 169·00 respectively, as intended by Captain Montgomerie, and that up to 3¼ miles or so from the former the ground levels of that officer's project do not differ materially (0·37) from those since taken; but further on the difference is at one point (5 miles 4,339 feet) as much as 2·62 feet, at another point (6 miles 4,100 feet) 3·23 feet, while at 7 miles 1,820 feet the difference is 1·66 feet, and at 7·3,720, 2·64 feet. There appears, therefore, to be no reasonable doubt that Mr. Stephens' levels were wrong.

5. The line of the channel as executed differs materially from Captain Montgomerie's from the head sluice to the road, which is crossed some 800 yards lower down; at the lower end of the first mile there is a very slight modification also, but the modifications make no difference of consequence in the cost of the work, for although Major Oakes showed a saving of Rupees 559, he omitted to provide for the flood bank from the head sluice to the road, and this item amounts to Rs. 560. In the lower end of the 5th mile there is a deviation for a short length at and near the crossing of road No. 4, where the actual line is a few feet south of the sanctioned line.

Proceedings of the Madras Government, Public Works Department,
21st May 1874.

[illegible]

[illegible]

[illegible]

the work. It appears that the wells were filled with concrete when the work was stopped, and I fear it may be necessary to take up some of the wells as they have only been got down from 3 to 4½ feet; clay is said to have been met with. The wells of the rear retaining wall were got down 6 feet. When this was done I was in the eastern part of the district, and the water has prevented the examination of the foundations.

5. Levels have not yet been taken along the last section of the channel, and hence the estimated amount is entered against it, the amount will probably be sufficient.

6. The excess and savings will be as follows:—

	Excess	Saving
Earthwork	1,715	...
1 Syphon Sluice	110	...
1 Distribution Sluice	50	...
Probable excess on head sluice	415	...
	2,290	
On land		250
Paid by Messrs.		40
	760	760
Excess requiring sanction	2,290	

No. 477.

MEMORANDUM.

As it is observed that the estimate and plans of the Ponnavassel Project were returned to the district on the 4th January last, the undersigned has the honour to request that it may be reported who is responsible for the many mistakes which occurred while it was under preparation, and which show that, instead of being carefully it was unfortunately carelessly made out. A mistake of 2 feet in level for an hydraulic work of this kind is somewhat extraordinary, and a provision of under 27,000 cubic yards of earthwork in the 4th section when 2ird times that quantity were needed shakes one's confidence in the skill as well as care bestowed upon the scheme.

2. The exact circumstances of the foundations of the head sluice are not understood. It will be necessary to ascertain exactly what has been done, and indeed of this it would seem that the station books should contain a record.

Papers connected.
G. O., No. 2,841, dated 6th December 1872.
R. No. 1,203, „ 28th July 1873, and three enclosures.

(Signed) J. MULLINS, Lieut.-Colonel, R.E.,
Chief Engineer for Irrigation.

4th August 1873.

From Major R. F. OAKES, R.E., District Engineer, Tanjore, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Tanjore, 1st September 1873, No. 573,

With reference to your memorandum, No. 477, dated 4th ultimo, (received 14th,) I have the honour to inform you that the contour levels for the Ponnavassel Project appear to have been taken by a temporary Surveyor, one Rungasawmy, and the working sections by Mr. Supervisor Stephens, while the project was prepared by Captain Montgomerie, who will be able to state whether I have been rightly informed relative to the survey.

2. With regard to the extra work for providing wells for the head sluice, I calculated the probable cost approximately. The details required by you are furnished in the enclosed replies by the Range Officer to questions put by me; from them it would appear Rupees 857-6-11 have been expended on the extra foundations of the sluice, and Rupees 100 will be required next season for baling, making Rupees 957-6-11 in all against Rupees 106-13-0 provided in the estimate; the excess, therefore, will be Rupees 850 instead of Rupees 415, and the total sum required will be Rupees 2,525.

3. I am apprehensive that it may be necessary to take up some of the wells, as they were filled with concrete when the water could not be kept from the foundations owing to the rising of the river, and some of the wells should, I expect, have been carried lower.

4. With regard to your quotation from my note on the work in which I stated that the project was carefully prepared, I have to observe that I was obliged to accept the levels submitted, and as a great part of the channel was shown in cutting in the 3rd section, and the water level would be for the most part only a few inches above the ground level, the spoil from the channel would have sufficiently protected the country.

No. 655.

MEMORANDUM.

On the receipt of the letter, No. 573 of the 1st instant, from the District Engineer, Tanjore, the correspondence was forwarded to Captain Montgomerie for such explanations as he might be able to afford, and the undersigned has now the honour to transmit a copy of a letter without number or date, but which appears from the date of the attached sketch to have been written about the 12th instant, from that officer, and to request that the several points noticed may be reported on; that the surveys, longitudinal and cross sections, with the plans of works as sanctioned by Government for the Ponnavassel Project may be forwarded; that the line as actually laid out and in course of execution may be marked on the above survey; and that copies of the longitudinal and cross sections thereto appertaining may be submitted; it should be clearly shown where the error of about 2 feet in the ground levels, as reported in paragraph 1 of Major Oakes' letter, No. 442 of the 28th July last, was found, and it should be ascertained conclusively whether this difference was due to any mistake in the original levels or to alterations in the then intended levels of any or several parts of the project. The levels of every part of the project, as now being carried out, should be distinctly shown, and Captain Mead's report should refer to all differences in the levels of those portions of the work which occupy the same position or nearly so, such as the crossing of the Munniyaur.

1 Copy of a letter.
1 Sketch.

3. Moreover, with regard to quantities, it should be known exactly wherethere were errors in the estimate, and to what extent these quantities were deficient on the sanctioned line for the channel.

3. It will be necessary also to state by whom the mistakes were discovered; by whom the channel was laid out on the ground before the execution; what measures were taken to ascertain whether the original estimate were really correct; by whom the change of line was recommended, and what reasons were adduced in favour of the change.

4. In any case it would have been necessary to obtain the sanction of Government to the revised arrangements, and it is now requisite that much fuller information should be furnished than would have sufficed had the line adopted for actual execution been that originally selected.

15th *September* 1873. (Signed) J. MULLINS, Lieut.-Colonel, R.E.,
Chief Engineer for Irrigation.

To the District Engineer, Tanjore.

From Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, to Captain P. MONTGOMERIE, R.E., dated 15th September 1873, No. 558.

I have the honour to forward, for your perusal, certain correspondence as per margin* between Executive Engineer and the District Engineer, Tanjore, regarding serious errors which have been discovered in the Ponnavarcel Project, for which an estimate, amounting to Rupees 19,300, was sanctioned in G. O., No. 2,881, of the 6th December 1872, and I to request that you will be good enough to afford such explanations as you may be able; for it will be observed from paragraph 1 of Major Oakes' letter, No. 573 of the 1st instant, that it has not been clearly shown who is responsible for the mistakes, and Government will expect information on this point.

* Received to be returned
From District Engineer, 442
To do. do. 477.
From do. do. 573.

From Captain P. MONTGOMERIE, R.E., Acting Under Secretary to Government, Public Works Department, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Ootacamund, —— September 1873.

In returning the correspondence as per margin, received with your letter No. 558, dated 8th September 1873, regarding serious errors which are said to have been discovered in the Ponnavarcel Channel Project, Tanjore District, I have the honour to inform you that Major Oakes is perfectly correct in the statement made in paragraph 1 of his letter of the 1st September 1873, regarding the agency by which the levels were taken and the estimate prepared. Mr. Stephens' levels agreed so well with those taken by the Surveyor that I did not consider further check necessary, and they are much more likely to be correct than any levels taken by Lieutenant Greenaway or by his still less experienced Overseer "Mahadeo Iyer."

From District Engineer, 442.
To do. do. 477.
From do. do. 573.

2. Major Oakes was also perfectly correct in any statements he may have made regarding the carefulness with which the project was prepared. But he was most inaccurate in stating "that no separate provision had been made for earth for embankments where the excavation from the channel itself was not sufficient;" and a simple glance at the map and sections would convince any man of ordinary intelligence of the fact.

3. Major Oakes in his first letter states that "it was found that the level of the ground differed about 2 feet from that shown in the sections sent up with the project," but in what way he does not explain. Had there been a difference of 2 feet in the total distance of 10 miles 4,018 feet, I would have been much disappointed; it would however have made only a slight difference in the slope to be given to the bed of the channel, and no appreciable difference whatever in the earthwork to be executed. It is quite preposterous to suppose that the original levels could possibly have been taken with jumps of 2 feet every here and there, and the only way I can account for the Major's statement is that the Range Officer must have actually and metaphorically "let himself into every hole" he could possibly find, and why the simple fact of "the whole project having been recast," and the line of the channel considerably altered, as clearly indicated in Major Oakes' letters, could not suggest itself to your mind as accounting for all the difference either in quantity of work or level of ground is to me inexplicable.

1/1 = 2½ inches per mile.

4. The savings on earthwork in Nos. 1 and 2 Sections (*vide* statement) more than counterbalance the loss in No. 3 Section. These savings were most certainly not due to any recasting of the project by the Range Officer, as I laid them out myself before leaving Tanjore, but must be chiefly owing to the full amount of work estimated for not having been carried out, and this I have always found to be the tendency in executing new earthworks through valuable land. These two sections pass through the only valuable land to speak of in the whole project.

I also laid out the general direction of No. 3 Section, which a look at the Map will satisfy any one was the only different bit of the channel, and which could not possibly have been altered without far exceeding the estimate.

5. I will therefore confine my remarks to No. IV. Section (of which I send you a sketch from memory) where all the discrepancies have occurred (*vide* statement), and which I maintain might have been laid out by any intelligent ryot without the aid of levels, the width of the channel being only three yards and the lay of the ground the most favourable throughout the whole line, except at E and F where, so far as I can remember, ample allowance was made in the estimate for embankments. But of course if the Range Officer has laid out the canal as indicated by Major Oakes in the 4th and 5th paragraphs of his first letter, by hugging the south bank of the Coleroon from B to C, and again from D to F the difference of 2 feet in the level of the ground already referred to is most easily accounted for, not only by the ground being naturally lower at those parts, but also on account of the pits which have been dug for the repairs of the Coleroon bank from time immemorial. And again, if the channel has been taken too close to the village of Vellangoody between C and D, any amount of extra work may have been required in excavating. I would, therefore, suggest that the actual

cover any extra work required for the foundations. And this I found to be the case in carrying out the Vennaur Regulators, where we put the foundations 3 and 4 feet lower than that allowed in the estimate, and under the allotment sanctioned.

From Captain H. R. MEAD, R.E., District Engineer, Tanjore, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Tanjore, 30th December 1873, No. 968.

As directed in your memorandum No. 655, dated 18th September, I have the honour to forward the original survey, sections, etc., of the Ponnavassel Project as sanctioned by Government, and also a copy of the original detailed estimate.

4 Tracings of Levels.
1 Book of original Survey, etc.
1 Abstract Estimate.
1 Do. for Masonry Work, B.
1 Statement of Earthwork, A.
1 Original detailed Estimate for Earthwork.
4 Revised do. do. for Sections Nos. 1, 2, 3, and 4.
1 Detailed Estimate for forming Cauvery bank.

2. I have also to report that the original levels were first taken by a Surveyor of the name of Rungasamy, and afterwards the longitudinal section, from which the estimate was made, by Mr. Stephens. After the work was sanctioned Overseer Mahadeo Iyer was ordered to lay out the work; this he did, but he found that the original levels were incorrect; by order of Major Oakes the levels were taken over again by Mahadeo Iyer and checked by Lieutenant Greenaway; the line was practically the same as that in the original plan, and on this section Major Oakes laid out the channel that has been for the most part executed.

3. I have had these levels re-checked (I checked the greater portion myself), and also a line of levels taken from the Munniyaur head sluice to the Cauvery bridge at Triviaur, so as to close them on the levels taken by myself in 1866 when on the Cauvery survey, etc.; I find that they are correct, and the original levels are incorrect, there being a difference of nearly 2 feet at the Munniyaur head sluice.

4. I now forward a copy of this new section, showing the level of the channel as designed by Major Oakes and the detailed estimate for it, also a comparative statement and the supplemental estimate amounting to Rupees 2,975.

5. This amount is more than that given by Major Oakes; it is in consequence of his having made no allowance for the new Cauvery bank required from the head sluice to Road No. 2, which now forms the river bank, and also to the allowance for the extra cost of the head sluice in consequence of the bad foundation necessitating the use of wells; this and the cost of baling will probably be Rupees 750 instead of Rupees 415 allowed for before.

6. I regret also that another mistake was made in laying out the new falls for the channel at 6¼ miles; the channel changes its fall from 1 in 1,000 to 1 in 3,000, and its depth from 2 feet to 1¾; unfortunately owing to an error in drawing, which was not noticed, the bed was kept on the same level, and the surface of the water was made to rise 3 inches. I have corrected this by raising the water line 3″, as I am able to do this as at 5; the channel changed its fall from 1 in 3,000 to 1 in 1,000, and Major Oakes allowed a head of 6″ at this point to generate the increased

velocity required; as this increased velocity can be generated with less head the error will not affect the project. I have not attempted to affect it further than altering the water surface line on the plan as the work has been executed.

7. It is much to be regretted that the original levels were incorrect, and this is the chief reason of the excess the project, however will prove a paying one, and I trust, therefore, that the supplemental sanction now asked for may be given as soon as possible, so that the work may be fully completed this working season and the land brought into cultivation next July.

No. 422.

Ootacamund, 21st May 1874, No. 1,750.

IRRIGATION, No. 35.

G. O., No. 2,931

The Government have learnt with regret that considerable errors have been found to exist in the levels of the Pennaroad Project which was sanctioned in December 1872, and that the revision of the estimates consequent thereupon, including additions to the foundations of the head sluice and two additional minor masonry works, has raised the total from Rupees 19,500 to Rupees 22,175.

2. The Chief Engineer for Irrigation has inquired into the circumstances of the case, and on his recommendation sanction for the supplemental amount required, viz., Rupees 2,675, is granted.

3. The Chief Engineer will take due notice of Mr. Stephens' carelessness in regulating promotions in the Upper Subordinate Grades.

(True Extract.)

Lieut.-Colonel, R.E.,
Joint Secretary to Government.

To the Chief Engineer for Irrigation.
" District Engineer, Tanjore.
" Officiating Controller of Public Works Accounts.

Exd. S. T. Austin.
Spare Copies

No. 255.

Note by the Chief Engineer for Irrigation.

In a letter No. 242 of the 28th November 1873 the District Engineer, Tanjore, reported that the levels on which the Pennaroad project, sanctioned in G.O. No. 2881 of the 6th December 1872, was prepared, had been found to be incorrect, a difference of about 2 feet in the ground level having been discovered. This error affected principally the 4th to 8th miles of the channel, the ground being lower than had been supposed and the quantity of earthwork required consequently materially greater than that included in the estimate. Major Oakes therefore asked that supplemental sanction to the extent of Rupees 2070 would be needed.

2. Enquiry was then made as to the person responsible for the error

and the District Engineer reports
that the contour levels had been
taken by a temporary observation
named Rangaswamy, and the workings and
sections by Mr Stephenson Stephens
while the project was prepared
by Captain Montgomerie.

3 References were made to the
latter Officer for explanations and
on the receipt of his reply, Captain
Mead who had in the meantime
become District Engineer of Tanjore,
and who had been up to the time of
his joining the District entirely unc-
connected with the work, was request-
ed to report on all the points raised
by Captain Montgomerie, and with
his letter of the 2nd (P) September last,
No. 968, he has forwarded revised
Estimates in detail as well as sections
of the ground.

4 It may be remembered that
the levels of the head sluice will
and of the approach at the Kannayam
have been obtained with reference
169.00 respectively, as in levels for Captain
Montgomerie

Montgomerie, and that up to 3 miles or so from the former the ground levels of that officers project do not differ materially (0.37) from those since taken, but further on the difference is at one point (5.6332) as much as 2.62 feet, at another point (6.4100) 3.23 feet, while at M. Post 7.1820 the difference is 7.66 feet, and at 7.3720, 2.64 feet. There appears therefore to be no reasonable doubt that Mr Stephens levels were wrong.

5 The line of the channel as
exposed differs materially from
Captain Montgomeries from the
head sluice to the road which is
crossed some 800 yards lower down,
at the lower end of the 1st mile
there is a very slight modification
also

also, but the modifications make no difference of consequence in the cost of the work. Although Major Baker showed a saving of (Rupees 339, he omitted to provide for the block bank from the head sluice to the Road, and this alone amounts to Rupees 560. In the lowest bed of the 5th Brick class is a dividing stratum of hard Gravel, about 4 inches thick, & Rupees 4, whereas the actual Cubic is a few feet South of the foundation line.

Major Baker's calculations by the errors in the levels preceded to modify the bed falls, depths of water, &c as to endeavour to reduce the quantity of earth work required. His intentions were good, but I think it would have been much better had such complications been avoided, and had a revised estimate for as regards fall and depth of water been

been submitted. The work has been carried out, and probably the channel will convey the intended quantity of water well enough, though not in the way or exactly at the level supposed.—

Captain Meade's revised estimate amounts to Rupees 2,975 in excess of the amount sanctioned and this sum is made up of,

Earth work		Rupees 2325
Well foundations to head Sluice		750.
Additional Syphon Sluice		570
do irrigation do	90 660	1410
		3735.
Deduct Savings		
Land Compensation	360	
Contribution by Mee-rasidars	400	760
	Rupees	2975

Regarding the earth-works there is nothing more to be said: the excess on the head sluice is perhaps not of much

much consequence though it was not very remarkable that nothing but sand was found at 6 feet below sill level. It would not have been diffientt to ascertain the nature of the sub soil, and it is better to do this than to have to make hasty alterations of design so as to save a working season. The additional works one for drainage and one for irrigation are of a kind which are often found to be needed when new channels are cut and banks thrown up; there is no regular line of drainage cut or near the site of the Syphon or under tunnel, but it has been found that an outlet for the drainage of the fields to the Westward is required.—

8. Major Oakes, then Acting Chief Engineer for Irrigation in submitting the project to Government remarked that it had been carefully prepared and he was, I think, justified in forming this opinion from the papers submitted. Captain Montgomerie evidently bestowed much pains on the preparation of the project, but how he came to the conclusion expressed at the end of para 1 of his letter, that the levels taken by the Surveyor and Mr. Stephens agreed closely, I have been unable to ascertain, as the level books exhibit a considerable difference. The terminal level 169.00 as fixed by Captain Montgomerie is certainly very nearly right, but how he obtained it is not clear.—

9. With these observations I beg to submit the revised estimate amounting to Rupees 22,475 for sanction.—

Camp at
Vadavropettio
28th March 1874

W. Underlein Lieut Colonel R.E.
Chief Engineer for Irrigation

To,
The Secretary to Government
Public Works Dept.

MEMORANDUM.

The Returns of the ~~Establishments~~ under-mentioned papers :— is requested.

@ Rs 37-21 January/71 } Sent with the Ch. Engr's D.O. No 8 dt 9-3-71 to Govt in Sec Dept No 1338-17 Marg/74.
@ Rs 16-1 February/71 }

@ ~~Rs 15~~ 15 Rs monthly 73. } Sent with the Ch. Engr's D.O. No 26 dt 4-6-74 to Govt in Sec Dept No 1339-20 Marg/74.
@ Rs 107-28 Feb 73.
@ ~~Rs 1000~~ 17 Rs each 72.
@ ~~Rs 1000~~ 12 Rs each 72.
@ ~~Rs 1000~~ 75 9 Sept 72
@ ~~Rs 1000~~ 7 Rs each 72

3 — ~~4 Plans of Retaining~~
4 — Rs 94-1536 — Sept/73. } Sent with D.O. Letter No 25 dt 4-6-74 to Govt in Sec Dept No 1350-21 Marg/74.
All marginal Original
Enclosures of the letter No 963
of 30 Dec/73

OFFICE OF THE CHIEF ENGINEER
FOR IRRIGATION,
13 — 6 — 1874.

Draft Clerk

To

The Registrar of the

Q.O. No: 1358-21-5-74.

Recommendation sanction for the

Public Works Department.

1357.

Proceedings of the Madras Government

Read the following letter

From The Chief Engineer for Irrigation - } H.E. No. 2557 / 28th March 1874

G.O. No. 2881.

The Government learnt with regret that considerable errors have been found to exist in the levels of the Ponnaivaseel project, which was sanctioned in December 1872, and that the revision of the estimates consequent thereupon, including additions to the foundations of the head sluice and two additional minor masonry works has raised the total from Rupees 19,500 to Rupees 22,475.

2 The Chief Engineer for Irrigation has enquired into the circumstances of the case, and on his recommendation sanction for the

the supplemental amount
required, viz Rupees 2975,
is granted. —

by 30/3/74

The Chief Engi-
neer will take
due notice of Mr.
Stephens' com-
plaint, & re-
gulate proc-
ceedings in the
Upper Subordinate
Grades

Engineer

To
The Chief Engineer Presidency
— Dist. Engr. Sangor ✓
— Controller of Public ✓
Works accounts
Ft. Cossid dep. 8 to all 6/6/74.

428-429

24 - Rcd 21/4/74

2097/

Govt. of Madras.

PUBLIC WORKS.

To

Mr. C. Ingle Goldsmith

Dated

Rcd. Del. 25

G. O. 21 May 74. No. 1350

Kurnool Cuddapah Canal

Nos. 428-429.

Tonnavassal Irrigation

Project, — Tanjore District

The supplemental Es:
timate of Rs. 2975.
for Project, sanc-
tioned Dist re-
ed to take due
Govt Sophisti-
ness in regulating
ons in the Distric

Subordinate grade