(1) Number of pages 5 Sheets

(2) Date of repair

(3) Initials of the Referencer

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Revenue DEPARTMENT

G.O. No. / B.P. No: 6121	Press. / Mis.
Dated 15-10-1877	197 .

Not to be folded or roughly handled

Archives 1—10,006—19-4-79.

6121
1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

24th September 1877, No. 345 I.

Irrigation.

Account.

Read the following papers :—

No. 125. From Major P. MONTGOMERIE, R.E., District Engineer, Salem, to the Chief Engineer for Irrigation, dated Salem, 31st August 1877, No. 45.

As directed in G.O., No. 228 I, dated 9th instant, I have the honor to submit the plans, two reports, and an approximate estimate as per margin for the Marandahully project in the Darampoory taluq, amounting to Rs. 1,50,000.

2 large plans with sections (sent by Bangy).
1 Report.
1 Do. by Mr Blacker.
1 Approximate estimate with abstract.
1 Revenue Statement.
1 Tracing of Index map.

2. The works have been put in hand in accordance with your telegram, dated 21st August 1877.

3. I regret much that these plans and estimates are not in a complete state; but as the works are being vigorously carried out in accordance with the further orders of Government, No. 2,535, dated the 18th instant, I have thought it advisable to submit the scheme as it stands, more especially as a failure in the larger or Sangan-basavan reservoir (which will have a bund of about 60 feet in height) would probably annihilate Palcode and the neighbouring villages.

4. I have therefore to request you will be so good as to return at your very earliest convenience all the plans and documents connected with the project with such orders as you may consider necessary in carrying out the work.

5. Mr. Supervisor Mahony is in immediate charge of the work, and the project will be matured with the assistance of Mr. Kuster of the Bengal Public Works Department, lately joined.

6. The Baroor project has been completed and will be submitted for orders as soon as ever it is received from the Range Officer; this work has also been put in hand, and I rejoin my camp in that locality to-morrow to see that there are no difficulties in the way of furnishing work for all comers.

P.S.—The whole of Mr. Blacker's original sections which have been left on the works will be forwarded to the Chief Engineer for Irrigation in case the information furnished on the accompanying plans is not sufficient.

District Engineer's Report, dated 31st August 1877.

Approxima[illegible] Estimate.

Statement of Ta[illegible] and Channels.

Mr. Blacker's Report N[illegible] 95, 29th August 1872.

No. 170 I.

No. 125-A. *Note by the Chief Engineer for Irrigation.*

THE Marandahully project* as described by Major Montgomerie, and as indicated in the papers transmitted by that officer, has for its object the diversion of water from the Sunadakumara river which drains some 340 square miles of country to supplement the somewhat precarious supply of the Sanganbasavan, Jairytalab, and other tanks.

* Called also Sanganbasavan project.

2. *Water-supply.*—In fairly good seasons the water-supply will be sufficiently abundant to do all that is desired; when the monsoon fails over the catchment basins of the several tanks there will be very little water in a river, the drainage basin of which is so small and so similarly circumstanced.

3. *Approximate estimate.*—The approximate estimate prepared by the District Engineer amounts to Rupees 1,50,000, and it is supposed that 3,000 acres additional will be irrigated yielding a gross revenue of 15,000, while it is thought that in time a further considerable extension of irrigation will result. The information available is inadequate for a review of the financial aspect of the scheme, and it is not even clear what the average cultivation and revenue of the two principal existing tanks have been, for though in the revenue statement, dated 31st August 1877, there are given particulars of the ayacut area and revenue of irrigation in twenty-two villages, and it is mentioned that 550 acres, yielding 2,000 Rupees, will be brought under cultivation, it is not indicated what the total ayacut under the tanks is while particulars of the average cultivation are not shown. The Jairytalab has a basin of 27 square miles, and the average cultivation under it would have been some guide—

1*st.*—To the yield of drainage in this part of the country.

2*nd.*—To the storage capacity required.

4. *Project already started.*—Government have, however, ordered the project to be proceeded with to afford employment to the distressed population, and the points of immediate importance are—

1*st.*—The designs of the works.

2*nd.*—The order in which they should be carried out.

5. *Component works.*—The project includes—

1*st.*—The construction of an anicut across the river and of a head sluice.

2*nd.*—The cutting of a supply channel to the Sanganbasavan tank.

3*rd.*—The enlargement of the Sanganbasavan tank.

4*th.*—Distribution channels under the above tank.

5*th.*—The enlargement of the Jairytalab.

6*th.*—Distributaries from the do.

6. *Anicut.*—The circumstances of the river have been in a rough way apparently ascertained and noted. The maximum flood discharge is estimated to be 25,000 cubic feet a second which probably is ample. The length of the anicut as shown on the plans would be 200 — 14 = 186 feet, but the afflux would then be about 7·75 instead of 6·11 feet, and it appears to be very desirable to considerably lengthen the anicut; 250 in the clear or 264 feet including the under-sluice piers would be none too much, and it may be ju[illegible] from the cross section of the river that such an extension would be feasible. [illegible] afflux would then be about 6·33 feet, and the wings should be 6·33 + 1·89 + [illegible]1·22 feet above crest level.

Part of the anicut is to be built [illegible]k and part on soil of some sort, the nature of which is not indicated. The [illegible]ty of the water passing over the anicut will in case of maximum flood be as hig[illegible] 15 feet a second, and where there is no rock the aprons will need to be substant[illegible]nd wide, for the action to a considerable

distance from the crest wall will be violent. In the cross section a masonry apron, 15 feet wide and 6 feet below crest level, with an outer rough stone apron at a slope of 1 in 6, is shown. The latter will have to be of very large stone, at least 2 feet long* and from $6\frac{3}{4}$ to $4\frac{1}{2}$ cubic feet in bulk for 15 feet from the retaining wall, and beyond this a further width of 15 feet of stones of about 3 cubic feet each.

* Laid at right angles to slope.

The anicut should, however, not be built on a straight line at right angles to the axis of the river, if by varying the alignment better foundations can be secured.

It is advantageous to place the sill of under sluices considerably below the head sluice sill, and in this case they can very well be put at 1,963 instead of at 1,966. If the height of the vents were then made 4 feet instead of 6 feet, they might be worked from the crest of the anicut instead of from a bridge above maximum flood level.

7. *Supply Channel.*—It is not practicable to demonstrate what the dimensions of this channel should be, seeing that there is no definite information as to the frequency and duration of freshes. What the rainfall at Palcode is has not been stated, but it is believed that about half the rainfall occurs from June to September and one-fourth in October to December. It is proposed to allow a bottom width of 50 feet with side slopes suitable to the soil, these being near the head at $\frac{1}{4}$ to 1. The resulting discharge is estimated at 1,200 cubic feet a second which is approximately correct.

A head sluice with 8 vents of 6 feet will suffice, and the roadway should be 3 feet above calculated maximum flood level including afflux.

This channel will cross the drainage of $7\frac{1}{2}$ square miles at a point in the 2nd mile, and here a surplus weir, 300 feet long, is proposed to be built which will be more than ample.

In the first mile moreover Major Montgomerie has proposed to construct another surplus weir 350 feet long in case the head sluice should be accidentally left open when the river is in high flood. A permanent establishment will be necessary, and so this contingency must not be allowed to happen. Were provision made for the effects of neglect, in all such cases the cost of irrigation works would become prohibitive.

The cutting through the rock at the tail end of the channel should be so made as to maintain the proper surface fall above. This can be secured by making the cross section through the rock less than that of the channel above, the discharge being calculated by the formula for weirs. About 30 feet width will be right.

8. *Sanganbasavan Tank.*—The present capacity of the tank is stated to be 1·408 millions of cubic yards and the proposed capacity 9·250 millions, the difference being 7·842 millions, or sufficient for, say, 1,000 acres. The area of the drainage basin proper of the tank has not been stated, but it appears to be very small. A part of the drainage of $7\frac{1}{2}$ square miles has, however, been diverted to it by the old supply channel or catch drain. The level of the lowest existing sluice is 1,932·92 — (20·9 + 1·91 = 1,910·10 ... ... 1,932·92

Present F.T.L ... ... { 1,956·41 or 1,960·50

Proposed ... ... 1,916·00

Level of sill of proposed new sluice ... ...

The District Engineer recommends the higher water level if the greater depth of water be not deemed objectionable.

Major Montgomerie has sketched a section of the proposed bund for the lower [illegible]rangement is a top width of 9 feet, water level on the large plan. Its general interior slopes $1\frac{1}{2}$ to 1, exterior 2 to 1, level [illegible]op of bund above F.T.L. 6 feet.

In the report it is said, "there will be [illegible]lifficulty in finding an admirable site" for the surplus weir and the intended positi[illegible] "proposed south weir" is marked, but apparently no information is recorded [illegible]the plan or sections as to the level of the ground at what appears to be a detache[illegible] saddle, or as to the nature of the soil.

Upon the circumstances the proper F.T.L. and difference between F.T.L. and M.W.L. will depend. From the estimate for the weir which amounts to 500 Rupees it may be gathered—

1*st.*—That the site requires little or no masonry, and must therefore allow of the discharge taking place over rock.

2*nd.*—That the difference between F.T.L. and M.W.L. is to be 2 feet.

3*rd.*—That the weir is to be 350 feet long, and that consequently the maximum discharge is calculated to be about 2,425 cubic feet a second. Now seeing that the supply channel may at times run 8 feet deep when its discharge will be about 2,200 cubic feet a second, and that there will be some drainage from the basin and from rainfall over the tank, it will be prudent to calculate on the tank water surface rising to $2\frac{1}{2}$ feet above F.T.L. if a weir of 350 feet be provided.

For a tank of this size and depth in which the waves may be high a margin for the bund of 6 feet above M.W.L. will be the least advisable, and a further margin of 2 feet should be provided by constructing a dry stone parapet on the top of the revetment which must be carried up to the top of the interior slope.

The top of the bund should therefore be $6 + 2\frac{1}{2} = 8\frac{1}{2}$ feet above F.T.L.

The following modifications of the section of the bund proposed should therefore be made:—

1*st.*—The new bund should be placed on the tank side of the old bund. This is of much importance, for then the old bund, which has consolidated, will act as a substantial support to the new work.

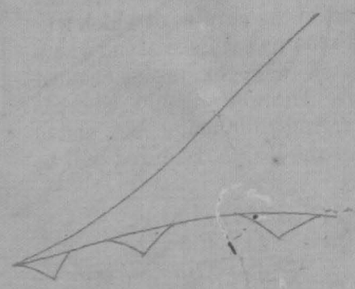
2*nd.*—There is no objection to the F.T.L. being made 1,960·50 if the surplus weir can conveniently be formed at that level without any material extra expense, say, with all subsidiary arrangements, at a cost of not more than 2,500 Rupees instead of 500.

3*rd.*—The puddle wall should have its top 2 feet above M.W.L., otherwise it may be constructed with a batter of 1 in 8 on either face as proposed. The depth at which it should be founded must depend upon the soil at each part, and whether drains in rear will be necessary generally or at particular places will be determinable on the same considerations.

4*th.*—A great thickness of revetment or pitching is not necessary at the base of the interior slope. The greatest action will be felt at from M.W.L. to 20 feet below F.T.L., and there the revetment should be substantial, viz., about $2\frac{1}{2}$ feet thick, and composed of large stone. To all the revetment a backing of well-rammed gravel slightly mixed with clay concrete should be given.

5*th.*—The top width of the bund exclusive of the parapet wall (2 feet) should be 10 feet.

6*th.*—Where the bund will be seated on flat rock all loose rock should be removed, and a trench should be cut out in the rock for the foundation of the puddle wall, the form of the cross section of the trench being similar to that shown in the drawings attached to Circular No. 79. If the rock any where slopes towards the toes of the bund, benches with a reverse slope should be cut to prevent slips; such benches to be about 12 feet apart and not less than 4 feet wide on the bed seat.



9. *Tank sluice.*—An item of Rupees 12,000 has been allowed for a new sluice, but no design has been submitted. This work should consist of a cut stone lined* tunnel under the bund, the dimensions depending upon the discharge which has not been stated, but not less than 4 feet × 6 feet, of which 2 feet would be the rise of the semi-circular arch ($2\frac{1}{2}$ feet thick) and 4 × 4 the waterway. A discharge of 80 to 120 cubic feet a second would then be allowable. The regulation of the admission of water to the culvert should be by means of a tower, circular in plan, and having openings through the wall at intervals of 3 or 4 feet vertically from centre to centre or sill to sill. These openings to be closed by iron shutters worked by screws. Each vent might be so arranged as to give a certain discharge† with a maximum working head of 9 feet. The shutters to work in iron V grooves bolted to the outside of the masonry. The entrance to the culvert to be about 3 × 3‡ feet with a shutter and screw gear, so that the head of water in the tower may be regulated at will.

* Up to springing of arch.

† *e.g.*, vents 2 × 2 would each discharge about 65 cubic feet a second with 9 feet head, and about 44 cubic feet a second with 4 feet head.

‡

Precautions against leakage along the line of junction of the culvert and bund must be taken; on either side of the puddle wall there should be a transverse wall projecting 4 feet beyond the culvert side walls and carried to 2 feet above the top of the culvert. Similar transverse walls to be built at intervals of 20 to 25 feet. Of course, the utmost care must be taken to consolidate the earthwork when filling in over the sluice culvert.

The foundations will need careful designing, especially if, as appears probable, the sluice is to be built partly on rock and partly on soil.

It might as in the case of the Nagpur water works have been desirable, had it been practicable, to convey the water by a syphon pipe over the old bund, but to obtain the pipes would involve a delay of several months, and therefore the old bund will have to be cut through and the culvert built as soon as possible, as also the base of the water tower up to the top of culvert level. The entrance to the culvert may then be temporarily closed by planks or bars and earth until the shutters are ready.

All vents to be formed of Ashlar masonry, and the frames of the shutters of the tower vents to be secured by through bolts.

10. *Distributaries of Sanganbasavan.*—These will not be particularly well adapted to the employment of famine labor, and their details need not be reviewed at present.

11. *Jairytalab.*—Both the District Engineer's report and that of August 1872 by Mr. Blacker afford very scanty information regarding the proposed enlargement of this tank. It is intended to raise the F.T.L. 10 feet, whereby the capacity will, it is stated, be increased from 1·700 to 5·700 millions of cubic yards. The catchment basin of the tank is 27 square miles. The [illegible] of this area should be sufficient for the irrigation of some 810 acres, but [illegible] cultivation has been is not stated, nor has any allusion shown. What the length of existing weirs for the enlarged tank, the been made to the length or position of the [illegible] principal part of the surplus of which will

		Cubic Feet.
From Sanganbasavan tanks, say ...	...	2,500
From catchment basin... ...	...	4,500
Total ...		7,000

have to be discharged at the east end where a large weir and the main surplus channel situated. The weir should be capable of discharging 7,000 cubic feet, and to allow of this the length required will be

Difference of 2 feet between F.T.L. [illegible] F.T.L. (C. 606) 760 feet.
Do. 3 do. do. do. do. 400 ,,
Do. 4 do. do. do. do. 270 ,,

It is of course essential to the settlement of all other details that the manner of disposal of surplus should be settled. Until this is done not even the section of the bund can be determined—

	Feet.
The level of the sill of the lowest sluice appears to be ...	39·30
And by scale present F.T.L. is	60·00
And by scale proposed F.T.L. will be	70·00
The maximum depth of water is therefore now	21·70
Do. do. do. will be	31·70

The top of the bund should be 6 feet above M.W.L. whatever that may be. The slopes, revetment, puddle wall, &c., may be similar to those of the Sanganbasavan tank.

12. *Sluices*.—Rupees 1,500 have been allowed in the estimate for sluices, a sum which will be altogether inadequate unless the present sluices are of substantial construction, and their tunnels of sufficient length and waterway, in which case possibly the mere addition of means of regulation may be effected for this small sum. Moreover, a new sluice is required for the western channel.

13. *Distributaries*.—The western channel from the Jairytalab is intended to be a considerable work as it is to carry water for the supply of several tanks lower down the valley. It is not quite clear what the arrangements are to be, for the levels have been plotted to different datums. Apparently, however, the sill of the sluice at the head is to be at 58·50, or at 11·50 below future F.T.L. The channel is to carry at first 300 cubic feet a second, and to have a fall of 3 feet a mile and a depth of 3 feet. Major Montgomerie says that a bottom width of eight yards at this part will be required. With these dimensions, however, a greater depth of water would be necessary, probably 3·75 feet if the side slopes be 1½ to 1. Mr. Blacker's report, paragraph 11, alludes to three masonry falls being required, but they are not shown in the longitudinal section of the channel. A distribution statement should be prepared and the arrangements should be matured. This can be done before it will be necessary to take up this part of the work.

14. *Cost of project*.—It is probable that the estimate when prepared in proper detail will exceed the approximate amount of Rupees 1½ lakhs. The anicut is to be lengthened and will cost therefore more. There will be more earthwork in the bunds of the tanks. There will be rock excavation in preparing the seat for the Sanganbasavan tank bund; the masonry works will be likely to cost more than has been allowed, and there will, no doubt, be subsidiary works necessary in connection with the distribution.

15. *Order in which work should be taken up*.—The work which can at once be undertaken is the cutting of the supply channel for the Sanganbasavan tank. This can be commenced at 20 to 30 feet from the site of the head sluice, and can be completed below that point. The waterway of the channel should be confined to its intended cross section throughout. No berms should be left any where where the ground level is not above M.W.L., for t[illegible]nsions allowed are ample, and berms unless carefully sectioned, so as to sl[illegible]m the channel and drained, make the maintenance of a channel in go[illegible]. At the heavy cutting near the head berms may be allowed, he[illegible] and the drainage properly disposed of.

This channel is estim[illegible],500, and will, therefore, occupy 4,500 [illegible]oolies for a month* or a smaller number [illegible] for a proportionate period.

* *i.e.*, if the coolies do a full ta[illegible]

2ndly.—While the supp[illegible]nel is being cut the Sanganbasavan tank [illegible]rovements sho[illegible]signed in detail, and the seat for the new bund [illegible]pared,

It is clearly of much imp[illegible] get the sluice design ready, the materials collected and the culvert and [illegible] of the tower thereafter built at once, for it is more than probable that it [illegible]ssary to discharge water through it during the construction of the bun[illegible]t stone work will take some time to execute. The existing sluices shou[illegible]le, be used to discharge any small quantity of

water that may come into the tank; but ere long it will be necessary to close them securely behind the interior slope of the present bund and to form the whole of the new bund over them. Much care must be taken to prevent these sluices being a source of danger in the future.

As soon as the seat of the bund has been prepared the construction may be commenced, the revetment, backing and earthwork being carried up regularly foot by foot from one end up to the site of the new sluice.

The old escapes must be kept open at their present level until the new bund has been brought up to that level and perhaps for some time longer.

3rd.—The procedure with regard to the enlargement of the Jairytalab should be similar to that indicated for the Sanganbasavan tank.

16. Special measures appear to be necessary for the settlement of land compensation. The waterspreads of the tanks should be marked out and the compensation to be paid determined. The provision in the estimate is Rupees 11,210, but there is nothing to show on what data this sum has been fixed. The enlargement of the Jairytalab will involve the removal of several villages to higher ground.

17. The plans are some of them of such inconvenient size that it is almost impracticable to get at the information they are intended to afford. The information must in sending up the project in detail be shown on sheets of Imperial paper; this information must be properly completed, and all the levels must be plotted to one (mean sea) datum. The instructions regarding size of plans are clear and should be carefully conformed to always.

Circular No. 9.

Fort St. George, 8th September 1877.

(Signed) JOHN MULLINS, Colonel, R.E., Chief Engineer for Irrigation.

To the Joint Secretary to Government, Public Works Department, Irrigation Branch.

No. 126. ORDER THEREON, 24th September 1877, No. 345 I.

HIS GRACE the Governor in Council sanctions the approximate estimate of Rupees 1,50,000 for the Marandahully project in the Salem District, which has already been commenced under the orders as per

G.O., No. 2,535, dated 18th August 1877, Revenue Department.
G.O., No. 29 I, dated 21st August 1877, Public Works Department.

margin to meet the urgent need of the distressed population in this part of the district.

2. The estimates provide for—

	Rs.
(1.) An anicut across the Sunnath Cottara river	6,370
(2.) Head sluice of supply channel	2,500
(3.) Cutting a supply channel to the Sanganbasavan tank	22,500
(4.) Enlarging the Sanganbasavan tank and distribution channel under it	62,460
(5.) Enlarging the Jairytalab and channels therefrom	43,960
(6.) Gate-house at head works	1,000
(7.) Land compensation	11,210
Total ...	1,50,000

3. So far as the information given [illegible]ould allow the Chief Engineer for Irrigation has reviewed the project and has p[illegible]ted out what modifications of details are required; the remarks made in the Chi[illegible]ngineer's Note should receive immediate attention, and the designs of the several[illegible]ks should be completed or revised accordingly, and the works carried out in conf[illegible]ty with those arrangements.

4. Colonel Mullins considers it p[illegible]ible that the regular estimate will be in excess of the approximate estimate now [illegible]as soon as possible after the designs have been matured, a regular es[illegible]bmitted.

5. The Collector will take immediate steps for the settlement of all land compensation claims. All land to be taken up for the works for whatever purpose should have the boundaries lock-spitted under the District Engineer's directions, and the lines of lock-spitting should be laid down on the surveys. It will be noticed that the full tank level of the Sanganbasavana Tank has yet to be finally determined with reference to facilities of construction of the necessary surplus works, and this point should be at once settled. The details and amount of compensation are to be reported as soon as determined.

6. The expenditure incurred will be met from Famine Relief Funds, and the value of work done will ultimately be chargeable to Ordinary Agricultural, Irrigation.

7. This sanction has been registered as No. 214 I of 1877-78.

(True Extract.)

Major, R.E.,
Acting Under Secy. to Govt., P.W.D.,
Irrigation Branch.

To the District Engineer, Salem.
" Collector of Salem.
" Chief Engineer for Irrigation.
" Revenue Department.
" Do. do. (Famine.)
" Board of Revenue.
" Examiner of Public Works Accounts.

13/10

Revenue Despatch
No 4368

IRRIGATION.
ACCOUNT.

Govt. of {1877: Madras.

PUBLIC WORKS.

To

THE DISTRICT ENGINEER,
SALEM,
&c., &c., &c.

Dated September 24th.

Issued

Recd. 13 October Encl.

G. O., 24th September 1877, No. 845 I.

SEPTEMBER.

Nos. 125-126.

-Mavandahully Project, Salem District.—Sanctions, with remarks, the approximate estimate of Rupees 1,50,000 for the —.

No. 6121
Lodged
15-10-77