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Government of Madras

Public Works

DEPARTMENT

G.O. No. .	1927	Press	<i>Original</i>
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Dated	28.7.	195	1876

Not to be folded or roughly handled

Read the following papers :—

No. 498. From Captain J. PENNYCUICK, R.E., District Engineer, North Arcot, to Lieut.-Colonel, J. MULLINS, R.E., Chief Engineer for Irrigation, dated Camp at Palamanair, 3rd April 1876, No. 14.

I HAVE the honor to forward herewith plans and estimates for the repair and improvement of the tanks shown in the enclosed statement, with the following remarks.

6 Detailed Estimates.
11 Abstract do.
6 Plans.
17 Sections.
1 Sketch.
1 List.

2. *Velary Tank*.—This tank was greatly damaged during the storm of May 1874, and the bund is in a highly irregular condition; it has no escape, and one of dry stone, 140 feet long, is proposed to be constructed. The estimate also provides for constructing a permanent kondam to feed the supply channel, and for rebuilding a sluice which is in a state of ruin.

3. *Palayanoor Tank*.—This tank also has badly breached in 1872, and extensive repairs to the bund are required. Provision is made for increasing the escape from its present length of 48 feet to 81 feet, which will discharge the surplus with a depth of 3 feet, and for converting it into a flush escape by the removal of the dam stones and the raising of the crest to full tank level; this work ought perhaps to be charged to Capital, but as it is small in comparison with the total of the estimate, it has been thought better to charge the whole to Revenue.

4. *Pinnapady Tank*.—This tank also was damaged in 1874, but the repairs required to the bund are not very extensive. Provision is made for the construction of an escape 130 feet long, which will discharge the surplus due to the drainage area with a depth of 3 feet, for the reconstruction of an injured sluice, and for the construction of a new one. It is believed that if this tank be put into complete order, more land will be brought under cultivation and the revenue proportionately increased.

5. *Kecapady Tank*.—Has no escape, and the bund is in very bad order, as will be seen from the sections; it breached in several places in 1872, a sluice being at the same time carried away. The estimate provides for restoring the bund, rebuilding the sluice above-mentioned, constructing a new sluice on a somewhat higher level, and providing a dry-stone escape 80 feet in length.

6. *Oyalay Chittary*.—This is a very trifling work, and it is doubtful whether it is worthwhile to keep it up at the expense of Government; the ayacut area of 12 acres ought, however, to produce a revenue of at least Rupees 80. The difference between which and the present revenue will be nearly 10 per cent. on the estimate.

7. *Oyalay Large Tank*.—This tank also breached in 1872, and the bund is in bad order throughout. It has no escape, and provision is made for a dry-stone escape 80 feet in length. It is fed by a channel from one of the drainage channels supplying the Kunnanoor tank, and the "kondam" for diverting the water having been destroyed, it is proposed to restore it in a more substantial manner. The estimate is high, but it is probable that a revenue greater than the nominal ayacut, which is low for the acreage, will be realized, as the water-supply is ample if the tanks be put into order.

8. A sketch showing the relative positions of these tanks is enclosed.

9. I request that the plans and estimates may be returned when no longer required.

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No. 114-W.

No. 498-A.

Note by the Chief Engineer for Irrigation.

The following estimates from the No. 3 or Vellore Range are forwarded by the District Engineer, North Arcot, with his letter marginally noted:—

Taluq.	Village.	Work.	Amount.
Arcot...	Velary	V. Tank	Rs.
Do. ...	Palayanoor	V. Do.	2,210
Do. ...	Pinnapady	V. Do.	6,310
Do. ...	Keelpady	V. Do.	2,060
Do. ...	Oyalay	V. Chittary Tank	2,950
Do. ...	Do.	V. Large Tank	510
			3,150

2. The financial and hydraulic details of the Irrigation Works concerned are exhibited in the following statement:—

I.—Financial Details.

Name of Work.	Ayacut Area.	Assessment.	Average Revenue for 5 years.	Highest Revenue for 5 years.	OUTLAY.			
					PROPOSED.			
					During the previous 4 years.	Original Works.	Repairs.	Average annual proportion of Charges to Revenue.
	ACRES.	RS.	RS.	RS.	RS.	RS.	RS.	PER CENT.
Velary Tank	100	514	513	Not stated.	473	...	2,210	104.7
Palayanoor Tank	150	1,200	1,111		...	410	5,900	114.5
Pinnapady Tank	97	650	668		560	490	1,570	73.4
Keelpady Tank	85	430	424		...	360	2,500	159.1
Oyalay Chittary Tank	12	38	32		...	60	451	318.7
Oyalay Large Tank	55	250	174		...	820	2,630	362.0

II.—Hydraulic Details.

Name of Work.	Catchment Basin Area.	MAXIMUM SUPPLY.		LENGTH OF ESCAPE.		AVERAGE HEIGHT OF BUND.		Surplus discharged at M. T. L. per Sec.	Tanks above.
		Catchment basin.	Channel's Second.	Total.	Effective.	Above P. T. L.	Above M. T. L.		
	SQ. M.	C. FT.	C. FT.	FT.	FT.	FT.	FT.	C. FT.	No.
Velary Tank	3	1,170	...	E 140	140	8.53	1.51	0.0	Not stated.
Palayanoor Tank	4	1,417	...	W 81	81	4.50	2.50	896.9	do.
Pinnapady Tank	8	2,250	...	W 130	130	5.50	2.50	1414.0	2
Keelpady Tank	15	747	...	W 130	130	5.50	2.50	2200.5	...
Oyalay Chittary Tank	3	324	...	E 80	80	4.50	2.50	500.8	...
Oyalay Large Tank	15	747	...	E 80	80	4.50	2.50	354.7	5

NOTE.—The proposed dimensions of escapes and heights of bund are entered in large type. The existing dimensions in small type. The following abbreviations are used: K.—Kalingulah with dam stones. W.—Weir with flush gate. E.—Escape at ground level. B.—Bund of tank. V.—Village. S.—Revenue Survey.

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3. The following is a summary of the work proposed to be carried out in each case:—

Velary Tank.—Raising and repairing the bund, planting nanel grass, reconstructing an irrigation sluice, constructing a loose stone escape and masonry dam or kondam to the supply channel.

Palayanoor Tank.—Raising and repairing the bund, planting nanel grass along the top of the revetment, repairing the sluice, improving and extending the existing kalingulah and converting it into a weir.

Pinnapady Tank.—Raising and repairing the bund and planting nanel grass, reconstructing an irrigation sluice, constructing a masonry weir and an irrigation sluice.

Keelpady Tank.—Closing breaches and repairing the bund, constructing a loose stone escape, reconstructing an old and building a new irrigation sluice.

Oyalay Chittary Tank.—Repairing the bund, closing a breach, repairing the sluice, raising the revetment of the bund with new stones, and constructing a loose stone escape.

Oyalay Large Tank.—Raising and repairing the bund, closing the breaches and also repairing an irrigation sluice and supply channel, raising the revetment of the bund with new stones, constructing a loose stone escape and a masonry dam or kondam to the supply channel.

4. The object of estimating for tanks by groups being the consideration of the circumstances of the group as a whole it is desirable that the financial and hydraulic details of the whole of the tanks in a group should be brought together into one statement. From the sketch-map forwarded with the District Engineer's report it is apparent that one tank at least has not been included in the statements, and the reason assigned is that the work of repair has been sanctioned and is in progress. It should be understood in future that the features of the group in the gross, whether as regards cultivation and revenue or outlay, are to be brought into view.

One important object in dealing with tanks in groups is to see whether the maintenance of all the tanks is really necessary. In the present case it is by no means clear that the Pinnapady tank should be retained. The catchment basin above it is altogether 8 square miles, but of this area 7 square miles are intercepted by the Velary and Palayanoor tanks, and, judging from the sketch-map, it would not be difficult to bring the whole of the irrigation under the last-named tanks. The outlay proposed is Rupees 490 on a new weir, and Rupees 1,570 on repairs, the average revenue being Rupees 668, and the ayacut Rupees 699. It should be shown clearly that the retention of this tank is necessary before any large expenditure is sanctioned.

The Oyalay Chittary is a petty tank, irrigating something less than 12 acres, with an average revenue of Rupees 32. The expenditure proposed is Rupees 510, and probably the revenue which this outlay would secure would be 20 to 25 Rupees. It is considered that it would involve a waste of money to pass this estimate as it stands.

The rate for earthwork is 1½th Annas, an unnecessary rate for a petty tank at which the lead and lift are probably small. This item should be reduced, say, to Rupees 186.

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The turfing should be omitted, as also the new stone revetment. The other items will be—

Repairs to sluice	...	...	...	...	...	...	Rs.
Escape (lengthened 16 feet)	...	...	...	...	...	...	25
Sundries	...	...	...	...	...	...	75
							286
							4
Total	...	...	...	...	...	...	290

The Oyalay large tank lies as short distance below the Chittary, the average revenue is Rupees 174, and the estimates for repair and improvement amount to Rupees 3,150.

The following reductions can be made—

New revetment	...	...	...	...	...	...	Rs.
Supply channel, kondam or dam	...	...	...	...	...	...	520
							1,070

Supply Channel.

By altering rate of earthwork from $1\frac{1}{4}$ to 1 Anna	...	...	...	...	...	...	Rs.
Turfing	...	...	...	...	...	...	29
Sundries	...	...	...	...	...	...	64
							4

Tank Bund.

Rate from $1\frac{1}{4}$ to 1 Anna	...	...	...	...	...	...	Rs.
Turfing	...	...	...	...	...	...	155
Sundries	...	...	...	...	...	...	309
							19
							2,170

leaving the amount to be sanctioned at Rupees 980 which is still more than five years' revenue. There should be no need for payment for land compensation it is thought. The Keelpaudy tank estimate is very high and is capable of considerable reduction—

Tank Bund.

The rate for earthwork should be reduced to 1 Anna	...	...	...	...	...	...	Rs.
Turfing must be omitted	...	...	...	...	...	...	235
Sundries	...	...	...	...	...	...	518
							27

Reconstructing Sluice.

Reduction of height and length of front wings	...	...	...	...	...	...	Rs.
Land compensation which is an unintelligible item in connection with such a work	...	...	...	...	...	...	50
New sluice	...	...	...	...	...	...	50
							360
							1,230

leaving Rupees 1,720 which will suffice for all the more important requirements of the tank. Turfing is in a great many cases a waste of money, and if the soil be suitable, grass will grow without laying down turf sods, especially if a little

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be dibbled in here and there to give the growth a start. An additional sluice may be desirable, but the ayacut acreage is but 85, and if the plug-holes of the reconstructed sluice be made large enough, probably the whole ayacut and a few acres besides may be irrigated therefrom. Expenditure for extension of irrigation should be based on definite information as to the circumstances.

The Palayanoor tank is mentioned by the District Engineer to have been badly breached in 1872, and the longitudinal section shows 10 breaches, some very large, the bund being in wretched order. There is but one rate, $1\frac{1}{2}$ Annas a cubic yard, shown in the estimate for earthwork. This high rate may be proper for some of the work, but it is manifestly inapplicable to all of it, and the greater part of the work being on a low level, it is believed that $\frac{1}{3}$ at 1 Anna, $\frac{1}{3}$ at $1\frac{1}{4}$ Annas, and $\frac{1}{3}$ at $1\frac{1}{2}$ Annas will suffice. The reduction on earthwork will thus be Rupees 705. It is to be noticed that an average rate for a large quantity of earthwork to be carried out under widely differing conditions is not proper and cannot be accepted. Turfing may be allowed for the breaches and for interior slopes where not otherwise protected. The item of Rupees 740-4-0 on this account may be reduced by Rupees 500. The rate, 1 Rupee a cubic yard, entered in the surplus weir estimate for the demolition of the east wing-wall is most extravagant, 4 Annas a cubic yard will probably be more than ample. The item is small and the amount of the estimate need not be altered, but the entry is referred to, because in North Arcot the rates have a tendency to be higher than is necessary and they require readjustment generally.

The original estimate provided for a certain amount of new stone revetment which the District Engineer struck out, substituting nanel planting and putting in an item of Rupees 400 on this account. The quantity of stone was to have been 2,230 cubic yards, $\frac{1}{2}$ a yard thick, or 4,460 square yards of superficies. This number of square yards of nanel planting at 6 Pies a square yard would cost under 140 Rupees, and a sum of Rupees 150 would appear to be ample. The rate for nanel planting depends entirely upon the distance whence the grass may have to be procured, and on this point nothing has been said; but it is not worthwhile to bring this grass from a great distance or to plant it in soil not well adapted for its growth. The cuscus grass, though inferior as a breakwater, can be made to answer this purpose, and is more abundant and more hardy.

The reductions suggested amount to Rupees 705 + 500 + 250 =	Rs.
Sundries	1,455
	45
Total	1,500

and the balance of the estimate will be Rupees 4,810.

The provisions of the Velary tank estimate require remark in two cases. In lieu of $381\frac{1}{2}$ cubic yards of new revetment, $\frac{1}{2}$ a yard thick, or 763 square yards, the District Engineer has entered Rupees 200 for nanel. This number of square yards of the latter would probably cost about 25 Rupees. The proposed kondam or dam at the head of the offtake of the Palayanoor tank channel is of doubtful propriety. It would prevent any water going to the latter tank until more than 3 feet were passing down into the Vellary tank, and the ayacut under the latter is only $\frac{2}{3}$ of that of the former. This may be a proper division of the water, but as the work appears to be an innovation, if necessary its estimate should be separately submitted for sanction

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with the information required to enable the suitability of the arrangement to be understood. The deductions to be made as above noted are—

Nanel planting	...	...	...	...	...	...	Rs.
Constructing a regulating weir	...	...	...	...	...	...	175
							560
Total	...	...	...	...	...	...	735

leaving Rupees 1,475 as the balance of the estimate which will be all chargeable to Repairs.

Local terms like kondam should not be used.

The following statement shows the proposed distribution of the outlay recommended for sanction, to the debit of the several heads of account involved:—

Name of Tank.	Items of Estimate.	FUND.		Total for each Tank, &c.
		ORDINARY AGRICULTURAL.		
		Original Works.	Repairs.	
Velary Tank ...	Raising and repairing the bund and planting nanel grass ...			} 1,475
	Reconstructing an irrigation sluice ...	...	675	
	Constructing a loose stone escape ...	...	480	
Palayanoor Tank ...	Repairing the bund, planting nanel grass, and repairing the sluice ...	320	...	} 4,810
	Improving and extending the present kalingulah and converting it into a weir ...	...	4,400	
	Repairing the bund ...	...	...	
Keelpaudy Tank ...	Constructing a loose stone escape ...	410	...	} 1,720
	Reconstructing an irrigation sluice ...	...	1,010	
	Repairing the bund, closing the breach, and repairing the sluice ...	130	...	
Oyalay Chittary Tank.	Constructing a loose stone escape ...	...	580	} 290
	Raising and repairing the bund, closing the breaches, and also repairing an irrigation sluice and supply channel ...	75	215	
	Constructing a loose stone escape ...	...	...	
Oyalay Large Tank.		80	900	} 980
			...	

A. DEC. SCOTT, Major, R.E.,
Deputy Chief Engineer for Irrigation,
for Chief Engineer for Irrigation.

No. 499.

ORDER THEREON, 23th July 1876, No. 1,927.

IRRIGATION, No. 54.

Account.

No. 114-W., dated 24th July 1876.

The following estimates for Irrigation Works in the No. 3 or Vellore Range, North Arcot District, forwarded by the Chief Engineer for Irrigation with his Memorandum marginally noted are sanctioned.

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Irrigation.

Name of Tank.	Provision of Estimate.	FUND.	Amount.	Irrigation Register No.
		Ordinary Agricultural.		
			RS.	
Velary Tank	Raising and repairing the bund and planting nanel grass ...	Repairs ...	675	1
	Reconstructing an irrigation sluice ...	Repairs ...	480	2
	Constructing a loose stone escape ...	Original Works...	320	3
Palayanoor Tank.	Repairing the bund, planting nanel grass, and repairing sluice ...	Repairs ...	4,400	1
	Improving and extending present kalingulah and converting it into a weir ...	Original Works...	410	2
	Repairing the bund ..	Repairs ...	1,010	1
Keelpaudy Tank.	Constructing a loose stone escape ...	Original Works...	130	2
	Reconstructing an irrigation sluice ...	Repairs ...	580	3
	Repairing the bund, closing breach, and repairing the sluice ...	Repairs ...	215	1
Oyalay Chittary Tank	Constructing a loose stone escape ...	Original Works...	75	2
	Raising and repairing the bund, closing the breaches, and also repairing an irrigation sluice and supply channel ...	Repairs ...	900	1
Oyalay Large Tank	Constructing a loose stone escape ...	Original Works...	80	2

2. These sanctions are registered as shown above.

(True Extract.)

Colonel,

Offg. Under Secy. to Govt., P.W.D.

To the District Engineer, North Arcot.
" Collector of do.
" Chief Engineer for Irrigation.
" Examiner of Public Works Accounts.
" Revenue Department.

Exd. W. H. French.

Spare Copies

Ootacamund, 24th July 1876.

Note by the Chief Engineer for Irrigation.

No. 14

Dated 3rd April 1876.

Encls 43.

The following Estimates from the *Madras Vellore* Range are forwardedby the *District* Engineer *North Arcot* with his letter marginally noted:—

Taluq.	Village.	Work.	Rs.	Amount.
<i>Arcoot</i>	<i>Velaray</i>	<i>V. Tank</i>		2210
<i>do</i>	<i>Palayanor</i>	<i>V. do</i>		6310
<i>do</i>	<i>Pinnapady</i>	<i>V. do</i>		2060
<i>do</i>	<i>Kulpanady</i>	<i>V. do</i>		2950
<i>do</i>	<i>Ayalay</i>	<i>V. Chittary Tank</i>		510
<i>do</i>	<i>do</i>	<i>V. Large</i>		3150

2. The Financial and Hydraulic details of the Irrigation works concerned are exhibited in the following statement:—

I.—Financial Details.

Name of Work.	Ayacut Area. Acres	Assessment. Rs.	Average Revenue for 5 years. Rs.	Highest Revenue for 5 years. Rs.	OUTLAY.			
					During the previous 4 years. Rs.	Proposed.		
						Revised Capital Rs.	Revised Annual Rs.	Average proportion of Charges to Revenue. Percent
<i>Vitary Tank</i>	100	514	513		178		2210	104.7
<i>Palayanor, d.</i>	150	1200	1111		411	410	5900	113.5
<i>Pinnapady d.</i>	97	699	668		560	490	1570	78.4
<i>Kulpanady d.</i>	85	430	424		Nil	360	2590	139.1
<i>Ayalay Chittary d.</i>	12	38	32		d.	60	450	318.7
<i>Ayalay Large d.</i>	55	260	174		d.	520	2630	362.5

II.—Hydraulic Details.

Name of Work.	Catchment Basin Area.	Maximum Supply.		Length of Escape.		Average Height of Bund.		Surplus discharged at M. T. L. per Sec.	Tanks above.
		Catchment per Second.	Channels per Second.	Total.	Effective.	Above F. T. L.	Above M. T. L.		
	Sq. M.	C. ft.	C. ft.	Ft.	Ft.	Ft.	Ft.	C. ft.	No.
Velary Tank	3	1170		1.1	1.1	5.53	1.53	0.0	
Palayanoor do	4	1417		K. 48	Not known	1.77	0.0	Not known	
Pinnapady do	8	2250		1.1	1.1	5.53	1.53	0.0	
Kielpandy do	15	737		1.1	1.1	1.62	0.0	0.0	2
Ayalay Chetty do	3	354		1.1	1.1	1.62	0.0	0.0	1.1
Ayalay Large do	15	737		1.1	1.1	Not stated	0.0	0.0	1.1
				1.1	1.1	2.00	0.0	0.0	5

Note.—The proposed dimensions of escapes and heights of bund are entered in red. The existing dimensions in black. The following abbreviations are used:—K.—Kalingulah with dam stones. W.—Weir with flush crest. E.—Escape at ground level. B.—Bund of tank. Y.—Village. S.—Revenue Survey.

3. The following is a summary of the work proposed to be carried out in each case—:

Velary Tank. Raising and repairing the bund, planting Kanel grass, reconstructing an irrigation sluice, constructing a loose stone escape and masonry dam or Koudam to the supply channel.

Palayanoor Tank. Raising and repairing the bund, planting Kanel grass along the top of the revetment, repairing the sluice, improving and extending the existing Kalingulah and connecting it into a weir.

Pinnapady Tank. Raising and repairing the bund and planting Kanel grass, reconstructing an irrigation sluice, constructing a masonry dam or Koudam to the supply channel.

Kielpandy Tank. Closing breaches and repairing the bund, constructing a loose stone escape, reconstructing an old and building a new irrigation sluice.

Ayalay Chetty Tank. Repairing the bund closing a breach, repairing the sluice, raising the revetment of the bund with new stones and constructing a loose stone escape.

Ayalay Large Tank. Raising and repairing the bund, closing the breaches and also repairing an irrigation sluice and supply channel, raising the revetment of the bund with new stones, constructing a loose stone escape and a masonry dam or Koudam to the supply channel.

The object of estimating for tanks by groups being the consideration of the circumstances of the group as a whole it is desirable that the financial and hydraulic details of the whole of the tanks in a group should be brought together into one statement. From the sketch map forwarded with the District Engineer's report it is apparent that one tank at least has not been included in the statements and the reason assigned is that the work of repair has been sanctioned and is in progress. It should be understood in future that the features of the group in the gross whether as regards cultivation and Revenue or Outlay are to be brought into view.

The important object in dealing with tanks in groups is to see whether the maintenance

of all the tanks is really necessary. In the present case it is by no means clear that the Pannagandy tank should be retained. The catchment basin above it is altogether 8 square miles, but of this area 7 square miles are intercepted by the Velary and Palayanoor tanks, and judging from the sketch map it would not be difficult to bring the whole on the irrigation under the last named tanks. The outlay proposed is Rupees 490 on a new dam, and Rupees 1570 on repairs, the average revenue being Rupees 699. It should be shown clearly that the retention of this tank is necessary before any large expenditure is sanctioned.

The Ayalay Chetty is a petty tank irrigating something less than 12 acres with an average revenue of Rupees 32. The estimate proposed is Rupees 510 and probably the revenue which this outlay would secure would be 20 to 25 Rupees. It is considered that it would involve a waste of money to pass this estimate as it stands.

The rate for earthwork is 16 annas an unnecessary rate for a petty tank at which the head and lift are probably small. This item should be reduced

say

Station P...
type...

say to ----- Rupees 186.

The bunding should be omitted, as also the new stone revetment. The other items will be

Return to Service - - - - -	25
Excavation lengthened to feet 1 - - - -	75
	256
Excavation - - - - -	4
	290

The Ayalay large tank lies on short distance below the Chetty, the average revenue is Rupees 174, and the estimate for repair and improvement amount to Rupees 3100.

The following reductions can be made

New revetment - - - - - Rupees 520.
Supply Channel Roadwork or dam - 1070.

Supply Channel.
By altering rate of earthwork
from 16 to 1 Anna - - - - - 29
Bunding - - - - - 64
Excavation - - - - - 4

Tank Bund
rate from 16 to 1 Anna - - - - - 155
Excavation - - - - - 309
Bunding - - - - - 19
2170

leaving the amount to be sanctioned

at Rupees 980 which is still more than 5 years Revenue. There should be no need for payment for land compensation it is thought.

The Helpanady tank estimate is very high and is capable of considerable reduction.

Tank bund

The rate for earthwork should be reduced to 1 anna 225.
 Turfing must be omitted 513
 Sundries 27

Reconstructing sluice

Reduction of height and length of front wings 50
 Land compensation which is an unintelligible item in connection with such a work 50
 New sluice 560

1250

leaving Rupees 1720 which will suffice for all the more important requirements of the tank. Turfing is in a great many cases a waste of money and if the soil be suitable grass will grow without laying down turf so do especially if a little be dibbled in here and there to give the growth a start. An additional sluice may be desirable, but the Agent's average is but as is the plan of the reconstruction.

sluice be made large enough probably the whole Agent and a few acres besides may be irrigated therefrom. Expenditure for extension of irrigation should be based on definite information as to the circumstances.

The Balayanore tank is mentioned by the District Engineer to have been badly breached in 1872 and the longitudinal section shows 10 breaches some very large, the tank being in worked order. There is but one rate, 1 1/2 annas a cubic yard, shown in the estimate for earthwork. This high rate may be proper for some of the work, but it is manifestly inapplicable to all of it and the greater part of the work being on a low level it is believed that 3 at 1 anna, 5 at 1 1/2 annas and 3 at 1 1/2 annas will suffice. The reduction on earthwork will thus be Rupees 700. It is to be noticed that an average rate for a large quantity of earthwork to be carried out under widely differing conditions is not proper and cannot be accepted. Turfing may be allowed for the breaches and for interior slopes where not otherwise protected. The item of Rupees 740.40 on the account

may be reduced by Rupees 500. The rate 1 Rupee a cubic yard entered in the surplus must estimate for the demolition of the east wing wall is most extravagant, & as a cubic yard will probably be more than ample. The item is small and the amount of the estimate need not be altered, but the entry is referred to because in North India the rates have a tendency to be higher than is necessary and they require readjustment generally.

The original estimate provided for a certain amount of new stone masonry which the District Engineer struck out substituting navel planting and putting in an item of Rupees 400 in his account. The quantity of stone was to have been 2250 Cfts. 2 a yard thick or 4500 square yards of superficies. This number of square yards of navel planting at 1 Rupee 2 a square yard would cost under 1400 Rupees and a sum of Rupees 150 would appear to be ample. The rate for navel planting depends entirely upon the distance whence the grass may have to be procured and on this point nothing has been said but it

is not worth while to bring this grass from a great distance or to plant it in soil not well adapted for its growth. The encro grass though inferior as a breakwater can be made to answer this purpose and is more abundant and more hardy. The reduction suggested amounts to Rs. 750 + 500 + 250 = 1500

Luxuries . . . 45
1500.

and the balance of the estimate will be Rs. 8810.

The provisions of the Volary Bank estimate require remark in two cases. In lieu of 3315 Cfts. of new masonry cut 2 a yard thick or 740 square yards the District Engineer has entered Rupees 200 for navel. This number of square yards of the latter would probably cost about 25 Rupees. The proposed Road dam or dam at the head of the off take of the Balayapore Bank channel is of doubtful propriety. It would prevent any water going to the latter tank until more than 8 feet were passing down into the Volary tank and the squalor under the latter is only 3/4 of that of the former. This may be a proper diversion of the water but as the work

appears to be an innovation if necessary -
 its estimate should be separately submitted
 for sanction with the information required
 to enable the suitability of the arrangement
 to be understood. The deductions to be
 made as above noted are

Hand planting - - - - - Rs 155
 Constructing a regulating weir 500

655

leaving Rs 645 as the balance on the
 estimate which will be all chargeable
 to Repairs

Local terms like Bandam should
 not be used.

The following statement shows the proposed
 distribution of the outlay recommended for sanction
 to the debit of the several heads of account involved:-

Name of Tank	Items of Estimate	Fund		Total for each Tank
		Ordinary works	Capital works	

Kelary Tank	Leaving & repairing the bund and planting maret grass - - -		645	1145
	Reconstructing an irrigation sluice		480	
	Constructing a loose stone escape		320	

		17	
Palayanore Tank	Repairing the bund, planting maret grass repairing the sluice	4400	4810
	Improving & extending the present Balingulak and converting it into a weir - - -	410	
	Repairing the bund Constructing a loose stone escape - - -	130	
	Reconstructing an irrigation sluice	580	
Kelipandy Tank	Repairing the bund, closing the breach & repairing the sluice	215	240
	Constructing a loose stone escape	75	
	Raising and repairing the bund, closing the breaches & also repairing and irrigation sluice & supply channel	400	
	Constructing a loose stone escape - - -	80	
Ayalar Chikary Tank	Repairing the bund, planting maret grass repairing the sluice		480
	Constructing a loose stone escape		
	Raising and repairing the bund, closing the breaches & also repairing and irrigation sluice & supply channel		
	Constructing a loose stone escape - - -		

Am. Sato

Major R. E.

Deputy Chief Engineer for
 for Chief Engineer for Irrigation

To The Secretary to Government
 P. W. Works Department

Ch. S.

Issue Case.

FORMER CASES.

No. of 187 .
" " "

I. E. Form No. 31.

P. W. 1876 . Department
The Chief Engineer for Irrigation.

Receipt No.

Dated 24 July 1876.

742
24 July 1876
P. W. 1876

Issue No. 114 W.

Dated 24 July 1876

LATER CASES.

No. of 187 .
" " "

Sent to Government with No.

18

W. of

Printed with G. O. No.

dated

REMINDERS ISSUED.

No. 1, dated 187 .
" 2, " "
" 3, " "
" 4, " "
" 5, " "

KEEP-WITH.

Cii - 26.7.76
Ch. Sheth & Co. P. W.

I. E. Form No. 3

No. 1927 20 July 1876

THE following Estimates for Irrigation Works in the 1st 3 or 4th Range, North Arcot District, forwarded by the Chief Engineer for Irrigation with his Memorandum marginally noted are sanctioned.

Irrigation.

Name of Tank.	Provision of Estimate.	Fund. Ordinary Agricultural	Amount	Irrigation Register No.
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Vilary Tank	Repairing & preparing the bund & planting canal grade	Repairs	675	1
	Reconstructing an irrigation sluice	Repairs	480	2
	Constructing a loose stone dam	Original works	320	3
Vilayam Tank	Repairing & bund planting canal grade & preparing sluice	Repairs	4460	1
	Improving and extending present Kalingula sluice	Original works	410	2
	Repairing the bund	Repairs	1010	1
Melpandy Tank	Constructing a loose stone wall	Original works	130	2
	Reconstructing an irrigation sluice	Repairs	580	3
Ayalay Tank	Repairing the bund & closing breach and repairing the bund	Repairs	215	1
	Constructing a loose stone dam	Original works	75	2

80.I

81.I

82.I

83.I

Oyalay Large Tank.	Raising and repairing the bund, closing the breaches & also repair- ing in irrigation sluice & supply channel Constructing a loose stone escape...	Repairs	900	1	} P4. I
		original works	80	2	

2. These sanctions are registered as
 shown above.

Adopted

498/99

J. G. M. Smith
 Collector - do -
 C. & J. Smith 43 Cusbs
 Ex. P. 100
 Rev. S. P. 100

Dec 15/87

5461 CH

Gobt. of 1876 Madras.

PUBLIC WORKS.

To

The W. C. & S. Co. Ltd.

By

For

Recd

Encl.

G. O., 28 July 1876, No. 192

Nos. 498/99

Tanks. Nares Dr

Estimates for the
repairs of certain —
sanctions of —

Ent in Reg
17-8-76

6. 12. 15/876