Public Works (189 8) Department.

G.O., No. 518 J

DATED 8 July 98

[Despatch Abstract.]

Municipal Profit. Revised Estimate of Rs 632000 for the ——— in the Kistna Dt, Sanctioned with remarks

P.E.J

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8.7.98

[P. W. 26.
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Indexed.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department	Date.	G.O.	No.	Department.	Date.

IRRIGATION.
ACCOUNT.

Government {1898} of Madras.

PUBLIC WORKS.

Recd.
Regd.
} 1898.

Enclosures
Spare copies

G.O., No. 518 I., 8th July 1898.

JULY.

Muniyeru Project

Revised estimate of Rs. 6,32,000 for the — in the Kistna district, sanctioned with remarks.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

From Captain W. M. ELLIS, R.E., Officiating Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezwada, 9th January 1898, No. 89 K.N.

Herewith I forward the revised estimates with plans for the Muniyeru project works.

The original estimates were sanctioned in G.O., No. 1089 I., dated 12th December 1893.

2. The revised estimates show a very great excess over the original, amounting to 71 per cent.

The causes of the excesses are fully explained in the reports and statements accompanying the estimates. It will be noted that there is every prospect of a direct return of 5 per cent. on outlay being realized in spite of the large excesses.

3. The difficulties with ryots in inducing them to cultivate under the works experienced early in the season are diminishing. Some 1,300 acres were irrigated as first crop and gave an exceptional return to the ryots who took water, and 300 acres of second crops are reported to be planted. Other ryots now evince eagerness to cultivate wet crops. This is highly satisfactory. Great credit is due to the Sub-divisional officer * who has taken much interest in starting cultivation and inducing the ryots to use the water now available.

4. I strongly recommend that funds be allotted for completing the remaining works as early as possible, as the prompt completion of distributaries will greatly assist in the rapid extension of cultivation.

5. The matter of extending the anicut is also one which should be taken up early. Should it be possible to carry out this work during the next dry season, the project might be completed and the sub-division closed at the end of next financial year.

* M.R.Ry. N. Rajagopala Aiyangar, B.C.E.

ENCLOSURES.

REPORT TO REVISED ESTIMATES.

Constructing Anicut and Head Works, Muniyeru Project, at Polampalli.

These works have been freely altered in design during or subsequent to construction, especially the anicut.

Alterations and additions to Anicut.—The following alterations were made on the first construction of the anicut :—

(*a*) The lanka on which the right of the anicut rests had been eroded greatly since the surveys were taken for the works rendering an extension of the anicut a greater length of 44 feet necessary. The total length of the anicut as built from the river end of the under sluices is 544 feet ; the original design showed a length of 500 feet.

(*b*) In order to secure the lanka from further erosion, a front wing and return not originally provided for were built on the right of the anicut and the margin of the lanka above the anicut revetted.

Damage to Apron from floods.—During the floods of 1895, the year of construction, the apron of the anicut was badly scoured out in several places showing that it was incapable of withstanding the clear overfall of 8 feet to which it was subjected An estimate for improvements to the anicut apron was then sanctioned, which provided for the temporary repairs necessary for the safety of the works and for remodelling the whole apron to the sloping form shown in the present design (now submitted). This work has been carried out at a cost of Rs. 7,250 charged as maintenance during construction. The protection of the margins of the lanka on which right of the anicut rests has been further provided for by the construction of stone groynes above the anicut and planting up of the margins with nanal, &c., &c.

This has been charged to the lump sum item "making river approaches and removing shoals" in the original estimate.

A separate detailed estimate for the work done is submitted.

Under sluices.—These have been but slightly altered during construction by the provision of a platform from which to work the gear, by carrying up the cutwaters and corbelling out the tops and laying beam stones across between them.

A little pitching in front and considerable additions to the revetment of the river margin in rear of the under sluices was found necessary and has been carried out.

Head sluice.—This has been altered by being brought close to the under sluices than in the original design. The whole design of the masonry wings in rear has been altered, the wings being prolonged to take the water round the curve required to lead it off in the direction required.

This is shown in detail in the designs. All the above works are complete.

REPORT TO THE REVISED ESTIMATE.

Muniyeru Project.

The original project estimates amounted to Rs. 3,68,000 and provided for an anicut head and under sluices and a main channel 27 miles in length with distributaries to irrigate an area of 10,000 acres.

This estimate was sanctioned with G.O., No. 1089 I. of 12th December 1893.

General state of works and progress to date, 30th June 1897.—Materials were collected during the second half of the year 1894–95 and ground was broken on the anicut foundations early in March 1895.

Since then, work has been in progress on the anicut head works and channel, and the state of affairs in June 1897 is as under. The anicut and head works are complete. The main channel with its masonry works (except distributary channel head sluices) is practically complete to 22⅓ miles, beyond which no work has been done.

The excavation of the distributaries under this length of channel is about half out, but the drops on these channels which are very high are most of them not commenced owing to want of funds, and for this reason water (which was admitted to the channel as soon as the state of the Muniyeru permitted) cannot be passed down most of the distributaries ; and irrigation under the channel for the current year will be very little and practically confined to the lands previously irrigated under tanks. The ryots who have been accustomed to cultivate their fields dry have not yet made any move towards preparing for wet cultivation, but it is hoped that this apathy will disappear, now that water has actually been passed down the main channel. In this connection the Revenue Department might bring pressure to bear, if this proves necessary, as the ryots have bound themselves to take water (*vide* Dis. No 3634-Ver., 14th October 1893, from Collector, Kistna, published with the Government Order sanctioning the project in the first instance.)

Amount of Revised Estimate.—The revised estimate amounts to Rs. 6,29,970—an excess on the original estimate of Rs. 2,61,970, or about 71 per cent.

This large excess is due, principally, to three main causes, viz. :—

(*a*) Hardness of the soil in main channel and deviations from original alignment necessary.

(*b*) The high rates which had to be paid for masonry.

(*c*) The inadequate provision for distributary channels in the original estimate.

*(*d*) For extending the anicut.

* This was since received as supplementary estimate to the revised estimate, and the amount has been included in the classified abstract. Separate report accompanies the estimate.

(*a*) *Hardness of Soil, &c.*—To this is due a total excess of Rs. 78,600, the average rate of excavation being Rs. 5–8–0 as against Rs. 4–14–8 in the original estimate. The rate of rupees 5–8–0 excludes all rock which had to be removed by blasting, on which a sum of Rs. 23,500 has actually been spent.

(*b*) *Rates for Anicut and Head works.*—The original estimates allowed very fair rates for the anicut and head works where stone and sand were within easy distance of the works ; the works were carried out within these rates.

BACK PAPERS

Rates for Masonry works on the Main channel.—The rates allowed in the original estimate for the scattered works along the main channel were considerably less than those for the anicut although, in most cases, the lead for material was greater, and in some cases very much greater, and the works being small isolated ones, were more difficult of execution and supervision.

Considerably higher rates had therefore to be paid for the channel masonry works. The contractors would not take up the works on the channel at the same rates as the anicut and head works and would not take up the 12 to 22 mile section of the channel at the rates given for the miles 1—12 which were first given out. The rates at which the masonry works on the channel (especially 12—22 miles) were carried out, were somewhat high owing to the want of any competition from contractors for these works. The locality is somewhat remote, the people about are poor and there is absolutely no local skilled labour.

No native contractors competed for the work in response to advertisements for tenders and the two firms of European contractors who tendered did so at higher rates than they were afterwards induced to accept.

It is to be added that the firm who has carried out most of the works (Messrs. Putman and Ritchi) did so in an efficient and workmanlike manner, one of the partners living constantly on the works for over two years.

A statement is submitted with the estimate showing the rates of the various contracts and agreements entered into and the leads for material to each masonry work and working up to the consequent rate for masonry on each work.

Provision for Distributary Channels.—(*a*) Only lump sum provisions were made in the original estimate for distributaries with the exception of the item "head sluices," for which a type design was made out and the seventeen sluices estimated for at so much per sluice. The gross total of the revised estimate for this item does not differ materially from the original. On all other items for the distributary channels, the original estimate was faulty.

(1) No provision whatever was made for masonry works along the channels, although the first mile of nearly every distributary falls about 20 feet.

The details of the revised estimate show that the necessary drops cost Rs. 27,640, and a further sum of Rs. 950 is provided as a lump sum to form pot sluices, through which water will be supplied to the lands. The provision of such sluices in all the larger channels is absolutely necessary if economy in distribution is to be studied.

The cost, therefore, of masonry works to distributaries, exclusive of head sluices, is Rs. 28,590.

(2) The provision for excavating distributary channels in the original estimate only amounted to Rs. 1-2-0 per acre, a totally inadequate provision for an undulating country. The cost, as now estimated for in detail, amounts to Rs. 45,405, or Rs. 4-4-8 per acre. The total excess under this item is Rs. 34,405.

Thus we see that the excesses under the main heads mentioned are :

		Rs.
(*a*)	Excessive hardness of soil, &c.	78,600
(*b*)	Excess rate for masonry on masonry works of main channel (about)	20,950
(*c*)	Excess on masonry works and excavation of distributary channels	63,345
(*d*)	Extending anicut	21,300
	Total ...	1,84,195
	Add—Establishment, tools and plant, at 24½ per cent. ...	47,890
	Total ...	2,32,100

These four items account for a total of Rs. 2,32,100 out of a total excess Rs. 2,68,800.

The other excesses come chiefly under the head of maintenance of head works Rs. 11,132. Of this sum Rs. 1,752 may be taken as representing ordinary repairs, while the project works were under construction. The balance sum (Rs. 9,380) is made up of Rs. 7,250, repairs and improvements to the anicut.

The apron built as per original design was scoured in the floods of 1895 and the design was remodelled the apron being altered to a sloping form and the whole apron repacked.

A detailed estimate of the work done accompanies this report.

There can be little doubt that the damage occurred because of the faulty design of the original work.

The sum of Rs. 2,130 is the amount of the estimate for closing the spills beyond the right flank of the anicut being high level channels of the main river ; the necessity for this is explained further on.

Excess on construction of head works.—This amounts to Rs. 5,970, and is due principally to extra work being found necessary to the lump sum provision made for making approaches and removing shoals. The cost of this is Rs. 6,738 against lump sum provision of Rs. 1,900, in the original estimate.

Unforeseen works.—The principal is the Vemavaram tank, raising and revetting the bund. This matter was fully explained in this office No. 451 S.E., dated 20th November 1895, and the proposals approved by the Chief Engineer for Irrigation in his No. II/203 K.S., dated 3rd December 1895. The extra cost of this work is Rs. 6,900.

The other items in which differences from the original estimate occur are of minor importance and need not be mentioned in the report, but the details of all are shown in the estimates accompanying.

General scope of project as compared with the original.—The original estimate provided for the irrigation of 10,000 acres without the aid of reservoirs for storage of any kind.

The revised estimate provides for irrigating 10,580 acres and provides a limited amount of storage by means of the Vemavaram tank and regulator. The regulator is half a mile below the tank, and the full supply level of the channel below this work is 2 feet below F.S.L. of the tank.

The storage capacity of the first 2 feet of the tank is 9·234 million cubic feet, and this, it is anticipated, will be found a most valuable store on which to draw from time to time, and will justify the slight increase of the irrigated area provided for. The channel, as now designed, tails into the natural supply channel of Somavaram tank which will be filled at times when the water can be spared from the crops on the channel and the irrigated area under which might be increased with safety by some 200 acres without increasing the capacity, of the tank. The tank is in a site admirably suited for economically increasing the storage capacity, and the village karnam reports that in this village and the adjoining village of Damalur, an area of 2,000 acres is commanded by the tank. The small catchment of the tank has hitherto restricted extension of cultivation under it. No regular investigation of this promising supplementary extension of the project has been made; but I have inspected the tank and there is no doubt that if the ayacut under it proves as extensive as reported, the economical extension of the tank capacity is feasible. The project and expenditure would be additional and supplemental to the present project and estimates, but being a very promising one it has been here mentioned. The Muniyaru channel commands several small tanks in the villages of Kondur and Gummadidurru and will be able to keep these tanks well supplied by feeder channels. The cultivation under such tanks, instead of being very precarious, will thus be assured and Government as well as the ryots will be benefited. Such benefits will not, however, appear in the financial returns of the project.

Financial aspect—

Acreage under the sluices		10,580
Deduct existing wet cultivation		700
Balance, acres ...		9,880

(*Note.*—Some 500 acres can be cultivated under pot sluices in addition to the above if water-supply is found to be sufficient, but the above is set off against any area which may be left uncultivated under the sluices).

Revenue—

Wet assessment on 9,880 acres at Rs. 4	39,520
Deduct—Upkeep, As. 12 per acre	7,410
Net profit ...	32,110

Capital Account—

Total expenditure on works	5,06,000
Add—Establishment	1,16,380
Tools and plant	7,590
Total direct charges ...	6,29,970
Add—Leave and pension allowances of establishment 14 per cent. on establishment charges	16,345
Capitalized abatement land revenue	12,485
Total Capital expenditure ...	6,58,800

Revenue—

Return ... ... 5 per cent.

It is to be added that the charges for establishment above allowed for are grossly in excess of those actually incurred and to be incurred on construction which will not amount to more than Rs. 50,000 allowing for the works being completed in 1898–99.

Land compensation and capitalized value—land revenue lost.—In the above estimates nothing has been allowed for land compensation, and the capitalized value of land revenue lost has been entered as in the original estimate.

As regards the later item, the area of land required to be taken up for the project will amount to some 800 acres, and I think the loss of revenue under this head must have been underestimated as most of the land is cultivated dry. This might be referred to the Collector.

With regard to land compensation, the attention of the Superintending Engineer has lately been drawn to the fact that the land compensation already settled has been paid for in cash and the money debited to the project and to the allotments made for carrying out the works. As I understand that the waste lands under the project are all to be sold in public auction and some have already been so sold at prices in excess of those usually given for compensation for dry lands and this proceeding seems sound from a financial point of view, but the allotments asked for and given have been wholly based on the estimate which only provide for works and the land compensation paid cannot be met from these allotments.

Further works which may be necessary.—As far as I can foresee the safety and efficiency of the works are threatened and seriously threatened in two different ways—

(*a*) By the deepening of the heigh level channels and spills of the Muniyeru river which pass round beyond the right flank of the anicut and so turn it.

(*b*) By the silting up of the undertunnels in which the drop is at all considerable (say 3 feet and upwards).

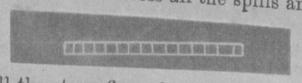
Spills round the right flank of the anicut.—The anicut, as has already been mentioned, does not extend all the way across the river but only across the deep channel.

The right flank rests on a "lunka" in the river bed which is totally submerged in a high flood. The condition of affairs before the anicut was built was as follows.

The high level channels or spills passing round on the right side of the lunka carried off the surface drainage from part of the lands on the right of the river and also carried part of the river water in even moderate floods.

When the survey was made and designs prepared the lowest level of the bed of any of these spills on a line in prolongation of the anicut was + 46·00, viz., the same as the proposed crest of the anicut.

A survey of the spills made in March 1896 is put up with the plans of the revised estimate with a section of the river in prolongation of the anicut taken at the same time, and a section on the same line taken in 1893—when the original survey was made—is superposed on this in dotted lines. The difference is very striking.

With regard to when this change took place I may state that the deepening of the "middle channel" took place almost altogether prior to the construction of the anicut. Considerable uneasiness has always been felt with regard to the high level channels, and the Chief Engineer for Irrigation inspected these in June 1895 and ordered a roughstone floor shown on the survey across the middle channel at "A" to be made which was done the same year. The year of the construction of the anicut there occurred considerable scouring out both of the high level channel bed and of the bed of the channel between the anicut and the middle channel. The season was one of abnormal rainfall, floods were incessant and of long duration. The following year stone floors were thrown across all the spills and high level channels as shown on plan by the symbol "  ."

All the stone floors have been undisturbed except the one across the spill nearest the anicut which was slightly displaced and the bed below and above it scoured.

A section taken in February 1897 shows that no alteration in the bed levels of the spills on the prolongation of the anicut took place in 1896.

The season (1896) was however one of great scarcity of water.

During the dry season of 1896 a rough stone bund was thrown across the head of the middle channel and also the head of the channel between this and the anicut. The first bund settled in the centre by percolation through the sandy bed below and the second showed signs of doing the same. It is evident that neither are of much use.

When the water level in the river is not more than about 2 feet over the anicut, all the water passing round the right of the anicut outfalls into the main river at the "outfall to the middle channel."

Across the channel here is a reef of hard gneiss. Thus there is no danger here of a retrogression of levels of the bed taking place so long as this continues to be the position and limits of the outfall.

The channel approaching the outfall shows considerable erosion of banks as is natural considering the greatly increased work it has to do since the construction of the anicut.

Revetment has been built this year to the bank on the left of the outfall. As this was being eroded and it is considered most desirable to retain the outfall on the rock over which it now flows and not to allow it to cut away to the left as it tends to do.

The above description and the survey and sections show the present state of affairs which it must be admitted disclose matter for serious uneasiness. It is to be noted—

(*a*) That even if things remain in their present state, the loss of water through the high level channels is very great, so great as to make it imperatively necessary to do something to stop it.

(*b*) There is a danger of the deep bed of the river gradually altering and working off to the right of the present anicut. The latter contingency does not appear to be imminent just at present but it is not altogether improbable and must not be lost sight of.

The loss of water which should be available for irrigation through the spills is a present fact and tends to become more and more serious. For the current year it has been decided to throw sand bunds across the spills to such a height that they will keep the water from passing round the right of the anicut until the water level in the river reaches + 49·00 (3 feet above anicut crest). They will then breach and must be again thrown up when the water falls. This method requires constant supervision, is liable to cause scours in the beds of the spills and is also liable to failure by interference by subordinate officials of the Government of His Highness the Nizam of Hyderabad in whose territories the spills are situated (the boundary between the Nizam's and British territory being the river Muniyeru) and a good deal of interference with works is liable to take place in consequence. The question of extending the anicut must therefore be approached at an early date and I am inclined to think it will be found absolutely necessary.

I would suggest that a tongue wall similar to that on the right of the present anicut but with shallow foundations should be carried on through the lunkas above + 48·00 level with its top flush with the lunka surface and pitching, packed in for some 3 feet in front and 8 feet in rear at ground level.

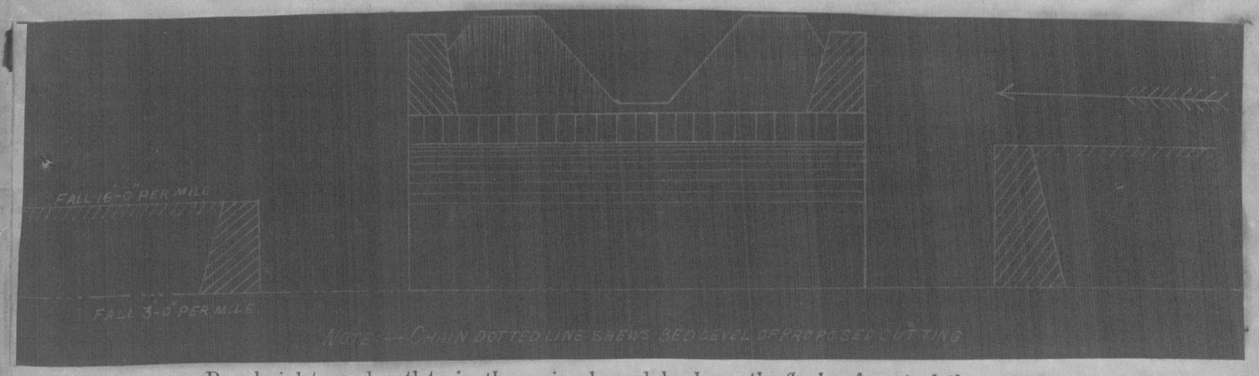
Across the spills build anicuts with crest level one foot above that of the present work. These would have to be founded deep or have extension aprons as the beds of the spills are sand down to 10 feet below present bed. The cost of prolonging the anicut and making the work absolutely safe would probably amount to some Rs. 50,000. The matter is one calling for early orders as delays will most probably occasion increased expenditure eventually.

Silting up of undertunnels.—The undertunnels, which were completed in the dry season of 1896, and in which the drop was at all considerable, evinced a great tendency to get choked with sand and silt.

Slopes have been substituted for drop walls in the later works, but I am not very hopeful that the alteration will have the wished-for effect. The sand is generally very coarse and mixed with small pebbles. Most of the "Vagus" are of the nature of torrents and roll along a lot of such material. The remedy would appear to me to be to cut out a channel from the floor of the undertunnel with a fall of, say, 3 feet per mile, until the channel bed so excavated runs out into the natural bed of the Vagus.

The undertunnel would thus be changed into a drop.

The fall of the Vagus is some 16 feet per mile, and the cost of this remedy would not be prohibitive.



Rough inlets and outlets in the main channel banks on the flanks of most of the undertunnels have been made for fear of the failure of these works to pass the cross drainage.

Lands in Hyderabad Territory.—It is most important to acquire control of the lunka on which the anicut right flank rests the river margin on the prolongation of the anicut on which works may have to be built and of the lunkas immediately above the anicut where these are in Hyderabad

territory. These lands are all grazing lands only and should be taken over on settled rent or otherwise from the Hyderabad Government. The cost would be small. Failing some such arrangement, I foresee constant interruptions of works, interference with conservancy operations and friction with Hyderabad officials.

We have already suffered great inconvenience from stoppage of work on cross bounding the high level channels which led to a delay of months in execution of these important works. In my opinion this matter is one that calls for early action.

Note by the Superintending Engineer, II Circle, on the above report, dated 9th January 1898.

Since the above report was written a supplemental estimate, with a separate report for the extension of the anicut, amounting to Rs. 21,300, has been submitted by the Executive Engineer and has been incorporated in this office with the financial statement and totals of this revised estimate for the project. The estimate and a separate report is forwarded with this. The matter is one requiring early action, as the cost and difficulties of the work will be increased if the extension is not allowed to be proceeded with this dry season (March to June 1898).

2. Experience has shown that during the past rainy season the undertunnels on the main channel have worked well. They become silted with slight rainfall, but the action of the water passing through them after heavy rain has cleared them out. It appears improbable that the alterations mentioned in the Executive Engineer's report will be found necessary.

3. The matter of land compensation has not been taken up in the estimates now submitted. The reason has been explained in the Executive Engineer's report. That officer has now been ordered to submit a supplemental estimate for the compensation, as, although it was originally reported by the Revenue Department that no money would be required for this purpose, the system of selling vacant lands under a project now in force renders such payment necessary as no lands are given in exchange. The amount which will be required for this purpose will probably be Rs. 12,000.

Estimate Form—Abstract—Classified.

Sub-head.	Names of works.	Amount of estimate for individual works.	Total of sub-heads.	Total for each canal or distributary.	Total of each main head.
1	2	3	4	5	6
	PROVINCIAL—IRRIGATION.	Rs.	Rs.	Rs.	Rs.
	43. Minor and Navigation Works.				
	Minor Works for which Capital and Revenue Accounts are kept.				
	Capital Account.				
	Muniyeru Project.				
	I. Works.				
	(1) Head Works.				
3. Works ..	Anicut—Constructing	36,800			
	Undersluices—Constructing	8,950			
			45,750		
4. Buildings ..	Rest-house at Polampalli	2,550			
	Store shed at do.	35			
	Huts for lascars at do.	1,360			
			3,945		
6. Maintenance.	Head works	350			
	Anicut apron—Repairs and improvements	7,250			
	Rest-house at Polampalli	212			
	Lascars' sheds at do.	70			
	Anicut repairs	1,120			
	Forming sand banks across the spills on the R. S. of the anicut	2,130			
			11,132		
				60,827	
					60,827

Estimate Form—Abstract—Classified—cont.

Sub-head.	Names of works.	Amount of estimate for individual works.	Total of sub-heads.	Total for each canal or distributary.	Total of each main head.
1	2	3	4	5	6
	(2) Main Canals and Branches.	Rs.	Rs.	Rs.	Rs.
2. Regulators ..	Head sluice—Constructing	10,900			
	Regulator at 11/0	2,630			
			13,530		
5. River and Hill Torrent Works	Outlet at 10/0	2,020			
	Surplus weir 14/4	850			
	Inlets and outlets	5,400			
			8,270		
6. Other Cross Drainage Works.	Undertunnel 2/3, 160′	9,450			
	Do. 2/2, 210′	2,330			
	Do. 2/2, 120′	4,500			
	Do. 2/4, 330′	3,150			
	Do. 16/14, 540′	10,270			
	Do. 12/2, 330′	11,000			
	Do. 18/3, 500′	3,410			
	Do. 14/3	1,490			
	Do. 11/7, 495′	2,700			
	Do. 12/6	10,800			
	Do. 18/4, 300′	2,610			
	Do. 16/6	9,250			
	Do. 15/5, 635′	3,890			
	Do. 17/2, 556′	2,250			
	Do. 20/1, 430′	2,170			
	Do. 21/0	4,190			
	Do. 21/0, 595′	2,110			
	Do. 22/0	2,880			
	Do. 25/3, 330′	3,080			
			91,530		
7. Bridges ..	Bridge at 1/0	2,320			
	Do. 2/2	1,440			
	Do. 3/6, 165′	1,180			
	Do. 3/3, 495′	1,320			
	Do. 3/3	1,330			
	Do. 7/0, 330′	1,460			
	Do. 9/3, 450′	1,420			
	Do. 14/4	1,600			
	Do. 14/3	1,660			
	Do. 14/3	1,660			
	Do. 17/6, 165′	1,770			
	Do. 19/6	1,520			
	Do. 23/6	1,330			
			20,010		
11. Buildings ..	Rest and tool shed at Vemavaram	200			
	Rest shed at Muchintla	1,650			
	Do. at Gummadiduru	200			
			2,050		
12. Earthwork.	Excavating channel	1,92,000			
			1,92,000		
14. Tanks and Reservoirs.	Vemavaram tank improvements	6,850			
	Do. sluice	50			
			6,900		
15. Miscellaneous	Demarcation stones	2,000			
	Mile and furlong stones	370			
	Cattle crossing	150			
			2,520		
16. Maintenance.	Repairs to Muchintla rest-house	80			
	Do. to shed at Vemavaram	60			
			140		
				3,36,950	
					3,36,950
	(3) Distributaries.				
	Alurpad Branch.				
3. Works ..	Head sluice	560			
	Drop at 0/3¾	140			
			700		
4. Earthwork.	Excavating channel .. .. Rs. 2,100				
	Do. branch .. .. „ 570				
	Do. side channel .. .. „ 210				
		2,880			
			2,880		
				3,580	

Estimate Form—Abstract—Classified—cont.

Sub-head.	Names of works.	Amount of estimate for individual works.	Total of sub-heads.	Total for each canal or distributary.	Total of each main head.
1	2	3	4	5	6
	Vatsavai distributary No. 1.	RS.	RS.	RS.	RS.
3. Works ..	Head sluice	530			
4. Earthwork.	Excavating channel	490			
			530		
			490		
	Vatsavai distributary No. 2.			1,020	
3. Works ..	Head sluice	460			
4. Earthwork.	Excavating channel	510			
			460		
			510		
	Penuganchiprole distributary.			970	
3. Works ..	Head sluice	850			
Do. ..	Drop No. 1 at 0/3	380			
Do. ..	Do. „ 2 at 0/4	370			
Do. ..	Do. „ 3 at 1/5¼	320			
Do. ..	Do. „ 4 at 2/1	370			
Do. ..	Do. „ 5 at 3/0⅓	290			
Do. ..	Do. „ 6 at 3/4¼	300			
Do. ..	Do. „ 7 at 4/3½	390			
Do. ..	Do. „ 8 at 5/1½	290			
Do. ..	Do. „ 9 and 10 and 2 drops on the extension at 280 each	1,120			
			4,680		
4. Earth work.	Excavating channel	19,000			
			19,000		
5. Miscellaneous	Mile and furlong stones	160			
			160		
	Vemavaram Branch channel.			23,840	
3. Works ..	Head sluice	430			
Do. ..	Three drops at each 300	900			
			1,330		
4. Earthwork..	Excavating channel	600			
			600		
				1,930	
	Rabbavaram Branch and its branch.				
3. Works ..	Head sluice	560			
Do. ..	Drop No. 1 at 1/0	410			
Do ..	Do. „ 2 at 1/1	410			
Do. ..	Do. „ 3 at 1/2	410			
Do. ..	Do. „ 4 at 1/3¼	410			
Do. ..	Do. „ 5 at 1/4½	190			
Do. ..	Do. „ 6 at 2/3⅓	240			
Do. ..	Do. „ 7 at 2/7¼	270			
Do. ..	Do. „ 8 at 3/1¼	270			
Do. ..	Do. „ 9 at 0/3 of Bodapad branch	180			
Do. ..	Do. „ 10 at 0/4¼ of do.	180			
			3,530		
4. Earthwork..	Excavating channel .. .. .. Rs. 4,290	..			
Do. ..	Do. branch .. .. .. „ 610	..			
		4,900			
			4,900		
				8,430	
	Muchintala channel No. 1.				
3. Works ..	Head sluice	490			
			490		
4. Earthwork..	Excavating channel	600			
			600		
				1,090	
	Muchintala No. 2 and its branch and east side channel.				
3. Works ..	Head sluice	490			
Do. ..	Drop No. 1 at 0/1½	370			
Do. ..	Do. „ 2 at 0/2½	370			
Do. ..	Do. „ 3 at 0/3½	370			
			1,600		
4. Earthwork..	Excavating channel .. .. .. Rs. 480	..			
Do. ..	Do. branch .. .. .. „ 400	..			
Do. ..	Do. east side channel .. .. „ 240	..			
		1,120			
			1,120		
				2,720	

Estimate Form—Abstract—Classified—cont.

Sub-head.	Names of works.	Amount of estimate for individual works.	Total of sub-heads.	Total for each canal or distributary.	Total of each main head.
1	2	3	4	5	6
	Muchintala channel No. 3 and west side channel.	RS.	RS.	RS.	RS.
3. Works ..	Head sluice	500			
Do. ..	Drop No. 1 at 0/1	340			
Do. ..	Do. „ 2 at 0/1¾	370			
Do. ..	Do. „ 3 at 0/2⅔	370			
Do. ..	Do. „ 4 at 0/3	340			
Do. ..	Do. „ 5 at 0/3¾	340			
			2,260		
4. Earthwork..	Excavating channel .. .. .. Rs. 390	..			
Do. ..	Do. west side channel .. .. „ 160	..			
		550			
			550		
	Anegallapad channel No. 1 and its branches.			2,810	
3. Works ..	Head sluice	530			
Do. ..	Drop No. 1 at 0/4	470			
Do. ..	Do. „ 2 at 1/0⅔	470			
Do. ..	Do. „ 3 at 1/2½	470			
Do. ..	Do. „ 4 at 1/4	420			
Do. ..	Do. „ 5 at 1/6	420			
Do. ..	Do. „ 6 at 1/7⅓	350			
			3,130		
4. Earthwork ..	Excavating channel .. .. .. Rs. 2,220				
Do. ..	East side channel .. .. .. „ 280				
Do. ..	West do. .. .. .. „ 160				
		2,660			
			2,660		
	Anegallapad Channel No. 2 and its Branch.			5,790	
3. Works ..	Head sluice	470			
Do. ..	Three drops	1,000			
			1,470		
4. Earthwork ..	Excavating channel .. .. .. Rs. 1,010				
Do. ..	Do. branch channel .. .. „ 500				
		1,510			
			1,510		
	Anegallapad Channel No. 3 and Right and Left side channels.			2,980	
3. Works ..	Head sluice	460			
			460		
4. Earthwork ..	Excavating channel .. .. .. Rs. 60				
Do. ..	Right side „ .. .. .. „ 535				
Do. ..	Left side „ .. .. .. „ 325				
		920			
			920		
	Gummudedurru No. 1 and its Branches.			1,380	
3. Works ..	Head sluice	480			
Do. ..	Drop No. 1 at 0/1	380			
Do. ..	Do. „ 2 at 0/3	420			
Do. ..	Do. „ 3 at 0/5½	420			
Do. ..	Do. „ 4 at 0/7½	420			
Do. ..	Do. „ 5 at 1/0½	430			
Do. ..	Do. „ 6 at 1/1¼	430			
Do. ..	Do. „ 7 at 1/6	200			
			3,180		
4. Earthwork ..	Excavating channel .. .. .. Rs. 2,350				
Do. ..	Do. side channel .. .. .. „ 330				
		2,680			
			2,680		
	Gummudedurru No. 2 and its Branches.			5,860	
3. Works ..	Head sluice	470			
Do. ..	Drop No. 1 at 0/1	370			
Do. ..	Do. „ 2 at 0/1½	370			
Do. ..	Do. „ 3 at 0/2½	370			
Do. ..	Do. „ 4 at 0/3½	370			
Do. ..	Do. „ 5 at 0/4½	370			
Do. ..	Do. „ 6 at 0/5½	370			
Do. ..	Do. „ 7 at 0/7½	370			
			3,060		
4. Earthwork ..	Excavating channel .. .. .. Rs. 1,680				
Do. ..	Do. right side channel .. .. „ 400				
		2,080			
			2,080		
				5,140	

Estimate Form—Abstract—Classified—cont.

Sub-head.	Names of works.	Amount of estimate for individual works.	Total of sub-heads.	Total for each canal or distributary.	Total of each main head.
1	2	3	4	5	6
	Ramireddi branch.	Rs.	Rs.	Rs.	Rs.
3. Works ..	Head sluice	480			
Do. ..	Six drops at 360 each	2,160			
4. Earthwork ..	Excavating channel	1,650	2,640		
	Kondur branch.		1,650		
3. Works ..	Head sluice	480		4,290	
Do. ..	Six drops at 420 each	2,520			
4. Earthwork ..	Excavating channel	1,060	3,000		
	Magalla branch.		1,060		
3. Works ..	Head sluice	520		4,060	
Do. ..	Seven drops at 480 each	3,360			
4. Earthwork ..	Excavating channel	2,195	3,880		
			2,195		
5. Miscellaneous.	Demarcation sluices for above distributaries ..	890		6,075	
Do. ..	Pot sluices to distributaries	950			
			1,840		
				1,840	83,805
	Add for unforeseen works ..	..	..	..	4,81,582
					3,218
	Establishment charges at 23 per cent.	..	..	..	4,84,800
	Tools and plant at 1½ per cent.	..	..	..	1,11,504
	Total, Direct charges ..	..	..	..	7,696
	Capitalized abatement of land revenue	..	..	..	6,04,000
	Leave and pension allowances at 14 per cent., say ..	..	..	..	12,389
	Total, Indirect charges ..	..	..	..	15,611
	Grand Total ..	..	..	..	28,000
		..	..	..	6,32,000

No. 186 I.

Note by the Chief Engineer for Irrigation.

The estimate of Rs. 3,90,000 was sanctioned in G.O., No. 1089 I., dated 12th December 1893, for an anicut across a portion of the Muniyeru and a channel, 27 miles long for the irrigation of 10,000 acres. The collection of materials was begun in 1894–95 and the construction of the anicut in March 1895. In December 1896, it was reported that the estimate would be largely exceeded and a further report was made in April 1897 that the excess on the excavation of the main channel alone would probably be Rs. 67,000. Government therefore, in Order No. 413 I., dated 1st May 1897, called for the early submission of the revised estimate. The estimate now comes to Rs. 6,29,970 or 71 per cent. above the original but includes Rs. 21,300, or with establishment, &c., Rs. 26,518 for extending the anicut.

The causes of the excess are fully explained in the report. The excess on the excavation of the main channel, where much hard soil and rock were met, is Rs. 78,600, on the masonry works of main channel, Rs. 22,950, and on the distributaries, Rs. 63,425. The channel has been excavated for 22½ miles and partly brought into use over 1,000 acres having been cultivated last year. The work is at present in abeyance for want of funds.

It appears certain that a very serious mistake has been made in the design and location of the anicut. The Superintending Engineer's report printed with G.O., No. 1089 I., dated 12th December 1893, states the drainage area of the river to be 2,357 square miles. Its width as shown on the survey varies from a quarter to half a mile where there are no islands and where there are islands the channels through which the water flows in moderate freshes are nearly a quarter mile in width. In floods the islands are submerged and the river flows full from bank to bank. The estimate provided only for an anicut 400 feet long across the deep main channel at the left bank, the right flank of the anicut being abutted on an island where it was protected by pitching and walling. The level of the anicut crest was made the same as the bed of the deeper of the channels to the right of the island and therefore some one to four feet below the lunka level between the anicut and right bank of the river. It was expected that water would flow in floods harmlessly over this land, some 1,750 feet in width. The cutting of channels due to the more frequent spill and greater velocity caused by the heading up of water by the anicut began at once. Some bunds were made across the channels but these as might have been expected were of little avail and the cutting has continued though very little occurred in the exceptional season of last year. The anicut was built slightly longer than designed but must eventually be lengthened I should say to at least a quarter of a mile; whether considering the site chosen it will not have to be a good deal longer than this. I can offer no opinion. If the site had been a little lower down or higher up the river, banks might have been made across some of the lunkas. The Executive Engineer's estimate for extending the anicut provides for building some short lengths on a section which would not be strong enough if there were deep scour in rear. I think it would be of very little use to build these and have struck the provision out of the estimate which therefore stands at Rs. 4,84,800 for works. The channels may be bunded up this year and by next year when further experience will have been gained and a thorough examination of the soil made, the designs for the additions, which are likely to cost a large sum, can be made out. One must be careful in dealing with a river which may have a flood discharge of 100,000 to 150,000 cubic feet per second. The flood level marked on the plans is evidently too low.

The estimate is recommended for sanction without the extension for which a supplemental estimate will be submitted in due course.

OOTACAMUND,
16th June 1898.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

ORDER—No. 518 I., dated 8th July 1898.

The revised estimate for the Muniyeru project amounting to Rs. 6,32,000 including indirect charges as modified by the Chief Engineer for Irrigation is sanctioned in supersession of the estimate of Rs. 3,90,000 sanctioned for the project in G.O., No. 1089 I., dated 12th December 1893.

2. The Government observes that the original design and estimate are very faulty and a discredit to the officers responsible. These officers, it is observed, have left the service.

3. This sanction is registered as No. 49 I. of 1898–99.

(True Extract.)

Under Secretary to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, II Circle,
„ Examiner, Public Works Accounts.
with plans and estimates.

Exd. Md. Pahilvan.

A/ ~~Sir H. Bliss K.C.I.E.~~
~~The Hon'ble Mr Arundel, I.C.S.~~

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Irrigation 24 P

UNDER date the

Estimate for the Munnyeru Project
Kistna District

READ the following

Precis with General Report & classified abstract of Estimate as altered

From Supg Engr. II Circle, No. 89 K.N., d/ 12 Feb/98
Note by the Chief Engr for Irrigation No. 186 I d/ 16 June 1898
N 518 I d/ 8.7.98

Issue
JHt
30.6.98
I

The original Design and Estimate are very faulty, and a discredit to the Supg Engineer, Mr Martin, and to the C.E.I., Col. Drake Brockman. Both these gentlemen have left the Service. If they had not, I should call them to account.

The revised Estimate is sanctioned.

A.G.H.
18.6.98

Flagged I AH 24.6.98

A very discreditable business. Ironmymart, I cant see why an affair of this kind should not be followed up even though an officer has retired

H.S.
23/6/98

The revised Estimate for the Munnyeru Project amtg to Rs 6,32,000 including indirect charges as modified by the Chief Engr. for Irrigation is sanctioned in supersession of the Estimate of Rs 3,90,000 sanctioned for the project in G.O. No 1089 I, d/ 12 Oct/93.

→ 2.

3. This sanction is registered as No 49. I of 1898-99.

To
The Chief Engr for Irrigation
Supg Engr, II Circle
Ex. Engr. T.W.Z.

The Government observes that the

W.H.
16.6.98

15/6/98

13/6/98

15/7/98

the original design & Estimate are very faulty and a discredit to the officers responsible. These officers, it is observed, have left the service.

[illegible] 28/6/98

WH 29.6.98

Public Works (1898) Department.

CURRENT No. 5597

Order

[illegible] - Print before numbering as there is a [illegible] [illegible]

Print also Enclos: marked C1 & C21 in red pencil in file of Estimate [illegible] 5/7/98

Print [illegible]

From The Chief Engineer for Irrigation

No. 186-I

Dated 16-6-98

Received } 5.7.98
Registered }

Enclosures ~~[illegible]~~ 4 (1 book of Estd & 1 book of plans)

Spare copies

SUBJECT.

Munirgon Project - Revised Estd of Rs. 632,000 for - Note recommending with remarks for sanction the -

[illegible]

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

Note by the Chief Engineer for Irrigation

22

The estimate of Rs 3,90,000 was sanctioned
Flag. D in G O No 1089. I. dated 12th December 1893 for an
anicut across a portion of the Munnyaw and a
channel 24 miles long for the irrigation of 10,000 acres
The Collection of materials was begun in 1894-5 and
the construction of the anicut in March 1895. In
December 1896, it was reported that the estimate would
be largely exceeded and a further report was made
in April 1897 that the excess on the excavation of
the main Channel alone would probably be Rs 67,000
Flag. B Government thereupon in order No 413. I. dated 1st May
1897 called for the early submission of the revised
Estimate. The estimate now comes to Rs 629,970. or
78 percent. above the original but includes Rs 21,300
or with Establishment &c Rs 26,518, for extending
the anicut.

The causes of the excess are fully explained
in the report. The excess on the excavation of the
main Channel, where much hard soil and rock
were met, is Rs 78,600, on the masonry works of
main Channel Rs 22,950, and on the distributaries
Rs 63425. The Channel has been excavated for 22½ miles
and partly brought into use, over 1000 acres having
been cultivated last year. The work is at present
in abeyance for want of funds.

Yes. B.H. It appears certain that a very serious
mistake

mistake has been made in the design and location of the anicut. The Superintending Engineer's report printed with G.O. No 108 S.I. dated 12th December 1893 states the drainage area of the river to be 2357 Sq. miles. Its width as shown on the Survey varies from a quarter to half a mile where there are no islands and where there are islands the channels through which the water flows in moderate freshes are nearly a quarter mile in width. In floods the islands are submerged and the river flows full from bank to bank. The estimate provided only for an anicut 400 feet long across the deep main channel at the left bank, the right flank of the anicut being abutted on an island where it was protected by pitching and walling. The level of the anicut crest was made the same as the bed of the deeper of the channels to the right of the island and therefore some one to four feet below the bunks level between the anicut and right bank of the river. It was expected that water would flow in floods harmlessly over this land, some 1750 feet in width. The cutting of channels due to the more frequent spill and greater velocity caused by the heading up of water by the anicut, began at once. Some bunds were made across the channels but these as might have been expected were of little avail and the cutting has continued though very little occurred in the exceptional season of

Map D

of last year. The anicut was built slightly longer than designed but must eventually be lengthened I should say to at least a quarter of a mile. Whether considering the site chosen it will not have to be a good deal longer than this. I can offer no opinion. If the site had been a little lower down or higher up the river, banks might have been made across some of the bunkas. The Executive Engineer's estimate for extending the anicut provides for building some short lengths on a section which would not be strong enough if there were deep scour in year. I think it would be of very little use to build these and have struck the provision out of the estimate which therefore stands at Rs 4,84,800- for works. The channels may be bunded up this year and by next year when further experience will have been gained and a thorough examination of the soil made, the designs for the additions, which are likely to cost a large sum, can be made out. One must be careful in dealing with a river which may have a flood discharge of 100,000 to 150,000 Cub. feet per second. The flood level marked on the plans is evidently too low.

The estimate is recommended for sanction without the extension for which a supplemental estimate will be submitted in due course.

W. Hughes

Chief Engineer for Irrig.

Ootacamund
16th June 1898

To
The Joint Secy to Govt
P.W.D. Board

Blk

Public Works (1898) Department.

CURRENT No. 16. K.S.

Order

From The Supg. Engineer
2 Circle

No. 89. K.N.

Dated 12th January 1898

Received 17th — do —

Registered

Enclosures

Spare copies

SUBJECT.

Municipal Project works — Forwards for sanction revised Estimates for the — with Explanation for Excess.

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

Print

SUPG. ENGINEER'S OFFICE, No. 23/ 2087 25 AUG. 97 P. W. D. SECOND CIRCLE.

Report to Revised Estimates

Constructing Anicut and Head Works Irrigation Project at Polampalli

These works have been freely altered in design during or subsequent to construction especially the Anicut.

Alterations and additions to Anicut.

The following alterations were made on the first construction of the Anicut:—

(a) The lanka on which the right of the Anicut rests had been eroded greatly since the surveys were taken for the works rendering an extension of the Anicut a greater length of 44ft necessary. The total length of the Anicut as built from the river end of the under sluices is 544ft the originally design showed a length of 500 ft.

(b) In order ~~further~~ to secure the lanka from further erosion a front wing and return not ~~in the~~ originally provided for were built in the right of the Anicut and the margin of the lanka above the Anicut revetted.

Damage to Apron from floods.

During the floods of 1896 the year of construction the Apron of the Anicut was badly scoured out in several places showing that it was incapable of with-standing the clear overfall of 8 feet to which it was subjected. An Estimate for Improvements to the Anicut Apron was then sanctioned which provided for the temporary repairs necessary for the safety of the works and for remodelling the whole Apron to the sloping form shown in the present design (now submitted). This work has been carried out at a cost of Rs 7250/0/0 charged as Maintenance during Construction. The protection of the margins of the lanka on which right of the Anicut rests

reats has been further provided for by the construction of stone groynes above the Aviemt and planting up of the margins with hawl de de.

This has been charged to the Lump Sum item "making River approaches and removing shoals" in the original Estimate.

A separate detailed Estimate for the work done is submitted.

Under Sluices

These have been but slightly altered during construction by the provision of a platform for working the gear, by carrying up the cut waters and corbelling out the tops & laying beam stones across between them.

A little pitching in front and considerable additions to the revetment of the River margin in rear of the Under Sluices was found necessary and has been carried out.

Head Sluice

This has been altered by being brought close to the Under Sluices than in the original design. The whole design of the masonry wings in rear has been altered the wings being prolonged to take the water round the curve required to lead it off in the direction required.

This is shown in detail in the designs. All the above works are complete.

W. H. Wilson
Captain R.E.
Executive Engineer
Kistna Northern Div

16 8/57

OIC
DU

the original design & Estimate

CHIEF ENGINEER FOR IRRIGATION. 15 JAN 1883 16 Ks

120

Munigeru Project_

Anicut and Head works

at Palampalli_

Report to accompany

revised estimates

for the_

(1)

1388.

Print

35.P

Report to the Revised Estimate

Munigeru Project.

The original Project Estimates amounted to Rs 3,68,000 and provided for an Anicut Head & under sluices and a main Channel 27 miles in length with Distributaries to irrigate an area of 10,000 acres.

This Estimate was sanctioned with G.O. No. 1089 I of 12-12-93. Flag. D

General State of works & Progress to date 30th June/97

Materials were collected during the second half of the year 1894-95 and ground was broken on the Anicut foundations early in March 1895.

Since then work has been in progress on the Anicut Head works and Channel and the state of affairs in June /97 is as under. The Anicut & Head works are Complete. The main Channel with its Masonry works (except distributary Channels Head sluices) is practically Complete to 22½ miles beyond which no work has been done.

The excavation of the distributary under this length of Channel is about half out but the drops on these channels which are very high are most of them not commenced owing to want of funds & for this reason water (which was admitted to the Channel as soon as the state of the Munigeru permitted) Cannot be passed down most of the Distributaries and irrigation under the Channel for the Current year will be very

the original design & Estimate

(2)

very little and practically Confined to the Lands previously irrigated under tanks. The ryots who have been accustomed to Cultivate their fields dry have not yet made any move towards preparing for wet Cultivation but it is hoped that this apathy will disappear now that water has actually been passed down the Main Channel. In this Connection the Revenue Department might bring pressure to bear if this proves necessary as the ryots have bound themselves to take water vide Dis No. 3634 dt 14th October/93 from Collector Kistna published with the G.O. Sanctioning the Project in the 1st instance.

Amount of Revised Estimate

The revised Estimate amounts to Rs ~~6,66,400~~ 6,29,970 an excess on the Original Estimate of Rs ~~2,38,400~~ 2,61,970 or about ~~64~~ 71 per Cent.

This large excess is due principally to three main Causes. Viz:—

(a) Hardness of the Soil in main Channels and deviations from original alignment necessary.

(b) The high rates which had to be paid for masonry.

(c) The inadequate provision for Distributary Channels in the Original Estimate.

*(d) For extending the anicut

* This was since received as supplementary Estimate to the revised estimate and the amount has been included in the classified abstract accompanies the Separate Report estimate

Hardness of Soil &c

(a) To this is due a ~~total~~ excess of Rs ~~77,600~~ 78,600 the average rate of excavation being Rs 5-8-0 as against Rs 4-14-8 in the Original Estimate. The rate of Rs 5-8-0 excludes all rock which had to be removed by blasting on which a Sum of Rs 23,500 has actually been spent.

(6)

(3)

Rates for Anicut and Head works.

The Original Estimates allowed very fair rates for the Anicut and Head works where stone and Sand were within easy distance of the works; the works were carried out within these rates.

4 S.P

Rates for Masonry works on the Main Channel.

The rates allowed in the Original Estimate for the Scattered works along the Main Channel were considerably less than those for the Anicut although in most cases, the lead for material was greater & in Some cases very much greater and the works being Small isolated ones were more difficult of execution and Supervision.

Considerably higher rates had therefore to be paid for the Channel masonry works. The contractors would not take up the works on the channel at the Same rates as the Anicut and Head works and would not take up the 12 to 22 mile. Section of the Channel at the rates given for the miles 1-12 which were first given out. The rates at which the Masonry works on the channel (especially 12-22 miles) were carried out were Somewhat high owing to the want of any competition for contractors for these works. The locality is Somewhat remote, the people about are poor and there is absolutely no local Skilled labour.

No native contractors competed for the work in response to advertisements for tenders and the two firms of European Contractors who tendered did So at higher rates than they were afterwards induced to accept.

It is to be added that the firm who has carried out most of the works Messrs. Putman and Ritchie

did so in an efficient and workmanlike manner One of the partners living constantly on the works for over 2 years.

A Statement is Submitted with the Estimate showing the rates of the various contracts and agreements entered into and the leads for Material to each masonry work and working up to the Consequent rate for masonry on each work.

(C) Only Lump Sum provisions were made in the original Estimate for Distributaries with the exception of the Item Head Sluices: for which a type design was made out & the 17 sluices estimated for at so much per Sluice. The gross total of the Revised Estimate for this item does not differ materially from the original. On all other items for the Distributary Channels the original Estimate was faulty.

Provision for Distributary Channels.

(1) No provision whatever was made for Masonry works, along the channels although in the first mile of nearly every distributary falls about 20 feet.

The details of the Revised Estimate show that the necessary drops cost Rs 27,640 ~~27,000~~ and a further Sum of Rs 950 is provided as a lump Sum to form Pot Sluices through which water will be supplied to the lands. The provision of such Sluices in all the larger channels is absolutely necessary if economy in distribution is to be studied.

The cost therefore of masonry works to Distributaries exclusive of Head Sluices is Rs. 28,590 ~~26,050~~.

(2) The provision for excavating Distributary channels in the original Estimate only amounted to Rs 1/2/0 per acre

and totally inadequate provision for an undulating country. The cost as now estimated for in detail amounts to Rs. 45,405 ~~48,850~~ or Rs 4-4-8 ~~4-9-10~~ per acre. The total excess under this item is Rs. 34,405 ~~37,850~~

Right for 2 seasons only.

Thus we see that the excesses under the main heads mentioned are:—

(a) Excessive Hardness of Soil	Rs.	78,690 ~~77,000~~
(b) Excess rate for Masonry on Masonry works of Main Channels (about)	Rs.	20,950 ~~16000~~
(c) Excess on Masonry works and excavation of Distributary channels	Rs.	63,345 ~~64,800~~ 21,300
(d) Extending Cuttings		
	Rs.	184,285 ~~188,650~~
Add Establishment Tools & Plant — at 24½ per Cent	Rs.	47,890 ~~49,300~~
	Rs	2,32,100 ~~199,700~~

These ~~three~~ items account for a total of Rs. 2,32,100 ~~199,700~~ out of a Total excess Rs 2,68,800 ~~2,44,500~~

The other excesses come chiefly under the head of Maintenance of Head works. Rs 11132/0/0.

Of this Sum Rs 1752/0/0 may be taken as representing ordinary repairs while the Project works were under construction. The balance Sum Rs. 9380/0/0 is made up of Rs 7250/0/0. Repairs and Improvements to the Anicut.—

The Apron built as per original design was scoured in the flood of 1895 and the design was remodelled the Apron being altered to a sloping form and the whole Apron repacked.

A detailed estimate of the work done accompanies this Report.

There can be little doubt that the damage occurred because of the faulty design of the original work.

The sum of Rs 2130/o/o is the amount of the estimate for closing the spills beyond the right flank of the Ancient Lieing high level channels of the Main river, the necessity for this is explained further on.

This amounts to Rs 5970/o/o and is due principally to extra work lieing found necessary to the lump sum provision made for making approaches & removing Shoals. The cost of this is Rs 6738/o/o against lump Sum provision of Rs. 1900/= in the original Estimate

Excess on Construction of Head works.

~~Rs 1900/o/o~~

The principal is the Vemavaram Tank Raising & Revetting the Bund.

Unforeseen works.

This matter was fully explained in this office No 4514 P.E. 20-11-95 and the proposals approved by the Chief Engineer for Irrigation in his No III/2034/95 3-12-95. The extra cost of this work is Rs 6900/o/o.

The other items in which differences from the Original Estimate occur are of minor importance and need not be mentioned in the report but the details of all are shewn in the Estimates accompanying.

The original Estimate provided for the irrigation of 10,000 acres without the aid of Reservoirs for storage of any Kind.

General Scope of Project as compared with the original.

The Revised Estimate provides for irrigating 10580 acres and provides a limited amount of Storage by means of the Vemavaram Tank and Regulator.

The Regulator is 1/2 a mile below the tank and the full Supply level of the channel below this work is 2ft below F.S.L of the Tank.

The Storage capacity of the 1st 2 feet of the tank is 9.234 million C/ft and this it is anticipated will be found a most valuable Store on which to draw from time to time and will justify the slight increase of the irrigated area provided for. The channel as now designed tails into the natural Supply channel of Somavaram Tank which will be filled at times when the water can be spared from the crops on the channel and the irrigated area under which might be increased with Safety by Some 200 acres without increasing the Capacity of the Tank. The Tank is in a Site admirably Suited for economically increasing the storage capacity and the village Kurnam reports that in this village and the adjoining village of Damalur an area of 2000 acres is commanded by the tank. The Small Catchment of the tank has hitherto restricted extension of cultivation under it. No regular investigation of this promising Supplementary extension of the Project has been made: but I have inspected the Tank and there is no doubt that if the Ayacut under it proves as extensive as reported the economical extension of the tank capacity is feasible. The Project and Expenditure would be additional and Supplemental to the present project & estimates but being a very promising one, it has been here mentioned. The Munisyam Channel commands Several Small tanks in the villages of Rondur and Gummadidurru and will be able to keep these tanks well

Supplied by Feeder Channels. The cultivation under such tanks instead of being very precarious will thus be assured and Government as well as the Ryots will be benefited. Such benefits will not however appear in the financial returns of the project.

Financial Aspect

Acreage under the Sluices. —	10,580
Deduct Existing Wet cultivation —	700
Balance acres —	9,880

Note. (Some 500 acres can be cultivated under Pot Sluices in addition to the above if water supply is found to be sufficient but the above is set off against any area which may be left uncultivated under the Sluices)

Revenue

Wet Assessment on 9880 acres at 4/0/- —	39,520
Deduct upkeep @ 12/- per acre —	4,410
Net Profit —	35,110

Capital Account.

Total Expenditure on works —	~~5,06,000~~ ~~4,04,100~~
Add Establishment —	~~1,16,380~~ ~~1,11,000~~
Tools and Plant. —	~~7,590~~ ~~7,300~~
Total direct charges -	~~6,06,400~~ 16,19,970
Add leave and pension allowances of Establishment } -	16,345
14 P.C on Establishment charges }	~~15,615~~
Capitalized abatement Land Revenue —	12,485
Total Capital Expenditure —	~~6,34,500~~ 6,58,800

Revenue.

Return — 5 Per Cent — ~~7,587~~

It is to be added that the charges for establishment above allowed for are grossly in excess of those actually incurred and to be incurred on construction which will not ~~account~~ amount to more than Rs 50,000/- allowing for the works being completed in 1898-99.

Land Compensation and Capitalized value Land Revenue lost.

In the above estimated nothing has been allowed for Land Compensation and the Capitalized value of Land Revenue lost has been entered as in the original estimate.

As regards the latter item the area of land required to be taken up for the Project will amount to Some 800 acres and I think the loss of Revenue under this head must have been under-estimated as most of the land is cultivated dry. This might be referred to the Collector.

With regard to Land Compensation the attention of the Superintending Engineer has lately been drawn to the fact that the Land Compensation already settled has been paid for in Cash and the money debitted to the Project and to the allotments made for carrying out the works. As I understand that the waste lands under the project are all to be sold in public auction and Some have already been so sold at prices in excess of those usually given for compensation for Dry Lands, this proceeding seems sound from a financial point of view but the allotments asked for and given have been wholly based on the estimate which only provide for works and the Land Compensation paid cannot be met from these allotments.

As far as I can foresee the safety and efficiency of the works are threatened and seriously threatened in 2 different ways:—

Further works which may be necessary

(a) By the deepening of the high level channels and Spills of the Mennyarra River which pass round beyond the right flank of the Ancient and so leave it.

(b) By the silting up of the Under Tunnels in which the Droop is at all considerable (say 3 ft and upwards.)

The Ancient as has already been mentioned does not extend all the way across the river but only across the deep channel.

Spills round the Right flank of the Ancient.

The right flank rests on a "Lunka" in the river bed which is totally submerged in a high flood. The Condition of affairs before the Ancient was built was as follows:—

The high level channels or spills passing round on the right side of the lunka carried off the Surface drainage from part of the lands on the right of the river and also carried part of the river water in even moderate floods.

When the Survey was made and designs prepared the lowest level of the bed of any of these spills on a line in prolongation of the Ancient was + 46·00. Viz the Same as the proposed crest of the Ancient.

A Survey of the Spills made in March/96 is put up with the plans of the revised Estimate with a Section of the river in prolongation of the Ancient taken at the Same time, and a Section on the Same line taken in /93. When the original Survey was made, is superposed on this in dotted lines. The difference is very Striking

With regard to when this change took place I may

State that the deepening of the "middle channel" took place almost altogether prior to the construction of the Ancient. Considerable uneasiness has always been felt with regard to the high level channels and the Chief Engineer for Irrigation inspected these in June/95 and ordered a roughstone floor shewn on the Survey the across the middle Channel at "A" to be made which was done the same year. The year of the construction of the Ancient there occurred considerable scouring out both of the high level channel bed and of the bed of the Channel between the Ancient & the middle channel. The Season was one of abnormal rainfall floods were incessant & of long duration.

The following year Stone floors were thrown across all the spills and high level channels as shewn on plan by the Symbol "▭▭▭▭▭▭▭▭"

All the stone floors have been undisturbed except the one across the spill nearest the Ancient which was slightly displaced and the bed below & above it scoured.

A Section taken in February/97 shews that no alteration in the bed levels of the spills on the prolongation of the Ancient took place in 1896.

The Season (1896) was however one of great scarcity of water.

During the dry Season of 1896 a Rough stone bund was thrown across the head of the middle channel and also the head of the channel between this and the Ancient. The first bund Settled in the centre by percolation through the Sandy bed below and the Second Shewed

Signs of doing the Same. It is evident that neither are of much use. When the water level in the river is not more than about 2 ft over the Anicut all the water passing round the right of the Anicut out falls into the Main river at the "outfall to the middle channel."

Across the Channel here is a reef of hard gneiss. Thus there is no danger here of a retrogression of levels of the bed taking place so long as this continues to be the position and limits of the outfall.

The Channel approaching the outfall shews considerable erosion of banks as is natural considering the greatly increased work it has to do since the construction of the Anicut.

Revetment has been built this year to the bank on the left of the outfall. As this was being eroded and it is considered most desirable to retain the outfall on the rock, over which it now flows and not to allow it to cut away to the left as it tends to do.

The above description & the Survey and Sections shew the present State of affairs which it must be admitted disclose matter for Serious uneasiness. It is to be noted.

(a) That even if things remain in their present State the loss of water through the high level channels is very great. So great as to make it imperatively necessary to do Something to stop it.

(b) There is a danger of the deep bed of the river gradually altering and working off to the right of the present Anicut. The latter contingency does not appear to be imminent just at present but it is not altogether improbable & must not be lost sight of.

The loss of water which should be available for irrigation through the spills is a present fact and tends to become more and more Serious. For the current year it has been decided to throw Sand bunds across the spills to such a height that they will keep the water from passing round the right of the Anicut until the water level in the river reaches +49.00 (3 ft above Anicut Crest). They will then breach and must be again thrown up when the water falls.

This method requires constant Supervision, is liable to cause Scours in the beds of the spills & is also liable to failure by interference by subordinate Officials of the Government of H. H. the Nizam of Hydrabad in whose territories the spills are Situated. (The boundary between the Nizam's and British territory being the River Munnigaru) and a good deal of interference with works is liable to take place in consequence. The question of extending the Anicut must therefore be approached at an early date and I am inclined to think it will be found absolutely necessary.

I would Suggest that a tongue wall Similar to that on the right of the present Anicut but with shallow foundations should be carried on through the banks above +48.00 level with its top flush with the bank Surface & pitching, packed in for Some 3 feet in front and 8 ft in rear at ground level. Across the spills build anicuts with Crest le

one foot above that of the present work. These would have to be founded deep or have extension aprons as the beds of the Spills are Sand down to 10 feet below present bed. The cost of prolonging the Ancient and making the work absolutely Safe would probably amount to Some Rs 50,000/s/s.

The matter is one calling for early orders as delays will most probably occasion increased expenditure eventually.

Silting up of Under Tunnels.

The Under Tunnels which were completed in the dry season of /36 and in which the drop was at all considerable Evinced a great tendency to get choked with Sand and Silt.

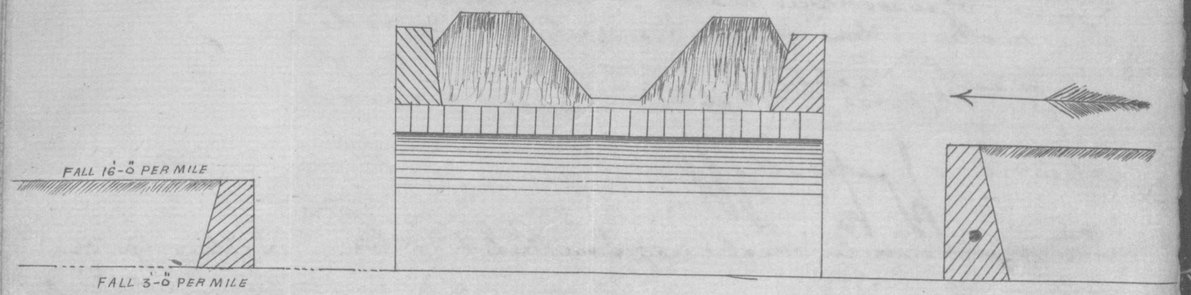
Slopes have been substituted for Drops walls in the later works but I am not very hopeful that the alteration will have the wished for effect.

The Sand is generally very coarse and mixed with small pebbles. Most of the "Vagus" are of the nature of torrents and roll along a lot of such material

The remedy would appear to me to lee to cut out a channel from the floor of the Under Tunnel with a fall of Say 3 ft per mile until the channel bed is excavated runs out into the natural bed of the Vagu.

The Under Tunnel would then be changed into a Drop.

The fall of the Vagus is Some 16 feet per mile and the cost of this remedy would not be prohibitive.



NOTE:—CHAIN DOTTED LINE SHEWS BED LEVEL OF PROPOSED CUTTING

Rough Inlets and Outlets in the Main Channel banks on the flanks of most of the Under Tunnels have been made for fear of the failure of these works to pass the cross drainage.

Lands in Hydrabad territory

It is most important to acquire control of the lunka on which the Ancient Right flank rests the inner Margin on the prolongation of the Ancient on which works may have to be built and of the lunkas immediately above the Ancient which these are in Hydrabad territory. These lands are all grazing lands only and should be taken over on Settled rent or otherwise for ever the Hydrabad Government. The cost would be Small Failing Some such arrangement I foresee constant interruptions of works, interference with conservancy operations

and friction with Hydrabad officials.

We have already suffered great inconvenience from stoppage of work on cross bounding the high level channels which led to a delay of months in execution of these important works.

In my opinion this matter is one that calls for early action.

Wm. Sellis 21/8/97
Captain R.E.
Executive Engineer
23.8.97 Kistna Northern Dn.

BB
Dn 21/8/97.

Noted by the Superintending Engineer II Circle on the above report.

1. Since the above report was written a Supplemental Estimate with a separate report for the excision of the channel amounting to Rs. 21,300 has been submitted by the Executive Engineer and has been incorporated in this Office with the financial statement and totals of this revised Estimate for the Project. The Estimate & a separate report is forwarded with this. The matter is one requiring early action as the cost and difficulties of the work will be increased if the excision is not allowed to be proceeded with this dry season (March to June 1898)

2. Experience has shown that during the past rainy season the under tunnels on the main channel have worked well. They become silted with slight rainfall but the action of the water passing through them after heavy rain has cleared them out. It appears ~~impossible~~ improbable that the alterations mentioned in the Executive Engineer's report will be found necessary.

3. The matter of Land Compensation has not been taken up in the Estimates now submitted. The reasons have been explained in the Executive Engineer's report. That Officer has now been ordered to submit a supplemental Estimate for the Compensation, as although it was originally reported by the Revenue Department that no money would be required for this purpose, the System of selling Vacant lands under a project now in force renders such payment necessary, as no lands are given in exchange. The Amount which will be required for this purpose will probably be Rs. 12,000.

Wm. Sellis
9-1-98
Offg: Supdg: Engineer II Circle.

16 Ks
123

SUPG. ENGINEER'S OFFICE
No. 244/1778
25 AUG. 97
P. W. D.
SECOND CIRCLE

Revised Estimate
Report
of
Muneyaru Project

2

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	REMARKS.
1	2	3	4	5	6	7
	Provincial ~~[illegible]~~ Irrigation					
	43- Minor and Navigation works ~~for which~~ ~~[illegible]~~ Capital & Revenue Accts are kept.					
	Capital Account.					
	Muneyiru Project					
	I Works					
	(1) Head Works					
3- Works	Anicut - Constructing	36,800				P.No. 1. S. 123 & 4
"	~~Do extending~~	~~21,300~~	Struck out vide E.E. note w/. 5/4/98			This plan in 3 sheets [illegible]
"	Under Sluices Constructing	8,950	~~67,050~~ 45,750			P.No. 1. S. No. 5
4- Buildings	Rest house at Polampalli	2,550				P.No. 1. S.No. 6
"	~~Store Shed at — do~~ Huts for lascars — do	1,360 (335)	~~3,910~~ 3,945			P.No. 1. S. No. 7
6. Maintenance	Head works	350				
"	Anicut Apron - repairs & impts	7,250				
"	Rest house at Polampalli	212				
"	Lascars sheds at — do	70				
"	Anicut repairs	1,120				
"	Forming sand banks across the spills on the R.S of the anicut	2,130	11,132			
				~~82,092~~ 60,827	~~82,092~~ 60,827	
	(2) Main Canals & Branches					
8- Regulators	Head Sluice. Constructing	10,900				P.No. 1. S.No. 5 & 11; [illegible]
"	Regulator at 11/0	2,630	13,530			
5- River & Hill Torrent works	Outlet at 10/0	2,020				P.No. 2. S.No. 24
	Surplus weir 14/1	850				P.No. 2. S.No. 25
"	Inlets & Outlets	5,400	8,270			P.No. 2. S.No. 27
	Carry over		21,800	-	~~82,092~~ 60,827	

STATION——
Dated——
2,000—15-5-95.

Executive Engineer.

R. No. 12

CIRCLE.

DIVISION—

DISTRICT

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.
of 189 –9 for *

* Here enter the Name and Description of work in full.

4

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
	Brought forward		21,800		~~82,092~~ 60827	
6- Other Cross drainage works	Under Tunnel 2/3 160'—	9,450				P.No 2 - S.No 5
—" —	—" — 1/7 210'—	2,330				P.No 2 - S.No 16
—" —	—" — 3/2 120'—	4,500				P.No 2 - S.No 17
—" —	—" — 4/4 330'—	3,150				P.No 2 - S.No 18
—" —	—" — 6/4 540'—	10,270				P.No 2 - S.No 19
—" —	—" — 7/5 330'—	11,000				P.No 2 - S.No 20
—" —	—" — 8/7 500'—	3,410				P.No 2 - S.No 21
—" —	—" — 11/2 —	1,490				Abandoned
—" —	—" — 11/7 495'—	2,700				P.No 2 - S.No 25
—" —	—" — 12/6 —	10,800				P.No 2 - S.No 27
—" —	—" — 15/4 380'—	2,610				P.No 2 - S.No 29
—" —	—" — 16/6 —	9,250				P.No 2 - S.No 31
—" —	—" — 18/4 635'—	3,890				P.No 2 - S.No 32
—" —	—" — 19/2 556'—	2,250				P.No 2 - S.No 33
—" —	—" — 20/1 430'—	2,170				P.No 2 - S.No 34
—" —	—" — 21/0 —	4,190				P.No 2 - S.No 35
—" —	—" — 21/6 595'—	2,110				P.No 2 - S.No 36
—" —	—" — 23/3 —	2,880				
—" —	—" — 25/3 330'—	3,080	91,530			
7- Bridges	Bridge at 1/0 —	2,320				P.No 2 - S.No 13
—" —	—" — 2/1 —	1,440				P.No 2 - S.No 14
—" —	—" — 3/6 165'—	1,180				
—" —	—" — 4/2 495'—	1,320				
—" —	—" — 5/3 —	1,330				
—" —	—" — 7/0 330'—	1,460				
—" —	—" — 9/2 450'—	1,420				P.No 2 - S.No 32
	Carry over —	10,470	1,13,330		60827 ~~82,092~~ 60827	

STATION—

Dated—

Executive Engineer.

(E. No. 126.)

CIRCLE.

DIVISION—

DISTRICT

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.

of 189 –9 for *

* Here enter the Name and Description of work in full.

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
7 Bridges (Cont	Brought forward	10,470	1,13,330		60827 ~~82,092~~	
—" —	Bridge at 12/4	1,600			60827	
—" —	—" — Do — 14/5	1,660				P.No 2 - S.No 2b
—" —	—" — Do — 16/2	1,660				P.No 2 - S.No 20
—" —	—" — Do — 17/6	1,770				
—" —	—" — Do — 19/6	1,520				
—" —	—" — Do — 23/6	1,330	20,010			
11. Buildings	Rest and stock shed at Vemavaram	200				
—" —	Rest Shed at Enchintla	1650				P.No 4
—" —	—" — Do — Gummadidurru	200	2,050			P.No 15
12. Earthworks	Excavating channel	1,92,000				P.No 2 - S.No 46/2
14. Tanks & Reservoirs	Vemavaram Tank improvements	6,850				P.No 16 - S.No 142
—" —	Vemavaram Tank sluice	50	1,92,000 6,900			
15. Miscellaneous	Demarcation Stones	2,000				
—" —	Mile and furlong Stones	370				
—" —	Cattle Crossing	150	2,520			
16. Maintenance	Repairs to Enchintla Rest house	80				
—" —	—" — Do — shed at Vemavaram	60	140			
				3,36,950		
					3,36,950	
	(3). Distributaries					
	Alurpad Branch					
3 Works	Head Sluice	560				P.No 3 S.No 1
—" —	Drop at 0/3-1/4	140	700			P.No 3 - S.No 3
	Carry over		700		~~19,042~~ 347777	

STATION

Dated

2,000—15-6-25.

Executive Engineer.

(E. No. 126.)

_____ CIRCLE.

DIVISION—

DISTRICT

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.

of 189 -9 for *

* Here enter the Name and Description of work in full.

6

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
	Brought forward		700		~~4,19,042~~ 3,97,777	
4- Earth work	Excavating Channel Rs 2,100-					P.No 3 S.No 2
—" —	—Do— branch 570					P.No 3 S.No 3/A
—" —	—Do— Side chl: 210	2,880	2,880			
				3,580		
	Vatsavai Distributary No-1					
3- Works	Head Sluice	530	530			P.No 4 - S.No 1
4- Earth work	Excavating Channel	490	490			P.No 4 - S.No 2
				1020		
	Vatsavai Distributary No 2					
3- Works	Head Sluice	~~430~~ 460	~~430~~ 460			P.No 5 - S.No 1
4- Earthwork	Excavating Channel	510	510			P.No 5 - S.No 2
				~~9770~~ 9770		
	Penuganchiprole Distributary					
3- Works	Head Sluice	850				P.No 6 - S.1
—" —	Drop No 1 at 0/3	380				P.No 6 - S.2
—" —	Drop —" 2 —" 0/4	370				P.No 6 - S.3
—" —	Drop —" 3 —" 1/5 1/4	320				P.No 6 - S.4
—" —	Drop —" 4 —" 2/1	370				P.No 6 - S.5
—" —	Drop —" 5 —" 3/0 1/2	290				P.No 6 - S.6
—" —	Drop —" 6 —" 3/4 1/4	300				P.No 6 - S.7
—" —	Drop —" 7 —" 4/3 1/2	390				P.No 6 - S.8
—" —	Drop —" 8 —" 5/1 1/2	290				P.No 6 - S.9
—" —	Drop —" 9+10+2 drops in the extension at 280 each	1,120	4,680			P.No 6 - S.10
4- Earth work	Excavating Channel	19,000	19,000			P.No 6 - S.11 & 12
5- Miscellaneous	Mile and furlong stones	160	160			
				23,840		
		Carry over		~~29,380~~ 23,840	~~4,19,042~~ 3,97,777	

STATION _____

Dated _____

2,000—15-5-95.

P for Plans
S for Sheet

Executive Engineer.

(E. No. 126.)

6.)

Circle.

Division—

District

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.

of 189 –9 for*

* Here enter the Name and Description of work in full.

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
	Brought forward			29410	397777	
				~~29,380~~	~~336,950~~	
				29410	397,777	
	Vemavaram Branch Chl:					
3- Works	Head Sluice	430				
"	3- Drops- each 300	900	1,330			
4- Earth work	Excavating Channel	600	600			
				1,930		
	Rabbavaram Branch & its branch					
3- Works	Head Sluice	560				P.N:7- S.N:1
"	Drop N:1 at 1/0	410				P.N:7- S.N:3
"	Drop " -2- " - 1/1	410				
"	Drop - " -3- " - 1/2	410				
"	Drop - " -4- " - 1 3/4	410				
"	Drop - " -5- " - 1 4/4	190				P.N:7- S.N:4
"	Drop - " -6- " - 2/3 1/2	240				P.N:7- S.N:5
"	Drop - " -7- " - 2/7 1/4	270				P.N:7- S.N:6
"	Drop - " -8- " - 3/1 1/4	270				
"	Drop - " -9- " - 0/3 Bodapad branch	180				P.N:7- S.N:7
"	Drop No 10 at 0/4 1/4 of do	180				
4- Earth work	Excavating Channel No 4,290		3,530			
"	do branch 610	4,900	4,900			P.N:7- S.N:2 & 2 A
				8,430		
	Muchintala Chl: No 1					
3- Works	Head Sluice	490	490			
4- Earth work	Excavating Channel	600	600			
				1,090		
		Carry overs		~~40,880~~ 40860	~~336,950~~ 397777	

Station

Dated

2,000—15-5-25.

Executive Engineer.

(E. No. 126.)

_____ CIRCLE.

DIVISION—

DISTRICT

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.
of 189 –9 for *

* Here enter the Name and Description of work in full.

8

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
	Brought forward—			40860	~~397777~~	
				~~40830~~	~~334950~~	
				40,860	397,777	
	Muchintala No. 2 and its branch					
	East Side Channel.					
3 Works	Head Sluice	490				
"	Drop No. 1 at 0/1-1/2	370				P.No.8 - S.No.1
"	Drop No. 2 " 0/2 1/2	370				P.No.8 - S.No.3
"	Drop No. 3 " 0/3 1/2	370				
4 Earth work	Excavating Chl: Rs 480		1,600			
"	do branch " 400					
"	do East Side Chl: 240	1120				
			1,120			P.No.8 - S.No.2
				2,720		
	Muchintala Chl: No. 3 &					
	West Side Channel.					
3 Works	Head Sluice	500				
"	Drop No. 1 at 0/1	340				P.No.9 - S.No.1
"	Drop No. 2 " 0/1 3/4	370				P.No.9 - S.No.3
"	Drop No. 3 " 0/2 3/8	370				P.No.9 - S.No.4
"	Drop No. 4 " 0/3	340				
"	Drop No. 5 " 0/3 3/4	340				
4 Earth work	Excavating Channel Rs 390		2,260			
"	" West Side Chl: " 160	550				P.No.9 - S.No.2
			550			
				2,810		
	Anegallapad Chl: No. 1					
	and its branches					
3 Works	Head Sluice	530				
"	Drop No. 1 at 0/4	470				P.No.10 - S.No.1
"	Drop No. 2 at 1/0-3/4	470				P.No.10 - S.No.3
	Carry over—	1,470		~~46360~~	~~336950~~	
				46,360	336,950	
				46360	~~397777~~	
					397777	

STATION_____

Dated_____

2,000—15-5-95.

Executive Engineer.

(E. No. 126.)

_____ Circle.

Division—

District

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.

of 189 –9 for *

* Here enter the Name and Description of work in full.

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
				46390	~~47,450~~	
3 Works/Cont	Brought forward	1,470		46,360	3,36,950	
—"	(1) Drop No 3 at 1/2 1/2	470		46390	3,77,777	
—"	(1) Drop No 4 " 1/4-0	420				P.No 10 - S.No 4
—"	(1) Drop No 5 " 1/6-0	420				
—"	(1) Drop No 6 " 1/7-1/2	360	3,130			P.No 10 - S.No 5
4. Earth work	Excavating Chl: 2,220					P.No 10 - S.No 2
—"	East Side Chl: 280					
—"	West side Chl: 160	2,660	2,660	5,790		
	Anegallapad Chl: Ex 2 and its Branch					
3 - Works	Head Sluice	470				
—"	3 Drops	1,000	1,470			
4 - Earthwork	Excavating Chl: 1,010					
—"	" Branch " 500	1,510	1,510	2,980		P.No 1 - S.No 1
	Anegallapad Chl: No 3 & R & L. Side Chls.					
3 - Works	Head Sluice	460	460			
4 - Earthwork	Excavating Chl: 60					
—"	Right Side " 535					
—"	Left Side " 325	920	920	1,380		
	Gummadedurru No 1 and its Branches					
3 - Works	Head Sluice	480				P.No 12 - S.No 1
—"	(1) Drop No 1 at 0/1	380				P.No 12 - S.No 2
	Carry over	860		~~56,510~~ 56,540	~~4,19,042~~ 3,77,777	

Station _____

Dated _____

2,000—15-5-95.

Executive Engineer.

(E. No. 126.)

_____ Circle.

Division—

District

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No. of 189 –9 for *

* Here enter the Name and Description of work in full.

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
	Brought forward	860	~~56,540~~	~~56,540~~ 56,540	~~419,042~~ 297,770	P. No. 12 – S No. 4
3- Works /Cm/	Drop No. 2 at 0/3	420				
"	Drop " 3 " 0/5½	420				
"	Drop " 4 " 0/7¼	420				P. No. 12 – S No. 5
"	Drop " 5 " 1/0¼	430				
"	Drop " 6 " 1/1¼	430				P. No. 12 – S No. 6
"	Drop " 7 " 1/6	200	3,180			
4- Earth work	Excavating Chl: 2350					P. No. 12 – S No. 2
"	" Side " 330	2,680	2,680	5,860		
	Gummadevvu No. 2 and its branches					
	Head Sluice	470				See P. No. 12 – S No. 1
3- Works	Drop No. 1 at 0/1	370				P. No. 13 – S No. 2
"	Drop No. 2 at 0/1-3/4	370				
"	Drop No. 3 at 0/2½	370				P. No. 13 – S No. 3
"	Drop " 4 " 0/3½	370				
"	Drop " 5 " 0/4½	370				
"	Drop " 6 " 0/5¼	370				
"	Drop " 7 " 0/7½	370	3,060			
4- Earth work	Excavating Chl: 1,680					P. No. 13 – S No. 1
"	" R.S. Chl: 400	2,080	2,080	5,140		
	Ramireddi branch					
	Head Sluice	480				
3- Works	6 Drops at 360 each	2,160	2,640			
"						
	Carry over			2,640	~~67,540~~ 67,540	~~419,042~~ 297,770

Station _____

Dated _____

2,000 –15-5-95.

Executive Engineer.

Executive Engineer.

(E. No. 126.)

Circle.

Division—

District

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.
of 189 –9 for *

* Here enter the Name and Description of work in full.

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	Remarks.
1	2	3	4	5	6	7
	Brought forward	—	2,640	~~67,510~~ 67,540	~~4,19,042~~ 397777	
4- Earthwork	Excavating Chl:—	1,650	1,650	4,290		
	Kandur Branch					
3- Works	Head Sluice —	480				
— " —	6. Drops at 420 each	2,520	3,000			
4- Earthwork	Excavating Chl:—	1,060	1,060	4060		
	Magalla Branch					
3- Works	Head Sluice —	520				
— " —	7 Drops at 480 each	3,360	3,880			
4- Earthwork	Excavating Channel	2,195	2,195	6,075		
5- Miscellaneous	Demarcation Pillars to above distributaries	890				
— " —	Pat. Sluices to do	950	1840	1840		
					~~83,775~~ 83,805	
					~~5,02,817~~ 481582	
	Add for Empressen works	—			~~5,183~~ 32.18	
	Establishment Charges 23%	—	—	—	~~5,06,000~~ 484800	484800
	Tools and Plant 1½%	—	—	—	~~1,16,380~~ 111504	111504
	Total direct Charges				~~7,690~~ 7696	7696
					6,29,370	604000
	Carry out				604000 ~~6,29,370~~	6,04000

Station—

Dated—

25/V/98

Executive Engineer.

(E. No. 126.)

______ CIRCLE.

DIVISION—

DISTRICT

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No. of 189 -9 for*

* Here enter the Name and Description of work in full.

No. 89 H N Superintending Engineer's Office II Circle

12

ESTIMATE FORM—Abstract—Classified.

Sub-head.	Names of Works.	Amount of Estimate for individual Works.	Total of Sub-heads.	Total for each Canal or Distributary.	Total of each Main head.	REMARKS.
1	2	3	4	5	6	7
	Brought forwd				~~604,000~~ ~~639,970~~	✓
	Capitalized abatement of Land Revenue				12389 ~~12,405~~	12389
	Leave and pension allowances 14% Pay				15611 ~~16,345~~	15611
	Total indirect charges				28000	
	~~Total indirect charges~~ ~~Grand total Rs~~				632,000 ~~658,800~~	28000
	Grand total					632,000

Sanctioned in G.O. No: 5181 D of 8-7-98 & registered as No: 49 of 1898-99

R.H.

[signature] Capt. R.E.

STATION——

Dated——

2,000—15-5-95.

9.1.98

Supdg [signature]

Executive Engineer.

(E. No. 126.)

1645

Second 12 Circle.

Division— Kistna Northern

District Kistna.

Revised Estimate

ESTIMATE FORM—Abstract—Classified.

To accompany the Detailed Estimate No.
of 189 -9 for* Munjeru Project

* Here enter the Name and Description of work in full.

No 89 KN
12.1.98

Superintending Engineer's Office II Circle
Bezwada 9th January 1898
12

From

Captain W. M. Ellis R.E.
Offg: Superintending Engineer
Second Circle.

To

The Chief Engineer
for Irrigation.

Sir,

Herewith I forward the Revised Estimate with plans for the Munjeru Project works.

The Original Estimates were sanctioned in G.O No 1089 dated 12th December 1893.

2. The Revised Estimates shew a very great excess over the Original — amounting to 71 per cent.

The Causes of the excesses are fully explained in the reports and Statements accompanying the Estimates. It will be noted that there is every prospect of a direct return of 5 Per Cent on outlay being realized in spite of the large excesses.

3. The difficulties with ryots in inducing them to cultivate under the works — experience

experienced early in the season are diminishing. Some 1300 acres were irrigated as first crop and gave an exceptional return to the Ryots who took water and 300 acres of 2nd crops are reported to be planted. Other ryots manifest eagerness to cultivate wet crops. This is highly satisfactory. Great credit is due to the Sub. Divisional Officer* who has taken much interest in starting cultivation and in inducing the ryots to use the water now available.

4. I strongly recommend that funds be allotted for completing the remaining works as early as possible as the prompt completion of distributaries will greatly assist in the rapid extension of cultivation.

5. The matter of extending the Anicut is also one which should be taken up early. Should it be possible to carry out this work during the next dry season, the project might be completed and the Sub-Division closed (at the end of next financial

* Mr N Rajagopaul Iyengar B.E.E

financial year.

I have the honor to be
Sir
Your Most Obedient Servant

Wm. Willis. Captain R.E.
Offg: Superintending Engineer
Second Circle.

early in the

CHIEF ENGINEER
FOR IRRIGATION
15 JAN 19
No. 16 KS

25p