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MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	2846	Press
B.P. No.		Mis.
Dated	25 - 10 -	4876
		195

Not to be folded or roughly handled

No. 378. Read the following endorsement of the Chief Engineer for Irrigation, dated Ootacamund, 11th August 1876, No. 228 W:—

From W. A. GOODCHAP, Esq., District Engineer, Kurnool, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Camp at Cumbum, 30th July 1876, No. 33.

At the request of Major Hasted I have the honor to forward a certified copy of his memorandum on the improvement of the water-supply and drainage of Cumbum Town with sketch.

MEMORANDUM.

1. The following remarks which have been entered in the Reports of the Committee will illustrate the scheme proposed for the improvement of the water-supply and drainage of Cumbum Town.

The subject of improving the water-supply of the town has been considered in connection with that of the proposed improvements of the irrigation channels from the tank, for which estimates are now being prepared under the District Engineer. Drinking water is now obtained from the Nuckkalagundi and Pedda Cumbum channels which run through the town, and from the Marlapaud channel which runs round the lower side of it, and under no circumstances can it be expected that the water thus supplied will be fit for human consumption.

A project for providing separate drinking water channels has been under consideration, and plans and estimates, which unfortunately have not been laid before us, were prepared. It is understood, however, that the supply-channel was brought to the town on much the same line as that we have adopted. We propose to cut a channel through the high ground north of the road from near the tank calingulah, to take the place of the present Nuckkalagundi channel, this channel will be cut at a short distance above the town, and from it will be cut covered conduits down each of the two main streets of the town, supplying masonry basins, of which probably ten or twelve will be required. At convenient places the conduits can probably be cut in the rock in most parts, but will always be lined with cement, as also should the basins be. After supplying the conduits the new channel will tail into the Nuckkalagundi channel a short distance from the toll bar on the Markapur road.

The Nuckkalagundi channel will then be filled in through and in the neighbourhood of the town, and the Pedda Cumbum channel, which runs on level of about 10 feet below the Nuckkalagundi channel will be covered over with slabs set in cement, through the town, so that the people will not be able to make use of the water. Suitable gratings will have to be fixed at the commencement of the covered portion of the channel.

The Marlapaud channel will be cut off near the lower part of the town, and tailed into a drainage falling direct into the Gundlakamma, the lower portion of the channel to the east of the town being supplied by a new head from the Pedda Cumbum channel taken off to the east of the town. Outfall drains for the surface drainage of the town must then be provided direct to the Gundlakamma.

The improvements to the irrigation channels do not otherwise affect the town as regards its water-supply. The drainage can at little cost be made all that is necessary.

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The improvements to the irrigation channels do not other than to use stones of sufficient regards its water-supply. The drainage can at little cost be improved.

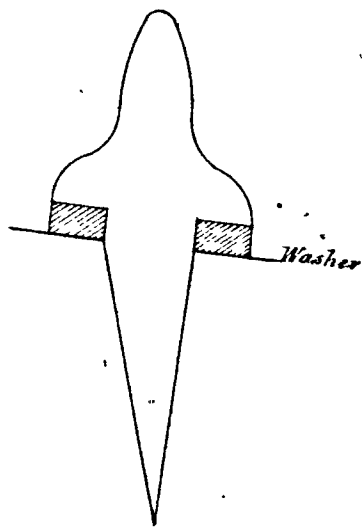
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The town is constructed on a tongue of rock having a very considerable fall from north to south and from the southernmost end there is a fall of several feet to the Gundlakamma. If V shaped side-drains are constructed to the roads, and the hollow places in which water now stagnates filled up, the surface drainage will freely run off. The accompanying sketch map shows the channels referred to above.

2. As regards the irrigation, the existing channels can be utilized, the original scheme for improving them being revised in accordance with the suggestions of the Chief Engineer for Irrigation. The incomplete state of the levels at present precludes the possibility of my laying out the channels on paper, and I can only therefore detail the points which, I think, need attention in preparation of the project, as follows.

3. Plans of the existing sluices, one near the calingulah and two in the other bund are not forthcoming, and it is necessary that accurate plans should be made. The regulation at present effected by plugs worked by chains from a platform detached from the bank is very defective, there being considerable leakage when the sluice is supposed to be closed. This may be due to the plugs having become worn, but as they cannot be got above water this is not certain. Unless the plugs can be made to fit accurately so as to enable the discharge to be regulated it will be necessary to alter the sluices so that they may be opened or closed by means of a shutter to be raised by screw gearing. This will be an expensive work, and therefore if the plugs can be made to fit it would be better to utilize them than to put up shutters.



4. The calingulah which has answered well for so many years is 230 feet in length, but is furnished with upright stones which reduces the waterway by 30 feet; these dam stones are never used, and should be removed by being cut off at the level of the crest of the calingulah, thus reducing the obstruction to the flow of water. (The flood last year rose to the highest point ever recorded, 5 feet above the crest of calingulah). The upper apron of rough stone covered with a thick layer of concrete needs but little repair; the concrete in places has been broken off, and here it should be renewed.

The lower apron has had the concrete covering almost entirely removed, but I think it needs renewal; where the stones have been displaced they can be replaced, the interstices between them being carefully packed with small pieces; where the retaining wall is curved, it may be well to set the apron stones, which are slate set on edge in fine concrete.

5. The new Nuckkalagundi channel should be taken off immediately at the calingulah, the water level being regulated by a masonry dam to be built

escape channel. This will probably best be placed on a ledge of rock which crosses the channel, the bed of the escape channel being about 193.33, and the bed of the Nuckkalagundi channel near the toll gate on the Markapur road being 192.09, there will be an available bed fall of nearly 1 foot per mile which will probably do. The discharge of the channel will be regulated by amount of cultivation to be provided for under the channel and the quantity required for the supply of the town. I think that $2\frac{1}{2}$ cubic yards per hour per acre will be sufficient for the cultivation, and an allowance of 25 gallons per head of population in twenty-four hours. The channel will run along the north side of the escape channel, water being held up by a masonry wall of sufficient height to ensure the requisite head being maintained at the sluice; when the tank discharges over the calingulah the flood water will be over this wall and its section must therefore be strong.

The head sluice will most conveniently be placed under the road immediately below the top, which is near the calingulah, a small work of one vent will suffice. From the calingulah to the point where the Pedda Cumbum channel crosses the escape channel the latter must be embanked.

6. The Pedda Cumbum channel will have to be laid out to supply the full extent of old irrigation only at the rate of $2\frac{1}{2}$ cubic yards per hour per acre. It is believed that the existing channel is sufficiently wide, but it may be improved by cutting off some awkward curves; the fall in the upper portion of the channel where the bed is rocky is heavy; when once the channel reaches the cultivated land it will be well to give it a uniform reduced fall.

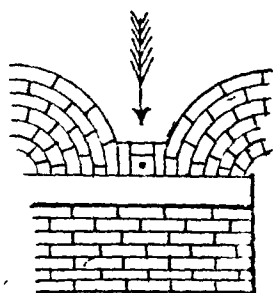
I think it will be well to make arrangements for supplying the Katwa Kalwa channel through the Gundlakamma in dry weather from the head of the Pedda Cumbum channel. There is a sort of escape a little below the sluice, which might probably be converted into a head of supply; where the channel crosses the escape channel from the calingulah a masonry anicut must be constructed over which the escape water can pass in floods. A section something like that shown in the margin would answer the crest of the dam being at full supply level, so that if desirable water can be let down from the Nuckkalagundi sluice to supplement the supply given to the Katwa Kalwa from the Gundlakamma.



The escape channel must be embanked down to this anicut; at the north end of the anicut a head sluice should be constructed to the channel, and the water will then be perfectly under control. Up to the head of the Marlapaud channel the existing channel needs only rectification; here a head sluice will be required to the Marlapaud channel; and from this point the channel which runs through the town has to be covered over to prevent its being used for drinking purposes. These are now places where it will be difficult to procure stones of sufficient

length to slab it over, but I believe the fall may be so regulated as to ensure a sufficient discharge with a width that can easily be covered. In places where rock is not met with the sides of the channel through the town are formed of dry rough stone walls; where the channel has to be contracted stone in chunam side walls should be constructed, and the covering slabs should be set in chunam to prevent sand and dirt washing into the channel; at the commencement of the covered portion of the channel a grating must be fixed to prevent the channel being stopped up by an accumulation of rubbish. Below the town the channel will throw off another branch to supply the lower portion of the Marlapaud channel; this branch will intercept drainage from some portion of the town, and if the fall of ground is not sufficient to enable it to be laid out with a bank only on the lower side provision must be made for inlets. Small rough stone inlets would be sufficient, but as the town is so near, and boys cannot resist the temptation to pull up stones in the channels to look for fish, I think the outer surface of all inlets or outlet walls near the town should be of stone in chunam. After the head of the Marlapaud channel, the channel needs only to be properly laid out, head sluices to the irrigating channels supplied, and inlets

to take the surplus from the irrigation under the Nuckkalagundi channel provided. These minor head sluices should be of the simplest description, probably a straight wall with revetments at each end will be as cheap as any thing; something like the sketch in the margin.



The sluice channel water is at present taken across the Kutwa Kalwa in places, by means of palmirah aqueducts, to irrigate a strip of land below the latter channel which is too high to get water

otherwise. I think this irrigation should be given up, that the Pedda Cumbum channel should irrigate only the land lying between it and the Kutwa Kalwa channel, and that the drainage should be allowed to pass freely into the lower channel. Masonry inlets being provided only where the water enters the channel with sufficient velocity to scour out the soil. As this channel will receive drainage from above, the remarks of the Chief Engineer for Irrigation with reference to provision being made for the escape of flood water, at points, when the channel is to be narrowed will have to be attended to.

7. The old Marlapaud channel will, by the arrangements proposed above, be cut in two, the portions south and north of the town being supplied by separate head sluices. That portion of the channel which runs round the lower portion of the town will be done away with, and the drainage will then have a free escape towards the Gundlakamma. I propose that two defined drainage channels should be made one on each side of the road; these would tend to keep the outside of the town much drier and probably healthier.

8. The Chinna Cumbum channel I need say little about, the upper portion which I have seen is urgently in need of repair, it should be taken up and remodelled according to the instructions of the Chief Engineer for Irrigation.

9. The Gundlakamma down to the Sekrail anicut it has been decided to retain, as it is, when the Kutwa Kalwa channel is restored, the water will be sufficiently held up by the anicut to ensure a good supply, and no earthen dam or raising of the anicut should be allowed. It is thought that if the level of the water in the Gundlakamma can be kept to about the level of the crest of the anicut, and rank vegetation in the water removed, there will be nothing objectionable in the river thus ponded back. To keep the water to this level, even in floods, it is proposed to construct powerful scouring sluices with shutters worked by screw gearing in the old course of the river between the anicut and the Kutwa Kalwa head. With the information available I am not able to say exactly what dimensions will be necessary for these sluices. But after the upright stones are removed from the calingulah I calculate that the flood discharge water running 3 feet over the anicut will give 4,000 cubic feet per second, of which it will be necessary to discharge about 2,700 cubic feet per second by the sluices, the remainder being discharged over the anicut. This could be effected by a sluice with six openings of 6 feet span, the water-way required being 270 square feet. The road from Cumbum towards Kurnool would be carried over this sluice.

10. The Kutwa Kalwa channel will require a head sluice, this can be constructed so that the road will pass over it, and this sluice and those to the other main channels should be furnished with shutters and raised by screw gearing. The channel can be much improved by cutting off several bends in it, and will be laid out otherwise as directed by the Chief Engineer for Irrigation. Probably a bund on the upper side will be unnecessary, and as the fall below the channel to the Gundlakamma is very considerable, there will be no difficulty in providing for the discharge of drainage water at those points where it is advisable to reduce the dimensions of the channel.

11. The estimates for the water-supply of the town might be prepared separately from those for the channels above described. The supply will be taken off the Nuckkalagundi channel at two places, the conduits being arranged to run down the two main streets of the town. The levels for this work must be most accurately taken. The conduits will be of stone in cement throughout, and in the town must be, as it appears to me, carried under the middle of the street; in some parts rock will be met with in which a conduit can be excavated, but throughout it must be lined with cement. The basins to which they lead, the positions of which should be fixed in communication with the Head Assistant Collector, should be of stone in chunam lined with cement; the openings of the conduits with the basins being protected by gratings, the shape of the basins should be circular, and the dimensions can be suited to the positions in which they are constructed. They should be surrounded by a paving of stone in cement, which should be drained into one of the side-drains of the street. As there will be a free outfall from the lowest basins into the drains leading to the Gundlakamma, the water can be kept always trickling through the conduits, and the supply will thus be always fresh.

12. The drainage of the town is connected in some measure with the water-supply, and I think it will be well to estimate for it at the same time, especially as the Municipality is to be abolished. It is only with the surface street drainage however that we need concern ourselves; the house drainage being a sanitary arrangement which, in the absence of a Municipality, will receive the attention of the Local Fund Board. The streets have a good out-fall, and all that I think is necessary

*Proceedings of the Madras Government, Public Works Department,
25th October 1876. No. 2,846.*

is to construct V shaped side-drains, which I suggest should be of slabs of stone procurable on the spot, set in chunam; the levels for these must be carefully taken and a free out-fall provided into one of the channels above referred to. In intimate connection with the drainage of the town is the filling up of holes in which rain water collects and stagnates; this work, I think, should be provided for by the Local Fund Board. The town has better facilities for drainage than most towns I am acquainted with, and the expense of carrying off the surface water should not be considerable.

13. Returning to the irrigation under the tank, it may be necessary for me to call attention to conservancy arrangements. As I understand the subject, there are fourteen nirgantis at present employed, not paid in money, but allotted certain Inam lands, for opening the sluices, &c.; certain portions of the channels are supposed to be maintained by landholders to whom Inam lands were granted for the labor they supplied, and the other channels and parts of channels are supposed to be maintained by kudimaramut. It would appear however that no one ever took the trouble to see that the work was done, and as a matter of course the Inamdars did nothing and the channels deteriorated yearly. The state at which they lately arrived came to notice only because they supplied drinking water to a town where the death-rate was found to be about three times that in most towns of the Presidency; and I may say that I have never seen anything more filthy and abominable than the channels; when I reached Cumbum, levels not being forthcoming, it was decided by the Committee to clear the channels of vegetation and mud without them; and this has now been nearly completed at an expense of over Rupees 5,000. A conservancy establishment has been sanctioned by the Board of Revenue of thirty-four nirgantis on pay of Rupees 3 a-month, who will be supposed to look after the channels and keep them in order. The superior officers of the Revenue Department are supposed to see that they do their work. I cannot consider that such arrangements are likely to be effective. The tank is one of that description that requires the distributing channels as well as the tank bund and sluices to be in charge of the professional department, and I think a conservancy establishment should be provided for in the Irrigation Budget. When the sluices are provided with proper shutters there will be the more need for proper supervision.

I suppose of course that the system of granting Inams for services not rendered will not be continued.

The establishment I would propose is one Superintendent on Rupees 30 a-month, four lascars at Rupees 6, and four lascars at Rupees 5. Rupees 864 a-year.

The average revenue from the tank is Rupees 51,794, and by proper regulation of the water I have little doubt that the area of irrigation may be increased, and that the health of the town will be improved.

CAMP, CUMBUM,
28th July 1876.

(Signed) J. O. HASTED, Major, R.E.,
Offg. Superintending Engineer.

P.S.—I think that cross sections of the channels at 100 feet apart are unnecessarily numerous, and that if they are taken at 300 feet apart it will be sufficient. The longitudinal section also if plotted on the same scale as the existing

*Proceedings of the Madras Government, Public Works Department,
25th October 1876. No. 2,846.*

sketch map will be too small, a larger survey will be necessary, and it might be on such a scale as to enable the longitudinal and cross sections to be conveniently plotted on separate sheets of Imperial paper.

(True Copy.)

CAMP, CUMBUM,
30th July 1876.

(Signed) W. A. GOODCHAP,
District Engineer.

SUBMITTED for the information of Government with the following remarks:—

Memorandum, paragraph 3.—If the details of the plug-stones and head of the sluices can be ascertained, new plugs with leather washers might be made up and substituted for the old plugs. The leather under pressure would probably almost entirely stop leakage, and the lowest thickness of leather might project 2 or 3 inches all round beyond the shoulder of the plug. A sketch of a plug and of simple means for working it will be found attached to inspection notes of a tour in the Cuddapah District and will probably be applicable to these sluices. The leather washers however will, it is thought, need to be from 1½ to 2 inches thick, and the fastenings securing the layers should be distributed so as not to correspond in successive layers. It will be advisable to retain the old form of sluice head if possible.

Proceedings, Madras Government, No. 1,300,
dated 24th May 1876.

2. *Paragraph 13.*—It will be seen that Major Hasted recommends the abolition of Inams for the maintenance of the channels under the tank, and the sanction of a regular establishment of one Superintendent and eight lascars to manage the distribution at a cost of Rupees 864 yearly, or about 1½ per cent. on the revenue. It is believed that with the improved means of regulation contemplated, Major Hasted's proposal will be likely to answer, but much will depend upon the qualifications of the Range Officer who would have to introduce and maintain efficient arrangements. Some 2,500 to 3,000 Rupees annually on the average ought to be spent on the tank and channels in order to keep them in good order, and probably the Inams would go a good way towards meeting the cost.

(Signed) JOHN MULLINS, Lt.-Col., R.E.,
Chief Engineer for Irrigation.

No. 379.

ORDER THEREON, 25th October 1876, No. 2,846.

IRRIGATION, No. 42.

RECORDED and communicated to the District Engineer, Kurnool, and to the Assistant Engineer on special duty at Cumbum, who will give careful consideration to the remarks contained in the foregoing memorandum in designing the improvements required to the Cumbum tank and channels. The remarks of the Chief Engineer for Irrigation on a means of improving the regulation of water at the tank sluices should also be considered.

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Proceedings of the Madras Government, Public Works Department,
25th October 1876. No. 2,846.

2. The questions raised in paragraph 13 of the memorandum will be referred to the Revenue Department for consideration.

(True Extract.)

(Signed) G. W. WALKER, Major-General, R.E.,
Secretary to Government.

To the District Engineer, Kurnool,
with copy of Procs. of Madras Government, 24th May 1876, No. 1,300.
.. Assistant Engineer, on Special Duty, Cumbum, with ditto.
To Major Hasted, R.E., with ditto.
To the Chief Engineer for Irrigation.
.. Revenue Department.
.. Public Department.

Endorsement of the Chief Engineer for
Irrigation W. H. d. 11 August 1876.

I conclude the details FOR ORDERS. Without the levels I could give
of the scheme for the improvement no opinion of value on these details
of the Cumbum water supply what may be clear to an officer of Major
& drainage - has the approval Hasted's experience on the spot is not so to
of the Chief Engineer for anyone at a distance without levels be
irrigation - tho' this is not *W. H. d. 20/10*
clearly stated. *Colonel*
His Memo regarding Joint Secretary to Govt. P.W.D.
Mugstones will be com.
to Major Hasted.

The question raised of forfeiture of claims & the
introduction of a special establishment for the
management of the irrigation at Cumbum should
be referred to the Revenue Dept.

I conclude that the Report of the forw. of Major
Hasted's Memo is an extract with shortly be before for
then orders will be issued *W. H. d.*

FOR ORDERS.

11

No 33.

131

District Engineer's Office
Camp Bumbum
30 July 1876

From The District Engineer
Kurnool
To The Chief Engineer
for Irrigation

Sir,

enclosures

Copy of Memo-
randum by
Major Hasted.
Sketch.

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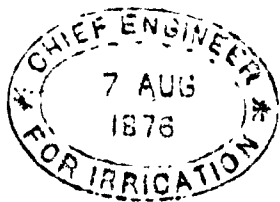
I have the honor to be
Sir

Your Most Obedient Servant

A. P. G. G. G.
District Engineer

7650

8.0. 24 May/76. No 1300



P.W.D.
240076
N^o 7650

1876-77
From Mr. District Engineer
to Mr. Chief Engineer
for Irrigation
dated 30.3 July 1876
Re: 1. 2. 3.
Enc. 2. 1. 2.
Cumbum Town.
Submits sketches
and elevations of
the improvement
the water supply and
drainage of:-

N^o 378

Ci-14-8-76 Ptd 17-10-76.
O.K. Shew 14 Aug.

Mr. C. W. H. W. W.

15-1/2

Memorandum

1. The following remarks which have been entered in the Reports of the Committee will illustrate the Scheme proposed for the improvement of the water supply and drainage of Cumbum Town.

The subject of improving the water supply of the town has been considered in connection with that of the proposed improvements of the Irrigation channels from the Tank, for which estimates are now being prepared under the District Engineer. Drinking water is now obtained from the Nuckkalagundi and Pedda Cumbum Channels, which run through the town, and from the Marlapand Channel, which runs round the lower side of it, and under no circumstances can it be expected that the water thus supplied will be fit for human

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1876-77
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C. H. S. H.

17
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The improvements to the irrigation channels do not otherwise affect the town as regards its water supply. The drainage can at little cost be made all that is necessary. The town is constructed on a tongue of rock having a very considerable fall from N. to S. and from the southern most end there is a fall of several feet to the Gemslacamma. If V-shaped side drains are constructed to the roads, and the hollow places in which water now stagnates filled up, the surface drainage will freely run off. The accom-

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1946/7

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broken off and here it should be renewed.

The lower apron has had the concrete covering almost entirely removed, but I don't think it needs renewal, where the stones have been displaced they can be replaced, the interstices between them being carefully packed with small pieces, where the retaining wall is curved it may be well to set the apron stones, which are slate slabs set on edge, in fine concrete.

5. The new Kuckhalagundi channel should be taken off immediately below the Calingulah the water level being regulated by a masonry dam to be built across the escape channel. This will probably best be placed on a ledge of rock which crosses the channel, the bed of the escape channel being about 193.33, and the bed of the Kuckhalagundi channel near the Tollgate on the Markaper Road ~~being~~, being 192.09, there will be an available bed fall of nearly 1 foot

per mile which will probably do. The discharge of the channel will be regulated by amount of cultivation to be provided for under the channel and the quantity required for the supply of the town. I think that $2\frac{1}{2}$ Cyps. per hour per acre will be sufficient for the cultivation and an allowance of 25 gallons per head of population in 24 hours. The channel will run along the north side of the escape channel, water being held up by a Masonry wall of sufficient height to ensure the requisite head being maintained at the sluice, when the Tank discharges over the Calingulah, the flood water will be over this wall and its section must therefore be strong.

The Head Sluice will most conveniently be placed under the Road immediately below the Slope, which is near the Calingulah, a small work of 1 vent will suffice. From the Calingulah to the point where the repair

235
Pedda Cumbum channel crosses the escape channel, the latter must be embanked.

6. The Pedda Cumbum channel will have to be laid out to supply the full extent of old Irrigation only at the rate of $2\frac{1}{2}$ Cyps per hour per acre. It is believed that the existing channel is sufficiently wide, but it may be improved by cutting off some awkward curves; the fall in the upper portion of the channel, where the bed is rocky is

heavy; when once the channel reaches the cultivated land it will be well to give it a uniform reduced fall. I think it will be well to make arrangements for supplying the Kathwa Kalwa channel through the Gundla Cunnia in dry weather, from the head of the Pedda Cumbum channel. There is a sort of escape a little below

the sluice, which might probably be
converted into a head of supply; where
the channel crosses the escape channel
from the Calingulah, a Masonry
anicut must be constructed over
which the escape water can pass in
floods. A section something like
that shown in the Margin would answer
the crest of the dam being at full
supply level; so that if desirable water
can be let down from the Kuchhalafundi
sluice to supplement the supply
given to the Katwa Kalwa from the
Gandlacumina.

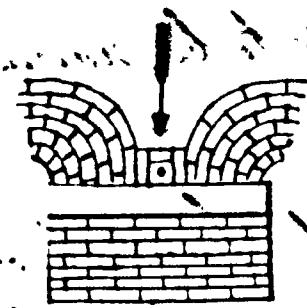
The escape channel must be
embanked down to this anicut, at the
North end of the anicut a Head sluice
should be constructed to the channel,
and the water will then be perfectly under
control. Up to the head of the Marlapand
channel the existing channel need only
rectification, here a head sluice will



be required to the Marlapand channel,
and from this point the channel which
runs through the town has to be covered
over to prevent its being used for
drinking purposes. There are now plans
where it will be difficult to procure stones
of sufficient length to slab it over,
but I believe the fall may be so
regulated as to ensure a sufficient
discharge with a width that can easily
be covered. In places where rock is not
met with the sides of the channel
through the town are formed of dry rough
stone walls; where the channel has to
be contracted stone in Chunan side
walls should be constructed and the
coosing slabs should be set in Chunan
to prevent sand and dirt washing into
the channel, at the commencement of
the covered portion of the channel a
grating must be fixed to prevent the
channel being stopped up by an

accumulation of rubbish. Below the town the channel will throw off another branch to supply the lower portion of the Marlapand channel; this branch will intercept drainage from some portion of the town, and if the fall of ground is not sufficient to enable it to be laid out with a bank only on the lower side, provision must be made for inlets. Small rings to stone inlets would be sufficient, but as the town is so near, and boys cannot resist the temptation to pull up stones in the channels to look for fish, I think the outer surface of all inlets or outlet walls near the town should be of stone in Chunanam. After the head of the Marlapand channel the channel needs only to be properly laid out, supplied, and inlets to take the surplus from the Irrigation under the Vackhalagundi channel provided.

77
These Minor Head Sluices should be of the simplest description, probably a straight wall with revetments at each end, will be as cheap as any thing, something like the sketch in the margin. The Sluice channel water is at present taken across the Kutwa Kalwa in places, by means of palamirah aqueducts, to irrigate a strip of land below the latter channel which is too high to get water otherwise. I think this irrigation should be given up, that the Pedda Lumbard Channel should irrigate only the land lying between it and the Kutwa Kalwa channel, and that the drainage should be allowed to pass freely into the water channel. Masonry inlets being provided only when the water enters the channel with sufficient velocity, to scour out the soil. As this



Lower
Lm.

Channel, will receive drainage from above the remarks of the Chief Engineer for Irrigation with reference to provision being made for the escape of flood water at points when the channel is to be narrowed will have to be attended to.

7. The old Marlapad channel will by the arrangements proposed above be cut in two, the portions S & N of the town being supplied by separate head sluices. That portion of the channel which runs round the lower portion of the town will be done away with and the drainage will then have a free escape towards the Gundlacumma. I propose that 2 defined drainage channels should be made one on each side of the road; these would tend to keep the outside of the town much drier and probably healthier.

8. The Chinna Gumbam channel I need say little about the upper portion which I have seen is urgently

in need of repair, it should be taken up and remodelled according to the instructions of the Chief Engineer for Irrigation. 9. The Gundlacumma down to the Sekrail ancient, it has been decided to retain as it is, when the Kutwa Kalwa channel is restored, the water will be sufficiently held up by the ancient to ensure a good supply, and no earthen dam or raising of the ancient should be allowed. It is thought that if the level of the water in the Gundlacumma can be kept to about the level of the crest of the ancient, and rank vegetation in the water removed, there will be nothing objectionable in the river thus ponded back. To keep the water to this level, even in floods, it is proposed to construct powerful scouring sluices with shutters worked by screw gearing in the old course of the river between the ancient, and the Kutwa Kalwa head. With the information available

Channel will receive drainage from above the remarks of the Chief Engineer for Irrigation with reference to provision being made for the escape of flood water at points when the Channel is to be narrowed will have to be attended to.

7. The old Marlapad Channel will by the arrangements proposed above be cut in two, the portions S & N of the town being supplied by separate head sluices. That portion of the Channel which runs round the lower portion of the town will be done away with, and the drainage will then have a free escape towards the Gundlacumma. I propose that 2 defined drainage Channels should be made one on each side of the road; these would tend to keep the outside of the town much drier and probably healthier.

8. The Chinna Kumbar Channel I need say little about the upper portion which I have seen is urgently

298
in need of repair, it should be taken up and remodelled according to the instructions of the Chief Engineer for Irrigation.
9. The Gundlacumma down to the Sekrail Anicut, it has been decided to retain as it is, when the Kutwa Kalwa Channel is restored, the water will be sufficiently held up by the anicut to ensure a good supply, and no earthen dam or raising of the anicut should be allowed. It is thought that if the level of the water in the Gundlacumma can be kept to about the level of the crest of the anicut, and rank vegetation in the water removed, there will be nothing objectionable in the river thus ponded back. To keep the water to this level, even in floods, it is proposed to construct powerful scouring sluices with shutters worked by screw gearing in the old course of the river between the anicut, and the Kutwa Kalwa head. With the information available

Channel, will receive drainage from above the remarks of the Chief Engineer for Irrigation, with reference to provision being made for the escape of flood water at points when the Channel is to be narrowed will have to be attended to.

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I propose that 2 defined drainage Channels should be made one on each side of the road; these would tend to keep the outside of the town much drier and probably healthier.

8. The Chinna Gumma Channel I need say little about the upper portion which I have seen is urgently

in need of repair, it should be taken up and remodelled according to the instruction of the Chief Engineer for Irrigation.

9. The Gundlacumma down to the Sekrail ancient, it has been decided to retain as it is, when the Kutwa-Kalwa Channel is restored, the water will be sufficiently held up by the ancient to ensure a good supply, and no earthen dam or raising of the ancient should be allowed. It is thought that, if the level of the water in the Gundlacumma can be kept to about the level of the crest of the ancient, and rank vegetation in the water removed, there will be nothing objectionable in the river thus ponded back. To keep the water to this level, even in floods, it is proposed to construct powerful scouring sluices with shutters worked by screw gearing in the old course of the river between the ancient, and the Kutwa Kal head. With the information available,

I am not able to say exactly what dimensions will be necessary for these sluices. But after the upright stones are removed from the Calingulah. I calculate that the flood discharge water running 3 feet over the anicut will give 4000 Cft. per second, of which will be necessary to discharge about 2700 Cft. per second by the sluices, the remainder being discharged over the anicut. This could be effected by a sluice with 6 openings of 6 feet span, the water way required being 270 Sq. ft. The road from Cumbum towards Kurnool would be carried over this sluice.

10. The Kutwa Kalwa channel will require a head sluice. This can be constructed so that the road will pass over it, and this sluice and those to the other Main Channels should be furnished with shutters and raised

319
by screw gearing. The channel can be much improved by cutting off several bends in it, and will be laid out otherwise as directed by the Chief Engineer for Irrigation. Probably a bund on the upper side will be unnecessary, and as the fall below the channel to the Gundlamma is very considerable there will be no difficulty in providing for the discharge of drainage water at those points where it is advisable to reduce the dimensions of the channel.

11. The estimates for the water supply of the town, might be prepared separately from those for the channels above described. The supply will be taken off the Nuck Kalagundi channel at two places, the Conduits being arranged to run down the two Main Streets of the town. The two
this work must be most accurately

taken. The conduits will be of stone in Cement throughout and in the town must be as it appears to me, carried under the middle of the street, in some parts rock will be met with, in which a conduit can be excavated, but throughout it must be lined with Cement. The basins to which they lead, the positions of which should be fixed in communication with the Head Assistant Collector, should be of stone in Chunan lined with Cement, the openings of the conduits with the basins being protected by gratings, the shape of the basins should be circular and the dimensions can be suited to the positions in which they are constructed. They should be surrounded by a paving of stone in Cement, which should be drained into one of the side drains of the street. As there will be a free outfall from the lowest basins into the drains

330
leading to the Gundlacamma, the water can be kept always trickling through the conduits, and the supply will thus be always fresh.
12. The drainage of the town is connected in some measure with the water supply and I think it will be well to estimate for it at the same time; — especially as the Municipality is to be abolished. It is only with the surface street drainage however that we need concern ourselves; the house drainage being a Sanitary arrangement which in the absence of a Municipality will receive the attention of the Local Fund Board. The streets have a good outfall and all that I think is necessary is to construct V-shaped side drains, which I suggest should be of slabs of stone procurable on the spot, set in Chunan, the levels for these must be carefully taken and a free outfall

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provided into one of the channels above referred to. In intimate connection with the drainage of the town is the filling up of holes in which rain water collects and stagnates; this work I think should be provided for by the Local Fund Board. The town has better facilities for drainage than most towns I am acquainted with, and the expense of carrying off the surface water should not be considerable.

13. Returning to the Irrigation under the Tanks, it may be necessary for me to call attention to conservancy arrangements. As I understood the subject, there are 14 Virgannies at present employed, not paid in money but allotted certain Inam lands, for opening the sluices &c, certain portions of the Channels are supposed to be maintained by Land holders to whom Inam lands were granted for the labour they supplied, and the other channels

3511
and parts of channels are supposed to be maintained by Kudimaramut. It would appear however that no one ever took the trouble to see that the work was done, and as a matter of course the Inamidaris did nothing, and the channels deteriorated yearly. The state at which they lately arrived came to notice only because they supplied drinking water to a town where the death rate was found to be about 3 times that in most towns of the Presidency; and I may say that, I have never seen any thing more filthy and abominable than the channels; when I reached Cumbum levels not being forthcoming, it was decided by the Committee to clear the channels of vegetation, and mud without them; and this has now been nearly completed at an expense of over Rupees 5,000. A conservancy establishment has

been sanctioned by the Board of
pro Revenue of 34 Niganties on pay
refe of Rs. 3 a month, who will be supposed
with to look after the channels and keep
fills them in order. The Superior Officers
colle of the Revenue Department are supposed
think to see that they do their work, I cannot
Loca Consider that such arrangements are
better likely to be effective. The Tank is one
most of that description that requires the
and to distributing channels as well as the
surface 13. Tank Band and sluices to be in
under a charge of the professional department,
me to, and I think a conservancy establish-
arrange-ment should be provided for in the
subject Irrigation Budget. When the sluices
present are provided with proper shutters, the
but as will be the more need for proper provision
for open. I suppose of course that the system
of the, of granting Inams for services not
mainly rendered, will not be continued.
Inam, The establishment I would propose
they is one Superintendent on Rs. 30 a month.

2712
4 lacars at Rs. 6 and 11 lacars at
Rs. 5. Rs. 864 a year.

The average revenue from the
Tank is Rupees 51,794 and by proper
regulation of the water, I have little
doubt that, the area of irrigation may
be increased, and that the health of the
town will be improved.

Campbunbun / Sig^d J. O. Haisted Major R.E.
28 July 1876 } Offg. Supg. Engineer

P.S. I think that cross sections of
the channels at 100 feet apart, are
unnecessarily numerous, and that if
they are taken at 330 feet apart it will
be sufficient. The Longitudinal
section also if plotted on the same
scale as the existing sketch map,
will be too small, a larger survey
will be necessary, and it might be

It would be a survey on
a scale sufficiently large on
which the channels could be
plotted - The sketch map
will be large and the
survey nominal
in comparison with the
1871.

Longitudinal and cross sections
to be conveniently plotted on separate
sheets of Imperial paper.



P.W.D.

24 OCT 76

No. 650

(True Copy)

W. B. Goodchap
District Engineer

Camp Cumbum

30 July 1876

Encls. 3

Memo Para 3.

Submitted for the information
of Government with the following
remarks.

If the details of the plug
stones and head of the sluices
can be ascertained, new plugs with
leather washers might be made
up and substituted for the old
plugs. The leather under pressure
would probably almost entirely
stop leakage, and the loosest thick-
ness of leather might project 2
or 3 inches all round beyond
the shoulder of the plug. A sketch
of a plug and of simple means
for making it will be found
attached to inspection notes of a
tour in the Luddipah District and
will probably be applicable to
these sluices. The leather washers
however well it is thought need to
be from $1\frac{1}{2}$ to 2 inches ~~thick~~, and
the fastenings securing the layers

Pm. 1300 of
24th May 1876.

should be distributed so as not
to correspond in successive
layers. It will be advisable to
retain the old form of brace
head if possible.

2 It will be seen that Major Hasted recommends the abolition of Inams for the maintenance of the channels under the Tank, and the sanction of a regular establishment of one Superintendent and 8 Peons to manage the distribution at a cost of Rupees 864 yearly or about $1\frac{2}{3}$ per cent on the Revenue. It is believed that with the improved means of regulation contemplated Major Hasted's proposal will be likely to answer, but much will depend upon the qualifications of the Range Officer who would have to introduce and maintain efficient arrangements. Some 2,500 to 3,000 Rupees annually on the average ought to

he spent in the tank and
channels in order to keep
them in good order and probably
the Inams would go a good way
towards meeting the cost.

Colonel L. St. Colwell
Chief Engineer for the

Robertson
11 Aug 1963

J.

The Secretary to Govt. P.W.

4916

Public Works Department.

No 2846

PROCEEDINGS OF THE MADRAS GOVERNMENT.

1876.W.D.

24 OCT 76

No 7650

The Chief Engineer for Irrigation
The Secretary to Govt.
P.W.D.

CHIEF ENGINEERS. No. 32.

11-11-76

Dated 11 August 1896

Encls 2

No. 228-W.

~~Sketch of the~~

1. Sketch.

given to the Irrigation
Chief Eng's office on request
+ reply attached 18-11-76
Cumbum Dam - Manual Dist.

— Submits, with remarks, the
Kist's memo. on the improvement
of the water supply and drainage
of —

on a means of improving
the regulation of water.

20m

'UNDER date the

the following:—

For C. No.

MEMORANDUM

REQUESTED for reference the under-mentioned papers:—

are which accompanied Mr
Fraser's Report on Cambridge
Municipality can be used in
Ex. 1st April 1876 no. 610 Financial
to which appears to have been
forwarded to the P.W. on 26th July 1876

GOVERNMENT OFFICE,
Revenue Department.

Thereseia Poplar, a
Zwieback

The Chief Assistant

Public Works Department

Engineer for Irrigation
on a means of improving
the regulation of water.

1878 W.D.
24 OCT 76
No 7650

*Planned
to the first side road
may be made for the plan
that a further search
will be requested
and forwarded to
Ceylon with its enclosure
7-1-4-76 10610 7-1-4-76
the original of 4-1-4*

*What the General
Record of it was
if you wish to
make further enquiry
please write the
General Manager to
enable us to do so.
A. Davidson
24-11-76*

4916
No 2846 Public Works Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.
Under date the 25th Oct 76.
Read the following:-

E. I. Form No. 34.

Receipt
MEMORANDUM.

Requested for reference the under mentioned papers:-

*All the plans of Cumbum Tank
disposed of in G.O. No. 2846 dated
25 October 1876.*

*Done
8-12-76*

OFFICE OF THE CHIEF ENGINEER
FOR IRRIGATION,
8-12-1876.

P. Andruschewsky
Head Clerk.

To The Registrar of the P.W. Secretariat

*remarks of the Chief
Engineer for Irrigation
on a means of improving
the regulation of water.*

1878 W.D.
24 OCT 76
No 7650

may be made for improvement
to the tank with the
plan

These proposals are
put in front of you
as far as possible
properly
No 2846 Public Works Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Under date the 25th Oct/76
Read the following:-
Cumbum, and are now waiting
to dispose of contracts for a long time
have been waiting for a long time

Endorsement of the Ch.

Engr for design

{ H.L. D. 228 Wd. 11 Aug/76.

Recorded and
communicated to the
District Engineer, Kurnool,
and to the Assistant
Engineer on special duty
at Cumbum, who will
give careful consideration
to the remarks contained
in the foregoing memo-
randum in designing
the improvements re-
quired to the Cumbum
Tank and channels. The
remarks of the Chief
Engineer for irrigation
on a means of improving
the regulation of water.

at the tank sluices
should also be con-
sidered.

2. The questions raised
in para 13 of the Memo
will be referred to the
Revenue Department
for consideration.

May 20/10

MM

K_u 378/9

To. D.L. Hurwood, with copy of S.M. 24 May 1876, No. 1300
" Assistant Engr. on special duty, Combrum - with do -
" Major Hasted Ab. " do -
" Chief Engineer for Surfr
" Revenue Dept
" Public Dept
Dated 28-10-76

7/20



Gobt. of Madras.
PUBLIC WORKS.

To the R. & K. Harasab

Dated

Issued

Recd.

Encl.

G. O. 25th October 1876, No. 7846

Nos. 7846

Water Supply & Drainage
of Cumbum City, Madras
Dist — Endorsement of
the Chief Engineer for Engrs.
his submission with comments
Major Bartlett's Memorandum
on the improvement
of the —

Submitted by
to the Chief Engineer
for Engrs. for his
approval

Done in R. & K.
20-10-76

1. State created of the
office & the registration thereof
18-1-77

K. M. S.