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[L. & M.]
[9,000-6-6-96.]

Local & Munl. (1895) Department.

MISCELLANEOUS.

G.O., No. *1936 M*

DATED *22nd November 1895*

[Despatch Abstract.]

Water-supply.

Communicating to the Sanitary Engineer letter from the Government of India, Military Department, with the request that the investigation of the Copper Mountain scheme may be expedited and the result reported to Government at an early date.

BACK PAPERS.

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

FURTHER PAPERS.

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

[7]

INDEXED.

Miscellaneous.

LOCAL AND MUNICIPAL DEPT.

G.O., DATED 22.11.95

No. 1936.M.

When given for copying.

[Despatch Abstract.]

Water supply

Communicating to the sanitary
 Engr. letter from the Govt. of
 India, Military Dept.,
 with the request that an
 investigation of the Copper
 Mountain Scheme may be
 expedited and the result
 reported to Govt. at an early
 date.

READ AGAIN ORDER OF GOVERNMENT, DATED
189 , No , MISCELLANEOUS.

ENCLOSURES.

CURRENT No

STATEMENT WITH DITTO.

ORDER OF GOVERNMENT

STATEMENT WITH DITTO.

PAPERS NOT FILED UP, BEING MEANT FOR DESPATCH
IN ORIGINAL (not paged).

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BACK PAPER, No.

OF 119

FURTHER PAPER, No. *Ans 3655 h/78* OF 189

*Cantonments
Water Supply*

Local & Municipal Dept.
CURRENT No. *3483 M*

No *2837* M. W.

GOVERNMENT OF INDIA.

MILITARY DEPARTMENT

48
Simla, the *21st* November 1895.

It is requested that the
above heading, with number
and date of this communica-
tion, may be quoted in any
subsequent correspondence on
this subject.

To

THE SECRETARY TO THE GOVERNMENT OF MADRAS,
Municipal Public Works Department.

SIR,

I am directed to forward, for the
information of His Excellency the Governor
in Council, a copy of the letter margin
N^o 2891 dated the 4th October 1895 and enclosure fully noted from the Director
General of Military Works, rel-
ative to the provision of a pipe water
supply for the city and cantonment
of Bellary and to observe that the question
of the water supply for this station has
been for a very long time under consid-
eration. I am therefore to request that, under
His Excellency's orders, the local authorities
may be urged to take steps towards

securing

Copied by *HL*
Examined by

securing an early settlement of the question.

I am,

Sir,

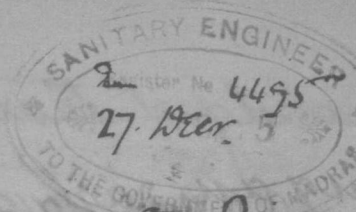
Your most obedient servant,

Mumtaz Ali

Captain R.E.

Secy. to the Government of India.

Enclosure to letter No. 3529 of 1896



Copy of a letter from the Director General of Military Works to the Secretary to the Government of India, Military Department, No. 289/15 dated 4th October 1895.

With reference to Military Department letter No. 1593 marked 25 May 1895, I have the honor to forward herewith a copy of a preliminary report and rough approximate estimate amounting to 7½ lakhs, prepared by the Sanitary Engineer to the Madras Government, on a scheme for supplying the city and cantonment of Bellary with water from the Hagari river, distant about 8 miles from Cantonments.

The Sanitary Engineer has also prepared a rough scheme for a supply from wells sunk in the sloping ground at the foot of the Copper Mountain. The cost being estimated at 5 lakhs.

I do not forward a copy of this last named scheme, because it is

acknowledged

acknowledged that the available data are too meagre to allow of a correct forecast being made of the quantity and quality of water that can be obtained from this source. The Municipality have, however, allotted a sum of Rs 2000 with a view to a further investigation of this Copper Mountain scheme.

So far as my information goes, the most promising source of supply for the city and cantonment is the Nagari river, and from para: 3 of the Sanitary Engineer's report it will be seen that little doubt is entertained locally as to the sufficiency of its yield of water.

2 Turning now to the proposals put forward in the Sanitary Engineer's Report, I observe that he recommends a provision of 15 gallons per head per diem for a combined civil and military population of 66000 souls. The scale of 15 gallons all round appears to me excessive. Taking our experience in other cantonments as a guide, the total quantity of water ^{required} for the military population would be

65000

65000 gallons per day made up as follows:

1039 Europeans at 15 gallons per day	15,585
3227 Natives at 8 " "	11,816
741 houses at 10 " "	7,410
	64,811

Total (say) 65000 gallons.

In this connection I may mention that at Beshawar and elsewhere it has been found by practical test that 5 gallons per head per diem amply suffices to meet the wants of a native family.

3 In paragraphs 13 and 14 of his report the Sanitary Engineer calculates on a contribution of one lakh of rupees from the Military Works Department towards the initial cost of the scheme and three lakhs from the Local Government. The total working charges (exclusive of interest) are estimated at Rs 18000 per annum.

Further, in para: 17, it is asserted that the inclusion of the Barracks and Native Infantry lines in the scheme entails the whole of the town supply being lifted 30 feet higher than the requirements of the town demand. The charge for this

additional

act
are additional lift is worked out to be Rs 5,000 of
each annually which amount the Sanitary
engineer considers should be borne by
the Military Department exclusively. This would
have a balance of Rs 43,000 for the annual
pumping charges which it is proposed shall
of be shared by the Municipality and Military
Department in the proportion of the
the population, taking the military population
for at $\frac{1}{11}$ of the whole. Hence the proposed
military share would be Rs 5,000 for the ad-
ditional lift plus $\frac{1}{11} \times 43,000 = 4,000$, that is,
a total of Rs 9,000 per annum approximately.

To sum up, the Sanitary Engineer reckons
2 on an initial contribution of one lakh of
rupees from the Military Works Department
and 3 lakhs from the ~~Military Works De-~~
partment and 3 lakhs from the Local Govern-
ment towards the capital cost, and a pay-
ment of Rs 9,000 annually by the Military
Department. It is hoped that the balance
of the annual charges for pumping and
interest will be covered by taxes, but on this
point the Sanitary Engineer is not sanguine.

14 With regard to these proposals I
fail

82
fail to see any special reason for treat-
ing the Bellary scheme differently from
those for Agra, Allahabad &c. Consequently
I do not recommend that any fixed an-
nual sum be contributed towards the
extra cost of the Municipal head works
and mains due to the supply required for
the cantonment. This extra cost should be
covered by the price charged by the Muni-
cipality for the water supplied to the can-
tonment.

The Military Department should only
pay a certain rate per thousand gallons
for water supplied as is done in the case
of Agra, Delhi, Allahabad and as has
been proposed and accepted for Sebung.

Again, instead of an initial contri-
bution of one lakh of rupees, the Military
Works Department should provide or
meet the cost of all reservoirs, distribution
pipes &c. required from beyond the
point where the cantonment scheme will
take off from the Municipal main.

5 In paragraph 20 of his report
the Sanitary Engineer suggests that
the

the Municipality should levy a water tax on private houses in the Cantonment. This proposal is inadvisable as, whatever the powers of the Municipality may be outside Cantonment limits, that body have no authority to levy a water tax within those limits, especially as the water supplied to the Cantonment will be paid for at a certain fixed rate.

6 It is evident from the general tenor of the Sanitary Engineer's report that there exists some doubt whether the Municipality of Bellary will be able to find the funds for their share of the work on the Nagari project and it is, I am informed, mainly for this reason that the investigation of the Copper Mountain source has been undertaken, meanwhile the Nagari scheme is in abeyance.

Should the Copper Mountain scheme prove to be practicable at a moderate cost the Municipality will doubtless be advised to accept it. If on the other hand, the investigations show that sufficient water

is

is not available at the base of the Copper Mountain then the Nagari river project for water supply to the Cantonment and town should be worked out in detail without further delay.

In conclusion, I would suggest the expediency of pressure being brought to bear on the Municipality through the Madras Govt, with a view to an early settlement of the source of supply and the commencement of work on the one scheme or the other.

Copy of

The San. Engineer's
Report

Bellary Water Supply
The Nagari scheme

Enclosure plan

The source of supply as proposed by Mr Innes here is underflow in sandy bed of the Nagari river at a point close to the Nagari station on the Southern Mahratta Railway which is as the crow flies about 8 miles from the Bellary Club. The scheme briefly is to collect the underflow in Nagari in the best manner possible, to pump the water into Service Reservoir placed on the high

High ground on which the Kellary Club stands; and finally to distribute the water throughout the town and cantonment in the usual manner with pipes and fountains.

2 Quality of water. The Kagri water has not been analysed. The popular opinion is that it is a good water the villagers on the bank of the river drink its water. A fair idea of the quality of the Kagri water would be obtained by having the water of the Railway well at Kagri analysed. This well is close to the margin of the river. I have made this suggestion to the collector.

Since analysed
Vide C. No. 2095
in 20 146 gm
9.995
of potassium
sulfate

3 Quantity of water The Kagri is about 2500 feet broad at the place it is proposed to tap it. It has a very deep sandy bed. The iron cylinders of the Railway bridge are said to have been sunk 200 feet deep. From enquiries made of the villagers on the bank it appears that the dry weather level of water never falls more than 6 feet below the surface of the bed. A spring channel that takes its rise a little

above

above the village of Kagri is reported to have been flowing even during the famine of 1877. Taking these facts into consideration there is little doubt about the sufficiency of water.

4 Quantity of water required. The civil and military population is about 60,000. A provision of 15 gallons per head per diem should be made. The collector considers that a provision of 10 gallons would be ample. This would no doubt be so for the first few years after the introduction of the scheme. But it is very likely that, within a period which will be very small compared with the life of the works the consumption would exceed 10 gallons. As the pumping main will be about 8 miles in length any future attempt to increase the supply from 10 to 15 gallons will involve a very considerable outlay. It will, therefore, be cheaper in the long run to make the delivery main large enough to carry a supply calculated at 15 gallons per head. The pipe should therefore be capable of

delivering

delivering

$66,000 \times 15 = 990,000$ gallons per day of 24 hours
= 687 gallons per minute.

5 Pumping main A 12 inch pipe with a hydraulic gradient of 2 in 1000 will give the above supply. The weight per foot of 12' pipe to stand a head of 300 = 75 ^{84 cwt}. A mile of 12' piping at Rs 150 per ton laid complete would cost Rs 30,000.

6 Lift The bed of the Nagri is 215 feet below the ground near the Bellary Club, where it is proposed to construct the service reservoir. To this must be added 5 feet, level of water in reservoir above ground and 15 feet, level of inlet to pumps below bed of the Nagri. The actual height to which water has to be lifted will be 235 feet.

7 Loss of head by friction through 8 miles of piping $8 \times 5282 \times 2 = 85$ feet.

8 The total lift on the head against which pumps will have to work will be $235 + 85 = 320$ feet.

9 The consumption for some years to come will not exceed 10 gallons or

$$\frac{10}{15} \times 687$$

1080
 $\frac{10}{15} \times 687$ say 460 gallons per minute. The head required to pass 460 gallons through a 12' pipe is 1.1 in 1000 or say 50 feet in 8 miles of piping. The total lift in this case would be $235 + 45 = 280$ feet.

10 Pumping power For a supply of 10 gallons per head $460 \times \frac{280 \times 10}{33,000} = 39$ pump horse power would be required, or 3 engines of 13 P.H.P. each. Add one as a reserve engine. Total required, 4 engines of 13 P.H.P. each.

11 Estimate of Works. The following is an approximate estimate of the scheme.

Infiltration Works	50,000
Engine house, Engine Drivers quarters, Store shed land &c	50,000
Engines and pumps (4 of 13 P.H.P. each)	75,000
8 miles of 12' C.I. pipes	240,000
Service reservoir	50,000
Distribution system	2,150,000
	6,80,000
Contingencies	70,000
	750,000

12 Cost of pumping, cost of pumping 10 gallons per head per diem for a population

population of 66,000 at 10 annas per million gallons lifted one foot high would be

$$\frac{66,000 \times 10 \times 280 \times 365 \times 10}{10,00,000 \times 16} = \text{say Rs } 45,000$$

To the above must be added Rs 5000 annual cost of establishment, repairs &c. to the distributory system. The total working charges would be Rs 48,000 exclusive of interest and sinking fund on the initial outlay.

Allocation of charges.

13 Calculating roughly not more than a lakh of the initial cost of the scheme would fall on the Military.

14 The Government has helped several municipalities with a moiety of the cost of water supply schemes. But in view of the large amount of the estimate and financial difficulties, it would be over sanguine on the part of the municipality to expect a grant of more than 3 lakhs.

15 The Municipality will therefore have to provide Rs 35,000. Presuming that the whole of this amount would

be

11 1/2 p
be borrowed from Government it will involve an annual charge of Rs 2,000.

16 If the barracks and Native Lines were excluded from the scheme, it would be possible to reduce the lift by about 30 feet, because bowl Nagar and Braespett which constitute the whole of the municipality are lower than the general level of the cantonment.

17 The inclusion of the cantonment or rather the barracks and Native Lines in the scheme compels the whole of the town supply being lifted 30 ft. higher than the requirements of the town demand it. The cost of lifting the town supply 30 feet higher would therefore be a legitimate charge on the milty. This charge works out to about Rs 5000 annually.

18 The balance of the pumping charges would be borne by the municipality and the Military in the proportion of the population. The military share of the pumping charges would thus be
$$\text{Rs } 5000 + \frac{6000}{66000} \times (48000 - 5000) = \text{say Rs } 9000$$

and the Municipality will have to bear
$$\text{Rs } (48000 - 9000) = 39,000.$$

19 The cost of the scheme to the Municipality stands thus:-

Interest and sinking fund at 6% on Rs 35,000	Rs 21,000
Bumping charges	3,900

Total 24,900

20 Financial aspect The amount collected as house tax at the maximum rate of $7\frac{1}{2}$ % is about Rs 28,000 yearly.

This includes tax on private houses in the cantonment. An 8% water tax which will be the maximum leviable when the new District Municipal Act is passed, would be about Rs 30,000. This sum could be increased to some extent by the revision of taxes, but it seems doubtful if the Municipality would be able to provide Rs 58,000 annually even with its best efforts.

CHIEF SECRETARY
8-NOV. 1895
GOVERNMENT OF MADRAS

(True copies)

A. Mege

for Suptd. Military Department.

3483
1936
11-95

LOCAL AND MUNICIPAL DEPARTMENT.

Local Municipal Dept.

CURRENT No. 3483/M

From

The Secretary to the

Govt. of India,

Military Deptt.

No. 2837 M.W.

Dated 2nd November 1895.

Received 8" -----

Enclosures I

SUBJECT.

Forwarding a copy of letter from the Director General of Military Works relating to the provision of a pipe water supply for the city and cantonment of Bellary and requesting that the local authorities may be urged to take steps towards securing an early settlement of the question.

1667/15-10-95
1469/14-9-95
1097/14-21-93
484/14-10-93
483/14-10-93
93/14-23-73

C.L.
misc.

Order No. 1936/15-10-95

Communicated to the Sanitary Engineer with the request that the investigation of the Copper Mountain scheme, for which an allotment of Rs. 2000 was sanctioned in G.O. No. 1469/14, dated 9th September 1895, may be expedited and the result reported to Government at an early date.

K.B.
13/11/95L.S.D.
19/11/95R.R.
21/11/95

When given for copying _____
When copied _____
When examined _____
When signed _____

189

READ AGAIN G.O., No.
189

DATED

CURRENT No.

ENCLOSURES TO G. No.

ORDER OF GOVERNMENT

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

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To,
The Sanitary Engineer
Copy to the Chairman, M.C., Bellary
thru the Collector.