Date taken out.	For what purpose.			Initials of clerk taking the paper or of attender.	Date returned.	Initials of attender.
	Department.	C. No.	Year.			

[L. & M.
9,000-8-8-96.]

Local & Munl. (1895) Department.

MISCELLANEOUS.

G.O., No. 1469 M.

DATED 9th September 1895

[Despatch Abstract.]

Allotment.

Sanctioning the-----of Rs.2,000 required by the Bellary Municipal Council for the investigation of the Copper Mountain water-supply scheme.

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 9-9-95.
No. 1469 M

When given for copying.

[Despatch Abstract.]

Allotment

Sanctioning the ________ of Rs 2000 required by the Bellary Munl. council for the investigation of the Coppe Mountain Water supply scheme.

Read again Order of Government, dated 189 , No , Miscellaneous.

Back Papers, No. of 189

Further Papers, No. of 189

Enclosures.

Current No

Statement with ditto.

Order of Government

Statement with ditto.

Papers not filed up, being meant for despatch in original (not paged).

N.B.
A — Copy in full.
B — Not to be copied.
P — Copy abstract only.
Q — Copy heading only.

Copied by

Examined by

Bellary Water Supply

The Hagri Scheme.

The source of supply as proposed by Mr. Srinivasiengar is the underflow in the sandy bed of the Hagri river at a point close to the Hagri Station on the Southern Maharatta Railway, which is as the Crow flies about 8 miles from the Bellary Club. The scheme briefly is to collect the underflow in the Hagri in the best manner possible, to pump the water into a service reservoir placed on the high ground on which the Bellary 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 Hagri 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 Hagri

Hagri Water would be obtained by having the Water of the Rail=way well at Hagri analysed. This well is close to the margin of the river. I have made this Suggestion to the Collector.

3. Quantity of Water – The Hagri 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 Rail=way 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 the Village of Hagri 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 popu=lation is about 66000. A provi=sion 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 intro=duction 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 deli=very main large Enough to Carry a Supply Calculated at 15 gallons per head. The pipe would there=fore be capable of delivering

66000×15 = 990000 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

12" pipe to stand a head of 300 feet = ·75 Cwts. A mile of 12" piping at Rs 150 per ton laid complete would cost Rs 30000-

6. Lift — The bed of the Hagri 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 Hagri — 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 $8 \times 5280 \times 2 =$ = 85 feet.

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

9. The consumption for some years to come will not exceed 10 gallons or $\frac{10}{15} \times 687$ - 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 $\frac{460 \times 280 \times 10}{33000} = 39$ 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.

	Rs.
Infiltration works -	50000
Engine house, engine drivers quarters, stone shed, land &c	50000.
Engines and pumps (4 of 13 P.H.P each.	75000
8 miles of 12 C.I. pipes	240000.
Service reservoir	50000.
Distribution system	215000.
	680000.
Contingencies	70000
	750,000

12. Cost of pumping — Cost of pumping 10 gallons per head per diem

for a population of 66000 at 10 annas per million gallons lifted one foot high would be—

$$\frac{66000 \times 10 \times 280 \times 365 \times 10}{1000000 \times 16} = \text{say Rs } 43{,}000$$

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 48000 exclusive of interest and sinking fund on the initial outlay.

13. Allocation of charges— 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 Estimates 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 350000. Presuming that the whole of this amount would be borrowed from Government it will involve an annual charge of Rs 21000.

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 Cowle Bazaar and Bruce Pettah 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 feet higher than the requirements of the of the town demand it. The cost of lifting the town supply 30 feet higher would therefore be a legitimate charge on the military. 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

$$\text{Rs } 5000 + \frac{6000}{66000} \times \text{Rs } (48000 - 5000) = \text{say Rs } 9000$$

and the municipality will have to bear Rs (48000 − 9000) = 37000.

19. The cost of the scheme to the municipality stands thus—

Interest and Sinking fund at
6 % on Rs 35000 = Rs 21000
Pumping Charges " - 37000.
Total Rs. 58000

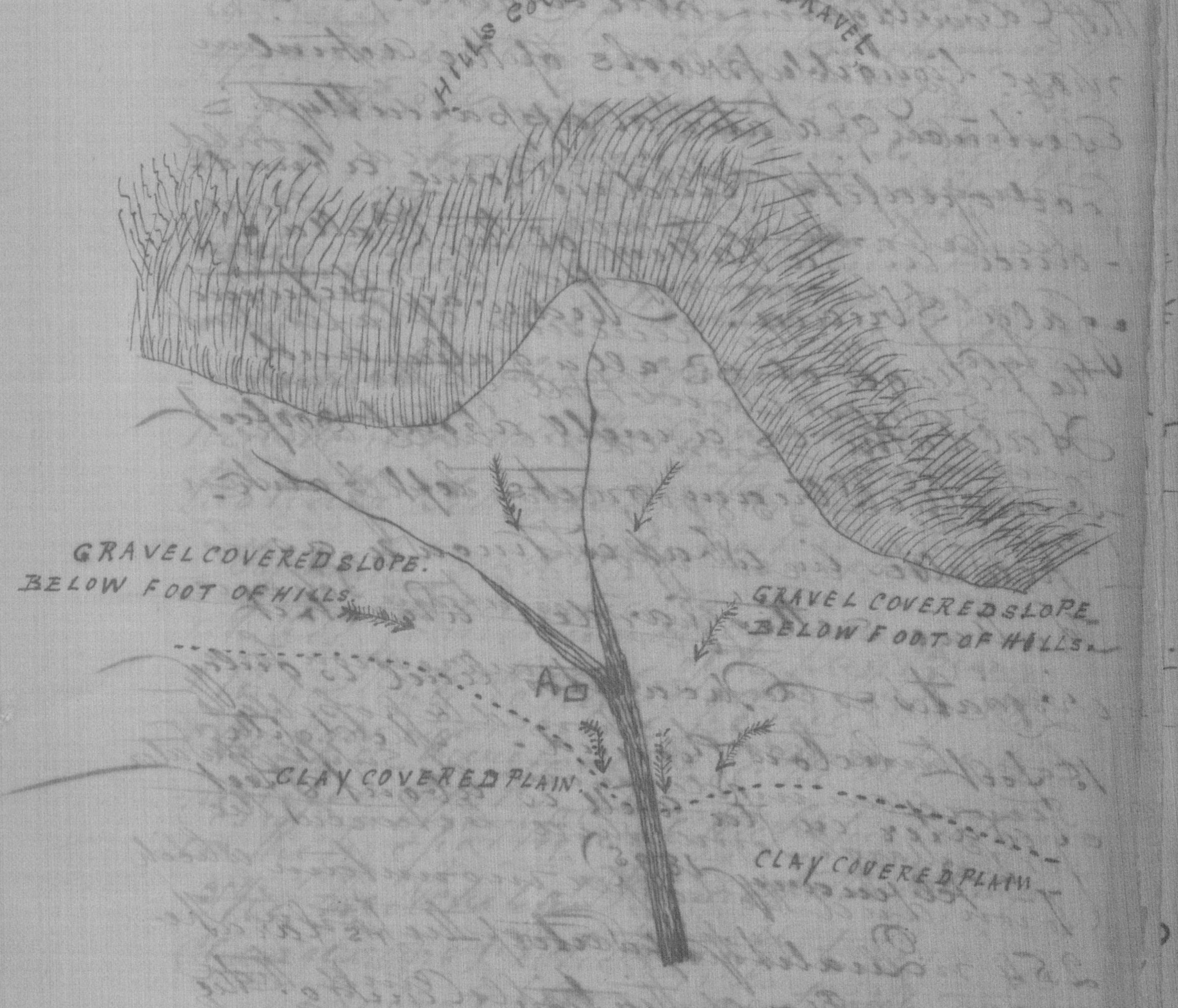
20. Financial aspect. The amount collected as house tax at the maximum rate of 7½ % is about Rs 28000 yearly. This includes tax on private houses in the Cantonment. An 8 % water tax which will be the maximum leviable when the new District municipal act is passed would be about Rs 30000. This sum could be increased to some extent by the revision of taxes, but it seems doubtful if the municipality would be able to provide Rs 58000, annually even with its best efforts.

Copper mountain Scheme

21. It has been my impression for a long time that it should be possible to secure an underground supply of water for Bellary some where between the town and the Copper mountain which is 4 miles to the west of the town. The whole area of the hills and the slope below the foot of the hill for some distance is covered with gravelly soil. A much larger proportion of the rain is absorbed by this area than the clay

covered plain below the hill does. Naturally the water absorbed by the slopes of the hills must flow towards the Hagri river, the under current in each valley concentrating towards the stream that runs through the valley.

22. In the present case the obstruction offered by the clay plains to the flow of water from the hills probably intensifies the current along the line of the stream. The sketch below illustrates the above remarks.


HILLS COVERED WITH GRAVEL
GRAVEL COVERED SLOPE BELOW FOOT OF HILLS
GRAVEL COVERED SLOPE BELOW FOOT OF HILLS
A
CLAY COVERED PLAIN
CLAY COVERED PLAIN

Note. The dotted line drawn represents the line where the gravel merges into the clay.

Red arrows indicate the direction of the under current.

23. From what has been said above it will be argued that the most favorable position for a well or infiltration gallery would be at the place marked A on the sketch.

24. Thus far my arguments have been based on the topographical and geological features of the Country. There are however more tangible proofs of the actual existence of water of apparently good quality and in some abundance in the valley of the Ballagalu Stream. Midway between the villages of Ballagalu and Haldathi is a well about 300 feet from the Stream on its left bank. The well is in what is known as Kuttai Setti's garden which it irrigates. The water level is only 15 feet below ground. The depth of water in the well is about 8 feet (7th February 1895).

25. Quality of water — As far as physical examination can go the water appears to be good. The present owner of the garden says that during the last outbreak of Cholera amongst the troops at Bellary they were encamped

about half a mile to the south of this well, and that this well supplied the water to the troops during their continuance in Camp. He says the Regimental doctors had examined the well water and pronounced it good.

26. Quantity of water — As regards the quantity of water the man says that a double bullock mote working for 8 hours at the ordinary speed does not appreciably affect the level of water in the well. He also says that he attempted to dig another well closer to the stream. But the in-rush of water was so great that the sides were continually slipping and with the appliances at his command it was found impossible to keep down the water. He had therefore to abandon the construction of the well.

27. The level of the ground at this place is not known, but comparing the levels of the stream at Ballagalu and at the Bellary tank (which are known) the level of the ground near Kuttai Setti's garden would be about 1550 above

above M.S.L.

Level of Ground —— 1550 above M.S.L.
Water level (7 February 1895) 1535 — " —
Lowest water level say — 1530 — " —
Bottom of proposed gallery 1520 — " —

28. With this source of supply the best site for service reservoir would be near the Native Infantry Lines. This site commands the European barracks, the town and almost the whole of the Cantonment. The only portion that could not be served by the reservoir would be the Club and a few buildings in its immediate vicinity.

29. The distance from the proposed site of the gallery to the reservoir is 12000 feet or say 2½ miles. The level of the ground near the site of the proposed reservoir is 1535. The total lift including friction in pipes would not exceed 50 feet.

30. Roughly the cost of the works

works would be.

	Rs.
Infiltration works	25,000
Engine House &c	4,0000
Engines and pumps	50,000
Pumping main	75,000
Service Reservoir	50,000
Distributory System	210000
	4,50,000
Establishment Contingencies	50,000
Total Rs^a	500,000

31. The cost of pumping would be about Rs 10,000. Establishment and up keep of the distributory system would cost Rs 5000/- and if the municipality had to provide half the initial cost, the interest and sinking fund would be Rs 15,000. Total would be about Rs 30000 which is well within the means of the municipality.

32. I must, however, confess that I do not put forward this scheme with a full assurance of success because the data available are meagre. To collect more information money is

required. But information on hand and the conclusions it points to are sufficient to warrant an expenditure being incurred in investigating the scheme thoroughly. The expenditure would however be incurred cautiously and I would suggest the following procedure. The well in Kottai Settis Garden should be thoroughly baled out by picottahs if possible or by a steam pump. It would then be cleaned out and allowed to refill. The water should then be analysed. Of course during pumping records will be kept to calculate the yield. If the results are encouraging, a trial well should be sunk at a spot to be selected hereafter. The trial well should be as deep as the future permanent works would be. The trial well will decide whether the scheme is feasible or not, and until the success of the scheme is assured, detailed plans and estimates need not be prepared.

Sd/. Hormusji Nowroji
Am. I.C.E.
Assistt: Sany: Engr to Govt

Office Sany: Engr
Fort St George
19.2.95

J. N. 8 dated 27.2.95 Camp
Madura.

Copy forwarded to the Collector of Bellary for information. The Hagri Scheme seems to be beyond the financial capability of the Municipality. The Scheme proposed by Assistant Sanitary Engineer to Government seems worth investigating and a grant of Rs 2000/- would enable this to be done.

Sd/. J. A. Jones.
Sanitary Engr to
Government

No 1356
14.5.95

True Copy forwarded to the Chairman, Municipal Council, Bellary, with reference to his letter No 83 dated 9th May /95

Sd/. J. A. Jones.
Sanitary Engineer to
Government

(True Copy)

Municipal Councillors [illegible]
Bellary 11 June 95

C. Rama Rau

C. 25.5.95

Ind 10/6
Chairman Delegate

EXTRACT FROM PROCEEDINGS OF THE BELLARY MUNICIPAL COUNCIL,

dated 21st May 1895.

Present (The Present Strength being 24).

1. M.R.Ry P. Rama Row Garu B.A. Presiding member.
2. M. Abraham Esqr
3. Mr. K. Abdool Karreem Saib.
4. C. E. Clunitall Esqr.
5. M.R.Ry T. Chellaperumall Pillay Avergal
6. Do. D. Kristnamacharlu Garu
7. Do. G. Kristappah Garu.
8. Do. T. Hampyyah Garu.
9. The Hon: A. Sabapathy Moodr. Avergal Row Bahadur.
10. M.R.Ry J. C. Cotelingam Avergal M.A.
11. Do. A Gopalswamy Naidoo Garu
12. Do. B. Culliah Chetty Garu.

3. Read Letter No 1171, dated 26.4.95 from the Sanitary Engineer to Government referring the Chair=man to his No 9/81, dated 27.2.95 to

to the Collector of Bellary regarding the Haggri Scheme and the Copper mountain Scheme and stating that the former scheme is beyond the financial capability of the municipality, that the latter Scheme proposed by the Assistant Sanitary Engineer is worth investigating and that a grant of Rs 2000/- would enable this to be done -

Proposed by Mr. M. Abraham and Seconded by Mr. B. H. Cotelingam Avergal that the sum of Rs 2000/- be sanctioned for investigating the feasibility of the Copper mountain Scheme

(TRUE EXTRACT.)

Municipal Councillors Office,
Bellary 22d May 1895.

delegate
Chairman M. C.

11.6.95.

22.5.95

I.

Application for allotment of Funds required by the Municipal Council of Bellary

Particular work or purpose.	Major and minor heads in the budget.	Amount provided for the work or purpose in the budget.	Amount subsequently allotted or transferred.	Amount now required, and the source from which it is to be met.	Necessity for the allotment.	Reference to previous correspondence.
1	2	3	4	5	6	7
		Rs.	Rs.	Rs.		
For the investigation of the Scheme for the Water Supply of Bellary	Grant I Public Works A. Water Supply	500	"	2000 to be met from the closing balance of the official year 1895-96	To meet the proposed Expenditure	Chairman's letter No. 1530 dated 12-6-95

Note — The balance will then be Rs 15,820/

Municipal Councillor's Office
Bellary 11th June /95

Dasf 11/6

M Ramakar

OM

Delegate
Chairman, Municipal Council.

SANITARY ENGINEER
2 2887
18 AUG 5
TO THE GOVERNMENT OF MADRAS

3
2095 - m/95

No 1530/135 Municipal Council's Office
Bellary 11th June 1895
2095 M. 12
Encl (3)

Local & Municipal Dept.
CURRENT No. 2095 M

From
M.R.Ry. C. Ramasesha Iyer
Avergal B.A.
Ex: Officio: Chairman
Municipal Council
Bellary

To
The Chief Secretary
to Government
Local and Municipal Department
Madras

Thro: the Revenue Officer
in Charge of Division.

Sir,

I have the honor to report that in accordance with the suggestion of the Sanitary Commissioner for Madras made in his Inspection notes on his visit to this Municipality in October 1894 Embodied in G.O. No 534 m Local and Municipal dated 25th March 1895, the Council addressed the Sanitary Engineer

1895 3

Through the Rev Officer

Local & Municipal Dept.
CURRENT No. 2095 M

~~From~~

The Chairman

Municipal Council

Bellary

To

The Chief Secretary

to Government, Local

and Municipal Deptt,

Madras.

Dated 11th
Despd 12th } June 1895
Recd

1024 r. No.
17 JUN. 95
BELLARY

No 1530.
Encl (3). 135

Subject

SANITARY ENGINEER
No 2887
18 AUG 95
THE GOVERNMENT OF MADRAS

Requesting Government to accord sanction to the expenditure of Rs 2000 from the closing balance of the current year 1895-96 for the investigation of the Copper mountain Water Supply Scheme

Rt.
Ro. 1015 of 24-7-95

Referred to the Sanitary Board for remarks.

(By order)

W Francis

for Assistant Secretary

Fort St George
24th July 1895 } I. S. 18/7/95

To, The Sanitary Boards.

534 h 25-3-95
162 h 4-2-95
1338 h 26-9-94
889 L 17-5-94
1097 h 21-8-93

484 [illegible]
483 [illegible]
93 [illegible]

OFFICE OF SANITARY COMMISSIONER
No 13608
26 JUL 95
WITH THE GOVERNMENT OF MADRAS

COLLECTOR'S OFFICE
No. 3148.
24 JUN. 95
BELLARY
Mty Reg

Submitted to the Collector of Bellary

[illegible]

18.6.95 [illegible]

~~Forwarded~~. The undersigned has had the water of a well sunk in the Hagari analyzed, & unfortunately it has been reported "Suspicious". Otherwise the scheme promised well, & would not have been impracticable in point of cost, with a contribution from the Military Dept & the aid of Government.

Rs 2000 may now be sanctioned for investigating the Copper mountain Scheme

25.5.95. [illegible]

Government of Madras

Sanitary Board Office

Proceedings of the Sanitary Board No 2371
dated 21st August 1895

Present

The Hon'ble Col: J. Pennycuick, R.E., President.
Surgeon Lieut-Col: W. G. King, M.B., C.M., D.P.H., Sanitary Commissioner for Madras.
J. A. Jones, Esq., Mem. Inst. C.E., F.R.S.E., Sanitary Engineer to Government.

Read reference by Government No 1015 of 24th July 1895 forwarding for remarks letter from the Chairman, Municipal Council, Bellary requesting sanction to the expenditure of Rs 2000 for the investigation of the Copper Mountain Water Supply Scheme.

Resolved that Government be informed that the Board considers the subsoil infiltration scheme should take precedence of the Huggri Scheme. The Collector has required an investigation as to why the Huggri Water should be classed as suspicious, and this will duly be made; but in the meantime the scheme proposed by the Assistant Sanitary Engineer has sufficiently good features to warrant its investigation and the Board suggests this investigation should be undertaken.

2. In investigating yield that officer be instructed to ascertain the whereabouts of the camp referred to as having been occupied by British Soldiers during a cholera epidemic. Not only might it be possible to sink in ground where cholera excreta have been buried, but as soldiers use trench latrines in camp the site might be struck within a short distance.

True Extract

Joint Secretary
Sanitary Board (Engineering Dept)

kd/

~~No.~~ sure to letter No. 2372 of 1895

1895

From

The Joint Secretary
Sanitary Board
Engineering Dept.

To

The Chief Secretary
to Government
Local & Municipal Dept.

Subject

Resolution of the Sanitary Board No. 2371 of 21-8-95 regarding the allotment of funds for the investigation of the Copper Mountain Water Supply Scheme, Bellary.

1/2752 Inw 95

S. E./6 19-3-95—1,000.

GOVERNMENT OF MADRAS.

No. 2372

OFFICE OF SANITARY ~~ENGINEER~~ Board,

Fort St. George, 21st August 1895.

From

J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E.,
Joint Secretary, Sanitary Board (Engineering Dept.),
~~SANITARY ENGINEER TO GOVERNMENT~~,

To

The Chief Secretary to Government,
Local and Municipal Department.

SIR,

Bellary Water Supply Scheme

With reference to your reference No. 1015, dated 24th July 1895 I have the honor to forward herewith a resolution of the Sanitary Board on the subject of allotting funds for the investigation of the Copper Mountain Water Supply Scheme.

I have the honor to be
Sir
Your most obt. servt.

L. C. Lockyer,
for Joint Secretary,
Sanitary Board (Engineering Dept.)

LCL

Sd.

Local & Municipal Dept.
CURRENT 2652
1895

From

The Joint Secretary
Sanitary Board
Engineering Dept.

To

The Chief Secretary
to Government
Local & Municipal Dept.

No. 2372

Dated 21st }
Despd 22nd } August 1895
Recd

Enc-one

Subject

Bellary Water Supply Scheme

Forwarding a Resolution of the Sanitary Board on the subject of allotting funds for the investigation of the Copper Mountain Water supply Scheme, Bellary.

(with order)

Order 9-9-95.

Ord. Cts. 2095 & 2652 M/95

HM

C.S.
misc.

The proposed allotment of funds is sanctioned.

2. The attention of the Sanitary Engineer will be drawn to para. 2 of the Sanitary Board's Proceedings.

V.R. 28/8/95.

30-8-95

4/9/95

Note.

Current 2095 is a letter from Bellary Chairman asking for sanction to an allotment of Rs. 2000 for investigating the "Copper Mountain scheme" of water supply to Bellary. The scheme is described in Asst. San. Engr's report enclosed therein. The San. Board in the second current approves of the expenditure of this sum for investigation & adds a warning as to the site to be chosen for trial wells.

30-8-95

Submitted to HM for perusal as there is a report on a proposed water scheme and the suggestions to the author. 4/9

To,

The Chairman M.C., Bellary,
Sanitary Engineer.

Desp. 13/9/95 Issue

[illegible] given for copying
[illegible] copied
[illegible] examined
[illegible] signed
} 189 .

AGAIN G.O., No. DATED 189 ,

CURRENT No.

ENCLOSURES TO C. No.

ORDER OF GOVERNMENT .. .. .. A A A A A A A

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

PAPERS NOT FILED UP, BEING MEANT FOR DESPATCH IN ORIGINAL.

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