

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—the following papers :—

From R. E. ELLIS, Esq., ASSOC. M. INST. C.E., Acting Sanitary Engineer to Government, to the Chief Secretary to Government, dated Fort St. George, 20th August 1894, No. 1866.

With reference to G.O., dated 14th July 1893, No. 911 M. Mis., Local and Municipal, I have the honour to report on the construction of the experimental tunnel and to forward a copy of the analysis of the water obtained as directed in the Government Order quoted above.

2. The amount sanctioned for the work was Rs. 11,000 which is the net amount provided in the estimate without contingencies. The length of the tunnel estimated for was 500 feet. The work executed consists of two new shafts and tunnelling with an aggregating length of 541 feet.

3. The actual expenditure is Rs. 11,331-0-10. But this includes expenditure debitable to contingencies. The cost of the works so far executed is therefore well within the estimate.

4. Tunnelling was started in a southerly direction from the trial shaft. The tunnel is not in a straight line. In the attempt to follow the springs it has assumed a somewhat tortuous course. During the progress of the tunnel two more shafts were sunk to enable tunnelling proceeding on more faces than one. Shaft No. III was however abandoned as the rock met with was very hard and there was no indication of its yielding water even at the depth of 47 feet.

5. Shaft No. 2 proved to be in water bearing rock and the tunnel was worked from shafts Nos. 1 and 2 face to face; as the allotment of Rs. 11,000 has been completely spent, the connection of the two tunnels could not be effected. This could however be done if Government sanction the work being carried to completion.

6. The aggregate length of the tunnel from No. 1 shaft is 404 feet and consists of 235 feet of the main heading and 169 feet of branch adits. The tunnel from No. 2 shaft measures 137 feet.

7. A No. 4 pulsometer was used to pump out the water from shaft No. 1 during construction. The record of pumping for the last two weeks is appended. The yield from shaft and tunnel No. 2 was about 400 gallons. From the table it will be seen that when pumping stopped each evening, after about $10\frac{1}{2}$ hours average pumping, there remained a depth of water in the tunnel varying from one foot to one foot five inches and that during the night when there was a cessation of pumping the level of water rose to a maximum of only two feet above the sill of the tunnel, though the level of saturation is eighteen feet higher. The average quantity of water pumped out by

the pulsometer was 4,000 gallons per hour which was the full pumping capacity of the pulsometer employed. Of the 4,000 gallons pumped out per hour part represents the percolation in the tunnel and the balance was drawn from the storage in the tunnel. The proportion which the former bears to the latter varied as the pumping progressed hour by hour. The following table shows how the above quantities differ at the commencement and termination of each day's pumping. The figures given are the average of the results of the trial shown in appendix :—

	Depth of water in tunnel.	Quantity drawn from storage per hour.	Quantity percolation per hour.
		GALS.	GALS.
Commencement of pumping	1'-10"	1,600	2,400
Termination of pumping	1'-2"	1,000	3,000

From the table it will be seen that when the water stood at 1' 10" the percolation was 2,400 gallons, and at 1' 2" the percolation was 3,000 gallons. There is thus sufficient reason to warrant the supposition that if the water in the tunnel is reduced to its lowest level, the percolation would reach 3,500 gallons, neglecting the 400 gallons obtained from shaft No. 2, and this may be accepted as the yield of the tunnel during the dry season per hour when pumping continuously night and day. This matter could have been placed beyond doubt by continuous night and day pumping for a couple of weeks, but the allotment for the work having been expended it was decided not to incur any further expenditure.

8. The above is the record of pumping at the very end of the dry season, the yield of 3,500 gallons may therefore be accepted as the minimum yield. The minimum yield of the tunnel may therefore be reckoned as 84,000 gallons in 24 hours, which gives five gallons per head for a population of 16,000. The scheme was intended to provide for this population at ten gallons a head.

9. The supply could be increased by extending the branch adits from the main tunnel. But there seems to be no immediate necessity for doing so.

10. Five gallons per head in the dry season cannot be called a stinted supply for a small town like Dindigul.

11. The following table gives the actual consumption of water in some of the Indian towns which possess a public water-supply :—

Name of town.	Supply actually used.	Population.
	GALS.	
Khandwa	3½	12,000
Jabalpur	4 to 6	75,000
Nagpur	7½	98,000
Sholapur	4½ in 1881	50,666
Lahore	3	130,000
Thana	3	15,000

12. A supply of five gallons per head may be considered quite ample for the present requirements of Dindigul. I would recommend that the remaining part of the scheme relating to pumping and distribution works be now undertaken, leaving the further extension of the tunnel for the future when necessity arises.

13. In paragraph 17 of the Sanitary Engineer's letter No. 1104, dated 30th May 1893, allusion is made to the possibility of a service reservoir being required. The necessity for a reservoir is now quite obvious. The cost of a reservoir with extra supply and delivery pipes will be Rs. 7,500.

14. The estimate will now stand thus :—

Estimate as per Sanitary Engineer's letter No. 1104 of 30th May 1893	RS.
Service reservoir with contingencies	71,030
	7,500
Total	78,530

I may add that exchange has declined very much since the above estimate was framed, but it is hardly worth trying to guess now what the exchange will be when pipes are ordered.

15. The quality of water is decidedly better than any obtained from the neighbouring wells and other proposed sources of supply.

16. If Government is satisfied that the tunnel will yield a fairly moderate supply for the town, I request that early sanction may be issued to complete the works.

No. 765.

Referred to the Public Works Department for favour of remarks.

FORT ST. GEORGE,
4th September 1894.

(Signed) W. FRANCIS,
Ag. Assistant Secretary.

Office-note from C. H. B. BURLTON, Esq., Under Secretary to Government, Public Works Department, to the Chief Secretary to Government, dated Madras, 10th October 1894, No. 3061-C.

[Endorsement, dated 4th September 1894, No. 765, Local and Municipal.]

With this endorsement is referred for the remarks of the Public Works Department a report by the Acting Sanitary Engineer on the construction of an experimental tunnel in connection with the Dindigul water-supply project. The file is so incomplete as to be unintelligible. The undersigned has the honour to request that all the papers on record on the subject may be forwarded for reference.

No. 3386 C.

Note by the Chief Engineer, Public Works Department, dated 30th October 1894.

[Endorsement in the Local and Municipal Department, No. 765, dated 4th September 1894.]

The papers as sent up are not intelligible, as the general plan (sheet No. 1) is inconsistent with the Sanitary Engineer's report. The former shows an unbroken length of main tunnel with four short branches, and a short detached length, apparently unconnected with either the main tunnel or the branches running eastward from near the southern end of the former.

2. The report mentions two shafts (the positions of which are not marked on the plan) and states that a length of 235 feet of main heading and 169 feet of branch adits has been executed from No. I and 137 feet (presumably of main heading) from No. II; the total length of branch tunnels shown on the plan amounts to only about 140 feet, and of main tunnel to about 230 feet, the detached piece mentioned above is about 70 feet long. It is not clear where the length of 137 feet stated to have been run from No. II shaft is, nor by what distance it is separated from that run from No. I shaft which is presumably in connection with the engine-house.

3. Without this information it is not possible to say whether it is worthwhile to complete the connection between the two lengths of tunnel, nor does the report give any information whatever on this point.

4. Unless the distance is considerable it would seem unwise to waste the money that has been already spent upon the tunnel from No. II shaft, the more so as this shaft is said to be in water bearing rock, and the tunnel from it would therefore give a valuable addition to the supply.

5. The supply at present available, which is stated to be 84,000 gallons per day, or about four gallons per head per day, might be accepted if no more could be obtained, but if a material increase to the supply can be obtained at a moderate cost, that cost should certainly be incurred.

6. I consider the construction of a service reservoir very desirable. That proposed by the Sanitary Engineer will hold about 100,000 gallons, which is a suitable quantity, but I do not think either the outer walls or the floor as designed are thick enough; neither should be less than three feet.

7. The general estimate is one submitted in May 1893; in it establishment is included under the head of contingencies. It would be well to order that establishment should always form a distinct and separate item, to include not only the actual pay of the staff, but all such charges as office-rent, stationery, and office contingencies. The item "contingencies" should be reserved for expenditure which cannot be foreseen and under favorable circumstances should not usually be drawn upon at all.

(Signed) J. PENNYCUICK, Col., R.E.,
Chief Engineer, P.W.D.

Transferred to the Local and Municipal Department with advertence to endorsement in that department No. 765, dated 4th September 1894, and the referred papers returned.

(Signed) J. PENNYCUICK, Col., R.E.,
Secretary to Government, P.W.D.

No. 1226.

Forwarded to the Sanitary Engineer with the request that he will furnish full information on the several points referred to by the Chief Engineer.

(By order.)

FORT ST. GEORGE,
10th November 1894.

(Signed) W. FRANCIS,
Ag. Assistant Secretary.

From R. E. ELLIS, Esq., ASSOC. M. INST. C.E., Acting Sanitary Engineer to Government, to the Chief Secretary to Government, dated Fort St. George, 15th November 1894, No. 2611.

Dindigul Water-supply.

With reference to endorsement No. 1226, dated 10th November 1894, I have the honour to report that the lengths of tunnel and position of the shafts have been marked on the plan.

2. The distance between the tunnel from No. II shaft and No. 1 shaft that remains unconnected is about 25 feet.

3. The cost of extending the tunnel 500 feet will be about Rs. 11,000 which will materially increase the supply, but to what extent will only be known after construction.

4. The service reservoir is similar in design to the one constructed at Cuddapah. If the flooring and walls are increased to the dimensions given by the Chief Engineer, the estimate will be raised by Rs. 1,200.

5. The items tools and plant, establishment and contingencies are shown separately in the estimate.

6. The estimate as now revised amounts to Rs. 91,850 (appendix A). As this appears to be beyond the means of the Municipality, I would recommend that the construction of the extra length of tunnel be postponed for a future date and that Rs. 500 be added in the estimate for connecting the detached length from No. II shaft; the contingencies may then be reduced in proportion to Rs. 3,774 and the total amount of the estimate will be Rs. 80,000 (appendix B).

No. 1316.

Transferred to the Public Works Department, with reference to its memorandum, dated 1st November 1894, No. 3386-C.

FORT ST. GEORGE,
21st November 1894.

(Signed) W. FRANCIS,
Ag. Assistant Secretary.

No. 3818 C.

Note by the Chief Engineer, Public Works Department, dated 26th November 1894.

[Endorsement in the Local and Municipal Department, No. 1316, dated 21st November 1894, on letter from the Sanitary Engineer to Government, No. 2611, dated 15th November 1894.]

I consider that the short length of tunnel required for connecting the headings from Nos. 1 and 2 shafts should certainly be executed; the extension referred to in paragraph 3 of the Sanitary Engineer's letter might be deferred for the present.

2. The estimate, reduced to Rs. 80,000 by the modifications mentioned in paragraph 6, is approved.

(Signed) J. PENNYCUICK, Col., R.E.,
28th November 1894. Chief Engineer, P.W.D.

Transferred to the Local and Municipal Department.

(Signed) J. PENNYCUICK, Col., R.E.,
Secretary to Government, P.W.D.

ORDER—dated 14th December 1894, No. 1942 M., Local and Municipal.

The revised scheme for the water-supply of Dindigul estimated to cost Rs. 80,000 is sanctioned.

2. The Sanitary Engineer will proceed with the work and report what funds will be required in the current year. The 25 feet of tunnel required to connect the headings from shafts Nos. 1 and 2 should be executed, but the additional tunnelling referred to in paragraph 3 of the Sanitary Engineer's second letter read above may be postponed for the present.

3. In G.O., dated 3rd August 1891, No. 1210 M., the Government promised to contribute one half of the initial cost of the scheme and to lend the remainder at $4\frac{1}{4}$ per cent. interest repayable in 30 years. As the Municipal Council's closing balance of 1893-94 amounted to Rs. 9,128, of which a sum of Rs. 2,128 will be required as a reserve and working balance for next year, the remainder, viz., Rs. 7,000 will be available for expenditure on this project and the amount to be raised by loan will be reduced to Rs. 33,000. The Municipal Council will be requested to submit an application for this loan in the form printed at page 8 of G.O., dated 8th February 1889,

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No. 322 L., and to levy from the 1st April 1895 the arts and water taxes, and the tax on vehicles at maximum rates, as it has already promised to do in its resolutions read in G.O., dated 24th June 1892, No. 1089 M., and G.O., dated 3rd September 1892, No. 1440 M.

(True Extract.)

Mr. Francis

for Chief Secretary.

To the Chairman, Municipal Council, Dindigul.

- „ Collector of Madura.
- „ Sanitary Engineer.
- „ Public Works Department.
- „ Financial Department.

Editors' Table.

Gobt. of {1894} Madras.
LOCAL AND MUNICIPAL.

28-11-94 N^o 3818. C
1-11-94 N^o 3386. C
10-10-94 N^o 3061. C
17-6-93 N^o 414. D
11-5-91 N^o 192. D

Lo. 73 W. d. 12 January 1895

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G.O., 14th Dec. 1894, No. 1942 M.

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Water-supply.

Sanctioning, with remarks, the revised scheme
of — for the town of Dindigul.

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information

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