

19-8-18✓

29-9-28 III✓

Local & Munl. (1895) Department.

PRINTED.

G.O., No. 1082/m,

DATED 9th July 1896

[Despatch Abstract.]

Water-Supply.

Submitting, with remarks, the revised estimate for the
--- of Karnool and requesting the Sanitary Engineer to report
the amount of the estimate as now approved.

READ AGAIN ORDER OF GOVERNMENT, DATED

18

No.

788 M. 5, 6-5-95 (A) 5

FURTHER PAPER, No.

Cm 2508 1/2 of 18

ENCLOSURES

CURRENT No.

1612 1888 M. - (A)

STATEMENT WITH DATED

ORDER, &c., OF GOVERNMENT: A.

PAPERS KEPT OUT OF FILE FOR DISPATCH IN ORIGINAL
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9TH JULY 1895, No. 1082 M., LOCAL AND MUNICIPAL.

GOVERNMENT OF MADRAS.

LOCAL AND MUNICIPAL DEPARTMENT.

READ—again the following paper:—

G.O., dated 6th May 1895, Mis. No. 788 M., Local and Municipal.

Read—the following papers:—

From R. E. ELLIS, Esq., ASSOC. M. INST. C.E., Acting Sanitary Engineer to Government, to the President, Sanitary Board, Madras, dated Fort St. George, 28th January 1895, No. 211.

With reference to G.O., dated 16th November 1894, No. 2380 L., Local and Municipal, I have the honour to forward herewith a draft resolution on the revised scheme of Kurnool water-supply. I should be glad if this matter could be treated as urgent in order that the work may be proceeded with at an early date.

Note by the Chief Engineer, Public Works Department, dated 2nd April 1895, No. 1383-C.

In the absence of details connected with the original scheme, it is not possible to compare its advantages with those of the revised scheme. The latter must therefore be treated on its merits with the information available.

I. It is proposed to pump direct into the settling reservoir through a 10-inch pipe with a fall of 1.3 feet in 1,000 feet. This by Darcy's formula $V = 109 \sqrt{RS}$ will give a discharge of 365 gallons per minute. It is not known how the Acting Sanitary Engineer arrived at 315 gallons as a result. Again, the same water that is passed into the settling reservoir through a 10-inch pipe is eventually passed through a 12-inch main to the town. The fall of the main is not stated; therefore the reason for the increase of diameter is not clear.

II. Mr. Jones in paragraph 14 of his report dated 6th December 1892, No. 2774, calculated the quantity of water required to be 630 gallons per minute; and to get this discharge he provided a 5 H.P. engine with a lift of 26.5 feet; but as the lift is now increased to 45.11 feet, the horse power will have to be increased to 9 H.P. to give the same supply. Mr. Ellis apparently allows for only 315 gallons—though 630 are required for the population—for the sake of restricting the engine to the 5 H.P. originally provided; it would, in the Chief Engineer's opinion, be better to adhere to the original quantity and increase the power.

III. The necessity for a cistern at each end of the masonry conduit is not explained. If the cisterns are intended as silt traps, it should have been so stated in the report.

IV. In memorandum No. 1328-C., dated 21st March 1893, the Acting Chief Engineer, Public Works Department, expressed his conviction to the effect that the settling reservoir should be capable of holding six weeks' supply. It is calculated however that the reservoir according to the design submitted will not hold more than a supply for a fortnight.

V. The theoretically correct area of the filter beds may be calculated at 5,787 square feet. Therefore 7,500 square feet as shown in the plan is somewhat excessive. Three filter beds each $44' \times 44'$ giving a total area of 5,808 would answer requirements if formed as follows:—

2 feet 6 inches of fine sand,
6 inches of common sand,
6 inches of shells,
2 feet 6 inches of gravel,

perforated pipes being laid in lowest stratum (*vide* Molesworth); but the error is on the side of safety.

VI. The Chief Engineer has noticed more than once the still prevalent antipathy to concrete foundations. Here attention is drawn to the large quantity of under-ground masonry which might with advantage be replaced by concrete.

Under these circumstances the estimates are returned for revision.

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

From J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E., Sanitary Engineer to Government, to the Chief Engineer, Public Works Department, dated Fort St. George, 3rd April 1895, No. 928.

With reference to your memorandum, No. 1333 C., dated 2nd April 1895, on the Kurnool water-works plans and estimate, I have the honour to forward an explanatory note and also a draft resolution for your initials if you now approve of the scheme.

2. I shall be much obliged if you can express very early approval as I have an Assistant Engineer at Kurnool practically doing nothing waiting until sanction is accorded.

ENCLOSURE.

EXPLANATORY Note by the Sanitary Engineer to Government.

While Darcy's formula gives a discharge of 365 gallons for a 10-inch pipe with a fall of 1.3 in 1,000, Neville's, which is used in this office, and on which pipe discharge tables are ordinarily based, gives lower results. By formula $V = 140 \sqrt{S}$, if S is 1.3 in 1,000, the discharge for a 10-inch main will be 324 gallons, and if S is 1.29 in 1,000, the discharge will be about 317 gallons. If the pipe is slightly large, it is because a 9-inch would be too small and there will be less lift at pumping station with a pipe slightly larger than actually necessary. The scheme provides for a population of 30,000 people at 15 gallons per head per day of 24 hours or only 315 gallons per minute. The delivery mains to the town from the service reservoir are calculated to pass one-half of the daily supply in six hours or the whole supply in twelve hours. This accounts for providing a larger delivery main to town from service reservoir than the pumping main.

2. Mr. Ellis adopts 315 gallons as the quantity to be pumped as the fluctuations of maximum and minimum demands are compensated by the settling reservoir whence it is now proposed to draw water entirely by gravitation. In paragraph 14 of the Sanitary Engineer's letter, No. 2774, dated 6th December 1892, the undersigned assumed the maximum supply as the quantity to be pumped as no service reservoir between the engines and the town was then proposed. There would appear therefore no reason for having the engine power to the extent originally proposed.

3. The cisterns referred to are intended for silt traps, but are also necessary to avoid cast-iron specials for conducting water to the lower level to feed filter beds.

4. Since writing the memorandum No. 1333 C., dated 21st March 1893, the Acting Chief Engineer in his subsequent memorandum, dated 12th July 1893,

embodied in G.O., dated 24th August 1893, No. 1114 M., Local and Municipal, approves of the capacity of the settling tanks to retain sufficient water for a fortnight's consumption, as the cost of larger tanks is beyond the means of the municipality. There is room for future extension if it were found necessary. This course was approved by Government.

5. Though Molesworth gives one square yard of filter for each 700 gallons in 24 hours as sufficient, this has long been found to be bad practice. In the Bombay water-works the rate varies when filter is clean from 510 gallons per square yard to 322 with filters dirty and the average is only 400 gallons per square yard of sand area per 24 hours and this maximum of 400 is not exceeded in London and Sir J. Fowler recommended it should never be so.

6. The concrete backing in place of masonry foundations at service reservoir will reduce the estimate by Rs. 200 and can be adopted if desirable.

(Signed) J. A. JONES,
Sanitary Engineer to Government.
FORT ST. GEORGE,
3rd April 1895.

Note by the Chief Engineer, Public Works Department, dated 18th April 1895.

Referring to the Sanitary Engineer's explanatory note, dated 3rd April 1895, the undersigned is willing to accept Mr. Jones' calculated discharge of 324 gallons since the discrepancy between that and 369 gallons is on the right side. It is observed, however, that there are no means of ascertaining whether the diameter—12 inches—of the delivery main to the town is correct; for, though the Sanitary Engineer explains the necessity for having it larger than the 10 inch pipe, he omits to give its fall, without knowing which it is not possible to tell whether the diameter is suited to the purpose required. The diameter of the delivery main is therefore accepted provisionally only.

2. With reference to paragraph 2 of the explanatory note, it is considered that if the reservoir be filled with fourteen days' supply before commencing to draw off, a 5 H.P. engine may suit. The points alluded to in paragraphs 3, 4 and 5 are conceded.

3. As stated in paragraph 6 of his note No. 1333 C., dated 2nd April 1895, the Chief Engineer considers that the large quantity of under-ground masonry might be replaced by concrete, and the Sanitary Engineer's allusion in paragraph 6 of his explanatory note regarding the substitution of concrete backing for masonry foundation is not understood.

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

No. 33-D.

Transferred to the Local and Municipal Department. It is considered in the Public Works Department that, subject to the modifications suggested by the Chief Engineer, the revised estimate may be sanctioned.

(Signed) J. PENNYCUICK, Col., R.E.,
OOTACAMUND,
22nd April 1895.
Secretary to Government, P.W.D.

Order—dated 6th May 1895, Mis. No. 788 M., Local and Municipal.

The Sanitary Engineer will be requested to revise the estimates with reference to the Chief Engineer's remarks and to resubmit them to Government for sanction at an early date.

(True Extract.)

(Signed) J. F. PRICE,
Chief Secretary.

To the Sanitary Engineer.
" Public Works Department.

READ—also the following papers:—

From J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E., Sanitary Engineer to Government, to the Chief Secretary to Government, dated Fort St. George, 15th May 1895, No. 1386.

With reference to G.O., dated 6th May 1895, Mis. No. 788 M., Local and Municipal, I have the honour to send herewith the plans of Kurnool water-supply so that Colonel Pennycuick may state what portion of the work under ground he desires to be in concrete.

2. I suggested the backing of the arches of the service reservoir because I did not see where concrete could be used with advantage at other places than already proposed as it is for all foundations.

3. I have to point out that more concrete will be required than brickwork or stonework if it is used in vertical walls, &c.; and if used in walls or pillars which do not abut against the earth, we must have frames in which to build the work and these will be very expensive. These remarks refer to the service reservoir, filter bed and engine house.

4. I do not suppose Colonel Pennycuick wishes it used in the settling reservoir as on a sloping bank especially in black cotton soil it would crack.

5. I admit I am averse to the use of concrete in this country, except in a horizontal position, unless the work is of great thickness and of some extent, so that the cost of moulds, &c., would not bear a high percentage to the cost of the work; but for comparatively thin vertical walls, &c., I think its use would be a mistake as natives are not to be trusted to lay it so that it can be depended upon.

6. The estimate hardly needs revision on account of the difference of the material to be used unless the use of concrete for vertical walls and pillars is insisted upon; but it is so long ago since the estimate was prepared (1892) and the rate for pipes, &c., in succeeding estimates has not been altered though exchange has fallen considerably (1s. 2 $\frac{3}{4}$ d. to 1s. 1 $\frac{3}{4}$ d.) that some addition must be made on this account; on going into the matter I find that pipes, instead of costing Rs. 105 a ton landed at Madras (*vide* paragraph 18 of my report—G.O., dated 24th August 1893, No. 1114 M.) will now cost Rs. 112 per ton. This increases the estimate by Rs. 3,000 for pipes alone without taking into account specials and sluice valves, &c.

7. Again, an Assistant Engineer and a small staff has been at Kurnool since October last as from all appearances it was considered that when the preliminary work was finished the estimate would have been sanctioned and work begun. The average cost of staff including office contingencies will be Rs. 750 a month, say for two years from October last Rs. 18,000 against Rs. 13,000 in the estimate.

8. The above charges would increase the estimate by about Rs. 8,000, but it is, until tenders are received, impossible to say what the actual cost will be especially as in delivering pipes at Kurnool many contingencies will arise in landing at Madras, railing to Kistnapuram, transshipping to the canal and carrying by canal to Kurnool. The increase or decrease in using concrete would be very small compared with these excesses. Perhaps everything considered it would be better to let it be understood that on the above account there will be some excess roughly calculated as above and that a revised estimate will be submitted to Government when the pipes are received in Kurnool and work begun.

No. 722.

Referred to the Public Works Department for favour of remarks.

FORT ST. GEORGE,
21st May 1895.

(Signed) C. G. TODHUNTER,
Ag. Assistant Secretary.

Note by the Chief Engineer, Public Works Department, dated 10th June 1895, No. 334-D.

With reference to Mr. Jones' letter, No. 1386, dated 15th May 1895, the Chief Engineer, Public Works Department, has the honour to make the following observations.

2. It is not understood how there can be any doubt as to what portion of masonry work it is considered desirable to replace by concrete, for the Chief Engineer in his note No. 1383-C. of 2nd April 1895, clearly indicated under-ground masonry as being the work referred to. In paragraph 2 of his letter under reference, the Sanitary Engineer says that he has allowed concrete for all foundations; but a glance at the drawing for the engine-house will show that such is not the case. The foundations consist of only one foot of concrete with no less than five feet of superincumbent masonry. To guard against any further possibility of misunderstanding, the portion referred to is now hatched in red. It is considered that this portion should consist of concrete entirely to ground level and of the width prescribed.

3. Paragraphs 3 to 6 of Mr. Jones' letter are entirely beside the question, as the idea of concrete pillars or walls above ground was never suggested, and as there is no under-ground masonry connected with the service reservoir or filter bed it is not understood why Mr. Jones brings these works into question.

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

No. 335-D.

Transferred to the Local and Municipal Department with advertence to its endorsement No. 722, dated 26th May 1895, and the referred papers returned.

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

10th June 1895.

ORDER—dated 9th July 1895, No. 1082 M., Local and Municipal.

The revised estimate for the water-supply of Kurnool, submitted by the Sanitary Engineer, is sanctioned, subject to the modifications suggested by the Chief Engineer.

2. The Sanitary Engineer will be requested to report the amount of the estimate as now approved.

3. He is also requested to explain more fully the reason why an Assistant Engineer and a small staff have been kept at Kurnool since October last, apparently doing nothing. As at present informed, the Government fails to understand why this should have been allowed.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Chairman, Municipal Council, Kurnool.
" Collector of Kurnool.
" Sanitary Commissioner.
" Sanitary Engineer.
" Public Works Department.
Editor's Table.

Exd. S. J. Peraira.

Gobt. of {1895} Madras.
LOCAL AND MUNICIPAL.

G.O., 9th July 1895, No. 1082 M.

JULY.

Water-supply.

Sanctioning, with remark, the revised estimate for the — of Kurnool, and requesting the Sanitary Engineer to report the amount of the estimate as now approved.

19-3-95-1,000.

No. 1082 M.

GOVERNMENT OF MADRAS.

OFFICE OF SANITARY ENGINEER,

Fort St. George, *5th May* 1895.

CURRENT No. *11/12/10*

From

J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E.,

SANITARY ENGINEER TO GOVERNMENT,

To

The Chief Secretary to Government
Local and Municipal Department

SIR,

With reference to G.O., dated 6th May 1895, No. 788, re. the Local and Municipal

I have the honor to send herewith the plans of Kurnool water supply, so that before Mr. Dennyewick may state what portions of the work underground he desires to be in concrete.

2. I suggested the backing of the arch of the service reservoir because I did not see where concrete could be used with advantage at other places than already proposed, or it for all foundations.

3. I have to point out that more concrete will be required than brickwork or stone work if it is used in vertical walls and if used in walls or pillars which do not

in which to build the work, and these will be very expensive. These remarks refer to the service reservoir, filter bed & engine house.

4. I do not suppose Col. Cunningham wishes it used in the settling reservoir as on a sloping bank especially in black cotton soil it would crack.

5. I admit I am averse to the use of concrete in this country, except in a horizontal position unless the work is of great thickness & of some extent so that the cost of moulds &c. would not bear a high percentage to the cost of the work but for comparatively thin vertical walls &c. I think its use would be a mistake as natives are not to be trusted to lay it so that it can be depended upon.

6. The estimate hardly needs revision on account of the difference of the material to be used unless the use of concrete for vertical walls & pillars is insisted upon but it is so long ago since the estimate was prepared (1892) and the rate for pipes &c. in succeeding estimates has not been altered though exchange has fallen considerably ($1-2\frac{1}{2}$ to $1-1\frac{1}{2}$) that some addition must be made on this account, on going into the matter I find that pipes instead of Rs 105 a ton landed at Madras (vide Jan.

21.9.93.

Para: 18 of my report G.O., dated 24th August 1893, (M 1114 A) will now cost Rs 112 per ton.

This increases the estimate by Rs 3,000 for pipes alone without taking into account specials & sluice valves &c.

7. Again an Assistant Engineer & a small staff has been at Kurnool since October last so from all appearances it was considered that when the preliminary work was finished the estimate would have been sanctioned & work begun. The average cost of staff including office contingencies will be Rs 750 a month, say for two years from October last Rs 18,000 against 13,000 in the estimate.

8. The above charges would increase the estimate by about Rs 8,000 but it is, until tenders are received, impossible to say what the actual cost will be especially as in delivering pipes at Kurnool many contingencies will arise in landing at Madras, railing to Kistnaapuram, transshipping to the canal & carrying by canal to Kurnool. The increase or decrease in using concrete would be very small compared with these excesses. Perhaps everything considered it would be better to let it be understood that on the above account there will be some excess roughly

From

The Sanitary Engineer,
to Government.

No. 722

Referred to the Public
Works Department, for favour
of remarks.

K.D.
21/5/75

Fort St. George
26th May 1895

No. 1386.

Dated 15 May 1895.

Received 16' ———— 24 —

Enclosures (1 Roll of plan.)

SUBJECT.

Submitting the plans of the
K. and making supply so here
so that Col. Panzerick may
take what portion of work &
underground he desires to be in
concrete, with certain suggestions

C. R. 4472

Retransmitted to the
Local and Municipal
Department with reference
to P.W. Dept. Endorsements
No. 335 D dated 16 June 1895

13 JUN. 1895

Under Secretary.
F. W. Depl

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Local &
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From
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Dated 15
Received 16
Enclosures (

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Concrete, etc.

Public Works Department

P. W. CURRENT NO. 4672

10 Recd 10-6-95

Forwarded to the Public Works Department in anticipation

Enclosure of endorsement of 24 May 1895 N. 722.

1895-1896
First Assistant
Public Works Department

For Mr. [unclear]
10 June 1895

Cash
10/14/95

225/37

the Chief Engineer

Public Works Dept.

34 D. 10 June 1895

With reference to
Letter No. 1386

5th May 1895 the
Engineer Public

Works has the honor to
the following -

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is not understood
can be any

to what portion
of work it is considered

to replace by
for the Chief

in his note N. 1383
of 1895 clearly

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as being the work

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under reference,

the Sanitary Engineer

[] Loca
LOCAL &
CURRE

From

The

Enc to San'y Engr's
No 1386 of '95.

C. C. Monahan Chief

Manager

Off'g San'y Engr to Govt

Dated 15

Received 16

Enclosures

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Submitting
to that Govt
to take what
underground
concrete, etc.

Public Works Department

Note by the Chief Engineer

Public Works Dept:—

No. 334 D 10¹ June 1895

With reference to
Mr. Jones's letter No. 1386
dated 15th May 1895 the
Chief Engineer Public
Works Dept has the honor to
make the following—
observations:—

2. It is not understood
how there can be any
doubt as to what portion
of masonry work it is considered
desirable to replace by
concrete, for the Chief
Engineer, in his letter No. 1383 C
of 2nd April 1895 clearly
indicated under ground
masonry as being the work
referred to. In para 2 of
his letter under reference,
the Sanitary Engineer says

85 788h
6-5-95

that he has allowed
concrete for all foundations
but a glance at the
drawing for the engine-house
will show that such is not
the case. The foundations
consist of fully one foot of
concrete with no less than
5 feet of superincumbent
masonry. To guard against
any further possibility of
misunderstanding, the
portion referred to is now
hatched in red. It is
considered that this portion
should consist of concrete
entirely to ground level, and
of the width prescribed.
3. Paras 3 to 6 of Mr.
Jones's letter are entirely
beside the question, as the
idea of concrete pillars
or walls above ground
was never suggested, and
there is no underground

12
masonry connected with
the service reservoir or
filter bed it is not understood
why Mr. Jones brings these
works into question.

(Sd) John Pennycook.
Colr.
Chief Engineer P. W. S.

Ootacamund }
7th June 1895 } LOCAL & MUNI }
CURRENT } 1895/12

No. 335-D. 10th June 1895

Transferred to the
Local and Municipal
Dept. with advertisement & its
endorsement No. 722 dated
26. May 1895 and the
referred papers returned.

John Pennycook
Secretary to Com. P. W. S.

To,
The Local & Municipal
with original papers
returned.

cross
8/55

22/5/95

Local & Municipal Dept.

CURRENT No. 1888. m.

From

The Public Works Department. H. M.

Again J. Co. 6 May 1895, no 788-m. H.
C: no. 1612 & 1888. m.

P. S.

Order.

The revised estimate for the water supply of Kemok, submitted by the Sanitary Engineer is sanctioned, subject to the modification suggested by Remarks of the Chief Engineer.

2. The Sanitary Engineer will be requested to report to amount of the estimate as now approved.

3/7/95

No. 335. D.

Dated 10th June 1895.Received 13th June 1895.

Enclosures: C. no. 1612 m. returned.

SUBJECT

Transferring note by the Chief Engineer, P. W. Dept. regarding the Kemok water supply scheme.

1/12/95 28.11.95. 3. This is also reported to explain more fully the reason why an extra line? and a small staff have been sent to Kemok since October last apparently doing nothing. As no mention is made of the fact that the staff found, the fact fails to understand why they should have been allowed. H. M.

Note

It has been thought best not to ask for formal revision as the establishment are waiting their time waiting for the sanctioned estimate. The C.E. has already said that it may be sanctioned subject to the modifications suggested by him vide note of 22.11.95 in P.O. no 788-m. 6.11.95

The Chairman, M. C. Kemok
" Collector of Kemok
" Sanitary Commissioner
" Sanitary Engineer

Public Works Department

C. no. 1612 m. returned.