Scott. II-27—1,000—25-6-36.

Local & Municipal (193/893) Department.

Miscellaneous SERIES.

G.O. No. 760 M

DATED 10-6-1893

[Despatch Abstract.]

Madeira Water works – Sanctioning the modifications in the designs of the filter bed in the designs which are proposed by the Sanitary Engineer and have received the C.E's approval and ordering that the – should not be proceeded with to Completion.

BACK PAPERS.

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

FURTHER PAPERS.

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

R Dis 439/38
30-8-38

GOVERNMENT OF MADRAS.

Received.....1938. Registered.....1938.

Abstract.

Records-Madras Record Office-Formation of a fresh set of G.O. 760 M dated 10th June 1893 and recording G.O.342 M, dated 13th March 1893 as lost-Ordered.

EDUCATION AND PUBLIC HEALTH DEPARTMENT.

G.O.No.Ms.2610. dated 19th July 1938.

Read:-

From the Curator, Madras Record Office, No.439, dated 26th April 1938.

O R D E R

The Chief Engineer, Public Works Department(General, Buildings and Roads) has forwarded copies of G.O.No.760 M, dated 10th June 1893 and the correspondence connected with it. He states that no papers relating to G.O.No.342M, dated 13th March 1893 are available or can be obtained from other offices. The Curator, Madras Record Office is requested to form a fresh set of G.O.No.760 M, dated 10th June 1893. He is permitted to record G.O.No.342 M, dated 13th March 1893 as lost.

(BY ORDER OF HIS EXCELLENCY THE GOVERNOR)

C.H.Masterman,
Secretary to Government.

To the Curator, Madras Record Office with the papers returned.
Copy to the Chief Engineer, Public Works Department.

(True copy)

Forwarded
(By Order)

(Sd) x x x x x x
Superintendent.

(True copy)

SVR/21-7.

Sir,

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25-4-93.

3

No.355. Municipal Office,
20th April .

From

The Chairman,
Municipal Council,
Madura.

To

The Sanitary Engineer,
MADRAS.

Sir,

With reference to your letter dated the 18th instant, No.804, I have the honor to forward for your information copy of Resolution of the Municipal Council passed at the last meeting on the subject of taking the loan promised by Government towards the completion of the Madura Water Works. It will be seen therefrom that until final orders are passed by Government in the matter the Council hesitate to avail themselves of the promised loan. A copy of my letter to Government is also enclosed.

Sd. R. Fischer,
Chairman.

C/C.

[True Copy]

Mpl.Gl.No.109
25-4-93.

LOCAL & MUNICIPAL DEPARTMENT.

CHIEF SECRETARIAT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following:-

Telegram from the Chairman, Municipal Council, Madura, dated 18th April 1893, requesting early reply to the Chairman's letter No.6, dated 17th March 1893 regarding the Water Supply Scheme as the Council are not in a position to avail themselves of the Loan under the present circumstances.

O R D E R 19th April 1893 No. 530 M.Ms.

The Municipal Council will be informed that the letter in question has been forwarded to the Sanitary Engineer for consideration and report.

(True Extract)

Sd. xxxxxxxxxxx

Assistant Secretary.

To the Chairman, Municipal Council, Madura,
thro' the Collector.
To the Sanitary Engineer.

(True Copy)

Mpl.Gl.123
5-6-93.

LOCAL & MUNICIPAL DEPARTMENT.

CHIEF SECRETARIAT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following paper:-

From the Sanitary Engineer to Government, dated 20th April 1893 No.845.

With reference to G.O. dated 19th April 1893 No.530 M.Mis. Local & Municipal, I have the honor to inform you that I have the Madura papers under consideration but have had to visit Madura since my return to duty and my proposal and report will yet take a week or two to complete and it will be sometine further before Govvernment can pass orders.

2. I would submit to Government that present liablilities must meantime be met and I beg that the Chairman may be urgently requested to take some steps to place himslef in funds either by drawing part of the loan or otherwise.

3. The Contractos already complain that they cannot be paid the full amount of their bills and there are bills for pipe laying etc. which are about to go forward. The liabilities incurred are practically the cost of the total work except the cost of the filter bed and though the question of proceeding with this work must be finally settled by Government, I trust yet to be allowed to proceed with the works to completion with perhaps a few modifications in design.

ORDER dated 28th April 1893, No.578 M.Mis.

Communicated to the Municipal Council, Madura with the remark that present liablities should be met without delay.

(True Extract)

Sd.xxxxxxxxxxxxxxx
Under Secretary P.W.D.
For Chief Secretary.

To the Chairman.

GOVERNMENT OF MADRAS.

OFFICE OF ASSISTANT SANITARY ENGINEER,

SOUTHERN CIRCLE,

Madura. 8 - 5 - 1893.

My dear Fischer,

I understand you have arranged for money for paying up bills due to the Water Works Contractors. I shall be obliged if you can pay something to the Engine House Contractor ("Veeramia") as his works are not advantageous and he has a lot due to him - it will only mean loss in the end if works are stopped. What do the Council say to the G.O.?

Yours sincerely,

Sd.xxxxxxxxxxxxxxxxx

(True Copy)

Municipal Office, Madura,

13th May 1893.

From

The Chairman,
Municipal Council,
Madura,

To

The Chief Secretary to Government,
Fort St. George,
MADRAS.

Through

The Collector
of MADURA.

Sir,

Sub: Submitting copy of resolution No.45/12-5-93 of the Madura Municipal Council praying for the early issue of orders on the Chairman's communication regarding the Madura Water Works.

With reference to G.O. No.578 M.Mis. dated the 28th April 1893, I have the honor to submit for the orders of the Government copy of resolution No.45 passed by the Municipal Council, Madura, at the meeting held this day regarding the Madura Water Works.

2. An application in the prescribed form will be submitted for drawing such portion of the loan sanctioned for the Water Works as may be considered necessary after consultation with the Sanitary Engineer who has been requested to submit a statement of the liabilities already incurred in connection with the said works. I also beg to request that the Government will be pleased to issue early orders for stopping the said works till the question raised by the Council is finally ~~xxxxx~~ settled.

I have the honor to be,
Sir,
Your most obedient servant,

Sd. R. Fischer,
Chairman.

(True copy)

No.396. Municipal Office, Madura,
12th May 1938.

From

The Chairman,
Municipal Council,
Madura.

To

The Sanitary Engineer to Government,
MADRAS.

Sir,

Adverting to your letter to Government, No.845 dated the 20th April 1893 and to G.O. No.578 M.Mis dated 28th April 1893, passed thereon, I have the honor to forward for your information copy of resolution No.45 of the Municipal Council, Madura, passed at the meeting held this day and to request that you will be so good as to forward to me at a very early date a statement of the liabilities already incurred in connection with the Madura Water Works in order that the necessary application may be submitted to the Government for drawing such portion of the loan as may be considered necessary for the present.

I have the honour to be,
Sir,

Your most obedient servant,

Sd. Fischer,
Chairman.

No.397

True copy forwarded to the Assistant Sanitary Engineer, Southern ~~Circle~~ Circle for information with reference to his letter No.745 dated the 3rd inst.

True copy.

10

Municipal Council, Madura,
26th May 1893.

From

The Chairman,
Municipal Council,
Madura.

To

The Chief Secretary to Governmnt,
Fort St. George,
MADRAS.

Through

The Collector
and The Divisional Officer,
MADURA.

Sir,

In continuation of my letter No.18 dated the 12th May 1893, I have the honor to submit herewith an application in the prescribed form for drawing Rs.164000 upon the loan sanctioned by the Government for the completion of the Madura Water Works and to request that the Government will be pleased to sanction the same and order the amount to be placed at the disposal of the Council at an early date. This sum is required by the Sanitary Engineer for meeting the liabilities already incurred in connection with the said Works as detailed in the accompanying copy of his letter to me.

I respectfully beg to invite the attention of the Government to Chairman's letter No.6 dated 17-3-93 and resolutions of the Council Nos.40. dated 18-4-93 and 45. dated 12-5-93 already submitted to them and request that early orders be passed on the matter. I also beg to submit that as G.O. No.632 M.Mis. of the 11th inst. has not disposed of the points raised by the Council I considered it advisable to ascertain the views before submitting the enclosed application, but as there was no quorum at the meeting called to day, I have addressed this letter now.

I have the honor to be,
Sir,
Your most obedient servant,
Sd.- R. Fischer,
Chairman.

(True copy)

Statement prescribed by Government of India to accompany application of the Madura Municipality for raising a loan of Rs.1,64,000 under the rules made under Section 7 of the Local Authorities Loan Act - 1879.

1. The loan is required for expenditure on the extension of the Water Supply Scheme estimated to cost about Rs.3,91,000 inclusive of the Government grant of Rs.2,13,525 of which Rs.2,12,000 has already been spent.

2. It is proposed to borrow Rs.1,64,000 for the water supply at 4% payable half-yearly on the 15th April and the 15th October.

3. It is proposed to borrow the above on the security of the municipal taxes and rates.

4. The law under which the said rates and taxes are imposed and collected is the Madras District Municipalities Act IV of 1884.

5. The loan is required for a period of 30 years. It is proposed to repay the loan by means of a sinking fund of Rs.3280 at the expiration of 30 years.

6. The yearly proceeds of the funds administered by the Municipality are exhibited for three years in the ace companying Statement A.

7. The yearly expenditure for three years is shown in the accompanying Statement B.

8. There are no prior charges on the funds except that, when Government hand over charge of the Old Jail Buildings, a payment of Rs.3000 will have to be made for the same by instalements of Rs.1000 per annum with interest at 4½% - Vide G.O. No.1155 dated 8-5-84 Judicial Department and that a loan of rupees 10000 has been raised on the security of rates and taxes on houses and lands - Vide G.O. No.2995 dated 23-12-92 communicating the sanctioning of the Government of India for the raising of the loan conveyed in letter from the Government of India No.137 dated 13-12-84 Home Department and that a debenture loan of Rs.27000 has

Statement prescribed by Government of India to accompany application of the Madura Municipality for raising a loan of Rs.1,64,000 under the rules made under Section 7 of the Local Authorities Loan Act - 1879.

1. The loan is required for expenditure on the extension of the Water Supply Scheme estimated to cost about Rs.3,91,000 inclusive of the Government grant of Rs.2,13,525 of which Rs.2,12,000 has already been spent.

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ceedings of the
s xxxxxx special
12th May 1893.

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Read Government orders No.530 M.
and 578 M.Mis dated 28-4-93 and of the Sa
Engineer directing that the present liabili
connection with the Madura Water Works shou
without delay.

Proposed by Mr. G. Srinivasa Row and seconde
Mr. I. Ramachandrier that such portion of the
as may be suffieicent to meet the present liab
ties be drawn, and that the Government may be
quested to expedite its reply to Chairman's le
No.6 dated the 17th March 1893 and to stop imme
all works pending final disposal of the questio
by the Cpuncil and to treat such loan as a furt
grant to the municipality in case the Water Wo
prove a failure or are stopped for any other reaso

Unanimously carried.

x x x

(True Extract)

Sd. xxxxxxx
Chairman.

14

GOVERNMENT OF MADRAS.

No.J/31. OFFICE OF SANITARY ENGINEER,

Camp Trichinopoly, 17th May 1893.

From J.A. Jones Esq., MEM.INST.C.E., F.R.S.E.,
Sanitary Engineer to Government.

To The Chairman,
Municipal Council, Madura.

Sir,

I have the honor to acknowledge your No.396 of 13th May 1893 enclosing copy of resolution of the Municipal Cpuncil of 12th May 1893.

2. As you are aware, the total estimates for the works now stands atRs.3,91,000 and the whole work with the exception of the Filter Bed (Costing Rs.36,000) but of this Rs.9000 have been spent) are contracted for and indeed all the material is now on the ground. Of contingencies some Rs.30,000 are still unspent and Rs.6000 for driver's quarters, so that the total amount of the loan Rs.1,95,000 less (Rs.36,000 - Rs.9000) + Rs.30,000 + Rs.6000 or say Rs.63,000/2 = 31500Ø or Rs.1,64,000 is now required to meet liabilities.

3. Under these circumstances, you may passibly think it well for the Council to reconsider its resolution as to Government granting the money instead of lending it. To stop the works would be a proceeding that I do not think can be contemplated and I know of no reason for doing so except that, after 15 months drought, less water than we expected to get was found and this at the driest time of the year. I have advised Government to proceed with the work with an alteration in the design of the filter so that we can by a year or two experience and until after the Periyar waters come into the river, find out exactly what amount of water Madura requires and what we will obtain throughout each month of the year.

4. Meantime I request that if the Council have no water works funds, advances to that fund may be made from general revenues to meet current expenditure or otherwise extra expense will be incurred by delay.

Sd. Jones.
Sany. Engr. to Govt.

(True copy)

No.19.

Municipal Office, Madura,
31st May 1893.

To

The Chief Secretary to Government,
Fort St. George, Madras.

Through

The Colletor
and The Divisional Officer,
Madura.

Sir,

In continuation of this office No.18 dated 12th May 83 I have the honor to submit herewith copy of resolution No.53 of the Municipal Council dated the 30th instant on the subject of the Madura Water Works:

It will be seen from the enclosed copy of the Sanitary Engineer's letter that a sum of Rs.1,64,000 is required to meet the liabilities on account of the works and I have the honor to request that the Government will be pleased to order this amount to be placed at the disposal of the Council at an early date and to trat the sum now sought to be borrowed as a further grant to the Municipality in case the Water Works ultimately prove a failure or are stopped for any other reasons. The statement prescribed by Government of India to accompany the loan application is herewith submitted.

I have etc.

Sd. R. Fischer,
Chairman.

(True Copy)

Extract from the proceedings of the Municipal Council Madura passed at the meeting held on the 30th May 1893.

Read the following papers:-

1. Resolution of the Municipal Council Madura No.582 dated 14th March 1893.

2. Chairman's letter to Government No.6 dated 17th March 1893.

3. Resolution of the Council No.40 dated 18th April 93.

4. Chairman's letter to Government No.15 dated 19th April 1893.

5. G.O. No.530 M.Mis dated 19th April 1893.

6 Sanitary Engineer's letter to Government No.845 dated 20th April 1893 and G.O. No.578 M.Mis dated 28-4-93 passed thereon.

7. Resolution of the Council No.45 dated 12th May '93.

9. Chairman's letter to the Sanitary Engineer No.396 dated 12th May 1893.

10. Sanitary Engineer's letter to Chairman No.7/31 dated 17th May 1893.

11. G.O. No.632 M.Mis dated 11th May 1893.

..

Resolved that the Government be requested to place at the disposal of the Council Rs.1,64,000 required by the Sanitary Engineer in his letter No.7/31 dated 17th May 1893 to meet the present liabilities of the Water Works and to treat the same as a loan in case the Water Works prove a success or treat it as a grant in case of failure.

x x x x x

(True Extract)

Statement prescribed by Government of India
to accompany application of the Madura Municipality
for raising a loan of Rs.1,64,000 under the rules made
under Section 7 of the Local Authorities Loan Act - 1879.

1. The loan is required for expenditure on the extension of the Water Supply Scheme estimated to cost about Rs.3,91,000 inclusive of the Government grant of Rs.2,13,525 of which Rs.2,12,000 has already been spent.

2. It is proposed to borrow Rs.1,64,000 for the water supply at 4% payable half-yearly on the 15th April and the 15th October.

3. It is proposed to borrow the above on the security of the municipal taxes and rates.

4. The law under which the said rates and taxes are imposed and collected is the Madras District Municipalities Act IV of 1884.

5. The loan is required for a period of 30 years. It is proposed to repay the loan by means of a sinking fund of Rs.3280 at the expiration of 30 years.

6. The yearly proceeds of the funds administered by the Municipality are exhibited for three years in the accompanying Statement A.

7. The yearly expenditure for three years is shown in the accompanying Statement B.

8. There are no prior charges on the funds except that, when Government hand over charge of the Old Jail Buildings, a payment of Rs.3000 will have to be made for the same by instalements of Rs.1000 per annum with interest at 4½% - Vide G.O. No.1155 dated 8-5-84 Judicial Department and that a loan of rupees 10000 has been raised on the security of rates and taxes on houses and lands - Vide G.O. No.2995 dated 23-12-92 communicating the sanctioning of the Government of India for the raising of the loan conveyed in letter from the Government of India No.137 dated 13-12-84 Home Department and that a debenture loan of Rs.27000 has

Statement prescribed by Government of India
to accompany application of the Madura Municipality
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been raised on the security of the same rates and taxes at 6% interest per annum - Vide G.O. No.638 dated 7-7-86 Mis.

(True Copy)

Local & Municipal Department.

Chief Secretariat.

Proceedings of the Madras Government.

...

Read the following paper:-

From the Chairman, Municipal Council, Madura dated 12th May 1893, No.18 submitting copy of resolution No.45 dated 12th May 1893, praying fot the ealy issude of orders regarding the Madura Water Works.

Order dated 30th May 1893 No.710 M.Mis.

The Government sees no reason for stopping the works pending settlement of the engineering questions now under consideration.

2. The suggestion that in the event of the failure of the Scheme, the loan should be trated as grant is not a matter on which orders are at present required.

(True Extract)

Sd. xxxxxxxxxxxxxx
Under Secretary, P.W.D.
For Chief Secretary.

To the Chairman, Municipal Council, Madura,
thro' the Collector.

Copy to P.W. Department.

the Chairman was wired to expedite transfer of lower halves. The bill fell due on 18th April, but it was not until the 21st April that the Bank placed a further sum of Rs.12,764 to my credit making then Rs.21,223 + Rs.12764 + Rs.4000 or a total of Rs.37,987 and with my permanent advance I was just able to prevent the bill being dishonored on the last day of grace. The sum of Rs.12,764 was the proceeds of only a portion of the Promisory Notes for Rs.12,000 out of Rs.31,500, the remainder of the notes viz. 18,500 having to be returned to the Council for a correction of the endorsement. This was on 21st April 1893. Up to this date (29-5-93) these notes have not been returned to the Bank and the Bill of 20th February 1893 for Rs.17,428 as above still remains unpaid. I have wired the Chairman on 26th May for an explanation and requesting the notes to be forwarded as the contractors are calling to be paid as they should be under the contracts.

4. I regret to have to place all these details before Government but am forced to do so by the many calls for money from all quarters.

5.I have the honor to request that the Council may be urgently called on to provide funds forthwith.

Order dated 8th June 1893 No.754 M.Mis.

The Municipal Council will be requested to see that the necessary payments are made without delay, as already required in G.O. dated 28th April 1893 No.578 M.

(True Extract)

Sd. xxxxxxxxxx
Under Secretary P.W.D.
for Chief Secretary.

To the Chairman, Municipal Council, Madura,
thro' the Collector.
,, the Sanitary Engineer.

Local & Munivipal Department.

Chief Secretariat.

Proceedings of the Madras Government.

Read the following paper:-

From the Sanitary Engineer, dated 1st May 1893 No.931.

With reference to G.O. dated the 15th March, 1893 No.342 M.Mis. Local & Municipal and papers in connection therewith regarding the Madura Water Supply also endorsement No.219 of the 11th April 1893 I have the honor to forward the accompanying report (copy enclosed) which includes proposals for certain modification of the design and to request orders thereon.

2. The papers referred above are returned.

Memorandum of the Public Works Department dated 29th May 1893 No.2152 C.

Read Endorsement in the Local and Municipal Department No. dated 8th May 1893 on letter from the Sanitary Engineer No.93 dated 1st May 1893.

Note by the Acting Chief Engineer, Public Works Department, dated 18th May 1893:-

The undersigned agrees with the Sanitary Engineer that the calculation of the flow of the subterranean water is one of much difficulty and considers that the actual minimum supply of water to the Madura Works can only be ascertained after those -- works have been in operation for some time.

It seems however to be fairly proved that this minimum supply will not fall much below 60 feet per minute- when the filter and barrage wall have been constructed it is quite possible that the minimum supply will be in excess of this quantity.

60 C.ft, of water per minute will admit of a daily supply of 7 gallons to 80,000 people, and the undersigned is therefore of opinion that the works should now be proceeded with to completion.

the Chairman was wired to expedite transfer of lower halves. The bill fell due on 18th April, but it was not until the 21st April that the Bank placed a further sum of Rs.12,764 to my credit making then Rs.21,223 + Rs.12764 + Rs.4000 or a total of Rs.37,987 and with my permanent advance I was just able to prevent the bill being dishonored on the last day of grace. The sum of Rs.12,764 was the proceeds of only a portion of the Promisory Notes for Rs.12,000 out of Rs.31,500, the remainder of the notes viz. 18,500 having to be returned to the Council for a correction of the endorsement. This was on 21st April 1893. Up to this date (29-5-93) these notes have not been returned to the Bank and the Bill of 20th February 1893 for Rs.17,428 as above still remains unpaid. I have wired the Chairman on 26th May for an explanation and requesting the notes to be forwarded as the contractors are calling to be paid as they should be under the contracts.

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(True Extract)

Sd. xxxxxxxxxx
Under Secretary P.W.D.
for Chief Secretary.

To the Chairman, Municipal Council, Madura,
thro' the Collector.
,, the Sanitary Engineer.

23

Local & Munivipal Department.

Chief Secretariat.

Proceedings of the Madras Government.

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It seems however to be fairly proved that this minimum supply will not fall much below 60 feet per minute- when the filter and barrage wall have been constructed it is quite possible that the minimum supply will be in excess of this quantity.

60 C.ft, of water per minute will admit of a daily supply of 7 gallons to 80,000 people, and the undersigned is therefore of opinion that the works should now be proceeded with to completion.

.... that the question of a supplementary supply whether from the Periyar or from the Vaigai, and not for the present, be further investigated.

The original design of the filter bed provided an area of 150' square equal to 22,500 square feet. Mr. Hughes proposed a filter of an equal area 225' x 100' to be constructed towards the centre of the river where the deepest bed of sand was situated. Mr. Jones now proposes to extend the filter across the river for a length of 1125' with a breadth of 20' only, thus retaining the same filtration area as that originally adopted. This filter is to be supplemented by a barrage wall.

The undersigned approves of these arrangements.

The wall should be constructed to the full section shown on the drawings (Sheet No.2) but it might in the first instance be brought up only to 2' above the gravel in the filter. If experience should show this arrangement to be insufficient, the wall could hereafter be easily continued up to -- mean sand level.

.....

Forwarded to the Local & Municipal Department.

....

Order dated 10th June 1893 No.760 M.Mis.

The modifications in the design of the filter bed in the Vaigai, which are proposed by the Sanitary Engineer and have received the Chief Engineer's approval are sanctioned.

The water works should now be proceeded with to cpmpletion.

(True Extract)

Sd. xxxxxxxxxxxxxx
Under Secretary P.W.D.
for Chief Secretary.

To the Sanitary Engineer (with plans and estimates)returned.
,, the Chairman, Municipal Council, Madura, thro' the Collector.
,, the Collector.
,, Public Works Department.

Enclosure.

MADURA WATER WORKS.

G.O. dated 13th March 1893, No.342 M.Mis.

...

This report has reference to the circumstances which were found to exist when the excavation for the filter bed in the Vaigai had been completed when it was reported by the Asst. Sanitary Engineer that he found that the yield was much less than expected. The amount estimated, as the maximum amount which would be required when the town had increased population to 100,000 drawing 15 gallons per head daily from the water works was 1500000 gallons.

2. During the undersigned's absence on leave and Mr. Clark, the Acting Sanitary Engineer, being ill, Mr. Minchin reported the fa ct through the Collector of the District who advised Government and Mr. Hughes, the Superintending Engineer VI Circle visited the works, Mr. Hughes' reports of the 11th and 17th February 1893 have been before Government and accompany this report. There is also a further letter of Mr. Hughes dated 24th February 1893 No.1214 M.D. to the Chief Engineer, Public Works Department.

3. Mr. Hughes in his first letter No.1166 M.D. states that he finds that the flow of river (that is, as calculated from the supply to an open channel cut across the river bed with a second longitudinal channel) was between 45 and 60 feet per minute and that the water level was 2½ feet below the assumed level in the designs but adds that it is exceptional for the river to be so dry at that time of the year. The time selected for the construction of the filter was of course the time when freshes were not likely to occur and hence the time when the river was expected to have the least quantity of water in it. The amount of water met with is much less than it was anticipated it would be, but it is apparently in quantity that Mr. Hughes would have anticipated, for he refers to a report of certain experiments (which report is now among the attached papers) made by him with reference to Mr. O'Shaughnessy's scheme (of which the scheme

.... that the question of a supplementary supply whether from the Periyar or from the Vaigai, and not for the present, be further investigated.

The original design of the filter bed provided an area of 150' square equal to 22,500 square feet. Mr. Hughes proposed a filter of an equal area 225' x 100' to be constructed towards the centre of the river where the deepest bed of sand was situated. Mr. Jones now proposes to extend the filter across the river for a length of 1125' with a breadth of 20' only, thus retaining the same filtration area as that originally adopted. This filter is to be supplemented by a barrage wall.

The undersigned approves of these arrangements.

The wall should be constructed to the full section shown on the drawings (Sheet No.2) but it might in the first instance be brought up only to 2' above the gravel in the filter. If experience should show this arrangement to be insufficient, the wall could hereafter be easily continued up to -- mean sand level.

.....

Forwarded to the Local & Municipal Department.

....

Order dated 10th June 1893 No.760 M.Mis.

The modifications in the design of the filter bed in the Vaigai, which are proposed by the Sanitary Engineer and have received the Chief Engineer's approval are sanctioned.

The water works should now be proceeded with to cpmpletion.

(True Extract)

Sd. xxxxxxxxxxxxxx
Under Secretary P.W.D.
for Chief Secretary.

To the Sanitary Engineer (with plans and estimates)returned.
,, the Chairman, Municipal Council, Madura, thro' the Collector.
,, the Collector.
,, Public Works Department.

Enclosure.

MADURA WATER WORKS.

G.O. dated 13th March 1893, No.342 M.Mis.

This report has reference to the circumstances which were found to exist when the excavation for the filter bed in the Vaigai had been completed when it was reported by the Asst. Sanitary Engineer that he found that the yield was much less than expected. The amount estimated, as the maximum amount which would be required when the town had increased population to 100,000 drawing 15 gallons per head daily from the water works was 1500000 gallons.

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now under execution is an amendment) and sent to the Superintending Engineer on the 19th September 1889. (Mr. Hughes says 25th September 1889). This report was not communicated to me nor Mr. Hughes states, was it to the Collector or apparently to any one. It remained in the Office of the Superintending Engineer and no objection was raised in any quarter to the scheme being carried out.

4. Had the result of Mr. Hughes observations been communicated, it is possible that some alterations might have been made in the design of the project but these have been more or less, supplementary works. The letter which was communicated to me was Mr. Hughes' letter No.538 M. of 27th September 1889 (on copy sent me the date is 19th September 1889) in which the subject discussed is simply the best position for the dam or line of wells and in which no question is raised as to the sufficiency of the supply and therefore it was presumed that that question had been settled and it will be seen that in my report to Government the question of the sufficency of the supply was neve alluded. In the report to the Superintending Engineer dated the 19th September 1889, Mr, Hughes with his belief that the abailbale quantity being smaller than generally estimated says:- of Mr. O'shanghnessy's project:- "I do not say that the project for this reason needs reconsideration. I believe it is a good and necessary project but for its success will depend on an occasional flush from the Periyar which there ought to be no difficulty in arranging for". I draw attention to these remarks because there is apparently an impression on the mind of the Madura Council that the works, i.e. the pumping station including the Engine House, the pipes etc., these works would not have been designed as they are or occupy the position they do had the above information been supplied. This point may at once be met by saying that that the pumping station is placed in the best situation it can be with regard to Madura and that even if the Periyar supply had been the originally proposed source of supply, the present site is the most advantageous at which to pump because the town is commanded more conveniently and at better elevation than it would be from any other position. The works therefore which are constructed are practically those which would in any case have been so.

5. Mr. Hughes in his No.1166 M.D. Para 4 states that he was unaware how much of his No.384 of 19 (not 25) September 1889 was communicated to the Sanitary Engineer but his No.1207 M.D. of 22 February 1893 states that nome of this letter was, and the sections to which he refers and which accompany this report were sent to me with a copy of his No.538 M. of the 27th September 1889. Mr Hughes recommended the section at 3600 feet above Mr. O'shanghnessy's line, but there was no site in such a position for the Engine House etc. and as the section at 4000 gave a larger area (vide section) viz.1080 x.5.5 = 5940 against 1280 x 4.5 = 5760 that site was adopted. the site therefore is 400 feet above that recommended by Mr. Hughes, this seems a matter of not much importance in respect to the quantity of water available because the same amount though with a different velocity will pass either section.

6. Reverting to the question of the amount of water available in the dry season by drawing from the river snad alone, it will be observed vide Mr. Hughes report of 19th September 1889 No.334 that estimates by various Engineers differ very considerably The calculation of subterranean supplies has always been and always will be one of much difficulty (witness the investigation by Royal Commissioner now going on to endeavour to find what amount of water London might derive from the Chalk formation) and therefore the difference of opinion as to the actual quantity available or actually discharged is not to be wondered at. While not prepared to accept the experiment reported in Mr. Hughes' letter of the 11th February 1893 as accurately giving the discharge, it is -- possible that not more than 60 feet per minute (without any river works whatever and drawing from an open channel) was flowing at that time at last such is the result found by pumping for 3 days since the date of Mr. Hughes' visit.

7. The year 1892 has however been an exceedingly exceptional one and since they year 1876 the past year has been one of the driest on record indeed except in 1855 taking the rainfall on the palins, it has been the year of the least rainfall so that it is probable that the possible minimum and therefore the most unfavourable

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7. The year 1892 has however been an exceedingly exceptional one and since the year 1876 the past year has been one of the driest on record indeed except in 1855 taking the rainfall on the palins, it has been the year of the least rainfall so that it is probable that the possible minimum and therefore the most unfavourable

condition of the supply are known. But even assuming that at certain period of the year only 60 C.Ft. a minute will be available, it is a quantity which equals a supply of no less than 7 gallons a head for 80,000 people, the present population of Madura.

$$\frac{\text{Cft.} \quad \text{mt.} \quad \text{hrs.} \quad \text{gals.}}{60 \times 60 \times 24 \times 6\tfrac{1}{4}} = 7.8 \text{ gallons.}$$
$$80{,}000 \text{ people.}$$

Many towns in India do not have their works constructed capable of supplying more than this and many towns have less throughout the whole year. In Madura's case this quantity is the hot weather supply; there will be a very much increased supply during other months and a full supply not only for 80,000 people but for 1,00,000 people at 15 gallons per head during the remaing three months and in expressing these views I am simply coinciding with those of Mr. Hughes expressed in his No. 1214 M.D. of 24th February 1893. As before stated however the question of subterranean supplies is a difficult one to estimate for there are so many factors to consider, for instance the increased velocity caused by continual pumping may result in an increased flow if there is a supply now kept back by friction and want of head - By continual pumping a flow may be caused towards the river which does not exist, nor is it known at present what is the yield of the river at various times throughout the year other than at the end of a very exceptional period of draught.

8. Mr. Hughes also states vide his No. 1188 of 17 February 1893 that there are several spring channels at present on the left bank of the river which will not be maintained where the lands are brought under cultivation from the Periyar, while at first at any rate there will be a good deal of surplus passed into the river and the discharge increased in time of draught to 1½ feet per second - or say 10 gallons per head for 80,000 people.

9. Again the water consumption of Provincial towns on the palins of Madras has yet to be tested, hitherto it has been based on what is known in regard to other Presidencies and excepting Cuddapah no figures are available; in that town the water works may said to be hardly yet complete bu the consumption has at no time

been 10 gallons per head.

10. To say therefore at present that Madura must have so much water from the Periyar is an assumption that can be made only on an inadequate basis even though that basis is that of maximum capacity of the works as designed. A supply from the Periyar is the only source mentioned by Mr. Hughes but it is possible that the Vaigai itself may be used for a further supply. Plenty of water comes down the Vaigai and it is possilbe that a large amount can be stored somewhere near the river bank in some of the existing tanks now fed from the river. This and other points for reasons to be hereafter given it has not been thought - necessary to enter into before writing this report.

11. It is believed that what ought ought to be done is to finish the works because it is only on completion of the works it possibly can be ascertained what water will be obtained from time to time during the year from Vaigai and secondly what the demand will be from time to time during each month of the year. These questions cannot be solved by stopping the work and letting the river flow on without attempting to pump it up and waitng for four years and perhaps more than that time. There must be a complete year's experience of pumping from the river before any estimate of the difference of demand and supply can be accurately formed.

12. Even if the Periyar supply is available, if meantime other subsidiary works have not been carried out it is desirable that effect of the Periyar Supply on the river should be ascertained before any special works for bringing that water to the pumping station are contemplated.

13. It will therefore be seen that it is considered that there is no present good reason for thinking of the abandonment of the Vaigai supply, partial though it may be at sometime of the year.

14. By completing the works the improvements will be very considerable over the present existing works and during a large portion of the year there will not only be ample water for all but a large amount may be stored in the tenks in the town etc. this will also be a very great advantage.

15. Looking at the matter on this light no attempt has been made to consider what works would be required to get Periyar water or Vaigai water etc.. Considerations have been limited to the question of an improved method by which all the water may be obtained from the river and the prevention of any loss. At the sametime, however, the chance that additional water may be required to be brought from the left bank of the river has not been lost sight of - it may be Periyar water or Vaigai water and the improvements have been designed accordingly.

16. The amended design for the filter bed with an estimate accompanied this report and it is believed that this design will meet several of the objections made by Mr. Hughes to the sanctioned design though the original design was not made under the misconception supposed.

17. Looking at the design, it will be seen that it is proposed to place the filter right across the river so that all the water passing down the river must pass over it. The culvert already referred to, which is of ample size to carry much more than the full supply, is placed in rear of the filter and at the face of a barrage wall which completes the design. The filter has the same area as that originally designed. The barrage wall will be useful in preventing or delaying the passage of any water down the river which is below the level of top of the wall. This at is/about the mean level of the surface of the sand, but it might perhaps be still furhter raised and the sand area behind it increased. These are points for consideration; it is behind that the barrage wall will, when the water has fallen to its top level, dam back and retain a very considerable quantity of water. The fall of the river bed is only 6 feet per mile and the escaping water over the top of the wall would be the natural flow less what was being pumped while all below that level would be storedexcept what might possibly escape at spring channels higher up. The proper section of the wall is also a point for consideration. It is placed under the level of the sand; at times however, there is no doubt that the sand in rear will be disturbed possibly to an extent of 2 feet in depth.

18. As these may be some doubts as to the efficacy of the barrage

wall there has been shown on one of its cross sections an alternative proposal wherin the lower wall of the conduit will be raised only 2 feet higher than the top of the gravel in the filter; this would tend to back up the water passing over the filter, but the sufficiency of the proposal is a matter for consideration.

19. Mr. Hughes might possibly take exception to this design because of his opinion that a certain amount of water ought to be passed down the river to keep it clean. This, I think, is unimportant for if there is no water in the river persons will cease to go there and as the same amount if not more will be available elsewhere, there will be no hardship caused. It is, however, not at all certain that there will not be found still a flow in the river. The theory that all the water in a river's sandy bed is water coming from itsupper reaches stored there during the last floods etc. is probably not correct. There must always be a flow from the land to the river.

20. Enquiries have been made in respect to a well (diameter 15 feet) now in use at the Madura Mills; the ordinary water level is at 426.0 and when being pumped at the rate of 500 gallons per minute the surface falls some 4 feet only (the well is lower down the river than the new Head Works and the water stands about the same level as that in the river) the well is sunk at the Mills into sand which apparently must run below the kunkur of the river but the water level as before stated is nearly the same as that of the river. The water is slightly brackish but it is just possible by sinking a well in the bed of the river to a greater depth than the well referred to an ample supplementary supply may be tapped. This experiment is worh trying.

Estimates.

21. The cost of the amended design as compared with the original design is Rs.60,880 against Rs.38,201. It will be noticed however, that certain expenditure has been incurred for baling and puddle walls etc. and for experiments as to quantity of water which cannot be recouped and thus amounts

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Estimates.

21. The cost of the amended design as compared with the original design is Rs.60,880 against Rs.39,201. It will be noticed however, that certain expenditure has been incurred for baling and puddle walls etc. and for experiments as to quantity of water which cannot be recouped and thus amounts

to Rs.8829. Much material (about Rs.14,000 worth) for the execution of the original design is already on the ground. This however will all be used if the revised design is accepted. If the design mentioned in para No.18 is thought to be sufficient the cost of the new design will be only Rs. 52,186 against the original amount of Rs.39,201/- to which has again to be added the amount of Rs,8829. It is not however proposed to ask for ~~xxxtiom~~ sanction to an increase in the estimates at present; there is likely to be a considerable saving on pipes, say some Rs.12,000/- and it is probable that that the savings from the contingencies making allowance for everything, will find the remainder. It is also to be noted that the original estimates were reduced by some Rs.33,360 of which Rs.14,287 were returned to Government so that at present the charges will be less than what the Council originally intended to meet.

22. It may be necessary to provide a small service reservoir but the removal of the existing iron tank at the Stone Elephant to a higher elevation will meet present circumstances.

23. It is hoped Government will sanction the works proceeding as suggested and meantime during the following years when further information is abailable, the question of any further provision necessary may be considered.

24. From Mr. Hughes' No.124 M.D. of 24 February 1893, it may be inferred that he practically is in agreement with the above proposals. there are ~~xmch~~ certain points such as the position and method of filtration to be adopted, if Periyar water is eventually brought in, but that point does not need to be discussed at present. In regard to the culvert proposed, as Mr. Hughes says, it will be useful in any case and an improved supply will be a great blessing to Madura and as a great deal of the filter bed material is already at site, it is undoubtedly the wisest course to go on with the works to completion.

...---...

No.790. Municipal Office, Madura,
21st Aug. 1894.

From
The Chairman,
Municipal Council,
Madura,

To
The Sanitary Commissioner,
for Madras,
Fort St. George.

Ref: Your letter No.1480/S. dated 6th August 1894.

...

Sir,

I have the honor to acknowledge the receipt of the file of correspondence relating to the Madura Water Works forwarded with the above.

I have etc.,
Sd. xxxxxxxx
Chairman.

No.1480/S. Office of the Sanitary Commissioner
6th August 1894.

From
Surgeon Lieut-Col. W.G. King, M.B.,C.M.,D.P.H.,
Acting Sanitary Commissioner,
for Madras.

To
The Chairman,
Municipal Council,
Madura.

Sir,

I have the honor to return herewith the papers connected with the Madura Water Works lent to me. Please acknowlege receipt.

I have the honor etc.,

Sd. xxxxxxxxxxx
For Sanitary Commissioner.,
absent on duty.

Municipal Office, Madura,
13th June 1894.

From

The ~~Commissioner~~ Chairman,
Municipal Council,
Madura.

To

The Assistant Sanitary Engineer,
In Charge of Madura Water Works,
Madura.

Sir,

With reference to the pay bill of the Water Works establishment for May 1894, I have the honor to inform you that the pay of the establishment as per the scale sanctioned in the budget for 1894-95 for the new Water Works has been passed and a cheque for Rs.426-2-7 accordingly issued and sent herewith.

2. As for the temporary staff and the establishment at the Myamantapam pumping station, I have to observe that their entertainment or rather their retention in service has not been sanctioned by Government and that withouttheir sanction pay cannot be passed.

3. Meanwhile I would request you to be so good as to inform me whether you consider it any longer necessary to continue their services and if so xxxx for what period in view to enable me to submit the necessary application to Government. But in case you are of opinion that their services are not at all required, they may be discharged at once.

I have the honor etc.,

Sd. xxxxxxxxxxx

Chairman delegate.

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I have the honor etc.,

Sd. xxxxxxxxxxx

Chairman delegate.

GOVERNMENT OF MADRAS.
Sanitary Engineer's Department.

Office of Asst. Sany. Engineer,
Madura, 24th June 94.

From

J.E. Lockyer Esq., Assoc.M. Inst.C.E., F.I. Inst.

Asst. Sanitary Engineer.

To

The Chairman,
Municipal Council,
Madura.

Sir,

Ref: your No.578 dated 14-6-94.

I have the honor to request sanction to the following expenditure on the Mayamandapam engine for the months May to July inclusive.

May 1894.

Pay of temporary drivers and firemen.	Rs.	16--8--0
1 Head Watchman.	..	6--0--0
2 Watchman.	..	8--0--0
2 Temporary channel cleaners at 3 As. a day.	..	11-10--0
Sundries.	..	50--0--0
Repairs.	..	10--0--0
	Rs.	100--0--0

June 1894.

2 Watchmen.	Rs.	8--0--0
2 Temporay channel cleaners for 1 to 22 at 3 As.	..	8--4--0
1 do. 23 to 30	..	1--8--0
Firewood 60 Tons.	..	372 --0--0
Sundries.	..	90--0--0
Repairs.	..	10--0--0
	Rs.	489-12--0

July '94.

2. Watchmen.	..	8--0--0
1 Temporary channel cleaner.	..	5-13--0
Firewood, sundries etc. as above. ...	..	472--0--0
	Rs.	485-0--0
Total.	Rs.	1076-0-0

GOVERNMENT OF MADRAS.
Sanitary Engineer's Department.

Office of Asst. Sany. Engineer,
Madura, 24th June 94.

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Sundries.	... ...	.. 50--0--0
Repairs.	... ...	.. 10--0--0
		Rs.100--0--0

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Sundries.	... ...	.. 90--0--0
Repairs.	... ...	.. 10--0--0
		Rs.489-12--0

July '94.

2. Watchmen.	... ...	.. 8--0--0
1 Temporary channel cleaner.	.. ...	.. 5-13--0
Firewood, sundries etc. as above.	...	..472--0--0
		Rs.485-0--0
	Total.	Rs.1076-0-0

2. A further application, if necessary, will be made after consultation with the Sanitary Engineer to Government regarding the present Water supply to the filter bed.

3. As it may take some time to obtain the Government sanction and the men are clamouring for their pay, I request that permission may be given me to pay them from my imprest as 'advances' recoveralbe on the receipt of Government sanction.

4. A separate application is herewith sent for pay of temporary fountain watchman.

I have the honor etc.,

Sd. xxxxxxxxxx

Asst, Sany. Engineer.

GOVERNMENT OF MADRAS.
Sanitary Engineer's Department.

Office of Asst. Sany. Engineer.
Madura, 24th June '94.

From

J.E. Lockyer, Esq., Assoc. M.Inst.C.E.E. I.Inst.,

Assistant Sanitary Engineer.

To

The Chairman,
Municipal Council,
Madura,

Sir,

In continuation of my No.671 dated 24-6-94 I have the honor to request sanction to the following additional expenditure on account of pay of temporary fountain watchman.

May 1894.

6 Watchmen at Rs.5 each. Rs.30-0-0

June 1894.

6 do. for 1 to 13. .... Rs.13-0-0
2 do. for14 to 30. .... Rs. 6-0-0

Rs.49-0-0

2. The Council, in its resolution No.331 dated 27-2-94 sanctioned the entertainment of 6 Watchmen and their pay bills were passed by you for the months of March and April. I stopped 4 from the 13th instant and mean stopping the other two from the end of this month.

3. My request in para 3 of my letter quoted above (to pay the men from imprest pending regular xxxxxxx sanction) holds good for the pay of these men as well, for May and June 94.

I have the honor etc.,

Sd. xxxxxxxxxxxxxx
Asst. Sany. Engineer.

40

Municipal Office, Madura,
14th July 1894.

From

The Chairman,
Municipal Office,
Madura.

To

The Chief Secretary to Government,
Fort St. George,
Madras.

Sir,

In submitting herewith copy of resolution of the Municipal Council, No.97 dated the 10th instant, I have the honor to request that Government will be pleased to sanction the entertainment of the temporary establishment referred to and the additional expenditure to be incurred in consequence The necessity for this extra expenditure will be apparent from the enclosed copies of the letter of the Asst. Sanitary Engineer in charge of the Madura Water Works and from my letter to Government dated ....

A proposition statement and an application for allotment of necessary funds are herewith submitted in the prescribed form.

I have the honor etc.,

Sd. Cxxxxxxxxxx

Chairman.

40

Municipal Office, Madura,
14th July 1894.

From

The Chairman,
Municipal Office,
Madura.

To

The Chief Secretary to Government,
Fort St. George,
Madras.

Sir,

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A proposition statement and an application for allotment of necessary funds are herewith submitted in the prescribed form.

I have the honor etc.,

Sd. Cxxxxxxxxxx

Chairman.

GOVERNMENT OF MADRAS.
Sanitary Engineer's Department.

Asst.
Office of the/Sanitary Engineer.
Madura 9th July 1894.

From

J.E. Lockyer Esq, M.Inst.C.E.F.Inst.,

Asst. Sanitary Engineer.

To

The Chairman,
Municipal Council,
Madura.

Sir,

In continuation of my letters 671 & 673 dated 24-6-94 I have the honor to enclose copy of letter No.1467 dated 3rd July 1894 of the Sanitary Engineer to Government for your information. He is of opinion that the pay of the staff working the new engines should be met from capital accounts and that of old mantapam engine from municipal funds.

I have the honor etc.,

Sd.xxxxxxxxxxx

Asst. Sany Engineer.

42

No.1467

Fort St. George,
30th July '94.

From

R.E. Ellis Esq.,
Acting Sanitary Engineer to Government,
Madras.

To

The Assistant Sanitary Engineer,
Madura.

Sir,

With reference to para 5 (A) of your letter No.662 dated 20th July 94, I have the honor to inform you that until the engines are handed over to the Municipal Council, the cost of staff for working the new engines should be changed to capital accounts and that for the old engine at Myamantapam to the Revenue accounts.

Please inform the Chairman, accordingly.

Sd. cxxxxxxxxxxx

Ag. Sany. Engineer.

No.1467

Fort St. George,
30th July '94.

From

R.E. Ellis Esq.,
Acting Sanitary Engineer to Government,
Madras.

To

The Assistant Sanitary Engineer,
Madura.

Sir,

With reference to para 5 (A) of your letter No.862 dated 20th July 94, I have the honor to inform you that until the engines are handed over to the Municipal Council, the cost of staff for working the new engines should be changed to capital accounts and that for the old engine at Myamantapam to the Revenue accounts.

Please inform the Chairman, accordingly.

Sd. cxxxxxxxxxxx

Ag. Seny. Engineer.

GOVERNMENT OF MADRAS.

No.1638. Office of Sanitary Engineer,

Fort St. George.25th July 1894.

From

R.E. Ellis Esq., Assoc.M.Inst.C.E.,

Acting Sanitary Engineer to Government.

To

The Chairman,
Municipal Council,
Madura.

Sir,

With reference to your letter No.578 of the 14th June to the Assistant Sanitary Engineer, I have the hohor to inform you that the extra staff at Myamantapam engines has been dispensed with and paid up by this department from capital account pending reference to Government.

2. It may be necessary to work the experimental engines from time to time pending the full supply being obtainable from the new works, and I have arranged to work the old engines by part of the staff employed at the new engines with or without extra expense exepting the watchmen who should in any case, be kept on till the old engines are are dismantled. There will be no extra expense in fuel either as there will be a corresponding saving at the new engines when the old engines are at work. To ~~xxidxax~~ avoid complication, I should be glad if you would pay all bills for working the old engines provided they do not cause your budget estimate to be exceeded pending any reference that may be made to Government on the point.

I have the honor to be etc.,

Sd. xxxxxxxxxxxx.
Ag. Sany Engineer.

pal Office, Madura.

Sir,

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Municipal Office, Madura.

From

The Chairman,
Municipal Council,
Madura.

To

The Sanitary Engineer
to Government, Madras.

Sir,

With reference to your letter No.2300 dated the 16th instant I have the hobor to inform you that I have fixed the 1st of November next as the day on which the Municipality will be prepared to take charge of the fountains, pipes, valves etc. as well as the outdoor -- establishment and to request that you will be so good as to issue orders accordingly.

I have etc.,

Sd. xxxxxxxxxxxxx

Chairman.

Municipal Office, Madura.

From

The Chairman,
Municipal Council,
Madura.

To

The Sanitary Engineer
to Government, Madras.

Sir,

With reference to your letter No.2300 dated the 16th instant I have the hobor to inform you that I have fixed the 1st of November next as the day on which the Municipality will be prepared to take charge of the fountains, pipes, valves etc. as well as the outdoor -- establishment and to request that you will be so good as to issue orders accordingly.

I have etc.,

Sd. xxxxxxxxxxxxx

Chairman.

that this is not the case. Moreover when once the water reaches the filter it soon finds its way into the conduit and pump well. The deficiency is then not due to the filter bed itself but to the slow percolation down the river and this might be remedied by a system of collecting drains similar to that used in land drainage placed below the sand and extending up the river.

5. As it is probable that the water from the Periyar Project will be admitted into the Vaigai next year, I do not recommend any scheme for dealing with the deficiency in the dry season by leading water from the river bed down to the filter or by other means, until it has been ascertained what the supply will be under the new conditions.

6. The expenses for working the new engines are being paid by the Council, but as an objection was raised to pay for the staff of the old engines, the same has been paid from capital account pending orders of Government.

7. The staff employed at the old Myamantapam engines has lately been dismissed and paid up, except that watchmen who should in any case be kept on till the old engines are dismantled.

8. It may be necessary to work the old experimental engines from time to time pending the dull supply being obtainable from the new head works and I have arranged to work them by part of the staff employed at the new engines without extra expense for staff or materials as there will be a corresponding saving at the new engines whenever ~~xxxxxxxxxx~~ it is necessary to work the old ones. The expenses of working both old and new engines should, I think, be met by the Council provided the Budget estimate for pumping ~~xxxxxxx~~ is not exceeded. The additional supply provided by the old engines is estimated at 75,000 gallons a day.

9. I would recommend that the new engines remain under the supervision of this department for the following reasons:-

(a) That the old engines were allowed to get into a very bad state of repair when under municipal control and when placed under the Asst. Sanitary Engineer accordance with G,O. ddated 8th November 1892 No.1830 M.Mis. L & M, the cost of working the engines was reduced to about one half.

(b) That the engines should be inspected by a competent engineer periodically

periodically and the ~~xxxx~~ driver in charge should have an engineer to report to in case of need.

10. The outdoor establishment including overseers and filters are at present paid by the municipality but work under the orders of this department. No orders of Government have yet been issued in connection with this office letter No.1908 of 15th September 1892 embodied in G.O. dated 7th November 1892 No.1825 M., L & M. dealing with the administration of water works by the department after completion. However I beg to recommend that for the present the outdoor staff be placed directly under the orders of the Chairman and that a periodical report be submitted to Government by this department on the condition of the pipes, taps, valves etc., and that no extensive alterations or repairs be carried out by the municipality without reference to this department.

Order 14th August 1894 No.1094 A. M.Mis.

The Sanitary Engineer's sedond letter will be communicated to the Municipal Council, Madura.

2. The recommendations contained in paras 8,9 and 10 of the letter above referred to, are approved, on the express condition that the course recommended in para 8 does not lead to an expenditure on pumping in exeess of the Budget estimate.

(True Extract)

Sd. xxxxxxxxxxxxxx
Under Secretary P.W.D.
for Chief Secretary.

To the Chairman, Municipal Council, Madura.

To the Sanitary Engineer.

Local & Municipal Department.

Proceedings of the Government of Madras.

Read the following paper:-

Memorandum of the Public Works Department, dated 18th Oct. 1894 No.3160 C.

Read the following:-

Note by the Chief Engineer, Public Works Department, dated 15th October 1894. -

With reference to G.O. (Local and Municipal Department) No.1309 M. dated 22nd September 1894, I have inspected the Madura Water Works in company with Mr. Lockyer, the Asst. Sanitary Engineer in charge and from the information furnished by him and examination of the ground I have little doubt of the real reason for the failure of water supply during dry weather.

2.Underneath the sand which forms the immediate bed of the river is a stratum of clay almost if not quite impervious to water and an examination of the longitudinal section of the bed shows that at about half a mile above the water works this stratum rises to within a foot of the surface of the sand so that as long as water does not appear above the surface, only so much as can pass through this depth of one foot can reach the conduit.

This beingso, it is evidently useless to adopt any measures such as I was at first disposed to advocate, for facilitating access of the water to the conduit by cutting leading channels in the bed of the river, such channels would at most increase the rate of supply for a few hours, andwhen once the area between the conduit and the barrier of clay was drained, the supply of the conduit would be limited by the rate at which water can pass over the barrier.

Directly water ~~xxxxxxxxxbegin~~ begins to show in the smallest degree above the sandy bed of the river the supply of the water works becomes amply sufficient and as before this takes place the amount of subsoil water brought down must be very large, it will naturally be asked what becomes of this water if does not pass over the barrier.

5. The answe appears to be that it leaves the river bed on its right bank by a subtaranean passage above the barrier and rejoins it below the town.

6. It appears to be well established that there is aline to the south of the river, well sunk in which have a never failing supply of water: one such belongs to the South Indian Railway and another to the mills close to the Railway Station.

7. The supply of the latter well is so large that its water is used in the condensers without any attempt at economy; the cooling pits which were constructed with a view to using the same water over and over again have, I am informed, never been used, but the water is allowed to run off freely and is sold to the neighbouring ryots for irrigation, the cost of pumping being thus recouped.

8. Mr. Lockyer states that the line along which these wellws occur is known as the old bed of the Vaigai. I have never before heard of any tradition of the river having altered its course, nor does the District Manual contain any reference to such tadition, but the thing is not impossible in itself. The position of the great temple which would naturally have been built on the river bank seems to point in that direction and the lie of the barrier of clay which has been mentioned above is consistent with its having originally found part of the bank rather than the bed of the river.

9. However this may be, there seems very little doubt that a large quantity of sub soil water does escape to the right of the present river bed and it is not unlikely that if the source of supply had been looked for in this direction, an ample supply might have been obtained at a cost considerably less than has actually been incurred.

10. The defect can be got over without difficulty by cutting a channel through the barrier, but it is a question whether it is worth while to incur the cost of this for the sake of a single seasons supply. The Periyar Water will in all probabilty be sent down before this time next year and when this has been done there will never be any risk of failure of the supply. One of the branch channels tails into the Vaigai immediately above Madura and there will be no difficulty in sending down in sending down this channel, even when no irrigation is going on, and ample supply for the town: this supply can be sent into the river between the barrier and the

water works conduit.

11. The natural supply of the river will probably be sufficient up to the end of January and whether it is worth while to cut the channel for the sake of the supply from February to June of a single year must depend upon the cost of the channel. I have aksed Mr. Lockyer to make an estimate for the work and when this is received, the question of its construction can be considered.

....

Transferred to the Local and Municipal Department.

Order dated 2nd November 1894 No.1605 M.Mis.

Recorded pending receipt of the estimate referred to in the concluding portion of the Chief Engineer's note.

(True Extract)

Sd. xxx xxxxxxxxxxx
Ag. Asst. Secretary,
for Chief Secretary.

To The Public Works Department.
,, ,, Sanitary Engineer.
,, ,, Chairman, Municipal Council, Madura.

MADURA MUNICIPALITY.

==========

WATER SUPPLY.

R.Dis.14 of 1894.

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(True Copy)

Forwarded

to

The Chief Engineer.
P.W.D.
(General, Buildings & Roads)
Chepauk,
Madras.

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