25-9-05

& M.
-8-8-96.

Local & Munl. (1896) Department.

MISCELLANEOUS.

G.O., No. 435 M

DATED 16th March 1896

[Despatch Abstract.]

Water-supply.

Requesting the Sanitary Engineer to submit revised estimates with reference to the resolution of the Sanitary Board No. 538, dated 24" February 1896, regarding the Tuticorin -------.

BACK PAPERS.

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

FURTHER PAPERS.

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

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[7]

INDEXED.

Miscellaneous.

LOCAL AND MUNICIPAL DEPT.

G.O., DATED 16-3-96
No. 435 M.

When given for copying.

[Despatch Abstract.]

Water-supply

Requesting the Sanitary Engineer to submit revised estimates with reference to the resolution of the Sanitary Board No. 538 dated 24th February 1896 regarding the Tuticorin ——.

✓

13.

BACK PAPER, NO. 189 .

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

FURTHER PAPER, NO. Cwo 1117 W of 189/96. (Chin

ENCLOSURES.

CURRENT NO. Reminder reply by Cwo 1549 W/96

STATEMENT WITH DITTO.

ORDER OF GOVERNMENT

STATEMENT WITH DITTO.

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

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Taluq

S NO——189——9

Water Works.

RECD. BY SECY. TO GOVT. P.W.D.

Herewith Submitted

Office of Sanitary Commissioner,
Fort St. George, 23d Sept 1895

Paper filed

Dear Mr. Francis,

With reference to Official Memo No. 1354 of the 20th inst. I am about to visit Tuticorin, and have purposely retained the papers therein mentioned before referring them to the Sanitary Board; so as to at once dispose of sanitary questions that might cause delay in settlement. Tuticorin will not be visited for another fortnight. If therefore the matter is regarded

Carried over......

Back Papers, No. 189 .

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

Enclosures.

Current No. Ren

Statement with ditto.

Order of Government

Statement with ditto.

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L AL FUND PUBLIC WORKS DEPARTMENT.

T elly District ______________________ Taluq

189 — 9 .

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regarded as urge the paper will at once on receipt of intimations, be transferred to the Engineering Branch of the Board, and the sanitary survey, which is the usual preliminary of a water scheme might be considered subsequently.

Yours sincerely.

W S King

Reply sent saying no particulars showing
[illegible] 2.10.9

Main Wall	1				
Parapet Wall	1	87·3	-	3	261·9
Carried over......					

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

BACK PAPER, NO. 189 .

FURTHER PAPER, NO. Cuo 1117 h of 189 96. (Chairman)

ENCLOSURES.

CURRENT NO.

STATEMENT WITH DITTO.

ORDER OF GOVERNMENT

STATEMENT WITH DITTO.

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SANITARY ENGINEER
Register No. 149
17 JAN.
TO THE GOVERNMENT OF MADRAS.

Enclos 9
Sa 9/96

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velly District ________ Taluq

FORM—DETAIL MEASUREMENTS NO.——— 189 9 .

WORK Tuticorin Water Works.

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length.	Breadth	Height or depth.		
~~Repairing the Existing Reservoir at Tuticorin~~						
Plastering with Portland Cement.						
Inside the Reservoir	1	195	"	8½	1657½	
Top of Parapets	1	199	1¼	"	248¾	
Outside of Parapets	1	203	"	1½	304½	
Total Cement Plastering Sq. ft.	—	—	—	—	—	2210¾
~~Dismantling & Reconstructing 10 Wells of 13' Size~~						
Dismantling old Work						
Dismantling old work at bottom	1	area 433.7	-	¾	325.2	
- Do - at flooring	1	252.9	-	1/8	31.6	
Total Cub. ft. of dismantling Concrete	—	—	—	—	—	356.8
Dismantling masonry work.						
Main Wall below the groundline	1	119.5	-	8	956.0	
Parapet wall	1	87.3	-	3	261.9	
Foundation for Retaining Wall	1	169.0	-	½	84.5	
Superstructure — do —	1	120.7		1	120.7	
Total dismantling masonry work C. ft.	—	—	—	—	—	1423.1
Concrete						
At the bottom of the well	1	433.7	-	¾	325.2	
Flooring all round	1	252.9	-	1/8	31.6	
Total Concrete Cub. ft.	—	—	—	—	—	356.8
Brick in mortar						
Main Wall	1	119.5	-	8	956.0	
Parapet Wall	1	87.3	-	3	261.9	
Carried over......						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
Foundation for the Retaining Wall	1	area 169.0	.	½	84.5	
Superstructure — do —	1	120.7	.	1	120.7	
Total Brick in mortar Cub. ft.			...	...	...	1423.1
Plastering with Portland, Cement						
Inside the well up to the Ground Line.	1	63	-	8	504	
Inside the Parapet	1	66	-	3	198	
Outside the Retaining Wall	1	101	-	1	101	
Inside — do —	1	93	—	1	93	
Top of parapet, tread & Ret. wall	1	82	6	—	492	
Total Cement plastering Sq. ft.			...	...	...	1388
Concrete						
At the bottom of the well	1	area 433.7	-	¾	325.2	
Flooring all round	1	252.9	-	⅛	31.6	
Total Concrete Cub. ft.			...	...	...	356.8
Brick in mortar						
Main Wall	1	119.5	-	8	956.0	
Parapet wall	1	87.3	-	3	261.9	
Foundation for the Ret. wall	1	169.0	-	½	84.5	
Superstructure — do —	1	120.7	-	1	120.7	
Total Brick in mortar Cub. ft.			...	...	...	1423.1
Plastering with Portland Cement.						
Inside the well up to the Ground Line	1	63	-	8	504	
- Do - Parapet	1	66	-	3	198	
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Top of parapet tread & retaining wall	1	82	6	"	492	
Outside the Ret. wall	1	101	-	1	101	
Inside the Retaining wall	1	93	-	1	93	
Total Cement plastering Sq. ft.			...	...	...	1388
Dismantling old work.						
Dismantling Concrete at bottom	1	area 143.1	-	¾	107.3	
- Do - at flooring	1	158.6	-	⅛	19.8	
Total Concrete dismantling Cub. ft.			...	...	...	127.1
Dismantling masonry work.						
Main wall below ground line	1	64.5	-	6	387.0	
Parapet wall	1	48.1	-	3	144.3	
Foundation for Ret. wall	1	114.0	-	½	57.0	
Superstructure — do —	1	81.4	-	1	81.4	
Total dismantling masonry works c. ft.			...	...	...	669.7
Concrete.						
At the bottom	1	143.1	-	¾	107.3	
At the flooring	1	158.6	-	⅛	19.8	
Total Concrete Cub. ft.			...	...	...	127.1
Brick in mortar						
Main wall below ground line	1	area 64.5		6	387.0	
Parapet wall	1	48.1		3	144.3	
Foundation for Ret. wall	1	114.0		½	57.0	
Superstructure — do —	1	81.4		1	81.4	
Total Brick in mortar Cub. ft.			...	...	...	669.7
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
Plastering with Portland Cement						
Inside the well up to the Ground Line	1	31	–	6	186	
Inside the parapet	1	35	–	3	105	
Top of parapet, tread & Ret. wall	1	50	6	..	300	
Outside the Ret. wall	1	69	–	1	69	
Inside — do	1	61	–	1	61	
Total Cement plastering Sq. ft. — ..					—	721
Constructing 2 wells of small size of 10 feet diameter.						
Concrete						
At the bottom	1	area 143·1	–	3/4	107·3	
At the flooring	1	158·6	–	1/8	19·8	
Total Concrete Cub. ft. — ..					—	127·1
Brick in mortar						
Main wall below ground line	1	area 64·5	–	6	387·0	
Parapet wall	1	48·1	–	3	144·3	
Foundation for Ret. wall	1	114·0	–	½	57·0	
Superstructure — do —	1	81·4	–	1	81·4	
Total Brick in mortar Cub. ft.		—	— ..	—		669·7
Plastering with Portland Cement						
Inside the wall up to the ground line	1	31		6	186	
Inside the parapet	1	35	–	3	105	
Top of parapet, tread & ret. wall	1	50	6	..	300	
Outside the Ret. wall	1	69	–	1	69	
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Inside the Ret. wall	1	61	–	1	61	
Total Cement plastering Sq. ft.				— ..	—	721
Constructing a Sluice in Koranpallam Tank [illegible] to the Reservoir Tank						
Earth Work						
Cutting the Bund of Koranpallam Tank	1	86	20	8	13760	
Excavating foundations for the body of the sluice	1	50½	7½	3	1136¼	
Front face wall & platform	1	10¾	14½	4	623½	
Front wing walls	1	19½	16¼	3	950⅝	
Returns	2	6¼	5¼	3	196⅞	
Total Earth Work Cub. ft.		— ..	— ..	—		16667
Concrete in Foundations						
Body of Sluice	1	52¼	7½	1	391⅞	
Front face wall & platform	1	10¾	14½	1	155⅞	
Front wings	1	21	16	1	336	
Returns	2	6½	5¼	1	68¼	
Over Covering stones	1	49¼	4½	½	110 13/16	
Total Concrete Cub. ft.		— ..	— ..	— ..		1063
Brick in mortar						
Foundations						
Body of Sluice	1	51¼	5½	2	563¾	
Front face wall & platform	1	8¾	12½	3	328⅛	
Wing walls	1	19½	14	2	546	
Returns	2	6½	3¼	2	84½	
Superstructure						
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
Superstructure.						
Side walls of the Sluice	2	50 3/4	1 1/2	1 1/2	228 3/8	
-Do- of the Head	1	4 3/8	8 1/2	12	446 1/4	
Platform walls, at sides, rect's portion	2	2	3 1/2	10 1/2	147	
-Do- do- triangular portion	2	5/8	3 1/2	9	39 3/8	
Wing walls	2	20	3 3/4	9	1350	
Returns	2	6 1/2	1 7/8	3	73 1/8	
Parapet Wall in front	1	5 1/2	1 1/2	1 1/2	12 3/8	
-Do- in rear	1	4 1/2	2	1 1/2	13 1/2	
Backing over side walls	2	50 3/4	3/4	3/4	57 1/16	
Total Cub. ft. — .. — .. — .. —					3889 7/16	
Deduction for						
Covering stones under Head wall	2	2	3/4	3/4	2 1/4	
Do — Do —	1	3	2	3/4	4 1/2	
Sill Stone	1	4	3	3/4	9	
Covering stones over the vent, below the Head wall	1	5	3	3/4	11 1/4	
Do — Do — in rear	1	2	3	3/4	4 1/2	
For the orifice below the Head wall	1	5 1/2	3 1/2	1 1/2	28 7/8	
Total deduction Cub. ft. — .. — .. —					60 3/8	
Total Brick in mortar less deductions — .. — .. —						3829
Plastering						
Sides & sill of vent	1	56 1/2	-	4 1/2	254 1/4	
In front of the Head wall	1	2 1/2	-	12	30	
Platform wall sides	2	2 5/8	-	10	52 1/2	
Parapet walls sides & top	1	5 1/2	-	3 1/4	17 7/8	
-Do- at ends	2	1 1/2	1 1/2	-	4 1/2	
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Parapet walls at rear end	1	4 1/2	4 1/2	-	20 1/4	
Wing Walls	2	20	9 1/2	-	380	
Returns	2	8	-	4 1/2	72	
Flooring	1	19	7	-	133	
Total plastering sq. ft. — .. — .. — .. —						964
Rough Stone Revetment.	~~2~~					
-Revetment in front	2	50 1/4 c.ft.		-	100 1/2	
-Do- in rear	1	100	50	1 1/2	7500	
Total Cub. ft. Rough Stone revetment — —						8564 7/8
Cut stone Work						
Covering stones over the vent	1	56 1/2	3	3/4	127 1/8	
Vent Stone in front & rear	2	2	3	3/4	9	
Stone under the Head in front	1	2	3	3/4	4 1/2	
Sill stone in front	1	4	3	3/4	9	
Platform Stone	1	3 1/4	3	3/4	7 5/16	
Total Cub. ft. of Cut stone work — .. —						157 15/16

Constructing a Sluice on [illegible] Tank Bund leading to the Filter Beds

Detail of work.	Number.	Length	Breadth	Height or depth	Area or Contents.	Total quantity of each description of work
Earth Work						
Cutting the Bund	1	86	20	8	13760	
Excavating foundations for the body of the Sluice	1	50 1/2	7 1/2	3	1136 1/4	
Front face wall & platform	1	10 3/4	14 1/2	4	623 1/2	
Front Wing walls	1	19 1/2	16 1/4	3	950 5/8	
Returns	2	6 1/4	5 1/4	3	196 7/8	
Total Earth Work Cub. ft. — .. — .. —						16667
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work	Number.	Measurements in Feet Length	Breadth	Height or depth.	Area or Contents	Total quantity of each description of work
Brought forward ...						
Concrete in foundations.						
Body of Sluice	1	62¼	7½	1	391 7/8	
Front facewall & platform	1	10¾	14½	1	155 7/8	
Front wings	1	21	16	1	336	
Returns	2	6½	5¼	1	68¼	
Over Covering stones	1	49¼	4½	½	110 13/16	
Total Concrete Cub. ft.						1063
Brick in mortar						
Foundations.						
Body of Sluice	1	51¼	5½	2	563¾	
Front face wall & platform	1	8¾	12½	3	328 1/8	
Wing walls	1	19½	14	2	546	
Returns.	2	6½	3¼	2	84½	
Superstructure.						
Side walls of the sluice	2	50¾	1½	1½	228¾	
-Do- of the Head	1	4 3/8	8½	12	446¼	
Platform walls at sides,						
rectangular portion	2	2	3½	10½	147	
-Do- triangular -do-	2	5/8	3½	9	39 3/8	
Wing walls	2	20	3¾	9	1350	
Returns	2	6½	1 7/8	3	73 1/8	
Parapet wall in front	1	5½	1½	1½	12 3/8	
-Do- in rear	1	4½	2	1½	13½	
Backing over side walls	2	50¾	3/4	3/4	57 1/16	
Total Cub. ft.					3889 7/16	
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work.	Number.	Measurements in Feet Length	Breadth	Height or depth	Area or Contents.	Total quantity of each description of work
Brought forward...						
Deduction for,						
Covering stones over Headwall	2	2	3/4	3/4	2¼	
-Do- Do-	1	3	2	3/4	4½	
Sill Stone	1	4	3	3/4	9	
Covering stones over the vent,						
below the Head wall	1	5	3	3/4	11¼	
-Do- do- in rear	1	2	3	3/4	4½	
For the orifice below the Head wall	1	5½	3½	1½	28 7/8	
Total deduction Cub. ft.					60 3/8	
Total Brick in mortar less deductions						3829.
Plastering						
Sides & sill of vent	1	56½	-	4½	254¼	
In front of the Headwall	1	2½	-	12	30	
Platform wall sides	2	2 5/8	-	10	52½	
Parapet walls sides & top	1	5½	-	3¼	17 7/8	
-Do- at ends.	2	1½	1½	-	4½	
-Do- at rear end	1	4½	4½	-	20¼	
Wing walls	2	20	9½	-	380	
Returns	2	8	-	4½	72	
Flooring	1	19	7	-	133	
Total Plastering Sq. ft.						964 3/8
Rough stone revetment.						
Revetment in front	2	x 50¼ C.ft.		-	100½	
Total C.ft. of Rough stone revetment						100.
Cut stone work						
Covering stones over the vent	1	56½	3	3/4	127 1/8	
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
Vent stone in front & rear	2	2	3	3/4	9	
Stone under the Head in front.	1	2	3	3/4	4½	
Sill stone in front	1	4	3	3/4	9	
Plat form stone	1	3¾	3	3/4	7 5/16	
Total cub. ft. of cut stone work ― ― ―						156 15/16
Constructing another Sluice on Korampallam Tank Bund, leading to Filter Bed, next to the previous one						
Detail measurements, same as above.						
Constructing a Sluice on the bund of the Reserve Tank leading to the Filter beds.						
Earth Work						
Excavating foundations for the body of the sluice	1	50½	7½	3	1136¼	
Front face wall & platform	1	10¾	14½	4	623½	
Front wing walls	1	19½	16¼	3	950 5/8	
Returns	2	6¼	5¼	3	196 7/8	
Total Earth Work Cub. ft. ― ― ―						2907¼
Concrete in foundations						
Body of sluice	1	52¼	7½	1	391 7/8	
Front face wall & platform	1	10¾	14½	1	155 7/8	
Front wings	1	21	16	1	336	
Returns	2	6½	5¼	1	68¼	
Over Covering stones	1	49¼	4½	1/2	110 13/16	
Total Concrete Cub. ft. ― ― ―						1063
Brick in mortar						
Foundations						
Body of sluice	1	51¼	5½	2	563¾	
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Front face wall & plat form	1	8¾	12½	3	328 1/8	
Wing Walls	1	19½	14	2	546	
Returns	2	6½	3¼	2	84½	
Superstructure						
Side walls of sluice	2	50¾	1½	1½	228 3/8	
-Do- of Head	1	4 3/8	8½	12	446¼	
Platform walls, at sides rect. portion	2	2	3½	10½	147	
-Do- triangular portion	2	5/8	3½	9	39 3/8	
Wing walls	2	20	3¾	9	1350	
Returns	2	6½	1 7/8	3	73 1/8	
Parapet wall in front	1	5½	1½	1½	12 3/8	
-Do- in rear	1	4½	2	1½	13½	
Backing over Side walls	2	50¾	3/4	3/4	57 1/16	
Total Cub. ft. ― ― ―					3889 7/16	
Deduction for						
Covering stones in Head wall	2	2	3/4	3/4	2¼	
-Do- Do	1	3	2	3/4	4½	
Sill stone	1	4	3	3/4	9	
Covering stone over the vent,						
Below the Head wall	1	5	3	3/4	11¼	
-Do- Do- in rear	1	2	3	3/4	4½	
For the orifice below the Head wall	1	5½	3½	1½	28 7/8	
Total deduction Cub. ft. ― ― ―					60 3/8	
Total Brick in mortar less deductions ― ―						3829
Plastering						
Sides & sill of vent	1	56½	-	4½	254¼	
In front of the Head wall	1.	2½	-	12	30	
Carried over						

Estimate Form—Detail Measurements;—(Continued)

Detail of work	Number.	Measurements in Feet: Length	Breadth	Height or depth.	Area or Contents	Total quantity of each description of work
Brought forward ...						
Platform walls sides	2	2 5/8	–	10	52 1/2	
Parapet walls sides & top	1	5 1/2	–	3 1/4	17 7/8	
– Do – at ends	2	1 1/2	1 1/2	–	4 1/2	
– Do – at rear end	1	4 1/2	4 1/2	–	20 1/4	
Wing walls	2	20	9 1/2	–	380	
Returns	2	8	–	4 1/2	72	
Flooring	1	19	7	–	133	
Total plastering Sq. ft.						964 3/8
Rough stone revetment						
Revetment in front	2	50 1/4 c.ft.			100 1/2	
Total Cub. ft of Rough stone revetment						100
Cut stone Work						
Covering stones over the vent	1	56 1/2	3	3/4	127 1/8	
Vent stone in front & rear	2	2	3	3/4	9	
Stone under the head in front	1	2	3	3/4	4 1/2	
Sill stone in front	1	4	3	3/4	9	
Platform Stone	1	3 1/4	3	3/4	7 5/16	
Total Cub. ft. of Cut stonework						156 15/16
F Another sluice in the body of Reserve [illegible]						
[illegible]						
Detail measurements, same as above						
The Reserve Tank						
Puddle wall						
At foundations of the bund on 3 sides	1	4341	3	2	26046	
At superstructure – do –	1	4341	3	10	130230	
Total Cub. ft.					156276	
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work.	Number.	Measurements in Feet: Length	Breadth	Height or depth	Area or Contents.	Total quantity of each description of work
Brought forward...						
Deduction for,						
The portion covered by the 2 sluices	2	20	3	10	1200	
Total deductions Cub. ft.					1200	
Total puddling less deductions						155076
Earth Work						
Raising the bund on the 3 sides	1	4341	41	14	2491734	
Total C. ft.					2491734	
Deduction for,						
The puddle wall above the ground line, after deducting the portion covered by the sluices	1	1401	3	8	33624	
The portion covered by the sluices	2	86	8	3 3/4	5160	
Total deduction Cub. ft.					38784	
Total Raising less deductions Cub. ft.						2452950
Excavating for foundations						
For the puddle wall on 3 sides	1	4341	4	4	69456	
For the Reserve Tank	1	1366	1366	2	3731912	
Total Excavating foundations Cub. ft.						3801368
But the quantity required for Raising as per above is						2452950
∴ The excess quantity in raising						1348418
Rough stone Work						
Pitching with Rough stone, the bund of Korampallam Tank, inside of the Reserve Tank	1	1401	43	1 1/2	90365	
Total Rough stone work						90365
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward ...						
Constructing 2 Sets of Filter Beds, (Each containing 2 filter beds with 2 Cells clear Water Basins)						
Earth Work						
Excavation for filters	2	91¼	91½	8	133590	
" For the clear water basins	2	173	173	6	359148	
" For the sluices in the center bund	14	74	1½	6½	10101	
" For the sluices from clear water basins	2	65	1½	2	290	
Total Excavation	Cub. ft.	—	—	—	—	503229
Raising the Bund						
At the center of 2 filters	1	140⅝	107	14	210656¼	
At the ends of 2 filters	2	140⅝	33	14	129938	
The sloping portion, within the filter bed, of the bund between the clear water basin & the filter bed	2	140	16½	14	64680	
The projection at ends of the bund between the filter beds & the clear water basins	2	37	16½	14	17094	
The sloping portion (within the clear water basins) of the center bund	2	214	16½	14	98868	
Ends of the clear water basin inside	2	214	16½	14	98868	
The front bund of clear water basin do	2	214	16½	14	98868	
Bund between the clear water basins	1	214	33	14	98868	
Ends of clear water basins outside	2	214	16½	14	98868	
Outside the bund at front	1	514½	16½	14	118849½	
Total Raising the bund Cub. ft.		—	—		1035558	
Carried over						

Estimate Form—Detail Measurements:—(Continued)

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Deductions						
For the puddle on the bund of the Reserve Tank, inside the F. Bed	2	130	27	1½	10530	
- Do - on the bund between the filter beds & the clear water basins	2	130	22	1½	8580	
- Do - inside the filter beds, on the side bunds	4	134⅝	22	1½	17770½	
- Do - inside the clear water basins	8	204	22	1½	53856	
Total deduction C. ft.	—	—	—	—	90736	
Total Raising less deductions Cub. ft.	—	—	—	—	—	944822
But the excavated quantity is	—	—	—	—	—	503229
∴ The excess quantity in raising is	—	—	—	—	—	441593
Puddle.						
At the bottom of filters	2	79½	81	1½	19318½	
On the bund of the Reserve Tank, inside the filter beds	2	115½	44¼	1½	15332⅝	
On the bund between the filter beds & the clear water basins, inside of the filter beds	2	115½	36¾	1½	12733⅞	
On the side bunds inside the filter beds	4	118½	36¾	1½	26129¼	
On the bund between the filter beds & the clear water basins, inside the clear water basins	2	189½	36¾	1½	20892⅜	
On the side bunds of the clear water basins, inside	4	189½	32⅜	1½	36810⅜	
Carried over						

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
On the front bund of the clear Water basin, inside	2	197 1/2	28	1 1/2	16590	
At the bottom of the clear Water basins	2	171	166	1 1/2	85158	
Turfing. Total cub. ft.	— ..	—	.. —	.. —		232965
The top of bund between the 2 filter beds	1	172 1/8	79	–	13597 7/8	
-Do- at ends of the Filter beds	2	172 1/8	5	–	1721 1/2	
-Do- in front & rear of the clear W. basins	2	489	5	–	4890	
-Do- at ends & center of -do-	3	237	5	–	3555	
Front of the clear water basin, outside the bund	1	517	31	–	16027	
Sides of -do- -do-	2	275	31	–	17050	
Rear Ends of -do- -do-	2	37	31	–	2294	
Ends of filter beds do-	2	140 5/8	31		8718 3/4	
Inside the bund of the clear W. Basins	8	229	9	–	16488	
On the bund between the filter beds & the clear water basins, inside the filter beds	2	155	9	–	2790	
On the bund of the Reserve Tank, inside the filter beds.	2	155	10 3/4	–	3332 1/2	
On the side bunds of Filter Bed, inside the filter beds.	4	163 1/8	9	–	5872 1/2	
Total Turfing sq. ft.	—	.. —	.. —	..	—	96337 1/8
Filtering Materials.						
Carried over						

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Filtering Materials						
Large Rubble Stones	2	82 1/8	83	1	13632 3/4	
Small Rubble stones	2	85 1/8	85 2/3	1/3	4861 2/3	
Total Cub. ft. of Rubble stones	—	.. —	..	—		18494
Course gravel	2	86 7/16	86 5/6	1/4	3752 7/8	
Medium gravel	2	87 15/16	88 1/6	5/12	6461	
Total Cub. ft. Of gravel	—	.. —	..	—		10214
Fine Sand	2	90	90	1/2	8100	
Course Sand	2	91 1/20	91 1/3	1/6	2886 3/4	
Fine sharp sand	2	101	95 1/3	1 5/6	35305	
Total Cub. ft. Of Sand	—	.. —	.. —	.. —		46292
Cut slate Stone Sluices	6" x 6"					
Concrete in Hydraulic mortar						
For sluices below the center bund, leading from the Filter beds to the clear water basins	14	87	2 1/2	1 1/2	1522 1/2	
-Do- below the bund of clear water basin, leading from the C. water basin to outside the bund	2	62	2 1/2	1 1/2	155	
Total Cub. ft.	— ..	—	.. —	.. —	.. —	1677 1/2
Brick in Hydraulic mortar.						
Side walls of the Sluices on the Centre bund	2×14	87	3/4	1/2	913 1/2	
Backing to Side walls of -do-	2×14	87	3/8	1/2	456 3/4	
Side walls of sluces on the bund of clear water basins	2×2	62	3/4	1/2	93	
Backing to side walls of -do-	2×2	62	3/8	1/2	46 1/2	
Total Cub. ft.	— ..	— ..	— ..	—	—	1509 3/4
Carried over						

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
Cut slate stones 6" thick						
For the sluices on the Center bund	14	87	1¼	½	761¼	
—do— on the bund of Clear W. Basin	2	62	1¼	½	77½	
Total Cub. ft.	—	—	—	—	—	838¾
Cement plastering ¾" thick						
Bottom & sides of vents of Sluices, On the Center Bund	14	87	1½	—	1827	
-Do- do, on the bund of Clear W. Basin	2	62	1½	—	186	
Total Sq. ft.	—	—	—	—	—	2013
Laying distribution pipes in Tuticorin Town.						
Earth Work						
Excavating & filling in, From the Service Reservoir to Beach, for 12" pipes.	1	5600	1½	1½	12600	
From the Big well at the Southern Corner of Edakudy Street to the Southern Corner of Vadakku Raja Street, Crossing Thacha Street, for 12" pipes	1	4950	1½	1½	11,138	
From the main pipe to Teppocolum, near Mariammancoil for 9" pipes	1	120				
Along the beach Road —do—	1	5700				
		5820	1¼	1½	9094	
Along Therku Raja Street for 6" pipes	1	208				
Along Emperor Street —do—	1	216				
		424	1	1	424	
Carried over						

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Additional pipes, from the main pipes to the wells, for 6" pipes	60	10	1	1	600	
Total Earth Work Cub. ft.	—	—	—	—	—	33856
Cast Iron Spigot & Socket pipes.						
12" diameter pipes.						
From the Reservoir to Beach	1	5600	—	—	5600	
From the Big well at Southern Corner of Edakudy street to the Southern Corner of Vadakku Raja Street, Crossing Thacha Street	1	4950	—	—	4950	
Total L. Ft. of 12" pipes	—	—	—	—	—	10550
9" diameter pipes.						
From the main pipe to Teppocolum near Mariammancoil	1	120	—	—	120	
Along the Beach Road	1	5700	—	—	5700	
Total L. Ft. of 9" pipes	—	—	—	—	—	5820
6" diameter pipes						
Along Therku Raja Street and Superior Streets	1	424	—	—	424	
Branch pipes to Wells	60	10	—	—	600	
Total L. Ft. of 6" pipes	—	—	—	—	—	1024
Lead for pipe joints						
For 12" diametre pipe sockets, the length of each pipe being 9 ft.	1172	18·2 lbs			21330 lbs	
For 9" diametre —do— do —	647	10·4 lbs			6729 lbs	
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work	Number.	Measurements in Feet			Area or Contents	Total quantity of each description of work
		Length	Breadth	Height or depth.		
Brought forward ...						
For 6" diameter pipe Socket &c	114	6.5 lbs		-	741 lbs	
Total weight of lead in lbs	— ..	— ..	— ..		— .. —	28800 or $\frac{28800}{112}$ cwts or 257 cwts
Conduits						
Laying Cast Iron pipes from Korampallam & Reserve Tanks to the Service Reservoir at Tuticorin)						
Earth Work						
Excavating & filling in, from the filter beds near the Reserve Tank to the main pipeline	1	1551	2	2	6204	
-Do- from the Filter beds near Korampallam Tank, to meet the main line, with the other branch from the Reserve Tank	1	2651	2	2	10604	
From the Service Reservoir at Tuticorin to the point where both pipe lines meet, at pt. 11.59	1	18,905	4	2	151240	
Total Earth work Cub. ft.	— ..	— ..		— ..	168048	
Deduction for the portion covered by the cast Iron pipe of 18" in diameter, with $\frac{13}{16}$" thick metal	1	18905	area 2.1		39700	
Total deduction Cub. ft.	—	—	—	—	39700	
Total Earth Work less deductions Cub. ft.		— ..	— ..	— ..	—	128348
Cast Iron Spigot and Socket pipes of 18" in diameter.						
Carried over						

Estimate Form—Detail Measurements:—(*Continued*)

Detail of work.	Number.	Measurements in Feet			Area or Contents.	Total quantity of each description of work
		Length	Breadth	Height or depth		
Brought forward...						
Cast Iron Spigot & Socket pipes of 18" in diameter.						
Throughout the whole length	1	23107	-	-	23107	
Total L. Feet of Cast Iron pipes		— ..	— ..	—		23107.
Lead for pipe joints.						
For the pipes laid thro'-out, taking the length of each pipe to be 9 feet	2567	26.6 lbs		.	68282 lbs	
Total weight of lead in lbs.		— ..	— ..	— ..	—	68282 lbs or $\frac{68282}{112}$ cwts or 609.6 cwts.
Conduit of Wrought Iron Sheet with Hydraulic lined & Coated work. (Hydraulic Cement 1 of lime, 1 of Sand & 1½ Cement)						
Earth Work.						
Excavating & filling in from the filter beds near the Reserve Tank, to the main line	1	1557	2	3	9306	
-Do- from the filter beds near Korampallam Tank to meet the main line with the other branch	1	2657	2	3	15906	
From the Service Reservoir at Tuticorin to the point where both the pipe lines meet at point 11.59	1	18905	4½	1½	127.609	
Total Earth work Cub. ft.		—	..	—	152821	
Carried over						

Detail of work	Number.	Measurements in Feet: Length	Breadth	Height or depth.	Area or Contents	Total quantity of each description of work
Brought forward ...						
Deduction for						
Semicircular portion at top of conduit	1	18905	area 1·2		22686	
Total deduction Cub. ft.					22686	
Total Earth work less deductions Cub. ft.						130135
Concrete.						
For foundation below Hydraulic Cement work	1	23,107	$1\frac{19}{24}$	½	20700	
Total Concrete Cub. ft.						20700
Hydraulic Cement work.						
Rectangular portion at the bottom of the conduit, from Korampallam & Reserve Tanks to the Service Reservoir at Tuticorin	1	23,107	$1\frac{19}{24}$	$\frac{43}{48}$	37087·5	
Semicircular portion at top —do—	1	23,107	area 1·26		29114·82	
Total Cub. ft.					66202	
Deduction for						
The inner circular portion	1	23,107	area 1·767		40830	
Total Hydraulic Cement work less deductions Cub. ft.						25372
Sand required is		⅓ of 25372 or			8457⅓	
Total Sand Cub. ft.						8457
Lime required is		⅓ of 25372 or			8457⅓	
Total Lime Cub. ft. is						8457
Portland cement required is		⅓ of 25372 or			8457⅓	
Total Cement Cub. ft. is						8457 or $\frac{8457\times93}{2240}$ tons or 357½ tons.
Carried over						

Detail of work.	Number.	Measurements in Feet: Length	Breadth	Height or depth	Area or Contents.	Total quantity of each description of work
Brought forward...						
Portland Cement.						
Between the Wrought Iron Sleeves & the pipes, at joints, which are 8 feet apart	2888		area ·21	⅔	404	
Total Cub. ft.						404 or $\frac{404\times93}{2240}$ t or 17 tons.
∴ The total quantity of Portland Cement required is						368½ tons
Wrought Iron Sheet of ·065 inch in thickness.						
For Conduit	1	23,107	5·605	·	129514·7	
—Do.— for sleeves 8" in breadth & 8 feet apart	2888	5·86	⅔	-	11282	
Total Sq. ft.						140797 Sq. ft. or 140797×2·627 lbs or 369874 lbs

Masonry Conduit, with Wrought Iron Sheet inside, with a coat of thin layer of Portland Cement over the Wrought Iron Sheet.

Earth Work						
Excavating & filling in, from the filter beds near the Reserve Tank to the main line	1	1557	3½	3½	18999¾	
From the filter beds near the Korampallam ~~Reserve~~ Tank to meet the main line with the other branch	1	2657	3½	3½	32474¾	
Earth from the Service Reservoir at Tuticorin to the point where both the pipe lines meet at point 11·59	1	18905	6	3	340290	
Carried over						

Estimate Form—Detail Measurements;—*(Continued)*

Detail of work	Number.	Measurements in Feet: Length	Breadth	Height or depth.	Area or Contents	Total quantity of each description of work
Brought forward ...						
Total Cub. ft. — .. — .. — .. — .. —					391768	
Deduction for the masonry Conduit						
Rectangular portion at bottom	1	18905	$3\frac{1}{2}$	$1\frac{2}{3}$	$110279\frac{1}{6}$	
Semicircular portion at top	1	18905	area 3.53		$66734\frac{13}{20}$	
Total deduction Cub. ft. — .. — .. —					177014	
Total Earth work less deductions — .. — .. —						214757
Concrete.						
At the bottom & sides of the masonry Conduit thro' out the whole length	1	23,107	$3\frac{1}{3}$	$1\frac{2}{3}$	$128372\frac{2}{9}$	
At top & sides — do —	1	23,107	2	$\frac{1}{3}$	$15404\frac{2}{3}$	
Total Concrete Cub. ft. — .. — .. —					143779	
Deduction for						
The lower semicircular portion of the vent	1	23,107	area 2.13		49218	
Total deduction Cub. ft. — .. — .. —					49218	
Total Concrete less deductions — .. — .. —						94561
Circular masonry work						
Center area of the circular portion		area 4.27				
Inner area — do — do —		1.96				
∴ the area of the masonry portion — .. —		2.31				
∴ the masonry work	1	23107	area 2.31		53377	53377
Wrought Iron Sheeting.						
Throughout the whole length	1	23107	5.47		126395	
For sleeves 8" in breadth & 8 feet apart	2888	5.86	$\frac{2}{3}$		11282	
Total sq. ft. of wrought Iron Sheeting — .. — .. —						137677 or 137677 × 2.62 lbs or 361677 lbs
Carried over						

Estimate Form—Detail Measurements:—*(Continued)*

Detail of work.	Number.	Measurements in Feet: Length.	Breadth	Height or depth.	Area or Contents.	Total quantity of each description of work
Brought forward ...						
Masonry Conduit with Cement plastering inside.						
Total Earth Work as per above details, for the masonry Conduit, with Wrought Iron Sheet inside — .. — Cub. ft. — .. — .. —						214757
Total Concrete - do - do - C. ft. — .. — .. —						94561
Total masonry work - do - do - C. ft. — .. — .. —						53377
Cement Plastering						
Inside the Conduit thro' out the whole length	1	23,107	area 4.97		114842 11842	
Total Sq. ft. Cement plastering — .. — .. —						114842 11842

Station ______________________

Dated ______________________ 18

Local Fund Overseer.

______________ Taluq.

RKoff

Draughtsman.

~~Range Officer.~~

District Board Engineer

18/5/95 Tinnevelly.

President.

REFERENCE TO L. F. P. W. RULES.

PARAS 40 & 47

L. F. P. W.
Form No 43

L. F. P. W. Department.

Tinnevelly District

Taluq

Estimate Form—Detail Measurements No —— 189 9

Estimate for Tuticorin
Water Works.

TINNEVELLY
23 MAY

SANITARY ENGINEER
Register No 149
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TO THE GOVERNMENT OF MADRAS.

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LOCAL FUND PUBLIC WORKS DEPARTMENT.

Tinnevelly District ______________ Taluq

ABSTRACT ESTIMATE No ______ of 189 -9 .

Head of Service.
Class.
Main head.
Sub head.
NAME AND NATURE OF WORK Tuticorin Water Works.

Quantity.	Description of work	Rate.			Per.	Amount.			Total.		
		Rs	A	P		Rs	A	P	Rs	A	P
	Brought forward...										
	Repairing the Existing Reservoir at Tuticorin										
2210	Sq. ft. Portland Cement plastering for a thickness of $\frac{1}{2}$"	6	8	"	100 Sq. ft.	143	10	5			
	Contingencies & Superintendence at 5%					6	5	7			
	Total								150	"	"
	Dismantling & Reconstructing 10 Wells of Big size of 20' diameter										
357	C. ft. Dismantling old Concrete Work	"	8	"	100 C. ft.	1	12	7			
1423	" - Do - old masonry work	1	"	"	Do	14	3	8			
357	" Concrete	9	12	"	Do	34	12	11			
1423	" Brick in mortar	16	"	"	Do	227	10	11			
1388	Sq. ft. Portland Cement plastering for a thickness of $\frac{1}{2}$"	6	8	"	100 Sq. ft.	90	3	6			
	Contingencies & Superintendence at 5%					16	4	5			
	Cost of 1 Well					385	"	"			
	∴ For 10 Wells								3850	"	"
	Constructing 20 Wells of Big size of 20' in diameter										
357	C. ft. Concrete	9	12	"	100 C. ft.	34	12	11			
1423	" Brick in mortar	16	"	"	- Do -	227	10	11			
1388	Sq. ft. Cement Plastering, $\frac{1}{2}$" thick	6	8	"	100 Sq. ft.	90	3	6			
	Carried over ...										

ABSTRACT ESTIMATE:—(Continued)

Quantity	Description of Work.	Rate. Rs	A	P	Per.	Amount. Rs	A	P	Total. Rs	A	P
	Brought forward ...										
	Contingencies & Superintence at 5% —					17	4	8			
	Cost of 1 Well — .. — .. —					370	„	„			
	∴ For 20 Wells — .. — .. —								7400	„	„
	Dismantling & Reconstructing 10 Wells of Small Size of 10 feet in diameter										
127	C.ft. Dismantling old Concrete work	„	8	„	100 c.ft.	„	10	2			
670	„ -Do- masonry work	1	„	„	Do	6	11	2			
127	„ Concrete	9	12	„	Do	12	6	1			
670	„ Brick in mortar	16	„	„	Do	107	3	2			
721	Sq.ft. Cement plastering ½" thick	6	8	„	100 sq.ft.	46	13	10			
	Contingencies & Superintence at 5% — ..					6	3	7			
	Total for 1 Well — .. — .. —					180	„	„			
	∴ For 10 wells — .. — .. —								1800	„	„
	Constructing 20 wells of small size of 10' in diameter										
127	c.ft. Concrete	9	12	„	100 c.ft.	12	6	1			
670	„ Brick in mortar	16	„	„	Do	107	3	2			
721	sq.ft. Cement plastering ½" thick	6	8	„	100 sq.ft.	46	13	10			
	Contingencies & Superintendence at 5% —					8	8	11			
	Total for 1 well — .. —					175	„	„			
	∴ For 20 wells — .. — .. —								3500	„	„
	Constructing a sluice in Kirampallam Tank Bund, leading to the Reserve Tank.										
16667	c.ft. Earth Work	2	5	„	1000 c.ft.	38	8	8			
1063	„ Concrete	9	12	„	100 c.ft.	103	10	3			
3829	„ Brick in mortar	16	„	„	Do	612	10	3			
964	sq.ft. Plastering 2 Coats	2	8	„	100 sq.ft.	24	1	7			
8565	c.ft. Rough stone revetment	8	11	10	100 c.ft.	748	8	9			
	Carried over ...										

ABSTRACT ESTIMATE:—(Continued)

Quantity	Description of Work.	Rate. Rs	A	P	Per	Amount. Rs	A	P	Total. Rs	A	P
	Brought forward ...										
157	c.ft. Cut stone work	45	„	„	100 c.ft.	70	10	5			
1	Shutter — .. — .. — .. — ..					10	„	„			
	Contingencies & Superintendence at 5% —					76	14	1			
	Total Amount — .. — .. —								1685	„	„
	Constructing 2 Sluices in Kirampallam Tank Bund leading to the filter beds.										
16667	c.ft. Earth Work	2	5	„	1000 c.ft.	38	8	8			
1063	„ Concrete	9	12	„	100 c.ft.	103	10	3			
3829	„ Brick in mortar	16	„	„	Do.	612	10	3			
964	sq.ft. Plastering 2 coats	2	8	„	100 sq.ft.	24	1	7			
100	c.ft. Rough stone revetment	8	11	10	100 c.ft.	8	11	10			
157	„ Cut stone work	45	„	„	Do.	70	10	5			
1	Shutter — .. — .. — .. —					10	„	„			
	Contingencies & Superintendence at 5% —					41	11	„			
	Cost of 1 Sluice — .. — .. —					910	„	„			
	∴ For 2 Sluices — .. — .. — .. —								1820	„	„
	Constructing 2 Sluices in the Bund of Reserve Tank leading to the Filter Beds.										
2907	c.ft. Earth Work	2	5	„	1000 c.ft.	6	11	7			
1063	„ Concrete	9	12	„	100 c.ft.	103	10	3			
3829	„ Brick in mortar	16	„	„	Do	612	10	3			
964	sq.ft. Plastering 2 Coats	2	8	„	100 sq.ft.	24	1	7			
100	c.ft. Rough stone revetment	8	11	10	100 c.ft.	8	11	10			
157	„ Cut stone work	45	„	„	Do.	70	10	5			
1	Shutter — .. — .. —					10	„	„			
	Contingencies & Superintendence at 5% —					43	8	1			
	Cost of 1 Sluice — .. — .. —					880	„	„			
	∴ For 2 Sluices — .. — .. —								1760	„	„
	Carried over ...										

ABSTRACT ESTIMATE:—(Continued)

Quantity.	Description of Work.	Rate. Rs.	A.	P.	Per.	Amount Rs.	A.	P.	Total. Rs.	A.	P.
	Brought forward ...										
	The Reserve Tank										
155076	c.ft. of Puddling	„	14	„	100 c.ft.	1356	14	7			
3801368	„ Earth Work, in excavating & raising the bund	2	5	„	1000 c.ft.	8790	10	7			
90365	„ Rough stone pitching	8	11	10	100 c.ft.	7897	8	5			
	Contingencies & superintendence at 5%					899	14	5			
	Total								18945	„	„
	Constructing 2 sets of Filter Beds (each set consisting of 2 filter beds & 2 clear Water Basins)										
944822	c.ft. Earth Work for Raising the bund &c	2	5	„	1000 c.ft.	2184	14	5			
232965	„ Puddling	„	14	„	100 c.ft.	2032	7	1			
96337	sq.ft. Turfing	„	6	„	100 sq.ft.	361	4	3			
18494	c.ft. Rubble Stones	1	6	„	100 c.ft.	254	4	8			
10214	„ Gravel	„	10	„	Do	63	13	5			
46292	„ Sand	1	6	„	Do	636	8	3			
1678	„ Concrete in Hydraulic mortar	11	„	„	Do.	184	9	3			
1570	„ Brick in Hyd. mortar	17	4	„	Do	260	7	7			
839	„ Cut Stones Slabs	45	„	„	Do.	377	8	10			
2013	sq.ft. Cement plastering ½" thick	6	8	„	100 sq.ft.	130	13	6			
2	Sluice valves	200	„	„	Each	400	„	„			
	Contingencies & superintendence at 10%					683	4	9			
	Total for 1 set					7570	„	„			
	∴ For 2 sets								15140	„	„
	Distributing Pipes in [illegible] Town										
33856	c.ft. Earth Work	2	5	„	1000 c.ft.	78	4	8			
10550	L.ft. 12" Cast Iron, Spigot & Socket pipes	4	3	6	Foot	44507	13	„			
	Carried over ...										

ABSTRACT ESTIMATE:—(Continued)

Quantity.	Description of Work.	Rate. Rs	A	P	Per.	Amount. Rs	A	P	Total. Rs	A	P
	Brought forward ...										
5820	L.ft. 9" cast Iron Spigot & Socket pipes	2	13	„	Foot	16368	12	„			
1024	„ 6" — do — do —	1	9	„	Do.	1600	„	„			
257	Cwt. Lead for pipe joints	28	„	„	Cwts.	7196	„	„			
	Contingencies & Superintendence at 15%					10459	2	4			
	Total								80210	„	„
	Compensation for land to be taken up for the Reserve Tank and Filter Beds								5000	„	„
	Grand total for the different works								141,260	„	„
	Conduits										
	I. Laying Cast Iron Spigot & Socket Pipes of 18" diameter										
128348	c.ft. Earth Work	2	5	„	1000 c.ft.	296	12	11			
23107	L.ft. Cast Iron Spigot & Socket pipes of 18" diameter	7	6	1	Foot	170534	7	7			
609.6	Cwts. Lead for pipe joints	28	„	„	Cwt.	17068	12	10			
	Contingencies & Superintendence at 15%					28184	14	8			
	Total								216085	„	„
	II. Wrought Iron Cement lined & Coated Conduit										
130135	c.ft. Earth Work	2	5	„	1000 c.ft.	300	15	„			
20710	„ Concrete	9	12	„	100 c.ft.	2018	4	„			
	25372 c.ft. of Hydraulic Cement Work, viz:—										
8457	c.ft. Sand	1	6	„	100 c.ft.	116	4	7			
8457	„ Lime burnt, slaked & delivered	15	„	„	Do.	1268	8	10			
8457 c.ft. or 368½ tons }	Portland Cement	70	„	„	Ton	25795	„	„			
	Carried over ...										

REF

ABSTRACT ESTIMATE:—(Continued)

Quantity.	Description of Work.	Rate.			Per.	Amount.			Total.		
	Brought forward ...	Rs.	A.	P.		Rs.	A.	P.	Rs.	A.	P.
369874	lbs. of Wrought Iron sheeting	"	2	"	lb	46234	4	"			
	Add about 10% of the Cost of Wrought Iron sheeting, for revetting					4620	"	"			
	Contingencies & Supt. at 5%					4016	11	7			
	Total								84370	"	"
	III. Masonry Conduit with Wrought Iron sheeting inside, with a coat of [illegible] Cement over the [illegible]										
214751	C. ft. Earth Work	2	5	"	1000 c.ft.	409	5	6			
94561	" Concrete	9	12	"	100 c.ft.	9219	11	2			
53377	" Brick in Hydraulic mortar	17	4	"	Do	9207	8	6			
361677	lbs of Wrought Iron sheet	"	2	"	lb	45209	10	"			
	Add about 10% of the Cost of Wrought Iron Sheet for revetting					4000	"	"			
	Contingencies & Supt. at 5%					3403	12	10			
	Total								71450	"	"
	IV. Masonry Conduit										
177014	C. ft. Earth Work	2	5	"	1000 c.ft.	409	5	6			
94561	" Concrete	9	12	"	100 c.ft.	9219	11	2			
53377	" Brick in Hyd. mortar	17	4	"	Do.	9207	8	6			
114842 11842	sq. ft. Cement Plastering ½" thick	6	8	"	100 sq. ft.	7464 769	11	8			
	Contingencies & Supt. at 5%					983	11	2			
	Total								19285 20570	"	"
	Carried over ...										

ABSTRACT ESTIMATE:—(Continued)

Quantity.	Description of Work.	Rate.			Per.	Amount.			Total.		
	Brought forward ...	Rs	A	P		Rs	A	P	Rs	A	P
	1st. Scheme										
	Grand total of different Works					141,260	"	"			
	Cost of laying 18" Cast Iron Spigot and Socket pipes from Korampallam Tank &c to the Reservoir at Tuticorin					216085	"	"			
	Total of 1st. Scheme								357345	"	"
	2nd. Scheme										
	Grand total of different Works					141,260	"	"			
	Cost of laying Wrought Iron Cement lined & Coated pipes from Korampallam Tank &c to the Reservoir					84370	"	"			
	Total of 2nd. Scheme								225630	"	"
	3rd. Scheme										
	Grand total of different Works					141,260	"	"			
	Cost of laying Masonry Conduit, with Wrought Iron Sheet inside, from Korampallam Tank &c to the Reservoir at Tuticorin					71450	"	"			
	Carried over ...										

ABSTRACT ESTIMATE:—(*Continued*)

Quantity.	Description of Work.	Rate. Rs. A. P.	Per.	Amount Rs. A. P.	Total Rs. A. P.
	Brought forward ...				
	Total of 3rd. Scheme				212910
	4th Scheme				
	Grand total of different works			141,260	
	Cost of laying masonry Conduit from Korampallam Tank &c to the Reservoir at Tuticorin			27285 20590	
	Total of 4th Scheme				168535 161850
	Carried over ...				

ABSTRACT ESTIMATE:—(*Continued*).

Quantity.	Description of work.	Rate. Rs A P	Per.	Amount. Rs A P	Total. Rs A P
	Brought forward...				

Grand Total of Estimate Rs...

Checked by

Draughtsman

Range Officer.

L. F. Overseer.
Taluq.

STATION
DATED 189 .

District Board Engineer,
Tinnevelly.
18/5/95

President.

NOTE. 1.—Quantities are to be entered as so many units.
2.—All rates are to be quoted in Rupees, Annas and Pies.
3.—Annas and Pies are to be excluded from the Abstract Estimates, the cost of each item being brought to the nearest Rupee, Totals of estimates need not be brought to round numbers.

L. F. P. W.
Form No. 45

NOTES.

Reference to L. F. P. W. rules.
Paras 40, 48, 49 and 61.

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1. Abstracts of Estimates should be prepared under such sub-heads as are to be separately shown in the accounts [Register of works Work vouchers, &c)

L. F, P. W. DEPARTMENT

Tinnevelly District

TINNEVELLY 22 MAY 96 DEPUTY COLLECTOR'S OFFICE

________ Taluq

ESTIMATE FORM-ABSTRACT

To accompany the Detailed Estimate.
No.——— of 189 . for*
Tuticorin Water
Works.

SANITARY ENGINEER TO THE GOVERNMENT OF MADRAS
Register No. 149
17 JAN 96

Amount of Estimate Rs

Sanctioned by
Board in its Resolution
No.
Dated

2
7th Mar 95

Sany: En 8/7
~~715~~/95
25/96

2
25/14 Mar 95

* Here enter the name and Description of work in full.

Cir No 177

From

D. P. Chester Esqr.
District Engineer
Tinnevelly

TINNEVELLY 22 MAY 96 DEPUTY COLLECTOR'S OFFICE

26/6/95

To

The President
District Board
Tinnevelly

Enclo = 11
Plans
(14 sheets)
& 2 estimates
(Detailed
(& abstract)

Sir,

Tuticorin water Supply

In Compliance with the requisition of the Collector and the Sub Committee appointed to sit and propose for a water supply scheme for Tuticorin, I have the honor to submit the following report, plans and estimate for the Construction of a water supply project for the Town of Tuticorin Combining economy with the advantages of a plentiful supply of pure and drinkable water for the inhabitants of the Tuticorin Town, which has been a longfelt want studied projected and given up for various reasons, of which the probable Cost and the Chances of failures were I am led to believe the most prominent.

The present scheme however proposes

by

by the simple means of gravitation, to bring down to Tuticorin its requirements of water from the Korampallam Tank, from which the present supply is derived, but as it is asserted that only 16 per Cent of the water delivered into the existing supply Channel of Tuticorin reaches its destination and that of a most objectionable quality from a sanitary point of view, to prevent contamination and to obviate waste of water incidental to evaporation and leakage, pipes are now proposed to be used and the Main Conduit or pipe from the Korampallam Tank to the Reservoir at Tuticorin is proposed to be 18 or 19 inches in diameter which has been calculated to discharge the required quantity of water per diem, Viz:— 600,000 gallons in 24 hours.

Source of supply. The Korampallam Tank receives its supply from the Tambrapurani River, and the Uppar Odai. The River Tambrapurani falls into the North Main Channel at Srivaikunthum feeding on its way the following tanks as well Viz: Arumugamangalam, Daykulam, Marutoney — Pottaikulam — vide "Sketch Map Srivaikunthum anicut system"

The River Tambrapurani rises in the Western ghauts having its principal source in the

valley

valley of Papanasam, drains a large tract of hilly and woodland country under the influence of both monsoons, and falls into the sea south of Tuticorin. Its catchment area is as follows:—

At Palamcottah . . . . 587. sqr. miles

At Srivaikunthum . . . 1400. sqr. miles

and the entire catchment area 1750 square miles, with their respective discharges 61,250 Cub: ft: per second at Palamcottah, 107,754 Cub: ft: per second at Srivaikunthum and 125,000 cub: ft: per second the entire discharge.

Its course for 20 miles is in forest covered mountains, where the rain fall is from 200 to 300 inches and for 70 miles in plains, at the foot of the hills, where the rainfall is from 20 to 30 inches; for the remainder of its course, it receives a rainfall of only 18 inches. Its floods commence in June, when they are sometimes 10 feet deep and frequently recur during the next 6 months or during the North East Monsoon. The drainage from the hills keeps a hot weather stream at Srivaikunthum of about 314 Cub: ft. per second and never less than 198 Cub: ft per second, in March; during the 6 months the discharge is not less than 600. Cub. ft. per second. The amount of its discharge utilized for irrigation is thus estimated. Viz:—

For

For 225 days of 1st Crop at 32 Cub. yds per second = 237,600,000.
" 45 2nd 15 " " = 58,320,000.
" 45 2nd $7\frac{1}{8}$ " " = 28,382,400.

average depth at Srivaikuntham 7 feet, fall $2\frac{1}{2}$ to 3 feet per mile, Velocity 5 to 5.6 feet, per second.

The Uppar Odai has a catchment area of 342 sq. miles and it is supposed that there is a maximum rainfall in 24 hours of 8 inches over one-fourth of it, of 4 inches over another fourth, and of 2 inches over the remainder, and that the stream carries off one-fourth of this, three-fourths being lost by absorption and evaporation. This gives a flood discharge of 8850 cubic feet per second.

It will be thus observed, that the source of supply is a continuous one and that it is natural, good and abundant.

Reserve Tank. For eight months out of the year Tuticorin would get its present supply, as already described, from Korampallam Tank which has a total capacity of $206\frac{1}{2}$ millions of cubic feet; and if pipes were laid, the Town would get its full supply at 15 gallons per head, per diem, leaving four months of each year unprovided for. to meet which want, it is now proposed to construct a Reserve Tank, adjoining the Korampallam Tank and to be fed by means of a masonry sluice from the latter.

The population of Tuticorin in 1881 was 16,281 and in 1891, 25,221, and for the purpose of the present scheme, presuming that the population has increased to 30,000, it has been deemed necessary to allow for a further increase of 10,000 making the total population 40,000, requiring an average of 15 gallons of water, per head per diem. Therefore the quantity required would be 40,000 × 15 or 600,000 gallons per diem, and for four months, the total quantity of water required to be stored would be 600,000 gallons × 120 days or 72,000,000 gallons of water, on the basis that $6\frac{1}{4}$ gallons equal 1 cub: ft: of water, 72,000,000 gallons would therefore equal 11,520,000 cub: ft.

The F.T.L of Korampallam Tank is 19.40 ft above M.S.L, the proposed new bed of tank equals 9.40 feet, giving the Reserve tank a depth of 10.0 ft now allowing .20 of an inch for mean daily evaporation; for eight months in the year, the total depth of evaporation would be 4 feet. Therefore the length and breadth of proposed tank would be 1386′ × 1386′ × 6′, which is equivalent to 11,520,000 cub: ft or 72,000,000 gallons storage for four

four Months; and which has been provided for, vide Plan No: 4.

Filter Beds. In proposing as already described the Korampallam tank, as the head of supply from the Tambrapurani River, the present scheme provides for four Filter beds with four discharge sluices, so that before water is let into the main pipe, it is filtered, which is an advantage for many reasons.

The dimensions of each filter is 90'×90' or 8100 sq. ft. which would provide for the filtering of 600,000 gallons at 700 gallons per sqr: yard, in 24 hours. For details of Filter Beds, please see plan No: 5. Two filter Beds are provided for each tank, the Korampallam and its Reserve, so that when one filter is filtering, the other may be open to the process of cleaning. The water having been filtered, passes into the Clear water basins provided for and from thence conveyed into the main pipe or Conduit, which supplies the Reservoir at Tuticorin. Each Clear water basin is calculated to hold 2,002,560 gallons of water ready for discharge.

The distribution of water. The main pipe line is to be laid along existing fresh water supply Channel, starting at the new level of 9.40 feet

and

and has a fall of 2.30 feet for its whole length of 21,405 feet, and empties its water into the existing circular reservoir, 60 ft in diameter, situated outside the town of Tuticorin, from whence the water supply is distributed through the town, by cast Iron pipes into wells of 10 and 20 feet diameter, as is now done. To guard against percolation of brackish water and objectionable matter, into the fresh water delivered into Tuticorin, it is proposed to demolish the existing circular supply wells and to erect new ones of brick in mortar, plastered inside with Portland Cement, and well puddled on the outside, the bottom to be laid with 9 inches of Concrete. I have proposed 30 large sized wells of 20 feet diameter and 30 small sized ones of 10 feet diameter; for details of these wells please see plans Nos: 9 and 10. The number of wells may however be increased as the town may require, and the present project has also the advantage of supplying the tanks, in and about the town of Tuticorin.

Cost of Scheme. The probable cost of the present project is estimated as follows:—

(a) With Cast Iron Conduit or pipe = Rs 357,345.

(b) With wrought Iron Cement lined and Coated pipe } = Rs 225,630.

(c) With Masonry Conduit with Wrought iron sheeting inside } = Rs 212710.

(d) With Masonry Conduit, plastered inside, with Portland cement } = Rs 161850.

I would however suggest that scheme (d) be adopted.

As the upkeep of an elaborate maintenance establishment and the cost of pumping is entirely done away with, with the exception of a couple of water tyndals and coolies, to clean the filter beds occasionally, the advantage of my scheme deserves consideration, it being simple, practical and economical and therefore an easy and quick method of relieving the sufferings of the people of Tuticorin, which their impecunious condition does not permit to meet, as Government was kindly disposed to defray half the expenses, provided the municipality contributes the other half, much more to pay for an elaborate scheme.

In conclusion I would add that if the Municipality are not in a position at present to carry out the entire scheme (d) as proposed by me at a cost of Rupees 1,61,850 I would suggest that the following works be put in hand at once:—

	Rs
1 Repairing the existing Reservoir at Tuticorin —	150
(2) Constructing a sluice on Korampallam Tank bund which leading to the Reserve tank	1685.
(3) Constructing 2 sluices on Korampallam Tank bund which leading to the Filter beds	1820.
(4) Constructing 2 sluices on the bund of the Reserve Tank leading to the Filter beds	1760.
(5) The Reserve Tank	18945.
(6) Constructing 2 sets of Filter beds each containing 2 Filter beds and 2 clear water basins	15140.
(7) Masonry conduit from Korampallam Tank to Reservoir	20590.
(8) Compensation for land to be taken up for the Reserve tank and Filter beds	5000.
Total Rs:	65090.

The distribution of water in the Town by Cast Iron pipes and wells may be carried out later on as funds permit.

The above works if carried out would in no way affect further proposals as to whether the water is to be distributed into the Town by means of pumping under high pressure or by the simple means of gravitation.

I have the honor to be,
Sir
Your most obdt: servt:

District Engineer
Tinnevelly

20/5/95.
Despd 20—

III

Current No. 513 of 1895

22 5 95

Transferred to the Collector of Tinnevelly for disposal

[illegible] Haggard

Forwarded to the Chairman Municipal Council Tuticorin, in reference to his letter No 26 26.1.95

2. Mr Chester's scheme is exceedingly cheaper than Mr Jones's

Haggard
Collector

DESPATCHED 8.6.95
10 JUN 95

1038

Enclosure to letter No. 537 of 1896

11/6/95

RECEIVED
11 JUN. 95
ANSWERED

SANITARY ENGINEER
Register No. 149
17 JAN.
TO THE GOVERNMENT OF MADRAS

S.E./23 200—30-8-95.

GOVERNMENT OF MADRAS.

SANITARY BOARD OFFICE.

SANITARY ENGINEERING BRANCH.

Proceedings of the Sanitary Board, No. 538, dated 24 February 1896.

At a meeting of the Sanitary Board held on 22nd February '96

Present

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

READ the following:—

G.O. No. 75 M. Mis., dated 16th January 1896 expressing an opinion that the pumping scheme for the water supply of Tuticorin approved by the Sanitary Board is impracticable on financial grounds and requesting consideration of the two schemes put forward by the Chairman, Municipal Council, Tuticorin and by the District Board Engineer, Tinnevelly.

Resolution

The Board having fully considered the proposals before it, including the original scheme is of opinion that both from an Engineering & Sanitary point of view it is impossible to arrange a satisfactory supply to Tuticorin without pumping. Hence the Board recommends in the interest of economy that the supply per head be reduced to 10 gallons per diem and the original scheme revised accordingly.

'True Extract'

Joint Secretary
Sanitary Board (Engineering Branch)

1896

Enclosure to letter No. 539 of 1896

From

The Joint Secretary
Sanitary Board
Engineering Branch

Subject

Tuticorin Water Supply

Proceedings of the Sanitary Board No. 538 dated 24th February 1896 recommending the adoption of the original scheme for the revised.

$\frac{\text{S. B.}}{1}$ 17-3-95—200.

No. 539

GOVERNMENT OF MADRAS.

OFFICE OF SANITARY BOARD,
Fort St. George, 24th February 1896.

From

J. A. JONES, Esq., MEM. INST. C.E., F.R.S.E.,
JOINT SECRETARY, SANITARY BOARD (ENGINEERING BRANCH),

To

The Chief Secretary to Government
Local and Municipal Department

SIR,

With reference to G.O. No. 75 M. Mis., dated 16th January 1896, I have the honor to forward herewith Proceedings of the Sanitary Board No. 538 dated 24th February 1896 in connection with the Water Supply of Tuticorin.

I have the honor to be
Sir,
Your most obedient Servt.

Joint Secretary
Sanitary Board (Engineering Branch)

...al & Municipal Dept.
CURRENT No. 710 M

1896

From

The Joint Secretary
Sanitary Board
Engineering Branch

To

The Chief Secretary
to Government
Local & Municipal Dept.

CHIEF SECRETARY 26 FEB 1896 GOVERNMENT OF MADRAS

No 539

Dated 24
Despd 24 } February 1896
Received

Enc - 2

Subject

Tuticorin Water Supply

Forwarding Proceedings of the Sanitary Board No 538 dated 24 February 1896 in connection with the —

Cus 73 1896
75 L.L. 16-1-96

L.M.
Misc.

No. 435 order/8
16.3.96

141 3/96

The Sanitary Engineer will be requested to submit revised estimates with reference to the resolution of the Sanitary Board

V.S. 6/3/96

W.W.D. 7.3.96

S.K. 10/3/96

To The Sanitary Engineer
Chairman, M.C. Tuticorin
Through the Collr. of Tinnevelly.

Desp 16/3

...en given for copying
...en copied
...en examined
...en signed } 189 .

...D AGAIN G.O., No. DATED
189 ,

...RRENT No.

ENCLOSURES TO C. No.

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

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

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

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