

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

P. 12
DEPARTMENT.

G.O. No. 2873	Press Mis.
206 207	
Dated 8 9 1866.	

Not to be folded or roughly handled

19

**Proceedings of the Madras Government, Public Works Department,
8th September 1866.**

No. 206. Read the following letter from the Officiating Superintending Engineer, 4th Division, to the Secretary to Government, Public Works Department, dated Madras, 25th August 1866, No. 1,800 :—

1 Report
1 Comparative Statement.

1. With reference to paragraph 24, of the Order of Government No. 1,919, dated 20th June 1866, and in continuation of letter No. 3,887, dated 2nd November 1864, from this Office, wherein it was shown that the work would in all probability cost Rupees 17,986, instead of Rupees 13,981, as originally estimated, I have the honor to submit a comparative Statement, together with an elaborate report from Captain Rogers, showing in detail the character and history of the Guindy Water Project, and the difficulties he had to deal with in its execution.

2. Government will observe from the comparative Statement, that while the amount of the estimate already sanctioned in G. O., No. 3,426, dated 30th November 1864, is Rupees 17,986, the actual expenditure by the Executive Engineer had been Rupees 15,210, which added to the sum still required to complete the work, viz., Rupees 2,776 and Rupees 11,208 for Mint and Public Works Store charges, makes an aggregate of Rupees 29,194, which is Rupees 11,208 in excess of the sanctioned estimate; but as no money payment is required to be made on account of the Mint and Public Works Store charges, the work will be completed within the sanctioned amount, viz., Rupees 17,986.

* Rupees 15,210 expended up to 30th April 1866.
Do. 1,040 allotted in .8c6-07.

16,850

3. A sum of Rupees 16,850* having been already allotted in this year's incomplete list, it is requested that the balance of Rupees 1,136 may be granted from the current year's Reserve under the head "Civil Buildings."

4. The causes of excess of Rupees 11,208 over the sanctioned amount, for which no allotment is now required, are insufficient rates, increased depths of foundation, improved materials, alterations in design to suit the engine and pumps, and to provide a better residence for engine drivers, &c.

5. The quality of work is first rate, and is very creditable to the Executive Engineer, Captain Rogers, who bestowed great pains upon it, as did Mr. Thompson, Mechanical Engineer, on the pipe laying house service, engine pumps, &c.

No. 207. ORDER THEREON, 8th September 1866, No. 2,873.

ACCOUNT, No. 20.

1. In G. O. dated 20th June 1866, No. 1,919, the Superintending Engineer of the 4th Division was requested to report, with reference to an entry in his Statement of Incomplete Works, whether the expenditure on the Guindy Water Project was likely to be within the sanctioned estimate. From Captain Goddard's letter above read, which gives cover to a detailed report from Captain Rogers on the project, it is observed that although, owing to the several causes which are referred to in paragraph 4, the actual cost of the work will be Rupees 29,194, yet, as no money payment is required to be made

Proceedings of the Madras Government, Public Works Department,
8th September 1866.

for Mint and Public Works Store charges, it is expected that the project will be completed within the amount of the original estimate of Rupees 17,986.

2. As the Government are unable at present to provide the sum of Rupees 1,136 required to complete the allotment for the project, the Superintending Engineer will, if unable to propose a diversion of the money from existing allotments, complete the work and leave the adjustment of the additional expenditure to be effected hereafter.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Superintending Engineer, 4th Division, with three Enclosures.
.. Controller of Public Works Accounts.
.. Accountant General.

Ed. S. T. Augusta.

29
N^o 1800. Superintending Engineers Office
4th Division Madras
25th August 1866.

From
Captain J. Goddard R. E.
Officiating Superintending Engineer
4th Division

To
Colonel C. A. Orr R. E.
Secretary to Government P.W.D.

Sir,

Enclosure
Report
Comparative
Statement

With reference to paragraph 24
of the order of Government N^o 1919 dated
20th June 1866 and in continuation of
letter N^o 3887 dated 2nd November 1864
from this Office wherein it was shown
that the work would in all probability
cost Rupees 17,986 instead of Rupees
13,981 as originally estimated. I have
the honor to submit a Comparative State-
ment together with an Elaborate Report
from Captain Rogers shewing in detail
the character and History of the Gumdy
water

water project and the difficulties he had to deal with in its execution.

2. Government will observe from the Comparative statement that while the Amount of the Estimate already sanctioned in G. O. N. 3426 dated 30th November 1864 is Rupees 17,986, the actual expenditure by the Executive Engineer had been Rupees 15,210 which added to the sum still required to complete the work viz: Rupees 2,776 and Rupees 11,208 for Mint and Public Works store charges, makes an aggregate of Rupees 29,194 which is Rupees 11,208 in excess of the sanctioned Estimate; but as no money payment is required to be made on account of the Mint and Public Works store charges, the work will be completed within the sanctioned Amount viz: Rupees 17,986.

3. A sum of Rupees 16,850 having been already allotted in this year's Incomplete List, it is requested that the balance of Rupees 1136 requests may

Rs 15210 Extended up to 1530 April 1866
Rs 1640 allotted 1866/67
16850

may be granted from the Current year's Reserve under the head Civil Buildings."

4. The causes of excess of Rupees 11,208 over the sanctioned Amount, for which no allotment is now required, are insufficient rates, increased depths of foundation, Improved materials, Alterations in design to suit the Engine and Pumps and to provide a better residence for Engine Drivers &c.

5. The quality of work is first rate and is very creditable to the Executive Engineer Captain Rogers, who bestowed great pains upon it as did Mr. Thompson Mechanical Engineer on the pipe laying house service, Engine Pumps &c. -

I have the honor to be

Sir
Your Most Obedient Servant
Dunrood Capt. R. E.
Offg Supg Engr 4th Div.

591
Report on Cundy Water Pond

41

pages. *

The

P. H. 1866 No. 1. and
List of Cundy Pond
Division 3522
The Cundy Pond
Division

To the Secretary
to Government. P.H. 1866

Dated 25
Nov 27 1866

Dec 3. No 1800

Submitting a Comparative
Statement together with an
Elaborate Report from
Captain Rogers, showing
in detail the character
and history of the Cundy
Water Pond, and the
difficulties he had to deal
with in its execution.

Nov 28 1866. 84. 2012/66

2008.

2008. 1866. 2012/66

The accompanying report of -
 Capt Rogers P. E. on Gundy Water
 Works Project recorded in G. O. 8th Sept/86
 No. 2873 is forwarded to the Chief Assistant
 Government Officer P. W. D with reference
 to his Memorandum of 8th January 1875

L. Christie Dec

Chief Asst. Engr. Office, Off. Road Clerk
 Gundy 11th January 1875
 Sup. Engr. Office
 (Chief Asst.)

Public Works Prov. 8 Sept 1875

Report on Gundy Water Project.

There are two different levels to which
 the water supply has to be raised, the
 lower level to Command the garden
 Stables, Stable, Kitchen, and detached
 Bungalows, the higher to Command the
 upper story of the Government House.

2 The water is stored at these 2 levels in 2
 iron tanks 13' x 8' x 4' on the top of Govt house
 and in an oval shaped earthen reservoir
 placed in the garden.

3 The pipes leading from the river to these
 two reservoirs are iron socket pipes 5" diameter
 Caulked with lead.

4 A single line of pipe runs from the
 river for 3186 $\frac{3}{4}$ feet, where it bifurcates
 one branch of 436 $\frac{1}{4}$ feet leading to the
 earthen reservoir and one of 562 feet to
 the iron tanks, a valve in each of these
 branches a few feet from the point of
 bifurcation opens & closes either or both
 passages. *

*These valves
 are of an ~~ordinary~~
 kind inasmuch
 as they do not
 show when they
 are open or
 shut.

The

5 The water is lead from the Adyar through an open Channel 70 feet long 5' wide at bottom with a depth of 15 ft. with slopes of 45°. This Channel Communicates by means of a Sluice 3' x 3' with a filter through which the water after filtration passes into a well inside the Engine House whence it is pumped up by a six horse power Engine.

6 The filter Comprises 3 filtering Chambers and a well, the 1st Chamber is 6" below the bed of the river. This has an area of $5' \times 3' 8"$ is filled to a height of $3\frac{1}{2}$ ^{feet} or a little above the top of the sluice with stones of $2\frac{1}{2}$ to 3 inches. This Chamber Communicates with the next one by an opening of 3×3 , this opening as well as the one into the Channel are partially Closed by horizontal iron bars 1" Square and 2" apart in the Clear to retain the loose stones.

7 The 2nd & 3rd Chambers are each of 5 ft. Square, & are a level 3' lower than the 1st Chamber and Communicate with each other by an aperture at the bottom 5' wide and one foot high. These Chambers are filled first with 9" of Stone of 2½ to 5" Cube, then

then with 3" of Stone of 1 to 1½" Cube. upon which
rest the finer filtering materials of gravel
Sand & Charcoal in such quantities as
may be found the most efficient for
filtering the water without impeding its
passage too much.

8 The water passes through the first Chamber down through the second and up through the third, whence it flows, through an arched opening into the well, the sill of this opening is 3' 6" above the bottom of the 2^d and 3^d Chambers & therefore on a level with the bed of the river. the bottom of the well is 2' lower than the 2nd & 3rd Chambers or 5' 6" below the bed of the river.

9 The filter was first tried with 2 ft of Sand and Charcoal in alternate layer of 6" laid over the stones at the bottom of the 2nd and 3rd Chambers, this of course filtered the water admirably, but the process was found to be too slow to be of any practical use, the well which is $13\frac{1}{2}' \times 4'$ in area only filling at the rate of $1\frac{1}{2}"$ per hour or less than 6 cubic feet. In future gravel or fine granite (the latter being the most easily procured) must be substituted for

for sand.

10 The pumps consist of two horizontal plungers $2\frac{1}{2}$ ' diameter, moved by cranks on a shaft coupled to the engine shaft, so that the pump cranks & engine crank move together, and there is no loss of power by gearing. The stroke of the plungers is 2 ft., the stroke of the engine 10 inches.

11 The suction pipe into the well communicates by a branch pipe with 2 vertical valve boxes communicating with the cylinders of the two plungers, the valves are ~~clock~~ ^{are clock} valves. Above the upper valves, the valve boxes again are connected by a branch pipe leading to the air vessel whence issues the delivery pipe.

12 The engine is a high pressure engine with vertical tubular boiler. Cylinder $9\frac{1}{2}$ inches, stroke 10 inches, pressure 60 lbs.

Details of Construction

The greatest depth of the filter is 19' 6" below the level of the ground, the flooring

flooring of each chamber of the filter consists of 1 foot of brick-work laid upon 1 foot of concrete.

2 The greatest depth of excavation was there fore 21' 6" below the surface of the ground & 7' 6" below the bed of the river, the water which came in to the work in large quantities, was kept under, by means of 2 Picottas working very often night and day.

3 The work was commenced on the 4th October when the monsoon was daily expected, every precaution had therefore to be taken against the sides of the excavation being washed into the work by the rain as well as the more serious danger of the whole being swept away by the river overflowing its bank & pouring down into it from a height of over 18 feet. A small bund was therefore carried all round the work to prevent any damage from the surrounding surface running into it, the river bank was also raised 3 feet by a bund running along the bank with two short branches at each end up to the high ground. The exterior of this mound was carefully puddled with clay.

It

4 A number of bushes were also secured in the water along the bund to diminish the force of the water in the expected freshet; 2 of the 5" iron pipes were laid through this bund to drain the enclosure into the river.

5 The precautions answered perfectly. For shortly after their completion a freshet came down, and the river rose above its banks, and but for the bund would have poured into the work.

6 The whole excavation having been completed the last 10 feet of which was almost all rock, the concrete foundation of the well was laid.

7 The concrete was made in the following manner.

A reservoir 12 ft. square & $1\frac{1}{2}$ ft. deep was excavated close to the work & lined with brick into this $\frac{1}{2}$ a part of quick lime, 1 part of sand, 1 of soot, and 6 of brick-jelly were thrown all in separate heaps with the quick lime in the center, the lime was then slaked and took up about its own bulk of water making one part of lime; the whole of the ingredients were then mixed together as rapidly as possible, water being thrown on during the process, till the mixture showed that it would absorb no more, it was found to take up, from 2 to 3 parts of water, the charges mixed at a time were from about 2 to 4 cubic yards.

8 As soon as the charge was thoroughly mixed it was carried down in baskets hot, by a double line of coolies, one line carrying full and the other the empty baskets. When the concrete was laid carefully over the ground for a depth of from 4 to 6 inches (never more) it was well beaten with rammers. Before it was beaten the concrete presented scarcely any appearance of moisture, but looked as if all the materials had been mixed dry, gradually however as it became compressed by the rammers the moisture oozed through the surface & the whole became one solid homogeneous mass which after 24 hours became as hard as rock & perfectly impervious to water for though when the concrete was laid a large quantity of water was pouring in from crevices in the rock, none ever made its appearance through the concrete after it had set & a very little after it had been tolerably rammed. The remaining continued for 3 or 4 hours & was always very carefully done as I believe the serviceable quality of the concrete a great deal depends upon it.

9 After the concrete foundation came the brick work, which was executed in hydra

lie

4 lie mortars Consisting of 1 of fresh
is Slaked lime, 1 of doorker & 1 of sand, the
8 walls were built as much as possible on a
2 level through the whole work and as soon
1 as the work was raised 6" a backing of
Concrete was given to it made in precisely
the same way as the foundation & so on for
every 6" in height, till the level of the
ground was reached, the bond employed
was English bond with this difference
that on every Stretcher Course two rows of
half bricks, split longitudinally were
introduced, this broke joints with each
header Course above and below.

10 The walls of the gutter were built flush
inside with offsets of 3" outside, the Concrete
backing following the offsets, the difficulty
of ramming the Concrete backing was
obviated by filling the excavation as the
walls rose & revetting the side of excavation
with a little Clay wall about 9" high,
so as to leave round the wall a well
defined trench of a foot wide, into
this the Concrete was thrown &
then being thus Confined on all
sides could be rammed firm.

99
Report on Gundry
Working of the Engine

- "Much difficulty was experienced with
the Engine at first, owing to the water putting out
the fire as soon any great pressure of steam
was raised in the boiler, this was considered to be
priming. The exhaust pipe which led straight into the
funnel was then removed and an exhaust pipe was
carried from the cylinder up through the roof parallel
to and outside of the funnel, the top of this pipe was
bent over so that no water from the cylinder could
possibly enter the boiler.
- 2 This however had no effect the water still put
the fire out.
- 3 Pet cocks were then fixed to the top and the bottom of
the cylinder as it was still considered that it was
the priming that put out the fire (although I formed a
different opinion myself); the boiler was then exam-
ined and it was found that the tubes leaked at
their junction with the upper plate of the boiler; the
boiler was then taken off its seat and all the tubes
set up, this of course occupied a long time, ^{some} three
or four days. The boiler was then tried with a
pressure of one 100 lbs. applied by hydraulic
power by means of the Engine pump and found
to be perfectly tight.
- 4 Steam was then got up and the Engine worked
very successfully water reaching the reservoir in
20 minutes, although the pipes were quite empty
when

4 When the Engine started.

5 Almost immediately however after the water began to pour into the reservoir, the supply ceased; this was probably owing to some obstruction in the pipe for after about the lapse of a quarter of an hour the water again came through and threw out some rubbish from the pipe.

6 After proving the capability of the machinery to throw water into the reservoir, the reservoir valve was closed and the cistern valve was opened, after a short time the pumps were found to have ceased working; clacks would not move. The pumps were then opened; the clacks some of which were found jammed were taken out & cleaned and the Engine again set going, still the clacks would not move. A method which I had introduced for starting the pumps was then tried. This method is as follows—

7 A cock was let into the branch delivery pipe by opening which the whole of the contents of the air vessel could be discharged.

8 To start the pumps, the valve in the delivery main inside the Engine house is closed the air vessel cock is opened and the whole pressure let off; the air vessel; and pumps are then only full of atmospheric air. The Engine is then started, the air vessel cock being

109
being left open by way of precaution. As soon as the pumps have started and as pressure in the air vessel equals to that of the head of water in the main is accumulated the valve in the main is opened; this of course produces an additional pressure as the pressure on one side of the valve was made equal to the pressure on the other before it was opened. A few more strokes of the Engine will produce a sufficient compression of the air in the air vessel to overcome the inertia of the mass of water in the pipes and the friction on the pipes and the water will begin to move gradually with increasing velocity till its normal velocity agreeing with the power of the Engine is reached. This method then was now for the first time attempted and perfect success resulted. All the clacks gave their regular beat and when the valve in the main was opened and that the pressure of the whole head of water applied, there was no perceptible difference in their action.

9 Another disappointment was however yet in store. No water would enter the cistern on the top of the house, again the pump clacks would not work. Every expedient was tried to put them in motion but all without effect. It was then found that the defect of the main valves referred

before was the cause of the stoppage.
10 The Valve screw had been screwed apparently
home but on applying considerable force
so it the screw was found to be capable
of being turned very much more, so much
so that it was evident that the valve had
been scarcely if at all opened. As soon as
the valve had been opened the pumps began
again to work and shortly afterwards the
water flowed into the Cistern. From actual
measurement the water was found to be supplied
at the rate of 9 C. ft. or 56 gallons a minute.
A result proving the Emergency Water Project
to be perfectly feasible with the means employed.
This first successful trial of the Engine
was made on the 15th March.

The pump shaft was immediately afterwards
removed to the P.M. Workshops & fitted
with a new coupling box as the old one
was found not to work true in consequence
of which there was a great amount of friction
in the bearings. On the 10th April it was returned
and the shafting worked perfectly true.
The check valves however of the pumps
were constantly stopping, in fact one
or other of the two pumps almost invariably
refused to work - the checks were then
removed and taken to the workshops

119

Madras to be reduced in the thickness
of the Piston in order to render them lighter.
The valves were repaired on the 17th April and
the Engine again set to work where the pumps
were found to work much better, the Engine
and pumps were then handed over to me by Mr.
Morriff to work.

12 The Engine was accordingly set to
work on the morning of the 18th April by the
overseer in charge of the Mount Workshop &
Steam Engine. I inspected it in the middle
of the day when I found the steam had
gone down and the Engine stopped in order
to accumulate the necessary pressure &
or due to the overseer to start the Engine when
the pressure reached 4.5 lbs this was accordingly
done when the boiler began to leak in precisely
the same manner as it did before, the
water streaming down the sides of the boiler
from under the bonnet.

13 On the 21st March I examined the
boiler by hydraulic pressure and found
almost every flange leaked at its junction
with the upper boiler plate - The
overseer however said that he would
undertake to render the boiler tight
and

and in order to avoid the delay of
applying to the Art Mechanical Dept
I allowed him to make the attempt;
he set up all the flues but two or three
which he found beyond his skill to repair.
I was then obliged to have recourse
to the Mechanical Dept and the corres-
pondence which has taken place
on the subject is annexed from the time
of which it appears very uncertain when
the Quincy water Propet will be successful.

W 2 or Mount Range
Office
5. May 1866

W. H. Rogers Captain R.
Executive Engineer Mount Range

M.
H.

121
No 925
To F. C. Claunriff Esq?
Sup^t of Govt Workshops Capehart

Sir
I have the honor to inform you
that after working the Steam Engine
at Quincy for 2 or 3 hours this morn-
-ning the boiler was found to leak
in precisely the same manner as it did
when the Engine was worked under
your superintendence - Large quantities
of water issuing from under the boiler
and streaming down the side of the boiler.
I shall be very much obliged if
you will have the boiler thoroughly
repaired at your very earliest convenience.

I have the honor to be
Sir
Your most obedient Serv^t
Signed W. H. Rogers Capt R.
Ed: Rogers Mount
Range

W 2 or Mount
Range Office
18th April 1866

N^o 227

Public workworkshops
Chepault 19th April 1880

To
Captain H. M. Gerstle

Off: Dept. Mount Royal
Ottawa

Sir

I have the honor to acknowledge
receipt of your letter N^o 925 of the
18th Inst. In reply I regret to state
that I have no person attached
to this establishment who could
be entrusted to do the repairs you
require to the 6 Horse Power Engine
at Quindry.

I would suggest you to apply
to the Sup^r & Engrs & have
Mr. Thompson's services placed
at your disposal as a temporary measure.

I have the honor to be

Yours most obedient servant

(Signed) E. L. Moncrieff C.E.

J. Sup^r Public Workworkshops

N^o 957

138

To The Superintending Engineer

Sir

H. D. Macdonald

By the annexed correspondence
you will perceive that owing to defects
in the boiler of the Steam Engine the Jimmy
water works are still after all the money
and trouble expended upon them, practically
of no use. The Engine having never yet done
any day's work and being now from the
defective condition of its boiler perfectly
useless.

I have the honor therefore to request
the favor of your causing the boiler to
be examined and reported on by the
mechanic Dept^l of the Public Works
with a view to its being put at once into
thorough repair or else having another Engine
substituted.

It really does seem a ^{fact} ~~fact~~ that
such an extensive work as this should
be an utter failure simply through a defective
boiler having been supplied for it.

I would have made this application
to you some days ago had I not been
troubled in order to avoid delay to
endeavour to stop the leakage of the boiler
with

149

146
The cotton market in New York.

Yours most ^{aff} obedt servant

Wm. H. Rogers

Est: Leg^a M^ount Chy.

S. The Co: Regt Mount Range
Dated: 1 - 2

Dated 13 May 1966

Letter No. dated 20 April 66

Intimates that Mr Thompson is the only person whose services are at the disposal of the Lupton Co. and he will be ordered to proceed to Quincy where he has completed the job he has now in hand at Madison.

1/2 Sumit A. Boulean to Bore
Lup-1 Day 11 "23"

1 True Copies,

5. May/86.

W. H. Jones Captain RE
Co. D. 1st Regt. Kansas

073522/60

See Rs 29,196, yet, as no money payment is required to be made for drink and P. Works show charges, it is expected that the project will be completed within the amount of the original estimate of Rs 17,906.-

As the Govt are unable at present to provide the sum of Rs 1136 required to complete the allotment for the project, the D. Engr will if unable to propose a diversion of the money from existing allotments, complete the work and leave the adjustment of the additional expenditure to be effected hereafter.

P. W. 1863. Department.

Recd of Govt for Sept 1866
No 2873

PROCEEDINGS OF GOVERNMENT

Dated 8 Sept 1866

The D. Engr of the 1st Div. furnished with certain instructions relating to the provisions of funds for the completion of the water project.

206. 207.

22 Sept 1866. A. H. B.

The 1st Div. is directed to
Controller
Recd of Govt for Sept 1866