No of Sheets - 21

Date of Repair -- 12/4/88

Initials of the Rpr: ✓

20/5/88

TAMILNADU ARCHIVES.

Govt of Tamilnadu.

G.o No: 3148 W dt 21-11-1887

Public Works Department

G.P

21st November 1887, No. 3148 W., Public Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers:—

From Colonel H. M. VIBART, R.E., Superintending Engineer, V Circle, to the Chief Engineer, Public Works Department, dated Bangalore, 19th October 1887, No. 2917.

I have the honor to submit, for sanction, under paragraph 8 of G.O., No. 3211 W., dated 6th December 1882, plans and an estimate of Rs. 1,66,100 for constructing a masonry bridge of 16 arches of 60-feet span across the Ponniar immediately to the north of Cuddalore, on the road to Pondicherry, together with the covering letter of the President of the District Board, South Arcot Circle, No. 57, dated 27th September 1887.

2. The proposed bridge is to replace the old bridge, which was destroyed during the heavy floods of 1884. The new bridge will provide 17,070 square feet waterway, which is nearly 22 per cent. in excess of the waterway of the old bridge.

3. The waterway allowed for the railway bridge, South Indian Railway, some 20 miles up the river, is 16,575; but a great deal of this water, after passing the railway bridge, spills over the north bank of the river before it reaches the site of the road bridge. The wells are estimated to be sunk 30 feet throughout, so as to reach stiff clay. From the section it would appear that very hard stiff soil is met at 13 feet depth under seven piers and abutments, and that in only seven cases is the clay at a greater depth than 20.

4. It is probable, therefore, that a considerable saving will be made in sinking the wells, as having reached the clay, it will be unnecessary to continue the wells about 2 or 3 feet into the clay. The retaining walls should, I think, be built deeper, say, 8 feet instead of 6; they need not, I think, be more than 3 feet thick. The afflux will only be a few inches. It is unnecessary to recapitulate the grounds on which it has been decided to build a masonry bridge in preference to an iron bridge, which are sufficiently given in the report and the letter from the President, Local Board.

Note by the Chief Engineer, Public Works Department.

The waterway allowed appears to be ample, as in extreme floods much of the water spills over the country.

2. The depth the wells are to be founded appears excessive. If very hard stiff clay is to be found at depths shown in the cross section of the river, it will be sufficient to sink the wells, as suggested by the Superintending Engineer, 2 or 3 feet into the clay; this will effect a considerable reduction in the estimate.

3. The flooring might be improved, as the Superintending Engineer has also suggested, by increasing the depth of the retaining wall.

4. The spandril arches should, it is recommended, be omitted; they are not ornamental, are above high-water mark, and are in the position with reference to the arch where weight is desirable.

5. The cut-waters to the piers are not of good shape; they would look better and be less obstructive if curved as shown in pencil on the plan.

6. The rates for the following descriptions of work are somewhat in excess of the Public Works rates current in the district:—Brick-work, arch-work, dental cornice, plastering, laterite boulders in mortar.

With these remarks the estimate is recommended for sanction.

12th November 1887. (Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer, Public Works Department.

Order—dated 21st November 1887, No. 3148 W., Public Works.

The estimate, amounting to Rs. 1,66,100, for constructing a masonry bridge across the Ponniar river, immediately to the north of Cuddalore, on the road to Pondicherry, is sanctioned.

2. The attention of the District Board will be drawn to the remarks of the Chief Engineer, Public Works Department.

3. This sanction has been registered as Local, No. 34 W. of 1887-88.

(True Extract.)

Captain, R.E.,
Under Secy. to Govt., P.W.D.

To the Local and Municipal Department, with 15 enclosures.
" Superintending Engineer, V Circle.

Exd. E. Fernandez.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of (1887) Madras.

PUBLIC WORKS.

Dated November, 21st.

Recd. *Encl.*

G.O., 21st Nov. 1887, No. 3148 W.

NOVEMBER.

Masonry Bridge across the Ponniar River

Estimate for a —, north of Cuddalore, on the road to Pondicherry, sanctioned, and attention of the District Board drawn to the remarks of the Chief Engineer, Public Works Department.

3148/3

SUPERINTENDING ENGINEER'S OFFICE,
V Circle, Madras,
No. 2917. Camp Bangalore ~~Chepauk~~, 19th October 1887.

From
Colonel H. M. Vibart R.E.
SUPERINTENDING ENGINEER, V CIRCLE,

To
THE Chief Engineer,
P. W. Department.

Enclosures.
1 Copy letter of the President No. 57 27-9-87 to the Chief Secy to Govt. Local & Municipal Dept.
1 List of enclosures.
1 Estimate of Rs. 166,000
1 Report.
1 Specification & Data list
1 Plan of masonry bridge
1 Sketch of proposed site
1 Survey & section of Ponniar river
1 Longitudinal levels of the Pondicherry road over Ponniar
1 Old plan of bridge.
1 Section showing the borings taken in the Ponniar river
1 Copy of resolution of the District Board No. 1 of 24 September 1887.

SIR,

I have the honor to submit for sanction under para 8 of G. O. No. 3211 W dated 6th December 1882, plans and an estimate of Rs. 166,800 for constructing a masonry bridge of 16 arches of 60' span across the Ponniar immediately to the North of Cuddalore on the Road to Pondicherry, together with the covering letter of the President of the District Board South Arcot Circle No. 57 dated 27th September 1887.

The proposed bridge is to replace the Old Bridge which was destroyed during the heavy floods of 1884. The new bridge will provide 17070 sq. ft. of waterway which is nearly 22 per cent in excess of the waterway of the Old bridge.

The waterway allowed for the Railway Bridge South Indian Railway some 20 miles up the river

river is 16575 - but a great deal of this water fter passing the Railway bridge spills over he North bank of the river before it reaches the site of the Road Bridge. The wells are estimated to be sunk 30 ft. throughout so as to reach stiff clay. From the section it would appear that very hard stiff soil is met at 13 feet depth under 7 piers and abutments and that in only 7 cases is the clay at a greater depth than 20.

It is probable therefore that a considerable saving will be made in sinking the wells - As having reached the clay it will be unnecessary to continue the wells about 2 or 3 ft. into the clay. The retaining walls should I think be built deeper say 8 ft. instead of 6 - they need not I think be more than 3 ft. thick. The afflux will only be a few inches. It is unnecessary to recapitulate the grounds on which it has been decided to build a masonry bridge in preference to an Iron bridge which are sufficiently given in the Report & the letter from the President Local Board.

I have the honor to be
Sir
Your most Obedient Servant
Col. R.E.
Supdg: Engineer, 7 Circle

G.O. 3211 W dd/6-12-82
" 269 W - 1-2-86
" 1525 W - 16-6-86
" 2173 W - 30-8-86
65

P.W.C. No. 8627

No. 2917.

From

The Superintending Engineer
5th Circle

To
The Chief Engineer
P.W. Dept.

E. 15
(- 6 [illegible])

Dated 19th } October 1887
Read 27 }

Ponniar
South Arcot District

Submits for sanction plans and estimate of Rs 166,100 for constructing a masonry bridge of 16 arches of 60' span across the ——— to the north of Cuddalore on the Road to Pondicherry

Circ 18-11-87

172

P.W. Department

3148
5

Note by the Chief Engineer P.W. Department

The water way allowed appears to be ample, as in extreme floods much of the water spills over the country.

2. The depth the wells are to be founded appears excessive. If very hard stiff clay is to be found at depths shown in the cross section of the river, it will be sufficient to sink the wells as suggested by the Superintending Engineer 2 or 3 feet into the clay; this will effect a considerable reduction in the estimate.

3. The flooring might be improved as the Superintending Engineer has also suggested, by increasing the depth of the retaining wall.

4. The spandrel arches should, it is

recommended, be omitted, they are ot ornamental, are above High water mark and are in the position with reference to the arch where weight is desirable.

5. The cut waters to the piers are not of good shape, they would look etter and be less obstructive if curved s shewn in pencil on the plan.

6. The rates for the following descriptions of work are somewhat n excess of the P.W. rates current n the district.

Brick work
Arch work
Dental cornice
Plastering
Laterite boulders in mortar.

With these remarks the estimate is recommended for sanction.

Johnstone. Col. R.E.
Chief Engineer P.W.

Public Works Department.

3168/6

Current No. 3627
Letter No. 2917
Dated the 14th October 1887
From the Supg: Engr. V Circle

NOTE OF REMARKS.

The estimate under review amounting to Rs 1,66,100 provided for constructing a masonry bridge of 16 arches of 60 feet span across the river Ponniar immediately to the north of Cuddalore on the Road to Pondicherry.

The following particulars are gleaned from the papers in the file.

It is stated that in 1856-57 a masonry bridge of 21 arches of 25' span, costing

but was 13' above floor level,

Rs 67,000 was constructed a little to the East of the proposed site. The freshes of 1874 slightly injured the work, but the heavy rains or rather floods of 1884 destroyed 13 arches and damaged the others –

In August 1886 it was proposed to construct an iron girder bridge, in order to secure as much waterway as possible, at an estimated cost of Rs 1,65,350 which was sanctioned by the District Board and submitted for the sanction of Govt. but the Supdg: Engineer at that time, Colonel Burton, pointed out that certain standard designs

Chief Engineer P.W.D.

circ. 18-11-87

3168/7

for iron girder bridges were expected from the Secy: of State & that it would be in accordance with the orders of Govt. to adopt one of these designed to replace the fallen bridge, and called for further information.

The President after waiting for upwards of a year now states that it seems doubtful when the designs will be received, and whether when received they will be suitable for a long bridge like that required to span the Pennar requiring a clear width of roadway

13' above flood level

of 18' - In the opinion Colonel Burton and Mr Martin the Ex: Engr of the division concerned and on a reference to the Chief Engineers Note embodied in G.O. No 2691 W Dept Feby/83 it was found that the standard designs were to be prepared to have roadways of only 9' & 14' in width which it is considered is insufficient for the traffic and that a special design would have to be prepared if an iron [illegible] was adopted. Under these circumstances the District Board has decided to construct a masonry bridge -

circ. 18-11-87

The following is a summary of the work proposed to be carried out -

The bridge proposed to be adopted is designed with 16 semi elliptical arches of 60' span, founded on wells carried down to a uniform depth of 30' till they enter stiff clay. The maximum depth entering the clay being 17' and the minimum depth 5' - The fifth pier from each end of the bridge are to be constructed as abutment piers and are to be 22' in length, and 12' in breadth and

but was 13' above floor level

height.

The abutments are to be 24' in length 12' in breadth and 6' in height. The cutwaters or Starlings are to be of the same width and height of the piers & will project 3½' beyond the piers, the heads will be semi circular in form.

The backing over the abutments is to be carried to a height of 5' above springing line, and then sloped upwards to a height of 12' to meet the second footing of the Extrados of the arch.

Three counterforts to be constructed

circ 18-11-87

at the back of each abutment, the centre one is to be 10' in length 6' in breadth and 11' in height, and those on the sides are to be 8½' in length, 4' in breadth and 11' in height.

The wing walls are to be splayed at an angle of 30° and are to measure 26' in length, 8½' in breadth near abutments and 17½' in height sloped down to a minimum height of 6' with a top width 2½' and a bottom width of 3'.

The thickness of the arches are to be

but was 13' above form and,

3¾' from springing line to a length of 8' or to the first footing, 3'–4½" for a length of 6½' or to the second footing, and 3' to a length of 6¼' or third footing, the rest of the arch to be 2½' thick.

The Spandrils are to be carried up to 10' above the piers, over which the Spandril arches are to be built 10' in width with a rise of 5' or semi circular.

Pilasters are to constructed over each pier to the full width and carried up to the blocking course

The blocking course is to be 2½' thick & 1½' high and

circ. 18-11-87

carried over the whole length of the face walls –

Parapets 1¼' thick and 4' high are to be provided

A dental cornice projecting 1½' is also to be provided along the entire length of the blocking course.

Retaining walls of stone in surkee 4' thick are to be constructed 14½' beyond the starlings on both sides of the bridge, transverse walls are to be constructed between the retaining walls, and within the squares thus formed a flooring

bed was 13 stone

2½ feet thick as to be laid.

The wells for the foundations are to be arranged as follows -

There are to be 6 large wells of 6' inner and 9' outer diameter under each abutment and abutment piers and 3 wells under the ordinary piers, one under each wing wall taking off from the abutments and one under each counterfort, each return is to have 4 smaller wells of 3' inner diameter & 6' outer diameter, of these smaller wells there will be one under each counterfort one under each wing wall and one under each

circ. 18-11-87

starting of abutment piers.

The approaches to the bridge are to have a top width of 2½' with side slopes of 1½ to 1 -

The bridge is to be constructed of brick and mortar and plastered -

Remarks

The semi elliptical curve adopted for the arches of the bridge under review appears to be open to objection. The semi ellipse is not a correct form of arch for heavy traffic on the road for an ordinary rise would have to be extremely small at the crown and infinitely great at the spring of the arch for unless the haunches are heavily loaded and the enormous horizontal thrust due to any accession of load on the crown well counteracted, such an arch is apt to fail by the settlement of the crown, and to construct spandril arches where solidity and weight is required appears to be a serious mistake.

circ. 18-11-87

The oval arch is more generally prefer to the Ellipse, because the voussoirs can be more easily arranged and with the same rise and span it can be constructed to give a greater water-way than the Ellipse, and this it is understood is what is wanted in the present case –

The construction of abutment piers with counterforts is also objectionable on account of greatly diminishing the waterway and thereby endangering the foundations, they also form a very considerable addition to the expense of the Structure, to say nothing of their being extremely unsightly & apparently unnecessary as the bridge has ample foundations –

The piers might with advantage have a slight batter of 10 vertical to 1 base which would add to their strength –

The Starlings instead of being semi circular as proposed might be made to take the form of a semi Ellipse which would afford an easier passage for the water to pass through the bays, [illegible] Starlings like the piers should have a slight batter –

circ 18-11-87

~~It is proposed to~~ sink the walls to a uniform depth of 30 feet, the minimum depth entering the clay being 5', which appears to be insufficient, and the maximum depth viz 17' as unnecessarily deep, it would therefore be better to sink the walls to a uniform depth of 8' into clay this appears to be a sufficient depth and if adopted would effect a very considerable saving in the estimate about Rs 12,000 –

level was 13' above flood level,

3148/14

The centering proposed does not appear to be suitable — It is proposed to have intermediate pillars or bolsters as points of support for the framing. This seems objectionable as the pillars are liable to sink or settle down in the sandy bed as the arches are being constructed which would result in their failure. It would therefore be better to step off the foundations of the piers and abutments to a depth of about 4' and to make the offsets there points of support for the framing without intermediate supports, the frame would then be rigid and would undergo no other change from the pressure of the arch than what may arise from the elasticity of the wood —

The rates for the following shewn do not agree with the schedule of rates in this office

	L.F.	P.W.D.
Brickwork	12-17-3 —	12-6
Archwork "	19-12-8 —	" 18-0-0
Dental Cornice	38-8 —	" 21-14
Plastering —	3 —	" 2-1

circ. 18-11-87 [illegible]

bed was 13' above floor level,

L.F. P.W.D.

Laterite boulders
in mortar – Rs 18-10 – Rs 12-14

The total saving that would be effected by adopting the P.W.D. rates for these items would be Rs 6,496

The plans and Estimate have been countersigned by the President of the District Board –

4/11/87

Dw

circ 18-11-87

C. No 8627

Wy M/ 3148/15

There are 82,122 c.ft. of archwork exclusive of spandril arches, the rate obtained from the Presidency Div. which includes carriage of cement to site is Rs 46 for a unit of 100 c.ft. which would then give

82,122 × 46 = 37,776

or

Rs 21,522 in excess of brick in mortar. This if added to the Estimate would make the total amount Rs 1,87,623 instead of Rs 1,66,100 –

The increase however would be covered

PWC No 8627 3148/16

Masonry Bridge over the Ponnaiar, to the North of Cuddalore on the road to Pondicherry.

The District Board & Head have decided in favour of a masonry bridge, on account of the narrow roadway proposed for the type designs of girder bridges, viz 14' and 9'; also these type designs have not yet been received from England. It will therefore be sufficient to examine the design for the Masonry bridge –

The old bridge which was built in 1856-57 at a cost of about 67,000 ~~[illegible]~~ had shallow foundations, resting on sand, and a clear waterway of 12,117 sq feet. It did not show signs of failure until 1875 and only finally collapsed in 1884 –

The raised rise of the arches was 11'3" and at the time the bridge fell, the flood level was 13' above floor level,

L. F. W.D.

Laterite boulders
in mortar – Rs 15-10 – Rs 12-14

The total saving that would be effected by adopting the P.W.D. rates for these items would be Rs 6,496

The plans and Estimate have been countersigned by the President of the District Board –

4/11/87

circ. 18-11-87

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to a considerable extent by a reduction in the depth of the wells which appear to be unnecessarily deep & by a reduction in the rates.

The total saving thus effected would aggregate about Rs 18,000

8/11/87

PWC No 8627 3148/16

Masonry Bridge over the Ponnier, to the North of Cuddalore on the road to Pondicherry.

The District Board & Asst have decided in favour of a masonry bridge, on account of the narrow roadway proposed for the type designs of girder bridges, viz 14' and 9'; also these type designs have not yet been received from England. It will therefore be sufficient to examine the design for the Masonry bridge –

The old bridge which was built in 1856-57 at a cost of about 67,000 Rs had shallow foundations×, resting on sand, and a clear waterway of 12,117 sq feet. It did not show signs of failure until 1875 and only finally collapsed in 1884 –

The versed sine of the arches was 11' 3" and at the time the bridge fell, the flood level was 13' above floor level,

× 2½ feet masonry on wells sunk 6'
the piers were 6' high

it is clear therefore that the bridge failed from scour, and not from pressure caused by insufficient waterway –

The new bridge is to have 16 five centre arches, of 60' span with versed sine of 15' giving a clear waterway of 17,070 sq feet or rather more than that of the Railway bridge about 20 miles higher up the river; moreover it is stated that after passing the railway bridge, a good deal of the water spills over the low country to the North of the site of the new bridge.

Foundations.

From the section of borings taken immediately above the site of the old bridge, there is very hard stiff clay underlying the sand, right across the river; and if all the wells are taken down 2 feet into the clay; there will be no danger of the foundations failing from scour – ~~[illegible]~~ From the section, the maximum

3148/17

depth to which the wells will have to be sunk is 20 feet and the minimum 15 feet.

Flooring.

The flooring provided is somewhat elaborate, but there is no doubt that the additional retaining walls provided will bind the flooring in a most substantial manner –
The retaining walls up and down stream might be carried down to a depth of 8 feet –

Drainage

No details are given regarding this – I would suggest that openings, fitted with cast iron pipes, be made in the parapet walls, to carry off as much as possible of the drainage from the roadway; and that in the body of the bridge, openings be made into the spandrel spaces, from which gutters can be made to the faces of the bridge, with pipes to throw the water clear of the pilasters –

In other respects I think the design of the bridge and the arrangements

Estimate

proposed for the centering are satisfactory -

With the very solid flooring provided, I do not think there will be any unusual sinking of the centres -

The total amount of Rs 1,66,100 can be reduced considerably by reducing the depth to which the wells are to be sunk, viz to a depth of 2 feet into clay, instead of to a uniform depth of 30 feet.

Some of the rates as detailed by T are in excess of the PW rates, and if the latter be adopted, there would be saving of 6,500 Rs

It is probable that 12000 Rs more might be saved by the reduction of depth in the wells.

With these remarks the design & estimate are recommended for sanction

Wm
10. 11. 87

3148/18

Note by the Ch. E. [illegible]

The water way allowed appears to be ample, as in extreme floods much of the water spills over the country.

2 The depth of the wells are to be founded appears excessive. If very hard stiff clay is to be found at depths shown in the cross section of the river, it will be sufficient to sink the wells, as suggested by the S. Engr ~~[illegible]~~ 2 or 3 feet into clay. This will effect a consider: -able reduction in the Estimate.

3 The flooring to [illegible] be deepened as the S.E. has also suggested by increasing the depth of the retaining walls.

4 The spandril arches shown, it is recommended, be omitted, they are not ornamental, are above H.W. line and are in the position with reference to the arch where weight is desirable.

5 The cut waters of the piers are not of good shape, they would

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15 F R
Works.

PUBLIC WORKS DEPARTMENT.

3148/20

THE MADRAS GOVERNMENT.

UNDER date the 21st Novr 1887

READ the following

er V Circle S.E. No 2917 of 19th October 1887

eer P.W.D. of 12th Novr/87

The estimate amounting to Rs 166,100 for constructing a masonry bridge across the Ponnaiar river, immediately to the north of Cuddalore, on the road to Pondicherry, is sanctioned.

2. The attention of the District Board will be drawn to the remarks of the Chief Engineer P.W. Department.

Ms

3168/19

work better, and be less obstructive if curved as shewn in pencil on the plan.

6. The rates for the following descriptions of work are somewhat in excess of the P.W. rates current in the district.

Brick work
Arch work
Dentil cornice
Plastering
Laterite boulders in mortar.

With these remarks the Estᵉ is recommended for sanction.

Order sanctioning

Jole
12/11/87

B & R
Works

PUBLIC WORKS DEPARTMENT.

3168/20

THE MADRAS GOVERNMENT.

UNDER date the 21st Novr 1887

READ the following

er P Circle A.E. No 2917 d/
19th October 1887

er P.W.D. d/ 12th Novr/87

The estimate amounting to Rs 1,66,100 for constructing a masonry bridge across the Ponniar river, immediately to the north of Cuddalore, on the road to Pondicherry is sanctioned.

2. The attention of the District Board will be drawn to the remarks of the Chief Engineer P.W. Department.

Estimate

No. 3148

B & R

Works

PUBLIC WORKS DEPARTMENT.

3148/20

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 23d Novr 1887

READ the following

From the Supdg. Engineer V Circle H. E. No. 2917 d/ 19th October 1887

Note by the Chief Engineer P. W. D. d/ 12d Novr/87

PPH 20 nov

The estimate amounting to Rs 166,100 for constructing a masonry bridge across the Ponniar river, — immediately to the north of Cuddalore, on the road to Pondicherry, is sanctioned.

2. The attention of the District Board will be drawn to the remarks of the Chief Engineer P. W. Department.

Mis

3. This sanction has been registered as Local No 34 W of 1887-88.

15-11-87

15/11/87.

17/11

To
The Local & Municipal Dep
with 15 enclosures
" Supg. Engineer 2 Circ

D 5/12/87

circ. 18-11-87 R. 21-11-87.

Expl. W. Wesly 24/7/8
D 24/7

8·4·10

8627

Govt. of (1887) Madras.
PUBLIC WORKS.

Dated 23/11/87

Recd. &c. Encl.

G.O. 21 Nov 1887, No. 3148 W.

Masonry bridge across the Ponniar River

=

Est. for a –, north of Cuddalore, on the road to Pondicherry, sanctioned, & attention of the St. Board drawn to the remarks of the Chief Engr, P.W.D.

70/4