(1) Number of pages 72

(2) Date of repair 1/88

(3) Initials of the Referencer [illegible] ✓

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P.W.D DEPARTMEN

G.O. No. 175 — W ~~Press.~~
B.P. No. ~~Mis.~~

Dated 20-1-1887 ~~198~~.

Not to be folded or roughly handled

-10,006 1 -80.

20th January 1887, No. 175 W., Public Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers:—

From J. THOMSON, Esq., President, Local Fund Board, Godávari, to the Chief Secretary to Government, dated 7th August 1886, No. 100.

The District Board at their meeting held on the 23rd February 1886 sanctioned a revised estimate, amounting to Rs. 68,700, for constructing the bridge over the Yeleru river, near Yerraram, miles 30, on the great northern trunk road.

2. The Superintending Engineer having personally inspected the work, the original amount, Rs. 37,228, is increased to Rs. 67,850 with reference to his remarks—*vide* his letter, No. 267 G.D., dated 17th April 1886, copy enclosed. Sanction is requested for this amount.

3. The reasons for the revision of the estimate are given in the enclosed copy of letter, No. 3343, dated 8th February 1886, of the Local Fund Engineer. Rs. 2,690 are provided for this work in the current year's budget.

4. This bridge is a sub-work of the estimate "constructing great northern trunk road from Rajahmundry to Tuni," sanctioned originally in G.O., No. 1221 W., dated 9th March 1878.

Enclosure.

Copy of proceedings of the District Board, Godávari, passed at their meeting held at Cocanada on the 23rd February 1886.

* * * * * *

24. Read Local Fund Engineer's letter, No. 3343, dated 8th February 1886, forwarding revised estimate, amounting to Rs. $\frac{68,700}{37,228}$, for constructing a bridge over Yeleru river, near Yerraram, miles 30, great trunk road. The Engineer says that the original estimate was framed in 1877, since which rates and prices have risen considerably and it was found quite impossible to do the work at the rates given, which appear to be those for the rougher sort of work, and requests that sanction to continue the work may be accorded in anticipation as this is the working season.

The Board accord sanction to proceed with this important work in anticipation. They notice that certain items have been apparently left out in the original estimate.

(Signed) P. H. BROWN, C.E.,
Local Fund Engineer and Presiding Member.

No. 518, Financial.

Transferred to the Public Works Department.

(By Order.)

(Signed) E. S. LAFFAN,
Under Secretary.

Madras,
21st August 1886.

From G. T. WALCH, Esq., Superintending Engineer, I Circle, to the Chief Engineer, Public Works Department, dated Dowlaishweram, 3rd December 1886, No. 2148 G.D.

Bridge over Yeleru on the Trunk Road near Yerraram.—With reference to your No. 3381 C., dated 1st October, I have the honor to state that I find * that the right (or Somaram) abutment and wings have already, in accordance with Major Clarke's approval, been built up to 6 feet above spring, [illegible] allowing for only 15 arches, and to now remove them to put the 16 arches would be costly and cause much delay in completion of the work.

* I visited the work on 13th ultimo.

2. It should have been pointed out that the springing of the arches has been made 8 feet 3 inches above the floor instead of 7 feet as in the sanctioned plan, and this more than compensates in area of water-way for the reduction of one in the number of arches.

3. I have therefore altered the estimate,† which I now resubmit with all the file which accompanied it, only as regards the substitution of timber for mud centerings as ordered, and, as far as possible, for three arches have already been satisfactorily turned with "mud centerings."

† Rs. 69,035.

4. Delay in getting a reply to a reference on the subject to the Local Fund Engineer has prevented this report going to you some fortnight ago.

ORDER—dated 20th January 1887, No. 175 W., Public Works.

The revised estimate, amounting to Rs. 69,035, for constructing a bridge across the Yeleru river, near Yerraram, on the trunk road from Rajahmundry to Tuni, in the Godávari district, is sanctioned in supersession of the estimate of Rs. 37,228, included in the general estimate of the road, sanctioned in G.O., No. 1221 W., dated 9th March 1878.

2. It is understood that the springing line of the arches has been made 8 feet 3 inches above floor level, although 8 feet is shown in the plan.

3. This sanction has been registered as Local, No. 34 W. of 1886-87.

(True Extract.)

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

To the Local and Municipal Departments, with thirteen enclosures.
„ Superintending Engineer, I Circle.

Exd. P. L. Pereira.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of (1887) Madras.

PUBLIC WORKS.

Dated January, 20th.

Recd. *Encl.*

G.O., 20th Jan. 1887, No. 175 W.

JANUARY.

Bridge

Revised estimate of Rs. 69,035 for constructing a — across the Yeleru river, near Yerraram, on the trunk road from Rajahmundry to Tuni, in the Godávari district, sanctioned.

No. 100

175/3

GODAVARI CIRCLE,
LOCAL FUND'S OFFICE,
7th August 1886.

2/1

From

The President L. F. Board.

To

The Chief Secretary to Government,
Madras

Sir,

The District Board at their meeting held on the 23rd February 186 Sanctioned a revised Estimate amounting to Rs 68700 for constructing the bridge over the Yeleir river near Erraram m. 30 on the great Northern Trunk road.

2. The Superintending Engineer having personally inspected the work, the original amount Rs. 37228 is increased to Rs 67850 with referenee to his remarks vide his letter No 267 G. D. D/17th April 186 Copy enclosed. Sanction is requested for this amount.

3. The reasons for the revicion of the estimate are given in the enclosed copy of letter No 3343 D/8th February 1886 of the Local Fund Engineer. Rs 2690 are provided for this work in the current Year's Budget.

4. This bridge is a Sub work of the estimate "Constructing Great Northern Trunk Road from Rajahmundry

to Yuni" Sanctioned originally in Government Order. No 1221 W. dated 9th March 1878.

I have the honor to be,
Sir,
Your most obedt. Servant.

President.

Copy of Proceedings of the District Board, Godaveri, passed at their meeting held at Cocanada on the 23rd February 1886. 17/4

Present.

P. A. Brown Esquire. Local Fund Engineer & Presiding Member.
Shaik Mahamed Yusuff Sahib Bahadur gar. Temporary Dy. Collector.
M. R. Ry. A. Subbarayudu gar. Rao Sahib.
" P. Ramakristnayya gar "
" N. Tirapatirayudu Naidu gar "
" S. Venkatrazu gar. "
" M. Subbarayudu gar. "
" G. Kristnamma gar. "
" D. V. Siva Row gar "

24. Read Local Fund Engineer's letter No 3343 D/ 8th February /86 forwarding revised estimate amounting to Rs. $\frac{68700}{37,228}$ for constructing a bridge over Yeleir river near Yerraram m 30 Great Trunk Road. The Engineer says that the original estimate was framed in 1877 since which rates and prices have risen considerably and it was found quite impossible to do the work at the rates given which appear to be those for the rougher sort of work and requests that sanction to continue the work may be accorded in anticipation as this is the working season.

The Board accord sanction to proceed with this important work in anticipation. They notice that certain items have been apparently left out in the original Estimate.

(Signed) P. H. Brown C.E.
Local Fund Engineer
and Presiding member.

(True Copy)

President.

P.W.C. No 6554

(4)

Local Fund {1886} Department.

Financial Department

CURRENT No. 152247

From

The President,

Godavari Circle.

B. No 12214. 9.3.78.

No. 100

Dated 7th }
Despatched 18th } August 1886
Received 23 }

Su. 3
P.h.9878/81.

No.

475
Enct 3 Plan

SUBJECT.

p3

Submitting for San

the revised estimate am

to Rs ~~68700~~ 67,850 for Constructing the

bridge over the yeleir river

near Erraram on great Northern

Trunk road.

No 518

Transferred to the Public
Works Department
(By Order)
[illegible]
Under Secretary

Madras
21st Aug/86

PR
[illegible]

ays. 48/9.

6.9.9.86

18/8

No. 2148 G.D.

p4

175
6

FROM

THE SUPERINTENDING ENGINEER

FIRST CIRCLE.

TO

THE CHIEF ENGINEER

P.W. Department

~~FOR IRRIGATION.~~

DOWLAISHWERAM, 3rd December 1886

Despd 10th — do —

Enclos. 14
3 tracings &
1 Comparative statement
are [illegible]
Copy

SIR,

Bridge over Yeleru on the Trunk Road; near Yerraram.

With reference to your No 3381 C 1st October I have the honor to state that I find that the right, or Somaram, abutment & wings have already, in accordance with Major Clarke's approval, been built up to 6' above springing allowing for only 15 arches, & to now remove them to put the 16 Arches would be costly and cause much delay in completion of the work.

x I visited the work on 13th ultimo.

2. It should have been pointed out that the springing of the arches has been made 8'-3" above the floor instead of 7 feet as in the sanctioned plan and this more than Compensate in area of waterway, for the reduction of one in the number of arches.

3. I have therefore altered the

estimate×, which I now re-submit with all the file which accompanied it, only as regards the substitution of timber for mud centerings as ordered, & as far as possible, for 3. three arches have already been satisfactorily turned with "mud centerings".

× Rs 69,035.

4. Delay in getting a reply to a reference on the subject to the Local Fund Engineer has prevented this report going to you some fortnight ago.

I have the honor to be,
Sir,
your most Obedient St

C. Ewald
Supg Engr 1st Circle

JK

1

P.W.C. No. 9878

FROM

THE SUPERINTENDING ENGINEER
FIRST CIRCLE.

TO

THE CHIEF ENGINEER P.W. Dept
~~FOR IRRIGATION~~.

No. 1221 Wa/9.3.78
" 3381 C/1.10.86

DATED 3d.
DESPATCHED 10 } December 1886
RECEIVED 16

16 DEC 86

NO. 2148 G.D.

ENCLOSURES. 14 + 16

(+ 3 plans)

Bridge over Yeleru on the Trunk Road near Yerravam — Estimates &c of — Resubmits with some alterations

C. 1-9-86

13/8

NO. 3355 Roads and Buildings.

135/8

FROM

THE OFFG. SUPERINTENDING ENGINEER
GODAVERY DISTRICT.

TO,

THE CHIEF ENGINEER
FOR ROADS AND BUILDINGS.

CAMP DOWLAISHWERAM, 28th January 1878

Encls 3
[illegible]

SIR,

I have the honor to resubmit the Plans and estimate of the Trunk Road No. VI for the portion between Rajahmundry and Tuni whic have been again revised according to the instructions conveyed in your Memorandum No. 2565 of 4th September 1877.

2. Opportunity has also been taken to pr -vide some increase of waterway at a few poi where the exceptionally heavy rains that fell in May 1877 showed that the culverts alrea constructed on certain completed portions of the road were insufficient.

3. The amount of the estimate before this last revision was Rs 1,74,000, it now stands corrected to Rupees 1,74,600.

I have the honor to be
Sir,
Your most obedient Servt
J. Beatty Lieutt Col. R.E.
Supt. Engineer Godavery.

Comp^d by

Roads and Buildings

FROM,

THE ~~OFFG.~~ SUPERINTENDING ENGINEER
GODAVERY DISTRICT

TO,

THE CHIEF ENGINEER
FOR ROADS AND BUILDINGS

DATED 28th January 1878.
RECEIVED

No. 3355

ENCLOSURE.

Resubmitting the revised estimate of Trunk Road No. VI from Rajahmundry to Tuni –

In Reg 782/78

No. 1292 **Roads and Buildings**

175/9

From,
The Offg. Superintending Engineer
Godavery District

To,
The Chief Engineer
for Roads & Buildings

Camp Dowlaishweram 23rd July 1877

Sir,

With reference to your Memo No. 373 of 15th February 1877 I have the honor to resubmit the estimate of the Trunk Road from Rajahmundry to Tuni; a distance of 62 miles –

2. The original estimate, amounting to Rupees 3,50,000, referred to in G. O. No. 1874 # of 22d September 1875, was prepared by Mr. Hannan, who was in charge of the Rajahmundry Range from 11th March 1869 to 18th October 1874. That estimate was dated 5th August 1869 –

3. Work was commenced × on the Trunk Road in August 1869; stopped in

# Financial Dept. communicated with G. O. No. 26 of 6th Octr. 1875

× From Imperial Funds –

in February 1870; and recommenced January×1873 -

× From Local Funds -

4. The estimate was returned to the Range Officer for revision on 9th September 1873. Probably oral instructions had been given him, as none are found in the Memo returning the estimate -

5. On 28th January 1874 Mr Hannan submitted a revised estimate amounting to Rupees 1,70,312. He explained the reason of the great difference between the original and revised estimates in this way; (1) The original estimate was prepared in a hurried manner, without sufficient information, and part of the difference is due to reduced rates; (2) In the revised estimate the width of the road proposed was 6 yards, instead of 8 yards; (3) Mr Hannan proposed to dispense with metalling in the first 10 miles out of Rajahmundry -

6. Certain omissions were observed in

Mr

Mr Hannan's revised estimate which would have brought the total amount up to Rupees 176,800; and Assistant Engineer Mr Larminie having taken charge of the Range in 1875, the estimate was returned to him for a second revision. It had also been found that metalling was badly needed in the first ten miles of the road, which during the closure of the Canals often gets by far the heaviest part of the traffic -

7. Mr Larminie submitted a revised estimate, amounting to Rupees 1,75,100, on 23rd May 1876. He increased certain rates which experience had shown to be insufficient; provided for metalling the first ten miles out of Rajahmundry; and altered the bridge over the Elair, reducing the waterway from 5000 square feet, which Mr Hannan had provided, to 4000 square feet, and giving an iron superstructure of the lightest description, in fact dangerously light.

I think –

8. The Elairu is the principal river to be bridged between Rajahmundry and Tuni. Both Mr Hannan and Mr Larminie proposed masonry piers and abutments, and an iron superstructure; Mr Hannan's bridge with a waterway of 5000 square feet would cost Rupees 47,800, Mr Larminie's having a waterway of only 4000 square feet would cost 43,000 Rupees –

9. Mr Larminie's estimate was submitted during my absence from the District in July 1876, through the Local Fund Board, and came back for further revision with your Memo. No. 373 of 15th February 1877. It has been carefully checked by Supervisor Subbiah Naidu, now in charge of the Range, who has brought to notice certain omissions, on account of baling, compensation for land &c, which would

have

have brought Mr Larminie's Elairu bridge estimate up to Rupees 44,490.

10. The estimate now submitted provides for a masonry bridge at the Elairu of 16 spans of 36 feet each: giving a waterway of 5431 square feet. The arches would be of brick, and the bridge would cost only Rupees 37,066; i.e. about 10,800 Rupees less than Mr Hannans, and 6,000 Rupees less than Mr Larminies, while it provides a greater waterway than either of those bridges –

11. The area of the catchment basin of the Elairu, above the point where it is crossed by the Trunk Road, is 150 square miles, and from my observation of the discharges of hill streams in this District, I am of opinion that Ryves' formula $D = C\sqrt[3]{M^2}$, using a coefficient of 300. will give a sufficiently accurate approximation to the maximum discharge which I thus find to be 39,375 cubic feet per second, equal to a rainfall of about $9\frac{3}{4}$ inches in 24 hours.

This assumes that we may have a maximum rainfall of 13 inches over the whole area of 150 square miles, and that three fourths of it will flow off at once. 17 inches of rainfall, were registered in 24 hours at Vizagapatam Observatory in the Cyclone of October last, but it is supposed that that was a very extraordinary case, and that it did not extend over any great area. Probably if the Chicacole, Chittivalsa, and other bridges then swept away had provided for $9\frac{3}{4}$ inches flowing off they would have been standing now.

12. The bridge now proposed having a waterway of 5431 square feet below maximum flood level, equal to the section of a maximum flood, will discharge such a flood with a velocity of a little over 7 feet per second.

13. As regards my use of Ryve's formula and the coefficient of 300, I may also mention that Lieutenant A. Dorward was encamped at Annamalanka

lanka on the Yerra Calwa in 1872 when the greatest fresh on record occurred. That fresh rose 2 feet higher than the highest fresh remembered by the oldest inhabitants. Lieutenant Dorward took most careful levels and cross sections of the Yerra Calwa (which there drains 672 square miles) and from these, by De Buat's formula, he calculated the discharge to have been 3 millions of cubic yards per hour. Now by Ryve's formula with a coefficient of 293.

$$D = C\sqrt[3]{M^2}$$
$$= 293\sqrt[3]{672^2}$$
$$= 293 \times 76{\cdot}74$$
$$= 22{,}500 \text{ Cft per second nearly}$$
$$= 3{,}000{,}000 \text{ Cyds per hour; conse-}$$

quently the coefficient 300 will be ample.

14. As Government desire that* native products shall be used as far as practicable, and by using masonry and brickwork a larger waterway can be provided at less cost than with iron girders, while the

*Vide G.O. No. 2883 of 28th October 1876.

the former structure will be more durable and maintained at less cost than iron work, I consider the bridge now proposed in every way more suitable.-

15. Trial pits have been dug in the bed of the Elairu, and they have shown that the depth of sand varies from 6'.58 to 11'.50 over a substratum of clay.-

16. The cost of the work required to complete the road after 1st April 1877, including the Elairu bridge, has been carefully re-estimated by Supervisor Subbiah Naidu and comes to Rupees 79,556. The expenditure incurred up to that date was Rupees 94,444. The whole of this work is shown in the revised estimate now submitted which therefore amounts to Rupees 1,74,000.-

I have the honor to be

Sir

Your Most Obedt. Servant

C. Beatty. Major R.E.

Offg. Superintending Engr. Godv. Dn.

C. E. of 15th Febr/77 — No. 373
G. O. of 3d July/75 — 1747 a his
" 6 Octobr/75 — " 26 — "
" " 26 March/74 — " 233 — "
" " 10 Jany/73 — " 77 — "
" " 28 Octr/76 — " 2883

Roads & Buildings

From,
The Offg Supg Engineer
Godavery Dist.

To,
The Chief Engineer
for
Roads & Buildings.

Dated 23rd } July 1877.
Desp 23rd }

No. 1292

& Returns

Trunk Road from Rajahmundry to Tuni — Submitting estimate of Rupees 1,74,000 for —

In Fin. 782 of /78

17/14

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

28th February 1878, No. 388.

Local Funds—Roads.

Read the following papers:—

No. 237. *Proceedings of the Board of Revenue, dated* 15*th January* 1877, *No.* 153.

Read the following letter from J. HOPE, Esq., President of the Local Fund Boards, Godavery District, to the Acting Secretary to the Board of Revenue, dated Cocanada, 30th August 1876, No. 70:—

With reference to G.O., dated 22nd September 1875, No. 1874, communicated with Board's Proceedings of the 13th October 1875, Miscellaneous No. 9,276, I have the honor to forward herewith a revised estimate, amounting to Rupees 1,75,100, for the construction of Great Northern Trunk Road from Rajahmundry to Tuni in substitution of the original one for Rupees 3,50,000, and to request the Board of Revenue will be good enough to obtain the sanction of Government for the same.

2. The above estimate has been approved of by the Local Fund Board of the Cocanada Circle at their meeting of the 24th instant.

5 Plans.
1 Specification.
1 Estimate.
1 Section of Yellairoo River.
1 Estimate of the calculations for a lattice girder bridge over the Yellairoo River.
2 District Engineer's original letters, Nos. 903 and 1115, dated 28th June and 19th July 1876.
1 Assistant Engineer's original letter, No. 43, of the 23rd May 1876.
—
12 To be returned.
—

ENCLOSURES Nos. 1 to 6.—Plans.

ENCLOSURE No. 7.—Specification.

ENCLOSURES Nos. 8 and 9.—Estimates.

ENCLOSURES Nos. 10 to 12.—Letters from District Engineer and Assistant Engineer.

The revised estimate, amounting to Rupees 1,75,100, for the construction of the Great Northern Trunk Road from Rajahmundry to Tuni is submitted for the sanction of Government after reference to the Chief Engineer.

2. The present estimate is in substitution of the original one for Rupees 3,50,000 noticed in G.O., Financial Department, dated 22nd September 1875, No. 1874.

3. The work appears as Item No. 7 in Part I of the current year's budget of the Cocanada Circle with an allotment of Rupees 8,690. Up to October 1876 Rupees 92,610 had been expended on the work, and the work done is apparently included in the present revised estimate.

(A true Copy and Extract.)

(Signed) H. E. STOKES,
Acting Secretary.

Earthwork Rs 1250; Metalling

No. 124.

Referred to the Chief Engineer for his remarks.

FORT ST. GEORGE,
17*th January* 1877.

(Signed). W. HUDLESTON,
Chief Secretary.

No. 238. *Memorandum from the Chief Engineer, Public Works Department, to the Chief Secretary to Government, dated Fort St. George, 20th February* 1878, *No.* 912.

The plan and estimate have been checked in the Chief Engineer's Office and the necessary corrections made, and additional information having been obtained are approved of and retransferred to the Financial Department.

(Signed) E. A. FOORD, Colonel, R.E.,
Chief Engineer, P.W.D.

No. 239. ORDER THEREON, 28th February 1878, No. 388.

Sanctioned.

(True Extract.)

Acting Under Secy. to Govt.

To the Board of Revenue.
„ Public Works Department, with enclosures for return to the Board.
„ Accountant-General.

Exd. A. F. Goodall.

101

6 Earthworks Rs 1250; Metalling

Pro: for March

Govt. of {1878} Madras.

FINANCIAL.

To

THE BOARD OF REVENUE,

&c., &c., &c.

Dated February 28th.

Issued 5/3

Recd. Encl.

G.O., 28th February 1878, No. 388.

FEBRUARY.

Nos. 237—239.

Local Funds.—Roads.—Revised estimate, amounting to Rupees 1,75,100, for the construction of the Great Northern Trunk Road from Rajahmundry to Tuni, sanctioned.

6.10.75 No 28 mis

No. 1221 Wd/9th March/78

Mi.

1 ~~Abstract~~ Estimate sent the to C

Comml. to S.E. Godavery.

W 9.3.78.

The sanction accorded in the above No. in the Financial Dept. to the ~~[illegible]~~ Revised Estimate of Rs 174,850 has been registered as Local No 218 B. of 15/7/78.

S.E. Godavery &

Ex. G.N. Camth (?) Estimate

Dwpk - 12 - 3 - 78

4 Plans
1 Specification Report
1 Genl Specification Report
1 Tabular ~~Estimate~~ Statement for masonry Works
1 Letter No. 903 from Ex Engr. to President L F B
1 - Do No - 1115
1 Do No. 43 from Asst Engr Rajahmundry &c to Ex Engr.

Sent to S.E. Godavery with the 14 March/78

1376

Public Works Department.

(4) 9

Current No. 1554

Letter No. 518

Dated the 21st August/86

From the Secty to Govt - Financial Dept.

NOTE OF REMARKS.

The accompanying revised plans and estimate provide for meeting the Yerraram bridge across the yeleru river on the great trunk road between Rajahmundry and Tuni in the Godavari district. The revised estimate for the Yerraram bridge amounts to Rs. 67,850 being Rs 30,622 in excess of the sum Rs. 37,228 originally sanctioned for that work in G.O. No. 1221 W of the 9th March/78. The following are the items of the excess:— Brick in mortar – Rs. 5,521; Wells (kerbs and sinking) – Rs. 6,091; Concrete – Rs. 4,521; Archwork (brick and stone) – Rs 4,012; Rough stone in aprons and revetments – Rs. 724; Cut stone in parapet wall – Rs. 905; Removal of silt – Rs. 750; Ba[illegible] – Rs. 224; Temporary dams Rs. 383; Centerings – Rs. 3,700; Excavation – Rs [illegible]; Earthwork – Rs. 1,250; Metalling – Rs.

1.86

C. 7. 7. 86 10/8

Contingencies—Rs.1,308; and Petty
supervision—Rs.2,600.— There are
two items, in the column 'Saving':
— Stone in mortar (face dressed)
—Rs.1,227; and Plastering—Rs.50.
2. The original design provides for
a bridge of sixteen segmental
arches each of 30 ft span and
9 ft rise; it is now proposed to
reduce the number of the arches
to fifteen while strengthening
at the same time the [illegible]
right bank of the river by
two additional wing walls,
each 5 ft long and set at right
angles to the longitudinal axis
of the bridge, and rough stone
revetments. So far as can be
judged from the data furnished
the reduced waterway is still
ample and the proposal,
which is strongly supported by
S.E.I. after a personal inspection
of the work which is now in progress
may as a whole be termed an
improvement and may as such
subject to approval, be accepted.
The height of the springing line
[illegible] is above floor level is 8 feet

which gives an area of waterway
up to springing line of (15×36×8)
4,320 sq ft. The cross section of the
river above site of bridge shows
an area of waterway of stream
of 2,925 sq ft; that below the site
2,883 sq ft. The ratio between rise
and span, 1 to 4, is good, and
the additional areas obtained
from the arched openings, the
M.F.L. is 6 ft below the intrados of
arch at crown, must be taken
into account when calculating
the waterway of the bridge
3. The various causes necessitating
the submission of the present re-
vised estimate are well
satisfactorily explained in
the accompanying documents
and S.E.I. in his letter No. 2076 B.
the 7th April '88, writes:- "I consider
recommend this Revised Estimate
to be passed considering that
all the suggestions and propo-
sitions have been carefully
weighed, and are essentially ne-
cessary." — In the same letter
when speaking of the bridge
after his personal inspection

ht he says "The necessary
work so far as it has gone is
ery good and creditable to
ll concerned. The subordina
re evidently interested in
their work — and turning
ut very satisfactory work." —
he rates allowed in the revising
estimate though much higher
than those set down in the
original, are in fair accordance
th those now obtaining in the
odavari district as given in
e schedule of Rates received
om that district. And S.E. I
rites — "There is but little doubt
that all working rates have
aterially altered since 1877 —
as that of the ordinary cooly —
those now being worked out appear
th reasonable and fair and
should be accepted."
The revised plans and estimate
have been approved by the
Godavari District Board,
and have been countersigned
by S.E.I Circle.

21/1/82

---

(4) 58

The design & estimate for this
bridge were originally submitted in
79 when Col Beatty was S. Eng.
The revised estimate amounts to Rs 67,850
, Rs 30,622. in excess of the original
estimate.
There is an increase of Rs 12,161 in the cost
of the wells alone, which is due to
the low rate originally allowed for
the brickwork & also to the fact that
no provision was made for well
curbs or for sinking which seems
a most extraordinary omission.
The other principal increases are in
Concrete, Brickwork & Centering &
are principally due to insufficient
rates allowed in the original estimate.
The wells were included in the original
design to be 6'0" deep & to be sunk
to a depth of 4'0" below floor level.
But the L. F. Engineer found that
increased depth was necessary in
order to let the wells rest on the
clay soil & has also built the wells
up to 3'6" below floor level owing
to the difficulty of keeping out water.
The curtain walls are therefore practically
formed by the wells which are practically
close together & the spaces between them
have been filled in with concrete.
The flooring is only 9" deep between

ries & only 6" deep over
the well's. & though formed of
dressed stone and therefore with
close joints this depth seems to
be insufficient.

The original plan shows circular
wells but the L.F. Engineer has
as mentioned in the S.E.'s letter
sunk square wells & in consequence
of their shape some of them are
said to have cracked & bulged.

It is not said who authorized
the L.F. Engr to make this alteration
but as most of the wells are already
sunk it is too late to do anything.

The L.F. Engineer gives the following
levels as those of M.F.L. at 2 furlongs
above bridge at the bridge & at 3 furlongs
below it respectively. 122.11, 119.87.
& 119.27.

It is not clear why there should be more
fall above the site of the bridge than below it.

The ~~[illegible]~~ M.F.L at bridge has been taken
at 119.87 & this it is said will give
8'.0" of water on the flooring & this
has been taken as the springing height
of the arches. but in the original tracing
the M.F.L is shown 10 ft above floor.
& above the springing of the arches. but
as no levels are marked it is not known
whether the M.F.L is the same or not—

The sectional area at 3 furlongs above the bridge is ~~[illegible]~~ 2925 sq ft & at 3 furlongs below is 2783 sq ft. but the area at the bridge site is not given.

The area of waterway proposed is 4320 sq ft & this is after reducing the number of spans from ~~16'-0" to 15'-0"~~ 16 to 15.

The S.E has added some extra wings at right angles to the bridge.

The L.F. Engineer states that the bridge can be sufficiently strongly built into the existing bank without the 16th span & if so the necessity for these extra wings is not quite clear.

The centering to be used is apparently the ordinary method of blocking up the whole archway with bricks in mud, earthwork etc.

This will cost Rs 300 per centering whereas the wooden centering will cost Rs 1160 per arch. The latter would however be more satisfactory for brick arches 36'-0" span as the centering could be systematically struck.

CB

3/7/06

135/21

D.P.W.

I cannot let this note go.

No notice has been taken of Col. Beatty's letter No. 1292 - 23rd July/77 where the question of waterway was carefully gone into. The M.F.L. now recorded is apparently based on information given by the villagers.

If an abutment is not thrown out into the river bed, water wings should be unnecessary. Revetment of some kind should do.

I cannot understand any one wishing stone arches in the bed of a river on mud centerings. [illegible] case has not been fairly put. Each mud centering would cost 300 Rs apparently. 2 or 3 timber centerings would do for the whole bridge.

Many of the S.E.'s remarks I should be very obvious. His remarks on the plan regarding the 'corbeling of P. walls' shews that he did not understand the plan.

The estimate has not been carefully examined in the office, but the S.E.'s had followed everything out.

11/9/86.

Note by the Chief Engr. P.W.D.

Recommended that the estimate be sanctioned with the following remarks

It is stated that the sectional areas of the river above and below the bridge are 2925 sq. ft and 2083 sq. ft respectively, while the waterway of the bridge is 4320, such being the case, the number of spans may, with advantage be reduced from 16 to 15

The water wings added by Supg. Engr. I Circle are not considered necessary, and may be omitted.

Timber centreings should be used in preference to ~~either~~ earthen ones, though more expensive, they prevent all chance of failure owing to wet weather or uneven settlement.

The cost of well sinking seems high, and unless very stiff soil is met with, there should be a considerable saving in this item.

6/9/86

E.W.

175/22

PROCEEDINGS OF THE MADRAS GOVERNMENT.

READ the following

From the President, District Board, Godavari, H. E. No: 100 d/ 7th August 1886.
Endorsement by the Financial Department. H. E. No: 518 d/21st August 1886.
Note by the Chief Engr. P. W. Department d/ —

The revised estimate amounting to Rs. 67,850, for constructing ~~the~~ a ~~Yerravaram~~ bridge across the Yeleru river near Yerravaram on the great trunk road from Rajahmundry to Tuni in the Godavari District, is sanctioned in supersession of the estimate of Rs. 37,228 included in the general estimate for the road sanctioned in G. O. No: 1221 W d/9th March 1878.

2. Attention is drawn to the note by the Chief Engineer P. W. Department above recorded.

3. This sanction has been registered as Local No: W of 1886-87.

8/9/86

To The Financial Deptt. (L. F.) with 14 enclos.
" Suptg. Engr. I Circle.

Chief Engr for [illegible]

In his letter No. 1292. d/ 25th July 1877, the Offg. Engineer Godavari Distt. gives some calculations regarding the discharge of the Elaiur at the site of the bridge. He takes the area of the catchment basin to be 150 square miles and using the formula $D = C\sqrt[3]{M^2}$ $C = 300$ finds the discharge to be 39,375 cubic feet a sec: this assumes that there may be a rainfall of 13" in 24 hours over the whole area, he then shows that with 16 arches of 36' span each, giving a waterway of 5431 the velocity during the highest flood would be a little over 7' a sec:

I consider that 15" of rainfall is too great and that such a fall over so large an area as 150 square miles is unknown on the East Coast, and that supposing it possible

16

16 vents is too few, as a velocity of over 7' a sec: is not safe unless very strong and wide aprons be provided. The Local Fund Engineer who submits the present estimate basis his calculation of waterway required on the marks of M.F.L. as shown by the villagers, if this source of information could be depended on, it would be far preferable to any calculations, but of course no great accuracy can be expected, though it is difficult to understand the great difference between Colonel Beatty's calculations and the observations ~~served and~~

It is therefore probable that the calculations give too great a discharge and the observation and [illegible] too little. In these circumstances it will perhaps be as well to construct the 16 arch as originally designed —

As

Possibly Col. Beatty's calculations give an excessive discharge, though in the face of the tremendous floods occasionally experienced it does not appear that he provided an excessive waterway. he carries water in the max^m. flood considerably above springing of arches. his calculation is much safer than flood level pointed out by villagers. I think 16 arches should be allowed as then the waterwings would be unnecessary

17/24

If timber centring costs so little more than mud, timber should certainly be used. I should insist on this.

As regards the centring, the Local Fund Engineer allows 15 mud centrings at Rs 300 each or Rs 4,500 — he also submits an estimate, Rs 1529 for a timber centring, and as I consider 3 centrings are advisable (though 2 might do) the cost would be Rs 4587 or more than that of mud centrings as I said in my previous note —

It was not thought necessary to notice in the note any of the remarks made by S. E., in fact his remark about corbelling out the parapet I was thinking of having expunged, so that it might not be seen by the Local Fund Engineer when the papers were returned. The waterwings I do not consider necessary even if only 15 arches were allowed.

I would take this opportunity to observe that if Local Fund estimates

are

4

are to be checked in detail in this Office it will be necessary for the Engineers to submit them in proper form in accordance with instructions given in the Code. At present they are often received without report or specification, often necessary sections are omitted, levels are not entered &c &c. Very many Local Fund estimates pass through this Office and it would save considerable time and trouble if they were submitted in proper form.

17/9/86

Yerraram Bridge.

Note by DW

I don't say that L. F. Estimates should be checked in detail, but they must be so examined that we are not misled by [illegible] made by a L. E. who does not understand the plans. We have to see that the designs are safe & good, but not extravagant.

23/9/86

10/2

P.W. Department

From the President, Dist. Board, Godavari, H.E. No. 100 d/ 7th August 1886
Endorsement by the Financial Dept. H.E. No 518 d/ 21st August 1886

Although it is possible that the calculations made by Col. Beatty in 1877 give an excessive discharge it does not appear that he provided an excessive waterway, taking into consideration the tremendous floods occasionally experienced. He proposed to carry water in the maximum flood considerably above springing of arches, and his calculation is much safer than flood level pointed out by villagers on which the Local Fund Engineer has based his calculation of the waterway required. In the circumstances it is considered that 16 arches should be allowed, and that then the waterwings would be unnecessary.

2. The Local Fund Engineer allows 15 mud centreings at Rs 300/ or Rs 4500/ for all. He also submits an Estimate of Rs 1529 for a timber centreing and as it is considered that 3 centreings would be necessary the cost would be Rs 4587. As this is so little in excess of the cost of mud centreings it is considered that timber centreings should certainly be used.

3. With

3. 17/20 With these remarks the plans and Estimate are forwarded to the present Suptg. Engr. I circle for his scrutiny and opinion – and for such alterations as may be necessary.

25/7/86

To.

The Suptg. Engr. I circle
with papers.

J.B.
25.7.86

[illegible] Bridge

Memo

Superseded

Superseded

13/2

D W.

The first memo was approved and initialled by W please say whether the revised memo may issue during W's absence.

JB

28. 9. 86.

Although it is possible that the calculations made by Col. Beatty in 1877 were on excessive discharges, it does not appear that the variation of them in two years, taking into consideration the heavy flood occurring, appreciable.

Col. Beatty's calculations were based on the drainage basin & the rainfall and are much more likely to be correct than those of the [illegible] Engineers which ~~depend~~ are based on the flood level [illegible] of the villages. In the circumstances it is considered that 16 inches should be provided, as the [illegible] will be required.

In addition [illegible]

also submits an [illegible] for No 1565
for a similar condition

These conditions as proposed by the L. Z.
[illegible] shall not be allowed, and similarly
I think conditions similar to those on for
this ~~the L. L.~~ [illegible] submits an [illegible]
for No 1528 shall be [illegible]. The [illegible]
& there will be No 4857 a [illegible] in
[illegible] of the same conditions: but they
are in any way for [illegible]
Write them [illegible] & [illegible]

27/2/84

C/ [illegible] of [illegible] P. W. Dept

D/

From the President D. Bd. Godavari No. 100 d/ 7. 8. 86
Endorsement in the [illegible] dept. 518 d/ 11 --

Although it is possible that the calculation made by Colonel Beatty in 1877 gives an excessive discharge, it does not appear that the waterway provided by him is too great, taking into consideration the heavy floods recently experienced.

Colonel Beatty's calculations were based on the drainage basin and the rainfall, and are much more likely to be orrect than those of the L.F. Engineer which are based on the flood level pointed out by the villagers. In the circumstances it is considered that 16 arches should be provided, and then no enterings would be required.

Mud centerings as proposed by the Local Fund Engineer should not be allowed, and instead, 3 timber centerings similar to the one for which he submits an stimate for Rs. 1529/- should be provided; the cost then will be Rupees 4857 or slightly in excess of the mud centerings, but they are in every way far superior.

With these remarks the plans and estimates are forwarded to the present Supdg Engineer I Circle for his scrutiny and opinion - and for such alteration as may be necessary.

27/9/86

S.E. I Circle

with papers. —

Jll
30/9/86

D. No. 1221 W. d/ 9.3.78

No. 3396 C d/ 1-10-80

Public Works Department

Current No. 2578

Letter No. 2148 G.B.

Dated the 3rd December '80

From the S.E. I Circle

NOTE OF REMARKS.

The accompanying revised plans and estimate for reconstructing the Gorraram bridge across the Yeleru in the great trunk road between Rajahmundry and Tuni in the Godavari district. The revised estimate amounts to Rs. 69,035 being Rs. 31,807 in excess of the original estimate Rs. 37,228, sanctioned in G.O. No. 1221 W. dated 9th March '78.

2. In reply to G.O. Memo No. 3396 C of the 1st October, '80 S.E. I explains in his enclosing letter No. 2148 G.B. of the 3rd instant that as the construction of the Gorraram bridge in accordance with the revised design (Barclay) lately submitted by Major Blake has already advanced very far, it would be inadvisable in the way of loss of time and increased expenditure to revert to the

sanctioned original design of 16 arches.

3. The revised design of 15 arches for the Jerrasani bridge formerly submitted remains unaltered, but the revised estimate which then accompanied it has now been increased by Rs. 185 by the substitution of timber – "as far as possible" – for brick centerings.

W.

17.1.57

Jerrasani bridge across the Yelera R: 17/34

Under the circumstances explained in the S.E.'s letter No 2145 of 3rd Dec 1856 the original design for a bridge with 16 arches cannot now be reverted to, and the present design, as partly constructed, of 15 arches is approved –

It is understood that the springing line of the arches is 5' 3" above floor level, although 5' is shewn in the plan

The revised estimate of Rs 69,035 is sanctioned

20.12.56.

20/12/56.

17/34

15/35

No. 175 W

X/

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 20 Jany/87

READ the following

Letter from the President Dt. Board, Godavari No. No. 100 of 7th August 1886

Endt. in the Financial Dept — " No. 578 of 21st August 1886

Letter from the Supg. Engineer I Circle " No. 2148 GD of 3rd Decr. 1886.

5

The revised estimate amounting to Rs. 69035 for constructing a bridge across the Yelern river near Yerraram on the trunk road from Rajahmundry to Tuni in the Godavari District is sanctioned in supersession of the estimate of Rs. 37228 included in the general estimate of the road sanctioned in G.O. No. 1221 W, dated 9th March 1878.

2 It is understood that the springing line of the arches has been made 8'-3" ~~above plinth~~ floors level, although 8' is shown on the plan.

3. This sanction has been registered as Local No. 3/K W of 1886 87.

17.1.87

Jm
17/1/87

HCS
19/1

CHIEF SECRETARY
17 JAN 87

1

HJ 21/1

2 To Local & Municipal
The ~~Financial~~ Depts ✓
with 13 enclosures ✓
" Supdt Engineer ✓
I Circle

To Chief Secretary
for favour of countersignature

15/1

CS. 17.1.87

9878

Govt. of 1886 Madras.

PUBLIC WORKS.

Dated

Recd.

Encl.

G.O., 20th Janry 1887, No. 175 W

Bridge

Revised Estimate of Rs 69,035 for constructing a — across the Yeleru river near Yerravaram on the trunk road from Rajahmundry to Tuni in the Godavari district, sanctioned.