

Public Works (1899) Department.

G.O., No. 1845 W

DATED 18th July 1899.

[Despatch Abstract.]

Pandalur Road:

The estimate, amounting to Rs 42,100,
for constructing the — in the Malabar
District, sanctioned with remarks.

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The estimate, amounting to Rs. 42,100, for constructing the — in the Malabar district, sanctioned with remarks.

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following papers:—

From A. H. GARRETT, Esq., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works Department, dated Camp Ootacamund, 5th May 1899, No. 242/W.

In continuation of this office No. 200/W., dated 12th April 1899, I have the honour to forward for sanction of Government an estimate, amounting to Rs 42,100, for the Pandalur road.

The estimate for the inspection shed has not been checked in this office for want of plan. The plan has been called for from the Divisional officer and it will be sent as soon as it is received.

My inspection notes for January explain the difficulties experienced in preparing accurate estimates for these Moplah roads.

From A. H. GARRETT, Esq., Superintending Engineer, IV Circle, to the Chief Engineer, Public Works Department, dated Camp Ootacamund, 13th May 1899, No. 265/W.

In continuation of this office No. 242/W., dated 5th May 1899, I have the honour to submit the plan for the inspection shed at Pandalur.

Note by the Chief Engineer, Public Works Department.

The estimate for constructing the Pandalur road in the Malabar district, amounting to Rs 42,100, is recommended for the sanction of Government with the following remarks:—

- (1) The road surface should be barrelled with a rise of 4 inches in centre, except on ghâts where it should slope inwards to the inside drain.
- (2) The side slopes for embankments should not be less than $1\frac{1}{2}$ to 1.
- (3) The iron girder bridge of 2 spans, 25 feet each, across the Todu river at the 6th mile 2nd furlong and 120 feet, need only be wide enough to discharge its own flood water. With a coefficient of 700, the discharge for a drainage area of 4.5 square miles equals 1,902 cubic feet per second which one span of 25 feet will discharge with a depth of 7.6 feet and a velocity of 10 feet per second; therefore, one span may be adopted.

The base of the abutments and wings is too slight; it should not be less than four-tenths of the height.

The estimate provides for iron girders of a section $14" \times 6"$ weighing 60 lb. per foot run; taking one-twentieth the span as a safe height for girders, a girder $15"$ in depth would be required; therefore a steel girder of a section $15" \times 6"$, weighing 59 lb. per foot, would be preferable as iron girders are now obsolete.

It is pointed out that it would be cheaper to obtain the girders from Bombay than from Calcutta as estimated for.

In the case of the wooden platform bridges, the Chief Engineer considers that old railway rails should be used if procurable, spaced 2 feet apart, in lieu of wooden beams as estimated.

(Signed) W. B. DEWINTON,
Chief Engineer.

3rd July 1899.

ORDER—No. 1845 W., dated 18th July 1899.

The estimate, amounting to Rs. 42,100, for constructing the Pandalur road in the Malabar district, is sanctioned.

2. The outlay on the work to end of 31st March 1899 was Rs. 23,860 and the amount required for its completion is Rs. 18,240. The expenditure on the road in the current year will be met from the budget grant of Rs. 30,000 for the Ernad roads. This sum will, if necessary, be augmented, on application by the Superintending Engineer.

3. Attention is drawn to the Chief Engineer's note read above.

4. This sanction has been registered as Provincial No. 42 W. of 1899-1900, and classified as Communications—Original Works.

(True Extract.)

Under Secretary to Government.

To the Superintending Engineer, IV Circle, with 34 enclosures.

- „ Examiner, Public Works Accounts.
- „ Judicial Department.
- „ Local and Municipal Department.

Exd. T. K. Narayana Aiyangar.

READ the following:—

Circulated to

~~His Excellency the Governor.~~

To The S. E. IV Circle, with 34 enclos.

Exar. P. W. Accounts

- Javal Deptt ✓
 P. W. 4
 [1,000 - 1,098. Deptt

Note.

The estimate has been dealt with in the accompanying technical note and the note by the Chief Engineer read above.

48
Hole by E.W.

The estimate for constructing the Pandelur road in the Malabar District, amounting to Rs 42,100, is recommended for the sanction of Govt. with the following remarks:

1. The road surface should be cambered with a rise of 4 inches in centre except on ghats where it should slope inwards to the inside drain.

2. The side slopes for embankments should not be less than $1\frac{1}{2}$ to 1.

3. The iron girder bridge of 2 spans, 25 feet each, across the Todra river at the 6th mile, 2nd furlong and 120 feet need only be wide enough to discharge its own flood water - with a coefficient of $\frac{700}{500}$. The discharge for a drain of area of 4.5 sq. miles, 1902 per sec, which one span of 25 ft. will discharge with a depth of 8.5 feet & a velocity of 10 feet per sec.

Altered by me
The figures should be altered - I have no further here
L.H.S.

3747

Current No. 3967

Letter No. 262/W

Dated

5th May 1899

From the Supt Engineer W Circle.

NOTED BY TECHNICAL SECTION.

Name of work

Constructing the Pandalar road in the Malabar District

Amount of estimate Rs 42,100

This estimate has been framed with reference to G.O. No. 916 W dated 31st March 1897.

The tract of country lying between the Pandalar hills and Kadalmudi river is dependent for its communication on steep and winding footpaths and in times of tropical outbreaks this tract has been difficult to reach. Hence the necessity for establishing an easier communication.

The road is to take the place of one proposed by the District Board from Malappuram via Kuthangadi Ferry, Pandalar and Muddikud to Pandikad.

The present road branches off from the Manjeri - Angadipuram road at about the 2nd mile stone and runs more or less parallel with Kodak road.

to W. for orders.

Hag H.

The work has been started and a good deal of it is done. Vide Progress Reports in file.

Level of the road is in accordance with the order.

I enclose the trail & No VI in accompanying tracing - W to: say to

W. No. VI. 26/6/99
P. W. 60.
[250-5-9-98.]
30.6.99.

Therefore one span may be adopted.

The base of the abutments & wings is too slight; it should not be less than $\frac{1}{10}$ of the height.

The estimate provides for iron girders of a section 14" x 6", weighing 60 lbs per foot run, taking $\frac{1}{20}$ the span as a safe height for girders. A girder 15" in depth would be required, therefore a steel girder of a section 15" x 6", weighing 89 lbs per foot, would be preferable as iron girders are now obsolete.

It is pointed out that it would be cheaper to obtain the girders from Bombay than from Calcutta as estimated for.

In the case of the wooden bridges, the Chief Engineer considers that old railway rails should be used if procurable, spaced 2 feet apart in lieu of wooden beams as estimated.

J. H. 20/7

20/7/99
L. H.

From To W

I have altered W's figures in pencil, regarding the discharge of 4.5 ft/sec for the 2 span girder bridge with a coefficient of 500.

[Signature]

1.9.44.

To E.W. Please consider whether 500 is a high enough coefficient on the west coast. I have been through the rainfall statistics and falls of over 10 inches in 24 hrs are not uncommon and occur at a time when the ground is saturated. The ground is I believe hilly. & I think a coefficient of 700 should be allowed. This will not affect the proposal to have one span of 25' to the bridge.

(2) I am much against sloping roads inwards except where it is very important to keep all drainage away from the edge. I would modify the last part of para 11 to "except in places where there are heavy rainfalls when it should be" with "Kodak" = and

1845^u

If you approve of these suggestions the note may be modified and the order written

H.L.

2/7

(1) The ground is, I believe, better to some extent & 700 may be adopted

(2) few but say why few are allowed to them - by our experience is also in their labour - a case in point occurred here up a few months ago

order draft 5/7
L.H.

parallel in the Kodak = andi

Kodalandi river. It crosses this river at 9240 feet. The river here is 200 feet wide and in major floods 25 feet deep, no bridge is provided as it will be costly. There is a well established ferry, and hereafter when carts use the road a "jangadam" can be provided at the crossing. From the river the road is fairly level for half a mile, when it crosses a ridge about 90 feet high with a steep gradient & then drops to the paddy flats at 14000 feet, from this point to about 24000 ft. the line is easy. Here commences the steep ascent to the top of the Pandikod hill 26000 ft., the descent to the Pangari paddy flats being very steep. This is the difficult portion of the line, the gradients being 1 in 15.5 and 1 in 17. From this paddy flat to 33000 ft. the line is fairly easy, here a deep stream, the "Todu" crosses the line & the estimate provides for bridging the stream by an iron girder bridge of 2 spans of 25 feet each. From 33000 ft. there is a gradual ascent to 36000 ft. & again a gradual descent to the paddy flat at 37600. Leaving the paddy flat it joins the Pandikod Angadipinam road at 38395 feet. The total distance being $7\frac{1}{4}$ miles and

& a double boat with a platform on top.

+ this will be better than $1\frac{1}{2}$ to 1.

Road surface should be barrelled, with a rise in centre, except in places where it should slope inward to inside drains. No outside drains needed.

The ruling gradient fixed is 1 in 15. This being necessary at a few places. which gradient is common on the hilly roads in Malabar.

The width of the road is as under:
 formation width ——— 15 feet
 slopes of cuttings ——— $\frac{1}{2}$ to 1
 ——— embankments ——— 1 to 1
 Soil is generally earth & gravel in places.

Metalling & gravelling are provided for at the camps into the Kodalandi river and on such portions of the road at paddy flat embankments where the soil is generally earth & clay. All other parts of the road must be metalled & gravelly soils. The width of gravel formation is 12 ft. and the average depth $4\frac{1}{2}$ inches.

The amount of the estimate for earthwork including compensation for land is Rs 20,800.

Drainage works

For the disposal of the ordinary cross drainages, the following culverts and road drains are provided.

4 culverts of 6 feet span	Rs 310
4 - do - of 4 ft. span	139
9 - do - of 4 ft. span, concrete found.	227
4 - do - of 3 ft. span	109
2 - do - of 3 ft. span, concrete found.	175

- 3 Culverts of 2 ft. span, concrete joints, $\text{Rs } 139$
- 6 - do - 2 ft. span - 98
- 2 natural wood dams - 23
- 11 Road dams with - 45
- 2 Earthenware pipe drains 1 ft. dia. 40
- 6 - do - " - 10 inches dia. 38
- 3 Irrigation drains 1 foot wide - 38

The smaller streams are crossed with the following bridges, the drainage area being approximately taken as 1 sq mile. The waterway allowed is ample.

- 1 wooden bridge 12 ft. span 1 M 190 ft. $\text{Rs } 1260$
- 2 - do - do - at 2 M 20 ft. & 2 M. 7 Fur. 858
- 1 - do - skew at 7 M. 1 Fur. 570 ft. 1262
- 1 Arched masonry bridge 10 ft. span 1 M 1 F. 1056

Our new girder bridge of 2 spans of 25 feet each is provided across the "Todu" river at the 6th mile. 2 furlongs & 120 feet. The drainage area is given as $4\frac{1}{2}$ sq miles. but the report explains that the site of the bridge is close to the Kodahundi river, (from site plan) which has a drainage area of 450 sq miles & the flood water of this river backs up the stream, thus reducing the free area of the latter. It is also stated in the report that there is some doubt as to the mag. F. L. but as far as can be ascertained the design provides for a sufficient height above bed of stream.

A small diversion of the road at this bridge is made in order

This appears to me quite unnecessary. Water will rise and fall above the proposed bridge through any vent we choose to give it. All that is necessary is to see that at no time either with a rising or falling flood will the velocity through the bridge be so great as to damage the masonry. Let us take 10' as a limiting velocity. Then, $H = \frac{V^2}{2g} = \frac{100}{2 \times 32.2} = 1.55$

The total depth of water between floor level and M.F.L. is only 19' and it would need a very small vent way indeed to cause such an obstruction as that. I do not know if anything has been done towards the construction of this bridge but I would abolish one span, and possibly reduce the other. The mathematical calculation would be very difficult.

$$0.5 \times 10^6 \times 500 \times 4.5 = 1365 \text{ cfr}$$

and we have not data to go on to make them.

The bridge need not be wide enough to discharge its own flood water with a coeff of 500 the discharge from an area of $4\frac{1}{2}$ sq miles = 1750 cfr/sec. which is less than the discharge with a depth of 7' & a vel. of 10' per sec. so we shall have no trouble. The base of abutment is too slight. It should be less than .4 of height.

Have they been obtained? $+ 25 \times 5.5 \times 10 = 1375$

Not known. The expenditure up to May last is $\text{Rs } 23859.11.6$ as obtained from C's office.

In progress report received today I see that construction of girder bridges is deferred till estimates are sanctioned. I suppose they are not ordered. & may be directed to be obtained from Bombay.

There is a pointed out that Bombay is under a check. + old Railway carts should be used in there if possible. Macal 2' clear.

in order to prevent rock founded for the abutments.

The total cost of the masonry work is $\text{Rs } 21,400$.

Rates cannot be checked with the Divisional schedule as the cost of carriage of materials is not given but data links for a few items have been submitted.

It is not clear why the girder & iron platform for the large bridge work, should have been obtained from Calcutta, at a cost of $\text{Rs } 65$ per ton, for freight alone, when they could be obtained from Bombay at $\text{Rs } 10$ per ton. f.o.b. or say $\text{Rs } 12$ per ton including landing charge.

The estimate for the Reel house cannot be checked with the plan now submitted, as the dimensions do not agree. The shed, however, has been constructed.

Calculation sheet for wooden & iron girders are as follows:-
Wooden platform bridge 12 ft. span.

Weight on one beam. cfr
woodwork beam $12 \times 1 \times 1 = 12$
planking $12 \times 4 \times \frac{1}{2} = 24$
Total cfr of good wood 24×56
Total dead load $\text{Rs } = 1344$
Live load $12 \times 4 \times 120 = 5760$
Total load $\text{Rs } 7104$

for deflection $\delta d = \frac{WL^2}{240} = \frac{7104 \times 12^2}{240} = 4091$

Therefore make $6.5\frac{1}{2}$ inches and
 $d = 10$ inches.

The section provided in estimate
 $12" \times 12"$ which is more than
ample & may be allowed to
stand.

Iron girder bridge of 2 spans 25 ft
length over girders.

Material	$25 \times 5 \times \frac{3}{4} \times 120$	$= 11,250$
Shoring plates	$25 \times 5 \times 16$	$= 1,250$
Girders	25×60	$= 1,500$
Timber	$25 \times 5 \times 120$	$= 15,000$

Which weight in tons $29,000$
or say in tons 13.

By formula $= WL$

$= 13 \times 25 = 325$ foot tons.

for which a section $15" \times 6"$
weighing 59 lbs per foot run would
be required for a steel girder
but the estimate allows an
iron girder $14" \times 6"$ weighing 60 lbs
per foot, taking $\frac{1}{20}$ the span as
a safe height for girders. Then
a girder $15"$ in depth will be
required. Therefore a steel
girder $15" \times 6"$ weighing 59 lbs
per foot would be preferable
as iron girders are now ob-
solete.

If the girders have been
obtained it is no use making
these suggestions

Dr.
Submitted for orders. There
is a lump sum provision of Rs 30,000
for the termad roads in the
current year.

Public Works (1899) Department.

CURRENT No. 3747

From The Asst. Engineer,
4th Circle.

Order

No. $\frac{242}{15}$

Dated 5th May 1899

Received

Registered

Enclosures 18 plans

Spare copies.

SUBJECT.

Pandalur Road.

Submits for sanction of
Government, etc. & amts. to
Rs 42,000 for constructing—

0 L 8 228 129/6 sent again 1/7/99

BACK PAPERS.

No.	Date.
2119C	24-6-99
1847C	28-3-99
1548C	14-3-99
1344C	4-3-99
443C	21-1-99
2969C	24-6-98
1022C	17-2-99
248C	11-1-99
5189C	21-11-98
10178	4-10-98
1879C	29-3-99
1636C	17-3-99
309W	1-2-99
1902W	29-7-98
8908	29-8-98

FURTHER PAPERS.

No. 242
W

Office of the Superintending Engineer,
FOURTH CIRCLE,
Camp of Tacumán 5th May 1899.
Comandante

From

A. H. Gamett Esquire,
Superintending Engineer,
Fourth Circle, Coimbatore.

To

The Chief Engineer
Public Works Department
Madras.

Enclosures. /

List of enclosures.

Sir,

In Continuation of this office
no: 200^W dated 12th April 1899, I have
the honour to forward for sanction of
Government an Estimate amounting to
Rs 42100 for the Pandalur Road.

The Estimate for the Inspection Shed
has not been checked in this office
for want of plan. The plan has been
called for from the Divisional officer
and it will be sent as soon as it is
received.

My Inspection Notes for January explain the difficulties experienced in preparing accurate estimates for these

these Moplah roads.

I have the honor to be,
Sir,
Your Most obedt. Servt.

Ansured -
Suptg Engineer 4th Circle

Public Works (1899) Department.

CURRENT No. 3930

Order

From The Suptg. Engineer,
4th Circle

No. 265
W.

Dated 13th May 1899

Received }
Registered } 16.5.99

Enclosures One plan.

Spare copies. ✓

SUBJECT.

Inspection shed at Pandalur.
Submits a plan of the

o 25228

sent again 17/7/99

3747/99

SAW

FURTHER PAPERS.

No. 265

Office of the Superintending Engineer,
FOURTH CIRCULE,
Camp Ostry
Simulator 13th May 1899.

From

A. H. Garrett Esq
Superintending Engineer,

Fourth Circle, Coimbatore.

To

Enclosures: /

Plan

Sir,

In continuation of this office
No. 242 W. dated 5th May 1899, I have
the honor to submit the plan for the
Inspection shed at Paundahur.

I have the honor to be
Sir

Your most obed^t. servant

Andrew
Sup Engineer 4/10/06