No. of G. O.	For what purpose.	When taken.	Name of the party by whom taken.
1240 R	files fr office	Oo{ fr	D.G.R. 8/7/1/93

30th July 1890, No. 1089 R., Public Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following papers:—

From the Consulting Engineer for Railways, dated Madras, 15th July 1890, No. 498.

From the Agent and Manager, Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 3rd May 1887, No. 326.

I have the honor to state that, owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for the month of April 1887, I have to report the following excess of expenditure for that month, and to request that you will kindly sanction the payment of the amount:—

	RS.	A.	P.	RS.	A.	P.
Sanctioned pay, Chief Auditor ..				1,363	10	2
Do. Chief Accountant				727	4	4
Total ...				2,090	14	6
Due Mr. F. Church 19 days	863	10	2			
Do. do. sick pay 11 days ...	250	0	0			
Do. Audit Assistants	363	10	2			
Do. Mr. J. Cramp 26 days	630	4	10			
Do. do. acting 4 days	109	1	5			
				2,216	10	7
Excess over sanction ...				125	12	1

2. This excess applies only to April and will not affect the accounts of the half-year as there will be a saving in the two offices during absence of the Chief Auditor on sick leave to the extent of Rs. 227-4-4 per mensem, being one half of Mr. Church's personal allowance.

From the Consulting Engineer for Railways, to the Agent and Manager, Madras Railway Company, dated Madras, 9th May 1887, No. 294.

In reply to your letter No. 326, dated 3rd May 1887, I have the honor to communicate the sanction of Government to the payment of the excess expenditure of Rs. 125-12-1 for the month of April 1887 owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for that month.

From the Agent and Manager, Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 7th July 1890, No. 6426/732.

Adverting to G.O., dated 15th February 1890, No. 244 R., and correspondence embodied therewith on the question of furlough due to Mr. Cramp, Chief Auditor, raised in consequence of his having been ordered back to duty in April 1887 before the expiration of leave which had been granted to him prior to that date, I have the honor to invite your attention to your letter to my address No. 294, dated 9th May 1887.

2. This letter had been overlooked at the date of the correspondence which led to the Government Order above alluded to, and the Chief Auditor subsequently added to his leave certificate, dated 16th April 1890, which specified as due to him 10 months and 15 days furlough from 27th April 1890, the following remark :—

> "If the time spent on my journey to India is counted as duty, the amount of leave now due to me is 11 months and 10 days. This is according to precedent, and was specially approved on behalf of Government in Consulting Engineer's letter, No. 294, dated 9th May 1887."

3. I quote for convenient reference the letter referred to, and request you to be kind enough to inform me whether, under the authority conveyed by it, Mr. Cramp's leave certificate may now be altered from 10 months and 15 days to 11 months and 10 days due.

ENCLOSURE.

Copy of letter from Consulting Engineer for Railways, to Agent and Manager, Madras Railway, No. 294, dated 9th May 1887.

In reply to your letter No. 326, dated 3rd May 1887, I have the honor to communicate the sanction of Government to the payment of the excess expenditure of Rs. 125-12-1 for the month of April 1887 owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for that month.

Submitted for the orders of Government with reference to G.O., No. 244, dated 15th February 1890.

ORDER—dated 30th July 1890, No. 1089 R., Public Works.

Ordered that the Government of India be addressed.

(Here enter No. 1090 R., dated 30th July 1890.)

(True Extract.)

Major, R.E.,
Under-Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
" Examiner, Guaranteed Railway Accounts.

Exd. J. Moses.
Spare Copies

No.

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated July, 30th.

Recd. *Encl.*

G.O., 30th July 1890, No. 1089 R.

JULY.

Mr. Cramp, Chief Auditor, Madras Railway.

Ordered that the Government of India be addressed as to whether the claim of — to have the time occupied by him on the voyage out to India in 1887, when ordered to duty while on furlough, counted as duty, should be admitted.

30th July 1890, No. 1090 R., Public Works.

PUBLIC WORKS DEPARTMENT.

Railway.

Letter—from

Lieutenant-Colonel T. GRACEY, R.E.,
Officiating Joint Secretary to the Government of Madras,
Public Works Department,
Railway Branch,

To

The SECRETARY to the GOVERNMENT of INDIA,
Public Works Department,
Simla.

Sir,

I am directed to submit, for the orders of the Government of India, the letters marginally noted, embodied in the Proceedings of this Government, No. 1089 R., dated 30th July 1890, and also a copy of G.O., No. 244 R., dated 15th February 1890.

1. Letter No. 326, dated 3rd May 1887, from the Agent and Manager, Madras Railway, to the Consulting Engineer for Railways, Madras.
2. Letter No. 294, dated 9th May 1887, from the Consulting Engineer for Railways, Madras, to the Agent and Manager, Madras Railway.
3. Letter No. 6426/732, dated 7th July 1890, from the Agent and Manager, Madras Railway, to the Consulting Engineer for Railways, Madras.

2. A brief statement of the case is as follows:—

In 1887 Mr. Cramp, Chief Auditor of the Madras Railway, then absent in England on furlough, was ordered back to duty in Madras. On return to India he claimed full pay from the date he left England, and this was sanctioned by the Consulting Engineer in his letter No. 294, dated 9th May, above quoted. Mr. Cramp now puts forward a claim to have the time occupied by him on the voyage out to India in 1887 counted as duty and not as furlough.

3. In the case of officers in Government employ ordered back from England from furlough the voyage out is counted as furlough and not as duty, and I am therefore to inquire if Mr. Cramp's present claim should be admitted.

I have the honor to be,
Sir,
Your most obedient servant,

Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

Ootacamund,
30th July 1890.

Exd. J. Moses.
Spare Copies

RAILWAY.

Govt. of (1890) Madras.

PUBLIC WORKS.

Dated July, 30th.

Recd. *Encl.*

G.O., 30th July 1890, No. 1090 R.

JULY.

Mr. Cramp, Chief Auditor, Madras Railway

Inquiring whether the claim of — to have the time occupied by him on the voyage to India in 1887, when ordered to duty while on furlough, to be counted as duty, should be admitted.

30th July 1890, No. 1089 R., Public Works. 3 leads 2 do.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT. Centre

Railway.

Read the following papers:—

From the Consulting Engineer for Railways, dated Madras, 15th July 1890, No. 498. lead

From the Agent and Manager, Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 3rd May 1887, No. 326.

I have the honor to state that owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for the month of April 1887, I have to report the following excess of expenditure for that month, and to request that you will kindly sanction the payment of the amount:—

	RS.	A.	P.	RS.	A.	P.
Sanctioned pay, Chief Auditor				1,363	10	2
Do. do. Accountant				727	[illegible]	4
Total				2,090	14	6
Due Mr. F. Church, 19 days	863	10	2			
Do. do. sick pay 11 days ...	250	0	0			
Do. Audit Assistants	363	10	2			
Do. Mr. J. Cramp, 26 days	630	4	10			
Do. do. acting 4 days ...	109	1	5			
				2,216	10	7
Excess over sanction				125	12	1

Chief

2. This excess applies only to April and will not affect the accounts of the half-year, as there will be a saving in the two offices during absence of the Chief Auditor on sick leave to the extent of Rs. 227-4-4 per mensem, being one half of Mr. Church's personal allowance.

From the Agent and Manager, Madras Railway Company, to the Consulting Engineer for Railways, dated Madras, 7th July 1890, No. 6426/732.

Adverting to G.O., dated 15th February 1890, No. 244 R., and correspondence embodied therewith on the question of furlough due to Mr. Cramp, Chief Auditor, raised in consequence of his having been ordered back to duty in April 1887, before the expiration of leave which had been granted to him prior to that date, I have the honor to invite your attention to your letter to my address No. 294, dated 9th May 1889.

2. This letter had been overlooked at the date of the correspondence which led to the Government Order, above alluded to, and the Chief Auditor subsequently added to his leave certificate, dated 16th April 1890, which specified as due to him 10 months and 15 days furlough from 27th April 1890, the following remarks:—

> "If the time spent on my journey to India is counted as duty, the amount of leave now due to me is 11 months and 10 days. This is according to precedent, and was specially approved on behalf of Government Consulting Engineer's letter, No. 294, dated 9th May 1887."

3. I quote for convenient reference the letter referred to, and request you to be kind enough to inform me whether under the authority conveyed by it Mr. Cramp's leave certificate may now be altered from 10 months and 15 days to 11 months and 10 days due.

Arrange as numbered in pencil

Exd JM 5/8/90

3 ems pica

ENCLOSURE.

Copy of letter from Consulting Engineer for Railways, to Agent and Manager, Madras Railway, No. 294, dated 9th May 1887.

In reply to your letter No. 326, dated 3rd May 1887, I have the honor to communicate the sanction of Government to the payment of the excess expenditure Rs. 125-12-1 for the month of April 1887 owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for that month.

From the Consulting Engineer for Railways, to the Agent and Manager, Madras Railway Company, dated Madras, 9th May 1887, No. 294. lead

In reply to your letter No. 326, dated 3rd May 1887, I have the honor to communicate the sanction of Government to the payment of the excess expenditure of Rs. 125-12-1 for the month of April 1887 owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for that month. 3 ems pica

Submitted for the orders of Government with reference to G.O., No. 244, dated 15th February 1890.

ORDER—dated 30th July 1890, No. 1089 R., Public Works. lead

Centre Ordered that the Government of India be addressed.

(Here enter No. 1090 R., dated 30th July 1890.)

(True Extract.)

Major, R.E.,
Under-Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
" Examiner, Guaranteed Railway Accounts.

RAILWAY.

Mr. Cramp, Chief Auditor, Madras Railway.

Ordered that the Government of India be addressed as to whether the claim of — to have the time occupied by him on the voyage out to India in 1887, when ordered to duty while on furlough, counted as duty, should be admitted.

Revise

No 1089-90-R

5—8—90

(No. I.)

No. 326

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE,

Madras, 3rd May 1887

From

The Ag: Agent and Manager.

To

The Consulting Engineer for Railways.

SIR,

I have the honour to state that owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for the month of April 1887, I have to report the following excess of expenditure for that month and to request that you will kindly sanction the payment of the amount.

Sanctioned pay Chief Auditor		1363.10.2
do " Accountant		727.4.4
Total Rs		2,090.14.6
Due Mr. F. Church 19 days	863.10.2	
do do sick pay 11 days	250.0.0	
do Audit Assistants (one month)	363.10.2	
do Mr. J. Cramp 26 days	630.4.10	
do do Acting 4 "	109.4.5	2216.10.7
Excess over sanction		Rs 125.12.1

@ 1363-10-2
681-13-1
363-10-2 half of Chief Audr
727-4-4
454
364 } 818

This excess applies only to April and will not affect the accounts of the half year as there will be a saving in the two Offices during the absence of the Chief Auditor on sick leave to the extent of Rs 227. 4. 4 per mensem, being one half of Mr Church's personal allowance.

I have the honour to be,
Sir,
Your most Obedient Servant,
W. R. Robinson
Ag. Agent & Manager.

329

MADRAS RAILWAY.

From
The Agent and Manager.

To
The Consulting Engineer
for Railways.

Dated 3rd May 1887

Recd.

No. 326

C R

Requesting sanction for the payment of excess expenditure in the Audit Office in consequence of the recall of Mr Cramp

Rep No 294 d/9/5/7

Print

6 P

Form No. 5.

Madras, 9th May 1887.

No. 294

From

The CONSULTING ENGINEER FOR RAILWAYS,
Madras,

To

The AGENT AND MANAGER,
MADRAS RAILWAY,

Sir,

Enclosures.

In reply to your letter No 326 dated 3rd May 1887, I have the honour to communicate the sanction of Government to the payment of the excess expenditure of Rs 125-12-1 for the month of April 1887 owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for that month.

I have the honour to be
Sir
Your most obedient Servant
(Signed) Sidney Smith Major RE
for Consulting Engineer for Rys

From
The Consulting Engineer
for Railways,
Madras,
To
The Agent and Manager,
Madras Railway.
Dated
Received } 18
No.
Enclosures.

(No. I.) 5,000—14-11-85.

No. 6436

732

Print

MADRAS RAILWAY.

AGENT AND MANAGER'S OFFICE,
Madras, 7th July 1890

From
The Ag Agent and Manager.
M.R.C

To
The Consulting Engineer for Railways.

Sir,

Adverting to Government Order dated 15th February 1890 No 244R and correspondence embodied therewith on the question of furlough due to Mr Cramp Chief Auditor, raised in consequence of his having been ordered back to duty in April 1887 before the expiration of leave which had been granted to him prior to that date, I have the honour to invite your attention to your letter to my address No 294 dated 9th May 1887.

2. This letter had been overlooked at the date of the correspondence which led to the Government Order above alluded to, and the Chief Auditor subsequently added to his Leave Certificate dated 16th April 1890 which specified as due to him 10 months and 15 days furlough from 27th April 1890 the following remark:-

> "If the time spent on my journey to India "is counted as duty, the amount of leave "now due to me is 11 months and 10 days. "This is according to precedent, and was "specially approved on behalf of Government in Consulting Engineer's letter "No. 294 dated 9th May 1887.

3. I quote for convenient reference the letter referred to and request you to be kind enough to inform me whether under the authority conveyed by it Mr. Cramp's

leave

MADRAS RAILWAY.

From The Agent and Manager.

To The Consulting Engineer for Railways.

Dated 188

Recd.

No.

---

leave certificate may now be altered from 10 months and 15 days to 11 months and 10 days due.

Copy of letter from Consulting Engineer for Railways to Agent & Manager, Madras Railway No. 294 dated 9th May 1887.

In reply to your letter No. 326 dated 5th May 1887 I have the honour to communicate the sanction of Government to the payment of the excess expenditure Rs 125-12-1 for the month of April 1887 owing to Mr. Cramp having been sent back to Madras on duty which entitles him to draw full pay for that month.

I have the honour to be
Sir
Your most Obedient Servt
H. Trevithick
Ag Agent & Manager.

REGISTER
No 946
FILE
No

Plo Incl
6696/90

MADRAS RAILWAY.

From
The Agent and Manager.

To
The Consulting Engineer
for Railways.

Dated 7th July 1890
Recd. 8.7.90
Regd
No. 732

Re: The question of furlough due to the Chief Auditor —

C.R.

Form No. 1.

Public Works Department.

Office of Consulting Engineer for Railways,

Madras. 15th July 1890.

Print

(3) Letter from the Agent and Manager, Madras Railway, No: $\frac{6426}{732}$ dated 7th July 1890.

(1) Letter from — do — do — No. 326 dated 3rd May 1887.—

(2) Letter to — do — do — No. 294 — — 9th May 1887.—

No. 498. 7 P

Submitted for the orders of Government, with reference to G. O. No: 244 dated 15th February 1890.

Sidney Smith
Major R.E.
for Offg. Consg. Engr. for Rys.

Subject.—

Form No. 3.

A No. 1089 R 30th July 1890.

Print

Ordered that the Govt: of India be addressed.

H.E. No. 1090 R. 30th July 1890.

To
D. R.
Sir

The Hon: member has seen & returned these papers, which are now sent for file in E R's Office. Please have the original G.O. No: 244 R of 15th Feby 1890 returned to Works Office Madras.

W.L.
16/5

AB.G.S.
19.5.90

The Cons. Engr for Rys
" - Exr Genl Ry Accts

al. 23/7
Dn. 24/7 R 28.7.90

P.W. Cons. No. 6696

From

THE CONSULTING ENGINEER
FOR RAILWAYS,
MADRAS,

No. 498

Dated 15th } July 1890
Received 16. }

NO. OF ENCLOSURES. 1

Subject.

The claim of Mr. Cramp, Chief Auditor, Madras Railway, to count the period occupied in the voyage to India in 1887 as on duty for purposes of his application for furlough.

A

No. 1089/1090 R 30th July 1890

D.A.R.

These papers may be filed for the present.

I don't know whether the Hon'ble member has seen the correspondence between C.E. and the accountant Genl. (put up) as if not I think they should be shown to him.

J.S.L.
13 May

13/5/90

Submitted to the Honorable Member.

14.5.90

There is apparently no rule entitling Mr. Cramp to the full pay in 1887. But even if there were the period would not necessarily be duty. We may safely stick to our ruling & await further development of the case.

H.C.S.
7 May

Anyhow, the letter of /87 emanated only from the Con. Engr. & compromises him only. If it is cast in our teeth we need only say it is wrong.

H.C.S.

12.5.90

E R's ofs. 13/5
Dn. 14/5 R 15.5.90.

F220

PUBLIC WORKS SECRETARIAT,
RAILWAY BRANCH.

Station Madras date 30th April 1890.

OFFICE NOTE.

With reference to the Honorable Members remarks on Mr. Cramp's case, the only furlough rules in force on the Madras Railway are to be found at the end of the establishment list, and the question of being recalled from leave is not dealt with in them.

There is no provision in the rules, for full pay being granted to an officer for the period of the return journey on recall prior to expiry of leave, nor that this period should be considered as "on duty".

I understand that Mr. Cramp is going on furlough on 5th May & will not raise the question here, but intends submitting it to the Board.

Sidney Smith
Major R.E.
under Secy. P.W.D. Deptt. R'y Branch

H. Dn. 5/5/90. R. 7-5-90

Elli Cndt 498 of 15/7/90

E.R. papers

[illegible] To be printed
[illegible]

~~For Mr. J. H. [illegible]~~

PUBLIC WORKS SECRETARIAT
RAILWAY BRANCH.

Station Ootacamund date July 1890.

NOTE.

It appears that Mr Cramp Chief Auditor Madras Railway went on furlough and was ordered back to duty by his Board in 1887

1st. He claimed full pay from the date he left England and this was sanctioned by the Consulting Engineer as follows in No: 294 dated 9th May 1887.

"I have to communicate "the sanction of Government "to the excess expenditure of "Rs 125-12-1 for the month "of April 1887 owing to Mr. "Cramp having been sent "back to Madras on duty "which entitles him to draw "full pay for that month."

2nd. Mr. Cramp now claims that the time he was on the

voyage

Obl. 17/7
Ahm. 18/7 R 22.7.90

oyage from England to Madras
hould not be counted as furlough

The Examiner of Accounts tates that the Guaranteed Railway rules do not make provision for such a case but that the Government rules make the return voyage furlough and not duty.-

The Government of Madras has already stated in passing Mr. Cramp's pay on the voyage that he was "on duty" and cannot now I presume draw back from its ruling although as noted by Mr. Stokes it emanated from the Consulting Engineer only.-

I think the best plan would be to refer the whole case to the Government of India for orders:- The order when received would form a precedent for dealing with such cases in future.-

approved
22/7/90

Spry Lt Col: R.E.
Offg: Jt: Secy: to Govt: P.W.D. Ry: Branch

1089-GO R

A

Print

No. 1090 R.

Government of Madras.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

To

The Secy: to the Govt: of India
P. W. Department
Simla

30th July 1890.

Sir,

I am directed to submit for the orders of the Government of India the letters marginally noted, embodied in the Progs: of this Govt: No 1089 R dated 30th July 1890, and also a copy of G.O. No. 246 R dated 15th February 1890.-

2. A brief statement of the case is as follows:-

In 1887 Mr. Cramp Chief Auditor of the Madras Railway then absent in England on furlough was ordered back to duty in Madras.- On return to India he claimed full pay from the date he left England and this

1. Letter No. 326 dated 3rd May 1887 from the Agent & Manager Madras Railway to the Consulting Engineer for Railways Madras.-

2. Letter No: 294 dated 9th May 1887 from the Consulting Engineer for Railways Madras to the Agent & Manager Madras Railway.-

3. Letter No. $\frac{6426}{732}$ dated 7th July 1890 from the Agent & Manager Madras Railway to the Consulting Engineer for Railways Madras.-

28/7/90

his was sanctioned by the
A onsulting Engineer in his
tter No: 294 dated 9th May
bove quoted. – Mr. Cramp
now puts forward a claim
G to have the time occupied
by him on the voyage out
to India in 1887 counted
as duty and not as furlough

3. In the case of officers
in Government employ ordered
back from England from furlough the voyage out is counted
as furlough and not as duty
and I am therefore to enquire
if Mr. Cramp's present claim
should be admitted. –

A
No. $\frac{1089}{1090}$ R 30th July 1890.

Recd
13/8

By: R

Ol.S. 23/7
Ahn. 24/7
R 28. 7. 90

10

66 76.

Govt. of (18) Madras.

PUBLIC WORKS.

Dated Nov 2/8/90

Recd. Encl.

G.O., 30th July 1890, No. 1087-90 R.

Mr. Cramp
Chief Auditor
M Rys.

Ordered that the G of I be addressed as to whether the claim of — to have the time occupied by him on the voyage out to India in 1887, when ordered to duty while on furlough, counted as duty, should be admitted.

Do do do.

Enquiring whether the claim of — to have the time occupied by him on the voyage to India in 1887, when ordered to duty while on furlough, to be counted as duty, should be admitted.

80 copies of G.O. 1089 R
3
70 copies of G.O. 1090 R.
2
20 collection copies.

G.O. 1/8

29TH JULY 1890, No. 1087 R., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following papers :—

G.O., dated 12th July 1890, No. 1003 R., Public Works.

Telegram from the Secretary to the Government of India, Public Works Department, to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 5th July 1890, No. C 71.

Referring to my telegram, 26th June last, C. 66, Government of India proposes to commence construction this season of Bezváda-Vizianagrum section which would comprise four divisions. Construction of Kistna bridge and of Mahánadi bridge at Cuttack to go on at same time if on receipt of Walker's report Government of India can decide on site of latter. This work Government considers would necessitate employment of one Chief Engineer, one Superintending for Mahánadi, one Superintendent Works for Kistna, and nineteen Executive and Assistants. Present Survey staff will form nucleus of the construction. Do you concur in proposals.

Telegram from the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated 10th July 1890.

This Government approves proposals your telegram C 71, fifth instant, regarding construction Bezváda-Vizianagrum section.

Order—dated 12th July 1890, No. 1003 R., Public Works.

Communicated to the Consulting Engineer for Railways in continuation of Proceedings No. 950 R., dated 3rd July 1890.

(Signed) SIDNEY SMITH, Major, R.E.,
Under-Secy. to Govt., P.W.D.,
Railway Branch.

G.O., dated 18th July 1890, No. 1034 R., Public Works.

From the Under-Secretary to the Government of India, Public Works Department, (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 3rd July 1890, No. 582 R.C.

Telegram, dated 28th May 1890.

"Your telegram C 46. Walker wires: 'Kistna bridge. Sand at 140 feet on up-stream side of anicut. Have stopped boring work. Am preparing plans for bridge on down-stream side.'"

With reference to your telegram, marginally quoted, intimating that the Engineer-in-Chief of the East Coast Railway Survey is preparing the plans for the Kistna bridge at Bezváda on the down-stream side of the anicut, I am directed to request that, when the project for this bridge is ready, the Engineer-in-Chief may, with the permission of the Governor in Council, be directed to depute Mr. F. J. E. Spring, Executive Engineer, to Simla with the plans and estimates of the bridge and with full information as to the considerations which have led to the adoption of the particular design proposed.

2. It is desirable that the matter shall be discussed with the Consulting Engineer to the Government of India for State Railways personally before work is commenced, and it is desired that full advantage shall be taken of the next working season if possible and the arrangement proposed seems likely to be conducive to this end.

3. The Madras Government will no doubt favor the Government of India with their views on the project when ready for discussion.

Telegram from the Engineer-in-Chief, East Coast Railway Survey, to the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Vizagapatam, 11th July 1890.

Most important that Spring should go to chief store depôts at once to procure plant for Kistna bridge. Please sanction this.

From the Consulting Engineer for Railways, dated Madras, 14th July 1890, No. 497-A.

From the Engineer-in-Chief, East Coast Railway, to the Consulting Engineer for Railways, Madras, dated Waltair, June 1890, No. 1089/4.

I have the honor to forward, for the information of Government, three alternative plans for bridging the Kistna river near Bezváda with estimates to correspond and a report on the project prepared by Mr. Spring who has been engaged on this work since his arrival here.

2. As Mr. Spring has gone into the question involved in very considerable detail, it is only necessary for me to touch on the main points at issue. The three most important questions, in fact the only ones we have at present to settle, are the site for the bridge, its length which involves all questions of waterway, cost and such like, and the most economical and advisable span to be adopted.

3. As regards the site of the bridge I never had any second opinion on that subject, but as Colonel C. J. Smith appeared to be in favor of that above the anicut, hoping, I think, to find rock at a moderate depth below the bed, I had borings taken on the line he suggested. These borings showed that the material passed through was practically identical with that below the anicut, nothing having been met with but sand and clay down to a depth of 110 feet. No rock having been found in the river bed, we were relieved from the necessity of comparing the value or risk of well foundations on rock 30 or 40 feet below the river bed with deep ones sunk below possible scour. The borings, having reached a depth lower than any wells are likely to be sunk in this river, were then stopped; and as there was no further reason for considering the up-stream site, plans and estimates were prepared for a bridge below the anicut.

4. The site now proposed is about half a mile below the dam and in direct continuation of the line of the Nizam's Railway, passing the town of Bezváda at its south angle but injuring no buildings or valuable property. Mr. Spring in his report enters fully in the details of this subject and quotes largely from his experience and that of other Engineers on the Punjab rivers. I think his information very valuable, and would be more so if applied to a bridge built either above the anicut or farther down stream, but in the present instance the case is in my opinion much simplified. The plans show that the flood water of the Kistna is, at Bezváda, much narrowed, and completely confined by the two hills between which the anicut is built. The hills cannot be turned, and by connecting them with the abutments of the bridge by means of solid pitched banks we train the river for the half mile between the anicut and the bridge with a canal of constant breadth, with even solid side slopes, so ensuring as much as possible a uniform flow. The nearer we approach this object the more likely will it be that each span of the bridge will do its proper share of work and that a fairly

uniform depth will be maintained in each span. I do not suppose that in a river three-quarter of a mile wide we can attain all we could wish for in this way, but I feel assured that we can approach it more nearly in this manner and without risk than by ten times the outlay if the bridge were built up-stream.

5. As regards the length of the bridge, it would, in my opinion, be perfectly useless to give it a greater length of waterway than that afforded by the anicut; in fact, if we did so, it would be more likely to cause cross currents and backwaters which it is advisable to avoid. The designs prepared are for one of 17 spans of 202 feet giving 3,434 L.F. of waterway, one of 14 spans of 250 feet giving 3,500 L.F. of waterway, and one of 12 spans of 300 feet giving 3,600 L.F. of waterway.

6. During moderate floods the crest of the dam gives 3,400 L.F. of clear flow and 3,700 in very high water.

7. To what extent, if any, it would be desirable to narrow the bridge below 3,400 feet it is very difficult to say; we could still ensure a fairly even flow but with increased velocity, and then it appears to be a question how deep we can afford without danger to let the bed scour. The only way in which we could arrive at any practical conclusion would be to build the side training works as soon as possible to suit the length of bridge fixed on and note the action of the current during the ensuing floods. At all events I feel assured that at present we are perfectly safe in proposing a bridge which gives between 3,400 to 3,600 L.F. of clear waterway founded on wells sunk 75 to 80 feet below the river bed and let the question of shortening it by one or two spans remain over for the present.

8. With reference to the best span to adopt, if other things were equal and we could accurately calculate the cost of our foundation work, then I would be induced to accept the 200-foot span in which the cost of the masonry and that of the iron and roadway are practically equal. I have had much experience in well-sinking and can only venture to say now that there is nothing more uncertain; deep well foundations may turn out most easy or most troublesome, and to make a sound forecast with reference to them is next to impossible. With all the other work there is no difficulty in seeing our way, so that I am of opinion that it would be safe and more wise to reduce the number of uncertain elements; viz., the wells and reject the 200-foot span bridge, in which there are sixteen besides those of the abutments which are common to all. It would then become a choice between the 250 and the 300 foot spans.

9. To enable you to compare readily the cost of each design I have thrown Mr. Spring's figures into the following form, from which you can compare the cost of the bridges proper, as well as that of the bridges with each main head item added one by one:—

—	Seventeen spans of 202 feet.	Fourteen spans of 250 feet.	Twelve spans of 300 feet.
	RS.	RS.	RS.
Cost of bridge proper	25,04,500	27,41,500	29,72,300
Approaches	2,54,000	2,54,000	2,54,000
Bridge and approaches	27,58,500	29,95,500	32,26,300
Training works	5,10,000	5,10,000	5,10,000
Bridge, approaches and training works	32,68,500	35,05,500	37,36,300
Service works and plant	3,68,000	3,68,000	3,68,000
Total Bridge, Approaches, Training works, Stores and plant	36,36,500	38,73,500	41,04,300
Establishment	1,62,500	1,68,000	1,87,700
	37,99,000	40,41,500	42,92,000
Contingencies	1,16,000	1,19,500	1,34,000
Total ...	39,15,000	41,61,000	44,26,000

10. The above table shows that the 200-foot span bridge both by itself and with the other items added is about 2·4 lakhs cheaper than the 250-foot span one and about 4·8 lakhs less than that with 300 openings.

11. Again the 250-foot span bridge by itself is 2·3 lakhs less than the 300-foot span one, and taken with approaches, &c., costs 2·6 lakhs less than the larger span bridge.

12. If the 200-foot span design is selected, I think the cost of the piers must be somewhat increased, but this would not be to a greater extent than 22 to 30,000 rupees. The 200-foot span bridge can without doubt be built for considerably less than the others, but taking all the circumstances of the case into consideration, such as the uncertainty and delay with respect to foundations blocking the river course and convey more numerous eddies and cross currents, I feel justified in recommending either of the two larger span bridges. From a purely engineering point of view I don't think it matters much which is selected, but from an economical one the cheaper one appears to be the most advisable.

13. Mr. Spring has gone into very considerable detail not only in the report but in the preparation of drawings; doubtless all the girder designs will be prepared in Sir Alexander Rendell's office, but I beg to suggest that all the points noted by Mr. Spring with reference to details which tend to simplify erection and such like be brought to Sir A. Rendell's notice.

14. Whatever design is selected by Government, it is most desirable that the preliminary operations be put on hand at once. These are erection of staff-quarters, shops, store-sheds and the collection of materials. A considerable quantity of tools and machinery will be required. Such articles are very expensive in England just now, and markets are in an uncertain state. There is much of what we require in India both in Government and other stores; these we could get I suppose on application, but as my experience teaches me that to purchase machinery (particularly from lists) without careful examination is unwise to the last degree. I suggest that Mr. Spring be permitted to proceed to the chief store centres in India with a view to selecting and purchasing such articles as we shall require for the construction of the bridge. On his ascertaining what articles cannot be procured readily in India, he could then prepare an indent on England for the remainder. During the next two months little can be done at Bezváda; it is therefore the best opportunity (possibly the only one) Mr. Spring may have for a most necessary duty.

Submitted to Government. The Engineer-in-Chief forwards three alternative estimates for bridging the Kistna river at Bezváda as follows:—

	RS.
Seventeen spans of 202 feet giving 3,434 lineal feet of waterway and costing	39,15,000
Fourteen spans of 250 feet giving 3,500 lineal feet of waterway and costing	41,61,000
Twelve spans of 300 feet giving 3,600 lineal feet of waterway and costing	44,26,000

These bridges provide for a mixed broad and narrow gauge railway and for a roadway all on the same level.

2. The site selected for the bridge is about half a mile below the anicut, and is in my opinion preferable to that proposed above it. If the bridge were built above it would be impossible to predict exactly what effect the piers would have upon the currents in the river approaching the anicut, but if it be placed half a mile below and the river between the bridge and the anicut is trained in an even channel, an equalisation in the velocity of the water over the whole discharging channel must be produced and the general result must be beneficial to the stability of the foundation of the anicut.

3. The bridge should, in my opinion, have about the same length of waterway as is given at the anicut (*i e.*, between 3,400 and 3,600 feet, depending upon whether the flood is moderate or very great) and should offer as little obstruction as possible to the equal flow of water over the total length between its abutments. I therefore think that moderately large spans with no pitching round the piers should be adopted. Pitching round the piers is of course desirable when the stability of the bridge only has to be considered, but in this case the stability of the anicut is of infinitely greater importance than the stability of the bridge. It is possible, though not probable, that the deepening of the bed of the river between piers heavily pitched might in time of an abnormal flood reach as far back as the apron of stone at the base of the anicut and endanger the structure. Piers must to a certain extent obstruct the channel and cause unequal currents, and it is desirable I think in the present case not to increase the obstruction by heaping in pitching also. I believe piers founded 80 to 90 feet below the cold weather level of the water in the river would be perfectly safe without any pitching, the spans should I think be 250 feet, and the total waterway 3,500 feet.

4. It is proposed to construct the bridge for a broad and narrow gauge railway and a roadway all on the same level. The broad gauge is of course necessary, and the narrow gauge is also I think required, as the Southern Mahratta Railway should have access to the town of Bezváda even if no extensions of the metre gauge is ever permitted north of the Kistna river. A fourth rail should, in my opinion, be laid for the metre gauge track, otherwise the unequal weights will cause unequal deflections in the girders and consequent oscillation in the metre gauge trains. The roadway if constructed will not I think be of any value, the distance between the points at which carts would enter upon and leave the railway would be about three-quarter mile apart, and the time of transit would probably not be much under half an hour and there is not room for two carts to cross each other. When the East Coast Railway is open throughout probably at least 3 metre gauge and 4 broad gauge trains would cross the bridge daily each way or at least 14 trains in all, or the trains would average 1⅔ hours apart. It would be necessary to begin clearing the bridge at least 30 minutes (the time of transit of a cart) before the time arranged for the arrival of a train, leaving only 70 minutes for cart-traffic. If late trains, engines running light and the other contingencies of railway working be taken into consideration, no time would be left for cart traffic, and I therefore think that the provision of a cart-road would be an unnecessary expense unless it is required for military purposes; footways might be provided outside the girders for the passage of foot-passengers.

It may be thought that I have over-estimated the number of trains that will cross the bridge, but if it be borne in mind that the whole of the railways and manufactories in Southern India must eventually receive their supply of coal from the Singareni mines across this bridge, it will I think be admitted that my estimate of the traffic to be expected is not excessive.

5. In my last paragraph I stated that in my opinion 14 broad and metre gauge trains would pass the Kistna bridge daily soon after the opening of the East Coast Railway, and it is possible that this number might be largely exceeded, and I am therefore of opinion that the masonry of the bridge should be built for a double line of railway, the girders for the second line being erected when required, the immediate extra cost would not probably exceed one lakh of rupees whilst the ultimate saving might be more than ten times that amount.

6. I am therefore of opinion—

(*a*) That the site chosen for the bridge is suitable.

(*b*) That provision should be made for both broad and metre gauge trains across the bridge, but that separate rails should be provided for the latter so that a passing narrow gauge train would cause an equal deflection in both girders.

(*c*) That the provision of a roadway for carts at rail level between the girders will be useless unless required for military purposes, but footways might be provided outside the girders.

(*d*) That provision should be made in building the bridge for a double line of railway, but that only girders for one line should be at first erected.

(*e*) That the bridge should be 14 spans of 250 feet.

(*f*) That the wells should be sunk about 80 to 90 feet below cold weather level of the water in the river, and no pitching should be used round the piers.

(*g*) That each pier might be founded on 2 wells 25 feet in diameter pitched 6 feet apart and corbelled out to meet each other. The wells might also be corbelled out about 3 or 4 feet up and down stream to carry the cut water of the piers.

7. When the design of the bridge has been finally approved of, the well curbs might be obtained from Richardson and Cruddas, Bombay, or some other firm in India, to save time. Mr. Spring might also, as suggested by the Engineer-in-Chief, be deputed under his orders to visit the completed works in India where suitable plant is for sale in order to select what is requisite for the construction of the bridge. In the meantime the collection of stone and other material for the bridge should be put in hand. It is useless bringing the well curbs to site if there is no stone to build the wells with. Quarters for the use of the staff must also be built, and no time should be lost in commencing this very necessary work.

8. The rates entered in the estimate are not in my opinion excessive, but at the same time they leave a margin which should prevent any call for extra funds in future.

Office note to the Chief Engineer for Irrigation, dated 14th July 1890.

Order—dated 18th July 1890, No. 1034 R., Public Works.

Ordered that the following telegram be despatched to the Engineer-in-Chief, East Coast Railway Survey :—

> "Please order Spring to proceed to Simla about 1st August to discuss plans Kistna bridge with Consulting Engineer to Government of India. Plans and estimates will be sent on from here as soon as possible."

And that the following letter be addressed to the Government of India.

(Here enter No. 1035 R., dated 18th July 1890.)

(True Extract.)

(Signed) SIDNEY SMITH, Major, R.E.,
Under-Secy. to Govt., P.W.D.,
Railway Branch.

From the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated 18th July 1890, No. 1035 R.

I am directed to forward, for the consideration of the Government of India, copy of the Proceedings of this Government, No. 1034 R., dated 18th July 1890, with which is embodied the estimate by the Engineer-in-Chief, East Coast Railway Survey, for constructing a bridge over the Kistna river at Bezváda.

2. I am to state that the Government of Madras generally concurs in the proposals and suggestions made by the Officiating Consulting Engineer, and especially as regards the uselessness of constructing a roadway for carts on the same level with the Railway.

3. The Chief Engineer for Irrigation has been consulted and states that he has no objection whatever to the proposals made for bridging the river at the site chosen.

4. I am directed to state that His Excellency the Governor in Council attaches great importance to the completion of the bridge over the Kistna at Bezváda, and requests that very early orders for commencing the work may be given. He considers that the iron well curbs should be obtained in India, and that Mr. Spring should, after

completing his work at Simla, be deputed to visit the various depôts where suitable plant is available for the bridge-works and in the meantime the collection of materials and the construction of staff quarters should be put in hand.

Read also the following papers :—

Telegram from the Engineer-in-Chief, East Coast Railway Survey, to the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Vizagapatam, 17th July 1890.

Please procure early Government sanction to deputation of Spring on six weeks' tour to procure plant for whole line from existing Indian depôts. English plant indent delayed. Valuable time lost pending this.

Telegram from the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Engineer-in-Chief, East Coast Railway Survey, dated 19th July 1890.

Your telegram seventeenth. You have already been requested to send Sprin Simla after which India has been asked to depute him to depôts to select plant Kistna. Have you any further proposals to make.

Telegram from the Secretary to the Government of India, Public Works Department, to the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 19th July 1890, No. G. 332.

Walker telegraphs. Begins. Please authorise Madras sanction deputation of Spring six weeks' tour selecting plant from Indian depôts for my whole line. Ends. The proposal to inspect plant seems a good one, but should have been sent to you. If you approve please sanction. Direct Spring to come first to Simla to discuss plan of Kistna bridge with O'Callaghan, and then he may have sufficient leave for purposes of inspection after. Ascertain what information exists in our Central office as to plant available.

Telegram from the Officiating Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, to the Secretary to the Government of India, Public Works Department, dated 22nd July 1890.

Your telegram G 332. Orders already sent Walker in sense you indicate and Government of India has been asked to sanction deputation of Spring after discussing Kistna bridge with O'Callaghan.

From the Officiating Under-Secretary to the Government of India, Public Works Department (Railway Construction), to the Joint Secretary to the Government of Madras, Public Works Department, Railway Branch, dated Simla, 21st July 1890, No. 647 R.C.

With reference to your telegram * of the 10th July 1890, and in continuation of Public Works Department letter No 582 R. C., dated 3rd July 1890, asking that Mr. F. J. E. Spring may be deputed to Simla, bringing with him the plans and estimates of the Kistna bridge when completed, I am directed to inform you that the Government of India considers that it would probably facilitate matters in connection with the examination of the main project if Mr. F. B. Walker, Engineer-in-Chief of the East Coast Railway Survey, could also come up to Simla, bringing with him such preliminary plans connected with the East Coast Railway scheme generally as he may have ready.

* "This Government approves proposals your telegram C 71, 5th instant, regarding construction Bezváda-Vizianagrum section."

2. I am therefore to ask that, with the permission of His Excellency the Governor in Council, Mr. Walker may be instructed to proceed to Simla sometime next month, if his services can be spared, and bring with him such preliminary plans as he may have been able to get ready by then.

ORDER—dated 29th July 1890, No. 1087 R., Public Works.

Ordered that the following telegram be despatched to the Engineer-in-Chief, East Coast Railway Survey:—

"Please proceed to Simla sometime next month, taking with you such preliminary plans connected with the East Coast Railway scheme generally as you may have ready by then. Your services are required by India in addition to Mr. Spring to discuss matters in connection with the examination of the main project."

2. A copy of these Proceedings will be forwarded for the information of the Government of India with reference to its letter No. 647 R.C., dated 21st July 1890.

(Here enter No. 1088 R., dated 29th July 1890.)

(True Extract.)

(Signed) T. GRACEY, Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Consulting Engineer for Railways.
" Examiner, Public Works Accounts.

ENDORSEMENT—dated 29th July 1890, No. 1088 R., Public Works.

Forwarded.

(By Order.)

Lieut.-Colonel, R.E.,
Offg. Joint Secy. to Govt., P.W.D.,
Railway Branch.

Exd. J. Moses.
Spare Copies

RAILWAY.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated July, 29th.

Recd. Encl.

G.O., 29th July 1890, Nos. 1087, 1088 R.

JULY.

Mr. F. B. Walker, Engineer-in-Chief, East Coast Railway Survey

Forwarding copy of Proceedings directing — to proceed to Simla.

DS

INDIAN TELEGRAPH. Local No.

To (Station) Ootacamund From (Station) Simla

Words. 99.4 Day. 5 Hour. 16 Minute. 59 Official Instructions. defd.

To (Person) Madras works. Ry. From (Person) works.

C.71 (a) allegory C. 66 government of India proposes to commence construction this season of bezwada Vizianagram section which would comprise four divisions construction of Kistna bridge and of Mahanadi bridge at Cuttack to go on at same time if on receipt of walkers report Government of India can decide on site of latter this work government considers would necessitate employment of one Chief Engineer one Superintending for Mahanadi one Superintendent works for Kistna and nineteen Executive and assistants present survey staff will

Recd. from L.N. At Hrs. Mts., By

(a) Referring to my telegram 20th June last

Sent to L.N. At Hrs. Mts., By

on 6-7-90

Date OOTACAMUND 5-7-90 Telegraph Master.

Print

TELEGRAM ~~Urgent~~ ~~Ordinary~~ ~~Deferred~~ State

From R.

To Works Simla

3 P

His Government approves proposals your telegram C 71 fifth instant regarding construction Bezvada Vizianagram section.—

8/7/90

9/7

8/7/90

Telegram desp 10-7-90

(4) H.E. Hon: the Governor
(3) H.E. the Commander in Chief
(1) Hon: Mr. J. H. Garstin
(2) Hon: Mr. J. Grose

Special

INDIAN TELEGRAPH. | Local No.

From (Station)

Words.	Day.	Hour.	Minute.	Official Instructions.

From (Person)

II

form nucleus of the Construction
do you Concur in proposals

KEGD. FROM	L. N.	SENT TO	L. N.
At Hrs.	Mts., By	At Hrs.	Mts., By

OOTACAMUND 5-7-90

Date

Telegraph Master.

O.L.S. 5/7 Air 8/7 Re 10-7

No. 1003 R.

B.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 12th July/90.

READ the following

Telegram from the Govt: of India P.W. Deptt: } H.E. No. C71 of 5th July 1890

Telegram to — do — " — " — of 10th — do —

Communicated to the Consulting Engineer for Railways in continuation of Procgs: No. 950 R dated 3rd July 1890.

11.7.90 to for R

1417

To
The Cons: Engr for Rys
— " — Exr P. W. Accts:
— " — Engr. in Ch: E. C. Ry. Sy
— " — Marine Deptt.
despd by only office
12.7.90.

A No. 754-55 R. 6-7-89.
A - 168 R. 3-2-90
B - 950 R. 3-7-90. [illegible]
17-7-90

B
No. 1003 R d/ 12 July /90.

Ee 17/7

G.O. d/ 18/7/90 No 1034 A. R.

No. 582 R.C.

All communications
should be addressed
to the Secretary.

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
RAILWAY Construction

To

The Joint Secretary to the Government of Madras.
(Railway Branch) Public Works Department.

Sd/ 11/7/90 11/7

Simla, the 3rd July 1890.

Sir,

With reference to your telegram, marginally* quoted, intimating that the Engineer-in-Chief of the East Coast Railway Survey is preparing the plans for the Kistna Bridge at Bezvada on the down stream side of the Anicut, I am directed to request that, when the project for this Bridge is ready the Engineer-in-Chief may with the permission of the Governor in Council be directed to depute Mr. F. J. E. Spring, Executive

* Telegram dated 28th May 1890.
"Your telegram C 46. Walker wires; 'Kistna Bridge. Sand at 140 feet on up stream side of Anicut. Have stopped boring work. Am preparing plans for bridge on down stream side'."

P W C No. ~~6568~~

Executive Engineer, to Simla with the plans and estimates of the Bridge and with full information as to the considerations which have led to the adoption of the particular design proposed.

Rd 11-7-9

2. It is desirable that the matter shall be discussed with the Consulting Engineer to the Government of India for State Railways personally before work is commenced and it is desired that full advantage shall be taken of the next working season if possible and the arrangement proposed seems likely to be conducive to this end.

3. The Madras Government will no doubt favour the Government of India with their views on the project when ready for discussion.

I have the honour to be,
Sir,
Your most obedient Servant,

M.W. Brackenbury Major R.E.

Under-Secretary

9/11/7

Documents accompanying

Consltg Engrs Inwarat No 497A

From

The Engineer-in-Chief
East Coast Railway.

To

The Consulting Engineer
for Railways, Madras.

No 1089/4. Dated Waltair June 1890.

Sir,

I have the honor to forward for the information of Government three alternative plans for bridging the Kistna River near Bezwada, with estimates to correspond and a report on the project prepared by Mr Spring who has been engaged on this work since his arrival here.

As Mr Spring has gone into the question involved in very considerable detail it is only necessary for me to touch on the main points at issue. The three most important questions in fact the only ones we have at present to settle are the site for the bridge, its length which involves all questions of waterway cost and such like, and the most economical and advisable span to be adopted.

As regards the site of the bridge I never had any second opinion on that subject, but as Colonel C. J. Smith appeared to be in favor of that above the anicut hoping, I think, to find rock at a moderate depth below the bed, I had borings taken on the line he suggested. These borings shewed that the material passed through was practically identical with that below the anicut nothing having been met with but sand and clay down to a depth of 110 feet. No rock having been found in the river bed, we were relieved from the necessity of comparing the value or risk of well foundations on rock 30 or 40 feet below the river bed with deep ones sunk below possibly of scour. The borings, having reached a depth lower than any wells are likely to be sunk in this river, were then stopped; and as there was no further reason for considering the up stream site, plans and estimates were prepared for a bridge below the anicut.

The site now proposed is about half a mile below the dam and in direct continuation of the line of the Nizams Railway, passing the town of Bezwada at its South angle but injuring no buildings or valuable property. Mr. Spring in his report enters fully in the details of this subject and quotes largely from his experience and that of other Engineers on the Punjab rivers. I think his information very valuable and would be more so if applied to a bridge built, either above the anicut or farther down stream, but in the present instance the case is in my opinion much simplified. The plans shew that the flood water of the Kistna is, at Bezwada, much narrowed, and completely confined by the two hills between which the anicut is built. The hills cannot be turned and by connecting them with the abutments of the bridge by means of solid pitched banks, we train the river for the half mile between the anicut and the bridge with a canal of constant breadth, with even solid side slopes, so ensuring as much as possible a uniform flow. The nearer we approach this object the more likely will it be that each span of the bridge will do its proper share of work and that a fairly uniform depth will be maintained in each span. I do not suppose that in a river 3/4 of a mile wide we can attain all we could wish for in this way, but I feel assured that we can approach it more nearly in this manner and without risk than by ten times the outlay if the bridge were built up stream.

As regards the length of the bridge, it would, in my opinion, be perfectly useless to give it a greater length of waterway than that afforded by the anicut; in fact, if we did so, it would be more likely to cause cross currents and back waters which it is advisable, to avoid.

The designs prepared are for:—

one of 17 spans of 202' giving 3434 L.F. of waterway,
one of 14 spans of 250' giving 3500 L.F. of waterway,
and one of 12 spans of 300' giving 3600 L.F. of waterway.

During moderate floods the crest of the dam gives 3400 L.Ft of clear flow and 3700 in very high water.

To what extent, if any, it would be desirable to narrow the bridge below 3400 feet it is very difficult to say; we could still ensure a fairly even flow but with increased velocity and then it appears to be a question how deep we can afford without danger to let the bed scour. The only way in which we could arrive at any practical conclusion would be to build the side training works as soon as possible to suit the length of bridge fixed on and note the action of the current during the ensuing floods. At all events I feel assured that at present we are perfectly safe in proposing a bridge which gives between 3400 to 3600 L.Ft of clear waterway founded on wells sunk 75 to 80 feet below the river bed and let the question of shortening it by one or two spans remain over for the present.

With reference to the best span to adopt, if other things were equal and we could accurately calculate the cost of our foundation work, then I would be induced to accept the 200 ft span in which the cost of the masonry and that of the iron and roadway are practically equal. I have had much experience in well sinking and can only venture to say now that there is nothing more uncertain; deep well foundations may turn out most easy or most troublesome, and to make a sound forecast with reference to them is next to impossible. With all the other work there is no difficulty in seeing our way so that I am of opinion that it would be safe and more wise to reduce the number of uncertain elements; viz: the wells and reject the 200 ft span bridge, in which there are 16 besides those of the abutments which are common to all. It would then become a choice between the 250 and the 300 foot spans.

To enable you to compare readily the cost of each design I have thrown Mr Spring's figures into the following form from which you can compare the cost of the bridges proper, as well as that of the bridges with each main head item added one by one.

	17 Spans of 202′	14 Spans of 250′	12 Spans of 300′
Cost of Bridge proper	25.04.500	27.41.500	29.72.300
Approaches	2.54.000	2.54.000	2.54.000
Bridge and approaches	27.58.500	29.95.500	32.26.300
Training works	510 000	5.10.000	5.10.000
Bridge, approaches & Training works	32.68.500	35.05.500	37.36.300
Service Works and Plant	3.68.000	3.68.000	3.68.000
Total Bridge, approaches Training works, Stores & Plant	36.36.500	38.73.500	41.04.300
Establishment	1.62.500	1.68.000	1.87.700
	37.99.000	40.41.500	42.92.000
Contingencies	1.16.000	1.19.500	1.34.000
	39.15.000	41.61.000	4426000

The above table shews that the 200 ft span bridge both by itself and with the other items added is about 2·4 lacs cheaper than the 250 foot span one and about 4·8 lacs less than that with 300 openings.

Again the 250 ft span bridge by itself is 2·3 lacs less than the 300 ft span one and taken with approaches &c. costs 2·6 lacs less than the larger span bridge.

If the 200 ft span design is selected, I think the cost of the piers must be somewhat increased but this would not be to a greater extent than 22 to 30.000 rupees. The 200 ft span bridge can without doubt be built for considerably less than the others, but taking all the circumstances of the case into consideration such as the uncertainty and delay with respect to foundations blocking the river course and convey more numerous eddies and cross currents, I feel justified in recommending either of the two larger span bridges. From a purely engineering point of view I dont think it matters much which is selected, but from an economical one the cheaper one appears to be the most advisable.

Mr. Spring has gone into very considerable detail not only in the report but in the preparation of drawings: doubtless all the girder designs will be prepared in Sir Alexander Rendell's office but I beg to suggest that all the points noted by Mr Spring with reference to details which tend to simplify erection and such like, be brought to Sir A. Rendell's notice.

Whatever design is selected by Government it is most desirable that the preliminary operations be put on hand at once. These are erection of staff quarters, shops, store sheds and the collection of materials. A considerable quantity of tools and machinery will be required. Such articles are very expensive in England just now and markets are in an uncertain state. There is much of what we require in India both in Government and other stores; these we could get I suppose on application, but as my experience teaches me that to purchase machinery (particularly from lists) without careful examination is unwise to the last degree. I suggest that Mr Spring be permitted to proceed to the chief store centres in India with a view to selecting and purchasing such articles as we shall require for the construction of the Bridge. On his ascertaining what articles cannot be procured readily in India, he could then prepare an indent on England for the remainder. During the next two months little can be done at Bezwada; it is therefore the best opportunity (possibly the only one) Mr Spring may have for a most necessary duty.

I have the honor to be,
Sir,
Your most obedient servant,
F. J. Waring
Engineer-in-Chief
East Coast Railway

REGISTER
No. 2 x 63
FILE
No.

In 1 file Report & Estimate
9 plans

Incl
6842/90

Form No. 1.

OFFICE OF CONSULTING ENGINEER FOR RAILWAYS,

PUBLIC WORKS DEPARTMENT.

Madras, 14th July 1890.

Letter from the Engineer-in-Chief, East Coast Railway Survey, No. 1089/4, dated June 1890, forwarding plans, report, and estimate for the construction of a bridge over the Kistua river at Bezvada.

No. 497A

~~Government.~~

SUBMITTED. to Government.

The Engineer-in-Chief forwards three alternative estimates for bridging the Kistua River at Bezvada as follows

	Rs
17 spans of 202 feet giving 3434 lineal feet of waterway and costing	39,15,000
14 spans of 250 feet giving 3500 lineal feet of waterway and costing	41,61,000
12 spans of 300 feet giving 3600 lineal feet of waterway and costing	44,26,000

These bridges provide for a mixed broad and narrow gauge railway and for a roadway all on the same level.

The site selected for the bridge is about half a mile below the anicut and is in my opinion preferable to that proposed above it. If the bridge were built above it would be impossible to predict exactly what effect the piers would have upon the currents in the river approaching the anicut but if it be placed half a mile below and the river between the bridge and the anicut is trained in an even channel an equalization in the velocity of the water over the whole discharging channel must be produced and the general result must be beneficial to the stability of the foundation of the anicut.

3. The bridge should in my opinion have about the same length of waterway as is given at the anicut (i.e. between 3400 and 3600 feet depending upon whether the flood is moderate or very great) and should offer as little obstruction as possible to the equal flow of water over the total length between its abutments. I therefore think that moderately large spans with no pitching round the piers should be adopted. Pitching round the piers is of course desirable when the stability of the bridge only has to be considered but in this case the stability of the anicut is of infinitely greater importance than the stability of the bridge. It is possible though not probable that the deepening of the bed of the river between piers heavily pitched might in time of an abnormal flood reach as far back as the apron of stone at the

Coast

base of the anicut and endanger the structure. Piers must to a certain extent obstruct the channel and cause unequal currents and it is desirable I think in the present case not to increase the obstruction by keeping in pitching also. I believe piers founded 80 to 90 feet below the cold weather level of the water in the river would be perfectly safe without any pitching, the spans should I think be 250 feet and the total waterway 3500 feet.

4. It is proposed to construct the bridge for a broad and narrow gauge railway and a roadway all on the same level. The broad gauge is of course necessary and the narrow gauge is also I think required as the Southern Mahratta railway should

have

have access to the town of Bezwada even if no extensions of the metre gauge is ever permitted north of the Kistna river. A fourth rail should in my opinion be laid for the metre gauge track, otherwise the unequal weights will cause unequal deflections in the girders and consequent oscillation in the metre gauge trains. The roadway if constructed will not I think be of any value, the distance between the points at which carts would enter upon and leave the railway would be about 3/4 mile apart and the time of transit would probably not be much under half an hour and there is not room for two carts to cross each other. When the East

Coast Railway is open throughout probably at least 3 metre gauge and 4 broad gauge trains would cross the bridge daily each way or at least 14 trains in all or the trains would average ~~1⅔~~ 1⅓ hours apart. It would be necessary to begin clearing the bridge at least 30 minutes (the time of transit of a cart) before the time arranged for the arrival of a train leaving only 70 minutes for cart traffic. If late trains, engines running light and the other Contingencies of railway working be taken into consideration no time would be left for cart traffic and I therefore think that the provision of a cart road would be an unnecessary expense unless it is required for military purposes footways might be provided outside the girders for

the passage of foot passengers.

It may be thought that I have overestimated the number of trains that will cross the bridge but if it be borne in mind that the whole of the railways and manufactories in Southern India must eventually receive their supply of coal from the Singareni mines across this bridge it will I think be admitted that my estimate of the traffic to be expected is not excessive.

5. In my last paragraph I stated that in my opinion 14 broad and metre gauge trains would pass the Kistna bridge daily soon after the opening of the East Coast Railway and it is possible that this number might be largely exceeded and I am

therefore of opinion that the masonry of the bridge should be built for a double line of railway the girders for the second line being erected when required the immediate extra cost would not probably exceed one lac of rupees whilst the ultimate saving might be more than ten times that amount.

6. I am therefore of opinion

(a) That the site chosen for the bridge is suitable.

(b) That provision should be made for both broad and metre gauge trains across the bridge but that separate rails should be provided for the latter so that a passing narrow gauge train would cause an equal deflection in both girders.

(c) That the provision of a road way for carts at rail level between the girders will be useless unless required for ~~railway~~ military purposes but footways might be provided outside the girders.

(d) That provision should be made in building the bridge for a double line of railway but that only girders for one line should be at first erected.

(e) That the bridge should be 14 spans of 250 feet.

(f) That the wells should be sunk about 80 to 90 feet below cold weather level of the water in the river and no pitching should be used round the piers.

(g) That each pier might be founded on 2 wells 25 fee in diameter pitched 6 feet apart and corbelled out to meet each other - The wells might also be corbelled out about 3 or 4 feet up and down stream to carry the cut water of the piers.

7. When the design of the bridge has been finally approved of the well curbs might be obtained from Richardson and Cruddas Bombay or some other firm in India to save time - Mr Spring might also as suggested by the Engineer - in - Chief be deputed under his orders to visit the completed works in India where suitable plant is for sale in order to select what is requisite for the construction of the bridge - In the [illegible] in the collection of

I agree in all the suggestions made by the Consulting Engineer especially as to the usefulness of making a roadway on the bridge & as to the expediency of having a pair of rails for the metre gauge laid outside the broad gauge rails

J. H. G.

15/7/80

stone and other material for the bridge should be put in hand - It is useless bringing the well curbs to site if there is no stone to build the wells with - Quarters for the use of the staff must also be built and no time should be lost in commencing this very necessary work.

8. The rates entered in the estimate are not in my opinion excessive but at the same time they leave a margin which should prevent any call for extra funds in future.

Henry L. Hoare.

Offg: Consulting Engineer for Rys:

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Form No. 3.

P.W. C. No. 6842

From

THE CONSULTING ENGINEER
FOR RAILWAYS,
Madras,

G. O. No. 796 R d/ 7th June/90.

No. 497A

Dated 14th }
Received 21. } July 1890.

No. of Enclosures. ×14. 4†plan not recd
(× 9 tracings)

Subject.

Submitting plans, report, and estimate for the construction of a bridge over the Kistna river at Bezwada.

No. 1034 R

B

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 18th July/90

READ the following

Letter from the Govt. of India P.W.D.	(H.G. No. 582 R.C. d/ 3rd July/90)
Telegram from the Engr.-in-Chief East Coast Ry. Survey	(" " 11th – do – ")
Endorsement from the offg. Consulting Engineer for Railways Madras.	" " 497A " 14th – do –)
office note to Chief Engineer for Irrigation	" " 12th – do –)

22 S.P.

23 P

C

7/8/90

Telgm despd 18-7-90

Ordered that the following telegram be despatched to the Engineer-in-Chief, East Coast Railway Survey.

"Please order Spring to proceed to Simla about 1st August to discuss plans Kistna bridge with Consulting Engineer to Government of India - plans and estimates will be sent on from here as soon as possible."

and that the following letter be addressed to the Government of

Form

of India.

G. Ole H.E. No. 1035 R, 18th July 1890.

To,

The Secretary to the Government
of India, P.W.D.

Sir,

C 17/6/90

I am directed to forward for the consideration of the Government of India copy of the Proceedings of this Government No. 1034 R, dated 18th July 1890, with which is embodied the estimate by the Engineer-in-Chief, East Coast Railway Survey for constructing a bridge over the Kistna River at Bezwada.

2. I am to state that the Government of Madras generally concurs in the proposals and suggestions made by the

officiating

24

officiating Consulting Engineer and especially as regards the uselessness of constructing a road way for carts on the same level with the railway.

3. The Chief Engineer for Irrigation has been consulted and states that he has no objection whatever to the proposals made for bridging the river at the site chosen.

4. I am directed to state that His Excellency the Governor in Council attaches great importance to the completion of the bridge over the Kistna at Bezwada and requests that very early orders for commencing the work may be given. He considers that the iron well curbs should be obtained in India

4. and that Mr Spring should after completing his work at Simla, be deputed to visit the various depôts where suitable plant is available for the bridge works and in the meantime the collection of materials and the construction of staff quarters should be put in hand.

M.
offg: R.

Info despd to India
with ×10 enclosures.
(×9 plans + 1 file report and
estimate)
& sent by banghy.
Despd on the 1st July/90
3 P. M. post.

P.W.C. No

RATES OF CHARGE FOR INLAND TELEGRAMS.

The address (including name of Sender and name and residence of Addressee) is transmitted free.

	First 8 words.	Each additional word.	
Deferred Message	... 8 Annas	... 1 Anna.	A group of 3, or less figures, is reckoned as one word.
Ordinary "	... 1 Rupee	... 2 Annas.	
Urgent "	... 2 Rupees	... 4 Annas.	

No charge for delivery within a distance of 5 miles.

Recd 18·vii·90

No 493 D / 19·7·90

Ohs 15·vii

oll. 14/7
Mfn. 15/7
A.E. 17.7.90

R 17.7.90

B

No. 1034-35 R dy 18th July/90.

SGC 21/7

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.
18th July 1890

READ the following:—

Telegram from the Engineer-in-Chief East-Coast Railway Survey dated 17th July 1890.—

FOR ORDERS.

We might telegraph as follows, "deferred":—

"Your telegram seven-"
"teenth × You have already"
"been requested to send Spring"
"Simla after which India"
"has been asked to depute"
"him to depots to select"
"plant Kistna × Have you"
"any further proposals to"
"make".—

Spacey Lt Col. R.E.
Offg: Jt. Secy. to Govt. P.W.D. Ry. Branch

19/7/90

Telegram despd 19-7-90

27 8

F C1

Class DS | INDIAN TELEGRAPH. | Local No. 9777

To (Station) Ootacamund | From (Station) Simla

Words.	Day.	Hour.	Minute.	Official Instructions.
91/3	19	18	38	Dfd

To (Person) Madras Ry works | From (Person) Works

~~G.332 walker telegraphs begins please authorise madras sanction deputation of Spring six weeks tour selecting plant from Indian depots for my whole line ends. The proposal to inspect plant seems a good one but should have been sent to you if you approve please sanction direct Spring to come first to Simla to discuss plan of Kistna bridge with ocallaghan and then he may have sufficient leave for purposes of inspection after ascertain what information exists in our Central office as to plant available~~

Recd. from | L. N. | Sent to
At | Hrs. | Mts. By | At | Hrs. | Mts. By
Date OOTACAMUND 20 .. 90 | Telegraph Master.

FOR ORDERS.

D

No. 293 D 19th July 1890

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

Ootacamund 21st July 1890.

READ the following:—

Telegram G 332 - 19th July from the Government of India, regarding the deputation of Mr. Spring to Simla and to purchase plant for the Kistna bridge.

FOR ORDERS.

Mr. Walker appears to be rather impatient. I propose replying to India by wire deferred.

"Your telegram G 332.
"Orders already sent Walker
"in sense you indicate and
"Government of India has
"been asked to sanction
"deputation of Spring after
"discussing Kistna bridge
"with O'Callaghan ×"

He is I believe very much so & fond of getting the rules & authorities altogether of that in accord with his idea of the powers of [illegible]. J.H.G.

Print

278.1

approved J.H.G. 21/7/90

[illegible] 22/7

Telegram despd 22-7-90

Spring L. A. Cooke.
Offg: Joint Secretary to Govt. P.W.D.
Railway Branch.

FOR ORDERS.

All communications
should be addressed
to the Secretary.

No. 647 R. C

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY Construction.

To

The Joint Secretary to the Government of Madras
(Railway Branch), Public Works Department.

Simla, the 21st July 1890.

Sir,

With reference to your telegram* of the 10th July 1890, and in continuation of Public Works Department letter No. 582 R. C dated 3rd July 1890, asking that Mr. F. J. E. Spring may be deputed to Simla, bringing with him the plans and Estimates of the Kistna bridge when completed, I am directed to inform you that the Government of India considers that it would probably facilitate matters in connection with the examination of the main project if Mr. F. B. Walker, Engineer in Chief of the East Coast Railway Survey, could also come up to Simla, bringing with him such preliminary plans connected with the East Coast Railway scheme generall preliminary for th
hav

*"This Government approves proposals your Telegram C 71, 5th Instant, regarding Construction Bezvada Vizianagram Section".

P.W.C. No 7216

have ready.

2. I am therefore to ask that, with the permission of His Excellency the Governor in Council, Mr Walker may be instructed to proceed to Simla sometime next month, if his services can be spared, and bring with him such preliminary plans as he may have been able to get ready by then.

Recd. ~~29.VII.90.~~
1-8-90

I have the honour to be,
Sir,
Your most obedient Servant,

F. B. Hebbert

Offg: Under Secretary.

Documents accompanying.
Nil.

O.S. 19/7
hm 21/7 R 22.7.90

O.S. 24/7
Hm. 29/7 R 29/7
Ok 23.VII