

Public Works (1895) Department.

RAILWAY BRANCH.

(R)

G.O., No. 699R

DATED 22nd October

[Despatch Abstract.]

Plans and Sections of the East Coast Railway.

*Letter to the Govt of India returning rolls
of certain —*

[illegible]

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

(2) Freight, insurance and landing charges.

(3) Loss by exchange.

(4) Charges incurred between the port and destination, but they need not contain any provision for electric telegraph or for indirect charges.

4. The plans and sections received with the estimates are herewith returned, Mr. O'Callaghan having marked on some of them certain proposed alterations (*vide* paras 11 and 16 of his note). It is requested that they may be returned when done with.

5. I am to take this opportunity to repeat that no deviation from the standard scales for plans and sections prescribed in the rules for the preparation of railway projects should have been allowed.

6. The provisional sanction communicated in the second paragraph of this letter has been registered as No. 1, East Coast Railway of 1891-92.

ENCLOSURES.

NOTE by F. L. O'CALLAGHAN, Esq., Consulting Engineer to the Government of India for State Railways, on the estimates for the East Coast Railway, dated 1st June 1891.

A comparison between the estimate for the East Coast Railway, as now submitted, and the average of railways constructed under ordinary conditions, is attached. As the estimate does not include the cost of bridges over the Kistna and Godavari rivers, which will probably amount to 100 lakhs, or Rs. 20,000 per mile, the total does not represent the real average mileage rate, which, by making this addition, and subtracting the amount for a ferry, amounts to Rs. $\text{Rs. } 1,27,279 + 20,000 - 2,180 = \text{Rs. } 1,09,099$ per mile.

2. Besides the cost of these two great bridges the only items that call for remark are land, earthworks, and ballast. All others are about normal or below it. The high cost of ballast is partly accounted for by the large quantity allowed for, viz., 23½ cubic feet per foot run instead of 13½, or about 27 per cent. in excess.

3. The principal rates as given in the estimates are as follows:—

Earthworks embankments	...	...	Rs. 4 to 4-8 per 1,000 cubic feet.
" cuttings	...	...	" 4 to 5 "
" moorum	...	...	" 12 to 15 "
" rock	...	...	" 25 "
Excavation for foundation.			
Dry	...	...	Rs. 10 per 1,000 "
Wet	...	...	" 25 "
Well sinking	...	...	" 15 per 100 "
Concrete	...	...	" 15 "
Masonry in building	...	...	" 20 "
culverts	...	...	" 25 to 27 "
wells	...	...	" 45 per 100 "
bridges	...	...	" 45 "
arches, small	...	...	" 27 "
large	...	...	" 60 "
Ashlar	...	...	12 annas to Re. 1 "
Timber	...	...	Rs. 2-8 per cubic foot.
Ballast	...	...	" 4-8 to 5 per 100 cubic feet.

4. These rates are moderate and in some cases appear low.

5. The section and plan will now be considered.

6. (As miles 45 to 120 are being re-surveyed, they will not be noticed in the following remarks).

7. Miles 15 and 16.—The length of level in the cutting should be reduced by continuing the grades upwards and merely rounding them off at the top.

8. The same remarks apply to the summit at mile 17½.

9. The formation should be slightly raised in the 21st mile, keeping the line out of shallow cuttings.

10. Miles 120½ to 126.—The earthworks might be reduced by keeping the formation down to 2½ feet above flood level, except at bridges.

11. On the plans and sections, I have pencilled alterations to gradients and curves, which with the information at my disposal seem to me to be improvements. These alterations are in the following miles—129 to 132, 145, 155, 156, 157, 161, 162, 181, 201, 215, 216, 218, 219, 221, 222, 223 to 229, 243 to 245, 259 to 278, 287 to 291, 295 to 298, 303, 308, 307, 309, 310, 312, 313, 317, 318, 320, 321, 322, 324, 325, 326, 329, 334, 336, 342, 344 to 346, 349 to 351, 353 to 356, 358, 363, 365 to 367, 369, 370, 373, 374.

12. From mile 374 to Ganjam a different alignment would probably avoid the high summit shown, and allow of improved gradients.

13. The Engineer-in-Chief says in his report that the length by the Chilka lake is capable of improvement.

As work has not yet been started on the two northern divisions, or from about mile 270 onwards, I think the Superintending Engineer, who may be posted to that district, should have instructions to go carefully over the whole alignment with a view to improvements right up to Cuttack.

14. The tendency has been to keep too much in cutting along the whole section. In many cases the curves can be flattened with advantage, but the information on the plans is so meagre that it is difficult to say exactly what the effect may be.

15. Regarding bridges—

In mile 35 the aqueduct over the Tamileru has 12 arches of 16-feet span each; therefore, for the railway, a bridge of 6 spans of 40 feet would appear sufficient. Again, in the 37th mile, eight 20-feet spans seem excessive. If the foundations of the Vamadhara, Langulya, Nellimerla, and Bhimasingha rivers are as shown on the drawings, it would seem that open foundation would be best for all and that 100-feet spans would be best for the two larger rivers, and 60-feet for the smaller ones.

16. The line approaching the Nellimerla river seems open to improvement as pencilled on the plan.

17. Where the line runs near a public road the sizes of the bridges on the road should be marked on the plans.

18. At mile 200, Gopalpatnam station is shown inside the junction on the main plans, but outside the junction, and on the northern line on the index plan. In the first position it is but 4 miles from the main Waltair station. It would seem best to lay the line double from the junction unto Waltair, and to put Gopalpatnam station at mile 204, thus better dividing the distance between Waltair and Kottavalah stations.

19. Designs for bridges and culverts.—These designs are not good and should, I think, be altered at once, before any more structures are put in hand.

20. The length of abutments of both culverts and bridges on the face is but 16 feet, which is too short by 4 feet, formation being 20 feet.

21. The splay of wing walls is 45°; I think 27½° from the line at right angles to centre line is ample and will tend to shorten the wing walls and save masonry.

22. In arched bridges and culverts, the span should be proportioned to the height of embankment. Such culverts as a 20-feet arch in eleven feet of embankment, when nothing but the arch appears above ground, should not be allowed. The height of abutment should be proportioned to the depth of water passing through, and several small arches should be used in preference to one large arch when the depth of embankment does not give sufficient headway for the latter.

23. On the other hand in high embankments culverts should be run out into the slopes instead of raising the abutments unnecessarily, or building unsightly high spandril walls.

24. The general outline, as given in Mr. Stone's culvert tables, should be followed as a rule. In the case of such bridges as have already been commenced, the wing walls must be built to the full height of bank, out to the edge of formation level.

25. As regards the calculation of drainage area, and the waterway to be allowed, I find the annual rainfall varies from about 30 inches to 50 inches. In similar country, in the Central Provinces, with a rainfall of 40 to 50 inches, a co-efficient for "Dickens" formula of 800 was found suitable for exceptional floods, and the large bridges certainly should provide for such floods. This co-efficient held from small streams up to rivers of over 8,000 square miles drainage area, and I do not think that a smaller co-efficient should be used. It is obvious that if the formula is to be used at all the co-efficient should not be altered for every stream as seems to have been done on the East Coast Railway.

So far as my experience goes I think the formula is fairly reliable.

Station arrangements.

26. I think that in all minor stations only one set of points should take off from the main line at each end, and thus keep down the number of facing points to one for each minor station.

27. At changing stations where all trains must stop this is not of so much consequence.

Buildings.

28. Goods sheds should not be erected in the first instance except at places where traffic is assured. They may well consist of old rails for posts, &c., and corrugated iron roofing, which can easily be removed if found desirable.

29. Engine sheds should be 45 feet clear inside, if for two roads, and not 40 feet as shown. Wrought-iron tanks, on old rail framings or on pillars, for watering stations, are best in the first

instance, as they can be shifted if the site is found unsuitable. Four 1,600-gallon tanks can be converted into one tank containing 12,000 gallons without difficulty. A copy of the drawing showing how this is done might be sent to Mr. Walker. Passenger waiting sheds should not be put up until the traffic shows that they are required.

30. On the whole the plans and drawings seem to have been got up in a very rough and slovenly style, and but little attention has been paid to the instructions for preparing projects. The books have been made very cumbersome by using scales of 300 feet to one inch, horizontal, and 30 feet to one inch, vertical. This change of scale from the standard gives much trouble in examining plans, and I trust more stringent orders will be issued on the subject. In the present case five large books have been sent up when all might easily have been put in three.

31. I know that Mr. Walker had a very inferior staff to assist him on these surveys, but the standard scale might easily have been insisted on. The regular working sections may be on a larger scale if an Engineer-in-Chief thinks it necessary, but copies of the working sections are not required in this office. Much time and money would be saved if projects were sent up in "Parliamentary" style.

Gauge 5' 6".

COMPARISON of cost per mile of East Coast Railway with average of railways constructed in India under ordinary conditions.

Heads of Account.	Average for ordinary railways.	COST OF EAST COAST RAILWAY.			Remarks.
		Railway.	More +	Less -	
I.—Preliminary expenses—	Rs. 800	Rs. 800	Rs. 800	Rs. 800	
1. Survey expenses	150	88	..	94	
2. Plant	80	85	15	..	
3. Establishment	600	442	..	158	
II.—Land	700	2,865	2,165	..	
III.—Formation—	6,000	6,557	2,557	..	
1. Earthwork	6,000	6,557	2,557	..	
2. Tunnels	..	..	..	..	
IV.—Bridgework—	14,400	..	..	..	
1. Large bridges	9,600	10,137	637	..	
2. Minor do.	4,800	3,616	..	1,284	
V.—Fencing, &c.—	800	..	..	..	
1. Fencing	2,303	2,280	..	40	
2. Road crossings	450	932	482	..	
3. Mile and gradient posts	60	45	..	6	
VI.—Electric telegraph	..	..	..	..	
VII.—Ballast and permanent-way—	30,500	..	..	..	
1. Ballast	4,500	7,090	2,590	..	
2. Permanent-way	26,000	27,640	1,640	..	
VIII.—Stations and buildings—	8,000	..	..	..	
1. Stations and offices	2,400	1,917	..	483	
2. Workshops, store buildings, &c.	1,200	912	..	288	
3. Staff quarters	2,000	1,384	..	612	
4. Station machinery	2,400	1,988	..	412	
IX.—Plant—	1,800	..	..	..	
1. Engineering	700	625	..	175	
2. Locomotive	800	994	394	..	
3. Carriage and wagon	200	81	..	119	
4. Station and office furniture	300	105	..	195	
X.—Ferries, &c.—	..	..	..	..	
1. Ferries	..	..	..	..	
2. Floating bridges	..	..	..	..	
XI.—Rolling stock—	12,000	..	..	..	
1. Locomotive	4,000	4,978	878	..	
2. Carriage and wagon	8,000	7,829	..	171	
XII.—General charges—	6,000	..	..	..	
1. Direction	1,000	437	..	563	
2. Engineering	3,000	4,630	1,630	..	
3. Stores	800	118	..	384	
4. Audit and account	350	189	..	161	
5. Medical and sanitation	150	68	..	82	
Average Total cost per mile ..	82,000	89,102	12,328	8,228	Difference 7,102.

ORDER—dated 25th July 1891, No. 1708 R., Public Works.

Communicated to the Consulting Engineer for Railways for early attention.

2. This provisional sanction has been registered as No. 19 R. of 1891-92.

(True Extract.)

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

To the Consulting Engineer for Railways, with copy of note and ferrotype.
" Examiner, East Coast Railway Accounts.

Exd. A. D. Xavier.
Spare Copies

RAILWAY.

Govt. of {1891} Madras.
PUBLIC WORKS.

Dated July, 25th.

Recd.

Encl.

G.O., 25th July 1891, No. 1708 R.

JULY.

East Coast Railway

Letter from the Government of India conveying provisional sanction to estimates amounting to Rs. 460,54,753 for the — and requesting the early submission of revised estimates, communicated to the Consulting Engineer for Railways for early attention.

All communications
should be addressed to
the Secretary.

No. 875 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 22nd July 1895.

Sir,

I am directed to invite attention to Government of India letter No. 586 R.C., dated 3rd July 1891, and to
----- request that the
Government of India Drawing Branch 9 rolls of plans
No. 2727 "a to i" and sections of
----- the East Coast
railway, therewith forwarded, may be returned to this
office.

2. If the plans were made over to the Engineer-in-Chief, East Coast railway, I am to request that this letter may now be transferred to the Manager for compliance.

I have the honour to be,

Sir,

Your most obedient servant,

3. n. Thakur

Under Secretary.

Documents accompanying:-

Nil.

M.L.M.

This should have been transferred to the Manager for compliance. 19/7/95

P. M. GURRAMA No. 5769

P. M. Current No. 576

Letter No: 875 RC dated
22 July 1895 from the
of India

Ans: 29.7.95

No 2456
30.7.95 Copy forwarded to
Manager East Coast
for perusal of compliance

No 2456 27-8-95

27.8

issued 28.8

11/11
11/11
11/11

YHS

for ER
29-7-95

No. 875 R. 6.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY-Construction.

TO
THE *Joint Secretary to the*
Govt of India, P.W. Dep.
Ry. Branch
Simla, the *1st Sept* 1895

The undersigned is directed to invite attention
to the letter noted below, and to request that the
reply may be expedited.

Mountbatten
Assistant Secretary
S. 11

P. W. D. No. 875 R.C., dated 22. 7. 1895.
Requesting the return of the
plans & sections of the
East Coast Railway referred
to.

CM 26/7

No. 73/85

In your reply please quote the number and date of this letter.

No. 8044

11/10/10

Form No. Mgr. 19.

Dec: 26. 9. 95

FROM

THE MANAGER,

East Coast Railway.

TO

THE Consulting Engineer

for Railways.

Address.

Dated Waltair, the 5th October 1895.

SIR,

With reference to Government of India, P.W.D. letter No. 875 R.C. dated 22nd July 1895, copy received with your endorsement No. 2456 dated 20th idem, I have the honor to forward herewith 9 rolls of plans and sections referred to therein, and to state that the following are missing from amongst them:

First 28 sheets of plans and sections, Chicacole Division roll No. F mile 291-342

Last sheet of the above, mile 382-384.

Sheets Nos. 32 and 41 of plans and sections of Chilka Lake Division, roll No. G mile 448-448.

484-486.

2 Steps are being taken to trace out the missing plans which if found out, will be sent as soon as possible, otherwise copies will be furnished.

I have the honor to be,

Sir,

Your most obedient Servant,

Manager,
E.C. Railway.

Enclosures.

600-11-8-94

Form No. 20.

TELEGRAM
URGENT
DEFERRED

FROM

E.R.

TO

The Manager
E.C.R.

D/271 Please reply my 2456
July 30th 1895

CPM: 26/9

Despatched 30/9

26/9

4358
9.10.95

Form No. 20.

TELEGRAM

URGENT
DEFERRED

FROM

E. R.

TO

Manager
E.C.R.

8291 your 8044, 5th instant.
Please send bill of lading
for box of plans. CMM. 15/10

reply received 19.10.95

Despatched
15/10.

1570

Form No. 3.

OFFICE OF THE AGENT FOR GOVERNMENT
CONSIGNMENTS,

Madras, 12th October 1895.

No. 301

FROM

THE AGENT FOR GOVT. CONSIGNMENTS,

TO

The Consulting Engineer
for Railways
Government
Madras

Has the honour to inform that 1/14/95
have been loaded

ex S.S. *Kangra* from
for the ship and to request
that a proper person may be sent to have
them removed at once.

Please forward the Bill of Lading for the
stores duly receipted with a receipt in dupli-
cate

E. D. Roxario

Agent for Govt. Consignments.
11/10

Form No. 10.

Railway Department.

OFFICE OF THE CONSULTING ENGINEER FOR RAILWAYS,

Madras, 15th October 1895.

TO

Agent
Govt. Consignments
Madras

No. 3244

Reply No.

, dated

SIR,

With reference to
your No. 301 of 12th inst.
I have the honor to
request that the box may be
delivered to the bearer
P. Ramaswamy
Clerk of this office.
The bill of lading
will be sent to you
on receipt from the
Manager, East Coast R.

CMM. 15/10

Reminders.

1570
14.10

Code
Class

LP

INDIAN

TELEGRAPHS.

Monthly
Number

10171

To *Madras*
(Office)

From *Vizagapatam*
(Office)

24-1/8

18

15

32

Official
Instructions

2/6

To

(Person)

*Consulting Engineer
for railways.*

From

(Person)

*Stuart Hall
Co.*

*Beliver Consulting Engineer
addressed one case drawing.*

Kangra.

64 Word Form.

F.C.2

MADRAS 18-10-95

Recd. from

LN.

Sent to

LN.

At

Hrs.

Mts. by

At

Hrs.

Mts. by

Telegraph Master.

TELEGRAM ^{ORDINARY}
~~DEFERRED~~

FROM

TO

E R.

Manager
E.R.

21297. Your letter 80444
fifth instant - Please
forward missing sheets
of plans & sections drawn
to India when found.

CMM.

Tel. despatch 21/10/95.

No. 699.R

Government of Madras.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

B/-

To
THE Secy. to the Govt. of India
P. W. Dept.

Madras, 22nd October 1895.

SIR,

With reference
to your letter No: 875 R.C.
of 22nd July 1895, I am
directed to return as
per list enclosed the
9 rolls of plans and
sections of the East Coast
Railway referred to therein.

2. A copy of letter from
the Manager East Coast
Rly No. 807 of 5th Oct 95
is also enclosed stating
that certain sheets
are missing but that

Yours

Officer has been asked
to forward the no. direct
to you. when found.

Y.M.U.

19.
10

Documents acc?

- (1) List of plans & sections etc.
- (2) Copy of letter from Mr. E. J. J.

B/- No. 699. D. dated 22.10.95

List of plans & sections East Coast Ry

Roll No. C - 1 to 56

Do - A - Survey Plan 1 to 24

Do - 24 a - 58 sheets

Do 2. Block plans
of station arrangements } 255 sheets
Station buildings

Do 3. Bridges & Plan, Cross
sections of viaducts } 218 sheets

Do - D. Terrace Division

Coconada Branch - 1 to 4 sheets

Therese - 43 -

Do E. Virajapuram Div. - 45 sheets

Do F. Melur to Chattrapuri.

Chattrapuri Division - 47 sheets but sheets 1 to 2
+ last sheet missing

Do G. Chitka Division

Ganj'am to Mahanadi

Plan & section - 52 sheets but sheet
32 & 41 missing

Forwarded in R. office
on 22.10.95
Y.M.U.

B/.

N^o 699. R. dated 22.10.95

22/10

24/10