M.R.O. 1—77,006—8-6-37.

(1) Number of pages 206

(2) Date of repair 31-10-44

(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Public works. **DEPARTMENT.**

G.O. No. 2851-52. Press Mis.
79-2-82.

Dated 4. 12 1872..

Not to be folded or roughly handled

Note on Estimates for the Estimates for Railway Communication between Madhukalone.

IX

With his Letter of date 17th August 1872, No. 2526, Mr. Wicks submitted a Report, by the Acting Engineer, and plans and estimates, amounting to Rs: 78,85,833 for a line on the metre gauge from Nagdanee to Cuddalore.

It was directed out to Mr. Wicks that the estimate submitted by him was incomplete in certain respects, the following heads of expenditure, Viz:

I. Preliminary expenses

IX. Maintenance

X. 1 Establishment. Director

5 ——— do ——— Stores

6 ——— do ——— Auditor's Account.

XI. 1 ~~Contingencies~~ — Director

5 ——— do ——— Stores

6 ——— do ——— Auditor's account

not being provided for.

3 It was explained that, in the opinion of the Consulting Engineer, the item "Contingencies & Surveys", in Main head XI should only provide for unforeseen requirements and office contingencies &c., and that the ordinary Engineering Contingencies to meet unexpected excesses in Rates or Quantities should be provided for by Percentages upon the several heads of Engineering expenditure and should be shown under

under these heads.

4 On the 17th September 1872, the Agent submitted Revised estimate amounting to Rs. 94,47,707, in which provision is made for the heads of expenditure previously omitted; at the same time Mr. Brisbee forwarded a letter from the Chief Engineer asking that his estimate of contingencies might be allowed to stand as originally framed.

5 The Chief Engineer in his Report, points out that his estimates for iron girders have been framed upon the supposition that the streams to be dealt with are those which would be caused by the Rolling loads laid down in the

the enclosure to Public Works Department Circular No. 15 C of 1871, and he explains that if, as seems possible, the rolling loads have been doubled by a clerical error, his estimate may be considerably reduced. The Government of India's letter, forwarded with the order of the Madras Government No. 1996, dated 21st August 1872, shows that the rolling loads should be taken at one half the weights given in the Circular above referred to, and Mr. Dibbles estimate may therefore be reduced by Rs: 2,06,936; the total of the estimate will then be Rs: 12,40,771.

6 The above estimate assumes, is based on the supposition that the

the Madras Terminal station is to be located immediately to the Perilon Tank but, as the extension of the Arcadia Company's proposed line from the site near the Male Orphan Asylum to the Penitentiary, site is being separately considered by Government, that portion of the proposed line may be left out of consideration in the present note, and the above named sum of Rs: 9,40,771 may be reduced by Rs: 70,000 the cost of the said extension, the balance Rs: 9,70,771 representing the estimated cost of constructing, stocking and maintaining for 12 months, a line on the

metre

metre gauge from Madras ('Male' Orphan Asylum) to Cuddalore, a distance of 127 miles, at an average rate of Rs: 72,211 per mile.

7. A careful examination of the estimates has shown that Reduction and modification are called for in numerous particulars. These points are severally referred to, and recommendations as to modifications are given, in the following paragraphs, and a revised estimate amounting to Rs: 68,26,180, or an average of Rs: 53,750 per mile, has been framed upon the basis of those modifications.

8 Mr. Dibblee estimates are

are in many instances mere average estimates; that is to say, instead of an estimate for each work being framed in accordance with the actual circumstances of that work, an average condition of circumstances has been assumed, an estimate has been framed for such average condition, and this estimate has been applied without modification to individual cases, even when the circumstances differ widely from the assumed conditions. Estimates framed in this way may afford a tolerably near approximation to the actual cost if the line be considered as a whole; but it is clear that for any individual work, or indeed for any individual district, they may,

and

Mr. Dibblee estimates in certain cases not exact enough.

and in many cases must be al-
together discretionary. Two instances
are selected to illustrate the
manner in which the system
works.

District IV will include
no stations and will require,
therefore, no sidings. District
I, on the other hand, includes the
terminal Passenger and Goods stations
at Headcorn and many stations at
Tenterden, Cranbrook, Sydenham, and
parts of Edmonton, Enfield, as well as
the Enfield loop to Southbury, and
will require, therefore, some few
miles of sidings. But Mr Dibble
has provided for sidings by
allowing in each district, without
regard to its circumstances —
———, 12 per cent on the
Engine

length of the main line, and
District IV being longer than
District I actually has the larger
proportion of sidings.

Again plan 28 is the plan
of an engine shed. It is proposed to
erect an engine shed of this pattern
at Maidstone, and at no other
station, and it would be expected
therefore, that the engine shed, plan
28 should have been specially
designed for the circumstances of
the Maidstone station ground,
but a reference to the plan shows
that the engine shed is designed for
a site at which the ground level
and the formation level are the
same, without a reference to the
working sections shows that at
Maidstone

Cuddalore station the line is in
rice or ocean field of bank. Yet the
amount entered in the estimate for
the Cuddalore engineered is based
upon quantities taken from plan No
28, without any modification. The
Reply to a reference from this office
Mr Dibblee explains that, as
the line is to be continued south-
wards from Cuddalore instead of
Pondicherry, the site of the station
will have to be altered, and
that he hopes to be able to select
a spot where the line will
not be in bank. The fact,
however, remains that, as the
plans were submitted, the design
for the Cuddalore engineered
is

is unsuited to the site of the
Cuddalore station, and that the
estimate for the Engineered
is inexact.

Some of these average
estimates it has been found
easy to correct in this office
concurrently with the revision
rendered necessary by various
proposed modifications; but in
the case of the estimates for
minor bridges and culverts it
was found necessary to write the
Chief Engineer to recast the estimate,
taking into account the circumstances
of individual works. Mr Dibblee
in reply, states that as he has
not been allowed to visit Madras
site and make borings, he has
not

not at his disposal the information
necessary to determine accurately
the depth of foundations that
will be required in any particular
case, and that, as he
cannot therefore estimate ac-
curately for the masonry in
foundations, it would be irrational
to aim at extreme accuracy by
estimating minutely for the
masonry in superstructure.
Existing data, such as Banks of
Streams &c will in general give
such indications of the nature of
subsoil as will enable an Engineer
to predicate with a very small
limit of possible error the
depth and nature of foundations
necessary in the case of any work
comprised under the head Minor

Bridges

Bridges and Culverts without
the necessity of borings and trial
pits; but however this may be,
it cannot be admitted that it is
irrational to estimate accurately
for such portions of a work
work as can be accurately esti-
mated for simply because the
details of some other portions cannot
be accurately foreseen. Under the
circumstances however, the Estimates
Estimates must be accepted as
they stand, the scale for masonry
being fixed at 10 Rs per cubic yard.

9

Scale for Carriage

In the Chief Engineers
estimates the scale for carriage is
throughout entered at annas 5 per
ton mile. This rate is considered
excessive. It is thought that the
whole

whole of the carriage may be done by
contract at 3½ annas per ton mile,
and it is recommended that the
estimate rate be reduced to 4
annas per ton mile for permanent way
material: the rate for girder work,
in which there may give more difficulties
in carriage, may be kept at 5
annas.

10

In Mr Bibbel's estimate
Cement of earthy
it is assumed that the whole of
the permanent way material
and girder (and other iron) work
for bridges will be carted to their
destinations. It is hoped, however,
that by judicious exertions it may
be found possible to land the
whole of the iron work for the
Palar, Ponnar, and Cuddalore

bridges

bridges, and the permanent way and
iron work for the lines between the
Palar and Ponnar rivers, to their
destinations by rail.

11

Rate for brickwork
The rate for brickwork is
every where entered as Rs 12
per cu-yd, excepting in the case of the
bridge over the Gingee Polyar, where
it is Rs: 15 and in the case of
Gate-keepers' lodges and Station-
masters' bungalows, where it is Rs: 10
and 7 respectively. The 12 and 15-16
rates are certainly excessive. The
rates prevailing in the Public Works
Department of the district through
which the line passes are from
Rs: 3½ to 6½ per cu-yd. For the
railway works a better, and therefore
more expensive, description of brickwork

will

will be required; but the very least possible work should be obtainable at Rs: 10 per cub. yd. In reviewing the estimates in this office a rate of 10 Rupees has been allowed for all brickwork in bridges and in buildings with the exception of upwards of 15 feet span. For these buildings and for platform walls Rs: 8 is allowed, and for Station-Masters' bungalows and Police-Officers' and Platelayers' huts, Rs: 7.

12 The general heads and items of estimate will now be considered in the order in which they follow one another in the General Summary. The estimate for the Madras Division will be first considered

considered apart from the estimate for the West of the line. If this arrangement is found convenient here because it is adopted by Messrs Dibdin; because the data for the Madras station not being yet settled, the designs have not been matured and the estimates can only be roughly dealt with; and because the requirements of the Settlements will be considerably affected by any amalgamation with the Great Southern of India Railway Company.

1. Preliminary Expenses

13 The amount entered in the estimate on account of "Preliminary Expenses" is Rs: 3,60,994, of which

Rs: ...

Rs. 2,96,276 respectively, actual expenditure upto 31st August last, and Rs. 64,918 is additional expenditure expected to be incurred by the end of the current financial year.

II. Land

14. As the land required must be provided by Government its cost does not enter into the estimate.

III. Construction of Line

III. 1. Earthwork

15. The rates for earthwork [Rates] appear to be sufficient without being excessive.

[Information with the embankment]

Mr. Debbie in forwarding the estimate, states that

the quantities have been taken out for a formation width of 12 feet in embankment and 15 feet in cutting: he expresses his opinion that the width in embankment is insufficient and asks for permission to increase the width to 14 feet, and in place where black material is found, or in the beds of nullas, to 16 feet. The extra cost which this change would involve is stated at Rupees 376 per mile. The Government of India, in sanctioning the estimates for the Southern Extension of the Great Southern of India Railway, (No. 6 dt. 8.03 of 21st March 1872) did not insist on the maximum width of 12 feet,

but

must allowed the Chief Engineer to increase the middle, in places where he considered it necessary, 10 feet; the cost being credited by the sum set down for contingencies. Similar latitude might well be allowed. No 10s. Dibble, and in the revised estimate 1Cs: 300 per mile has been added to 10s. Dibbles estimates 10. per mile for extra earthwork, as it seems undesirable to leave the cost of works, the necessity for which is clearly foreseen, to be met from the sum set down for contingencies. The estimates for earthwork in each district will then stand as follow:-

District.	Amount.
1	31,600
2	26,550
3	41,970
4	49,480
5	31,820
6	32,460
7	35,260
8	47,890
9	40,900
10	53,430
Total Rs.	3,91,360

III: 2: Bridgework

16 The provision of waterway

Waterway

appears to have been carefully considered in the case of each individual drainage, and the allowance seems to be sufficient;- it will of course be liable to some slight modification

modification should subsequent experience show this to be desirable.

17

Protective works

No provision is made for curtain walls and flooring in the case of any bridge of larger span than 10 feet. It is hoped that in most cases the bridges may be founded on rock; but when this is impossible protective works must be added. It cannot at present be judged in what cases, and to what extent, flooring and curtain walls will be required: the cost of these must therefore be met from the sums set down for contingencies.

18

In reviewing the estimates, the rate for brickwork in

Masonry in bridges

in bridges has been reduced to 16s: 10 per cu. yd; and the reduced scaling loads have been taken into account in estimating for the iron work.

19

Iron work in bridges.

Mr. Dibble has allowed 16s: 300 per ton for wrought iron, including fixing, and 16s: 200 per ton for cast iron. It is hoped that the former may be sufficient in spite of the recent rise in the price of iron; there seems to be no reason to suppose that the prices set down for cast iron will prove insufficient. However, the final estimates for the girders and other iron work must be framed in England.

20

III. 2. i Minor Bridges & Culverts.

20 Mr. Dibbles original estimates for Minor Bridges and Culverts, as explained above, all average estimates, and the only Revision which it has been possible to carry out in the Office consists in a Reduction of the Scale for masonry: The estimate as Revised stands as follows:-

District.	Amount.
1	13,000
2	15,550
3	18,100
4	19,400
5	18,750
6	37,000
7	16,200
8	25,800
9	32,100
10	15,100
Total Rs:	2,11,000

13 17

III. 2. ii Large Bridges

21 The Large Bridges consist of three bridges of four 20 feet girders; one of three, and one of four, 25 feet girders; one of three, one of four, one of five and one of nine 30 feet girders; and one of three, one of four and one of nine 40 feet girders, in addition to the Bridges spanning the Adyar, the Palar, the Ponnar, and the Cuddelalam River and Backwater.

22 For the bridge over the Adyar, the Chief Engineer submits two designs, each of which provides for a bridge of nine 66 feet girder openings: in

one

one design the maximum width of masonry prescribed by the Government of India for the piers, 12 feet, has been exceeded and the cost of the bridge consequently increased. Mr. Dibdin represents that, with the limited amount of masonry allowed, it is impossible to provide a structure having any pretensions to architectural effect, and he asks that he may therefore be allowed to erect the more expensive bridge, at an extra cost of Rs: 5,362. The circumstances of the bridge over the Adyar do not appear to be such as to warrant a

departure

from the general principle of legal economy and consideration, and the less costly design is therefore recommended for adoption, the estimate having been framed on the scale for masonry.

23. For the crossing of the Palar, Mr. Dibdin proposes eight piers spaced each 120 feet in the clear, spanned by girders resting upon iron cylinder piers, 3 feet 9 inches diameter, and 8 1/2 inches thick, a pair of cylinders to each pier. Borings taken in the River bed show that, to reach a firm foundation, the piers must be sunk

sunk to an average depth of
40 feet. The drainage area
of the River is estimated at
6120 square miles.

The girders have been
designed for rolling loads now
admitted to be too large. With
the reduced loads the gross
weight of the main girders may
be reduced by upwards of 250
tons; and it will probably
be found that, under the altered
circumstances, a slightly smaller
span will be more economical.
It is understood that the
girders will be designed in
England, and their fourth will
no doubt, then become

considerations

considerations. The remarks applies
equally to the Bonear and
Guddelam bridges.

24 Mr Dibblee states
that the borings taken
Bridges over the Bonear — and the Guddelam River
show the beds of the
Bonear and the
Guddelam Rivers to consist of
sand with occasional deposits
of clay; and, considering
such a formation to indicate
that scour does not take place,
and believing that piles will
not be without lateral support
be adequate for the piers of the
bridges clusters of small screw
piles, braced together, for each
pier two clusters of three piles
each. It is estimated that
the

the piles will have to be spread to average depths of 22 feet and 20 feet in the cases of the Poonar and Luddelam respectively. For the Poonar Mr Dibblee proposes 17, and for the Luddelam River 8 spans of 100 feet each, and a single span of 100 feet for the Luddelam backwater. The catchment basins of these rivers are estimated at 4550 and 1065 square miles respectively.

25. It is proposed to support the ends of the abutments & girders of the Palar, Poonar, and Luddelam bridges upon

Abutments of Bridges with piers of cylinders and screw piles.

upon cylinders and piles similar to those employed on the piers, prolonging the ends of the embankments by retaining walls.

26. Excepting in the case of the Palar, Poonar, and Luddelam bridges, no provision appears to have been made for the carriage of materials. In revising the estimate, this item has been allowed for.

Carriage of Materials

27. The estimate for large bridges as revised in this office, is as follows:-

Revised Estimate

III. — Level crossings.

28 **Gates**

Wherever gates are required to close across the road, teak wood gates 13 feet 6 inches between posts have been provided; these gates comply with the orders of the Government of India regarding the minimum distance of fixed obstructions from centre of track. Larger gates may hereafter be found necessary at one or two points, and the extra cost will have to be met from the sum set down for contingencies.

29 **Gate keepers lodges.**

A very superior description of masonry is not necessary for gate keepers' lodges; the gate

rate should be reduced to 1 Rupee
8 per yard; and the estimated
cost of a single load to 16: 317.
3.0 . . . . . So other points
under this head of the estimate
seem to call for remark.

Revised Estimate

The revised estimate
for level crossings will then
stand as under:-

Districts	Amount
1	
2	6,930
3	4,040
4	3,910
5	3,560
6	3,940
7	3,170
8	4,050
9	3,230
10	4,310
	3,940
Total Rs:	41,700

22

III. 5. Fencing. 18

31 . Mr. Dibble provides
in his estimate for wire fencing
for one-third of the length of
the line at a cost of 1 Rupee per
lineal yard of fence. The
number of wires proposed is six,
but the gauge of the wire and
the number of straining posts
are not given; but as the fence
is said to weigh 16 tons per
mile it would seem that the
wire must be needlessly stout,
and straining posts unnecessarily
numerous. On the Madras and
Great Southern of India Railway,
four-wire fences are found to
answer very well, with one-
fourth inch wire, and with
straining

drainage posts at every 10 or 15
Mains: such a fence ought to
be erected that a cost of not more
than 12 annas per yard lineal.
A two-wire fence surmounting
a low earthern bank, as sug-
gested by Mr. Molesworth,
might be provided at a still
lower cost.

For the Southern Extension
of the Great Southern of India
Railway, the Government of
India have only sanctioned
the provision of wire fencing
for one-fourth the length of
the line. The Carnatic Line
will learn, it is true, for a
great part of its length
almost within a stone's throw
of

1923

of the Trunk Road, and with
the exception of a good deal
of fencing on one side, but
there is no reason to suppose
that a vegetable fence cannot
be successfully grown. Similar
to the exception noted for wire fencing
for one-fourth the line only
the whole amount of fencing, at 12
annas per yard, the estimate will
stand as follow:-

Districts	Amount
1	6,710
2	7,760
3	9,160
4	9,140
5	8,580
6	8,580
7	8,620
8	8,580
9	8,580
10	8,260
Total Rs:	83,970

32. Rupees 50 per mile should be added to the estimate to provide for Temporary Telegraph for the use of the Engineering staff during construction. It is assumed that the Government Telegraph department will be able to lend light wire for this purpose. If this cannot be done it will be necessary to increase the estimate considerably.

Temporary Telegraph

33 The total revised estimate under the head "construction of line", to which it is recommended that sanction should be accorded, is as follows:-

24

Division.	Earthwork.	Drainage. Bridges.	Land.	Land Revenue.	Fencing.	Temporary Telegraph.	Total.
1	31,600	13,000	47,000	6,930	6,710	510	105,750
2	26,550	15,550	7,000	4,040	7,760	580	61,480
3	41,970	18,100	7,100	3,910	9,160	690	80,930
4	49,480	19,410	399,200	3,560	9,140	680	481,460
5	31,820	18,750	"	3,940	8,580	650	63,740
6	32,460	37,000	"	3,770	8,580	650	82,480
7	35,260	16,200	33,600	4,050	8,620	650	98,380
8	47,890	25,800	21,600	3,230	8,580	650	107,750
9	46,900	32,100	225,100	4,310	8,580	650	317,640
10	53,430	15,100	117,500	3,940	8,260	620	198,850
	391,260	211,000	858,100	41,700	83,770	6,330	1,592,460

IV. Ballast and Permanent Way.

34 As pointed out in paragraph 8 of this note, Mr. Bibbles has allowed for sidings, and therefore for ballast and permanent way in sidings, by a percentage on the length of main line in each district.

This

This is obviously incorrect, and in the estimates as revised in this office, the ballast and permanent way have been calculated with reference to the actual length of main line and sidings in each district, the length of the sidings being based upon the station arrangements as modified in this office, not upon the station arrangements as proposed by Mr. Pebbles. (see below paragraph 57.)

IV. 1. Ballast.

35 The rate allowed for ballast is sufficient without being excessive. The revised estimate will stand as follows:-

District.	Amount.
1	12,830
2	13,730
3	16,400
4	15,510
5	15,130
6	15,130
7	14,910
8	15,130
9	15,130
10	15,930
Total No:	1,49,530

IV. 2. Permanent Ways.

36 Mr. Pebbles estimates for the Railway jointed metals & chairs plated sleepers, and Bergin's plated iron sleepers, at a cost of Rs: 1,27,67 per mile of track. The estimate is thus arrived at:-

Rails

Nails per ton in England £ 11-8-0

Freight ——— 0 ——— " — 1-12-0

Insurance 3½ per cent — " — 9-0

Landing charges ——— " — 6-0

Customs — 1 per cent. ——— " — 2-0

£ 13-13-3

say Rs: 137 per ton.

Iron sleepers ~~per mile 7.500 proposed~~

Chairs Rs: 2 per joint.

Weight of rails in one mile 628 tons.

628 tons at Rs: 137 per ton Rs: 8,611

Iron sleepers for 1 mile ——— 1,300

628 chairs bolts & keys for joints at Rs 2 per do ——— 1256

Total Rs: 11,167

The price allowed for the rails seems on the present condition of the market, fair; the rate for freights is probably unnecessarily high.

Iron

Iron rails is an item which varies greatly and the rate first down may be allowed to stand.

37 The Government of India

Wooden ways recommended. — when sanctioning the estimates for the Southern Extension of the Great Southern of India Railway observed that they would not object to an iron road if it could be laid down at the same price as a road with creosoted pine sleepers. It is presumed therefore that in this instance the Government of India will not sanction an iron road if its first cost is greater than that of a wooden sleeper road. In the revised estimate, prepared in this

this office, exclusive of the expenses already allowed for.

38. With the modifications above referred to, the Revised Estimate will stand as follows, for one mile of track.

Revised Estimate

Rails ——— No: 880

Sleepers, fish bolts, spikes, and fang bolts — " — 738

Ibbotson's patent sleepers — 700

Wooden sleepers, say 2000 per mile at No: 1-8 — each — 3,000

Total No: 13,048

being a saving of a little less than No: 4000 per mile upon the estimate for an iron road. It will however be observed that Mr. Pebbles has estimated for iron sleepers at £ 6-0-0 per ton

in

in England, a very low price in the present state of the iron trade.

39. The patent sleepers for the Railways

Ibbotson's patent sleepers

do not appear to have met with the approval of the Consulting Engineer to the Government of Sweden and it might perhaps be as well to dispense with them on the Carnatic line.

The rails for carriage ways

Carriage & Permanent Way Material

be reduced from 8 cwts to 6 cwts per lineal yard, moreover the substitution of a wooden for an iron road reduces very considerably the weight of the Permanent Way Materials.

The weight of the iron road, according to Mr. Pebbles,

is

is as follows:-

Rails per mile	69.85 Tons
Sleepers — Do.	84.7
Fish-bars	6.6
Bolts and Check Plates &c.	2.81
Total	163.95 Tons

The weight of the wooden Road will be:-

Rails per mile, as	63 Tons.
Fish Plates, bolts, spikes, and fang bolts	
Sleepers, Red Baltic Pine, as 40 th to a lin. yd. of track	66
Total	129 Tons

per 130 Tons per mile of track.

41 The estimate for Permanent Way will then stand as follows:-

District	Materials at 163.95 per mile.	Loading at 1.4 per ton-mile	Laying &c. at 9.8 per lineal yard	Total cost of Permanent Way.
1	145,974	1818	9,849	157,641
2	159,932	6,674	10,790	177,396
3	190,979	12,639	12,885	216,503
4	181,926	19,547	12,188	213,661
5	176,238	24,961	11,890	213,089
6	176,238	25,499	11,818	213,557
7	173,629	19,502	11,713	204,844
8	176,238	14,061	11,890	202,189
9	176,238	8,354	11,890	196,482
10	185,500	2,889	12,519	200,908
	1742,892	135,944	117,504	1976,340

The lengths of track on main line and sidings, upon which the above estimate, and that for ballast, are based, will be found below in paragraph 57.

42 The total estimate for Ballast and Permanent Way Total estimate

Main Road, XX, "Ballast and Permanent Way" will be as follows:-

District	Ballast.	Permanent Way.	Total.
1	12,530	157,641	170,171
2	18,780	177,396	196,176
3	16,400	216,503	232,903
4	16,510	213,661	230,171
5	15,130	213,089	228,219
6	15,130	213,627	228,757
7	14,910	204,844	219,754
8	15,130	202,189	217,319
9	15,130	196,482	211,612
10	15,930	200,908	216,838
Total	159,530	1976,340	2135,870

V Stations and Buildings

49 The stations proposed by Mr. Dibbles and their distances apart are as follows:

Proposed Stations

Distance from Madras Miles	Distance from preceding Station Miles	Names of Stations	Class of Station
		Madras Egmore	Terminal
1½	1½	Chetpet	Third
5¼	3¾	Saidapet	Do
6¾	1½	Guindy	Occasional
8	1¼	St. Thomas Mount	Second
11¾	3½	Palaveram	Do
18¾	7	Tambaram	Third
23½	4¾	Chengalpat	Do
29¾	6¼	Chengalpat Permanent	Do
36½	6¾	Chingleput	Second
49¾	13½	Madrantacum	Third
68¾	18½	Acharamoke	Do
67¾	9½	Worlacoor	Do
74¾	7	Tindevanum	Second

82¾	8½	Tchendur	Third
90½	7¾	Vieteravandi	Do
98¼	7¾	Villapuram	Second
104¾	6½	Alkadavillai	Third
110½	5¾	Pandoor	Second
118¾	8¼	Nellicoopam	Third
126¾	8	Virupapatam	Do
127	2½	Cuddalore	Second

44 Compared with the number of stations upon existing lines, and upon the sanctioned extension of the Great Southern of India Railway to Tuticorin, the number of stations proposed for the line to Cuddalore, twenty-one, besides the terminal station, is large;

Number of Stations

it is not however considered ex-
pedient to dispense with any
one of these.

Of the stations close to
Madras, Chetpet station is
conveniently situated for the
greater number of European Re-
sidents; Egmore is the Naval
town of a large; the station at
Guindy is intended to accommo-
date people attending the Madras
Races, and certainly the crowds
who come from Madras on
these occasions will not take
the rail unless they are sent
down close to the race-course;
Saint Thomas' Mount is a
large Military station; Palaveram

an invalid depôt: so that at all
these points it is advisable
to provide stations.

45 The accommodation

Station accommodation

which Mr. Dibdin proposes to afford at
second class stations is shown
on plans Nos 25 and 25A, and that for
third class stations in plans Nos
24 and 24A.

Saint Thomas' Mount,
Palaveram, Sundavasum, Vellapuram,
and Perambur, certainly do not
require any thing like the
station accommodation proposed
for them. Between Madras and
Saddalore there is only one station,
Chingleput, which does require
such

such accommodation, — perhaps even a little more in some respects.

As many of the third class stations the waiting-shed for passengers may be dispensed with, the length of the platforms may be reduced at all of them (excepting perhaps the Visiers) to 300 feet, as sanctioned for the line to Gutzkow; and at some of the smaller villages it is not considered necessary to build a public building for station offices: at such places a wooden sentry-box, such as was used at Vereinigtwuhrau station on the Madras Railway, will at first be sufficient.

46 In substitution for the station classification proposed by the Railway Authorities, it is recommended that there should be, both for passengers and goods, five classes of accommodation. The first class in each case would be for the Madras Terminal station, so that the other four classes have alone to be considered at present.

Revised classification of stations

47 As regards passenger accommodation the proposed classification is as follows:

Passenger accommodation

V. Second class station to have

1. Platform 400 feet long, partly covered.

2. Station House comprising:-

i. General waiting-room and booking-office.

ii Ladies' waiting-room and bath-room.

iii Gentlemen's waiting-room and bath-room.

iv Refreshment-room.

v Station-Master's room.

vi. Store-room.

vii Lamp-room.

3 Covered waiting shed for Native Passengers.

4 Urinals for Natives.

A third class station [Continued]

1 Platform 300 feet long (except in the case of the Mount station the platform must be 600 feet long)

2 Ticket-Office and Lamp-room

Cattle

28.

(with the addition of a small waiting-room 12'x12' at the Mount station.)

3 Covered waiting-shed for Native passengers.

4 Urinals for Natives.

C Small class station to have:-

1 Platform 300 feet long.

2 Ticket-office and Lamp-room.

3 Urinals for Natives.

C Eighth class station to have:-

1 Wooden sentry-box for issue of tickets.

2 Platform 300 feet long.

118 As regards the goods accommodation [accommodation for goods.] accommodation, the approved classification is as follows

follows:—

A Second class goods station to consist

1 A goods-shed 90 feet by 45 feet with two lines of rail passing through it, and an open platform 60 feet long attached. Plan No 25.

2 Two goods sidings, one of them passing through the goods shed. (as per Plan No 28)

A Third class station to consist

1 A goods-shed 60 feet by 25 feet with one goods siding (as per Plan No 27)

2 One goods siding passing outside the goods shed.

A Fourth class goods station to consist

1 A goods shed 30 feet by 20 feet

2 A single goods siding

whilst fifth class stations will have no other accommodation than

a

" goods siding.

49 Stations according to classes.

Of the above classification the several stations may for the present be classed as under, for passengers and goods respectively:-

Six Passengers.		Six Goods.	
Second class	Chingleput	Second class	Cuddalore
"	Cuddalore	Third "	Chingleput
Third "	Chittoor	" "	Tindevanum
" "	St Thomas Mount	" "	Pandoor
" "	Palamcotta	Fourth "	St Thomas Mount
" "	Tindevanum	" "	Vandalur
" "	Villupuram	" "	Madrantacum
" "	Pazhavoor	" "	Villupuram
Fourth "	Sydapett	Fifth "	Chittoor
" "	Vandalur	" "	Sydapett
" "	Guddalore	" "	Guindy
" "	Madrantacum	" "	Palamcotta
" "	Chetpet	" "	Guddalore
" "	Viravandi	" "	Singaperumalcoil
" "	Pallicondai	" "	Chetpet
Fifth "	Guindy	" "	Wallajanagar
" "	Singaperumalcoil	" "	Chingleput
" "	Wallajanagar	" "	Viravandi
" "	Chingleput	" "	Arcot
" "	Arcot	" "	Pallicondai
" "	Tirupapalur	" "	Tirupapalur.

50

Engine Stations

Mr. Dibble does not appear to contemplate having any engine station between Madras and Cuddalore, a distance of 128 miles; but with the low speeds which will be enforced on the narrow gauge lines a train of 128 miles will occupy 10 or 11 hours and it will, it is submitted, be necessary to have changing stations at least at every 70 or 80 miles: the question of engine stations must however be considered with reference to the line southwards, and its extension which is likely to be almost immediate, and it may probably be found unnecessary to have a changing station at Cuddalore; it is clear however that

30

that no changing station will be required somewhere on the Madras to Cuddalore division, so that the total distance will not be altered even if Cuddalore should not be an engine station.

51. The stations proposed by Mr. Dibble for watering

Watering Stations

stations, and their distances apart, are as follows:-

Distance in Miles	Name of Stations.
1	Madras
8 3/4	St. Thomas' Mount
10 3/4	Vandalore
15 3/4	Chingleput
23 3/4	Chittawatt
16 1/2	Kindevanum
23 1/2	Villapuram
12 1/2	Panroite
16 1/2	Cuddalore

It

It is not proposed to enlarge much this arrangement: Local trains will probably run between Pandole and Villupuram; the latter must therefore be a watering station.

In the absence of any information regarding the stallions of engines which will be sent out, it is impossible to speak positively on this point; but the distance from Mount to Chingleput, 26½ miles, is probably greater than could always be conveniently run without watering; hence the necessity for a watering station at Vandalur: between Villupuram and Pandole the distance is short, but a watering station is necessary between Cuddalore

and

and Villupuram, and Pandole is the best place for it: in all other cases the intervals seem as great as they can safely be made.

It will be seen that Mess. Dibblee provided for two watering cranes at each station: in the revised estimate, only one has been allowed; and at first, at any rate, this will be sufficient. The cranes should be placed alternately at the Madras and Cuddalore end of the station.

52 Mess. Dibblee make all his watering stations fuelling stations also. The number of fuelling stations required must depend upon the description of locomotives sent out.

Fuelling stations

Then

these will be designed in England: in the meanwhile the numbers of fuelling stations may be kept as prescribed; but one fuel-stage and one water-pit will be sufficient at each station, instead of two, of each as provided by Mr. Dibble.

53 Carriage-sheds are

Carriage Sheds.

provided for by Mr. Dibble at Cuddalore and Saint Thomas' Mount. At the latter station certainly there is no need of shelter for carriages, nor indeed does there seem to be an absolute necessity for a carriage-shed anywhere. They are not provided for in the

the revised estimate. If one shelter is found absolutely necessary at Vizna it can be added hereafter, but as it must be less wet than Mr. Dibble proposes to ensure.

54. Mr. Dibble provides accommodation for East Indian

Station Masters Bungalows

Station-Masters at all the second class stations. It is submitted that Native Station-Masters will be found sufficient at all stations excepting Chingleput and Cuddalore, and provision for bungalows is made accordingly in the revised estimate.

55 No Surgeons' Drivers'

Surgeons' Drivers' Quarters

quarters are provided for by Mr. Dibble at Cuddalore. Wherever Surgeons stations may be located, quarters for drivers will certainly

especially be required, and provision for four of such is accordingly made in the Revised estimate.

56 General station arrangements.

For Cuddalore Station, considering it as an urgent station, the arrangements shown on plan No. 28, are recommended for approval; the carriage-shed however being omitted, and the compartment being attached to the main station building.

For all other stations some such arrangement as is shown in the following sketch is recommended. By placing the goods-shed upon the opposite side to the passenger platform, the station is made more compact; and by keeping the ticket-office, waiting-shed, and urinals, clear of the passengers' platform, crowding in footing will be saved.

57 Length of main line and sidings in each district

With these arrangements the length of main line and sidings in each district will be as follows, exclusive of the requirements of the Madras terminal station and other stations:-

District	Main line yards	Sidings yards	Total yards
1	17,892	1,800	19,692
2	20,880	900	21,780
3	24,420	1,350	25,770
4	24,376		24,376
5	22,880	900	23,780
6	22,880	900	23,780
7	22,976	450	23,426
8	22,880	900	23,780
9	22,880	900	23,780
10	22,039	3,011	25,050
Total Yards	223,908	11,100	235,008

Details of Estimates for Stations and Buildings.

58 The preceding para-
graph contains general recommenda-
tions that the estimates for stations
and buildings will now be con-
sidered more in detail, with
special reference to the revised
estimate prepared in this office
and recommended for adoption.

V. Stations and Offices.

59 **Platforms.** The modifications in-
troduced in the design
of the Railway Clerk will render
it necessary to raise the average
platform about 9 inches higher
than Mr. Bibbles has allowed
for;

for; in the other hand the scale
for masonry may be reduced
to Rs: 8 per cubic-yard, the
estimates for platforms will
stand thus approximately:

Platform 300 feet by 200 feet,
when the formation level
is on the surface of the
ground Rs: 400, to which
must be added Rs: 125
for every foot by which
formation level is above
the surface of the ground.
For a platform 400 feet by 25 feet,
estimate Rs: 600, to which
must be added Rs: 170
for each additional foot
of height.

69.

Station house for second class station.

For this station houses at Cuddalore and Chingleput a slight modification of the arrangements shown in plan No. 26 A is recommended for approval: (see sketch on next page.) No Public Office design does not provide for any refreshment-room, but such will certainly be required at Cuddalore, and probably at one intermediate station, say Chingleput. At Mr. Dibdin's last Conference room and store-room apart from the main building, an arrangement which entails very little expense without any apparent disadvantage: in the suggested

suggested modification these are combined with the main building. A height of 18 or 19 feet for the Rooms of the Station building is not necessary, and entails much extra masonry. In the Revised Design a height of 14 feet is allowed for. With these modifications, and reducing the rate for masonry to Rs: 10 per cubic-yard, it is found that the building may be erected for about the sum now Rs: Dibdin has allowed for his Station-House, Viz Rs: 17,000 including wadding shed, to which may be added Rs: 300 for Refreshment-Room and Godown.

No

As Mr. Ribble hopes
to be able to improve the location
of the Cuddalore station no
allowance is made in the re-
vised estimate for the extra
masonry in footings which
would be required if the station
were to be located as shown in
the working survey and section.
61

Mr. Ribble's estimate
for ticket-office
and lamp-room
amounts to Rs: 1125.
Deducting the rate for masonry
Rs: 2 per cubic-yard, and
knocking off the extra masonry
required to raise floor level
to platform level, there amounts
in

Ticket office and Lamp Room for Shard and Shoalhaven stations

42

is reduced to Rs: 850. At
Saint Thomas Mount an
extra room will be pro-
vided at a cost of, say,
Rs: 100.

62 Mr. Ribble's

Stations Revised. revised are scoped,
and are estimated to
cost Rs: 774 per station.

The roof is unnecessary,
and the length of walling
greater than it need be;
nor is there any necessity
for raising the floor level
of the veranda to the
level

level of the platform.

By leaving out the roof, lowering the entire wall to a height of 7 feet, reducing the length of wall to that allowed on the Great Southern & Western Railway (see offset upon opposite page), being away with the unnecessary footings, and reducing the scale for masonry 10s. 2 per cubic yard, the estimate is reduced to £230 or thereabouts; but the floor should be asphalted, and allowing £5 0s. for this, the estimate amounts to £280.

63

In the revised estimate

estimate £6: 470 is allowed for a wooden railway-house as there is a chance where it is suggested that this arrangement might be established for a private building.

Wooden railway house

64 £6 Portable estimate is £6: 1072 for a railway shed; by reducing the scale for brickwork to £6: 10 per cubic yard, and knocking off the extra brickwork in footings, this is brought down to £6: 870.

Waiting shed for Third class passengers

65 The amount set down for compound, £6: 725, may be allowed to stand: as first class station it will probably be necessary to fence the compound in first; but it will be as well to take up as much ground as is likely to be eventually.

Compound

eventually sequenced; if the station afterwards has to be abandoned, the Transmit can always be dispensed of advantageously.

66

Goods sheds

In the large goods-sheds 90 feet by 63 feet, the heights above flooring, 16 feet, seems unnecessary; reducing them to 14 feet, and shifting the estimate is reduced from Rs: 10,860 to Rs: 7550...

The smaller goods sheds, 60 feet by 25 feet, is not proposed to undertake the same dimensions as for the first class stations will be Rs: 3680 only.

A small godown, 30 feet by 20 feet should be erected for not more than 100 bags.

67

In the various modifications recommended should be sanctioned, the sanctioned estimate for stations and offices will stand as follows:—

Division	Name of station	Ladies Waiting Room	Gentlemen Waiting Room	Ladies Latrine	Gentlemen Latrine	Booking Office	Verandah	Compound	Total	Total of Division
		16	16	16	16	16		16	16	
1	Coimbatore	830	850	870	280			725	3555	
	Sydapet	455	850		280			725	2310	
	Cuncidy	580	470					725	1775	
	St Thomas Mount	660	1250	870	280	1600		725	5385	13025
2	Palamcottah	455	850	870	280			725	3180	
	Vandalur	455	850		280	1600		725	3910	7090
3	Goodvancherry	455	850		280			725	2310	
	Singaperumaul	830	470					725	2025	
	Calicut	660	1700		280	3600		725	22665	26780
5	Madras Egmore	705	850		280	1600		725	4160	
	Nelamangalam	580	850					725	2695	6855
6	Wallajahroad	455	470					725	1650	
	Tindivanam	455	850	870	280	3680		725	6860	8510
7	Salem Junct.	705	470					725	1900	1900
8	Vellaveram	455	850		280			725	2310	
	Villupuram	455	850	870	280	1600		725	4780	7090
9	Arcadapettai	705	470					725	1900	
	Pandivanam	705	850	870	280	3610		725	7010	9010
10	Nellecoopum	820	850		280			725	2685	
	Seringapatam	705	470					725	1900	
	Cuddalore	660	1700		280	9550		725	28515	33100
								Grand Total		113900

V. 2. Workshops and Store Buildings

68 By lowering the Estimate per cubic yard for Engine shed. Brickwork to Rs: 10, the amount of the estimate is reduced from Rs: 7,020 to Rs: 6370.

69 In the same way the estimate for Fuel-stores fuel stores is reduced from Rs: 4,678 to Rs: 4,250.

70 The amount set down for Temporary Store sheds for Temporary store sheds may be allowed to stand; but the arrangement and distribution of these buildings may very probably have to be altered.

71 The revised estimate for

for the sub-head Workshops & Store Buildings & Fuel Depots &c will stand thus:-

District	Engine shed	Fuel store	Temporary Store sheds	Total
			450	450
1			300	300
2			450	450
3			300	300
5			150	150
6			300	300
8			150	150
9				
10	6,370	4,250	750	11,350

Grand total 13,450

V. 8. Staff Quarters

72 Bungalows Standard Station Masters bungalow

At the inspection and Standard Station-Masters bungalows at Rs: 2,525, the amount of Mr Dibblee's estimate, with outhouses

out-houses, have been allowed for in the Revised estimate; for third and fourth class stations Rs: 1,280 have been allowed for native station-masters' houses, at first class stations no provision has been made for Station-Masters' quarters.

73 Rupees 15,000 has been added to the estimate, to provide quarters for Engineer Drivers &c at out changing stations.

Engineer Drivers 1 Bungalows

74 The temporary accommodation for the Engineering staff has been left as estimated for by Mr. Dibblee; but the amount will of course be

Temporary Quarters for Engineering Staff.

40

be reduced if the establishment is reduced as recommended hereafter, in paragraph 108.

75 With the above modifications the Revised estimate will stand as follows:—

	Drivers	Station Masters Quarters	Engine Drivers Quarters	Temporary Quarters for Engineering staff.	Total
1		3,840		3,100	6,940
2		2,560		3,100	5,660
3		3,805		3,100	6,905
4				3,100	3,100
5		2,560		3,100	5,660
6		1,280		3,100	4,380
7				3,100	3,100
8		2,560		3,100	5,660
9		1,280		3,100	4,380
10		3,805	15,000	3,100	21,905
				Grand total	68,690

V. 4. Steam Machinery.

76 Well pump and tank house.

Mr. Dibble provides for wells 20 feet deep, 12 feet external dia. meter, at an estimated cost of Rs: 928, from which he proposes to raise the water by means of double-acting pumps, estimated cost Rs: 300 each, to separate tank-houses, estimated cost Rs: 976 each.

It is submitted that a well of 6 feet internal diameter will meet all requirements; and, if the water is to be raised by means of a pump, the tank might economically be placed vertically above

above the well, as shown on the type drawings of wells and tanks prepared by the Consulting Engineer to the Government of India for — State Railways. With such an arrangement a 6 feet well, and a sufficient tank-house and tank, might be provided for about Rs: 700; but pumps are apt to get out of order and at an out-of-the way station, when there is no skilled labour to effect repairs, any accident to the machinery by which the water is raised might be attended with serious consequences; it would therefore seem advisable to

to trust to ordinary coindery
appliances for raising water:
with a 6 feet well a bucket
could scarcely be worked, but
a self lowering mot, or a bucket
and rope would answer that
purpose well: a separate tank-
house would then be necessary.

The well might cost ... £ 300
Self acting mot, and wooden
stage ... 150
Tank-house ... 1000

Total £ 1,450

The masonry in Mr Dibblee's
tank-house seems very slight,
and it would perhaps be
as well to strengthen them,
at the same time the estate
for brickwork is unnecessarily
high.

77

Piping

Next the water main
short lengths of piping will
be sufficient. In the revised
estimate £ 210 has been
entered on this account for
the water mains.

78

Gate valves

The water cranes are
estimated by Mr Dibblee
at £ 450 each. This does
not appear to exclude fixing
for which £ 100 has therefore
been added.

79

Reducing the scale
for masonry to £ 10
in the case of the
ash-pit, and leaving the
estimate for the fuel-stage

Fuel-stage and ash-pit

as

as it is, the revised estimate will stand thus:-

Dual-stage — 1Co: 160

Double-bell — 0·230

Total 1Co: 370

80 Mr Dibbles allows 1Co: 2,500 for an Engine Turn-table at Cuddalore. No doubt a table to turn a small tank-engine might be provided and fenced for 1Co: 2,500, but a turn-table to turn say 18 ton engines and tender would, it is thought, cost, including fencing, nearer 1Co: 5,000 than 1Co: 2,500, the former item has therefore been allowed in the revised estimate

Engine Turntable.

estimate.

81 With the station arrangements shown in paragraph 56 three single points only will be required at each intermediate station. For both of above stations Mr Dibblee estimate may stand.

82 No buffer-stops have been allowed for by Mr Dibblee. One will be required for the blind siding at each intermediate station, and two at Cuddalore. They have been allowed for at the rate of 1Co: 150 each in the revised

Points

Buffer-stops

a revised estimate.

83 Mr. Dibbles reminds

Semaphore for two single-armed

semaphores at each station.

One double-armed semaphore

would probably be more

conveniently worked.

84 Owing to

several modifications

detailed in the

paragraphs the revised

estimate for Stations

Machinery will stand

as follows:—

District	Name of Station	Hill Semaphore, Distant signal, &c.	Level Crossing and Gate	Engine Turn Table	Points	Bottom Slide	Semaphore	Total Guinea allowance	Total Guinea distance
1	Kelvedon				360	120	400	880	
	Sydaber				360	120	400	880	
	Ginnett				360	120	600	880	
	St Johns Wood	2200	370		360	120	400	3450	6,090
2	Paddington				360	120	400	880	
	Vauxhall	2200	370		360	120	400	3450	4,330
3	Goodrington				360	120	600	880	
	Teignmouth				360	120	600	880	
	Shrewsbury	2200	370		360	120	600	3450	5,210
5	Macclesfield				360	120	600	880	
	Nelson	2200	370		360	120	600	3450	4,330
6	Wallasey				360	120	600	880	
	Liverpool	2200	370		360	120	600	3450	4,330
7	Ellesmere				360	120	600	880	880
8	Leicester				360	120	600	880	
	Villafield	2200	370		360	120	600	3450	4,330
9	Shadwell				360	120	600	880	
	Pancras	2200	370		360	120	600	3450	4,330
10	Millwall				360	120	600	880	
	Liverpool				360	120	600	880	
	Euddalore	2200	370	5000	1200	120	600	2770	11,050
	Grand Total Rs:								44,880

85 The Revised estimate for the Main Head V. Stations and Buildings will then stand thus:-

Distns	Stations and Offices	Workshops Store buildings &c.	Cattle Quarters	Platforms	Total
1	13,025	450	6,760	6,070	26,305
2	7,290	300	5,660	4,320	17,570
3	26,980	450	6,905	5,210	39,545
4	"	"	3,900	"	3,900
5	6,595	300	5,660	4,330	16,885
6	8,510	150	4,380	4,330	17,370
7	1,900	"	3,100	880	5,880
8	1,070	300	5,660	4,330	17,380
9	7,110	150	4,380	4,330	17,870
10	33,100	11,350	5,905	11,050	77,405
Grand Total	113,300	13,450	58,470	44,158	260120

Madras Terminal Station and Works.

86 The location of the terminal station at Madras will be considered by the Government

45/5-2

Government no design has as yet been matured for the passenger station: it is the intention to provide for a covered shed 400 feet long having four lines of rails and two platforms (arrival and departure) each 20 feet wide, with a station building two stories high — containing about 20 ft. by 150 feet, in which the various offices establishments of the Agency, Engineering, Traffic, Accounts, and other departments will be accommodated.

87 The designs for goods-shed, engine-shed, general stores and fuel stores, are suitable, and the accommodation which they severally provide is not excessive

8 excessive. If the carriage-shed
th may be dispensed with for the
B present; the shelter afforded
by the passenger station is so
much as will be required for
some time to come, and a carriage-
shed can be added if found
indispensable at some future date.

88 ... No design is sub-
mitted for the Locomotive
Superintendent's office;
the amount entered in the estimate
on this account is not large.

Locomotive Workshops

16ft to 6ft to the foot, the
designs for the Locomotive Work-
shops may be submitted to
the Company's Consulting
Engineer in England: some
such course would seem advisable.
It is observed that 16ft to 6ft

7 design provides stabling for more
than the whole of the proposed
locomotive stock, or that allow-
ance of the stabling for the
carriage stock is no greater
than that for the locomotive stock.

89 The rate for brickwork
has been put at Rs: 12 per
cubic yard throughout; the
actual cost of first class
brickwork on the New Central
Station of the Madras Railway has
averaged about Rs: 7½ per cubic
yard excluding the towers: allowing 9 Rs: rate
for the Coconada Railway terminal
works, the estimate will be re-
duced by some Rs: 55,000 on account
of 18,275 cubic yards of brickwork,
besides about Rs: 16,800 saved by
dispensing with the proposed
carriage

carriage-shed.

90. On the other hand it will be necessary to allow for, say, four miles of sidings, bay-bays &c., which in Mr Dibblee's estimate are allowed for by a per-centage on each district.

The revised estimate will therefore stand thus:-

IV.	Ballast and Permanent Way, say, No:	60,000
V.	Stations and Buildings	603,200
	Total No:	663,200

VI Electric Telegraph.

91 It is understood that the electric telegraph will be erected by the Government Telegraph

Telegraph department: in previous ~~&~~ Memoranda made for this head-service estimate.

VII. Plant.

92 Mr Dibblee's estimate for plant amounts to No 171,817 thus:-

Engineering	No: 20,484
Locomotive	" 59,826
Carriage and Wagon	" 59,825
Station and Office Furniture	" 31,677

The amount allowed for the last three items seems sufficient; but the estimate for Engineering plant is very low; it might well be increased to No: 60,000.

The revised estimate for plant will

will then stand thus:—

Engineering plant Rs: 60,000
Locomotive do " 60,000
Carriage & Wagon do " 60,000
Station and Office
Furniture " 31,700
Total Rs: 211,700

VIII. Rolling Stock

93 Among the various schedules will be found a list of the Rolling-stock which is considered necessary by the Agents, and for which Messrs Gibbs's estimate is:—

Locomotives Rs 5,54,400
Carriage and Wagon " 4,81,470
Total Rs: 10,35,870

94

VIII. 1. Locomotives.

94 The proposed number of Locomotives does not seem too large, but the prices are much in excess of what it is expected the engines will cost. A few of the Locomotives will of course be small tank-engines of 10 or 12 tons, for shunting purposes, and should not cost more than 12,000 or 13000 Rupees. As regards the Locomotives for traffic purposes it is desirable that they, or at any rate some of them, should be of such power as to haul trains of 35 or 40 loaded vehicles of ordinary length over the rising incline of 1 in 100: for with the restricted speed which will be enforced

enforced on the narrow-gauge lines a few long trains will have to be substituted for frequent short trains; but even so it is hoped that they may cost considerably less than Rs: 28,000 each.

VIII. 2. Carriage & Wagons.

95 As regards the Carriage and Wagon estimates, it is submitted that the numbers of vehicles proposed by the Agent is are considerably in excess of immediate actual requirements, or indeed if probable requirements for some years to come, except in the case of the goods trucks.

96 It may be necessary to provide one first class carriage (saloon) as ——

First class Carriages.

accommodation

accommodation may occasionally be required for a larger number of first class passengers than can be accommodated in a composite carriage; but it is not recommended that more than one first class carriage should be provided; sufficient ordinary accommodation for first class passengers may, it is thought be provided by one first class compartment in each of either first and second class composites.

97 Mr Sinclair and Mr Pibble both ask that sanction may be given to erect long bodied carriages on bogie trucks, —— for third class passengers presumably; for they are certainly not

Third class carriages with bogies

not required for the first and second classes. If the third class passenger traffic is likely to be large, and it would probably be more advantageous to have long train short carriages; it is recommended therefore that thirty third class carriages, to hold about 50 passengers each, be sanctioned.

98 Carriage of troops

No European troops will have to be conveyed in third class carriages, these vehicles must be provided with double roofs, and sun-blades.

99 Carriage of Mails

Under the terms of their contract, the Canada Railway Company are bound to provide free of cost

5

cost such accommodation as may be required for carrying, sorting, and distributing the mails. If the line were always to end at Cuddalore it would be unnecessary to provide special mail carriages: for the mails could then be accommodated in a compartment of a third class carriage; but on the extension of the line to Saigone, the whole of the southern mails will, it is presumed, be carried over the Canada Railway. Special mail carriages will then certainly be required, and it will therefore be as well to provide at once a sufficient number of them.

100 The goods traffic will, it is thought, consist chiefly of grain. On the Madras Railway high-sided open goods wagons are preferred for this,— as indeed for most descriptions of traffic; this however is a matter which must be left mainly to the discretion of the individual Traffic Managers. On the Great Southern of India covered goods wagons find more favour than open-sided trucks.

Goods Wagons

101 A travelling crane will probably be required, and should be allowed for.

Travelling crane.

102 The following list shows in parallel columns the number of each description of vehicle asked for by the Agents, and the

Number of Vehicles Recommended for Sanction

51

the number recommended for sanction:-

Description of stock	number asked for by Agents	number recommended for sanction	
Locomotive Engines	18	18	
Third class carriages	84	30	—
Second class carriages	12	2	—
First class carriages	6	1	—
First and Second class composite carriages	18	8	
Post Office Vans	6	3	
Break Vans (Passengers)	12	8	
do do (Goods)	6	4	
Timber trucks	12	10	
Ballast do	48	30	
Flat-sided open goods trucks	24	24	
Covered do do	100	100	
Horse-boxes	6	4	—
Carriage trucks	6	2	—
Cattle do	12	10	
Gunpowder Van	1	1	
Platelayers' trolleys	20	12	
Engineers' do	6	6	
Travelling crane.	0	1	

N.B. The Third class carriages are understood to be long-bodied vehicles on bogie-trucks.

103 Rolling Stock Revised Estimate

The Rolling-stock will be designed in England, and nothing is at present known as to the cost; it is therefore recommended that the estimate be reduced, provisionally, to an average of Rs: 5,500 per mile, or a total of Rs: 7,04,000.

IX Maintenance

104 The Carnatic Railway Company's contract contains no provision for maintenance at the expense of Capital for any period after the opening of the line to traffic; but it was considered advisable to make some allowance for such maintenance, and the Chief Engineer was therefore asked to estimate for maintaining the line during

during 12 months. The amount entered in the estimate on this account is Rs: 55,080, being at the rate of Rs: 630 per mile, — certainly not too much. It will however be for the Government of India to say for how long, if at all, the line shall be maintained at the expense of Capital.

X. Establishment.

105 The total amount entered in the estimate on account of establishment is Rs: 11,42,191, which is thus distributed:-

Direction (including Audit and Accounts)	Rs: 85,995
Engineering	" 8,85,276
Locomotive	" 1,45,728
Stores	" 25,200

The

X. 1 Establishment. Direction.

106 The estimate for "Establishment. Direction" provides for keeping up during three years the Establishment required for Direction, Agency, Audit, and Account, at a yearly cost of Rs: 28,665, which is, if any thing, too little; it is hoped however that the full establishment will not be required during so long a period as three years. The total amount will therefore be put at Rs: 80,000.

X. 2. Establishment. Engineering.

107 The estimate for "Establishment. Engineering", also provides for keeping up during three years a full establishment, at an annual cost of Rs: 2,95,092; this

53 60

this estimate is in every way excessive and cannot be recommended for sanction;

1 The number of district establishments is unnecessarily great.

2 The length of line, during which it is estimated that the full establishments will have to be maintained, is excessive.

3 The head-quarters and district establishments are individually too large and costly.

108. It will be seen that the Chief Engineer divides the length of line to be constructed,

Division of line into districts and distribution of Engineers.

127 miles, into 10 districts with an average length of less than 12¾ miles each: to each district be allotted one Assistant Engineer with full establishments, and provision an additional Engineer for the terminal works.

In order to facilitate the consideration of this question a synoptical statement has been prepared in this Office, showing as a guide the approximate amount of work of different descriptions to be carried out in each district; it is evident from this statement that the works to be executed are, with the exception of the bridges over the Palar, Ponnar and Cuddalore rivers, of the very lightest.

If

61

54

Synoptical statement shewing the position of the stations and large bridges, and the division of the line into districts, the work to be executed at each large bridge, and upon the minor bridges and culverts in each district.—

2	1	3	2	1	3	1	4	3	5	6
Districts proposed by Chief Engineer.		Large Bridges			Work to be executed		Work in each district.	Stations		
		Name of River	Spans				Minor Bridges & culverts	Name	Class of accommodation	Working and Engine Stations
Length.	Number		Width of openings.	Number	Brickwork	Masonry	Earthwork	Brickwork	Masonry	Goods / Passengers	
miles			Feet		cu. yds	Tons	Cu. yds	cu. yds	Tons		
										Madras	1st / 1st	W & E
										Chetpet	5th / 3rd	
10 mo 13 chs	1	Cooum	40	4	340	35				Egmore	5th / 4th	
		Adyar	66	6	650	60	94,000	870	6	Guindy	5th / 5th	
										St. Thomas' Mount	4th / 3rd	W
										Palaveram	5th / 3rd	
11 mo 60 chs	2						90000	1,120	4	Vandaloor	3rd / 4th	W
			20	4	200	12				Goodovanchery	5th / 4th	
13 mo 70 chs	3						146000	1,060	0	Pingapermalcoil	5th / 5th	
			20	4	200	12				Chingleput	3rd / 2nd	W
13 mo 68 chs	4	Palar	120	18	1180		193000	1,350	4			
			25	4	270	16						
			20	4	200	12						
		Cauvengoly	40	9	620	80				Madranticum	4th / 4th	
13 mo 0 chs	5						102,000	1,380	5	Acherwauk	4th / 4th	W
13 mo 0 chs	6						106,000	1,860	40	Woolacoot	5th / 5th	
										Findivanum	3rd / 3rd	W
13 mo 44 chs	7		30	4	270	20	126,000	1,130	4	Chendoor	5th / 5th	
		Zingee	30	9	490	45				Vickravandi	4th / 4th	
13 mo 0 chs	8		30	5	320	25						
			30	3	230	15	171,000	1,560	20	Villapooram	3rd / 3rd	W
13 mo 0 chs	9	Villaur Nullah	40	3	290	27				Alhadaviliew	5th / 5th	
		Poonar	100	17		540						
			25	3	230	12						
							153,000	1,810	20	Panroote	3rd / 3rd	W
12 mo 42 chs	10									Nellicoopum	5th / 4th	
		Gudalam	100	8		300	202,000	1060	5	Tirupapalair	5th / 5th	
		do Backwater	100	1		45				Cuddalore	2nd / 2nd	W & E

12 Miles

56 63

It is submitted that the construction of a length of thirteen miles of line is, under the circumstances, considerably less than one Engineer may fairly be expected to superintend, and it is recommended that the length of the districts should be increased to eighteen or twenty miles. The statement also shows that the works between the Barrangoolby Tunnel and the Edendale station site are even lighter than at any other part of the line. The earthwork on this portion is by no means heavy, and such masonry as has to be executed is distributed among a number

7

of small bridges and culverts;

It is submitted that, on a portion of line with such light works, twenty-five or thirty miles is not a greater length than can be satisfactorily superintended by a single Engineer: — on the Great Southern of India extension two Engineers now have charge of lengths of thirty and twenty seven miles respectively; and the works are decidedly heavier, or heavier than the works on any portion of the Western Karnatic line excepting only the three bridges above named.

It is therefore recommended that sanction be given to entertain eight Assistant Engineers

Engineers (two first class, two second class, and four third class) one as an Assistant to the Chief Engineer, a second, say, to have charge of the terminal works, and the portion of line lying between the Madras terminal station and the provisional site of the Permanent Way shops; the remainder of the line, one hundred and twenty three miles in length, to be divided into six districts with one Assistant Engineer to each.

109

Length of line required for construction of line.

The works, with the exception above referred being of light, it is submitted that they should, with these exceptions, be easily completed

completed within two years from
receipt of sanction; indeed it
is hoped that the portions of
the line which lie between the
terminii and the Pulai and the
Pennar respectively may be so advanced in
about twelve months from receipt
of sanction that the whole of
the material for these bridges
and the permanent way material
for the line between them may
be forwarded by rail to their
destinations, thus effecting a
great saving in time and in
cost of carriage; and the
line might probably be opened to
traffic by the end of
eighteen months
from receipt of sanction.
In the general estimate recommended for sanction it is

assumed

58 65

assumed that full establishments
will be maintained during an
average period of two years.

110 For the head quarter establishments the
Head Quarters Establishment
establishments the
staff and cost as proposed
by Mr. Hobbs and recommend-
ed for sanction are shown below
in parallel columns:

Description	Cost per Month proposed by Chief Engineer	Cost per Month recommended for sanction.	Remarks
Chief Engineer	1,200	1,200	
Assistant do	700	650	Second class Assistant
Managers Accountant	250	250	
Salem Assistant	100		Unnecessary
Clerks aggregate	400	400	
Head Draughtsman	150		
Draughtsmen	700	200	
Lithographer	30		Unnecessary
Moonshee	15	15	
Apothecary	65	65	
Peons & Lascars &c.	99	99	
Total	3751	2879	

the

the establishment now recommended for sanction being at the rate of Rs: 34,550.

111 For the Engineering workshop the scale proved by the Chief Engineer as a cost of Rs: 568 per month, is recommended for sanction.

Engineering Workshop

112. For district establishments the scale proposed by Mr. Pibbles and that recommended for sanction are as under:-

District Establishments

Capacity	Cost per Annum Proposed by Mr. Pibbles for Engineering Establishment Rs	Cost per Annum recommended for sanction Rs	Remarks.
1 Assistant Engineer (average)	762	650	
1 Engineering Assistant	180	120	
2 Inspectors	300	250	
2 Sub-Inspectors	120		Unnecessary
1 Cash-keeper	80	80	
1 Apothecary	65	65	
1 Store-keeper		60	A Store-keeper is necessary in each district
Clerks	220	100	
Peons, Store Peons, Lascars &c	98	80	
Total	1,765	1,355	

59 66

Thus the establishment for each district as recommended for sanction amounts to Rs: 1,355 per mensem or Rs: 16,260 per annum.

113 In addition to the regular district establishments it will be necessary to provide for the occasional employment of Engineers, Engineering Assistants, Inspectors, &c. upon works requiring special care and attention, & as it is impossible to say at present where and how long such occasional establishments may be required, and as it is therefore recommended that a lump sum of Rs: 50,100 be sanctioned on this account, on the understanding that any expenditure under this

Occasional Establishments

head

head will legueste the previous
despatch equeleon of the Consulting
Engineer.

114. The establishment
Temporary Telegraph. will be required to
work the temporary
telegraph which will have to
be erected for the use of the
Engineering staff during construction.
In the revised estimate Rs: 4,80
per mensem is allowed for this.

115 The revised estimate
for Engineering establishment
will then stand as follows:-

	cost for 2 years
Chief Engineer & Secretarial works — Rs:	84,700
Engineers workshops ———	13,630
District Engineers. 6 at Rs: 32,520 —	195,120
Temporary Telegraph ——— "	10,800
Seasonal ——— "	50,000
Total Rs:	3,54,250

60 67

X. 3. Establishment-Locomotive.

116 The estimate for Locomotive
establishment provides for nineteen
having during three years a
full establishment at a cost per
mensem of Rs: 4,048, or a total of
Rs: 1,45,728. The strength of
the establishment may be less
as proposed, but it ought
not to be required during
more than two years; the total
estimate may then be reduced
to Rs: 97,800.

X. 5. Establishment-Stores.

117. The estimate for stores
establishment may be allowed
to stand as proposed by the Agent.

118

118. The total estimate for Diversion head "establishment", as revised and now recommended for adoption, is as follows:-

Direction, including Rs. Audit and Accounts.		80,000
Engineering	"	354,250
Locomotive	"	97,300
Stores	"	25,200
Total Rs:		556,750

XI Contingencies.

119 The estimate for contingencies as submitted by Messrs Deakes is as follows:-

Direction, including Audit, Accounts and Stores - Rs:		3,600
Engineering	"	559,607
Locomotive	"	157,287
Total Rs:		720,494

120 The amount set down under Direction head is decidedly small, and might well be increased to Rs: 10,000.

121 The sum set down for Engineering amounts to nearly 10 per cent on the total of the estimate under the Engineering heads, Construction of Levi; Ballast and Permanent way, and Stations and Buildings, and includes, as previously explained, those Engineering contingencies which, in the opinion of the Consulting Engineer, should have been provided for under the several heads above enumerated. To facilitate comparison, however, the

the arrangement with regard to contingencies has not been disturbed in framing the estimates. It is considered however that, on so large a work, a margin of five per cent for contingencies is quite sufficient to work within; in the present estimate therefore, a sum of Rs: 2,33,000 being about five per cent upon the amount of the estimate under the three main heads above enumerated, (Rs: 66,53,630) has been entered on this account; and it is recommended that this sum of Rs: 2,33,000 should be sanctioned, with the understanding that,

that, subject to the approval of the Consulting Engineer, it will be available for expenditure upon any incidental work comprised under the three heads Construction of Line, Ballast and Permanent way, and Stations and Buildings. A further sum of Rs: 50,000 has been added to meet unforeseen requirements and office contingencies, which are understood by the Consulting Engineer to fall properly under the eleventh main head of the estimate.

The total amount asked for as Engineering contingencies will thus amount to Rs: 2,83,000.

122 The necessary Rolling stock having been already provided for under head VIII of the estimate, and the Locomotive Plant and establishment under heads VII and X there does not appear to be any necessity for proceeding under head XI for more than Office contingencies, and the estimate under this head may therefore be reduced to Rs: 2,000.

Locomotive.

123 The revised estimate will then stand as under:

Contingencies of Direction	Rs: 10,000
—do— & Engineering	283,000
—do— & Locomotive	2,000
Total Rs:	295,000

General

General Summary 63 70

124 In reviewing the estimates for the Carnatic Railway every endeavour has been made to carry out the wishes of the Government of India, to secure the utmost economy of first outlay by limiting in the first instance only for absolute essentials all expenditure amounts being confirmed would be called for and warranted by increased traffic.

Some of the recommendations put forward in this note may appear individually trivial, but collectively they will be found to lead to large economy.

The complete Revised estimate

estimate under the several heads in seven below the amounts of the estimate submitted by the Agents of the Company, being shown in a parallel column:-

Heads of Expenditure	Agents' Estimate	Revised Estimate
Preliminary Expenses	361,774	361,000
Construction of Line	16,22,129	15,12,461
Rolling & Permanent Way	29,45,452	22,06,870 ⊗
Stations and Buildings	1124,997	8,43,320
Plant	271,817	211,700
Rolling Stock	4035,870	7,04,000
Maintenance	65,080	55,080
Establishment	1142,199	556,750
Contingencies	712,288	295,000
Total	91,70,771	68,26,180

* including Rs: 6,74,816 on account of Permanent works.

⊗ including Rs: 60,000 — Do — Do — Do —

* including Rs: 1,03,200 — Do — Do — Do —

The total of the revised estimate thus amounts to Rs: Current 68,26,180 being at the rate of Rs: 53,750 per mile. After carefully however examining the estimate, there may be a considerable saving. The rates entered for brickwork, stone & bridges, Mr. Dibdin's rates are regarded as on the safe side, & there should be no difficulty in securing the work of the desired qualities. In the matter of transport of material again it is hoped that a very large saving may be effected by substituting carriage by Rail for cartage by Road.

126. The estimate has been prepared without reference to the contemplated amalgamation between the Great Southern of India and Carnatic Railway Companies; but should the amalgamation be carried out there will result a large saving in the matter of terminal works. The head quarters of the Agency of the united companies will, no doubt, be located in Madras but the Permanent Workshops and the general stores will be most conveniently placed at Negapatam a central position where suitable buildings on a large scale already

65 72

already exist. In the event of an amalgamation the expenditure on account of locomotive and carriage and wagon plant will also be considerably reduced, and probably also the cost of establishment.

Madras
6th October
1872

Mountstuart Grant Jenkins Lt Col
Consg Engr for Railways

18 67 74

Enclosure to Consulting Engineer's letter No 533 dated 4th October 1872.

List of estimates &c received from the Agent of the Carnatic Railway Company.

Summary Estimates &c

1. Summary Estimate, incomplete, amounting to Rs 78,85,833
2. General Estimate for Districts 1 to 10
3. ——— do ——— do ——— Madras Terminal Works and Stations
4. Revised and Complete Summary estimate amounting to Rs 94,47,707

Detailed Estimates &c relating to Bridges

1. Estimates for culverts of 1'0", 2', 4', 5 and 6' and bridges of 10 ft, 20 ft, 25 ft, 30 ft 40 ft span.

2. Estimate for Bridge over Adyar, Rs 43,106
3. Alternative do do do . 48,448
4. Estimate for Bridge over Palar, . 427,647
5 do do do Poonear . 261,550
6. do do do Guddelam . 120,656
7. do do do Backiralu . 19,440

In all these estimates the girders have been calculated for unnecessarily heavy rolling loads.

8. Statements of weights of girders designed for reduced rolling loads

9. Revised Estimate for Bridge over Adyar . 33,921
10. do do do Palar . 343,981
11. do do do Poonear . 203,653
12. do do do Guddelam . 100,251

In these estimates the girders have been calculated for higher rolling loads.

13. Statement shewing savings effected by adopting reduced rolling load.

Detailed Estimates for Stations & Buildings at Madras

1. Estimate for Passenger Station
2. do do Goods shed
3. Estimate for Locomotive Superintendents Office
4. do do Engine shed
5. do do Carriage shed
6. do do Coal store
7. Estimates for Workshops, including Engine and Carriage erecting shops, Wood-cutting and Sawing shops, Fitting shop, Smithy, Locomotive Stores Building, Boiler shop, Boiler seat and Tank, Wells, Compound Walls and Gates, Temporary Engineering Workshops, Locomotive Employés' Quarters, Locomotive Employés' Outhouses, Locomotive Superintendents Outhouses, and Gate-keepers' Lodges.
8. Estimate for general Stores building.

Detailed Estimate for Station Buildings at Stations other than Madras

1. Detailed Estimate for Junction (2nd class) Station House with Verandah and Shed

2. Detailed Estimate for Private Room in
Junction Station House
3 do do do Third Class Station
4 do do do Goods shed 90 ft × 43 feet
5 do do do do 60 ft × 25 feet
6 do do do Tank House 1
7 do do do Engine Shed 1
8 do do do Carriage do 1
9 do do do Coal store 1
10 do do do Native Station
Masters' House
N.B. Estimate for East Indian
Station Masters' Bungalow is
same as Estimate for Locomotive
Employés Bungalow
11. Detailed Estimate for Level Crossing Gate
12 do do do Gate Keeper Lodge
13 do do do Temporary Bungalow
for Engineers.

Miscellaneous Statements

1. Statement of Drainage area & Waterways
2. Table of gradients
3 do do Curves
4. Table of Earthwork
5 do do Superficial area of Slopes of
banks and Cuttings
6. Statement of Ballast required in each
district.

Miscellaneous Papers

1. Sketch of Catchwater Drains & Memo. on do
2 do Road Diversion do do
3. Estimate for Level crossings
4. Memorandum upon cost of Fencing
5 do do do Permanent Way
6. Estimate for Plant
7 do do Rolling Stock
8. Memorandum of proposed Establishment.

List of drawings submitted with Estimates for Line to Cuddalore

Working Sections
1. Madras to Meenambaukum

2. Meenambaukum to Goodoorancherry
3. Goodoorancherry to Chingleput
4. Chingleput to Madranticum
5. Madranticum to Aucherawauk
6. Aucherawauk to Tindivanum
7. Tindivanum to Salay
8. Salay to Villapuram
9. Villapuram to Panrooti
10. Panrooti to Cuddalore.

Working Surveys

1. Madras to Meenambaukums
2. Meenambaukum to Goodoorancherry
3. Goodoorancherry to Chingleput
4. Chingleput to Aucherawauk
5. Aucherawauk to Tinderanum
6. Tinderanum to Villapuram
7. Villapuram to Panrooti
8. Panrooti to Cuddalore

Sketch Map of Drainage Areas.

Plans of Buildings, &c.

1. Design for Culvert of 1ft 10 ins Span.
2. do do do 2ft do
3. do do girder do of 4 feet do
4. do do box do of do do
5. do do Arched do of 5 feet do
6. do do girder do of 6 feet do
7. do do Arched do do do
8. do do girder do of 10 feet do
9. do do Arched do do do
10. do do 20 feet girders bridge
10. A. details of the above
11. Design for a 25 feet girder bridge
11. A. details of the above
12. Design for a 30 feet girders bridge
12. A. details of the above
13. Design for a 110 feet girder bridge
13. A. details of the above
14. Design for a bridge over the Adyar
14 A. details of the above
14 B. Alternative design for a bridge over the Adyar.

There are no plans numbered 15 or 16.

17, 18, 19, and 22. Designs for Gate keeper's lodge, wire fencing and iron gate, and stiles.

There is no plan numbered 21.

23. Details of Permanent Way.

24. General arrangements for 3rd class Stations

24. A. Designs for buildings at do do

25. General Arrangements for 2nd class do

25. A. Designs for buildings at do do

26, 27, and 31. Designs for goods shed

90ft × 43ft. goods shed

60ft × 25, and tank house.

26. A. Design for goods shed at Madras Terminal Station

28. Design for an Engine shed

28. A. do do do do at Madras.

28. do do do Carriage do do

29. do do General Stores Building

30 do do Coal Store House

30. A. do do do do at Madras Terminal Station

There are no plans numbered 32, 33, or 34

35. Design for a Native Station Masters' House

36. do do East Indian do do or Locomotive Workmens' Bungalow.

37. Design for an Engineer's temporary Bungalow

There are no plans numbered 38 or 39

40 do do Locomotive Workshops

Unnumbered. Design for teak wood gate

do do full stage.

P. W. 4846/72

Carnatic Railway Company, Limited,

Agent's and Manager's Office,

Madras, 17th August 1872.

No. 526.

72

From

J. J. Fisher Esqre.

Agent & Manager

Carnatic Railway Co.

To

Lieut. Col. J. H. M. Shaw Stewart R.E.

Consulting Engineer for Rys.

Sir,

In continuation of this office letter No. 482. I have now the honor to submit for the consideration of Govt., the designs for structures proposed to be erected on this Railway, together with an estimate of the total cost of construction and equipment, supported by schedules giving detailed quantities and prices of labor & materials. These documents are also accompanied by the Chief Engineer's report No. 427. dated the 16 Instant in which the reasons for the adoption of the plans recommended are generally stated.

2. These designs, estimate and report will I trust commend themselves to the favorable consideration of Govt., but should there be any points upon which you deem further information requisite your suggestions shall have the earliest & most careful attention.

I have the honor to be.

Sir,

Your most Obedt. Servant.

J. J. Fisher

Agent & Manager.

Carnatic Railway Company, Limited,

Chief Engineer's Office,

Madras, 16th August 1872.

No 427.

J. T. Fisher Esqre
Agent & Manager

My dear Sir,

I have the pleasure herewith to hand you my Estimate of the Cost of Constructing and Equipping the Railway, for submission to Government. I also send the Plans of Structures and Schedule, giving detailed quantities and prices of the required labour and materials, and I would request that the sanction of Government be solicited thereto.-

2 The Plans of Surveys and Sections of the line have already been forwarded, and all questions relative to the location have been fully discussed in my Report to on Trial Surveys, and in Correspondence which has since passed upon the subject. I think, therefore that but few remarks are at present necessary. The line has been taken from Madras via Chingleput, Madrantekum, Tindivanam, Villupuram & Panrooty to Cuddalore, following throughout the Course approved by Government* with the exception of short lengths in

*G.O. No 910. 27 March 1871.-

75/81

in two places; from Chinglepet to Madrantecum via Ballalen, and from Penroothy to Cuddalore via Nellicoopum, where the amended location was subsequently sanctioned.*

* Con. Engrs. letter No. 191 15th Augt 1871
Do. No. 154. 25th June 1872

3. Detailed Tables of the Gradients and alignment will be found in the appended Statements. I have been enabled to keep the gradients within a limit of 1 in 140 while the alignment is very favorable being 113 miles of straights and 15 of Curves, with no curve sharper than 18 Chs.

4 In making my Designs I have adhered to the dimensions laid down in the Government order,** and my Estimates will be found to show quantities in accordance with them. On several points, however, I would recommend a departure from those dimensions for reasons which I propose to explain as each case comes under notice.—

** No. 2624 of the 14th October 1871

5 Earthwork quantities have been taken out for a width of 12 ft. for Embankments and 15 ft for Cuttings. these in my opinion are insufficient on grounds of safety and, eventually, of economy. I also explained my views fully on this subject in my letter No 902,*** which, I understand

*** of the 11th Novr 1871

how

7b

have been submitted for the Consideration of the Government of India I would now therefore briefly state, that with such a narrow width of formation, the maintenance would be a matter of difficulty and extra expense, especially where turf cannot be made to grow, and that after heavy rain, there being only 2 inches of berm, the denudation of the slopes would be such that the ballast would be washed away and wasted, and the safety of the Permanent way endangered.—

6. I recommend a width of at least 14 ft± and in places where bad material is found, or where embankments are exposed to water, as in Jamkó, that the width should be increased to 16 ft. The quantity necessary to form this increased bank would be about 2000 Cyds per mile at a cost of Rs 375, and there can be little doubt such a sum will be more than overbalanced in a short time in saving extra men for maintenance.—

7 Designs for Bridges and details of Girders and Iron work, will be found accompanying, viz 6 spans of 66 ft. for the larger

larger openings detailed drawings have been left to be prepared in England after sanction for general dimensions has been received.— Calculations for Strains and weights of Iron have been made, and are herewith sent, on which the Estimate has been founded.—

8. In order to keep within the dimensions prescribed, it has been found necessary to place the rails on top of the girders, and this has been done, except in the case of the larger spans of 100 & 120 ft, which I propose for Bridges over the Palar, Ponear, and Guddalum Rivers. For these, I would request sanction to be allowed to build the Piers wider, for the purpose of increasing the distance between the girders so that the line may be laid on the lower flange of the girders, allowing for the beams running between them.

9 The River Banks at all the above named Bridges are very low, being but little above flood level, and the Country on either side is flat and level, the embanked approaches are therefore considerable. I have considered it desirable to keep a clear headway of 5 ft above high water

highest recorded floods, and the depth of girders being 13 & 11 ft. the great saving in Earthwork by running on the lower instead of the upper flanges, will be obvious, in addition to which is the advantage of having low, instead of high, embanked approaches to maintain. I estimate the saving in Earthwork at the Palar River will amount to Rs 10,520, at the Ponea Rs 7347, and at the Gaddalum Rs 5921.–

10. There will also be a saving in the cost of the Piers – by making the gradient lower, as they will be reduced in height which the material per unit of length remains the same. This of course would not have been the case with Masonry piers which would be increased in quantity as the width of them is increased.–

11. For the Bridge over the Palar, which is to have 120 girders, I propose to use Cast Iron Cylinders for the Piers, and to sink them to the hard material beneath the sand. The depth of each pier is given in the Estimate and has been ascertained from actual borings taken in the River bed at the site.–

The

12. The foundations of the Poonar and Guddaleur Bridges are left in depths, and the material found by boring proves to be sand with occasional distinct strata of clay, which, in my opinion would indicate that the river bed is not liable, to be disturbed and become a quick sand, as is possibly the case with the Palar in times of flood, and that consequently piles would not be without lateral support. I therefore propose for these to use clusters of small screw piles which are less expensive in first cost and can be more cheaply erected. The span of girders will be 100 feet clear.

13 In making my calculations for designs of Girders I have employed the Rolling loads as given in the Government Order, × G.O.No.2624 14th Oct/72. and the cost of the Bridges, shown in my Estimate, is based upon Strains that would be produced by such loads. I am of opinion however, that the loads are much heavier than can, by any possibility be brought upon the Bridges by our traffic, and as the Consulting Engineer agrees with me that a clerical error may have been made in the Order, × Con: Engrs letter No 153 of the 28th June/72. I have ab

at his request prepared duplicate calculations for weights of Bridges with half the load (keeping the original weights in my Estimates) and forward them with the others. If the lighter weights and lighter Bridges are accepted a saving to the amount of Rs 2,06,936 will be effected and my Estimate may be reduced by that amount.— × Before it was decided that the width of Masonry for Bridges should be confined to 12 feet, × I had prepared designs for Bridges with a greater width. I now send tracings of one of the plans so prepared for the Bridge over the River Adyar, and would solicit for it the consideration of Government with a view to it being substituted for that accompanying the Estimate, on the dimension required by the Govt order. The site of this Bridge is within a few miles of Madras & close to Guindy Park, and I think a slight departure from the Government order would be desirable for the sake of the improved appearance of the Bridge in such a position. It will be seen that the piers are

× Para 11.

× Consulting Engrs letter No 90 of 16th April 72.

are on the Skew and it has
been found impossible, with
the narrow width of Masonry,
to make a design with any
pretension to architectural
effect. - The difference in the
Cost of Bridges ~~are~~ on these
alternative designs will be
Rs 5,342 and I would ask for
sanction to build the more
expensive Bridge, under the
circumstances -

15 With regard to Fencing:
I have ~~estimated~~ for Fencing for
one third the length of each
District, leaving the remainder
of the line unprotected, in
accordance with the wishes of
the Government of India as shown
by the sanction accorded to the
Great Southern. ~~***~~ I am inclined
to the opinion, however, that
it will ultimately prove necessary
to fence the line for a much greater
length, if not throughout. In the
event of fencing throughout being
adopted I should recommend the
use of American Cattle Guards,
consisting of an open pit across &
beneath the line of rails, as being
a much more secure protection than
gates, which require watchmen &
constant attendance to keep them
shut

shut, and are so expensive to repair and maintain. Where the line is only in part enclosed, however, these Cattle Guards are not admissible, and I have estimated for gates for ⅓ the lengths.

16. For Stations, I have provided at most of the places a small room for a booking office with one adjoining for Stores, and a covered shed to protect passengers from the sun. Goods sheds, of two sizes, have been provided in accordance with what I consider the requirements will be. The General arrangement of all stations is such that a third class station can be increased subsequently to a second or second Class commenced by erecting the smaller buildings first, making it in fact a third class station for the time being, leaving the others to be added subsequently. I have thought it desirable, however, to estimate in full for what I anticipate the ultimate requirements will be for many years to come. The total amount of Estimate for Stations, exclusive of Terminal Stations, amounts to £88,000 giving an average per mile of £2,250 per mile of line. The average cost per mile including the Terminal Station and Staff

Officers

Officer is 4464 Rs per mile.-

17. The amount which is entered for Terminal Station & Officers must be accepted as approximate, as I shall not be in a position to complete designs in detail, until the site for the Station can be determined. I have fixed upon the size of the building as to the exterior walls, size of roof &c., and from this have deduced the figures given as the amount of expenditure required.-

18. Among the drawings will be found a general arrangement with Sections of buildings required for Locomotive Workshops.- I would suggest that permission be obtained to have this design modified (keeping the expenditure within the amount of the Estimate) in England.- Very great changes and improvements have of late years been introduced in Locomotive Plant and Machine tools, and I think it desireable that the very best mode of carrying on the works for which these shops are intended, should be adopted and that, therefore, modifications of the general design may be deemed necessary by the Company's Consulting Engineer in England.-

19. As I understand it has been definitely settled that the Government will Construct the Telegraph along our line, I have omitted it from my Estimate.- I would however point out that it is of the utmost importance that we should have the advantage of using a line of wire which work Es of Construction are in progress, and would urge, that if Government are not in a position to Construct the Telegraph at the Commencement of our work that sanction should be obtained to put up a temporary wire for our own purposes until the Construction is completed.-

20. I have estimated for Rolling Stock at the rate of Rs 8,092 per mile of Railway. the numbers of each description of Carriage &c^a being given in the accompanying Statement. The designs of all Rolling Stock are, I understand, to be left for decision in England, I would however suggest that the sanction of Government should be applied for to our adopting long Carriage frames for the 3^d & 2^d Class Carriages with bogie trucks. If this sanction is here obtained it will facilitate

the

the preparation of designs when application for them is sent home.

21. The average cost per mile including Locomotive & Terminal works is is Rs 46,400 - the Rolling Stock & Locomotive plant gives an average per mile of 9434 making a total per mile of ~~55,834~~ 56,834 without Establishment and Contingencies.—

22. For compiling my Estimate I have adopted a form in accordance with the Rules laid down for keeping the accounts during Construction. I trust that sufficient information has been given on the Plans and in the Schedules of detailed quantities, but I shall be glad to give any further information that may be thought necessary and explain any points that may not appear clear. And should it be thought desireable I shall have pleasure in pointing out the line and the positions selected for Stations, Bridges and Structures to the Consulting Engineer on the ground -

Yours faithfully

Fredk Dibdin

Chief Engineer

C.W. 4846/12.
Rec'd Dec 1912 Ltr 573

Carnatic Railway Co. Ltd.
Chief Engineers Office
Madras 17th September 1912

No. 491

J. D. Fisher Esqr.
Agent & Manager.

My dear Sir.

The Summary Estimate asked for in the Consulting Engineers letter No. 229 was handed to you with my letter No. 485 on the 14th inst.

With reference to para 3 of the Consulting Engineers letter I have as you are aware, considered that the estimate for Contingencies was to be calculated in a different manner from that indicated by the Consulting Engineer at the meeting in my office, and all my detail Schedules and Estimates have been formed upon my interpretation of Rules for the Accounts issued by the Govt. of India - were I to alter the Summary now to accord with the opinion of the Consulting Engineer it would in effect make every detailed statement which I have prepared incorrect. I would suggest therefore in this instance that Amounts submitted by me should remain for the present, and that any Sums which have been incorrectly dealt with should be transferred subsequently in accordance with the Sanction that will be conveyed to us from Government.

Yours &c.

pp J. D. Fisher
Agent & Manager

pp F. L. Debell
Chief

Public Works Department

No 2851

Proceedings of the Madras Government

Read the following

From The Consulting Engineer for Railways } H.E. No. 533 of 4th Oct. 79

With the above paper the Consulting Engineer for Railways forwards for sanction the estimates for a line of Railway on the metre gauge from Madras to Cuddalore. The estimates as finally submitted by the Chief Engineer amounted to Rs 94,47,717 but this amount has been reduced by the

Bone Engineer to Rs 68,26,180 for the reasons fully set forth in the note by that officer.

In the recommendation made in this note evincing as they do an able and careful scrutiny by the Govt officers and a thorough appreciation of the principles urged by the Govt of India as applicable to Railway construction in India His Excellency the Governor in Council with the following exceptions fully concurs.

The Bone Engineer recommends for adoption the less expensive of the two designs for the bridge proposed for erection over the Adyar River, but His Excellency having regard to the situation, to the small additional cost, and to the extremely unsightly character of the proposed design is of opinion that in this instance a departure from the principle of rigid economy in first cost may be permitted.

For St Thomas' Mount a third class station is proposed. His Excellency is of opinion that a second class station without a refreshment room would not provide more accommodation than is advisable. Rs 1,500 have accordingly been added to the Consg Engineer's revised estimate on this account. The item rolling stock appears to have been reduced to the lowest possible extent consistent with efficiency and in the case of passenger carriages Horse boxes and Carriage trucks. His Excellency is of opinion that a more liberal allowance should be made. The mileage allowance proposed by the Consg Engineer has accordingly been raised from Rs 5,500 to Rs 6,000 per mile.

His Excellency the Governor in Council observes with regret the somewhat unsystematic and imperfect manner in which the various

estimates and statements have been submitted by the Railway Company's officers for the scrutiny of the Consulting Engineer, entailing thereby much extra work in the Govt. office.

The attention of the Govt. of India will be invited to the Consulting Engineer's remarks on the economy that might be looked for from an early amalgamation of the Great Southern of India and Carnatic Railway Companies; a measure which, in the opinion of His Excellency the Governor in Council, cannot be too strongly advocated.

The Govt. of India will be requested to sanction a total expenditure of Rs 69, 10, 5-22.

O.J.

Gww

80/2

13/5 Loss Engineer

Desp: 9/12/72

No 2852

To The Secretary to the
Government of India
PWD

Sir I am directed to forward for the sanction of the Government of India the Surveys, plans and estimates for the construction of a line of Railway on the metre guage from Madras to Cuddalore.

The estimates as finally submitted by the Chief Engineer of the Carnatic Railway Company amounted to Rs 94,47,707 but this amount has been reduced by the Consulting Engineer for Railways to Rs 68,26,180 for the reasons fully set forth in the "Note" by that Officer accompanying

I think St Thomas' Mount should be a 2d class Station (miles 2 furlongs 4) from and to Egmore and Egmore a 2nd class Station (miles 4 furlongs 4) The rolling stock seems to be only reduced in the Estimates. E. G. only

the plans and estimates.

In the recommendation made in this Note by the Chief Engineering as they do, an able and careful scrutiny by the Government Officers and a thorough appreciation of the principles laid down by the Government of India as applicable to Railway construction in India, His Excellency the Governor in Council has come to the conclusion that the proposed design is of opinion that in this instance a departure from the principle of rigid economy in first cost may be permitted and Sanction accordingly directed to the expenditure of Rs. 683,522 as detailed in the margin.

In submitting these designs and estimates for the approval of the Government of India I am to express regret for the somewhat unsystematic and imperfect manner in which the various details and statements are prepared, but to state that looking to

Engineering unsightly character of the proposed design, is of opinion that in this instance a departure from the principle of rigid economy in first cost may be permitted and Sanction accordingly directed to the expenditure of Rs. 683,522 as detailed in the margin.

In submitting these designs and Estimates for the approval of the Government of India I am to express regret for the somewhat unsystematic and imperfect manner in which the various Details and Statements are prepared, but to state that looking to

Rs. 4 Thousand a time class chain is proposed for a 3rd class station without the Retaining Walls which would be necessary in the case of a 1st class station. Rs. 1,000 has accordingly been allowed in the Estimate for Retaining Walls at Rs. 6,000 a piece.

Rs. 5,500 has been allowed for Quarters for the Station Master at a Hundred Rupees each.

Rs. 69,10,522.

In submitting

the plans and estimates.

In the recommendation made in this Note by the Chief Engineering as they do, an able and careful scrutiny by the Government Officers and a thorough appreciation of the principles laid down by the Government of India as applicable to Railway construction in India, His Excellency the Governor in Council has come to the conclusion that the proposed design is the best under the circumstances, and only 2 carriage travellers.

L. & S. 19 Oct.

His Excellency the Governor in Council has come to the conclusion that the proposed design is the best under the circumstances, and only 2 carriage travellers.

L. & S. 19 Oct.

State, with one exception, fully concurs.

The Consulting Engineer recommends for adoption the less expensive of the two designs for the bridge proposed for erection over the Adrayar River, but His Excellency having regard to the situation, to the small additional cost and to the extremely

the delay which has
already occured in
the submission of the
plans by this Company
and to the extra work
entailed on the Engr
in his scrutiny of the
Project owing to the mode
of estimating adopted
by the Chief Engineer of
as illustrated in the
accompanying Note. Ops 7/6: 13.
It was thought better
to no longer postpone
the application for
sanction to commence
the construction of the
line.

I am also directed
to invite the attention
of the Govt of India
to the remarks of the
Engr

Consulting Engr on the subject
of the economy likely
to result from an early
amalgamation of the
Canada and Great
Nn of India Railway
Companies and to state
that in the opinion of
His Excellency the Govern
or in Council the
early adoption of this
measure cannot be
too strongly advocated.

Chs

GMW.

30

Despe 9/12/72 with 6 Encls
of Ltr No 2857 of 1872
6 plans & 2 Enclosures
Despe acknowledging 13/12/72 transmitting the
Customs House

Note on the Estimates
for
Carnatic Railway
Madras to Cuddalore

Revised estimate
Rs 94,47,707

Reduction due to clerical error in Govt. of India letter as to rolling load. 2,06,936

92,40,771

Further reduction due to alteration of terminal site for which no details are given but of which Rs 47,073 appear to be under head construction of line. 70,000

91,70,771

with this revised total the Consulting Engineer proceeds to deal in detail reducing it eventually to

68,26,180

Rs 23,44,591

Representing this the net reduction distributed as follows.

Construction of Line ..	29,664
Ballast and Permanent Way	7,38,582
Stations and Buildings	2,81,677
Rolling stock	3,31,870
Establishment	5,85,429
Contingencies	4,17,238
	23,84,480

Gross Reduction

Rs 33,84,280

which must be lessened or increased by the sums added under head

Preliminary expenses 6

Plant 39,88 8

39,889

Net Reduction 23,44,591

Contractors

1. Earthwork P/7

Rates approved.

Rs 300 per mile added for increased width of bank as recommended by Chief Engineer

2 Bridge work.

Cost of protective works, floors &c. omitted, but will be met from contingencies

Masonry

Rate reduced to 10 Rs per Cubic yard.

Reduced rolling load allowed for.

Final designs for iron work to be prepared in England.

2a Small bridges and culverts

Estimates as roughly approximated as to defy revision in Consulting Engineers office, rate for masonry only reduced

2b Large Bridges

Alternative designs for Adayar river. Rs 5342 difference in cost, less expensive design recommended.

For the Palar, Poonian and Suddelam rivers the estimates have been framed for the reduced rolling load but the designs will be finally prepared in England.

The cost of the carriage of the materials for all except the above mentioned bridges has been omitted by Chief Engineer and therefore added in the Consulting Engineers office.

Para 4 Level Crossings.

The rate for masonry for gate keepers lodges reduced to 8 Rs

Para 5 Fencing

a. 4 wire fence at 12 As per lineal yard as used on Madras and Great Southern India Railways substituted by Consulting Engineer for a 6 wire fence weighing 16 tons per mile at 1 Rupee per lineal yard and for one fourth whole distance instead of one third as proposed by Chief Engineer.

Temporary Telegraph

Rupees 50 per mile added by Consulting Engineer for the loan of a light wire during construction, but a further sum to be allowed if the Telegraph Department cannot lend the wire.

Para 6 Ballast and Permanent Way.

Ballast estimated on the basis of actual length of siding needed by the station arrangements as proposed by Consulting Engineer.

A wooden sleeper road costing Rs 13.0.0 instead of iron - pot road costing Rs 16,967 per mile of track substituted.

Abolitions patent clips having been condemned on State Railways, dispensed with.

Rate of Cartage reduced from 6 As to 4 As per ton mile.

Stations and Buildings

A fresh classification into 5 classes recommended

by Consulting Engineer.

Accommodation provided for each class will be found fully described at page 52 of "Note".

Stations of the several classes, distributed as per tabular form page 54 of "Note".

An Engine station added between Madras and Cuddalore the run 128 miles being deemed by Consulting Engineer to require it.

One watering engine instead of two allowed for each station.

One fuel storage and one ash-pit allowed instead of two at each station.

Carriage sheds proposed by Chief Engineer for Cuddalore and Saint Thomas' Mount disallowed by Consulting Engineer as unnecessary.

Native Station Masters proposed for all stations except Chingleput and Cuddalore and bungalow accommodation reduced accordingly.

Accommodations for four Engine drivers omitted by Chief Engineer allowed by Consulting Engineer.

The general station arrangements shown in plans 28 are recommended for Cuddalore. Sheds depicted in the sketch

(Page 65 of "Note") for all intermediate stations.

In consequence of a recent modification in height of rolling stock proposed platforms all estimated 9 inches higher than Chief Engineer allowed.

Rate of masonry reduced to Rs 8

Arrangements for Station and Houses proposed for Chief Deputy and Subordinate stations are illustrated in a sketch.

Refreshment rooms added by Cons Engineer.

Height of walls reduced from 18 to 14 feet.

Rate for masonry reduced to Rs 10 per cubic yard

The cost of Lamp room and Ticket office for intermediate stations reduced from Rs 1125 to Rs 850 each.

One extra room added to St Thomas Mount Station.

In the native urinals the Cons Engineer proposes to omit the roof, reduces the height of centre wall to 7 feet the length of the outer walls the unnecessary height of footings and the rate for the masonry, and so reduce the cost of each from Rs 774 to Rs 250 each, after adding for an asphalte floor.

The Chief Engineer's estimate for a waiting shed is reduced from Rs 1072 to Rs 870 by reducing the

rate for brickwork to Rs 10 per cubic yard and reducing the height of the footings.

The cost of Cowsheds has been reduced by lowering the height of the walls from 16 to 14 feet and by lowering the rate for brickwork to Rs 10 per cubic yard.

Workshops & Store buildings.

These and fuel stores have been lowered in cost by allowing a 10 Rs for the masonry.

Staff Quarters

Recommendation for Native Station Masters

only has been allowed for fourth class stations, none for fifth class stations.

Engine Drivers' quarters have been added to the value of Rs 15,000.

Station Machinery

A well 6 feet drain with rope and bucket substituted for a well 10 feet drain with Engleby pumps, the latter costing 2,204 Rs the former 1450 Rs

Length of piping allowed for each station reduced.

Rs 100 each added to the Chief Engineer's estimate for water cranes on account of fencing.

Rate for masonry in ash-pit reduced.

Chief Engineer's estimate for a turntable including fencing doubled.

The number of points for intermediate stations allowed according to proposed arrangements.

Buffer-stops omitted by Chief Engineer, provided for.

One double armed semaphore substituted for two single armed ones.

The rate of brickwork for the terminal works at Madras has been reduced from 12 Rs to 9 Rupees. Rs 9½ being the actual average cost of the Central

Station at Madras Railway exclusive of the tower.

Plant

The Engineering plant has been estimated by the Consulting Engr. at 60,000 Rs. instead of Rs. 20,489 the amount allowed by the Chief Engr.

Rolling Stock

The number of Locomotives proposed by Chief Engr approved, but the cost is considered excessive.

All third Class carriages to be provided with sun shades and double roofs on account of troops.

On page 107 of Conf Engrs "Note" will be found

Or a tabular Statement
each of rolling stock as
Ch proposed by the Chief
for a Engr and as recommended
fence by the Consulting Engrs
Ch all stock must be
designed in England
for the Estimate provides
allow for it at Rs. 5,500 per
-pos mile —
And Rs. 430 per mile
Br have been allowed for the
chief maintenance of the line
De from Capital for a period
-pho of 12 months although the
-sing Contract with this Company
th does not provide for it
for t 104 Establishment
head The staff for the direction
from including Audit Agency
Roy and account for a period
aver

of three years has been
left as proposed by the
Chief Engineer, but that
for "Engineering" is deemed
excessive —
The number of Districts
is thought unnecessarily
large —
The period of construction
over Estimated —
The head quarter and
District Establishment
on too costly a scale —
Nine Districts are proposed
instead of ten
Eight Assistant Engrs
instead of eleven
A period of two years
allowed for construction
instead of three —
At pages 121 and 122
of the Dorey: Engrs Note

will be form[illegible] a tabular
form shewing the head
quarter and District
Establishment as proposed
by Chief Engr. and
recommended by the
Consulting Engrs.

Occasional Establishments

Under this head the
Consg. Engrs. recommends
an allowance of Rs. 50,000
the expenditure of which
will be subject to previous
definite sanction.

P/124 Temporary Telegraph
An Establishment
estimated at 450 Rs
per month for 2 years
added for this.

Locomotive

Locomotive Establish
ment.

Period of duration
reduced from 3 to 2
years.

Contingencies
& Direction.

Estimate increased from
Rs. 3,600 to 10,000
by Engineering
Estimate reduced from
Rs. 5,99,647 to 2,83,000.

Locomotive.

Estimate reduced from
Rs. 1,25,287 to Rs. 2,000
to meet office contingencies
only.

will be submitting the above Note for circulation for the information of the Government of India. Noted I beg to call attention to the extremely unmethodical manner in which the various Statements & Estimates have been submitted by the Company's Officers for the scrutiny of the Consulting Engineer to the Government of India. Different kinds of paper and different hand writing have been presented in the same Statements. Erasures have been left throughout their removal would have entailed the re-copying of one sheet only and as will be seen no effort has been made to compile the information, but single papers have been stitched together and only classified by the paper case in which they are contained.

I wanted to call the attention to the entailing unnecessary labour in an Office by

The Government expressed their appreciation of the care and method exhibited in the submission of the Great Indian Railway Estimates and an expression of disapproval in the present instance would I believe tend in future to save the Consulting Engineer's Office from the vast additional labor

labor ~~that~~ must have been
entailed by the want
of ~~method~~ exhibited
in this instance.

18th Oct 1872 Respectfully Submitted
Wm. Mickle & Son

P.W.D.

Original

2851+2852 L

4-12-1872

79-81482