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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

28th March 1882, No. 829 W.

Buildings and Roads.
Civil Works

Read the following papers:—

No. 226.

No. 18 W.

MEMORANDUM.

Dumagudiem and Bhadrachalam Boat Canal.

The following information is submitted with reference to G.O., No. 3048 W. of the 8th December 1881.

2. In G.O., No. 3569 W. of the 9th September 1878, an estimate of Rs. 4,53,840, subsequently corrected (G.O., No. 4068 W. of the 19th October 1878,) to Rs. 4,55,300, was sanctioned for a canal to start from above the present tail locks at Gongole or new Dumagudiem and to run for more than one-third of the distance along the Toravagu, a stream or water-course which falls into the Godavari near Sitampetta. Thence it was to follow the line originally chosen for the long canal of the Upper Godavari navigation scheme, which has been already partially excavated, as indicated on the survey, to a short distance above Bhadrachalam, where a flight of locks would drop it into the river at a spot favorable for the lock construction, as also for the navigation.

3. The dimensions of the canal, viz., bottom width 20 feet, depth of water 5 feet, and width at water surface 35 feet, were suggested in 1877, and are suitable at any rate in the first instance.

4. There is an alternative line for the canal between new Dumagudiem and Sitampetta, which has been several times referred to in the discussions, and which would run parallel to, and at a short distance from, the river throughout, just as does the part below Sitampetta. Along this line levels have been taken and are shown in the plan No. 2, dated 30th November 1877, but no estimate of the cost on this line has been made. Plan No. 1 gives a good idea of the river and circumstances of the country, but on it only the Toravagu line is marked.

5. The complete inspection of the Toravagu throughout the part intended to be utilized by the canal would have occupied longer than the time available at the beginning of the present year, when, with the Superintending Engineer, the undersigned went to see the character of the country, and to obtain such information as would enable an opinion to be formed of the suitability of the arrangements sanctioned. Enough was however seen of the vagu to make it very doubtful whether this part of the line could be made a convenient navigation, and then be efficiently maintained at a reasonable cost. This water-course is extremely tortuous, so much so that it is contemplated to make numerous straight cuts, and at present a very large quantity of pebbles and coarse and fine sand is carried along it when in fresh. This material comes for the most part from the lateral drainages, of which there are a great many. No doubt the regulating tank, which Mr. Vanstavern proposed to construct across it

just above the point at which the canal would enter, would diminish materially the quantity of material tending to silt up the water-way, but there would remain that falling in lower down. The bed of the canal would be about 11 feet lower than the bed of the water-course at the point of entrance, and at about 1 mile 55 chains lower down, by the shortened course, the vagu bed falls below canal normal bed level. It is questionable whether the actual course of the vagu is correctly delineated on either Plan No. 1 on the scale of 4 inches to the mile, or on Plan No. 2, scale 800 feet to an inch; the two do not agree sufficiently closely to lead to the inference that they were plotted from survey field books. There is jungle on both sides of the water-course for much of the distance inspected, and thorny bushes which make it impracticable to get along in any desired direction without repeated detours. The site for the bund of the regulating tank was pointed out, but the jungle is too thick to allow of the character of the ground being ascertained from inspection. The length of the bund is, by the longitudinal section, 5,900 feet, and the greatest depth of water 22.89 feet, but this only at the stream bed: only for 900 feet is the depth more than 8 feet, so the tank would serve principally to stop the silt and to divert the water to a point further down, where its infall would be less inconvenient.

6. The line above the point where it falls into the vagu has to pass a ridge with 37½ feet of cutting, and it is not probable that in so deep an excavation of 1½ to 1 up to water level, and 1 to 1 above that, without any berms, would do: at any rate this arrangement would not be a convenient one for navigation, though the boats might pole through.

7. The conclusion arrived at is that it would not be desirable to take the canal along the Toravagu, unless it were clearly demonstrated that no better line could be found. It may be added that a more detailed examination of the material to be cut through, between new Dumagudiem and the Toravagu, would in any case be necessary before the excavation of the canal could be commenced.

8. The objections to the line round Duntinam point are stated in Mr. Vanstavern's report, and they are all connected with the supposed excessive cost of the canal by this line which is due to—

- (1) the presence of rock;
- (2) the supposed necessity for a lock above the crossing of the Toravagu;
- (3) the assumption that the canal would have to be carried across the Toravagu by an aqueduct;
- (4) the expensive flood bank supposed to be needed, and a wall instead of a flood bank at Duntinam point.

That the construction of a canal near the river is not a simple matter, like similar works in the Delta, is clear, but the evidence, as contained in paragraph 13 of Mr. Vanstavern's report of 1877-78 (not dated), is not conclusive against the Duntinam point line, and should that line be practicable a really convenient navigation would be secured; and that the line by the Toravagu could never be.

9. It may be noticed that canal bed level would be at the offtake from the present canal ... 157.69
and at the Toravagu (crossing) ... 156.35

These are the levels for the sanctioned arrangements, and the distance being rather more than 7 miles the fall would be trifling and could be eliminated without difficulty. The ground levels vary between 158.00 and 177.00 and are for the most part about 170. There would therefore be cutting varying from 1 to 20 feet, but generally of about 13 feet.

The maximum flood levels are at the tail locks of the present canal 185.50
at the Sitampetta lock ... 174.00
at the Bhadrachalam tail locks ... 167.23

It would appear, therefore, that the water is liable to rise to from 12 to 15 feet above ground level at the river bank. This is a very material difficulty if the current be so strong as to make the maintenance of an ordinary earthen bank impracticable, but such a bank suffices at Dumagudiem and there was no sign on the ground of any

scour from floods. As however it is several years now since the last high flood, it is quite possible that the traces of it have disappeared. If an earthen bund would stand, the flood bank, except here and there, would cost nothing, as it would be formed with the earth taken out of the canal.

10. With regard to the other objections to this line, the undersigned does not know what evidence there is of rock. There was very little to be seen any where on the surface, and none in the few small but deep drainages falling into the river. The ground on this line is nearly all under dry cultivation, and instead of, as was expected, finding the point difficult, it was only from the low hill lying a little to the east and from the rock in the river bed that its position was made apparent. There would probably be rock cutting at the point, but it is not unlikely that the greater part of the cutting would be in soil presenting no difficulty. Only by borings can the circumstances of this or of any part of the line be definitely determined.

11. It would not be necessary to have a lock on the canal just above the crossing of the Toravagu, but it would probably be desirable to have flood gates which would not be very expensive, as the depth of water on the sill would be under 16½ feet and the gates might be in two parts, the lower 10 feet in height, turning on trunnions at the sill, and the upper 7½ feet, sliding in grooves.

12. There is no need of an aqueduct for crossing the Toravagu on the Duntinam line. The canal bed levels will be approximately the same in either case, and if a weir will suffice for the one line it will do equally well for the other line.

13. It is recommended, therefore, that the Duntinam point line should be carefully investigated by borings, and then estimated for, before any thing is done on the line for which estimates were sanctioned in September 1878. For this latter line the estimate would need some revision, as a berm at, or not higher than, 10 feet above canal bed level, would be necessary wherever the cutting is deeper than that.

14. It was at one time proposed that the long canal should be carried past Bhadrachalam to Sudaram, some 8½ miles lower down the river, and this place was inspected. It is certain, however, that the junction with the river there would be much less convenient than at Bhadrachalam, for when the water is low there is a shoal close to the left bank, and there would be no sufficient advantage to compensate for the cost of the extension, and that of maintaining a navigable channel to the locks.

15. If the boat-canal to Bhadrachalam, be constructed it will be desirable to bund across the Gongole or new Dumagudiem tail locks and to provide for the discharge of land drainage by a sluice with self-acting shutters. These locks would no longer be required unless in case of an accident to the canal extension, and a great deal of silt is deposited when the river is in fresh. Were a serious accident to occur to the Bhadrachalam canal, access to the river at new Dumagudiem could be easily re-opened.

16. The Collector was asked to furnish statistics of the extent and character of the trade, as also to state his opinion as to whether the benefits which would be conferred by affording greater facilities to navigation would be in proportion to the cost, which would be considerable. Supposing the sanctioned estimate not to be exceeded, its amount being Rs. 4,55,320, under Works, the total direct and indirect charges would be about 6½ lakhs, and at 4 per cent. the interest would amount to Rs. 26,000 a year, and maintenance charges would perhaps be Rs. 2,000 more.

The Collector has not, however, replied to the letter.

According to the statement, dated 5th January 1878, prepared by Mr. Vanstavern, the trade of 1877 was—

	Tons.	Value.
		Rs.
Imports ..	3,331	1,86,651
Exports ..	3,087	1,30,595
Teak logs ..	No. 46,550	2,44,014
Total ...		5,61,260

Mr. Vanstavern has pointed out that the difficulties in the way of all trade above Bhadrachalam are great, and that the transport of jungle-wood, which is of greater specific gravity than water, is on any considerable scale impracticable. That the country greatly needs improved communications is undeniable, and it is quite possible that though, without a material expansion of trade, it would not be practicable to obtain direct returns from the canal which would approximate to the yearly charges against it on account of interest and upkeep, yet returns from extension of cultivation and from forest dues would make the project not unremunerative. On these points the opinion of the Collector would be of value.

CHEPAUK,
17th March 1882.

(Signed) JOHN MULLINS, Colonel, R.E.,
Chief Engineer for Irrigation.

To the Secretary to Government, Public Works Department.

No. 227.

ORDER THEREON, 28th March 1882, No. 829 W.

In passing orders with reference to the scheme for a short canal between Dumagudiem and Bhadrachalam, G.O. of 8th December 1881, No. 3048 W., it appears that the sanction accorded to this work in G.O. 9th September 1878, No. 3569 W., was overlooked; the Chief Engineer for Irrigation has however carried out the instructions conveyed to him in the first quoted order and inspected personally the site of the proposed canal in company with the Superintending Engineer, and now submits his report under date 17th March 1882.

2. In this report Colonel Mullins brings to notice the serious difficulties which would to all appearance attend the construction of that part of the proposed canal between its head near the tail lock at Dumagudiem, along the tortuous course of the Toravagu, to the point near Sitampetta, where the line quits that stream, and shows clearly that the grounds on which a line following closely the left bank of the Godavari river throughout this length was originally rejected are inconclusive.

3. The Government are satisfied that, in the light of Colonel Mullins' remarks, the scheme as previously sanctioned must be thoroughly reinvestigated, and the Superintending Engineer will submit proposals for having this carried into effect. A Supervisor having been lately specially nominated to the charge of the head works at Dumagudiem, it is considered that with the aid of a small temporary establishment the needful investigations might be undertaken at a sufficiently early date.

(True Extract.)

Lieut.-Col., R.E.,
Ag. Under Secy. to Govt., P.W.D.

To the Superintending Engineer, First Circle.
" Chief Engineer for Irrigation.
" Revenue Department.

Encl. S. T. Austin.
Spare Copies

Oct. 21 1939

MECHANICAL ENGINEERING
1947 CIRCUIT

G.O. 2014 M-11 1051 32 820 H

100-225-0100

Chief between Dunsinno and Blin-
durn, instructions issued for a thorough
investigation of the scheme for a short-

8294 Palmer

N^o 1180. P. $\frac{820}{4}$

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The file as ori-
ginally sent - we
your Office did
I think contain the
two S.O.s mentioned
by Mr. Walsh?

However they are
be it is necessary
before taking further
steps that I should
see the Estimate
in Rs 4,53,840 is
all the plans etc
I presume are
in your Office



28/12/87

No. 505 G.D.

829
5

FROM

Executive Engineer
THE SUPERINTENDENT OF WORKS

GODAVARI DISTRICT.

in charge of 4th Circle.

TO

THE CHIEF ENGINEER

FOR IRRIGATION.

Public Works Department

Dowlaisheram, 23rd December, 1881.

Enclos.

SIR,

With reference to G.O. No. 30486
dated 8th December 1881. it seems to me
that G.O. No. 1232 dated 10th April 1877
and G.O. No. 3569 W dated 9th September
1878 dealing with the plans and Estimates
for the Dummagudem Boat Canal to
Dhadrachellam have been lost sight
of.

I have the honor to be
Sir

Your Most Obedient Servant

[Signature]

Executive Engineer in charge of 4th Circle

Comptroller

From,
The Executive Engineer
in charge 4th Circle.

To,
The Chief Engineer
Public Works Dept.

Dated 23rd } December 1881
Received.

No. 505 G.S.

Dumagudem Boat
Canal to Phadrachalam. — Plans and
Estimates for the —

Reporting that certain
G.O.s dealing with the
have been lost sight of.

U. B. W. 823
Memorandum

Dumagudem & Phadrachalam
boat canal

The following information is
submitted with reference to G.O.
No. 3048 M of the 8th December 1881
2. In G.O. No. 3569 M of the 9th Sept
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for the long canal of the upper Godavari navigation scheme, which has been already partially excavated as indicated on the survey to a short distance above Badrachalam where a flight of locks would drop it into the river at a spot favorable for the lock construction, as also for the navigation.

3. The dimensions of the canal viz bottom width 20 feet, depth of water 5 feet, and width at water surface 35 feet were suggested in 1877, and are suitable at any rate in the first instance.

4. There is an alternative line for the canal between New Damagudem and Sitampetta which has been several times referred to in the discussions, and which would run parallel to, and at a short distance from the river throughout just as does the part below Sitampetta.

Along

Along this line levels have been taken and are shown in the plan N^o 2 dated 30th November 1877 but no estimate of the cost on this line has been made. Plan N^o 1 gives a good idea of the river and circumstances of the country, but on it only the Travagn line is marked.

5. The complete inspection of the Travagn throughout the part intended to be utilized by the canal would have occupied longer than the time available at the beginning of the present year when, with the Superintending Engineer, the undersigned went to see the character of the country and to obtain such information as would enable an opinion to be formed of the suitability of the arrangements sanctioned.

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Enough was however seen of the river
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- (1) the presence of rock
- (2) the supposed necessity for a lock above the crossing of the Toravagu
- (3) the assumption that the canal would have to be carried across the Toravagu by an aqueduct
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Only

Only by borings can the circumstances of this or of any part of the line be definitely determined.

11. It would not be necessary to have a lock on the canal just above the crossing of the Tyroagan, but it would probably be desirable to have flood gates which would not be very expensive as the depth of water on the sill would be under $10\frac{1}{2}$ feet and the gates might be in two parts the lower 10 feet in height turning on trunnions at the sill, and the upper $7\frac{1}{2}$ feet sliding in grooves.

12. There is no need of an aqueduct for crossing the Tyroagan on the Duntinam line. The canal bed levels will be approximately the same in either case, and if a weir will suffice for the one line it will do equally well for the other line.

13. It is recommended therefore that the Dintinam point line should be carefully investigated by borings, and then estimated for, before any thing is done on the line for which estimates were sanctioned in September 1878. For this latter line the estimate would need some provision as a berm at, or not higher than, 10 feet above Canal bed level, would be necessary wherever the cutting is deeper than that.

14. It was at one time proposed that the long Canal should be carried past Badrachallam to Indaram some $8\frac{1}{2}$ miles lower down the river, and this place was inspected. It is certain however that the junction with the river there would be much less convenient than at Badrachalam for when the water is low there is a shoal close to the left bank, and there

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there would be no sufficient advantage to compensate for the cost of the extension, and that of maintaining a navigable channel to the locks.

15. If the boat canal to Badrachalam be constructed it will be desirable to build across the Gongole or New Dummagudem Tail locks and to provide for the discharge of land drainage by a sluice with self-acting shutters. These locks would no longer be required unless in case of an accident to the Canal extension, and a great deal of silt is deposited when the river is in fresh. Were a serious accident to occur to the Badrachalam Canal, access to the river at New Dummagudem could be easily reopened.

16. The Collector was asked to furnish statistics of the extent and Character of

of the trade as also to state his opinion as to whether the benefits which would be conferred by affording greater facilities to navigation would be in proportion to the cost, which would be considerable. Supposing the sanctioned estimate not to be exceeded, its amount being Rs 4,55,320/- under works, the total direct and indirect charges would be about 6½ lakhs, and at 4 per cent the interest would amount to Rs 26,000/- a year, and maintenance charges would perhaps be Rs 2000/- more.

The Collector has not however replied to the letter.

According to the statement dated 5th January 1878 prepared by Mr. Vanstanern the trade of 1877 was.

Imports

	Imo	value
Imports	3331	186,657 ⁸²⁹ / ₁₄
Exports	3087	130,595
Teak logs N ^o 46,530		244,814
	Total	561,260

Mr. Vanstanern has pointed out that the difficulties in the way of all trade above Badrachalam are great, and that the transport of jungle wood, which is of greater specific gravity than water, is on any considerable scale impracticable. That the Country greatly needs improved communications is undeniable, and it is quite possible that though, without a material expansion of trade, it would not be practicable to obtain direct returns from the Canal which would approximate to the yearly charges against it on account of interest and upkeep, yet returns from extension of cultivation and

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Depante }
17 March }
1882 }
Dep 22 do }
Chief Eng for Inga

The Secretary to Government
P.W. Department

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14. 32. 0. 29. 5. 74

27. 2.

N^o 829 W. P.W. Department. B^o 829
Proceedings of the Madras Government,
Under date the 25th March 1882.
Read the following—

Memorandum by the Chief
Engineer for irrigation. } (H.E. N^o 18 W of 17th March 1882)

In passing orders
with reference to the
scheme for a short canal
between Annagudiem and
Bladraschellum, GO of
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instructions conveyed to
him in the first quoted
order and inspected per-
sonally ^{the site of the proposed canal} in company with
the Superintending Engineer
and now submits his
report under date 17th
March 1882.

2. In this report Colonel
Mullins brings to notice
the serious difficulties
which would to all
appearance attend the
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of the proposed Canal
between its head near
the tail lock at
Immagudim, along the
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throughout this length
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3. The Government are
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W.H.

27/3/82

S.E. I. L. L. ✓
C.E. for Spruzation ✓
Revenue Dept ✓
Desd
21/4/82

1887.

Govt. of (1881) India.

PUBLIC WORKS.

2/3/87

From

To

By

By

G. O. 28 Mar 1887 No. 829 W

Received

Canal between Demagade
and Radsachokum
Instructions issued for a
thorough preliminary
the scheme for a short