1095

Public Works (1898) Department.

√

G.O., No. 186 of 1897

Dated February 1898

[Despatch Abstract.]

Cross drainage works, Ellore Canal: Directing that a copy of the Pros: approving, with remarks, the estimate of Rs 23,700 for constructing — in the Godavari Western Dn., together with the estimate & plans & the estimate be forwarded to the Govt. of India with a request that sanction may be accorded, ~~to the estimate~~ at an early date.

Forwarding copy of Pros: approving, with remarks, the estimate of Rs 23700 for constructing — in the Godavari Western Dn., together with the estimate & plans, and requesting that sanction ~~may be~~ to the estimate may be accorded, at an early date.

(P.W.) √ 9.256

P.W. 9-3-98

[P.W. 30. 1,000—9-11-96.]

Indexed. 16/11

BACK PAPERS.

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

FURTHER PAPERS.

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

IRRIGATION.

Government {1898} of Madras.

PUBLIC WORKS.

Recd. } 1898. *Enclosures*

Regd. } *Spare copies*

G.O., Nos. 186, 187 I., 9th March 1898.

MARCH.

Cross-drainage Works, Ellore Canal

Forwarding copy of Proceedings approving, with remarks, the estimate of Rs. 23,700 for constructing — in the Gódávari Western division, together with the estimate and plans, and requesting that sanction to the estimate may be accorded, at an early date.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Read—the following papers:—

From W. C. DeMORGAN, Esq., M.I.C.E. Superintending Engineer, I Circle, to the Chief Engineer for Irrigation, dated Waltair, 9th December 1897, No. 1637 G.D.

With reference to G.O., No. 855 I., dated 23rd October 1895, I have the honour to submit, herewith, plans and estimates for the works noted below in connection with cross-drainage works, Ellore canal, Gódávari Western division, and to request that sanction of Government may be obtained to the same.

2. The report which accompanies the estimates fully explains the necessity for these works.

3. Rupees 10,000 have been promised for these works in the next year's budget (*vide* your memo., No. 11 I. of 16th November 1897).

4. These works are classed as unremunerative—*vide* paragraph 35 (ii) (1) and 36 (*c*), chapter V, Volume II, Public Works Code.

5. Probable date of completion of these works will be reported shortly.

6. The President, District Board, Gódávari, will be addressed on the subject of contributing towards the cost of road-dams, and the result will be communicated to you:

	Rs.
(1) Extension of No. 5 outlet	3,180
(2) Road-dam opposite No. 5 outfall	3,230
(3) Road-dam opposite No. 6 outlet	1,310
(4) Outlet on left side of No. 4 escape	2,960
(5) Outlet on right side of No. 4 escape	4,200
(6) Road-dam opposite No. 4 escape	4,320
Total ...	19,200

7. The plans and estimates now submitted were examined and approved by my predecessor, but, owing to restrictive orders on expenditure, were held back.

8. If sanctioned at once, Rs. 5,000 could be spent in the current year.

Enclosure.

Report to accompany the estimates for extension of cross-drainage works on the Ellore canal.

The cyclone of September 1895 did great damage to the Ellore canal between 28½ miles and Ellore lock at the 46th mile, owing to the cross-drainage works being of insufficient discharging capacity. Government has, therefore, called for proposals for improving this defect (G.O., No. 933 I., dated 5th November 1895).

2. A rough sketch-map has been prepared, which shows the positions of the cross-drainage works on the canal and waterways on the railway, which runs parallel to the canal. On this sketch have also been noted in red, the positions and lengths of the breaches in the canal banks which occurred during the cyclone.

3. *New railway waterways.*—It will be observed that the railway waterways have not been increased as proposed in G.O., No. 37 I., dated 15th January 1896. The most important new waterway is at 38/13 (railway mileage opposite 45/4 canal mileage), where a bridge of seven

20-feet spans has been replaced by one of twelve 40-feet spans, or a clear waterway of 480 feet. The other new waterways are:—

Waterway.	Railway mileage.		Approximate canal mileage.
1 six-feet span	41 m./14 t.p.		
1 six-feet „	41 m./15 t.p.	...	42 m. 6 f.
1 six-feet „	41 m./16 t.p.		
1 ten-feet „	41 m./18 t.p.		
3 twenty feet spans	43 m./ 7 t.p.	...	41 m. 2 f.
1 five feet span	45 m./13 t.p.	...	38 m. 6 f.
1 twelve-feet span	46 12 t.p.	...	37 m. 6 f.

4. *Canal breaches.*—The sketch-map shows clearly that the flow of the flood water across the canal was greatest between 41st and 46th mile; above this, the right bank of the canal was breached in the 38th mile, and a bad breach occurred close to No. 8 under-tunnel in the left bank. The statement herewith enclosed shows that breaches also occurred at different places from the 38th mile to 28/4; but, although some of these breaches were of a serious nature, no additional cross-drainage works in this part of the canal appear necessary as the existing works are theoretically sufficient, and as the damage done in September 1895 was due to the exceptional force of the flood owing to the sudden breaching of tanks; and, moreover, the canal banks do not appear to have been maintained at a sufficiently high level in this reach. The breaches at each point will now be considered separately, with reference to the additional cross-drainage works required.

5. (*a*) *Necessity for lengthening No. 4 escape.*—The breaches at 45/4 near No. 4 escape were caused chiefly by spill water from the Tammileru which poured through the railway bridge and breached in the railway embankment opposite. The only means of passage across the canal for this volume of water was the road-dam in the right bank and No. 4 escape in the left bank at 45/4. As the escape has only four 9-feet vents, the banks on each side of it soon breached. It is obvious that these vents are quite incapable of discharging a flood which might now pass through the new railway bridge with its clear waterway of 480 feet; it is, therefore, absolutely necessary to increase the discharging capacity of the escape. It may here be remarked that in paragraph 8 of this office No. 313 S., dated 14th September 1895, it was suggested to raise the road which runs parallel to the Tammileru for 5 miles from Ellore and thus convert it into a flood bank which would confine the flood water and direct the whole of it across the Kistna-Ellore canal; but this proposal must now be abandoned as the Superintending Engineer, II Circle, states in his No. 2608 K.S., dated 18th March 1896, that there is no intention of increasing the flood escapes of the Tammileru on the Kistna-Ellore canal; besides, as far as the town of Ellore is concerned, it is much better that there should be a wide area of spill.

In this report, by escape is meant a weir fitted with screw shutters; by outlet, a simple flush weir.
(Initld.) J. C. L.

(*b*) *Quantity of water to be discharged.*—In sending up proposals it was suggested in this office No. 505, dated 1st February 1897, that an additional 400 running feet of weir or outlet was required at No. 4 escape, and from information collected since, it will be seen that this is not too much. In G.O., No. 401 I., dated 21st June 1880, the drainage discharge across the canal between 43 miles 37 chains and 46 miles 32 chains was estimated to be 7,645 cubic feet per second, and the discharging capacity of the cross-drainage works to be 5,442 cubic feet per second, leaving a balance of 2,203 cubic feet per second unprovided for. Mr. Walch, therefore, remarked that it would be advisable to provide an additional 200 feet of weir—a proposal which was approved of in the Chief Engineer's note on the same Government Order. But the condition of things is now altered by the construction of the railway embankment and waterway of 480 feet which must concentrate the whole of the spill water, besides portions of the direct drainage across the canal at No. 4 escape. An additional 200 feet of weir would, therefore, be insufficient and provision must be made for discharging the whole of the Tammileru spill water. Referring, again, to G.O., No. 401 I., of June 1880, it will be seen that the Tammileru spill water to be discharged across the canal is estimated at 3,500 cubic feet per second. The Superintending Engineer, II Circle's No. 2608 K.S., dated 18th March 1896, may be taken in support of this, in which it is stated that the total discharge of the Tammileru is 23,200 cubic feet per second, and the discharging capacities of the East and West Tammileru escapes on the Kistna-Ellore canal are together 18,647 cubic feet per second, which leaves a balance of 4,553 cubic feet per second unprovided for. Hence, it may be concluded that the share of a Tammileru flood to be discharged across the Gódávari-Ellore canal at No. 4 escape is between 4,500 and 3,500 cubic feet per second. By adding on 400 running feet of weir to the escape, its discharging capacity will be increased to 4,800 cubic feet per second (when water stands at 2·5 feet above F.S.L. in the canal and assuming that there is a clear overfall). Though this is rather more than is apparently required, it cannot be considered to give an excessive margin when it is remembered that a clear fall over the new weirs cannot always be counted on and that the waterway of the railway bridge which discharges the flood water is 480 feet.

(*c*) *Design.*—The extension of the escape is to be carried out by adding simple weirs or outlets on each side; their crest level has been kept 6″ above F.S.L. in order to allow the deep channel in rear of the escape to be filled up by opening the vents before water begins to flow over the new weirs and thus obviate the scour which would be caused by the flow of water from the

weir aprons into the escape channel which is at a much lower level and, as a further protection against this, spurs have been run out from each rear return of the escape The retaining wall of the apron has been taken deeper than is apparently necessary; the object of this being that, should scour occur, another apron may be easily added at a lower level. It is proposed to provide a corresponding additional length of road-dam opposite in the right bank. It may be here noted that the flood level in the canal is taken at + 33·5, whereas the flood level during the cyclone was + 36·38, but this latter figure was probably recorded before the banks breached and relieved the canal.

6. Going up the canal, the next point at which it was breached is near the 44th mile at Nos. 7 and 8 outlets, but it is not proposed to provide any additional cross-drainage works at this point, as no new waterways have been provided in the railway opposite, and as the canal will be greatly relieved lower down by the extension of No. 4 escape.

7. At the 42nd mile both banks were breached and over-topped near Nos. 5 and 6 outlets. The damage was evidently, in a measure, due to there being no inlets opposite the outlets, so that the flood water stood up along the outside of the right bank, then suddenly breached through it and after filling up the canal breached and over-topped the left bank. According to G.O., No. 401 I., dated 21st June 1880, the area of the drainage basin which discharges across this part of the canal is 165 square miles, and the run off from it is 13,536 cubic feet per second. This is taken as crossing the canal between 37 miles and 19 chains and 42 miles 40 chains in which the discharging capacity of the cross-drainage works is 8,916 cubic feet per second. To provide for the balance, Mr. Walch suggested that 400 additional running feet of outlet were required. From an inspection of the features of the country, however, it seems that the extent of this basin has been over-estimated and should be treated as crossing the canal between the 41st and 43rd miles. Taking the area from the taluk map it comes to about 120 square miles and with the formula D = C (where C may be taken at 400), the discharges come to 9,720 cubic feet per second. The discharging capacity of the cross-drainage works is 6,756 * cubic feet per second, leaving 2,944 cubic feet per second unprovided for. It is therefore proposed to extend No. 5 escape 300 feet and provide a road-dam opposite, of a length equal to the existing escape and the extension, namely, 400 feet. It is also proposed to construct a 150-feet of road-dam opposite No. 6 outlet.

* Nos. 5 and 6 outlets and No. 9 under tunnel.

8. At the 39th mile the right bank of the canal was over-topped owing to water being held up along the outside by the bund of a small drinking-water tank running at right angles to the canal. The damage that was done is inconsiderable and no new works are required.

9. A breach occurred at the right wing of the No. 8 under-tunnel on the downstream side which endangered the safety of the work. The cross-drainage works seem insufficient at this point of the canal, as Bhimadole railway station at 36th mile (canal mileage) was under water during the cyclone until the canal bank breached. The No. 8 under-tunnel at 37/2 appears to have an undue strain put upon it by the arrangement of the waterways in the railway embankment which runs close the canal at this place. It is difficult to define the actual drainage basin, but from an inspection of the locality it appears that sufficient relief would be given to the under-tunnel by cutting down the right and left banks of the canal for 200 feet at or near 37/4 and thus providing a flush escape where the ground is suitable for the purpose.

10. From 36 to 28/4 the canal was breached at different points, but as already stated it is not proposed to increase the cross-drainage works as the existing ones are theoretically sufficient, and this has been more or less proved to be the case in the cyclone of September 1895, as will be seen from the following paragraph of the Executive Engineer's report, No. 313 S., dated 14th September 1895 :—

"I will now give some levels of the flood compared with the hitherto maximum flood levels of September 1882 :

Ellore Canal.

—	F.S.L.	1895. F.L.	1882. F.L.
$\frac{2\cdot9}{1\cdot0}$ In canal	..	35·64	34·96
$\frac{3\cdot2}{4\cdot0}$ In canal	33·38	34·72	34·80
Above canal	32·80	34·64	35·40
$\frac{3\cdot4}{2\cdot0}$ In canal	..	34·19	33·17
Above canal	32·48	33·91	..
$\frac{3\cdot6}{1\cdot0}$ In canal	..	34·75	..
$\frac{3\cdot7}{1\cdot0}$ In canal	31·79	35·07	34·11
Above canal	32·02	35·92	34·60
$\frac{4\cdot1}{6\cdot0}$ In canal	..	34·38	32·77
Above canal	31·94	34·53	..
$\frac{4\cdot3}{4\cdot0}$ In canal	..	34·26	34·48
Above canal	31·20	36·46	34·78
Below canal	..	31·36	..
$\frac{4\cdot5}{3\cdot0}$ Above canal	..	37·60	35·37
$\frac{4\cdot6}{3\cdot0}$ In canal	31·20	36·18	34·40
	31·20		

From these levels it will be seen that, considering the tops of the banks should be 4 feet above F.S.L., there should have been no breaches above the 37th mile, but below that the banks could not have stood the flood."

Hence, all that is necessary in this reach is the careful maintenance of the flood banks to 4 feet above F.S.L.

11. The direct damage caused by the flood to the banks of the canal between 37 and 47 cannot be estimated at more than Rs. 3,000 and as floods of this nature only occur once in about ten years, it is hardly sufficient to justify such a large outlay. On the other hand, the new works must be looked on as a very possible protection against damage or total destruction to the existing works. Besides, the whole cost will not be borne by the Public Works Department. The Railway department, by the construction of the large waterway opposite the No. 4 escape, have concentrated twice as much drainage across the canal at this work as would otherwise be the case; they should, therefore, be called upon to pay half the cost of the extension. As regards the road-dams, a simple body wall or apron would serve the purpose of this department, so the Local Fund department must be called upon to pay at least two-thirds of the cost. There is thus left an outlay of Rs. 9,728 to be borne by the Public Works Department.

This is scarcely to the point. The necessity for additional cross-drainage works for the Ellore canal was recognized years before the construction of the railway.

(Initld.) J. C. L.
22nd Nov. 1897.

If Local Funds pay one half, it will be as much as can be expected from them, as only one of the retaining walls, a portion of the apron and the metal and gravel appertain to them.

(Initld.) J. C. L.

(Signed) D. MARSHALL,
Executive Engineer.

From W. C. DEMORGAN, Esq., M.I.C.E., Superintending Engineer, I Circle, to the Chief Engineer for Irrigation, dated Waltair, 22nd December 1897, No. 1760 G.D.

With reference to paragraph 5 of my letter, No. 1637, dated 9th instant, I have the honour to state that, in the event of funds being made available, the works can be completed before 31st March 1899.

No. 26 I.

Note by the Chief Engineer for Irrigation.

A cyclone occurred early in September 1895 which did considerable damage to the canals of the Gódávari Western division. In his report on these damages published in Proceedings of Madras Government, No. 855 I., dated 23rd October 1895, the Executive Engineer promised to send a special report on the works that seemed necessary for the safety of the Gódávari-Ellore canal.

2. The Superintending Engineer, I Circle, now submits estimates amounting to Rs. 19,200 for extending two escapes in the 45th and 42nd miles and the road-dams opposite to them (as the District Board road runs parallel to the canal on the upland side), and also for cutting down the right and left banks of the canal at the 36th mile for 200 feet to form flush escapes where the ground is reported to be suitable.

3. The Executive Engineer proposes that, as the extension of the escape at the 45th mile is rendered necessary by the concentration of drainage at this point by the railway, the Railway should bear half the cost of this extension, or about Rs. 3,530; and that, as two-thirds of the work of extension of the road-dams are required for the road, the District Board should bear this proportion of the cost of the extension of the dams. The Superintending Engineer considers, however, that the extension of the escapes is required irrespective of any action of the railway and that no charge need be made on the railway, and that only half the cost of extending the road-dams need be borne by the District Board, that is, about Rs. 2,971, leaving the Government share of the works proposed at Rs. 16,229.

4. The Superintending Engineer reports that the President, District Board, Gódávari, has been addressed regarding its contribution to the cost of the works and that, if the estimate be sanctioned at once, Rs. 5,000 can be spent in the current year.

5. The estimate is recommended for sanction, and the work classed as "unremunerative" as it is not directly remunerative in itself, but being necessary for the canal, can justly be charged to "Capital." The work will probably be completed by the 31st March 1900.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

29th January 1898.

ORDER—No. 186 I., dated 9th March 1898.

The estimate amounting to Rs. 19,200, or Rs. 23,700 including establishment and tools and plant charges noted on the margin, for constructing cross-drainage works, Ellore canal, in the Gódávari Western division, is approved.

Capital Expenditure not charged to Revenue.
49. Irrigation
Gódávari Delta System.
Open Capital Account.
Western Section.
I. Works.
2. Main Canals and Branches.
Ellore Canal.
5. River and Hill Torrent Works.
Unremunerative Work.
Cross-drainage Works.

	RS.
I. Works	19,200
II. Establishment	4,416
III. Tools and plant	84
Total Estimate ...	23,700

2. The result of the reference made to the District Board, Gódávari, referred to in paragraph 4 of the foregoing note of the Chief Engineer for Irrigation, is awaited.

3. Ordered that a copy of these Proceedings, together with the estimate and plans for the works, be forwarded to the Government of India with a request that sanction to the estimate may be accorded at an early date, under "49. Capital Expenditure not charged to Revenue," Gódávari delta system.

[Here enter No. 187 I., dated 9th March 1898.]

(True Extract.)

(Signed) W. HUGHES,
Joint Secy. to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.
" Local and Municipal Department.

ENDORSEMENT—No. 187 I., dated 9th March 1898.

Forwarded.

(By order.)

(Signed) W. HUGHES,
Joint Secy. to Government,
Irrigation Branch.

Ext. T. K. Narayana Aiyangar.

Public Works (1898) Department.

CURRENT No. 1095

From From the Chief Engr for Irrn

Order

No. 261

Dated 29-1-98

Received } 7.2.98

Registered }

Enclosures 30 (9 plans)

Spare copies

SUBJECT.

Estimate of Rs 23700 for constructing cross drainage Works Godavari Division. Note recommending for sanction—

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

His Excellency the Governor.

PUBLIC WORKS DEPARTMENT,

IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Estimate of Rs 23700 for constructing cross drainage works Ellore canal Godavari Gn Note recommended for sanction —

UNDER date the 12

READ the following

From the Supg. Engineer, First Circle. (H.E. No. 1637-G.D. dated 9 Dec. 1897).
From the Supers. Engineer, First Circle. (H.E. No. 1760-G.D. dated 22nd Dec. 1897).

No 26 J.

Note by the Chief Engineer for Irrigation.

A cyclone occurred early in September 1895 which did considerable damage to the canals of the Godavari Western division. In his report on these damages published in P.W.D. No. 855-I dated 23rd October 1895, the Executive Engineer promised to send a special report on the works that seemed necessary for the safety of the Godavari Ellore Canal.

2. The Supers. Engineer, First Circle, now submits estimates amounting to Rs 19,200 for extending two escapes in the 45th and 42nd miles and the road dams opposite to them (as the District Board road runs parallel to the Canal on the upland side) and also for cutting

down the right and left banks of the Canal at the 36th mile for 200 feet to form flush escapes where the ground is reported to be suitable.

3. The Executive Engineer proposes that, as the extension of the escape at the 45th mile is rendered necessary by the concentration of drainage at this point by the railway, the Railway should bear half the cost of this extension or about Rs. 3,530 and that, as two-thirds of the work of extension of the road dams are required for the road, the District Board should bear this proportion of the cost of the extension of the dams. The Supt. Engineer considers, however, that the extension of the escapes is required irrespective of any action of the railway and that no charge need be made on the railway and that only half the cost of extending the road-dams need be borne by the District Board, that

13P

that is about Rs. 297, leaving the Government share of the works proposed at Rs. 16,229.

4. The Supt. Engineer reports that the President, District Board, Godavari has been addressed regarding its contribution to the cost of the works and that if the estimate be sanctioned at once, Rs. 5000- can be spent in the current year.

5. The estimate is recommended for sanction, and the work classed as "unremunerative" as it is not directly remunerative in itself, but being necessary for the Canal, can justly be charged to "Capital." The work will probably be completed by the 31 March 1900.

W.H.
29-4-98

28/4/98

No. 1862 dated 9-3-98
Order thereon.

The estimate amounting to Rs. 19,200 or Rs. 23,700 including Establishment and

and tools and plant charges, noted on the margin, for constructing cross drainage works, Ellore Canal, in the Godavari Western division, is approved.

2. The result of the reference made to the District Board, Godavari, referred to in para 4 of the forgoing order of the Chief Engineer for Irrigation, is awaited.

3. Ordered that a copy of these Proceedings, together with the estimate and plans for the works be forwarded to the Government of India with a request that sanction to the estimate may be accorded, at an early date, under "4g, Capital Expenditure not charged to Revenue," Godavari delta System.

No: 187/39-3-98

Endorsement.

Forwarded.

Capital Expenditure not charged to Revenue.
4g, Irrigation.
Godavari delta System.
Open Capital Account.
Western Section.
I. Works.
2. Main Canals & branches.
Ellore Canal.
5, River and hill torrent works.
Unremunerative work.
Cross drainage works.

I - Works.	———	19,200
II - Establishment.	—	4,416
III - Tools and plant	—	84
Total Estimate		23,700

A.G.H
1.2.98

Draft

Draft letter ~~25~~ 26 cattle undelivered 14/3/98 WH 2.2.98

WH 2-2-98

28/4/98

W.H 29-1-98

1CB 3/4/98

To The Chief Engineer for Irrigation.
" Supp. Engineer, 1st Circle.
" Examiner P. W. Accounts.
E. I. Form No. 1 (a)—250—1-11-97.
" Local & Municipal Dept.

17/3/98

No. 1CB 27/1/98. 28/4/98 HL 31.1.98

CEI
1898

Public Works (1897) Department.

CURRENT No. 340

Order

From W. Demorgan Esquire
Supdg Engineer
I Circle

No. 1760 GD

Dated 22nd December 1897
Received 1st January 1898
Enclosures Nil
Spare copies

SUBJECT.

Cross drainage works on Ellore Canal - Reporting that, in the event of funds being made available, the — can be completed before 31-3-1898

1CB 1/1/98

BACK PAPERS.

G.O.	No.	Department.	Date.
R	263 GD	dy 15-12-97	

FURTHER PAPERS.

G.O.	No.	Department.	Date.

No. 1760 GD

11P

FROM

W.C. Dellengan Esqr M.I.C.E.
SUPERINTENDING ENGINEER,

FIRST CIRCLE.

Enclosures. Nil TO

THE CHIEF ENGINEER
FOR IRRIGATION.

WALTAIR, 22. 12 1897.

Despd 29-12-97

SIR,

With reference to para 5 of my letter No. 1637 dated 9th instant, I have the honour to state that in the event of funds being made available the works can be completed before 31 March 1899.

I have the honour to be
Sir
Your most obedt Servt

W C Dellengan 27/12

Supdtg Engineer 1st Circle

23/12

S. E. I. 1 500—29-2-96.

FROM
SUPERINTENDING ENGINEER,
FIRST CIRCLE.

TO
THE CHIEF ENGINEER
FOR IRRIGATION.

CHIEF ENGINEER FOR IRRIGATION. 1st JAN. 1898 No. R3 GD

DATED
DESPATCHED
RECEIVED } 189 .

No.

ENCLOSURES.

SUBJECT.

Ows.21/1055/98

Public Works (1897) Department.

CURRENT No. 263 GD

Order

From W. Demorgan Esquire
Supt. Engineer Irrn

No. 1637 GD

Dated 7th December 1897
Received 15 — 12 — 97
Enclosures 21+1 list of Enclosures.
Spare copies (9 plans)

SUBJECT.

Cross drainage Works on Eastern Canal Godavari West — Submitting plans and Estimates for Works in Connection with — for obtaining Sanction of Government

D.E.I

18/12/97

BACK PAPERS.

G.O.	No.	Department.	Date.
R 788	W D	24.10.[illegible]5	

FURTHER PAPERS.

G.O.	No.	Department.	Date.

To this Office No 1637 GD

List of Enclosures forwarded to the Chief Engineer for Irrigation - Madras.

Letter No.	Particulars of Enclosures	No of Encls.
1	Estimate of No. 5 outlet with Data sheet Rs 3180	2
2	Do — for the proposed Road dam opposite to no. 5 outlet — Est Rs 3230 -	1
3	Do for Road dam opposite to no 6 outlet Ellore canal with data sheet — Est Rs 1310.	2
4	Do for the proposed outlet on left side of no. 4 Escape at 45 miles 38 chs of Ellore canal. Est Rs 2960	1
5	Do — for the proposed outlet on Right side of no 4 escape with data sheet Est Rs 4200	2
6	Do for Road dam opposite to no 4 Escape Est Rs 4320 —	1
7	Do Abstract General -	1
8	Statement of breaches in Ellore canal banks.	1
9	Report to accompany the Estimates for extending the Cross drainage works on the Ellore canal.	1
10	Tracing for the Extension of No. 5 outlet	1
11	Do of half of Top plan of Road dam opposite to No 6 outlet	1
12	Do Plan of No Escape with proposed outlets on both sides -	1
13	Do — Do of Road dam opposite to no 4 Escape with outlets.	1
14	Do of site plan —	1
15	Cross sections for Extending no 5 outlet —	1
16	Do of Ellore canal —	1
17	Do Site plan of Escape no 4 with proposed outlets -	1
18	Cross section of Ellore canal showing the proposed — outlets and Road dam on both sides of No 4. Escape	1

Total Enclosures 21

CHIEF ENGINEER
FOR IRRIGATION.
15 DEC. 1897
No. 263 GA

SUPERINTENDING ENGINEER
No. 1658
4 OCT 97
CIRCLE

Report to accompany the estimates for extending of cross drainage works on the Ellore Canal.

The cyclone of September/95 did great damage to the Ellore canal between 28½ miles and Ellore lock at the 46th mile, owing to the cross drainage works being of insufficient discharging capacity. Government has, therefore, called for proposals for improving this defect (Govt No. 933 I 5.11.95)

2. A rough sketch map has been prepared which shows the positions of the cross drainage works on the Canal and waterways on the Railway, which runs parallel to the Canal. On this sketch have also been noted in red the positions and lengths of the breaches in the Canal banks which occurred during the cyclone.

New Railway waterways.

3. It will be observed that the Railway waterways have not

not been increased as proposed in GO no 373/15.1.96. The most important new waterway is at 38/13 (Railway mileage opposite 45/4 canal mileage) where a bridge of 7,20 ft spans has been replaced by one of 12,40 ft spans or a clear waterway of 400 feet. The other new waterways are:—

Waterway	Ry mileage	approximate Canal mileage
1,6 ft span	41 m / 14 TP	
1,6 ft do.	41 m / 15 TP	
1,6 ft do.	41 m / 16 TP	42 m / 6 F
1,10 ft do.	41 m / 18 TP	
3,20 ft Spans	43 m / 7 TP	41 m / 2 F
1,5 ft Span	45 m / 13 TP	38 m / 6 F
1,12 ft Span	46 / 12 TP	37 m / 6 F

Canal breaches.

4. The Sketch map shows clearly that the flow of the flood water across the canal was greatest between 41st and 46 miles; above this, the Right bank of the canal was breached in the 38 mile and a bad breach occurred close to No 8 under Tunnel in the left bank. The Statement herewith enclosed shows that breaches also occurred at different places from the 38 mile to 28/4; but although some of these breaches were of a serious nature, no additional cross drainage works in this part of the canal appear necessary as the existing works are theoretically sufficient and as the damage done in September 95 was due to the exceptional force of the flood owing to the sudden breaching of Tanks; and moreover the canal banks do not appear to have been maintained at a sufficiently high level in this reach. The breaches at each point will now be considered seperately with reference to the additional cross drainage work required.

Necessity for lengthening No 4 Escape—

In their report, by escape is meant a weir fitted with screw shutters—by outlet, a simple flush weir.

JCL

5. The breaches at 45/4 near No 4 escape were caused chiefly by spill water from the Tammiliem which poured in through the Railway bridge and breaches in the Railway embankment opposite. The only

only means of passage across the canal for this volume of water was the road dam in the right bank and No 4 escape in the left bank at $\frac{45}{4}$. As the escape has only 419 ft vents the banks on each side of it soon breached. It is obvious that these vents are quite incapable of discharging a flood which might now pass through the new Railway bridge with its clear waterway of 480 feet; it is, therefore, absolutely necessary to increase the discharging capacity of the escape. It may here be remarked that in para 8 of this office No $\frac{313 \text{ S}}{14.9.95}$, it was suggested to raise the road which runs parallel to the Tammileru for 5 miles from Ellore and thus convert it into a flood bank which would confine the flood water and direct the whole of it across the Kistna Ellore Canal; but this proposal must now be abandoned as

Quantity of water to be discharged.

as the Superintending Engineer Second circle states in his No $\frac{2608 \text{ KS}}{18.3.96}$ that there is no intention of increasing the flood escapes of the Tammileru on the Kistna Ellore Canal, besides, as far as the town of Ellore is concerned it is much better that there should be a wide area of spill.

(b) In sending up proposals it was suggested in this office No $\frac{505}{1.2.97}$ that an additional 400 running feet of weir or outlet was required at No 4 escape, and from information collected since, it will be seen that this is not too much. In G.O No $\frac{401 \text{ S}}{21\text{st June } 80}$ the drainage discharge across the Canal between 43 M 37 ch and 46 M mile 32 chains was estimated to be 7,645 cft per second and the discharging Capacity of the cross drainage works to be 5442 cft per second leaving a balance of

of 2.203 cft per second
unprovided for. Mr Walch
therefore remarked that it
would be advisable to provide
an additional 200 feet of
Weir, a proposal which was
approved of in the Chief
Engineer's note on the same
G.O. But the condition of
things is now altered by the
Construction of the Railway
embankment and waterway
of 480 ft which must concentrate
the whole of the Spill water
besides portions of the direct drainage
across the canal at no 4 escape.
An additional 200 ft of Weir
would, therefore, be insufficient
and provision must be made
for discharging the whole of the
Jammiluru Spill water. Referring
again to G.O no $\frac{401\ S}{\text{June 80}}$ it will
be seen that the Jammiluru
Spill water to be discharged
across the canal, is estimated
at 3500 cft per second. The
Superintending Engineer II^nd
Circle's no $\frac{2608\ K}{18.3.96}$ may be taken
in support of this, in which
it is stated that the total
discharge

6 S.P

27200
18647
4553

discharge of the Jammiluru
is 23,200 cft per second & the
discharging capacities of the
East and West Jammiluru
escapes on the Kistna Ellore
Canal are together 18647 cft
per second, which leaves a
balance of 4553 cft per
second unprovided for. Hence
it may be concluded that
the share of a Jammiluru flood,
to be discharged across the
Godavari Ellore Canal at
no 4 escape is between 4500
& 3500 cft per second. By
adding on 400 running feet
of weir to the escape, its
discharging capacity will
be increased to 4800 cft per
second (when water stands
at 2.5 feet above F.S.L in
the canal and assuming
that there is a clear over
fall) Though this is rather
more than is apparently
required it cannot be
considered to give an
excessive margin when
it is remembered that
a clear fall over the new
Weir

400 ft of weir clear overfall
C = 625 9.42 cft per ft
= 3771.2 cft. depth 2 ft.
Existing escape.
4 vents aggregating 35.6 ft long
Sills 4 ft below F.S.L.
Lowered discharge 1029 cfs
with 2 ft head
Total 4800 cfs.

weirs cannot always be counted on and that the water way of the Railway bridge which discharges the flood water is 480 feet.

Design

C. The extension of the escape is to be carried out by adding simple weirs or outlets on each side, their crest level has been kept 6" above F.S.L in order to allow the deep channel in rear of the escape to be filled up by opening the vents before water begins to flow over the new weirs and thus obviate the scour which would be caused by the flow of water from the weir aprons into the escape channel which is at a much lower level and, as a further protection against this, spurs have been run out from each rear return of the escape. The retaining wall of the apron has been taken deeper than is apparently necessary the object of this being that, should

Scour

7 S.P

dam

Scour occur, another apron may be easily added at a lower level. It is proposed to provide a corresponding additional length of road down opposite in the Right bank. It may be here noted that the flood level in the Canal is taken at + 33.5 where as the flood level during the cyclone was + 36.38, but this latter figure was probably recorded before the banks breached and relieved the Canal.

6. Going up the canal the next point at which it was breached is near the 44½ mile at nos 7 & 8 outlets, but it is not proposed to provide any additional cross drainage works at this point as no new waterways have been provided in the Railway opposite and as the Canal will be greatly relieved lower down by the extension of no 4 escape.

7.

7. At the 42nd mile both banks were breached and overtopped near no 5 and 6 outlets. The damage was evidently, in a measure, due to there being no inlets opposite the outlets, so that, the flood water stood up along the outside of the right bank then suddenly breached through it and after filling up the Canal breached and overtopped the left bank. According to GO no 401/S 21st June 80 the area of the drainage basin which discharges across this part of the Canal is 165 Sq miles and the run off from it is 13536 cft per second. This is taken as crossing the Canal between 37m 19ch and 42m 40ch in which the discharging capacity of the cross drainage works is 8916 cft per second. To provide for the balance Mr Walch suggested that 400 additional running feet of outlet were required.

From

8.S.P.

From an inspection of the features of the country, however, it seems that the extent of this basin has been over estimated and should be treated as crossing the Canal between the 41st and 43rd miles. Taking the area from the Taluq map it comes to about 120 Sq miles and with the formula D = C (where C may be taken at 400) the discharge comes to 9720 cft per second. The discharging capacity of the cross drainage works is 6756 cft per second leaving 2944 cft per second unprovided for. It is therefore proposed to extend no 5 escape 300 feet and provide a road dam opposite of a length equal to the existing escape and the extension, namely 400ft. It is also proposed to construct a 150ft of road dam opposite no 6 outlet

× Nos 5 & 6 outlets + no 9 waste Tunnel

Traffic with a little over 2 ft head + slow motion

8. At the 39th mile the right bank of the Canal was overtopped owing to water

water being held up along the outside by the bund of a small drinking water tank running at right angles to the canal. The damage that was done is inconsi-derable and no new works are required.

9. A breach occurred at the right wing of the No 8 under Tunnel on the down stream side which endangered the safety of the work. The cross drainage works seem insufficient at this point of the Canal as Bhimadole Railway station at 36th mile (Canal mileage) was under water during the cyclone until the Canal banks breached. The No 8 under Tunnel at $\frac{37}{2}$ appears to have an undue strain put upon it by the arrangement of the water ways in the Railway embankment which runs close the Canal at this place. It is difficult to define the actual drainage basin but from

9 S.P

from an inspection of the locality it appears that sufficient relief would be given to the 8 under Tunnel by cutting down the right and left banks of the Canal for 200 feet at or near $\frac{37}{4}$ and thus providing a flush escape where the ground is suitable for the purpose.

10. From 36 to $\frac{28}{4}$ the Canal was breached at different points, but as already stated it is not proposed to increase the cross drainage works as the existing ones are theoretically sufficient, and this has been more or less proved to be the case in the cyclone of September 95 as will be seen from the following

para

para of the Executive
Engineer's report No 313 S printed in Govt G.O. 553-9/1900
dated 14.9.95.

"I will now give some
"levels of the flood compared
"with the hitherto maximum
"flood-levels of September/82

Ellore Canal

		F.S.L	F.L 1895	F.L 1882
29/0	in Canal	33.38	35.64	34.96
32/4	In canal	32.80	34.72	34.80
	above canal		34.64	35.40
34/3	In canal	32.48	34.19	33.17
	above canal		33.91	
35/1	In canal	31.79	34.75	
37/1	In canal	32.02	35.07	34.11
	above Canal		35.92	34.60
41/6	In canal	31.94	34.38	32.77
	above Canal		34.53	
43/4	In canal	31.20	34.26	34.48
	above Canal		36.46	34.78
	below "		31.36	
45/3	above Canal	31.20	37.60	35.37
46/3	in canal	31.20	36.18	34.40

"From these levels it will
"be seen that, considering
"the lops of the banks should
"be 4 ft above F.S.L there
"should have been no breaches
"above the 37½ mile but below
"the 37 mile but that the banks could
"not have stood the flood"

Hence,

10 SP

Hence, all that is
necessary in this reach
is the careful maintenance
of the flood banks to
4 ft above F.S.L

11. The direct damage
caused by the flood
to the banks of the canal
between 37 and 47 cannot
be estimated at more
than Rs 3000 and as
floods of this nature
only occur once in about
10 years it is hardly
sufficient to justify
such a large outlay.
On the other hand the
new works must be
looked on as any suitable
against damage or
total destruction to
the existing works.
Besides the whole
cost will not be borne
by the P.W.D. The
Railway Department by the
Construction of the
large

large water, opposite the No 4 escape, have concentrated twice as much drainage across the canal at this work as would otherwise be the case; they should be therefore be called upon to pay ½ the cost of the extension. as regards the road dams, a simple body wall or apron would serve the purpose & if this is departmental, so the Local Fund Department must be called upon to pay at least ⅔ of the cost. There is thus left an outlay of Rs 9,728 to be borne by the P.W.D.

Executive Engineer

24/10/97

OCS 1/1058/98

CHIEF ENGINEER FOR IRRIGATION. 15 DEC. 1897. 263 G8

This is ready for the Press. The necessity for additional cross drainage works for the Ellore Canal was recognised years before the construction of the bridge.

JCC 2/11

If Local Funds pay one half, it will be as much as can be extracted from them, as only one of the retaining walls, a portion of the above & the noted canal obstacles to them.

JCC

W De Morgan

Superintending Engineer First Circle

No. 1637 GD

FROM

W C De Morgan Esqre

SUPERINTENDING ENGINEER

FIRST CIRCLE.

Enclosures. 21 (as per details in the list attached to this)

TO

THE CHIEF ENGINEER

FOR IRRIGATION.

Waltair DOWLAISHWERAM, 9th December 1897. Desp 11th Dcer

SIR,

With reference to G.O. No. 855 I, dated 23rd October 95, I have the Honor to submit herewith plans and estimates for the works noted below in Connection with Crop drainage works, Ellore Canal, Godavari Western Division, and to request that sanction of Govt. may be obtained to the same.

2 The report which accompanies the estimates fully explains the necessity for these works.

3. Rs 10,000 have been promised for these works in the next years budget vide your Memorandum No. 11 I dated 16th November 97.

& Put up with file connected with Schedule of demands on Imptl funds to send to GI on 13/12/97 JCC

4 These works are classed as
unremunerative vide paras 35 II (1) & 36 (c)
Chapter V Volume II S. W. Code

5 Probable date of completion of
these works will be reported shortly.

6. The President District Board
Godavari will be addressed on the subject
of Contributing towards the cost of road
dams and the result will be communicated
to you.

1.	Extension of No 5 outlet	Rs.	3180
2.	Road dam opposite No 5 outfall	}	3230
3	Road dam opposite No 6. outlet	}	1310.
4	Outlet on left side of No 4 Escape.	}	2960
5.	Outlet on right Side of No 4 Escape.	}	4200.
6	Road dam opposite No 4 Escape	}	4320
		Total	19200.

7 The plans and estimates now
submitted were examined and approved
by my predecessor but owing to restrictive
orders on expenditure were held back.

8 If sanctioned at once

Rs 5000 could be spent in the current
year.

I have the honor to be
Sir.
Your Most Obedt Servant
[signature] 10/12
Superintending Engr
I Circle

Est 9/12

CHIEF ENGINEER
FOR IRRIGATION
15 DEC 1897
No. 2634

S. E. I
1

500—12 - 2 - 98

FROM

SUPERINTENDING ENGINEER

FIRST CIRCLE,

TO

THE CHIEF ENGINEER

FOR IRRIGATION.

DATED
DESPATCHED
RECEIVED
} 189 .

No.

ENCLOSURES

SUBJECT.

Orders
1055/88

3

14