Public Works (1896). Department.

G.O., No. 1129
113

DATED 3/2/96

[Despatch Abstract.]

New Head Sluice at Sitanagaram
Kistna Northern Dn —
Estimate for Construction —
approved

BACK PAPERS.

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

FURTHER PAPERS.

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

No. 112 I., 3RD FEBRUARY 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

From the Executive Engineer, Kistna Northern Division, to the Superintending Engineer, II Circle, dated 18th November 1895, No. 446 S.E.

In reference to your endorsement No. 1408 K.S., dated 7th October 1895, on Chief Engineer's No. II/155 K.S., dated 25th September 1895, I have the honour to submit herewith plan and estimate, amounting to Rs. 87,700,* for constructing a new head sluice at Sitanagaram, duly revised with reference to the instructions conveyed in the Chief Engineer's memorandum quoted above.

* Corrected to Rs. 88,000.

No. 1903 K.S.

Submitted to the Chief Engineer for Irrigation, with reference to his No. II/155 K.S., dated 25th September 1895.

(Signed) W. L. C. BADDELEY, Major, R.E.,
Suptg. Engr., II Circle.
6th December 1895.

ENCLOSURE.

REPORT to estimate for constructing a new head sluice to the Kistna Western Delta Main Canal at Sitanagaram.

Authority.—The existing head sluice is badly cracked through the crowns of the arches and also in the abutment wings, and the Chief Engineer for Irrigation in his letter, No. II/149 K.S., dated 10th October 1894, ordered the construction of a new one.

2. *Original estimate not sanctioned.*—In December 1894, an estimate was submitted for the construction of such a sluice of roughly squared blocks of Bezwada stone (sand stone) with chisel-dressed faces with 20 vents of 6 feet span and a total vent area of 1,080 square feet. A granite floor 1′ 6″ thick was also provided for.

The cost of this work was estimated at Rs. 1,18,500, but as the cost of the roughly squared stone was considerably under-estimated, this sum would have probably been exceeded in construction.

3. The estimate was returned not sanctioned by the Chief Engineer † with orders to substitute for it a work subsidiary to the existing sluice only and designed to take a 12-feet head of water, which would be held up in a chamber between the old sluice and the new work (200 feet in rear) and thus relieve the former of part of the water-pressure which it has now to bear.

† *Vide* Chief Engineer for Irrigation, No. II/8 K.S., dated 31st January 1895.

4. It was impossible to construct, economically, a work of this nature, as we were on receipt of these orders committed to a considerable expenditure for materials for the foundations and granite flooring of the sluice, as originally designed, and on this being represented to the Chief Engineer, on his inspection on the 10th March 1895, permission was given to put in foundations capable of carrying a head sluice, but omitting a row of wells in front of the curtain wall which appeared in the original design. Orders were also given to so design the work as to render it capable of taking the place of the head sluice should the existing sluice, in spite of the auxiliary work behind it, develop further serious cracks, &c.—*vide* Chief Engineer's No. II/155 K.S., dated 25th September 1895.

5. The above is briefly the history of the work, the designs and estimate for which is now submitted and the foundations of which, to the extent shown on the designs, were put in March, April and May 1895.

6. *Foundations.*—The nature of the foundations were expected to be sandy and water-bearing, and in view of this, lines of wells were provided for as curtain walls in front and rear of a platform of concrete on which the sluice stands and which forms its rear apron. Well bricks were consequently procured, well curbs prepared, &c., before the commencement of the working season last year. On actual excavation, supplemented by borings, it was found that the soil down to foundation level and for several feet below was stiff clay for the most part, but in places the clay was admixed with sand, and in places there were pockets of pure sand. On the whole it may be said the soil was stiff clay, in which wells could not be sunk, at the same time giving facilities for building an ordinary curtain wall in open foundations. These were put in as shown on the plan, a few wells being sunk here and there where the soil was sandy and water-bearing.

Some small quantity of foundation remains to be put in next season for the curtain walls and returns of the wings extending through the existing retaining walls on either side of the canal.

Some trouble from springs may be anticipated on the left side owing to the immediate vicinity of Sitanagaram hill.

7. *Flooring.*—This is of granite 6" thick on the average. The stones were ordered before the Chief Engineer's order to use surki concrete surfaced with small stone Portland cement concrete was received. The full supply of stone ordered was, however, countermanded, and the thickness of granite is reduced from 1' 6" to 6". The stones are not all of the same thickness, but vary from 8" to 5". They will be selected and laid with the thickest stones under and in the immediate vicinity of the shutters. The flooring will run under the masonry of the vents on either side two inches. It is to be laid in surki mortar over surki concrete and flush pointed with Portland cement (1 to 1).

8. *Size of vents, &c.*—The vents have, by order of the Chief Engineer, been increased from 6 to 8 feet span. They are 16 in number, 8 feet to springing of arch which has a rise of 1' 6". The area is therefore 72 square feet (nearly) per vent and total vent area for the sluice 1,152 square feet as against 810 square feet of the existing sluice.

The depth of full supply in the canal is 9 feet. The discharge with a head of ·25 (taking the vents, as wholly submerged, which is not quite but very nearly the case) will be about 3,456 cubic feet per second with a co-efficient of .75. The ultimate irrigable area has not been definitely fixed, but 315,000 acres is at present the figure which, it is believed, will be arrived at.

The sluice will, therefore, be capable of discharging the supply required for the ultimate area.

8. (*A*) *Superstructure material.*—It is proposed to build the sluice of Sattenapalle granite for the supply of which, with the permission of the Chief Engineer, a contract has been entered into. The bulk of the work will be of coursed rubble. The front cut-waters and corbelling granite ashlar fine dressed with a rubble hearting. The faces of the arch-work of ashlar and the interior of the arches, voussoirs of granite roughly dressed.

9. *Comparative cost of granite rubble and Bezwada hammer-dressed stone with chisel-dressed face work.*—Although at first sight the building in granite appears more expensive than the hammer-dressed Bezwada stone, the rate for building being somewhat high, owing to the necessity of importing labour from a distance and the lead of the stone which is 30 miles; this is counterbalanced by the fact that the chisel-dressing of the face work is not necessary in the case of granite, while as regards both durability and appearance the latter is very much superior.

A comparative statement is added of the cost of the roughly-squared blocks of Bezwada stone with dressed faces in surki mortar, provided for in the original estimate and of the granite coursed rubble in surki mortar as now provided for—

Coursed granite rubble in surki mortar.

	RS.	A.	P.
112 cubic feet stone at site ...	24	12	0
Labour for building	9	0	0
Mortar	6	0	0
Watering and sundries	0	4	0
Total ...	40	0	0

Bezwada stone hammer-dressed in surki mortar with faces chisel-dressed.

	RS.	A.	P.
100 cubic feet hammer-dressed stone at site	21	0	0
Labour for building	5	0	0
Mortar	5	0	0
Sundries	0	6	0
20 square feet dressed facing at Rs. 25–10–0	5	2	0
Total ...	36	8	0

10. *Revetment.*—By order of the Chief Engineer for Irrigation, the hammer-dressed stone revetment originally provided for is replaced by a grass one, the slopes of the sides of the chamber between old and new sluice being altered from 1 to 1 to 1½ to 1 and the wings prolonged.

A sum of Rs. 418 is provided for hammer-dressed stone revetment already done and for which material has been collected.

11. *Apron.*—The space between the rear curtain wall of the old sluice and the front curtain wall of the new at the bottom of the chamber is provided with a rough stone apron.

12. *Screw-gearing.*—Shutters of 5" teak have been provided, this being for an 8-foot span about equivalent in stiffness to 3¾ for a 6-foot span. Shutters 3½" have stood and given satisfaction in Bezwada head sluice. The shutters all work under the same maximum head, and there appears to be no reason for making them, as is often done, of different thickness. They are, therefore, all designed of the same thickness.

An alteration in the screw-gearing, which allows the top shutters to be lowered as well as raised, so that in flood time the water can be admitted over the top of this shutter instead of over the top of the middle shutter, has been provided for by order of the Chief Engineer for Irrigation. A feather also has been allowed at the back of each of the grooves in the casting to afford a better key for the casting in the cement concrete in which it is embedded.

13. *Contract for the works.*—The pencil design having been seen and approved by the Chief Engineer and the alterations ordered by him having been provided for, a contract for carrying out this work has, with the sanction of the Superintending Engineer, II Circle, been entered into, and the dressing of the cut-stone and collection of material is in progress. The making of the screw-gearing has also been put in hand.

(Signed) W. M. ELLIS, Captain R.E.,
Ex. Engr. Kistna Northern Div.

14th November 1895.

No. 10 I.

Submitted to Government. The estimate for the new head sluice at Sitanagaram to take the place of the existing head sluice reported to be in a shaky condition in Proceedings of Madras Government, No. 817 I., dated 25th October 1894, has been prepared in accordance with instructions issued from this office and is approved and recommended for sanction.

(Signed) R. R. E. DRAKE-BROCKMAN, Col., R.E.,
Chief Engineer for Irrigation.

11th Jan. 1896.

ORDER—No. 112 I., dated 3rd February 1896.

The estimate amounting to Rs. 88,000 for constructing a new head sluice at Sitanagaram, Kistna Northern division, is approved.

2. The formal sanction of Government thereto should be applied for as soon as the sanction of the Government of India to the application * for an additional sum of Rs. 8 lakhs for unforeseen works of the Kistna delta system is communicated to the Superintending Engineer, II Circle.

* *Vide* Proceedings of Madras Government, No. 66 I., dated 18th January 1896.

3. Ordered that a copy of these Proceedings be forwarded to the Government of India for information.

[Here enter No. 113 I., dated 3rd February 1896.]

(True Extract.)

(Signed) R. R. E. DRAKE-BROCKMAN, Colonel, R.E.,
Secretary to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with eight enclosures.
" Examiner, Public Works Accounts.
" ~~Public~~ Works Department.
" Rev

ENDORSEMENT—No. 113 I., dated 3rd February 1896.

Forwarded.

(By order.)

Colonel, R.E.,
Secretary to Govt., P.W.D.,
Irrigation Branch.

Exd. C. M. Brisson.
Spare Copies

IRRIGATION.
ACCOUNT.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated February, 3rd.

Recd. *Encl.*

G.O. Nos. 112, 113 I., 3rd Feb. 1896.

FEBRUARY.

Sluice

Forwarding Proceedings approving, with remarks, the estimate of Rs. 88,000 for constructing a new head sluice at Sitanagaram, Kistna Northern division.

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amtg. to Rs 88,000, for constructing a new head sluice at Sitanagaram, Kistna Northern Dn., is approved.

2. The formal sanction of Govt thereto should be applied for as soon as the [illegible]ction of the Govt of India to the applic[illegible] for an additional [illegible] of Rs 8 lakhs for unforeseen works of the Kistna Delta [illegible] is communicated to the Supg Engr. II Circle.

3. Ordered that a copy of these Procs: be forwarded to the Govt of India for informat[illegible]

Endorsement — No. 112 I. of 3d Feby 1896. Forwarded.

E. I. Form No. 1—500—14-5-95

Recd 11/1

the Chief Engineer
substitute for it a
wor

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

)F THE MADRAS GOVERNMENT.

UNDER date the

READ the following

L. No. 1903 K.S. d/ 6 Dec/95
No 10 I d/ 4-1-96

Submitted to Govt. The estimate for the new head sluice at Sitanagara to take the place of the existing h sluice reported be in a shaky co dition in P.M.G. 817 I. d/ 25 Oct. has been prepared in accordance with instructions issued from this office & is approved & recommended for sanction.

[illegible]

Order thereon
No. 112 I. d/ 3rd February 1896
The estimat

A

PROCEEDINGS C

Special Rep to W.

From Supdg Engr. Circ

So far as I can make out the origl. estte. of Rs 118500 for this work was prepared without the preliminary precaution of sinking bore holes or taking other means to ascertain the nature of the soil in which the foundation had to be laid. Money has been wasted therefore in procuring well bricks, curbs &c which cannot be used & are not required. Several changes in the design have also been made after engagements had been entered into for materials. I am of opinion that the matter has not been dealt with in a satisfactory manner.

W.S.
23/1/96

for

Of 1

The work was of an emergent nature, and the preparation of materials had to be made whilst the Canals were flowing full, so that the work could be started as soon as the Canals closed in March last. It is most probable that such of the materials as are not used up on this work will come in for some of the numerous other works that will have to be carried out in the Delta. None of these materials are of a perishable nature.

Letter [illegible] to W.S. 30/1/96

R.E.D.B. 25/1

J.G. 23/1/96

W 20 Jan

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the Chief Engineer
substitute for it a
work

P. W. CURRENT No. 488

[illegible]

Estimate for a new head sluice at Sitanagaram [illegible] Northern Dn.

Enclos II (5 plans)
Recd: 17.1.96

For orders T.M.G. in Circ. No. 66 dated 18 Jan/96.

To ~~H.E.~~
[illegible]
Reg. [illegible]

Recd 25/1

B.R.
24.1.96

W
29 Jan

~~F.E.D.~~

Issue

Recd 31/1

"J"

B.R.
31.1.96

To
The Chief Engr for I.
Supg Engr II with 9 enclos
Ex. Engr [illegible]
Rev Dept
1 Ch. 10/1

B.R.

DESPATCHED
21 FEB. 96

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y to the 88,000
Constructing a new
head sluice at [illegible]
[illegible]
[illegible] Dt., is
approved.
2. The [illegible]
tion of [illegible]
should [illegible]

(No. 1709)

Mr. I

Can you tell me please why this G.O. has been communicated to the "Public Works Dept" - The G.O. is already in the P.W. Dept. Perhaps the Revenue Dept is meant? If so, the communication should be altered -

R.S.
22 Feb 96

C.A.T.

It is a printers mistake. Revenue Dept was intended - please see the original -

B.R.
22.2.96

H.C.

Please correct.

R.S.
22 Feb 96.

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the Chief Engineer
substitute for it a
work

Report to Estimate for Constructing a new Head Sluice to the Kistna Western Delta Main Canal at Seethanagaram

Authority

The existing Head sluice is badly cracked through the crowns of the arches and also in the abutment wings, and the Chief Engineer for Irrigation in his letter No $\frac{II}{149}$ KS. dated 10th October 1894 ordered the construction of a new one.

Original Estimate not sanctioned

2 In December 1894 an estimate was submitted for the construction of such a sluice of roughly squared blocks of Bezwada stone (sand stone) with chisel-dressed faces with 20 vents of 6 feet span and a total vent area of 1080 Sft. A granite floor 1-6" thick was also provided for.

The cost of this work was estimated at Rs 118,500, but as the cost of the roughly squared stone was considerably under estimated, this sum would have probably been exceeded in construction.

× Vide Chief Engr. for Irrigation No $\frac{II}{8}$ KS d/31st January/95

3 The estimate was returned not sanctioned by the Chief Engineer× with orders to substitute for it a work

work subsidiary to the existing sluice only and designed to take a 12 ft head of water, which would be held up in a chamber between the old sluice and the new work (200 ft in rear) and thus relieve the former of part of the water pressure which it has now to bear.

4 It was impossible to construct economically a work of this nature as we were on receipt of these orders committed to a considerable expenditure for materials for the foundations, and granite flooring of the sluice as originally designed, and on this being represented to the Chief Engineer on his inspection on the 10th March/95, permission was given to put in foundations capable of carrying a head sluice, but omitting a row of wells in front of the curtain wall which appeared in the original design - Orders were also given to so design the work as to render it capable of taking the place of the Head sluice should the existing sluice inspite of the auxiliary work behind it develope further

further serious cracks &ca vide Chief Engineer's No 11/156 KS. dated 25th September
155 KS
1895.

5 The above is briefly the history of the work, the designs and Estimate for which is now submitted and the foundations of which to the extent shewn on the designs were put in in March, April & May 1895.

Foundations

6 The nature of the foundations were expected to be sandy and water-bearing, and in view of this, lines of wells were provided for as curtain walls in front and rear of a platform of Concrete on which the sluice stands and which forms its rear apron. Well bricks were consequently procured well curbs prepared &c, &c, before the commencement of the Working season last year. On actual excavation supplemented by borings, it was found that the soil down to foundation level and for several feet below was stiff clay for the most part, but in places the clay was admixed with sand, and in places there were pockets of pure sand. On the whole it

it may be said the soil was stiff clay in which wells could not be sunk, at the same time giving facilities for building an ordinary curtain wall in open foundations. These were put in as shewn on the plan, a few wells being sunk here & there where the soil was sandy and water bearing.

Some small quantity of foundation remains to be put in next season for the curtain walls and returns of the wings extending through the existing retaining walls on either side of the Canal.

Some trouble from springs may be anticipated on the left side owing to the immediate vicinity of Seethanagaram Hill.

Flooring

7 This is of granite 6" thick on the average. The stones were ordered before the Chief Engineer's order to use surki concrete surfaced with small stone Portland Cement concrete was received. The full supply of stone ordered was however, countermanded, and the thickness of granite is reduced from 1'-0" to 6". The stones are not all of the same thickness but vary from 8" to 5". They will be selected and laid with the thickest stones under and in the immediate vicinity of the shutters. The flooring will run under the masonry of the vents on either side two inches. It is to be laid in surki mortar over surki concrete and flush pointed with Portland Cement (1 to

Size of Vents &c.

8 The vents have by order of the Chief Engineer been increased from 6 to 8 ft span. They are 16 in number 8 feet to springing of arch which has a rise of 1'-6". The area is therefore 72 Sft (nearly) per vent and total vent area for the sluice 1152 Sft as against 810 Sqft of the existing sluice.

The depth of full supply in the Canal is 9 ft. The discharge with a head of ·25 (taking the vents as wholly submerged, which is not quite but very nearly the case) will be about 3456 Cft per second with a Coefficient of ·75. The ultimate irrigable area has not been definitly fixed but 3,15,000 acres is ~~not~~ at present the figure which, it is believed, will be arrived at.

The sluice will, therefore, be capable of discharging the supply required for the

the ultimate area.

Superstructure material

8(A) It is proposed to build the sluice of Sattenapalli granite for the supply of which, with the permission of the Chief Engr. a contract has been entered into. The bulk of the work will be of Coursed-rubble. The front cut waters and corbelling granite ashlar fine dressed with a rubble hearting. The faces of the arch work of ashlar and the interior of the arches, voussoirs of granite, roughly dressed.

Comparative cost of granite rubble and Bezwada hammer dressed stone with chisel-dressed face work

9 Although at first sight the building in granite appears more expensive than the hammer dressed Bezwada stone, the rate for building being some what high owing to the necessity of importing labor from a distance & the lead of the stone which is 30 miles; this is counterbalanced by the fact that the chisel-dressing of the face work is not necessary in the case of granite, which as regards both durability and appearance the latter is very much superior.

A comparative statement is added of the cost of the roughly squared blocks of Bezwada stone with dressed faces in

in Surki mortar provided for in the original estimate and of the granite coursed rubble in Surki mortar as now provided for.

Coursed granite rubble in Surki mortar	Rs A. P.	Bezwada stone hammer dressed in Surki mortar with faces chisel-dressed	
112 Cft stone at site	24-12-0	100 Cft Hammer dressed stone at site	21-0-0
Labor for building	9-0-0	Labor for building	5-0-0
Mortar	6-0-0	Mortar	5-0-0
Watering & sundries	0-4-0	~~Watering~~ & Sundries	0-6-0
		20 Sft dressed facing @ 25-10-0 %	5-2-0
	40-0-0		36-8-0

Revetment

10 By order of the Chief Engineer for Irrigation the Hammer dressed stone revetment originally provided for is replaced by a grass one the slopes of the sides of the Chamber between old & New sluice being altered from 1 to 1 to 1½ to 1 and the wings prolonged.

A sum of Rs 418 is provided for Hammer-dressed stone revetment already done & for which material has been Collected.

Apron

11 The space between the rear curtain wall of the old sluice and the front curtain wall of the new at the bottom of the Chamber is provided with a rough stone apron.

Screw Gearing

12 Shutters of 5" teak have been provided

this

this being for an 8 foot span about equivalent in stiffness to $3\frac{3}{4}$ for a 6 foot span. Shutters $3\frac{1}{2}''$ have stood and given satisfaction in Bezwada Head sluice. The shutters all work under the same maximum head, and there appears to be no reason for making them as is often done of different thickness. They are, therefore, all designed of the same thickness.

An alteration in the screw gearing which allows the top shutters to be lowered as well as raised, so that in flood time the water can be admitted over the top of this shutter instead of over the top of the middle shutter, has been provided for by order of the Chief Engineer for Irrigation. A feather also has been allowed at the back of each of the grooves in the Casting to afford a better key for the Casting in the cement-concrete in which it is embedded.

Contract for the works

13. The pencil design having been seen and approved by the Chief Engineer and the alterations ordered by him having been provided for, a Contract for carrying out this work has, with

Superintending Engineer 2nd Circle, been entered into, and the dressing of the cut stone and collection of material is in progress. The making of the Screw Gearing has also been put in hand

6 AP

Wm L Ellis

Captain R.E.
Executive Engineer
Kistna Northern Division

14/11/95

BC
Du 12/11

CHIEF ENGINEER
FOR IRRIGATION.
12 DEC. 95
No. 264 K.S.
4

Letter from the Executive Engineer Kistna Northern Division, to the Superintending Engineer, II Circle, No. 4468 dated 18th November, 1895.

In reference to your Endorsement No. 1408 K.S. dated 7th October, 1895, on Chief Engineer's No. II/156 K.S. dated 25th September, 1895, I have the honour to submit herewith plan & estimate amounting to Rs 87,700* for constructing a new Head Sluice at Sithanagaram duly revised with reference to the instructions conveyed in the Chief Engineer's Memorandum above.

* corrected to Rs: 88.000.

Enclos: 9

1 Dvt Estimate ✓
1 Report ✓
1 Specification ✓
1 Data ✓
×5 Tracings

No. 1903 K.S. / 6/9 12-95 Submitted to the Chief Engineer for Irrigation, with reference to his No. II/155 K.S. dated 25th September 95.

W. W. Baddeley, Major R.
Superintending Engineer
II Circle

× sent in a separate packet
W.

CHIEF ENGINEER
FOR IRRIGATION.
12 DEC. 95
No. 2534 Ks

From

The Supdg Engineer
Second Circle

To
The Chief Engineer
For Irrigation

Dated 6 } December 1895
Despd 9 }

Enclo 9.

No 1903 KS

No. 193 I of 24-3-90 ✓
„ 159 I „ 6-1-91 ✓
„ 510 I „ 7-7-94 ✓
„ 817 I „ 25-10-94 ✓
„ 890/A I „ 14-11-94 ✓

PWE1
488/96

New Head Sluice at Sitanagaram —

Resubmitting plans and Estimate for constructing duly revised as per C.E.'s instructions