

**IN THE COURT OF NATIONAL GREEN TRIBUNAL SITTING AT
CHENNAI
O.A.No. 84 of 2020**

INDEX

Sl.No	Details	Page No.
1	G.O.Ms.No.57 Revenue (Assn.I) Department dated:16-02-2015	1-2
2	GO.RT. No.388 Water Resources (Projects.III) Department dated:15-07-2020	3-4
3	Hon'ble High Court of Andhra Pradesh Orders in W.P No.34483 of 2012	5-8
4	Award No. 1/2013 dated: 05-2013	9-40
5	G.O.Ms.No.510 Revenue (Lands.I) Department dated:30-12-2019	41-42
6	G.O.Ms.No.783 Revenue (LA) Department dated:09-10-1998	43
7	Chief Engineer & DWRO, WRD, Kurnool Progds No. WRD-TW0KCC(TS)/2/2017/D.E.E.1/AEE 3/Kundu PW dated:28-06-2017	44-45
8	Collector, Kurnool Proceedings No. Neeru Chettu/SRBC/1NDL/TW/ATO/NC dated:23-04-2017	46-47
9	RSR copies	48-52
10	Tender Notice No. SE/2020-21 dated: -06-2020 by water Resource Department	53-469
11	Report of the Technical Expert Committee of Project Works in Kurnool Dated:16-12-2015	470-475

GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

Lands - Government Lands - Government Land Allotment Policy - Uniform guidelines with regard to allotment of Government land for various purposes to different Government departments and private organisations - Empowering the District Collectors to resume allotted land in case of violation of conditions of alienation - Amendments - Orders - Issued.

REVENUE (ASSN.I) DEPARTMENT

G.O.MS.No.57

Dated 16-02-2015.

Read the following:

1. G.O.Ms.No.571, Revenue (Assn.I) Department, dt: 14.09.2012.
2. G.O.Ms.No.607, Revenue (Assn.I) Department, dt: 11.10.2012.
3. From the Spl. Chief Secretary & Chief Commissioner of Land Administration, A.P., Hyderabad, letter No.B1/457/2011, dated 25.06.2013.
4. From the Spl. Chief Secretary & Chief Commissioner of Land Administration, AP, Hyderabad, D.O. Letter No.B1/457/2011, dated 04.10.2013.

<<>>

O R D E R:

In the G.O. 1st read above, orders were issued approving the "Government Land Allotment Policy" and prescribing the uniform and comprehensive guidelines with regard to allotment of Government land for various purposes to different Government departments and private organisations both in terms of extent and rate on the allotments.

2. Further, in the G.O. 2nd read above, Government have constituted Andhra Pradesh Land Management Authority (APLMA) with certain powers and responsibilities regarding processing the proposals for land allotment and recommending to Government, as required under para 3 (c) of the G.O. 1st read above.

3. According to para 3 (e)(iv) of the G.O. 1st read above, the APLMA will periodically review the overall allotment and utilisation of the land. If the allottee has not utilized the land for the purpose for which it was allotted or changes the purpose, then action will be proposed to resume the land. Para 3 (k) of Annexure to G.O.Ms.No.571, Revenue (Assn.I) Department, dated 14.09.2012 provides that "whenever it comes to the notice of the administrative department, the District Collector or the Revenue Staff, that the allottee has violated any condition of alienation or conditions specified in the Memorandum of Understandings, proceedings of resumption of land shall be initiated after giving reasonable opportunity to the allottee to explain the alleged violation/ deviation". Further, according to para 5(i) of the G.O. 2nd read above, the Committee shall be vested with processing and recommending the land allotment, with the task of monitoring the utilization of land for the intended purpose and resumption of land in case of violation of conditions. As such, there is ambiguity about the powers of the APLMA/ Collectors to resume the allotted lands in case of violations of conditions of alienation.

4. The Chief Commissioner of Land Administration, AP, Hyderabad in his letter 3rd read above, has stated that most of the allottees/ alienees for whom the land has been allotted/alienated with some specific conditions are either keeping the land vacant after getting the allotment or putting it into use in total violations of the conditions of the alienation. Since the original allotment is done by Government after Cabinet approval, any cancellation of such allotment now has to go all the way upto the Cabinet and this is likely to cause huge delays in taking action for violations of conditions of alienation. By the time the matter is taken up with the Government, concrete structures are coming up making it difficult to remove them. Thus, it is appropriate to properly delegate this power of cancellation to the District Collectors. In case of any violation, the District Collectors would be in a position to cancel the alienation and resume the land duly following the procedure, immediately.

(P.T.O.)

5. The Chief Commissioner of Land Administration, A.P., Hyderabad has therefore requested the Government (i) to insert an additional paragraph in all future allotments in every Cabinet Resolution itself that the District Collectors shall be competent to resume the land in case of violation of conditions; and (ii) to authorize the District Collectors in all allocations already made by specific Resolution or any order, to exercise the powers of Government regarding resumption of the land allotted subject to violations of conditions.

6. Government after careful examination, hereby as follows :-

- (i) The concerned District Collector shall be empowered to cancel and resume land on the grounds of violation of conditions or non-utilisation of the allotted land in favour of private individuals/ private organisations/ Government organisations/ Government departments. This shall be made applicable to all previous allotments made hitherto.
- (ii) In all future land allocations going before the Council of Ministers, as a part of other conditions of such allocation one more conditions shall be indicated that- "for violation of condition as well as for non-utilisation of land, the District Collector of the District concerned would be the authority to cancel and resume the land from the allottee".
- iii) a) In annexure to G.O.Ms.No.571, Revenue (Assn.I) Department, dated 14.09.2012, para 3(e)(iv) shall be deleted.
b) In G.O.Ms.No.607, Revenue (Assn.I) Department, dated 11.10.2012, para 5(i) shall be deleted.

7. The Chief Commissioner of Land Administration, AP, Hyderabad and the District Collectors in the State shall take further necessary action accordingly in the matter.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

J.C.SHARMA,
PRINCIPAL SECRETARY TO GOVERNMENT.

To
The Chief Commissioner of Land Administration, AP, Hyderabad.
All Department of Secretariat.
All Head of Departments.
All District Collectors.
All Assignment Sections in Revenue Department.
Copy to
The PS to Secretary to Hon'ble C.M.(GSP).
The PS to Hon'ble Dy.C.M.(Revenue).
The PS to C.S.
The PS to Prl.Secy to Govt., Revenue (Assn.) Department.
Sf/Sc.

// Forwarded :: By order //

SECTION OFFICER.

GOVERNMENT OF ANDHRA PRADESH

ABSTRACT

Water Resources Department – “Improvements to Escape Channel, Nippulavagu, Galeru River and Kundu River from Km 0.000 to Km 189.200 and Re-gradation of Vagu, flood Protection works and providing high level Bridges to en-route villages for improving the carrying capacity to 35000 cusecs” - Administrative Approval – Accorded – Orders – Issued.

WATER RESOURCES (PROJECTS.III) DEPARTMENT

G.O.RT.No. 388

Dated: 15-07-2020.

Read the following:-

- 1) From the Chief Engineer (P), Kurnool Letter No. CE/KNL/TWKCC(AA)/DEE4/AEE7/Rayalaseema Projects/1/2020, Dt:01/02/2020.
- 2) From the Chief Engineer (P), Kurnool
Lr.No.CE/KNL/DEE3/AEE2/Rayalaseema Projects/2020, Dt: 28.04.2020

&&&&

ORDER:

In the letters 1st and 2nd read above, the Chief Engineer (P), Kurnool has requested the Government to accord administrative approval for the work “Improvements to Escape Channel, Nippulavagu, Galeru River and Kundu River from Km 0.000 to Km 189.200 and Re-gradation of Vagu, flood Protection works and providing high level Bridges to enroute villages for improving the carrying capacity to 35000 cusecs” for an amount of Rs.1501.00 Crores.

2. Government after careful examination of the proposal of Chief Engineer (P), Kurnool, hereby accorded administrative sanction for the work “Improvements to Escape Channel, Nippulavagu, Galeru River and Kundu River from Km 0.000 to Km 189.200 and Re-gradation of Vagu, flood Protection works and providing high level Bridges to en-route villages for improving the carrying capacity to 35000 cusecs” for an amount of **Rs.1415,00,00,000/- (Rupees One Thousand Four Hundred and Fifteen Crores only)** in relaxation of FRBM norms subject to condition that the CE has to ensure the following before according technical sanction:

i)	The correctness of provisions, quantities, rates proposed in the estimate.
ii)	The design/drawings has to be approved by the competent authority
iii)	As per the revised Sand Policy of the Govt. the Sand rate has to be adopted.
iv)	Detailed estimates/quotations has to be supported for the LS provisions.
v)	The Present proposal may not overlap under Up-gradation Pothireddypadu Head Regulator.

P.T.O.

:: 2 ::

3. The above expenditure is debitable to the HOA: 4700-01-109 KCC -11 - 27C&D 530/531 O.E.

4. The Chief Engineer (Projects), Kurnool shall take further action accordingly.

5. This order issues with the concurrence of Finance (FMU.WR.II) Department vide their UO No. FIN01-FMU0MRAS(WR2)/ 136/2020-FMU-WR-II, dated:07-06-2020.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

ADITYA NATH DAS
SPECIAL CHIEF SECRETARY TO GOVERNMENT

To

The Chief Engineer (Projects), Kurnool.

Copy to:

The ENC (I), Vijayawada.

The Director of Works & Accounts, Vijayawada

The Finance (FMU.WR.II) Department

The PS to Minister (WRD)

The PS to Special Chief Secretary (WRD)

File No. ICD01/MJIR/136/2020-PRO-III (1091008)

SF/SC

//FORWARDED :: BY ORDER//

SECTION OFFICER

Cites 4 docs

The Land Acquisition Act, 1894

V.Chandrasekaran & Anr vs Administrative Officer & Ors on 18 September, 2012

Section 48 in The Land Acquisition Act, 1894

Section 21 in The General Clauses Act, 1897

Get this document in PDF

Print it on a file/printer

View the actual judgment from court

User Queries

land owner

uma devi : judgment

visakhapatnam

encumbrance

*Try out our **Premium Member** services: **Virtual Legal Assistant**, **Query Alert Service** and an ad-free experience. **Free for one month** and pay only if you like it.*

Andhra High Court

Surada Tata Rao vs The Collector & District ... on 29 November, 2012

THE HONOURABLE SRI JUSTICE C.V.NAGARJUNA REDDY

WRIT PETITION No.34483 of 2012

29-11-2012

Surada Tata Rao..... Petitioner

The Collector & District Magistrate,
Visakhapatnam, Visakhapatnam District,
and others..... Respondents

Counsel for Petitioner: Ms. M. Uma Devi for Mr.
G. Rama Gopal

Counsel for Respondents: AGP for Land Acquisition.

<GIST:

>HEAD NOTE:

?CITATIONS:

2012 (9) SCALE

ORDER:

This writ petition is filed for a Mandamus to set aside endorsement in Rc.No.18/11/E2/SW, dated 01.10.2011, of respondent No.2.

I have heard Ms. M. Uma Devi, learned counsel representing Mr. G. Rama Gopal, learned counsel for the petitioner, and the learned Assistant Government Pleader for Land Acquisition.

The petitioner was the owner of Ac.0.47 cents of land in Sy.No.34/3 of Chepalauppada Village, Bheemunipatnam Mandal, Visakhapatnam District. The said land was acquired by the Government in the year 1985 for the purpose of construction of houses to the weaker sections under the provisions of the [Land Acquisition Act](#), 1894. The petitioner admitted that he was paid compensation for the said land, but claimed that he continued to be in possession of the said land as the same was not utilized by the Government for the purpose for which it was acquired. The petitioner approached respondents 1 and 2 with a request to re-convey the said land as the same is not being put to use by the Government. The said request was considered and the same was rejected by respondent No.2 vide the impugned endorsement, whereunder it was stated that the land once acquired stands vested in the Government and that due to any reason if the land is not utilized for the purpose for which it was acquired, the same can be utilized for any other public purpose.

The law is well settled that once the land is acquired and compensation is paid to its owner, it absolutely vests in the State free from all encumbrances. The Supreme Court in [V. CHANDRASEKARAN vs. ADMINISTRATIVE OFFICER](#)¹ held as under:

"The said land, once acquired, cannot be restored to the tenure holders/persons-interested, even if it is not used for the purpose for which it was so acquired, or for any other purpose either. The proceedings cannot be withdrawn/abandoned under the provisions of [Section 48](#) of the Act, or under [Section 21](#) of the General Clauses Act, once the possession of the land has been taken and the land vests in the State, free from all encumbrances.

..In view of the above, the law can be crystallized to mean, that once the land is acquired and it vests in the State, free from all encumbrances, it is not the concern of the land owner, whether the land is being used for the purpose for which it was acquired or for any other purpose. He becomes persona non-grata once the land vests in the State. He has a right to only receive compensation for the same, unless the acquisition proceeding is itself challenged. The State neither has the requisite power to reconvey the land to the person-interested, nor can such person claim any right of restitution on any ground, whatsoever, unless there is some statutory amendment to this effect."

Ms. M. Uma Devi, learned counsel representing Mr. G. Rama Gopal, learned counsel for the petitioner, placed reliance on a press report published in the newspaper and submitted that an extent of Ac.28.56 cents of land, which was acquired for the purpose of steel factory in the year 1978, is being returned to the land owners.

A perusal of the newspaper report shows that the Government has taken a decision to return the land to its owners on the ground that the same was not useful as it was low lying and getting submerged in rain water. It is not the pleaded case of the petitioner that his land, which was acquired by the respondents, is similarly situated as those which were agreed to be returned by the Government as per the above-mentioned newspaper report. At any

rate, in view of the settled legal position that the petitioner has become persona non- grata with the acquisition of his land by the State, he has no legally enforceable right for claiming return of the land.

For the above-mentioned reasons, I do not find any merit in the writ petition and the same is accordingly dismissed.

As a sequel, WPMP.No.43842 of 2012 filed for interim relief is disposed of as infructuous.

_____ C.V.NAGARJUNA REDDY,J 29.11.2012

FORM - 8

DRAFT AWARD

No. 1 /2013.
Rc.G.1064/2012

Dated: 05.2013.

Made by : Sri B.Shankar,M.Sc
Land Acquisition Officer & Revenue Divisional Officer, Nandyal

(Under sec II of the Land Acquisition Act 1 of 1894)

Whereas an extent of land, measuring acres 209.05 and situated in the Village of Moolasagaram Village, in the madal of Nandyal, in the registration sub-District of Nandyal, in the District of Kurnool and registered in the name of or occupied by the person specified below has been declared by State Government at pages 1 to 9 of A.P Gazette part-I extraordinary No.11, Kurnool Dated:25.07.2012 to be needed for acquisition of lands required for deepening and widening of Kundu River in connection with Nandyal Flood Protection Works, the under signed after full enquiry into case and due consideration of the various circumstances connected with acquisition as here before set forth, makes the following award under his hand.

The True area of the Land	Ac.	209.05
a) The market value of the land subject to full assessment, peshkash on ground rent as the case may be, and in the case of house site held for, its market value as such, exclusive all cases of trees, buildings and standing crops at Rs. (vide BSO 90, para15(i) note (1)	Rs.	10,45,25,000.00
b) Valuation on account of buildings, wells, crops, trees etc.,	Rs.	19,26,946.00
c) Other damages, if any (to be specified)	Rs.	-
TOTAL		10,64,51,946.00
d) 30% Solatium on market value as per amended Sec.23(2)-Sec.15(b) of the L.A (Amendment) Act, 1984.	Rs.	3,13,57,500.00
TOTAL	Rs.	13,78,09,446.00
e) Interest at 9% per annum upto the date of award, as per amended Sec.34 of the L.A Act Sec.20(1) of the L.A(Amendment) Act, 1984 from to	Rs.	-
TOTAL		13,78,094,46.00
f) 12% per annum Additional market value (on market value) as per the amended Sec.23(1)-A, Sec.15(a) of the L.A (Amendment) Act, 1984 from 23.7.12 to 10.06.13 (323 days)	Rs.	1,10,99,696.00
TOTAL	Rs.	14,89,09,142.00

Rupees (14,89,09,142/-) Fourteen crores eighty nine lakhs nine thousand one hundred and forty two only.

Land Acquisition Officer &
Revenue Divisional Officer,
Nandyal.

11/2/2013
27/5/13
// True Copy //
Administrative Officer
O/o. Sub-Collector Office, Nandyal

18/4/13

Sale Nos. 2, 19, 20, 21, 30, 32, 33, 35, 38, 39, 45, 46, 53, 54, 55, 67, 70, 71, 72, 79, 82, 84 and 89 : These sales are combined sales. As such, they do not represent the true value of the lands, under acquisition. Hence these sales are discarded.

Sale Item Nos. 1, 16, 17, 25, 26, 28, 29, 57, 58, 59, 73, 74, 77 and 85 : These sales are seems to be Booster sales to get more market value to the lands under acquisition. As such, they do not represent the true value of the lands, under acquisition. Hence these sales are discarded.

Though the remaining sale item Nos. 44, 50, 60 and 68 are occurred during year 2011 and the sales are within the vicinity of the lands under acquisition and wherein the sales raises from Rs. 2,00,000/- to Rs. 2,50,000/- per acre, it seems the sale are got registered at low price to evade stamp duty. During inspection of the lands, the ryots of the lands, surrounded the lands under acquisition as well as the pattadars of the lands, under acquisition have stated that the prevailing market value of the lands within the vicinity of the lands, under acquisition are ranging from Rs. 40,00,000/- to Rs. 45,00,000/- per acre. But, they have neither produced nor adduced any documentary evidence in support of their claim. The basic value of the lands under acquisition are ranging from Rs.4,00,000/- Per Acre to Rs 38,72,000/- per acre.

In view of the above, all sales occurred during crucial period are discarded.

The then Sub Collector, Nandyal has passed an consent award in the year 1986 by fixing the market value at Rs. 4,55,000/- per acre on 15.7.1986 which was required for construction of APSRTC Bus stand in the lands of Moolasagaram village of Nandyal town. The lands under acquisition in connection with widening of kunduriver are located at a distance of 1.5 Kilometer. There is also one General Award passed in the year 2008 for an extent of Acs. 9.73 cents for acquisition of diversion road and construction of High level bridge across kunduriver situated in the villages of Moolasagaram and Udumalpuram villages of Nandyal Mandal. The then Land Acquisition Officer/ Revenue Divisional Officer, Nandyal has fixed the Market Value at Rs. 2,63,000/- per acre in Award No. 3/2008, dt: 20.2.2008 (R.D.O. file No. G. 2147/2008). The lands now proposed are in connection with widening of kunduriver nearer to the lands already acquired in the year 2008. The Market value fixed at Rs. 2,63,000/- per acre is in the year 2008 and by adding 12% of escalation charges for each year from 2008 to 2013 for 5 years, the Market value works out to Rs. 4,63,494/- Per acre. The Moolasagaram village is covered under urbanization area and having irrigation potentiality. The Basic values of the lands under acquisition are ranging from Rs.4,00,000/- Per Acre to Rs 38,72,000/- per Acre Almost all, the majority of Basic values of the lands under acquisition are at Rs 4,00,000/- Per Acre . As the lands are valuable and by adding Rs 1,00,000/- towards proximity, fertility and time log and also the village is

under urbanization, I feel it reasonable to fix the M.V @ Rs5,00,000/-per acre. Hence I fixed the Market value @ 5, 00,000/- per acre as it is a reasonable one and holds good for the lands under acquisition. ^{The S.C. has been approved M.V @ Rs 5,00,000/- P.A} Accordingly the P.V proposals were submitted to the Collector, Kurnool for approval. The Joint Collector, Kurnool has counter signed the Preliminary Valuation Statement for Rs.13,78,09,446/- vide Collector, Kurnool reference Rc.G.1/1799/2012, Dt:23.04.2013.

True area of the Land:

The Notice under Survey and Boundaries Act was published as required. No objections or representations have been stated or filed by interested persons in respect of the true area of the lands under acquisition. The S.D records were got prepared and pre scrutinized by the Deputy Inspector, Survey O/o Reenue Divisional Officer, Nandyal on 14.09.2009. I therefore accept the Sub-Division area of 209.20.acres of land as true area of the lands under acquisition.

PUBLICATION OF STATUTORY NOTICES :

The Notices U/s 9(1) and 10 of the L.A Act were got published by affixture on the Notice board of the Grama Chavidi, Moolasagaram Village, Tahsildar Office, Nandyal, Notice Board of RDO's office, Nandyal and other required places in time on 22.12.2012.

The individual notices U/s 9(3) and 10 of the L.A Act calling on the interested persons to appear and file objections with regard to the compensation amount to the measurements of the lands under acquisition before the Land Acquisition Officer on 05.01.2013 at Sub-Collector Office, Nandyal were got served on the interested persons, known are believed to interested persons in the land under acquisition on 22.12.2012.

Trees and Structures :

There are tress of Fruit bearing and Non-Fruit bearing existing on the lands under acquisition and the certain structures are also covered under acquisition. The details and estimated values are furnished as per the report of A.D, Horticulure, Nandyal and Forest Officer, Nandyal, E.E, SRBC Div No-I, CADA, Nandyal. The values are included accordingly.

Possession of land :

Possession of the lands have not been taken .

Solatum @ 30% :

The solatium @ 30% is awarded and ordered to be added to the market value.

Interest:

Does not arise since no possession taken.

Additional market value @ 12% :

The additional market value @ 12% for the period from 23.07.2012 to 10.06.2013 (323 days) is awarded and ordered to be added to the land compensation.

TITLE AND APPORTIONMENT:

1) Sy.No. 432/1, Extent acquired 4.35 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	2175000
30% Solatium	652500
12% Additional Market Value	230967

17-05-2013

Dated: 27.05.2013

Award No. 6/2013-14,
Rc.G/1064/2012.

Sub: Land Acquisition – General – Kurnool District – Nandyal Mandal –
Moolasagaram village – Sy.No. 432/1, 462/1 etc. – extent 209.05
acres – Acquisition of lands for widening and deepening of Kundu
river in connection with the Nandyal Flood Protection works – Draft
Award – Regarding.

- Ref: 1) R.Dis. G1/2606/2009, dt: 11.4.2012 of District Collector, Kurnool.
2) E.E. SRBC, Division No.-I (CADA), Nandyal
Lr.No.E.E/SRBC/D.N.I/CADA/NDL/TW/190M, Dt:05.05.2012.
3) This office Lr.No. Rc.G. 1064/2012, dt: 5.7.2012.
4) Collector, Kurnool Rc.G1/1705/2012, dt: 19.7.2012 & 20.7.2012.
5) This office Rc.G.1064/2012, Dt:19.01.2013.
6) Collector, Kurnool proceedings Rc.G1.1799/2012, Dt:01.02.2013.

ORDER :-

The Executive Engineer, I & CAD, K.C.Canal, Nandyal has sent requisition proposals earlier in GRc.No. F.No. TW/JTO31794 dt: 24.1.2009 for acquiring the lands to an extent of Ac. 198.00 cents of Moolasagaram village of Nandyal Mandal for widening and deepening of Kundu river in connection with Nandyal flood protection works. They were lapsed by 20.12.2011 due to Non- availability of funds when the L.A. proposals stood at Award stage.

Subsequently the Collector, Kurnool has requested to obtain a fresh requisition proposals. Accordingly the Executive Engineer has been asked to send a fresh requisition proposals for initiating L.A. proceedings in the matter. Meanwhile the Executive Engineer, SRBC Division, No. I (CADA), Nandyal has informed that the lands requisitioned earlier are holds good.

The following lands of Moolasagaram village, Nandyal Mandal have been inducted in the acquisition and the lands are inspected along with the Tahsildar and Mandal Surveyor of Nandyal on 5.7.2012.

Sy.No.	Extent A.C.
432/1	4.35
462/1	6.45
507/1	8.73
506	16.00
508/1	2.50
509/1	5.96
510/1A	0.15
510/2A	7.47
460/2	0.46
512/1A	4.05
512/2A1	1.00
466/2	2.11
467/2	3.83

482/2	3.56
485/2	4.47
486/2	3.80
487/2	6.97
488	5.82
477/2	1.71
476/2	0.31
146/2	0.27
146/3	0.81
144/2	2.78
142/2	4.52
141/1B	5.60
498/1A	3.63
499/1B	0.01
499/2A	0.39
502/2	13.42
503/1	1.57
503/2	7.47
504	12.98
145	1.93
497/A	2.68
497/B	2.75
496	2.98
495	5.00
494	0.56
493	2.17
492	1.35
491	8.52
484	4.05
483	4.15
464	7.04
415	10.89
413	0.71
TOTAL:	197.93

Addendum

490	7.30
498/2	3.82

G.Total:	209.05

The lands have been got measured, surveyed sub division records also got prepared and pre-scrutinised, according to which the actual extents of patta lands and the Government lands have been arrived to Ac. 209.05.

<u>Sy.No.</u>	<u>Govt. land</u> <u>Extent</u>	<u>Classification</u>
511	0.12	G.P.
458/1	0.03	G.P.
	0.15	

ABSTRACT

Patta	Ac. 209.05
Govt. patta	Ac. 0.15
	Ac. 209.20

The lands covered under acquisition are classified as I.D., IID, SID, GID. The lands are cotton soil and the following structures and trees are existing.

✓ 3

Fruit Bearing Trees

<u>Sy.No.</u>	<u>Extent</u>	<u>No.of fruit bearing trees</u>
509	5.96	6 Coconut trees
432/1	7.35	10 Palmyra trees, 500 sweet lime trees
462/1	6.45	32 Coconut trees
507/1	8.73	04 Coconut trees
510/2A	7.47	1 Coconut trees
486/2	3.80	15 Coconut trees
464	7.04	02 Coconut trees
506	16.00	43 Coconut trees 1 Amla tree 85 Mango trees 106 Sapota
415	10.89	04 Coconut trees 15 Palmyra trees 50 mango trees

Structures

<u>Sy.No.</u>	<u>Extent</u>	<u>Structures existing</u>
462/1	6.45	One round well with motor pump room
506	16.00	One round well with motor pump room
512/1A	4.05	One open well
464	7.04	One motor pump Room
415	10.89	One well, pump Room.

Non-Fruit bearing trees

<u>Sy.No.</u>	<u>Extent</u>	<u>No.of non fruit bearing trees</u>
462/1	6.45	02 Teak trees
507/1	8.73	01 Eucalyptus tree
510/2A	7.47	02 Margosa trees, 01 teak tree
460/2	0.46	01 Margosa trees – 04 Eucalyptus trees
466/2	2.11	04 Margosa trees
464	7.04	02 Margosa trees
506	16.00	130 Teak trees, 80 Teak trees
415	10.89	01 Soapnut tree.

Two (2) Electrical lines are passing from west to East in Sy.Nos. 510/1A, 510/2A, 510/2A and one (1) Electrical line is passing from East to West in Sy.Nos. 485/2, 486/2 and 487/2.

The AD, Horticulture, Nandyal- VI, Forest Officer, Nandyal and E.E SRBC Division No-1 CADA, Nandyal have been requested to furnish the estimation values of the above trees and structures. The values are furnished here under.

Structures Values

Sl.No	Survey No.	Name of the Structure	Estimate Cost as per S. S.R 2009-2010	Cast of the structure after deprecation
1	462/1	One motor pump room one round Well	87,109-00	64,686-00
2	506	One Motor pump room one round well	2,29,024	192930-00

3	512/1	One open well	Silted up	
4	464	One motor pump Room	105775-00	78537-00
5	415	One Well, Pump Room	4,86,189-00	3,28,177-00

Values of Fruit bearing trees

Sl. No	Sy. No	Extent	No of Fruit bearing trees	Values estimated RS/-
1	509	5.96	6 Coconut Trees	7631-00
2	432/1	7.35	500 Sweet lime Trees	617835-00
3	462/1	6.45	32 Coconut trees	40697-00
4	507/1	8.73	04 Coconut trees	5087-00
5	510/2A	7.47	1 Coconut trees	1272-00
6	486/2	3.80	2 Coconut trees	2544-00
7	464	7.04	02 coconut trees	2544-00
8	506	16.00	43 Coconut trees, one Amla tree, 85 Mango trees and 106 sapota	275872-00
9	415	10.89	04 Coconut Trees, 50 Mango trees	85350-00

Values of Non- Fruit bearing trees

Sl. No	Sy No	Extent	No of Non-Fruit bearing trees	Values estimated RS/-
1	462/1	6.45	03 teak trees	6423.59
2	507/1	8.73	01 Eucalyptus tree	733.99
3	510/2A	7.47	02 Neem trees, 01 teak tree,	5090.47
4	460/2	0.46	01Neem trees , 06 Eucalyptus tees	1513.86
5	466/2	2.11	04 Neem trees	4883.98
6	464	7.04	03 Neem trees	7393.54
6	506	16.00	212 Teak trees	187407.51
7	415	10.89	01 Soapnut tree	

The lands covered under acquisition are for widening and deepening of Kundu river in connection with the Nandyal Flood Protection Works.

The Draft Notification u/s 4(1) of the Land Acquisition Act has been approved in Kurnool Collector's proceedings No. Rc.G1/1705/2012, dated 19.7.2012 and published in the A.P. Gazette Part-I Extra ordinary No.10 dated 23.07.2012. The 2-A Telugu Notification has been published in two daily news papers, namely (1) Eenadu,

dated 24.07.2012 and (2) Maharadhi, dated 25.07.2012. The substance of the notification has been published in the village on 25.08.2012.

The D.D. u/s 6 of the L.A. Act proposals have been approved in Collector, Kurnool proceedings No. Rc.G1/1705/2012, dated 20.7.2012 and published in the A.P. Gazette Part-I Extra ordinary No. 11 dated 25.07.2012. It has also been published in local Telugu News papers i.e., (1) Andhra prabha dt 26/07/2012 (2) PrajaHitam dt 27/07/2012. The substance of D.D. was also published in the village on 27.08.2012.

Further it is noticed while preparing the enjoyment list of the lands under acquisition an extent of 11.12 acres in (Sy.No.490, extent 7.30 and Sy.no.498/2 extent 3.82, Total extent 11.12 acres) which is also covered under acquisition have been missed and the addendum proposals to the said extent are submitted to the Collector, Kurnool vide in this office Rc.G.1064/2012, Dt:11.01.2013 for approval and publication. Mean while the addendum proposals in respect of Sy.No's 490 and 498/2 extent 11.12 acres have been approved vide Collector proceedings Rc.G1/1799/2012, Dt:01.02.2013 and published in the A.P District Extra ordinary Part-I Gazette No.02/KNL Dt:05.02.2013. The substance of addendum Notification and Declaration have been published at conspicuous places of the Village on 10.03.2013. All together the total extent of the notification now arrived to $197.93+11.12=209.05$.

In order to fix up the market value of the lands, under acquisition, the sales statistics, which took place in Moolasagaram village, Nandyal Mandal during the crucial period of three years preceding the date of notification i.e., from 24.07.2009 to 23.07.2012 have been gathered from the Sub-Registrar's Office, Nandyal, which are detailed as follows:

Sl. No.	Document No. & Date	Sy.No. Sold	Extent sold in A.C.	Sale amount Rs.	Rate per acre Rs.
1	3640/2009 24.07.2009	153/1	2.00	200000/-	100000/-
2	4165/2009 10.8.2009	119, 102	3.00	189000/-	63000/-
3	4258/2009 13.8.2009	257/1	1.70	255000/-	150000/-
4	4329/2009 17.8.2009	312	1.15	173000/-	150435/-
5	4554/2009 27.8.2009	96	5.00	600000/-	120000/-
6	4572/2009 28.8.2009	120/1	4.80	408000/-	85000/-
7	4572/2009 28.8.2009	121/2	6.83	581000/-	85066/-
8	5637/2009 30.9.2009	120/1	2.30	230000/-	100000/-
9	7384/2009 29.12.2009	309	1.70	144000/-	84706/-
10	7385/2009 29.12.2009	309	1.75	144000/-	82286/-

11	7386/2009 29.12.2009	308	1.405	149000/-	106050/-
12	7387/2009 29.12.2009	309	1.00	82000/-	82000/-
13	80/2010 7.1.2010	305	3.195	320000/-	100516/-
14	957/2010 11.2.2010	120	2.00	200000/-	100000/-
15	1421/2010 02.03.2010	131	1.78	178000/-	100000/-
16	1421/2010 02.3.2010	149	2.35	235000/-	100000/-
17	1421/2010 02.3.2010	131/3	3.55	35500/-	100000/-
18	1580/2010 02.03.2010	120/1	1.58	158000/-	100000/-
19	1589/2010 06.03.2010	83, 91/2	4.70	170000/-	100000/-
20	1590/2010 06.03.2010	83, 91/2	1.898	190000/-	100105/-
21	1591/2010 06.03.2010	83, 91/2	0.375	38000/-	101333/-
22	2090/2010 26.03.2010	120	3.00	300000/-	100000/-
23	2482/2010 03.04.2010	936, 1113	3.59	288000/-	80223/-
24	2599/2010 06.04.2010	280	3.5	280000/-	80000/-
25	3425/2010 05.05.2010	131	2.28	274000/-	120175/-
26	3425/2010 05.05.2010	131	2.54	305000/-	120079/-
27	3917/2010 24.05.2010	258	0.48	100000/-	208333/-
28	3959/2010 26.05.2010	143	1.21	121000/-	100000/-
29	3959/2010 26.05.2010	143	2.43	243000/-	100000/-
30	4128/2010 02.06.2010	378, 377	0.6425	65000/-	101167/-
31	4366/2010 11.06.2010	339	5.1	735000/-	144118/-
32	4368/2010 11.06.2010	936, 1113	1.09	88000/-	80734/-
33	4369/2010 11.06.2010	936, 1113	2.5	200000/-	80000/-
34	6602/2010 24.08.2010	120/1	0.65	195000/-	300000/-
35	6614/2010 25.8.2010	370/2, 371	2.52	504000/-	200000/-
36	6725/2010 30.8.2010	114	6.14	1535000/-	250000/-
37	6726/2010 30.8.2010	156	1.45	363000/-	250345/-
38	6853/2010 8.9.2010	275/4, 276/1	4.45	890000/-	200000/-
39	7192/2010 20.9.2010	1088, 1090	2.05	410000/-	200000/-
40	8323/2010 1.11.2010	116/2, 132/2	0.05	73000/-	1460000/-

41	8740/2010 18.11.2010	93/1	2.50	500000/-	200000/-
42	9195/2010 6.12.2010	165	0.36	90000/-	250000/-
43	9196/2010 6.12.2010	165	0.41	103000/-	251220/-
44	9197/2010 6.12.2010	165	0.98	245000/-	250000/-
45	9685/2010 29.12.2010	990/1, 990/2	2.94	588000/-	200000/-
46	164/2011 10.1.2011	116/2, 132/2	2.92	585000/-	200342/-
47	948/2011 8.2.2011	118	2.82	2280000/-	808511/-
48	948/2011 8.2.2011	118	1.82	2280000/-	1252747/-
49	1049/2011 10.2.2011	101/1C	2.13	426000/-	200000/-
50	3356/2011 30.4.2011	165	1.87	374000/-	200000/-
51	3942/2011 20.5.2011	317	1.45	290000/-	200000/-
52	4155/2011 27.5.2011	50	0.43	86000/-	200000/-
53	5592/2011 07.07.2011	117/3, 117/4	0.82	164000/-	200000/-
54	6388/2011 29.7.2011	956, 957, 282	16.5	3300000/-	200000/-
55	6513/2011 3.8.2011	129, 131	4.31	862000/-	200000/-
56	6514/2011 3.8.2011	134	6.01	1202000/-	200000/-
57	6515/2011 3.8.2011	149	1.77	2571000/-	1452542/-
58	6516/2011 3.8.2011	149	1.75	2541000/-	1452000/-
59	6517/2011 3.8.2011	149	1.75	2541000/-	1452000/-
60	7085/2011 26.8.2011	148	1.20	240000/-	200000/-
61	7224/2011 30.8.2011	114	1.00	200000/-	200000/-
62	7225/2011 30.8.2011	114	2.00	400000/-	200000/-
63	7226/2011 30.8.2011	114	3.00	600000/-	200000/-
64	7266/2011 3.9.2011	957	1.74	350000/-	201149/-
65	7779/2011 13.9.2011	165	0.98	245000/-	250000/-
66	7885/2011 15.9.2011	310/2	1.00	200000/-	200000/-
67	8849/2011 28.10.2011	377, 378	5.03	1006000/-	200000/-
68	9900/2011 21.12.2011	143	1.21	242000/-	200000/-
69	10081/2011 28.12.2011	957	0.50	100000/-	200000/-
70	10152/2011 31.12.2011	943, 1072, 1112	2.94	588000/-	200000/-
71	723/2012 3.2.2012	101/1C4, 101/1D4	0.52	104000/-	200000/-

72	1129/2012 22.2.2012	1088, 1090	2.05	410000/-	200000/-
73	1347/2012 2.3.2012	479	1.38	1336000/-	968116/-
74	1348/2012 29.2.2012	479	1.38	1336000/-	968116/-
75	1458/2012 6.3.2012	370	0.341	69000/-	201843/-
76	1552/2012 12.3.2012	282	2.58	516000/-	200000/-
77	1916/2012 28.3.2012	149	1.64	2382000/-	1452439/-
78	1917/2012 28.3.2012	131/3	0.65	130000/-	200000/-
79	1938/2012 29.3.2012	118, 130, 117/3, 117/4	3.12	3021000/-	968260/-
80	1939/2012 29.3.2012	134	0.22	44000/-	200000/-
81	1940/2012 29.3.2012	131	0.30	60000/-	200000/-
82	1940/2012 29.3.2012	131, 131/3	0.31	62000/-	200000/-
83	2902/2012 3.5.2012	284	4.00	800000/-	200000/-
84	2973/2012 4.5.2012	131, 132/2	0.75	1116000/-	1486018/-
85	3529/2012 25.5.2012	154	1.00	1452000/-	1452000/-
86	4056/2012 20.6.2012	4/D	8.20	1640000/-	200000/-
87	4057/2012 20.6.2012	3/1A	5.61	1122000/-	200000/-
88	4057/2012 20.6.2012	239	2.60	520000/-	200000/-
89	4347/2012 02.7.2012	943, 1072	1.00	200000/-	200000/-
90	4990/2012 23.7.2012	983	1.60	320000/-	200000/-
91	4990/2012 23.7.2012	985	2.44	489000/-	200409/-

The lands under acquisition and the sale lands have been inspected on 09.2012 along with the Tahsildar, Nandyal, Irrigation officials, Village Revenue Officer concerned and Mandal Surveyor.

The above sales are discussed below.

Sale Nos. 27, 42, 43, 80 and 81 : These sales are bit sales. As such they do not represent the true value of the lands, under acquisition. Hence, these sales are discarded.

Sale Nos. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 22, 24, 30, 32, 36, 37, 41, 47, 48, 49, 51, 61, 62, 63, 64, 66, 83, 86, 87, 88, 90, 91 : These sales are far away from the lands, under acquisition. As such, they do not represent the true value of the lands, under acquisition. Hence, these sales are discarded.

Trees value	617835
TOTAL	3676302

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Patan. Rasool Khan S/o Jamaal Khan	3.10
2	Patan. Shamsher Khan S/o Jamaal Khan	0.38
3.	Patan Rasool Khan, J.Haseena Begum and Patan Hameeda Bee (Disputed the extent possessed by them)	0.87
	TOTAL	4.35

1. Patan. Rasool Khan S/o P.Jamaal Khan : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 432/1 which is in Patta No.550 and having pattadar Pass Book No. 462672 and stands registered in the name of Patan. Rasool Khan S/o Jamaal Khan as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. 500 Sweet lemon trees are existing on his land. The lands are not mortgaged to any other individual or institution. There are no other claimants. During the award enquiry he claimed market value @ 1 crore per acre.
2. Patan. Shamsher Khan S/o Jamaal Khan: He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 432/1 which is in Patta No. 619 and having pattadar Pass Book No. 493168 and stands registered in the name of Patan. Shamsher Khan S/o Jamaal Khan as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. There are no other claimants. During the award enquiry he claimed market value @ 40,00,000/- per acre
3. Patan Rasool Khan etc., : The dispute to an extent of 0.87 cents is engaged among Patan Rasool Khan, J.Haseen Begum and Patan Hameeda Bee.

During the award enquiry they claimed the Market Value at Rs.1,00,00,000/- and 40,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owners deposed that there are no permanent Structures, Tombs and Wells on the land under acquisition that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. The trees values are included as per estimation values furnished by the concerned officer.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compen sation Awarded Rs.
1	Patan. Rasool Khan S/o Jamaal Khan	432/1	3.10	2797432
2	Patan. Shamsher Khan S/o Jamaal Khan	432/1	0.38	267176
3	Patan Rasool Khan, J.Haseena Begum and Patan Hameeda Bee (Disputed the	432/1	0.87	611694

extent possessed by them)			
Total:		4.35	3676302

In respect of extent 0.87 cents as there is disputed among Patan Rasool Khan, J.Haseena Begum and Patan Hameeda Bee. The total compensation is ordered to be kept under Civil Deposit U/s 31(2) of the L.A Act.

2) Sy.No. 462/1, Extent. 6.45 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	3225000
30% Solatium	967500
12% Additional Market Value	342468
Structures Value	64686
Trees Value	56681
TOTAL	4656335

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Avuthu Umamaheswara Reddy S/o Koti Reddy	3.27
2	Avuthu Thulasamma W/o Koti Reddy	3.18
	Total:	6.45

1. Avuthu Umamaheswara Reddy S/o Koti Reddy : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 462/1 which is in Patta No. 1439 and having pattadar Pass Book No. 718948 and stands registered in the name of Avuthu Umamaheswara Reddy S/o Koti Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. There are no other claimants. During the award enquiry he claimed market value @ 1 crore per acre
2. Avuthu Thulasamma w/o Koti Reddy: She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 462/1 which is in Patta No. 1442 and having pattadar Pass Book No. 712972 and stands registered in the name of Patan. Avuthu Thulasamma W/o Koti Reddy as per 1B Register of Moolasagaram-village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. Three Teak 32 Coconut trees, and One motor Pump room and one round well are existing on her land . The lands are not mortgaged to any other individual or institution. There are no other claimants. During the award enquiry he claimed market value @ 1 crore per acre

During the award enquiry they claimed the Market Value at Rs.1,00,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owners deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. The trees and structure values are included as per estimation values furnished by the concerned officer.

17

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Avuthu Umamaheswara Reddy S/o Koti Reddy	462/1	3.27	~~2280000~~ 2289124
2	Avuthu Thulasamma W/o Koti Reddy	462/1	3.18	~~2280000~~ 225721
	Total:		6.45	

3) Sy.No. 490, Extent. 7.30 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	Rs. 3650000
30% Solatium	Rs. 1095000
12% Additional Market Value	Rs. 387600
Grand Total.	Rs.5132600

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Mainyar Nazeer Ahamed S/o M. Ameer Ahamed	1.22
2	Mainyar Zameel Basha S/o M. Ameer Ahamad	1.23
3	Mainyar Nisar Ahammad S/o M Ameer Ahamed	1.22
4	Bodhanapu Sai Krishna S/o B.Narasimhulu	0.72
5	Akula Chinna Ankaiah S/o A.Venkataiah	0.73
6	Akula Lakshmi Narasamma W/o Venkateswarlu	0.72
7	Bodhanapu Venkata Prasada Rao S/o B.Narasimhulu	0.73
8	Akula Pedda Ankaiah S/o A.Venkataiah	0.73
	TOTAL	7.30

1. Mainyar Nazeer Ahamed S/o Ameer Ahamed : He deposed that the land under acquisition is his ancestral and also self property. The above land under acquisition in Sy.No. 490 measuring an extent of 0.91 ½ which is in Patta No. 213 and having pattadar Pass Book's No. 176125 and stands registered in the name of Mainyar Nazeer Ahamed S/o Amerahamad as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. It is self acquired land. Further he got the property of his share of 0.30 ½ cents after his father's death since his father by name M.Ameer Ahamed had pattadar passbook No.176124 vide patta No.212. He has produced notary affidavit in connection with their partition deed. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the Award enquiry he claimed market value @ Rs.50,00,000/- per acre. There are no other claimants.
2. Mainyar Zameel Basha S/o Ameer Ahamed : He deposed that the land under acquisition is his ancestral and also self property. The above land under acquisition in Sy.No. 490 measuring an extent of 0.92 ½ which is in Patta No. 215 and having pattadar Pass Book's No. 176127 and stands registered in the name of Mainyar Zameel Basha S/o Ameer Ahamad as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. It is self acquired land. Further he got the property of his share of 0.30 ½ cents after his father's death since his father by name M.Ameer Ahamed had pattadar passbook No.176124 vide patta No.212.

He has produced notary affidavit in connection with their partition deed. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the Award enquiry he claimed market value @ Rs.50,00,000/- per acre. There are no other claimants.

3. **M Mainyar Nisar Ahammad S/o Ameer Ahamad :** He deposed that the land under acquisition is his ancestral and also self property. The above land under acquisition in Sy.No. 490 measuring an extent of 0.91 ½ which is in Patta No. 214 and having pattadar Pass Book's No. 176126 and stands registered in the name of Mainyar Nisar Ahamed S/o Ameer Ahamad as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. It is self acquired land. Further he got the property of his share of 0.30 ½ cents after his father's death since his father by name M.Ameer Ahamed had pattadar passbook No.176124 vide patta No.212. He has produced notary affidavit in connection with their partition deed. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the Award enquiry he claimed market value @ Rs.50,00,000/- per acre. There are no other claimants.
4. **Bodhanapu Sai Krishna S/o B.Narasimhulu :** He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 490 which is in Patta No. 410 and having pattadar Pass Book No. 353511 and stands registered in the name of Bodhanapu Sai Krishna S/o B.Narasimhulu as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
5. **Akula Chinna Ankaiah S/o A.Venkataiah :** He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 490 which is in Patta No. 409 and having pattadar Pass Book No. 353510 and stands registered in the name of Akula Chinna Ankaiah S/o A.Venkataiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
6. **Akula Lakshminarsamma W/o Vekateswaru :** She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 490 which is in Patta No. 407 and having pattadar Pass Book No. 353508 and stands registered in the name of Akula Lakshminarsamma W/o Venkateswarlu as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. She deposed that there are no structures or trees on the land under acquisition During the award enquiry she claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
7. **Bodhanapu Venkata Prasadarao S/o B.Narasimhulu :** He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 490 which is in Patta No. 406 and having pattadar Pass Book No. 333507 and stands registered in the name of Bodhanapu Venkata Prasadarao S/o B.Narasimhulu as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.

8. Akula Pedda Ankaiah S/o A.Venkataiah : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 490 which is in Patta No. 408 and having pattadar Pass Book No. 353509 and stands registered in the name of Akula Pedda Ankaiah S/o A.Venkataiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.

During the award enquiry they claimed the Market Value at Rs.50,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owners deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. There are no structures or trees on the land under acquisition

The Market Value of Rs.5,00,000/- per acre, fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Mainyar Nazeer Ahamed S/o M. Ameer Ahamed	490	1.22	857777
2	Mainyar Zameel Basha S/o M. Ameer Ahamed	490	1.23	864808
3	Mainyar Nisar Ahammad S/o M Ameer Ahamed	490	1.22	857777
4	Bodhanapu Sai Krishna S/o B.Narasimhulu	490	0.72	506229
5	Akula Chinna Ankaiah S/o A.Venkataiah	490	0.73	513260
6	Akula Lakshmi Narasamma W/o Venkateswarlu	490	0.72	506229
7	Bodhanapu Venkata Prasada Rao S/o B.Narasimhulu	490	0.73	513260
8	Akula Pedda Ankaiah S/o A.Venkataiah	490	0.73	513260
		TOTAL	7.30	5132600

4) Sy.No.507/1 , Extent. 8.73 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	Rs. 4365000
30% Solatium	Rs. 1309500
12% Additional Market Value	Rs. 463527
Trees Value	5821
	6143848

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Vanga Sarada W/o Vanga Seshi Reddy	4.14
2	Avuthu Thulasamma W/o Lakshmi Reddy	0.45
3	Vanga Seshi Reddy S/o Venkata Ramireddy	4.14
	TOTAL	8.73

1. Vanga Sarada W/o Vanga Seshi Reddy : She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 507/1 which is in Patta No. 1441 and having pattadar Pass Book No. 712971 and stands registered in the name of Vanga Sarada W/o Vanga Seshi Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ 1 crore per acre. There are no other claimants.
2. Avuthu Thulasamma W/o Lakshmi Reddy : She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 507/1 which is in Patta No. 1442 and having pattadar Pass Book No. 712972 and stands registered in the name of Avuthu Thulasamma W/o Lakshmi Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ 1 crore per acre. There are no other claimants.
3. Vanga Seshi Reddy S/o V.Venkata Rami Reddy : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 507/1 which is in Patta No.1440 and having pattadar Pass Book No. 718947 and stands registered in the name of Vanga Seshi Reddy S/o V.Venkata Rami Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. Four Coconut Tress and 1 Eucalyptus tree are existing on his land. The lands are not mortgaged to any other individual or institution. During the award enquiry he claimed market value @ 1 crore per acre There are no other claimants.

During the award enquiry they claimed the Market Value at Rs.1,00,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owners deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. The trees values are included as per estimation values furnished by the concerned officer.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Vanga Sarada W/o Vanga Seshi Reddy	507/1	4.14	2910813
2	Avuthu Thulasamma W/o Lakshmi Reddy	507/1	0.45	316399
3	Vanga Seshi Reddy S/o Venkata Ramireddy	507/1	4.14	2916636
	TOTAL		8.73	6143848

5) Sy.No.506 , Extent. 16.00 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	Rs. 8000000
30% Solatium	Rs. 2400000
12% Additional Market Value	Rs. 849534

Structure Values	159273
Trees Values	463280
TOTAL	11872087

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Atmakuru Vijay Kumar S/o A.Naga Bushanam Shetty	16.00

The Pattadar Atmakuru Vijay Kumar S/o A.Naga Bushanam Shetty has deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 506 which is in Patta No.333 and having pattadar Pass Book No. 4737 and stands registered in the name of Atmakuru Vijay Kumar S/o A.Naga Bushanam Shetty as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. One Round well with motor pump set, 43 Coconut Tress, 1 Amla, 85 Mango tress, 106 Sapota trees and 212 Teak tree are existing on his land. The lands are not mortgaged to any other individual or institution. During the award enquiry he claimed market value @ 50,00,000 per acre There are no other claimants.

During the award enquiry he claimed the Market Value at Rs.50,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of his claim. The claim was rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. The structures and trees values are included as per estimation values furnished by the concerned officers.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardee as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Atmakuru Vijay Kumar S/o A.Naga Bushanam Shetty	506	16.00	11872087

6) Sy.No.508/1 , Extent. 2.50 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	1250000
30% Solatium	375000
12% Additional Market Value	132740
TOTAL	1757740

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individual as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Patan Rasool Khan S/o P.Jamal Khan	2.50

The pattadar Sri Patan.Rasool Khan S/o P.Jamal Khan has deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 508/1 which is in Patta No.550 and having pattadar Pass Book No. 462672 and stands registered in the name of Patan. Rasool Khan S/o Jamaal Khan as per 1B

Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures or trees on the land under acquisition. He admitted of the service of statutory notice U/s 9(3) and 10 of the L.A act in time. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants.

During the award enquiry he claimed the Market Value at Rs.1,00,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of his claim. The claim was rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Patan Rasool Khan S/o P.Jamal Khan	508/1	2.50	1757740

7) Sy.No.509/1, Extent. 5.96 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	2980000
30% Solatium	894000
12% Additional Market Value	316452
Trees	7631
Total	4198082

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Patan Rasool Khan S/o P.Jamal Khan	0.78
2	Patan Reshma W/o late Dade Khan Sirani	1.89
3	Vanga Radha Rani W/o V.Deva Karunakar Reddy	1.68
4	Patan Reshma, J.Haseena Begum and Patan Hameeda Bee (Disputed the extent possessed by them)	1.61
	TOTAL	5.96

1. Patan Rasool Khan S/o P.Jamal Khan : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 509/1 which is in Patta No.550 and having pattadar Pass Book No. 462672 and stands registered in the name of Patan. Rasool Khan S/o Jamaal Khan as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are 6 coconut trees are existing and no structures on the land under acquisition. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants

2. Patan Reshma W/o late Dade Khan Sirani : She deposed that the land under acquisition is her ancestral property. The above land under acquisition in Sy.No. 509/1 which is in Patta No.618 and having pattadar Pass Book No. 493200 and

stands registered in the name of Patan. Reshma W/o late Dade Khan Sirani as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ 50,00,000 per acre. There are no other claimants

3. Vanga Radha Rani W/o V.Deva Karunakar Reddy : She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 509/1 which is in Patta No.1438 and having pattadar Pass Book No. 710769 and stands registered in the name of Vanga Radha Rani W/o V. Deva Karunakar Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ 1 crore per acre. There are no other claimants
4. Patan Reshma etc.,: As per the enjoyment list submitted by the Mandal Surveyor, Nandyal Sri P.Dada Khan Sirani S/o Khaja Khan is an enjoyer. He was died. The pass book was changed in favour of Smt Patan Reshma W/o deceased vide Pattadar Pass Book No.493200 in patta No.618 for an extent of 1.89 only in Sy.No.509 of Moolasagaram village. The full extent was already covered under acquisition in favour of Patan Reshma and compensation is awarded and apportioned to her. The Mandal Surveyor has given enjoyment to an extent of 3.50 to the deceased. But on perusal of pass books the extent possessed by Patan Reshma in Sy.No.509 is only Acs.1.89. It is disputed among Patan Reshma, J.Haseena Begum and Patan Hameeda Bi. Therefore the total compensation for an extent of 1.61 is ordered to be kept in Civil Deposit U/s 31(2) of the L.A Act.

During the award enquiry they claimed the Market Value at Rs.1,00,00,000/- and 50,00,000 per acre. But failed to adduce or produce any documentary evidence in support of his claim. Their claims are rejected as baseless. The land owners deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows except Sl.No. 4 kept in Revenue Deposit:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Patan Rasool Khan S/o P.Jamal Khan	509/1	0.78	556046
2	Patan Reshma W/o late Dade Khan Sirani	509/1	1.89	1328852
3	Vanga Radha Rani W/o V.Deva Karunakar Reddy	509/1	1.68	1181202
4	Not claimed by any one	509/1	1.61	1131982
	TOTAL		5.96	4198082

8) Sy.No.510/1A , Extent. 0.15 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	75000
30% Solatium	22500
12% Additional Market Value	7964
TOTAL	105464

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	M.Mery Prasanna Lakshmi W/o M.Umamaheswara Reddy	0.15

The pattadar Smt M.Mery Prasanna Lakshmi W/o M.Umamaheswara Reddy has deposed that the land under acquisition is her ancestral property. The above land under acquisition in Sy.No. 510/1A which is in Patta No.647 and having pattadar Pass Book No. 508143 and stands registered in the name of M.Mery Prasanna Lakshmi W/o M.Umamaheswara Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. She deposed that there are no structures or trees on the land under acquisition. He admitted of the service of statutory notice U/s 9(3) and 10 of the L.A act in time. During the award enquiry she claimed market value @ 70,00,0000 per acre. There are no other claimants.

During the award enquiry he claimed the Market Value at Rs.70,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of his claim. The claim was rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compen sation Awarded Rs.
1	M.Mery Prasanna Lakshmi W/o M.Umamaheswara Reddy	510/1A	0.15	105464

9) Sy.No.510/2A , Extent. 7.47 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	3735000
30% Solatium	1120500
12% Additional Market Value	396626
Trees Values	6363
Total	5258489

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Konda Sadguna Devi W/o Konda Nagi Reddy	0.97

2	Vanga Seshi Reddy S/o V.Venkata Rami Reddy	0.97
3	Vanga Radha Rani W/o V.Deva Karunakar Reddy	0.98
4	Konda Deva Krupakar Reddy S/o Konda Nagi Reddy	2.35
5	Konda Mahanandeeswara Reddy S/o K.Nagi Reddy	2.20
	TOTAL	7.47

1. Konda Sadguna Devi W/o Konda Nagi Reddy : She deposed that the land under acquisition is her self acquired property. The above land under acquisition in Sy.No. 510/2A which is stands registered in the name of Smt Konda Sadguna Devi W/o Konda Nagi Reddy vide document No.63, Dt:14.11.2002. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ 50,00,000 per acre. There are no other claimants.
2. Vanga Seshi Reddy S/o V.Venkata Rami Reddy : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 510/2A which is stands registered in the name of Vanga Seshi Reddy S/o V.Venkata Rami Reddy vide document No.63, Dt:14.11.2002. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures or trees on the land under acquisition. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants.
3. Vanga Radha Rani W/o V.Deva Karunakar Reddy : She deposed that the land under acquisition is her ancestral property. The above land under acquisition in Sy.No. 510/2A which is stands registered in the name of Smt Konda Sadguna Devi W/o Konda Nagi Reddy vide document No.63, Dt:14.11.2002. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ 1 crore per acre. There are no other claimants.
4. Konda Deva Krupakar Reddy S/o Konda Nagi Reddy : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 510/2A which is in Patta No.639 and having pattadar Pass Book No. 512904 and stands registered in the name of Konda Deva Krupakar Reddy S/o Konda Nagi Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that 1 coconu tree, 2 Neem trees and 1 teak tree are existing on his land under acquisition. During the award enquiry he claimed market value @ 50,00,000/- per acre. There are no other claimants.
5. Konda Mahanandeeswara Reddy S/o K.Nagi Reddy : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 510/2A which is in Patta No.138 and having pattadar Pass Book No. 512905 and stands registered in the name of Konda Mahanandeeswara Reddy S/o K.Nagi Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures and trees on the land under acquisition. During the award enquiry he claimed market value @ 50,00,000/- per acre. There are no other claimants.

During the award enquiry they claimed the Market Value at Rs.1,00,00,000/- and 50,00,000 per acre. But failed to adduce or produce any documentary evidence in support of his claim. Their claims are rejected as baseless. The land owners deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Konda Sadguna Devi W/o Konda Nagi Reddy	510/2A	0.97	682003
2	Vanga Seshi Reddy S/o V.Venkata Rami Reddy	510/2A	0.97	682003
3	Vanga Radha Rani W/o V.Deva Karunakar Reddy	510/2A	0.98	689033
4	Konda Deva Krupakara Reddy S/o Konda Nagi Reddy	510/2A	2.35	1658639
5	Konda Mahanandeeswara Reddy S/o K.Nagi Reddy	510/2A	2.20	1546811
	TOTAL		7.47	5258489

10) Sy.No.460/2 , Extent. 0.46 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	230000
30% Solatium	69000
12% Additional Market Value	24424
Trees Values	1514
Total	324938

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individual as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Vanga Chandra Sekhar Reddy S/o V. Venkata Rami Reddy	0.46

The pattadar Sri Vanga Chandra Sekhar Reddy V.Venkata Rami Reddy has deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 460/2 which is in Patta No.448 and having pattadar Pass Book No. 356296 and stands registered in the name of Vanga Chandra Sekhar Reddy S/o V.Venkata Rami Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there is 1 Neem tree and 6 Euglyptus are existing on the land under acquisition. He admitted of the service of statutory notice U/s 9(3) and 10 of the L.A act in time. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants.

During the award enquiry he claimed the Market Value at Rs.1,00,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of his claim. The claim was rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Vanga Chandra Sekhar Reddy S/o V. Venkata Rami Reddy	510/2A	0.46	324938

11) Sy.No.512/1A , Extent. 4.05 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	2025000
30% Solatium	607500
12% Additional Market Value	215038
Structure Values	33657
Total	2881195

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individual as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Maineni Purna Chandra Rao S/o M.Subbaiah	1.50
2	Vanga Seshi Reddy S/o V.Venkata Rami Reddy	0.85
3	Vanga Chandra Sekhar Reddy S/o Venkata Rami Reddy	0.85
4	Vanga Radha Rani W/o Deva Karunakar Reddy	0.85
	TOTAL	4.05

1. Maineni Purna Chandra Rao S/o M.Subbaiah : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 512/1A which is in Patta No.373 and having pattadar Pass Book No. 355926 and stands registered vide document No.3815, dt:18.7.1984 in the name of Maineni Purna Chandra Rao S/o M.Subbaiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures and trees on the land under acquisition. During the award enquiry he claimed market value @ 6 crores per acre. There are no other claimants.
2. Vanga Seshi Reddy S/o V.Venkata Rami Reddy : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 512/1A which is in Patta No.450 and having pattadar Pass Book No. 356298 and stands registered in the name of Vanga Seshi Reddy S/o V. Venkata Rami Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that one open well is existing on his land under acquisition. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants.
3. Vanga Chandra Sekhar Reddy S/o V.Venkata Rami Reddy : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 512/1A which is in Patta No.448 and having pattadar Pass Book No. 356296 and stands registered in the name of Vanga Chandra Sekhar Reddy S/o V.Venkata Rami Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures and trees on the land under acquisition. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants.

4. Vanga Radha Rani W/o V.Deva Karunakar Reddy : She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 512/1A which is in Patta No. 449 and having pattadar Pass Book No. 356297 and stands registered in the name of Vanga Radha Rani W/o V.Deva Kârunakar Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures and trees on the land under acquisition. During the award enquiry he claimed market value @ 1 crore per acre. There are no other claimants.

During the award enquiry they claimed the Market Value at Rs.1,00,00,000/- and 6,00,00,000 per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. The structure values are included as per estimation values furnished by the concerned officer.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Maineni Purna Chandra Rao S/o M.Subbaiah	512/1A	1.50	1054644
2	Vanga Seshi Reddy S/o V.Venkata Rami Reddy	512/1A	0.85	631288
3	Vanga Chandra Sekhar Reddy S/o Venkata Rami Reddy	512/1A	0.85	597631
4	Vanga Radha Rani W/o Deva Karunakar Reddy	512/1A	0.85	597632
	TOTAL		4.05	2881195

12) Sy.No.512/2A1, Extent. 1.00 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	500000
30% Solatium	150000
12% Additional Market Value	53096
Total	703096

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individual as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Maineni Purna Chandra Rao S/o M.Subbaiah	1.00

The pattadar Sri Maineni Purna Chandra Rao S/o M.Subbaiah has deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 512/2A1 which is in Patta No.373 and having pattadar Pass Book No. 355926 and stands registered in the name of Maineni Purna Chandra Rao S/o M.Subbaiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no trees and permanent structures on the land under acquisition. He

admitted of the service of statutory notice U/s 9(3) and 10 of the L.A act in time. During the award enquiry he claimed market value @ 6 crores per acre. There are no other claimants.

During the award enquiry he claimed the Market Value at Rs.6,00,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of his claim. The claim was rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Maineni Purna Chandra Rao S/o M.Subbaiah	512/2A1	1.00	703096

13) Sy.No.466/2, Extent. 2.11 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	1055000
30% Solatium	316500
12% Additional Market Value	112032
Trees Values	4884
Total	1488416

During the inspection the land in Sy.NO. 466/2 with an extent of 2.11 cents is covered by plots and the Mandal Surveyor has also noted that the land is covered by plots in enjoyment list. No interested persons are claimed for compensation during the time of award enquiry. There are 4 neem trees are existing on the land under acquisition. Hence the land compensation for the extent covered under acquisition is ordered to be kept under Revenue deposit and the apportionment of the award is to be apportioned whenever the pattadar approaches for land compensation with clear evidence.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	No interested persons claimed	2.11

It is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardee whenever the awardee approaches for land compensation with clear evidence since no interest persons have claimed

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	No interested persons claimed	466/2	2.11	1488416

14) Sy.No.467/2, Extent. 3.83 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	1915000
30% Solatium	574500
12% Additional Market Value	203357

Total

2692857

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individual as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Posam Ramanjaneya Reddy S/o P.Chenna Reddy	1.02
2	Posam Venkata Ramana Reddy S/o P.Ramanjaneya Reddy	1.02
3	Not claimed by any one	1.79
	TOTAL	3.83

1. Posam Ramanjaneya Reddy S/o P.Chenna Reddy : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 467/2 which is in Patta No. 230 and having pattadar Pass Book No. 176142 and stands registered in the name of Posam Ramanjaneya Reddy S/o P.Chenna Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures and trees on the land under acquisition. During the award enquiry he claimed market value @ 50,00,000/- per acre. There are no other claimants.
2. Posam Venkata Ramana Reddy S/o P.Ramanjaneya Reddy : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 467/2 which is in Patta No. 231 and having pattadar Pass Book No. 176143 and stands registered in the name of Posam Venkata Rami Reddy S/o P.Ramanjana Reddy as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. The lands are not mortgaged to any other individual or institution. He deposed that there are no structures and trees on the land under acquisition. During the award enquiry he claimed market value @ 30,00,000/- per acre. There are no other claimants.
3. Not claimed by any one : No interested persons have attended for award enquiry for the remaining extent of 1.79 acres and no one claimed. The Mandal Surveyor has also not given enjoyment for the above extent due to non availability of pattadars on the land. Therefore the total land compensation amount for an extent of 1.79 is ordered to be kept in Revenue Deposit and ordered to be paid whenever the pattadars/awardees are approached for payment with recorded evidence.

During the award enquiry they claimed the Market Value at Rs.30,00,000/- and 50,00,000 per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Posam Ramanjaneya Reddy S/o P.Chenna Reddy	467/2	1.02	717158
2	Posam Venkata Ramana Reddy S/o	467/2	1.02	717158

65

the property of his share of 0.30 ½ cents after his father's death since his father by name M.Ameer Ahamed had pattadar passbook No.176124 vide patta No.212. He has produced notary affidavit in connection with their partition deed. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the Award enquiry he claimed market value @ Rs.50,00,000/- per acre. There are no other claimants.

3. **M Mainyar Nisar Ahammad S/o Ameer Ahamad :** He deposed that the land under acquisition is his ancestral and also self property. The above land under acquisition in Sy.No. 464 measuring an extent of 0.91 ½ which is in Patta No. 214 and having pattadar Pass Book's No. 176126 and stands registered in the name of Mainyar Nisar Ahamed S/o Ameer Ahamad as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. It is self acquired land. Further he got the property of his share of 0.30 ½ cents after his father's death since his father by name M.Ameer Ahamed had pattadar passbook No.176124 vide patta No.212. He has produced notary affidavit in connection with their partition deed. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the Award enquiry he claimed market value @ Rs.50,00,000/- per acre. There are no other claimants.
4. **Bodhanapu Sai Krishna S/o B.Narasimhulu :** He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 464 which is in Patta No. 410 and having pattadar Pass Book No. 353511 and stands registered in the name of Bodhanapu Sai Krishna S/o B.Narasimhulu as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
5. **Akula Chinna Ankaiah S/o A.Venkataiah :** He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 464 which is in Patta No. 409 and having pattadar Pass Book No. 353510 and stands registered in the name of Akula Chinna Ankaiah S/o A.Venkataiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
6. **Akula Lakshminarsamma W/o Vekateswaru :** She deposed that the land under acquisition is her self property. The above land under acquisition in Sy.No. 464 which is in Patta No. 407 and having pattadar Pass Book No. 353508 and stands registered in the name of Akula Lakshminarsamma W/o Venkateswarlu as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
7. **Bodhanapu Venkata Prasadarao S/o B.Narasimhulu :** He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 464 which is in Patta No. 406 and having pattadar Pass Book No. 333507 and stands registered in the name of Bodhanapu Venkata Prasadarao S/o B.Narasimhulu as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on

- 66
- the land under acquisition During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
8. Akula Pedda Ankaiah S/o A.Venkataiah : He deposed that the land under acquisition is his self property. The above land under acquisition in Sy.No. 464 which is in Patta No. 408 and having pattadar Pass Book No. 353509 and stands registered in the name of Akula Pedda Ankaiah S/o A.Venkataiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the award enquiry he claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
9. No one claimed : On verification of the pass books and other relevant documents of the individuals from Sl.No. 1 to 8 an extent of 0.02 cents is leftover and it is not decided to whom compensation is paid as the above said awardies have not prove their title over an extent of 0.02 cents in Sy.No. 464. No one has been attended for award enquiry to an extent of 0.02 acres . No trees and structures are existing on the land. Therefore the total compensation amount for an extent of 0.02 is ordered to be kept in Revenue Deposit and ordered to be paid whenever the pattadars/awardees are approached for payment with recorded evidence.

During the award enquiry they claimed the Market Value at Rs.50,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land owners deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. They agreed to abide by the statutory provisions and other rules of the Land Acquisition Act. there are no structures or trees on the land under acquisition

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the-Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compens ation Awarded Rs.
1	Mainyar Nazeer Ahamed S/o M. Ameer Ahamed	464	1.17	911098
2	Mainyar Zameel Basha-S/o M. Ameer Ahamad	464	1.18	829653
3	Mainyar Nisar Ahammad S/o M Ameer Ahamed	464	1.17	822622
4	Bodhanapu Sai Krishna S/o B.Narasimhulu	464	0.70	492167
5	Akula Chinna Ankaiah S/o A.Venkataiah	464	0.70	492167
6	Akula Lakshmi Narasamma W/o Venkateswarlu	464	0.70	492167
7	Bodhanapu Venkata Prasada Rao S/o B.Narasimhulu	464	0.70	492167
8	Akula Pedda Ankaiah S/o A.Venkataiah	464	0.70	492167
9	Not claimed by any one	464	0.02	14062
	TOTAL		7.04	5038270

46) Sy.No.415 , Extent. 10.89 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	5445000
30% Solatium	1633500
12% Additional Market Value	578214
Trees Value	86125

Structures Value	328177
TOTAL	8071016

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1.	Patan Rasool Khan S/o P. Jamal Khan	3.64 ½
2.	Patan Reshma W/o late Dade Khan Sirani	2.12
3.	Patan Shamsheer Khan S/o P. Jamal Khan	4.00
4.	P. Hameeda Bi and J. Haseen Begum etc.,	1.12 ½
	TOTAL	10.89

1. Patan Rasool Khan S/o P. Jamal Khan : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 415 which is in Patta No. 550 and having pattadar Pass Book No. 462672 and stands registered in the name of Patan Rasool Khan S/o P. Jamal Khan as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are one soap nut tree, four coconut trees and fifty mango tree are existing on the land under acquisition. During the award enquiry he claimed market value @ Rs.1,00,00,000 per acre. There are no other claimants.
2. Patan Reshma W/o late Dade Khan Sirani : She deposed that the land under acquisition is her ancestral property. The above land under acquisition in Sy.No. 415 which is in Patta No. 618 and having pattadar Pass Book No. 493200 and stands registered in the name of Patan Reshma W/o Dadekhan Sirani as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. She deposed that there are no structures or trees on the land under acquisition. During the award enquiry she claimed market value @ Rs.50,00,000 per acre. There are no other claimants.
3. Patan Samsheer Khan S/o P. Jamal Khan : He deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 415 which is in Patta No. 619 and having pattadar Pass Book No. 493168 and stands registered in the name of Patan Shamsheer Khan S/o P. Jamal Khan as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures or trees on the land under acquisition. During the award enquiry he claimed market value @ Rs.40,00,000 per acre. There are no other claimants.
4. P. Hameeda Bi, J. Haseena Begum, P. Rasool Khan etc., : The land to an extent of 1.12 ½ acres are disputed among P. Hameeda Bi, J. Haseena Begum, P. Rasool Khan etc., One Well and Pump room are existing and are disputed. The advocates on behalf of their client Smt J. Haseena Begum has sent notice to the Land Acquisition Officer and requested to refer the matter to the Civil Court U/s 31(2) of the L.A Act as there is a dispute. Therefore land compensation is ordered to be kept under Civil Deposit U/s 31(2) of the L.A Act.

During the award enquiry they claimed the Market Value at Rs.40,00,000 1,00,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of their claim. The claims are rejected as baseless. The land deposed that it is neither surplus land assigned under Land Ceiling Act nor assigned under Dharkhast rules and that it is neither belongs to the Department or to the Wakf Board. They agreed to abide by the statute and other rules of the Land Acquisition Act. there are no structures on land under acquisition

s
it.
ne
all
on

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1.	Patan Rasool Khan S/o P. Jamal Khan	415	3.64 ½	2977086
2.	Patan Reshma W/o late Dade Khan Sirani	415	2.12	1490563
3.	Patan Shamsheer Khan S/o P. Jamal Khan	415	4.00	2812383
4.	J.Haseena Begum, P.Hameeda Bi etc.,	415	1.12 ½	790984
	TOTAL		10.89	8071016

47) Sy.No.413 , Extent. 0.71 Acres, Rate per Acre: Rs.5,00,000/-

Land Value	355000
30% Solatium	106500
12% Additional Market Value	37698
TOTAL	499198

During the award enquiry no one claimed for the extent of 0.71 cents and no interested persons attended for enquiry. The Mandal Surveyor, Nandyal has also not given enjoyment for the said extent. There are no structures and trees on the land under acquisition.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the land compensation for an extent of 0.71 cents is awarded and apportioned whenever the pattadar is approached for land compensation with clear evidence over title of the land.

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1.	No one claimed	413	0.71	499198

48) Sy.No.498/2, Extent 3.82 acres Rate per Acre RS.5,00,000/-

Land Value	1910000
30% Solatium	573000
12% Additional Market Value	202826
TOTAL	2685826

During the award enquiry it is revealed that the land under acquisition is under the possession and enjoyment of the individuals as detailed.

Sl. No.	Name of the Awardee with Father's Name	Extent Ac. C.
1	Chittari Raja Mohan Rao S/o C.Subbaiah	3.82

The Pattadar Chittari Raja Mohan Rao S/o C.Subbaiah has deposed that the land under acquisition is his ancestral property. The above land under acquisition in Sy.No. 498/2 which is in Patta No.335 and having pattadar Pass Book No. 4739 and stands registered in the name of Chittari Raja Mohan Rao S/o C.Subbaiah as per 1B Register of Moolasagaram village, Nandyal Mandal, Kurnool District. During the Award enquiry it is revealed that the land under acquisition is under the possession and enjoyment with saleable rights and it is free from all encumbrances. He deposed that there are no structures and trees are existing on

his land. The lands are not mortgaged to any other individual or institution. During the award enquiry he claimed market value @ 20,00,000 per acre There are no other claimants.

During the award enquiry he claimed the Market Value at Rs.20,00,000/- per acre. But failed to adduce or produce any documentary evidence in support of his claim. The claim was rejected as baseless. The land owner deposed that it is neither surplus land assigned under Land Ceiling Act nor land assigned under Dharkhast rules and that it is neither belongs to the Endowment Department or to the Wakf Board. He agreed to abide by the statutory provisions and other rules of the Land Acquisition Act.

The Market Value of Rs.5,00,000/- per acre fixed already holds good. Therefore the total land compensation is apportioned, awarded and ordered to be paid to the Awardees as follows:

Sl. No.	Name of the Awardee with Father's Name	Survey Number	Extent Ac. C.	Total Land Compensation Awarded Rs.
1	Chittari Raja Mohan Rao S/o C.Subbaiah	498/2	3.82	2685826
	TOTAL		3.82	2685826

The requisition Department i.e., Executive Engineer, SRBC Division No. 1 (CADA), Nandyal has placed sufficient funds before Land Acquisition Officer & Revenue Divisional Officer Nandyal.

The extent of Acs.209.05 acquired through this award is here by transferred as Kundu Poramboke.

3/5

APPROVED
Joint Collector

Land Acquisition Officer &
Revenue Divisional Officer,
Nandyal.

To

The above awardees.

Copy to the Assistant Pay & Accounts Officer, Works and Projects, Nandyal.

Copy to the Assistant Treasury Officer, Nandyal.

Copy to the Executive Engineer, SRBD Division No.-I, (CADA), Nandyal for favour of information.

Copy submitted to the Senior Civil Judge, Nandyal for favour of kind information.

Copy submitted to the Collector, Kurnool for favour of kind information.

// True Copy //

Administrative Officer
O/o. Sub-Collector Office, Nandyal

GOVERNMENT OF ANDHRA PRADESH

ABSTRACT

"NAVARATNALU - PEDALANDARIKI ILLU" - Providing House sites to 25 lakh eligible beneficiaries in the State - Resumption of Government lands alienated in favour of private individuals/ private organizations/Government organisations/ Government departments / Public Sector Undertakings/state Government Corporations on the grounds of violation of conditions or non-utilisation of the alienated lands - Lands acquired by various departments for any public purpose but not put into use for the same purpose - Authorization to the District Collectors to utilize for providing house sites - Orders - Issued.

REVENUE (LANDS-I) DEPARTMENT

Dated: 30-12-2019
Read the following:

1. G.O.Ms.No.57, Revenue (Assn.I) Department, Dated 16-02-2015.
2. G.O.Ms.No.367, Revenue (Assignment-I) Dept., dated.19-08-2019.
3. G.O.Ms.No.488, Revenue (Assignment-I) Dept., dated.02-12-2019.
4. Meeting held on 27-12-2019 in the camp office of the Hon'ble Chief Minister.

ORDER:

The Government have announced a flagship program "NAVARATNALU-PEDALANDARIKI ILLU" for distribution of 25 lakh House Site Pattas to all the eligible beneficiaries residing in Rural & Urban areas of the State in saturation mode irrespective of Caste, Creed or Religion by Ugadi-2020.

2. In the G.Os 2nd and 3rd read above, Government have issued Policy guidelines on distribution of 25 lakh House Site Pattas / Housing units.

3. Many of the District Collectors are sending proposals to Government for resumption of lands belongs to APIIC, APMDC and such other organisations etc., for utilising the same for proving house sites under "NAVARATNALU-PEDALANDARIKI ILLU".

4. During the meeting held on 27-12-2019, it has been decided to authorise the District Collectors to utilise any unutilised government land alienated in favour of private individuals/ private organizations/Government organisations/ Government departments / Public Sector Undertakings/state Government Corporations/Urban Development Authorities & Urban Local Bodies on the grounds of violation of conditions or non-utilisation of the alienated lands and also lands acquired by various departments for any public purpose but not put into use for the same purpose.

5. Accordingly, Government hereby authorize the District Collectors of the respective districts to resume the unutilised Government lands on the grounds of violation of conditions or non-utilisation of the allotted land which was earlier alienated in favour of private individuals/ private organizations/Government organisations/ Government departments / Public Sector Undertakings/state Government Corporations/Urban Development Authorities & Urban Local Bodies on the grounds of violation of conditions or non-utilisation of the alienated lands in terms of G.O.MS.No.57, Revenue (Assn.I) Department, Dated 16-02-2015 and they are further authorised to utilise the lands acquired by various Government departments/organisations for any public purpose but not put into use for the same purpose. These lands shall be utilised for providing House sites to eligible beneficiaries under the flagship programme "NAVARATNALU-PEDALANDARIKI ILLU".

(P.T.O)

6. The District Collectors shall furnish details of such lands utilised for house site purpose to the Government.
7. These powers are delegated to District Collectors for providing house sites only under the flagship programme "NAVARATNALU- PEDALANDARIKI ILLU".
8. The District Collectors are further instructed that not to propose any lands belongs to Endowments, Educational Institutions, Wakf or any other religious related lands, environmentally sensitive and fragile areas such as, tank beds, river beds, other water bodies and hillocks with afforestation etc., for house site purposes.
9. All the District Collectors shall take necessary action in the matter accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

V.USHARANI
SECRETARY TO GOVERNMENT

To
All the District Collectors in the State
All the Joint Collectors in the State.
The Special C.S & Chief Commissioner of Land Administration, A.P., Vijayawada.
The Special Commissioner (House sites), O/o Chief Commissioner of Land Administration, A.P., Vijayawada.
Copy to:
All Departments of A.P. Secretariat, Velagapudi.
All Head of Departments.
All Land sections in Revenue Department.
The OSD to Prl. Advisor to Hon'ble C.M.
The OSD to Advisor to Hon'ble C.M & Vice-Chairman, Implementation and Monitoring Committee in Navaratnalu.
The OSD to Hon'ble Dy. C.M(Revenue)
The OSD to Chief Secretary
The PS to Secretary, Revenue (Land) Department.
SC/SF

//FORWARDED::BY ORDER//

P. S. Gunde
SECTION OFFICER

GOVERNMENT OF ANDHRA PRADESH

Land Acquisition – Reconveyance of the lands acquired under the Land Acquisition Act 1894 to the Original Owners – Substitution of para 32 of B.S.O-90 – Orders – Issued.

REVENUE (LA) DEPARTMENT

G.O.Ms.No. 783

Dated: 09-10-98.
Read the following :-

From the Commissioner of Land Revenue, Andhra Pradesh, Hyderabad
Letter No. G1/9/1997, dated. 20.1.1997.

ORDER

The following amendment is issued to B.S.O - 90 para (32)

AMENDMENT

For paragraph 32 of B.S.O. 90, the following paragraph shall be substituted, namely :

PARA 32 Utilisation of acquired lands for any other Public Purposes :

"The Land Acquired for a public purpose under the Land Acquisition Act, 1894 shall be utilized for the same purpose for which it was acquired as far as possible. In case, the land is not required for the purpose for which it is acquired due to any reason, the land shall be utilized for any other public purpose, as deemed fit, including afforestation".

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

G.SUDHIR
Secretary to Government.

* * * * *

Office of the Chief Engineer & DWRO,
WRD :: Kurnool.

Progs.No.WRD-TW0KCC(TS)/2/2017/DEE.1/AEE3/Kundu PW,
Dt:28/06/2017

Present: Sri C.Narayana Reddy,M.Tech
Chief Engineer & DWRO

Sub: WRD- K.C.Canal- SRBC - Kundu River - Removal of deposited mounds and clear all obstructions in Kundu River portion from Km 2.000 to Km 7.900 of Kundu Protection works to Nandyal Town under Neeru-Chettu Programme - Technical sanction accorded - Regarding.

Ref: 1. The District collector, Kurnool Proc.No.Neeru chettu/SRBC-I/NDL/TW/ATO/NC, dt:23-06-2017
2. S.E/SRBC-I/NDL/TW/ATO/NC Lr.No.199CE, dt.23-06-2017.

In the ref 1st cited, the Dist. Collector, Kurnool have accorded administrative approval for the said work for Rs.825.40 Lakhs under Neeru- Chettu Programme 2017-18.

In the reference 2nd cited the Superintending Engineer has submitted the Estimate for the work under subject for Technical sanction and to take up work by fixing agency.

The Technical Sanction for the work noted in the table below is here by accorded with SSR 2016-17 as detailed below.

S.No.	Name of Work	CE's Register No.	Technical sanction Amount	Head of Account
1.	"Removal of deposited mounds and clear all obstructions in Kundu River portion from Km 2.000 to Km 7.900 of Kundu Protection works to Nandyal Town"	CER No:19/2017-18,dt: 28/06/2017	Rs.8,25,40,000/- (Rupees Eight Crores Twenty five Lakhs forty Thousand Only)	4702-101-11-SH(22)-530/531 Other Expenditure

The Superintending Engineer is hereby instructed to take further necessary action in calling for tenders and grounding the works.

Encl: Copy of Report and Abstract To The Superintending Engineer, SRBC-I,Nandyal.	NARAYANA REDDY C CHIEF ENGINEER

Copy with copy of Estimate (Report & Abstract) to APAO, W&P,Nandyal.

- ✓ Copy to the Executive Engineer, SRBC Division-I,CADA, Nandyal along with copy of Estimate (Report & Abstract) for information and necessary action with a request to adhere to the observations made by the District Collector while according administrative approval during executing the work.

Copy submitted to the District Collector, Kurnool for favour of information (i.e.copy of report and abstract of Estimate).

Signature Not Verified

Digitally signed by C
Narayana Reddy
Date: 2017.06.28
10:40:25 IST
Reason: Approved

GOVERNMENT OF ANDHRA PRADESH
Proceedings of the District Collector & Magistrate, Kurnool
Present: Sri S.Satyanarayana, I.A.S.,

Proceeding No. Neeru Chettu/SRBC.1/NDL/TW/ATO/ NC, Dt. 23-06-2017.

Sub: -Water Resources Department – SRBC Circle-1, Nandyal –
 Administrative approval for work costing to a tune of Rs. 825.40
 Lakhs – Sanctioned – Orders – Issued.

- Ref:-
1. G.O. Rt. No.108, I & CAD (CAD.1) Department, Dt. 26.02.2015.
 2. Govt. Memo No. 10444/CAD/2014-85, Dt. 01.07.2015 of WR (CAD) Department.
 3. Govt.Memo No.10444/CAD.1/2014-181, Dt. 3-5-2016 of WR (CAD), Department.
 4. G.O. Rt. No.187, Dt.19.04.2017.
 5. G.O. Rt. No.188, Dt.19.04.2017.
 6. Proposals received from the Executive Engineer, SRBC Division-No.I, CADA Nandyal through the Superintending Engineer, SRBC Circle No.1, Nandyal
 7. District Collect & Magistrate, Kurnool Note orders, dt. 23.06.2017.

ORDER:

Vide the reference 1st read above the Government of Andhra Pradesh has taken up the Neeru-Chettu programme on large scale basis.

Vide reference 3rd to 6th cited, the Govt. has issued instructions for implementation of Neeru-Chettu in Major and Medium Irrigation Projects.

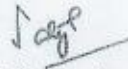
Under the above programme, proposals submitted by the Superintending Engineer, SRBC Circle No.1, Nandyal vide reference 6th cited are approved and administrative sanction is hereby accorded for one work costing to a tune of Rs. 825.40 Lakhs under Neeru-Chettu programme.

Sl. No.	Name of the Division	Name of the Work	No.of works for which administrative approval accorded by the Dist.collector, Kurnool.	Amount Rs. in Lakhs
1	Executive Engineer SRBC Division No.1 (CADA), Nandyal	Removal of deposited mounds and clear all obstructions in Kundu River portion from Km 2.000 to Km 7.900 of Kundu Protection works to <u>Nandyal Town.</u>	1 work	825.40

The Expenditure shall be debitable to the following Head of Account: 4702-101-11-SH22-530/531 OE.

The Executive Engineer, SRBC Division-No.1, CADA, Nandyal is instructed to follow the guidelines of Neeru-Chettu Programme specifically mentioned for Major Irrigation/Medium Irrigation Projects and execute the works with proper supervision.

Any deviation in Neeru-Chettu guide lines/execution/billing/payments, the Executive Engineer is held responsible.


District Collector & Magistrate
Kurnool

To
The Executive Engineer, SRBC Division No.1(CADA), Nandyal.

- 1) Copy to the Superintending Engineer, SRBC Circle No.1, Nandyal for information and necessary action.
- 2) Copy to the Chief Engineer (P), Water Resources Department, Kurnool for information and necessary action.
- 3) Copy to APAO, Works & Projects, Nandyal for information.
- 4) Copy to the PAO, Works & Projects, Kurnool for information.
- 5) Copy to the RDO, Nandyal for information.


District Collector & Magistrate
Kurnool

Name of Teacher or Instructor for this Sawyer
of the Department to which the
Certificate is issued
Name of the Department
Name of the Institution
Name of the State

14	Acres irrigated. Cents total.	Interest to 30 days.	Amount paid. Per cent.
15	Per cent irrigated. Amount of water.		

Handlung

சென்னை, 19.05.2019

TAHSILDAR
NANDYAL MANDA
Kurnool(Dist) A.P.

49

[illegible]

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

161

162

163

164

165

166

167

168

169

170

171

172

173

174

175

176

177

178

179

180

181

182

183

184

185

186

187

188

189

190

191

192

193

194

195

196

197

198

199

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

220

221

222

223

224

225

226

227

228

229

230

231

232

233

234

235

236

237

238

239

240

241

242

243

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

265

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333

334

335

336

337

338

339

340

341

342

343

344

345

346

347

348

349

350

351

352

353

354

355

356

357

358

359

360

361

362

363

364

365

366

367

368

369

370

371

372

373

374

375

376

377

378

379

380

381

382

383

384

385

386

387

388

389

390

391

392

393

394

395

396

397

398

399

400

401

402

403

404

405

406

407

408

409

410

411

412

413

414

415

416

417

418

419

420

421

422

423

424

425

426

427

428

429

430

431

432

433

434

435

436

437

438

439

440

441

442

443

444

445

446

447

448

449

450

451

452

453

454

455

456

457

458

459

460

461

462

463

464

465

466

467

468

469

470

471

472

473

474

475

476

477

478

479

480

481

482

483

484

485

486

487

488

489

490

491

492

493

494

495

496

497

498

499

500

501

502

503

504

505

506

507

508

509

510

511

512

513

514

515

516

517

518

519

520

521

522

523

524

525

526

527

528

529

530

531

532

533

534

535

536

537

538

539

540

541

542

543

544

545

546

547

548

549

550

551

552

553

554

555

556

557

558

559

560

561

562

563

564

565

566

567

568

569

570

571

572

573

574

575

576

577

578

579

580

581

582

583

584

585

586

587

588

589

590

591

592

593

594

595

596

597

598

599

600

601

602

603

604

605

606

607

608

609

610

611

612

613

614

615

616

617

618

619

620

621

622

623

624

625

626

627

628

629

630

631

632

633

634

635

636

637

638

639

640

641

642

643

644

645

646

647

648

649

650

651

652

653

654

655

656

657

658

659

660

661

662

663

664

665

666

667

668

669

670

671

672

673

674

675

676

677

678

679

680

681

682

683

684

685

686

687

688

689

690

691

692

693

694

695

696

697

698

699

700

701

702

703

704

705

706

707

708

709

710

711

712

713

714

715

716

717

718

719

720

721

722

723

724

725

726

727

728

729

730

731

732

733

734

735

736

737

738

739

740

741

742

743

744

745

746

747

748

749

750

751

752

753

754

755

756

757

758

759

760

761

762

763

764

765

766

767

768

769

770

771

772

773

774

775

776

777

778

779

780

781

782

783

784

785

786

787

788

789

790

791

792

793

794

795

796

797

798

799

800

801

802

803

804

805

806

807

808

809

810

811

812

813

814

815

816

817

818

819

820

821

822

823

824

825

826

827

828

829

830

831

832

833

834

835

836

837

838

839

840

841

842

843

844

845

846

847

848

849

850

851

852

853

854

855

856

857

858

859

860

861

862

863

864

865

866

867

868

869

870

871

872

873

874

875

876

877

878

879

880

881

882

883

884

885

886

887

888

889

890

891

892

893

894

895

896

897

898

899

900

901

902

903

904

905

906

907

908

909

910

911

912

913

914

915

916

917

918

919

920

921

922

923

924

925

926

927

928

929

930

931

932

933

934

935

936

937

938

939

940

941

942

943

944

945

946

947

948

949

950

951

952

953

954

955

956

957

958

959

960

961

962

963

964

965

966

967

968

969

970

971

972

973

974

975

976

977

978

979

980

981

982

983

984

985

986

987

988

989

990

991

992

993

994

995

996

997

998

999

1000

1001

1002

1003

1004

1005

1006

1007

1008

1009

1010

1011

1012

1013

1014

1015

1016

1017

1018

1019

1020

1021

1022

1023

1024

1025

1026

1027

1028

1029

1030

1031

1032

1033

1034

1035

1036

1037

1038

1039

1040

1041

1042

1043

1044

1045

1046

1047

1048

1049

1050

1051

1052

1053

1054

1055

1056

1057

1058

1059

1060

1061

1062

1063

1064

1065

1066

1067

1068

1069

1070

1071

1072

1073

1074

1075

1076

1077

1078

1079

1080

1081

1082

1083

1084

1085

1086

1087

1088

1089

1090

1091

1092

1093

1094

1095

1096

1097

1098

1099

1100

1101

1102

1103

1104

1105

1106

1107

1108

1109

1110

1111

1112

1113

1114

1115

1116

1117

1118

1119

1120

1121

1122

1123

1124

1125

1126

1127

1128

1129

1130

1131

1132

1133

1134

1135

1136

1137

1138

1139

1140

1141

1142

1143

1144

1145

1146

1147

1148

1149

1150

1151

1152

1153

1154

1155

1156

1157

1158

1159

1160

1161

1162

1163

1164

1165

1166

1167

1168

1169

1170

1171

1172

1173

1174

1175

1176

1177

1178

1179

1180

1181

1182

1183

1184

1185

1186

1187

1188

1189

1190

1191

1192

1193

1194

1195

1196

1197

1198

1199

1200

1201

1202

1203

1204

1205

1206

1207

1208

1209

1210

1211

1212

1213

1214

1215

1216

1217

1218

1219

1220

1221

1222

1223

1224

1225

1226

1227

1228

1229

1230

1231

1232

1233

1234

1235

1236

1237

1238

1239

1240

1241

1242

1243

1244

1245

1246

1247

1248

1249

1250

1251

1252

1253

1254

1255

1256

1257

1258

1259

1260

1261

1262

1263

1264

1265

1266

1267

1268

1269

1270

1271

1272

1273

1274

1275

1276

1277

1278

1279

1280

1281

1282

1283

1284

1285

1286

1287

1288

1289

1290

1291

1292

1293

1294

1295

1296

1297

1298

1299

1300

1301

1302

1303

1304

1305

1306

1307

1308

1309

1310

1311

1312

1313

1314

1315

1316

1317

1318

1319

1320

1321

1322

1323

1324

1325

1326

1327

1328

1329

1330

1331

1332

1333

1334

1335

1336

1337

1338

1339

1340

1341

1342

1343

1344

1345

1346

1347

1348

1349

1350

1351

1352

1353

1354

1355

1356

1357

1358

1359

1360

1361

1362

1363

1364

1365

1366

1367

1368

1369

1370

1371

1372

1373

1374

1375

1376

1377

1378

1379

1380

1381

1382

1383

1384

1385

1386

1387

1388

1389

1390

1391

1392

1393

1394

1395

1396

1397

1398

1399

1400

1401

1402

1403

1404

1405

1406

1407

1408

1409

1410

1411

1412

1413

1414

1415

1416

1417

1418

1419

1420

1421

14

Survey and Re-settlement Register of the
Kurmoal Taluk, Nandyal District,
Madras State.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Re-Survey Number of 1957-58.	Sub-Number of 1957-58.	Old Survey Number and letter, if any, and the Field Number.	Government or Private Possession of the land.	Day, large or dry, wet or, Paddy, etc.	Source of Irrigation if any.	Single or Double crop if any.	Day, dry.	Wet, dry.	Threshing, if any.	Harvesting, if any.	Area in acres.	Area in acres.	Area in acres.	Name of the holder of the land or the manager of the land, and the name of the land.
508	...	508	G	...	...	...	...	...	...	...	...	...	...	...
509	...	509	G	...	...	...	...	...	...	...	...	...	...	...
510	...	510	G	...	...	...	...	...	...	...	...	...	...	...
511	...	511	G	...	...	...	...	...	...	...	...	...	...	...
512	...	512	G	...	...	...	...	...	...	...	...	...	...	...
513	...	513	G	...	...	...	...	...	...	...	...	...	...	...
514	...	514	G	...	...	...	...	...	...	...	...	...	...	...
515	...	515	G	...	...	...	...	...	...	...	...	...	...	...
516	...	516	G	...	...	...	...	...	...	...	...	...	...	...
517	...	517	G	...	...	...	...	...	...	...	...	...	...	...
518	...	518	G	...	...	...	...	...	...	...	...	...	...	...
519	...	519 A, B	G	...	...	...	...	...	...	...	...	...	...	...
520	...	520	G	...	...	...	...	...	...	...	...	...	...	...
521	...	521	G	...	...	...	...	...	...	...	...	...	...	...
522	...	522	G	...	...	...	...	...	...	...	...	...	...	...
523	...	523	G	...	...	...	...	...	...	...	...	...	...	...
524	...	524	G	...	...	...	...	...	...	...	...	...	...	...
525	...	525	G	...	...	...	...	...	...	...	...	...	...	...
526	...	526	G	...	...	...	...	...	...	...	...	...	...	...
527	...	527	G	...	...	...	...	...	...	...	...	...	...	...
528	...	528 A	G	...	...	...	...	...	...	...	...	...	...	...
529	...	529 A	G	...	...	...	...	...	...	...	...	...	...	...
530	...	530 A	G	...	...	...	...	...	...	...	...	...	...	...

Kurmoal Taluk, Nandyal District, Madras State.

18/3/54

TAHSILDAR
NANDYAL MANDAL
Kurmoal(Dist)A.P.

Handwritten signature



**GOVERNMENT OF ANDHRAPRADESH
WATER RESOURCES DEPARTMENT**

REQUEST FOR PROPOSAL

**E-PROCUREMENT NOTICE INVITING TENDER CUM E-AUCTION
(REVERSE TENDERING)**

TENDER NOTICE No. SE/2020-21, Dated: -06-2020

**Name
of
work : Construction of a new reservoir across
Kundu river to a capacity of 0.80 TMC
near Joladarasi (V) of Koilkuntla (M) of
Kurnool (Dt)**

**OFFICE OF THE
SUPERINTENDING ENGINEER
SRBC CIRCLE No.2, NANDYAL
KURNOOL (Dist.,) 518501
Phone / Fax No. 08514-242096
ANDHRA PRADESH**

I N D E X

No	DETAILS	PAGE No.
1	NOTICE INVITING TENDER (NIT)	i-ix
2	INVITE TENDERS	1-3
	INSTRUCTIONS TO CONTRACTORS	
	A-GENERAL	4-7
	B- TECHNICAL REQUIREMENT	7-8
	C-FINANACIAL REQUIREMENT	8-9
3	BIDDING PROCESS	9-11
	SPECIFIC ISSUES	11-12
	SPECIAL ATTENTION	12
	AWARD OF CONTRACT	12-16
	FORMS OF TENDER QUALIFICATION INFORMATION	
4	CHECKLIST TO ACCOMPANY THE TENDER	17
	STATEMENTS (I to VII)	18-25
	CONDITIONS OF CONTRACT	
	TENDER	26-28
	ARTICLES OF AGREEMENT	29-31
	DIFINITIONS	32-34
5	A) GENERL	35-40
	B) TIME FOR COMPLETION	40-43
	C) QUALITY CONTROL	43-45
	D) COST CONTROL	45-53
	E) FINISHING THE CONTRACT	53-55
	F) SPECIAL CONDITIONS	55-70
6	TECHNICAL SPECIFICATIONS	
	DRAWINGS	71-71
7	BILL OF QUANTITIES & PRICE BID	72-76
8	SCHEDULE-A, PREAMBLE	77
9	SCHEDULE-A Part-I & II	78-123
11	SCHEDULE-B	124-125
12	SCHEDULE-C	126-324
13	SCHEDULE-D	325-353
14	SCHEDULE-E	354-374
15	FORMATS OF SECURITIES	375-380
16	MILESTONE PROGRAMME	381-384
17	ABBREVIATIONS	385-386
18	PQ Stage Forms	387-396
19	Self Declaration form	397-398
20	DRAWING SHEETS	3 Nos

**GOVERNMENT OF ANDHRA PRADESH
WATER RESOURCES DEPARTMENT**

REQUEST FOR PRAPOSAL

**E-PROCUREMENT NOTICE INVITING TENDER CUM E-AUCTION
(REVERSE TENDERING)**

NIT No. SE/2020-21, DATED:

1.	Department Name :	WATER RESOURCES DEPARTMENT
2.	Circle :	SRBC CIRCLE NO.2,NANDYAL
3.	Tender Notice No. :	
4.	Name of Project:	“ Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool <u>(Dt)</u>
5.	Tender Subject :	Construction of a new reservoir across Kundu River with spillway
6.	Estimated Contract Value :	Rs.207,95,15,493/-
7.	Period Of Contract :	24 Months
8.	Type of Work:	Civil Works
9.	Tender Type :	Open
10.	Tender Category :	Works
11.	Bid Call:	1
12.	Currency Type:	INR
13.	Default Currency:	Indian Rupee – INR
14.	Form Of Contract :	Lump Sum (LS)
15.	EMD / Bid Security :	Rs. 2,07,95,155/-
16.	Consortium / Joint Venture:	Applicable
17.	Reverse Tendering:	Applicable
18.	EMD/Bid Security Payable To :	1) Bank Guarantee in favor of the Superintending Engineer, SRBC CIRCLE No.2,NANDYAL to be valid for a period of 6 months from the date of bid submission to be obtained from any Government owned Public Sector Bank or any Scheduled Commercial Bank or 2) To be paid through Net banking/RTGS/NEFT from the Registered Bank Account.
19.	Mode of Payment:	Online Payment, Challan Generation, Bank Guarantee
20.	Transaction Fee :	As prescribed in e-procurement platform
21.	Transaction Fee Payable To :	Online payment to A.P.T.S., Vijayawada
22.	Tender Schedule downloaded Opening Date :	.06.2020
23.	Tender Schedule downloaded Closing Date :	.06.2020
24.	Bid Submission Closing Date :	.06.2020
25.	Hard Copy submission :	As per G.O.Ms.No.67, WR (Reforms) Dept., Dt.16.08.2019 of Water Resources Department
26.	Pre-Qualification/ Technical Bid Opening Date (Qualification and Eligibility Stage) :	at Office of the Superintending Engineer, SRBC CIRCLE No.2,NANDYAL

TENDERER

SUPERINTENDING ENGINEER

27.	Original EMD submission Date:	
28.	Price Bid Opening Date (Financial Bid Stage) :	.06.2020 onwards (Online only) at o/o The Superintending Engineer, SRBC CIRCLE No.2,NANDYAL
29.	E- Auction Date & Time:	
30.	Technical Qualification Stage Date & Time:	
31.	Declaration of successful bidder by competent authority (L1 after e-auction and physical document verification):	
32.	Bid Validity Period:	90 Days
33.	Place Of Tender Opening :	Office of The Superintending Engineer, SRBC Circle No.2,SRBC Camp Colony, NANDYAL
34.	Officer Inviting Bids/Contact Person :	Superintending Engineer, SRBC CIRCLE No.2,NANDYAL
35.	Address/E-mail id :	SRBC Camp Colony, NANDYAL 518501 sesrbc2@yahoo.co.in
36.	Contact Details/Telephone, Fax :	Sri K.Ravi, M.Tech.,, Superintending Engineer, SRBC CIRCLE No.2,NANDYAL-518501, Andhra Pradesh. Phone No: 08514-242096

37. Class of Contractor eligible for tendering;

A. General Requirements:

- Individual / Firm eligible for tendering shall have Registration as Special Class Contractor in Civil works as per the G.O. Ms. No.94,I&CAD (PW-COD) Department, Dated:01.07.2003 or with valid Registration in terms of CPWD or PWD codes in anywhere in the Country. The Restriction clause like Registration in Andhra Pradesh shall be relaxed as per the G.O. Ms. No.67, Water Resources (Reforms) Department, Dated:16.08.2019 and Joint Venture (JV) as well as MOU with combined Bid Capacity will be considered.
- In case of J.V, at least one member of the J.V group should have a valid registration with Central /any State Government and others should have applied for registration with the Central /any State Government in terms mentioned above as on the date of submission of bids. Evidence of their making applications with Central / any State Government will be sufficient to make them eligible for participation.
In case the J.V. happens to be successful Contractor, the other J.V partners who have applied for registration should produce valid registration with Central /any State Government within 3 months after concluding Contract agreement.
Failure to comply with this condition, contract shall be cancelled, duly forfeiting the EMD and value of work done as on that date besides blacklisting the other J.V partners having valid registration with Central /any State Government.
- The Bids are limited to those individuals, firms, companies, joint ventures, who meet the following qualification and eligibility requirements and herein after referred to as "Contractor".
- In case of joint ventures, the eligibility criteria will be considered on the basis of combined resources of the JV members.

- 5) The total members in the Joint venture shall not be more than **3 (Three)**.
- 6) The Contractor should submit a Power of Attorney for Signing of Bid. In the case of a Joint Venture, the members should submit a Power of Attorney in favour of the Lead Member.
- 7) In case of Joint Venture, the JV members should have entered into a legally valid Agreement for joint and several responsibilities and submit along with bid. The name of the Lead Member shall be defined. The Lead Member's share shall be not less than 51% in the joint venture. The share of each member including lead Member shall be exhibited in the JV Agreement.
- 8) The JV Agreement should clearly exhibit the responsibilities of the JV members. The non lead members of the JV shall execute a Power of Attorney in favour of the Lead Member authorizing the Lead Member to conduct all business for and on behalf of the JV during (a) Tendering process and (b) execution and for successful performance of the package including the Defect Liability period in case of award of work. The Lead Member shall execute a Power of Attorney in favour of one of its officers to be the Authorized Signatory for signing the Bid Documents and also to undertake all other acts and deeds on the behalf of the JV in connection with the Bid and the Contract.
- 9) The JV Agreement should clearly exhibit the validity of the Agreement until the completion of the work including the Defect Liability period.
- 10) The JV firm should furnish an undertaking from all the members that in case of award of work, the J.V Agreement deed is irrevocable by any one or all the members together until 3 months after the completion of the contract period including the defect liability period. In case of Extension of time granted by the employer, the Agreement of joint undertaking is also deemed to be extended for the period of such delay and that it is irrevocable until 3 months after the completion of the extended periods including defect liability period also.
- 11) The JV Agreement should also include JV members to agree that the above undertaking to be without any prejudice to the various liabilities of the members of the JV (Contractor) including the EMD as well as all the other obligations of the contract.
- 12) In case of J.Vs in meeting the requirement of eligibility criteria will be ascertained as combined resources of all Joint Venture members.
- 13) The experience of the work for which bids are invited shall be shared among the members of J.V. in the same ratio of their financial/equity participation in the work.
- 14) Foreign companies/Firms are not eligible for participating in the bid even as a JV partner also.
- 15) The intending bidder can be individual/consortium up to 2 or 3 to register as partnership firm in India, with names of all to find place in the register of firms, to comply before bid acceptance, if such consortium formed. In such event it must be ensured that the consortium member - Indian registered company or other entity even at abroad is not disqualified either by blacklisting or involved in any criminal cases and not covered by any even pending bankruptcy proceedings and subject to performance appraisal from track record to make out, otherwise not eligible for even technical bid eligibility, leave a part cannot be the lead member of the consortium.

B. TECHNICAL REQUIREMENT: The Contractor should satisfy the following.

1. The Contractor should have executed Minimum quantities in a year during last Ten Financial Years (2010-11 to 2019-20).

Sl. No.	Item	Estimated Quantity	Minimum Quantity Required
1.	Earth Work Excavation	14,30,325 Cum	3,57,581 Cum
2.	Embankment	17,59,218 Cum	4,39,805 Cum
3.	Concrete	44,331 Cum	11,083 Cum

Note: The combined capacity of quantities executed by all the members of JV group will be considered for evaluating Technical requirement.

2. Each bidder should further demonstrate:
 - a) Availability (either owned or leased or to be procured) of the following key and critical equipment for this work.

Sl. No.	Equipment type & Capacities	Minimum numbers required
1	Hydraulic Excavator (0.85 cum Bucket capacity)	5 No.
2	Tippers 14 cum capacity	40 Nos.
3	Dozers	3 Nos.
4	Vibromax Power Rollers	2 Nos.
5	Batching Plant 30 cum capacity	1 Nos.
6	Transit Mixers 6 cum capacity	4 Nos.
7	Water Tankers	6 Nos.
8	Needle Vibrators (40/60mm)	10 Nos.
9	10 HP Oil Engines	5 Nos.
10	10 KVA Generators	3 Nos.

- b) The contractor shall submit quality plan and also show proof of owning quality lab or tie-up with an established quality lab.
- c) Availability of the key personnel
 - i. Graduate Engineer (Civil) : **4 Nos.**
 - ii. Diploma Holders with adequate experience (Civil) : **8 Nos.**
- d) Copy of PAN card with a copy of latest income tax return submitted with Proof of receipt.
- e) Copy of GST Registration – **Should be registered in Andhra Pradesh State only.** The prospective bidder/contractor is liable to produce proof of its GST registration within the State of Andhra Pradesh as one of the eligibility criteria of technical bid qualifications and in case not already registered and undertakes by affidavit to cause register before entering into contract as per bid finalisation can be considered, however without which not eligible for entering into contract even any conditional bid acceptance given by declared as eligible bidder under reverse tendering process and for such default not only forfeiture of EMD, but also made liable for other civil and penal consequences if any.
- f) Liquid Assets / Solvency Certificate from any Indian Nationalized / Scheduled Banks of value not less than **Rs 36,51,00,000/-**.
- g) Scanned copy of Online payment receipt / BG towards EMD for **Rs. 2,07,95,155/-**
- h) Scanned copy of Transaction fee Receipt.

TENDERER

SUPERINTENDING ENGINEER

C. Financial Requirement: The Contractor should satisfy the following.

1. The bidder should have satisfactorily completed similar nature of works of value not less than **Rs. 51,98,78,873/-** as a prime contractor in any one year during last ten Financial years **(2010-11 to 2019-20)**. This value will be updated by giving 10% simple weightage per year to bring them to **2019-20** price level.
2. In case of J.V, the lead member should have satisfactorily completed similar works of value not less than the proportionate share equivalent to his share holding in the present J.V, as a prime contractor or lead member in a J.V during the last ten financial years (2010-11 to 2019-20) up dated by giving 10% simple weightage per year to bring them to 2019-20 price level.
3. The combined financial capacity of all the members of JV group will be considered for evaluating financial requirement.
4. a) Liquid assets or credit facilities or Solvency Certificate from Indian Nationalized or Scheduled Banks in their proforma or net worth certificate issued by the Chartered Accountant. of value not less than **Rs 36,51,00,000/-**.
b) In case of J.V, each individual J.V member shall have liquid assets or credit facilities or Solvency Certificate from Indian Nationalized or Scheduled Banks of value not less than their proportionate equivalent share in the J.V.
5. **Assured available Bid capacity as per formula (3AN-B) should be greater than ECV assessed by employer. (3 A N – B > ECV i.e. Rs.207,95,15,493/-**
A = Maximum value of Civil Engineering works executed in any one year during the last 10 (ten) financial years i.e., 2010-11 to 2019-20 (updated by giving 10% simple weightage per year to bring them to 2019-2020 price level) taking in to account the completed as well as works in progress.
N = Number of years prescribed for completion of the works for which tenders are invited.
B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids are invited (updated by giving 10% simple weightage per year to bring them to 2019-2020 price level).
6. Certificate regarding Annual Financial turnover of the firm in all Civil Engineering works duly authenticated by Statutory Auditor along with audit balance sheet be furnished.
7. Even though the Contractors meet the above Qualification Criteria, they are subject to be disqualified if they have:
 - a) Record of poor performance such as abandoning the works, not properly completing or financial failures etc., in preceding 10 (ten) financial years (2010-11 to 2019-20).
 - b) Consistent history of litigation or arbitration awards against the Contractor or any member of the JV in preceding 10 (ten) financial years (2010-11 to 2019-20).
8. Sub contractor's experience for the works awarded in terms of Government of Andhra Pradesh/CPWD/ Other State Governments and PSU norms by the competent authority shall alone be considered. Certificate in proof of such Sub Contractor's experience as stated above shall be signed by the Executive Engineer or equivalent and counter signed by the Superintending Engineer or equivalent and furnished along with the Bid. Any deviations to these norms shall not be entertained.
Sub Contractor's experience for the works awarded/ carried out not in accordance with the norms of Government of Andhra Pradesh/CPWD/ Other State Governments and PSU shall not be taken in to account. The Sub-Contractor's experience certificate should contain all relevant particulars required for consideration under Qualification Criteria.
General Power of Attorney holder's experience shall not be taken into Account.

Bids, which do not fulfill the Eligibility Criteria, will not be considered.

9. Procedure for Bid Submission:

A) Request for Proposal/Tender schedule can be downloaded from the web site:

<https://tender.apecurement.gov.in>

- a) Intending bidders can contact Superintending Engineer, SRBC CIRCLE No.2,NANDYAL, Andhra Pradesh Ph.No.08514-242096 for any clarification, information on any working day during working hours.
- b) All bidders must fill out the pre-qualification checklist and sign on the self-declaration form stating their compliance with all the technical and financial pre-qualification criteria.
- c) All bidders must upload documents in the e-Procurement portal validating their declarations under the technical and commercial pre-qualification criteria laid out in the checklist.
- d) The bidders should quote their initial price offer at the prescribed field / place provided in the e-market place.
- e) The quoted initial price offer cannot be in excess of 5% over the Estimated Contract Value (ECV) value provided by the Department.
- f) The bidder shall sign on all the documents uploaded by him including EMD owning responsibility for their correctness / authenticity and upload along with Tender.
- g) The Department shall carry out the technical bid evaluation solely based on the uploaded certificates / documents, in the e-procurement system.
- h) All bidders shall furnish the original hard copies of the EMD and Self-declaration before submitting their Initial Price Offer and within the stipulated time, failing which their Initial Price Offer shall not be opened and they will not be taken forward into the reverse auction.
- i) If the successful bidder fails to submit the original hard copies of up loaded certificates / documents within the stipulated time or if any variation is noticed between the up loaded documents and the hard copies submitted by the bidder, the bidder will be suspended from participating in the tenders on e-procurement platform for a period of 3 years as per G.O. Ms. No.174, Dated 01.09.2008. If any of the documents furnished by the bidder are found to be false / fabricated / Bogus, at any time the bidder will be black listed and the EMD will be forfeited.
- j) e-procurement corpus fund: The Corpus Fund @ 0.03% of ECV (Estimated Contract Value) + 12.36 Service Tax with a cap of Rs.10,000 (Rupees ten thousand only)+ 12.36% service tax for all works the ECV upto Rs.50 crores, and with a cap of Rs.25,000/- (Rupees twenty five thousand only) + 12.36% service tax and for all works the ECV More than Rs.50 Crores is payable by the bidder through a DD drawn in favour of Managing Director, APTS, Vijayawada at the time of conclusion of the Agreement.

38. E-Auction (Reverse Tendering);

After identifying the eligible agencies / bidders will be eligible to participate in e-auction process in terms of guidelines issued vide G.O.Ms.No.67, WR (Reforms) Dept., Dt.16.08.2019.

- a) All bidders shall submit the original hard copies of DD/ BG uploaded for EMD etc., and also the hard copies of the supporting documents regarding technical and financial criterion to the Superintending Engineer, SRBC CIRCLE No.2,NANDYAL/District Collector's Office, Kurnool to an officer not below rank of Deputy Executive Engineer) / Engineer-in-Chief (I) at Vijayawada within the stipulated time, failing which their Price Bid shall not be opened and they will not be taken forward into the reverse auction. In case the documents found to be

defective, incorrect or forged and therefore claim of qualification is not supported, severe action including forfeiture of EMD.

- b) After identification of the L-1 Initial Price Offer, eligible (those who have submitted original hard copies of the DD/ BG for EMD within the stipulated time) bidders shall be transferred to the Reverse Auction Platform.
- c) The initial period of the Reverse tendering process will start after 2 hours and 45 minutes, following which there will be auto extensions of time by 15 minutes in case of any reduction in bids recorded in the prior 15 minutes.
- d) Decrements made in each subsequent bid shall not be less than 0.5% of the ECV uploaded.

39. Conclusion of the Reverse Tendering Process;

- a) After conclusion of the reverse auction process, the pre-qualification criteria of all bidders shall be verified along with an additional field verification for the successful bidder. In case of successful verification of pre-qualification criteria of the L-1 Bidder, he will be awarded the contract and the EMDs of other successfully verified bidders shall be refunded.
- b) If any variation is noticed between the up loaded documents and the self-declaration submitted by the bidder, the bidder will be suspended from participating in the tenders on ape-procurement platform for a period of 3 years. If any of the documents furnished by the bidder are found to be false / fabricated / Bogus, at any time the bidder will be black listed and the EMD will be forfeited.
- c) In case of the L1 bidder being disqualified, the Department reserves the right to restart the reverse auction process with the L2 price of the concluded reverse auction as the start/ maximum bid price OR to restart the entire tendering process from the NIT Stage. In either case, the date and time of the subsequent process shall be communicated to the remaining bidders.

40. Special conditions;

- 1. The Scope of Work shown above is only indicative and detailed scope has been described in the Bid Document.
- 2. The time for completion of the Construction Works is 24 months, followed by Defect Liability Period of 24 months after successful completion of Construction Works.
- 3. Issue of Bid Document will not automatically construe the eligibility of the Contractor(s) for participation in the subsequent Bidding process and will be determined during evaluation.
- 4. The dates stipulated in the NIT are firm and under no circumstances they will be relaxed unless officially extended / notified.
- 5. The Contractors shall submit their Bids online only. Any sort of difficulties or the problems in the internet, web site in submission of tenders, the Employer is not responsible.
- 6. Bids received with an excess of more than 5% over the ECV Specified by the employer shall be summarily rejected. Negotiations are not permitted to be conducted at any level.
- 7. In respect of Bids received beyond 25% less than ECV specified by the employer, the Contractor shall furnish a Bank Guarantee (or) Demand Draft for the difference between the Bid amount and 75% of ECV at the time of concluding Agreement as additional security deposit valid up to 6 months after completion of work.
- 8. The Employer reserves the right to accept (or) reject any (or) all the Bids without assigning any reason whatsoever.
- 9. The Contractor should submit a copy of valid GST registration certificate issued by the registration authority.

10. The Contractor should submit copy of PAN card and copy of latest Income Tax return submitted to IT Department along with proof of submission.
11. Any other condition regarding receipt of Bids in conventional method appearing in the Bid documents may please be treated as not applicable.
12. The Contractors should invariably upload the scanned copies of Bid Security and experience certificates and other relevant documents duly signed by them.
13. The successful tenderer should however pay E.M.D. i.e., the E.M.D. calculated at 2.5% (Two and Half Percent) of Tender Contract Value (TCV) at the time of concluding the agreement in the shape of CFMS Challan in favour of Assistant Pay and Accounts Officer, Works Accounts, Nandyal (or) unconditional and irrevocable Bank Guarantee as per the standard format with Bank Guarantee / Demand Draft of 2.5% of agreement value shall be valid for a total period of 48 months + 28 Days (i.e. period of completion of 24 Months plus Defect Liability Period of 24 Months + 28 Days) in favour of Superintending Engineer, SRBC CIRCLE No.2, NANDYAL. The EMD paid at the time of submission of tender will be returned.
14. Bids shall be valid for a period of 3 months from the date of submission of bids. Before expiry of validity, the tender inviting authority may seek further extension of validity of the bid from the bidder and in case, the validity is not extended, the bid will not be considered after such expiry. During the period of validity if any bidder with draw bid his / her / their EMD shall be forfeited.
15. The retention amount from the bills will be deducted at the rate of 7.5% as usual.
16. The participating bidders will have to pay transaction fee to APTS, Vijayawada as per the amount prescribed in e-procurement platform. It is mandatory for the bidders to pay the transaction fee through the Electronic payment Gateway.
17. All necessary permissions / clearances / approvals are to be processed and obtained by the Contractor only at his own cost. As an user agency, the Employer will cooperate in processing the proposals in respect of the above.
18. In case of discrepancy between the Price Bid quoted online and in supporting documents uploaded, the Price Bid quoted in the template provided online only would be considered for evaluation.
19. Bid Price should be quoted online in the specified template.
20. Experience relating to the works executed in State / Central Government Departments or State / Central Government under takings in India shall only be considered.
21. In case of Projects executed in Government departments / Government undertakings, the experience certificates should be certified by the Executive Engineer or equivalent and counter signed by the Superintending Engineer or equivalent and copies may be uploaded along with tender duly self attested.
22. Further, the Employer reserves the right to undertake a verification of the experience so stated, through engaging the services of a Professional Agency, and if any discrepancies are noticed in the information provided by the Contractor/ Successful Contractor/ Contractor (meaning one or more members, in case of JV) regarding previous relevant experience, the said Contractor/ Successful Contractor/ Contractor shall be disqualified duly forfeiting EMD and value of work done and shall be liable to pay damages as determined by the Employer. Further, the Contractor/ Successful Contractor/ Contractor shall be black listed.
23. The Contractor is subjected to be disqualified and liable for black listing and forfeiture of Bid Security, if he is found to have misled or furnished false information in the documents submitted in proof of qualification requirement
24. Even during execution of the work, if found that the Contractor had produced false/fake certificates of experience, he will be liable for black listing and the

Contract will be liable for termination duly forfeiting EMD and all the amounts due to him.

25. The Employer reserves the right to relax the conditions if required for eligibility of the Contractor in the public interest. The contractor(s) shall not have any right to question the decision taken by the employer in this regard.
26. **Labour CESS:** : It is the liability of the Contractor to pay the Labour cess as per Government Rules/norms from time to time. The Government Water Resource Department is no way liable for the same in any contingency.
27. **National Academy Construction:** The Bid price quoted by the Contractor is exclusive of NAC and shall be recovered at the rate 0.1% on the cost of construction in each bill of the contractor and reimbursed within provisions made in the Schedule-A, Part II.
28. **Goods and Service Tax (GST) Component:** The GST component is loaded in Schedule-A, Part-II of Agreement. The GST will be applied as per G.O. Ms. No.58, Finance (WR.I) Department, Dated:08.05.2018 and as per Government rules varies from time to time. **The contractor shall file GST returns from time to time and produce proof to the Department in so far as the contract scope is concerned, and the reimbursement of GST will be made accordingly. Any input tax benefit or subsidy shall be accrued to the Government only.**
29. **Seigniorage charges:** The estimate Unit Rates of various items are exclusive of Seigniorage charges. A lump sum provision of Seigniorage charges is provided in Part-II of Schedule-A as per G.O. Ms. No.83, Water Resources (Reforms) Department, Dated:05.08.2015. The Seigniorage charges rates will be effected for the material used on the work vide G.O.Ms.No.11, Industries and Commerce (M.II) Department, Dated:11.02.2020 or as modified by the Government from time to time are recovered on all materials and ordinary earth used in the work from the bills on the quantities measured. The Seigniorage charges recovered from the Agency will be reimbursed after providing of evidence of payment of Seigniorage charges. Any increase/ decrease occurred in the Seigniorage charges, the same will be recovered and will be reimbursed.
30. **Income Tax:** During the currency of the contract deduction of income tax at **Prevailing rate** shall be made from the gross value of each bill of the contract as per Income tax Act, 1961 shall be followed. The Income tax will be recovered from gross value of the work bill of contractor as amended by the Government from time to time.
31. The successful bidder has to pay the Corpus Fund @ 0.03% of ECV (Estimated Contract Value) + 12.36 Service Tax with a cap of Rs.10,000 (Rupees ten thousand only)+ 12.36% service tax for all works the ECV upto Rs.50 crores, and with a cap of Rs.25,000/- (Rupees twenty five thousand only) + 12.36% service tax and for all works the ECV More than Rs.50 Crores is payable by the bidder through a DD drawn in favour of Managing Director, APTS, Vijayawada at the time of conclusion of the Agreement.
32. Other conditions are as per the bid documents which will be available on e-Procurement Market Platform from **-6-2020 onwards (online only).**
33. Articles of Contract - Successful Contractor/Contractor is to execute Articles of Contract as provided in the Bid Document.

41. General Terms & Conditions;

1. The details and certificates are to be furnished as per the proforma available in the tender schedules in proof of Qualification Criteria. The details of works not furnished in the relevant formats shall not be taken in to consideration for evaluation, though up loaded along with Bid.

2. The Contractor should have the key and critical equipment (either owned or leased) as mentioned in the Bid Document.
3. The Contractors shall submit Written Power of Attorney authorizing the signatory of the Bid to commit for the Contractor. In case of JV, Power of Attorney has to be provided by Lead Member of the JV, in the formats provided.

42. Scope of Work:

As per the approved designs, the following components of works are to be executed.

Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt including construction of Spillway

43. Tender can be down loaded at <https://tender.apecurement.gov.in>

NOTE: The bidders shall sign on all the statements, documents, certificates uploaded by him owning responsibility for their correctness/ authenticity.

**GOVERNMENT OF ANDHRA PRADESH
WATER RESOURCES DEPARTMENT
THE SUPERINTENDING ENGINEER, SRBC CIRCLE NO.2, NANDYAL
INVITES TENDER FOR THE WORK OF
“Construction of a new reservoir across Kundu river to a capacity of 0.80
TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)**

NIT No. SE/2020-21 Dated:. .06. 2020.

1. The Employer will pay the payment based on actual work done on Item Rate basis at agreement rates appended as per Schedule-A, Part-I duly fulfilling all the conditions of L.S agreement.
2. The price variation clauses are incorporated as per the standard procedure and covered in General conditions of contract.
3. The Contractor is responsible for maintaining the required rate of progress for completing the works under this agreement in the time period of 24 months from the date of this agreement. In the event of slow progress or non-fulfillment of Mile Stone Programme or any delay in completion as per Target, Liquidated damages together with suitable penal action will be taken as per conditions of contract stipulated in the L.S agreement.
4. In this Agreement words & Expressions shall have same meanings as are respectively assigned to them in the conditions of contract here in after refer to.
5. The following documents shall be deemed to form and be read and construed as part of this Agreement:
 - (a) The Letter of Acceptance dated.
 - (b) The Conditions of Contract.
 - (c) Schedule-A, Part-I & II
 - (d) Technical Specifications,
 - (e) Milestone Programme
6. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete all works and remedy any defects therein, in conformity with the provisions of the Contract.
7. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price at the times and in the manner prescribed by the Contract.
8. The documents forming the Contract shall be interpreted in the following order of priority:
 - a) Contractor's willingness letter
 - b) Letter of Acceptance, notice to proceed with the works.
 - c) Agreement.
 - d) Bill of quantities (Schedule-A)
 - e) Conditions of contract.
 - f) Specifications.
 - g) Drawings.
 - h) Any other document listed as forming part of the Contract.
12. The total contract value indicated in Schedule 'A' shall include all construction materials. The total contract value of the agreement should include all the aspects of the agreement to complete the finished item of work as per the A.P.S.S., I.S. specifications, the special specification & Drawings appended.
13. If there is any contradiction in specifications between A.P.S.S. and I.S Specifications, the latter shall prevail.
14. In case of a job for which specifications are not available in the Schedule – A or in A.P.S.S. or in I.S. code and are required to be prescribed, such work shall be carried out in accordance with the written instructions of the Engineer-in-Charge recorded in the “Order Book”.

15. The Contractor should use the excavated useful soils and stone for construction purpose only. Soils can be used either for homogeneous section or in hearting or in casing zone based on the suitability.
16. The total contract value of the Contractor should be based on the above aspects.
17. The total contract value shall also include the work of any kind necessary for the due and satisfactory construction, completion and maintenance of the works to be intent and meaning of the drawings and these specifications and further drawings and orders that may be issued by the Engineer –in-Charge from time to time. The contract value shall include compliance by the Contractor with all the general conditions of contract, whether specifically mentioned or not in the various Clauses of these specifications, all materials apparatus, plant, equipment, tools, fuel, water, strutting timbering, transport, Offices, stores, workshop, staff, labour and the provision of proper and sufficient protective works, diversions, temporary fencing and lighting, it shall also include safety of workers, first-aid equipment, suitable accommodation for the staff and workmen, with adequate sanitary arrangements, the effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties, duties or other charges arising out of the erection of works and the regular clearance of rubbish, reinstatement and clearing up of the site as may be required on completion of works safety of the public and protection of the works and adjoining land.
18. The work executed by the Contractor under the contract shall be maintained at the Contractor's risk until the work is taken over by the Executive Engineer. The Contractor shall accordingly arrange his own insurance against floods, fire and other usual risks during such period.
19. The Contractor shall ensure that, the total contract value shall cover all stages of work such as setting out, selection of materials, selection of construction methods, selection of equipment and plant, conveyance of materials, deployment of personnel and supervisory staff, quality control testing etc., The work of building in quality assurance shall be deemed to be covered in the total contract value.
20. In case of discrepancies between the written description of the item in the Schedule 'A' and the detailed description in the specification of the same item, the latter shall be adopted.
21. The quantities here given are those upon which the lumpsum cost of the work is based but they are subject to alteration, omissions, deductions or additions as provided for in the conditions of this contract and do not necessarily show the actual quantities of work to be done. The total contract value and unit rates in Schedule-A are those governing payment of extras or deductions for omissions according to the conditions of the contract as set-forth in the Preliminary Specifications of the A.P. Standard Specification and other conditions of specifications of this contract.
22. It is to expressly be understood that the measured work is to be taken net quantity (not withstanding any custom or practice to the contrary) according to the actual quantities when in place and finished, according to the drawings or as may be ordered from time to time by the Executive Engineer and the cost calculated by measurement of weight, at their respective rates without any additional charge for any necessary or contingent works connected therewith. The rates quoted are for works in situ and complete in every respect.
23. **Ineligibility to Tender:**
 - i. A retired officer of the Govt. of AP or Govt. of India executing works is disqualified from tendering for a period of two years from the date of retirement without the prior permission of the Government.
 - ii. The Tenderer who has employed any retired officer as mentioned above shall be considered as an ineligible Tenderer.
 - iii. The contractor himself or any of his employees is found to be Gazetted Officer who retired from Government Service and had not obtained permission from the Government for accepting the contractor's employment within a period of 2 years from the date of his retirement.
 - iv. The Contractor or any of his employees is found at any time after award of contract, to be such a person who had not obtained the permission of the

Government as aforesaid before submission of the tender or engagement in the Contractor's service.

- v. Contractor shall not be eligible to tender for works in the division / circle where any of his near relatives are employed in the rank of Assistant Engineer or Assistant Executive Engineers and above on the Engineering side and Divisional Accounts Officer and above on the administrative side. The Contractor shall intimate the names of persons who are working with him in any capacity or are subsequently employed. He shall also furnish a list of Gazetted / Non-Gazetted, State Government Employees related to him. Failure to furnish such information Tenderer is liable to be removed from the list of approved contractors and his contract is liable for cancellation.

Note: Near relatives include

1. Sons, stepsons, daughters, and stepdaughters.
2. Son-in-law and daughter-in-law.
3. Brother-in-law and sister-in-law.
4. Brothers and Sisters.
5. Father and Mother.
6. Wife / Husband.
7. Father-in-law and Mother-in-law
8. Nephews, nieces, uncle and aunts
9. Cousins and
10. Any person residing with or dependent on the contractor.

INSTRUCTIONS TO CONTRACTORS

A) GENERAL- WORK TO BE EXECUTED

“ Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)

SCOPE OF WORK:

As per the approved designs, the following components of works are to be executed.

- a) Formation of Reservoir by constructing earthen bunds both on Left side and Right side of Spillway.
- b) Construction of Spillway with 15 Nos.of radial gates of 13m x 5.50 m with lifting arrangements along with Spillway Bridge with Hoist, Gantry Crane, Stoplogs-3Nos. and Walkway Bridge connecting all Trunnion Chambers.
- c) With all appurtenant works and accessories such as **River Sluice, Electrification, DG Sets.**
- d) Miscellaneous works such as **Generator Room, Guard Room and Construction of Pylon.**
- e) Construction of Diversion Drain including drops.

Detailed quantities are shown in Part-I of Schedule-A.

A. LOCATION OF THE WORK:

The work site located near Koilkuntla town, Kurnool Dist.

Latitude : 15° 13' 58.584"

Longitude : 78° 18' 33.876"

B. ROADS: (Best way to approach the work site):

Site is located adjacent to Nandyal-Koilkuntla Road from Kalugotla (v) i.e., 35 Kms from Nandyal Town.

C.CLIMATE, RAIN FALL, TEMPARATURE (WORKING SEASONS):

The climate is of tropical type with highest temperature of 45°C. The climatic condition is very hot and semi-arid. The average rainfall of the district is 628 mm which is low compared to the state average of 896 mm.

D.Specifications:

Specifications are as per AP Revised Standard Data, MORT&H APDSS.

E. S.S.R. (YEAR AND EXTRA ALLOWANCES CONSIDERED) : Rates adopted in S.S.R. are as per Common Schedule of Rates for Roads and Buildings for all Engineering Departments of Water Resources Department SSR for the year

2019-20 including Overhead charges & Contractor Profit, but excluding Seigniorage Charges, **GST as applicable** & NAC at 0.10%.

F. ESTIMATED AMOUNT INCLUDING L.S. PROVISIONS :

As per Schedule-A Part-I & II enclosed

1.0 Time for completion

The time for completion of construction of the work including time required for creation of construction facilities and infrastructure works, necessary pre-construction survey, Engineering, investigation and soil exploration, etc., shall not exceed **24 Months** from the date of conclusion of Contract Agreement. Stipulated period of completion is the main essence of the contract and shall be strictly adhered to.

2.0 Site Visit.

The Contractor is advised to visit and examine the Site of Work and its surroundings and obtain all information that may be necessary for preparing the Rates for entering into a Contract, for construction of the Work. The costs of visiting the site shall be at the Contractor's own expense.

3.0 Technical Specification

The Contractor shall be deemed to have carefully examined all the site conditions and also to have satisfied himself as to the nature and character of the work to be executed and where necessary of the site conditions and other relevant matters / details, any information thus had or otherwise obtained from Employer, Engineer-in-Charge shall not in any way relieve the contractor from his responsibility for executing the Work in terms of the specifications including all details and incidental work and supply of all accessories and apparatus which may not have been specifically mentioned in the specification or drawings, but otherwise necessary for ensuring completion of project within the quoted agreement price only.

4.0 The Contractor shall pay special attention as regards achieving of critical milestones on schedule, so as to ensure final commissioning on time. The Employer directly and through Engineer-in-charge shall critically monitor both the Physical as well as Financial Targets, on monthly and quarterly basis. Shortfalls, if any, in the monthly targets shall be immediately rectified by supplementing the resources by the Contractor leading to increase in the progress,

5.0 Earnest Money Deposit (EMD)

5.1 The Contractor shall furnish, EMD at the time of conclusion of agreement. The EMD @ 2.5% of agreement value in the shape of demand draft or unconditional and irrecoverable Bank Guarantees at 2.5% of agreement value amount shall be furnished at the time of signing Contract by the successful Contractor. This Deposit can be in the form of,

- a) A Demand Draft from any Indian Nationalized Bank/ Scheduled Bank
or
- b) An Unconditional and irrevocable Bank Guarantee in the form given [under formats of securities, from an Indian Nationalized Bank/ Scheduled Bank]. The beneficiary of BG shall be Superintending Engineer, SRBC Circle No.2, Nandyal and the BG has to be obtained by the Contractor only.

The Bank Guarantee/Demand Draft of 2.5% of agreement value shall be valid for a total period of 48 months plus 28 Days. The EMD submitted by the Contractor will not carry any interest or other charges and it will be dealt with as provided in the conditions stipulated in the agreement.

The performance security bank guarantee, can be renewed in advance year to year or in alternative years or in one phase for total contract period and defect liability period and till rectification of defects and for any extended period and further made clear that any non-renewal in advance by the contractor of the Bank Guarantee shall be treated as non-furnished as a mandatory conditional default for termination of contract without prejudice to take other legal recourse by penalty, compensation, blacklisting etc. as the case may be.

6.0 Construction Programme

6.1 The Contractor shall submit a detailed construction programme **in a scientific manner duly considering the monsoons etc.,** after conclusion of this agreement describing broadly about Methodology and Technology going to be adopted for carrying out survey, investigation, soil exploration, and construction Methodology for all works of the Major components.

6.2 A. General Requirements:

- 1) Individual / Firm eligible for tendering all are having Registration as Special Class Contractor in Civil works as per the G.O. Ms. No.94, I&CAD (PW-COD) Department, Dated:01.07.2003 or with valid Registration in terms of CPWD or PWD codes in anywhere in the Country. The Restriction clause like Registration in Andhra Pradesh provided entire will be relaxed as per the G.O.Ms. No.67, Water Resources (Reforms) Department, Dated: 16.08.2019 & Joint Venture (JV) as well as MOU with combined Bid Capacity will be considered.
- 2) In case of J.V, at least one member of the J.V group should have a valid registration with Central /any State Government and others should have applied for registration with the Central /any State Government as on the date of submission of bids. Evidence of their making applications with Central /any State Government will be sufficient to make them eligible for participation.
In case the J.V. happens to be successful Contractor, the other J.V partners who have applied for registration should produce valid registration with Central /any State Government within 3 months after concluding Contract agreement.
Failure to comply with this condition, contract shall be cancelled, duly forfeiting the Performance Security, security deposits and value of work done as on that date besides blacklisting the other J.V partners having valid registration with Central /any State Government.
- 3) The Bids are limited to those individuals, firms, companies, joint ventures, who meet the following qualification and eligibility requirements and herein after referred to as "Contractor".
- 4) In case of joint ventures, the eligibility criteria will be considered on the basis of combined resources of the JV members.
- 5) The total members in the Joint venture shall not be more than 3 (Three).
- 6) The Contractor should submit a Power of Attorney for Signing of Bid. In the case of a Joint Venture, the members should submit a Power of Attorney in favour of the Lead Member.
- 7) In case of Joint Venture, the JV members should have entered into a legally valid Agreement for joint and several responsibilities and submit along with bid. The name of the Lead Member shall be defined. The Lead Member's share shall be not less than 51% in the joint venture. The share of each member including lead Member shall be exhibited in the JV Agreement.

- 8) The JV Agreement should clearly exhibit the responsibilities of the JV members. The non lead members of the JV shall execute a Power of Attorney in favour of the Lead Member authorizing the Lead Member to conduct all business for and on behalf of the JV during (a) Tendering process and (b) execution and for successful performance of the package including the Defect Liability and Operation and Maintenance periods in case of award of work. The Lead Member shall execute a Power of Attorney in favour of one of its officers to be the Authorised Signatory for signing the Bid Documents and also to undertake all other acts and deeds on the behalf of the JV in connection with the Bid and the Contract.
- 9) The JV Agreement should clearly exhibit the validity of the Agreement until the completion of the work including the Defect Liability.
- 10) The JV firm should furnish an undertaking from all the members that in case of award of work, the J.V Agreement deed is irrevocable by any one or all the members together until 3 months after the completion of the contract period including the defect liability and operation and maintenance periods. In case of Extension of time granted by the employer, the Agreement of joint undertaking is also deemed to be extended for the period of such delay and that it is irrevocable until 3 months after the completion of the extended periods also.
- 11) The JV Agreement should also include JV members to agree that the above undertaking to be without any prejudice to the various liabilities of the members of the JV (Contractor) including the performance security deposit as well as all the other obligations of the contract.
- 12) In case of J.Vs in meeting the requirement of eligibility criteria will ascertained as combined resources of all joint venture members.
- 13) The experience of the work for which bids are invited shall be shared among the members of J.V. in the same ratio of their financial/equity participation in the work.
- 14) Foreign companies/Firms are not eligible for participating the bid even as a JV partner also.

B) TECHNICAL REQUIREMENT:

The Contractor should satisfy the following.

- 1) The Contractor should have executed Minimum quantities in a year during last Ten Financial Years (2010-11 to 2019-20).

Sl. No.	Item	Estimated Quantity	Minimum Quantity Required
1.	Earth Work Excavation	14,30,325 Cum	3,57,581 Cum
2.	Embankment	17,59,218 Cum	4,39,805 Cum
3.	Concrete	44,331 Cum	11,083 Cum

Note: The combined capacity of quantities executed by all the members of JV group will be considered for evaluating Technical requirement.

- 2) Each bidder should further demonstrate availability (either owned or leased or to be procured) of the following key and critical equipment for this work. The tenderer should furnish an undertaking/declaration on a non-judicial stamped paper worth Rs.100/- as own/lease the key and critical equipment with sufficient proof.

Sl. No.	Equipment type & Capacities	Minimum numbers required

1	Hydraulic Excavator (0.85 cum Bucket capacity)	5 No.
2	Tippers 14 cum capacity	40 Nos.
3	Dozers	3 Nos.
4	Vibromax Power Rollers	2 Nos.
5	Batching Plant 30 cum capacity	1 Nos.
6	Transit Mixers 6 cum capacity	4 Nos.
7	Water Tankers	6 Nos.
8	Needle Vibrators (40/60mm)	10 Nos.
9	10 HP Oil Engines	5 Nos.
10	10 KVA Generators	3 Nos.

Availability of key personnel with adequate experience as required should be indicated based on the requirement for the work to be executed.

- a. Graduate Engineers - 4 Nos.
- b. Diploma Engineers - 8 Nos.

C. FINANCIAL REQUIREMENT:

The Contractor should satisfy the following.

- 1) The bidder should have satisfactorily completed similar nature of works of value not less than **Rs. 51,98,78,873/-** as a prime contractor in any one year during last ten Financial years **(2010-11 to 2019-20)**. This value will be updated by giving 10% simple weight age per year to bring them to **2019-20** price level.

The similar works means, Construction of a new reservoir with a capacity of 0.80 TMC or more along with all appurtenant works.

In case of joint venture the combined resources will be considered.

Certificate regarding annual financial turnover of the firm in all Civil Engineering works duly authenticated by Statutory Auditor along with audited Balance Sheet shall be furnished.

- 2) a) Liquid assets or credit facilities or Solvency Certificate from Indian Nationalized or Scheduled Banks in their proforma or net worth certificate issued by the Chartered Accountant. of value not less than **Rs. 36,50,00,000/-**.

b) In case of J.V, each individual J.V member shall have liquid assets or credit facilities or Solvency Certificate from Indian Nationalized or Scheduled Banks of value not less than their proportionate equivalent share in the J.V.

- 3) **Assured available Bid capacity as per formula (3AN-B) should be greater than ECV assessed by employer. (3 A N – B > ECV i.e. Rs. 207,95,15,493/-)**

A = Maximum value of Civil Engineering works executed in any one year during the last 10 (ten) financial years i.e., 2010-11 to 2019-20 (updated by giving 10% simple weightage per year to bring to 2019-2020 price level) taking in to account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of works for which bids are invited by giving 10% simple weightage per year to bring to 2019-20 price level.

- 4) Certificate regarding Annual Financial turnover of the firm in all Civil Engineering works duly authenticated by Statutory Auditor along with audit balance sheet be furnished.
- 5) Even though the Contractors meet the above Qualification Criteria, they are subject to be disqualified if they have:

- a) Record of poor performance such as abandoning the works, not properly completing or financial failures etc., in preceding 10 (ten) financial years (2010-11 to 2019-20).
- b) Consistent history of litigation or arbitration awards against the Contractor or any member of the JV in preceding 10 (ten) financial years (2010-11 to 2019-20).

6) Sub contractor's experience for the works awarded in terms of Government of Andhra Pradesh/ Government of India/ Other State Governments and PSU norms by the competent authority shall alone be considered. Certificate in proof of such Sub Contractor's experience as stated above shall be signed by the Executive Engineer or equivalent and counter signed by the Superintending Engineer or equivalent and furnished along with the Bid. Any deviations to these norms shall not be entertained.

Sub Contractor's experience for the works awarded/ carried out not in accordance with the norms of Government of Andhra Pradesh/ Government of India/ Other State Governments and PSU shall not be taken into account. The Sub-Contractor's experience certificate should contain all relevant particulars required for consideration under Qualification Criteria.

General Power of Attorney holder's experience shall not be taken into Account. Bids, which do not fulfill the Eligibility Criteria, will not be considered.

7. 0 BIDDING PROCESS:

Tender schedule can be downloaded from the web site:

<https://tender.apecurement.gov.in>

- a) Intending bidders can contact Superintending Engineer, SRBC Circle No.2, Nandyal, Andhra Pradesh Ph.No.08514-242096 for any clarification, information on any working day during working hours.
- b) All bidders must fill out the pre-qualification checklist and sign on the self-declaration form stating their compliance with all the technical and financial pre-qualification criteria.
- c) All bidders must upload documents in the e-Procurement portal validating their declarations under the technical and commercial pre-qualification criteria laid out in the checklist.
- d) The bidders should quote their initial price offer at the prescribed field / place provided in the e-market place.
- e) The quoted initial price offer cannot be in excess of 5% over the Estimated Contract Value (ECV) value provided by the Department.
- f) The bidder shall sign on all the documents uploaded by him including EMD owning responsibility for their correctness / authenticity and upload along with Tender.
- g) The Department shall carry out the technical bid evaluation solely based on the uploaded certificates / documents, in the e-procurement system.
- h) All bidders shall furnish the original hard copies of the EMD and Self-declaration before submitting their Initial Price Offer and within the stipulated time.
- i) If the successful bidder fails to submit the original hard copies of up loaded certificates / documents within the stipulated time or if any variation is noticed between the up loaded documents and the hard copies submitted by the bidder, the bidder will be suspended from participating in the tenders on e-procurement platform for a period of 3 years as per G.O. Ms. No.174, Dated 01.09.2008. If any of the documents furnished by the bidder are found to be false / fabricated / Bogus, at any time the bidder will be black listed and the EMD will be forfeited.

- j) 'e' procurement Corpus Fund:- The Corpus Fund @ 0.03% of ECV (Estimated Contract Value) + 12.36 Service Tax with a cap of Rs.10,000 (Rupees ten thousand only)+ 12.36% service tax for all works the ECV upto Rs.50 crores, and with a cap of Rs.25,000/- (Rupees twenty five thousand only) + 12.36% service tax and for all works the ECV More than Rs.50 Crores is payable by the bidder through a DD drawn in favour of Managing Director, APTS, Vijayawada at the time of conclusion of the Agreement..

7.1 E- Auction (Reverse Tendering Process) :

After identifying the eligible agencies / bidders will be eligible to participate in e-auction process in terms of guidelines issued vide G.O.Ms.No.67, WR (Reforms) Dept., Dt.16.08.2019.

- a. All bidders shall submit the original hard copies of DD/ BG uploaded for EMD etc., and also the hard copies of the supporting documents regarding technical and financial criterion to the Superintending Engineer, SRBC Circle No.2, Nandyal/Collector's Office at Kurnool to an officer not below rank of Deputy Executive Engineer / Engineer-in-Chief (I) at Vijayawada within the stipulated time, failing which their Price Bid shall not be opened and they will not be taken forward into the reverse auction. In case the documents found to be defective, incorrect or forged and therefore claim of qualification is not supported, severe action will be initiated including forfeiture of EMD.
- b. After identification of the L-1 Initial Price Offer, eligible (those who have submitted original hard copies of the DD/ BG for EMD within the stipulated time) bidders shall be transferred to the Reverse Auction Platform.
- c. The initial period of the Reverse tendering process will start after 2 hours and 45 minutes, following which there will be auto extensions of time by 15 minutes in case of any reduction in bids recorded in the prior 15 minutes.
- d. Decrements made in each subsequent bid shall not be less than 0.5% of the ECV uploaded.

7.2 Conclusion of the Reverse Tendering Process:

- a. After conclusion of the reverse auction process, the pre-qualification criteria of all bidders shall be verified along with an additional field verification for the successful bidder. In case of successful verification of pre-qualification criteria of the L-1 Bidder, he will be awarded the contract and the EMDs of other successfully verified bidders shall be refunded.
- b. If any variation is noticed between the uploaded documents and the self-declaration submitted by the bidder, the bidder will be suspended from participating in the tenders on e-procurement platform for a period of 3 years. If any of the documents furnished by the bidder are found to be false / fabricated / Bogus, at any time the bidder will be black listed and the EMD will be forfeited.
- c. In case of the L1 bidder being disqualified, the Department reserves the right to restart the reverse auction process with the L2 price of the concluded reverse auction as the start/ maximum bid price or to restart the entire tendering process from the NIT Stage. In either case, the date and time of the subsequent process shall be communicated to the remaining bidders.

8.0 Specific Issues:

- 8.1** A prospective Contractor is expected to examine all instructions, terms & conditions, forms and specifications in the agreement and fully inform

himself as to all the conditions and matters which may in any way affect the Works, his or the cost thereof. The contractor must have verified himself of all local conditions and factors which may have any effect on the execution of the Works covered under the specifications and documents.

- 8.2** It shall be the responsibility of Contractor to fully inform himself of all local conditions and factors which may have any effect on the execution of the Works covered under the specifications and documents.
- 8.3** The Contractors shall familiarize themselves with all the applicable laws including rules, regulations and notifications made there under, and judgements, decrees, injunctions, writs and orders of any court of record, as may be in force and effect during the subsistence of this Contract including the Income Tax Act, Companies Act, Customs Act, prevailing Labour Laws and other related Acts and Laws. Further, the Contractors are requested to comply with the applicable insurance laws including the Workmen's Compensation Act, laws governing third party insurance and other relevant laws/provisions governing the requirements of taking insurance for storage, Civil, Structural and Architectural Work, Erection, testing and commissioning, operation and Maintenance, till the Project is handed over to Employer.
- 8.4** The Employer shall not entertain any requests for clarification from the Contractors regarding local conditions. It must be understood and agreed that such factors have properly been investigated and considered by the Contractors while submitting their willingness. Failure to do so will not relieve the Contractors from the responsibility for estimating properly the cost of successfully performing the work and completion time required for the Work.
- 8.5** The Employer will assume no responsibility for any understanding, or representation concerning the conditions made by any of its officers or agents prior to award of the Contract. Neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by Employer, which arises out of lack of such clear knowledge or its effect on the cost of execution of the Contract on the part of the Contractor. Employer shall not entertain any request for clarifications from the Contractors, regarding any statutory provisions.
- 8.6** The Contractor shall take full responsibility for the Execution of entire work under Scope of Work including Operation Maintenance of the Project for a period of 48 months+28 days which includes Defect Liability Period of 24 months from the date of issue of completion certificate by the employer.
- 8.7** Contractor's work execution shall conform to Bureau of Indian Standard Codes and/or International Standards & practices / C.W.C. Manuals / IRC Codes/ I & CAD Department specifications / Circulars issued by Water resources Department from time to time.
- 8.8** It is understood that all plant, equipment, and works connected with the normal efficient execution of the Project are covered in the Scope of Work defined in the agreement.
- 9.0 Special Attention**
The Contractors is expected to aware of following conditions before conclusion of agreement.
- i. Infrastructure & Construction Facilities, Preliminary, Enabling & Ancillary works whatsoever required by them for successful completion of the Project in the specified time schedule.
 - ii. Indian Income Tax and Surcharge on Income Tax on Salaries of Expatriates etc.
 - iii. Corporate Income Tax.

- iv. All Taxes, Duties and expenses and transportation, Central Excise Duty, Customs Duty, and GST.
- v. All Local Duties, Royalties, Octroi etc.

9.1 The following recoveries will be made towards taxes.

1. GST as applicable
2. Income tax at applicable rate.
3. Seigniorage charges- where ever applicable.
4. NAC @ 0.10%.
5. Labour Cess

Note: The above Statutory deductions and any other Statutory Deductions if applicable then will be effected at applicable rates.

- 10.0** Central Excise Duty and Customs Duty are beyond contract Price. It will be reimbursed on the production of evidence of payment by the Contractor. However, the reimbursement of Central Excise Duty and Customs Duty by the Department is limited to Radial Gates with Hydraulic hoisting arrangements and related items only.
- 10.1** The Guidelines on GST and other taxes issued by the Government from time to time shall be binding for this agreement and accordingly suitable supplemental agreement shall be entered into.
- 10.2** The payment towards GST, NAC and Seigniorage charges at applicable rates shall be reimbursed from the PART-B of the Schedule A of this agreement.

AWARD OF CONTRACT

11.0 Award Criteria:

Notification of Award and Signing of Contract

- 11.1** The Contractor whose Offer has been accepted will be notified through the award of the Work by the Employer. This letter (hereinafter and in the Conditions of Contract called "Letter of Acceptance") will indicate that the Government will pay the Contractor in consideration of the execution, completion, operation and maintenance of the Works by the Contractor as prescribed by the Contract under L.S contract system (hereinafter and in the Contract called the "Contract Amount").
- 11.2** When the Offer is accepted, of a willing agency the concerned Contractor shall attend the office of the Superintending Engineer, SRBC Circle No.2, Nandyal on the date fixed in the Letter of Acceptance. Upon intimation being given by the Superintending Engineer, SRBC Circle No.2, Nandyal of acceptance of his Offer, the Contractors shall make payment of the EMD , Additional EMD and Additional Security Deposit wherever/whenever needed by way of Demand Draft or unconditional and irrevocable Bank Guarantee obtained from any Indian Nationalized bank or any scheduled bank with required validity period and sign a Contract in the form prescribed by the Employer within 15 days for the due fulfillment of the Contract. Failure to attend the office of the Superintending Engineer, SRBC Circle No.2, Nandyal, on the date fixed, in the written intimation, to enter into the required Contract shall entail black listing of Contractor. The written Contract be entered into between the Contractor and the Employer shall be the foundation of the rights and obligations of both the Parties and the Contract shall not be deemed to be complete until the Contract has first been signed by the Contractor and then by the Superintending Engineer to enter into Contract on behalf of the Employer.

12.0 Corrupt or Fraudulent Practices

TENDERER

76 SUPERINTENDING ENGINEER

12.1 The Government requires that the Contractors / suppliers / contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of the Works. Notwithstanding anything to the contrary contained herein, or in the Contract, the Authority may reject Willing agency, without being liable in any manner whatsoever to the Contractor, if it determines that the Contractor has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Nomination Process. In such an event, the Authority shall be entitled to Damages, without prejudice to any other right or remedy that may be available to the Authority under the agreement conditions.

Without prejudice to the rights and remedies of the Authority under this Clause if a Contractor is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Nomination Process, the Authority may blacklist / or debar a firm/JV and partners in J.V either indefinitely or for a stated period of time.

For the purposes of this Clause the following terms shall have the meaning hereinafter respectively assigned to them:

- i. "corrupt practices" means the offering, giving, receiving or soliciting of anything of value to influence the action of a Government official or any other person concerned with the Nomination Process
- ii. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a Contract to the detriment of the Employer and includes collusive practice among Contractors.
- iii. "Coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any person or property to influence any person's participation or action in the Nomination Process;
- iv. "undesirable practice" means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Nomination Process; or (ii) having a Conflict of Interest; and
- v. "Restrictive practice" means forming a cartel or arriving at any understanding or arrangement among Contractors with the objective of restricting or manipulating a full and fair competition in the Nomination Process.

13.0 The Contractor shall examine closely the A.P.S.S. and also the standard preliminary specifications contained therein and sign at Employer's office copy of the A.P.S.S. and its addenda volume in token of such study before submitting his willingness which shall be for finished work IN-SITU. He shall also carefully study the drawing and additional specifications and all the documents which form part of the Contract be entered in to by the Successful Contractor. The A.P.S.S. and other documents connected with such as specifications plans and any other information can be had at any time between 10.30AM. to 5.00P.M. on all working days in the office of the Superintending Engineer, SRBC Circle No.2, Nandyal.

13.1 The Contractors attention is directed to requirements of materials under the clause materials and "Work man ship" in the preliminary specifications of APSS. Material conforming to the Indian standards specifications shall be used on the work.

- 13.2** The Contractor has to do his own testing of materials and satisfy himself that they confirm to the specifications of respective I.S.I. codes before their use on the work.
- 13.3** The Contractor shall himself procure required construction materials of approved quality including the earth and Rock fill for formation of embankment and water from source of his choice. All materials required for the work shall be got approved by the Engineer-in-charge in writing well before their use on the work.
- 13.4** The Contractor shall himself procure the sheet piles, cement, steel, bitumen, sand, blasting materials, metal, soils etc., and such other materials required for the work well in advance. The Contractor has to bear the cost of materials, conveyance and storage charges etc.,.
- 13.5** The contractor can utilize the useful excavated materials from the other components of present work by paying the cost of useful excavated stone and seigniorage charge on useful excavated material.
- 14.0 Inspection of Site and Quarries by the Contractor**
Contractor is expected to inspect the site of proposed work. He should also inspect the quarries and satisfy himself about the quality and availability of materials. **The best class of material to be obtained and to be used on the work.** In every case the material must comply with the relevant standard specifications. Samples of materials as called for in the standard specifications or as required by the Engineer-in-Charge, in any case shall be submitted for the Engineer-in-Charge's approval before the supply to site of work is begun. The contractor after examination of the source of materials shall state clearly in his willingness that, where from he intends to obtain materials, subject to approval of the Employer / Engineer-in-Charge.
- 15.0 The Contractor particular attention is drawn to the sections and clauses in the standard specifications dealing with.**
- i) Test, Inspection and rejection of defective materials and work.
 - ii) Carriage.
 - iii) Construction plant.
 - iv) Water and lighting.
 - v) Cleaning up during the progress and for delivery.
 - vi) Accidents.
 - vii) Delays.
 - viii) Particulars of payments.
- The Contractor should closely pursue all the specifications clauses, which govern the agreement & work.
- 16.0** The Contractor is responsible for the quality of Works executed. If any defects are noticed during the construction period and also during the Defect Liability Period of 24 months after completion of works, the Contractor has to rectify at his own cost. The contractor has to rectify the defect within the time as directed by the Engineer-In-Charge.
- 17.0** The Contractor is responsible for 2 (two) years of Defect Liability Period after issue of Completion Certificate by the Employer.
- 18.0** No alteration which is made by the Contractor in the Contract form, the conditions of the Contract, the drawings, specifications accompanying the same will be recognized and if any such alterations are made, The offer will be void.
- 19.0 SUBLETTING OF CONTRACT :**
-- Subletting is not permitted for this work--
- 20.0** The Contractor shall keep identification cards issued by the registering Authority at all times, while at the site of work and at offices and Produce the identity cards as and when asked for.

21.0 Contractor Organizational Person

The contractor shall employ the Organizational staff during execution of Work.

Note:

1. The Key Personnel should be on full time basis and available at site whenever required by Engineer in charge to take instructions.
 2. The names of the Key Personnel to be employed by the Contractor should be furnished in the statement enclosed separately.
 3. In case the Contractor is already having more than one work on hand and if he is himself qualified Engineer and has undertaking more than one work at the same time, he should employ separate Key person on each work.
22. The Contractor should furnish the address & Designation of Technical persons to which communication relating to the Contract may be sent and also authorize a person to be available at work spot during his absence. Any change in the incumbency of the authorized agent shall be communicated in writing by the Contractor to the Engineer-in-Chief or his nominee and their acknowledgement obtained on his copy of the communication.
 23. It is to be expressly and clearly understood that Contractor shall make his own arrangements to equip himself with all machinery and special tools and plant required for the speedy and proper execution of the work and the Employer does not undertake any responsibility towards their supply.
 24. The Contractor should invariably make use of stone abundantly available in the excavation of spillway foundations, spill channel, approach channel and foundations of Power house for all items such as rubble for revetment/pitching, metal for filters, metal for C.C/R.C.C items of structure, any other item involving stone or metal, duly making necessary local arrangement for operations such as blasting, crushing the stone to the specified sizes. The excavated materials from other component of Works involved under Scope of Work can also be made use of. With the prior approval of Employer. The Contractor shall pay seigniorage charges on the used quantity.
 25. The Work will have to be executed as per the IS specifications, standard specifications of APSS and special specification attached herewith or as directed by the Engineer-in-charge with reference to the working drawings.
 26. Vernacular signature should be translated into English.
 27. The Contractor shall at his own cost do all the drainage and pumping necessary for carrying out the work including shoring, strutting etc., The Contractor shall provide at his own cost necessary river diversion works include coffer dams and other protective works contingent on the work. It is the duty of the Contractor not only to provide for such works but also maintain them during the course of work in serviceable and safe condition. The Employer accepts no responsibility for any damage to the work itself consequent on the failure of the coffer dams, diversion works or protective works, whether it be due to rains, floods in the river or other causes.
 28. Re-handling of excavated soil/rock due to injudicious selection of the place of dumping shall not be paid for.
 29. The special attention of the Contractor is drawn to the conditions in the agreement wherein reference has been made to the Andhra Pradesh standard Specifications and the standard preliminary specifications contained therein. These preliminary specifications shall apply to the Contract to be entered into between the Contractor and Employer and shall form an inseparable condition of the Contract along with the additional

conditions of Contract, special specifications, drawings, contract, schedules etc. All these documents taken together shall be deemed to form one Contract and shall be complementary to one another.

30. Critical Equipment proposed to be deployed

- A. The Contractor should furnish the information regarding the availability of the equipment, required for construction / quality control.
- B. A declaration regarding the equipment owned/leased shall be produced by the Contractor on a non-judicial stamp paper of Rs 100/-.

**FORMS OF TENDER QUALIFICATION INFORMATION
QUALIFICATION INFORMATION ANNEXURE-I
CHECKLIST TO ACOMPANY THE TENDER**

Sl. No	Description	Submitted in Cover 'A'	Page No. (see Note below)
1	2	3	4
1	Copy of Contractors valid Registration under appropriate Class as per Tender Notice	Yes / No	
2	Furnishing of Income tax clearance certificate is dispensed with. However the contractors shall furnish their copy of permanent Account Number (PAN) Card and copy of Latest Income tax reruns submitted along with proof of receipt.	Yes / No	
3	Copies of Commercial Tax Registration, Clearance Certificate	Yes / No	
4	Details of value of Civil Engineering works executed in the last TEN financial years in the Tenderers name in Statement-I with supporting certificates.	Yes / No	
5	Details of similar works completed as Prime Contractor during the last TEN financial Years in Statement-II with supporting certificates.	Yes / No	
6	Quantities of work executed as Prime Contractor in the last TEN financial years - in Statement – III with supporting certificates.	Yes / No	
7	A detail of existing commitments i.e., works on hand in Statement-IV with Supporting Certificates.	Yes / No	
8	Availability of critical equipment in Statement –V.	Yes / No	
9	Availability of Key personnel in Statement.VI.	Yes / No	
10	Litigation history in Statement –VII.	Yes / No	
11	Proof of liquid assets in the shape of Solvency certificates etc., for the required amount.	Yes / No	
12	List of certificates enclosed	Yes / No	

Notes:-

1. All the statements copies of the certificates, documents etc., enclosed to the Technical bid shall be given page numbers on the right corner of each certificate, which will be indicated in column (4) against each item. The statements furnished shall be in the formats appended to the tender document.

The information shall be filled-in by the Tenderer in the checklist and statements I to VII, and shall be enclosed to the Technical bid for the purposes of verification as well as evaluation of the Tenderers Compliance to the qualification criteria as provided in the Tender document. All the Certificates, documents, statements as per check-list shall be submitted by the Tenderer in sealed Cover "A".

DECLARATION

I / We _____ have gone through carefully all the Tender conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or determination of contract or any other action deemed fit, taken by, the Department against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

I / WE hereby declare that, I / WE have not been blacklisted / debarred / Suspended / demoted in any department in Andhra Pradesh or in any State due to any reasons.

Signature of the Tenderer

TENDERER

81 SUPERINTENDING ENGINEER

STATEMENT – I

Details of value of Civil Engineering works executed in each year during the last TEN financial years by the Tenderer.

Sl. No.	Financial Year	Value in Rupees
1	2010-11	
2	2011-12	
3	2012-13	
4	2013-14	
5	2014-15	
6	2015-16	
7	2016-17	
8	2017-18	
9	2018-19	
10	2019-20	

- a) Attach certificate(s) issued by the Executive Engineer concerned and counter signed by Superintending Engineer showing work wise / year wise value of work done in respect of all the works executed by the Tenderer during last ten years **OR**
- b) Certificate from Chartered Accountant supported with Annual Balance Sheet tallying with I.T. Clearance certificate.

Signature of the Tenderer

TENDERER

82 SUPERINTENDING ENGINEER

STATEMENT – II

Details of similar works completed in the Name of the Tenderer during the last TEN financial years.

Sl. No	Name of the work	Address of Agt. Concluding Authority	Agreement No. & dated.	Value of Contract	Stipulated period of completion
1	2	3	4	5	6

Actual date of completion	Value of work done year wise during the last 'TEN' years.										Total value of work done
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year	
7	8	9	10	11	12	13	14	15	16	17	18

Attach certificates issued by the Executive Engineer concerned and countersigned by the Superintending Engineer showing work wise / year wise value of work done and date of completion.

Signature of the Tenderer

STATEMENT – III

Physical quantities executed by the Tenderer in the last TEN financial years. [work wise / year wise].

Sl. No	Financial Year	Name of work	Agt.No	Quantities executed		
				Earthwork Excavation	Embankment	Concrete
1	2	3	4	5	6	7
1	2010-11					
2	2011-12					
3	2012-13					
4	2013-14					
5	2014-15					
6	2015-16					
7	2016-17					
8	2017-18					
9	2018-19					
10	2019-20					

Attach certificates in support of the above quantities issued by the Executive Engineer concerned and countersigned by the Superintending Engineer duly showing the quantities executed year wise.

Signature of the Tenderer

STATEMENT – IV**Details of Existing Commitments**

Details of works on hand and, yet to be completed as on the date of submission of the Tender and works for which Tenders have been submitted are to be furnished.

A) Existing Commitments on ongoing works:

Sl.No	Name of work	Address of Agt. Concluding authority	Agt. No. & Date	Value of contract	Stipulated period of completion	Value of work done so far.	Balance Value of works to be completed	Anticipated date of completion	Updated value of balance work
1	2	3	4	5	6	7	8	9	10

Attach certificates issued by the Executive Engineer concerned and countersigned by Superintending Engineer, indicating the balance work to be done, and likely period of completion.

Signature of the Tenderer

B) Details of works for which Tenders are submitted [awarded / likely to be awarded]

Sl. No.	Name of work	Address of Agt. Concluding authority	Estimated value of work	Stipulated period of completion	Date on which tender was submitted	Present stage of Tender
1	2	3	4	5	6	7

Signature of the Tenderer

STATEMENT – V**Availability of Critical Equipment**

The Tenderer should furnish the information required below, regarding the availability of the equipment, required for construction / quality control.

Sl. No.	Details of Equipment	Number required	Number	
			Owned	Leased
1	2	3	4	5

Signature of the Tenderer

The Tenderer has to submit with a certificate issued by the Executive Engineer (or) a Declaration on non judicial stamp paper worth Rs 100/- as prescribed in Statement-V given below along with sufficient proof of document in support of owning such as Invoice / Certificate of Registration by competent authority in support of the critical equipment..

DECLARATION

I / We _____, do hereby solemnly affirm and declare that I /we own the following equipment for using on the subject work and also declare that I / We will abide by any action such as disqualification or determination of Contract or blacklisting or any action deemed fit, if the department detects at any stage that I/we do not possess the equipment listed below.

Sl. No.	Details of each Equipment	Year of purchase	Regn. Number	Capacity	Any other data.	Is it in working condition
1	2	3	4	5	6	7

Signature of the Tenderer

STATEMENT – VI**Availability of Key Personnel**

Qualification and experience of Key Personnel proposed to be deployed for execution of the Contract.

Sl. No	Name	Designation	Qualification	Total Experience	Working with the Tenderer since.
1	2	3	4	5	6

Signature of the Tenderer

STATEMENT – VII

Information on litigation history in which Tenderer is the Petitioner.

Sl. No	Case No. / Year	Court where filed	Subject Matter / Prayer in the case	Respondent s i.e., SE / CE	Present Stage
1	2	3	4	5	6

Signature of the Tenderer

**CONDITIONS OF CONTRACT
TENDER**

Date:

To
The Superintending Engineer,
SRBC, Circle No.2, Nandyal
Sir,

I / We do hereby tender and if this tender be accepted, under take to execute the following work of **“Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt) as shown in the drawings and described in the specifications deposited in the office of the Superintending Engineer, SRBC Circle No.2, Nandyal with such variations by way of alterations or additions to, and omissions from the said works and method of payment as provided for in the “conditions of the contract”** for the sum of Rupees only

(Rs.) or such other sum as may be arrived under the clause of the standard preliminary specifications relating to “Payment on lump-sum basis or by final measurement at unit rates”

I/WE have also quoted percentage excess or less on E.C.V., in Schedule ‘A’ Part-I, annexed (in words and figures) for which I/We agree to execute the work when the lump sum payment under the terms of the agreement is varied by payment on measurement quantities.

I/WE have quoted Percentage excess or less on E.C.V., in Schedule ‘A’ Part – I both in words & figures. In case of any discrepancy between the Percentage excess or less on E.C.V., in words and figures, the rates quoted words only shall prevail.

I/WE agreed to keep the offer in this tender valid a period of Three month(s) mentioned in the tender notice and not to modify the whole or any part of it for any reason within above period. If the tender is withdrawn by me/us for any reasons whatsoever, the earnest money paid by me/us will be forfeited to Government

I/WE hereby distinctly and expressly, declare and acknowledge that, before the submission of my/our tender I/We have carefully followed the instructions in the tender notice and have read the A.P.S.S. and the preliminary specifications therein and the A.P.S.S. addenda volume and that I/We have made such examination of the contract documents and the plans, specifications and quantities and of the location where the said work is to be done, and such investigation of the work required to be done, and in regard to the material required to be furnished as to enable me/us to thoroughly understand the intention of same and the requirements, covenants, agreements, stipulations and restrictions contained in the contract, and in the said plans and specifications and distinctly agree that I/We will not hereafter make any claim or demand upon the Government based upon or arising out of any alleged misunderstanding or misconception /or mistake on my/or our part of the said requirement, covenants, agreements, stipulations, restrictions and conditions.

I/WE enclosed to my/our application for tender schedule a crossed demand draft (No.....dated:....) for Rs.....as earnest money not to bear interest.

I/WE shall not assign the contractor or sublet any portion of the same except the conditions in clause 5.1 of General conditions of contract. In case if it becomes necessary such subletting with the permission of the Executive Engineer shall be limited to (1) Labour contract, (2) Material contract, (3) Transport contract and (4) Engaging specialists for special item of work enjoined in A.P.S.S.

IF MY/OUR tender is not accepted the sum shall be returned to me/us on application when intimation is sent to me/us of rejection or at the expiration of

TENDERER

90 SUPERINTENDING ENGINEER

three months from last date of receipt of this tender, whichever is earlier. If my/our tender is accepted the earnest money shall be retained by the Government as security for the due fulfillment of this contract. If upon written intimation to me/us by the Superintending / Executive Engineer's Office, I/We fail to attend the said office on the date herein fixed or if upon intimation being given to me/us by the Superintending /Executive Engineer or acceptance of my/our tender, and if I/We fail to make the additional security deposit or to enter into the required agreement as defined in condition-3 of the tender notice, then I/We agree the forfeiture of the earnest money. Any notice required to be served on me/us here under shall be sufficiently served on me/us if delivered to me/us hereunder shall be sufficiently served on me/us if delivered to me/us personally or forwarded to me/us by post to (registered or ordinary) or left at my/our address given herein. Such notice shall if sent by post be deemed to have been served on me/us at the time when in due course of post it would be delivered at the address to which it is sent.

I/WE fully understand that the written agreement to be entered into between me/us and Government shall be the foundation of the rights of the both the parties and the contract shall not be deemed to be complete until the agreement has first been signed by me/us and then by the proper officer authorized to enter into contract on behalf of Government.

I AM/WE ARE professionally qualified an my/our qualifications are given below:

Name	Qualified

I/WE will employ the following technical staff for supervising the work and will see that one of them is always at site during working hours, personally checking all items of works and pay extra attention to such works as required special attention (eg) Reinforced concrete work.

Name of members of technical staff proposed to be employed	Qualification

I / WE declare that I/WE agree to recover the salaries of the technical staff actually engaged on the work by the department, from the work bills, if I/We fail to employ technical staff as per the tender condition.

TENDERERS / CONTRACTOR'S CERTIFICATE.

- (1) I/WE hereby declare that I/We have perused in detail and examined closely the Andhra Pradesh Standard Specifications, all clauses of the preliminary specifications with all amendments and have either examined all the standards specifications or will examine all the standard specifications for items for which I/We tender, before I/We submit such tender and agree to be bound and comply with all such specifications for this agreement which I/We execute in the Irrigation & Command Area Development Department.
- (2) I/WE certify that I/We have inspected the site of the work before quoting my Percentage excess or less on ECV, I /We have satisfied about the quality, availability and transport facilities for stones sand and other materials.
- (3) I/WE am/are prepared to furnish detailed data in support of all my quoted rates, if and when called upon to do so without any reservations.
- (4) I/WE hereby declare that I/We will pay an additional security deposit in terms of conditions 3.6 of Instructions to Tenderers
- (5) I/WE hereby declare that I am/we are accepting to reject my tender in terms of condition 3.7 of instructions to Tenderers
- (6) I/WE hereby declare that I/We will not claim any price escalation.

- (7) I/WE hereby declare that I am/We are accepting for the defect liability period as 24 months instead of 6 months under clause 28 of APSS.
- (8) a) I/WE declare that I/WE will procure the required construction materials including earth and use for the work after approval of the Engineer-in-Charge. The responsibility for arranging and obtaining the land for borrowing or exploitation in any other way shall rest with me/us for the materials for construction, I/WE shall ensure smooth and un-interrupted supply of materials.
- b) I/WE declare that the responsibility for arranging and obtaining the land for disposal of spoil/soil not useful for construction purposes shall rest with me/us.
- c) I/WE declare that I/WE shall not claim any compensation or any payment for the land so arranged for disposal of soil and the land for borrow area. My/our quoted percentage excess or less ECV., are inclusive of the land so arranged and I/We will hand over the land so arranged for disposal of soil to; the department after completion of work.
- d) I/WE declare that I/WE will not claim any extra amount towards any material used for the work other than the quoted works for respective schedule 'A' items.
- (9) I/WE declare that I/WE will execute the work as per the mile stone programme, and if I/WE fail to complete the work as per the mile stone programme I abide by the condition to recover liquidated damages as per the tender conditions.
- (10) I/WE declare that I/WE will abide for settlement of disputes as per the tender conditions.

DECLARATION OF THE TENDERER

- 1) I/WE have not been black listed in any department in Andhra Pradesh due to any reasons.
- 2) I/WE have not been demoted to the next lower category for not filing the tenders after buying the tender schedules in a whole year and my/our registration has not been cancelled for a similar default in two consecutive years.
- 3) I/WE agree to disqualify me/us for any wrong declaration in respect of the above and to summarily reject my/our tender.

Address of the Tenderer:

CONTRACTOR

TENDERER

92 SUPERINTENDING ENGINEER

ARTICLES OF AGREEMENT

Articles of agreement made this _____ day of _____, 2019 between Governor of Andhra Pradesh (herein after called the Governor which expression shall, where the context so admits include his successors in office and assignees) of the one part and _____ (herein after called the contractor which expression shall where the context so admits include his heirs, executors, administrators legal representative) of the other part.

Whereas the Government of Andhra Pradesh (herein after called the Government.

Desirous of taking up the work of **“Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)** and have caused an estimate of probable quantities contained in schedule ‘A’ drawings and specifications describing the work to be done to be prepared.

And where as the said schedule ‘A’ drawings numbered serially 1 to inclusive (Schedule- B) and the special specifications (Schedule-C), additional conditions materials (Schedule-D), General conditions (Schedule-E) detailed tender notice, tender articles of Agreement have been signed by or on behalf of the parties here to.

And where as the contractor has agreed to the retention by the Government of the earnest money of Bank Guarantee No. _____, Dated: _____ for an amount of Rs. _____ (Rupees _____ only) issued by _____ valid up to _____ towards EMD and the contractor having agreed to keep it valid till the completion of work **24 Months plus 24 Months+28 Days observation period.**

And whereas the contractor has agreed that during the course of the contract period an amount at the rate of 7.5% of the value of work done will be withheld from the bills.

And whereas the contract has also signed the copy of the Andhra Pradesh standard specification and addenda volume thereto maintained in the circle office in acknowledgement of being bound by all the conditions of the clauses of the Standard preliminary specifications and all the standard specifications for items of works described by a standard specification number in Schedule ‘A’ Part I.

And where as contractor has agreed to execute upon and subject to the conditions set forth in the preliminary specifications of the Andhra Pradesh Standard specifications and such other conditions as are contained in all the specifications forming part of his contract (herein after referred to as the said conditions) the work should upon the drawing and described in the said specifications and set forth in Schedule ‘A part I as the “Probable Quantities” and comply with the rates of progress noted at the end of this articles of agreement for a sum of Rs. _____ (Rupees _____ only) or such other sum as may be arrived at under the clauses of the standard preliminary specifications relating to payment on lump sum basis or by final measurement at unit rate.

NOW IT IS HEREBY AGREED AS FOLLOWS:

TENDERER

93 SUPERINTENDING ENGINEER

1. In consideration of the payment of the said sum of Rs. _____ (Rupees _____ only) or such other sum as may be arrived at under the clause of the standard preliminary specification relating to payments on lump sum basis or by final measurement at unit rate, the contractor will, upon and subject to the said conditions, execute and complete the works shown upon the said drawing and described in said specifications, and to the extent of the probable quantities shown in the Schedule "A with such variations by way of alterations of, additions to, or deductions from the said works and method of payment there for as are provided for in the said works and the conditions.

2. The term Executive Engineer in the said conditions shall mean the public works officer in charge of the having jurisdiction for the time being over the work, who shall be competent to exercise all the powers and privileges reserved herein, in favour of the Government with previous sanction of or subject to the ratification by the Superintending Engineer, SRBC Circle No.2, Nandyal herein after called Superintending Engineer in case where such sanction or ratification may be necessary.

3. SETTLEMENT OF DISPUTES:

Except as otherwise provide in the contract, any disputes and differences arising out of or relating to the contract shall as follows:

I) Settlement of all claims up to Rs.10,00,000/- in value and below by way of arbitration to the referred as follows:

a) Claims up to Rs.1,00,000/- :

Superintending Engineer, SRBC Circle No.1, Nandyal

b) Claims above Rs.1,00,000/- and up to Rs.10,00,000/- Value:

Chief Engineer (Projects), WRD, Kadapa.

The arbitration proceedings will be conducted in accordance with provisions of the Arbitration Act, 1940 as amended from time to time. The arbitrator shall invariably give reasons in the award.

ii) Settlement of all claims above Rs.10,00,000/- in value

All claims above Rs.10,00,000/- in value should be decided by the civil court of competent jurisdiction by way of a regular suit and not by arbitration.

1. A reference for adjudication under this clause shall be made by either party to the contract within six months from the date of intimating the contractor of the preparation of final bill or his having accepted payment.
2. The relevant clause of Andhra Pradesh Standard specification stand modified to the extent provided in this clause.
3. Time shall be considered as of the essence of the agreement and the contractor hereby agrees to commence the work as soon as the agreement is accepted by the competent authority as defined by the Andhra Pradesh Public Work Department code and agrees to complete the work **within 24 Months** from the date of concluding agreement and to show progress as defined in the tabular statement "Rate of Progress below, subject to nevertheless to the provisions for extension of time contained on clause, 59 of the standard preliminary specifications.
4. The said conditions shall be read and construed as forming part of this agreement and the parties hereto will respectively abide by and submit themselves to the conditions and stipulations and perform the agreements on their parts, respectively.
5. Upon the terms and conditions of this agreement being fulfilled and performed to the satisfaction of the Executive Engineer, the security deposited by the contractor as herein before recited or such portion thereof as he may been

titled to under the said conditions shall be returned to the contractor as provided in clause 3 of schedule 'E'.

In _____ witness _____ thereof, _____ the _____ Contractor
 _____ here unto set his hand
 and _____, Superintending
 Engineer, SRBC Circle No.2, Nandyal acting on behalf of and by the order and
 direction of his Excellency, the Governor of Andhra Pradesh has here unto set his
 hand the day and year first above written.

Signed by Contractor:

Address:

In the presence of witness 1) Signed by
 on behalf of Government Sri in the
 presence of witness"

**Superintending Engineer
 SRBC Circle No.2, Nandyal**

Definitions

In these General Conditions of Contract, the following words and expressions, unless repugnant to the context or meaning thereof, shall have the meanings assigned to them respectively hereunder. Words indicating persons or parties include corporations and other legal entities, except where the context require otherwise.

“Applicable Laws” means all laws, brought into force and effect by Government of India or the State Government of Andhra Pradesh, or any legally constituted public authority, including rules, regulations ordinances and notifications made there under, and judgements, decrees, injunctions, writs and orders of any court of record, applicable to this Agreement and the exercise, performance and discharge of the respective rights and obligations of the Parties hereunder, as may be in force and effect during the subsistence of this Agreement;

“Contractor” mean the firms/companies /individuals /Joint Ventures who have preferred their Nomination.

“Commencement Date” will be the date of work order / execution of the Contract Agreement.

“Contract” means collectively the Contract Agreement, General Conditions of Contract, the Special Conditions of Contract, the Employer’s Requirements, preamble and the other documents (if any) which are listed in the Contract Agreement.

“Contract Agreement” means the Contract Agreement including any annexed memoranda thereto.

“Contract Price”/ “Contract Amount” means the agreed amount stated in the Contract Agreement in accordance with the willingness of the Contractor.

“Contractor” means the person named as Contractor in the Contract Agreement and his successors/ assigns.

“Contractor’s Documents” means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature supplied by the Contractor under the Contract;

“Contractor’s Equipment” means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor’s Equipment excludes Temporary Works, Employer’s equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.

“Contractor’s Personnel” means the Contractors Representative and all personnel whom the Contractor employs on the Site, who may include the staff, labour and other employees of the Contractor and any other personnel assisting the Contractor in the execution of the Works.

“Contractor’s Representative” means the person named by the Contractor in the Contract or appointed from time to time by the Contractor

“Cost” means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.

“Country” means India

“Day” means a calendar day and **“Year”** means a calendar year of 365 days.

“Defects Liability Period” means the period for notifying defects in the Works or a Section (as the case may be). The Defects Liability Period shall be 24 months calculated from the date on which the Works are completed as certified.

“Employer” means the Government of Andhra Pradesh represented by the Superintending Engineer, SRBC Circle No.2, Nandyal, Andhra Pradesh as designated by the Government of Andhra Pradesh for the purpose of the Contract, and his successors/ assignees.

“Employer’s Equipment” means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Employer’s Requirements; but does not include Plant which has not been taken over by the Employer.

“Employer’s Personnel” means the Employer’s Representative, the assistant and all other staff, labour and other employees of the Employer and of the Employer’s Representative; and any other Personnel notified to the Contractor by the Employer or the Employer’s Representative, as Employer’s Personnel.

“Employer’s Representative” means the person named by the Employer in the Contract or appointed from time to time by the Employer

“Employer’s Requirements” means the document entitled Employer’s Requirements, as included in the Contract, and any additions and modifications thereto in accordance with the Contract. Such document specifies the purpose, scope, and/or other technical criteria, for the Works.

“Engineer-in-charge” means the officer nominated by Superintending Engineer, SRBC Circle No.2, Nandyal.

“Force Majeure” is defined in Clause 93.0 of G.C.C.

“Goods” means Contractor’s Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.

“Government” means the Government of Andhra Pradesh

Local Currency” means the lawful currency of India i.e. Indian Rupees.

“Material” means things of all kinds (other than plant) intended to form or forming part of the Permanent Works, including the supply of any materials (if any to be supplied by the Contractor under the Contract.

“PAO” means the pay and accounts officer who issues cheque for the bills.

“Parties” means the Employer and the Contractor collectively, and **“Party”** means either of them individually as the context requires.

“Earnest Money Deposit” means the security (or EMD, if any) deposited by the Successful Contractor / Contractor under Sub-Clause 5 of Instruction to Contractors.

“Permanent Works” means the permanent Works to be designed and executed by the Contractor under the Contract.

“Plant” means the apparatus, machinery and vehicles intended to form or forming part of the Permanent Works.

“Retention money” means the accumulated retention money which the Employer retains

“Schedule of Payments” means the document so named (if any), as included in the Contract.

“Section” means any of the 3 (Three) Sections I to III of the Contract and Operation and Maintenance part of the Contract.

“Site” means collectively all the places where the Permanent Works are to be executed and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.

“Statement” means a statement, which is either an interim running bill or a final bill, submitted by the Contractor as part of an application for payment.

“Sub- Contractor” means any person named in the Contract as a sub-Contractor or any person appointed as sub-Contractor, for a part of the Works; and the legal successors in title to each of these persons.

“Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.

“Tests After completion” means the tests (if any) which are specified in the Contract and which are carried out after the Works or a Section (as the case may be) are taken over by the Employer.

“Tests Before Completion” means the tests which are specified in the Contract or agreed by both Parties or instructed as Variation, and which are carried out before the Works comprising Sections I to III are certified to be completed by the Employer.

“Time for Completion of Construction” means the time for completing the Construction with any extension

“Variation” means any change to the Employer’s Requirements for the Works, as instructed or approved as variation by the Employer.

“Works” mean the Permanent Works and the Temporary Works, or either of them as appropriate.

GENERAL CONDITIONS OF CONTRACT

A. **GENERAL**

1. **Interpretation:**

- 1.1 In interpreting these Conditions of Contract, singular also means plural, male also means female, and vice-versa. Headings have no significance. Words have their normal meaning under the language of the contract unless specifically defined. The Engineers-in-charge will provide instructions clarifying queries about the conditions of Contract.
- 1.2 The documents forming the Contract shall be interpreted in the following order of priority:
 - 1) Agreement
 - 2) Letter of Acceptance, notice to proceed with the works
 - 3) Contractor's Tender (Technical bid)
 - 4) Conditions of contract
 - 5) Specifications
 - 6) Drawings
 - 7) Bill of quantities (Price-bid)
 - 8) Any other document listed as forming part of the Contract.

2. **Engineer-in-Charge's Decisions:**

- 2.1 Except where otherwise specifically stated, the Engineer-in-charge will decide the contractual matters between the Department and the Contractor in the role representing the Department.

3. **Delegation:**

- 3.1 The Engineer-in-charge may delegate any of his duties and responsibilities to other officers and may cancel any delegation by an official order issued.

4. **Communications:**

- 4.1 Communications between parties, which are referred to in the conditions, are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act)

5. **Sub-contracting:**

- 5.1 Deleted

6. **Other Contractors:**

- 6.1 The Contractor shall cooperate and share the Site with other contractors, Public authorities, utilities, and the Department. The Contractor shall also provide facilities and services for them as directed by the Engineer-in-charge.

7. **Personnel:**

- 7.1 The Contractor shall employ the required Key Personnel named in the Schedule of Key Personnel to carry out the functions stated in the Schedule or other personnel approved by the Engineer-in-charge. The Engineer-in-charge will approve any proposed replacement of Key Personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.
- 7.2 Failure to employ the required technical personnel by the contractor the following amounts will be recovered from the contractors bills as follows.
 - 1) Technical Agent with B.E., Degree at **Rs.960/-** per day
 - 2) Technical Agent with Diploma at **Rs.750/-** per day
- 7.3 The technical personnel should be on full time and available at site whenever required by Engineer in Charge to take instructions.
- 7.4 The names of the technical personnel to be employed by the contractor should be furnished in the statement enclosed separately.

- 7.5 In case the contractor is already having more than one work on hand and has undertaken more than one work at the same time, he should employ separate technical personnel on each work.
- 7.6 If the contractor fails to employ technical personnel the work will be suspended or department will engage a technical personnel and recover the cost thereof from the contractor.
- 7.7 If the Engineer-in-charge asks the Contractor to remove a person who is a member of Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the site forthwith and has no further connection with the work in the contract.
- 8. Contractor's Risks:**
- 8.1 All risks of loss of or damage to physical property and of personnel injury and death, which arise during and in consequence of the performance of the Contract are the responsibility of the Contractor.
- 9. Insurance:** G.O. Ms. No.5, Finance (Works & Project-F7) Department, Dt:5.3.2014 have issued orders dispensing with Insurance cover of all works.
- 10. Site Inspections:**
- 10.1 The contractor should inspect the site and also proposed quarries for materials source of water and quote his percentage including quarrying, conveyance and all other charges etc.
- 10.2 The responsibility for arranging the land for borrow area rests with the Contractor and no separate payment will be made for procurement or otherwise. The contractor's quoted percentage will be inclusive of land cost.
- 11. Contractor to Construct the Works:**
- 11.1 The Contractor shall construct and Commission the Work in accordance with the specifications and Drawings.
- 12. Diversion of streams / Vagus / Drains.**
- 12.1 The contractor shall at all time carry out construction of cross drainage works in a manner creating least interference to the natural flow of water while consistent with the satisfactory execution of work. The contractor at his cost shall form a temporary diversion where necessary. No extra payment shall be made for this work.
- 12.2 No separate payment for bailing out sub-soils, water drainage or locked up rain water for diversion, shoring, foundations, bailing of pumping water either from excavation of soils from foundations or such other incidental will be paid. The percentage to be quoted by the contractor is for the finished item of work in situ and including all the incidental charges. The borrow pits are also to be de-watered by the contractor himself at his expense, if that should be found necessary.
- 12.3 The work of diversion arrangements should be carefully planned and prepared by the contractor and forwarded to the Executive Engineer technically substantiating the proposals and approval of the Executive Engineer obtained for execution.
- 12.4 The contractor has to arrange for bailing out water, protection to the work in progress and the portion of works already completed and safety measures for men and materials and all necessary arrangements to complete the work.
- 12.5 All the arrangements so required should be carried out and maintained at the cost of the contractor and no separate or additional payments are admissible.

12.6 Coffor Dams.

Necessary cofferdams and ring bunds have to be constructed at the cost of contractor and same are to be removed after the completion of the work. The contractor has to quote his percentage keeping the above in view.

13. Power Supply.

13.1 The contractor shall make his own arrangements for obtaining power from the Electricity dept., at his own cost. The contractor will pay the bills of Electricity Department for the cost of power consumed by him.

13.2 The contractor shall satisfy all the conditions and rules required as per Indian Electricity Act 1910 and under Rule-45(I) of the Indian Electricity Rules, 1956 as amended from time to time and other pertinent rules.

13.3 The power shall be used for bonafied Departmental work only.

14. Temporary Diversions (Works on Highways)

14.1 The contractor shall at all time carryout work on the highway in a manner creating least interference to the flow of traffic while consistent with the satisfactory execution of the same. For all works involving improvements to the existing highway, the contractor shall in accordance with the directions of the Engineer-in-charge provide and maintain during the execution of the work a passage for traffic, either along a part of the existing carriage way under improvement or along a temporary diversion constructed close to the highway.

14.2 If in the opinion of the Engineer-in-Charge, it is not possible to pass the traffic on part width of the carriageway for any reason, a temporary diversion close to the highway shall be constructed as directed. It shall be paved with the materials such as hard murrum, gravel and stone, metal to the specified thickness as directed by the Engineer-in-Charge. In all cases, the alignment, gradients and surface type of the diversion including its junctions, shall be approved by the Engineer-in-charge before the highway is closed to traffic.

14.3 The contractor shall take all necessary measures for the safety of traffic during construction and provide erect and maintain such barricades, including signs, markings, flags lights and information and protection of traffic approaching or passing through the section of the highway under improvement. Before taking up any construction, an agreed phased programme for the diversion of traffic on the highway shall be drawn up in consultation with the Engineer-in-charge.

14.4 The barricades erected on either side of the carriage way portion of the carriage way closed to traffic, shall be of strong design to resist violation and painted with alternative black and white stripe. Red lanterns or warnings lights of similar type shall be mounted on the barricades at night and kept lit throughout from sunset to sunrise.

15. Ramps:

Ramps required during execution may be formed wherever necessary and same are to be removed after completion of the work. No separate payment will be made for this purpose.

16. Monsoon Damages:

Damages due to rain or flood either in cutting or in banks shall have to be made good by the contractor till the work is handed over to the Department. The responsibility of de-silting and making good the damages due to rain or flood rests with the contractor. No extra payment is payable for such

operations and the contractor shall therefore, have to take all necessary precautions to protect the work done during the construction period.

17. The works to be Completed by the Intended Completion Date:

- 17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the Engineer-in-Charge, and complete the work by the Intended Completion Date.

18. Safety:

- 18.1 The Contractor shall be responsible for the safety of all activities on the Site.

19. Discoveries:

- 19.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Government. The Contractor is to notify the Engineer-in-charge of such discoveries and carry out the Engineer-in-Charge's instructions for dealing with them.

20. Possession of the Site.

- 20.1 Date of agreement is date of commencement of work and no separate possession handing over is required but for resuming of possession by contractor.

21. Access to the Site:

- 21.1 The Contractor shall provide the Engineer-in-Charge and any person authorised by the Engineer-in-Charge, access to the site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

22. Instructions:

- 22.1 The Contractor shall carry out all instructions of the Engineer-in-charge and comply with all the applicable local laws where the Site is located.

23. Settlement of disputes:

- 23.1 If any dispute of difference of any kind whatsoever arises between the department and the Contractor in connection with, or arising out of the Contract, whether during the progress of the works or after their completion and whether before or after the termination, abandonment or breach of the Contract, it shall in the first place, be referred to and settled by the Engineer-in-charge who shall, within a period of thirty days after being requested by the Contractor to do so, give written notice of his decision to the Contractor. Upon receipt of the written notice of the decision of the Engineer-in-Charge the Contractor shall promptly proceed without delay to comply with such notice of decision.
- 23.2 If the Engineer-in-Charge fails to give notice of his decision in writing within a period of thirty days after being requested or if the Contractor is dissatisfied with the notice of the decision of the Engineer-in-Charge, the Contractor may within thirty days after receiving the notice of decision appeal to the Department who shall offer an opportunity to the contractor to be heard and to offer evidence in support of his appeal, the Department shall give notice of his decision within a period of thirty days after the Contractor has given the said evidence in support of his appeal, subject to arbitration, as hereinafter provided. Such decision of the Department in

respect of every matter so referred shall be final and binding upon the Contractor and shall forthwith be given effect to by the Contractor, who shall proceed with the execution of the works with all due diligence whether he requires arbitration as hereinafter provided, or not. If the Department has given written notice of his decision to the Contractor and no claim to arbitration, has been communicated to him by the Contractor within a period of thirty days from receipt of such notice the said decision shall remain final and binding upon the Contractor. If the Department fail to give notice of his decision, as aforesaid within a period of thirty days after being requested as aforesaid, or if the Contractor be dissatisfied with any such decision, then and in any such case the contractor within thirty days after the expiration of the first named period of thirty days as the case may be, require that the matter or matters in dispute be referred to arbitration as detailed below:-

SETTLEMENT OF DISPUTES:

Except as otherwise provided in the contract, any disputes and differences arising out of or relating to the contract shall be referred to adjudication as follows:

- 1) i) Settlement of a claims upto **Rs. 10,00,000/-** in value and below by way of Arbitration to be referred as follows:
 - a) Claims up to **Rs. 1,00,000/-** in value :
Superintending Engineer, SRBC Circle No.1, Nandyal
 - c) Claims above **Rs. 1,00,000/-** and up to **Rs. 10,00,000/-** in value :
Chief Engineer,(Projects), WRD, Kadapa.

The arbitration proceedings will be conducted in accordance with provisions of the Arbitration Act. 1940, as amended from time to time. The arbitrator shall invariably give reasons in the award.

- ii) Settlement of all claims above **Rs. 10,00,000/-** in value.
All claims above **Rs. 10,00,000/-** in value shall be decided by the civil court of competent jurisdiction by way of a regular suit and not by arbitration.
2. A reference for adjudication under this clause shall be made by either party to the contract within six months from the date of intimating the contractor of the preparation of final bill or his having accepted payment.
3. The relevant clause of Andhra Pradesh Standard specification stand modified to the extent provided in this clause.
4. Time shall be considered as of the essence of the agreement and the contractor hereby agrees to commence the work as soon as the agreement is accepted by the competent authority as defined by the Andhra Pradesh public works Department code and the site (or premises) is handed over to him as provided for in the said conditions and agrees to complete the work **within 24 Months** from the date of such handing over the site (or premises) and to show progress as defined in the tabular statement "Rate of Progress" below, subject to never-the-less to the provisions, for extension of time contained on Clause.59 of the Standard Preliminary Specifications.
5. The said conditions shall be read and construed as forming part of this agreement and the parties here to will respectively abide by and submit them-selves to the conditions and stipulations and perform the agreements on their parts, respectively.
6. Upon the terms and conditions of this agreement being fulfilled and performed to the satisfaction of the Executive Engineer, the security deposited by the Contractor as herein before recited or such portion thereof as he may be entitled to under the said condition shall be returned to the contractor as provided in clause 3 of schedule 'E'.

B. TIME FOR COMPLETION

24. Program:

- 24.1 The total period of completion is **24 Months** from the date of entering with agreement to proceed including rainy season. Keeping in view, the work should be programmed such as to achieve the milestones as in "Rate of progress statement" shown below:

RATE OF PROGRESS/MILE STONE PROGRAMME

(Enclosed as separate sheet in this Document vide page No.290-292 of this document)

- 24.2 The attention of the Tenderer is directed to the contract requirement at the time of beginning of the work, the rate of progress and the dates for the whole work and its several parts as per milestones. The following rate of progress and proportionate value of work done from time to time as will be indicated by the Executive Engineer's Certificate for the value of work done and completion of milestones will be required. Date of commencement of their programme will be the date for concluding agreement.
- 24.3 After signing the agreement, the contractor shall forthwith begin the work, shall regularly and continuously proceed with them.
- 24.4 Rate of progress:
i) Work programme of achieving the milestones as above in 24.1.
- 24.5 The contractor shall commence the works on site within the period specified after the receipt by him of a written order to this effect from the Superintending Engineer and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Superintending Engineer, or be wholly beyond the contractor's control.
- 24.6 Save in so far as the contractor may prescribe, the extent of portions of the site of which the contractor is to be given possession from time to time and the order in which such portions shall be made available to him and, Subject to any requirement in the contract as to the order in which the works shall be executed, the Superintending Engineer will, with the Executive Engineer's written order to commence the works, give to the contractor possession of so much of the site as may be required to enable the contractor to commence proceed with the execution of the works in accordance with the programme if any, and otherwise in accordance with such reasonable proposals of the contractor as he shall by written notice to the Superintending Engineer, make and will from time to time as the works proceed, give to the contractor possession of such further portions of the site as may be required to enable the contractor to proceed with the execution of the works with due dispatch in accordance with the said programme or proposals as the case maybe ; if the contractor suffers delay or incurs cost from failure on the part of the Superintending Engineer to give possession in accordance with the terms of this clause, the Superintending Engineer shall grant an extension of time for the completion of works.
- 24.7 The contractor shall bear all costs and charges for special or temporary way leases required by him in connection with access to the site. The contractor shall also provide at his own cost any additional accommodation outside the site required by him for the purposes of the work.
- 24.8 Subject to any requirement in the contract as to completion of any section of the works before completion of the whole of the works shall be completed in accordance with provisions of clauses in the Schedule within the time

stated in the contract calculated from the last day of the period named in the statement to the tender as that within which the works are to be commenced or such extended time as may be allowed.

24.9 Delays and extension of time:

Time is considered as the essence of the contract. Should the amount of extra or additional work of any kind or any cause or delay referred to in these conditions or exceptional adverse climate conditions or other special circumstances of any kind whatsoever which may occur, other than through a default of the contractor be such as fairly entitle the contractor to an extension of time for the completion of works including for milestones as stipulated in Cl. 24.1 the amount of such extension and shall notify the contractor has within 28 days after such work has been commenced or such circumstances have arisen or as soon thereafter as is practicable submitted to the Executive Engineer's representative full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time to be approved by the **Superintending Engineer, SRBC Circle No.2, Nandyal.**

25. Construction Programme:

- 25.1 The Contractor shall furnish within one month of the order of the work a programme showing the sequence in which he proposed to carry out the work, monthly progress expected to be achieved, also indicating date of procurement of materials plant and machinery. The schedule should be such that it is practicable to achieve completion of the whole work within the time limit fixed and in keeping with the Mile stone programme specified and shall obtain the approval of the Engineer-in-charge. Further rate of the progress as in the program shall be kept up to date. In case it is subsequently found necessary to alter this program, the contractor shall submit sufficiently in advance the revised program incorporating necessary modifications and get the same approved by the Engineer-in-charge. No revised program shall be operative without approval of Engineer-in-charge.
- 25.2 The Superintending Engineer shall have all times the right, without any way violating this contract, or forming grounds for any claim, to alter the order of progress of the works or any part thereof and the contractor shall after receiving such directions proceed in the order directed. The contractor shall also report the progress to the Superintending Engineer within 7 days of the Executive Engineer's direction to alter the order of progress of works.
- 25.3 The Contractor shall give written notice to the Engineer-in-Charge whenever planning or progress of the works is likely to be delayed or disrupted unless any further drawings or order including a direction, instruction or approval is issued by the Engineer-in-Charge within a reasonable time. The notice shall include details of the drawing or order required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

26. Speed of Work:

- 26.1 The Contractor shall at all times maintain the progress of work to conform to the latest operative progress schedule approved by the Engineer-in-Charge. The contractor should furnish progress report indicating the programme and progress once in a month. The Engineer-in-Charge may at any time in writing direct the contractor to slow down any part or whole of the work for any reason (which shall not be questioned) whatsoever, and the contractor shall comply with such orders of the Engineer-in-Charge. The

compliance of such orders shall not entitle the contractor to any claim of compensation. Such orders of the Engineer-in-Charge for slowing down the work will however be duly taken into account while granting extension of time if asked by the contractor for which no extra payment will be entertained.

- 26.2 Delays in Commencement or progress or neglect of work shall forfeiture of earnest money, Security deposit and withheld amounts:

If, at any time, the Engineer-in-Charge shall be of the opinion that the Contractor is delaying Commencement of the work or violating any of the provisions of the Contractor is neglecting or delaying the progress of the work as defined by the tabular statement. "Rate of progress" in the Articles of Agreement", he shall so advise the Contractors in writing and at the same time demand compliance in accordance with conditions of Tender notice. If the Contractor neglects to comply with such demand within seven days after receipt of such notice, it shall then or at any time thereafter, be lawful for the Engineer-in-Charge to take suitable action in accordance with relevant Clauses of APSS.

27. Suspension of works by the Contractor:

- 27.1 If the Contractor shall suspend the works, or sublet the work without sanction of the Engineer-in-Charge, or in the opinion of the Engineer-in-Charge shall neglect or fail to proceed with due diligence in the performance of his part of the Contract as laid down in the Schedule rate of progress, or if he shall continue to default or repeat such default in the respects mentioned in clause.27 of the APSS Engineer-in-Charge shall take action in accordance with relevant Clauses of APSS.
- 27.2 If the Contractor stops work for 28 days and the Stoppage has not been authorized by the Engineer-in-Charge the Contract will be terminated under Clause 61 of APSS.
- 27.3 If the Contractor has delayed the completion of works the Contract will be terminated under relevant Clause of APSS.

28. Extension of the Intended Completion Date:

- 28.1 The Engineer-in-Charge shall extend or recommend for extension, in accordance with the Government orders in force, the Intended Completion Date if a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.
- 28.2 The Engineer-in-Charge shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer for a decision upon the effect of a Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

29. Delays Ordered by the Engineer-in-Charge:

- 29.1 The Engineer-in-Charge may instruct the Contractor to delay the start or progress of any activity within the Work.

30. Early Warning:

- 30.1 The contractor is to warn the Engineer-in-Charge at the earliest opportunity of specific likely future events or circumstances that may adversely affect the Execution of Works.

- 30.2 The Contractor shall cooperate with the Engineer-in-Charge in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer-in-Charge.

31. Management Meetings:

- 31.1 The Engineer-in-Charge may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the programme for remaining work and to deal with matters raised in accordance with the early warning procedure.

C. QUALITY CONTROL

32. Identifying Defects:

- 32.1 The Engineer-in-Charge shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer-in-Charge may instruct the Contractor to verify the Defect and to uncover and test any work that the Engineer considers may be a Defect.

33. Tests:

- 33.1 If the Engineer-in-Charge instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the Contractor shall pay for the test and any samples.

33.2 TESTING EQUIPMENT AND LABORATORY :

The Contractor shall submit quality plan and show proof of owning quality laboratory or having tie-up with an established quality laboratory. The Tenderer should furnish the list of testing equipment available with him and suitable for the present work.

No extra cost will be paid for establishing the laboratory

34. Correction of Defects:

- 34.1 The Engineer-in-Charge shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins on Completion. The defects liability period shall be extended for as long as defects remain to be corrected by the Contractor.
- 34.2 Every time notice of a Defect is given, the Contractor shall correct the notified defect within the length of time specified by the Engineer-in-Charge's notice.

35. Uncorrected Defects:

- 35.1 If the contractor has not corrected the defect within the time specified in the Engineer-in-Charge's notice, the Engineer-in-Charge will assess the cost of having the defect corrected and the contractor will pay this amount.
- 35.2 The Engineer-in-Charge shall introduce O.K. cards and prescribe the formats thereof. O.K. cards shall relate to all major components of the work. The contractor / his authorized representative shall be required to initiate and fill in and present the O.K. card to the construction staff who would check the respective items and send to the quality control staff for final check and clearance / O.K. Any defects pointed out by the construction supervision staff or by the Quality Control staff shall promptly be attended to by the contractors and the fact of doing so be duly recorded on the back of O.K. card.
- 35.3 The Engineer-in-Charge may also introduce checklists, which shall be kept in Bound registers by the construction supervision staff. The contractor

may be required to fill up these lists in the first instance and shall be subsequently checked by the Construction / Quality Control Engineers.

36. Quality Control:

- 36.1 In addition to the normal inspection by the regular staff in charge of the Construction of work, the work will also be inspected by the Executive Engineer /Superintending Engineer Quality control Circle or by the State or District level Vigilance Cell Unit and any other recognized external Agency if any sub-standard work or excess payments are noticed with reference to measurement books etc., during inspection, action will be taken based on their observations and these will be effected by the Engineer-in-Charge of the execution of the work.

The Contractor shall submit quality plan and show proof of owning quality laboratory or having tie-up with an established quality laboratory. The Tenderer should furnish the list of testing equipment available with him and suitable for the present work.

- 36.2 Emphasis on the quality will be paramount. The concerned departments are directed to strengthen the quality control system, the Government by keeping a separate Chief Engineer for quality control under the direct control of Government. The Chief Engineer quality control should see that quality audit is done periodically and also evolve suitable punitive action against contractors as well as engineers in charge of the work who violate proper quality standards.

36.3 Quality Control Responsibilities

- a) The Contractor and the Engineers in charge of construction / maintenance are responsible for the quality of construction / maintenance. The departmental executing Engineers will act as Quality Assurance Engineers. The Quality Control Officials are accountable for the quality of the work where certification issued by them. They should also act as Quality Audit Engineers.
- b) If external agencies are engaged, for conducting quality audit, the following methodology given below should be adopted.
- c) Before inspecting the work, the external agency should inform the Head of the Department. It should conduct quality control tests as per the standard procedures in the presence of Construction and Quality Control Engineers and the Contractor who is executing the work.
- d) The observations of the external agencies on the quality of work should be recorded then and there and signatures of all the concerned obtained as a token of acceptance of the observations.
- e) For all works costing more than Rs.2.00 Crores, the Contractor shall submit quality plan and also show proof of owning Quality Laboratory or having tie-up with an established Quality Laboratory. The equipment needed should be standardized depending on nature of work.
- f) Quality control monitoring reports, test results, reports of corrective action etc, shall be furnished to the employer at regular intervals.
- g) Quality Audit will be got conducted by the Engineer-in-Charge departmentally or by other organization and the contractor shall extend the testing facilities to them also at his cost.
- h) The Contractor shall produce the Quality records maintained by him to the Employer for the quality audit.

For all works costing more than Rs.2.00 Crores the Contractor shall submit quality plan and also show proof of owning quality lab or tie-up with an established quality lab.

D. COST CONTROL

37. **Bill of Quantities:**

- 37.1 The Bill Quantities shall contain items for the construction work to be done by the Contractor.
- 37.2 The Contractor is paid for the quantity of the work done at the estimate rate in the Bill of Quantities for each item plus or minus Tender percentage.

38. **Changes in the Quantities:**

- 38.1 The contractor is bound to execute all supplemental works that are found essential, incidental and inevitable during execution of main work.
- 38.2 The payment of rates for such supplemental items of work will be regulated as under;
Supplemental items directly deductible from similar items in the original agreement.

38.2.1 The rates shall be derived by adding to or subtracting from the agreement rate of such similar item the cost of the difference in the quantity of materials labour between the new items and similar items in the agreement worked out with reference to the Standard Schedule of Rates adopted in the sanctioned estimate with which the tenders are accepted plus or minus over all tender percentage.

- 38.2.1.1 (a) Similar items but the rates of which cannot be directly deduced from the original agreement. (b) Purely new items, which do not correspond to any item in the agreement.

38.2.2 The rates of all such items shall be Estimated Rates plus or minus overall Tender premium.

39. **Extra Items:**

- 39.1 Extra items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-Charge. The Executive Engineer as per the conditions of the Contract shall work out the rates for extra items and the same are binding on the Contractor.
- 39.2 The contractor shall before the 15th day of each month, submit in writing to the Executive Engineer a statement of extra items if any that they have executed during the preceding month failing which the contractor shall not be entitled to claim any.

39.3 **Entrustment of additional items:**

- I. For all items of work in excess of the quantities indicated the rates payable for such excess quantities will be either the rates arrived at as per bid or SS rates for the item plus or minus over all tender percentage accepted by the competent authority whichever is less. The SS rates means the rates for the year with which the estimate is prepared / sanctioned for comparing the tender.
- II.
 - 1. The contractor is bound to execute all supplemental items that are found essential incidental and inevitable during execution of main work.
 - 2. The payment of rates of such supplemental items of work will be regulated as under.
(I) For the Supplemental items directly deductible from similar items in the original agreement, the rate shall be either (a) derived by adding to or subtracting from the agreement rate of such similar item, the cost of difference in quantity of material or labour between the new item and the similar item in the agreement worked out with reference to the schedule of rates adopted in the sanctioned estimate with which the tenders were compared plus or minus over all tender percentage. or (b) the estimate rate plus or minus over all tender percentage.

(II) For Similar items, the rates of which cannot be directly deduced from the original agreement and for Purely new items which do not correspond to any item in the agreement, the rate shall be estimate rate plus or minus overall tender percentage.

Note : It may be noted that the term estimate rate used above means the rate in the sanctioned estimate with which the tender's were compared or if no such rate is available in the estimate the rate derived with reference to the schedule of rates adopted in the sanctioned estimate with which tenders are compared.

III. Entrustment of additional items

- 1) Wherever additional items not contingent on the main work and outside the scope of original agreement are to be entrusted to the original contractor dispensing with tenders and if the value of such items exceeds the limits upto which the officer is empowered to entrust work initially to a contractor without calling for tenders approval of the next higher authority shall be obtained. Entrustment of all such items on nomination shall be at rates not exceeding the estimate rates.
 - 2) Entrustment of supplemental items contingent on the main work will be authorized by the officers up to the monetary limits up to which they themselves are competent to accept in an original agreement so long as the total amount of supplemental agreement does not exceed the amounts up to which they are competent to accept in an original agreement rates for such items shall be worked in accordance with the procedure prescribed in G.O.Ms.No.1493, PWD dated 25-10-1971 as amended in Govt. memo no 544 cond. 72-22, Dated:6-7-1973 and G.OMS or 900 PWD Dt 6-8-1975.
 - 3) Entrustment of either the additional or supplemental items shall be further subject to the provisions under Para 176(E) of APWD Code Viz. the items shall not be ordered by an officer on his own responsibility if the revised estimate of deviation statement providing for the same requires the sanction of a higher authority.
- a) Entrustment of supplement items contingent on the main work will be authorized by the officers up to the monetary limits up to which they themselves are competent to accept items in the original agreement so long as the total amounts up to which they are competent to accept in an original agreement rates for such items shall be worked in accordance with the procedure prescribed in G.O.Ms.No.1493, PWD, Dated:25.10.1971 and as amended in G.O.Ms No.41 Water Resources (Reforms) Department dated 24.05.2018.
 - b) Entrustment of either the additional supplemental items shall be further subject to the provisions under Para 176(b) of APWD Code Viz., the items shall not be ordered by an officer on his own responsibility if the revised estimate or deviation statement providing for the same requires the sanction of higher authority.

Note: It may be noted that the term estimate rate used above means the rate in the sanctioned estimate with which the tender's compared or if no such rate is available in the estimate the rate derived will be with reference to the schedule of rates adopted in the sanctioned estimate with which tenders are compared.

40. Cash flow forecasts:

40.1 When the program is updated, the contractor is to provide the Engineer-in-charge with an updated cash flow forecast.

41. Payment Certificates:

- 41.1 The Contractor shall submit to the Engineer-in-charge monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 41.2 The Engineer-in-charge shall check the Contractor's monthly statement within 14 days.
- 41.3 The value of work executed shall be determined by the Engineer-in-charge.
- 41.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 41.5 The Engineer-in-charge may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

42. Payments:

- 42.1 Payment for the work done by the contractor will be made for the finished work based on the measurements recorded in measurement books by any officer of the department not lower in rank than a Assistant Engineer and check measured by any officer not lower in rank than a Deputy Executive Engineer. The measurement shall be recorded at various stages of the work done and also after work is completed. The contractor shall be present at the time of recording of each set of measurement and their check measurement and accept them then and there so as to avoid disputes at a later stage. If the contractor is not available at the work spot at the time of recording measurements or check measurements the particulars of measurements shall be signed by the authorized agent of contractor based on which the contractor shall accept the set of measurements without any further dispute. If for any reason the contractor's authorized agent is also not available at site when the department decides to suspend the work recording of measurements in the absence of the contractor or his authorized representative the department shall not entertain any claim from the contractor for any loss incurred by him on this account. The Contractor shall however note that the Department cannot indefinitely wait for recording the measurement due to the absence of the Contractor and his authorized agent and check measure them even in the absence of the contractor.
- 42.2 Unless otherwise directed, measurements shall not be taken until sufficient materials for use on work have been collected and stacked. Immediately after measurement, the stack shall be marked by white wash or other means as directed by the Engineer-in-charge.
- 42.3 **Payments and Certificates:**
 - 42.3.1 Payments shall be adjusted for recovery of advance payments, liquidated damages in terms of tender conditions and security deposit for the due fulfillment of the contract. Payment will be made to the Contractor under the certificate to be issued at reasonably frequent intervals by the Engineer-in-Charge, and intermediate payment will be the sum equal to 92.5% of the value of work done as so certified and balance of 7.5% will be withheld and retained as security for the due fulfillment of the contractor under the certificate to be issued by the Engineer-in-Charge. On completion of the entire works the contractor will receive the final payment of all the moneys due or payable to him under or by virtue of the contract except 2.5% retention amount kept in cash as security (out of 7.5% amount retained from every bill) of the total value of the work done. The amount 2.5% withheld from the bills will be retained under deposits and paid to the contractor

together with the earnest money deposit retained as security after a period of **24 months+28 Days** as all defects shall have been made good according to the true intent and meaning thereof.

The Contractor shall execute the various components of work as per approved drawings & specifications. The Contractor shall arrange to take and record all measurements of work done of various components of work in the measurement book / level field books and plotted in the cross-section sheets and quantities arrived as per actual execution. The Contractor shall also arrange to take the measurements plot the cross sections and arrive the quantities as per actual execution as and when required in the presence of Engineer-in-Charge.

Measurements will be recorded by the Contractor for the work done only in each bay for which all tests conducted and work done in accordance with the specifications and agreement conditions specified in the Contract.

The Contractor shall prepare monthly bills based on the measurements of work done already recorded as stated above and submit to Engineer-in-Charge duly signed by him or his authorized signatory for arranging payment. Only completed portions of the works as per the sub-component wise break up of payment schedule as approved by Employer are eligible for payment.

42.3.2 In case of over payments or wrong payment if any made to the contractor due to wrong interpretation of the provisions of the contract, APSS or Contract conditions etc., such unauthorized payment will be deducted in the subsequent bills or final bill for the work or from the bills under any other contracts with the Government or at any time thereafter from the deposits available with the Government.

42.3.3 Any recovery or recoveries advised by the Government Department either state or central, due to non-fulfillment of any contract entered into with them by the contractor shall be recovered from any bill or deposits of the contractor.

42.3.4 No claim shall be entertained, if the same is not represented in writing to the Engineer-in-Charge within 15 days of its occurrence.

42.3.5 The contractor is not eligible for any compensation for inevitable delay in handing over the site or for any other reason. In such case, suitable extensions of time will be granted after considering the merits of the case.

42.4 **Intermediate Payments:**

42.4.1 For intermediate Stage of work, only part rates as fixed by the Engineer-in-Charge will be paid.

42.4.2 Part rates shall be worked out for the work done portion based on the actual operations involved keeping in view the value of the balance work to be done, to avoid unintended benefit to the Contractor in initial Stage.

42.4.3 Full rate shall be paid when the work is completed to the full profile as noted in the drawings.

42.4.4 Where payment is intended for aggregates by Bill of Quantities item based on stack measurements intends, 10% of the quantity measured will be withheld. No payment or advance will be made for unfixed materials when the rates are for finished work in site.

43. **Interest on Money due to the Contractor:**

- 43.1 No omission by the Executive Engineer or the sub-divisional officer to pay the amount due upon certificates shall vitiate or make void the contract, nor shall the contractor be entitled to interest upon any guarantee fund or payments in arrear, nor upon any balance which may, on the final settlement of his accounts, found to be due to him.

44. Certificate of Completion of works:

44.1 Certificate of Completion of works:

44.1.1 When the whole of the work has been completed and has satisfactory passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer-in-Charge accompanied by an undertaking to carry out any rectification work during the period of maintenance, such notice and undertaking shall be in writing and shall be deemed to be request by the Contractor for the Engineer-in-Charge to issue a Certificate of completion in respect of the Works. The Engineer-in-Charge shall, within twenty one days of the date of delivery of such notice either issue to the Contractor, a certificate of completion stating the date on which, in his opinion, the works were completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the Works which, in the Engineer-in-Charge" opinion, required to be done by the Contractor before the issue of such Certificate. The Engineer-in-Charge shall also notify the Contractor of any defects in the Works affecting completion that may appear after such instructions and before completion of the Works specified there in. The Contractor shall be entitled to receive such Certificate of the Completion within twenty-one days of completion to the satisfaction of the Engineer-in-Charge of the Works so specified and making good of any defects so notified.

44.1.2 Similarly, the Contractor may request and the Engineer-in-Charge shall issue a Certificate of Completion in respect of:

- a) Any section of the Permanent works in respect of which a separate time for completion is provided in the Contract, and
- b) Any substantial part of the Permanent Works, which has been both, completed to the satisfaction of the Engineer-in-Charge and occupied or used by the Department.

44.1.3 If any part of the Permanent Works shall have been completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the Engineer-in-Charge may issue such certificate, and the Contractor shall be deemed to have undertaken to complete any outstanding work in that part of the Works during the period of Maintenance.

45. Taxes included in the bid:

45.1 The percentage quoted by the contractor is exclusive of Goods and Service Tax (GST) but inclusive of other taxes that the contractor will have to purchase for performance of this contract.

45.2 The bid price quoted by the contractor is exclusive of GST and shall be paid to the contractor while making payment from the Part-II of Schedule-A. The contractor is liable to discharge their tax liability fully as per the provision of GST Act while filing their returns. The GST will be applied as per G.O. Ms. No.58, Finance (WR.I),Department, Dated:08.05.2018 and relevant GO's/ Circulars/ Guidelines issued by Government from time to time.

The contractor shall file GST returns from time to time and produce proof to the Department in so far as the contract scope is concerned,

and the reimbursement of GST will be made accordingly. Any input tax benefit or subsidy shall be accrued to the Government only. The contractor shall provide to the employer/client copies of all required licenses proof of what he to obtain, safety standard certificates if any, the particulars of the GST / IGST/SGST registration of the contractor and the particulars of the tax paid on particular product / package / service of the gross project cost respectively and any input tax benefit availed and are available, whenever required by the employer.

46. PRICE ADJUSTMENT:-

- 46.1** This price adjustment clause shall apply for **Cement, Steel & POL** for all works irrespective of the value of work and irrespective of agreement period As per G.O's (i) G.O.Ms.No.35, T,R&B (RI) Department, Dated:28.02.2006 (ii) G.O.Ms.No.73, T,R&B (RI) Department, Dated:24.4.2006 (iii) G.O.Rt.No.175, T,R&B (RI) Department, Dated:19.2.2007 and (iv) G.O.Ms.No.94, T,R&B (RI) Department, Dated:16.4.2008).
- 46.2** Price adjustment shall be both for increase and decrease in the prices for the works completed within the original agreement period or period extended on grounds of the departmental delays.
- 46.3** The Price adjustment for **Cement, Steel & POL** shall be applicable within the original contract period or period extended on grounds of the departmental delays and valid reasons and shall not be applicable to the extensions granted on account of the Contractors fault as envisaged G.O.Ms. No.94, Dated:01-07-2003 of Irrigation & CAD Department, Price adjustment shall be applicable for actual components of items of works actually carried out during the period of the bill.
- 46.4** The Price Adjustment will be applied in all cases where the variations between the estimated rates and Board of Chief Engineers approved rates (increase or decrease) is more than 5% for the month. The amount over the 5% of the estimate rates will only be compensated and the amount less than 5% of the estimate rates will be deducted.
- 46.5** Price adjustment shall be calculated separately for the components of the payment for work done in the manner explained in paras 46.7 to 46.10 below:
- 46.6** In the formula of price adjustment, RI, the value of work shall exclude seigniorage charges, NAC, GST and all other overhead charges.
- 46.7 Adjustment Clause for Cement component shall be as follows:**
Price adjustment for increase or decrease in the cost of **Cement** procured by the contractor shall be paid in accordance with G.O.Ms.No.94 of T,R&B Department, Dated:16.4.2008 for variation between the estimated rate and the rate approved by the Government for the month under consideration based on the recommendation of Board of Chief Engineers.
In respect of cement price adjustment will be made for the actual quantity used in the work for increase or decrease of prices by more than 5% over basic rate of **Rs.4600/- per M.T.** For the purpose of assessing the increase or decrease, the rates of cement as approved by the Board of Chief Engineers from time to time will be adopted. The amount over 5% of the above rate will be compensated and the amount less than 5% of above rate will be deducted.
- 46.8 Adjustment for Steel component shall be as follows:**

Price Adjustment for increase or decrease in the cost of steel Procured by the contractor shall be paid in accordance with the G.O.Ms.No.94 of T R&B (RI) Department. Dated:16-04-2008 for variation. Price adjustment will be made for increase or decrease of Prices by more than 5% over basic rate of **Rs.38,500/- per M.T for Steel Fe 415/500-TMT from 8mm to 40mm & Rs.40,000/- per M.T for Steel Plates.** For the purpose of assessing the increase or decrease, the rates of steel as approved by the Board of Chief Engineers from time to time will be adopted. The amount over 5% of the above rate will be compensated and the amount less than 5% of above rate will be deducted.

46.9 Adjustment Clause for POL component shall be as follows:

Price Adjustment for increase or decrease in the cost of POL shall be paid in accordance with the Percentage of POL component of the work will be decided by the Chief Engineer, Krishna Delta System , Nandyal.

Price Adjustment in respect of Fuel will be made based the rates prevailing in the nearest fuel station/stations to work spot on the last day of filing the bids and any increase or decrease by 5% over base rates and price adjustment will be calculated with following formula.

$$VF = 0.85 \times PF / 100 \times RI \times (FI - FO) / FO$$

RI = Value of work done during the quarter excluding seignior age charges, GST and all other overhead charges.

VF= increase or decrease in the cost of work during the month under consideration due to change in rates for Fuels & Lubricants.

PF= Percentage of Fuel and Lubricants of the work

(The component of PF will be assessed and approved by the Chief Engineer, Krishna Delta System , Nandyal.

FO = 1.05/0.95, the price existing of HSD at the existing consumer's pumps of IOC/IBP/HP nearest to the work spot on the last day of filling bids +/- for the increase or decrease in rate.

FI= The official retail price for HSD at the existing consumer's pumps of IOC/IBP/HP nearest to the work spot on the 15th day of the middle calendar month of the quarter under consideration of bill.

- i) Wherever it is said as price escalation it shall be read as "price adjustment" to take care of increase and decrease of prices.
- ii) Price adjustment can only be allowed on steel, cement & Fuel. Price Adjustment shall not be allowed where liquidated damages are levied and extension of time granted for reasons attributable to contractor.

47 Retention:

47.1 The department shall retain from each payment due to the contractor at the rate of 7.5% of bill amount until completion of the whole of the Works. 5% of retention amount so accumulated will be released against the Bank Guarantee, in spells of **Rs.50.00 Lakhs** at any point of time. The remaining 2.5% retention money with the department shall be in cash only.

47.2 On completion of the whole of the Works 5% will be re-paid to the Contractor and balance 2.5% which is in cash will be repaid when the Defects Liability Period has passed and the Engineer-in-Charge has certified that all the Defects notified by the Engineer-in-Charge to the Contractor before the end of this period have been corrected.

48 Liquidated Damages:

48.1 If for any reason, which does not entitle the contractor to an extension of item, the rate of progress of works, or any section is at any time, in the opinion of the Superintending Engineer too slow to ensure completion by the prescribed time or extended time for completion Superintending Engineer shall so notify the contractor in writing and the contractor shall there upon take such steps as are necessary and the Superintending Engineer may approve to expedite progress so as to complete the works or such section by the prescribed time or extended time. The contractor shall not be entitled to any additional payment for taking such steps. If as a result of any notice given by the Superintending Engineer under this clause the contractor shall seek the Superintending Engineer permission to do any work at night or on Sundays, if locally recognized as days or rest, or their locally recognized equivalent, such permission shall not be unreasonably refused.

48.2 If the contractor fails to complete whole of the works or any part thereof or section of the works within the stipulated periods of individual mile stones (including any bonafied extensions allowed by the competent authority without levying liquidated damages), the Superintending Engineer may without prejudice to any other method of recovery will deduct one tenth of one percent of contract value per calendar day or part of the day for the period of delays subject to a maximum of 10% of the contract value not as a penalty from any monies in his hands due or which may become due to the contractor. The payment or deductions of such damages shall not relieve the contractor from his obligation to complete the works, or from any other of his obligations and liabilities under the contract.

48.3 Liquidated damage charges at Rs. _____ per calendar day.
(The liquidated damages for the whole work will be filled up at the time of concluding agreement i.e after finalization of the contract price).
The maximum amount of liquidated damages for the whole of works is ten percent of the final contract price.
The milestones will be filled at the time of agreement after obtaining a programme of work.

49 Mobilization Advance: Not applicable.

50 Deleted . As per the Government of Andhra Pradesh G.O Ms No.83, Dt.17.12.2019 (WR Dept), clause of mobilization Advance is dispensed.

51 Securities:

51.1 The Earnest Money Deposit and Additional Security (for discount tender percentage beyond 25%) shall be provided to the Department not later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank acceptable to the Department. The Earnest Money shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security shall be valid until 6 months from the date of issue of the certificate of completion.

52 Cost of Repairs:

52.1 The Contractor at the Contractor's cost shall remedy loss or damage to the Works or materials to the Works between the Start Date and the end of the Defects Correction Periods if the loss or damage arises from the Contractor's acts or omissions.

E. FINISHING THE CONTRACT

53 Completion:

53.1 The Contractor shall request the Engineer-in-Charge to issue a Certificate of completion of the Works and the Engineer-in-Charge will do so upon deciding that the work is completed. However final bill payment is subject to clearance of Audit Paras if any.

54 Taking Over:

54.1 The Department shall takes over the Site and the Works within seven days of the Engineer-in-Charge issuing a certificate of Completion.

55 Final Account:

55.1 The Contractor shall supply to the Engineer-in-Charge a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer-in-Charge shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within **56 days** of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer-in-Charge shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the final Account is still unsatisfactory after it has been resubmitted, the Engineer-in-Charge shall decide on the amount payable to the Contractor and issue a payment certificate within 56 days of receiving the Contractor's revised account.

56 Termination:

56.1 The Department may terminate the Contract if the contractor causes a fundamental breach of the Contract.

56.2 Fundamental breaches of Contract include, but shall not be limited to the following.

- a) The Contractor stops work for 28 days when no stoppage of work is shown on the current program and the stoppage has not been authorized by the Engineer-in-Charge.
- b) The Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation.
- c) The Engineer-in-Charge gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer-in-Charge; and
- d) The Contractor does not maintain a security which is required and
- e) The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined.
- f) If the contractor, in the judgment of the Department has engaged in corrupt or fraudulent practices in competing for or in the executing the contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment o the Government and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Government of the benefits of free and open competition.

The contractor once entered into contract agreement, cannot withdraw, nor ask for novation, alteration or tinker with any of the contract terms and conditions, but for withdrawal if at all with mutual consent and that too with six months advance intimation to the client if at all willing, to make substitute arrangements, otherwise from default in performance makes liable for forfeiture of any amounts due and also the performance security, with all other consequences under the contract. It is the duty of the contractor to secure skilled and unskilled staff as per the pattern of strength mentioned, if choose to bid.

56.3 Notwithstanding the above the Department may terminate the contract for convenience.

56.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secured leave the Site as soon as reasonably possible.

57 Payment upon Termination:

57.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer-in-Charge shall issue a certificate for the value of the work done less advance payments **if any** received upon the date of the issue of the certificate, less other recoveries due in terms of the Contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed. Additional Liquidated Damages beyond clause 48 above shall not apply. If the total amount due to the Department exceeds any payment due to the Contractor the difference shall be a debt payable to the Department, **with interest to recover**.

58 Property:

58.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Department if the Contract is terminated because of Contractor's default.

59 Release from Performance:

59.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Department or the Contractor the Engineer-in-Charge shall certify that the contract has been frustrated. The Contractor shall make the site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all works carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. SPECIAL CONDITIONS

60 Water Supply:

The Contractor has to make his own arrangements for water required for the work and to the colonies and work sites, which are to be established by the Contractor.

61 Electrical Power:

The Contractors will have to make their own arrangements for drawing electric power from the nearest power line after obtaining permission from the Andhra Pradesh State Electricity Board at his own cost. In case of failure of electricity, the Contractor has to make alternative arrangements for supply of electricity by Diesel Generator sets of suitable capacity at place of work. If the Department arranges the supply, necessary Tariff rates shall have to be paid based on the prevailing rates.

The contractor will pay the bills of Electricity Board for the cost of power consumed by him.

The contractor shall satisfy all the conditions and rules required as per Indian Electricity Act 1910 and under rule 45(I) of the Indian Electricity Rules, 1956 as amended from time to time and other pertinent rules.

The power shall be used for bonafied Departmental works only.

61.1 Electric Power for Domestic Supply:

a) The contractor has to make his own arrangements for the supply of electric power for domestic purposes and the charges for this purpose have to be paid by him at the rates as fixed by the Andhra Pradesh State Electricity Board from time to time.

- b) The contractor will have to make his own arrangements to lay and maintain the necessary distribution lines and wiring for the camp at his own cost. The layout and the methods of laying the lines and wiring shall have the prior approval of the Engineer-in-Charge. All camp area shall be properly electrified. All lines, streets, approaches for the camp etc., shall be sufficiently lighted for the safety of staff and labour of the contractor, at the cost of the Contractor and it will be subject to the approval of the Engineer-in-Charge.

62 Land:

62.1 Land for Contractor's use:

The contractor will be permitted to use Government land for execution of work. The contractor shall have to make his own arrangements for acquiring and clearing the site, leveling, providing drainage and other facilities for labour staff colonies, site office, workshop or stores and for related activities. The Contractor shall apply to the Department within a reasonable time after the award of the contract and at least 30 days in advance of its use, the details of land required by him for the work at site and the land required for his camp and should any private land which has not been acquired, be required by the contractor for his use. The contractor at his own cost may acquire the same by private negotiations and no claim shall be admissible to him on this account.

The Engineer-in-Charge reserves the right to refuse permission for use of any government land for which no claim or compensation shall be admissible to the contractor. The contractor shall, however, not be required to pay cost or any rent for the Government land given to him.

62.2 Surrender of Occupied Land:

- a) The Government land as here in before mentioned shall be surrendered to the Engineer-in-Charge within seven days, after issue of completion certificate. Also no land shall be held by the contractor longer than the Engineer-in-Charge shall deem necessary and the contractor shall on the receipt of due notice from the Engineer-in-Charge, vacate and surrender the land which the Engineer-in-Charge may certify as no longer required by the Contractor for the purpose of the work.
- b) The contractor shall make good to the satisfaction of the Engineer-in-Charge any damage to areas, which he has to return or to other property or land handed over to him for purpose of this work. Temporary structures may be erected by the contractor for storage sheds, offices, residences etc., for non-commercial use, with the permission of the Executive Engineer on the land handed over to him at his own cost. At the completion of the work these structures shall be dismantled site cleared and handed over to the Executive Engineer. The land required for providing amenities will be given free of cost from Government lands if available otherwise the contractor shall have to make his own arrangements.

62.3 Contractor not to dispose off Spoil etc.:

The contractor shall not dispose off or remove except for the purpose of fulfillment of this contract, sand, stone, clay ballast, earth, trees and shrubs or other materials obtained in the excavation made or lying on the site of the work, and all such materials and produce shall remain property of the Government. The Department may upon request from the contractor, or if so stipulated in the conditions of the contract allow the contractor to use any of the above materials for the works either free of cost or after payment as may be specifically mentioned or considered necessary during the execution of the work.

63 Roads:

In addition to existing public roads and roads Constructed by Government, if any, in work area all additional approach roads inside work area and camp required by the Contractor shall be constructed and maintained by him at his own cost. The layout design, construction and maintenance etc. of the roads shall be subject to the approval of the Engineer-in-Charge. The contractor shall permit the use of these roads by the Government free of charge.

It is possible that work at, or in the vicinity of the work site will be performed by the Government or by other contractors engaged in work for the Government during the contract period. The contractor shall without charge permit the government and such other contractor and other workmen to use the access facilities including roads and other facilities, constructed and acquired by the contractor for use in the performance of the works.

The contractor's heavy construction traffic or tracked equipment shall not traverse any public roads or bridges unless the contractor has made arrangement with the authority concerned. In case contractor's heavy construction traffic or tracked equipment is not allowed to traverse any public roads or bridges and the contractor is required to make some alternative arrangements, no claim on this account shall be entertained.

The contractor is cautioned to take necessary precautions in transportation of construction materials to avoid accidents.

64 Payment for Camp Construction:

No payment will be made to the contractor for construction, operation and maintenance of camp and other camp facilities and the entire cost of such work shall be deemed to have been included in the tendered rate for the various items of work in the schedule of quantities and bids.

65 Explosive And Fuel Storage Tanks:

No explosive shall be stored within $\frac{1}{2}$ (half) KM of the limit of the camp sites. The storage of gasoline and other fuel oils or of Butane, Propane and other liquefied petroleum gases, shall conform to the regulations of Andhra Pradesh State Government and Government of India. The tanks, above ground and having capacity in excess of 2000 liters, shall not be located within the camp area, nor within 200m, of any building.

66 Labour:

The contractor shall, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport and also the amenities, facilities, statutory benefits and registrations under various legislations including insurance coverage.

Labour importation and amenities to labour and contractor's staff shall be to the contractor's account. His quoted percentage shall include the expenditure towards importation of labour amenities to labour and staff;

The contractor shall, if required by the Engineer-in-Charge, deliver to the Engineer-in-Charge a written in detail, in such form and at such intervals as the Engineer-in-Charge may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the contractor on the Site and such information respecting Contractor's Equipment as the Engineer-in-Charge may require.

66.1 Transportation of Labour:

The contractor shall make his own arrangement for the daily transportation of the labour and staff from labour camps colonies to the work spot and no labour or staff of the contractor shall stay at the work spot. No extra payment will be made to the contractor for the above transportation of the

labour and his quoted percentage to the work shall include the transportation charges of labour from colonies to work spot and back.

The contractor will at all times duly observe the provisions of employment of children Act XXVI of 1938 and any enactment or modification of the same and will not employ or permit any person to do any work for the purpose under the provisions of this agreement in contravention of said Act. The contractor here by agrees to indemnify the department from and against all claims, penalties which may be suffered by the department or any person employed by the department by any default on the part of the contractor in the observance and performance of the provisions of the employment of children Act. XXVI of 1938 or any enactment or modification of the same.

The contractor shall obtain the insurance at his own cost to cover the risk on the works and labour engaged by him during period of execution against fire and other usual risks and produce the same to the Executive Engineer **concerned before commencement of work.**

67 Safety Measures:

1. The contractor shall take necessary precautions for safety of the workers and preserving their health while working in such jobs, which require special protection and precautions. The following are some of the measures listed but they are not exhaustive and contractor shall add to and augment these precautions on his own initiative where necessary and shall comply with directions issued by the Executive Engineer or on his behalf from time to time and at all times.
2. Providing protective foot wear to workers situations like mixing and placing of mortar or concrete sand in quarries and places where the work is done under much wet conditions.
3. Providing protective head wear to workers at places like underground excavations to protect them against rock falls.
4. Providing masks to workers at granulates or at other locations where too much fine dust is floating about and sprinkling water at frequent intervals by water hoses on all stone crushing area and storage bins abate to dust.
5. Getting the workers in such jobs periodically examined for chest trouble due to too much breathing in to fine dust.
6. Taking such normal precautions like fencing and lightening in excavation of trenches, not allowing rolls and metal parts of useless timber spread around, making danger areas for blasting providing whistles etc.
7. Supply work men with proper belts, ropes etc., when working in precarious slopes etc.
8. Avoiding named electrical wire etc., as they would electrocute the works.
9. Taking necessary steps towards training the workers concerned on the machinery before they are allowed to handle them independently and taking all necessary precautions in around the areas where machines hoists and similar units are working.

68 Fair Wage Clause:

The contractor shall pay not less than fair wages to labourers engaged by him on the work.

“Fair” wages means wages whether for time or piecework notified by the Government from time to time in the area in which the work is situated.

The contractor shall notwithstanding the revisions of any contract to the contrary cause to be paid to the labour, in directly engaged on the work including any labour engaged by the sub-contractor in connection with the said work, as if the labourers had been directly employed by him.

In respect of labour directly or indirectly employed in the works for the purpose of the contractors part of the agreement the contractor shall comply with the rules and regulations on the maintenance of suitable records prescribed for this purpose from time to time by the Government. He shall maintain his accounts and vouchers on the payment of wages to the labourers to the satisfaction of the Executive Engineer.

The Executive Engineer shall have the right to call for such record as required to satisfy himself on the payment of fair wages to the labourers and shall have the right to deduct from the contract amount a suitable amount for making good the loss suffered by the worker or workers by reason of the "fair wages" clause to the workers.

The contractor shall be primarily liable for all payments to be made and for the observance of the regulations framed by the Government from time to time without prejudice to his right to claim indemnity from his sub-contractors. As per contract labour (Regulation and abolition) Act. 1970 the contractor has to produce the license obtained from the licensing officers of the labour department along with the tender or at the time of agreement.

Any violation of the conditions above shall be deemed to be a breach of his contract.

Equal wages are to be paid for both men and women if the nature of work is same and similar.

The contractor shall arrange for the recruitment of skilled and unskilled labour local and imported to the extent necessary to complete the work within the agreed period as directed by the Executive Engineer in writing.

69 Indemnity Bond:

Name of work: Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)

I / We _____, S/o _____, do hereby bind myself to pay all the claims may come (a) under Workmen's Compensation Act. 1933 with any statutory modification thereof and rules there under or otherwise for or in respect of any damage or compensation payable in connection with any accident or injury sustained (b) under Minimum wages Act 1948 (c) under payment of wages Act.1936 (d) under the Contractor labour (Regulation and Abolition) Act. 1970 by workmen engaged for the performance of the business relating to the above contract i.e., failing such payment of claims of workmen engaged in the above work, I abide in accepting for the recovery of such claims, effected from any of my assets with the departments.

CONTRACTOR

70 Compliance With Labour Regulations:

During continuance of the contract, the contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority and also applicable labour regulations, health and sanitary arrangements for workmen, insurance and other benefits. Salient

TENDERER

122 SUPERINTENDING ENGINEER

features of some of the major labour laws that are applicable to construction industry are given below. The contractor shall keep the Department indemnified in case any action is taken against Department by the competent authority on account of contravention of any of the provisions of any Act or rules made hereunder, regulations or notifications including amendments. If the Department is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provision stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the contractor, the Engineer-in-charge /Department shall have the right to deduct any money due to the contractor including his amount of performance security. The Department/Engineer-in-Charge shall also have right to recover from the contractor any sum required or estimated to be required for making good the loss or damage suffered by the Department.

The employees of the Contractor and the Sub-contractor in no case shall be treated as the Department of the Department at any point of time.

71 Salient features of some major labour laws applicable to establishment engaged in buildings and other construction work:

- (a) Workmen compensation Act 1923: The Act provides for compensation in case if injury by accident arising out of and during the course of employment.
- (b) Payment of Gratuity Act 1972: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if any employee has completed 5 years service or more, or on death, the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments, employing 10 or more employees.
- (c) Employees P.F. and Miscellaneous provision Act 1952: The Act provides for monthly contributions by the Department plus workers @ 10% or 8.33%. The benefits payable under the Act are:
 - i. Pension or family pension on retirement or death, as the case may be.
 - ii. Deposit linked insurance on the death in harness of the worker.
 - iii. Payment of P.F. accumulation on retirement/death etc.,
- (d) Maternity Benefit Act 1951: The Act provides for leave and some other benefits to women employees in case of confinements or miscarriage etc.
- (e) Contract Labour (Regulation & Abolition) Act 1970: The Act provides for certain welfare measures to be provided by the contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided by the Principal Department by Law. The Principal Department is required to take certificate of Registration and the contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Department if they employ 20 or more contract labour.
- (f) Minimum wages Act 1948: The Department is supposed to pay not less than the Minimum wages fixed by appropriate Government as per provisions of the Act if the employment is a Nationalized employment construction of Buildings, Roads, Runways are Nationalized employments.
- (g) Payment of wages Act 1936: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (h) Equal Remuneration Act 1979: The Act provides for payment of equal wages for work of equal nature to Male or Female workers and for not making discrimination against Female employee in the matters of transfers, training and promotions etc.
- (i) Payment of Bonus Act 1965: The Act Is applicable to all establishments employing 20 or more employees. The Act provides for payment of annual

bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing **Rs.3,500/- per Month** or less. The bonus to be paid to employees getting **Rs.2,500/- per month** or above and up to **Rs.3,500/- per Month** shall be worked out by taking wages as **Rs.2,500/- per Monthly** only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

- (j) Industrial Disputes Act 1947: The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (k) Industrial Employment (Standing Orders) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Department on matters provided in the Act and get the same certified by the designated Authority.
- (l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and Departments. The Trade Unions registered under the act have been given certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes, Employment Child Labour is prohibited in Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of service) Act 1979: The Act applicable to an establishment, which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another State). The inter State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.
- (o) The Building and Other Construction workers (regulation of Employment and conditions of service) Act 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay Cess at the rate not exceeding 1% of the cost of construction and as may be modified by the Government. The same will be reimbursed.
- (p) Factories Act 1948: The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 person or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

72 Liabilities of the Contractor:

72.1 Accident Relief and workmen compensation:

The contractor should make all necessary arrangements for the safety of workmen on the occurrence of the accident, which results in the injury or death of any of the workmen employed by the contractor, the contractor shall within 24 hours of the happenings of the accident and such accidents

should intimate in writing to the concerned Asst. Engineer/Asst. Executive Engineer of the Department the act of such accident. The contractor shall indemnify Government against all loss or damage sustained by the Government resulting directly or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines if any payable by Govt. as a consequence of Govt. failure to give notice under workmen's compensation Act or otherwise conform to the provisions of the said Act in regard to such accident.

72.2 In the event of an accident in respect of which compensation may become payable under the workmen's compensation Act VIII 23 whether by the contractor, by the Government it shall be lawful for the Executive Engineer to retain such sum of money which may in the opinion of the Executive Engineer be sufficient to meet such liability. The opinion of the Executive Engineer shall be final in regard to all matters arising under this clause.

72.3 The contractor shall at all times indemnify the Government of A.P. against all claims which may be made under the workmen's compensation act or any statutory modification thereafter or rules there under or otherwise consequent of any damage or compensation payable in consequent of any accident or injuries sustained or death of any workmen engaged in the performance of the business relating to the contractor.

72.4 In case of any claim by workmen pending in any court of law or tribunal involving the employer also with the contractor, the employer is entitled to retain amount in relation to the claim from final bill of contractor till the claim is cleared.

73 Contractor's Staff, Representatives and Labour:

- (a) The contractor shall, at all times, maintain on the works, staff of qualified Engineers, and Supervisors of sufficient experience of similar other jobs to assure that the quality of work turned out shall be as intended in the specifications. The contractor shall also maintain at the works, a Work Manager or sufficient status, experience and office and duly authorize him to deal with all aspects of the day-today work. All communications to any commitments by the Work Manager shall be considered as binding on the Contractor.
- (b) The Contractor shall at all times submit details of skilled and unskilled labour and equipment employed to the Engineer-in-Charge in prescribed Proforma as he may require to assess and ensure the proper progress of work.
- (c) If the contractor does not employ the technical person agreed to on the work a fine of **Rs.20,000/-** will be imposed. If he does not employ for 30 days, thereafter it becomes a fundamental breach of contract.

74 Accommodation and food:

The contractor should arrange accommodation he needs, at his own cost. The contractor shall make his own arrangements for supply of food grains, fuel and other provision to his staff and labourers including controlled commodities.

75 Relationship :

Contractor shall have to furnish information along with tender, about the relationship he is having with any officer of the Department, Government of Andhra Pradesh of the rank Assistant Engineer and above engaged in the work and any officer of the rank of Assistant Secretary and above of the Department of Government of Andhra Pradesh.

76 Protection of adjoining premises:

The contractor shall protect adjoining sites against structural, decorative and other damages that could be caused by the execution of these works and make good at his cost any such damages.

77 Work during night or on Sundays and holidays:

The works can be allowed to be carried out during night, Sundays or authorized holidays in order to enable him to meet the schedule targets and the work shall require almost round the clock working keeping in view:

- i. The provisions of relevant labour laws being adhered to:
- ii. Adequate lighting, supervision and safety measures are established to the satisfaction of the Engineer-in-Charge and
- iii. The construction programme given by the Contractor and agreed upon by the Engineer-in-Charge envisages such night working or working during Sundays or authorized holidays.

78 Layout of materials stacks:

The contractor shall deposit materials for the purpose of the work on such parts only of the ground as may be approved by the Engineer-in-Charge before starting work. A detailed survey, clearly indicating position and areas where materials shall be stacked and sheds built is to be conducted by the contractor at his own cost and only after obtaining necessary approval of the plan for use of sites by the Engineer-in-Charge, the Contractor can use the sites accordingly.

79 Use of blasting materials:

Procurement of blasting materials and its storage is the responsibility of the contractor. The contractor shall engage licensed blaster for blasting operation. The contractor is to act in accordance with Indian Explosive Act and other rules prevailing, during the execution of work. It is the responsibility of the contractor to see, that works by other agencies in the vicinity are not hampered, in such cases if any claim is made by other agencies that should be borne by the contractor. Carriage of blasting materials, from the magazine to the work site, is the responsibility of the contractor.

80 Plant and Equipment:

80.1 The contractor shall have sufficient plant, equipment and labour and shall work such hours and shifts as may be necessary to maintain the progress on the work as per the approval progress schedule. The working and shifts hours shall comply with the Govt. Regulations in force.

80.2 It is to expressly and clearly understood that contractor shall make his own arrangements to equip himself with all machinery and special tools and plant for the speedy and proper execution of the work and the department does not undertake responsibility towards their supply.

80.3 The department shall supply such of the machinery that may be available on hire basis but their supply cannot be demanded as matter of right and no delay in progress can be attributed to such non-supply of the plant by the department and the department cannot be made liable for any damage to the contractor. The Contractor shall be responsible for safe custody of the departmental machinery supplied to him (which will be delivered to contractor at the machinery yard at site of work) and he has to make good all damages and losses if any other than fire, wear and tear to bring it to the conditions that existed at the time of issue to the contractor before handing over the same to the department. The hire charges for the machinery handed over to the contractor will be recovered at the rate prevalent at the time of supply. The

contractor will have to execute supplemental agreement with Executive Engineer at the time of supply of the machinery.

80.4 The acceptance of departmental machinery on hire is optional to the contractor

81 Steel forms:

Steel forms should be used for all items involving and use of centering and shuttering shall be single plane without any dents and undulations.

82 Inconvenience to public:

The contractor shall not deposit materials at any site, which will cause inconvenience to public. The Engineer-in-Charge may direct the contractor to remove such materials or may undertake the job at the cost of the contractor.

83 Conflict of interest:

Any bribe, commission, gift or advantage given, promised or offered by on behalf of contractor or his partner, agent or servant or any one on his behalf to any officer, servant, representatives, agents of Engineer-in-Charge, or any persons on their behalf, in relation to the obtaining or to execution of this, or any other contract with Engineer-in-Charge shall in addition to any criminal liability, which it may occur, subject to the cancellation of this or all other contracts and also to payment of any loss or damage resulting from any such cancellation. Engineer-in-Charge shall then be entitled to deduct the amount, so payable from any money, otherwise due to the contractor under this or any other contract.

84 Contract documents and materials to be treated as confidential:

The contractor shall consider all documents, correspondences, decisions and orders, concerning the contract as confidential and/or restricted in nature and he shall not divulge or allow access to them by any unauthorized person.

85 General obligations of Contractor:

85.1 The contractor shall, subject to the provision of the contract and with due care and diligence, execute and maintain the works in accordance with specifications and drawings.

85.2 The contractor shall promptly inform the Department and the Engineer-in-Charge of any error, omission, fault and such defect in the design of or specifications for the works, which are discovered when reviewing the contract documents, or in the process of execution of the works.

85.3 If Contractor believes that a decision taken by the Engineer-in-Charge was either outside the authority given to the Engineer-in-Charge by the Contract or that the decision was wrongly taken, the decision shall be referred to the technical expert within 14 days of the notification of the Engineer-in-Charge's decisions.

85.4 Pending finalization of disputes, the contractor shall proceed with execution of work with all due diligence.

86 Security measures:

a) Security requirements for the work shall be in accordance with the Government's general requirements including provisions of this clause and the Contractor shall conform to such requirements and shall be held responsible for the actions of all his staff, employees and the staff and employees of his sub-contractors.

b) All contractors' employees, representatives and sub-contractor's employees shall wear identifications badges provided by the contractor. Badges shall identify the contractor, showing and employee's number and shall be worn at all times while at the site. Individual labour will not be required to wear identification badges.

- c) All vehicles used by the contractor shall be clearly marked with contractor's name.
- d) The contractor shall be responsible for the security of the works for the duration of the contract and shall provide and maintain continuously adequate security personnel to fulfill these obligations. The requirements of security measures shall include, but not limited to maintenance of order on the site, provision of all lighting, fencing, guard flagmen and all other measures necessary for the protection of the works within the colonies, camps and elsewhere on the site, all materials delivered to the site, all persons employed in connection with the works continuously throughout working and non working period including nights, Sundays and holidays for duration of the contract.
- e) Other contractors working on the site concurrently with the contractor will provide security for their own plant and materials. However, their security provisions shall in no way relieve the contractor of his responsibilities in this respect
- f) Separate payment will not be made for provision of security services.

87 Fire fighting measures:

- a) The contractor shall provide and maintain adequate firefighting equipment and take adequate fire precaution measures for the safety of all personnel and temporary and permanent works and shall take action to prevent damage to destruction by fire of trees shrubs and grasses.
- b) Separate payment will not be made for the provision of fire prevention measures.

88 Sanitation:

The contractor shall implement the sanitary and watch and ward rules and regulations for all forces employed under this contract and if the Contractor fails to enforce these rules, the Engineer-in-Charge may enforce them at the expenses of the Contractor.

89 Training of personnel:

The contractor, shall, if and as directed by the Engineer-in-Charge provide free of any charge adequate facilities, for vocational training of Government Officers, students, Engineers, supervisors, foremen, skilled workmen etc. not exceeding six in number at any one time on the contractor's work. Their salaries, allowances etc. will be borne by the Government and the training schemes will be drawn up by the Engineer-in-Charge in consultation with the contractor.

90 Ecological balance:

- a) The contractor shall maintain ecological balance by preventing deforestation, water pollution and defacing of natural landscape. The contractor shall so conduct his construction operation as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. In respect of the ecological balance, Contractor shall observe the following instructions.
 - i. Where unnecessary destruction, scarring, damage or defacing may occur, as result of the operation, the same shall be repaired replanted or otherwise corrected at the contractor's expense. The contractor shall adopt precautions when using explosives, which will prevent scattering of rocks or other debris outside the work area. All work area including borrow areas shall be smoothened and graded in a manner to conform to the natural appearances of the landscape as directed by the Engineer-in-Charge.

- ii. All trees and shrubbery which are not specifically required to be cleared or removed for construction purposes shall be preserved and shall be protected from any damage that may be caused by the contractor's construction operation and equipment. The removal of trees and shrubs will be permitted only after prior approval by the Engineer-in-Charge. Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the contractor shall adequately protect such trees by use of protective barriers or other methods approval by the Engineer-in-Charge. Trees shall not be used for anchorages. The contractor shall be responsible for injuries to trees and shrubs caused by his operations. The term "injury" shall include, without limitation bruising, scarring, tearing and breaking of roots, trunks or branches. All injured trees and shrubs are to be restored as nearly as practicable without delay to their original condition at the contractor's expense.
- iii. The contractor's construction activities shall be performed by methods that will present entrance or accidental spillage of solid matter contaminants, debris and other objectionable pollutants and wastage into river. Such pollutant and waste include earth and earth products, garbage, cement concrete, sewage effluent, industrial wastes, radio-active substances, mercury, oil and other petroleum products, aggregate processing, mineral salts and thermal pollution. Pollutants and wastes shall be disposed off in a manner and at sites approved by the Engineer-in-Charge.
- iv. In conduct of construction activities and operation of equipments the contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize the air pollution. The excessive omission of dust in to the atmosphere will not be permitted during the manufacture, handling and storage of concrete aggregates and the contractor shall use such methods and equipment as a necessary for collection and disposal or prevention of dust during these operations. The contractor's methods of storing and handling cement shall also include means of eliminating atmospheric discharges of dust, equipment and vehicles that give objectionable omission of exhaust gases shall not be operated. Burning of materials resulting from clearing of trees, bushes, combustible construction materials and rubbish may be permitted only when atmospheric conditions for burning are considered favorable.
- b) Separate payment will not be made for complying with the provisions of this clause and all cost shall be deemed to have been included in the unit rates and prices included in the contract if any provision is not complied with within a reasonable time even after issue of a notice in this respect, the necessary operations would be carried out by the Engineer-in-Charge at the cost of the Contractor, Orders of the Engineer-in-Charge in this respect would be final and binding on the contractor.

91 Preservation of existing vegetation:

- a) The contractor will preserve and protect all existing vegetation such as trees, on or adjacent to the site which do not unreasonably interfere with the construction as may be determined by the Engineer-in-Charge. The contractor will be held responsible for all unauthorized cutting or damage of trees, including damage due to careless operation of equipment, stockpiling of materials or trekking of grass areas by equipment. Care shall be taken by the Contractor in felling trees authorized for removal to avoid any unnecessary damages to vegetation and tress that are to remain in place and to structures under construction or in existence and to workmen.

- b) All the produce from such cutting of trees by the contractor shall remain the property of Government and shall be properly stacked at site, approved by the Engineer-in-Charge. No payment whatsoever shall be made for such cutting and its stacking by the Contractor. If the contractor does not hand over any produce from such cutting to the Government, he shall be charged for the same at the rates to be decided by the Engineer-in-Charge. The recovery of this amount shall be made in full from the intermediate bill that follows.
- c) The contractor shall also make arrangements of fuel deposits for supply of required fuel for the labourer to be employed for cooking purpose at his own cost in order to prevent destruction of vegetation growth in the surrounding area of the work site.

92 Possession prior to completion:

The Engineer-in-charge shall have the right to take possession of or use any completed part of work or works or any part thereof under construction either temporarily or permanently. Such possession or use shall not be deemed as an acceptance of any work either completed or not completed in accordance with the contract with in the interest of Clause 28 of APSS except where expressly otherwise specified by the Engineer-in-charge.

93 Payment upon termination:

If the contract is terminated because of a fundamental breach of contract by the contractor, the Engineer-in-Charge shall issue a certificate for the value of the work done less advance payment received upon the date of the issue of the certificate and less the percentage to apply to the work not completed as indicated in the contract data. Additional liquidated damages shall not apply. If the total amount due to the Department exceeds any payment due to the contractor the difference shall be a debt payable to the Department. In case of default for payment within 28 days from the date of issue of notice to the above effect, the contractor shall be liable to pay interest at 9% per annum for the period of delay.

94 Access to the contractor's books:

Whenever it is considered necessary by the Engineer-in-Charge to ascertain the actual cost of execution of any particular extra item of work or supply of the plant or material on which advance is to be made or of extra items or claims, he shall direct the contractor to produce the relevant documents such as payrolls, records of personnel, invoices of materials and any or all data relevant to the item or necessary to determine its cost etc. and the contractor shall when so required furnish all information pertaining to the aforesaid items in the mode and manner that may be specified by the Engineer-in-Charge.

95 Drawing to be kept at site:

One copy of the drawings furnished to the contractor shall be kept by the contractor on the site and the same shall at all reasonable time be available for inspection and use by the Engineer-in-Charge and the Engineer-in-Charge's representative and by any other persons authorized by the Engineer-in-Charge in writing.

96 B.I.S. [I.S.I.] books and APSS to be kept at site:

A complete set of Indian Standard specification referred to in "Technical Specifications" and A.P.S.S. shall be kept at site for reference.

97 Site Order Book:

An order book shall be kept at the site of the work. As far as possible, all orders regarding the work are to be entered in this book. All entries shall

be signed and dated by the Department Officer in direct charge of the work and by the contractor or by his representative. In important cases, the Executive Engineer or the Superintending Engineer will countersign the entries, which have been made. The order book shall not be removed from the work, except with the written permission of the Executive Engineer.

98 Variations by way of modification, omissions or additions:

For all modifications, omissions from or additions to the drawings and specifications, the Executive Engineer will issue revised plans, or written instructions, or both and no modification, omission or addition shall be made unless so authorized and directed by the Executive Engineer in writing.

The Executive Engineer shall have the privilege of ordering modifications, omission or additions at any time before the completion of the work and such orders shall not operate to annul those portions of the specifications with which said changes do not conflict.

Engineer-in-Charge's Decision:

It shall be accepted as an inseparable part of the contract that in matters regarding materials, workmanship, removal of improper work, interpretation of the contract drawings and contract specification, mode of the procedure and the carrying out the work, the decision of the Engineer-in-Charge, which shall be given in writing shall be binding on the contractor.

99 Care and diversion of river/stream:

The contractor shall submit details regarding the diversion and care of river or stream during construction of the work along with a separate print-out of the time table showing earliest and latest start and finish dates of various activities. He should submit a detailed layout plan with drawings for the diversion and care of river during construction of work. The above arrangements shall be at contractor's cost.

100. Income tax:

- a) During the currency of the contract deduction of income tax at prevailing rates as on the date of payment shall be made from the gross value of each bill of the contract, the contract value of which is in excess of Rs.10,000/- for deduction of tax at rates lower than prevailing rates as on the date of payment. Procedure stipulated under section 194-C(4) of Income Tax Act, 1961 shall be followed.
- b) Income Tax clearance certificate should be furnished before the payment of final bill.
- c) The contractor's staff, personnel and labour will be liable to pay personnel income taxes in respect of their salaries and wages as are chargeable under the laws and regulations for the time being in force, and the contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws and regulations.

101. Seigniorage charges: G.O.Ms. No.11, Industries and Commerce (M.II) Department, Dated:11.02.2020 as amended by the Government from time to time.

- 101.1 Seigniorage charges will be recovered from the Agency, as per rules from the work bills of the contract or based the instructions of the Government from time to time and the each amount will be reimbursed. The following rates are adopted towards Seigniorage charges.

S. No.	Material	Seigniorage
1.	Sand	Rs: 100.00 / Cum

2.	Metal	Rs: 90.00 / Cum
3.	R.R stone for masonry	Rs: 90.00 / Cum
4.	C.R.S stone	Rs: 90.00 / Cum
5.	Morrum/Gravel/Earth	Rs: 45.00 / Cum

102 Goods and Service Tax (GST):

102.1 The percentage quoted by the contractor is exclusive of Goods and Service Tax (GST) but inclusive of other taxes that the contractor will have to purchase for performance of this contract.

102.2 The bid price quoted by the contractor is exclusive of GST and shall be paid to the contractor while making payment from the Part-II of Schedule-A. The contractor is liable to discharge their tax liability fully as per the provision of GST Act while filing their returns. The GST will be applied as per G.O. Ms. No.58, Finance (WR.I), Department, Dated:08.05.2018 and as per Government rules varies from time to time.

The contractor shall file GST returns from time to time and produce proof to the Department in so far as the contract scope is concerned, and the reimbursement of GST will be made accordingly. Any input tax benefit or subsidy shall be accrued to the Government only. The contractor shall provide to the employer/client copies of all required licenses proof of what he to obtain, safety standard certificates if any, the particulars of the GST / IGST/SGST registration of the contractor and the particulars of the tax paid on particular product / package / service of the gross project cost respectively and any input tax benefit availed and are available, whenever required by the employer.

103 Labour welfare cess : It is the liability of the Contractor to pay the Labour cess as per Government Rules/norms from time to time. The Government Water Resource Department is no way liable for the same in any contingency.

104 National Academy Construction: The Bid price quoted by the Contractor is exclusive of NAC and shall be recovered at the rate 0.1% on the cost of construction in each bill of the contractor and reimbursed within provisions made in the Schedule-A, Part II.

105

A) Supply of construction materials:

- The contractor has to make his own arrangements for procurements, supply and use of construction materials.
- All materials so procured should confirm to the relevant specifications indicated in the bidding documents.
- The contractor shall follow all regulations of the Department/ Government of India in respect of import licenses etc., of the procurement of the materials is through imports and he shall be responsible for the payment of applicable duties and taxes, port clearances, inland transportation etc.
- The contractor shall make his own arrangements for adequate storage of the materials.

105 B) The Contractor shall procure the hot mix material to the work site, duly maintaining the required laying temperature, as per the specifications.

106. (a) The contractor shall purchase Bitumen/Emulsion only from the reputed firm i.e., HPCL, BPCL and IOCL. They shall not be permitted to use CRMB bought from private manufactures.

(b) The contractors shall procure original bills towards purchase of bitumen/emulsion while submitting the bills for payment.

Executive Engineer Concerned should endorse the name of work on the bills/vouchers/invoices for which the bitumen/emulsion is utilized to avoid reuse of bills on other works.

The contractors shall order and procure the bitumen/emulsion work wise so that the contractor obtain invoice/bills work wise and submit the same to the Executive Engineer concerned while preparing the bills.

- 107 The Contractor shall test all the materials as per the agreement specifications and results shall be recorded duly signed by the contractor or his representative and the Section Officer. The name of the work and quality location shall be clearly noted in the test reports.

If any deficiency in the size of metal (aggregates), thickness, binder, quantity, density, weight etc., beyond the limits/tolerances prescribed for road works are observed, necessary recoveries / penalties will be effected as per the Circular Memo No.12582/Vig.I/1/2005-1, Dated:23.03.2006 of the Engineer-in-Chief (R&B), Administration & Roads, A.P.,Hyderabad

[Any other special conditions applicable to the work put to Tender.]

- 108 Defect Liability Period:** The defect liability period is 24 months from the date of certification of completion of the package and the defect liability period shall be extended for as long as defects remain to be corrected by the Contractor, which is without prejudice to the right of the employer to cause rectify and recover. For defect liability the performance guarantee deposit (PGD) given in the form of Bank Guarantee on a Nationalised / Scheduled Bank, shall be valid for the duration of contract period plus the defect liability period of two years and in case any valid extension of contract period is granted, the validity of BG shall also be extended for the corresponding period and further till rectification of defects. The Performance Bank Guarantee on Nationalised / Scheduled Bank that is required to be furnished by the tenderer shall be valid till the work is completed and defects are rectified in all respects and the same will be refunded only after above period and compliance

TECHNICAL SPECIFICATIONS

1.0 DRAWINGS:

- 1.1 The plans enclosed with the tender are liable to be altered during execution of work as per necessity of site conditions. The premium quoted by the contractor for various items shall hold good for execution of work even with altered plans.
- 1.2 One set of drawings, on the basis of which actual execution of the work is to proceed shall be furnished free of cost to the contractor by the Superintending Engineer / Executive Engineer progressively according to the work program submitted by the contractor and accepted by the Superintending Engineer / Executive Engineer. Drawings for any particular activity shall be issued to the contractor at least 30 days in advance of the notional date of the start of the activity. However, no extra claims by the contractor toward any delay in issue of drawing or issue of any revision / change to the drawings issued earlier shall be admissible. The Superintending Engineer shall intimate the contractor 7 days in advance regarding any delay to issue of drawings, for any particular stage of works. If work gets affected due to delay to issue of drawings, for any particular stage of work the contractor shall be granted extension of time in terms of condition 14.7 of tender notice.
- 1.3 Signed drawings above shall not be deemed to be an order for work unless they entered in the agreement or schedule of drawings under proper alterations of the contractor and Executive Engineer or unless they have been sent of the contractor by the Executive Engineer with a covering letter confirming that the drawing is in and authority for work in contract.

2.0 DISCREPANCIES:

- 2.1 In case of discrepancies between documents the following order of procedure shall apply:-
 - 2.1.1 Between the written description of written dimensions in the drawings and the corresponding one in the specifications, the latter shall apply.
 - 2.1.2 Figured dimensions shall supersede scaled dimensions. The drawings on a larger scale shall take precedence over those on a smaller scale.
 - 2.1.3 Drawings issued as construction drawings from time to time shall supersede tender drawings and also the correspondence drawings previously issued.

Note: The contractor should not execute any component of work without obtaining the working drawings. Any work done without drawings shall be at the contractor's responsibility only. Acceptance for such work will be at the discretion of the Executive Engineer.

3.0 SECRECY CLAUSE:

The drawings and specifications made available to the Tenderer shall exclusively be used on the work and they are retained from passing on each plan to any unauthorized hand either in parts or in full under the provisions of Section-3 and 5 of the official secrets Act 1923. Any violation in this regard will entail suitable action under appropriate clause or official secret Act 1923.

BILL OF QUANTITIES AND PRICE BID

Name of work: Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)

BILL OF QUANTITIES

PREAMBLE

1. The Bill of Quantities shall be read in conjunction with the instructions to Tenderers, General and Special conditions of Contract Technical Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional and are given to provide common basis for tendering. The quantities here given are those upon which the lump sum tender cost of the work is based but they are subject to alterations, omissions, deductions or additions as provided for in the conditions of this contract and do not necessarily show the actual quantities of work to be done. The basis of payment will be actual quantities of work ordered and carried out as measured by the Contractor and verified by the Engineer and valued at the estimate rate plus or minus tender percentage quoted in the Bill of Quantities where applicable, and otherwise at such rates and prices as the Engineer-in-Charge may fix within the terms of Contract.
3. The estimate rates in the Bill of Quantities shall, except in so far as it is otherwise provided under the Contract include cost of all constructional material, labour, machinery, transportation, erection, maintenance, profit, taxes and duties together with all general risks, liabilities and obligations set out or implied in the Contract.
4. The plans enclosed with the tender are liable to be altered during execution of work as per necessity of site conditions. The Tender percentage quoted by the tenderer shall hold good for execution of work even with altered plans.
5. The whole cost of complying with the provisions of the Contract shall be included in the estimated rates for items provided in the Bill of Quantities and where no items are provided in the Bill of Quantities, their cost shall be deemed to be distributed among the estimate rates entered for the related items of work.
6. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering estimate rate against each item in the Bill of Quantities.
7. The method of measurements of completed work for payment shall be in accordance with the relevant B.I.S. Codes & A. P. S. Specifications.
8. All items of work are to be executed as per the drawings / specifications supplied with the contract documents.
If there is any contradiction between the drawings and the text of the specifications, the later shall prevail.
9. The Tenderer should inspect and select the quarries of his choice before he quotes the tender percentage in the Schedule of Bill of Quantities and satisfy himself about the availability of required quantum of materials.
10. Diversion drains should be excavated before completion of the embankments and the useful soils should be used in the nearby embankments.
11. The actual mix proportion by weight to be adopted during execution will be got designed in the laboratories to suit the grade of concrete and mortar to be used. It will be the responsibility of the contractor to manufacture concrete and mortar of required strength.

12. The quantum of measurement for all items of earthwork involving conveyance manually or by machinery shall be as assessed by level measurement. The measurements for the embankment will be for the consolidated banks only.
13. Wherever bailing out of water is involved either for excavation or for foundations or for constructions, the percentage quoted shall take into account the dewatering charges necessary. No separate payment will be made for dewatering.
14. Wherever embankment work is involved, useful soils approved by the Engineer-in-Charge from the cutting reaches and diversion drains shall be taken and used for forming nearby embankments soils used for constructions will be at free of cost.
15. The quoted tender percentage shall also include the work of any kind necessary for the due and satisfactory construction, completion and maintenance of the works according to the drawings and these specifications and further drawings and orders that may be issued by the Engineer-in-Charge from time to time. The quoted tender percentage shall include compliance by the Contractor with all the general conditions of contract, whether specifically mentioned or not in the various clauses of these specifications, all materials, machinery, plant, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop staff, labour and the provision of proper and sufficient protective works, diversions, temporary fencing and lighting. It shall also include safety of workers, first aid equipments suitable accommodation for the staff and workmen, with adequate sanitary arrangements, the effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties / Taxes, duties or other charges arising out of the execution of works and the regular clearance of rubbish, reinstatement and clearing-up of the site as may be required on completion of works safety of the public and protection of the works and adjoining land. The work of Building in quality control / assurance shall be deemed to be covered in the quoted percentage.
16. The Contractor shall ensure that, the quoted tender percentage shall cover all stages of work such as setting out, selection of materials, selection of construction methods, selection of equipment and plant, deployment of personnel and supervisory staff, quality control testing etc. The work quality assurance shall be deemed to be covered in the tender percentage.
17.
 - a) The special attention of the Tenderer is drawn to the conditions in the tender notices wherein reference has been made to the Andhra Pradesh Standard Specifications [APSS] and the Standard preliminary specifications containing therein. These preliminary specifications shall apply to the agreement to be entered into between the contractor and the Government of Andhra Pradesh and shall form an in-separable condition of the contract along with the estimate. All these documents taken together shall be deemed to form one contract and shall be complimentary to another.
 - b) The Tenderer shall examine, closely the A.P.S.S. / MORT&H and also the standard preliminary specifications contained therein and sign the Superintending Engineer's office copy of the APSS / MORT&H / MORD and its addenda volume in token of such study before submitting his overall tender percentage which shall be for finished work in-situ. He shall also carefully study the drawings and additional specifications and all the documents, which form part of the agreement to be entered into by the successful Tenderer. The APSS / MORT&H / MORD and other documents connected with contract such as estimate plans, specifications, can be seen on all working days in the office of the Superintending Engineer, SRBC Circle No.2, Nandyal.

18. The Tenderers attention is directed to requirements for materials under the clause 'materials and workmanship' in the preliminary specifications of APSS. Materials conforming to the Bureau of Indian Standards specifications, APSS etc., shall be used on the work and the Tenderers shall quote his overall tender percentage accordingly.
19. The Tenderer has to do his own testing of materials and satisfy himself that they conform to the specifications of respective I.S.I. Codes before tendering.
20. The contractor shall himself procure the required construction materials of approved quality including the earth for formation of embankment and water from quarries / sources of his choice. All such quarries / sources of materials required for the work shall be got approved by the Engineer-in-Charge in writing well before their use of the work.
21. The contractor shall himself procure the steel, cement, Bitumen, Blasting materials, sand, metal, soils, etc., and such other materials required for the work well in advance. The contractor has to bear the cost of materials for conveyance. The department will not take any responsibility for fluctuations in market in cost of the materials, transportation and for loss of materials etc.
22. Inspection of site and quarries by the Tenderer: Every Tenderer is expected before quoting his overall tender percentage, to inspect the site of proposed work. He should also inspect the quarries and satisfy himself about the quality, and availability of materials. The best class of materials to be obtained from quarries, or other sources shall be used on the work. In every case the materials must comply with the relevant standard specifications. Samples of materials as called for in the standard specifications or in this tender notice, or as required by the Executive Engineer, in any case, shall be submitted for the Executive Engineer's approval before the supply to site of work is begun.
23. The Tenderers particular attention is drawn to the sections and clauses in the A.P. standard specification dealing with
 - a) Test, inspection and rejection of defective materials and work.
 - b) Carriage
 - c) Construction plant
 - d) Water and lighting
 - e) Cleaning up during the progress and for delivery.
 - f) Accidents
 - g) Delays
 - h) Particulars of payments.

The contractor should closely peruse all the specification clauses, which govern the overall tender percentage he is tendering.
24. The Defect Liability Period of Contract in terms of G.O. Ms.No.94, Irrigation & CAD Department, Dated:01.07.2003 is **Twenty four months**.
25. The estimate rates for items shown in the Schedule-A, Pat-I include all construction materials. No escalation in rates will be paid unless specified in the tender document. The Tenderer has to quote an overall tender percentage considering all the aspects of the tender to complete the finished item of work as per the APSS/MORD/MORT&H/B.I.S. specifications, the special specifications appended, Drawings etc.
26. If there is any contradiction between APSS/MORD/MORT&H and B.I.S. specifications, listed and detailed technical specifications, the latter shall prevail.
27. In case of a job for which specifications are not available with the Schedule or in APSS/MORD/MORT&H or B.I.S. code and are required to be prescribed, such work shall be carried out in accordance with the written instructions of the Engineer-in-charge.

28. The contractor should use the excavated useful soils and stone for construction purpose. Soils used for construction either for homogeneous section in hearting or in casing zone based on the suitability will be at free of cost and the cost of stone used for construction purpose will be recovered from the contractor's bill.

The contractor should quote his tender percentage keeping in view of the above aspects.

29. Additions and alternations by the Tenderer in the Schedule of quantities will disqualify the tender.
30. In the case of discrepancies between the written description of the item in the Part-I of Schedule-A and the detailed description in the specification of the same item, the latter shall be adopted.
31. The Unit rates noted below are those governing payment of extras or deductions for omissions according to the conditions or the contract as set-forth in the preliminary specifications of the A.P. standard specifications and other conditions of specification of this contract.
32. It is to be expressly understood that the measured work is to be taken according to the actual quantities when in place and finished according to the drawings or as may be ordered from time to time by the Executive Engineer and the cost calculated by measurement or weight at their respective rates without any additional charge for any necessary or contingent works connected works connected herewith. The Percentage Excess or less on ECV quoted are for works in situ and complete in every respect.
33. For all items of work in excess of the quantities indicated the rates payable for such excess quantities will be tendered rates i.e., estimate rates plus or minus tender percentage.
34. For all items of work, intermediate payment will be made provisionally as per relevant clause. Full-accepted agreement rates will be paid only after all the items of works are completed.
35. The contractor is bound to execute all supplemental works that are found essential incidental and inevitable during execution of main work.
36. The payment of rates for supplement items of work will be regulated as under. Supplemental items directly deductible from similar items in the original agreement.
- The rates shall be derived by adding to or subtracting from the agreement rate of such similar item the cost of the difference in the quantity of materials labour between the new items and similar items in the agreement worked out with reference to the schedule of rates adopted in the sanctioned estimate with which the tenders are compared.
- a) Similar items but the rates of which cannot be directly deducted from the original agreement.
 - b) Purely new items, which do not correspond to any item in the agreement.

The rate of all such items shall be estimated rates plus or minus overall tender percentage.

BILL OF QUNATITES**SCHEDULE-A, PART- I**

Name of work:“ Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)

(Enclosed separately)

SCHEDULE-A, PART-II

(Enclosed separately)

PRICE BID

Name of work: " **Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)** .

Estimated contract value (in figures & words): Rs. 209,95,15,493/-

(Rupees Two Hundred and Nine Crores Ninety Five Lakhs Fifteen Thousand Four Hundred and Ninety Three only)

I / We _____,

S/o _____, do hereby express my willingness to execute the aforesaid work as per the conditions, standards, specifications, rules, regulations, etc., stipulated in the tender documents.

a) at an overall tender percentage of _____% Excess / Less (in words) over the estimated value.

OR

b) at estimate value.

SIGNATURE, NAME OF THE TENDERER /
AUTHORISED SIGNATORY.

SCHEDULE - A

PREAMBLE

- 1) The rates and amounts of estimate furnished in Schedule A are inclusive of cost of construction of temporary store shed and cost of engaging technical personnel etc., for the work. Hence the Contractor should quote his bid keeping in view of the above aspects.
- 2) The quoted bid shall include all construction materials. No escalation in rates will be paid. The tenderer has to quote his bid considering all the aspects of the tender to complete the finished item of work as per the A.P.S.S. & I.S. specifications, the special specifications appended Drawing etc.,
- 3) If there is any contradiction between A.P.S.S. and I.S. Specification, listed and detailed technical specifications, the latter shall prevail.
- 4) In case of a job for which specifications are not available with schedule or in APSS or in I.S. code and are required to be prescribed, such work shall be carried out in accordance with the written instructions of the Engineer-in-Charge recorded in the "Order Book".
- 5) The contractor should use the excavated useful soils and stone for construction purpose. Soils used for construction either for homogeneous section or in hearting or in casing zone based on the suitability will be at free of cost and the cost of stone used for construction purpose will be recovered from the Contractors bills at SS rates +/- Tender Premium.
The Contractor should quote his bid keeping in view of the above aspects.
- 6) The actual mix proportion by weight to be adopted during execution will be got designed in the laboratories to suit the grade of concrete and mortar to be used. It will be the responsibility of the Contractor to manufacture concrete and mortar of required strength. The Excess or less usage of cement due to change in mix proportion and the design proportion, if any that will be evolved in the laboratory will be paid or recovered from the Contractor. No cost due to variation of other materials of mix due to change in mix design (i.e., other than cement) will be paid or recovered.
Note: No bulkage in concrete will be allowed.
- 7) The quoted bid shall also include the work of any kind necessary for the due and satisfactory construction, completion and maintenance of the works to be intent and meaning of the drawings and these specifications and further drawings and orders that may be issued by the Engineer from time to time. The quoted bid shall include compliance by the contractor with all the general conditions of contract, whether specifically mentioned or not in the various clauses of these specifications, all materials apparatus, plant, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop, staff, labour and the provision of proper and sufficient protective works, temporary fencing and lighting.
It shall also include safety of workers, first-aid equipment, suitable accommodation for the staff and workmen, with adequate sanitary arrangements, the effecting and maintenance of all insurance, the payment of all wages, salaries, fees, royalties, duties or other charges arising out of the erection of works and the regular clearance of rubbish, reinstatement and clearing-up of the site as may be required on completion of works safety of the public and protection of the works and adjoining land.
- 8) The contractor shall ensure that, the quoted bid shall cover all stages of work such as setting out, selection of materials, selection of construction methods, selection of equipment and plant, deployment of personnel and supervisory staff, quality control testing etc., The work of building in quality assurance shall be deemed to be covered in the quoted bid.

SCHEDULE-A, PART-I						
Name of the work: Construction of Joladarasi Reservoir across Kundu river of 0.80 TMC near Joladarasi village, Koilakuntla Mandal,Kurnool Dist						
Spillway						
Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
1	8421 Cum	Excavation for foundation in all kinds of soil including boulders upto 0.30 m diameter for dam, spillway, intake structure and other appurtenant works and placing the excavated soil neatly in dump area or disposing off the same as directed etc., complete with all leads and lifts.	As per APSS No. 301 & as directed by the Department	124.00 (Rupees one hundred twenty four only)	Cum (One cubic meter only)	1044204.00
2	5910 Cum	Excavation for foundation in ordinary rock without blasting including boulders above 0.3 m upto 0.6 m dia for dam, spillway, intake structure and other appurtenant works and placing the excavated material neatly in dump area or disposing off the same as directed etc., complete with all leads and lifts.	As per APSS No. 301 & as directed by the Department	163.70 (Rupees one hundred sixty three and seventy paise only)	Cum (One cubic meter only)	967467.00
3	3384 Cum	Excavation for foundation in hard rock requiring blasting including boulders above 0.6 m upto 1.2 m dia. for dam, spillway, intake structure and other appurtenant works and placing the excavated material neatly in dump area or disposing off the same as directed etc., complete with all leads and lifts.	As per APSS No. 301 & as directed by the Department	244.30 (Rupees two hundred forty four and thirty paise only)	Cum (One cubic meter only)	826711.00

4	10919 Cum	Providing and laying insitu vibrated M-20 (28 days cube compressive strength not less than 20 N / sq mm) grade cement concrete using 40 mmdown size approved, clean, hard, graded aggregates including cost of all materials, machinery, labour, formwork, centering, scaffolding, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc., complete for RCC works of gallery, sluice, spillway crest, spillway d / s face, energy dissipating structures, training walls, piers, abutments and such other locations with all leads and lifts. (Cement content : 310 kg / cum with use of super plasticiser, CA : 0.90cum, blending ratio of CA--50:30:20, FA : 0.40 cum)	As per APSS No. 402 & as directed by the Department	5672.38 (Rupees five thousand six hundred seventy two and thirty eight paise only)	Cum (One cubic meter only)	61936717.00
5	17057 Cum	Providing and laying insitu vibrated M-20 (28 days cube compressive strength not less than 20 N / sq mm) grade cement concrete using 40 mmdown size approved, clean, hard, graded aggregates including cost of all materials, machinery, labour, formwork, centering, scaffolding, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc., complete for RCC works of gallery, sluice, spillway crest, spillway d / s face, energy dissipating structures, training walls, piers, abutments and such other locations with all leads and lifts. (Cement content : 310 kg / cum with use of super plasticiser, CA : 0.90cum, blending ratio of CA--50:30:20, FA : 0.40 cum	As per APSS No. 402 & as directed by the Department	5375.00 (Rupees five thousand three hundred and seventy five only)	Cum (One cubic meter only)	91681375.00

6	2548 Cum	Providing and laying insitu vibrated M-20 (28 days cube compressive strength not less than 20 N / sq mm) grade cement concrete using 20 mmdown size approved, clean, hard, graded aggregates including cost of all materials, machinery, labour, formwork, centering, scaffolding, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc., complete for RCC works of spillway bridge, blockouts and such other similar structures with congested reinforcement with all leads and lifts. (Cement content : 330 kg / cum with use of super plasticiser, CA : 0.80 cum, Blending Ratio of CA -- 65:35, FA :0.44 cum	As per APSS No. 402 & as directed by the Department	7062.47 (Rupees seven thousand sixty two and fourty seven paise only)	Cum (One cubic meter only)	17995174.00
7	491 Cum	Providing and laying insitu vibrated M-20 (28 days cube compressive strength not less than 20 N / sq mm) grade cement concrete using 20 mm down size approved, clean, hard, graded aggregates including cost of all materials, machinery, labour, formwork, centering, scaffolding, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc., complete for RCC solid parapet consisting of 35 cm x 20 cm kerb 35 cm x 35 cm x 1 m pillars spaced approximately at 3.35 m c / c, 12.5 cm thick wall 80 cm height with 12.5 cm thick and 35 cm wide coping slab for wall and 12 .5 cm thick 40 cm x 40 cm coping for pillars with top edges of kerb and coping chamferred / rounded as directed etc., complete (excluding cost of providing and placing reinforcement steel and gate) with all leads and lifts.(Cement content 350 kg / cum with use of super plasticiser(0.4% by wt.	As per APSS No. 402 & as directed by the Department	2987.78 (Rupees two thousand nine hundred eighty seven and seventy eight paise only)	Cum (One cubic meter only)	1467000.00
8	2706 Rm	Drilling 45 to 50 mm dia holes vertical or inclined upto 10 degrees to vertical in rock /masonry/ concrete by percussion drilling using waggon drill or any other suitable equipment including cost of all materials, machinery, labour, redrilling through partially set grout wherever required etc., complete. for drilling upto 6 m depth from surface.	As directed by the Department	211.50 (Rupees two hundred and eleven and fifty paise only)	RM (One running meter only)	572319.00

9	2706 Cum	for drilling upto 6 m depth from surface.average period of 30 minutes including water intake observations after flushing, cost of all materials, machinery, labour etc., complete.	As directed by the Department	57.60 (Rupees fifty seven and sixty paise only)	Cum (One cubic meter only)	155866.00
10	271 MT	Curtain grouting with neat cement grout mix of suitable consistency under specified pressure as directed in drilled holes by stage grouting method including cost of all materials, machinery, labour, redrilling if necessary etc., complete with all leads and lifts.	As directed by the Department	11250.37 (Rupees eleven thousand two hundred fifty and thirty seven paise only)	MT (One Metric ton only)	3048850.00
11	451.50 Rm	Providing and constructing contraction joints by fixing 16 SWG 60 cm wide annealed copper sheets in two lines with 8 mm dia steel dowel rods on either side at one metre interval, forming 125 x 125 mm size groove in between copper strips for filling asphalt including fixing 15 mm dia two legged G.I pipe with U - bend at bottom for circulation of steam at intervals and forming 150 mm dia formed drain behind water seals including cost of pipes etc., complete with all leads and lifts.	As directed by the Department	14215.30 (Rupees fourteen thousand two hundred fifteen and thirty paise only)	RM (One running meter only)	6418208.00
12	820 Nos	Providing and fixing 25 mm dia 3 m long cold twisted deformed steel dowel bars with one end driven into 45 to 50 mm diameter 1.50 m deep hole drilled in bed rock and other end provided with L-bend for embedding in concrete / masonry of over flow / non-over flow blocks and other appertenant works including cost of drilling and cleaning hole, filling hole with cement mortar 1 : 1 proportion, driving anchor rod, cost of all materials, machinery, labour etc., complete with all leads and lifts.	As directed by the Department	937.10 (Rupees nine hundred thirty seven and ten paise only)	1no. (One number only)	768422.00
13	348 MT	Providing, fabricating and placing in position reinforcement steel for RCC,below 36 dia rods overlaps and wastages wherever required, tying with 1.25 mm diameter soft annealed steel wire, including cost of all materials, machinery, labour etc.,complete with all leads and lifts.	As per APSS No.127 & as directed by the Department	51384.00 (Rupees fifty one thousand three hundred eighty four only)	MT (One Metric ton only)	17881632.00

Spill Way Sub Total

204763945.00

Mechanical Parts

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
14	118.50 MT	Fabrication, supply, erection, testing and commissioning of Embedded parts for radial gate consists of sill beam, wall plates, anchor girders , yoke girders , tie flats, trunnion supports etc., including cost of all materials, machinery, labour, welding, finishing, with leads and lifts &all accessories	As per APSS No.127 & as directed by the Department	148339.46 (Rupees one lakh forty eight thousand three hundred and thirty nine and forty six paise only)	MT (One Metric ton only)	17578226.00
15	474.15 MT	Fabrication, supply, erection, testing and commissioning of radial gate consisting of skin plate, stiffeners, horizontal girders, radial arms, trunnion assemblies, tie beam, pulley supports, bracings, rubber seals, clamps etc., with all accessories for spillway/canals including cost of all materials, machinery, labour, seal fixing etc., complete as per specifications and approved drawings	As per APSS No.127 & as directed by the Department	140317.19 (Rupees one lakh forty thousand three hundred and seventeen and nineteen paise only)	MT (One Metric ton only)	66531396.00
16	133.13 MT	Fabrication, supply, erection and commissioning of structural steel hoist bridge consisting of columns, beams, bracings, stiffeners, ties, chequered plate covering, hand railing, ladder etc., with all accessories for supporting rope drum hoist for operating barrage gates including cost of all materials, machinery, labour, welding, finishing, etc., complete complete as per specifications and drawings with all leads and lifts	As per APSS No.127 & as directed by the Department	122381.57 (Rupees one lakh twenty two thousand three hundred and eighty one and fifty seven paise only)	MT (One Metric ton only)	16292658.00
17	200.70 MT	Fabrication, supply, erection, testing and commissioning of electrically operated rope drum hoist of adequate capacity consisting of base frames, rope drums,connecting shaft, gear system, brake system, electric motor, wire ropes, gate position indicator, manual operation arrangement etc., with all accessories for spillway radial gate including cost of all materials, machinery, labour,, greasing, providing hand railing and approach staircase with gate to hoist platform, , complete as per specifications and approved drawings	As per APSS No.127 & as directed by the Department	39982.78 (Rupees thirty nine thousand nine hundred and eighty two and seventy eight paise only)	MT (One Metric ton only)	8024544.00

18	113.70 MT	Fabrication, supply, erection, testing and commissioning of vertical lift gates and stoplog gate elements, consisting of skin plate, horizontal and vertical girders, stiffeners, lifting pins, bronze padded slide blocks/bearings, guide shoes, rubber seals, clamps etc., with all accessories including cost of all materials, machinery, labour, seal fixing etc., complete as per specifications and approved drawings	As per APSS No.127 & as directed by the Department	145275.60 (Rupees one lakh forty five thousand two hundred and seventy five and sixty paise only)	MT (One Metric ton only)	16517836.00
19	25 MT	Fabrication, supply, erection, testing and commissioning of adequate capacity Class- II type moving gantry crane consisting of rail mounted gantry frame, top platform with hand railing, long / cross travel arrangements, rope drums, gear systems, electric motors, electro- magnetic brake system, cabin, control panel, wire rope, ladder, motorised cable reeling drum etc., with all accessories for operating spillway stop log gate elements and river sluice / canal sluice emergency gates including cost of all materials, machinery, labour, etc., complete with all leads and lifts.	As per APSS No.127 & as directed by the Department	220659.35 (Rupees two lakhs twenty thousand six hundred and fifty nine and thirty five paise only)	MT (One Metric ton only)	5516484.00
20	260 Rm	Fabrication, supply, erection and commissioning of rail track using 45 kg / m standard rails on spillway bridge for movement of gantry crane for handling and operating spillway stoplog gate elements / river sluice / canal sluice emergency gate including cost of all materials, machinery, labour, complete as per specifications (without painting on sand-blasted or mechanical cleaning surfaces which are added extra as per schedule of rates under items in this chapter and add as applicable separately)	As per APSS No.127 & as directed by the Department	7322.97 (Rupees seven thousand three hundred and twenty two and ninety seven paise only)	Rm (One Running meter only)	1903972.00
21	3718 Sqm	Surface cleaning of metal surfaces by chemical cleaners and then by hand and power tool cleaners and removing dust. After cleaning, applying primary coat with one coat of Protective Mastic to a thickness of 70+5 microns, followed by finishing coats 2 coats with Solventless Coal tar epoxy each coat with a DFT of 150+5 microns and total DFT of all coats including Primary coat should not be less than 350 microns with material, labour and all accessories with all leads and lifts	As per APSS No.127 & as directed by the Department	595.60 (Rupees five hundred and ninety five and sixty paise only)	1Sqm (One square meter only)	2214441.00

22	1008 Sqm	Surface cleaning of metal surfaces by chemical cleaners and then by hand and power tool cleaners and removing dust. After cleaning, applying primary coat with two coats of Zinc chromite red oxide primer followed by finishing coats 3 coats with synthetic enamel paint with material, labour, and all accessories with all leads and lifts where surface cleaning by sand blasting is not feasible and based on specific recommendations of designers, it is to adopt surface preparation done manually by hand and power tool after cleaning by chemical treatment to remove grease, rust, scaling etc., and to form phosphate coating to prevent further rusting, before applying primer painting.	As per APSS No.127 & as directed by the Department	451.50 (Rupees four hundred and fifty one and fifty paise only)	1Sqm (One square meter only)	455112.00
23	75.40 Rm	<u>RADIAL GATES</u> Walk way(cat walk) Fabrication, supply, erection and commissioning of 1 metre wide walkway connecting spillway piers / abutments at trunnion platform level including cost of all materials, machinery, labour, cutting, etc., complete as per specifications and approved drawings (without painting on sand-blasted or mechanical cleaning surfaces which are added extra as per schedule of rates under items in this chapter and add as applicable separately)	As per APSS No.127 & as directed by the Department	106383.30 (Rupees one lakh six thousand three hundred and eighty three and thirty paise only)	RM (One running meter only)	8021301.00

Mechanical Parts 143055970.00

Earthen Bund

Sl.No.	Qty	Description	code	Rate	Per	Amount
24	685146 Cum	Excavation for foundation in all kinds of soil including boulders upto 0.30 m diameter for dam, spillway, intake structure and other appurtenant works and placing the excavated soil neatly in dump area or disposing off the same as directed etc., complete with all leads and lifts.	As per APSS No.301 & as directed by the Department	124 (Rupees one hundred and twenty four only)	Cum (One cubic meter only)	84958104.00

25	31992.50 Cum	Excavation for foundation in ordinary rock (including HDR) without blasting including boulders above 0.3 m upto 0.6 m dia for dam, spillway, intake structure and other appurtenant works and placing the excavated material neatly in dump area or disposing off the same as directed etc. all leads and lifts.	As per APSS No.301 & as directed by the Department	163.70 (Rupees one hundred and sixty three and seventy paise only)	Cum (One cubic meter only)	5237173.00
26	89854.25 Cum	Excavation for foundation in hard rock (including F&F) requiring blasting including boulders above 0.6 m upto 1.2 m dia. for dam, spillway, intake structure and other appurtenant works and placing the excavated material neatly in dump area or disposing off the same as directed etc., complete with all leads and lifts.	As per APSS No.301 & as directed by the Department	244.30 (Rupees two hundred and forty four and thirty paise only)	Cum (One cubic meter only)	21951393.00
27	36225 Cum	Excavation for foundation in hard rock (including HR) requiring blasting including boulders above 0.6 m upto 1.2 m dia. for dam, spillway, intake structure and other appurtenant works and placing the excavated material neatly in dump area or disposing off the same as directed etc., complete with all leads and all lifts.	As per APSS No.301 & as directed by the Department	435.10 (Rupees one hundred and thirty five and ten paise only)	Cum (One cubic meter only)	15761498.00
28	185393.75 Cum	Providing cut-off trench filling using selected impervious soil from approved borrow areas in layers of 25 to 30 cm before compaction including cost of all materials, machinery, labour, all operations such as excavation, sorting out, transportation, spreading soil to specified thickness, breaking clods, sectioning, watering, compacting to density control of not less than 95 percent using Sheep foot roller / Vibratory roller/ 8 to 10 tonne power roller as stipulated etc., complete with all leads and lifts.	As per APSS No.301 & 304 and as directed by the Department	150.20 (Rupees one hundred and fifty and twenty paise only)	Cum (One cubic meter only)	27846141.00

29	743991 Cum	Providing homogeneous embankment using soil from approved borrow area in layers of 25 to 30 cm before compaction including cost of all materials, machinery, labour, all operations such as excavation, sorting out, transportation, spreading soil in layer of specified thickness, breaking clods, sectioning, watering, compacting to density control of not less than 95 percent or as stipulated using sheep / pad foot roller etc., complete with all leads and lifts .	As per APSS No.302 & 303 and as directed by the Department	195.60 (Rupees one hundred and ninety five and sixty paise only)	Cum (One cubic meter only)	145524639.00
30	803913 Cum	Providing casing embankment using semi-pervious soil from approved borrow areas in layers of 25 to 30 cm before compaction including cost of all materials, machinery, labour, all other operations such as excavation, sorting out, transportation, spreading soil in layers of specified thickness, breaking clods, sectioning, watering, compacting to density control of not less than 95 percent using sheep foot / pad foot roller as stipulated etc., complete with all leads and lifts.	As per APSS No.302 & 303 and as directed by the Department	740.00 (Rupees seven hundred and forty only)	Cum (One cubic meter only)	594895620.00
31	87479 Cum	Providing and constructing 45 cm thick chimney filter using clean approved sand satisfying filter creteria including cost of all materials, machinery, labour, compacting etc., complete with all leads and lifts. (Vertical sand chimney)	As per APSS No.305 & as directed by the Department	1520.70 (Rupees one thousand five hundred and twenty and seventy paise only)	Cum (One cubic meter only)	133029315.00
32	15767.39 Cum	Providing and constructing dry rubble rock-toe using rubble and stone chips from approved source including cost of all materials, machinery, labour, hand packing rubble and stone chips, finishing top and sides to required slopes etc., complete with all leads and lifts	As per APSS No.106 & as directed by the Department	546.60 (Rupees five hundred and forty six and sixty paise only)	Cum (One cubic meter only)	8618456.00
33	179180.50 Cum	Providing and Constructing 45 cm thick dry rubble stone pitching including cost of all materials,labour,hand packing,finishing etc.,complete (rubble stones : 0.495 cum/sqm)	As per APSS No.106 & as directed by the Department	678.77 (Rupees six hundred and seventy eight and seventy seven paise only)	Cum (One cubic meter only)	121622348.00

34	36096 Sqm	Providing and Constructing 30 cm thick dry rubble stone pitching including cost of all materials,labour,hand packing,finishing etc.,complete (rubble stones : 0.33 cum/sqm)	As per APSS No.106 & as directed by the Department	452.55 (Rupees four hundred and fifty two and fifty five paise only)	Sqm (One Square meter only)	16335244.00
35	118815.88 Cum	Providing and constructing graded filter media below and behind rock-toe consisting of 20 cm thick sand, 25 cm thick 20 - 4.75 mm and 40 cm thick 80 - 20 mm size graded coarse aggregates satisfying filter criteria as per specifications including cost of all materials, labour, machinery, laying to required slope, compaction etc., complete with all leads and lifts	As per APSS & as directed by the Department	1410.95 (Rupees one thousand four hundred and ten and ninety five paise only)	Cum (One cubic meter only)	167643266.00
36	4985 Cum	Providing and laying insitu vibrated M-15 (28 days cube compressive strength not less than 15 N / sq mm) grade cement concrete using 20 mm down size approved, clean, hard, graded aggregates including cost of all materials, machinery, labour, formwork, centering, scaffolding, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc.,complete for plain concrete works with all leads and lifts. (Cement content : 280 kg /cum with use of super plasticiser,CA : 0.80 cum, Blending Ratio of CA -- 65:35, FA : 0.44 cum) (For profile wall)	As per APSS No.402 & as directed by the Department	5323.44 (Rupees five thousand three hundred and twenty three and fourty four paise only)	Cum (One cubic meter only)	26537349.00
37	7488 Cum	Providing and laying insitu vibrated M-20 (28 days cube compressive strength not less than 15 N / sq mm) grade cement concrete using 20 mm down size approved, clean, hard, graded aggregates including cost of all materials, machinery, labour, formwork, centering, scaffolding, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc.,complete for foundation of parapet with initial lead upto 1 km and all lifts. (Cement content : 280 kg /cum with use of super plasticiser,CA : 0.80 cum, Blending Ratio of CA -- 65:35, FA : 0.44 cum) (For chute drain)	As per APSS No.402 & as directed by the Department	5894.88 (Rupees five thousand eight hundred and ninety four and eighty eight paise only)	Cum (One cubic meter only)	44140862.00

38	203.69 MT	Providing, fabricating and placing in position reinforcement steel for RCC,below 36 dia rods overlaps and wastages wherever required, tying with 1.25 mm diameter soft annealed steel wire, including cost of all materials, machinery, labour etc.,complete with all leads and lifts.	As per APSS No.127 & as directed by the Department	51384.00 (Rupees fifty one thousand three hundred and eighty four only)	MT (One Metric ton only)	10466407.00
39	179180.50 Sqm	Providing and laying Hariyala or other approved quality turfing sods for the slopes of earthen embankments over 20 mm thick sand backing including cost of all materials, machinery,labour including preparing surface, spreading sand, watering for 15 days etc., complete with all leads and lifts	As per APSS No.307 & as directed by the Department	134.86 (Rupees one hundred and thirty four and eighty six paise only)	Sqm (One Square meter only)	24164282.00
40	25920 Cum	Providing compacted embankment for field irrigation channels with gravelly soil from approved borrow area including sorting out, spreading in layers of 15 cm thickness, breaking clods, watering, compacting, dressing sides to required slopes etc.,complete with lead upto 50 m and all lifts.	As per APSS No.301,302 &303 and as directed by the Department	369.20 (Rupees three hundred and sixty nine and twenty paise only)	Cum (One cubic meter only)	9569664.00
41	20400.00	Drilling 45 to 50 mm dia holes vertical or inclined upto 10 degrees to vertical in rock /masonry / concrete by percussion drilling using waggon drill or any other suitable equipment including cost of all materials, machinery, labour, redrilling through partially set grout wherever required etc., complete for drilling upto 6 m depth from surface.	As directed by the Department	211.50 (Rupees two hundred and eleven and fifty paise only)	RM (One running meter only)	4314600.00
42	10200 Rm	Drilling 45 to 50 mm dia holes vertical or inclined upto 10 degrees to vertical in rock /masonry / concrete by percussion drilling using waggon drill or any other suitable equipment including cost of all materials, machinery, labour, redrilling through partially set grout wherever required etc., complete for drilling upto 6 m to 12m depth from surface.	As directed by the Department	232.65 (Rupees two hundred and thirty two and sixty five paise only)	RM (One running meter only)	2373031.00

43	30600 Rm	Flushing grout holes of all sizes with water and air jets alternatively for an average period of 30 minutes including water intake observations after flushing, cost of all materials, machinery, labour etc., complete.	As directed by the Department	57.60 (Rupees fifty seven and sixty paise only)	RM (One running meter only)	1762560.00
44	3060 MT	Curtain grouting with neat cement grout mix of suitable consistency under specified pressure as directed in drilled holes by stage grouting method including cost of all materials, machinery, labour, redrilling if necessary etc., complete with all leads and lifts.	As directed by the Department	11250.37 (Rupees eleven thousand two hundred and fifty and thirty seven only)	MT (One Metric ton only)	34426133.00

Earthen Bund

1501178085.00**Diversion Drain**

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
45	113851.68 Cum	Excavation in all kinds of soil including boulders upto 0.3 m diameter for canal, seating of embankment, filter drains / catch water drains etc., including dressing bed and sides to required level and profile, cost of all materials, machinery, labour, placing the excavated soil neatly in dump area or for the formation of service road / embankment as directed etc., complete with all leads and lifts.	As per APSS No.301 & as directed by the Department	98.80 (Rupees ninety eight and eighty paise only)	Cum (One cubic meter only)	11248546.00
46	113851.68 Cum	Excavation in ordinary rock (including HDR) without blasting including boulders above 0.30 m upto 0.6 m dia. for canals, seating of embankment, filter drain / catch water drains etc., including dressing of bed and sides to required level and profile, cost of all materials, machinery, labour, placing the excavated soft rock neatly in dump area or for formation of service road as directed etc., complete with all leads and lifts.	As per APSS No.301 & as directed by the Department	134.50 (Rupees one hundred and thirty four and fifty paise only)	Cum (One cubic meter only)	15313052.00

47	284270.08 Cum	Excavation in hard rock (including F&F rock) requiring blasting including boulders above 0.6 m upto 1.2 m dia. for canals, seating of embankment, filter drain / catch water drains etc., including dressing bed and sides to required level and profile, cost of all materials, machinery, labour, placing the excavated rock in dump area or for formation of service road as directed etc., complete with all leads and lifts.	As per APSS No.301 & as directed by the Department	205.70 (Rupees two hundred and five and seventy paise only)	Cum (One cubic meter only)	58474356.00
48	57284.97 Cum	Excavation in hard rock by blasting including boulders above 1.2 m dia. for canals, seating embankment etc., including levelling bed by removing all projections by hammering / chiselling, cost of all materials, machinery, labour, placing the excavated rock neatly in approved dump area and levelling the same as directed etc., complete with initial lead upto 1 km and all lifts	As per APSS No.301 & as directed by the Department	302.30 (Rupees three hundred and two and thirty paise only)	Cum (One cubic meter only)	17317247.00
49	568.59 Cum	Providing and laying insitu vibrated M-15 (28 days cube compressive strength not less than 15 N /sq mm) grade cement concrete using 40 mm down size approved, clean, hard, graded aggregates for foundation filling including cost of all materials, machinery, labour, formwork, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc., complete with all leads and lifts. (Cement content: 260 kg / cum with use of super plasticiser (0.4% by wt. of cement), CA : 0.90 cum, Blending Ratio of CA--50:30:20, FA : 0.40 cum)	As per APSS No.402 & as directed by the Department	5323.44 (Rupees five thousand three hundred and twenty three and forty four paise only)	Cum (One cubic meter only)	3026836.00

50	569.28 Cum	Providing and laying insitu vibrated M-15 (28 days cube compressive strength not less than 20 N / sq mm) grade cement concrete using 20 mm down size approved, clean, hard, graded aggregates for sub-structure / super- structure works including cost of all materials,machinery, labour, formwork, scaffolding, cleaning, batching, mixing, placing in position,levelling, vibrating, finishing, curing etc., complete with all leads and lifts (Cement content: 330 kg / cum with use of super plasticiser(0.4% by wt. of cement),CA : 0.80cum, Blending Ratio of CA--65:35, FA : 0.45 cum)	As per APSS No.402 & as directed by the Department	5894.88 (Rupees five thousand eight hundred and ninety four and eighty eight paise only)	Cum (One cubic meter only)	3355847.00
51	66.61 Cum	Providing and laying insitu M- 20 (28 days cube compressive strength not less than 20 N /sqmm) grade cement concrete using 20 mm down size approved, clean, hard, graded aggregates for wearing coat including cost of all materials, machinery, labour, formwork,cleaning, batching, mixing, placing in position in alternate panels, levelling, compacting,finishing, curing, packing joints with asphalt mortar etc., complete with all leads and all lifts If water is to be brought from other place add only lead charges @ 500 ltr / cum. to the data (Cement content: 330 kg / cum with use of super plasticiser(0.4% by wt. of cement),CA : 0.80cum, Blending Ratio of CA--65:35, FA : 0.45 cum)	As per APSS No.402 & as directed by the Department	5382.19 (Rupees five thousand three hundred and eighty two and nineteen paise only)	Cum (One cubic meter only)	358510.00
52	159607.13 Cum	Providing and Constructing 30 cm thick dry rubble stone pitching including cost of all materials,labour,hand packing,finishing etc.,complete (rubble stones : 0.33 cum/sqm)	As per APSS No.106 & as directed by the Department	511.55 (Rupees five hundred and eleven and fifty five paise only)	Sqm (One Square meter only)	81647026.00

Diversion Drain

190741420.00

Investigation

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
53	272000 Sqm	Clearing thin jungle growth (more than 50 percent open space) including bushes upto 30 cm / parthenium and other weeds including burning or disposing off the same as directed etc., complete.	As per APSS No.201 & as directed by the Department	1.70 (Rupees one and seven paise only)	Sqm (One Square meter only)	462400.00
54	4.86 Hect	Conducting Net level survey with levels at 3.0m.intervals to prepare working drawings for proposed reservoir at spillway portion for all labour charges other materials and operations required to complete the furnished the item of work etc as directed by the Engineer-in-charge.	As directed by the Department	5714.21 (Rupees five thousand seven hundred fourteen and twenty one paise only)	Hect (one hectare only)	27771.06
55	849.83 Hect	Conducting Net level survey with levels at 30m intervals to prepare 1m contour map for sub mergence of proposed reservoir and command area survey as per the guideline of CWC including cost and conveyance of all materials, , stationary etc other materials and operations required to complete the furnished the item of work etc as directed by the Engineer-in-charge.	As directed by the Department	418.26 (Rupees four hundred and eighteen and twenty six paise only)	Hect (one hectare only)	355449.89
56	10 Nos	Carrying double check BM value and establishing Bench marks enroute as per standard specifications including labour charges , all leads, lifts cost of drawing materials , paints, pegs all incidental, operational charges required to complete finished item of work excluding cost stone and fixing as directed by the Engineer-in-charge.	As directed by the Department	7040.72 (Rupees seven thousand forty and seventy two paise only)	Nos (One numer only)	70407.00
57	10.20 Km	Conducting Cross Sectional survey with Levelling instrument upto 50mtrs for earth bund and both sides from centre line with interval of 3 mtrs as per standard specification for the purpose of Estimate Earth work quantities of earth bund including the cost and conveyance of all materials.	As directed by the Department	5261.42 (Rupees Five thousand two hundred and sixty one and forty two paise only)	km (One kilometer only)	53666.48

58	10.20 Km	Conducting Longitudinal survey with Levelling instrument for every 30 mtrs interval as per standard specification for the purpose of Estimate Earth work quantities of earth bund including the cost and conveyance of all materials.	As directed by the Department	1714.08 (Rupees one thousand seven hundred and fourteen and eight paise only)	km (One kilometer only)	17484.00
59	74.90 Hect	Conducting Net level survey with levels at 30 m.intervals along down stream of kundu river as directed by the Engineer-in-charge.	As directed by the Department	320.45 (Rupees Three hundred and twenty and fourty five paise only)	Hect (one hectare only)	24001.70
60	5.60 Km	Conducting Longitudinal survey with Levelling instrument for every 30 mtrs interval as per standard specification for the purpose of Estimate Earth work quantities of Diversion channel including the cost and conveyance of all materials.	As directed by the Department	1714.08 (Rupees One thousand Seven hundred and fourteen and Eight paise only)	km (One kilometer only)	9598.85
61	16.24 Hect	Conducting Net level survey with levels at 3.0m.intervals for Diversion channel at down stream of reservoir for all labour charges other materials and operations required to complete the furnished the item of work etc as directed by the Engineer-in-charge.	As directed by the Department	5714.21(Rupees Five thousand Seven hundred and fourteen and twenty one paise only)	Hect (one hectare only)	92798.80
62	816 Nos	Providing and fixing 20 x 20 x 75 cm size roughly dressed boundary / demarcation /chainage / arrow stones including cost of all materials, labour, engraving marks, fixing in position, murum filling etc., complete with all leads and lifts.	As per APSS No.1518 & as directed by the Department	661.32 (Rupees six hundred and sixty one and thirty two paise only)	Nos (One numer only)	539637.12
63	10 Nos	Providing and fixing 20 x 20 x 75 cm size temporary bench mark stone in CC 1 : 4 : 8 using 40 mm down size graded coarse aggregate including cost of all materials, labour,dressing top surface, engraving BM data etc.,complete with all leads and lifts.	As per APSS No.402 & as directed by the Department	1085.81 (Rupees one thousand eighty five and eighty one paise only)	Nos (One numer only)	10858.10

64	10 Nos	Providing and fixing 20 x 20 x 75 cm size permanent bench mark stone in CC 1 : 3 : 6 block of size 90 x 90 x 120 cm using 40 mm down size graded coarse aggregate and providing 35 cm thick 30 cm high UCR masonry in CM 1 : 5 proportion protective wall around the BM stone, including cost of all materials, labour, dressing top surface of stone, engraving BM data on top surface, excavation, finishing, curing etc., complete with all leads and all lifts.	As per APSS No.402 & as directed by the Department	8067.70 (Rupees eight thousand sixty seven and seventy paise only)	Nos (One numer only)	80677.00

Investigation

1744750.00

River Sluice

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
65	24.00 MT	<u>VERTICAL LIFT GATES-EM PARTS</u> Fabrication, supply, erection and commissioning of embedded parts consisting of sill beam, slide tracks, seal seats, guide rails, dogging sets for storage of stoplog elements etc., with all accessories for spillway stop log gates and other vertical lift elements including cost of all materials, machinery, labour, etc., complete as per specifications and approved drawings (without painting on sand-blasted or mechanical cleaning surfaces which are added extra as per scedule of rates under items in this chapter and add as applicable separately)	As per APSS No.127 & as directed by the Department	164431.21	MT (One Metric ton only)	3946349.00

66	17.10 MT	<u>VERTICAL LIFT GATES/STOP LOGS - ROLLER MOUNTED</u> Fabrication, supply, erection, testing and commissioning of fixed wheel type vertical lift service gate consisting of skin plate, vertical and horizontal girders, wheels, stiffeners, lifting brackets, guide rollers, ballast blocks, teflon claded rubber seals etc., with all accessories for river sluice / canal sluice vent including cost of all materials, machinery, labour,welding ,aligning finishing seal fixing etc.with all leads and lifts, complete as per specifications and approved drawings (without painting on sand-blasted or mechanical cleaning surfaces which are added extra as per scedule of rates under items in this chapter and add as applicable separately)	As per APSS No.127 & as directed by the Department	141959.89	MT (One Metric ton only)	2427514.00
67	9.00 MT	<u>VERTICAL LIFT GATES/STOP LOGS - ROLLER MOUNTED</u> Fabrication, supply, erection, testing and commissioning of fixed wheel type vertical lift service gate consisting of skin plate, vertical and horizontal girders, wheels, stiffeners, lifting brackets, guide rollers, ballast blocks, teflon claded rubber seals etc., with all accessories for river sluice / canal sluice vent including cost of all materials, machinery, labour,welding ,aligning finishing seal fixing etc.with all leads and lifts, complete as per specifications and approved drawings (For Stop Logs) (without painting on sand-blasted or mechanical cleaning surfaces which are added extra as per scedule of rates under items in this chapter and add as applicable separately)	As per APSS No.127 & as directed by the Department	141959.89	MT (One Metric ton only)	1277639.00
68	54.40 MT	<u>VERTICAL LIFT GATES-ROPE DRUM HOIST UPTO 30 TON CAP. POWER OPERATED</u> Fabrication, supply, erection, testing and commissioning of adequate capacity rope drum hoist consisting of hoist platform, rope drum, gear system, electric motor, electro-magnetic brake system, hand operation assembly, control panel, wire rope, pulleys, ladder etc., with all accessories for operating river sluice / canal sluice service gate including cost of all materials, machinery, labour, , complete as per specifications and drawings with all leads and lifts (without painting on sand-blasted or mechanical cleaning surfaces which are added extra as per scedule of rates under items in this chapter and add as applicable separately)	As per APSS No.127 & as directed by the Department	63982.04	MT (One Metric ton only)	3480623.00

69	122.50 Sqm	Cleaning gates / hoists / embedded parts/lifting beams etc., to expose fresh metal surface for painting by sand blasting method as per specifications including cost of all materials, labour, machinery, scaffolding, etc., complete with initial lead for sand upto 1 km and all lifts.	As per APSS No.126 &127 and as directed by the Department	443.76	Sqm	54361.00
70	238 Sqm	painting of embedded metal parts and all types of gates, stoplogs,etc, on sand blasted surfaces with one coat of inorganic zinc silicate (airless spray preferred)70 +/- 5 and two super coats with a total thickness of 300 microns (each 150+/- 5) of solventless coaltar epoxy paint each coat 150 microns (total 300 microns) cost of all materials, labour, scaffolding etc., complete with all leads and all lifts	As per APSS & as directed by the Department	524.60	Sqm	124855.00
71	200 Sqm	HOISTS:STRUCTURAL COMPONENTS painting structurals on sand blasted surfaces with two coats of zinc phosphate primer (airless spray preferred) 40microns/coat and one coat 65+/-5 of alkyd based micaceous iron oxide paint followed by two coats of synthetic enamel paint 25 microns/coat cost of all materials, labour, scaffolding etc., complete with all leads and all lifts	As per APSS No.126 &127 and as directed by the Department	472.50	Sqm	94500.00
72	87.50 Sqm	<u>HOISTS:MACHINERY COMPONENTS</u> painting hoist machinery , on sand blasted surfaces with one coats of zinc phosphate primer (airless spray preferred) 50microns/coat and three coats of aluminium paint or synthetic enamel , 25 microns/coat cost of all materials, labour, scaffolding etc., complete with all leads and all lifts	As per APSS No.126 &127 and as directed by the Department	437.40	Sqm	38273.00

River Sluice

11444114

Pylon

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
73	7225 Sqm	Clearing thin jungle growth (more than 50 percent open space) including bushes upto 30 cm / parthenium and other weeds including burning or disposing off the same as directed etc., complete.	As per APSS No.201 & as directed by the Department	1.70 (Rupees one and seventy paise only)	Sqm (One square meter only)	12283.00

74	29.77 Cum	Earth work excavation for foundations and depositing on bank for all lifts and with an initial lead of 10m including all operational, incidental, labour charges such as shoring ,sheeting, planking, strutting, etc. complete for finished item of work including seigniorage excluding dewatering charges etc as per SS - 20 B (APSS 308).	As per APSS No.308 & as directed by the Department	173.70 (Rupees one hundred and seventy three and seventy paise only)	Cum (One cubic meter only)	5171.00
75	25.27 Cum	Excavation in all kinds of soil including boulders upto 0.30 m dia. for foundations of canal cross drainage and other appurtenant structures and placing the excavated stuff neatly in specified dump area or disposing off the same as directed etc., complete with all leads and lifts.	As per APSS No.308 & as directed by the Department	301.10 (Rupees three hundred and one and ten paise only)	Cum (One cubic meter only)	7608.00
76	11.01 Cum	Providing and laying insitu vibrated M-10 (28 days cube compressive strength not less than 10 N / sq mm) grade cement concrete using 80 mm down size approved, clean, hard, graded aggregates for foundation filling including cost of all materials, machinery, labour, formwork,cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc.,complete with all leads and lifts. (Cement content: 220 kg / cum with use of super plasticiser(0.4% by wt. of cement),CA : 0.98cum, Blending Ratio of CA--35:30:20:15, FA : 0.35 cum)	As per APSS No.402 & as directed by the Department	5123.54 (Rupees five thousand one hundred twenty three and fifty four paise only)	Cum (One cubic meter only)	56395.00

77	70.85 Cum	Providing and laying insitu vibrated M-15 (28 days cube compressive strength not less than 15 N /sq mm) grade cement concrete using 40 mm down size approved, clean, hard, graded aggregates for foundation filling including cost of all materials, machinery, labour, formwork, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc., complete with all leads and lifts. (Cement content: 260 kg / cum with use of super plasticiser(0.4% by wt. of cement),CA : 0.90cum, Blending Ratio of CA--50:30:20, FA : 0.40 cum)	As per APSS No.402 & as directed by the Department	5323.45 (Rupees five thousand three hundred and twenty three and forty five paise only)	Cum (One cubic meter only)	377166.00
78	2.40 Cum	Brick Masonry in superstructure with CM (1:3) prop: using Fly ASH Cement Bricks of size 290x225x140mm with compressive of 50 Kgs / Sqcm from approved source including cost and conveyance of all materials like cement, sand, fly ash bricks, water etc., to site, sales & other taxes on all materials, all operational, incidental and labour charges such as mixing cement mortar, constructing masonry, scaffolding charges, lift charges, curing etc.,. complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge	As per APSS No.501 & as directed by the Department	5674.10 (Rupees five thousand six hundred and seventy four and ten paise only)	Cum (One cubic meter only)	13618.00
79	66.63 Sqm	Flooring with granite stone tiles 8 mm thick (mirror polished of all shades) set over base coat of cement mortar (1:6), 12 mm thick over CC bed already laid or RCC roof slab, including neat cement slurry of honey like consistency spread @ 3.3.kgs per sqm & jointed neatly with white cement paste mixed with pigment of matching shade to full depth, including cost of all materials like cement, sand water and tiles etc., complete, including seigniorage charges, etc., complete for finished item of work, .	As per APSS No.703 & as directed by the Department	1373.09 (Rupees one thousand three hundred and seventy three and nine paise only)	Sqm (One square meter only)	91489.00

80	545.55 Kg	Providing, fabricating and placing in position reinforcement steel bars for RCC works including cleaning, straightening, cutting, bending, hooking, lapping, welding wherever required, tying with 1.25 mm dia soft annealed steel wire, including cost of all materials, machinery, labour etc., complete with all leads and lifts.	As per APSS No.126 & as directed by the Department	56.63 (Rupees fifty six and sixty three paise only)	Kg (One kilogram only)	30897.00
81	293.83 Kg	Providing Stainless Steel Tubes, sections, plates, sheets & pipes of all sizes & diameters for - 304 Grade including cost and conveyance of all items etc., complete	As directed by the Department	524.90 (Rupees five hundred and twenty four and ninety paise only)	Kg (One kilogram only)	154232.00
82	92.64 Sqm	Plastering 12mm thick in two coats with base coat of 8mm thick in CM (1:6) and top coat of 4mm thick in CM (1:4) dubara sponge finish including cost and conveyance of all materials like cement, sand, water etc., to site, charges, sales & other taxes on all materials, all operational, incidental and labour charges such as mixing mortar, scaffolding charges, lift charges, finishing, including cutting of Grooves wherever necessary for Even Surfaces of Brick Wall to complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge	As per APSS No.903 & as directed by the Department	169.88 (Rupees one hundred and sixty nine and eighty eight paise only)	Sqm	15737.00
83	25.93 Cum	Providing and filling murrum / gravely soil (CNS soil) for foundation or around pipes including breaking clods, spreading in layers of 10 to 15 cm, watering, compaction by earth masters to achieve density control of not less than 95 percent etc., complete with all leads and lifts.	As per APSS No.301 & as directed by the Department	1239.99 (Rupees one thousand two hundred and thirty nine and ninety nine paise only)	Cum (One cubic meter only)	32157.00

84	1825.20 Cum	Providing hearting / casing embankment with homogeneous soil from approved borrow areas in layers of 25 cm before compaction including cost of all materials, machinery, labour, all operations such as excavation, sorting out, transporting, spreading in layer of specified thickness, breaking clods, sectioning, watering, compacting each layer to density control of not less than 90 percent using 2 tonne roller etc., complete with initial lead upto 1 km and all lifts.(For Maintenance Works) For formation of ramp for De-silting operations.	As per APSS No.301 & as directed by the Department	179.50 (Rupees One hundred and seventy nine and fifty paise only)	Cum (One cubic meter only)	327623.00
85	8 Nos	NP - 3 Class 1000mm Dia pipe	As directed by the Department	6032.58 (Rupees six thousand thirty two and fifty eight paise only)	Nos (One numer only)	48261.00
86	4 Nos	Provision towards Supply of Plaques (3 Nos.) with all inscriptions and to be attached to Pylon	As directed by the Department	10000 (Rupees ten thousand only)	Nos (One numer only)	40000.00

Pylon 1212637.00

Construction of steps on Earth dam

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
87	133.38 Cum	E.W.E and depositing on banks as directed by the Department by machine in all soils upto SDR	As per APSS No.301 & as directed by the Department	124.00 (Rupees one hundred and twenty four only)	Cum (One cubic meter only)	16539.00

88	67.88 Cum	Plain Cement Concrete corresponding to M10 grade as per IS 456 equivalent to (1:3:6) proportion nominal mix (cement: fine aggregate: Coarse aggregate) using 40mm size Hard Blasted Granite (IS383, 1970) metal from approved quarry including cost and conveyance of all materials like cement, sand, coarse aggregate, water etc., to site, sales & other taxes on all materials, all operational, incidental, and labour charges such as mixing, laying and ramming concrete in layers in position not exceeding 15cm, finishing top surface, curing concrete, for Foundations and Flooring Bed complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge (For Bed Concrete)	As per APSS No.402 & as directed by the Department	3926.59 (Rupees three thousand nine hundred and twenty six and fifty nine paise only)	Cum (One cubic meter only)	266537.00
89	12.20 Cum	Plain Cement Concrete corresponding to M15 grade as per IS 456 equivalent to (1:3:6) proportion nominal mix (cement: fine aggregate: Coarse aggregate) using 20mm size Hard Blasted Granite (IS383, 1970) metal from approved quarry including cost and conveyance of all materials like cement, sand, coarse aggregate, water etc., to site, sales & other taxes on all materials, all operational, incidental, and labour charges such as mixing, laying and ramming concrete in layers in position not exceeding 15cm, finishing top surface, curing concrete, for Foundations and Flooring Bed complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge (For side walls and steps)	As per APSS No.402 & as directed by the Department	4321.69 (Rupees four thousand three hundred and twenty one and sixty nine paise only)	Cum (One cubic meter only)	52725.00
Steps						335801.00

K.M and H.M Stones

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees

90	12 Nos	Providing and fixing one line dressed 111x35x25 cm thick IRC standard kilometre stone in cement concrete M-10 grade with 40 mm down size aggregates including excavating pit of size 70x45x40 cm, embedding the stone by 30 cm in concrete, providing 2 coats synthetic enamel paint of approved quality and colour to exposed surfaces and lettering as directed, cost of all materials, labour, finishing, curing etc., complete with all leads and lifts.	As per APSS No.1517 & as directed by the Department	1568.75 (Rupees one thousand five hundred and sixty eight and seventy aise only)	Nos (One numer only)	18825.00
91	40 Nos	Providing and fixing one line dressed 65x15x10 cm thick IRC standard hectometre stone in cement concrete M-10 grade with 40 mm down size aggregates including excavating pit of size 50x45x40 cm, embedding the stone by 30 cm in concrete, providing 2 coats synthetic enamel paint of approved quality and colour to exposed surfaces and lettering as directed, cost of all materials, labour, finishing, curing etc., complete with all leads and lifts.	As per APSS No.1517 & as directed by the Department	1174.11 (Rupees one thousand one hundred and seventy four and eleven paise only)	Nos (One numer only)	46964.00
KM & HM Stones						65789.00

Building Items

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
92	18.69 Cum	E.W.E and depositing on banks as directed by the Department by machine in all soils upto SDR	As per APSS No.308 & as directed by the Department	124 (Rupees one hundred and twenty four only)	Cum (One cubic meter only)	2317.00

93	3.40 Cum	Plain Cement Concrete corresponding to M10 grade as per IS 456 equivalent to (1:3:6) proportion nominal mix (cement: fine aggregate: Coarse aggregate) using 40mm size Hard Blasted Granite (IS383, 1970) metal from approved quarry including cost and conveyance of all materials like cement, sand, coarse aggregate, water etc., to site, sales & other taxes on all materials, all operational, incidental, and labour charges such as mixing, laying and ramming concrete in layers in position not exceeding 15cm, finishing top surface, curing concrete, for Foundations and Flooring Bed complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge (For Foundation)	As per APSS No.402 & as directed by the Department	3926.59 (Rupees three thousand nine hundred and twenty six and fifty nine paise only)	Cum (One cubic meter only)	13351.00
94		RCC M- 20 Nominal mix (Cement:fine aggregate: coarse aggregate) corresponding to Table 9 of IS 456 using 20mm size graded machine crushed hard granite metal (coarse aggregate) from approved quarry including cost and conveyance of all materials like cement, fine aggregate (sand) coarse aggregate, water etc., to site and including Seigniorage charges, sales & other taxes on all materials including all operational, incidental and labour charges such as machine mixing, laying concrete, curing etc.,complete but excluding cost of steel and its fabrication charges for finished item of work, but excluding centering, shuttering.				
a.	5.58 Cum	Footing	As per APSS No.403 & as directed by the Department	5894.92 (Rupees five thousand eight hundred and ninety four ninety two paise only)	Cum (One cubic meter only)	32894.00
b.	2.39 Cum	Columns, Lintels	As per APSS No.403 & as directed by the Department	6267.11 (Rupees six thousand two hundred and seventy seven and eleven paise only)	Cum (One cubic meter only)	14979.00

c.	2.20 Cum	Beams	As per APSS No.403 & as directed by the Department	4892.87 (Rupees four thousand eight hundred and ninety two and eighty seven paise only)	Cum (One cubic meter only)	10764.00
d.	2.89 Cum	Slab	As per APSS No.403 & as directed by the Department	4892.87 (Rupees four thousand eight hundred and ninety two and eighty seven paise only)	Cum (One cubic meter only)	14141.00
e.	0.37 Cum	Sunshade	As per APSS No.403 & as directed by the Department	4892.87 (Rupees four thousand eight hundred and ninety two and eighty seven paise only)	Cum (One cubic meter only)	1810.00
95	11.94 Sqm	Brick Masonry in superstructure with CM (1:6) prop: using Fly ASH Cement Bricks of size 290x225x140mm with compressive of 50 Kgs / Sqcm from approved source including cost and conveyance of all materials like cement, sand, fly ash bricks, water etc., to site, sales & other taxes on all materials, all operational, incidental and labour charges such as mixing cement mortar, constructing masonry, scaffolding charges, lift charges, curing etc.,. complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge	As per APSS No.504 & as directed by the Department	4705.15 (Rupees four thousand seven hundred and five and fifteen paise only)	Sqm (One Square meter only)	56179.00
96	8.34 Cum	Sand filling in foundation including cost and conveyance of all materials and labour charge etc. complete	As per APSS No.309& as directed by the Department	1313.87 (Rupees one thousand three hundred and thirteen and eighty seven paise only)	Cum (One cubic meter only)	10957.00

97	16.02 Cum	Flooring in C.C (1:4:8) 100 mm thick and top plastered in C.M 20mm thick including cost and conveyance of all materials and labour charge etc. complete	As per APSS No.701& as directed by the Department	380.96 (Rupees three hundred and eighty and ninety six paise only)	Cum (One cubic meter only)	6103.00
98	160.98 Sqm	Plastering 20mm thick in two coats with base coat of 8mm thick in CM (1:5) and top coat of 4mm thick in CM (1:4) dubara sponge finish including cost and conveyance of all materials like cement, sand, water etc., to site, charges, sales & other taxes on all materials, all operational, incidental and labour charges such as mixing mortar, scaffolding charges, lift charges, finishing, including cutting of Grooves wherever necessary for Even Surfaces of Brick Wall to complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge	As per APSS No.903 & as directed by the Department	168.35 (Rupees one hundred and sixty eight and thirty five paise only)	Sqm (One Square meter only)	27101.00
99	1810 Kgs	Supplying, cutting, bending and placing in position of HYSD bars complete H15 Fe. Including cost and conveyance and labour charges	As per APSS No.126 & as directed by the Department	56.63 (Rupees Fifty six and sixty three paise only)	kg (One Kilogram only)	102500.00
100	4.41 RM	Supplying and fixing M.S hall out door frames manufactured by fold roll formed process steel sheet 1.25mm thick bright CRCA confirming to with higher tower bolts Etc (ssno.625 of building	As per APSS No.1002 & as directed by the Department	11140 (Rupees eleven thousand one hundred and forty only)	RM (One running meter only)	49127.00
101	4.75 Sqm	Supplying and fixing flush door shutter, solid bond wood block type with Take ply on both faces 35mm thick	As per APSS No.1002 & as directed by the Department	2031 (Rupees two thousand thirty one only)	Sqm (One Square meter only)	9647.00
102	7.06 Sqm	Bison lam windows with 3 painted steel	As directed by the Department	5411 (Rupees five thousand four hundred and eleven only)	Sqm (One Square meter only)	38202.00

103	0.54 Sqm	Supplying and fixing of cement jali for ventilators(375Item)	As directed by the Department	340 (Rupees three hundred and forty only)	Sqm (One Square meter only)	184.00
104	1.76 Sqm	CW Panelled door of size 1.05x1.68 including painting	As per APSS No.1001 & as directed by the Department	1860 (Rupees one thousand eight hundred and sixty only)	Sqm (One Square meter only)	3274.00
105	4.32 Sqm	CW Panelled door of size 1.20x1.20 including painting	As per APSS No.1005 & as directed by the Department	6295 (Rupees six thousand two hundred and ninety five only)	Sqm (One Square meter only)	27194.00
106	184.19 Sqm	Whiting to new walls and ceiling in three coats with Surya cem or equivalent quality to give an even shade after thoroughly brushing the surface to remove all loose powdered materials including cost and conveyance of all materials and water to site, sales & other taxes, all operational, incidental and labour charges such as cleaning the surface, painting, curing etc., for internal walls in All Floors to complete for finished item of work including all other incidental charges and other operations necessary to complete for finished item of work as per approved drawing or as directed by the Engineer-in-charge	As per APSS No.908 & as directed by the Department	34.66 (Rupees thirty four and sixty six paise only)	Sqm (One Square meter only)	6384.00
107	3.90 MT	Providing, fabricating and placing in position reinforcement steel for RCC,below 36 dia rods overlaps and wastages wherever required, tying with 1.25 mm diameter soft annealed steel wire, including cost of all materials, machinery, labour etc.,complete with all leads and lifts. (For Spiral Steps)	As directed by the Department	51384.00 (Rupees fifty one thousand three hundred and eighty four only)	MT (One Metric ton only)	200398.00

108	1 Nos	125KV ,3Phase, 145,50Hz, 156 BHP , water cooled multi cylinder diesel generator with alternator of 125 KVA out put continuous rating at 0.8 p.f and 1 numbers 12V 180AH batteries Exide/Amara raja and 1 No 200 A four pole NCCB	As directed by the Department	825000 (Rupees Eight lakhs twenty five thousand only)	Nos (One number only)	825000.00

Building Items 1452506.00

D.G Set

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
109	1.00 No	250KVA, 3 phase, 415, 50 Hz, 313BHP , water cooled multi cylinder diesel generator set with alternator of Kva out put continuous rating at 0.8 p.f and 1 Nos of 12V 200 AH Batteries Exide/ amaraja and 1 no 400A 4 pole MCCB.	As directed by the Department	1450000 (Rupees fourteen lakhs fifty thousand only)	Nos (One number only)	1450000.00
110	18.79 Cum	Providing and laying insitu vibrated M-15 (28 days cube compressive strength not less than 15 N /sq mm) grade cement concrete using 40 mm down size approved, clean, hard, graded aggregates for foundation filling including cost of all materials, machinery, labour, formwork, cleaning, batching, mixing, placing in position, levelling, vibrating, finishing, curing etc.,complete with all leads and lifts.(Cement content: 260 kg / cum with use of super plasticiser(0.4% by wt. of cement), CA : 0.90cum, Blending Ratio of CA--50:30:20, FA : 0.40 cum) (For Machine Foundation)	As per APSS No.402 & as directed by the Department	5323.44 (Rupees five thousand three hundred and twenty three and forty four paise only)	Cum (One cubic meter only)	100027.00

DG Set 1550027.00

Electrification

Sl.No.	Quantity	Description of Work	Specification No.	Rate (Figure and words)	Unit	Amount in Rupees
111	36 Nos	Supply and Erection of 9.1M 280kg WL PSCC poles including pit excavation of size 0.76x0.76x1.66 Mtrs. in all soils (except which requires blasting), transporting and all incidental charges complete	As per APSPDCL specifications & as directed by the Department	5377 (Rupees five thousand three hundred and seventy seven only)	Nos (One number only)	193572.00

112	10 Nos	Supply and Erection of 8.0M 140kg WL PSCC poles (stut) including pit excavation of size 0.6x0.6x1.50 Mtrs. in all soils (except which requires blasting), transporting and all incidental charges complete	As per APSPDCL specifications & as directed by the Department	3191.50 (Rupees three thousand one hundred and ninety one and fifty paise only)	Nos (One number only)	31915.00
113	34 Nos	Supply and Erection of "V" Cross Arm/Channel cross arm MS Channel 75x40 mm of 1.07Mtrs length and Back clamp with 50x6 mm MS flat of 0.45Mtrs including Bolts & Nuts with washers etc.,	As per APSPDCL specifications & as directed by the Department	717.15 (Rupees seven hundred and seventeen and fifteen paise only)	Nos (One number only)	24383.10
114	6 Nos	Supply and Erection of Channel cross arm MS Channel 100x50 mm of 1.20Mtrs length and Back clamp with 75x8 mm MS flat of 0.45Mtrs including Bolts & Nuts with washers etc.,	As per APSPDCL specifications & as directed by the Department	717.15 (Rupees seven hundred and seventeen and fifteen paise only)	Nos (One number only)	4302.90
115	34 Nos	Supply and Erection of Top cleat with 65x65x6mm MS angle of length 0.5Mtrs and 2 No.s back clamps with 50x6mm MS flat of length 0.45 Mtrs including GI bolts and nuts with washers etc.,	As per APSPDCL specifications & as directed by the Department	339.75 (Rupees three hundred and thirty nine and seventy five paise only)	Nos (One number only)	11551.50
116	102 Nos	Supply and fixing of 11 KV Pin Insulators with 11 KV Pins of weight 760 Gms	As per APSPDCL specifications & as directed by the Department	136.09 (Rupees one hundred and thirty six and nine paise only)	Nos (One number only)	13881.18
117	24 Nos	Supply and fixing of 11 KV C&T Disc Insulators (45KN) with hardware complete	As per APSPDCL specifications & as directed by the Department	345.79 (Rupees three hundred and forty five and seventy nine paise only)	Nos (One number only)	8298.96
118	12 Nos	Supply and Erection of MS Stay set complete as per drawing where ever necessary including excavation of stay pit of size 0.45x0.45x1.34 Mtrs in all soils (except which require blasting) including dewatering, shoring and shuttering wherever necessary and erection of anchor rod and anchor plate in the pit	As per APSPDCL specifications & as directed by the Department	1242.45 (Rupees one thousand two hundred and forty two and forty five only)	Nos (One number only)	14909.40

119	2 Nos	Supply and Erection of Double pole DP structure with 9.10mts PSCC Poles with bracing set with double cross arm of 100x50mm MS Channel 1.80mts cross basing with 50x50x6 mm MS angle 2.70mts length,with special clamps 50x6 mm MS Flat of 0.45 mts length and MS Bolt and Nuts as per Dept.Standard wherever necessary including cost of pit excavation and GI wire coil Earthing	As per APSPDCL specifications & as directed by the Department	37299.06 (Rupees thirty seven thousand two hundred and ninety nine and six paise only)	Nos (One number only)	74598.12
120	58 Nos	Concreting of ploe location for single ploe structure on which DTR erected upto ground level of size 0.5x0.5x1.5 mtrs with 1:3:6 cement concrete mix using 40 mm HBG metal including cost of all materials i.e., cement,sand, HBG metal etc., dewatering,curing the pits before and after concreting.	As per APSPDCL specifications & as directed by the Department	1669.86 (Rupees one thousand six hundred and sixty nine and eighty six paise only)	Nos (One number only)	96851.88
121	3 Nos	Supply, Erection and commissioning of 5 sqm AAA conductor on insulated iron supports etc., complete connecting to supports with pin Binding jumpering, HT AB Switchs HG fuse set neatly and securely as per drawing.	As per APSPDCL specifications & as directed by the Department	32414.64 (Rupees thirty two thousand four hundred and fourteen and sixty four paise only)	Nos (One number only)	97243.91
122	1 Nos	Supply, Erection and commissioning of 3 - phase 500 KVA copper wound DTR as per the specification of total losses not exceeding 615 Watts including mounting arrangements as per the SPDCL standard	As per APSPDCL specifications & as directed by the Department	1153531.75 (Rupees eleven lakhs fifty three thousand five hundred and thirty one and seventy five paise only)	Nos (One number only)	1153531.75
123	2 Nos	Supply and Erection of 11 KV 400 Amps AB Switch Horizontal type as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	12123.76 (Rupees twelve thousand one hundred and twenty three and seenty six paise only)	Nos (One number only)	24247.52

124	2 Nos	Supply and Erection of 11 KV HG Fuse set as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	2683.31 (Rupees two thousand six hundred and eighty three and thirty one paise only)	Nos (One number only)	5366.63
125	2 Nos	Supply and Erection of LT HG Fuse set as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	2291 (Rupees two thousand two hundred and ninety one only)	Nos (One number only)	4582.00
126	6 Nos	Supply and Erection of 80mm dia 6mm thick 2.5 mtrs long CI earth pipe including excavation of pit, earthing with n0.8 GI wire,Supply and refilling the pit with bentonite powder and soil with ratio 1:4 and giving connections etc., as per dept Standards as per drawing enclosed, the neutral earthing is to be done with 7/12 stay wire connected with heavy duty lugs to CI earth pipe and the balance earthing with 4mm GI wire should be done. The two electrodes should be inter connected with 4mm GI wire with heavy duty lugs,Double earthing is to be done for all the equipment as well as structure.	As per APSPDCL specifications & as directed by the Department	6028.50 (Rupees six thousand twenty eight and fifty paise only)	Nos (One number only)	36171.00
127	250 Nos	GI Bolt and Nuts With washers Various sizes	As per APSPDCL specifications & as directed by the Department	112 (Rupees one hundred and twelve only)	Kg (One kilogram only)	28000.00
128	2 Nos	Supply and Erection of Double pole DP structure with 9.10mts PSSC Poles with bracing set with double cross arm of 100x50mm MS Channel 1.80mts cross basing with 75x40 mm MS Channel 1.80mts length,with special clamps 50x6 mm MS Flat of 0.45 mts length and MS Bolt and Nuts as per Dept.Standard wherever necessary including cost of pit excavation and GI wire coil Earthing	As per APSPDCL specifications & as directed by the Department	37299.06 (Rupees thirty seven thousand two hundred and ninety nine and six paise only)	Nos (One number only)	74598.12

129	2 Nos	Supply and Erection of 11 KV 400 Amps AB Switch Horizontal type as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	12123.76 (Rupees twelve thousand one hundred and twenty three and seenty six paise only)	Nos (One number only)	24247.52
130	2 Nos	Supply and Erection of 11 KV HG Fuse set as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	2683.31 (Rupees two thousand six hundred and eighty three and thirty one paise only)	Nos (One number only)	5366.63
131	6 Nos	Supply and Erection of 11 KV 10 KA Metal Oxide Lightning Arresters as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	2367.10 (Rupees two thousand three hundred and sixty seven and ten paise only)	Nos (One number only)	14202.60
132	1 Nos	Supply and Erection of 11 KV HT Trivactor Meter (ELC) as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	5394.60 (Rupees five thousand three hundred and ninety four and sixty paise only)	Nos (One number only)	5394.60
133	1 Nos	Supply and Erection of 11 KV HT Metering set 20/10/5A as per requiriment with Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	47901.36 (Rupees forty seven thousand nine hundred and one and thirty six paise only)	Nos (One number only)	47901.36
134	1 Nos	Supply, Erection and commissioning of HT 3 core 35 sqmm XLPE UG cable 50 mts length including clamping , cleating, iron supports with 2 no's 11 KV Out Door Cable jointing kits with suitable lugs ets.,, complete connecting to HT AB Switchs, HG fuse set neatly and securely as per drawing.	As per APSPDCL specifications & as directed by the Department	137500.62 (Rupees one lakh thirty seven thousand five hundred and sixty two paise only)	Nos (One number only)	137500.62
135	50 Mtr	Supply and connecting of 4x2.50 sqmm copper cable to the HT meter and Cubical etc., complete.	As per APSPDCL specifications & as directed by the Department	112.28 (Rupees one hundred and twelve and twenty eight paise only)	Mtr (One meter only)	5614.10

136	50 Mtr	Supply and connecting of 4x4.0 sqmm Alluminium cable to the HT meter and Cubical etc., complete.	As per APSPDCL specifications & as directed by the Department	55.75 (Rupees fifty five and seven five paise only)	Mtr (One meter only)	2787.68
137	1 Nos	Supply and Erection of Distribution Box for fixing of HT Meter and Trivactor Meter with service connections as per Dept.Standard specifications	As per APSPDCL specifications & as directed by the Department	6588.63 (Rupees six thousand five hundred and eighty eight and sixty three paise only)	Nos (One number only)	6588.63
138	10 Mtr	Supply and fixing of 75 mm dia PVC pipe with fittings for laying of metering wires as per specifications	As per APSPDCL specifications & as directed by the Department	320.23 (Rupees three hundred and twenty and twenty three paise only)	Mtr (One meter only)	3202.30
139	6 Nos	Supply and Erection of 80mm dia 6mm thick 2.5 mtrs long GI earth pipe including excavation of pit, earthing with no.8 GI wire,Supply and refilling the pit with bentonite powder and soil with ratio 1:4 and giving connections etc., as per dept Standards as per drawing enclosed, the neutral earthing is to be done with 7/12 stay wire connected with heavy duty lugs to CI earth pipe and the balance earthing with 4mm GI wire should be done. The two electrodes should be inter connected with 4mm GI wire with heavy duty lugs,Double earthing is to be done for all the equipment as well as structure.	As per APSPDCL specifications & as directed by the Department	6028.50 (Rupees six thousand twenty eight and fifty paise only)	Nos (One number only)	36171.00
140	75 Kg	GI Bolt and Nuts With washers Various sizes	As per APSPDCL specifications & as directed by the Department	112 (Rupees one hundred and twelve only)	Kg (One kilogram only)	8400.00
141	15 Nos	Supply and Erection of 9.1M 280kg WL PSCC poles including pit excavation of size 0.76x0.76x1.66 Mtrs. in all soils (except which requires blasting), transporting and all incidental charges complete	As per APSPDCL specifications & as directed by the Department	5377 (Rupees five thousand three hundred and seventy seven only)	Nos (One number only)	80655.00

142	4 Nos	Supply and Erection of 8.0M 140kg WL PSCC poles (stut) including pit excavation of size 0.6x0.6x1.50 Mtrs. in all soils (except which requires blasting), transporting and all incidental charges complete	As per APSPDCL specifications & as directed by the Department	3191.50 (Rupees three thousand one hundred and ninety one and fifty paise only)	Nos (One number only)	12766.00
143	13 Nos	Supply and Erection of "V" Cross Arm/Channel cross arm MS Channel 75x40 mm of 1.07Mtrs length and Back clamp with 75x8 mm MS flat of 0.45Mtrs including Bolts & Nuts with washers etc.,	As per APSPDCL specifications & as directed by the Department	717.15 (Rupees seven hundred and seventeen and fifteen paise only)	Nos (One number only)	9322.95
144	4 Nos	Supply and Erection of Channel cross arm MS Channel 100x50 mm of 1.20Mtrs length and Back clamp with 75x8 mm MS flat of 0.45Mtrs including Bolts & Nuts with washers etc.,	As per APSPDCL specifications & as directed by the Department	717.15 (Rupees seven hundred and seventeen and fifteen paise only)	Nos (One number only)	2868.60
145	13 Nos	Supply and Erection of Top cleat with 65x65x6mm MS angle of length 0.5Mtrs and 2 No.s back clamps with 50x6mm MS flat of length 0.45 Mtrs including GI bolts and nuts with washers etc.,	As per APSPDCL specifications & as directed by the Department	339.75 (Rupees three hundred and thirty nine and seventy five paise only)	Nos (One number only)	4416.75
146	39 Nos	Supply and fixing of 11 KV Pin Insulators with 11 KV Pins of weight 760 Gms	As per APSPDCL specifications & as directed by the Department	136.09 (Rupees one hundred and thirty six and nine paise only)	Nos (One number only)	5307.51
147	12 Nos	Supply and fixing of 11 KV C&T Disc Insulators (45KN) with hardware complete	As per APSPDCL specifications & as directed by the Department	345.79 (Rupees three hundred and forty five and seventy nine paise only)	Nos (One number only)	4149.48
148	8 Nos	Supply and Erection of MS Stay set complete as per drawing where ever necessary including excavation of stay pit of size 0.45x0.45x1.34 Mtrs in all soils (except which require blasting) including dewatering, shoring and shuttering wherever neessary and erection of anchor rod and anchor plate in the pit	As per APSPDCL specifications & as directed by the Department	1242.45 (Rupees one thousand two hundred and forty two and forty five only)	Nos (One number only)	9939.60

149	1 Nos	Supply and Erection of Double pole DP structure with 9.10mts PSSC Poles with bracing set with double cross arm of 100x50mm MS Channel 1.80mts cross basing with 50x50x6 mm MS angle 2.70mts length,with special clamps 50x6 mm MS Flat of 0.45 mts length and MS Bolt and Nuts as per Dept.Standard wherever necessary including cost of pit excavation and GI wire coil Earthing	As per APSPDCL specifications & as directed by the Department	37299.06 (Rupees thirty seven thousand two hundred and ninety nine and six paise only)	Nos (One number only)	37299.06
150	27 Nos	Concreting of ploe location for single ploe structure on which DTR erected upto groung level of size 0.5x0.5x1.5 mtrs with 1:3:6 cement concrete mix using 40 mm HBG metal including cost of all materials i.e., cement,sand, HBG metal etc., dewatering,curing the pits before and after concreting.	As per APSPDCL specifications & as directed by the Department	1669.86 (Rupees one thousand six hundred and sixty nine and eighty six paise only)	Nos (One number only)	45086.22
151	3.3 Km	Supply, Erection and commissioning of 5 sqm AAA conductor on insulated iron supports etc., complete connecting to supports with pin Binding jumpering, HT AB Switchs HG fuse set neatly and securely as per drawing.	As per APSPDCL specifications & as directed by the Department	32414.64 (Rupees thirty two thousand four hundred and fourteen and sixty four paise only)	KM (One kilo meter only)	106968.30
152	100 Kg	MS Bolt and Nuts Various sizes	As per APSPDCL specifications & as directed by the Department	112 (Rupees one hundred and twelve only)	Kg (One kilogram only)	11200.00
153	1 Nos	Supply and Erection of Double pole DP structure with 9.10mts PSSC Poles with bracing set with double cross arm of 100x50mm MS Channel 1.80mts cross basing with 75x40 mm MS Channel 1.80mts length,with special clamps 50x6 mm MS Flat of 0.45 mts length and MS Bolt and Nuts as per Dept.Standard wherever necessary including cost of pit excavation and GI wire coil Earthing	As per APSPDCL specifications & as directed by the Department	37299.06 (Rupees thirty seven thousand two hundred and ninety nine and six paise only)	Nos (One number only)	37299.06
154	2 Nos	Supply and Erection of 11 KV 400 Amps AB Switch Horizontal type as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	12123.76 (Rupees twelve thousand one hundred and twenty three and seenty six paise only)	Nos (One number only)	24247.52
155	2 Nos	Supply and Erection of 11 KV HG Fuse set as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	2683.31 (Rupees two thousand six hundred and eighty three and thirty one paise only)	Nos (One number only)	5366.63

156	6 Nos	Supply and Erection of 11 KV 10 KA Metal Oxide Lightning Arresters as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	2367.10 (Rupees two thousand three hundred and sixty seven and ten paise only)	Nos (One number only)	14202.60
157	1 Nos	Supply and Erection of 11 KV HT Trivactor Meter (ELC) as per Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	5394.60 (Rupees five thousand three hundred and ninety four and sixty paise only)	Nos (One number only)	5394.60
158	1 Nos	Supply and Erection of 11 KV HT Metering set 20/10/5A as per requirment with Dept.Standard including labour Charges & Transporting etc.,	As per APSPDCL specifications & as directed by the Department	47901.36 (Rupees forty seven thousand nine hundred and one and thirty six paise only)	Nos (One number only)	47901.36
159	1 Nos	Supply, Erection and commissioning of HT 3 core 35 sqmm XLPE UG cable 50 mts length including clamping , cleating, iron supports with 2 no's 11 KV Out Door Cable jointing kits with suitable lugs ets.,, complete connecting to HT AB Switchs, HG fuse set neatly and securely as per drawing.	As per APSPDCL specifications & as directed by the Department	137500.62 (Rupees one lakh thirty seven thousand five hundred and sixty two paise only)	Nos (One number only)	137500.62
160	50 Mtr	Supply and connecting of 4x2.50 sqmm copper cable to the HT meter and Cubical etc., complete.	As per APSPDCL specifications & as directed by the Department	112.28 (Rupees one hundred and twelve and twenty eight paise only)	Mtr (One meter only)	5614.10
161	50 Mtr	Supply and connecting of 4x4.0 sqmm Alluminium cable to the HT meter and Cubical etc., complete.	As per APSPDCL specifications & as directed by the Department	55.75 (Rupees fifty five and seven paise only)	Mtr (One meter only)	2787.68
162	1 Nos	Supply and Erection of Distribution Box for fixing of HT Meter and Trivactor Meter with service connections as per Dept.Standard specifications	As per APSPDCL specifications & as directed by the Department	6588.63 (Rupees six thousand five hundred and eighty eight and sixty three paise only)	Nos (One number only)	6588.63
163	10 Mtr	Supply and fixing of 75 mm dia PVC pipe with fittings for laying of metering wires as per specifications	As per APSPDCL specifications & as directed by the Department	320.23 (Rupees three hundred and twenty and twenty three paise only)	Mtr (One meter only)	3202.30

164	1 Nos	Supply and fixing of security fencing to around the HT Metering structural yard including caot of MS angle 65x65x6 mm size,weld mesh 2x2 size including cost of labour charges for fabrication, cutting and drilling of holes etc., complete for finished item of work as per specification	As per APSPDCL specifications & as directed by the Department	51765.35 (Rupees fifty one thousand seven hundred and sixty five and thirty five paise only)	Nos (One number only)	51765.35
165	6 Nos	Supply and Erection of 80mm dia 6mm thick 2.5 mtrs long GI earth pipe including excavation of pit, earthing with no.8 GI wire,Supply and refilling the pit with bentonite powder and soil with ratio 1:4 and giving connections etc., as per dept Standards as per drawing enclosed, the neutral earthing is to be done with 7/12 stay wire connected with heavy duty lugs to CI earth pipe and the balance earthing with 4mm GI wire should be done. The two electrodes should be inter connected with 4mm GI wire with heavy duty lugs,Double earthing is to be done for all the equipment as well as structure.	As per APSPDCL specifications & as directed by the Department	6028.50 (Rupees six thousand twenty eight and fifty paise only)	Nos (One number only)	36171.00
166	1 Kg	Supply,erection and commissioining of 3-phase 100 KVA copper wound DTR as per the specifications of total losses not exceeding 615 Watts including mounting arrangements as per the SPDCL standard.	As per APSPDCL specifications & as directed by the Department	170078.34 (Rupees one lakh seventy thousand seventy eight and thirty four paise only)	Kg (One kilogram only)	170078.34
167	410 Mtr	Providing of Cable duct over Hoist Bridge with MS Sheet 16 SWG for making 300x200 mm path with top cover with MS Angle 25x3 mm where ever necessary with welding and Bolt & Nuts etc., complete for finished item of work.	As per APSPDCL specifications & as directed by the Department	1794.90 (Rupees one thousand seven hundred and ninety four and ninety paise only)	Mtr (One meter only)	735909.00
168	1 Nos	Fabrication and supply and commissioning of 20.0 HP Spillway gate motors control pannel with CRCA sheet of 16 SWG duly painted with two coats generally as per Drawing comprising of following	As per APSPDCL specifications & as directed by the Department	54307 (Rupees fifty four thousand three hundred and seven only)	Nos (One number only)	54307.00
169	4 Nos	MCCB 63 Amps 440 Volts,3 phase	As per APSPDCL specifications & as directed by the Department	5800 (Rupees five thousand eight hundred only)	Nos (One number only)	23200.00

170	24 Nos	DOL Starter 20.0 HP forward and reverse complete	As per APSPDCL specifications & as directed by the Department	20962.50 (Rupees twenty thousand nine hundred and sixty two and fifty paise only)	Nos (One number only)	503100.00
171	24 Nos	Single Phase Preventer	As per APSPDCL specifications & as directed by the Department	2256.25 (Rupees two thousand two hundred and fifty six and twenty five paise only)	Nos (One number only)	54150.00
172	24 Nos	Power Capacitor 5 KVAR 3 Phase , 440 Volts	As per APSPDCL specifications & as directed by the Department	12487.50 (Rupees twelve thousand four hundred and eighty seven and fifty paise only)	Nos (One number only)	299700.00
173	24 Nos	MCCB 25 Amps 440 Volts,3 phase	As per APSPDCL specifications & as directed by the Department	3712.50 (Rupees three thousand seven hundred and twelve and fifty paise only)	Nos (One number only)	89100.00
174	1 Nos	Volt meter 0-600 V with selector switch	As per APSPDCL specifications & as directed by the Department	4453.20 (Rupees four thousand four hundred and fifty three and twenty paise only)	Nos (One number only)	4453.20
175	1 Nos	Ammeter 0-50A with CTS 5/50A with selector switch	As per APSPDCL specifications & as directed by the Department	4707 (Rupees four thousand seven hundred and seven only)	Nos (One number only)	4707.00
176	3 Nos	RYB Indication Lamps	As per APSPDCL specifications & as directed by the Department	487.25 (Rupees four hundred and eighty seven and twenty five only)	Nos (One number only)	1461.75
177	1	Connectors and others etc.,	As per APSPDCL specifications & as directed by the Department	17500 (Rupees seventeen thousand five hundred only)	LS	17500.00

178	1 Nos	Fabrication and supply of weather proof and vermin proof outdoor floor mounting LT Distribution control Pannel with 16 SWG CRCA sheet generally as per drawing of following with LT copper 50x12mm Bus Bar 3 phase +(50x6mm) 1 neutral to feed	As per APSPDCL specifications & as directed by the Department	144273 (Rupees one lakh forty four thousand two hundred and seventy three only)	Nos (One number only)	144273.00
179	1 Nos	MCCB 400 Amps 440 Volts	As per APSPDCL specifications & as directed by the Department	28112.50 (Rupees twenty eight thousand one hundred and twelve and fifty paise only)	Nos (One number only)	28112.50
180	1 Nos	MCCB 400 Amps 440 Volts for DG set	As per APSPDCL specifications & as directed by the Department	20150 (Rupees twenty thousand one hundred and fifty only)	Nos (One number only)	20150.00
181	1 Nos	Change Over Switch 4 Pole,400 Amps 440 Volts	As per APSPDCL specifications & as directed by the Department	41462.50 (Rupees forty one thousand four hundred and sixty two and fifty paise only)	Nos (One number only)	41462.50
182	1 Nos	Volt meter 0-600 V with selector switch	As per APSPDCL specifications & as directed by the Department	4453.20 (Rupees four thousand four hundred and fifty three and twenty paise only)	Nos (One number only)	4453.20
183	1 Nos	Ammeter 0-400A with CTS0-400A with selector switch	As per APSPDCL specifications & as directed by the Department	4707 (Rupees four thousand seven hundred and seven only)	Nos (One number only)	4707.00
184	3 Nos	RYB Indication Lamps	As per APSPDCL specifications & as directed by the Department	487 (Rupees four hundred and eighty seven only)	Nos (One number only)	1461.00
185	1 Nos	Connectors and others etc.,	As per APSPDCL specifications & as directed by the Department	8587 (Rupees eight thousand five hundred and eighty seven only)	LS	8587.00

186	10 Nos	Supply and Erection of 80mm dia 6mm thick 2.5 mtrs long GI earth pipe including excavation of pit, earthing with no.8 GI wire,Supply and refilling the pit with bentonite powder and soil with ratio 1:4 and giving connections etc., as per dept Standards as per drawing enclosed, the neutral earthing is to be done with 7/12 stay wire connected with heavy duty lugs to CI earth pipe and the balance earthing with 4mm GI wire should be done. The two electrodes should be inter connected with 4mm GI wire with heavy duty lugs,Double earthing is to be done for all the equipment as well as structure.	As per APSPDCL specifications & as directed by the Department	6028.50 (Rupees six thousand twenty eight and fifty paise only)	Nos (One number only)	60285.00
187	2000 Kg	Supply and Laying of 50x6mm GI Flat for Earthing of all connected equipment including earth work excavation jointing and welding etc., complete from Transformer to last spillway gates.	As per APSPDCL specifications & as directed by the Department	118 (Rupees one hundred and eighteen only)	Kg (One kilogram only)	236000.00
188	1000 Mtr	Run off earth lead with GI wire SWG No.8 for all gate motors and all pannel boards two sides	As per APSPDCL specifications & as directed by the Department	86.72 (Rupees eighty six and seventy two paise only)	Mtr (One meter only)	86722.50
189	40 Kg	Copper Flat 25x3mm size for lightning electrodes upto pits for 2 no's 60m/40 kgs	As per APSPDCL specifications & as directed by the Department	885.36 (Rupees eight hundred and eighty five and thirty six paise only)	Kg (One kilogram only)	35414.40
190	100 Mtr	Supply ,Laying and Termination of 300 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable tworuns 500 KVA Dist Transformer yard to pannel board at Transformer	As per APSPDCL specifications & as directed by the Department	1599 (Rupees one thousand five hundred and ninety nine only)	Mtr (One meter only)	159900.00
191	500	Supply ,Laying and Termination and connecting of 300 sqmm PVC Armoured 3½ Core Aluminium under ground cable two runs from pannel board at Transformer yard to main pannel board and termination of cables and commissioining	As per APSPDCL specifications & as directed by the Department	1599 (Rupees one thousand five hundred and ninety nine only)	Mtr (One meter only)	799500.00
192	450 Mtr	Supply ,Laying and Termination of 150 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable from main control pannel to sub distribution pannel no 4	As per APSPDCL specifications & as directed by the Department	1066.40 (Rupees one thousand sixty six and forty paise only)	Mtr (One meter only)	479880.00
193	330 Mtr	Supply ,Laying and Termination of 150 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable from main control pannel to sub distribution pannel no 3	As per APSPDCL specifications & as directed by the Department	1066.40 (Rupees one thousand sixty six and forty paise only)	Mtr (One meter only)	351912.00

194	220 Mtr	Supply ,Laying and Termination of 150 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable from main control pannel to sub distribution pannel no 2	As per APSPDCL specifications & as directed by the Department	1066.40 (Rupees one thousand sixty six and forty paise only)	Mtr (One meter only)	234608.00
195	140 Mtr	Supply ,Laying and Termination of 150 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable from main control pannel to sub distribution pannel no 1	As per APSPDCL specifications & as directed by the Department	1066.40 (Rupees one thousand sixty six and forty paise only)	Mtr (One meter only)	149296.00
196	100 Mtr	Supply ,Laying and Termination of 70 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable from main control pannel to Scour Sluice gates sub distribution pannel.	As per APSPDCL specifications & as directed by the Department	660.70 (Rupees six hundred and sixty and seventy paise only)	Mtr (One meter only)	66070.00
197	6840 Mtr	a) For Spillway gates of each 400 m x 20 with connection (distance 10 m each).	As per APSPDCL specifications & as directed by the Department	392.52 (Rupees three hundred and ninety two and fifty two paise only)	Mtr (One meter only)	2684836.80
198	1000 Mtr	Supply ,Laying and Termination of 70 sqmm PVC Armoured 3 ½ Core Aluminium under ground cable for street lights arrangements from main control pannel	As per APSPDCL specifications & as directed by the Department	660.70 (Rupees six hundred and sixty and seventy paise only)	Mtr (One meter only)	660700.00
199	500 Mtr	Supply, Laying of PVC Armoured under ground cable 2 core 4 sqmm size for connecting street lights	As per APSPDCL specifications & as directed by the Department	239.72 (Rupees two hundred and thirty nine and seventy two paise only)	Mtr (One meter only)	119860.00
200	1 Nos	Fabrication and supply of weather proof and vermin proof outdoor floor mounting LT Distribution control Pannel with 16 SWG CRCA sheet generally as per drawing of following with LT copper 50x12mm Bus Bar 3 phase + 1 neutral to feed 400 Amps	As per APSPDCL specifications & as directed by the Department	144273 (Rupees one lakh forty four thousand two hundred and seventy three only)	Nos (One numer only)	144273.00
201	1 Nos	MCCB 400 Amps 440 Volts, 3 phase	As per APSPDCL specifications & as directed by the Department	28112.50 (Rupees twenty eight thousand one hundred and twelve and fifty paise only)	Nos (One numer only)	28112.50
202	1 Nos	MCCB 200 Amps 440 Volts, 3 phase	As per APSPDCL specifications & as directed by the Department	20150 (Rupees twenty thousand one hundred and fifty only)	Nos (One numer only)	20150.00

203	1 Nos	MCCB 100 Amps 440 Volts, 3 phase	As per APSPDCL specifications & as directed by the Department	14737.50 (Rupees fourteen thousand seven hundred and thirty seven and fifty paise only)	Nos (One numer only)	14737.50
204	15 Nos	Street Lights	As per APSPDCL specifications & as directed by the Department	11962.50 (Rupees eleven thousand nine hundred and sixty two and fifty paise only)	Nos (One numer only)	179437.50
205	1 Nos	MCCB 63 Amps 440 Volts, 3 phase	As per APSPDCL specifications & as directed by the Department	5800 (Rupees five thousand eight hundred only)	Nos (One numer only)	5800.00
206	1 Nos	Volt meter 0-600 V with selector switch	As per APSPDCL specifications & as directed by the Department	4453.20 (Rupees four thousand four hundred and fifty three and twenty paise only)	Nos (One numer only)	4453.20
207	1 Nos	Ammeter 0-400A with CTS0-400A with selector switch	As per APSPDCL specifications & as directed by the Department	4707 (Rupees four thousand seven hundred and seven only)	Nos (One numer only)	4707.00
208	3 Nos	RYB Indication Lamps	As per APSPDCL specifications & as directed by the Department	487.25 (Rupees four hundred and eighty seven and twenty five only)	Nos (One numer only)	1461.75
209	1	Connectors and others etc.,	As per APSPDCL specifications & as directed by the Department	8587 (Rupees eight thousand five hundred and eighty seven only)	Nos (One number only)	8587.00

210	80 Nos	Supply and fixing commissioning of sodium vapour Lamps SNF - 14/250W fitting with Bulb,including wiring with 2.5 sqmm twin core multi standard copper wire JB with 16 Amps, Fuse unit etc., complete	As per APSPDCL specifications & as directed by the Department	12887.40 (Rupees twelve thousand eight hundred and eighty seven and forty paise only)	Nos (One number only)	1030992.00
211	4 Nos	Supply and fixing commissioning of sodium vapour Lamps HVF - 12/400W fitting with Bulb,including wiring with 2.5 sqmm twin core multi standard copper wire JB with 15 Amps, Fuse unit etc., complete	As per APSPDCL specifications & as directed by the Department	11425 (Rupees eleven thousand four hundred and twenty five only)	Nos (One number only)	45700.00
212	100 Nos	Supply and fixing commissioning of High pressured Mercury vapour Lamps HPC - 11/125W fitting with Bulb,including wiring with 2.5 sqmm twin core multi standard copper wire JB with 15 Amps, Fuse unit from junction Box at right side and Left Side earthend banks at 30 m etc., complete	As per APSPDCL specifications & as directed by the Department	2750 (Rupees two thousand seven hundred and fifty only)	Nos (One number only)	275000.00
213	200 Nos	Supply and fixing of street light Brackets arms with GI pipe B class 40mm dis 1.5m long etc., complete	As per APSPDCL specifications & as directed by the Department	1856.25 (Rupees one thousand eight hundred and fifty six and twenty five paise only)	Nos (One number only)	371250.00
214	1 Nos	Supply and Installation of Pannels in enclosed box with required meters control switches etc., including all taxes for lighting systems a) For Sub Distribution Pannel	As per APSPDCL specifications & as directed by the Department	61966.40 (Rupees sixty one thousand nine hundred and sixty six and forty paise only)	Nos (One number only)	61966.00
215	1 Nos	Supply and Installation of Pannels in enclosed box with required meters control switches etc., including all taxes for lighting systems b) Local Distribution Pannel	As per APSPDCL specifications & as directed by the Department	19362.50 (Rupees nineteen thousand three hundred and sixty two and fifty paise only)	Nos (One number only)	19362.50
216	50 Nos	Supply and Laying of PVC armoured under ground Alluminium 31/3/4 core cable from main distribution pannel including all taxes	As per APSPDCL specifications & as directed by the Department	203.62 (Rupees two hundred and three and sixty two paise only)	Nos (One number only)	10181.00

217	50 Nos	Supply and Fixing of Power sockets including taxes a) For Gantry Crane Operation	As per APSPDCL specifications & as directed by the Department	1386.90 (Rupees one thousand three hundred and eighty six and ninety paise only)	Nos (One number only)	69345.00
218	6 Nos	Supply and Fixing of Power sockets including taxes b) Welding Purpose	As per APSPDCL specifications & as directed by the Department	1750 (Rupees one thousand seven hundred and fifty only)	Nos (One number only)	10500.00
219	230 Nos	Fabrication , Supply and Erection and Commissioning of steeped round pipe poles 165 mm dia x 8 mtrs length	As per APSPDCL specifications & as directed by the Department	16323 (Rupees sixteen thousand three hundred and twenty three only)	Nos (One number only)	3754290.00
220	1 No	Estt & general Charges @ 10 % +T & P Charges @1 % + Contengencies @ 3%+ Storage and handling Charges @ 3 % +Supervision Charges @ 10 %	As per APSPDCL specifications & as directed by the Department	4670883 (Rupees Forty Six Lakhs Sevety Thousand Eigh Hundred and Eighty Three only))	Nos (One number only)	4670883.00

Electrification**21970449****Grand Total****2079515493**

SCHEDULE –A (PART-II)

Name of work:Construction of a new reservoir across Kundu river to a capacity of 0.80 TMC near Joladarasi (V) of Koilkuntla (M) of Kurnool (Dt)

1. Provision towards GST	: Rs. 25,35,13,787/-
2. Provision towards NAC @ 0.10%	: Rs. 21,12,615/-
3. Provision towards Seigniorage Charges	: Rs.10,78,07,518/-
4. Provision towards Labour Cess	: Rs 2,07,95,155/-
Total:	: Rs. 38,23,62,160/-

NOTE:

i. The rates mentioned in Bill of Quantities (Part-I of Schedule-A) are including Overhead charges & Contractors profit, but excluding Seigniorage charges & GST charges. The items covered under contract profit & overhead charges are as per the APDSS/MORD/MoRT&H standard data book for analysis of rates.

ii. GST Charges: The bid price quoted by the contractor is exclusive of GST and shall be paid to the contractor while making payment from the Part-II of Schedule-A. The contractor is liable to discharge their tax liability fully as per the provision of GST Act while filing their returns. The GST will be applied as per G.O. Ms. No.58, Finance (WR.I) Department, Dated:08.05.2018 and as per Government rules varies from time to time. The contractor shall file GST returns from time to time and produce proof to the Department in so far as the contract scope is concerned, and the reimbursement of GST will be made accordingly. Any input tax benefit or subsidy shall be accrued to the Government only

iii.Labour welfare CESS: : It is the liability of the Contractor to pay the Labour cess as per Government Rules/norms from time to time. The Government Water Resource Department is no way liable for the same in any contingency. .

iv.Seigniorage charges: The estimate Unit Rates of various items are exclusive of Seigniorage charges. A lump sum provision of Seigniorage charges is provided in Part-II of Schedule-A as per G.O.Ms.No.83, Water Resources (Reforms) Department, Dated:5.8.2015. The Seigniorage charges rates will be effected for the material used on the work vide G.O.Ms.No.11, Industries and Commerce (M.II) Department, Dated:11.02.2020 or as modified by the Government from time to time are recovered on all materials and ordinary earth used in the work from the bills on the quantities measured. The Seigniorage charges recovered from the Agency will be reimbursed after providing of evidence of payment of Seigniorage charges.

v.National Academy Construction: The Bid price quoted by the Contractor is exclusive of NAC and shall be recovered at the rate 0.1% on the cost of construction in each bill of the contractor and reimbursed within provisions made in the Schedule-A, Part II.

vi. Income Tax: During the currency of the contract deduction of income tax at Prevailing rate shall be made from the gross value of each bill of the contract as per Income tax Act, 1961 shall be followed. The Income tax will be recovered from gross value of the work bill of contractor as amended by the Government from time to time.

vii. As the overhead charges include engaging technical persons by the contractor, no reimbursement for these will be made separately.

viii. If the contractor fails to employ technical persons, the work will be suspended or department will engage technical persons and recover the cost thereof from the contractor as indicated in the document.

SCHEDULE - 'B'**LIST OF DRAWINGS**

The drawings enclosed to the tender documents shall be used as a reference only

(Drawings are appended separately)

As referred to in the specifications including the preliminary specification of the Andhra Pradesh Standard specifications.

- 1) The plans enclosed with the tender are liable to be altered during execution of work as per necessity of site conditions. The total contract value furnished by the contractor for the work shall hold good for execution of work the even with altered plans.
- 2) One set of drawings, on the basis of which actual execution of the work is to proceed shall be furnished free of cost to the contractor by the Superintending Engineer/Executive Engineer progressively according to the work programme submitted by the contractor and accepted by the Superintending Engineer/Executive Engineer, Drawings for any particular activity shall be issued to the contractor at least 30 days in advance of the scheduled date of the start of the activity. However, no extra claims by the contractor towards any delay in issue of the drawings or issue of any revision/change to the drawings issued earlier shall be admissible. The Superintending Engineer shall intimate the contractor **7 days** in advance regarding any delay in issue of drawings, for any particular stage of works. If work gets effected due to the delay to issue of drawings, the contractor shall be granted extension of time in terms of condition 14.7 of tender notice.
- 3) Signed drawings above shall not be deemed to be an order for work unless they are entered in the agreement or schedule of drawings under proper attestation of the contractor and Executive Engineer or unless they have been sent to the contractor by the Executive Engineer with a covering letter confirming that the drawings is an authority for work in the contract.

DISCREPANCIES:

- a) In case of discrepancies between documents the following order of procedure shall apply.
 - i) Between the written description of written dimensions in the drawings and the corresponding one in the specifications, the latter shall apply.
 - ii) Figured dimensions shall supersede scaled dimensions. The drawing on a larger scale shall take precedence over those a smaller scale.

Tenderer

Superintending Engineer

- iii) Drawings issued as construction drawings from time to time shall supersede the tender drawings and also the corresponding drawings previously issued.

Note: The contractor should not execute any component of work without obtaining the working drawings. Any work done without drawings shall be at the contracts responsibility only. Acceptance of such work will be at the discretion of the Executive Engineer.

SECURITY CLAUSE:

The drawings and specifications made available to the tender shall exclusively be used on the work and they are retained from passing in on each plan to any unauthorized hand either in parts or in full under the provisions of section-3 and 5 of the official secrets act 1923. Any violation in this regard will entail suitable action under appropriate clause or official secret act 1923

SCHEDULE-C

TECHNICAL SPECIFICATIONS

S.No.	ITEM
1	GENERAL SPECIFICATIONS
2	SURVEYING, SETTING OUT WORKS & DESIGNING
3	CLEARING OF SITE
4	EXCAVATION FOR DAMS AND ANCILLIARY STRUCTURES
5	STEEL REINFORCEMENT
6	CONCRETE
7	RADIAL GATES
8	STOPLOG GATES
9	PERMANENT ELECTRIFICATION
10	PAINTING
11	EMBANKMENT CONSTRUCTION & SLOPE PROTECTION
12	INSTRUMENTATION
13	MASONRY
14	POINTING & PLASTERING

SECTION-1
GENERAL SPECIFICATIONS

Section – 1

GENERAL SPECIFICATIONS

Sl.No.	Para	Contents
1	1.1	General
2	1.2	Test standards for Materials and Quality of works
3	1.3	Reference Marks and Bench Marks
4	1.4	Setting out works
5	1.5	Power supply
6	1.6	Water supply
7.	1.7	Watching and Lighting
8.	1.8	Construction plant
9	1.9	Clearing up during progress and delivery
10	1.10	Scaffolding
11	1.11	Scope of rates quoted in bill of quantities
12	1.12	Protection of adjoining and existing premises
13	1.13	Approach Roads and Roads in work area
14	1.14	Seigniorage charges

SECTIONS – 1

GENERAL SPECIFICATIONS

1.1 General

- (a) These Technical specifications, shall apply to all works as are required to be executed under the contract or otherwise directed by the Engineer in Charge, in every case the work shall be carried out to the satisfaction of the Engineer in Charge and conform to the location, lines, grades and cross sections shown on the drawings or as indicated by the Engineer in Charge, The quality of work and materials, shall comply with the requirements set forth in this and succeeding sections. Where the drawings and specifications describe a portion of the work in only general terms, and not in complete detail, it shall be understood that only the best general practice is to prevail, materials and workmanship of the best quality are to be employed and the instructions of the Engineer in Charge, are to be fully complied with.
- (b) The works like Employee, Employer, Contract, Employer's representative, Tenderer's representative, Engineer in Charge, Drawings, Government, Works, site etc. Used in these specifications shall be considered to have the meaning as understood from the definitions of these terms included in sections 3 conditions of the Contract.

The Tenderer shall carryout the works in accordance with the specifications laid down in this section together with the detailed specifications stipulated under succeeding sections, Andhra Pradesh Standard Specification, relevant codes with all amendments published up to the date of tendering and the departmental manual for quality control.

1.2 Test Standards for Materials and Quality of works

The relevant standards for materials, as well as for testing procedures, indicated in this section together with detailed specifications indicated at appropriate places in the succeeding sections shall apply.

If any special material not covered here, is required to be used, it shall conform to relevant Indian Standards, if there are any, or to the requirements specified by the Engineer in Charge, or any special provisions.

Quality: All materials and workmanship shall be of the respective kinds described in the contract and in accordance with the Engineer in Charge's instructions and shall be subjected from time to time to such tests as the Engineer in Charge may direct at the place of manufacture of fabrication or on the site or at such other place or places as may be specified in the contract or at all or any of the instruments, equipments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the works for testing as may be selected and required by the Engineer in Charge.

Tenderer

Superintending Engineer

Tests, inspection, rejection of defective material and work: The Tenderer shall without extra cost provide samples and cooperate in the testing of materials and inspection of the works. The Engineer in Charge shall have access at all times to the places of storage and where material are being manufactured and processed for use in the works under the contract to determine whether their manufacture and process are proceeding in accordance with the drawings and specifications.

The Engineer in Charge shall during the progress of the works have power to order in writing from time to time.

- a) The removal from the site, within such time or time as may be specified in the order, of any materials which, in the opinion of the Engineer in Charge, are not in accordance with the contract.
- b) The substitution of proper and suitable materials and
- c) The removal and proper re-execution, notwithstanding any previous test thereof or interim payment thereof, of any work which in respect of materials or workmanship is not in the opinion of the Engineer in Charge, in accordance with the contract.

The Tenderer shall carryout such order at no extra cost to the employer; in case of default on the part of the Tenderer in carrying out such order, the employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Tenderer by the employer or may be deducted by the employer from any monies due to or which may become due to the Tenderer.

In lieu of removing the work or material which are not in accordance with the contract, the Engineer in Charge, may allow such work or materials to remain, and in that case such work may be paid at the reduced rates as may be decided.

1.3 Reference Marks and Bench Marks

- i) The basic center lines, reference points and bench marks will be fixed by the Department.
- ii) Additional reference lines and bench marks as may be necessary. The Tenderer shall remain responsible for the sufficiency and accuracy of all his bench marks and reference lines. He shall take precautions to see that the lines, points and bench marks fixed by the Department are not disturbed by his work and shall make good any such damage.

1.4 Setting out works

The Tenderer shall be responsible for the correct setting out of all works at his cost. The Tenderer shall execute the work true to alignment, grade and levels as shown in the drawings and as directed by the Engineer in Charge, and shall check these at frequent intervals. The Tenderer shall provide all facilities like labour and instruments, and shall cooperate with the departmental officers to check all alignments, grades, levels and dimensions; such checking shall not absolve the Tenderer of his own responsibility o maintaining the accuracy of the work.

Tenderer

Superintending Engineer

1.5 Power Supply

- i) For construction power and power for colonies, the Tenderer will be permitted to draw power from the transformer to be erected near dam site.
- ii) He has to lay all internal lines from the transformer at his own cost and he should bear the cost of power consumption as per bills of electricity authority.
- iii) If the available capacity is insufficient to meet the Tenderer's requirement, the Tenderer has to make his own arrangements for alternatives for power supply, including deposits to electricity authority.
- iv) The Tenderer shall satisfy all the conditions of rules required as per Indian Electricity Act 1910 and under rule 45 (i) of the Indian Electricity rules 1956 as amended from time to time and other pertinent rules.
- v) The power shall be used for bonafide departmental works only.
- vi) The Tenderer shall take all precautions to ensure safety to the workers. The department will not take any responsibility for any accidents that may occur on the Tenderer's installations.
- vii) The Tenderer shall take action to rectify the defects in any in the installations pointed out by the departmental Engineer in Charges in a reasonable time.
- viii) The following particulars should be furnished in quadruplicate by the Tenderer to the employer before the power is released to the equipment.
 - a) A schematic diagram of the installation from the point of commencement of supply to the points of utilization showing therein the various electrical equipment, switch gear, cables with their sizes etc.,
 - b) Transformer sub station's drawings.
 - c) Layout plan indicating therein the position of motors and other electrical equipment, their switch gear and earthing arrangements. The Tenderer shall give the particulars of his power load, if so desired by the Engineer in Charge and he shall make necessary arrangements for the Engineer in Charge and he shall make necessary arrangements for the Engineer in Charge to check these loads of diesel power proposed to be engaged by the Tenderer out of this total power requirement shall be furnished by the Tenderer.
- ix) The department is not responsible for any sort of power failures and power break down etc. And no compensation of any kind will be paid by the department on account of such failures and no extension of time will be granted under such reasons.

1.6 Water Supply

Tenderer

Superintending Engineer

It is the responsibility of the Tenderer to make own arrangements for water supply for work and labour and drainage from the work site, at his own cost. But the Tenderer has to lay pumping line from water source to work site and colony at his own cost. The pumps have to be installed by him at his own cost and pumping charges will be borne by him. The distribution system, measures for purification of water, shall be the responsibility of the Tenderer and shall be in accordance with rules and regulations of the Public Health Department. No compensation will be allowed to the Tenderer on this account.

1.7 Watching and Lighting

The Tenderer shall in connection with the works provide and maintain at his own cost all lights, guards, fencing and watching when and wherever necessary or required by the Engineer in Charge, or Engineer in Charge's Representative, or by any duly constituted authority for the protection of the work, or for the safety and convenience of the public or others.

1.8 Construction Plant

The Tenderer shall provide and install all necessary construction tools and plant, equipment, machinery and shall use such methods and appliances for the performance of all the operations connected with the work embraced under the contract as will secure a satisfactory quality of work and rate of progress which will ensure the completion of the work within the time specified.

1.9 Clearing up during Progress and Delivery

All rubbish shall be cleared and put in a thoroughly complete, clean, sound and workman like state to the satisfaction of the Engineer in Charge before the work is finally handed over. All rubbish and surplus materials not required shall be removed by the Tenderer. The Tenderer is responsible for its maintenance until it is taken over by the Department.

1.10 Scaffolding

All requisite scaffolding shall be provided at the Tenderer's expense and shall be double i.e. it must have two sets of upright supports. Care shall be taken to ensure the safety of the work people and the Tenderer must comply with such instructions as the Engineer in Charge may issue to ensure such safety. The Tenderer will be entirely responsible for any damage or injuries to persons or property resulting from ill-erected scaffolding, defective ladders, or otherwise arising of his fault in this respect.

1.11 Scope of rates quoted in bill of quantities

The Contract unit rates or Bid Price in Bill of Quantities for different items of the work shall be payment in full for completing the work as per the drawings and to the requirements of the specifications including full compensation for all the operation detailed in the relevant sections under measurement and payment. The rates of the Bid are to be considered as the full inclusive rate for finished work covering all labour materials, transport, wastage, temporary work, plant, over head charges, and toll fee, seigniorage charges, all kinds of taxes, octroi and expenses imposed by out side authority such as local body as well as the general liabilities, obligations and risks arising out of the General Conditions of the Contract.

Tenderer

Superintending Engineer

1.12 Protection of Adjoining and Existing premises

The Tenderer shall protect the whole of the adjoining and existing premises, and all works and all fittings to all buildings and adjoining the site against structural and decorative damages caused by the Execution of these works and make good in all respects all such damage done or occurring to the same, and leave such reinstatement in perfect order. He is also to make good any damage done in the execution of the work, the existing public or private property, foot ways and road ways, other over head power lines or Telecommunication lines.

1.13 Approach Roads and Roads in Work Area

- a) The roads inside the work area required by the Tenderer to convey huge machinery and all materials to dam site shall be constructed and maintained by him at his own cost. The layout, design, construction and maintenance etc. Of the road shall be subject to the approval of the Engineer in Charge.
- b) The Tenderer shall without charge permit the government and such other Tenderer and other workmen to use the access facilities including roads, any other facilities constructed and acquired by the Tenderer for use in the performance of the works.
- c) The Tenderer's heavy construction traffic or tracked equipment shall not traverse any public roads or bridges unless the Tenderer has made arrangements with the authorities concerned and the approval of the Engineer in Charge to such arrangements has been obtained. In case Tenderer's heavy construction traffic or tracked equipment is not allowed to traverse any public roads or bridges and the Tenderer is required to make some alternative arrangements, no claim on this account shall be entertained.

1.14 Seigniorage Charges

Seigniorage fee shall be recovered from the bills of the Tenderer on the work done and measured with reference to the quantities used in the works as per the theoretical requirements, at the rates prescribed by Government of Andhra Pradesh as per A.P Minor Mineral Concession Rules – 1966 and subject to amendments issued from time to time by the Government.

The Tenderer is liable to pay seigniorage fee to the Mines and Geology Department at the following rates for the material used on the work Vide G.O.Ms.No.331 Date:21.06.2000 and G.O.Ms.No.466 Date 24.08.2002 and . G.O.Ms. No.11, Industries and Commerce (M.II) Department, Dated:11.02.2020 as amended by the Government from time to time.

SL. No.	Name of Mineral	Rate of seigniorage fee	
1	Building Stone	Rs.90/- per cubic metre	
2	Rough Stone	Rs.90/- per cubic metre	
3	Road Metal	Rs.90/- per cubic metre	
4	Lime Kankar/Lime stone	Rs 90/- per MT	
5	Lime Shell	Rs.120/-Per MT	
6	Marble	Rs.300/- per cubic metre	
7	Mosaic Chips	Rs.90/- per MT	

Tenderer

Superintending Engineer

8	Morram/gravel/ordinary earth	Rs.45/- per cubic metre	
9	Ordinary sand useful for civil construction	Rs.100/- per cubic metre	
10	Boulders	Rs.90/- per cubic metre	
11	Shingle	Rs.90/- per cubic metre	
12	Chalcedony	Rs.90/- per MT	
13	Fullers Earth Bentonite	Rs.180/-per MT	
14	Shale/Slate	Rs.180/175/-per MT	
15	Rehmatti	Rs.35/- per cubic metre	
16	Lime stone slabs i) Colour ii) Black	Rs.10/- per sq.mt. or Rs120/ per MT whichever is high all colours other than black) Rs,10/- per sq.mt or Rs.110/- per MT whichever is higher	

- Note: 1. The above rates are liable to be revised and amended from time to time by the State Government by notification in the AP Gazette.
2. In case of revision the revised rates as fixed by the mineral and geology have to be adopted.

SECTION-2
SERVEYING, SETTING-OUT WORK & DESIGNS

SECTION-2**SERVEYING, SETTING-OUT WORK & DESIGNS****List of Contents**

Para	Contents
2.1	EXISTING SURVEY CONTROL POINTS
2.2	OBLIGATIONS OF THE TENDERER
2.2.1	General
2.2.2	Bench Marks and Triangulation Stations
2.2.3	Accuracy of Surveying
2.2.4	Auxiliary Works
2.2.5	Damage to Crops and Vegetation
2.3	CHECKING OF TENDERER'S WORK BY THE ENGINEER IN CHARGE
2.3.1	Regular Checking
2.3.2	Confirmation Survey of the Tunnel Alignment
2.4	MEASUREMENT AND PAYMENT
2.4.1	Survey Work Performed by the Tenderer
2.4.2	Temporary Suspension of Works in Underground
2.5	DESIGNS
2.5.1	Measurement and payment for designs

SECTION-2

SERVEYING, SETTING-OUT WORK & DESIGNS

2.1 EXISTING SURVEY CONTROL POINTS

- (1) Basic survey network consisting of fixed triangulation polygon points and benchmarks existing in the project area, any surveys carried out by the Survey of India, will be at the Tenderer's disposal to serve as a base for the setting-out and checking work.
- (2) Prior to commencing any construction work, the Tenderer shall undertake survey for the purpose of checking these reference data and in order to satisfy himself as to their accuracy. Should he have any objections to these data and the relevant drawings, he shall inform the Engineer in Charge in writing within two (2) weeks of receiving them from the Engineer in Charge.

2.2 OBLIGATIONS OF THE TENDERER

2.2.1 General

- (1) The Tenderer shall perform all calculations, surveys and setting-out necessary to establish the accurate location of the structures as shown on the Construction Drawings and shall carry out all necessary surveys to verify the topographical data used by the Engineer in Charge for the project design and measuring purposes.
- (2) Within 28 days from the date of issue of Notification of Award, the Tenderer shall submit his proposed survey plan to the Engineer in Charge. The proposed plan shall indicate the order of accuracy for all surveys.
- (3) In advance of any setting-out work associated with all principal project features, the Tenderer shall submit to the Engineer in Charge for approval a description of the method and procedures he intends to use in establishing bench marks and base lines.
- (4) If the Tenderer chooses to use triangulation points or bench marks other than those furnished by the Engineer in Charge, he shall do so at his own expense and risk.
- (5) The Tenderer shall carry out topographical surveys of the original ground surface in each sector of the Works where surface excavation will be necessary, and produce sufficient and adequate cross-sections which will permit later to evaluate the volume of excavation for the measurement purposes and payment of excavation.
- (6) The Tenderer shall entrust the surveying works only to persons who by their training and experience have sufficient qualifications and knowledge to ensure proper fulfillment of the survey tasks assigned to them. For the performance of the survey, the Tenderer shall use a sufficient number of reliable and accurate instruments.

2.2.2 Bench Marks and Triangulation Stations

- (1) Existing survey control point bench marks and base lines shall be verified with respect to permanent control points at Dam site and corresponding bench marks and base lines established afresh as necessary to construct each portion of the Works.
- (2) Permanent survey control points shall be established prior to starting the work and such permanent points shall be preserved during construction.
- (3) If not already in existence, a minimum of 2 permanent bench marks shall be established for all adit portals and referenced to date established by survey control points. Benchmarks shall also be provided at intermediate locations between adit portals for checking and carrying purposes. The location of such points with horizontal and vertical data shall be recorded on the construction record drawings by the Tenderer.
- (4) From the primary survey control points the construction surveys shall be performed as required to locate, layout and construct each portion of the Works.
- (5) Complete and adequate logs of all control and survey work shall be maintained as it progresses. Such logs shall be available for the Engineer in Charge's inspection at all times.
- (6) The Tenderer shall protect, preserve and keep accessible the bench marks and triangulation stations of the basic survey and those provided by himself. Any damage or removal of benchmarks and stations, including such of other parties shall be prevented. Any accidental damage shall immediately be brought to the attention of the Engineer-in-Charge. **It is expressly stated that the Tenderer will be made responsible for the damage and its consequences.**
- (7) Benchmarks shall be of stainless steel or cast iron. In softer soil, the steel bolt shall be embedded in a block of concrete of suitable size, and absolutely stable. Inscriptions shall be durable and clearly legible. Underground benchmarks shall be installed at suitable locations and adequately protected.
- (8) Subordinate points may be marked by steel pipes or pegs, subject to the approval of the Engineer-in-Charge. Every newly fixed point shall be checked, as far as possible through other elements than those, which served to establish the point.

2.2.3 Accuracy of Surveying

- (1) Horizontal distances shall normally be measured with optic or electronic distance measuring instruments. Chaining with metallic tape shall be restricted to measuring of short distances and will be rejected for use in survey of traverse nets.
- (2) Elevations shall be determined by differential horizontal levelling.
- (3) Angles shall be measured by Theodolite.
- (4) Traverse nets shall be executed with the precision and as per Survey of India practice and as per IS codes.
- (5) Levelling shall be checked by closing the loop to the initial benchmark.

Tenderer

Superintending Engineer

2.2.4 Auxiliary Works

- (1) The Tenderer shall perform auxiliary works with regard to surveying which include, but not be limited to, the following:
 - a) Perform all necessary calculations with clear presentation of calculations and results in order to facilitate verification,
 - b) Expose covered bench marks,
 - c) Provide bench marks in lieu of and/or in addition to those in existence,
 - d) Remove machinery and obstructions from the required sight-lines,
 - e) Provide adequate ventilation in tunnels to ensure the necessary clear view,
 - f) Provide adequate ventilation in tunnels to ensure the necessary clear view,
 - g) Provide adequate labour, and materials as deemed necessary and suitable by the Engineer in Charge for the control and auxiliary surveys,
 - h) Remove all obstructive accumulation of water,
 - i) Carry out additional topographical surveys in cases where the existing topographical data is, in the opinion of the Engineer in Charge, insufficient for accurate measurement of the Works,
 - j) Carry out all necessary topographical surveys for the incorporation of measuring equipment and instrumentation located in the Permanent Works.
 - k) Carry out all necessary topographical surveys for the observation of the behaviour of structures during construction.
- (2) All the above shall be done in close co-ordination with the Engineer in Charge.

2.2.5 Damage to Crops and Vegetation

- (1) No trees or crops of economic value existing at the Site shall be damaged or removed by the Tenderer during survey and cross-sectioning works prior to their enumeration and evaluation.
- (2) Throughout the surveying and setting-out the Tenderer shall work closely with the authorised local appraisers of crops and vegetation in question and shall provide them with facilities necessary for the expeditious performance of their duties.
- (3) As soon as a section of work has been defined and valued, the Tenderer shall delineate the boundaries of the areas to be cleared by approved markings.

2.3 CHECKING OF TENDERER'S WORK BY THE ENGINEER-IN-CHARGE

2.3.1 Regular Checking

- (1) All elements of the Tenderer's survey work associated with the setting-out of principal project features will be regularly checked by the Engineer in Charge during the course of the work, and the Tenderer shall provide assistance at any time as required in the performance of such control work.
- (2) The Tenderer may be required to provide the Engineer in Charge with any information, readings or computations for checking.

Tenderer

Superintending Engineer

- (3) The regular checks will usually be made during work breaks, but in case of urgency, the Tenderer shall restrict or stop the affected work.
- (4) Any checks by the Engineer in Charge shall not relieve the Tenderer of his full responsibility for the accuracy of structures and parts of them with regard to their position and dimensions.

2.3.2 Confirmation Survey of the Tunnel Alignment

- (1) In addition to the regular check surveys described above, the Engineer-in-Charge, or an independent survey organisation nominated by the Engineer-in-Charge, will perform confirmation survey of the Diversion tunnel alignment in the course of excavation progress. Starting from the duly surveyed fix points at the portals, a traverse net (combination of traverse and gyroscopic measurements) and a leveling will be carried out in each case.
- (2) The first confirmation survey is likely to be performed after the first 100 m of tunnel have been excavated. The following controls will be carried out after 200 m of excavation.
- (3) The Tenderer will be notified in writing in advance about the date of such confirmation survey and of the appointment of an independent surveyor who will perform the survey. The Tenderer shall co-operate with such surveyor and provide any assistance as required.
- (4) The Engineer in Charge and the Tenderer, in co-operation with other Tenderer, will mutually arrange to carry out such confirmation survey at a time and in such a manner, so as to limit as far as possible any delay or inconvenience to underground work. But notwithstanding the above, the Engineer in Charge may arrange such superior control to be performed at any time and notify the Tenderer accordingly.
- (5) Such work will have to be temporarily halted which will, in the opinion of the Engineer-in-Charge, cause excessive vibration or noise such as drilling, mucking, hauling persons, materials or rock spoil in or out of the tunnel, installing permanent or temporary support or any similar work.
- (6) The Engineer in Charge will normally give the Tenderer written notice of such stoppage at least 48 hours in advance and will state the approximate time at which work must cease and the approximate duration of such stoppage. The Engineer in Charge will also indicate what work, if any, may continue. The Tenderer must promptly acknowledge receipt of any such written notice and confirm this acknowledgement in writing.
- (7) Irrespective of the times given by the Engineer-in-Charge, he shall not be bound to adhere strictly to these times but will attempt to do so in so far as it is feasible. While the Engineer in Charge will endeavour to co-operate with the Tenderer in planning such temporary stoppages, the Engineer-in-Charge decision in all cases will be final.

2.4 MEASUREMENT AND PAYMENT

2.4.1 Survey Work Performed by the Tenderer

No extra measurement for payment or payment will be made for Tenderer's survey and setting-out work including the assistance in check/confirmation surveys, and the entire cost thereof shall be included in the Unit Prices for relevant items of the Works.

Tenderer

Superintending Engineer

2.4.2 Temporary Suspension of Works in Underground

No extension of time for the Completion of Works will be granted to the Tenderer due to temporary suspension of work required for the performance of the confirmation surveys of the tunnel alignment by the Engineer-in-Charge. The Tenderer shall take into account the number and time of these surveys indicated above in his construction time schedules and include all expenses, delays, disruptions, loss of production and inconvenience resulting from such temporary stoppage in the Unit Prices for other items of the Works.

Designs

The designs furnished is only tentative. The Tenderer is free to offer any design which is economical. The investigation and designs to be furnished shall be as per the relevant Indian Standards. A list of IS codes applicable is furnished below.

IS 11155-1984	Code of practice for construction of spill way and similar overflow structures
IS 11223-1985	Guidelines for fixing spillway capacity
IS 9761-1981	Criteria for hydraulic design of hydro power intakes
IS 11300-1985	Recommendations for design of trash rack for intakes
IS 4623-1984	Recommendations for structural design of radial gates
IS 6966 (Part-1) 1989	Guidelines for hydraulic design of barrages and weirs part-I alluvial reaches
IS 7720-1991	Criteria for investigation, planning and lay out of barrages and weirs
IS 11130-1984	Criteria for structural designs of barrages and weirs
IS 12892-1989	Guidelines for the safety of barrages and weir structures
IS 10386 (Part-1) -1983	Safety code for construction, operation and maintenance of river valley projects part-1 General aspects
IS 8400-1976	Criteria for river training works for barrages and weirs in alluvial reaches
IS 11532-1985	Guidelines for construction of river embankments
IS 12094-1987	Guidelines for planning and design o river embankments
IS 4877-1968	Guidelines for preparation of estimates for river valley project.
	Guidelines for preparation of project estimates for river valley project second revised edition March 1997 used by CWC
Is 4453-1967	Code of practice for exploration by pits drifts and shafts
IS 4464 (Part-III)- 1967	Code of practice for presentation of drilling information and core description in foundation investigation
IS 2132-1972	Code of practice for thin walled tube sampling of soils
IS 8763-1978	Guidelines for undisturbed sampling of soils
IS 5510-1969	Guide for soil survey for river valley project
IS 5597-1983	Guide for topographical surveys for river valley project
IS 6955-1973	Code of practice for sub-surface exploration for earth and rock fill dam
IS 10060-1981	Code of practice for sub-surface exploration for power house sites
IS 4186-1985	Guide for preparation of project report for river valley project.
IS 8835-1978	Guidelines for planning and design of surface drains
IS 8414-1977	Guidelines for design of under seepage construction measures for earth and rock fill dams

Tenderer

Superintending Engineer

IS 9429-1980	Code of practice for drainage system for earth and rock fill dams
IS 6512-1984	Criteria for design of solid gravity dam
IS 1893-1982	Seismic coefficient
IS 7894-1975	Code of practice for stability analysis of earth dams
IS 8826-1978	Guidelines for design of larger earth and rock fill dam
IS 9296-1979	Code of practice for inspection and maintenance of dam and appurtenant works
IS 10635-1983	Guidelines for free board requirement in embankment dams

In addition to these IS codes, the CWC guidelines, USBR Manuals and Standard Text books shall also be followed in the Design

The designs done shall be not approved by the employer before starting of the work. Any modification suggested by the employer and Engineer in Charge shall be incorporated to the drawings.

2.5.1 Measurement and payment for designs work

No extra measurement for payment or payment will be made for the Tenderer's design work. The entire cost there of shall be included in the unit prices for relevant item of work.

SECTION – 3
CLEARING OF SITE

SECTION – 3**CLEARING OF SITE****List of Contents**

Sl.No.	Para No.	Item
1.	3.1	General
2.	3.2	Clearing and grubbing
3.	3.3	Site Drainage

SECTION-3

CLEARING OF SITE

3.1 General

The hydrological data, pertaining to the streams furnished in the relevant report and drawings, are for information of bidders. The employer does not guarantee the reliability or accuracy of any of the data and shall assume no responsibilities for any deductions, conclusions, conclusion or interpretations that may be made from them, the Tenderer shall undertake at his expense such studies as are necessary to assess the reliability and accuracy of the information.

3.2 Clearing and Grubbing

a) Clearing

The portion of the right of way, where required for constructing the work under these specifications including submergence area, shall be cleared of all plants, bushes, rubbish and other objectionable matter. The timber and other useful materials should be stacked as directed by Employer in-charge and handed over to the Department. Trees designated by the Employer shall not be cut and shall be protected from injury. After handing over useful material to department the waste material shall be disposed off as removed from the site of work before the date of completion of the contract as approved by the Employer. The clearing operation shall be in accordance with clause 4.1, 4.1.1, 4.2 and 4.3 of IS:4701-1982 Indian code of practice for earthwork. Surface boulders either loose or partly embedded in the ground will have to be removed and stacked as directed.

b) Payment

Payment will be made for clearing of jungle including removal of the stumps and transporting to place and stacking for trees less than 30 cm girth as directed and grubbing including filling of holes and hollows and disposal of the cleared and grubbed material required under the above paras at the rates specified in the bill of quantities. Separate payment for cutting and uprooting of stumps more than 30 cm including removing and stacking will be paid separately. All measurements shall be worked out in Sq.m correct to 0.10sqm.

No payment towards removal of small stones and the boulders of size less than 0.03 cubic meters will be made, and the rate quoted for excavation should be inclusive of this item. However surface boulders of size greater than 0.03 cubic metres but less than 3 cubic metres, either loose or partly embedded in the ground, when removed, payment will be made for actual quantity. Surface boulders shall be pre measured. After removal the quantity based on stack measurement duly deducting 40% of more towards voids as considered by the Employer will be compared and minimum of the above measured quantity will be paid at the rates quoted in bill of quantities for the relevant classification.

3.3 Site Drainage and diversion and care of the river flows

The Tenderer shall handle all flows from natural drainage channels intercepted by the work. He shall perform any additional excavation and grading for drainage as directed and provide and maintain any temporary construction required to by pass or otherwise cause the flows to be harmless to the work and property. The Tenderer should design and construct the required coffer dams to diver the flows during execution. He should submit the design of the cofferdams and the diversion plans of the river flows and work progress schedule. They shall be submitted to the Engineer in Charge for approval. When the temporary construction is no longer needed and prior to acceptance of the work the Tenderer shall remove the temporary construction and restore the site to its original condition as approved by the Engineer in Charge. The cost of all works and materials required for the above work shall be included by the bidder in the unit prices quoted in bill of quantities and no separate payment will be made for the same.

SECTION – 4

EXCAVATION FOR DAMS &
ANCILLARY STRUCTURES

SECTION – 4**EXCAVATION FOR DAMS AND ANCILLARY STRUCTURES****List of Contents**

Sl.No.	Para no.	Item
1	4.1	General
2	4.2	Planning
3	4.3	Setting-out works
4	4.4	Clearing the site
5	4.5	Recording of working levels for soils & rocks
6	4.6	Earth work excavation for Dam foundation
7	4.7	Measurement
8	4.8	Rate of payment

Tenderer

Superintending Engineer

SECTION – 4

EXCAVATION FOR DAMS AND ANCILLARY WORKS

4.1 General

- a) The work to be done under these specifications shall consist of furnishing all tools, constructional plant, labour, materials and other things required for excavation in all strata, conveyance and disposal of the excavated materials, leads and lifts, temporary work for performance of all the operations connected with the work embraced under the contract as will secure a satisfactory quality of work.
- b) Construction and maintenance of diversions in case diversion of streams where they were disturbed due to excavation of dam and appurtenant for construction structures.

The list of I.S codes and other publications applicable to this section is given below.

The abbreviation, APSS, IS, IRC, B.S, ASTM shall be considered to have the following meanings.

APSS --Andhra Pradesh Standard Specification

I S --Indian standard of the Bureau of Indian Standards

IRC --Indian Roads Congress

B.S --British Standards

ASTM -- American Standard of the American Society of Testing
Materials

Earth work:

SI.No.	I.S.Number	Short Title
01	IS:4701-1982	Code of practice for earth work on canal
02	IS:3764-1966	Safety code for excavation work
03	IS:1200 (Part-I)-1974	Measurement of building and Civil Engineer in Chargeing works
04	IS:2720 (Part-2)-1973	Method of test for soils part-2, Determination of water content
05	IS:3701-1968	Safety code for scaffolding
06	IS:3698 (Part-1)-1966	Safety code for scaffolding
07	IS:3696 (Part-II)-1966	Safety code of ladders
08	IS:4082 – 1977	Recommendation of stacking and storage of construction materials at site.

In addition to the above IS codes, the specifications of APSS and manual for Quality control and inspection shall also be complied with.

Tenderer

Superintending Engineer

4.2 Planning

- a) Prior to the commencement of work, all relevant data shall be collected by the Tenderer and drawings prepared by him showing the location of the excavation, spoil deposition and filling as per schedule of quantities.
- b) The Tenderer shall present his planning of the work along with required details to the Engineer in Charge at least 15 days before starting the work. The plan and earth work data prepared by the employer to the extent that they exist are available for inspection by the bidders in the office of the concerned Engineer in Charge. Such information is made available solely for the convenience of bidders. Bidders are specifically cautioned that this information is subject to revision and that the Employer disclaims responsibility for any interpretations, deductions or conclusions which may be made there from.

4.3 Setting out works

- a) The Tenderer shall be responsible for the correct setting out of all works and its execution at his cost. The Tenderer shall execute the work true to alignment, grade and levels as shown in the drawings and as directed by the Engineer in Charge and shall check these at frequent intervals. The Tenderer shall provide all facilities like labour and instruments and shall cooperate with the Engineer in Charge to check all alignments, grades, levels and dimensions. Such checking shall not absolve the Tenderer of his own responsibility of maintaining the accuracy of the works.
- b) In the vicinity of dam alignment, the bench mark fixed by the Department will serve as control points for dam and appurtenant works. The basic centre lines and reference points will be fixed by the Department. The Tenderer shall establish sufficient number of referenced bench marks facilitating setting out of works and taking levels for purpose of measurements.
- c) Prior to starting any work, the Tenderer shall erect additional permanent bench marks, reference lines, reference points and check profiles at convenient locations approved by the Engineer in Charge. The Bench Mark stones shall be of 900 mm x 225 mm x 150 mm size, with 450 mm, embedded under firm ground in concrete and 150 mm projecting above ground.; The Work 'BM' showing value of RL shall be conspicuously carved and painted.
- d) The Tenderer shall take all precautions to see that the lines, points and bench marks fixed by the Department are not disturbed by his work and shall make good of any such damage.
- e) All materials and labour for setting out works including construction of bench marks, reference lines, check profiles and surveys, as may be required at various stages of construction shall be supplied by the Tenderer at his cost. The cost of such work shall be deemed to have been included in the cost of the relevant item of excavation in the bill of quantities.

4.4 Clearing the site

The provisions of Section 2 shall apply.

4.5 Recording of working levels for soils & rocks

- a) The area required for dams and appurtenant works shall be cleared in accordance with the provision of section 2, Measurements for soils and rocks will be based on levels. Initially on handing over site, net levels shall be taken at 2.5 m or less interval as directed by the Engineer in Charge. The levels will be entered in field books and plotted in cross section sheets by the Tenderer in the presence of Engineer in Charge or his representative. The Tenderer shall write a certificate "accepted the pre levels recorded on pages from -----to -----" and sign at the end of levels in the level field book in token of acceptance.
- b) After stripping and prior to commencement of excavation cross sectional levels of the stripped surface shall be taken at the same locations and intervals and certificates as mentioned in (a) above shall be recorded.
At the earliest, cross sectional profiles taken after stripping shall be prepared duly plotting the pre levels and the Tenderer's signature shall be obtained on these cross section sheets. These cross sections called initial cross sections duly signed by the Tenderer and Engineer in Charge shall be preserved. Final payment will be based on these levels only. All linear dimension shall be measured in metres to the nearest 0.01m; areas shall be computed in square metres nearest to 0.01 square metre. However, in case of rock excavation occurring in bed or sides, the actual quantity of rock shall be arrived at by taking block levels at 2.5m intervals all along the entire area of bed and sides.
- c) No separate payment will be made to the Tenderer for the materials and labour provided for taking the cross sectional levels.

4.6 Earthwork Excavation for Dam foundation

The Plans and earth work data prepared are for study and for planning. It is not intended that this earth work information will limit or prescribe the excavation and handling procedures of the Tenderer and the Employer reserves the right to utilise and distribute earth work materials from the dam excavation during the progress of work as best serves the interest of the Department.

Classification of excavated material:

All materials involved in excavation shall be classified and got approved by the Engineer in Charge into the following groups:

- a) All Soils
This shall comprise ordinary soils such as vegetable or organic soil turf, sand, silt, clay, mud, peat, black cotton soil, soft shale or loose morum and hard soils such as stiff black cotton soil, stiff clay, compressed hard gravel, stoney earth, stone matrix, soft disintegrated rock removable by pick axes and crow bars, boulders not exceeding 300 mm any direction and mixture of these and similar material.
- b) Hard Disintegrated Rock not Requiring Blasting
Hard disintegrated rock not requiring blasting Hard disintegrated rock or soft rock or conglomerate rock and hard lime kankur removable by pick axes and crow bars.
- c) Rock Requiring Blasting

Tenderer

Superintending Engineer

- i) Fissured and fractured rock and boulders of size more than 0.03 cum upto 3 cum in size requiring ordinary blasting.
- ii) Fissured and fractured rock and boulders of size more than 0.03 cum upto 3 cum in size required restricted blasting using jack Hammer with controlled charge.
- iii) Hard rock, sheet rock and boulders more than 3 cum size requiring restricted blasting using Jack Hammer with controlled charge.

4.6.1 Excavation of Foundation

Before any of the work for the excavation of foundation is taken up, all loose rock, semi-detached rock in or close to the area to be excavated, that is liable to fall or otherwise injure the workmen or the works shall be stripped. The method used shall be such as not to shatter or render unsuitable or unsafe any rock that was originally sound and safe. Any material not requiring removal as contemplated therein, but which may later become loosened or unsuitable shall be promptly and satisfactorily removed.

a) Excavation in all soils

Overburden excavation shall include removal of all material other than rock excavation. The overburden excavating shall include earth, gravel, such as hard and compact material as cemented gravel and soft disintegrated rock and also all boulders and detached pieces of rock measuring 0.03 cum or less in volume.

b) Rock excavation

Rock excavation shall include rock in place which cannot be excavated until loosened by blasting, barring or wedging and also all boulders or detached pieces of solid rock more than one cubic meter in volume.

The excavation shall be made to sufficient depth to secure foundation on sound rock, free from weathered material, open seams or other objectionable defects. All necessary precautions shall be taken to preserve the rock below and beyond the lines of excavation in the soundest possible condition. The rock excavation shall be done by controlled blasting using jack hammer holes of 32 mm dia or less with little charge such that the blasting done will neither open up seams nor crack the rocks beyond prescribed limit. Blasting using wagon drilled holes shall not be done.

The firing of system of blasts shall be controlled by the use of delay detonators. As excavation approaches its final lines, the depth of holes for blasting and amount of explosives used for hole shall be progressively reduced and excavation shall be done by controlled blasting. Whenever further blasting is liable to injure the against which concrete is to be discontinued and the excavation for final 0.5 m completed by wedging barring, chiselling line-drilling and broaching or other suitable methods.

No blasting shall be done within 15 Meters of any permanent structure. ; Where blasting would create a hazard to existing structures or installations, rock excavation shall be performed by methods other than blasting. The general excavation will be to levels and shapes shown in the relevant drawings. The foundation levels are based on indication of preliminary borings and are subject to changes as actual site condition warrant. Before starting

concrete or masonry work, as large an area as possible should be exposed for inspection test an nearby section excavated later should disclose that the former section should have been taken to lower depth.

c) Line drilling for rock excavation

Where vertical or square faces of rock are required in portions of the work, such faces of excavation shall be formed by line drilling and broaching. The diameter and spacing of the holes for line drilling shall be subject to approval. The spacing of the drill holes shall be sufficiently close to ensure that rock will break along the designed lines. No blasting will be permitted in the holes along the sides of the excavation but light blasting will be permitted in areas adjacent to the holes provided that where further blasting might injure the rock upon or adjacent to which concrete is to be placed, the use of explosives shall be discontinued and excavation completed by wedging, barring or other suitable methods. Wagon drills shall not be used as it may disturb the rock structure.

d) Preparation of foundation – initial

After completion of rough excavation of foundation, scaling and trimming operations for the final removal of all shabby weathered and drummy rock and loosened mass shall be done by chiseling, picking, wedging and barring. The final foundation surface shall present a rough outline to provide added resistance to sliding and all smooth surfaces shall be roughened. ; the final surface shall be free from steep angles and sharp projections. Neither along the dam nor across, shall the foundation have a slope exceeding the angle of friction of concrete on rock. Where slopes are steep the rock shall be benched to give a downward slope towards upstream of about 1:10.

The foundation surface after cleaning out should be sounded by striking with hammer and portions which do not return a solid ringing sound shall be chiseled out. Sprinkling the area with water will indicate the joints in rock from the water lines which cling to the cleavages after the area has partially dried up. Such portions shall be tested for soundness and rectified where necessary.

4.6.2 Tolerance in excavation

Measurements for soils and rocks will be based on levels. Initially on handing over the site, net levels shall be taken at 2.50 m or less interval as desired by the Engineer in Charge. The levels will be plotted in a cross section sheet and average level arrived at for purpose of determining the quantity of his acceptance. Final payment will be based on levels only.

- i. For excavation in Rock a tolerance of 15 cm beyond the profile will however be permitted,. No extra payment will be made for the excavation beyond the designed profile. The over breakages within the tolerance limit of 15 mm shall be refilled with C.C. M20 grade specified for foundations. Payment for filling such over breakage shall be at the unit rate quoted in Schedule 'A'.
- ii. Should any excavation occur beyond the tolerance limit, the excess quantity so removed beyond tolerance limit will not be paid for and on the other hand the Tenderer is liable for penal recovery at twice the agreed rate for similar item for excess quantity excavated. The same shall also be refilled

Tenderer

Superintending Engineer

at Tenderer's own expense with C.C.M20 grade or as specified by the Engineer in Charge.

4.6.3 Lead

The excavated spoil in soils, F & F and hard rock is to be deposited outside the working area at the location as directed by the Engineer in Charge.

4.6.4

In the case of hard rock boulders of size greater than 0.03 cum, payment shall be made on pre-measurements of stack measurements whichever is less, the stack shall be closely packed with minimum voids and 40% will be deducted from the stack measurements to obtain solid measurements (this is subject to increase in the case of loose packing). When soils and hard rock boulders occur intermingled, combined measurement shall be taken and measurements of other soils obtained by deducting from the combined measurements the finished measurements of the quantity of hard rock boulders as determined above.

4.6.5

Payment for earth work excavation for foundation will be restricted to box cutting only. If slips occur later or the slopes cave in during the process of excavation, the removal of such fallen materials shall be only at the expense of the Tenderer. Hence at all times he should aim at excavating the profiles as decided by the Engineer in Charge.

4.6.6

No re-handling of excavated material due to injudicious selection of the place for dumping will be paid for.

4.6.7

Blasting executed by Tenderer in connection with the works shall be carried out in the manner described under "Blasting operations – Instructions to Tenderers" of the A.P.S.S. Controlled blasting shall be carried out where desired in the manner as direct.

4.6.8

In conducting blasting operation, proper precautions shall be taken for protection of persons, the work and property. All Government laws and regulations relating to the design and location of powder magazines, transportation and handling of explosives and other measures enacted for the prevention of accidents at powder magazines shall be adhered to.

4.7 MEASUREMENT

4.7.1 All linear measurement shall be in metres correct to 0.01 of a metre and volumes worked out in cubic metres correct to 0.01 of a cubic metre.

4.7.2 The measurements for the foundation excavation shall be made according to the sections shown on the drawings or to such other sections including stepping and sloping back as authorised by the Engineer in Charge.

4.7.3 In the case of excavation in rock, when measurement is not directly possible from section it may be arrived at by measuring capacity formed stacks of the excavated rock. All original works shall be measured by levels.

4.7.4 Where payments are made with reference to levels, the L.F.books, the section sheets (in which the levels are plotted) and the calculation sheets shall be treated as adjuncts to the measurement books.

4.8 Rate for payment

The contract bid price shall include for the items of excavation in bill of quantities for one cubic metre shall be the payment in full for carrying out the following operations required for the individual items including full compensation.

- i) Setting out;
- ii) Top soil removal or stripping
- iii) Marking out,
- iv) Providing materials and labour for fixing reference lines, reference points, additional bench marks, for taking levels and connecting bench marks;
- v) Drilling by Jack hammer wherever necessary or ripping;
- vi) Blasting wherever necessary including cost, conveyance and storage of blasting materials and control blasting.
- vii) Safety measures;
- viii) All dewatering;
- ix) Providing temporary ramps and steps at the sides of deep trenches and subsequent removal
- x) Transporting the excavated materials and depositing the same outside the working area at the locations specified by the Engineer in Charge, stacking in stock piles to the specifications inclusive of preparation and maintenance of haul roads;
- xi) All work necessary to maintain the excavation in good order during excavation;
- xii) All labour, materials, tools, equipment, safe guards and incidentals necessary to complete the work to specifications; and
- xiii) Rehandling the temporarily deposited material in stock piles.

SECTION – 5
STEEL REINFORCEMENT

SECTION – 5**STEEL REINFORCEMENT****List of Contents**

Para No.	Item
5.1	General
5.2	Material
5.3	Placing of reinforcement
5.4	Splicing
5.5	Coupling of bars.
5.6	Care of placed reinforcement and concrete
5.7	Tolerances.
5.8	Dowels
5.9	Measurement and Payment.

SECTION – 5

STEEL REINFORCEMENT

5.1 General

- a. This section covers specifications for providing steel reinforcement to Dams and ancillary works and The Tenderer has to make his own arrangements for the procurement of tested mild steel and H.Y.S.D Bars required for the work only from the reputed manufacturers. Necessary I.S.I. test certificates are to be produced to Engineer in Charge before use on work Steel bars shall be stored in such a way as to avoid distortion and to prevent deterioration by corrosion. He shall make his own arrangements for transportation and storage.
- b. High yield strength deformed bars shall conform to I.S:1786-1985.
The diameter and weight of plain and HYSD Steel bars shall be as follows.

Sl.No.	Diameter of rod	Sectional weight in Kilogram per running metre both for plain and HYSD Steel
1	6 Millimeters	0.22
2	8 Millimeters	0.39
3	10 Millimeters	0.62
4	12 Millimeters	0.89
5	14 Millimeters	1.21
6	16 Millimeters	1.58
7	18 Millimeters	2.00
8	20 Millimeters	2.47
9	22 Millimeters	2.98
10	25 Millimeters	3.85
11	28 Millimeters	4.83
12	32 Millimeters	6.31
13	33 Millimeters	6.71
14	36 Millimeters	7.99
15	40 Millimeters	9.86
16	42 Millimeters	10.88

NOTE: If any rods other than those specified above are used, the weights shall be as per standard steel tables.

- c. This work shall consist of furnishing and placing reinforcement of the shape and dimensions shown on the drawings and as specified in this specifications, including cutting, bending, cleaning, welding, placing, binding and fixing in position. A list of IS codes applicable is furnished below:

List of IS Codes:

IS:456-1978/200	Code of practice for plain and reinforced concrete
IS:1786-1985	Specification for High strength deformed steel bars and wires for concrete reinforcement.
IS:432-1982 (Part-I)	Specifications for mild steel and medium tensile steel bars for concrete reinforcement and hard

Tenderer

Superintending Engineer

	drawn steel wire.
IS:280-1978	Mild steel wire for general Engineer in Chargeing purposes
IS:2502-1963	Code of practice for bending and fixing of bars for concrete reinforcement.
IS:9417-1989	Recommendations for welding cold worked bars for reinforced concrete construction.
IS:2751-1979	Welding of mild steel plain and deformed bars for reinforced construction.
IS:814-1991	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel.
IS:1278-1972	Filer rods and wires and gas welding.

In addition to the above Indian Standard codes, the specifications of APSS and manual for quality control and inspection shall also be complied with.

5.2 Material

- i.
 - a. Steel shall be clean and free from loose rust or loose mill scale at the time of fixing in position and subsequent concreting.
 - b. The Tenderer shall procure high yield strength deformed bars, conforming to IS:1786-1985. However, in case of non-availability of such bars, other steel bars conforming to IS:432-1982 shall be used as per the directions of the Employer in writing.
 - c. The reinforcement bars used by the Tenderer shall be in accordance with the Section. 5.1.
- ii. Cutting, bending and Binding of reinforcement.
 - a. Reinforcing steel shall conform accurately to the dimensions given in the bar bending schedules shown on relevant drawings.
 - b. Bars shall be bent cold to the specified shape and dimensions by a bar bender by hand or power to attain proper radii of bends as shown in drawings or as directed by the Engineer in Charge.
 - c. Bars shall not be bent or straightened in a manner that will injure the material.
 - d. Bars bent during the transport or handling shall be straightened before being used on work, they shall not be heated to facilitate bending.
 - e. "U" type hooks shall invariably be provided at the end of each bar, if specified in drawing or ordered by the Employer. The radius of the bend shall not be less than twice the diameter of round bar and the length of the straight part of the bar beyond the end of the curve shall be atleast four times the diameter of the round bar. In the case of bars which are not round and in the case of deformed bars, the diameter shall be taken as the diameter of a circle having an equivalent effective area.
 - f. The book shall be suitably encased to prevent any splitting of the concrete.

5.3 Placing of reinforcement

- a. Before the reinforcement is placed, the surface of the bars and the surfaces of any metal bar supports shall be cleaned of the rust, loose mill scale, dirt, grease and other objectionable foreign substances.
- b. All reinforcing bars shall be accurately placed in exact position shown on the drawing, and shall be securely held in position during placing of

Tenderer

Superintending Engineer

concrete by annealed binding wire, and by using stays, blocks or metal chairs, spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals.

- c. Wire for binding reinforcement shall be soft and annealed mild steel of 16 SWG and shall conform to IS:280-1978. Binding wire shall have tensile strength of not less than 5600Kg/cm² and an yield point of less than 3850 Kg/cm².
- d. Bars shall not be allowed to sag between supports. They shall not be displaced during concreting or any other operation over the work.
- e. The Tenderer shall also ensure that there is no disturbance caused to the reinforcing bars already placed in concrete.
- f. All devices used for positioning shall be of non-corrodible material. Metal supports shall not extend to the surface of the concrete, except where shown on the drawings. Pieces of broken stone or brick ad wooden blocks shall not be used. Where portions of such supports will be exposed on concrete surfaces designated to receive F2 or F3 finish, the exposed portion of support shall be galvanised or coated with other corrosion resistant material without which the concreting will not be permitted. Such supports shall not be exposed on surfaces designated to receive F4 finish unless otherwise shown on the drawings.
- g. Placing on layers of freshly laid concrete as work progresses for adjusting bar spacing shall not be allowed.
- h. Layers of bars shall be separated by spacer bars, pre-cast blocks or other approved devices.
- i. Reinforcement after being placed in position shall be maintained in al clean condition until completely embedded in concrete. Special care shall be taken to prevent any displacement of reinforcement in concrete already placed.
- j. To protect reinforcement from corrosion, concrete cover shall be provided as indicated on the drawings. All bars protruding from concrete and to which other bars are to be spliced and which are likely to be exposed for an indefinite period shall be protected by a thick coat of neat cement grout.
- k. Bars crossing each other, where required, shall be secured by binding wire (annealed) of size not less than 1 mm dia and conforming to IS:250-1978 in such a manner that they do not slip over each other at the time of fixing and concreting.
- l. As far as possible, bars of full length shall be used. In case this is not possible, overlapping of bars shall be done as directed by Engineer in Charge. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm or 1 ¼ times the maximum size of the coarse aggregate whichever is greater, by concrete between them. Where not feasible, overlapping bars shall be bound with annealed steel wire, not less than 1 mm thickness twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nr bending moment is maximum.
- m. The minimum allowable clearance between parallel round bars shall not be less than 1 ½ times the diameter of the large bars and for square bars shall not be less than twice the side dimensions of the larger bars of 1 ½ times the maximum size of aggregate, whichever is greater.
- n. Dissimilar diameter rods should not be joined together.

5.4 Splicing

- a. Where it is necessary to splice reinforcement the splices shall be made by lapping, by welding or by mechanical means.

When permitted or specified on the drawings, joints of reinforcement bars shall be butt welded so as to transmit their full strength. Welding of bars shall be done as directed by the Employer and conforming with requirements of clause 11.4 of IS:456-1978.

If it is proposed to use welded splices in reinforcing bars, the equipment, the material and all welding and testing procedures shall be subject to the approval of the Employer. The Tenderer shall also carryout test welds as required by the Employer. No extra rate will be paid for welding reinforcement, test-welds, as bid rate in bill of quantities is inclusive of this item.

For welded splices for reinforcing bars conforming to IS:1786-1985, welding shall be done in accordance with IS:9417-1979. For reinforcing bars conforming to IS:432(Part-1)-1982, welding shall be done in accordance with IS:2751-1979. Electrodes for manual metal arc welding shall conform to IS:814 (Part –I)-1974 and IS:814 (Part-II)-1974. Mild steel filler rods for Oxy-acetylene welding shall conform to IS:1278-1972, provided they are capable of giving a minimum butt weld tensile strength of 41 Kg/mm².

Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding the bars securely in position during welding. It must be ensured that no voids are left in welding and when welding is done in two or three steps, previous surfaces shall be cleaned well. Ends of bars shall be cleaned of all iron scale, rust, grease, paint and other foreign matter before welding.

- b. Reinforcing bars of 28 mm in diameter and larger may be connected by butt welding provided that lapped splices will be permitted if found to be more practical than butt welding and if lapping does not encroach on cover limitation or hinder concrete or reinforcement placing.
- c. Reinforcing bars 25 mm in diameter and less may be either lapped or butt welded, whichever is the most practicable.
Butt welding of reinforcing bars shall be performed either by the gas pressure of flash pressure welding process or by the electric arc methods under cover from weather.
Welded pieces of reinforcement shall be tested at the rate of 0.5% of total number of joints welded. Specimen shall be taken from the actual site of work. Strength of the weld provided shall be at least 25% higher than the strength of bars.
- d. Welded joints or splices shall preferably be located at points where steel will not be subject to more than 75% of the maximum permissible stresses and welds so staggered that at any section not more than 20% of rods are welded. Approval of such additional splices will generally be restricted to

Tenderer

Superintending Engineer

splices not closer than 8 metres in horizontal bars or metres in vertical bars measured between midpoint of laps.

5.5 Coupling of bars

Wherever indicated on the drawings or desired by the Engineer in Charge to use mechanical couplings for reinforcing bars, bars shall be joined by couplings which shall have a cross section sufficient to transmit the full strength of bars. The ends of bars that are joined by couplings shall be upset for sufficient length, so that the effective cross-section at the base of treads is not less than the normal cross-section of the bars. The threads shall be standard Whitworth threads. Steel for couplings shall conform to IS:226. The Tenderer shall submit samples of the proposed coupling to the Engineer in Charge for approval not less than 60 days prior to their proposed use.

5.6 Care of placed reinforcement and concrete

Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position, care shall be taken to ensure that at no time the radius of the bend is less than 6 x diameter for deformed bars and 4 x diameter for plain mild steel bars. Care shall also be taken, when bending such bars, to ensure that the concrete around the bars is not damaged.

5.7 Tolerances

As specified in clause 11.3 of IS:456-1978 unless otherwise specified by the Engineer in Charge reinforcement shall be placed within the following tolerances.

i. For effective depth 200 mm or less	= ± 10 mm
ii. For effective depth more than 200 mm	= ± 15 mm

The cover shall in no case be reduced by more than one third of specified cover of 5mm whichever is less.

5.8 Dowels

- The dowels shall be of the same HYSD bars of grade Fe 415 conforming to IS:1786-1985 as used for reinforcement.
- Details for dowels shall be as shown on the drawings or as directed by the Engineer in Charge.
- Dowels shall be placed in the concrete where shown on the drawings or where directed and will be inspected for compliance with requirements as to size, shape, length, position and amount after they have been placed, but before being covered by concrete.
- Before the dowels are embedded in concrete, the surfaces of dowels shall be cleaned of all dirt, grease or other foreign substances which in the opinion of the Engineer in Charge are objectionable.
- The dowels shall be accurately placed and secured in position so that they will not be displaced during the placing of the concrete.

5.9 Measurement and Payment

a. Measurement:

Measurement for payment, for furnishing and placing reinforcing bars will be made only on the calculated weight of the bars placed in concrete, in accordance with the drawings or as indicated by the employer.

The Calculated weight for reinforcing bars shall be determined as follows:

- i. Reinforcement shall be measured in length separately for different diameters as actually used in the work excluding overlaps. Lengths shall include hooks at ends.
- ii. Wastage, Overlaps, couplings, welded joints, space bars, dowels and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to have been included in the rates of reinforcement.
- iii. The unit of payment shall be one metric tonne weight of steel.

b. Payment rate:

No Separate payment will be made for this item. The bid price quoted shall include cost of steel, binding wire or welding material at site of work, its cutting, bending, cleaning, placing, binding or welding and fixing in position as shown on the drawings and as directed by the Engineer in Charge. The unit rate shall also include cost of all devices for keeping reinforcement in approved position, cost of jointing as per approved letters and all wastage, overlaps, dowels, binding wire or welding material and spacers of bars and cost of all incidental operations necessary to complete the work as per specifications.

SECTION – 6
CONCRETE

SECTION – 6
CONCRETE
(Excluding Formwork, Reinforcement and Joints)

List of Contents

6.1	SCOPE OF WORK
6.2	STANDARDS
6.3	SUBMITTALS
6.4	CONSTITUENTS OF CONCRETE
6.5	CONCRETE MIX DESIGN
6.6	QUALITY CONTROL
6.7	ACCEPTANCE CRITERIA
6.8	BATCHING AND MIXING
6.9	HOT AND COLD WEATHER CONCRETING
6.10	CONVEYING
6.11	SETTLEMENT CONTROL OF DAM
6.12	FORMS FOR CONCRETE
6.13	DRILLING HOLES AND GROUTING ANCHOR BARS IN CONCRETE
6.14	PLACING
6.15	FINISHING OF CONCRETE
6.16	CONSTRUCTION JOINTS IN CONCRETE STRUCTURES
6.17	CURING AND PROTECTION OF CONCRETE
6.18	REPAIR OF CONCRETE
6.19	PARTICULAR REQUIREMENTS FOR INDIVIDUAL CONCRETE STRUCTURE
6.20	MEASUREMENT AND PAYMENT

SECTION – 6 CONCRETE

(Excluding Formwork, Reinforcement and Joints)

6.1 SCOPE OF WORK

- (1) The work under this Section includes all labour, materials, equipment, testing and services related to the concrete work to be carried out by the Tenderer under this contract.
- (2) The concrete work shall be performed to the dimensions as shown on the Construction Drawings or as otherwise directed by the Engineer-in-Charge. Lift drawings for each pour showing all embedment, lines and levels shall be prepared by the Tenderer.
- (3) The Tenderer shall cooperate with all other Tenderers and organisations related to the construction of Permanent Works where the material or equipment is to be fixed to, or embedded in the concrete structures.
- (4) For work, reinforcement and shotcrete are covered separately in other sections of these Specifications.
- (5) The approval given by the Engineer in Charge to Tenderer's plants and equipment or their operation, or of any construction methods shall not relieve the Tenderer of his full responsibility for the proper and safe execution of concrete work or any obligations under this contract.

6.2 STANDARDS

- (1) Unless otherwise specified, the standards and recommendations of Indian Standards Code of Practices shall be followed in respect of all materials, equipment and performances.
- (2) The following Indian standards are specifically mentioned:
 - IS: 8112
 - IS: 456
 - IS: 383
 - IS: 2386 (Part-IV)
 - IS: 5878 (Part-V)
 - IS: 516
 - IS: 1489
 - IS: 1199
 - IS: 457
 - IS: 9103
 - IS: 7861 (Part-I and Part-II)
 - IS: 2505
 - IS: 4031
 - IS: 4032
- (3) In absence of relevant Indian Standards and specifications the recommendations of USACE manual, "ACI Manual of concrete Practice" and U.S.B.R. Concrete Manual shall be followed.

Tenderer

Superintending Engineer

6.3 SUBMITTALS

6.3.1 Submittals Before construction

- (1) Submittals listed herein are related to items, which require the consent of the Engineer in Charge and are to be submitted by the Tenderer before the appropriate work may proceed.
- (2) Within 28 days from the date of issue of Notification of Award, but before procuring or mobilising to the Site the equipment, the Tenderer shall submit to the Engineer in Charge updated and detailed plans and descriptions, consistent with those submitted with his Tender and any subsequent amendments and additions agreed to by the Engineer in Charge and the Tenderer, including but not limited to the following.
 - a) Aggregates Processing plant:
Description, flow diagrams and drawings in sufficient details to indicate layout, type and capacity of crushing, screening, washing, conveying and other aggregate processing and handling equipment.
 - b) Batching and Mixing Plants:
Description, flow diagrams, and drawings of the plants, and details of the equipment the Tenderer intends to use to determine and control the amount of each separate concrete ingredient and mixing thereof into uniform mixture.
 - c) Concrete Cooling Plant:
Details of refrigeration and ice plants and methods, which the Tenderer proposed to use to comply with, concrete temperature requirements.
 - d) Transport and Placing of Concrete:
Full details of the equipment and methods for transporting the concrete from the concrete plant to the final point of placing, including numbers, type and capacity of transport vehicles, concrete pumps, vibrators, and details of standby plants to be installed.
 - e) Details of concreting of plunge pool in various stages as per the method statement submitted along with the tender.
 - f) Mode and methodology of concrete compaction, and concrete curing.
 - g) Sampling and Testing of Materials:
List and details of equipment for sampling and testing, detailed program for quality control of concrete work, and qualification and experience of the proposed personnel.
- (3) At least 56 days in advance of any concrete work being carried out at the Site, the Tenderer shall submit to the Engineer in Charge following notifications based on the results on the preliminary material testing:
 - a) Notification whether cement is required in bulk or bags so that the, amount of cement to be obtained from several factories can be estimated from each factory and the proposed schedule of shipment can be finalised.
 - b) Notification of the source, analysis, method of delivery, and storage of water for concrete manufacture,

- c) Notification of any admixtures which the Tenderer proposes to use, manufacturers thereof, and information about the chemical names of the principal ingredients and the effects of under or over dosage. Should the Tenderer intend to use an accelerator in any concrete work for his own convenience, he shall give full details of the type, dosage, influence on construction, and the cost savings involved.
 - d) Details of the materials for formwork and surface finished, treatment of construction joints, and construction techniques which the Tenderer proposed to use in order to achieve the required concrete surfaces and allowable tolerances,
 - e) System, methods, and equipment for prestressing steel and grouting of cables in prestressed concrete elements.
 - f) Details of special additives like silica fume & steel fibres for production of high performance concrete,
- (4) At least 28 days prior to procuring or dispatch to the Site of the particular item of work to which the submittal relates, the Tenderer shall submit to the Engineer in Charge the following:
- a) Details of curing compounds, if any,
 - b) Details of epoxy mortar for concrete repair.
- (5) Drawings showing the location of construction joints proposed by the Tenderer which differ from those shown on the construction Drawings, including formwork and reinforcement details, shall be submitted to the Engineer in Charge at least 28 days prior to commencement of work on that particular structure.

6.3.2 Submittals During Construction

- (1) Tenderer shall provide the Engineer in Charge with a weekly placing scheduling giving the detailed location of the pours, the approximate extent of pours, and the date on which the concrete will be placed. This weekly programme of concrete placement shall be submitted to the Engineer in Charge for his acceptance at least 2 days prior to the commencement of the week.
- (2) Before commencement of the concrete placement the Tenderer shall prepare a checklist regarding all preparations for the specified work such as rock surfaces and foundations, cleaning, formwork, reinforcement, embedding, instrumentation and submit this list to the Engineer in Charge, who after his satisfaction about the work preparations will permit the Tenderer in writing to commence concrete placement.
- (3) The Tenderer shall keep and make available to the Engineer in Charge records of the date, amount, and storage location of each delivery of cement and of the part of the Works in which it was used and shall provide facilities for checking the stock of cement.
- (4) During the performance of the concrete work, the Tenderer shall keep a diary where he shall record the construction procedures related to concreting. This diary shall be made available to the Engineer in Charge upon request. The records shall be made available to the Engineer in Charge upon request. The records shall contain at least the following:
 - a) Commencement and termination of concreting of various parts of the structures,

Tenderer

Superintending Engineer

- b) Quantities and quality of aggregates and cement provided, and the storage from which they were drawn,
- c) Temperature of air, water, cement, aggregates, and concrete,
- d) Meteorological conditions and humidity of air,
- e) Sampling and testing performed and summary of results,
- f) Personnel employed during various stages of the concreting operation and name of the responsible inspector or foreman,
- g) Equipment used,
- h) Directives received from the Engineer in Charge=in-Charge,
- i) Any special material or procedures employed.

(5) The Engineer in Charge reserves the right to require any additional information deemed necessary to be included in the submitted documents.

6.4 CONSTITUENTS OF CONCRETE

6.4.1 Cement

Cement shall be ordinarily Portland cement conforming to IS:269 or low heat-low alkali Portland pozzolana cement (PPC) conforming to IS: 1489 or Grade 43 conforming to IS: 8112 or Grade 53 cement conforming to IS:12269 depending upon the use and type of structure. The cement shall be supplied by the corporation on cost recoverable basis as specified in General conditions and Conditions of particular applications if required Slag cement may also be used.

- (1) Cement, which does not comply with, relevant IS Code or is damaged in consignment, handling or storage shall be promptly removed from the Site.
- (2) All facilities for transport and storage of cement shall be subject to approval of the Engineer in Charge and shall be such that easy access for inspection is assured.
- (3) Bulk cement shall be transported from the port of factory to the Site in adequately designed weather-tight trucks, or other means where cement will be protected from exposure to moisture. Immediately upon receipt at the Site, cement shall be stored in a dry, weather-tight and properly ventilated structure with adequate provisions for the prevention of absorption of moisture, and constructed in such a way that there will be no dead storage. The vents of the bins and silos shall be equipped with dust collectors to reduce loss of cement during handling and inconvenience to the personnel.
- (4) Cement bags shall be stored in weatherproof buildings with a raised, well-ventilated wooden floor, and placed so that each consignment can be segregated if required and used in order of its age. Bags shall not be stacked more than 1.5m high. Cement shall not be protected during storage and handling by waterproof covers and a raised floor. Unused cement shall be placed back into the storage buildings.
- (5) Cement shall be preferably used in same order in which it has been received at the Site. Storage of cement shall be limited to 90 days in bags and 150 days in bulk. Cement that has been in storage for longer than these periods or which may have absorbed moisture shall not be used unless it has been re-tested by the Tenderer and approved by the Engineer in Charge-in charge. Cement that has become lumpy shall not be used. The cements coming from different factories or of different makes shall be stored separately.

Tenderer

Superintending Engineer

- (6) The temperature of cement upon arrival to the Site shall not exceed 70 C and when entering the mixers shall not exceed 50 C unless otherwise approved.
- (7) Fly ash (pozolana) shall not be allowed to be mixed with cement at place other than factory/manufacturing unit.** Fly ash (pozolana) mixed at factory shall conform to IS:3812 and IS: 1344.

6.4.2 Aggregate

6.4.2.1 General

Unless otherwise specified, concrete aggregates shall conform to the requirements of IS:456 and IS:383. They shall be tested in accordance with the provisions of IS:2386.

- (1) Aggregates shall consist of clean, hard, dense, durable and uncoated materials, and shall have stable moisture content and grading when delivered to the batching plant. Aggregates shall not contain substances which may impair the quality of the concrete, attack reinforcing steel, or reduce bond. The following substances are regarded as being harmful: loam, clay, pieces with large cavities, foam-like or vitreous pieces, and organic materials such as topsoil, roots, wood, coal, lignite, etc. In doubtful cases the effects of harmful substances shall be established by tests.
- (2) Use of aggregates containing minerals, which can cause alkali reactivity beyond acceptable limits, will not be permitted. Presence of such minerals in the stones will be determined by testing.
- (3) The shape of the particles shall be generally spherical or cubical. The amount of flat or elongated particles shall not exceed 25% by weight. A flat or elongated particle is defined as one in which the width to thickness, respectively length to width ratio is greater than 3. Rock, which breaks down into such shape, regardless of the type of processing equipment used, will not be approved for use in the production of aggregates.
- (4) The Tenderer shall make provisions for crushing and processing of material in accordance with recommendations contained in IS:383 to meet the gradation and other requirements of these Specifications, in order to obtain the total amount of aggregate required for concrete manufacture. Crushing, screening and washing operations, benefaction of aggregates, and blending of crushed and nature aggregates shall at all time be subject to the consent of the Engineer in Charge.
- (5) The handling, transporting, and stockpiling of aggregates shall be such that there will be a minimum amount of fines resulting from breakage and abrasion of material resulting from free fall and improper handling. Excess in any of fine or coarse aggregate sizes shall be disposed of in approved manner.
- (6) The Tenderer shall remove all rejected aggregate from the Site.

6.4.2.2 Source

- (1) Coarse and fine aggregates shall be produced from suitable material obtained from required excavation for Permanent and Temporary Works and from the approved quarry and borrow areas shown on the Drawings and described in the Information to Bidders, or from other sources as may be designated or approved in the course of the work.

- (2) The Tenderer shall carefully clear the area from which aggregates are to be produced of unsuitable materials and other objectionable matter. There shall be operated so as not to detract from the usefulness of the area. All materials removed from the area and not used in the work shall be disposed of as directed.
- (3) Alternative sources developed by the Tenderer shall be subjected to approval by the Engineer-in-Charge. The Tenderer shall carry out tests to furnish satisfactory evidence that aggregates from such alternative sources comply with the requirements of this Section.
- (4) The aggregate source shall be subject to the approval of the Engineer in Charge. However, such approval of source shall not be construed as acceptance of all materials to be taken from that source. The Engineer in Charge reserves the right to reject certain localised areas, strata, or channels within the approved areas and zones, when the material is unsatisfactory for use.
- (5) The aggregate for wearing surface concrete shall be transported from approved designated quarry.

6.4.2.3 Fine Aggregates

- (1) The term "fine aggregate" is used to designate aggregate in which the maximum size of particles is 4.75mm
- (2) The gradation of fine aggregate shall be confirm to specifications of IS 383:

Square Mesh Sieve Opening	Percentage Passing (by Weight)
4.750 mm	95-100
2.360 mm	80-100
1.180 mm	50-85
0.600 mm	25-60
0.300 mm	10-30
0.150 mm	2-10
0.075 mm	0-3

- (3) The percentage of deleterious substance in the fine aggregate shall conform to IS:383, except that the fine aggregate shall contain not more the 0.1% by weight of deleterious (reactive) ferrous sulphide. The total percentage of deleterious substance must not exceed 5% by weight.
- (4) Fine aggregate having specific gravity of less than 2.6 shall be rejected. Fine aggregates, when subjected to soundness test with a solution of sodium sulphate, after five cycles of tests, shall not suffer a loss of weight in excess of 10 per cent.
- (5) Fineness modulus of the aggregate shall be 2.6 ± 0.4 .
- (6) Fine aggregate, upon delivery to the batching plant, shall have uniform and stable moisture content. The amount of moisture shall be less than 6% by weight, and shall not vary by more than 0.5% per hour.
- (7) River sand shall not be used.

6.4.2.4 Coarse Aggregates

- (1) The term "coarse aggregate" is used to designate aggregate, which is retained on sieve opening 4.75mm. The coarse aggregate shall be well

Tenderer

Superintending Engineer

graded and its gradation will be decided based on the laboratory tests to obtain dense mass of concrete. The gradation will be approved by the Engineer in Charge before production of the concrete.

- (2) Coarse aggregates shall be stored separately in stockpiles or bins in such a manner to avoid intermixing of different size of aggregates. The storing shall be done in following sizes:

5 -10 mm
10 -20 mm
20 -40 mm
40 -80 mm
80 -150 mm

- (3) The percentage of deleterious substance in the coarse aggregate shall conform to IS383, except that the coarse aggregate shall contain not more than 0.3% by weight of deleterious (reactive) ferrous sulphide.
- (4) Coarse aggregate shall have al loss not more than 40% as determined by Los Angeles Abrasion test as specified in IS:2386 (Part IV). However in extreme cases, because of non – availability of such aggregate in near vicinity the Engineer in Charge may allow aggregates having this value as 50%.
- (5) When subjected to sodium sulphate soundness test, coarse aggregate shall not suffer a loss of weight in excess of 12% after five cycles.
- (6) Coarse aggregate shall be hard, dense, durable, uncoated rock fragments. Rock having an absorption greater than 3% or specific gravity less than 205 shall not be used.
- (7) Aggregate delivered to the batching plant shall have uniform and stable moisture content.
- (8) The nominal maximum aggregate size in relation to the structure dimension shall be fixed as per IS: 456 IS 457:

6.4.2.5 Aggregate Storage

- (1) Aggregates shall be stored in a manner so that each size of aggregate is stored separately in free-draining piles in a manner that reduces breakage, deterioration, contamination and segregation be a minimum. Storage arrangements shall be subject to acceptance by the Engineer in Charge.
- (2) The Tenderer shall maintain sufficient aggregate storage at the Site at all times to permit continuous placement of concrete in accordance with the contractual time schedule.
- (3) The moisture content of aggregates shall be controlled as far as practicable, by wetting the stockpiles and by adequate drainage. All aggregate shall remain in a free-draining stockpile for at least 12 Hours prior to use.
- (4) The preparation of stockpile areas, the storage of processed aggregates and the disposal of any rejected material shall be all times be subject to the approval by the Engineer in Charge.
- (5) Materials shall be removed from stockpiles by methods, which minimise segregation and crushing. No fine aggregate from the bottom 500-mm of to stockpile shall be used for mixing concrete.

6.4.3 Water

- (1) A reliable and adequate water supply shall be installed and maintained by the Tenderer for washing of aggregates, manufacturing and curing of concrete. The water shall be clean and free from harmful quantities of oil, acids, alkalis, sugar, salt, silt and other organic matters and shall conform to IS:456.
- (2) Water shall contain not more than 1,000 mg/l of chlorides (Cl), and shall have a turbidity limit of not more than 1,000 ppm.
- (3) Adequate water storage shall be provided at the batching plant to ensure smooth concrete production.
- (4) Tenderer shall familiarise himself with source and quality of water available. Attention is drawn to the possible requirement of setting pond and other facilities that he may be required to provide.

6.4.4 Admixtures

- (1) Admixtures shall be proposed by the Tenderer and shall be used only upon written approval of the Engineer in Charge. Only admixtures that have been commercially used with satisfactory service in a similar type of concrete work shall be considered for approval. All admixtures shall be manufactured by a reputable company(ies), supported by a fully staffed technical service organisation and research group.
- (2) The Tenderer may use the following admixtures when required with the approval of the Engineer in Charge:
 - a) High-range water-reducing admixture (HRWRA)/ Super plasticizer to improve workability without reducing the strength or durability of the mix,
 - b) Air-entraining agent,
 - c) Non-shrink agent,
 - d) Accelerating agent in the concrete, mortar or grout to increase the rate of hydration, shorten the setting time or increase the rate of hardening or strength development,
 - e) Plastifying agents to increase the workability of concrete particularly in concrete for tunnel lining.
- (3) High-range water-reducing admixture (HRWRA)/ Superplasticizer shall meet the requirements of ASTM C 494 type F or g or ASTM C 1017 type 1 or 2.
- (4) Admixtures shall comply with the provisions of IS:91023 or in case of lack of corresponding IS, the ASTM Specifications C494 and C260.
- (5) Admixtures shall be stored and handled so as to avoid contamination or damage to their properties by temperature or moisture changes or other influences.
- (6) The quantity of admixture and the method of mixing shall be strictly in accordance with the manufacturer's printed instructions, or as required to produce specified results as established by mix design whichever is less, and approved by the Engineer in Charge. No excess admixtures shall be used for getting more workability than functional requirement of the used for getting more workability than functional requirement of the structure. The Tenderer shall be liable for penalty for such overuse of admixture. No payment shall be made for the concrete produced, cement variation and admixture in case of such overuse of admixture.

Tenderer

Superintending Engineer

- (7) The Tenderer shall be held liable for any damages and difficulties resulting from the selection and use of admixtures such as delay in concrete placing or damage to concrete during forms removal, and shall not be entitled to any time extension or claims resulting here from.

6.5 CONCRETE MIX DESIGN

- (1) Denomination of concrete classed is based on the nominal cube compressive strength (in Newton per square mm) and maximum aggregate size.
- (2) The cube compressive strength is defined as the strength as measured at 28 days. The strength shall comply with the requirements of IS:456.
- (3) The following table shows, in general, the anticipated classes of concrete required in various sections of work. The specific class of concrete to be used in each area will be shown on the Construction Drawings or designated by Engineer in Charge:

Class of Concrete	Max. size of aggregate (mm)	Nominal cement content (kg)	Max. slump (mm)	28-day strength (N/mm ²)	Location
M30	20	350	100	30	Block-out concrete for equipment embedding
M25	20	325	100	25	Lining of hydraulic tunnels, Beams columns and slabs in control building & DG set room, Precast units for concrete lagging.
M25	40	300	80	25	Beams, columns, slabs, substructures/footings, parapet wall, Dam and spillway mantle, bridge, Piers, Diversion tunnel intake structure, Invert lining of hydraulic Tunnels and backfill concrete.
M20	40	275	100	20	Tunnel plugs and plunge pool, Filling of galleries for Cut off wall, Concreting of trenches for Cut off wall, DT outlet channel and backfill concrete.
M20	80	250	100	20	Concrete at bottom, u/s and d/s face of Dam, Concrete around galleries in Dam, concrete Blocks and backfill concrete.
M15	150	175	40	15	Mass concrete in dam

Tenderer

Superintending Engineer

M15	80	190	50	15	Mass concrete in Dam, retaining walls, concrete coffer walls and backfill concrete
M15	40	200	50	15	Concrete in footings/foundation
High	20	450	100	60	Spillway glacis and bucket.
performance concrete					
M60					
M10	-	150	-	10	Porous concrete

- (4) At least 4 months prior to commencement of any concreting of Permanent Works, the Tenderer shall start the testing of materials, propose the composition of concrete mixes and prepare trial mix of each of the proposed concrete class. The Tenderer shall prepare the trial mixes using the cement, water, aggregates and admixtures intended for the work and which conform to the requirements specified in this Section.
- (5) Tenderer shall determine, in accordance with IS standards and/or ACI MANUAL OF CONCRETE Practice, the mix proportions for the designated classes of concrete. The Tenderer shall submit the test reports to the Engineer in Charge for approval. This preliminary test program shall include the determination of following parameters:
- Cement properties,
 - Characteristics of aggregates,
 - Mix water properties,
 - Admixture properties,
 - Proportion of aggregate ranges in the mix,
 - Proportion of uncrushed to crushed aggregates,
 - Cement content,
 - Water-cement ratio (W/X),
 - Workability of concrete mixes,
 - Compressive and tensile strength,
 - Entrained air,
 - Density,
 - Water – tightness.
- (6) These test shall be carried out until the concrete mixes show appropriate strength, workability, density, and water-tightness without the use of excessive cement and water.
- (7) To carry out these preconstruction tests, full-scale machine-mixed test batches shall be made and test samples taken there from. Tests shall be made in ample time so that complete and acceptable results are available before concreting of structures.
- (8) Test samples shall be made in accordance with IS:1199 and tested in accordance with IS: 516. The test results shall be analysed in accordance with IS:456.
- (9) The mixes for different classes of concrete shall be selected jointly by the Engineer in Charge and the Tenderer.

Tenderer

Superintending Engineer

- (10) During the progress of the work, the mixes may be changed whenever, in the opinion of the Engineer-in-Charge, such change is necessary or desirable to secure the required strength, workability, water-tightness, density, economy, or to limit shrinkage. The Tenderer shall not change the approved mix proportions without the written permission of the Engineer in Charge.
- (11) Water to be added to the mix shall be adjusted to compensate for any variation in the free moisture content of the aggregate as they enter the batch plant. Water beyond the specified water – cement ratio shall not be added without the written permission of the Engineer in Charge.

6.6 QUALITY CONTROL

6.6.1 General

- (1) The Tenderer shall be completely responsible for performing detailed quality control program during the execution of the work. This quality assurance program shall be subject to inspection and checking by the Engineer-in-Charge.
- (2) The Tenderer shall keep records of test results, which shall be presented to the Engineer in Charge upon request.
- (3) Should the Tenderer wish to reduce his approved testing program he shall notify the Engineer in Charge of these changes 2 weeks in advance.
- (4) Besides Tenderer's testing program the Engineer in Charge will make control test to the extent as he deems necessary. The Tenderer shall give all required assistance in sampling and provide for the proper storage and transport of the specimens to be tested by the Engineer-in-Charge.
- (5) The Tenderer shall make such arrangements or purchase a new equipment should the test results prove that changes in the aggregates or concrete plant are necessary to obtain required concrete quality.

6.6.2 site Laboratory

- (1) The Tenderer shall build, equip, and operate the site laboratory in which the tests included in the Quality Control programme will be carried out. In some cases where special tests are required, they will be made in other specialised laboratories after approval by the Engineer-in-Charge.
- (2) The laboratory shall be equipped with all the necessary equipment to carry out the tests indicated below.
 - a) Tests on aggregates as per IS 2386 (Parts I, II, III, IV)
 - Sieve analysis
 - Compressive strength
 - Specific gravity
 - Water absorption
 - Flakiness
 - Sand equivalent
 - Soundness and organic matter
 - Los Angeles abrasion
 - Impact test
 - b) Tests on cement
 - Equivalent alkaline content (IS 4032)
 - Specific Blaine surface (IS 4031 (6))

- Standard Mortar Compressive Strength (IS 4031 (6))
 - Shrinkage (IS 4031 (10))
 - Heat of hydration (IS 4031 (5))
 - c) Tests on fresh concrete
 - Consistency through slump test (IS 1199)
 - Workability
 - Heat of hydration using thermometers, cells and recording instruments
 - d) Tests on hardened concrete
 - Compressive strength on all classes of concrete (IS 516)
 - Shrinkage (IS 4031 (10))
- 3) The site laboratory shall be properly air-conditioned and equipped with temperature and relative humidity recording instruments.

- (1) Aggregate samples shall be taken from silos at the batching plant or from the conveyor belt.
- (2) The sampling shall be done at the frequency of one every 1,000 m³ of produced concrete (cumulative of all concrete classes) and once a week at minimum.
- (3) The following tests will be carried out :
 - Sieve analysis
 - Sand equivalent
 - Cleanliness of gravel
 - Flakiness of gravel
 - Los Angeles abrasion

6.6.3.2 Cement

- (1) In case cement is procured by Tenderer the Quality control of cement shall be undertaken as described below.
- (2) Quality control of cement shall first take place at the cement factory. This will be exercised by the factory itself under the supervision and the follow-up of the owner. The quality control program at site will be established jointly with the Tenderer and shall be submitted for the approval of the Engineer in Charge.
- (3) The requirements on the Site laboratory are stipulated in the Section "Site Installations and Services".
- (4) The following tests will be carried out at both laboratories and compared:
 - Setting time,
 - Expansion
 - Specific Blaine surface
 - Equivalent alkali content
 - Standard mortar compressive strength
 - Heat of hydration
- (5) Furthermore, each week, a sample of cement shall be taken at the batching plant and the following tests shall be carried out:
 - Setting time ,
 - Specific Blaine surface,
 - Standard mortar compressive strength at 3, 7 and 28 days.

Tenderer

Superintending Engineer

6.6.3.3 Admixtures

- (1) Admixtures to be used for concrete production shall be tested for their suitability with the cement and other materials under actual working conditions. Each shipment of admixtures shall be tested for density and dry extract.
- (2) Admixtures older than 12 Months, after their manufacturing, shall be tested for deterioration.
- (3) Total lot of admixtures from which the tested sample failed the criteria, shall be rejected.

6.6.3.4 Water

A sample of water will be taken from the concrete batch plant every 3 months and submitted to chemical analysis as described in IS 3025 – 1964.

6.6.3.5 Fresh Concrete

- (1) The following tests shall be carried out by the Tenderer on fresh concrete samples:
 - Consistency (slump tests) on all concrete classes (sieved at 40mm for 80 mm size of aggregate concrete),
 - Air content,
 - Temperature.
- (2) These tests shall be carried out at the beginning of manufacturing of the concrete for each work or part of the work and for large quantities once every 100m³.
- (3) All consistency tests shall be determined on that portion of the total sample, which passes a 40 mm size.
- (4) Air content shall be determined in accordance with the established standard.
- (5) One air test (0.006 m³ capacity bowl) is required at the beginning of each shift, whenever a class change occurs, whenever air test results are deviating from specifications and at 500 m³ intervals for each class of concrete in production.
- (6) Routine air tests as noted above will be determined on that portion of the total sample, which passes a 40 mm sieve size.
- (7) All coarse aggregate larger than one quarter the minimum dimension of the mould will be removed by wet screening. Portions of samples of concrete used for slump, air content, unit weight, etc. Will not be used to mould specimens for compressive strength testing.

6.6.3.6 Hardened Concrete

- (1) Set of six samples for compressive strength tests at 7 and 28 days will be taken and tested for each part of the work, being defined as the volume poured in one concreting operation.
- (2) For large concreting operations, this set of sample will be taken every 200 m³.
- (3) Compressive strength specimens shall be prepared by the Tenderer and shall be performed in accordance with Indian Standards and Code of Practice.

6.6.3.7 Analysis of Results

The test results will include the different components analyses, the values obtained on fresh and hardened concrete and the characteristics of the corresponding batch given by the printer of the batching plant.

Tenderer

Superintending Engineer

- (1) The Tenderer shall present regularly to the Engineer in Charge a synthesis of all the results in the form of tables, charts, statistical analyses (weekly and monthly reports).

6.6.3.8 Concrete Plant

Monthly checks, or when requested by the Engineer-in-Charge, of the concrete plant's weight-batching accuracy, including the accuracy of any admixture dispenser, shall be made by the Tenderer in the presence of the Engineer-in-Charge. When checked by standard weights and volumes its accuracy shall be within 0.5% or as specified by the manufacturer.

6.7 ACCEPTANCE CRITERIA

6.7.1 Concrete Components

- (1) The acceptance criteria for hardened concrete shall be as per IS:456.
- (2) If analysis of test cube results indicates poorer concrete in the structure as per the acceptance criteria of IS:456, the Engineer in Charge will order the Tenderer to provide core tests. Location and number of cores will be decided by the Engineer in Charge. The Tenderer shall take out the specified sizes of cores from the structure.
- (3) In case the concrete cores fail to meet the specifications and the Engineer in Charge is not satisfied with various tests results and quality he will then instruct the Tenderer for removal or subsequent suitable strengthening measures for such works at no cost to the

6.8 BATCHING AND MIXING

6.8.1 General

- (1) The Tenderer shall provide, operate, and maintain at the Site automatic batching equipment to determine and control the amount of each individual material entering the concrete. Batching equipment shall be designed for such capacities, which will permit performance of the concrete work in accordance with Contractual construction Program.
- (2) Water, cement, admixtures, fine aggregate and coarse aggregate shall be measured separately and not cumulatively. The accuracy of the measuring devices shall be maintained so that the indicated measure does not vary by more than 1 percent from true measure throughout their range of use. The devices shall be capable of being operated to control the delivery of materials so that the combined inaccuracies in feeding and measuring do not exceed the following limits:

Material	Percent (by weight)
Cement	1
Water	1
Aggregates	3
Admixtures	1

6.8.2 Batching Equipment

- (1) At the batching plant, standard certified test weights shall be provided and such other auxiliary equipment as may be necessary to check the operating performance of each scale or other measuring device. When required by the Engineer in Charge, operator shall make these tests in his presence. Unless otherwise required by the Engineer in Charge. Check tests of equipment used for measuring water, cement aggregates and admixtures shall be made at least every week. After completion of each check test, operator shall report the results to the Engineer in Charge and make such adjustment, repairs or replacement as the Engineer in Charge deems necessary to secure satisfactory performance before further use of the measuring devices.
- (2) The batching equipment shall be capable of handling a minimum of three different sets of mix proportions concurrently, without having to reset scales manually, and recording the number of batches of each mix separately.
- (3) Each measuring unit shall include a visible springless dial (metric) which will register the scale load at any stage of the measuring operation or shall include an over-and-under indicator, which will show the scale in balance at no load when loaded to the beam setting. The masses of the components of each batch shall be automatically recorded and the records submitted to the Engineer in Charge at daily intervals.
- (4) Each measuring indicator and volume-measuring device shall be in full view of the operator, and the measuring equipment shall be arranged so that the operator may conveniently observe the operation of the bin gates, the materials discharging into the mixer and the concrete during mixing and discharging. The batch panel shall be equipped with chatter controls to control the dribble for each material batched and a volume selector capable of setting from 1 m³ up to the mixer capacity in increments of 1 m³.
- (5) The batching equipment shall be so constructed and arranged that the sequence and timing of the batcher discharge gates can be controlled to produce an intermixing of the aggregate, water and cementing materials, as the materials pass through the charging hopper into the mixer. The batching controls shall be so interlocked that a new batching cycle cannot be started until all the weighing hoppers are completely empty.
- (6) The operating mechanism in the water-measuring device shall be such that no leakage will occur when the valves are closed and the discharge valve cannot be opened until the filling valve is closed.
- (7) The dispensing device for adding admixtures shall be interlocked with the batching and discharging operation of the water so that the batching and discharging of the admixtures will be automatic. The device shall be capable of permitting the quantity of admixture being batched to be adjusted should this prove necessary, and shall be equipped with a suitable warning device to indicate when the level in the reservoir tank is low.
- (8) A calibrated container shall be incorporated in each admixture holding system such that normally the admixture will bypass the container during batching. However, at any time it will be possible to direct the

batched material into the container to check the accuracy of measurement.

- (9) The batching equipment shall include an accurate recorder for providing a continuous visible record of the measurement of each separate material, including all added water and admixture.
- (10) The measuring and recording equipment shall be supported on foundations independent of those for the mixing plant to prevent them from being affected by vibration.
- (11) Effective communication system including telephone shall be provided between the concrete plant and the point of placement at all times, and such facilities shall also be available at either location for use by the Engineer in Charge as required.
- (12) Volume batching will not be permitted.
- (13) In case of use of fully automated batching plant, all the recording and indicating system intentioned above shall be available and on-line control of all components of the batching plant shall be provided.

6.8.3 Mixing

- (1) Concrete shall be mixed in power-driven stationary batch mixers of approved type and size. They shall be kept clean and in proper working order. The mixing blades in the drum shall be replaced when worn by 10% of their design dimensions.
- (2) Movable truck mixers shall not be permitted for mixing concrete mixes.
- (3) The batching plant shall be provided with a bypass such that the mix materials can be discharged directly into a transit mixer drum. This bypass is to be used only in emergency and with permission of the Engineer in Charge.
- (4) The mixing equipment shall be capable of combining the aggregate, cementing materials, water and other ingredients, within the time hereinafter specified, into a thoroughly mixed and uniform mass, and of discharging the mixture without segregation.
- (5) The mixers shall be so charged that some water will enter in advance of cement and aggregate and all materials shall continue to flow in as rapidly as possible. The construction of the mixers should prevent loss of materials during charging.
- (6) The mixers shall not be charged beyond their rated capacities and the entire contents of the mixer shall be discharged before recharging.
- (7) Unless otherwise authorised by the Engineer in Charge for mixers of 1m³ capacity or less, the mixing of each batch shall continue for not less than 1.5 minutes as specified in IS:456 (but not more than 5 minutes when mixing air-entrained concrete) after all materials, except the full amount of water, are in the mixer. For mixers of larger capacity, the minimum mixing time will be increased by 15 seconds for each additional 0.5m³.
- (8) The mixing time shall be increased when, in the opinion of the Engineer-in-Charge, the charging and mixing operations fail to result in the required uniformity of composition and consistency within the batch and from batch to batch.
- (9) Mixers shall be rotated at the rate recommended by the manufacturer of the mixers.

- (10) The arrangement for controlling, measuring and mixing operations shall be such that the operator may observe the concrete discharging from the mixer.
- (11) Each mixers shall be equipped with a mechanically or electrically operated timing and signaling device for indicating and assuring the completion o the required mixing period and for counting the batches.
- (12) Should a mixer at any time prove unsatisfactory, it shall be replaced or its use discontinued until it is made satisfactory.
- (13) Each mixer shall be cleaned after each period of continuous operation and shall be maintained in such a condition that the mixing action will not be impaired.
- (14) On no account shall any addition be made to any component of a concrete batched once that batch has been mixed and discharged from the mixer, whether for the purpose of retempering or for any other reason.
- (15) Batching and mixing of concrete shall not commence unless due notice, at least 24 hours in advance, has been given to the Engineer in Charge and written approval has been obtained for the placing arrangements, and for the preparation and accuracy of the part of the Works in which concrete is to be placed.

6.9 HOT AND COLD WEATHER CONCRETING

6.9.1 Temperature of Concrete

- (1) The maximum permitted temperature rise in concrete and temperature distribution after placement will be determined by the Engineer in Charge based on the laboratory test performed prior to the start of concrete work using the actual cement, concrete mix proportions, and diffusibility for the concrete under consideration, or by actual field monitoring.
- (2) As a general rule. The maximum temperature developed after placement should not be higher than 55-60 °C, and the temperature difference within the pour or lining should not exceed 20 °C. For linings of tunnels these value shall be limited to 50 °C for maximum heat of hydration, and 10 °C maximum temperature gradient in any section of the lining.
- (3) The temperature of concrete when being placed in hot weather shall be as follows, unless otherwise permitted by the Engineer in Charge:
 - a) Mass concrete including 40-150 mm aggregate in dam and spillway and plugs in diversion tunnel, not more than 12 °C,
 - b) Structural, tunnel lining, not more than 20 °C,
 - c) All other concrete, not more than 30 °C,
- (4) The Tenderer shall supply and install temperature meters in the fresh concrete in the Dam, and perform temperature measurement as detailed in the section "Monitoring instruments".
- (5) The temperature of concrete when being placed in cold weather shall be as follows:
 - a) Mass concrete, not less than 7 °C,
 - b) Structural concrete, not less than 10 °C,
 - c) Structures thinner than 300 mm, not less than 13 °C.

- (6) Cold weather conditions will be considered to be in effect when the mean daily temperature drops below 5 °C for more than 3 successive days.
- (7) When temperatures above 10 °C occur during more than half of any 24-hour period, the concrete should no longer be regarded as “winter concrete”, and normal concreting practice should apply.

6.9.2 Hot weather Precautions

- (1) The Tenderer shall furnish, install, operate, and maintain equipment and make the necessary provisions in order to maintain the temperature of concrete, when being placed, below the maximum temperatures specified above.
- (2) Following means shall be employed to attain the specified concrete temperatures:
 - a) Pre-cooling of coarse aggregate by sprinkling, immersion in cold water or with cold air blast,
 - b) Refrigerating the mixing water or adding the chip or flake ice as a portion of the mixing water,
 - c) Insulating the water tanks and water supply lines, cement silos, mix drums, exposed pipelines for pumped concrete and sheltering the aggregates,
 - d) Mixing and placing the concrete at night.
- (3) Ice, when used for mixing water, shall be completely melted before mixing is completed.
- (4) The temperature of concrete at the mixing plant shall be 2C lower than the placing temperature specified above.
- (5) The Tenderer's concreting operations shall be in accordance with the recommendations contained in IS:7861 (Part 1).
- (6) The use of liquid nitrogen in lieu of ice may be permitted by the Engineer in Charge after review of proposed details for its use submitted by the Tenderer.

6.9.3 Temperature Control for Mass Concrete in Dam and Spillway

- (1) For mass concrete in spillway and dam, the maximum lift height shall be 1.5m.
- (2) The temperature difference (i.e., the gradient) between the interior “core” and the coldest exterior concrete surface shall not exceed 22 °C. Interior and exterior temperatures shall be monitored unless otherwise directed by the Engineer in Charge. The Tenderer shall provide his proposed monitoring program for the approval of Engineer in Charge in charge.
- (3) The Tenderer shall supply and install temperature meters in the fresh concrete and perform temperature measurement.

6.10 CONVEYING

- (1) The method and facilities for concrete transport shall be selected by the Tenderer within the limitations of these Specifications, and he shall be responsible for adequacy and suitability of the transporting system. The time elapse between mixing and the initial set of the concrete shall be taken into consideration. All methods used shall be reviewed by the Engineer in Charge.

Tenderer

Superintending Engineer

- (2) The concrete transporting methods and facilities shall be such that will prevent segregation of coarse aggregate, excessive loss of slump, and loss of ingredients. Equipment such as buckets, cars, conveyers and pumping equipment which may be used for conveying concrete, shall be of such size, design and condition as to ensure an even and adequate supply of concrete at the placement area. All equipment shall be kept clean and in good working condition.
- (3) The use of chutes to convey concrete will not be permitted, except that chutes less than 3m in total length may be used immediately adjacent to or on the forms with acceptance of the Engineer in Charge. Where chutes are used, they shall be so constructed and arranged as to permit continuous flow of the concrete without separation of the ingredients.
- (4) There shall be not vertical drop greater than 1.5m, except where equipment satisfactory to the Engineer in Charge is used to confine and control the falling concrete.
- (5) Concrete may be dropped through flexible elephant-trunk chutes, provided methods are used at the lower end to retard the speed of the falling concrete and prevent it from segregating. Where it is necessary to drop concrete from more than 1.5m it shall fall into a hopper with a capacity of 1m³ more than the total capacity of the full trunk.
- (6) Buckets for transporting concrete shall be manufactured as low slump concrete buckets.
- (7) All conveying plant shall be supported independently of the forms, except as specifically permitted by the Engineer in Charge.
- (8) The conveying plant shall be kept free from hardened concrete and foreign materials, and shall be cleaned at frequent intervals.

6.11 SETTLEMENT CONTROL OF DAM

- (1) Control of settlement of Dam foundation is an important requirement so differential loading of Dam foundation needs to be minimised. For monitoring of Dam, settlement and stress measuring instruments shall be provided as per construction drawing. Construction planning including concreting methodology shall be planned by the Tenderer keeping above in view.
- (2) Abutment stripping for Dam foundation and excavation/concreting of key trenches for construction of Cut off wall shall be performed as per the method statement submitted at the time of tender. However, **Dam blocks shall be raised uniformly from the deepest foundation level only.**
- (3) During concreting of dam, Tenderer shall regularly monitor and analyse instrumentation data. Construction methodology shall have to be modified, if warranted, from settlement requirement and/or as directed by Engineer in Charge at no financial implication to NHPC.

6.12 FORMS FOR CONCRETE

General requirements

Forms shall be used wherever necessary to confine the concrete, shape it to the required lines or to ensure against contamination of the concrete by materials caving or sloughing in from adjacent excavations or other features of the work. All exposed concrete surfaces having slopes of 1 to 2 or steeper shall be formed. Where the side slopes of walls of an

Tenderer

Superintending Engineer

excavation for concrete structure can be timed to the prescribed lines without sloughing the use of forms will not be required. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in correct position. Forms shall be tight to prevent loss of mortar from the concrete. Moulding strips shall be placed in the corners of forms so as to produce leveled edges at formed surface and edges at formed joints will not require leveling unless so indicated on the drawings. Forms for concrete surfaces for which finishes F3 and F4 are specified shall be reset and tightened at construction joints, so that they fit snugly and firmly against and tightened at construction joints, so that they fit snugly and firmly against the hardened concrete when concrete replacement is resumed. Additional forms/ ties shall be provided as necessary to ensure against spreading of the reset forms under pressure of the subsequently placed concrete and consequent offset from the previously formed face.

Tongue and groove sheathing

Tongue and groove sheathing, where used for forming shall be 10 cm to 15 cm common T & G and shall be placed horizontally.

6.12.1 FORMS FOR WRAPPED SURFACES DESIGNED FOR F4 FINISH

Forms for warped surfaces shall be constructed so as to conform accurately to the required curvatures of the sections. Intermediate sections shall be interpolated as necessary for the type of form construction being used and the forms shall be prepared, so that the curvatures will be continuous between sections.

Where necessary to meet requirements for curvature the form sheathing built of laminated slices be cut to make tight and smooth form surface. The forms are to be constructed such that the joint marks on the concrete surfaces inside of principal water conduits shall as far as possible follow the line of water flow. After the forms have been constructed and erected all surface imperfections shall be corrected, all nails shall be hidden and any roughness and all angles on the surfaces of the forms caused by matching the form materials shall be dressed to the required curvatures.

6.12.2 FORMS SHEATHING AND LINING

Wood sheathing or lining shall be of such kind and quality or shall be treated or coated that there will be no chemical deterioration or discoloration of the formed concrete surface. The type and condition of form sheathing and lining, the ability of the forms to withstand distortion caused by placement and vibration of the concrete and the workmanship used in form construction shall be such that the formed surfaces after being finished will conform with the applicable requirements of these specifications pertaining to finish of formed surfaces. Where finish F3 is specified, the sheathing or lining shall be so placed that the joint marks on the concrete surfaces will be in general alignment both horizontally and vertically. Except where other wise specifically provided materials used for form sheathing lining shall conform to the following requirements.

Required finish of formed surface	Wood sheathing or lining	Steel sheathing or lining
F1	Any grade	Steel sheathing permitted. Steel lining permitted.
F2	No.1 common shiplap	Steel sheathing permitted. Steel lining permitted if necessary.
F3	No.1 common tongue & grooved except where plywood lining or sheathing is specifically required.	Steel sheathing not permitted. Steel lining not permitted.
F4	No.1 common tongue & grooved for plane or cylindrical surfaces	Steel sheathing permitted. Steel lining not permitted. Thin plywood lining for warped surfaces.
F5	Absorptive form lining backed with No.1 common shiplap.	Steel sheathing not permitted. Steel lining not permitted.

Note:

“Steel sheathing” denotes steel sheets not supported by backing of wooden Boards

“Steel lining” denotes thin steel sheets supported by backing of wooden boards.

6.12.3 ABSORPTIVE FORM LINING

Absorptive form lining, where directed to be used shall be of the type of quality approved by the Engineer in Charge. The form lining shall be highly absorptive to air and water and through its absorptive capacity able to eliminate voids, pits and other common defects from the concrete surface. The lining shall be readily removable from the concrete without damage to the surface. It shall produce dense concrete surface of uniform and satisfactory texture and colour. The lining itself and treatment employed in its manufacture shall not discolour the concrete nor interfere with the normal reaction of the cement. The backing to which absorptive lining is attached shall be sufficiently smooth, even and free from cracks, knot holes and other imperfections to avoid unevenness in the finished surface. ; The lining shall be of sheets of uniform length and width. Location and direction of the joints shall be as approved by the Engineer in Charge. The joints between sheets shall be fitted smoothly and accurately and patching shall be avoided. Cutting and trimming shall be true and shall be done with tools well adapted to this work so that sharp, smooth, square edges are produced. The lining shall be spaced in uniform pattern and shall be driven flush. Dents and hammer marks in the surface of the lining shall be avoided. After the lining has been attached to the form, the joints shall be rubbed with a smooth tool to press down any projecting fibres. Where absorptive form lining is intact with the face of a previous pour, care shall be used in setting and sufficient pressure shall be applied in tightening

Tenderer

Superintending Engineer

form anchors to produce continuity and evenness at the face free from offsets and streaks and other irregularities. The lining shall be kept dry and shall not be reused.

6.12.4 FORM TIES

Embedded metal rods used for holding forms shall remain embedded and shall terminate not less than 30 mm clear of the formed faces of the concrete where the maximum size of aggregate is 75 mm. Embedded wire ties for holding forms will be permitted in concrete walls for which finish F1 is specified except walls to be subjected to water pressure where ties shall be cut off flush with the surfaces of the concrete after the forms are removed.

6.12.5 CLEANING AND OILING OF FORMS

At the time concrete is placed in the forms the surface of the form shall be free from incrustation of mortar grout or other foreign materials that would contaminate the concrete or interfere with the fulfillment of the specification requirements relating to the finish of formed surfaces. Before concrete is placed the surface of the forms except those of rough lumber meant for concrete surfaces which are to be plastered shall be oiled with a commercial form oil that will effectively prevent sticking and will not stain the concrete surfaces. After oiling, surplus oil on the form surfaces and any oil on the reinforcement steel or other surfaces requiring bond with the concrete shall be removed. For wooden forms, form oil shall consist of straight refined, pale, paraffin mineral oil. For steel forms, form oil shall consist of refined material oil suitably compounded with one or more ingredients which are appropriate for the purpose. Special care shall be taken to oil thoroughly the form strips for narrow grooves at windows, doors and elsewhere so as to prevent swelling of the form and consequent damage to the concrete prior to or during the removal of forms.

6.12.6 ERECTION OF FORMS

Before concrete is placed precaution shall be taken to see that forms are in proper alignment and that all form anchor and ties are thoroughly secured and tight. Where forms for continuous surfaces are placed in successive units the forms shall fit tightly over the completed surfaces as to prevent leakage of mortar from the concrete and to maintain accurate alignment of the surfaces. Care shall be taken in forming the contraction joints in the dam so as to form a smooth joint free from sharp deviation, projections or edges. Particular attention shall be paid to setting and tightening the form so that the contraction joint surface is to plump and in accurate alignment.

6.12.7 REMOVAL OF FORMS

- a. The Engineer in Charge shall be informed in advance by the Tenderer of his intention to strike any form. Forms shall not be struck until the concrete has reached a strength equal to at least twice the stress to which the concrete may be subjected at the time of removal of form work. Except as otherwise provided in this sub clause, form shall be removed as soon as the concrete has hardened sufficiently, thus facilitating satisfactory specified curing and earliest practicable repair of surface imperfection.

Where possible, the form work shall be left longer as it would assist the curing.

- b. While fixing the time for removal of form work, due consideration shall be given to the local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix.
- c. Forms under sloping surfaces of concrete, such as forms on the water sides of warped transition shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repair of treatment required on such sloping surface shall be performed at once and be followed immediately by the specified curing.
- d. In order to avoid excessive stresses in the concrete that might result from swelling of the forms, timber forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.
- e. Subject to approval, forms on concrete surface close to excavated rock surface may be left in place provided that the distance between the concrete surface and the rock is less than 400 mm and that the forms are not exposed to view after completion of the works.
- f. Forms shall be removed with care so as to avoid any damage to the concrete. Concrete damaged, if any due to form removal shall be repaired in accordance with the provisions for repair of concrete as per para 4.6.16.
- g. In normal circumstances and when ordinary Portland cement is used, forms may generally be removed after the expiry of the following period as specified IS:156-1978 but the period shall be modified in case of wet weather and also as per direction of the Engineer in Charge.

1.	Walls, columns and vertical faces of all structural members.	24 to 28 hours as may be decided by the Engineer in Charge
2.	Slabs (Props left under)	3 days
3.	Beam soffits (Props left under)	7 days
4.	Removal of props under slabs:	
	a. Spanning upto 4.5 m	7 days
	b. Spanning over 4.5 m	14 days
5.	Removal of props under beam and arches	
	a. Spanning upto 6 m	14 days
	b. Spanning over 6 m	21 days

6.13 DRILLING HOLES AND GROUTING ANCHOR BARS IN ROCK

In the spillway apron the spillway retaining walls and as shown on the drawings or as directed holes shall be drilled into the rock to receive bars for anchoring concrete structures of parts thereof to the rock. The types and dispersions of the anchor bars and the locations, diameters and depths of the anchor bar holes shall be as shown on the drawings or as directed. The diameter of each hole shall not be less than $1\frac{1}{2}$ times the largest transverse dimension of the bar specified for that hole subject to a minimum of 12 mm over the bar diameter. Anchor bars shall be cleaned thoroughly before being placed. The holes shall be washed out and cleaned thoroughly and shall then be placed. The holes shall be washed out and cleaned thoroughly and shall then

be completely and compactly filled with grout of proper proportions. Each anchor bar shall be forced into place to full depth immediately after the grout has been placed and shall then be rapped or vibrated until the entire embedded surface of the bars is in intimate contact with the grout. Special care shall be taken to prevent any movement of bars after they have been placed till the grout has adequately hardened. Alternatively the insertion of the anchor bar into the fresh grout filled hole may be carried out immediately prior to placement of grout in the location, the hardened concrete will then prevent undesirable vibration being imparted to the anchor bar and lead to avoidance of separation.

6.13.1 PLACING ANCHORS IN CONCRETE

Anchor bolts, structural shapes, plates and bearings required in connection with the installation of gates. Gate hoists and operating machinery shall be placed in concrete as shown on the drawings or as found necessary. Wherever practicable anchors shall be installed before the concrete is placed and except as otherwise provided drilling for the installation of anchors in the concrete will not be permitted. Where the installation of anchors prior to placing the concrete is not practicable, satisfactory formed openings shall be provided and the anchors shall be grouted into the openings later. Anchor bolts for machine may be placed in approved pipe sleeves to facilitate installation of machinery and the sleeves shall be completely filled with grout after the locations of the holes are finally determined.

6.14 PLACING

6.14.1 General

- (1) Tenderer shall place concrete in a given location only after the Engineer in Charge has agreed with the placement of such concrete. All concrete shall be placed in presence of the Engineer-in-Charge. Concrete placed without prior knowledge and approval of the Engineer in Charge at all times.
- (2) The Tenderer shall furnish, install, maintain and operate a telephone system or radio, linking the points of placing concrete with the concrete batching and mixing plant. These facilities shall also be available to the Engineer in Charge at all times.
- (3) When placing the concrete by pumping, direct communication shall be maintained between the concrete placing crew and the pump operators.
- (4) In order to reduce bleeding, slump shall not be higher than necessary to achieve proper placement and consolidation. Concrete shall be placed before initial set has occurred, initial set time being determined in the laboratory.
- (5) No concrete shall be placed when the atmospheric conditions are, in the opinion on the Engineer-in-Charge, such that proper placing and hardening of the concrete are not guaranteed. Specifically, the Tenderer shall have the responsibility for meeting the hot and cold weather concreting requirements and for postponing concreting whenever such requirements cannot be met or, based on weather forecast, probably cannot be met. Even if the above requirements are fulfilled, the Tenderer has the responsibility of delivering concrete project that meets specified requirements.

Tenderer

Superintending Engineer

6.14.2 Preparation for Concrete placing

Concrete shall not be placed until all formwork, installation of embedded parts, reinforcing steel, and surfaces against which concrete is to be cast have been accepted by the Engineer-in-Charge.

- (1) All surfaces of forms and embedded items that have become encrusted with dried material from concrete previously placed shall be cleaned of all such material before the surrounding or adjacent concrete is placed.
- (2) Concrete shall not be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or diverted by pipes, or by other means, and carried out of the forms clear of the work. Water shall not be allowed to stand on any concrete surface until it has attained its final set. Water flow over the concrete, which may injure the surface finish will not be allowed.
- (3) Pipes, conduits, dowels and other items to be embedded in concrete shall be so positioned and supported prior to placement of concrete to be stable and provide sufficient clearance (50 mm min.) between said items and steel reinforcement to allow proper concreting. Securing such items in position by wiring or welding to reinforcement will not be permitted.
- (4) Where excavated surfaces which are to form the foundations for structural concrete, are absorptive or likely to become otherwise unsuitable, or where shown on the Construction Drawings, the Tenderer shall place a 'blinding course' consisting of a layer of Class M10 or M15 concrete 50 to 100 mm thick, as directed by the Engineer-in-Charge, uniformly over the foundation such that the upper surface is at grade elevation. Blinding concrete shall be placed before installing reinforcement of formwork.
- (5) Immediately before concreting, the forms and all other surfaces which will be in contact with the fresh concrete shall be cleaned of all loose material and debris including shavings, wood chips, sawdust, pieces of wire, nails, fragments of hardened concrete and mortar. Clean-out holes which may be needed for this purpose shall subsequently be securely closed in order to obtain the required surface finish.
- (6) The use of compressed air for cleaning will be allowed only if adequate precautions are taken to avoid the deposition of suspended oil on construction joint surfaces, reinforcement or other items which are to be bonded to concrete.
- (7) The Tenderer shall provide such personnel and equipment so that the performance of the concrete work is in a satisfactory manner. The transporting and placing equipment shall be clean and in good condition, adequate, and properly arranged to proceed with the placing without undue delays. The number and condition of vibrators for use and standby shall be ample for the requirements during placement. The lighting system shall be sufficient to illuminate the inside of the forms when concrete is placed at night.
- (8) The Contractor shall have protective coverings available for fresh concrete surfaces if there is a possibility of rain or hail.
- (9) Rock surfaces against which concrete is to be placed shall be clean and free from oil, standing or running water, mud, loose rock,

Tenderer

Superintending Engineer

- objectionable coating. Debris, and loose or unsound fragment. Faults, fissures and seams shall be cleaned to sound rock, and if directed, backfilled with dental concrete, shotcrete or dry-pack as appropriate.
- (10) Immediately before concrete is placed, all surfaces shall be cleaned thoroughly by the use of high velocity air-water jets, sweeping with brooms, wet sandblasting, bush-hammering, or other satisfactory means including combinations of the above.
 - (11) Rock surface against which concrete is to be placed shall be kept wet for at least 12 hours during the 24-hour period prior to placing concrete and shall be in a damp condition at the time of placing, with all pools of water removed.
 - (12) Before placing the concrete for tunnel lining the following requirements should be met:
 - a) The excavated cross section profile shall be carefully checked to ensure the minimum lining thickness requirements and if necessary it should be corrected,
 - b) All loose rock which has been trapped by the wire mesh covering over the excavated surface shall be cleared and the mesh be repaired and in necessary replaced,
 - c) All timber supports, large wooden wedges used during the initial assembly and erection of steel supports shall be removed,
 - d) Inverts of tunnel and shafts shall be totally cleaned of debris leaving sound rock Wherever required the Tenderer shall use mechanical tools to loosen and remove all loosened and blast damaged rock.
 - (13) Before any concrete is cast against previously placed concrete, the surface of the old concrete shall be prepared as described in sub-section "Construction Joints".

6.14.3 Placing and Compaction

- (1) Concrete shall be carefully placed in designated position. Where dense reinforcement of deep forms may cause segregation of concrete while placing suitable methods shall be used to prevent segregation. The free fall of concrete shall not exceed 1.5m
- (2) Concrete shall be placed directly in its permanent position and shall not be worked along the forms to that position. Vibrators shall not be used to move concrete laterally.
- (3) The addition of water into concrete after batching to compensate for stiffening of the concrete before placing shall not be permitted.
- (4) All concrete, with exception of concrete tunnel lining, shall be placed in continuous approximately horizontal layers. The size of the concrete lift shall be as shown on the construction drawings. The lift height shall generally not exceed 1.5 m. The thickness of the layers shall not exceed 500 mm for mass concrete, and for structural and all other concrete. Each layer shall be soft when a new layer is placed upon it so that no seams or planes of weakness within the section can form, and the two layers shall be made monolithic by penetration of vibrators.

- (5) The Engineer in Charge reserves the right to order a reduced thickness of layers where the layers as stated above cannot be placed in accordance with the requirements of these Specifications.
- (6) Time interval between successive lifts of mass concrete shall be determined by the Engineer-in-Charge. Nevertheless a minimum of 72 hours shall elapse between successive lifts.
- (7) No concrete shall be placed under water except where shown on the Construction Drawings or specifically so required by the Engineer-in-charge. No concrete shall be placed in running water. Water shall not be allowed to rise over freshly poured concrete until final set has been achieved.
- (8) Each layer of concrete shall be consolidated to the maximum practicable density, be free from pockets of coarse aggregate, completely fill all recesses in forms and around embedded parts, and be free of all voids. The concrete shall be compacted and worked into all corners and angles of the forms, around reinforcement and embedded items without permitting the component concrete materials to segregate.
- (9) No layer of concrete shall be placed until the previous layer in the same lift has been thoroughly consolidated. Each layer of concrete within a lift shall be covered with fresh concrete as soon as possible, but certainly within the period when the lower layer is still capable of being revibrated so that successive layers can be thoroughly worked together.
- (10) The maximum permissible time between the placing successive layers in a pour shall not exceed initial setting time of cement or 45 minutes, whichever is less, and shall be reduced to suit the temperature, humidity and job conditions. Concrete shall not be piled up in the forms in a manner that causes movement of the unconsolidated concrete, or permits mortar to escape from the coarse aggregate.
- (11) On proposal of the Tenderer and with the Engineer-in-Charge's approval, the concrete lining in tunnel may be placed in one continuous pour from invert to crown with construction joints normal to the axis of the tunnel over the full cross section, or continuous placing may be adopted with a sloping joint corresponding to natural angle of repose at end of each concreting cycle.
- (12) Concreting of lining shall be carried out by concrete pump using methods which do not cause segregation or requiring remixing of the concrete. The point of discharge when concreting the crown above the springing line shall be kept buried sufficiently to allow enough pressure to be built up to completely fill the crown including areas of overbreak in the crown if any.

- (13) Concrete shall be consolidated with the aid of approved immersion type mechanical vibrators complying with IS:2505 or electric or air driven vibrators operating at a speed of at least 7,00 cycles/minute when immersed in the concrete. The vibrating equipment shall at all times be adequate in number of units and power to penetrate concrete as it is adequate in number of units and power to penetrate concrete as it is being placed, to the satisfaction of the Engineer in Charge. Vibrators with flexible operating shafts shall be used for reinforced concrete and for concrete in restricted forms. At least one extra vibrator in working condition shall be constantly on hand at each point of placement for emergency use.
- (14) Application of the vibrators shall be made systematically and at such intervals that the zones of influence overlap and the concrete is properly compacted.
- (15) Every vibrator shall be operated in a near vertical position and the vibrating head shall be allowed to penetrate under the action of its own weight. In consolidating each layer of concrete, the vibrating head shall be allowed to penetrate and revibrate the concrete in the upper portion of the underlying layers. Extreme care shall be taken to ensure that the vibrators do not touch or disturb the reinforcing, embedded steel or forms.
- (16) To ensure even and dense surfaces which are free from aggregate pockets, honeycombing or air holes, it may be necessary to supplement internal vibration with hand-spading along the boundaries of the concrete and around embedded parts while the concrete is plastic under the vibratory action, should slip forms be used, the equipment and methods shall be such that the finished concrete will be well consolidated and homogeneous.
- (17) Tenderer shall use any or all of the above methods of consolidation, if required, to produce the necessary finish. Form vibrators shall not be used unless the forms are designed for form vibration and unless specifically authorised by the Engineer-in-Charge.

6.14.4 Pumping Concrete

- (1) Positive displacement pumping or other approved methods may be used to place concrete in locations approved by the Engineer in Charge. The type and the arrangement of equipment shall be subject to approval, and the equipment shall be operated only by experienced persons.
- (2) The equipment and its method of operation shall allow the concrete to enter the forms at a low velocity.
- (3) Concrete pumps and auxiliary equipment shall be in good condition and shall be maintained as such throughout the duration of the work. Through washing down of all parts that come in contact with concrete shall be performed after each concreting operation.

Tenderer

Superintending Engineer

- (4) Pumplines shall consist of rigid shall consist of rigid steel pipe or flexible pipe made of rubber, spiral-wound flexible metal or plastic, or combination of both. Use of aluminium pipe for pumplines shall not be permitted. Couplings shall be leakproof and strong enough to withstand handling during erection and poor support along the lines. They shall provide a full internal cross section with no constrictions of the smooth flow of concrete.
- (5) Immediately prior to the start of al concrete pumping, the pump and pumplines shall be primed by pumping an approved grout mixture through the equipment
- (6) Concrete pumping operations shall be planned in such a way that concrete does not set before the succeeding layer is place thereon. An adequate supply of fresh concrete shall be provided at all times.
- (7) When placing the concrete by pumping in tunnel lining, the sides of the lining shall be brought up evenly through windows prepared in the formwork and care shall be taken equal pressure is maintained on the formwork. The crown shall be filled through the slick line running along the top of the formwork. This line shall be deeply buried in the concrete at all times. Identifications marks to indicate the depth of burial shall be provided. The buried pumpline shall be withdrawn form the form gradually as the placement is completed. Air boosters shall be permitted until slick lines are buried as least 1.5 m into fresh concrete.

6.14.5 Concrete in Blockouts, Second Stage in Restricted Locations, etc.

- (1) All concrete required to be placed in blockouts to permit the installation and adjustment of mechanical and other equipment, around formed holes and second stage concrete in other locations shall be included in respective concrete as described in these Specifications.
- (2) The concrete surfaces of blockouts and first stage concrete at other locations shall be chipped and roughened as described herein before second stage concrete is placed at such locations.
- (3) Exceptional care shall be taken to placing concrete in blockouts in order to ensure satisfactory bond with concrete previously placed and to secure complete contact with all metal works in the blockouts.
- (4) The roughening of the first stage concrete surfaces shall be attained by chipping or sand blasting as approved by the Engineer in Charge and in such a manner as not to loosen, crack or shatter any part of concrete beyond the roughened surfaces.
- (5) After being roughened, the surfaces of concrete shall be cleaned thoroughly of loose fragments, dirt and the objectionable substances and

shall be sound and hard to ensure good mechanical bond between the existing and new concrete.

- (6) Second stage concrete shall be placed in lifts of not more than 3.0 m and concrete placement rate shall not exceed 1.5 m per hour except as otherwise approved by the Engineer-in-Charge.

6.15 FINISHING OF CONCRETE

6.15.1 General

- (1) The quality of the surface finish shall be in accordance with the requirements for the particular class of finish specified hereunder. The finished surfaces of concrete shall be free from areas of honeycombs, segregation, loss of cement or fine material, from damage due to stripping of forms, from bolt holes, abrupt irregularities caused by movement of forms or components, loose knots and similar features, and bulges or depressions in the general plane of the surface.
- (2) Only one type of formwork shall be used for all parts of a concrete structure which is visible from any direction.

(3)

6.15.2 Formed Surfaces

- (1) The classes of finish for formed surfaces are designated by the use of symbol F and the shape of the formwork panels required for concrete work shall be either plane (F1, F2, F3) or curved (F1C, F2C, F3C).
- (2) Surface finishes and other variations in finishing of concrete shall conform to the tolerances indicated below:

Type of	General areas of application and method of forming	Tolerances (in mm)
F1, F1C	Formed surfaces of construction joints and other surfaces, which will not be permanently exposed. The surface will require no treatment after form removal other than repair of defective concrete and specified curing, or treatment as specified for construction joints.	+25 -10
F2, F2C	All permanently exposed formed surfaces. Immediately on the removal of forms all unsightly ridges or fins shall be removed; all holes left by removal of ends of form rods shall be neatly filled with mortar and surfaces treated to meet the required tolerances by tooling and rubbing.	+10 -10
F3, F3C	Formed surfaces, which will be exposed to flowing water. These surfaces shall be hard, smooth and dense, free from offsets, pits, voids, air holes and irregularities, and shall be chipped, ground and thoroughly cleaned as necessary to conform to the required tolerances.	+3 -3

6.15.3 Unformed Surfaces

- (1) The classes of finish for unformed concrete surfaces are designated by the use of symbol U and shall be finished by screeding, floating and trowelling.
- (2) Surface finishes and other variations in finishing of concrete shall conform to the tolerances indicated below.

Type of finish	General areas of application and method of forming	Tolerances (in mm)
U1	Unformed, screeded surfaces which will be covered by fill materials. Finishing shall consist of sufficient levelling and screeding to produce an even, uniform surface meeting the required tolerance	+10 -10
U2	Unformed surfaces not concealed by fill. Floating by means of hand or power-driven equipment shall be started as soon as the screeded surface has stiffened sufficiently, and shall be the minimum necessary to produce a surface that is free from screed marks and that is uniform in texture.	+5 -5
U3	Unformed, screeded surfaces which will be exposed to flowing water. This finish shall be applied by steel troweling after the concrete has hardened enough to prevent excess of fine materials and water from being worked to the surface, free from blemishes, ripples and trowel marks. After the surface has nearly hardened, it shall be trowelled once more until the surface is hard and glossy in appearance.	+3 -3

- (3) Interior surfaces shall be sloped for drainage where shown on the Construction Drawings. Exterior surfaces, which will be exposed to the weather, shall be sloped for drainage even if there is no such indication on the Construction Drawings. In such case the slope shall be at least 2% but not exceed 3%

6.15.4 Tolerances for General Concrete Structures

General Areas of Application		Tolerances in mm
Variations of the constructed line or outlines from established position in plan	In 6 metres In 12 metres In 24 metres or more	12 mm 20 mm 30 mm
Variations of dimensions to individual structural features from established position	In buried construction	Twice the above amount
Variations from the plumb, from the	In 3 metres	12 mm

Tenderer

Superintending Engineer

specified batter or from the curved surface of all structures, including the lines and the surfaces, walls and vertical joints	In 12 metres or more In buried construction	30 mm Twice the above amount
Variations from the level or from the grades indicated on the drawing	In 3 metres In 12 metres or more In buried construction	6 mm 12 mm Twice the above amount
Variation in cross sectional dimension of columns, beams, buttresses, piers and similar members and variation in the thickness of slabs, walls and similar members		-6 mm +12 mm
Variation from plumb and level for sills and side walls for radial gates and similar watertight joints	Not greater than;	3 mm/3 m

6.15.5 Bush Hammer Finish

Bush hammer finish shall be applied on the surfaces when required by the Engineer-in-Charge. Bush hammering shall not commence until at least one month after placement of concrete. The tool used for bush hammering shall be electrically driven and have a head 3 cm² with 16 pyramid shaped teeth. The surfaces shall be finished at a rate of 250 to 400 cm²/minute indenting the concrete surface approximately 2 mm.

6.16 Construction joints in concrete structures

- (1) Construction joints are defined as concrete surfaces on or against which concrete is to be placed and to which new concrete is to adhere and which have become so rigid that the new concrete cannot be incorporated integrally with that previously placed.
- (2) Construction joints shall be located in the positions shown on the construction Drawings or as required by the Engineer in Charge and the Tenderer shall not be permitted to form any additional joints or deviate from the joints indicated on the Drawings, without the written authorisation of the Engineer in Charge. Necessary rearrangement of steel reinforcement arising from such modifications shall be to the Tenderer's debit.
- (3) Horizontal construction joints shall be arranged, wherever possible, to coincide with joints in the formwork.
- (4) Joints at exposed surfaces of concrete shall be straight and continuous Feather-edged construction joints will not be permitted.
- (5) The faces of vertical joints shall be shuttered with expanded metal or other approved rough material. The expanded metal shall be removed as far as possible, before the adjacent lift is poured. If required, the surface shall be cleaned by wet sandblasting and roughened by light bush-hammering.

- (6) The surface of construction joints upon or against which new concrete is to be placed and to which new concrete is to adhere shall be clean, rough, and free of water when covered with fresh concrete. The laitance, loose or defective concrete and foreign material shall be removed from the surface of existing concrete. The previous concrete lift shall be saturated by water but surface dry when the successive lift is placed.
- (7) The surface of the hardened concrete shall be cleaned and roughened by wet-sandblasting and washing thoroughly with air-water jet. Care shall be taken to prevent undercutting of aggregate in the concrete during sandblasting.
- (8) Wet-sandblasting equipment shall be operated at an air pressure of approximately 7 bars. Sand to be used for blasting shall be dense, hard, not easily broken and sufficiently dry.
- (9) In lieu of wet-sandblasting the Tenderer may propose high-pressure water blasting utilising pressures not less than 400 bars, provided that such high-pressure water blasting produce equivalent results to those obtainable by wet-sandblasting.
- (10) The horizontal surfaces of construction joints may be treated by cutting with an air=water jets ("green-cutting") This shall be performed after the initial set has taken place but before the concrete has become too hard for effective cutting. The fresh concrete surface shall be cut with air-water jets to remove all laitance and to expose clean, sound aggregate. After cutting, the surface shall be washed with clean water. Care shall be taken that the treated surface does not become contaminated before new concrete is placed upon it. Should the surface become contaminated that a satisfactory joint with new concrete is not ensured the Tenderer shall clean it by means of wet sandblasting.
- (11) Water used in cutting, washing and rinsing of concrete surfaces shall be disposed of in such a way that it does not stain, discolour or affect exposed surfaces of the structures.
- (12) When necessary, as determined by the Engineer in Charge, structural concrete placement in forms shall be started with an over sanded mix with 20 mm maximum size aggregate, an extra 50 kg of cement per cubic meter and a 100 mm slump. This mix will be referred to as a starter mix and shall be placed approximately 50 mm deep.
- (13) Disturbance of the surface at a joint during the early stages of hardening shall be avoided, and traffic on the concrete will not be permitted until the concrete has hardened sufficiently to withstand such treatment without injury.
- (14) All construction joints shall be kept continuously moist until they are covered with concrete, provided that, if it becomes necessary to delay the placement of new concrete on or against a construction joint for an extended period, moist curing of the surface of the joint may be discontinued at the expiration of the regular prescribed curing period. If the moist curing is so discontinued, it shall be resumed not later than 24 hours prior to the placement of new concrete against the joints.

6.17 CURING AND PROTECTION OF CONCRETE

- (1) Plant for curing and protection of concrete shall be available at the location of each concrete placement before concrete placement is started. The water used for curing shall meet the requirements for water used for mixing concrete. The curing water temperature shall not exceed 25 C.
- (2) Exposed surface of concrete which has been finished as specified shall be protected from the direct rays of the sun for at least 2 days after placing. Freshly placed concrete shall be protected from damage by rainfall.
- (3) Exposed surfaces shall be kept moist or the moisture in the concrete shall be prevented from evaporating for at least 14 days after placing by means of continuous sprinkling or spraying with water, or by other methods approved by the Engineer-in-Charge.
- (4) Care shall be taken not to disturb the steel reinforcement projecting from any placement for at least 24 hours after the completion of such placement.
- (5) The Tenderer shall not move any load on concrete surfaces which in the opinion of the Engineer in Charge have not attained sufficient strength. In case loads are required to be moved, the Engineer in Charge may permit Tenderer to do so on condition that Tenderer provides the means for protecting the concrete surface subject to approval of the Engineer in Charge.
- (6) The Engineer in Charge may permit the use of curing by means of membrane forming compounds. Sealing compounds proposed by the Tenderer will be subject to sampling and testing and will have to be approved by the Engineer in Charge.
- (7) Curing compounds shall be applied according to the manufacturer's recommendations to provide a continuous uniform membrane over all area. Curing compounds shall be applied only after moist curing has been carried out for at least 24 hours. Curing membranes shall be protected from damage at all times.
- (8) Curing compound shall not be used on any unformed surface where, in the opinion of the Engineer in Charge, the irregularities in that surface would prevent the membrane forming an effective seal, on any surface which has a temperature lower than manufacturer's recommended application temperature, on any surface where a bond is required for additional concrete, or where a bonded surface coating is to be applied. Where a curing compound is placed on a surface where a bond is required, it shall be removed by sand blasting or by other means satisfactory to the Engineer in Charge.
- (9) Concrete poured in tunnels to form tunnel linings shall be cured by membrane curing, as described above. Curing compounds used in tunnels shall not contain solvents, which may create hazardous conditions.
- (10) Curing compounds used for surfaces exposed to view shall degrade completely when exposed to air for more than 3 months. They are to remain at least 80% impermeable for 1 month after application.

6.18 REPAIR OF CONCRETE

Tenderer

Superintending Engineer

6.18.1 General

- (1) Repair of damaged or defective concrete shall be performed by skilled workmen only, and in the presence of the Engineer in Charge. No repair work shall be carried out until the Engineer in Charge has inspected the location of the proposed repair and accepted the method of repair proposed by the Tenderer.
- (2) Tenderer shall correct all imperfections of the concrete surface as necessary to produce surface that conforms to the requirements specified.
- (3) Where concrete is exposed to flowing water or to weather, porous and fractured concrete and surface concrete to which additions are required to bring it to prescribed lines shall be removed by chipping openings into the concrete a minimum of 75 mm below the reinforcing or to the depth required by the Engineer in Charge if sound concrete is not encountered at 75mm. Repair areas shall be formed and area filled with fresh concrete. If the concrete section to be repaired contains no reinforcement, concrete shall be chipped to a minimum depth of 100mm.
- (4) The chipped opening shall be sharp edged and keyed and shall be filled to the required lines with fresh concrete or patching mortar, as approved by the Engineer-in-Charge. Where concrete is used for filling, the chipped openings shall not be less than 75 mm in depth and the fresh concrete shall be reinforced and doweled to the surface of the openings, as directed by the Engineer in Charge.
- (5) Dry pack mortar for patching shall consist of 1 part cementing material, 2 parts by volume of regular sand, and just enough water so that after thorough mixing of the ingredients the mortar will barely held together when compacted by squeezing with the hand. The mortar shall be fresh when placed, and any mortar that is not used within 1 hour after preparation shall be wasted. Just prior to mortar application, the surface to which the mortar is to bond shall be kept wet for at least 2 hours, then scrubbed with a small quantity of cement grout using a wire brush.
- (6) When repairs are more than 25 mm deep, the mortar shall be applied in layers not more than 20 mm thick to avoid sagging. After each layer, except the last is placed, it shall be thoroughly roughened by scratching with a trowel to provide an effective bond with the succeeding layers. The last or finishing layer shall be smoothed with a trowel to form a continuous surface with the surrounding concrete. All patches shall be thoroughly bonded to the surfaces of the chipped openings, shall be cured to the satisfaction of the Engineer in Charge and shall be sound and free from shrinkage cracks and drummy areas.
- (7) For concrete surfaces where high velocity flows may occur, and as required by the Engineer in Charge, repairs to surfaces having F3 and U3 finishes shall be bonded with an epoxy adhesive approved by the Engineer in Charge and used in accordance with the manufacturer's instructions.
- (8) All repairs to the surface of concrete required for flowing water shall be ground smooth to meet the tolerances specified for that surface.

6.18.2 Sealing Work in Concrete Lining of Underground Structures

- (1) The Tenderer shall carry out sealing work to reduce water inflow and water losses through, and to guarantee the normal water-tightness of the

concrete lining of underground structures according to criteria stated hereafter and as directed by the Engineer in Charge.

- (2) The work shall consist of sealing the cold joints, construction joints, shrinkage cracks both vertical and horizontal, honeycombs, and poorly grouted or sealed grout holes. The work shall be performed intermittently, whenever water inflows are observed and measured, wide cracks are discovered (especially after performance of tunnel pressure testing), or the future impermeability is, in the judgment of the Engineer in Charge, doubtful.
- (3) The sealing work shall be carried out when following phenomena are encountered:
 - a) Water inflow equals or exceeds 1 litres/min measured at each single inflow source,
 - b) Any water inflow from grout holes and through honeycombs is unacceptable,
 - c) Cracks or joints, regardless whether they are dry or wet, of width
 - 0.2 mm in tunnels and shafts containing reinforcing steel
 - 0.5 mm in unreinforced stretches of tunnels or shafts
- (4) The sealing work shall be executed as follows:
 - a) Crack or joint 0.2-0.6 mm wide shall be repaired as stipulated in the Section "Drilling and Grouting".
 - b) Crack or joint wider than 0.6 mm shall be repaired as under (1) above, followed by cutting a groove 25x25 mm along the joint or crack and subsequent filling with an epoxy mortar.
 - c) Wet joint may also be sealed by applying the "Oberhasli Method", which consists of cutting a groove as for the dry joint and by collecting the seepage water into one or several flexible plastic pipes. As soon as the groove is without running water shall be filled with a quick-setting mortar and, after its hardening, followed by pumping the cement-bentonite-water slurry through the plastic pipes.
 - d) Areas of porous concrete shall be grouted under high pressure (30 bar) with cement grout mix W/C=0.7, by weight, containing suitable water-reducing air-entraining admixture. Grout holes shall be drilled at 500 mm spacing until the rock. After grouting, the area shall be repaired with epoxy mortar.
 - e) Grout holes filled only with water/cement mix shall be redrilled upto 2/3 of the theoretical lining thickness and filled with dry-pack mortar.

6.19 Particular Requirements for Individual Concrete Structures

6.19.1 Concrete in the Spillway glacis

- (1) Concrete used for construction of the spillway mantle shall be class M 25 A40.
- (2) Where the overbreak in excavation below the theoretical lines and grades exceeds acceptable limits, as determined by the Engineer in Charge, the Tenderer shall place blinding unreinforced concrete over the rock foundation in such thickness that the upper surface is at the theoretical grade elevation, Surface shall be roughened before placing the structural spillway concrete.

- (3) No construction joints shall be slowed in the spillway conveyance structure, unless otherwise approved or directed by the Engineer-in-Charge. In case such joint is permitted, additional steel reinforcement shall be placed across the joint and the joint surface shall be shuttered with expanded metal.
- (4) Contraction joints shall be executed at the distances shown on the drawings. The surface of the joints shall be painted with bituminous coat or other approved bond breaker.
- (5) All movement joints exposed to flowing water shall be chamfered 1:1 on upstream side and 1:8 on downstream side as the case may be.
- (6) The top layer of the spillway glacis concrete shall be terminated approximately 300-500 mm below the final surface to provide room for placing the special concrete to increase the abrasion resistance of the structure. Similarly, in the walls, which will come into contact with rapidly flowing water, recesses will be blocked out to a depth of 300-500 mm and height of approximately 2 m.
- (7) This high performance concrete shall be obtained by adding silica fume and/or steel fibres in the concrete. Depending on the mix, design quantity of silica fume will be approximately 40 kg per cubic meter and/or steel fibres of 60 kg per cubic meters. Mix proportions to be used will be determined by trial mix design. Test samples shall be made in accordance with IS:1199, tested as per IS:516 and analysed as per IS:456. Source of aggregate for high performance concrete shall meet the requirement of wearing surface and shall be as identified by Engineer-in-Charge.
- (8) Silica fume shall comply with SABS CAN/CSA-A23.5-M86 or equivalent international standards. In addition, it shall meet the following requirements:

Particle size	Average not more than 0.2 micron max. 0.4 micron
SiO content	Not less than 85%
Carbon content	Not greater than 5%
Total alkali content $\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O}$	not greater than 1.5% and When combined with OPC not greater than 0.6%

In addition to the standard requirements for individual materials, the blended cement and silica fume for high strength concrete shall comply with the following requirements (IS:4031 (3), (5), (6) and (10)-1988 and IS:4032-1988):

Min. compressive strength at 28 days	60 MPa
Min. initial setting time	90 minutes
Max. mortar shrinkage at 28/ days	0.07%
Max. sulphate content (SO_4)	5%
Max autoclave expansion	0.5%
Max CaO content	45%

The Tenderer shall present the results of quality control test carried on a representative sample by the supplier. Once approved, the silica fume shall only be supplied from the same production plant. Deliveries shall be in impervious sacks weighing about 40 kg and shall be accompanied by manufactures quality assurance certificates.

- (9) Steel fibres shall be Dramix ZC 60/0.80 or equivalent, hook bends bundled fibres with normal desolving. The fibres shall be clean and free from rust, oil and deleterious materials. The method of storage shall be such as to prevent oxidation. Rusted fibres shall be refused.
- (10) The concrete surface finished in the gate structure and chute shall be F3, F3C, U3, and U3C. For surfaces in contact with high velocity water flow the permissible surface irregularities shall not exceed the following values:

Abrupt Gradual

Measured along a line parallel of flow direction 5 mm 10 mm

Measured along a line transverse to flow direction 3 mm 6 mm

- (11) Abrupt irregularities are offsets caused by displaced or misplaced form sheathing or lining form sections, or by loose joints in forms or otherwise defective form lumber. They shall be tested by direct measurements.
- (12) Gradual irregularities are all other irregularities and shall be tested by a 2 m long template. The templates will be a straight edge for plane surfaces or a "shaped" template for curved or warped surfaces.
- (13) Furthermore the following shall apply if not otherwise shown on the Construction Drawings or directed by the Engineer in Charge:
- Abrupt irregularities parallel to the flow direction shall be eliminated completely by grinding to bevel of 1 to 20 ratio of height to length.
 - Abrupt irregularities transverse to the flow direction shall be eliminated completely by grinding to bevel of 1 to 50 ratio of height to length.

6.19.2 Concrete in the Plunge pool and Deo nallah

- Concrete used for construction of the Plunge pool and deo nallah channel at the diversion tunnel outlet, shall be class M 20 A 40.
- Where the overbreak in excavation below the theoretical lines and grades exceeds acceptable limits, as determined by the Engineer in Charge, the Tenderer shall place blinding unreinforced concrete over the rock foundation in such thickness that the upper surface is at the theoretical grade elevation. Surface shall be roughened before placing the structural concrete.
- Contraction joints shall be executed at the distances shown on the drawings. The surface of the joints shall be painted with bituminous coat or other approved bond breaker.
- the top layer of the plunge pool concrete shall be terminated approximately 300-500 mm below the final surface to provide room for placing the special concrete to increase the abrasion resistance of the structure, similarly, in the walls, which will come into contact with rapidly flowing water, recesses will be blocked out to a depth of 300-500 mm and height of approximately 2m.

6.19.3 Concrete in Gravity Structures

- Concrete used for the construction of mass concrete gravity structures shall be class M15/A80-150 unless otherwise approved or directed by the Engineer in Charge. However, concrete surface exposed to weathering and standing or flowing water shall be constructed of class

M 20/A80 concrete as indicated on the construction drawings. Where higher strength concrete is used, part of each lift will therefore normally be composed of two classes of concrete. Water-cement ratio shall not exceed 0.45.

- (2) Reinforcement shall be provided at the surfaces in contact with standing or flowing water and at all openings in mass concrete.
- (3) Mass concrete of Dam, and spillway shall be water cured for at least 10 days unless otherwise directed by Engineer in Charge. When curing compound is used as bond breaking membrane at contraction joints, it shall be also be considered acceptable in meeting the curing requirements.
- (4) Where the overbreak in excavation below the theoretical lines and grades exceeds acceptable limits, as determined by the Engineer in Charge, the Tenderer shall place blinding unreinforced concrete class M15/A40 over the rock foundation in such thickness that the upper surface is the theoretical grade elevation. Surface shall be roughened before placing the structural concrete.

6.19.4 Filling of galleries for cutoff wall:

- (1) When no longer required for cutoff wall construction purposes, the Tenderer shall backfill the galleries by non-shrink concrete as per the method statement given in submittals.
- (2) Non-shrink concrete used for the filling the galleries shall be class M20/A40 or as specified in construction drawing unless otherwise directed by the Engineer-in-Charge.
- (3) Before commencing the filling of galleries, the surface of the gallery concrete shall be cleaned and roughened as stipulated in para 8.14 "Construction joints in concrete structure".
- (4) The Tenderer shall adopt appropriate concrete placement method including pumping, for filling of galleries as approved by Engineer-in-Charge. Contact grouting shall be performed to ensure the contact between the concrete of filled concrete and surface of gallery.

6.19.5 Concrete Plug in Diversion Tunnel:

- (1) When no longer required for river diversion purposes, the Tenderer shall plug the diversion tunnels as shown on the construction drawings.
- (2) The concrete shall be placed in sections with drainage pipes to allow the removal of ground and service water. No independent cooling system for limiting the temperature rise is foreseen, as sufficient time is available for elapsing between placing of the individual concrete lifts. The river flows

during plug concreting will be diverted through the finished spillway openings.

- (3) Before commencing the construction of the plug, the surface of the existing diversion tunnel concrete lining shall be cleaned and roughened in those stretches where the plug will be installed. Damaged existing lining shall be removed as necessary without recourse to blasting.
- (4) Air vents, grout stops, and grouting system shall be provided for assuring good bond between the original lining and plug concrete.
- (5) The Tenderer shall supply and install thermocouples including thermocouple junctions and extension-wires in the fresh concrete, and perform temperature measurement to monitor temperatures within the concrete mass. Based on this measurement the time for next concrete lift shall be determined by the Engineer in Charge.
- (6) Once cooling of the concrete is substantially progressed, contact grouting between plug and the surrounding concrete, grouting of construction joints, and grouting up of the air vents and drainage pipes installed shall be carried out in accordance with the requirements of the Section "Drilling and Grouting". Grout shall be forced through previously installed longitudinal feeder pipes along the channel axis, with radial riser pipes extended into the surrounding concrete, and to grout outlets placed in construction joints between the plug section.
- (7) No less than 15 days after completion of contact grouting of the plug, the Tenderer shall carry out consolidation/curtain grouting of the surrounding rock, in accordance with the requirements of the Section "Drilling and Grouting".

6.19.6 Parts Embedded In Concrete

- (1) Anchors, anchor bolts, structural shapes, plates shapes, plates for gates, hoists, valves, machinery etc. and other miscellaneous parts shall be installed in the concrete by the Tenderer, as shown on the Construction Drawings or as required by the Engineer-in-Charge. Wherever practicable, anchors shall be installed before the concrete is placed. Except as otherwise specified, drilling and installation of anchors in the concrete after concrete is placed will not be permitted. Before being placed in position, all anchors and embedded parts shall be thoroughly cleaned of rust, grease, paint, splashed concrete, or other coatings that will reduce bond. Where the installation of the anchors is not practicable before the concrete is placed, formed openings shall be provided, and the anchors grouted into the openings at a later time in a manner acceptable to the Engineer-in-Charge.
- (2) Embedded anchors shall be supported during embedding and embedded so that the tolerances specified will not be exceeded. Care shall be taken not to disturb or displace embedded items during concrete placement.

- (3) Concrete may be placed to embed items erected by other agencies in the locations and to the dimension shown on the Construction Drawings or as required by the Engineer in Charge. The methods of placement and rates of placing concrete shall be subject to the approval of the Engineer-in-Charge. Care shall be exercised that such parts shall not be damaged or disturbed by placing operations.
- (4) Unless otherwise specified the Tenderer shall provide any foundation, wall or roof openings and coverings, concrete floor filling sleeves in foundations, inclusive of metal works supplied by other Tenderers. All adjustments to foundation levels, embedding, bedding and grouting works on foundations, and cementing works into walls and floors, shall be done by the Tenderer but all levelling and adjustment of works in foundations shall be the responsibility of the concerned E&M/HM Tenderer. Grouting shall be done by the Tenderer under the supervision of the E&M/HM Tenderer who will also approve the grout mixes and grouting pressures.

6.19.7 Concrete in Blockouts for Equipment Embedding

- (1) The Tenderer shall form blockouts, place reinforcement and concrete as shown on the Construction Drawings or as directed by the Engineer in Charge, and in such manner as to ensure good bond with the existing concrete, to secure complete contact with the metalwork to be embedded in the blockout concrete and to avoid displacement of the metalwork.
- (2) Blockout concrete shall include the concrete around second stage gate parts, anchor bolts and anchor plates etc.
- (3) Except as otherwise specified the hydro-mechanical, mechanical, and electrical equipment will be provided and installed by the suppliers in co-operation with the Tenderer.
- (4) Before placing concrete, all parts to be embedded shall be checked to ensure that they are firmly fixed in their required position. The surfaces of blockouts or holes shall be thoroughly cleaned and wetted. Oil or grease shall be removed by brushing and chipping of affected surfaces to a sufficient depth, or by application of approved chemicals and flushed with clear water.
- (5) The parts to be embedded shall be cleaned of rust, mill scale, paint, oil or grease before they are set into place. Where bond between metal parts and concrete or grout is not desired, approved material such as flake graphite or paraffin shall be applied to the metal parts. The metal surfaces shall be wetted before placing the concrete or grout.
- (6) Concrete containing an approved non-shrink agent shall be used for concrete in blockouts for equipment embedding as shown on the Construction Drawings.

6.19.8 Grouting of the Equipment Bearing Plates and Anchors

- (1) Limited spaces and small blockouts where equipment bearing plates, anchors, rails, etc., are placed shall be grouted under pressure.

Tenderer

Superintending Engineer

- (2) The grouting shall be performed using non-shrink cement-based grout or non-shrink epoxy grout as proposed by the Tenderer and approved by Engineer-in-Charge. All mixing and grouting shall be performed in accordance with the manufacture's recommendations and shall be tested prior to grouting. Technical service by manufacturer shall be organised by the Tenderer upon request by the Engineer-in-Charge.
- (3) Before placing grout, the surfaces of the base concrete to which the grout will be bonded shall be roughened and cleaned of all laitance, loose or defective concrete, any coatings or other foreign material, followed by thorough washing with water.
- (4) Forms for grouting shall be installed where necessary and care shall be taken that the grouts fill all spaces under the plates leaving no voids. The exposed surfaces of the grout shall be cured as recommended by the manufacturer and no loads shall be applied until the grout has reached the design strength.

6.19.9 Precast Concrete

- (1) Precast concrete including Precast concrete lagging for tunnels which has been dealt separately under section "Rock Supports". Shall be produced in an enclosed area separate from other construction works.
- (2) Precast units shall generally conform to the other parts of the same technical specifications where applicable and as required by the Engineer-in-Charge.
- (3) Precast units shall be protected at all times from damage at the place of fabrication and during handing, storage and erection.
- (4) Precast concrete units shall be placed in their correct relative location and temporarily braces and secured to prevent collapse or distortion of the structure until completion of the work to the satisfaction of the Engineer-in-Charge.
- (5) Following removal of formwork, any hole, voids or other blemished in the surfaces of precast concrete unit which are to be exposed shall be patched and a smooth rubbed finish provided. Rubbing shall be done with a corborumdum stone and a mixture of Portland cement and water.

6.19.10 Porous Concrete

- (1) Porous concrete shall be placed where free drainage is required, and shall be produced by gap grading or single size aggregate grading.
- (2) The strength requirements for porous concrete shall be as for class M10/A40 concrete. The porosity shall be such that water will pass through a slab 30 mm thick at a minimum rate of 500 l/min/m² with a constant depth of water on the slab of 100 mm.
- (3) Porous concrete shall not be vibrated but only place and lightly rammed. Formed surfaces shall be Class F1 finish. Exposed surfaces of the porous concrete shall be sealed in an approved manner, such as the use

of polyethylene or rendering with sand and cement, before structural concrete is placed against it.

6.20. MEASUREMENT AND PAYMENT

6.20.1 General

- (1) Measurement for each class of concrete including concrete in surface structures, unless specified otherwise hereafter, will be of the volume placed within the lines, grades, and pay-limits shown on the Construction Drawings or as established at the Site by the Engineer-in-Charge.
- (2) Unless otherwise stated, no payment will be made for concrete placed outside these limits, other than in additional excavation directed by the Engineer-in-Charge, and the measurement shall not include any filling of overbreak
- (3) Payment will not be made separately for these items. They shall be included in the Bid price quoted, and the amount for different classes and shall include but not be limited to, the following:
 - a) Excavation, loading, transportation, crushing, screening, washing, blending, and storage of aggregates,
 - b) Batching, supply of mixing water, mixing, transportation, placing, and compacting the concrete,
 - c) Provision, delivery, transportation, storage and mixing of cement at the nominal content per different classes of concrete indicated in Sub-Section "Concrete Mix Design". And complying with all requirements specified.
 - d) Labour, tools and equipment for cleaning, and preparing surfaces prior to concreting,
 - e) Forming and treatment of construction joints including furnishing and spreading of mortar layers, or starter mixes before concrete placing,
 - f) Surface finishing including bush-hammering,
 - g) Attaining the concrete temperature as specified, and hot and/or cold weather precautions,
 - h) Protection and curing of concrete,
 - i) Repair of defective concrete and removal of rejected concrete,
 - j) Communication system connecting the points of placing concrete with the relevant mixing plant or delivery equipment,
- (4) All associated concrete work, such as removal of forms and repairs and finishing of concrete shall be completed as soon as practicable after concrete is placed. Concrete will not be considered for payment until all associated works have been completed to the satisfaction of the Engineer in Charge.
- (5) Measurement for payment and payment for formwork and steel reinforcement are stipulated in other Sections of these Specifications.

6.20.2 Exclusions – Concrete

No extra measurement for payment or payment will be made for the following:

- a) Any rounded or bevelled edges, fillets, scoring, chamfers, or any deduction made for voids or embedded items which are either less than 0.10m^3 in volume or 0.05 m^2 in cross section. No allowance will be made for approved temporary openings, drains, embedded pipes, or recesses created by the Tenderer for his own convenience during construction provided they are filled as directed,
- b) Any collecting of seepage water or water inflow from rock surfaces and diverting it into the drainage systems for care of water during construction,
- c) Any defective and wasted concrete; concrete which has to be removed and replaced due to Tenderer's non-compliance with the Specifications or Engineer-in-Charge's directions, and all related cost shall be at the Tenderer's expense,
- d) Any concrete which the Tenderer places or uses for his own installations or for his own convenience,
- e) Developing alternative sources of aggregates by the Tenderer and the resulting additional material testing.
- f) Pumping of the concrete and HRWRA/ super plasticizer used for pumping of concrete,
- g) Concrete produced with overuse of admixture.
- h) Any precast and precast – prestressed concrete units damaged by improper storing, handling or transportation,
- i) Any pipe work or material incorporated into the work to aid in placement of concrete.
- j) Backfill concrete in overbreak in surface and underground excavation except geologically approved overbreak.
- k) Form work for the tunnels. However the formwork for Dam shall be measured and paid separately.
- l) Transportation of rock for wearing surface concrete aggregate from quarry area.

6.20.3 Tests

- (1) All cost associated with testing as described in this Section shall be borne by the Tenderer, who shall make allowance for such expense in the Unit Prices for the concrete work. These shall include, but not be limited to, the following:
 - a) The costs for all tests to be carried out prior to the start of concrete work, whether carried out at Site or elsewhere,
 - b) Routine tests for quality control during the execution of the concrete work carried out by the Tenderer as specified herein and as directed,
 - c) Other tests required during execution of the work to be carried out by an approved test laboratory(ies),

- d) Preparation storage, handling, curing and delivery of samples to a laboratory designated by the Engineer in Charge, if so required for additional independent testing.
- (2) Should the Tenderer fail to adhere to his testing program, all tests deemed necessary by the Engineer in Charge to check concrete work will be performed by the Engineer in Charge or a laboratory assigned by him, at Tenderer's expense.

SECTION – 7
RADIAL GATES

**SECTION 7
RADIAL GATES
TECHNICAL SPECIFICATIONS AND SCHEDULE FOR TOP SEAL SPILLWAY
RADIAL GATES.**

LIST OF CONTENTS

7.1	SCOPE
7.2	GENERAL REQUIREMENT
7.3	SPECIFICATION DRAWINGS
7.4	DESIGN CRITERIA FOR RADIAL GATES
7.5	OPERATING MACHANISM FOR GATE
7.6	MANUFACTURE
7.7	ERECTION
7.8	INSPECTION TESTING AND FINAL ACCEPTANCE

TECHNICAL SPECIFICATIONS AND SCHEDULE FOR SPILLWAY RADIAL GATES.

7.1.0 SCOPE OF WORK

7.1.1 These specifications cover the requirements of design, fabrication including shop & field painting shop assembly transportation, supply erection and successful commissioning of the equipment mentioned below at

7.1.1.1 RADIAL GATES.

Sets of radial gates of size 13000 mm X 5500 mm along with all accessories such as guide rollers, seals, seals lifting brackets, trunnion brackets, trunnion tie beams and any other appurtenances etc., and embedded parts for radial gate such as wall plates, sill beam seal seats, Yoke/trunnion girders, load carrying anchor rods and walk way at trunnion level, ladders on the top arms and between horizontal girders etc. Including 1st stage and 2nd stage anchor bolts subject to the provisions mentioned in para 9.1.2.0

7.1.1.2 OPERATING MECHANISM FOR GATES

Electrically operate rope drum hoist of suitable capacity for operation of radial gates mentioned under para 9.1.1 above including all mechanical equipment, electrical & remote control equipment consisting of wire ropes, rope drums, reduction gears, central drive unit including gear reducer, E.M.Brake, motor, gate position indicator, arrangement for manual drive & auxiliary power unit etc. Metal covers for the hoist machinery shall also be provided.

7.1.1.3 HOIST SUPPORTING STRUCTURE & APPROACH LADDERS

Hoist bridges including walkway cum support structure for the floating shaft, all fastening bolts, anchor bolts, chequered plates, side railings ladders and other accessories including support structure for hoist assemblies on piers, approach ladders to the hoist bridge on either side.

The 1st as well as 2nd stage concreting is included in the scope of this work. However, the 1st stage concreting for load carrying anchors of anchorage assembly and 2nd stage concreting for gates is to be done under the supervision of Regional Mechanical Wing of the Department. The frames consisting of embedded parts for gates are also required to be embedded under the supervision of the Regional Mechanical Wing. The responsibility for the correctness and accuracy of alignment of embedded parts would rest with the Regional Mechanical Wing. Ladder rungs on concrete face for approaching the trunnion girders from hoists bridge level shall be provided by the Tenderer. Shop as well as field painting is included in the scope of agreement.

Dry as well as wet tests are to be carried out by the tenderer. Any defect noticed during testing or during the guarantee period (not less than 24months) is to be removed by the Tenderer free of cost.

The Tenderer, when ordered in writing by the department, shall perform extra work in furnishing material not covered by the specifications or included in the schedule but forming an inseparable part of the work contracted for Extra work and materials will ordinarily be paid for a lumpsum or unit price agreed upon by the Tenderer and the department. Whenever in the judgment of the department it is impracticable because of the nature of work or for any other reason to fix the price in the order the extra work and material shall be paid for at actual cost as determined by the department plus 10% allowance for superintendence, use of tools, tackles and shop etc..

7.1.1.4 WASTAGE OF STEEL

The wastage of steel sections, received from main producers, shall not be compensated to the Tenderer under price variation clause. The price variation will be reimbursed for the net weight of gates, hoists based on the sectional unit weight as per the table of standard sections (supplied by SAIL) and used in the gates. The weight of nuts, bolts, rivets, welding etc. Will not be considered in the net weight of gates. All the wastage of steel sections supplied by the main producer will be at Tenderer account and the Tenderer should consider this aspect while quoting the rates.

7.2.0.0 GENERAL REQUIREMENTS

The tenders shall carefully study the technical specifications and drawings and shall intimate the department in case any error/omission is discovered. As a result of such interaction, if some corrections/modifications are required, the same shall be brought to the notice of all the tendereers before the date of submission.

7.2.1.0 The drawings shall broadly cover following items shall be supplied by the department.

S.No.	Item	No of Drawings.
1	Embedded Parts Installation	2
2	Embedded parts including load carrying anchors, etc., and their details	2
3	Sill beam, wall plates, seal seats etc. And their details	2
4	Gate leaf Assembly	2
5	Gate parts Details	1
6	Side Seal Assembly & Details	
7	Seal assembly & Details	1
8	Guide Roller & Details	1
9	Lifting Attachments & details	1

Tenderer

Superintending Engineer

10	Dogging arrangement & details	1
11	Bonded Anchorage Assembly & details	1
12	Trunnion Girder Assembly & details	1
13	Trunnion, Trunnion bracket etc. Assemblies & their details	2
14	General Layout of Hoist	1
15	Hoist Machinery	1
16	Hoist Machinery part details	2 to 3
17	Base frame details for Hoist	1
18	Hoist supporting structure	2 to 3
19	Walkway at trunnion and walkway floating shaft support	1
20	Gate position indicator & manual arrangement & other details	1
21	Electrical connections & details	2
22	Remote control arrangement	1
23	General arrangement of Gate & Hoist	1

7.2.3.0 Schedule and progress

Within 30 (sixty) calendar days after the receipt of approved drawings, the tenderer should submit to the department the schedule of fabrication and transport of the equipment so as to ensure its delivery within the specified period. The schedule shall clearly state all the stages of fabrication to enable the department to plan for inspection accordingly as stated in the specifications. The Tenderer shall also (during the course of fabrication) submit a monthly progress report along with photographs of fabrication done to the department, apprising department of the progress of equipment for the preceding month.

7.2.4.0 Delivery period

Time of delivery at the project site is important and the Tenderer shall abide by the following time schedule, the time being reckoned from the date of approval of the drawings.

I	Supply of all the 1 st stage embedded parts	--
II	Supply of bonded Anchorage Assembly for radial gates	--
III	Supply of all the 2 nd stage embedded parts	--
IV	Erection of all the embedded parts	--

(Note: The erection of 1st stage embedded parts and erection of anchorage & load carrying anchor rods have to match with the progress in civil construction)

Tenderer

Superintending Engineer

V	Supply and erection of radial gates	--
VI	Supply and erection of Hoist, Hoist supporting structure & Hoist platforms, walkways etc.	--
VII	Balance work including field painting and testing	--

7.2.5.0 Warranty

The Tenderer shall furnish warranty of the equipment for a minimum period of two year from the date of the acceptance of equipment or commissioning whichever is earlier. The Tenderer shall warrant among other things the following items.

- a. Quality and strength of the materials used
- b. Satisfactory operation of the equipment
- c. Safe stresses in all parts under all conditions of operation
- d. Protection of equipment against vibration and corrosion.

The Tenderer shall at his own expense rectify the defect if any during the warranty period. The Tenderer shall assume all responsibility for direct damages causing personal injury or property damage caused by any manufacturing defect under these specifications.

7.3.0.0 SPECIFICATION DRAWINGS

The general arrangement of the equipment shall conform to the drawings listed as under. These drawings are not intended to define the design of the equipment but all merely illustrative to shown the general layout of the equipment except where limiting or mandatory dimensions and elevations are given.

S.No.	Title	Drawing No.
1	Spillway Radial Gates....mm x...mm General Installation – (sheet 1/2	--
2	Spillway Radial Gates....mm General Installation – (sheet 2/2	--

The above drawings shall be treaded as a part of these technical specification. Unless other wise specifically mentioned in the schedule or specifications, or drawings, or communicated in writing by the department, the Tenderer shall furnish all the materials, accessories and appurtenant parts called for in these specifications or shown on the drawings. Any item shown on the drawings and not mentioned in the specifications or the item called for in the specifications but not shown on the drawings shall have to be supplied at no extra cost.

Tenderer

Superintending Engineer

7.4.0.0 Design Criteria For Radial Gates

The radial gate consists of curved skin plates, supported by vertical stiffeners which in turn rest on horizontal girders. The horizontal girders are mounted on inclined end arms which transmit the hydrostatic pressure to load carrying anchorages through the trunnion girder. The anchorages transfer the load to the civil structure in bond as a bond stress between the anchors & the concrete. Guide rollers shall be provided on the sides of radial gate to limit the lateral motion or side sway of the gate to not more than 6mm in either direction. Roller shall be adjustable & removable. These shall travel on wall plates but the portion of wall plates in which they travel shall be made of structural steel. Rollers shall be provided with self lubricating bushings running on fixed stainless steel pins. Suitable provision for greasing shall also be made. The gates shall be designed for condition of one gate fully opened & adjoining gate fully closed in accordance with IS:4623-(LATEST) for the loads mentioned below and the permissible stresses in design shall be as given in IS 4623(LATEST EDITION).

- a) The full hydro-static pressure on upstream side of the gate with water level at final FRL and gate closed.
- b) Total hydrostatic, hydro-dynamic and frictional forces occurring when the gates are raised, lowered or maintained partially opened with the upstream water level at any elevation between EL.....m & m and a wind load on gate with raised position.
- c) Dead weight of gate.
- d) Gate shall also be checked for water level corresponding to MWL. In this condition allowable stresses shall be governed by relevant clauses of IS:4623.

7.4.1.0 Design Data for Radial Gates

i.	Clear Span	:-
ii.	Number of spans	:-
iii.	Full Reservoir level	:-
iv.	Maximum water level	:-
v.	EL of centre line of trunnion	:-
iv.	Sill level (for radial gate)	:-
vii.	Crest level	:-
viii.	Insider radius of skin plate	:-
ix.	Level of bottom of the gate in raised position	

Tenderer

Superintending Engineer

.....(in normally raised position)

.....(in fully raised position)

- x. Operation: The gates have to be lifted when the water level rises above F.R.L.per the operation schedule (to be finalized by the project authorities)
- Xi Type of arms : Inclined arms
- Xii Type of suspension of wire rope :Down stream suspension
- Xiii Minimum thickness of stainless Steel skin plate :10mm
- Xiv Minimum thickness of stainless steel side seal seat (after machining) :10mm
- Xv Minimum thickness of bottom and top seal seat of Stainless steel(after machining) :10mm
- Xvi Type of side seal :Teflon cladded solid Music note type rubber seal with rectangular bulb
- xvii Type of bottom seal : Wedge Type(Rbber)
- Xix Governing Indian Standard Code :IS.4623, IS:800(latest)
Note: Gate shall be checked for seismic effect Related coefficient would be supplied by the project authorities.
- Xx Permissible stresses
 - (a) Skin plate : Wet & inaccessible
 - (b) All other structural components
Including yoke/trunnion girder.: Dry & inaccessible
 - (c) Anchor rods : Wet 7 inaccessible
- Xxi Permissible deflection :1/500th span
- Xxii Permissible bearing and shearing :As per IS 456(LATES)
Stresses in concrete
- Xxiii Grades of concrete to be used :1st stage concrete M20
2nd stage concrete M25
- xxiv Lubrication of trunnion bearing :Through non-grease nipple.

7.4.2.0 Materials

All the materials shall be tested quality new, unused, free from defects and of the grade/classification envisaged in the designs. The Tenderer shall furnish the test certificate for each lot of material, if so required by department. Plates with laminations discovered during welding or during inspection shall be

rejected. Materials not supplied according to the approval of department shall not relieve the manufacturer of the responsibility of supply of suitable materials.

Recommended materials for main components are given below.

S.No.	Component/paart	Recommended materials	Reference
1	Skin Plate	Structural steel	IS.1570
2	All structural members such as stiffeners, horizontal girders, arms bracings, Yoke/turnnion girders, load carrying anchor roads, trunnio brackets, trunnion tie beam, hoist connection brackets, sill beam, wall plates seal seat bases seal clamp,etc.	Structural steel	IS.2062
3	Trunnion bearings	Self lubricating bushings of high strength brass castings	ASTM B 22 with self lubricating inserts of standard made like DEVA, LUBRITE OILESS AND TENMAT
4	Trunnion Pin	Stainless steel	IS.1570(PART-5)
5	All pins including guide roller pins, lifting pins etc.	Corrosion resisting steel	IS.1570(PART-5)
6	Seal seats	Stainless steel	IS.1570(PART-5)
7	Guide rollers, trunnion hubs	Cast steel	IS.1030
8	Seals	Natural synthetic rubber	IS.11855
9	Screws/Bolts for seals	Stainless steel	IS.1570(PART-5)

In all the reference cited above, the latest revised edition of indian standard or equivalent shall be followed. Decision regarding adopting particular equivalent standard/make shall be made by the department or their authorized consultants and shall be binding on the Tenderer.

7.5.0.0 OPERATING MECHANISM FOR GATES

7.5.1.0 ROPE DRUM HOIST AND HOIST SUPPORTING STRUCTURE

The hoisting equipment to be furnished by the Tenderer will be used to operate the radial gates for spillway.....sets of hoists shall be provided for radial gates & each mechanism shall include a driving motor, a gear reducer, rope drums, ropes, shafts, gears, couplings, brakes, emergency manual operation arrangements, limit switches, gate position indicator, covers etc., all mounted on a fabricated steel frame. Electrical controls and all necessary and

Tenderer

Superintending Engineer

mechanical accessories shall be provided for the satisfactory operation of the hoist. All machinery is to be supported on the hoist supporting structure placed on piers at EL.....m. The Hoist shall be capable of fully opening/closing the gates, and holding the gate in its fully opened or in any intermediate position during either the opening or closing operation. Suitable ladder for access shall be provided to approach the hoist components and sufficient space shall be provided around them for repair/maintenance

7.5.1.1 DESIGN CRITERIA FOR ROPE DRUM HOIST

- i. Capacity : Suitable capacity for operation of spillway Radial gates of size 13000mm x 5500mm
- ii. Minimum lift of gates : 6m(vertical)(tentative)
- iii. Operating speed : 0.3m/min.+10%
- iv. Number of drums : 2(two) with single layer of rope (for each hoist)
- v. Type of end reduction unit : Spur gear and pinions The end reduction shall be mounted on the portable base frames. Suitable cover shall also be provided.
- iv. Wire rope of required size and specification and number fibre core, improved plough, steel, lang's lay conforming to IS 2266 to be used (galvanized)
- vii. For wire rope minimum factor of safety under normal load shall be 6 and under breakdown torque condition of motor, it shall be 3.
- viii. Central drive unit.
 - a. **Worm reducer**
Self locking reversible worm/helical reducer of standard make such as Radicon, Allenroyd, Elecon or any other BIS standard quality. They reducer shall match with ratings of motor.
 - b. **Brake:**
Single phase solenoid release, shoe type electromagnetic brake (having rated torque of 1.5 times the output torque of motor) of standard make such as Technocraft, Electromag, Stromcraft or of any other BIS standard make.
 - c. **Motor**
T.E.F.C reversible squirrel cage, operating on 415 V, 3 PHASE, 50 Hz A.C. Power supply of standard make such as GEC siemens, Kirloskar, NGEF, Crompton Greaves or any other BIS approved make. The shaft of the motor shall be of extended type to accommodate arrangements for manual drive. The motor shall have high starting torque, low starting current and shall be suitable for operation in highly humid atmosphere. The breakdown torque shall not be less than 200% of the rated torque

- of motor. The central drive unit shall be mounted on a protable frame suitable covers shall also be provided.
- ix Couplings and clutches: Standard made such as Allenberry, Stromcraft or any other BIS standard quality and suitable for the torque transmitted.
 - x. Coupling between drive unit and end reduction unit: Flexible coupling.
 - Xi Auxiliary Power unit:
An auxiliary power equipment comprising a generator powered by internal combustion engine of capacity 150% of hoisting requirement of one hoist plus lighting load with one standby unit shall be supplied and commissioned by the gate Tenderer. The auxiliary power equipment shall be pressed into service in the even of failure of firm power source.
 - Xii Manual drive
The manual operation shall be provided with electrical interlock to prevent operation by electric power when the manual drive is engaged. Effort per person shall not be more than 10kg at a crank radius of 400mm operating at a speed of 24rpm.
 - Xiii Covers:
All the components of the hoist, i.e. drums, gear, brakes motors, shaft couplings and clutches etc. shall be provided with individual covers of M.S.sheet of minimum 3mm thickness. The covers shall be such that it is easily possible to lubricate the machinery without removing them.
 - Xiv Control panel and protective devices:
T.P.air breakers, fuses, themal protective relays etc., of suitable ratings shall be provided in the motor circuit and D.P.air circuit breaker, single phase preventer, limit switches (for lowest and highest positions of gates) shall be provided in the control circuit. All the Tenderers, relays, push-buttons etc. shall be of adequate ratings of standard make and of tested quality One step down transformer of adequate capacity shall be used to get 1010 volt A.C.supply for the control equipment's. Limit switches shall also be provided to ensure that the motors do not start whil the gates are being operated manually. Suitable anti-condensation heaters shall be provided in all control panels. In addition to the equipment for local control of the gates, all equipment for remote control of each gate shall be provided. For the purposes of remote control, local gate control cabinets shall provide an electrical interface for remote control including remote position indicator. These features shall be furnished for each gate. All interface wiring shall be wired to one terminal block for individual gate.
 - Xv All the components of hoists shall be checked for the breakdown torque of motor selected. Actual breakdown torque or pull out torque as indicated in the motor catalogue supplied has to be adopted limiting of

BDT/POT of motor by using a torque limiter or by effecting any local change in the motor circuit will not be permitted.

Xvi Number of hoists.....sets

Xvii Governing Indian standard code: IS 6938(LATEST)

7.5.1.2 Design criteria for Hoist bridge/Hoist supporting structure:

i. Load on the structure:

- a) load transmitted through the hoist
- b) impact load.
- c) live load of 500kg/sq.m.area
- d) dead weight of the members.
- e) seismic load

ii. Permissible stresses : As per IS800(latest Edition)

iii. Breakdown condition : Hoist supporting structure shall be checked for actual break down torque of motor selected.

iv Limiting deflection : L/600

v. The platform and walkways shall be designed for a live load of at least 500kg/sq.m.

vi. Clear space of 1000mm width shall be made available around the hoisting equipment Interconnecting cat-walkway (at least 600mm wide cum supporting structure for the float shift and trunnion level walk way (at least 100mm wide) shall be provided from pier including all fastening bolts, anchor bolts, chequered plates etc.,

vii Hand railings of not less than 120mm height two horizontal pipe rail and minimum 40mm diameter shall be provided on both sides of hoist supporting bridge, trunnion level walkway, and on all approach ladders. All ladders shall not be less than 40mm width between side parts shall have round rungs 20mm in diameter spaced at 300mm c/c.

viii Flooring: Chequered plate of minimum 8mm thickness,

7.5.1.3 Materials

All the materials shall be of tested quality new unused free from defects and of grade/classification envisaged in the designs. The Tenderer shall furnish the test certificate for each lot of materials, if so required by the department. Platters with laminations discovered during welding during inspection shall be rejected. Materials not supplied according to the approved designs/drawings shall be rejected, removed and replaced. Approval of department shall not relieve Tenderer of his responsibility of supply of suitable materials. Recommended materials for such of the components are given below.

S.No.	Component/part	Recommended materials	Reference
1	All structural members for hoists supporting structure, walkway etc.	Structural steel	IS:2062
2	Rope drum	Cast steel	IS:1030
3	Wire rope	Improved plough steel(galvanised)	IS:2266
4	Wire rope socket	Forged steel	IS:2004 IS:1875
5	Gears/Pinions	Cast stell Forged steel	IS:1030 IS:1875
6	Shafts	Forged steel	IS:1875
7	Sheaves/pulleys	Cast steel/ Forged steel	IS:1030 IS:1875
8	Equiliser bars/turn buckles	Structure steel/Forged steel	IS:2062 IS:1875
9	Bushings	Bronze	IS:305 IS:318
10	Keys	Forged steel	IS:2048
11	Motor	As per standard	I325

Decision regarding adopting particular equivalent standard/make shall be made by the department, and shall binding on the Tenderer.

7.6.0.0 Manufacture

All the works shall be performed completed in a thorough workman-like manner as per the best modern practice in vogue in the manufacture and fabrication of equipment of the type covered by these specifications. The work shall in all cases be of high grade and carefully performed to the satisfaction of the department. The Tenderer shall warrant all materials and workmanship furnished by him to be free from injurious and defective materials or workmanship and shall bear all cost of the repair in case of any error for which he is responsible and workmanship shall conform to the relevant standard laid down by the Bureau of Indian standards. All sharp corners, which can damage the matching parts, shall be rounded and chamfered.

7.6.1.0 Tolerances

Where tolerances or fits are not specified on the drawings, the Tenderer shall follow the best modern shop practices for apparatus of the type covered by these specifications and drawings, due consideration being given to the special nature of function of the parts and to the corresponding accuracy required to secure proper operation.

Tenderer

Superintending Engineer

7.6.2.0 Machine finish

Where finished surfaces are not specified on the drawings, the type of finish shall be that most suitable for the part to which it applies and shall be as per IS:3073 (latest edition). A smooth finish (two delta, i.e., 1.6 to 6.3 microns) will be required for all surfaces in sliding or rolling contact and for surfaces in permanent contact, where a tight joint is required. A finish (single delta, i.e. 6.3 microns and above) shall be given to all other machined surfaces where selective assembly for matching parts is specified on the drawings or otherwise required. The parts shall be ground, if necessary.

7.6.3.0 Castings

While making patterns for the castings, care shall be taken to avoid sharp corners or abrupt changes in cross section and ample fillets shall be used. All castings shall be true to patterns and the thickness of the metal shall not vary at any point by more than 5mm from that shown in the drawings. Care shall be taken in the foundry to cool the castings properly so that they will not warp or twist. No casting will be accepted if it is warped or twisted to such an extent that machined surfaces cannot be properly finished to the dimensions shown on the drawings. All castings shall be sound, clean, and free from cracks, blow holes or sand holes and other defects. These shall have a workman like finish. Castings shall not be repaired, plugged or welded without the permission of the department. Such permission shall be given only when the defects are small and do not affect the strength, use or machinability of the castings. No welding shall be done after the castings are finally annealed. No defect shall be removed and paint or oil be applied to the surface of any casting until the department or his authorized representative has inspected it. The treatment for casting involves heating slowly upto about 40 °C above its critical temperature, holding it at the temperature just only long enough for a uniform temperature to be attained throughout the casting and then allowing it to cool slowly in furnace. During the process, the requisite annealing temperature shall not be exceeded and overheating shall be avoided. End products shall conform to the requirements of relevant Indian Standards. All castings shall be ultrasonically tested to ascertain their soundness. Acceptance criteria as specified by department shall be binding.

7.6.4.0 Forging

All forging shall be done in accordance with the latest practice and shall exhibit physical and chemical properties envisaged in the corresponding Indian Standards. Only those forging shall be used whose working is well known without doubt.

7.6.5.0 Fabrication of Structural steel

The Tenderers are expected to perform fabrication in the best possible manner to meet the requirements of designs and drawings. However, some specific guidelines are given herein under.

7.6.5.1 Straightening of Members

Before being laid off or worked in any manner, structural steel shall be straight, without twists, bends or kinks, and if straightening is necessary, it shall be done by a method which shall not injure the metal to ensure good welding and fittings of members. All steel shall be cleaned of dirt, mill scale and rust prior to fabrication.

7.6.5.2 Shearing, chipping and Gas cutting

Shearing, chipping and gas cutting shall be performed carefully and all portions of the work, which will be exposed to view, shall present a neat appearance. Finishing of sheared or cut edges of plates or shapes will not be required except as noted in these specifications.

7.6.5.3 Edges to be welded

The edges of plates and shapes to be joined by welding shall be properly formed to suit the type of welding selected. Where plates and shapes have been sheared, edges to be joined by welding shall be machined or chipped to sound metal. Plates and shapes to be field welded shall have their edges prepared in the shop for the type of weld selected.

7.6.5.4 Bent Plates and Shapes

Where bending or forming of plates or shapes is required, the plates or shapes shall be bent by cold forming. Heating and hammering to correct bends will not be permitted.

7.6.5.5 Welding

a. Welding Technique

Care shall be taken in designs that the welds when being made, are well accessible. Overhead welding is to be avoided, if possible and flat position is to be strived for.

Drawings should clearly indicate the joint position, shop or fielding, kind of welding, method of welding, welding sizes and other required points. Symbols to be shown on the drawing should conform to relevant Indian Standards.

All welding shall be done by the electric arc method by a process which will exclude the atmosphere from the molten metal, except where otherwise specifically permitted. All welding electrodes required shall be furnished by the Tenderer. Correct selection of electrodes shall be done taking due care of welding method and base metals of components. The welding electrodes shall be of the heavily coated type designed for all position welding. The make, type and size of all welding electrodes shall be subject to the approval of the department.

In assembling and during welding, the component parts of built up members shall be held in place by sufficient clamps or other adequate means to keep

All parts in proper position. The surface to be welded shall be cleared of scale, slag, rust, paint, and other foreign matter, except that thin coat of linseed oil need not be removed before welding. Where weld metal deposited in two or more layers, each layer shall be brushed with a wire brush or otherwise cleaned before the subsequent layer is deposited. In welding, precautions shall be taken to minimize stresses due to heat by using the proper sequence in welding.

Upon completion, the welds shall be brushed with wire brush and shall show uniform section smoothness of weld metal. Edges and ends of fillets and butt joint welds shall indicate good fusion and penetration into base metals. Specific requirements for butt joints and fillet joints are given below.

i) Butt Joints

In principle, butt joints should be made with back run. The joints in the skin plate shall be staggered & preferably located near the point of contraflexure. The edges of skin plate shall be prepared in shop. Skin plate joined by butt welding shall be without any back plate so as to facilitate radiography. Joints, if required in horizontal girders and hoist bridge girders shall be located sufficiently away from location of maximum bending moments. They shall also be butt welded in such a way as to facilitate radiographic testing of welded joints.

All butt welds in gate components shall be 100% radiographically tested for their soundness. However, the extent of radiography for joints in skin plate alone shall be limited to 10% of total weld length suitably selected. However other tests like ultrasonic, dye-penetrant or magnetic particle test should be conducted for full length of butt joints in the skin plate. All butt joints in hoist bridge shall also be 100% radiographically tested for their soundness. Dye-penetrant test shall be carried out after each pass of the weld.

ii) Fillet joints

All fillet welds shall be continuous. For the main members, no fillet welding should be made on members whose thicknesses differ substantially. Fillet weld at 'T' joints should be made, as a rule, on each side of the joint, unless it is otherwise agreed due to some practical reasons. All fillet welds shall be tested ultrasonically for soundness.

b. Qualification of Welding Process

A specification of the welding process, that is proposed to be used, shall be established and recorded and, if required, a copy of such specification

Together with a certified copy of report of results of tests made in accordance with the process and specifications shall be furnished.

The qualification of the welding process shall be at least equal to that required by 'Standard Qualification Procedure' of the Indian Standards and the minimum requirement of the tests shall be at least as stated in the said, 'Standard qualification Procedure'

c. Qualification of Welders

The Tenderer shall be responsible for the quality of the work performed by his welding staff. All welders assigned to the work shall have passed qualification tests for welders. If at any time the work of any welder appears questionable, the welder shall be required to pass additional qualification tests to determine his ability to perform the type of work on which he is engaged.

7.6.5.6 Riveting

Rivets shall be driven by power riveters, employing pneumatic, hydraulic or electric power. After driving, their finished heads shall be of approximately hemispherical shape of uniform size throughout the work for the same size rivet, neatly finished and concentric with the holes. Rivets shall be finished and heated uniformly to a temperature not exceeding 1065°C. All shop driven rivets within a distance of 425 mm from a shop welded joint shall be driven after the welding is completed. Recupping a caulking of loose or defective rivets will not be permitted. While removing defective rivets, care shall be taken not to injure the adjacent metal and if necessary, they shall be drilled out.

7.6.6.0 Turned and fitted Bolts

In cases, where bolts have to be used but strength of a riveted connection is required, this can be obtained by using special bolts in special holes to a driving fit. The bolts are specially made from black round bars and turned down to the exact diameter. The inside of the head and flat face of the nut should be machined. The hole must be accurately drilled or reamed with a

clearance of not more than 0.25 mm the holes after assembly of the parts must be true throughout the thickness of all parts and perpendicular to axis of the member. Washers for turned and fitted bolts should be machined on both faces.

7.6.7.0 Drilling and Reaming

Holes shall be accurately located and drilled or reamed perpendicular to the face of the member and, if necessary, shall be drilled to a template. Counter-sinking, wherever required, shall be done carefully and to the full depth of Head. Open holes in material of 18 mm or less in thickness, shall be sub-drilled or sub-purchased before assembly and reamed during assembly.. Holes in structural steel of more than 18 mm in thickness shall be drilled 3 mm smaller than the normal diameter of the rivet or bolt, before assembly and reamed to the full size during assembly. All members shall be shop assembled before reaming or drilling holes for field connections.

7.6.7.1 Punching

For sub-punching, the diameter of the punch shall be 4.5 mm smaller than the nominal diameter of the rivet or bolt and holes shall be clean cut without torn or ragged edges.

7.6.7.2 Stress relieving

Stress relieving of welded parts, where required, shall be carried out after all welding is completed but before that part is machined or assembled into structure. Localized stress relieving will not be permitted for shop welded parts. The stress relieving of parts shall be done as per IS:2825,IS:10801 and IS:10234 latest edition). Provisions of IS:4623 shall also be fulfilled for stress relieving of gate components.

7.6.8.0 Painting

7.6.8.1 General

All paints, painting materials and accessories for painting shall be supplied by the Tenderer and shall be included in the price bid. The paints proposed by the Tenderer must be approved by the representative of the department before application of the same. The analysis in respect of paint properties, paint composition and performance requirements of the paints shall be submitted by the Tenderer for examination and approval. The painting and surface preparation shall conform to the relevant Indian Standard specifications, IS:1477 – Guidelines for Painting System for Hydraulic gates and Hoists.

7.6.8.2 Preparation of Surfaces

Surface preparation shall be in accordance with the following procedure:

Weld spatters or any other surface irregularity shall be removed by any suitable means before cleaning.

All oil, grease and dirt shall be removed from the surface by the use of clean mineral spirits, xylol or white gasoline (lead free) and clean wiping materials.

Following the solvent cleaning, the surfaces to be painted shall be cleaned of all rust, mill scale, and other lightly adhering objectionable substances by sand blasting or grit blasting to uniform bright base metal. Any grit or dust remaining after the cleaning operation shall be completely removed from the surface by wire brushing, air blowing, suction or other effective means before the surface is painted.

Surface of stainless steel, nickel, bronzes and machined surface adjacent to metal work being cleaned or painted shall be protected by masking tape or by other suitable means during the cleaning and painting operations.

Primers shall be applied as soon as the surface preparation is complete prior to the development of surface rusting. The time gap between the application primer and surface preparation shall normally not exceed six hours. In case there is considerable time gap, the surface should be reblasted prior to priming.

7.6.8.3 Painting Details

Stainless steel and bronze surfaces shall only be cleaned but not painted.

All surface of the embedded parts, which are to come in contact with concrete, shall be cleaned as mentioned above and given two coats cement latex to prevent rusting during shipment and while awaiting installation.

Two coats of zinc rich primer shall be applied to all unfinished surfaces of the embedded parts and gates to be exposed to atmosphere or water to obtain a dry film thickness of 75 microns, which shall be followed by two coat coaltar blend epoxy resin paint to get dry film thickness 150 microns in each coat. Total dry film thickness shall not be less than 350 microns. Time interval between the coats shall be 24 hours.

All finished surfaces of ferrous metal including bolts, screw threads, etc that will be exposed during shipment while awaiting installation shall be given a heavy uniform coating of gasoline soluble rust preventive compound or equivalent.

Two coats of zinc phosphate primer shall be applied to all exposed surfaces of rope drum hoist, hoist support structure, hoist frame exposed to atmosphere

Tenderer

Superintending Engineer

or water to obtain a dry film thickness of 15 microns, which shall be followed by two finishing coats of aluminium paint to obtain dry film thickness of 75 microns per coat. The total dry film thickness of allcoats including primer coating shall not be less than 225microns. The interval between thoats shall be 24 hours.

7.6.4.Measures During Painting

Any bare spots or holidays shall be recoated with additional application of primer. All runs, sags, floods, or drips shall be removed by scrapping and cleaning. The cleaned area should be retouched or all such defects shall be remedied by reblasting or repriming.

Special attention should be given to good coverage on rivets, welds and sharp edges and covers.

Suitable measures shall be taken to protect the applied primer from contact with rain, fog, mists, dust other foreign matter until completely hardened and next coat is applied.

The air temperature at the time of application must not be below 10⁰ C and relative humidity must not be above 90%

7.6.8.5 Application Procedure

Paints and coating materials shall be in a homogeneously mixed condition at the time of application and shall not be thinned except as hereinafter specifically provided. Warming of the paint shall be performed by means of hot water bath. All surfaces to white paint shall be applied immediately after cleaning and except otherwise specifically provided, shall be applied by either washing or by airless spray. When paint is applied by spraying, a mechanical agitator type of paint put shall be used. Means shall be provided for removing all free oil and moisture from the air supply line of all spraying equipment. Each coat of paint shall completely cover the surfaces and shall be free from runs, sags, pinholes, and holidays. Each coat of paint shall be allowed to dry or harden thoroughly before the succeeding oat is applied.

All paints shall be applied by skilled workers in a workmanlike manner. Paint shall not be applied during damp weather and on the surfaces, which care not entirely free from moisture. Rust preventive compound shall be applied by any convenient method to ensure complete coverage of heavy coating. After the final application, the paint film shall be allowed to cure at least for 7 days.

7.6.8.6 Field Painting

The painted metal work shall be handled with care so as to preserve the shop coats. The area of the shop paint, which has been damaged during transport shall be cleaned to bases metal and repainted. Paint applied to such areas shall be of the same type as used originally in shop painting.

7.6.9.0 Catalogues and Operating/Maintenance Instructions

Six sets of catalogues indicating the complete lists of parts and operating instructions in the English language, which may be needed or useful in operation, maintenance, repair, dismantling or assembling and for the repair and identification of parts for ordering the replacement, shall be supplied by the Tenderer to the department. Such catalogues shall be in hard cover bound books and should have suitable jackets of thick polythene paper.

7.6.10.0 Instruction Plates

All gauges, meters and other instruments etc., shall have dials or scales calibrated in metric system. All name plates, instruction plates, warning signs etc., shall be in English as well as in Hindi. All markings to be used shall be submitted to the department for approval before the equipment is marked or labeled.

7.6.11.0 Shop Assembly and Test:

All gate frames and appurtenances shall be shop assembled so as to allow for adjustment of various dimensions to make them conform to the designed dimensions fits, tolerances, surface finishers, clearances etc. in the event it is not possible to complete the gate leaf or any other equipment/component in the shop they will be accurately assembled in the shop using temporary connections and various critical dimensions shall be verified. The embedded metalwork to be furnished under these specifications shall be shop assembled to the extent possible. Special care shall be taken in all phases of work affecting the strength and rigidity of anchorages and embedded anchorages since the correct operation and stability of gates are largely dependent upon the strength and accuracy of these parts. The yoke/trunnion girders shall be completely fabricated in the shop. The cost of carrying out the tests, not including the cost of inspection by the government personnels shall be borne by the Tenderer and included in the lump sum price bid in the schedule. However, at the discretion of the Engineer in Charge, the above tests shall be carried out by the Tenderer on the shop assembled parts and bought out items to the extent possible and in accordance with the instructions of the Engineer in Charge. The yoke/trunnion girders shall be suitably stress relieved in an annealing furnace in accordance with standard practice. The fabricated parts and assembly of gates/gate frames and other

equipment shall be inspected and tests observed by the department or his authorized representative.

7.6.11.1 Pretensioning of load carrying anchors

All the load carrying anchors shall be suitably pretensioned on the trunnions to ensure proportionate load sharing by the anchor rods. The prestress shall be of a magnitude to introduce a stress of 5% of permissible tensile stresses in the anchor.

7.6.12.0 Preparation of Dispatch

7.6.12.1 Unit marking, match marking and Transportation Designation

Each part of the gates, embedded parts and hoists, which is to be transported as a separate piece. Shall be marked to show the unit of which it is a part and match marked to show its relative position in the unit to facilitate assembly in the field. Unit marks and match marks shall be made with heavy steel stamps and paint. Each piece, sub-assembly or package transported separately shall be labeled or tagged with transport designation consisting of the specifications number and the marks number of such pieces, number of parts grouped in such sub-assemblies or contained in package.

7.6.12.2 Weights

Before dispatch, the Tenderer shall determine (by the most accurate means available), the net weight of each piece of assembly that is to be shipped as a unit exclusive of boxes, crates or kits. The particulars listing the net weight shall be painted on the respective pieces of assemblies or stated on the tags attached thereto.

7.6.12.3 Packing

All parts shall be prepared for dispatch so that slings for handling may be attached readily while parts are to be moved. Where it is unsafe to attach slings to the box, parts shall be packed with slings attached to the part and slings shall project through the box or crate so that attachment can be made easily. All parts shall be properly secured, packed to withstand handling during transportation. All packing shall allow for easy removal and checking at site. Special precautions shall be taken to prevent rusting of steel and iron parts during transit.

Suitable methods proposed to be adopted for protection against moisture shall be subject to the prior approval of the department. Each bale or package is to contain packing note quoting number and date of Tenderer's order and the name of office placing the order.

After delivery of material at site, all packing shall become property of the department. Notwithstanding anything stated in this clause, the Tenderer shall be entirely responsible for loss, damage or depreciation to the stores

Tenderer

Superintending Engineer

due to faulty and insecure packing. The equipment shall be insured for loss or damage during transit at the cost of the Tenderer.

7.7.0.0 Erection

The equipment covered by these specifications shall be furnished and erected by the Tenderer at the project site. The Tenderer shall follow approved drawings for all erection. The Tenderer shall prepare a complete erection procedure, which shall describe the sequence of operations to be carried out, the method to be used, the measurements to be taken and the tolerances to be met, in the erection and alignment of the equipment. Such procedure shall have the approval of the department prior to the commencement of fabrication and when approved shall form a part of the specification furnished by the Tenderer.

7.7.1.0 Installation of 1st Stage Embedded Parts

The Tenderer should be prepared to accept reasonable inaccuracy in the location of 1st stage anchors without asking for compensation.

7.7.2.0 Installation of 2st Stage Embedded Parts

Gate frames, anchor flat, guides and seal seats etc., Shall be assembled and installed, brought to line grade and plumb within erection tolerances and secured in place by anchorages as shown on the drawings or otherwise according to the best method in practice and as may be necessary for successful functioning of these units. The erection tolerances for the frames and guides shall be as indicated on the drawings or as per latest relevant BIS Codes. Extreme care shall be taken to ensure that their surfaces be in a true plane within the tolerance throughout their entire length. The 2nd stage anchorages shall be strong enough to hold the embedded parts securely in position while concrete is being placed.

7.7.2.0 Installation of Gates, Hoists & Supporting structure.

All the components of gate & hoist shall be erected perfectly, giving due cognizance to the unit and match marks on the components. All components shall be designed and assembled to fit snugly and shall be water tight. It is desirable to avoid the flood period to perform erection of gate. Due precautions should be taken for measures against floods since the gate may be submerged in water sustaining damages or the half erected gate may disturb the water flow causing damages to the civil structure.

7.7.4.0 Placing of Concrete

Concreting shall be done by the department and the Tenderer shall give a detailed programme of fixing and aligning the embedded parts to the department for this purpose. Before placing the concrete if any one lift and between placement of successive lifts, alignment tolerances shall be checked and remedial action taken by the Tenderer if any displacement has occurred.

7.7.5.0 Erection Personnel

Except for the concreting, skilled as well as unskilled personnel shall be arranged by the Tenderer for erection of the equipment covered in these specifications.

7.7.6.0 Tools & Tackles

The Tenderer shall provide all tools & tackles used in the above erection work.

7.8.0.0 INSPECTION, TESTING AND FINAL ACCEPTANCE

7.8.1.0 Place of Manufacture & Inspection

The tenderer shall state in his tender the place of manufacture, testing and inspection of various portions of the work included in the contract. Authorized representatives of the department may be present at the time of any or all tests and the tenderer shall provide all necessary facilities for the same. Representatives of the department shall also be entitled to access to tendere's /sub-Tenderer's work at any time during the working hours for the purpose of inspecting the manufacture of equipment and materials.

7.8.2.0 Inspection

All supplies (which include without limitation raw materials, components, intermediate assemblies and end products) shall be subject to inspection and test by the department to the extent practicable at all time and places. Inspection shall be carried out in accordance with relevant Indian standards.

If any inspection or test is made by the department in the premises of the Tenderer or sub-Tenderer, the Tenderer without additional charge shall provide all reasonable facilities and assistance for the safety and convenience of inspectors in the performance of their duties. If on the request of the department, inspection or test is made at a point other than the premises of the Tenderer o sub-Tenderer of the Tenderer , it shall be at the expense of the department except as otherwise provided in the contract, provided that in value of samples used in connection with such inspection and test. All inspection and tests by the department shall be performed in such a manner as not to unduly delay the work. The department reserves the righty to charge

the Tenderer any additional cost of inspection and test when supplies are not ready at the time of such inspection and test. Acceptance or rejection of the supplies shall be made as promptly as practicable after delivery except as otherwise provided in the contract but failure to inspect and accept or reject supplies shall not relieve the Tenderer of the responsibility for such supplies to be in accordance with the contract requirements. The inspection and test by department of any supplies or lots thereof does not relieve the Tenderer of any responsibility regarding defects or other failure to meet the contract requirements which may be discovered prior to the acceptance .

Except as otherwise provided in the contract, acceptance shall be conclusive except as regards latent defects, fraud or such gross mistakes as amount to fraud. The Tenderer shall provide and maintain the inspection system acceptable to the department covering the supplies hereunder. Records of all such inspection work shall be kept complete by the Tenderer and made available to the purchase during the performance of the contract and for such longer period as may be specified elsewhere in the contract.

7.8.3.0 Operational Tests

7.8.3.1 Gates

The Tenderer shall carry out in the presence of project authorities such tests on the gate equipment to determine that the gate will fulfill the functions for which it has been designed. Test shall be repeated, if necessary, until successfully carried out to the satisfaction of the department. Leakage tests and operational tests shall be carried out at the convenience of the project authorities after completion of other portions of the work. The project authorities shall have the right to carry out such tests also when the reservoir is at a level other than design level.

7.8.3.1.1 Dry Tests

Operational tests in dry shall be carried out as soon as possible after completion of erection. Tests shall include at least two complete traverses from the maximum raised position to the fully closed position. All adjustments, clearances etc., shall be checked for proper operation.

7.8.3.1.2 Wet Tests

These tests should simulate the actual operating conditions as closely as possible. At least two complete traverses will be made from the fully closed position to the normal raised position of each gate as follows:

- a) When gate is closed, raise gate to its normally open position in steps and observe the performance including vibration.
- b) Lower the gate to the fully closed position in steps and observe the performance of the gate including vibration.

Tenderer

Superintending Engineer

- c) Check up the proper operation of limit switches.

7.8.3.1.3 Leakage Tests

Leakage tests shall be carried out with each gate lowered on to the sill. Before measuring the leakage, the gate shall be raised and lowered several times by a metre or so in order to dislodge any debris that may have lodged in the side seal seats. The leakage shall then be measured and recorded. The maximum permissible leakage shall not exceed 5 litres per min, per length of periphery of sealing surface.

7.8.3.2.0 Rope Drum Hoist:

The hoist should be able to perform its function for which it has been designed. The gate shall be tested for self closing by its own weight. The movement of gate should be smooth. The hoist will be tested to stop the gate in intermediate positions with effective braking. The winding of rope over the drum should be uniform. Ensure that there is not any jerk in gate while starting and stopping.

7.8.4.0 Final Acceptance

The final acceptance of the equipment shall be based on the following.

- a) Quality and workmanship of the equipment.
- b) Satisfactory operation of the equipment after erection as required under these specifications.
- c) Acceptance of various tests by the department as mentioned in various paras have to be conducted. All tests may be witnessed by the Tenderer or his Authorised representative. On successful completion of all tests, the equipment shall be accepted but all the responsibilities shall remain with the supplier within the guarantee period.

7.8.5.0 Guarantee

Within two years after acceptance of the equipment, if any part of the gate, embedded parts and hoist is found defective because of workmanship or material or otherwise, the Tenderer shall at his own expense, furnish and install new parts and materials approved by the department.

7.8.5.1 Failure to Meet Guarantee

Should any part of the equipment fail to meet the guarantee/other requirements of the technical specifications within the time covered by the guarantees, the purchase may direct the Tenderer to proceed at once to make alterations or furnish new parts as may be necessary to meet the requirements. All expense of furnishing, delivering and installing new parts or making alterations to existing parts and of tests made necessary by failure of

the equipments to meet the guarantee and other requirements of the technical specifications, shall be borne by the Tenderer. If, after due notice, the Tenderer refuses to correct any failure of the equipment to meet the requirements of the technical specifications during the guarantee period, the department may proceed at his own expense to correct such failure and to collect from the Tenderer an amount equal to actual expense so incurred, including overheads and all other incidental expenses.

7.8.5.2 Defective Equipment

In case any part of the equipment is found to be defective in material or workmanship or develops defects or does not otherwise meet the requirements of the specifications including errors or omissions on the part of the Tenderer the following shall apply:

a) **Defects Disclosed Prior to Final Acceptance:**

Any defect in materials or workmanship or other failure to meet the requirements of these specifications including errors or omission on the part of the Tenderer, which are disclosed prior to final payment or prior to final acceptances tests, whichever occurs at a later date, shall, if so directed by the department, be corrected entirely at the expense of the Tenderer.

b) Any latent defect not disclosed before date of final acceptance shall be corrected promptly y the Tenderer entirely at his expense provided that latent defects shall not exceed twelve months after date of final acceptance of the equipment.

7.8.5.3 Operation of Unsatisfactory Equipment.

The department shall have the right to operate the equipment as soon as and as long as it is in operating condition, whether or not such equipment has been accepted. Such operation by the department shall not lessen or impair any express or implied warranties concerning such equipment. All repairs or alterations required shall be made at such times as directed by the department and in such a manner as will cause the minimum interruption in the use of the equipment by the department.

Operation of the equipment pursuant to this section shall not relieve the Tenderer of his responsibility to supply all equipment in complete accordance of technical specifications. While unsatisfactory articles can be taken out of service, for correction of latent defects, errors or omissions, the period of such operation of any use pending the correction of latent defects, errors or omissions shall not exceed two years without mutual consent of the Tenderer and the department.

7.9 Measurement and payment

No separate payment will be made for this item, it shall be included in the Bid price quoted in Schedule 'A'.

SECTION 8
SPECIFICATIONS FOR STOPLOG GATES

SECTION 8**SPECIFICATIONS FOR STOPLOG GATES****INDEX**

Sl.No.	Para No	Item
1.	8.1	Scope
2.	8.2	Details of stop logs and emergency gates
3.	8.2.1	General
4.	8.2.2	Details of stoplogs
5.	8.2.3	Details of Guide frames
6.	8.3	Salient features
7.	8.4	Designs and drawings
8.	8.5	Shop drawings and fabrication
9.	8.6	Installation and test at site
10.	8.7	Measurement and payment

SPECIFICATION FOR STOPLOGS

8.1 Scope

The section shall covers various works necessary to install stop logs for General specifications “as appropriate.

One set of vertical lift fixed wheel type stop log gates, each gate consisting of (3) elements with appurtenant parts complete with necessary accessories shall be fabricated as per approved drawings. Finishing. Paintings, insuring, shipping, and delivery at site and including installation of each element over the stop log groove and dogging beam designed suitable to hold one stop log elements for the purpose of storage as shall allow the stop log elements to slide into groove when necessitated by operating lifting beam and gantry crane.

8.2 Details of stop logs and emergency gate

8.2.1 General

This stop logs / emergency gate are meant for inspection, maintenance and repair of the main gates while keeping lake water level even if one of the main gates is raised for such purpose. The stop logs shall be operated by the gantry crane under the fully water head balanced condition both in raising and lowering condition.

The stop logs in general shall satisfy the following requirements.

- a) These shall be reasonably watertight
- b) These shall be capable of being raised or lowered by the hoisting mechanism provided within the prescribed time, and
- c) These shall be rigid and reasonably free from vibration

8.2.2 Details of stop logs

a) General

Each stop log shall consist of skin plate, main horizontal girders, vertical members, bearing plates rollers, shoes, shoes, seals, upper sealing plate, lifting lugs and all other necessary components. The stop log shall be of the slide gate type and of welded constructions.

All stop log leaves shall be identical in construction and strength, and shall be interchangeable.

The details of construction of the stop log not specified herein shall be made by the Tenderer subject to review and approval of the Department.

b) Skin plate

The skin plate shall be at the down stream side of the stop log. The skin ploat shall not be considered as a part of the strength members of main horizontal beams in the design of stop logs. The bottom of skin plate of the

Tenderer

Superintending Engineer

stop log shall be in true and straight plain to the embedded sill beam for complete water tight and uniform distribution of load along the sill beam.

c) Main Horizontal beams

The main horizontal beams shall be built up girder construction as per the drawings. Provision shall be made to drain off water from the horizontal member.

d) Bearing plates

The bearing plates shall be provided all along the side beams of stop logs to transmit the load acting on stop log to the embedded guide frames. The bearing plates shall be of corrosion – resisting steel.

e) Seals

The seals shall be the molded rubber shape clamped to the downstream face of the stop log by means of steel clamping plates and corrosion – resisting steel bolts, nuts, and washers. The side seals shall be of P shaped type or other approved shape which shall be activated by the upstream water pressure while the bottom seal shall be a plain bar rubber seal.

The sharp edges of clamping plates, base plates of rubber, bottom edge of skin plate etc., which contact with rubber seals shall be rounded to avoid a cut damage of rubber seals.

f) Side Rollers/Shoes

Two (2) side shoes shall be provided on each side of each stop log leaf to guide and position the stop log in the guide frame. The rollers/shoes shall be provided with corrosion – resisting steel pins, self – lubricating bushings with lubricating system and location. Washers or corrosion resisting plates.

The side rollers/ shoes shall be designed for the inertia force acting on stop log leaf due to earthquake.

g) Upper sealing plate

The sealing plate shall be provided on the top of each stop log to receive the bottom rubber seal of the upperstop log, when the stop log is piled up each other in the slot. The sealing plate shall be straight and true plain within the specified tolerances to form complete continuous water tightness with the bottom rubber seal of the upper stop log and shall be of corrosion resisting steel.

Lifting Lugs

- g)** Each stop log leaf shall be fitted with suitable member of lifting lugs on the top of it. The lugs shall permit the sure catch and release operation by hand.

8.2.3 Details of Guide Frames

a) General

Each guide frame shall consist of the track – cum side sealing frames, sill beam front frames with side rollers / shoe path and all other necessary components. The corrosion resisting steel plates shall be attached to all exposed surfaces of guide frames to avoid excessive wear thereof.

The details of the construction of the guide frames not specified herein shall be made by the Tenderer subject to review and approval of the Departments.

b) Sill Beams

The sill beam shall be straight and true flat for providing a close fit with the bottom of the stop log leaf. The sill beam shall consist of L shape beam and sealing plate made of corrosion – resistance steel T – shape beams shall not be applied to the sill beams.

The sealing surface of the sill beam shall be connected to the side sealing frames at the bottom corners to form a continuous seal with the seal rubbers of stop logs. The seal weld shall be made for the sealing plates at the corners and shall be ground finish.

The approved type water – tight expansion joints shall be used to connect the sill beam segments across the contraction joints of the foundation concrete. PVC water stops shall be connected to the bottom of sill beam at the contraction joints to keep complete water tight at the joints.

c) Track – cum – side sealing frames

The track frames incorporating the side sealing frames therein shall be provided at the downstream side of guide frames to transfer the load of the bearing plates of stop log to the concrete structures.

The track frames are provided with the bearing plates made of corrosion – resisting steel and its surfaces made to true flat.

The corner edges of the track frames shall be armored with the corrosion – resisting steel plates against the abrasion/wear due to sand, boulders etc., The seating surface shall be made to provide complete and smooth sliding seating with side seal rubber.

d) Side roller / Shoe Paths

The side roller/shoe paths and frames shall have ample strength to resist the load from the side rollers/shoes of the stop logs. The assembled side roller/shoe paths shall be straight over their entire length and no offset shall exist at joints. The paths shall be made of corrosion – resisting steel.

8.3 Salient features

<u>Sl.No.</u>	<u>Description</u>	<u>Salient features of Reservoir</u>
1	Type	Radial
2.	Clear span	13.00 m
3.	Designed water level	187.50 m
4.	Sill elevation	181.50 m
5.	Designed head	5.50 m
6.	Gate element size	13.00 x 5.50 m
7.	No. of elements per set	15 (13+2) Nos

Quantity to be provided

1.	E.M.Parts of Stop log gates	15 sets
2.	Stop Log gates	3 elements
3.	Sill beams	15 Nos

8.4 Design and drawings

Each element of the stop logs for reservoir is designed conforming to IS 4622 1976” Recommendations for structural design of fixed wheel gates and other applicable Indian standards of BIS Listed in table as noted below. These tables also indicate the related Indian standards for materials, fabrication, installation and testing. Accordingly the drawings are prepared and supplied and they shall be reckoned as part of these specifications for fabrication supply and installation of stop logs and emergency gate.

No further detailed drawings than indicated will be provided. The details not specified there in shall be made by the Tenderer subject to review and approval by the Department.

Table 8.3.4-1

List of referred Indian standards of BIS

Sl.	Code No	Title
1	IS: 4622 -1978	Recommendations for structural design of fixed wheel gates.
2	IS: 800 -1962	Code of practice for use of structural steel in general building construction.
3	IS: 2502 -1963	Code of practice for bending and fixing of bars in concrete reinforcement.

Tenderer

Superintending Engineer

4	IS: 1893 -1966	Criteria for earthquake resistance design of structures.
5	IS: 6938 -1973	Code of practice for design of rope drum and chain hoist for hydraulic gates.
6	IS: 2266 -1970	Specification for steel wire ropes for general Engineer in Chargeing purpose.
7	IS: 3681 -1966	General plan for spur and helical gears.
8	IS: 325 -1970	Specification for three phase induction Motors.
9	IS: 816 -1969	Code of practice for use of metal arc welding for general construction
10	IS: 7718 -1975 (Part-1)	Recommendations for inspection, testing and maintenance of fixed wheel and slide gate.
		Part-1: Inspection, testing and Assembly at the Manufacturing stage.
11	IS: 7718 -1978 (Part-II)	Recommendations for inspection, testing and maintenance of fixed wheel and slide gate.
		Part-II: Inspection, Testing at the time of the erection.
12	IS: 7718 (Part-III)	Recommendations for inspection, testing and maintenance of fixed and slide gate.
		Part-III: Inspection, Testing and maintenance after erection.
13	IS: 1181 -1967	Qualifying tests for metal arc welders (engaged in welding structure other than – pipes) (first revision).
14	IS: 2825 -1969	Code of practice for unfired pressure vessels.
15	IS: 2595 -1978	Code of practice for radiographic sting.
16	IS: 823 -1964	Code of procedure for manual metal arc welding of mild steel.
17	IS: 3658 -1981	Code of practice for liquid penetrant flaw detection.
18	IS: 3664 -1981	Code of practice for ultrasonic pulse echo testing by contact and immersion methods.
19	IS: 3703 -1980	Code of practice for magnetic particle flaw detection.

8.4.2

Materials for parts of vertical lift fixed wheel type gates.

Component part	Recommended	Reference to specification of BIS Material
Wheel	Cast steel	IS:1030-1974 Specification for carbon steel castings for general Engineer in Chargeing purposes
Bushing	Bronze	IS:4622-1978 Recommendation for structural design of fixed wheel gates.
Wheel Pin	E.N.S.T.	IS:4622-1978 Recommendation for structural design of fixed wheel gates.
Structural parts of Gate leaf, track base etc.,	Structural steel	IS:2062-1962 Specification for structural steel (fusion welding quality)
Seal	Rubber	IS:4622-1978 Recommendation for structural design of fixed wheel gates.
Wheel track	Stainless steel	IS:1510-1972 Specification for stainless and Heat resisting steels
Seal seat	Stainless steel	IS1510-1972 Specification for stainless and Heat resisting steels
Seal base Seat base	Seal structural steel	IS:2062-1962 Specification for structural steel (fusion welding quality)
Seal Clamp	Structural steel	IS:2062-1962 Specification for structural steel (fusion welding quality)
Guide and Guide Shoes.	Structural steel	IS:2062-1962 Specification for structural steel (fusion welding quality)
Springs	Spring Steel	IS:1570-1962 Schedules for wrought steels for general Engineer in Chargeing purposes.
Anchor bolts	Structural steel	IS:2062-1962 Specification for

Tenderer

Superintending Engineer

		structural steel (fusion welding quality)
Wire ropes	Steel	IS:2066-1970 Specification for steel wire ropes for general Engineer in Chargeing purpose.
Drum	Cast steel	IS:1030-1962 Specification for steel castings for general Engineer in Chargeing purposes.
Sheaves/Pulleys	Mild Steel	IS:226-1970 Specification for structural steel (Standard a quality).
Gears	Cast steel	IS:1030-1962 Specification for steel castings for general Engineer in Chargeing purposes.
Pinions	Forged steel Cast Steel	IS:1570-1962 Schedules for wrought steels for general Engineer in Chargeing purposes.)
Shafts	Steel (C55Mn 75)	IS:1570
Gear bore frame	Mild steel	IS:2062-1962 Specification for structural steel (fusion welding quality).

8.5 Shop drawings and fabrication

The Tenderer shall carry out the fabrication of steel materials in accordance with the detailed design specifications and method approved by the Department.

The gates and embedded parts shall be manufactured to such accuracy and tolerances as are required for safe and efficient operation of the gates.

The manufacturing tolerances in Table shown below shall be taken for general guidance in accordance with IS:17718 (part-I)-1975" recommendations for inspection, testing and maintenance of Fixed wheel and slide gate"

TABLE 8.3.5.1.MANUFACTURING TOLERANCES

Sl.No.	Description	Tolerance

1. Embedded parts.

i.	Deviation of any point on the face of seal seats or Wheel track from a 2 meter machined straight edge held against it.	0.50 mm
ii.	Deviation from straightness of the guide track in 2 meters length.	2.00 mm

Tenderer

Superintending Engineer

- iii. Variation in the distance between the face of the seal seat and the face of its respective wheel track. 1.00 mm
- iv. There shall be no off-sets or gaps at any adjoining field joints between seal seats, wheel tracks and guide tracks.

2. Gates

- i. These gates shall be so assembled that when a machined straight edge is held against all the wheels on either sides in zero position. It will not be possible to insert a feeler gauge thicker than 1.5 mm Between any of the wheels and the straight edge.
- ii. Distance between the side guide-block or guide roller on one side of the gate to the corresponding guide block or guide roller on the other side. 1.5 mm with reference to Dimension shown on the drawing.

8.6 Installation and Test at site

a) Guide frames

Guide frames shall be assembled in the block outs in accordance with the Approved Drawings and approved installation procedures, brought to line and grade within the tolerances specified and firmly secured in place. Alignment bolts or other necessary devices shall be used to install the guide frames at corresponding accurate position. Connections between the guide frames and anchor plates/bars shall be adjustable for alignment and firmly tightened to hold the guide frames securely in position while concrete is being placed in the block outs. Additional bracing shall be provided where necessary in the opinion of the department to ensure the required alignment without any additional cost and claim.

Extreme care shall be taken to ensure that the guiding, bearing and sealing surfaces lie in a true plane within the tolerances specified for their entire length. Placement of concrete in the block outs shall not proceed until the guide frames have been completely assembled and secured and passed the tests under the witness of the Department. After concrete placing, alignment and tolerances shall be checked and remedial action taken if readings indicate that displacement has occurred.

b) Stop logs

Each stop log leaf complete with seals, bearing plates and side rollers shall be assembled and erected in accordance with the approved Drawing and Approved installation procedures. Joints shall be watertight where required for complete watertight. The rubber seals shall be so fixed on each stop log leaf and adjusted that the stop log, when set in the guide slots, have a tight and closes fit on the sealing frames of the guide frames.

c) Tests

Tenderer

Superintending Engineer

i) Tests after competition of installations.

After completion of installation work at the site, the test shall be performed by the Tenderer in accordance with the approved test procedures.

The tests shall include but not be limited to

- a. Inspection by feeler gauge measurement for satisfactory sealing or all seals.
- b. Inspection for satisfactory installation of all components.
- c. Check of satisfactory operation under dry condition.

Any defect or improper operation discovered during the test shall be correct and the entire test shall be repeated to the satisfaction of the department.

ii) Test on completion

After test at the site have been completed and approved by the Department and relevant structures under other sections are fully installed, the following tests shall be performed by the Tenderer as tests on completion.

- a. Check of satisfactory operation under an acceptable water level condition.
- b. Check of water leakage from closed stop logs under an acceptable water level condition.

After the tests, stop logs shall be stored in the warehouse for them by the Tenderer.

Any defect or improper operation discovered shall be corrected at once and entire test shall be repeated to the satisfaction of the Department within the tolerances as shall be defined by the Tenderer himself and subject to the Department's approval.

8.7 Measurement and payment

No separate payment will be made for this item. It shall be included in the price bid quoted in Schedule 'A'

SECTION 9

SPECIFICATIONS FOR PERMANENT
ELECTRIFICATION

SECTION 9**SPECIFICATIONS FOR PERMANENT
ELECTRIFICATION****INDEX**

Sl.No.	PARA NO.	ITEM
1.	9.0	Scope
2.	9.1	General
3.	9.2	Salient features
4.	9.2.1	Extension of 11KV over Head power supply line
5.	9.2.2	Stepdown Transformer
6.	9.2.3	Diesel Generator System
7.	9.2.3.1	Diesel Generator
8.	9.2.4	Portable Diesel Generator
9.	9.2.5	Generator room/Control Room
10.	9.2.6	Control panel at the Transformer control panel
11.	9.2.7	Main distribution panel
12.	9.2.8	Sub-Distribution panels
13.	9.2.9	Moulded case circuit Breaker (MCCB)
14.	9.2.10	Local Control panels
15.	9.2.11	Cables and wires
16.	9.2.12	Lighting system
17.	9.2.13	3 Phase power sockets
18.	9.2.14	Earthling and lighting protection system
19.	9.2.15	Electrical installation works
20.	9.2.16	Measurement and payments

Tenderer

Superintending Engineer

Section 9

9.0 Scope

The specifications given in this section cover the design, supply, installation, testing and commissioning the permanent electrification required for **Operation of Fifteen (15) radial gates of spill way of Joladarasi Reservoir**

9.1 General

a) The design requirements contained in these specifications are general and the Tenderer shall assume all responsibility for a coordinated and adequate design confirming to the best Department practice. All apparatus, accessories and material which have not been specifically mentioned but which are necessary for installation and for the efficient performance of the system shall be provided by the Tenderer and included in the price schedule-A.

All the equipment and components for permanent electrification including the wirings and electrical accessories and fixtures shall be designed as per Indian Electricity Act and Indian Electricity rules and standards of BIS listed in table (1) and other applicable codes. The standards are also to be maintained as per the rules of electrical inspectorate of Government of Andhra Pradesh and Andhra Pradesh State Electricity Board as the installations are to be approved by these authorities.

b) The requirements for permanent electrification are furnished under sections 10.1.7.1 to 10.1.7.8

LIST OF SPECIFICATIONS OF BIS

a)	Cables and conductors	
b)	Cables and conductors	
i)	IS:434 (Part-1) -1964)	Rubber insulated cables part-1 with copper conductors
ii)	IS:434 Part-II)1964 aluminum	Rubber insulated cables part-II with conductors
iii)	IS:693-1965	Vamished cambric insulated cables
iv)	IS:694(Part-I)1964 with	PVC insulated cable (for voltage upto 100 V) Part-I copper conductors
v)	IS:694(Part-III) 1964 V) Part-II	PVC Insulated cable (for voltage upto 100 with aluminum conductors
vi)	IS:1554 (Part-I) 1988 part-I for	PVC Insulated (Heavy duty) electric cables working voltage upt and including 1100 Volts.
vii)	IS:1554(Part-II) 1988 part-II for	PVC Insulated (Heavy duty) electric cables working voltages from 3.3 KV upto and including 11 KV upt and including 1100 Volts.
viii)	IS:1596-1970 cables upto	Polyethylene insulated and PVC sheathed and including 250 V.
ix)	IS:1753-1967	Aluminum conductor for insulated cables.
x)	IS:3035 (Part-I)1965 cable part-I	Thermo plastic insulated weather proof PVC insulated and PVC sheathed.
xi)	IS:3035 (Part-II) 1965 cables: Part-II	Thermoplastic insulated weather proof polyethylene insulated and polyethylene sheathed.
b)	Conducts	
i)	IS:1953 – 1972	Rigid steel conducts for electrical wiring
ii)	IS:2509 – 1973 installations	Rigid non-metallic conducts for electrical
c)	Switchgear	
i)	IS:1822 – 1967 V	AC Motor starters for voltage not exceeding 1000
ii)	IS:2147 – 1962 low	Degrees of protection provided by enclosures for voltage switch gear and control gear
iii)	IS:2516 (Part-I)	Alternating current circuit breakers: part-I requirements section-I voltage not Sec.1 – 1965 exceeding 1000 Volts
iv)	IS:2516 (Part-I) 1963	Alternating current circuit breakers: Part-I

Tenderer

Superintending Engineer

- requirements Sec.2 Section-2 voltage
1000 volts to 11000 volts.
- v) IS:2516 (Part-II) Alternating current circuit breakers: Part-I
requirements section-3 voltage Sec.3 – 1973
above 11 KV
- VI) IS2516 (Part-II) Alternating current circuit breakers: Part-II Tests
Sec.2-1966 Section-1 voltage not exceeding 1000
volts.
- vii) IS:2516 (Part-I) Alternating current circuit breakers: Part-II Tests
Sec.-1965 Section-2 voltages above 1000 upto
and including 11000 V
- viii) IS:3427 – 1969 Metal enclosed switch gear and control gear for
voltages above 1000 V butnot exceeding 11000
V .
- ix) IS:4064 – 1978 Normal duty air break switches and composite
units of
air break switches and fuses for voltages not
exceeding 1000 V
- x) IS:4227 – 1967 Braided nylon cord for aeronautical purpose
- xi) IS:5124 – 1969 Code of practice for installation and maintenance
of AC
induction motor starters
- d) Earthing**
- i) IS:3043 – 1966 Code of practice for earthing

9.2 Salient features

The salient features of the permanent electrification, furnished in the Para No.10.4.1 of this section are as follows. However, the Tenderer has to consider and provide for the accruals including all other subsidiary and incidental requirements to accomplish supply, installation, testing and commissioning the permanent electrifications.

- a) Extension of 11 KV over head power supply line upto Reservoir site.
- b) Step down transformer 11 KV/440 V of capacity not lower than 250 KVA suitable for simultaneous operation of gate motors, Gantry Motors, welding transformer and lighting etc.
- c) Diesel Generator system of capacity not lower than 250 KVA suitable to meet the requirement indicated in (b) above, in case of failure of APSPDCL power supply.
- d) Portable diesel Generator system mounted on two – Wheel trolley to meet a working load of 82.5 KVA in case of exigencies.
- e) Control panel at transformer yard comprising moulded case circuit breaker (MCCB) each for APESB power supply and for diesel generator power

- supply, change over switch, volt meter, Ammeter, indication lamps and connectors etc.
- f) Main distribution panel with required meters, switches, fuses, bus bars etc. control switches for supplying power to sub-distribution panels for motors spillway and for lighting system of Reservoir.
 - g) Sub-distribution panels enclosed in a box with required meters, control switches change over switch, fuses etc located at
 - i) Reservoir
 - ii) Main distribution panel for lighting system of Reservoir
 - h) Underground PVC armored aluminum cable of suitable size
 - i) Two runs from transformer to control panel
 - i) Two runs from control panel at transformer to main distribution panel
 - ii) Independent cable from main distribution panel to sub-distribution panels located on gate hoists of spillway and located at piers numbered (4),(9),(14), (19)
 - iii) Independent cable from main distribution panel to lighting system of Reservoir for
 - a) Earth bound n left flank
 - b) Host of bridge and spillway
 - c) Walkway bridge
 - d) Road way on right flank
 - iv) Local control panels with MCCB direct on line starter, single phase preventer, power capacitor, voltmeter, Ammeter with selectors switches, indicator lamps, connectors, lugs, etc.
 - i) For each gate motors of spillway
 - ii) For each feeder for lighting system of spillway.
 - j) Cable rock over Hoist bridges of spillway and on walkway bridge and cable trench
 - k) Stepped pipe poles with
 - i) Twin bracket arms for lighting hoist bridges and carriageway located at the center of each span.
 - ii) Light bracket arm for walkway bridge
 - iii) Street light bracket arm for lighting earthen bund on left flank and road way on right flank at a span of 30 meters.
 - l) 250 watt sodium vapor lamp fitting with bulb, with bulb, with connecting wire from junction box of cable and fuse unit for each pole on hoist bridges for lighting hoist and spillway and also for walkway bridge.
 - m) 125 watt high pressure mercury vapour lamp fitting with bulb with connecting wire from junction box of cable and fuse unit for each pole on bund on left side and road way on right for lighting.
 - n) 400 watt high pressure mercury vapour lamp with connecting wire from junction boxes of cable and fuse unit for flood lighting the water way.

- o) Three phase power sockets with earthing pin suitable for operation of gantry cranes and for welding machines.
- p) Gantry cranes and for welding machines.

9.2.1 Extension of 11 KV over head power supply line

a) General

The 11 KV APSPDCL Supply is to be installed upto a distance of 300 meters where Generator system is to be located.

b) Requirement

The 3 phase 11 KV overhead line is to be provided on RS joist supports at a span of 50 meters with ACSR conductor of suitable size v-cross arms disc insulators with metal parts, pin insulators with GI pipes back clamps stay sets complete with concreting, pole earthing and concreting.

The item of work shall confirm to Indian Electricity rules and shall be got approved by the Electrical inspectorate of Government of Andhra Pradesh and the APSPDCL.

9.2.2 Step down Transformer

a) General

The step down transformer shall be capable of taking the following loads simultaneously.

- i) Hoist motors of twenty (20) spillway gates
- ii) Lighting
- iii) Welding machine of 15 KVA capacity and
- iv) All losses

The transformer shall be 11 KV/440 V, Delta/star 3 phase, 50 HZ with capacity not lower than 250 KVA oil natural cooling outdoor type mounted on plinth with 11 KV AB Switch, HG fuse, lightning arrestors, earth etc., provided on DP structure with RS joists poles of 175 x 85 mm plinth with masonry control switch of suitable capacity on LV : side and generally confirming to IS:1180 (part-I & II) 1979 and IS2026:1977 (Latest version) except where specified otherwise with first filling of oil generally as per IS-355:1983 (Latest version).

The transformer shall be standard make of reputed firm and shall be guaranteed at least for a period of five years from the date of its installation and commissioning.

c) Test

Test Certificates with relevant IS codes for Tests for Materials/equipment purchased and subject to approval by the Electrical Inspectorate of Government of Andhra Pradesh and APSPDCL shall be furnished.

9.2.3 Diesel Generator system**9.2.3.1 Diesel Generator****a) General**

One (1) set of diesel generator shall be provided with other necessary equipment such as the generator control panel and accessories, and installed in the generator room as shall be provided.

b) Requirement**i) Diesel Engine**

The diesel engine shall be a 4 cycle, radiator water cooling type. The diesel engine and generator specified below shall be placed on a common bed plate.

Continuous out put of diesel engine generator set shall be guaranteed to e not lower that 250 KVA subject to design capacity at the generator terminals, under the specified climatic conditions. The diesel engine shall be automatically started for loading by a starting motor on operation of the AC under voltage relay in the generator control panel, and manually stopped. The diesel engine shall e started automatically when failure occurs.

ii) Generator

The generator shall be of a 3 phase, 4 wire synchronous alternator, rated 440 volt, 50 Hz 0.8 lagging of suitable capacity not lower that 250 KVA continuous output and shall be directly connected with the engine. The excitation current shall be controlled by both voltage and current of the generator through rectifiers having compound characteristics. The automatic voltage regulator shall be provided for the excitation system capable of controlling voltage within + 5% from no load to full load. The neutral point of armature winding shall be connected to the neutral bus of the control panel and solidly grounded.

iii) Materials

All materials, which are not specifically mentioned herein but necessary for the performance of the installation works among the diesel engine generator, shall be provided.

iv) Accessories

The following accessories shall be supplied for each set

a) Engine

One (1) daily fuel oil tank of 200 liters capacity with float level gauge.

One (1) monthly fuel oil tank of 4,000 liters capacity with manhole for refilling

One (1) Set of engine shaft – driven pumps for lubricating oil and fuel oil injection

One (1) set of filters for fuel oil and lubricating oil, of a cleanable type so as to avoid frequent replacement

One (1) set of thermometers for cooling water

One (1) radiator with cooling fan

One (1) tachometer with service hour meter

One (1) Governor

One (1) common bed plate, including foundation bolts and nuts with vibration proof isolator

One (1) cooling air exhaust duct with flexible joint, to be attached to the engine radiator with cooling fan

One (1) set of sealed type battery with a capacity for starting the diesel engine generator 5 times

One (1) Set of battery chargers

One (1) Set of alarm and automatic shut down devices in the event of lubricating oil pressure drop and cooling water high temperature

One (1) Safety device with alarm, associated with the generator control as required.

One (1) pressure gauge lubricating oil

One (1) air suction strainer, cleanable type to avoid frequent replacements

One (1) Set of silencer and exhaust pipe with expansion and flexible joint to out door

One (1) set of flexible fuel line and float tank for gravity feed

Any accessories according to manufacturer's standard.

v) Generating control panel

The panel – mounted equipment and devices for control shall include the following.

Two (2) 440 V motors operated moulded case breakers of suitable capacity to apply as automatic changeover switch

Three (3) AC ammeter with current transformer

One (1) AC voltmeter with selector switch

One (1) Frequency meter

One (1) Tenderer for starting motor and emergency lighting

One (1) Set of cable terminals, back wiring and terminal boards and name plates

One (1) Set of test terminals

One (1) Set of indicating lamps
 One (1) set of static exciter with AVR
 One (1) set o standard tools
 Any necessary accessories of the manufacturer's standards

vi) Spare Parts

The Tenderer shall offer the recommended spare parts. The offered spare parts shall atleast be sufficient for a three year period of operation

One (1) set of alarm and automatic shut-down devices in the event of lubricating oil pressure drop, or high temperature cooling water
 One (1) safety device with alarm, associated with a generator control as required
 One (1) pressure gauge for lubricating oil
 One (1) set of maintenance tools
 One (1) set of silence and exhaust pipe with expansion and flexible joints
 One (1) set of flexible fuel feed line

Any accessories recommended by the manufacturer

vii) The equipment shall be standard make of a reputed firm confirming to all the relevant standards of BIS

viii) Test

The shop test report, which include the following items shall be submitted for approval
 Starting test

- a) Load test including temperature rise and oil consumption measurement
- b) Governor test
- c) Insulation resistance measurement
- d) AC withstand voltage test
- e) Impulse voltage test
- f) Characteristic test for the relay etc.
- g) Accuracy check for metering instruments such as Watt meter, ammeter, voltmeter, current transformer, voltage transformer etc.,
- h) Construction check
- i) Sequence operation test
- j) Other requested by the department.

9.2.4 Portable Diesel Generator

a) General

One(1) set of portable Diesel generator mounted on two wheel trolley for emergency purpose shall be provided with other necessary accessories.

b) Requirements

i) Diesel Engine

The diesel engine shall be of a 4 cycle radiator water cooling type. The diesel engine and generator specific below shall be placed on a common bed plate and shall be mounted on a two wheel trolley.

ii) Generator

The generator shall be of 3-Phase, 4 wire synchronous alternator rated 440 volts,

50 Hz, 0.8 lagging of suitable capacity not lower than 82.5 KVA, continuous out put and directly connected with the engine. The excitation current shall be controlled by both voltage and current of the generator through rectifiers having compound characteristics. The automatic voltage regulator shall be provided for the excitation system, capable of controlling voltage within + 5% from no load to full load. The neutral point of armature winding shall be connected to the neutral bus of the control panel and solidly grounded.

iii) Materials

All materials which are not specifically mentioned herein but necessary for the performance of the portable generator system shall be provided as directed by the Department.

iv) Accessories

All the accessories required for satisfactory performance of portable generator system including control panel trolley etc., shall be supplied in accordance with the manufacturer's standard of reputed make.

v) Spare parts

The Tenderer shall offer the recommended spare parts sufficient for at least a three years period of operations.

vi) The equipment shall be standard make of a reputed firm confirming to all the relevant standards of BIS

vii) Test

Tenderer

Superintending Engineer

The tests shall confirm to para – 11.2.3.1

9.2.5 Generator Room/Control Room

a) General

The Generator room shall accommodate the diesel generator system to be designed, supplied and installed as an auxiliary to APSPDCL power supply. It shall also have provision for accommodating the control equipment. A separate room for keeping portable generator mounted on two-wheel trolley and one room for storage of spares and maintenance tools shall also to be provided. Necessary door, windows, ventilators, lighting, fans including exhaust fans, rolling shutters suitable for shifting the equipment in and out of the room etc. are to be provided.

b) Requirement

The generator room shall be built of walls with random rubble masonry over cement concrete foundations and plastered. The roof shall be of reinforced cement concrete. The machinery foundations shall be designed suitable and laid in cement concrete and the flooring shall be laid in cement concrete with a neat finish. Ramp for movement of trolley mounted generator shall be provided. Adequate ventilation, air change arrangements and lighting with all other provisions referred in Para (a) above, painting walls and iron work shall be made conforming to the relevant standards of BIS.

9.2.6 Control panel at the transformer

a) General

The control panel at the Transformer shall be provided to distribute the receiving power from APSPDCL power supply/Diesel generator supply to the main distribution panel. The control panel is of outdoor type with provision for locking the door.

Requirement

The control panel shall be of weather proof and vermin proof outdoor floor mounting LT distribution panel and fabricated with standard metal steel as designed. It shall be provided with MCCB one each for APSPDCL supply and for Diesel generator supply of suitable capacity, change over switch, voltmeter, Ammeter, selector, selector switches indicator lamps, connectors etc.

b) Test

The shop test report, which includes the following items, shall be submitted.

- i) Construction check
- ii) Insulation resistance measurement
- iii) AC withstand voltage test
- iv) Impulse voltage
- v) Characteristic test for the relay, etc.
- vi) Accuracy check for metering instruments such as Ammeter, voltmeter, current transformer and voltage transformer etc.
- vii) Switching and operation test
- viii) Test certificates with relevant BIS codes for tests for the materials/equipment purchased.
- ix) Other tests as requested by the Department

9.2.7. Main distribution panel

a) General

The main distribution panel shall be provided to distribute the receiving power from the control panel at the transformer to the sub distribution panels for gate motors and lighting in the following manner.

- i) Four sub-distribution panels each for operating a set of five hoist of 7.5 HP of spillway radial gates.
- ii) One sub-distribution panel for the four distribution lines for
 - a) Lighting the hoists spillway
 - b) Lighting the walkway bridge
 - c) Lighting the earthen Bund on left flank and
 - d) Lighting the road way on right flank

b) Requirements

The main distribution panel shall be weather proof, vermin proof, outdoor, L.T type fabricated with standard metal sheet as designed. It shall be provided with suitable capacity copper bus bar with one MCCB for total load and one MCCB each of suitable capacity for sub-distribution loads, shall also be provided with voltmeter, Ammeter, indicator lamps, connectors etc.

c) Tests

The tests shall confirm to Para © of section 9.2.6

9.2.8 Sub-Distribution panels

a) General

The sub-distribution panels shall be provided to distribute the receiving power from the main distribution panel to suitable number of feeders for lighting system of Reservoir and / or Hoist motors of various gates of spill way. The panel shall also distribute the emergency power from the portable diesel generator even in case of the stoppage of power supply from control panel.

One (1) sub-distribution panel for lighting shall distribute power to four (4) feeder lines for lighting.

- i) Earth bund on left flank
- ii) Hoists of spillway
- iii) Walkway bridge and
- iv) Road way on right flank

Four (4) sub-distribution panels for hoist motors of spillways each distributing power to a set of five (5) motor local control panels are to be provided. The sub-distribution panels may be located at the piers numbered as 4, 9, 14, 19.

b) Requirement

The sub-distribution panels, shall be fabricated with metal sheet of suitable gauge weather proof and vermin proof out door floor mounting with copper bus bar (3 phase + 1 neutral) to feed the required load and comprising suitable MCCB, changeover switch, MCB (TPN) for each feeder to local control panel of the respective sub-distribution panel, Voltmeters, Ammeters, Selector switches for Voltmeter and Ammeter indicator lamps. Provision for locking the door shall be made

c) Tests

Tests shall confirm to para (c) section 10.4.8

9.2.9 Moulded case circuit breaker (MCCB)

- a) MCCB shall be manually operated and trip free by the handle in front and shall be provided with inverse time thermal element for over load protection and instantaneous magnetic elements for short circuit protection both on all poles. The circuit breaker shall be any one of four or three or two poles or single pole. MCCB shall have auxiliary switches, voltage tripping mechanism, rated interrupting capacity of each circuit breaker shall be selected for the short circuit current of the system, in which it is applied. Each circuit breaker shall include external handle which clearly indicates 'on' 'off' or 'trip' and shall be lockable in the 'off' position Trip rating of each circuit breaker shall be coordinated with motor rating served when it is used with a combination starter.
- b) Test shall confirm to the para (c) of section 11.2.6

9.2.10 Local Control Panels

a) General

Tenderer

Superintending Engineer

The local control panels shall be provided to transmit the receiving power from the respective sub-distribution panel to the respective gate motor of spillway.

Each motor shall be provided with local control panel and the supply and installation shall be made as per the specific instructions of the Department and it is optional to the Department to instruct.

b) Requirement

The local control panel shall be fabricated with metal sheet of suitable gauge, weather proof and vermin proof, outdoor floor mounting with suitable MCCB, direct on line starter single phase prevent or, power capacitor with MCCB, voltmeter and ammeter with selector switches, indicator lamps connectors and lugs. Provision for locking the door shall be made.

c) Tests

Tests shall confirm to the Para (c) of section 9.2.6

9.2.11 Cables and wires

- a) The sizes of insulated wire and cable shall be suitably designed. The wires shall be PVC insulated copper wire. The LT cables shall be PVC insulated and sheathed armoured aluminum underground cable designed suitably for the loads and losses and shall confirm to IS:1554 (part-101988 "PVC insulated (heavy duty) electric cables part-1 for working voltage up to and including 1100 volts" and other relevant standards.

The underground cables of suitable sizes as designed shall be provided for:

- i) Two runs from transformer to control panel
- ii) Two runs from control panel to main distribution panel
- iii) Independent cables from main distribution panel to sub-distribution panels located at
 - a) Spillway at piers numbered
 - b) Main distribution panel for lighting system of reservoir
- iv) Independent cable from sub distribution panel to the termination point as per the sketch for lighting.
 - a) Earth bund on left flank
 - b) Hoist bridges of spillway
 - c) Walkway bridge
 - d) Road way on Right flank and
- v)

- a) Independent cables from Sub-distribution panels to the respective local control panels of all gate motors of spillway
- b) All necessary junction boxes, clamps, terminations etc. shall be suitably designed and provided.
- c) Steel conduits for outdoor cabling shall be located in the ground in depth of not less the 0.6 m and 1.2 m at the place where crossing the road or on the cable rack to be provided and installed over the hoist bridges and walkway bridge. The cable rack shall be of fabricated mild steel (MS) sheet of adequate thickness reinforced with necessary MS angles. The cable shall be run in suitable fastenings, clamps, etc.
- d) Manufacturer's test certificates for all the materials conducted in accordance with relevant is standards or other approved standards shall be furnished for approval of the Department before installation.

9.2.12 Lighting system

a) General

The outdoor lighting system (post type) shall be provided for earth bund on left flank carriage way and Hoist Bridge of spillway, walkway Bridge and road way on right flank the flood lighting shall also be provided suitably for spillway.

The indoor lighting facility shall also provided in control room/generator room

b) Requirements

i) Lighting fixtures

The lighting fixtures shall be complete with lamps

Fluorescent lighting fixtures shall be equipped with complete fitting for AC 230 volt 50Hz source and a ballast or ballasts of high power factor and rapid starter and provided inside control/generator room.

Mercury lighting fixtures shall be equipped with a screwed base lamp holder suitable for 125 Watt/400 Watt high pressure mercury lamp and appropriate ballast and capacitor of high power factor for stable operation with all accessories.

Sodium vapour lamp lighting fixtures shall be equipped with a screwed base lamp holder suitable for 150 Watt, 250 Watt lamp and appropriate ballast and capacitor and all other accessories in separate control gear box.

The lighting fixtures for outdoor use shall be of weatherproof type. Special care shall be exercised on selection of fixtures so that illumination of the lamps is not obstructed by accumulation of insects and dust

The shape for lighting fixtures shall be of approved standard size.

ii) Out door lamp posts

Outdoor lamp posts shall be of galvanized stepped steel pole with light bracket arm. The shape and size of poles shall be of standard size. Ballasts and terminals shall be equipped on each terminal box and other attachments necessary for wiring protection to isolate faulty individual light and fixing of the lighting fixtures shall also be supplied. The ground level shall be marked on the support for easy installation.

Twin arm bracket to hold 250 Watt sodium vapour lamps shall be located along the hoist bridge of spillway.

iii) Manual on-off switch for flood lamp on the inspection bridge

An outdoor use on-off switch shall be provided for each flood lamp, and is attached beside the lamp fixture. The switch shall have high reliability.

iv) Tumbler switch

Wall switches shall be of flush or surface mount tumbler type, single pole 230 volt, 15 Amps and with suitable plate for covering them.

v) Convenience outlet

For single phase load, convenience outlet shall be of single or duplex 2 pin type with one earthing pin and of 250 Volt 15 Amp shall be provided conveniently.

vi) Cable and wires

The sizes of insulated wires and cables shall be suitably designed, insulated wires to be used shall be PVC insulated single core copper wire insulated wires shall be of stranded conductors.

Low-voltage cables shall be cross-linked polyethylene insulated and PVC sheathed cable (CVG cable) and its conductors shall

be of stranded conductors, the low-tension cables shall be used for between the panels, outdoor lighting circuits etc.

Control cables to be used shall be polyvinyl chloride (PVC) insulated sheathed multi copper core. This cable will be used for electrical wiring between the photo sensor and the magnetic contactor in the lighting panel and for other necessary wiring.

vii) Steel conduit

Rigid steel conduit shall be galvanized inside and outside and enameled inside. The steel conduit shall be used for indoor electrical wiring.

viii) PVC conduit

PVC conduit shall be of hard polyvinyl chloride pipe with mechanical impact – resistant, corrosion resistant and highly weather able and a minimum wall thickness of about 4 millimeters. The PVC conduit shall be used for a part of outdoor electrical wiring.

ix) Outlet and junction Box

The flush mount type outlet and junction box to be concealed in the concrete shall be of galvanized sheet steel and shall be fitted with appropriate covers, where necessary. The surface mount type outlet and junction box shall be of galvanized cast steel or alloy fitted with appropriate covers.

Manufactures test certificates for all the equipment and materials conducted in accordance with relevant IS standards or other approved standards shall be furnished for approval of the Departmental before installation.

9.2.13 3 Phase power sockets

- a) 3-Phase power sockets with earthling pin, suitable for operation of gantry crane shall be provided at an interval of 21 meters along the spillway. This shall be suitable for outdoor type with appropriate enclosure.
- b) 3-Phase power sockets with earthling pin suitable for welding machines of 15 KVA capacity with appropriate enclosure shall be conveniently provided on the hoist bridge of spillway.
- c) Manufacturers test certificate confirming to Para 9c) of section 10.4.14 shall be furnished before installation.

9.2.14 Earthing and lightning protection system

a) General

The earthing system shall be provided for distribution transformer yard and control room, independent earthing system shall be provided for the equipment and for the lightning protection. Also the earthing system shall be provided for the neutral of the electric distribution system. These earthing system shall be isolated to avoid the interference for each other. The Tenderer shall provided any supplemental earthing works in accordance with the result of the measurement of earthing resistance, if required, without extra charge.

Lightning rod (s) shall be provided on the roofs of the control house.

All the components of the lightning protective equipment shall be the products confirming to the provision of IS:3043-1966 Code of practice for earthing or approved equivalent. The Tenderer shall submit to the Department the necessary catalogues of the lightning protective equipment and the shop drawings of its mounting hardware for his approval

b) Earthing Resistance

The target of earthing resistance for each grounding system is suitably provided.

c) Materials

All materials shall confirm to IS specifications

The conductors rods and plats for earthing system shall be embedded 0.75 m below the ground surface. The lightning rod system shall be composed of elevation rod lightning conductor, testing terminal box earthing rod and other necessary accessories. The elevation rod shall be of a gold plated or a chromium plated copper pointer, and shall be supported and connected by a supporting pipe which is of stainless steel or brass pipe.

In order to connect electrically the rod to earthing system, the lightning conductor shall be applied, and be run in the supporting pipe and in addition be wired on the surface of external wall through the testing terminal box to earthing rods. The lightning conductor shall be soft annealed stranded copper conductor of more than 50 Sq mm.

Tenderer

Superintending Engineer

The position of air terminal shall be such that the total area required to be protected lies within protected range.

Number of lightning rods may be adequately provided.

9.2.15 Electrical Installation Works

a) General

All electrical installation works shall be carried out by skilled personnel. The indoor wiring shall be of concealed PVC conduit type as designated on the Drawings. The outdoor wiring shall be installed in PVC conduits buried in ground as shown on the relevant drawings.

b) Installation works

i) Lighting fixtures

The exact location and height of fixtures shall be determined by the structural and mechanical limitations of building and equipment to be installed, and fixtures shall be installed in such a manner as to avoid obstructions and to provide the proper illumination results.

Fixtures shall be installed in such a manner as not to damage outlet boxes, conduit tubes wall ceiling etc. With the weight of fixtures. Lamps shall be set in position after completion of construction work.

ii) PVC conduit works

PVC conduits shall be concealed within or embedded inside the structure without affecting their construction and strength. The cut ends of conduits shall be smoothed pull boxes shall be provided for the conduit system to give easy pulling in or replacing of wires. The bending radius of conduits shall be not less than 6 times its inside diameter without normal bend. Exposed runs of conduit shall be made with saddles or sheet steel supports spaced not more than 1.5 meters and shall be fixed or supported at least at 2 positions. They shall installed running parallel or perpendicular to adjacent walls, structural members or intersections of vertical planes and ceilings with right angle turns so as to give a neat appearance.

When fixtures or other fittings are installed, they will be symmetrically located according to room layout and will not interfere with other work or equipment. Conduit shall be installed

in such a manner as to insure against trouble from the collection of trapped condensation. U-shaped piping shall be avoided as far as possible. Conduit shall be connected mutually by means of screwed or non-screwed coupling and also shall be securely fastened to all sheet metal outlet, junction and pull

Boxes with galvanized locknuts and bushings. Conduit in exposed work shall be screwed with boxes and other fittings.

Connected portions of conduit shall be coated with anticorrosive paint. Exposed runs of conduit including boxes. Supports and all other fittings shall be coated with finished paint the color of which shall be instructed by the Employer. The Tenderer shall exercise the necessary precautions to prevent the lodgement of dirt, plaster, trash or damp inside conduit pipe, fittings, and boxes in the courses or installation works.

iii) Steel conduit works

Steel conduits for outdoor cabling shall be located in the ground in depth of not less than 1.2 meters at the place where crossing road, or on the cable rack installed beneath the bridge. The installation of steel conduit shall be carefully done upon consolidating the ground on which steel pipe is to be buried.

iv) Cabling and wiring

The conductor shall be continuous between outlets, and no junction shall be made except within switch panels convenience outlets or junction boxes. The conductor shall be drawn through ducts or conduits after they have been cleaned. Oil or grease shall not be used as a lubricant for the drawing operation of the conductor, but an approved compound may be used for this purpose. Joins in wiring shall be pressure terminal and insulate with PVC tape. Earthling conductor where required run with other conductors shall run inside the conduit piping. A part of the cabling route for outdoor lighting system and the cabling routes between the control house and DG houses and between a receiving power terminal and control houses shall be made in the cable trench with suitable cable rack.

v) Cable handling pits

Cable handling pits shall be provided on lengthy power cable circuits at an appropriate distance of sharply angled corner of PVC piping at the Tenderers direction or when so judged to be necessary for cabling works and as directed by the Department.

c) Site Test

The following tests shall be carried out by the Tenderer in the presence of department at the site after completion of work.

- i) Insulation resistance measurements for equipment cable and wiring,
- ii) Earthling resistance measurements
- iii) Circuit continuity tests
- iv) Switching and operating tests
- v) Measurement of illumination
- vi) Appearance check for the equipment
- vii) Sound level check for DG set

9.2.16 Measurement and payments

No separate payment will be made for this item. It shall be included in the price bid quoted in Schedule 'A'

SECTION – 10
PAINTING WORKS

SECTION – 10**PAINTING WORKS****INDEX**

S.NO.	PARA NO.	ITEM
1	10.1	General
2	10.2	Surface preparation
3	10.3	Application procedure
4	10.4	Surface not to be painted
5	10.5	Pain schedule
6	10.5.1	Embedded parts, gates, stop logs
7	10.5.2	Hoists and supporting structure
8	10.5.3	Mechine surfaces
9	10.5.4	Painting of Embedded parts in contract with concrete
10	10.6	Inspection
11	10.7	Measurement and payment

Tenderer

Superintending Engineer

SECTION 10 SPECIFICATION FOR PAINTING WORKS

10.1 GENERAL

The painting of the part shall include the preparation of the metal surfaces, paint application, protection and drying of the paint coatings as well as the supplying all tools, labours and materials necessary for the entire painting work. The painting work shall conform with IS:14177-1994 Guide lines for painting system for hydraulic.

The finish color of all parts shall be approved by the Engineer in Charge. The Tenderer shall propose a color scheme for the equipment and shall submit color chips or paint samples. Color chips shall be included with the approved painting specification for each type of finish. The colour of all undercoats shall match the colour of the finish coat.

The paint shall be a product of reputable manufacturer and shall be delivered in the manufacturer's sealed tins stored under cover and used within the storage time and in accordance with the method recommended by the manufacturer.

The Tenderer shall prepare and submit the painting specifications for approval of the Engineer in Charge "The painting specifications shall cover paint schedule, manufacturer's statement of the physical and performance characteristics for paint materials to be selected, and manufacturer's recommended procedures for the surface preparation application, handling instructions, equipment, ambient conditions, mixing instruction safely and storage instruction etc. The procedures shall also include any special requirements for field repairs the damaged coating and for the coating of field joints.

All parts which will ultimately be buried in concrete shall be cleaned and protected, before leaving the manufacturer's shop by a Portland cement wash or other approved method. Before being installed they shall be thoroughly discolored and cleaned of all rust and adherent matter.

10.2 Surface preparation

All oil, paraffin grease and dirt shall be removed from the surfaces to be painted, by wiping the surfaces with a clean cloth dipped; in mineral solvent following solvent cleaning all weld spatter, slag, burrs loose rust and mill scale and other foreign substances shall be removed by sand blasting.

The average surface roughness after sand blasting should not exceed 40 microns. Blast cleaning shall conform to IS 1477(part)-1997 code of practice for painting of ferrous metals in building-part I pretreatment.

Tenderer

Superintending Engineer

Blast cleaned surfaces showing plate surface defects which scabs or sharp gouges shall be repaired in an approved manner prior to painting.

After blast cleaning the surface shall be dusted off or blown off with compressed air free of detrimental oil and water. All surfaces to be painted shall be completely dry, clean and free from moisture just prior to and during painting. If rust forms or the surface become contaminated in the interval between cleaning and painting re cleaning to the same degree shall be required.

In case of host equipment, the surface preparation is done manually by wire brush, mechanical tools etc., instead of sand blasting immediately following the cleaning operation the surface shall be thoroughly given a coat of rust inhibitive phosphate wash by brush at a rate approximately 30ml per square meter and allowed to dry for 24 hours. Rising after application is generally not inhibited surface with damp cloth within one hour; after rust inhibitive wash has dried thoroughly.

10.3 Application procedure

The application of protective coating shall be carried out at the Tenderers shop and/or field shop whenever possible. Painting work at erection site shall be limited to touch-up coatings for damaged areas and coatings for field welding portions.

All paint, when applied, shall provide a satisfactory film and a smooth and even surface. Paint shall be thoroughly stirred, strained, and kept at the uniform consistence during application. Paint shall not be applied when the temperature of the metal or surrounding air is below 10 degrees Celsius and that of the metal is above 50 degrees Celsius or when the humidity is above 90 percent or when it threatens to rain before the painted coat gets dry. Each coat shall be protected during the initial curing period against the possibility of moisture condensation or contamination with foreign matter. All painting works shall be performed by airless spraying.

When the coating materials is applied by spraying, suitable means shall be provided to prevent segregation during the coating operation. Free oil and moisture shall be removed from the air supply lines of all spraying equipment. Each coat shall be uniform and free from runs, sags and other imperfections. The time between successive coats shall be not less than the minimum nor more than the maximum re-coating time specified by the paint manufacturer.

The paint shall be applied so that the thickness at any point is not less than that stipulated in the approved painting specifications.

Tenderer

Superintending Engineer

Surfaces not required to be coated, but adjacent to surfaces which are to be cleaned and coated shall be adequately protected during cleaning and coating.

Because of the flammable and toxic nature of the coating materials, the Tenderer shall take precautions to eliminate any health or safety hazard that may arise during the applications of the coating. Smoking and welding shall not be allowed within 10 meters of the place when painting is in progress.

Where steelworks is to be welded, only the primer shall continue over the weld area. Subsequent coats shall be kept back 150mm from the weld and completed after welding. The primer shall be such that no toxic fumes are given off during welding. Alternatively approved temporary protection such as taping may be provided as an alternative to priming the weld areas. The edges of shop coats exposed on removal of the tape shall be treated in accordance with the manufacturers instructions to ensure adhesion to coats applied at site.

Painting shall be stopped off 75 millimeters from the edges of interface areas for high strength friction-grip bolts. Painting over and around such bolts shall be completed as specified after assembly.

10.4 Surfaces not to be painted

Bronze, brass machined parts surfaces of gear teeth finished ferrous surfaces, surfaces in rolling or sliding contact after assembly and hoist ropes; shall not be painted. All corrosion-resisting steel surfaces for bearing and machinery parts shall also not be painted.

On completion of cleaning the surfaces not to be painted shall be coated with an approved rust preventive coating material or an adhesive plastic film to protect the surfaces from minor mechanical damage and corrosion during shipment and storage at the site. The coating material shall be stripped off after field erection of equipment.

Unassembled, fittings pins bolts and nuts shall be oiled and wrapped with moisture-resistant or protected other approved means.

10.5 Paint schedule

The paint shall be applied so that the thickness at any point is not less than that stipulated in the approved painting specifications no 14177-1994 guidelines for painting system for Hydraulic Gates and Hoists and its Adjuncts Viz., IS:1477(Part 1)-1971 IS:1477(Part II)-1971, IS 2339-1963 and IS:2932-1994.

10.5.1 Embedded parts, gates and stop logs

(a) Primer coat

After surface preparation the following primer coats shall be applied.

i) Gates and stop logs

Over the prepared surfaces one coat of inorganic zinc silicate (preferably airless spray) should be applied giving a dry film thickness 70+5 microns. Alternatively two coats of zinc rich primer (containing not less than 85% Zinc on dry film) should be applied to give a total dry film thickness of 70+5 microns.

ii) Lifting beam/lifting tackles

Over the prepared surfaces, two coats of zinc phosphate primer should be applied giving a dry film thickness of 40 microns per coat.

iii) Exposed embedded parts

Over the prepared surfaces two coats of zinc rich primer (containing not less than 85% zinc on dry film) should be applied to give a total dry film thickness of 75+5 microns.

(b) Finishing coats.

Over the prime coats, the following finishing coats shall be applied.

i) Gates and stop logs

Finishing coats should consist of two coats of solvent less coal tar epoxy paint. These should be applied at an interval of 24 hours. Each coat should give a minimum dry film thickness of 150+5 microns. The total dry film thickness of all the coats including primer coating should not be less than 200+5 microns.

Finishing coat should consist of two coats of alkyl based micaceous iron oxide paint. Each coat of paint should give a minimum dry film thickness of 65+5 microns. The interval between coats should be 24 hours. The total dry film thickness of all coats including primer coating should not be less than 200+5 microns.

ii) Exposed embedded parts.

Finishing coat should consist of two coats of solvent less coal tar epoxy paint. These should be applied at an interval of about 24 hours. Each coat should give a dry film thickness of 150+5 microns. The total dry film thickness of all the coats including primer coating should not be less than 200+5 microns.

10.5.2 Hoists and supporting structure

(a) Primer coat

i) Structural component

Two coats of zinc phosphate primer should be applied. Dry film thickness of 40+5 microns per coat should be given.

ii) Machinery

Expect machined surfaces, all surfaces of the machinery including gearing housing shafting bearing pedestals etc., should be given one coat of zinc phosphate priming paint to give a minimum thickness of 50+5 microns. Motors and other bought out items should also be painted if necessary.

(i) Hydraulic hoist

All unmachined ferrous surfaces (hoist cylinder, cylinder heads, hydraulic piping pipe fittings bonnet covers) exposed to water should be given one coat of inorganic zinc silicate (preferably air less spray) to give a dry film thickness of 70+5 microns and surfaces unexposed to water should be given two coats of zinc phosphate primer paint giving a dry film thickness of 40+5 microns per coat. Oil tank control cabinets, hoist beams and pipe support should be given one coat of zinc phosphate priming giving a minimum film thickness of 50+5 microns.

(ii) Unmachined surfaces

All unmachined surfaces should be given one primer coat of chlorinated rubber based zinc phosphate primer to give a dry film thickness of 50+5 microns.

(b) Finishing coats.**(i) Structural component**

The finish paint should consist of one coat of alkyl based micaceous iron oxide paint at dry film thickness of 65+5 microns followed by two coats of synthetic enamel paint conforming to IS:2932-1974 to give dry film thickness of 25+5 microns per coat or synthetic enamel paint. The interval between coats should be 24 hours. Total dry film thickness of all the coats including primer coat should not be less than 175 microns.

(ii) Machinery

The finish paint should consist of three coats of aluminium paint conforming to IS 2339-1993 or synthetic enamel conforming IS:2932-1974 to give dry film thickness of 25+5 microns per coat.

(iii) Hydraulic hoist

All unmachined ferrous surfaces (hoist cylinder, cylinder heads, hydraulic piping pipe fittings bonnet covers) exposed to water should be given two coats of solventless coalter epoxy paint. Each coat should give a dry film thickness of 150+5 microns. Total dry film thickness of all the coats including primer coat should not be less than 350 microns. Surfaces unexposed to water should be given one coat of alkyl based micaceous iron oxide paint to give dry film thickness of 65+5 microns followed by two coats of synthetic enamel paint: conforming to IS:2935-1974 to give dry film thickness of 25+5 microns per coat. The interval between coats should be 24 hours. The total dry film thickness should not be less than 175+5 microns oil tank, control cabinet, hoist beams pipe supports and clamps ladders, etc., should be given these coats of aluminium paint conforming to IS 2339-1963 or synthetic enamel conforming to IS 2932-1974 to give a dry

film thickness of 25+5 microns per coat. The total dry film thickness of all the coats including primer coat should not be less than 125+5 microns.

(iv) Unmachined surfaces

The unmachined surfaces of the position and the unfinished surfaces of cylinder heads should be cleaned and given three coats of very resin/chlorinated rubber to given a dry film thickness of 30+5 microns per coat, to obtain a minimum thickness of 125+5 microns including primer coat..

10.5.3 Machine surface

All machined surfaces of ferrous; metal including screw threads which will be exposed during shipment or while a waiting installation should be cleaned by suitable solvent and give a heavy uniform coating of gasoline soluble removable rust preventing compound or equivalent surface should be protected with adhesive tapes or other suitable means during the cleaning and painting operations of other components.

10.5.4 Painting of embedded parts in contact with concrete

All surfaces of embedded parts which are to come in contact with concrete should be cleaned as given in IS:14177-1994 to meet the requirements of class D and should be given a coating of cement latex to prevent rusting. Exposed machined surfaces of ferrous metal which are to be rolling and sliding contact should not be painted but should be coated with heavy gasoline soluble rust preventive compound. In all exposures where metal will be partially embedded in concrete, it is good practice to extend the protective coating on the non-embedded portion a short distance into the area later to be embedded, thus eliminating problem at the junction point.

10.6 Inspection

All painting works shall be inspected by the Tenderer himself in accordance with the approved test procedure prescribed subject to approval of the department.

Following the visual inspection on surfaces that have been coated, the dry film thickness of coating shall be checked at as many spots of the coated area as possible to prove that the overall thickness to be to the specified minimum thickness by the Electromagnetic thickness meter. Further for the purpose of measuring the continuity of coatings, areas shall be examined by the pin hole detector("Holiday detector).

10.7 Measurement and payment

No separate payment will be made for this item. It shall be including in the price bid quoted in Schedule'A'.

SECTION 11
EMBANKMENT CONSTRUCTION
&
SLOPE PROTECTION

SECTION 11

**EMBANKMENT CONSTRUCTION
&
SLOPE PROTECTION**

INDEX

S.NO.	PARA NO.	ITEM
1	11.1	Scope
2	11.2	Embankment construction
3	11.3	General requirements
4	11.4	Material
5	11.5	Preparation of ground surface for embankment
6	11.6	Compaction
7	11.7	Cohesive materials
8	11.8	Cohesion less materials
9	11.9	Embankment without controlled compaction.
10	11.10	With controlled compaction
11	11.11	Moisture content
12	11.12	Special precaution
13	11.13	Embankment test section
14	11.14	Measurement and payment
15	11.15	Refilling of key trench and consolidation
16	11.16	Compacting by other than power driven equipment
17	11.17	Dowel banks
18	11.18	Weather conditions
19	11.19	Borrow area consideration
20	11.20	Borrow pits
21	11.21	Stripping of borrow area
22	11.22	Moisture control at borrow area
23	11.23	Measurement and payment
24	11.24	Clay blankets
25	11.25	Backfilling
26	11.26	Inspection and tests
27	11.27	Surface drains
28	11.28	Rockfill in toe of embankments and filters
29	11.29	Metal filters
30	11.30	Measurement and payment
31	11.31	Rockfill in toe of embankments
32	11.32	Measurement and payment
33	11.33	Protection
34	11.34	Roads and Ramps

11.0 EMBANKMENT CONSTRUCTION

Tenderer

Superintending Engineer

11.1 SCOPE:

Site clearance, stripping and formation of embankment of homogeneous section/Zonal section viz., casing zone/hearding zone with the useful excavated soils and balance soils of approved quality from the borrow area including the cost of soil, if any sampling, testing and pre-wetting of soils at source of excavation and conveyance of soil and extra soils required for shrinkage including swell factor with all leads, lifts, delifts, laying on bank, spreading breaking clods, sectioning, extra watering and consolidation including benching of old embankment slopes, joining with the new embankment formation trimming of side slopes, formation and removal of ramps, formation of Dowel banks etc., as per drawing and as directed by the Engineer in Charge to complete the finished item of work.

11.2 Embankment Construction

Setting out:-Specification No.1.13 Shall apply

11.3 General Requirements

a) The Cross sections for embankment are to be designed to suit the characteristic of the best quality soils available in the vicinity of the proposed work. If the Tenderer proposes to use any other type of soils than those mentioned in the design to save the lead and thereby the cost pursuant to the clause of I.S.Code and A.P.SS. the Tenderer has to form the embankment to the revised profiles worked out by the competent authority sanctioning the estimate. The extra quantity involved will not be measured and paid. The theoretical quantity required based on the original cross sections will only be measured and paid. But the Tenderer has to form the bund to the revised cross section designed with the characteristics of the proposed soils. The designs given by the estimate sanctioning authority are final.

b) Embankment shall be built to the height, top width and side slopes as shown on the drawings. All the edges of the embankment shall be neatly aligned symmetrical to the central line. They shall be absolutely straight in all reaches except at bends. At bends they shall be smoothly curved.

c) The top of each embankment shall be leveled and finished so as to be suitable for road way and given a cross slope to drain away rain water. The bank carrying road shall be given a suitable cross slope.

11.4 Material – The provisions of schedule – D shall apply

a) The suitability of foundation of placing embankment materials thereon and all materials proposed for use in construction of embankment shall be determined by the Engineer in Charge well in advance on the basis of Laboratory Test results. Chemical and Physical tests of the material proposed for construction of embankment shall be carried out to ensure

- that the soil does not contain soluble lime content, soluble lime salt content or cohesion less fines, in quantities harmful to the embankments.
- b) Material for construction of embankment should be free from the organic material. Unless otherwise directed by the Superintending Engineer/Engineer in Charge all materials shall be deposited in embankments so that cobbles, gravel and boulders are well distributed through other material and not nested in any portion within or under are embankment as per clause 6.4 of I.S.4701-1982.
 - c) Suitable excavated material available from the cut off trenches, canal cutting, extra cutting for seating to lining, foundation excavation for structures, approach and tail channels for structures, vagu diversion, removal of ramps obstruction removal on the upstream and downstream of surplus weirs and excavation in surplus course and any such excavations, shall be used for construction of adjacent embankments and also embankments of deficit reaches.
 - d) After completing the construction of embankments with the materials as indicated in(c) above, material required for the construction of balance embankment shall be obtained from the borrow areas.
 - e) The soils and morum excavated and useful for construction of the embankment shall be classified by the Superintending Engineer / Engineer in Charge as impervious and Semi-Pervious based on Laboratory Test results. They shall be utilized on the embankment work.

11.5 Preparation of ground surface for embankment:

- a) Clearing site: Specification 2.0 shall apply.
- b) Stripping: Specification 3.1.8 shall apply
- c) All portions of excavation made for test pits or other subsurface investigations, all hollows and all other existing cavities found within the area to be covered and to the extent below the established lines of excavation for embankment seat shall be filled in earth of the corresponding zone of the embankment and suitably compacted. The pits of surface boulders shall be filled with suitable material and compacted at no extra cost.
- d) Pools of water shall not be permitted in the foundation for embankment and such water shall be drained and cleared prior to placing the first layer of embankment materials.
- e) On sloping ground or in case of existing banks, where embankment portions are to be modified, benching of slopes shall be done with a little slope towards the inside of beaching so as to give a good grip to the embankment soil with the sub-grade. Unless otherwise specified the benches shall be 0.3x0.6.m on the front and rear slope of the embankment. Before benching, the bank slopes shall be cleared of all roots and vegetables matter as per specification 2.0 No. separate payment will be made for either benching or refilling. The rate quoted for

raising embankment is inclusive of above operations. The bank section shall be brought to design standard by filling the scours with suitable material and compacting to 98% proctor density by suitable measure of compaction.

f) Soil foundation:

The ground surface under embankment and area of bed filling wherever necessary (except rock surfaces) shall be loosened or scarified making open furrows by means of a plough, or ripper or any other methods to a depth of not less than 200mm deep below the stripped surface at intervals of not more than 1m to the satisfaction of the Engineer in Charge. Roots or other debris turned up during scarifying, shall be removed from the entire foundation area for the fill. The areas under the embankments shall be prevented by sprinkler before the construction of embankment begins. The moisture content shall be optimum.

g) Rock foundation:

The treatment of the rock surface under the embankment shall be done so as to ensure tight bond between embankment and the foundation. This shall be done by the following procedure.

h) The area of the rock surface which is to be in contact with the embankment shall be fully exposed by removing all the loose and disintegrated rock having the surface of rock rugged. Hard rock projects and overhangs shall be removed. If blasting is to be resorted to, care shall be taken to avoid objectionable shocks to foundation rock. As far as possible the whole contact area shall be exposed at one time to enable examination of rock surface characteristics and planning the method of treatment.

ii) Exposed rock shall be benched.

11.6 Compaction:

a) General:

The earth compacting equipment specified in Appendix-C of I.S.4701-1982 shall be used for compacting the soils shown against them. The compacting equipment shall conform to the relevant I.S. Specification. While the I.S. Specifications specify the compacting. It is contended that the use of improved compaction equipment for embankment construction shall be encouraged as may be most suited to the site conditions and the programme of construction. The methods of compaction shall conform to clause 7.2.2 and 7.2.3 of I.S.4702-1982.

11.7 a) When each layer of material has been prepared so as to have the proper moisture content uniformly distributed throughout the material, it shall be compacted by passing the roller. The layer shall be compacted in strips overlapping not less than 0.30 Meter. Rolling shall commence at edges and progress towards centre longitudinally. The roller shall travel in a direction parallel to the axis of the bank. Turns shall be made carefully to

ensure uniform compaction. Density tests shall be made after rolling and dry density achieved shall be not less than 98% of the maximum dry density (standard proctor) as obtained in the laboratory for the type of material used. The density achieved shall not normally be less than the designed density. The dry density of soil in field shall be determined in accordance with I.S.2720(Part-XXVII)1974 or I.S.2720(Part-XXIX) 1975.

- b) Standard proctor density test shall be carried out at regular intervals to account for variations in the borrow area materials as well as that in situ excavated material. Not less than three tests shall be carried out to indicate variations in the standard proctor density attained in laboratory.
- c) Engineer in Charge might review the design if necessary on examination of density test results and the Tenderer shall have no claim arising out of such a review and consequent change, if any, in the design.
- d) In case embankment covers the barrels of cross drainage or any other structures, first 45cm of the embankment shall not be compacted with roller but it shall be compacted with pneumatic/hand tampers in thin layers. The compaction above this layer of total 45cm shall be done by using suitable light rollers to avoid damage to the structure, by adjusting the thickness of layers until sufficient height is achieved to permit compaction by heavy rollers. Density test shall be conducted from time to time on site to ascertain where the compaction is attained as specified above.
- e) Separate tests shall be conducted on each zone of the embankment for every 1500 cubic meters of compacted earth work, at least one field density test shall be taken in each layer. Minimum two density tests shall be taken in each layer per day irrespective of the quantity of earth work specified above. In case the test shows that the specified densities are not attained, suitable measure shall be taken by the Tenderer either by moisture correction or by entire removal and relaying of layer or by additional rolling so as to obtain the specified density which shall be checked again by taking fresh tests at the same locations. Necessary unskilled labour required for carrying out such density tests shall be provided by the Tenderer.
- f) Compaction shall be achieved by the use of smooth rollers pneumatic type rollers, sheep foot rollers, mechanical compactors like vibratory rollers, vibrating plates, programmers, rammers, slope compacting equipment, pneumatic tamping equipment and such other equipment as shall be specified by the Engineer in Charge based on type of material and actual field tests.
- g) The dimensions and weight of the rollers should be such as to exert a ground pressure of not less than 12kg/cm² of tamping when it is empty and 25kgs/cm² When ballasted. The number of passes required for each layer to obtain the specified density shall be determined by actual field tests.

11.8 Cohesionless Materials:

- a) Where compaction of cohesionless free-draining material such as sand and gravel is required, the materials shall be deposited in horizontal layers and compacted to the relative density specified. The excavating and placing operations shall be such that the material, when compacted, shall be blended sufficiently to secure the highest practicable degree of compaction and stability,. Water shall be added to the materials, if required to obtain the specified density depending on the method of compaction being used.
- b) As per clause 6.6.2.1 of I.S. 4701-1982, the thickness of embankment layer shall not exceed 25cm (Loose) before compaction and it should be spread over the full width of embankment and compaction shall be done by rollers or tampers to obtain specified density. The thickness of the horizontal layers after compaction shall not be more than 10cm.If compaction is performed by tampers, not more than 15cm. If by 8 to 10 tonnes rollers and not more than 30cm.If compaction is performed by vibratory or pneumatic rollers or similar equipment. The relative density of the compacted materials shall not be less than 70 percent as determined by laboratory tests as per I.S. 2720 Part-XIV.If compaction is performed by internal vibrators, the thickness of layers shall not be more than the penetrating depth of the vibrator.

11.9 Embankment without controlled compaction.

- a) No materials shall be placed in any section of the earth fill portion of the embankment until the embankment seat for that section has been approved by Executive Engineer in Charge.
- b) Where the natural ground surface is above the maximum water level but below the top of the embankment, the embankment shall be built in layers not exceeding 15cm., In thickness and to the full width of embankment. Each layer shall be commenced from the edge farthest from excavation. It shall be compacted with two ton roller.
- c) The excavating and hauling equipments shall travel over the embankment to evenly distribute the material and compacting effort over the whole surface.

11.10 Embankments with controlled compaction:

- a) Bushes, roots, sods or other perishable or unsuitable material shall not be placed in the embankment.
- b) (i) Unless otherwise specified, embankment materials shall be spread in successive horizontal layers generally not exceeding 25cm, in thickness (loose layer) in the zones where these are required to be laid, extending to the full width of the embankment including slopes at the level of the particular layer. Each layer shall be commenced from the edge farthest

from excavation. In no case shall embankments be widened by material dumped from the top.

- ii) Top of each layer shall be kept slightly depressed in the centre.
- c) i) Extra width of 600mm., in thickness as measured perpendicular to the slope shall be provided on either side so that when compacted, lines of the finished embankment slopes shall have not less than specified density.
 ii) Later the extra width shall be neatly trimmed and the trimmed material shall be permitted or re-use in embankment at higher elevations.
 iii) No payment shall be made for providing removal of the extra section. Removal of extra section in the embankment shall be deemed to have been included in the item of compaction.
- d) Thickness of layers shall be adjusted with particular type of compactors used to give the required density by carrying out trial compaction and requisite tests and required number of passes should also be determined as directed by the Engineer in Charge.
- e) No fresh layer shall be laid until the previous layer is properly watered and compacted as per requirement. The work of spreading and compaction shall be so adjusted as not to interfere with each other and in such a way that neither of the operations is held up because of non-completion of the rolling and watering. The surface of the banking shall at all times of construction be maintained true to required cross section. If the surface of any compacted layer of earth fill is too dry or too smooth it shall be moistened and scarified to provide a satisfactory bonding surface before the succeeding layer is placed. All the rollers used on any layer of fill shall be of the same type and same weight.
- f) The Tenderer shall ensure that only approved soils are used for construction of embankment.
- g) For proper bond of the embankment done in the previous season with the new embankment, the work shall be carried out as detailed below.
 - i) In case of the old bank to extended horizontally. It shall be cut to a slope not steeper than 1 in 4 and the surface so prepared shall be scarified and made loose at least for a depth of 15cm. Necessary watering shall be done and the earth surface shall be thus prepared to receive the new embankments. The soils shall be laid in layers and compacted to the required degree of compaction to have a proper bond with the old one.
 - ii) If the old bank is to be raised vertically, vegetation shall be cleared followed by scarifying , watering and placing of the new earth layer as specified above.
 - iii) The surface which are damaged due to rain shall be made good by filling with proper soil duly compacted by tampers. A cross slope away from the centre of canal of about 1 in 80 shall be maintained throughout the rainy season to ensure proper drainage in the event of occasional rainfall. No extra or separate payment shall be made for these items of work.

h) Settlement allowance:

i) The canal embankments shall be constructed to a higher elevation than that shown on drawings at the rate of 2.5m per every one meter height of bank if power driven equipment is used and 25cm/ 1 mt height if other than power driven equipment is used for compaction towards Shrinkage/Settlement.

ii) No extra or separate payment shall be made for this work as this shall be deemed to have been included in the respective item of construction and consolidation of embankment.

iii) Care shall be exercised that all large clods are broken and no clod bigger than say 8cm rock, are buried in the banks.

i) Homogenous Section:

The homogeneous section for canal embankments shall be provided as specified in the drawings. The available coarser and more pervious materials shall be placed nearby outer slopes in order to have increasing permeability from inner to outer side. The compaction shall be carried out as per clause 6.6.2 of I.S. 4701-1982.

j) Zonal Embankments:

In zonal sections the selected and approved soils shall be spread to the required widths of respective zones. All the zones shall be tackled simultaneously and the difference in level between zone to zone shall not be more than 150mm.

11.11 Moisture content:

a) The initial moisture content of the material shall be determined at the source of supply(all excavations including from the borrow areas) in field laboratory test. Prior to and during compaction operations, the embankment shall have optimum moisture content required for the purpose of compaction and this moisture content shall be fairly uniform throughout the layer, as per clause 6.6 of I.S 4701-1982. In so far as practicable the moistening of the material shall be performed at the site of excavation but such moistening shall be supplemented as required by sprinkling water at the site of compaction, if necessarily. Flooding shall be done either through a proper sprinkler tanker or using proper spray nozzles. Sprinkling straight from the water house shall not be allowed.

b) If the earth delivered to the embankment is too wet, it shall be dried by aeration, exposure to the sun, ploughing, disc harrowing or other methods, till the moisture content is reduced to acceptable optimum for compaction. If due to wet weather, the moisture content cannot be reduced to the required optimum by the above procedure, work on compaction shall be suspended until such time the earth has dried to the optimum moisture content. For such suspension of work no extra claim by the Tenderer shall be allowed.

c) If the moisture content is not uniformly distributed throughout the layer or less than the optimum rolling shall be stopped and shall be started again

only when the above conditions are satisfied. After adding the required amount of water, if found necessary the soil shall be processed by means of harrows, rotary mixers or as otherwise approved until the layer is uniformly wet to optimum moisture content.

d) Moisture content of each layer of soil shall be checked in accordance with I.S.27210(Part-II) 1973 and unless otherwise mentioned shall be adjusted, making due allowance for evaporation losses that at any time of compaction, up to -1% to +2% than the optimum moisture content in the casing zones and up to +1% to -1% than the optimum moisture content in the hearting zones may be permissible. The optimum moisture content shall be determined in accordance with I.S.2720(Part-VII) 1973. The above compaction tests will be conducted by the Engineer in Charge or his authorised representative and the Tenderer shall ensure compaction till it is satisfied that 98% of the maximum dry density at OMC is obtained.

11.12 Special Precautions:

a) During the actual construction of any earth work, maximum use should be made of construction plant and routing of the plant should be carefully controlled to obtain uniform compaction over as wide an area as possible. Care should also be taken during the compaction operation to shape the surface of the works to facilitate the shedding and to minimize the absorption of rain water, particular attention being given to the prevention of ponding of water. The Tenderer shall do this at the end of each day's work.

b) The earth moving machinery shall not be allowed to pass over a compacted portion of the embankment beyond certain limits by varying the hauling routes and ramps thus ensuring that over compaction does not take place in any particular reach.

c) During the Construction, a small transverse slope from centre towards the edges shall be given and further in the reach when bank is being raised, the works shall be tackled in continuous horizontal layers to avoid pools of water and concentration of flow of water during rains, which will cause damages, scours and rain gullies.

d) Special precautions shall also be taken while rolling the spread soil near structures, conduit, sluice barrels, filters, rock toes at the junctions of bank connections with the structures, using hand or power tampers. It is essential that the compaction of filling should be carried out in such a manner as to avoid an unbalanced thrust on walls etc., which might displace or damage it. The equipment shall be provided with suitably shaped heads to obtain the required density.

11.13 Embankment test section:

Tenderer

Superintending Engineer

Test Embankment section shall be built as directed by the Engineer in Charge-in charge prior to starting fill operations or at an early stage of embankment construction. The test section shall be used to establish.

- i) Layer thickness of fill materials.
- ii) Optimum practicable moisture content.
- iii) No. of passes of sheep foot roller/vibratory roller for effective compaction.

11.14 Measurement and payment:

No separate payment will be made for this item. It shall be included in the price bid quoted in Schedule 'A'.

11.15 Refilling of key trench and consolidation:

- a) Key trench shall be back filled with impervious material of the same specifications and in the same manner, as for the impervious hearting zone of the embankment of the canal. The impervious soils shall be placed in Continues and approximately horizontal layers not more than 25cm (loose) thick and compacted by 8 to 10 Tonne power roller under optimum moisture content.
- b) Rolling shall be done along the key trench and the roller shall be taken close to the sides of the trench.
- c) In cases where the compaction by rollers is not possible, compaction to the required density shall be achieved by such other means as specified by the superintending Engineer/ Engineer in Charge.
- d) Each layer shall be compacted to achieve the required dry density of not less than 98% of the maximum dry density(Proctor's density) for the type of material at optimum moisture content.
- e) Watering of material for its compaction shall have to be arranged by the Tenderer at his cost as the quoted rate for consolidation of Schedule 'A' is inclusive of watering.
- f) During placing and compaction of impervious soils in the key trench where dewatering is involved, the sub soil water level at every point in the key trench shall be maintained below the bottom of the earth fill until the compacted fill in the key trench at that point has reached a height of 3m. After which water level shall be maintained at least 1.5m below the top of compacted fill.
- g) The quantity for payment shall be the volume of key trench measured in cubic meters,. The unit for payment shall be ten cubic meters.

11.16 Compacting by other than Power Driven Equipment.

- a) This shall conform to that of embankments compacted by power driven equipment except that instead of using power driven rollers ordinary rollers driven by tillers shall be adopted for compaction if the work is at small magnitude. No manual compaction shall be allowed except through the use of pneumatic tampers and only very occasionally hand tampers shall be used.

Tenderer

Superintending Engineer

- b) Thickness of layer shall not exceed 150mm before compaction (loose)
- c) Each layer shall be compacted to not less than 98% dry density (Proctor's density) at optimum moisture unless otherwise specified.
- c) Any loose soil shall be removed by trimming and bringing embankment and side slopes of canal to the section shown on the drawings. Slope compacting equipment and pneumatic equipment should be used.
- d) Measurement and rate for payment shall conform to para 3.2.14 slope compacting equipment and pneumatic tamping equipment should be used.

11.17 DOWEL BANKS:

- a) Dowel Bank shall be constructed to the dimensions, grades slopes as shown on the drawing.
- b) Payment will not be made for construction of Dowel Banks.

11.18 Weather Conditions.

- a) Embankment soils shall be placed only when the either conditions are satisfactory to permit accurate control of the moisture content in the embankment material. Before closing work in embankment, in any continuous reach prior to setting of monsoon the top surface shall be graded and rolled with a smooth wheeled roller to facilitate run-off away from canal. Prior to resuming work, the top surface shall be scarified and moistened or allowed to dry as necessary.
- b) The Tenderer shall provide suitable protection works protect the slope from erosion due to rain water. No. payment whatsoever shall be made for providing such protection work and rectifying any monsoon damages.

11.19 BORROW AREA CONSIDERATION:

- a) The Tenderer shall use only the suitable soils for formation of embankments, out of the soils excavated under the provisions of Schedule A if they are proved to be suitable, based on Laboratory test results, and if they are within the Economic lead. Otherwise the Tenderer shall borrow the soils from the borrow area after test checking the suitability of the soils for the embankments for particular embankment work.
- b) The Tenderer shall be allowed to borrow the soils from the fore shore areas of Reservoirs/tanks upto the MWL contour and on the sides of the canal, where the department is having provision to borrow or exploit the soils. The Tenderer can avail this provision. If for any reason the Tenderer is not interested to borrow the soils, from the above said areas the Tenderer is free to borrow the soils from any other laces of this choice.
- c) The responsibility for arranging and obtaining the land for disposal of spoil and the land for borrowing or exploitation in any other way shall rest with the Tenderer who shall ensure smooth and uninterrupted supply of materials/earth for the quantity required in construction during the construction period.

11.20 BORROW PITS:

Tenderer

Superintending Engineer

- 1) The borrow pits shall not normally be more than 25M in length and 10M in width and 11/2M. Depth. A clear spacing of one meter between each pit shall be left out. Each pit shall be clearly peg marked and number tags of the pits shall be maintained.
- 2) In the case of earth dams unless otherwise specified the borrow pits shall not be located within a distance of 10 times the height of the embankment on the upstream side and two times the height of the embankment on the downstream side.
- 3) The depth of the pits shall be so regulated that their bottom does not cut the hydraulic gradient line having a slope 4:1 from the top edge of the embankment.
- 4) In no case the pits shall be located within 5M from the toe of the embankment. If there are old pits in the borrow area the new pits shall be located one meter away from them.
- 5) If the Tenderer excavated the pits near to the toe against to the above clauses and the same is observed at any time during or after the execution of work the Tenderer has to fill the same pits with the soil suitable for hearting zone of embankment and compact to 98% proctor's density at the cost of Tenderer.

11.21 Stripping of borrow areas:

- a) Borrow areas shall be stripped of topsoil and any other objectionable materials to the required depths as ordered by the Superintending Engineer/Engineer in Charge (Stripping operations shall be limited only to designed borrow areas) materials from stripping shall be deposited of in exhausted borrow areas are in the approved adjacent areas. Particular care shall be taken to exclude all organic matter from the borrow area. The cleared areas shall be maintained free of vegetable growth during the progress of work.
- b) No payment shall be made for removal of tops soil on borrow area

11.22 Moisture control at Borrow Areas:

- a) Borrow area watering shall be done by the Tenderer in the manner specified by the Engineer in Charge-in charge.
- c) No payment shall be made for watering the borrow area or drying the material in borrow area or on bank to reduce extra moisture content or for delay due to this.
- d) The cost for such works shall be deemed to have been included in the rate in schedule A for the item of compacting borrow quantity.

11.23 Measurement and payment:

No separate payment will be made for this item. It shall be included in the price bid quoted in schedule A.

11.24 Clay blankets:

- a) Scope: Clay blankets are made from impervious soils and are used on the beds of reservoirs or in channels or canals reduce seepage.

Tenderer

Superintending Engineer

- b) Requirements: The materials issued for these purpose, shall be impermeable, free from excessive shrinkage and swelling, shall resist erosion and have adequate stability. As far as possible, G.C. or S.C. materials shall be used. When satisfactory soils are not available, the surface shall be protected with a blanket of stable gravelly soils if so instructed by the Engineer in Charge-in charge .
- c) Laying: the clay blankets shall be laid and compacted to 98% proctors density to a length and depth.
- e) Measurement: Dimension shall be measured to the nearest 0.01M and volume worked out to the nearest 0.01cum.

11.25 Back filling:

Back filling with selected material in foundation trenches around structures and above lining key.

1) General.

- a) The type of material used for backfill, and the manner of depositing the material, shall be subject to approval of the Engineer in Charge. As far as practicable, back fill material shall be obtained from the excavation for structures or from adjacent canal excavation or from the excavation of the other ancillary works. Back filling shall be done with approved material after the concrete or masonry is fully set.
- b) Back full material shall not contain stone larger than 7.5cm.size.
- c) The pervious materials (sand) with perfused watering used for back filling around he cut off wall shall be placed as shown on drawing or as directed by the Engineer in Charge.
- d) Backfill shall not be placed against retaining walls until the retaining wall is cured adequately and is strong enough to take lateral pressure of the backfill. Trimming of the sides of excavation against which the backfill is to be laid shall be delayed until immediately prior to back filling and any excessive drying of the surface shall be conditioned properly and made adequately moist to avoid potential desiccation of the rock or partly compacted/consolidated materials.
- e) The backfill material shall not be placed against retaining walls until the retaining wall is cured adequately and is strong enough to take lateral pressure of the backfill, Trimming of the sides of excavation against which the backfill is to be laid shall be delayed until immediately prior to back filling and any excessive drying of the surface shall be conditioned providing adequate earth cover over pipe to prevent damage due to loads of construction equipment.
- f) If a haul road is built over a pipe all back fill around and over the pipe shall be placed to a uniform surface and no humps or depressions shall be permitted at the pipe crossing.

2) Compaction of Backfill:

- a) When compacting the soil against the steep rock, abutment walls of masonry or concrete structures, the construction surface of embankment

shall be sloped away from the rock or masonry or concrete structure leaving a minimum distanced of 0.6 metre and at an inclination of 3:1. Roller shall not be used close to structures as structural damage is very likely more particularly when structures have not been fully cured. The size and weight of equipment will depend on nature of material, the height and load assumed in design of structure. The backfill close to the structure upto the rolled layer shall be compacted in suitable uniform layers, using pneumatic tampers as appropriate to obtain dry density of at least 98% pf proctor density. The moisture content of the earth fill placed against rock or the structure shall be on higher side of OMC by about 2% or so, to allow it to be compacted into all irregularities of the rock. Profuse watering shall be done to pervious materials (sand) before compaction as per instruction, shall be carried out with special care without claiming any extra cost.

b) No payment shall be made on back filling around the structures and consolidation as the cost of the same shall be deemed to have been included in the relevant item of concrete/masonry payment shall not be made in full till the Tenderer carries out the compaction of backfill as per the above specifications. Deployment of hand tampers be restricted to rare usage that too very small jobs.

3) Structures on backfill:

Where the original ground surface is below the base of the structure or below the bottom of pipe, all fill required for the structure foundation and all fill upto the bottom in the pipe shall be placed as compacted embankment. The embankment over natural ground upto pipe bottom and over the pipe shall be laid in accordance with clause 9.24,2.5 and 9.2.6 IS. 783of 1985. The compacted back fill shall be placed in horizontal layers not exceeding 15cm. after compaction. Heavy stones shall neither be dropped on top of pipes not shall be allowed to roll down the side of the embankment against the pipes.

13.26 Inspection and Tests:

1) General.

a) The Engineer in Charge shall maintain and exercise through check on the quality of full material delivered to the embankment and shall arrange to obtain the data and in-situ properties of the material after compaction for compression with design assumption. To achieve these objectives, a programme of field testing and inspection shall be planned to effect quality control.

b) Scope of testing and inspection:

Filed control of fill material shall be required by visual and laboratory checks. The checks on the effectiveness of placement and compaction procedures shall be made by filed density tests at prescribed intervals.

2) Tests

The following tests shall be carried out for determining compaction.

- a) Density moisture relation of the soil. In accordance with I.S.2720(Prt,VII) 1980.
 - b) Density of the Soiling Filed; In accordance with I.S.2720(Part XXVIII)1974 or I.S.L2720(Part XXIX) 1975.
 - c) Moisture Content: In accordance with I.S.2720(Part.II)1973.Before compaction: Materials delivered to the fill shall be visually examined and their properties estimated by way of inspection.
- 3) Embankment
- i. Moisture content tests shall be carried out in the field laboratory while placing the fill materials.
 - ii. Moisture content shall be controlled by adding water or allowing the soil to dry.
 - iii. It shall be ensured that the methods of dumping, spreading and moisture conditions are such as will result in reducing segregation and/or variation of moisture content to a minimum.
- 4) Borrow Area
- i. Excavation of borrow areas shall be limited in extent and depth as indicated in specification.3.2.
 - ii. Estimation of moisture content of materials by visual examination and feel.
 - iii. Different samples shall be taken for laboratory analysis in case the soil is of different characteristics.
- These inspection checks shall be supplemented by sampling the materials at prescribed minimum intervals and by testing the samples in the laboratory for gradation and moisture content.
- During Compaction:
- It is intended that the checks in operations during compaction shall verify.
- i) That the layer thickness of the materials is as specified.
 - ii) That the fill is compacted at least to 98% of standard proctor's Density or (Dry density at OMC) or 70% relative density as the case may be.
 - iii) That no excessive rutting waving or scaling of the fill occurs during compaction.
- 5) The condition of the fill after compaction shall be observed and recorded particularly with respect to rutting or waving. However, the properties of materials after compaction shall be determined primarily by field density tests. Routine tests on samples taken from constructed embankment shall include beside density tests, grain size distribution, Attenberg limits, permeability, shear and consolidation characteristics.

11.26.1 Frequency of Testing:

- a) It will be necessary to carry out sampling and testing of materials before and after compaction at sufficient frequencies so that effective checks on the full operations are maintained. Testing frequencies proposed should correspond to the frequencies as mentioned in the relevant paragraphs.

However, the actual frequencies shall be adjusted to suit the nature and variability of materials placed and the rate of fill placement.

- b) Testing shall be performed at frequent intervals that those specified in table during initial stages of placing in each zone in order to establish control on testing techniques and also testing should be conducted at higher rates in case of special problem of control caused by such factors such as material variation, equipment performance and weather.

d) Compaction:

Test location shall be chosen only through random sampling technique. Control shall not be based on the result of any other test but on the mean value of 5 to 10 density determinations. Generally these shall be at the locations indicated below or any other areas so determined by the Engineer in Charge in addition to these test shall be made at the following locations.

- 1) In areas where the degree of compaction is doubtful.
- 2) In areas where embankment operations are concentrated.
- 3) For record tests at the locations of all embedded instruments. Areas of doubtful density may be detected by the inspection by Engineer in Charge and possible location of insufficient compaction include.
 - i) The junction between areas of mechanical tamping and rolled embankment along abutment or cut-off walls.
 - ii) Areas where rollers turn during rolling operations.
 - iii) Areas where too thick layer is being compacted.
 - iv) Areas where improper water content exists in material.
 - v) Areas where less than specified number of roller passes were made.
 - vi) Areas where dirt clogged rollers were used to compact the materials.
 - vii) Areas where compacted by rollers that have possibly lost part of their ballast.
 - viii) Areas where oversized rock which has been over looked is contained in the fill.
 - ix) Areas containing materials differing substantially from the average.

11.26.2 Record and Report:

Record of borrow area material and embankment placing operations shall be maintained in order to have a continuous check on the suitability and availability of fill materials and quality of fill. Thus shall be possible to have complete description of materials in any portion of the embankments. The record shall be maintained on the form specified in ANNEXURE-1.

11.26.2 Field Test Data:

Tenderer

Superintending Engineer

Records of Field Test Data results should be presented in the form of statistical analysis sheets and summary sheets in order to provide control required for enforcement of statistical requirements of the specifications.

Test data summary sheets and inspection reports be used to form the basis of construction control report, which should be issued from the site at fortnightly intervals, during construction season. The report would contain narrative accounts of the progress and problems of filed constrictions, statistical analysis of test data and photographs of the fill operations.

ANNEXURE -1

Earth work Daily Report:

Name of work:-----
 -----Date-----shift-----
 -----Weather-----
 Inspector-----Following Inspector-----Type roller
 equipment used -----Weight of roller-----

(A) EXCAVATION

1. Type Excavator.
2. Depth of Cut
3. Type of Soil
4. Borrow pit location.
5. Whether water added at borrow pit
6. Percentage of moisture content.

(B) FILL CONDITONS

1. Location of fill
2. Elevation
3. Weather water added at the fill
4. Moisture content before rolling
5. Roller passes.

(C) TEST DATA

1. Location of Sampling point

- (a) Chainage.
- (b) Off-set
2. Serial Number
3. Moisture content
4. Dry density(S/C)
5. Plasticity needle reading(Kg/Sq.cm)
6. Quality of Earth work rolled.

LABORATORY CHECK

1. Serial Number
2. Optimum Moisture content percent.

Tenderer

Superintending Engineer

3. Maximum dry density(Gr/CC)
4. Plasticity needle reading(Kg/Sq.Cum)

(D) COMPACTION EFFICIENCY

1. Field moisture deviation from optimum
2. Percentage Compaction.

11.27 Surface Drains:

- a) This work shall consist of constructing surface drains Schedule of work shall be so arranged that the drains are completed in proper sequence with canal excavation works as necessary subsequently or no damage is caused to these works due to lack of drainage.
- g) Surface drains shall be excavated to the specified lines, grades levels and dimensions. The excavated soils shall be removed from the area adjoining the drains. And is found suitable utilized in embankment construction. All unsuitable soils shall be disposed off as directed.
- h) The excavated bed and sides of drains shall be dressed to bring these in close conformity with the specified dimensions, levels and slopes.
- i) All works on drain constructions shall be planned and executed in proper sequence with other works as approved by Engineer in Charge with view to ensure adequate drainage for the area.

11.28 Rockfill in Toe of Embankments and filters:

Scope: This specification covers filters to be laid for internal drains sandy filter blankets, horizontal and inclined filter drains. Longitudinal and transverse filters around rock toe etc.,

11.28.1 Filters:

a) As and where indicated in the approved drawings, Filter Blanket should be laid on the base, under the down stream portion of the canal embankment. The number of layers in the filter blankets and the thickness of each layer shall be, as specified in the drawings. Sand shall be placed and compacted to an average relative density of 85% with a minimum relative density of 75% The sand shall be placed and tamped in place in such a manner that mixing of sand with foundation or backfill materials will not occur. The filter materials should satisfy the following criteria.

- i) D.15 of Filter material $> 4 < 20$
D.15 base material
- ii) D.15 of Filter material < 5
D.85 base Material

iii) D.50 of Filter material < 25

D.50 base Material

iv) Co-efficient of Curvature CC = $\frac{(D_{30}) > 1 < 3}{D_{10} \times d_{60}}$

v) Co-efficient of Curvature Cu = $\frac{D_{60} > 6 \text{ for SW}}{D_{10}}$

And Cu = $\frac{D_{60} > 4 \text{ for GW}}{D_{10}}$

Where

SW: Sand well Graded and GW: Aggregate well graded

- b) The base filter materials should be well graded so as to satisfy the above mentioned criteria. The grain size Curve should be approximately parallel to that of base materials, especially in the fine range. Filter materials should not contain more than 5% of fines i.e., materials finer than 0.075mm (passing through sieve No.2000 I.S. sieve 75micron) and fines should be cohesion less to ensure that filter does not sustain a crack. The filter should not have particles larger than 75mm. so as to minimise the segregation.
- c) D₁₅ is the size at which 15% of the total soil particles are smaller, the percentage being by weight is being propped to be determined by mechanical analysis. D₈₅ size is that at which 85% of the total soil particles are smaller. As more than one filter layer is required, similar criteria is followed in each case, viz the finer filter is considered as base materials for the selection of the gradation at the coarser filter.
- d) The requirement for grading of the filter shall be established by the tests conducted in the field laboratory on the basis of mechanical analysis of adjacent materials, Mechanical analysis shall be performed of all samples, which have been compacted by the methods equivalent to compaction by roller, so that the individual particles are broken to their field condition in the embankment.
- e) The filter materials shall be compacted to an average relative density of 85% with minimum relative density of 70% as determined by the standard U.S. Bureau of Reclamation (Relative density test for cohesionless free draining soils

$D_d = e_{max} - e$

$E - e_{min}$.

Where "e" = In place void ratio

E_{max} = Void ratio in loosened state

E_{min} = Void ratio in most compacted state, and

Void ratio = $\frac{\text{Volume of Voids}}{\text{Volume of solids}}$

The relative density may also be computed using the maximum and min density as follows.

$D_d Y_d \max (Y_d - Y_{min}) Y_d (Y_d \max - Y_{d.min})$

Where Y_d Max = Maximum dry density of soil as obtained by the

Tenderer

Superintending Engineer

laboratory Procedure.

Yd Max = Maximum dry density of soil as obtained by the laboratory Procedure.

Yd = The dry density at which the soil is to be placed or the in place dry density.

f) The thickness of each filter layer shall less than 150mmk.

11.28.3 Placing of Filter:

- a) Filters shall be laid to the lines and grades and dimensions shown on the drawings.
- b) The foundation shall be cleared and stripped in accordance with specification 2.0 before laying the bottom layer of filter material.
- c) Filter material shall be laid in layer of 150mm adequately watered and compacted by required number of passes of crawler type tractor or any method approved by the Superintending Engineer to get dense and stable filter.
- d) Care shall be taken to ensure that materials of different layers do not get mixed both at the time of placing and during compaction. Extreme

Care shall be taken when placing materials to obtain a fill free lenses, layers and streaks of segregated materials.

- e) In case of horizontal filters after being compacted earth fill material shall be laid over it in layers of 150mm and compacted as directed by the Engineer in Charge sheep foot roller or DRR shall not be used till earth has been laid and compacted to a thickness of 600mm over the filter blanket. However, the construction of earth fill in the initial 600mm thickness shall be subject to the same quality control regarding moisture content and dry density as for the rest of the embankment.

In case of inclined filter, the filter shall be raised along the adjoining embankment layers and shall be properly compacted by suitable means. In order to avoid contamination of filters with adjoining earth fill material, the top of filter be kept slightly higher than the adjacent embankment level and any contaminated portion shall be scrapped and removed before adding the new layer.

11.28.4 Measurement

The measurement shall be in meters correct to 0.01 meter and volume shall be worked out to nearest 0.01 cubic meter.

11.29 Metal Filters:

- a) Material : Provisions of Schedule 'D' shall apply
- b) Scope:- Formation of metal filters of specified thickness using approved quality of well graded metal of size 10mm to 75mm at the specified place

Tenderer

Superintending Engineer

including cost and conveyance of metal, sampling, testing sand laying with all leads, lifts delifts, watering, compacting, seigniorage charges and all other incidental and operational charges necessary to complete the finished item of work as per drawings and as directed by the Engineer in Charge.

c) Placing:

i) The coarse aggregate filter shall be laid to the lines and grades and dimensions shown on the drawings.

ii) Filter materials shall be laid in layers of 150mm adequately watered and compacted by any method approved by the Engineer in Charge to get a dense and stable filter, a fill free from lens, layers and streaks of segregated materials.

In case of horizontal filters, after being compacted, earth fill materials shall be laid over it in layers of 150mm and compacted as directed by the Superintending Engineer/Engineer in Charge sheep foot roller or DRR

Shall not be used till earth has been laid and compacted to a thickness of 600mm over the filter blanket. However, the construction of earth fill in the initial 600mm thickness shall be subject to the same quality control regarding moisture concrete and dry density as for the rest of the embankment.

iv) In case of inclined filters, the filter shall be raised along the adjoining embankment layers and shall be properly compacted by suitable means. In order to avoid contaminations of filters with adjoining earth fill material, embankment level and any contaminated portion shall be scraped and removed before adding the new layer.

11.30 Measurement:

All liner measurement shall be in meters correct to 0.01 meter. Volume shall be worked out to nearest 0.01 cubic meter.

11.31 Rock fill in Toe of embankment(Rock toe)

a) Material Provisions of schedule 'D' shall apply.

b) Scope:- Formation of metal filters of specified thickness using approved quality of well graded metal of size 10mm at the specified place including cost and conveyance of metal, sampling, testing sand laying with all leads lifts, delifts, watering compacting seigniorage charges and all other incidental and operational charges necessary to complete the finished item of work as per drawings and as directed by the Engineer in Charge.

c) Placing:

- i) The coarse aggregate filter shall be laid to the lines and grades and dimensions shown on the drawings.
- ii) The rock fill shall be placed and packed to obtain a suitable well graded and free draining fill.
- iii) The smaller rock fragments shall be placed adjacent to the filter of embankment and large rock fragments near the outer edge of the fill.
- iv) The rock fill shall be placed and roughly levelled in layers not greater than one meter in thickness.
- v) The stones shall be properly hand packed and the inter slices shall be well filled with spells and chips and tightly wedged to ensure firm packing so as to have dense well graded fill with no larger voids and cavities.
- vi) Contamination of rock toe with finer materials from any other zones shall be avoided.

11.32 Measurement:

All liner measurement shall be in meters, correct to 0.01 volume shall be worked out to nearest 0.01mm

11.33 Protection:

The Tenderer shall take all precautions necessary for the protection of the work by diversion of stream local surface drainage rain water etc. if these are likely to damage the work. Any damage to earth work due to any reason what so ever shall be made good by the Tenderer at his cost till the work is certified as completed and takeover by the Superintending Engineer/ Engineer in Charge.

11.34 Roads and Ramps:

The Tenderer shall construct, operation and maintenance roads and earth ramps adjacent to the canal and structures at his own expenses. Suitable materials from excavation or borrow area shall be placed as embankment for the roads and ramps. The width of the road shall be not less than 4.25m

SECTION – 12
MONITORING INSTRUMENTS

SECTION – 12

Tenderer

Superintending Engineer

370

MONITORING INSTRUMENTS**INDEX**

S.No.	Para	Item
1	14.1	Scope of work
2	14.2	Submittals
3	14.3	Skilled Personnel
4	14.4	Installation
5	14.5	Care of Instrumentation
6	14.6	Reading of the instruments
7	14.7	Measurement and payment

SECTION – 12

Tenderer

Superintending Engineer

MONITORING INSTRUMENTS

12.1 SCOPE OF WORK

12.1.1 General

1. The Tenderer shall prepare a plan of instrumentation to be done in the Dam and appurtenant work for study of the behaviour of the Dam and internal stresses. He should get approval of the Engineer in Charge before proceeding with instrumentation.
2. The Tenderer shall supply, install, calibrate, test, survey and maintain instrumentation in the foundation, in/on the Dam body and Diversion tunnel intake structure, underground work or elsewhere as specified in this section or as directed by the Engineer in Charge. He shall supply and install and ancillary measuring equipment and construct reading stations, protective surrounds for instruments, excavate pits and trenches, drill holes, install pipes and fittings, and cast concrete where required.
3. All instruments and accessories shall be suitable for operation at the project site. They shall withstand the high humidity and wetness inside the Dam. All steel parts shall be of hot dip galvanized steel, long-term protected against corrosion or of stainless steel of first quality.
4. All instrumentation operating on electrical or hydraulic systems shall be accompanied by individual test certificates, and shall be tested in the presence of the Engineer in Charge prior to installation, unless specifically stated otherwise.
5. All instruments shall be installed to the lines and elevations shown on the construction Drawings or as established by the Engineer in Charge as the work progresses during construction.
6. The installation of instruments may interfere with the overall construction progress. The Tenderer shall make provision for any such interference in his construction planning. He will not be entitled to any compensation or extension of the Time for Completion by reason of any such delay, including repair and replacement of damaged instruments.
7. No instruments or any of their components shall be purchased prior to Engineer in Charge's approval. However, approval by the Engineer in Charge of the Tenderer's proposals and drawings or data shall not relieve the Tenderer from his sole responsibility to meet all the requirements under this contract.
8. All instruments shall be guaranteed against defect in installation/manufacturing for all least 18 months from the date of supply or 12 months from the date of embedment/installation whichever is later. All defective instruments during eh period of guarantee shall be replaced by the Tenderer at no cost to NHPC. However the buried defective instruments shall not be returned to the Tenderer.
9. All the instruments shall be supplied with at least 3 copies of instruction

Tenderer

Superintending Engineer

manuals explaining install procedures, guidelines, necessary protection measures and necessary maintenance requirements etc., complete in all respects.

12.1.2 Measuring devices

1. Instrumentation and monitoring for the Dam & Spillway comprises of the following:

- Topographical markers
- Direct and inverted pendulums
- Joint meters
- Temperature meters
- Tele-thermometer
- Pore-pressure meters
- Strain meters
- Stress meters
- No-stress strain meters
- Junction Box
- Cables
- Cable splicing Kit
- 10 Position junction cum switch box
- Portable readout unit
- Up lift measuring devices
- Seismometers
- Strong motion accelographs
- Computer hardware and software
- Automatic weather station
- Water Level gauges
- Seepage measuring weir
- Multipoint bore hole extensometer
- Data acquisition system

2. Instrumentation and monitoring for underground works includes the following:

- Loan cells
- Measuring tape
- Tape convergence points
- Single and multiple point bore hole extensometers
- Pore pressure meters (Piezo meters)
- Readout units
- Total pressure cells
- Field and laboratory tests.
- Micro seismic surveying

- Tunnel mapping

12.2 SUBMITTALS

1. The Tenderer shall submit with his bid general information on the instrumentation he proposes to install, as band and type including additional equipment, readout units or probes which may be necessary for the instruments he proposes to use.
2. Within 112 days after the day of receipt of the Notification of Award, the Tenderer shall submit details of the instruments proposed for the installation. These shall be consistent with the general information on the instrumentation submitted by the Tenderer with his Tender as well as with any modification subsequently agreed to be the Engineer in Charge and the Tenderer, and shall include.
 - Detailed description of all instrumentation, cabling and accessories including any ancillary measuring equipment be proposes to install.
 - Evidence of the successful performance of the instrumentation proposed for installation.
 - Manufacturer's instructions for the installation, testing and operation of the instruments
 - Details of the layout of all equipment and accessories to be installed in each switchbox and reading stations.
 - Details of the reading station, concrete surrounds, recesses in concrete structures, etc., proposed for the installation of instrumentation and switch boxes.
 - Schedule of monitoring of instruments
3. Not less than 28 days before the anticipated date of installing any instrumentation, the Tenderer shall submit details of construction procedures to be employed in the Dam placing operations in the vicinity of the instrument installation, and the programmed sequence of events for this work including details of all labour, construction plant and materials to be used.
4. During the execution of the works, the Tenderer shall submit any further details regarding the instrumentation required by the Engineer in Charge. The Tenderer shall prepare surveys and furnish "as-built" drawings for shall installed instruments.

12.3 SKILLED PERSONNEL

1. The whole of the instrumentation work shall be carried out under the direct supervision of a senior supervisor, approved by the Engineer in Charge and employed by the Tenderer who is well experienced in all types of instrumentation and installation work and who understands the purpose and function of all instruments being installed.

Tenderer

Superintending Engineer

2. Installation and calibration of measurement instrumentation shall be carried out by skilled technicians, acceptable to the Engineer in Charge, well experienced in the installation of embedded instruments in Dams and who have a thorough understanding of the purpose and function of the particular instrument being installed.

12.4 INSTALLATION

1. The Tenderer shall install and calibrate all instrumentation confirming to the suppliers instructions and shall, where necessary, expose all partially installed instruments, cables and tubes to continue their installation, including carrying out all survey work required to locate such instruments. A representative of instruments manufacturer shall be present during the entire process of installation. The Tenderer shall submit a certificate issued by the manufacturer regarding the installation of instruments as per the instrument's manual, to the Engineer in Charge. The Tenderer shall tag all cables and tubes with identification tags approved by the Engineer in Charge to provide continuous identification.
2. Installation shall be installed and calibrated in the presence of the Engineer in Charge, and when he considers it desirable, instruments shall be installed only during daylight hours. As all times, the Tenderer shall ensure that adequate lighting is available, whether by natural or artificial means, to ensure proper execution of the work.
3. Cables and tubes shall be installed in the maximum lengths practicable. Splicing and coupling, if essential, shall be performed in accordance with the manufacturer's recommendations. Calibration reading shall be taken prior to and immediately after splicing. Open ends of all incomplete lines of tubing and casing shall be kept: plugged or sealed and the Tenderer shall at all times during installation keep the insides of casings and tubes free from foreign matter. Cables and tubes shall be protected from mechanical damage.
4. The instrumentation shall be put in operation at the earliest practicable period during construction in order to obtain information pertaining to the performance of the Dam, its foundation and abutments.

12.5 CARE OF INSTRUMENTATION

1. The Tenderer shall protect all instruments and connections from damage and displacement during the progress of the work. If damage or displacement of the instruments or connections occurs during the progress of the work, they shall be repaired or replaced immediately by the Tenderer.
2. The Tenderer shall be full responsible for the maintenance and repair of all instrumentation for the duration of the contract period.

Tenderer

Superintending Engineer

3. The Tenderer shall recalibrate instruments at the frequency/period as specified by manufacturer/or Engineer in Charge

14.6 READING OF THE INSTRUMENTS

1. An initial set of readings on all instruments installed at any particular elevation will be taken immediately after their installation, and the Tenderer shall not place concrete over the instruments or tubes or cables at this location until these readings have been taken.
2. The Tenderer, after consultation with the Engineer in Charge shall program his work and made all necessary arrangements to record the reading of instruments as soon as possible after their installation. Such arrangements shall include, where necessary, the provision of temporary read cut points.
3. During execution of the works, the Tenderer shall observe, record readings of instruments like temperature meter, stress mater, multipoint bore hole extensometer in specified format and at frequency/period as per approved monitoring schedule and submit the same along with analysis of data to the Engineer in Charge.

12.7 MEASUREMENT AND PAYMENT

No Separate payment will be made for this item. It shall be included in the price bid quoted in Schedule "A".

1. Unless otherwise specified, the instrumentation shall include the supply, installation, calibration, testing, surveying, repairing and maintaining of all instruments, ancillary and read out equipment, including protective steel covers, tubes and tube protections, required to perform the specified measurements.
2. It shall also include for forming all necessary recesses in concrete, all necessary trench and pit excavation, foundation preparation, temporary and permanent protection of instruments and ancillary equipment by surrounding with selected material or by other approved method, and maintaining easy access to all readout points. No. Deduction will be made for the volume occupied by the instruments and instrument protection which measuring the embankment material for payment.
3. The Tenderer shall include in his Bid price any additional readout equipment, which may be necessary for reading the instruments he proposes to use.

SECTION – 13

Tenderer

Superintending Engineer

MASONRY

13.0 STONE MASONRY FOR STRUCTURES:

13.1 General : The section detailed specifications for :

Random Rubble Masonry and Coursed Rubble Masonry in cement mortar including scaffolding, curing etc., for sub-structure and superstructure. This also includes dewatering wherever necessary.

13.2 'A' list of IS codes applicable is furnished below:

- 1) IS: 1121-1974 Methods of test for determination of strength properties of Part 1 to 4) natural building stones.
- 2) IS: 1122-1974 Method of test for determination of true specific gravity of natural building stones.
- 3) IS: 1123-1975 Method of identification of natural building stones.
- 4) IS: 1124-1974 Method of test for determination of water absorption apparent specific gravity of porosity if natural building stones.
- 5) IS: 1125-1975 Method of test for determination of weathering of natural building stones.
- 6) IS: 1126-1974 Method of test for determination of durability of natural building stones.
- 7) IS: 1127-1970 Recommendation for dimensions and workmanship of natural building stones for masonry work.
- 8) IS: 1129-1972 Recommendation of dressing of natural building stone.
- 9) IS: 1542-1977 Specification for sand for plaster.
- 10) IS: 1597-1967 Code of practice for construction of stone masonry Part I & II Part- Rubble Stone Masonry Part II-Ashlar Masonry.
- 11) IS: 1706-1972 Method for determination of resistance to wear by abrasion of natural building stones.
- 12) IS: 2116-1980 Specification for sand for masonry mortars.
- 13) IS: 2250-1981 code of practice for preparation and use of masonry mortars.
- 14) IS: 4101-1967 (Part-I): Code of Practice for external facing and veneers stone masonry.
- 15) IS: 4121-1967 Method of test for determination of water transmission rate by capillary action through natural building stones.
- 16) IS: 4122-1967 Method of test for surface softening of natural building stones by exposure to acidic atmosphere.
- 17) IS: 4348-1973 Method of test for determination of permeability of natural building stones.
- 18) IS: 5218-1969 Method of test for toughness of natural building stones.
- 19) IS: 8381-1977 Recommended practice for quarrying stones for construction purposes.
- 20) IS: 1200-1976 Measurement of building and Civil Engineer in Chargeing works stone masonry Part-IV

- 21) IS :11216-1985 Code of practice for permeability test for masonry (during and after construction)
- 22)IS 3696-1978 (Part-I) Safety code of scaffolds and ladders.
- 23) IS: 3696-1991 safety code of scaffolds and ladders.

In addition to the above I.S Codes, the specifications of A.P.S.S and manual for Quality control and inspection shall also be complied with.

13.3 Materials: Provisions of Schedule 'D' shall apply for cement, sand, stone, water etc.,

13.4 Mortar:

- a) Cement and sand shall be mixed in specified proportion given on the drawings. Cement shall be proportioned only by weight by taking the unit weight as 1440 kg. per cubic meter and the sand shall be proportioned by volume after making due allowance for bulkage.
- b) The mortar shall be mixed thoroughly in mechanical mixer of tilting type having calibrated water tank for storing water. The first batch of mortar at the commencement of work with any mixed shall be made richer by mixing 10 percent more cement over and above that required for the particular mix. In case of mechanical mixing, the mortar shall be mixed for at least 3 minutes after addition of water. Hand mixing shall not be allowed. However, in exceptional circumstances such as mechanical breakdown of mixer, work in remote areas or when the quantity of work is very small, hand mixing shall be permitted and it shall be done on a smooth water light platform, large enough to allow efficient turning over of the ingredients before and after adding water mixing platform shall be so arranged that neither foreign material shall get mixed with mortar nor does the mixing water flow out. Dry sand and cement be mixed thoroughly by turning over to get a mixture of uniform colour. Enough water shall then be added gradually and mixing continued until mortar of required consistency of 90 to 100 millimeters as required in Clause :9.1.1 of IS : 2250-1981 is obtained.
- c) All ingredients shall be fed to the mixer simultaneously. The required quantity of water to achieve the required consistency shall be predetermined by trial mixes, and portion of water from 5 to 10 percent shall precede and the like quantity shall follow the introduction of other materials. The remainder of water quantity shall be added during mixing operation.
- d) The wet mortar shall be used within 30 minutes of mixing. Mortar remaining unused, after above time shall be rejected and shall not be allowed to be used. The cost of rejected mortar shall be borne by the Tenderer.

- e) In case of cement mortar, that has stiffened because of evaporation of water, the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but this retempering shall be permitted only within thirty minutes from the time of addition of water at the time of initial mixing. The cost of retempering of mortar shall be borne by the Tenderer.
- f) Necessary tests to determine compressive strength of the mortar, for consistency of the mortar and its water retentivity shall be carried out in accordance with IS:2250. Tests for compressive strength of mortar shall be in accordance with the procedure laid down in IS:2250 Appendix-A as amended from time to time. A minimum of 3 test specimens shall be made for each 120 cums. of each class or mortar for given age. There shall be atleast 3 test specimens of mortar for each day of masonry work even if only a few cum.of particular mortar is manufactured in a day.

13.5 TYPES OF MASONRY:

13.5.1 Scope:

R.R masonry / CRS masonry in cement mortar of specified proportion / grade using R.R stone / CR stone of specified variety / specified sort including cost and conveyance of cement and other materials, sampling, testing , mixing of mortar, labour charges, all leads, lifts and delifts, seigniorage charges, scaffolding, dewatering, curing, all water leads, and all other operations, necessary to complete the finished item of work to specifications as per drawings and as directed by the Engineer in Charge.

13.5.2: The type of masonry used for structures shall be random rubble masonry (coursed or uncoursed) or coursed rubble masonry. The actual type of masonry used for different parts of structures shall be as specified in the drawings.

13.6 CONSTRUCTION OPERATIONS:

13.6.1 General requirements:

- a) The dressing of stone shall be as specified for individual type of masonry work and it shall also confirm to the general requirements for dressing of stone covered in IS: 1129. Other specific requirements are covered separately with respect to particular type of rubble stone work.
- b) Stone shall be sufficiently wetted before laying to prevent absorption of water from mortar. The bed which is to receive the stones shall be cleaned, wetted

and covered with a layer of fresh mortar. All stones shall be laid full in mortar both in bed and in vertical joints and settled carefully in place with a wooden mallet immediately on placement so that it is solidly bedded in mortar before the same has set. Clean chips and spalls shall be wedged into the mortar joints and beds wherever necessary, to avoid thick beds or joints of mortar. Whenever foundation masonry is laid directly on rock, the face stones of the first course shall be dressed to fit into the rock snugly when pressed down in the mortar bedding over the rock. No dry or hollow space shall be left anywhere in the masonry and each stone shall have all the embedded faces completely covered with mortar.

- c) Courses of the masonry shall ordinarily be predetermined. They shall generally be of the same height. Where there is variation in the height of courses, larger courses shall be placed at lower levels, with height of courses decreasing gradually towards the top.
- d) Vertical joints shall be staggered as far as possible.
- e) All necessary chases for joggles, dowels and cramps shall be formed in the stones beforehand.
- f) Sufficient transverse bond shall be provided by the use of bond stones extending from the front to the back of the masonry. In case of thick walls bond stones shall overlap each other in their arrangement.
- g) Bell shaped bond stones or headers shall not be used. The position of bond stones shall be marked on faces for identification and verification.
- h) At all angular junctions stones at each alternate courses shall be well bonded into the respective course of the adjacent wall.
- i) All connected masonry in structure shall be carried out at one uniform level throughout as far as possible, but when breaks are unavoidable, the masonry shall be raked in sufficient long steps to facilitate joining of new work without. The stepping of raking shall not be more than 45 degrees with the horizontal. Wing walls, abutments and piers, etc., shall be carried out to truly plumb or to the specified batter.
- j) Face work and hearting shall be brought up evenly. The top of each course, however, shall not be levelled up by use of flat chips.

- k) After the day's work, the face and top of masonry shall be cleaned well with brushes or broom sticks to remove all the dead mortar on the stones.
- l) Green work shall be protected from rain by suitable covering. Masonry work in cement or composite mortar shall be kept consistently moist on all faces for a minimum period of fourteen days. The top of the masonry work shall be left flooded with water at the end of the day. During hot weather all finished or partly completed work shall be covered or wetted in such a manner as to prevent rapid drying. The racking of joints where necessary shall be done at the end of day's work when mortar is green.
- m) When fresh masonry is to be placed against existing surface of structure, the old surface shall be cleaned of all loose material, roughened and wetted as directed by the Engineer in Charge so as to achieve a good bond with the new work.
- n) Stone shall be sufficiently wetter before laying to prevent absorption of water from The scaffolding shall cement mortar. The bed which is to receive the stones shall be cleaned wetted and covered with a layer of fresh mortar.
- o) be sound and strong to withstand all loads likely to come upon it. The holes, which provide resting space for horizontal members shall not be less than 1 meter wide. The holes left in the masonry work for supporting the scaffolding shall be filled and made good.

13.7 UNCOURSED RUBBLE OR RANDOM RUBBLE MASONRY:

13.7.1 Dressing:

The face stone shall be hammer dressed on the face, side and the beds to enable it to come into close proximity with the neighbouring stone. The bushing in the face shall not project more than 40mm. on an exposed face and 12 mm on a face to be plastered. Stones with round surface shall not be used in construction.

13.7.2 Size of face stones:

- a) The width of face stones shall be not less than 150mm for walls of 400mm thick, 200mm for walls of 450mm thick, 250 mm for walls of 600mm thick or more. Half the quantity shall not be less than 1/70 cum: 1/50 cum and 1/35 cum in volume for walls of the above thickness respectively. No stone less than 150 mm in height shall be used on the face.
- b) Face stone shall be laid headers and stretchers alternatively so as to break joints by at least 75mm. care is to be taken to break joints vertically. The stone shall be solidly bedded with joints not exceeding 20 mm in thickness, further dressing being done if necessary to ensure this. No pinning what so ever shall be given on the face and face stones shall extend well back into hearting. Height of stones shall not exceed breadth at face nor length in wards.

13.7.3 Chips:

Chips and spalls of stone may be used wherever necessary to avoid thick mortar beds or joints and it shall also be ensured that no hollow spaces are left anywhere in the masonry. The chips shall not be used below hearting stones to bring these up to the level of face stones. Use of chips shall be restricted to filling of interstices between the adjacent stones in hearting and they shall not exceed 10 percent of the quantity of stone masonry.

13.7.4 Hearting Stones:

The hearting or interior filling of wall face shall consist of rubble stones not less than 15 cm. In any direction, carefully laid, hammered down with a wooded mallet into position and solidly bedding in mortar. The hearting should be laid nearly level with facing and backing.

13.7.5 Bond Stones:

Through bond stones shall be provided in masonry upto 60 cm thickness and in case of masonry above 60cm thickness, a set of two or more bond stones overlapping each other at least by 15 cm shall be provided in a line from face to back. In case of highly absorbed types of stones (porous limestones and sand stone etc.,) the bond stone shall extend only about two-third into the wall as through stones in such cases may give rise to penetration of dampness and, therefore, for all thicknesses of such masonry a set of two or more bond stones overlapping each other by atleast 15 cm. Shall be provided. One bond stone or a set of bond stones shall be provided in each layer at 1.5 to 1.80 m interval.

13.7.6 Quoin stone:

The stone specially and neatly dressed for forming an internal angle in masonry work shall not be less than 0.03 cubic metre in volume.

13.7.7 Plum stone:

The plum stones are selected long stones embedded vertically in the interior of masonry to form a bond between successive courses and shall be provided at about 90 cm. Interval.

13.7.8 Laying:

The Masonry shall be laid with or without courses as specified. The quoins shall be laid header and stretcher alternately. Every stone so as to form neat and close joint, face stone shall extend and bond well in the back. These shall be arranged to break joints, as much as possible, and to avoid long vertical lines of joints.

13.7.8 Laying:

The face joints shall not be more than 20 mm thick, but shall be sufficiently thick to prevent stone to stone contact and shall be completely filled with mortar.

13.8 COURSED RUBBLE MASONRY**13.8.1 Dressing:**

Face stones shall be hammer dressed on all beds and joints so as to give them approximately rectangular shape. These shall be square on all joints and beds. The bed joints shall be chisel dressed for at least 8 cm. Back from the face and for at least 4cm for the side joints. No portion of the dressed surface shall show a depth of gap more than 6mm from straight edge placed on it. The remaining unexposed portion of the stone shall not project beyond the surface of bed and side joints. The requirements regarding the bushing shall be same as for random rubble masonry.

13.8.2 Hearting stone:

The hearting or interior filling of the wall shall consist of flat bedded stone carefully laid on their proper beds in mortar. The use of chips shall be restricted to the filling in interstices between the adjacent stones in hearting and these shall not exceed 10 percent of the quantity of masonry. While using chips it shall be ensured that no hollow spaces are left anywhere in the masonry.

13.8.3 Bond stones:

The requirements regarding through or bond stone shall be same as for random rubble masonry but these shall be provided at 1.5 metre to 1.8 metre apart clear in every course.

13.8.4 Quoin stones:

The quoins which shall be of the same height as the course in which these occur, shall be formed of header stones not less than 45cm in length. They shall be laid lengthwise alternately along each face, square in their beds which shall be fairly dressed to a depth of at least 10 cm.

13.8.5 Face stones:

Face stones shall tail into the work for not less than their heights and at least one-third of the stones shall tail into the work for a length not less than twice their height. These shall be laid headers and stretchers alternately.

13.8.6 Laying:

The stones shall be laid on horizontal courses and all vertical joints shall be truly vertical. The quoin stones shall be laid stretchers and headers

alternately and shall be laid square on their beds, which shall be roughly chisel dressed to a depth of at least 10 cm.

13.8.7 Joints:

The face joints shall not be more than 10 mm thick but shall be sufficiently thick to prevent stone to stone contact and shall be completely filled with mortar.

13.9 TESTS:

a) At least three sets of test specimen of cement mortar used be taken from each days work and it shall be tested for 28 days strength in accordance with Appendix-A of IS:2250-1965, code of practice for preparation and use of masonry mortars given below.

Mix Grade	Minimum compressive strength
1) MM3	30 Kgs/ Square centimetre
2) MM 5	50 Kg/Square centimetre
3) MM 7.5	75 Kg/Square centimetre

b) From the design mortar mix, cubes shall be cast in the laboratory at suitable intervals and their strengths found out.

1) the average strength of any 3 consecutive samples strength shall be greater than specified strength.

2) the overall coefficients of variation for any 10 consecutive samples shall not be less than 15%

3) Note more than 10% of the specimen strength shall be less than 85% of the specimen strength.

13.9.1 Additional tests shall be carried out as and when directed. These strengths shall be deemed as the standard strength for that mortar. The strengths of the test cubes shall be found out and that strength shall not be less than 80 percent of the standard strength mentioned above. For acceptance, the 28 days strength of tests cubes shall be the criteria. 80 percent of the test cubes should satisfy the above criteria.

13.9.2 The Engineer in Charge may direct the Tenderer to conduct percolation tests in the masonry in accordance with IS -11216-1985. These tests shall be conducted at regular intervals as the masonry work progresses and that if the water loss is more than 2.5 lugeons in the upstream portion of masonry and 5.0 lugeons in the real portion, remedial measures like drilling and grouting shall be taken to achieve the acceptance standards duly backed up with confirmatory tests.

13.10 CURING

Tenderer

Superintending Engineer

- a) Watering shall be done carefully so as not to washout the mortar joints or disturb the masonry in any manner. The top masonry work shall be left flooded with water at the close of the day. All masonry built with cement mortar shall be kept watered continuously for a minimum period of two weeks from the date of construction.
- b) If the Tenderer fails to do the curing to the satisfaction of the Engineer in Charge the latter with either make arrangement for curing the masonry at the risk and cost of the Tenderer or order, the masonry to be pulled down. The masonry so pulled down should be rebuilt by the Tenderer at his own cost.

13.11 MEASUREMENT AND PAYMENT

No separate payment will be made for this item. It shall be included in the price bid quoted in Schedule.A

SECTION – 14

PLASTERING & POINTING

SECTION – 14**PLASTERING & POINTING****INDEX**

S.No.	Para	Item
1	14.1	GENERAL & PLASTERING
2	14.2	POINTING
3	14.3	MEASUREMENT & PAYMENT

14.0 PLASTERING AND POINTING:

14.1 General

14.1.1. The surface of Masonry shall be finished by “Pointing” or by “Plastering”. For a surface which is to be subsequently pointed or plastered. The joints shall be squarely raked out to depth not less than the width of the joints or as directed while the mortar is still green. The raked joints shall be well brushed to remove dust and loose particles and the surface shall be thoroughly washed and cleaned and wetted.

14.1.2 Scope: Plastering of specified thickness with specified mortar proportion to the exposed face of R.R masonry/brick masonry/concrete including cost and conveyance of cement and all other materials, sampling, testing mixing of mortar, labour charges, all leads, lifts, delifts, seigniorage charges, scaffolding, curing, all water leads, and all other operations necessary to complete the finished item of work as per drawings and as directed by the Engineer in Charge.

14.1.3 Materials: Provision of schedule “D” shall apply for cement, sand, water etc.,

14.1.4 Mortar: Preparation of mortar for plastering, pointing work: Unless otherwise specified, the cement mortar used in plastering, pointing work shall be of cement mortar mix MM7.5 grade, or any other specified grade using minimum 360 Kgs. of cement per cubic metre of mortar. The other specifications and conditions enunciated in paragraph 6.4 shall apply for mortar for plastering work.

14.1.5 Plastering with cement mortar MM 7.5 grade or any other specified grade.

14.1.6 Preparation of surface:

The roughening of the back-ground improves the bond of plaster. All joints shall be thoroughly raked. After roughening the surface, care shall be taken to moisten the surface sufficiently before plastering as otherwise freshly exposed surface may tend to absorb considerable amount of water from the plaster. The surfaces shall be wetted evenly before applying the plaster. A fog spray may be used for this work and as far as possible, the plaster work shall be done under shade.

14.1.7 Laying of plastering:

- a) The mortar used for plastering shall be stiff enough to cling and hold when laid. To ensure even thickness and true surface, plaster shall be applied in patches of 150mm. X150mm., of the required thickness at not more than 2meters intervals horizontally

and vertically over the entire surface to serve as guides. The surface of these guides shall be truly in the line of the finished plaster surface and truly plumb. Plastering shall be started from top and worked down. All the pot log holes shall be properly filled in advance of the plastering. The mortar shall then be applied to the surface to be plastered between the guides with a trowel. Each trowel full of mortar shall overlap and sufficient pressure shall be used to force it into thorough contact with the surface. On relatively smooth surfaces, the mortar shall be dashed on with the trowel to ensure adequate bond. The mortar shall be applied to a thickness slightly more than that specified, using a string, stretched out between the guides. This shall then be brought to a true surface by working with a long wooden float with upward and sideways motion 50mm. Or 75mm at a time. The surface shall be periodically checked, with a small wooden float, over working shall be avoided. All corners, arises, and junctions shall be neatly finished. I.S. 1661-Code of practice for application of cement and cement lime plaster finishes shall be applicable for this section.

- b) If it is necessary to suspend the work at the end of the day it shall be left in a clean horizontal or vertical line not nearer than 150 millimeters from any corner or arises or parapet tops or copings etc., When recommencing the work, the edges of the old work shall be scraped clean and wetted and treated with cement slurry before the new plaster is laid adjacent to it. After the first coat is done it shall be kept undisturbed for the next 24 hours and there after kept moist and not permitted to dry until the final rendering is applied.
- c) After the plaster has sufficiently hardened cement slurry with cream like consistency shall be applied evenly and rubbed to a fine condition
- d) No portion of the surface shall be left out initially to be plastered up later on. The plaster shall be finished to a true and plumb surface and to proper degree of smoothness as required by the Engineer in Charge.
- e) The average thickness of plaster shall not be less than the specified thickness but shall not be thicker than 25mm in any case. Any cracks which appear on the surface and all portions which sound hollow when tapped or found to be soft or otherwise defective, shall be cut-out in rectangular shape and re-done as directed by the Engineer in Charge at no extra cost. Plastering shall be cured for 10 days.

14.2 PLASTERING TO C.R. MASONRY WITH CEMENT ORTER MM 7.5 GRADE:

14.2.1Scope:

- 14.2.1.** Flush pointing with cement mortar of specified proportion to the exposed faces of CRS masonry including cost and conveyance and of

Tenderer

Superintending Engineer

cement and all other materials, sampling, testing mixing of mortar, labour charges, all leads, lifts, delifts, seigniorage charges, scaffolding, curing all other operations necessary to complete the finished item of work as per drawings and as directed by the Engineer in Charge.

14.2.2 Preparation of Surface:

The joints in the masonry shall be raked out to a depth not less than the width of the joints or as directed when the mortar is green, joints are to be brushed to clean the dust and loose particles with a stiff brush. The area shall then be washed and the joints thoroughly wetted before pointing is commenced.

14.2.3 Laying flush pointing:

- a) Flush pointing shall be done with cement mortar mix M.M 7.5 grade or any other specified grade. The mortar shall be pressed into the raked out joints. The mortar shall not be spread over the corners, edges or surface of the masonry. The pointing shall then be finished as detailed below. The mortar shall be finished off flush and level with to edges of the stones, so as to give a smooth appearance. The edges shall be neatly trimmed with a trowel and straight edge.
- b) The pointing shall be cured for seven days.

SCHEDULE - D

SCHEDULE - D**INDEX**

S.No.	Para	Item
1	1.1	GENERAL
2	1.2	SAMPLES
3	1.3	PROCUREMENTS
4	1.4	DEFECTIVE MATERIALS
5	1.5	SAMPLING, TESTING AND QUALITY ASSURANCE
6	1.6	STANDARD TESTS & QUALITY
7	2.1	EARTH FOR EMBANKMENT
8	2.2	CEMENT
9	2.3	STEEL
10	2.4	BLASTING MATERIALS
11	2.5	STORE MASONRY
12	2.6	COARSE AGGREGATE
13	2.7	FINE AGGREGATE
14	2.8	SAND FOR FILTER MATERIAL
15	2.9	METAL FOR FILTER MATERIAL
16	2.10	ROCK FILL TOE OF EMBANKMENT
17	2.11	WATER
18	2.12	ADMIXTURE / AIR ENTRAINING AGENTS
19	2.13	STORAGE OF MATERIALS

MATERIALS AND WORK MANSHIP

1.1 GENERAL

- 1.1.1** No materials shall be used for construction in any work until notice has been given by the Engineer in Charge that the test results are satisfactory. No. oral.
- a)**
- b)** Recommendation of stacking and storage of construction materials at site shall be in accordance with IS:4082-1977
- c)** **To be of the best quality:-** All materials, articles, and workmanship shall be the best of their respective kinds for the class of work described in the contract specifications and schedule. The work best as used in the specification shall mean, that in the opinion of the Engineer in Charge there is no superior quality of material of finish of articles on the market and that there is no better class of workman ship available for the nature of the particular item described in the contract schedule. The Tenderer shall upon the request of the Engineer in Charge, furnish him with the vouchers to prove that the materials are such as are specified.
- 1.1.2** The tenderer has to do his own testing of materials and satisfy himself that they conform to the specifications of respective I.S.I codes, before tendering.
- 1.1.3** The Tenderer shall himself procure the required construction materials of approved quality including the earth for formation of embankment and water from quarries / sources of this choice. All such quarries / sources of materials required for the work shall be got approved by the Engineer in Charge in writing well before their use on the work. The materials as per standards of relevant I.S.I codes only will be accepted.

1.2 SAMPLES:

- 1.2.1** The representative samples of all materials should be procured by the Tenderer and arrange to send them to the Engineer in Charge for conducting pre-construction tests and approval duly informing the source of materials from where he has collected the samples.
- 1.2.2** The raw and processed samples should be supplied at the Tenderer's expense to the Engineer in Charge within 14 days after signing of the agreement. For testing of samples a maximum of 60 days time will be required. Each samples shall approximately consist of 100 kgs. Of materials, or as directed by the Engineer in Charge.

- 1.2.3** If the Tenderer desires to change the source of materials, he shall supply the raw and processed representative samples at his own expense to the Engineer in Charge at least 60 days before its use for pre-construction tests and approval.
- 1.2.4** In addition to pre-construction tests and approval of quarries, the Engineer in Charge may test the aggregate for their suitability during their processing. The Tenderer shall provide such facilities as may be necessary for procuring at no extra cost representative samples at the aggregate processing plant and at the batching plant. Final acceptance of the materials will be based on the acceptable test results of samples taken from the construction site only.
- 1.2.5** The Tenderer has to bear the cost of raw and processed representative samples, laboratory tests and field tests. The Tenderer has to arrange the required men and materials for collecting the samples and bear the cost thereon required for transporting them to the laboratory also. The Tenderer should quote his tender percentage for finished item of work for the items of works of Schedule "A" keeping in view the cost of pre and processed samples to be submitted to the Engineer in Charge and also the rate of progress and the time required for conducting laboratory tests. No extension of time will be granted for any delay occurred in collecting the samples and conducting pre-construction tests in the laboratory and getting approval.

1.3 PROCUREMENT:

- 1.3.1** The rates quoted or all items shall include cost and conveyance of all materials with all leads.
- 1.3.2** It will be the tenderer's responsibility to satisfy himself that sufficient quantities of construction materials required for the works shall exist in the borrow areas or quarry sites. The Department does not accept any responsibility either in handing over the quarries or procuring the materials or any other facilities. The tenderer will not be entitled for any extra rate or claim for the misjudgement on his part or quantity and quality of materials available in the quarries.
- 1.3.3** Failure by the tenderer to do all the things, which in accordance with this clause he is deemed to have done, shall not relieve the successful tenderer of the responsibility for satisfactory completing of the works as required at the rates quoted by him.
- 1.3.4** The Tenderer shall make his own enquiries regarding the availability of other materials and make his own arrangements for procuring them.
- 1.3.5** The materials for embankment construction shall be obtained and got approved by the Engineer in Charge. The responsibility for arranging and obtaining the land for borrowing or exploitation in any

Tenderer

Superintending Engineer

other way shall rest with the Tenderer, who shall ensure smooth and uninterrupted supply of materials for the quantity required in construction during the construction period. No separate cost will be paid.

- 1.3.6** Similarly, the supply of aggregates for construction shall be of approved quality approved by the Executive Engineer in Charge. Responsibility for arranging uninterrupted supply of materials from the source shall be that of the Tenderer. No separate cost will be paid.
- 1.3.7** The Tenderer has to open and develop the quarry for the stone and aggregate required. All incidentals such as removal or over burden, stripping etc., in the quarry should be done by the Tenderer. The Tenderer shall make his arrangements for maintaining the approach roads to quarry for conveying the materials to site of work.
- 1.3.8** The Tenderers have to make their own arrangements for storage and conveyance of water and storage at work site for construction purpose. No extra payment will be made to the Tenderer over and above their tender rates for water lead for storage arrangement.
- 1.3.9** The tenderer should inspect the site and check-up the possible water source for carrying out the entire work throughout the year in monsoon and non-monsoon seasons irrespective of the quantum of rain fall and quote their rates accordingly. No subsequent claims for extra water lead will be entertained under any circumstances.
- 1.3.10** The materials and labour utilized in the execution of work by the Tenderer shall not be less than that given in the A.P.P.W.D standard data for the relevant item.
- 1.3.11** Lay-out of material stacks: The contractor shall deposit materials for the purpose of the work on such parts only of the ground as may be approved by the Engineer in Charge. He shall submit, for the approval of the Executive Engineer in Charge, before starting work, a detailed site survey clearly indicating positions and areas where materials shall be stacked and sheds build.

1.4 DEFECTIVE MATERIALS:

- 1.4.1** All materials which the Engineer in Charge or his representative has determined as not conforming to the requirements of the contract will be rejected whether in place or not. They shall be removed immediately from the site as directed. Materials, which have been found defective, and which have been subsequently collected, shall not be used in the work unless approval accorded in writing by the Engineer-in-Charge, given under this clause, the Engineer in Charge shall have authority to cause the removal of rejected material and to deduct the removal cost thereof from any money

Tenderer

Superintending Engineer

due to the Tenderer.

- 1.4.2** The rejected rubble and spoils should be dumped far away from work spot as directed by the Engineer in Charge. The muck, boulders etc., fallen on the approach roads, ramps, etc., below the place should be removed by the Tenderer immediately after blasting at the Tenderer's cost. In case the above materials are not cleared within 24 hours of issue of departmental instructions, the same will be removed by the Department and the cost there of will be recovered from the Tenderer's bills.
- 1.4.3** The Department will not be liable for any compensation due to breakdown in machinery, water supply or electricity or delay in supply or materials and for damage due to rain and floods.
- 1.4.4** The Engineer in Charge shall have power to reject at any stage, any work which he considers to be defective in quality or material or workmanship and he shall not be debarred from rejecting wrought materials by reason of his having previously passed them in an unworked condition. Any portion of the work or materials rejected or pronounced to be inferior not in accordance with the drawings and specifications shall be taken down and removed from the work-site at the Tenderer's expense, within 24 hours after written instructions to that effect have been given by the Executive Engineer in Charge. Replacement shall at once be made in accordance with the specifications and drawings, at the Tenderer's expense.
- 1.4.5** In case of default on the part of the Tenderer to carry out such orders, the Engineer in Charge shall have power to employ and pay other persons to carry out the orders at the Tenderer's risk and all expenses consequent thereon and incidental there to shall be borne by the Tenderer.
- 1.4.6** Engineer in Charge's decision: To prevent dispute and litigation, it shall be accepted as an inseparable part of the Tenderer that in matters regarding materials, workmanship, removal of improper work, interpretation of the contract drawings and contract specifications, mode of procedure and the carrying out of the work, the decision of the Engineer in Charge shall be final touching the contract, the Executive Engineer in Charge's decision shall be final and conclusive. In the case of any difference between Engineer in Charge and Tenderer on matters regarding materials, workmanship, removal of improper work, interpretation of contract drawings and contract specifications, mode of procedure and the carrying out of the work the Tenderer shall have right of appeal to the next higher authority viz., the Superintending Engineer of the circle, and the decision of the latter shall be final and conclusive.

1.5 LABORATORY SET UP:

- 1.5.1** For the works costing Rs. 50.00 lakhs and above the contractor shall setup a laboratory and equip the same with adequate equipment and personnel in order to carry out all required tests and Quality Control work as per specifications or as directed by the Engineer-in-charge. The internal layout of the laboratory shall be as given in the drawing and list of equipment shall be got approved from the Engineer-in-charge in advance.

The cost of laboratory building including services, essential supplies like water, electricity, sanitary and their maintenance and cost of all equipment, tools, materials, labour and incidentals to perform tests and other operations of quality control according to the specifications requirement shall be deemed to be incidental to the work and no extra payment shall be made for the same".

This part of the specification covers sampling, testing and quality assurance requirement (including construction tolerances and acceptance criteria) for all works and structures covered in this specification ie., excavation and filling cast in situ concrete and allied works, fabrication and erection of structural steel works, masonry/sheeting and allied works, finishing items, water supply and sanitation, modular aerated concrete panel, pre-Engineer in Charge building, special items of works, and pilling.

- 1.5.2** This part of the technical specification shall be read in conjunction with other parts of the technical specifications, general technical requirements and erection conditions of the contract. Wherever IS code or standards have been referred they shall be the latest revisions.
- 1.5.3** All tests required for all materials (bought by Tenderer) and workmanship shall be done/got done by the Tenderer at his own cost. The rate for respective items of works or price shall include the cost for all works. Activities equipment, instrument, personnel, material etc. whatsoever associated to comply with sampling, testing and quality assurance requirement including construction tolerances and acceptance criteria and as specified in subsequent clauses of this part.
- 1.5.4** The Tenderer shall provide the facilities whatsoever required and also bear all cost for all sampling, testing and quality assurance in the field and in the laboratory. The Tenderer shall carry out all sampling and testing in accordance with the relevant Indian standards and/or international standards and this technical specification. Where no specific testing procedure is mentioned, the tests shall be carried out as per the best prevalent Engineer in Chargeing practices and to the directions of the Engineer in Charge. All sampling shall be done in the presence of the Engineer in Charge or his authorized representative. The Tenderer shall establish the Field Quality Assurance (FQA) laboratory and field

tests shall be done in the presence of the Engineer in Charge and /or his authorized representative. The tests which cannot be carried out in the field laboratory shall be done at a laboratory of reputed organization of NABL accreditation as agreed by the Engineer in Charge, if the Engineer in Charge desires to witness such tests at laboratory, Tenderer shall arrange to conduct test in his presence.

- 1.5.5** The recommendations and suitability of material for concreting and other building materials like brick, cement aggregates etc., shall be ascertained by Tenderer prior to start of work.

Preliminary evaluation of aggregate and its evaluation for potential alkali-aggregate reactivity as per following scope of work shall be done:-

Evaluation of Aggregates.

- i) index and flakiness index, as per IS:2386 To carry out different tests on coarse aggregate sample ie., specific gravity, water absorption, sieve analysis deleterious material, soundness, crushing value, impact value, abrasion value elongation.
- ii) To carry out different tests on fine aggregate sample ie., specific gravity, water absorption, sieve analysis, soundness, deleterious material, silt content, clay content and organic impurities as per IS:2386.
- iii) To prepare evaluation report based on test results of 1) and ii) above and to advise regarding suitability of fine and coarse aggregates.

B Evaluation of Aggregates for Potential Alkali-Aggregate Reactivity.

Evaluation for Potential Alkali-Aggregate reactivity as per following scope of work:-

- i) To carry out petrographic analysis and accelerated Mortar bar Test on aggregate samples(1N NaOH at 80deg. Centigrade for 14 days as per ASTM 1260 or the method established/developed by CSMRS for 22 days test.
- ii) To prepare a report based on test results of 1) above and to advise regarding suitability of aggregates and further testing required if any.

Moreover Tenderer prior to start of work shall ascertain the recommendations and suitability for fill material. A full scale test shall be conducted including Grain Size Analysis, Specific Gravity, Moisture Content and Standard Proctor Density of fill material. The Tenderer shall submit the test results to the owner in triplicate within three(03) days after completion of any test.

Tenderer

Superintending Engineer

All records/results shall be submitted, unless specified otherwise, as per the format developed by the Tenderer and approved by the owner.

1.5.6 All records shall be submitted, unless specified otherwise as per the format developed by the Tenderer and approved by the Engineer in Charge.

1.5.7 The Tenderer shall identify the main purchase orders & that of sub-contracts as per owner's specification and shall forward the list of manufactures/vendors for each bought out items envisaged in the contract. The bought out item (BOL) list shall include all the materials brought out in technical specifications and finalized drawings. The BOIs shall conform to the relevant IS/technical specifications referred for the highest quality grade of material unless otherwise specified. All bought out items shall be procured from the manufacturer's approved and tested as per relevant IS codes. To facilitate advance planning (well before the start of activity) of material testing/approval of bought out items, representative samples shall be procured by the Tenderer (from approved vendors) and submitted to the Engineer in Charge for his approval before bulk procurement at least two months prior to start of works. In case of manufacturers test certificate submitted for acceptance, it shall be clearly traceable and correlated with the consignment received at site. Approval of material/sample by the Engineer in Charge shall not relieve the Tenderer of his responsibility, for their conformance to the specification as well as the requisite quality and performance of material.

Structural steel and reinforcement steel supply if in the scope of Tenderer shall be procured from main steel producers like SAIL, TISCO, IISCO, VSP etc.

1.5.8 Field Quality plans shall detail out all the equipment, the quality practices and procedures etc., to be followed by the contractor's "site quality control organization"

The Tenderer shall furnish complete QA & QC programme for the work envisaged which may include the following.

- The organization structure for the management and implementation of the proposed quality Assurance Programme.
- Documentation Control system
- The procedure for procurement of materials and source of inspection
- System for site controls including process controls.
- Control of non-conforming items and systems for corrective action.
- Inspection and test procedures for site activities.

- System for maintenance of records.
- System for handling, storage and delivery.
- Quality Plan detailing out quality practices and procedures relevant standards and acceptance levels for all types of work under the scope of this contract.

The Tenderer shall appoint a dedicated, experienced and competent quality management representative on site preferably directly reporting to the Project Manager supported as necessary by experienced personnel, to ensure the effective implementation of the approved quality assurance programme.

The onsite quality management representative shall have the organisational freedom and authority to implement the requirements of these quality assurance arrangements, free from commercial and programme restraints.

The QA set up of the Tenderer shall consist of qualified and experienced Engineer in Charges, with their supporting staff for approval of the owner. Field Quality Assurance(FQA) organizational set up in addition to requisite mechanical & Electrical Engineers, shall consist sufficient graduate Civil Engineers & Supervisors to take care of quality assurance activities of both site & laboratory. The deployment of man power for FQA set up shall be scheduled on the basis of L-2 network so that necessary manpower shall be available to take care of relevant areas of works in progress during currency of work demand. Based on the schedule of work and the approved FQP, the Tenderer shall prepare a schedule of FQA tests and shall submit to the owner and shall organize the tests as scheduled.

1.5.9 The field Quality Assurance (FQA) Laboratory shall have all necessary equipment and instruments and shall be managed by a qualified /experienced person. An indicative list of test equipment is attached at Annexure. All these testing equipment shall be provided by the Tenderer at his own cost. The Tenderer shall maintain the equipment in good working condition along with valid calibration certificate, for the duration of the contract. Any other equipment though required for testing but not listed in the equipment list shall be provided/arranged by the Tenderer as his own cost.

1.5.10 The Tenderer shall prepare and obtain the approval of the owner of the field Quality plan (FQP) before the award of the work. This FQP shall cover for all the items/activities covered in the schedule of items and required for the completion of the work.

- a) All materials components and equipment covered under this specification which shall be manufactured at shop/factory of the vendors/sub vendor shall be covered under a comprehensive quality assurance programme. The detailed quality plan for manufacturing shall be drawn up by the Tenderer and will be submitted for approval in the prescribed format for manufacturing quality plan.
- b) Manufacturing Quality Plan(MQP) will detail out for all the components and equipment, various test/inspection to be carried out as per the requirements of this specification and standards mentioned therein and quality practices and procedure followed by Bidder's/Sub-Bidder's/sub-supplier's quality control Organisation, the relevant reference documents and standards, acceptance norms, inspection documents raised etc., during all stages of materials procurement manufacture, assembly and final testing/performance testing The quality plan shall be submitted on electronic media eg., floppy or e-mail in addition to hard copy for review and approval. After approval the same shall be submitted in compiled form on CD-RM.

1.5.11 The Tenderer shall store and handle the materials as per the requirements of the relevant standards at his own cost.

1.5.12 The blasting work shall be undertaken based on the finalized/approved methodology/scheme. The ground vibrations and noise level shall be measured continuously during the blasting operations. All the statutory laws and rules under the Explosive Act and other local rules in force shall be fully observed.

1.5.13 All major bought out items shall be included in the quality plan. The Quality plan shall inter alia include following works/ Bought out items wherever relevant to the Technical specifications. BOQ & drawings.

1. Earthwork including selection of fill material, compaction, proctor density tests etc.
2. Cement reinforcement steel and structural steel procurements.
3. Coarse/fine aggregates water for concrete
4. Cast-in-situ concrete & allied works
5. Masonry & allied works
6. Piling works if required
7. Structural steel works including approved welding procedures
8. Concrete admixtures, chemical injection grouting, waterproofing chemicals etc.
9. Preparation of concrete joints & joint fill materials
10. Pond/Hydraulic tests of water retaining structures
11. Drainage /cross drainage works /Hume pipe

1.5.14 TYPICAL FIELD QUALITY LAB EQUIPMENT

S.No.	Equipment	Nos
1.	Vicat Apparatus with deskpot	
2.	Le Chaterlier flask	
3.	Le Chatelier Mould	
4.	Cube Moulds for cement testing	
5.	Vibration Machine	
6.	Laboratory Cement autoclave	
7.	Length comparator	
8.	Shrinkage Bar mould	
9.	Sieves for coarse aggregate for Road	
10.	Proctor Testing equipment	
11.	Slump testing equipment	
12.	Oven	
13.	Physical balance	
14.	Rapid moisture meter	
15.	Thermometer	
16.	Burret	
17.	Measuring cylinders	
18.	Measuring flasks	
19.	Compression testing machine	
20.	Cube moulds	
21.	Electronic balance	
22.	PH Balance	
23.	Radiographic facilities	
24.	Mechanical weighing machine	
25.	Ultrasonic testing machine	
26.	D.P.Test kit	
27.	Vernier 300mm. 600mm	
28.	Micrometer(0.25mm) out side(25.00)	
29.	Radiography film viewer	
30.	Inside Micrometer 25-750dia	
31.	Digital elcometer for paint thickness	
32.	Baking oven for electrode	
33.	Standard sieve analysis set up along with sieve G.I.frame, Motorized sieve shaker, pans and covers etc.	
34.	Standard Hydro Meter Analysis set op	
35.	Liquid limit & Plastic limit se up(Atterberg limits)	
36.	Shrinkage limit test set up	
37.	Specific Gravity Test set up	
38.	Free swell index test se up	

Tenderer

Superintending Engineer

39. Testing facilities for chemical analysis like, Organic matters, calcium carbonate, PH total soluble sulphate etc.
40. Universal (standard) Automatic Proctor Compactor set up with sufficient moulds as per requirements.
41. In-situ dry Density by core cutter Methods set up with sufficient core cutters and Hammers or In-situ Dry Density by sand Replacement set up
42. Density index(Relative Density) for cohesionless soils set up – vibratory Table surcharge base plates, surcharge plates, dial gauge, calibration bars, pouring devices etc.
43. Proctor Needle penetration test set up
44. Total station (Digital survey Instruments) along with all accessories of levelling instruments.
45. Moisture content of soil
Thermostatically controlled Laboratory Electric oven of required capacity, Dessicator – Vacuum type containers (sufficient quantity)
Electronic balances as above etc.
46. Portable ovens

Note: The list of equipment shown above is indicative. Additional equipment if any, required for successful completion of work shall be provided/arranged by the Tenderer.

1.5.15

“The cost of laboratory building including services, essential supplies like water, electricity, sanitary and their maintenance and cost of all equipment, tools, materials, labour and incidentals to perform tests and other operations of quality control according to the specifications requirement shall be deemed to be incidental to the work and not extra payment shall be made for the same”.

1.6

STANDARD TESTS AND QUALITY:

1.6.1

The day to and periodical tests to be carried out on materials, finished or otherwise shall be specified by the Engineer in Charge from time to time and the Tenderer shall allow all facilities and co-operation towards collection of samples and cores etc., The Tenderer shall however make good at his cost materials, mixes and cores with similar or other materials as may be directed and to the satisfaction of the Engineer in Charge.

1.6.2

An authorized representative of the Tenderer shall remain present at the time when the samples or cores etc. are taken shall authenticate the fact if so required. Should the Tenderer's agent fail to be present as aforesaid the samples or cores etc. taken by the Engineer in Charge or his representatives shall be considered to be authentic. The Tenderer however will be informed of the details of such samples and cores etc. having been taken.

1.6.3

The material, mixes and cores etc. shall be tested day to day periodically at the laboratory available at the site or at other laboratory

Tenderer

Superintending Engineer

or place that the Engineer in Charge may directed and the result given thereby shall be considered correct authentic by the Tenderer It shall then be the Tenderer responsibility to execute work to the standard based on the laboratory designs and tests.,

1.6.4 The Tenderer shall provide proper facilities at all times, for the testing of materials, and inspection of work by the Engineer in Charge and the Engineer-in-charge shall accordingly also have access at all times to the place of storage or manufacture where materials are being made for use under the contract to determine that manufacture is proceeding in according with the drawings and specification.

1.6.5 The Tenderer shall, upon demand, also forward for the Engineer in Charge's inspection test certificates supplied by the vendors, when he is purchasing consignments of cement, steel and other materials in respect of which such certificates are usually available.

2.1.1 The suitability of foundation for placing embankment materials there on and all materials proposed for use in construction of embankment shall be determined by the Engineer in Charge well in advance on the basis of laboratory test results Chemical and physical test of the basis of laboratory test results embankment shall be carried out to ensure that the soil does not contain soluble lime content, soluble lime salt content or cohesionless fines, in quantities harmful to the embankments.

2.1.2 Materials for construction of embankment should be free from the organic materials. Unless otherwise directed by the Engineer in Charge all materials shall be deposited in embankment so that cobbles, gravel and boulders are well distributed through other material ad not nested in any position with on with in or under the embankment as per clause 6.4 of I.S.4701-1982.

2.1.3 The soil and Morum useful for construction of embankment shall be classified as impervious and semi pervious based on laboratory test results. They shall be utilized on the embankment work.

2.1.4 Soils for embankment:

To ascertain the suitability of soils for embankment purposes soils samples shall be taken in accordance to clause. No.3032.1.2 of A.P.S.S.

2.1.5 Testing and selection of suitable soils:

The soil samples collected as above shall be tested in accordance with the Indian Standards for the following properties to assess their suitability for embankment.

- a) Grain size analysis.
- b) ATTEMBOURG LIMITS.
- c) Shrinkage limit
- d) Optimum Moisture content
- e) Proctor's density

- f) Shear strength of optimum Moisture content and 100% saturation.
- g) Permeability tests shall be conducted where so required

Note: Additional tests shall be conducted where so required

2.1.6 Homogeneous section

The soils for embankment construction of Homogeneous section shall generally be in accordance with the recommendations contained in I.S.8826-1978(PARA."8").

- 2.1.7** Zonal embankments: CH and SC type of soils with high plasticity index shall not be used in the casing zone.
- 2.1.8** The impervious zone shall be built of materials having sufficient percentage of clay so that it can be compacted at optimum moisture content by suitable compacting equipment to maximum dry density. Soil which are sufficiently impervious but have lower plasticity and higher density and shear strength shall be used in the hearting zone. The dry density of the soil fraction in compacted embankment material shall not be less than 98% of the maximum dry density at optimum moisture content obtained in accordance with I.S.2720-(Part.VII)-1980 or as specified.

2.2 CEMENT:

- 2.2.1** The Tenderer has to make his own arrangements for the procurement of cement required for the works subjects to the following.
- 2.2.2** The Tenderer shall procure 43 grade ordinary Portland cement conforming to IS 8112-1989 or 53 grade OPC as per IS:1226-1990 in standard packing of 50Kg.bag as fresh as possible from non-B.I.S. license firms will not be allowed. The Tenderer shall make necessary arrangements at his own cost to the satisfaction shall make necessary arrangements at his own cost to the satisfaction of the Engineer in Charge for actual weighment of random samples from the available stock. Cement shall be got tested as directed by the Engineer in Charge at least 15 days in advance before its actual use on work. Cement required for the testing shall be supplied by the Tenderer free of cost. All tests shall be conducted in accordance with I.S.4031-1988 and I.S.4032-1968 and I.S.3535-1986.
- 2.2.3** The Tenderer has to purchase the cement on the name of work and on the name of Tenderer. The cement without mentioning the above two names will not be accepted. Vender's test certificates and weighment bills are to be furnished to the Executive Engineer in Charge. Any quantity purchased without test certificates will not be accepted for use on the work.
- 2.2.4 a)** The Tenderer should procure the cement required during the next 30 days at least a fortnight in advance to facilitate conducting test on the quality of cement, so brought to site and shall be stored in accordance with clause No.112 of APSS. The Tenderer shall forth with remove from the work site any

Tenderer

Superintending Engineer

cement that the Engineer in Charge may disallow for use on account of its failure to meet with the required standards.

b) No cement procured by the Tenderer shall be used in any work until notice has been given by the Engineer in Charge that test results are satisfactory. Physical and chemical requirement shall conform to IS.269-1989.

c) The Tenderer has to furnish the test certificates and samples for testing of each batch and each consignment to the Engineer in Charge immediately after receipt of cement into the godown for verification and testing.

2.2.5 The Tenderer will have to construct sheds at approved location having a capacity for storing cement required for not less than 30 days use. The Engineer in Charge or his representative shall have free access to such stores at all times for verification of the stocks received used on works and balance. A stock register should be kept in the store shed to facilitate such verification. If any difference is observed based on the carriage inwards, carriage outwards, theoretical requirement of cement for finished work. The contract will be cancelled and the Tenderer will be blacklisted.

2.2.6 The Tenderer shall further, at all times satisfy the Engineer in Charge on demand by production of records and books or by submission of returns and other proofs as directed, that only the cement tested and approved by the Engineer in Charge is being used. The Tenderer shall at all times keep his records up to date to enable the Engineer in Charge to apply such checks as he may desire.

2.2.7 Cement more 3 months shall invariably be tested to ascertain that it satisfies the acceptability requirements. If any reduction in strength of cement is observed in the tests the Tenderer shall forth wither remove the respective consignment from the stores. For such rejection/removed no claim will be entertained.

2.2.8 Usage of cement on works, be it concrete or for mortar or otherwise should be done only by weight and not be volume.

2.2.9 Cement Storage: Recommendation of stacking and storage of cement at site shall be as per IS:4082-1977

- A) Cement bags shall be stored in dry, weather proof godowns. Adequate precautions shall be taken to ensure stacking of cement bags in such as to keep them about 150mm.to 200mm clear above floor.
- B) The height of stack shall not ordinarily be more than 10 bags and in no case more than 15 bags (except for very short periods) to prevent possibility of lumping up under pressure. Cement bag shall be stacked in a manner to facilitate their removal and use in the order in which they are received.
- C) Cement shall be stored at the work site in such a manner as to prevent deterioration due to moisture.
- D) Cement which has become caked or otherwise damaged by getting wet or for any other reason shall on no account be used on the work.
- E) If cement is not properly stored as specified above, the Tenderer will not be allowed to use the cement for the work.

Tenderer

Superintending Engineer

2.3 STEEL:

- 2.3.2** The Tenderer has to make his own arrangements for procurement of tested steel required for the work. Steel for use in head works, major bridges, buildings water supply schemes and major structures on main canals, branch canals, etc., shall invariably be procured from main manufacturers. Test certificates conforming to I.S.No.1786-1985 are to be furnished to the Engineer in Charge before using the steel on works. The HYSD steel (I.S.1786-1985) bars should have TOR mark.
- 2.3.3** The Tenderer has to purchase the steel on the name of work and on the name of Tenderer and furnish the same to the Executive Engineer in Charge. The steel without mentioning the above two names will not be accepted. Vendors test certificates and weightment bills are to be furnished to the Executive Engineer in Charge. Any quantity purchased without test certificates will not be accepted for use on the works.
- 2.3.4** If any difference is observed based on carriage inwards carriage outwards theoretical requirement of steel for finished work, the contract will be cancelled and the Tenderer will be black listed.
- 2.3.5** The diameter and weight of steel should be as per I.S.1786-1985 or relevant I.S. specifications with subsequent revisions from time to time.

S.No.	Diameter of rod	Sectional weight in Kilogram per meter running both for MS and HYSD Steel
1	6Millimeters	0.22
2	8Millimeters	0.39
3	10Millimeters	0.62
4	12Millimeters	0.89
5	14Millimeters	1.21
6	16Millimeters	1.58
7	18Millimeters	2.00
8	20Millimeters	2.47
9	22Millimeters	2.98
10	25Millimeters	3.85
11	28Millimeters	4.85
12	32Millimeters	6.31
13	33Millimeters	6.71
14	36Millimeters	7.99
15	40Millimeters	9.86
16	42Millimeters	10.88

Note: If any rods other than those specified above are used, the weights shall be as per standard steel tables.

2.3.6 Procurement:

- a) The Tenderer has to furnish the test certificates issued by the vendors and samples for testing for each batch and each consignment to the Engineer in

Tenderer

Superintending Engineer

Charge immediately after receipt of steel in the stock yard at site of work for verification and for testing.

- b) No steel procured by the Tenderer shall be used in any work until notice has been given by the Engineer in Charge that the test results are satisfactory.

Storage: a) Reinforcement steel and binding wire shall be stored above ground surface up on platform, skids or other supports protected as far as practicable from surface detonations by direct contact with undesirable elements or by exposure to conditions producing rust and corrosion. Bars shall be so supported as to avoid distortion and sagging of long lengths. All the reinforcement of same designation shall be stacked separately and distinctly marked.

- b) Recommendation of stacking and storage of steel at site shall be in accordance with IS.4082-1977

2.4 BLASTING MATERIAL:

- 2.4.1** The Tenderer shall make his own arrangements to procure blasting materials. It shall be the responsibility of the Tenderer to store the materials in accordance with the rules of the explosive. Act or other rules framed by the Government of India. He should possess/acquire proper license for transport, possession, and use of explosives and short firers licenses as per revised explosives Act. 1983.

The Tenderer has to purchase the blasting materials on the name of work and on the name of Tenderer. The blasting material with out mentioning the above two names on the bills will not be accepted.

- 2.4.2** All the materials such as explosive detonators, fuse coils, tamping materials etc., that are proposed to be used in the blasting operations shall have the prior approval of the Engineer-in-charge. Only explosives of required make and strength to be used.

Black powder and safe explosives shall be used wherever possible. Explosives with nitroglycerine shall be used where the above explosives are not effective.

The use of fuse with only one protective coat is prohibited. The fuse shall be sufficiently water resistance as to be unaffected when immersed in water for thirty minutes. Rate of burning of the fuse shall be uniform and not less than 25 millimeters of length per 4 seconds with 10% (ten percent) tolerance on either side. The fuse known as instantaneous fuse shall not be used.

The fuse shall be inspected before use and the moist, damaged or broken ones discarded. The rate of burning of all new types of fuses shall be

Tenderer

Superintending Engineer

examined. When they have been in stock for a long time they shall be treated before use. The detonators used shall be capable of producing effective blasting of the explosives.

- 2.4.3** The Tenderer shall build a magazine or make suitable permanent arrangements at his cost for safe storage of the explosives. The Tenderer shall provide portable magazine for carrying the explosives to work-sport from the magazine at his cost .The site of the magazine, its capacity and design shall be subject to approval by the Engineer in Charge and the inspector of explosives before the construction is taken up. As a rule, the explosives should be stored in a clean, dry well ventilated, bullet proof and fire proof building, on an isolated site.

The Tenderer shall provide armed guard security of required number for explosives magazine, or while transporting to work site, as per rules in force at his cost..

The explosives, detonators, and fuse coils shall each be separately stored.

A careful and day to day account of the use of explosives shall be kept by the Tenderer in a register in a manner prescribed by the Engineer in Charge. The Engineer in Charge may also pay surprise visits to the storage magazine. In case of any unaccounted storage of the explosives, or if the account is not found to have been maintained in a manner prescribed. By the Engineer-in-charge, the Tenderer shall be liable to be penalised, in which case, he shall not be entitled to any compensation for the losses etc. The action taken under this clause shall be in addition to that which might be taken by the competent civil authorities I the Court of Law.

The magazine shall at all times be kept scrupulously clean

No unauthorized person should at any time be admitted inside the magazine. A notice shall be hung near the storage prohibiting entrance of un authorised persons.

The Magazine on no account be opened during or on the approach of a thunder storm and no person shall remain in the vicinity of the magazine during such periods.

Magazine shoes without nails shall at all times be kept in the magazine and a wooden tub or cement trough about 300 millimetre high and 450 millimetre in diameter filled with water shall be fixed near the door of the magazine.

Persons entering the magazine, must put on the magazine shoes which shall be provide by the Tenderer for the purpose and be careful.

- h) Not to put their feet on the clear floor unless they have the magazine shoes on:
 - i) Not to allow the magazine shoes to touch ground outside the clean floor.
 - j) Not to allow any dirt or grit to fall on the clean floor

Persons with bare foot shall, before entering the magazine, dip their feet in water and then step direct from tub over the barrier(if there be one) on the clean floor.

A brush or broom shall be kept in the lobby of the magazine for cleaning the magazine on each occasion it is opened for the receipt, delivery or inspection of explosives. No matches or inflammable material shall be allowed in the magazine. Light shall be obtained from the electric storage battery lantern.

No person having articles of steel or iron on him shall be allowed to enter the magazine.

Oily cotton rags waste and articles liable to spontaneous ignition, shall not be allowed inside the magazine.

Workmen shall be examined before they enter they magazine to see that they have none of the prohibited articles on them.

No tools or implements other than those made of copper, brass gun metal or wood shall be allowed inside the magazine. All tools shall be used with extreme gentleness and care.

Boxes of explosives shall not be thrown down or dragged along the floor and shall be stacked on wooden trestles.

Where there are white ants, the legs of the restless should rest in shallow copper, lead or brass bowls containing water. Open boxes of Dynamite shall never be exposed to the direct rays of the sun. Empty boxes or loose packing materials shall not be kept inside the magazine. Magazines shall be inspected at least twice a year by an officer representing the Engineer in Charge.

He shall see that all the rules are strictly complied with. The magazine shall have lightning conductor which should be got tested at least once a year. The Tenderer shall, comply with all the recommendations. Made by the officer testing the lighting conductor and also rectify the defects notified to him within 15 days, failing which the Engineer in Charge shall be entitled to comply with the same at the Tenderer's expenses which shall not be open to question. The Engineer in Charge may taken any action that he may consider fit at the cost of the Tenderer.

The following shall be hung in the bobby of the magazine.

- a) A copy of rules both in English and in the language which the workers on concerned are familiar with.
- b) A statement showing the stock in the magazine on the day.
- c) A certificate showing the last date of testing of the lighting conductor
- d) A notice that "smoking is strictly prohibited.

2.5 STONE FOR MASONRY:

2.5.1 GENERAL:

2.5.2 The following specifications shall govern the quality of material and general practices of construction of masonry for the dams and appurtenant structures like spill ways, non over flow dams, retaining walls, regulators, bridges and other massive masonry structures with a view to ensure strength durability,

Tenderer

Superintending Engineer

impermeability and uniformity. The masonry shall conform generally to I.S.8605-1977 and special specifications elaborated hereunder.

2.5.3 Materials

2.5.4 Stone

2.5.5 Quality: All stones used shall be hard dense, durable tough sound and clean. They shall be free from decay, weathered faces, soft seams, coating holes, veins, flaws, cracks, stains and other defects. Stones not in uniform colour texture and /or with stains may be permitted only after proper tests.

2.5.6 Strength: The strength of stones shall be adequate to carry the load imposed allowing a suitable factor of safety. The crushing strength shall be determined in accordance with the I.S.1121(PART-1)-1974 and shall be not less than what is detailed below.

Sl.No.	Type of Stone	Minimum Crushing Strength
1.	Granite	1,000 kg/sq.com
2.	Basalt	400 kg/sq.com
3.	Lime Stone	200 kg/sq.com

2.5.7 Water absorption: The percentage of water absorption shall generally not exceed 5 percent by weigh as determined in accordance with I.S.1124-1974.

2.5.8 Stone for masonry: The stone for masonry shall satisfy the requirement in respect of compressive strength durability and water absorption and its general quality as indicated in 5.6 to 5.8. The size of stone shall normally vary from 0.05 to 0.01m³.. The stones shall be taken from quarries approved from Geological and Engineering considerations. No stones shall weigh less than 25kg. The stone used in the hearting shall be roughly cubical in shape. No stone weighing between 75kg and 150kg shall be less than 225mm in any direction and no stone weighing between 25kg and 75kg shall be less than 150mm in any direction.

2.5.9 Spalls with minimum dimensions of 200mm to 100mm shall be used to wedge into thick mortar spaces. They shall not normally exceed 10 percent of the volume of stone masonry.

2.5.10 Stone for cursed face work: The height of the stone for face work shall be uniform and is recommended to be 300mm including mortar joint. The length and depth of face stone shall not be less than the height of the stone. At least 50 percent of the stones shall have length more than twice the height of the stone. At least one third of the stones shall be bond stones projecting not less than 2 ½ times the height into the masonry. The remaining in shall be header stones with depth not less than 1 ½ times the height of the stones. The stones shall be hammer dressed on face and one line chisel dressed on bed, top and sides for a minimum depth of 75mm up to which the stones shall be true and rectangular. Beyond 75mm depth, the stones any be tapered but the tail end of the stones shall have at least half the area of the face.

Bushing on the faces of the stones shall not project more than 40mm

2.5.11 Header Stones: The header stones shall not be less than 300mm. in length, one and half times of the height in depth.

2.5.12 Stretcher Stones: The stretcher stones shall not be less than 600mm in length and not less than its height in depth.

2.5.13 Quoins: Quoin stones shall be of the same height as the faces but shall be true and rectangular on two faces with the face dressing for 75mm depth in beds and sides. The stone shall be at least 300mm. long on one face and 450mm on the other face.

2.5.14 Bond Stones: The bond stones shall not be less than 300mm in length and two and half times its height in depth.

2.5.15 Stone for uncaused face work: Stones for un coursed face work shall be selected from stones meeting the requirement of stones for coursed face work (see 5.11) except that the stones shall be hammer dressed. The stones shall be nearly rectangular.

2.5.16 Rough stone (For pitching & Revetment):

Stone shall be used from the surplus useful excavated rubble or from the approved quarries if required, and shall be subject to thorough inspection and approval by the Engineer in Charge. The bed pitching material shall consist of the most durable rock fragments of approved quality selected for the purpose. The stone shall be sound, hard, dense, resistant to abrasion durable, and free from segregation, seams cracks, shall partings weathered portions, conglomerate bands and other structural defects or imperfections tending to affect their soundness and strength,. Stone shall generally be freshly quarried with sharp edges and clean faces. They shall be free from EI + rounded, worn. Or weathered surfaces of skin or coating. Stone subject to marked deterioration by water or weather shall not be used. The shape of the individual stones shall be angular. Stones when immersed in water for 24 hours shall not absorb water by more than 5% of their weight when tested as per IS:1125-1974 or its latest edition.

2.5.17 Size of stone:

The size of the stone to be used for various thickness of revetments shall be as follows:

The size of stone shall be as large as possible. In no case any fragment shall weight less than 40 kg. The specific gravity of stones shall be as high as possible and it shall not be less than 2.50.

Unless otherwise specified, for revetments up to 450 mm. thickness, the length of the stone shall be equal to the revetment thickness. For revetment over 450 mm thick at least 50% of the stones shall be 450 mm long. No stone shall have any dimension less than 150mm or less than 50% of the maximum dimension of the stone.

The minimum volume of the individual stones used for various thickness of revetments shall be as follows:

Thickness or revetment	Volume of stones
225 mm	0.015 cum
300 mm	0.015 cum
450 mm	0.030 cum

Tenderer

Superintending Engineer

600 mm

0.045 cum

2.5.18 Staking

Deleted

2.6. COARSE AGGREGATE:

2.6.1 General: For the purposes of these specifications, the term, “Coarse Aggregate” designates clean well graded aggregate most of which is retained on 4.75mm I.S. Sieve and containing only so much finer material as permitted for various types described under clause 2.2 of IS.383-1970. Coarse aggregate for concrete shall consist of uncrushed gravel or stone, crushed gravel or stone and partially crushed gravel or stone. Coarse Aggregate shall generally have uniform and stable moisture content. In case of variations, clause 9.2.3 of I.S.456-1978 shall govern during batching.

2.6.2 Quality: The coarse aggregate shall consist of naturally occurring (crushed OR uncrushed) stones and shall be hard, strong, durable clear and free from veins and adherent coating and free from injurious amounts of disintegrated pieces alkali, vegetable matter and other deleterious. Coarse aggregate will be rejected if it fails to meet any in of the following requirements.

2.6.3 Los –Angels abrasion test; The abrasion value of aggregates when tested in accordance with the method specified in I.S.2386(PART-IV)-1963 using Los-Angels machine shall not exceed 30% for aggregates to be used in concrete for wearing surface and 50% for Aggregates to be used in other concrete.

2.6.4 Aggregate crushing strength test: Aggregate crushing value, when determined in accordance with I.S.2386(Part-iv) 1963 shall not exceed 45% for aggregate used for concrete other than wearing surface and 30% for wearing surfaces. As an alternative to the crushing strength test aggregate impact value will be determined with the method specified in I.S.2386(Part-iv) 1963 the aggregate impact value shall not exceed 45% by weight for aggregates used for concrete for other than wearing surfaces, and 30% by weight for concrete for wearing surfaces such as run ways, roads and pavements.

2.6.5 Soundness test: The coarse aggregate to be used for all concrete works shall sodium or magnesium sulfate accelerated soundness test specified in I.S.2386(Part-v) 1963 and the average loss of weight after 5 cycles shall not exceed the limits specified in clause 3.6.67 of I.S.383-1970.

2.6.6 Specific Gravity: 2.60 minimum:

2.6.7 Deleterious materials: The maximum quantity of deleterious materials in coarse Aggregate shall not exceed the limits specified in Table -1 of I.S.386-1970 when tested in accordance with I.S. 2386-1963.

Tenderer

Superintending Engineer

2.6.8 Grading

- a) Coarse aggregate shall be well graded to give a dense concrete of the specified strength and consistency that will readily into position without segregation and without the use of an excessive water content.
- b) Coarse aggregate shall be supplied in the nominal sizes given in Table-2 of IS 383-1970. For any one of the nominal sizes, the proportion of other sizes as determined by the methods described in IS 2386(PART-1) 1963 shall also be in accordance with Table-2 reproduced below.

TABLE – 2

Nominal sizes and corresponding grading for single size and graded aggregates

IS Sieve Design ation Graded Nation	Percentage passing by weigh for single size Aggregated of nominal size.						Percentage passing by weigh for graded aggregated of nominal size			
	60mm	40mm	20m m	16m m	15.5m m	10m m	40mm	20mm	16m m	2.5.m m
80mm	100	-	-	-	-	-	100	-	-	-
63mm	85-100	100	-	-	-	-	-	-	-	-
40mm	0-30	85-100	100	-	-	-	95-100	100	-	-
20mm	0-5	0-20	85-100	100	-	-	30-70	95-100	100	10
16mm	-	-	-	85-100	100	--	-	-	90-100	-
12.5mm	-	-	-	-	85-100	100	-	-	-	90-100
10mm	0-5	0-5	0-20	0-30	0-45	85-100	10-35	25-55	30-70	40-85
4.75mm	-	-	0-5	0-5	0-10	0-20	0-5	0-10	0-10	0-10
2.36mm	-	-	-	-	-	0.5	-	-	-	-
-										

However the exact gradation required to produce a dense concrete of specified strength and desired workability shall be decided by the Engineer in Charge.

- c) The material passing through the screen shall be grade ranging from 40mm to 4.75mm. Each shall be stacked separately.

a) SPECIFIC GRAVITY: 2.60 minimum

iii) Storage

Aggregate shall be stacked in such way as to prevent the admixture of foreign materials such as soil, vegetable matter etc. Heaps of fine and coarse aggregates shall be kept separately.

Tenderer

Superintending Engineer

2.7 FINE AGGREGATE(SAND)

- 2.7.1** General: The term sand is used to designate aggregate most of which passes 4.75mm I.S, sieve and contains only so much coarser material as permitted in clause 4.3 of I.S, 383-1970. Sand to make up deficiencies in the natural sand gradings.
- 2.7.2** Sand shall have uniform stable moisture content. Determination of moisture content shall be made as frequently as possible the frequency for a given job being determined by the Engineer in Charge according to weather conditions, (I.S. 456-1978).
- 2.7.3** **Quality:** The sand shall consist of clean, dense, durable, un coated rock fragments as per IS:383-1970
- 2.7.4** Sand may be rejected if it fails to meet any of the following quality requirements.
- 2.7.5** **Organic impurities in Sand:** Colour no darker than the specified standard in clause 6.22 of I.S 2386 (part-II) 1963 (Indian standard method of test for Aggregate for concrete Part-II estimation of deleterious materials and organic impurities).
- 2.7.6** Sodium Sulphate test for Soundness: The sand to be used shall pass a sodium or magnesium Sulphate accelerated test as specified in I.S. 2386 (part-V) – 1963 for limiting loss of weight.
- 2.7.7** **Specific gravity:** 2.6 minimum
- 2.7.8** **Deleterious Substances:**
- 2.7.9** The amounts of deleterious substances in sand shall not exceed the maximum permissible limits prescribed in table I Clause 3.2.1 of I.S. 383-1970 (Indian standard Specification for coarse and fine aggregates from natural source for concrete) when tested in accordance with I.S. 2386-1963.
- 2.7** **Grading:** Sand for mortar shall conform to the grading of sand given in Clause 4 of I.S. 2116-1980 as indicated below.

Grading of sand for use in masonry mortars.

I.S Sieve Designation	Percentage by weight passing by mass
4.75mm	100
2.36mm	90 to 100
1.18mm	70 to 100
600 microne.	40 to 100
300 microne	5 to 70

- 2.7.11** Sand whose grading falls outside the specified limits due to excess or deficiency of coarse or fine particles may be processed to

Tenderer

Superintending Engineer

comply with the standard by screening through a suitably sized sieve and / or blending with required quantities of suitable size sand particles. The sand for concrete as batched shall be well graded and when tested by means of standard sieves shall conform to the limits given in table-4 or I.S. 383-1970 and shall be described as Fine aggregates, grading zones-I,II,III, and IV, Sand complying with the requirements of any of the four grading zones is suitable for concrete. But sand conforming to the requirements of grading zone-iv shall not be used for reinforced cement concrete work.

2.7.12 Fineness Modulus:

- a) Sand shall have a fineness modulus between 2.4 to 3.0 subject to the gradation specified in the preceding paragraph.
- b) The modulus shall be computed by adding cumulative percentage of sand retained on the standard screens 4.75 mm, 2.36., 1.18mm, 600 micron, 300 micron, 150 micron, IS sieves and dividing the sum by 100. Gradation of sand shall be so controlled that the fineness modulus of at least 9 out of 10 consecutive test samples of finished sand shall not vary by more than 0.10 from the average of 10 test samples. Sand having any deviation from the specified range of gradation and fineness modulus shall not be permitted to be used in work without the written permission of the Engineer in Charge.

Storage:

All sand shall be stored on the site of work in such manner as to prevent intrusion of foreign matter.

2.8 SAND FOR FILTER MATERIAL:

- 2.8.1** The filter material shall consist of clean, sound and well graded sand and crushed rock. The materials shall be free from debris, organic matter and other deleterious matter.

It shall be ensured that the surface over which the filter is to be laid has been well consolidated to not less than 95 percent of proctor's density.

- 2.8.2** The filter materials in contact with earth of foundation soil shall be of any available clean, well graded sand having a maximum size of 6mm. This shall be overlaid with well graded, hard durable coarse aggregate of size 10mm to 75mm. In contact with rock fill, riprap shall be used.

2.9 METAL FOR FILTER:

- 2.9.1** The coarse aggregate as filter materials unless otherwise specified shall consist of clean, sound, hard, dense, durable, sharp, angular pieces, broken to specified sizes, free from all dust, dirt, and vegetable matter.

Flaky and weathered stones shall not be used. The aggregates shall not contain any harmful material such as iron pyrites, coal mica, shale or similar laminated material, Clay, alcalie, soft fragments, organic impurities etc.,

- 2.9.2** The aggregate shall be well graded and or size 10mm. To 75mm. Broken rock obtained from rock excavation of canal or from approved quarries shall be approved by the Engineer in Charge. Prior to being transported to the areas of depositing.

2.10 ROCK FILL FOR TOE OF EMBANKMENT (Rock toe):

- 2.10.1** Rock fill shall consist of sound, durable and well graded broken rock obtained from approved excavation of work and / or from approved quarries and shall be approved prior to being transported to the areas of deposition. The materials shall range in size from 75mm to 450mm. However, no load shall contain more than 15 percent by volume of rock fragments smaller than 75mm. In size. All brush roots, or other perishable material shall be removed from rock fill during the spreading.

2.11 WATER

- 2.11.1** The water used in making and curing of concrete, mortar and grout shall be free from objectionable quantities of silt. Organic matter injurious amounts of oils, acids, salts and other impurities etc., as per I.S. Specifications No.. 456-1978. Potable water is generally considered satisfactory for mixing and curing.

- 1.11.2** The Engineer in Charge will determine whether or not such quantities of impurities are objectionable.

- 1.11.3** Such determination will usually be made by comparison of compressive strength, water required, time of set and other properties of concrete made with distilled or very clean water and concrete made with the water proposed for use. Permissible limits for solids when tested in accordance with I.S.3025-1964 shall be as tabulated below.

Permissible limits for solids:

1.	Organic	Maximum permissible limit 200 Mg/liter
2.	Inorganic	3000 mg/liter
3.	Sulphates (as SO ₄)	500/mg/liter
4.	Chlorides (as Cl)	2000mg/liter for plain concrete work and 100 mg/liter for RCC work
5.	Suspended matter	2000mg/liter

If any water to be used in concrete, mortar or grout is suspected by the Engineer in Charge as exceeding the permissible limits for solids, samples of water will be obtained and tested by the Engineer in Charge in accordance with I.S. 3025-1964

2.12 ADMIXTURES / AIR – ENTRAINING AGENTS:

2.12.1 An admixtures air entraining agent may be used in the concrete in such quantities as to produce a total workable concrete as may be permitted, upto 5% volume of concrete. The admixture agent shall satisfy the relevant specifications for air-entraining agents (I.S 1903-1979) and the dosage shall be determined based on specific laboratory studies.

2.12.2 The department will specify. And approve the admixtures / Air entraining agents required for the works. The use of such admixtures / Air entraining agents shall be made and the cost conveyance, storage, bathing, mixing of admixtures shall be borne by the Tenderer and shall be included by his in the quoted rates for respective items or works involved in the use of cement.

2.13 STORAGE OF MATERIALS:

Storage of materials shall conform to the I.S 458-1978 and I.S 457-1957

SEIGNIORAGE CHARGES

Seigniorage Charges: G.O.Ms. No.11, Industries and Commerce (M.II) Department, Dated:11.02.2020 as amended by the Government from time to time. The Seigniorage charges for the materials covered under this work shall be recovered from the Tenderer's bill at the following rates and as amended by the Government from time to time.

S.No.	Material	Seigniorage charges
1.	Sand	Rs.100.00/Cum
2.	Metal	Rs.90.00/Cum
3.	R.R Stone for masonry	Rs.90.00/Cum
4.	Revetment stone	Rs.90.00/Cum

Tenderer

Superintending Engineer

5.	C.R.S Stone	Rs.90.00/Cum
6.	Gravel	Rs.45.00/Cum
7.	Ordinary Earth	Rs.45.00/Cum

The rates are liable to be revised and amended from time to time by the state Government by ratification in the "Andhra Pradesh Gazette". If the revised seigniorage fee is more than above mentioned, the recovery from the Tenderer's bill is as per revised rates. Seigniorage charges will be recovered from the Agency, as per rules from the work bills of the contract or based the instructions of the Government from time to time and the each amount will be reimbursed.

SCHEDULE - E

ADDITIONAL CONDITIONS SUPPLEMENTAL TO THE PRELIMINARY

SPECIFICATIONS TO A.P.S.S. PROGRESS SCHEDULE.

1. CONSTRUCTION PROGRAMME:

- 1.1 The Contractor shall furnish within one month of the order to start the work a programme showing the order of procedure in which he proposes to carry out the work in quadruplicate monthly progress expected to be achieved also indicating date of procurement and setting of materials plant and machinery. The schedule should be such as is practicable of achievement towards completion of the whole work in the time limit and in keeping within the mile stone programme specified under condition 14 in the tender notice and shall have the approval of the Executive Engineer. Further rate for the progress in the schedule shall be kept upto date. In case it is subsequently found necessary to alter this schedule the contractor shall submit sufficiently in advance the revised schedule incorporating necessary modification proposed and get the same approved by the Executive engineer. No revised schedule shall be operative without such acceptance in writing.
- 1.2 The Superintending Engineer shall have all times the right without any way violating this contract, or forming grounds for any claim to alter the order of the works or any part thereof and the contractor shall after receiving such directions proceed in the order directed, The contractor shall also report the progress to the superintending Engineer within 7days of the Executive Engineer's direction to alter the order of works.
- 1.3 The Contractor shall give written notice to the Engineer in charge whenever planning or progress of the works is likely to be delayed or disrupted unless any further drawing or order including a direction, instruction or approval is issued by the Engineer -in-charge within a reasonable time. The notice shall include details of the drawing or order required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late. If, by reason of any failure or inability of the Executive Engineer to issue within a time reasonable in all the circumstances any drawings or order requested by the contractor, the contractor suffers delay, then the Executive Engineer shall take such delay into account in determining any extension of time.

SPEED OF WORK:

- 1.4 The contractor shall at all times maintain the speed of work to conform to the latest operative progress schedule provide the Executive Engineer with progress report and bar charts indicating the programme and progress once in a month., The Executive Engineer. may at any time in writing direct the contractor to slow down any part or whole of the work for any reason (which

Tenderer

Superintending Engineer

shall not be questioned whatsoever, and the contractor shall comply with such orders of the Executive Engineer. The compliance of such orders shall not entitle the contractor to any claim or compensation. Such orders of the Executive Engineer for slowing down the work will however be duly taken into account while granting extension of time if asked by the contractor for which no extra payment will be entertained.

1.5 Work during night or/on Sundays and Holidays:

Unless otherwise provided, none of the permanent works shall be carried out during night Sundays or authorised holidays without the permission in writing, However, when work is unavoidable or necessary for the safety of life, property of works the contractor shall take necessary action immediately and advised the Engineer-in-charge accordingly.

2. MEASUREMENT AND CHECK MEASUREMENT:

- 2.1** Payment for the work done by the contractor will be made for the finished work based on the measurement recorded in measurement books by any officer of the dept. not lower in rank than a Assistant Engineer and check measured by any officer not lower in rank than a Dy. Exe. Engineer. The measurement shall be recorded at various stages of the work while in progress for the proper assessment of the quantities of work done and also after work is completed or when the contract is terminated. The contractor shall be present at the time of recording of each set of measurement and their check measurement and accept them. Then and there so as to avoid disputes at a later stage. If the contractor is not available at the work spot at the time of recording measurements or check measurements the authorised agent of contractor based on which the contractor shall accept the set of measurements without any further dispute if for any reason the contractor's authorised agent is also not available at site and the work, has to be suspended by the department representative to avoid recording of measurement during the absence of the contractor or his authorised representative the department shall not entertain any claim form the contractor for any loss incurred by him on this account. The contractor shall however note that the Dept, cannot indefinitely wait for recording the measurement due to the absence of the contractor and his authorised agent and check measure them even in the absence of the contractor after giving in writing a notice of 3 days.
- 2.2** Measurement will be recorded for the finished work for which all tests are conducted in accordance to schedule 'D' and the work is done in accordance with schedule 'E' by using the material, specified in schedule 'D'
- 2.3** Deleted

3. PAYMENTS AND CERTIFICATES:

- 3.1 Payments shall be adjusted for recovery of advance payments liquidated damages in terms of condition 14.8 of tender notice and security for the due fulfillment of the contract. Payment will be made to the contractor under the certificate to be issued at reasonably frequent intervals by the Executive Engineer, within fourteen days of the date of each certificate, and intermediate payment will be made of a sum equal to 92.50% of the value of work, as so certified and balance of 7.50% will be with held and retained as a security for the due fulfillment of the contract under the certificate to be issued by the Executive Engineer. On the completion of the entire work the contractor will receive the final payment of all the moneys due or payable to him under or by virtue of the contractor except earnest money deposit retained as security and a sum equal to 2.50% of the total value of the work done, provided there is no recovery from or forfeiture by the contractor to be made under liquidated damages and clause 60 of APSS. The amount withheld from the final bill will be retained under deposits and paid to the contractor together with the earnest money deposit retained as security after a period of Twenty four months as all defects shall have been made good according to the true intent and meaning thereof.
- 3.2 No certificate of the Executive Engineer shall be considered conclusive evidence as to the sufficiency of any work or materials or correctness of measurement to which it relates, not shall it relieve the contractor from his liability to make good defects as provided by the contractor, The Contractor, when applying for a certificate, shall prepare a sufficiently detailed bill based on the original-figures of quantities and rates in the contract, schedule "A" to the satisfaction of the Executive Engineer, to enable the Executive Engineer or Dt, Executive Engineer to check the claim and issue the certificate, The certificate as to such of the claims mentioned in the application as are allowed by the Executive Engineer shall be issued within fourteen days of the application, No application a for a certificate shall be made with in fourteen days of a previous application.
- 3.3 In case of over payments or wrong payment made if any to the contractor due to wrong interpretation of the provisions of the contract, APSS or otherwise, such unauthorized payment will be deducted in the subsequent bills or final bills for the work or from the bills under any other contracts with the Govt. or at any time there after from the deposits available with the Govt.
- 3.4 Any recovery or recoveries advised by the Govt. Dept. either state or central due to non fulfillment of any contract entered in to with them by the contractor shall be recovered from any bill or deposits of the contractor.
- 3.5 No claim shall be entertained if the same is not represented in writing to the Executive Engineer with in 15 days of its occurrence.

Tenderer

Superintending Engineer

- 3.6 The contractor is not eligible for any compensation for inevitable delay in handing over the site in accordance with, the condition 14 of tender notice. In such case suitable extensions of times will be granted after considering the merit of the case.
- 3.7 The Contractor shall have the right to withdraw from the contract and obtain refund funned of his Security deposit if such intimation of handing over the site in accordance with condition 14 of tender notice is delayed more than two months from the date of acceptance of the agreement by competent authority.
- 3.8 Interest on money due to the contractor. No omission by the Executive Engineer or the sub-divisional officer to pay the amount due upon certificates shall vitiate or make void the contract, nor shall the contractor be entitled to interest upon any guarantee fund or payments in a arrears, not upon any balance which may, on the final settlement of his accounts, the found to be due to him.
- 3.9 Deleted

4. INTERMEDIATE PAYMENTS:

- 4.1 For intermediate Stage of work, only part rates as fixed by the Executive Engineer will be paid.
- 4.2 Part rates shall be worked out for the work done portion based on the actual operations involved keeping in view the value of the balance work to be done, to avoid unintended benefit to the Contractor in initial Stage.
- 4.3 Full rate shall be paid when the work is completed to the complete profile as noted in the drawings.
- 4.4 For earth work in cutting, 10% of the quantity will be with held for intermediate payments and the same will be released after completing the work to the profiles as per drawings and disposal of the spoil material at the specified places and handing over of balance useful stone. For this purpose a length of 25 mts will be taken as a Unit.
- 4.5 For earthward embankment formation work, 10% of the quantity will be withheld for intermediate payments and the same will be released after completing the bund to the profiles as per drawings including trimming of side slopes and all other works contingent to the bund profile. For this purpose, 25 mts of length will be taken as Unit.
- 4.6 For the structure works either with masonry or concrete where the height of structure is more than three meters, the quantities executed in the lower level will be withheld at the rate of one percent for every three meters height, if the balance height of the structure work is more than three meters in height over

the executed level and the same will be released only after the entire work is completed as certified by the Engineer.

- 4.7** For C.M. & C.D. works and for lining works, spread over more than 2KM in length 5 percent of the concrete and Masonry quantities will be with held and the same will be released after completion of all C.M&C.D. works and lining for the entire length certified by the Engineer-in-charge.

- 4.8** Deleted

CERTIFICATE OF COMPLETION OF WORKS:

- 5.1** When the whole of the works have been completed and have satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer accompanied by an undertaking to finish any outstanding work during the period of maintenance. Such notice and undertaking shall be in writing and shall be deemed to be request by the Contractor for the Engineer to issue a Certificate of Completion in respect by the Works. The Engineer shall, within twenty one days of the date of delivery of such notice either issue to the Contractor, with a copy of the Employer. A certificate of completion stating the date on which, in his opinion, the works were completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the Works. Which, in the Engineer's opinion, requires to be done by the Contractor before the issue of such certificate. The Engineer-in-charge shall also notify the contractor of any defect in the works affecting completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Certificate of the Completion within twenty one days of completion to the satisfaction of the Engineer of the works so specified and making good any defects so notified.
- 5.2** Similarly, in accordance with the procedure set out in sub-clause (1) of this clause, the Contractor may request and the Engineer shall issue a Certificate of Completion in respect of:
- a) Any section of the Permanent Works in respect of which a separate time for completion is provided in the Contract, and.
 - b) Any substantial part of the Permanent Works which has been both completed to the satisfaction of the Engineer and occupied or used by the Employer.
- 5.3** If any part of the Permanent works shall have been completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the Engineer may issue of such certificate, the Contractor shall be deemed to have undertaken to complete any outstanding work in that part of the Works during the period of Maintenance.

- 5.4 Provided always that a Certificate of completion given in respect of any section or part of the Permanent Works before completion of the whole shall not be deemed to certify completion of any ground or surfaces requiring instatement, unless such Certificates shall expressly so state.

6.0 Delays in Commencement or progress or neglect of work and forfeiture of earnest money , Security deposit and with held amounts:

If, at any time, the Executive Engineer shall be of the opinion that the Contractor is delaying Commencement of the work or violating any of the provisions of the Contractor is neglecting or delaying the progress of the work as defined by the tabular statement. "Rate of progress" in the Articles of Agreement" he shall so advise the Contractor in writing and in the same time demand compliance in accordance with conditions-14.8 of Tender Notice. If the Contractor neglects to comply with such demand within seven days after receipt of such notice, it shall then, or at any time there after, be lawful for the Executive Engineer to take suitable action in accordance with Clause. 60 of A.P.S.S.

7.1 Suspension of the works by the Contractor:

If the Contractor shall suspend the works, or sublet the work in terms of clause 15 of Tender notice without sanction of the Executive Engineer, or in the opinion of the Executive Engineer shall neglect or fail to proceed with due diligence in the performance of his part of the Contract as laid down in the Schedule rate of progress, or if he shall continue to default or repeat such default in the respects mentioned in clause. 27 of the A.P.S.S. the Executive Engineer shall take action in accordance with Clause. 61 of A.P.S.S.

- 7.2 If the Contractor Stops work for 28 days when no Stoppage of work is shown on the Current programme and the Stoppage has not been authorised by the Executive Engineer and not suitable for granting extension of time in accordance with Clause. 14.7 of Tender Notice, the Contract will be terminated under Clause. 61 of A.P.S.S.

- 7.3 If the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the tender Notice under condition - 14.8 the Contract will be Terminated under Clause. 61 of A.P.S.S.

- 7.4 The Executive Engineer may Terminate the Contract for Convenience.

8.1 Extra Items:

Extra items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-charge. The rates for extra items shall be worked out by the Executive Engineer as per the conditions of the contract and the same are binding on the contractor.

Tenderer

Superintending Engineer

- 8.2 The Contractor shall be bound to execute the work of drilling and grouting for foundation stabilization whenever necessary, though it is included or not included in the contract and contingent to the main work.

8.3 Extra Items:

The contractor shall before the 15th day of each month, submit in writing to the Executive Engineer a statement of extra items if any that they may have to execute during the proceeding month failing which the contractor shall not be entitled to claim any.

9. Quality Control:

In addition to the normal inspection by the regular staff incharge of the construction of work, the work will also be inspected by the Executive Engineer/Superintending Engineer Quality control Circle or by the State District, level Vigilance Cell Unit and if any substandard work or excess payments are noticed with reference to measurement books etc., during inspection, recovery will be ordered based on their observations and these will be effected by the Executive Engineer of the execution of the work.

10.1 I.S.I Books and APSS to be kept at site:

A complete set of Indian Standard Specification referred to in "Technical Specifications" and A.P.S.S. shall be kept at site for reference.

10.2 Drawings to be kept at Site:

- a) One set of the drawings furnished to the contractor shall be kept by the contractor on the site and same shall at all reasonable times be available for inspection and use by the Executive Engineer and by any other person authorised by the Executive Engineer in writing.
- b) **Order Book:-** An order book shall be kept at the Department Office on the site of the work. As far as possible, all orders regarding the work are to be entered in this book. All entries shall be signed and dated by the Department Officer in direct charge of the work and by the contractor or by his representative. In important cases, the Executive Engineer or the Superintending Engineer will countersign the entries which have been made. The order book shall not be removed from the work, except with the written permission of the Executive Engineer.
- c) **Variations by way of modification, omissions additions:**
 - (i) For all modifications, omissions from or additions to the drawings sand specifications, the Executive Engineer will issue revised plans, or written instructions, or both and no modification, omission or addition shall be made unless so authorized and directed by the Executive Engineer in writing.

Tenderer

Superintending Engineer

- (ii) The Executive Engineer shall have the privilege of ordering modifications, Omission or additions at any time before the completion of the work and such orders shall not operate to annul those portions of the specifications with which said changes do not conflict.

d) Engineer-in-charge's Decision:

It shall be accepted as in separable part of the Contract that in matters regarding materials, workmanship, removal of improper work, interpretation of the contract drawings and Contract Specification, mode of the procedure and the carrying out of the work, the decision of the Engineer-in-Charge, which shall be given in writing, shall be binding on the contractor.

The Engineer-in-charge's authority applies to technical considerations and does not include decisions regarding sums due to or from the contractor or extension of time.

11. TRAINING OF PERSONNEL:

The contractor, shall, if and as directed by the Engineer-in-charge, provided free of any charge adequate facilities for vocational training of Govt. Officers, students, Engineers, Supervisors, Foremen, skilled work men etc., not exceeding six in number at any one time on the contractor's work. Their salaries, allowances etc., will be borne by the Govt and training schemes will be drawn up by the Executive Engineer in consultation with the contractor.

12.1 Plant and Equipment:

The Contractor shall have sufficient plant, equipment and labour and shall work such hours and shifts as may be necessary to maintain the progress on the work as per the approval progress schedule. The working and shifts hours shall comply with all Govt., regulations in force.

- 12.2 The department shall supply such of the machinery that may be available on hire basis but their supply cannot be demanded as matter of right and no delay in progress can be attributed to such non-supply of the plant by the department and the department cannot be made liable for any damage to the contractor. The contractor shall be responsible for safe custody of the departmental machinery supplied to him (which will be delivered to contractor at the machinery yard at site of work) and he has to make good all damages and losses if any other than fire wear and tear. to bring it to the conditions that existed at the time of issue to the contractor before handing over the same to the department. The hire charges for the machinery handed over to the contractor will be recovered at the rate prevalent at the time of supply. The contractor will have to execute supplemental agreement with Executive Engineer at the time of supply of the machinery.

- 12.3 The acceptance of Departmental machinery on hire is optional to the contractor.

Tenderer

Superintending Engineer

13. STEEL FORMS:

Steel forms should be used for all times involving and use of centering and shuttering. They shall be such that the concrete surface obtained after removal of the centering or shuttering shall be single plane without any dents and undulations.

14. PERSONNEL OF THE CONTRACTOR:

- 14.1 The contractor shall at all times, maintain on the work a staff of qualified Engineers and Supervisors of sufficient experience of similar other jobs to ensure that the quality of work turned out shall be as intended in these specifications and they shall be present at the work-spot during working hours and at the time of inspection by the Deptl. Officers. All orders and direction given to such supervisory or other staff of the contractor to be present on any specified inspection and the contractor shall comply with such requisitions.
- 14.2 The contractor shall supply to the Executive Engineer details of name, qualifications and experience in regard to all supervisory staff employed by the contractor and notify the changes when made and satisfy the Executive Engineer regarding the quality and adequacy of staff thus employed.
- 14.3 The Executive Engineer will have the unquestionable right to ask for change in the quantity and the number of the contractor's supervisory staff and to order removal from the work and connection herewith of any of such staff. The contractor shall comply with such order and effect replacement to the satisfaction of the Executive Engineer.
- 14.4 The contractor shall not without written authorisation permit entry on site of work of any person authorised agents, engaged on hand in connection with work.
- 14.5 All vehicles used by the contractor shall be clearly marked with contractor's name.

15 FOOD GRAINS:

The contractor should make his own arrangements for procuring food grain for his staff and labour. However, the Dept. will try to assist in getting permission for supply of food grains.

16. SECURITY MEASURES:

- 16.1 The contractor shall be responsible for the security of the works for the duration the contract and shall provide and maintain continuously adequate security personnel to fulfill these obligations. The requirements of security

Tenderer

Superintending Engineer

measurements of security measures shall include but not limited to maintenance of order on the site, provision of all lighting, fencing, guard, flagmen, and all other measures necessary for the protection of the works with in the colonies, camps and elsewhere on the site, all materials delivered to the site, all persons employed in connection with the works continuously throughout working and non-working period including nights, Sundays and holidays for duration of the contract.

16.2 Other contractors working on the site concurrently with the contractor will provide security for their own plant and materials. However, their security provisions shall in no way relieve the contractor of his responsibilities in this respect.

16.3 Separate payment for provision of security services will not be made and the cost of this work shall be deemed to have been included in the unit rates and prices included in the contract.

17. LIABILITIES OF THE CONTRACTOR:

17.1 Accident relief and workmen compensation:

The contractor should make all necessary arrangements for the safety of workmen on the occurrence of the accident, which results in the injury or death of any of the workmen employed by the contractor, the contractor shall within 24 hours of the happening of the accident and such accidents should intimate in writing to the concerned Asst. Engineer/Asst. Executive Engineer of the dept. the act so such accident. The contractor shall indemnify Govt. against all loss or damage sustained by the Govt. resulting directly or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines if any payable by Govt. as a consequence of Govt. failure to give notice under workmen's compensation Act or otherwise conform to the provisions of the said Act. In regard to such accident.

17.2 In the event of an accident in respect of which compensation may become payable under the workmen's compensation Act VIII 23 whether by the contractor, by the Govt, it shall be lawful for the Executive Engineer to retain such sum of money which may in the opinion of the Executive Engineer be sufficient to meet such liability. The opinion of the Executive Engineer shall be final in regard to all matters arising under this clause.

17.3 The contractor shall at all times indemnify the Govt. of A.P. against all claims which may be made under the workmen's compensation act or any statutory modification there after or rules there under or otherwise consequent of any damage or compensation payable in consequent of any accident or injuries sustained or death of any workmen engaged in the performance of the business relation to the contractor.

18. CONTRACTOR'S RISKS

Tenderer

Superintending Engineer

All risks of loss or damage to physical property and of personnel injury and death which arise during and in consequence of the performance of the contract other than the expected risks are the responsibility of the contractor.

18.1 Insurance:

Deleted.

19. **USE OF SITE:**

The contractor may be permitted to avail the site at a nominal value of Rs. 1/- (Rupee one only) per acre or part thereof per month on lease for use by him in carrying out the.

Contractor work and when Executive Engineer may consider such use to be necessary for the bonafide purpose of executing works. The contractor shall commence any operation on such lands with the prior approval of the Executive Engineer.

20. **ECOLOGY:**

20.1 The contractor shall preserve all existing vegetations such as trees on adjacent to the sites which do not interfere with construction as determined by the Executive Engineer. The contractor shall take all possible precautions to avoid and unnecessary damage to vegetation, structures and any other Govt. property near by and to trees not to be felled and to structures. Under construction, to the workmen and shall be responsible for any damage if it occur in such operations. All produce from the cutting of trees etc., shall be the property of the Govt. and shall be stacked and placed at the place specified by Executive Engineer. No claim shall be made for such cutting and stacking trees etc., by the contractor. If any produce from such cutting is not handed over to the Dept. by the contractor, he shall be charged for the same at the rates to be decided by the Engineer-in-charge. The recovery of this amount shall be made in full from the intermediate bill that follow.

20.2 The contractor shall not unnecessarily or for use of fuel cut any trees, bushwood grass or other vegetations nor shall set fire to without the written permission to the Executive Engineer. When such permission has been given, the contractor shall take necessary measures to prevent damage and to prevention of fire spreading to surrounding property and shall, be responsible to any such damage if caused.

20.3 **Ecological Balance**

- a) The contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter contaminants, debris and other objectionable pollutants and wastage into river. Such pollutants and waste include earth and earth products, garbage cement, concrete, sewage

Tenderer

Superintending Engineer

effluent, industrial wastages, radio-active substances, mercury, oil and other petroleum products, aggregate processing, mineral salts and thermal pollution. Pollutants and wastes shall be disposed off in a manner and at sites approved by the Engineer- in-charge.

- b) In conduct of construction activities and operations of equipments, the contractor shall utilize such practicable methods and devices as are reasonably available to control prevent and other wise minimize their pollution.
- c) The excessive emission of dust into atmosphere will not be permitted during the manufacture, handling and storage of concrete aggregates and the contractor shall use such methods and equipment as are necessary for collection and disposal or prevention of dust during these operations. The contractor's method of storing and handling comment shall also include means of eliminating atmospheric discharges of dust. Equipment and vehicles hat give objectionable emission of exhaust gases shall no be operated, Burning of materials resulting from cleaning of tree bush, combustible construction materials and rubbish may be permitted only when atmospheric conditions for burning are considered favorable.
- b) Separate payment will not be made for complying with the provisions of this clause and all cost shall be deemed to have been included in the unit rates and prices included in the contract if any provision (S) is not complied with within a reasonable time even after issue of a notice in this respect, the necessary operations would be carried out by Engineer-in-charge at the cost of the contractor. Orders of the Engineer-in-charge in this respect would be final and binding on the contractor.

21. CLEARING OF THE SITE AND REHANDLING OVER:

- 21.1 Government land as may be considered necessary by the Executive Engineer for the execution of the work will be given to the contractor and shall be handed over to the department in good condition and to the complete satisfaction of the Executive Engineer.
- 21.2 All areas of operations including those for his staff and labour colonies handed over to the contractor shall be cleared and handed back to the Executive Engineer. The Contractor shall make good to the satisfaction of the Executive Engineer all damages or alterations made to the area while handling over back of other property or land handed over to him for purpose of the works. Temporary structures may be erected by the contractor, such as storage sheds office, residence etc., for non - commercial use in the land handed over to him at his expenses and with the permission of the Executive Engineer, At the completion of work, the structures should be dismantled at the site cleared and handed over to the Department.

22.1 Vagus/drains,

The contractor shall at all times carry out cross drainage works in a manner creating least interference to the natural flow of water while consistent with the satisfactory execution of work. A temporary diversion shall be formed by the contractor at his cost where necessary, No extra payment shall be made of this work.

22.2 No separate charge for bailing out sub-soils water drainage or locked up rain water for diversion, shoring foundations bailing of pumping water either from excavation of soils from foundation each other incidental will be paid unless otherwise specified in Schedule 'A'. The rates to be quoted by the contractor are for the finished item of work in situ and including all the incidental charges. The borrow pits are also to be de-watered by the contractor himself at his expense, if that should be found necessary.

22.3 The work of diversion arrangements should be carefully planned and prepared by the contractor and forwarded to the Executive Engineer technically substantiating the proposals and approval of the Executive Engineer obtained for execution.

22.4 The contractor has to arrange for bailing out water, protection to the work in progress and the portion of work already completed and safety measures for men and materials and all necessary arrangements to enable the contractor to complete the work.

22.5.1 All the arrangements so required should be carried out and maintained at the cost of the contractor and no separate or additional payments is admissible. Unless otherwise specified in Schedule-A.

22.6 Coffer Dams

Necessary cofferdams and ring bunds have to be constructed at the cost of contractor and same are to be removed after the completion of the work. The contractor has to quote his rate keeping the above in view.

23. POSSESSION PRIOR TO COMPLETION:

The Engineer-in-charge shall have the right to take possession of or use any completed part of work or works or any part thereof under construction either temporarily or permanently. Such possession or use shall not be deemed as an acceptance of any work either completed or not completed in accordance with the contract, within the intent of clause-28 of APSS except where expressly otherwise specified by the Engineer-in-charge.

24. ACCESS TO THE CONTRACTOR'S BOOKS:

Wherever, it is considered necessary by the Engineer-in-charge to ascertain the actual cost of execution of any particular extra item of work or supply of the

Tenderer

Superintending Engineer

plant or material on which advance is to be made or of extra items or claims, he shall direct the contractor to produce the relevant documents such as pay polls, records of personnel, invoices of materials and any or all data relevant to the item or necessary to determine its cost etc., and the contractor shall, when so required furnish all information pertaining to the aforesaid items, in the mode and manner that may be specified by the Engineer-in-charge.

25. POWER SUPPLY :

25.1 The contractor shall make his own arrangements for utilization of power from the Electricity Board at his own cost The contractor will pay the bills or Electricity Board for the cost of power consumed by him.

25.2 The contractor shall satisfy all the conditions of rules required as per Indian Electricity Act 1910 and under Rule- 45(i) of the Indian Electricity Rules, 1956 as amended from time to time and other pertinent rules

25.3 The power shall be used for bonafide Departmental works only.

26. PRIORITY:

The Contractor should make his own arrangement for obtaining the priority certificate, in respect of items required in connection with the execution of the work. The Department will render necessary assistance in this regard.

27. FIRE FIGHTING MEASURES:

27.1 The contractor shall provide and maintain adequate fire fighting equipment and take adequate fire precaution measures for the safety of all personnel and temporary and permanent works and shall take action to prevent damage to destruction by fire of trees, shrubs and grasses.

27.2 Separate payment will not be made for the provision of fire prevention measures and all cost of such work shall be deemed to have been included in unit rates and prices included in the contract.

28 APPROACH ROADS AND ROADS IN WORK AREA:

28.1 In addition to existing public roads and roads constructed by the Govt. if any in work area all additional approach roads and roads inside the work area camp required by the contractor shall be constructed and maintained by him at his own cost.

28.2 It is possible that work at, or in the vicinity of the work site will be performed by the Govt. or by other contractors engaged in work for the Govt. during the contract period. The contractor shall without charge permit the Govt. and such other contractor and other workmen to use the access facilities including roads any other facilities constructed and acquired by the contractor for use in the performance of the works.

Tenderer

Superintending Engineer

28.3 The contractor's heavy construction traffic or tracked equipment shall not traverse any public roads or bridges unless the contractor has made arrangement with the authority concerned. In case contractor's heavy construction traffic or tracked equipment is not allowed to traverse any public roads or bridges and the contractor is required to make some alternative arrangements, no claim on this account shall be entertained.

28.4 The contractor is cautioned to take necessary precautions in transportation of construction materials to avoid accidents.

29. TEMPORARY DIVERSIONS (WORKS ON HIGHWAYS):

29.1 The contractor shall at all times carryout work on the highway in a manner creating least interference to the flow of traffic while consistent with the satisfactory execution of the same. For all works involving improvements to the existing highway, the contractor shall in accordance with the directions of the Engineer-in-charge provide and maintain during the execution of the work a passage for traffic either along a part of the existing carriage way under improvement or a long a temporary diversion constructed close to the highway.

29.2 If in any the opinion of the Engineer-in-charge it is not possible to pass the traffic on part width of the carriage way for any reason, a temporary diversion close to the highway shall be constructed as directed. It shall be paved with the materials such as hard morum, gravel or stone, metal to the specified thickness as directed by the Engineer. In all cases, the alignment gradients and surface type of the diversion including its junctions, shall be approved by the Engineer-in-charge before the highway is closed to traffic.

29.3 The contractor shall take all necessary measures for the safety of traffic during construction and provide erect and maintain such barricades including signs markings, flags, lights and information and protection of traffic approaching or passing through the section of the highway under improvement. Before taken up any construction, an agreed phased programme for the diversion of traffic on the highway shall be drawn up in consultation with the Engineer-in-charge.

29.4 The barricades erected on either side of the carriage way portion of the carriage way closed to traffic, shall be of strong design to resist violation and painted with alternative black and white stripe, Red lanterns or warning lights of similar type shall be mounted on the barricades at night and kept lit throughout from sunset sunrise.

30. RAMPS:

Ramps required during execution may be formed wherever necessary and same are to be removed after completion of the work. No separate payment will be made for this purpose.

31. MONSOON DAMAGES:

Damages due to rain or flood either in cutting or in banks shall have to be made good by the contractor till the final section is handed over to the Dept. The responsibility of desalting and making good the damages due to rain or flood rests with the contractor. No extra rate is payable for such operations and the contractor shall there fore, have to take all necessary precautions to protect the work done during the construction period.

32.a) The contractor shall, at all times during the continuance of the contract, comply fully with all existing. Acts, regulations and by laws including all statutory amendments and re-enactments of state or central Govt. and other local authorities and any other reenactments, notification and acts that may be passed in future either by the state or the central government or local authority, including Indian workmen's compensation Act, 1923. Contract labour (Regulation and Abolition) Act.1970, The child labour prohibition and regulation Act 1986 and Equal remuneration Act. 1976, Factories Act., minimum wages Act. 1948, provident fund regulations, Employees provident fund Act. 1952, schemes made under the same Act. The buildings and other construction workers (Regulation of employment and conditions of service) Act. 1996, the Cess Act. 1996 and also applicable labour regulations, health and sanitary arrangement for workmen, insurance and other benefit and shall keep department identified in case any action is commenced by competent authorities for contravention by the contractor.

a) If the department is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated henceforth on the part of the contractor, the Executive Engineer shall have the right to deduct from any monies due to the contractor, his amount of performance security or recover from the contractor personally any sum required or estimated to be required for making good the loss or damage suffered by the department, responsibility in connection with the employees of the contractor, who shall, in no case, be treated as the employees of the department at any point of time.

33. HEALTH AND SANITARY:

Medical rules for the provision of health and sanitary arrangements for worker employed by the departments and contractors.

The camp and hutting accommodation water supply and sanitary arrangements for the workers and labour employed on the works shall be made by the contractor at his own cost and shall strictly conform to the requirements and to the satisfaction of the Medical and sanitary authorities of the project and in accordance with the medical rules listed below.

I. The contractor's special attention is invited to clauses 37,38,39,50 and 51 of preliminary specifications to the APSS and he is requested to provide at his

Tenderer

Superintending Engineer

own expenses and following amenities to the satisfaction of the Executive Engineer.

- II. First aid:** At the work site there shall be maintained in a readily accessible place first aid appliances and medicines including an adequate supply of sterilized dressings and sterilized cotton wool. The appliances shall be kept in good order. They shall be placed under the charge of a responsible person who shall be readily available during working hours.

Drinking Water: Water of good quality fit for drinking purpose shall be provided for the working people on a scale of not less than 3 gallons per day Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage tank where such drinking water shall be stored.

Every water supply storage shall be at a distance of not less than 15m from any latrine drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and water proof.

A reliable pump shall be fitted to each covered well and the trap door shall be kept closed and opened only for cleaning or inspection which shall be done at least once in a month.

Washing and Bathing Place: Adequate washing and bathing place shall be provided separately for men and women such places shall be kept in clean and drained conditions, bathing or washing should not be allowed in or near any drinking water well.

Latrines and urinals: These shall be provided with in the premises of every work place, latrines and urinal in an accessible place and the accommodation separately for each of them shall be on the following scale or as directed by the Executive Engineer in any particular case.

1. Where the number of persons employed does not exceed 50-2 seats
2. Where the number of persons employed exceeds 50 but not 100-3 seats
3. For every additional 100. -3 seats

If women are employed, separate latrines and urinals, screened from those for men shall be provided on the same scale. Except in work places provided with water flushed latrines connected with a water borne sewage system, all a latrines shall be cleaned at least four times daily. The excreta from the latrines shall be disposed off at the contractor's expense in out of way pits approved by the local public health authority. The contractor shall also employ adequate

Tenderer

Superintending Engineer

number of scavengers and conserves staff to keep the latrines and urinals in a clean condition which shall be cleaned at least four times daily.

Rest shelters: At the work site they shall be provided free of cost. Two suitable sheds one for meals and the other for the use of labour shall be provided.

Crèches: At every work place at which 50 or more women workers are ordinarily employed there shall be provided two huts of suitable size for the use of children under the age of 6 years belonging to such women one hut shall be used for important games and play and other as their bed rooms. The huts shall not be constructed on a lower standards than the following.

1. Thatched roof:
2. Mud floors and walls.
3. Planks spread over the mud floor and covered with matting.

The use of the huts shall be restricted to children, their attendants and mothers of the Children.

Canteens: A cooked food canteen on a moderate scale shall be provided for the benefit of workers, if it considered essential.

Sheds for workmen: The contractor shall provide at his own expense sheds for housing the workmen. The shed shall be on a standard not less than cheap shelter type to live in which the work people in the locality are accustomed to a floor area of about 2m x1.5m per two persons shall be provided. The sheds are to be in rows with 12.5 mm. clear space between sheds and 19 m clear space between rows if conditions permit. The work people's camp shall be laid in units of 400persons each unit to have a clear space of 12m all round.

Land should be acquired temporarily for storing contractor's materials on for his staff. The contractor should make his own arrangements for temporarily acquisition of land enquired for storing his materials and for housing of his staff at his expenses.

34. LABOUR CAMP AND CONTRACTOR'S STAFF COLONY:

- I. The Executive Engineer will hand over the site for the contractor and his labour. All areas of operation including those for his staff and labour colonies handed over to the contractor shall be cleared and handed back as soon as his contract for the work is over. The contractor at the time of handing over back shall make good to the satisfaction of the Executive Engineer any damage or alterations made to the areas or other property or land handed over to him for the purpose of the project work. Temporary structures may be erected by the contractor for storage sheds, offices, residences etc., For non commercial use, with the permission of the Executive Engineer on the land handed over to him at his

own cost. At the completion of the work these structures shall be dismantled site cleared and handed over to the Executive Engineer. The land required for providing amenities will be given free of cost from Government lands if available otherwise the contractor shall have to make his own arrangements.

- II. Labour importation and amenities to labour and contractor's staff shall be to the contractor's account. His quoted rates shall include the expenditure towards importation of labour amenities to labour and staff.

35. Transportation of labour:

- I. The contractor shall make his own arrangements for the daily transportation of the labour and staff from labour camps and staff colonies to the work spot and no labour or staff of the contractor shall stay at the work spot. No extra payment will be made to the contractor.

for the above transportation of the labour and his quoted rates to the work shall include the transportation charges of labour from colonies to workspot and back.

- II. The contractor will at all times duly observe the provisions of employment of children Act. XXVI of 1938 and any enactment or modification of the same and will not employ or permit any person to do any work for the purpose under the provisions of this agreement in contravention of said Act. The contractor hereby agrees to indemnify the department from and against all claims, penalties which may be suffered by the department or any person employed by the department by any default on the part of the contractor in the observance and performance of the provisions of the employment of children Act. XXVI of 1938 or any enactment or modification of the same.

As per Govt. memo No.721/Gr.(1) 81-35. Dated:17-11-1987. The contractor shall obtain the insurance at his own cost to cover the risk on the works to labour engaged by him during period of execution against fire and other usual risks and produce the same to the Executive Engineer concerned before commencement of work.

36. Safety Measures:

1. The contractor shall take necessary precautions for safety of the workers and preserving their health while working in such jobs which require special protection and precautions. The following are some of the measures listed but they are not exhaustive and contractor shall add to and augment these precautions on his own initiative where necessary and shall comply with directions issued by the Executive Engineer or on his behalf from time to time and at all times.
2. Providing protective foot wear to workers situations like mixing and placing of mortar or concrete sand in quarries and places where the work is done under much wet conditions.

Tenderer

Superintending Engineer

3. Providing protective head wear to workers at places like underground excavations to protect them against rock falls
4. Providing masks to workers at granulators or at other locations where too much fine dust is floating about and sprinkling water at frequent intervals by water houses an all stone crushing area and storage bins abate to dust.
5. Getting the workers in such jobs periodically examined for chest trouble due to too much breathing in to fine dust.
6. Taking such normal precautions like fencing and Lightening in excavation of trenches, not allowing rolls are metal parts of useless timber spread around, making danger areas for blasting providing whistles etc.,
7. Supply workmen with proper belts, ropes etc., when working in precarious slopes etc.,
8. Avoiding named electrical wire etc., as they would electrocute the works.
9. Taking necessary steps towards training the workers concerned on the machinery before they are allowed to handle them independently and taking all necessary precautions in around the areas where machines hoists and similar units are working.

37. FAIR WAGE CLAUSE:

1. The contractor shall pay not less than fair wages to labourers engaged by him on the work.
2. "Fair" wages means wages whether for times of piecework notified by the Government from time in the area in which the work is situated.
3. The contractor shall not with-standing the revisions of any contract to the contrary cause to be paid labour, in directly engaged on the work including any labour engaged by the sub-contractor in connection with the said work, as if the labourers had been directly employed by him.
4. In respect of labour directly or indirectly employed in the works for the purpose of the contractors part of the agreement the contractor shall comply with the rules and regulations on the maintenance of suitable records prescribed for this purpose from time to time by the Government. He shall maintain his accounts and vouchers on the payment of wages to the labourers to the satisfaction of the Executive Engineer.
5. The Executive Engineer shall have the right to call for such record as required to satisfy himself on the payment of fair wages to the labourers and shall have the right to deduct from the contract amount a suitable, amount, for making good the loss suffered by the worker or workers by reason of the "fair wages" clause to the workers.

Tenderer

Superintending Engineer

6. The contractor shall be primarily liable for all payments to be made and for the observance of the regulations framed by the Govt. from time to time without prejudice to his right to claim indemnity from his sub-contractors.
7. As per contract labour (Regulation and abolition) Act, 1970 the contractor has to produce the license obtained from the licensing officers of the labour department along with the tender or at the time of agreement.
8. Any violation of the conditions above shall be deemed to be a breach of his contract.
9. Equal wages are to be paid for both men and women if the nature of work is same and similar.
10. The contractor shall arrange for the recruitment of skilled and unskilled labour local and imported to the extent necessary to complete the work within the agreed period as directed by the Executive Engineer in writing.

Power of Attorney for Lead Member of Joint Venture

(To be executed on appropriate stamp paper)

Whereas the (the “**Employer**”) has invited Bids from interested parties for the Project (the “**Project**”).

Whereas, M/s....., M/s. and M/s.

(collectively the “**Joint Venture Partners**”) being Members of the Joint Venture are interested in bidding for the Project in accordance with the terms and conditions of the Bid Documents in respect of the Project, and

Whereas, it is necessary for the Members of the Joint Venture to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the Joint Venture all acts, deeds and things as may be necessary in connection with the Joint Venture’s Bid for the Project and its execution.

NOW THEREFORE KNOW ALL MEN BY THESE PRESENTS

We, M/s. having our registered office at, and M/s. having our registered office at, (hereinafter collectively referred to as the “Principals”) do hereby irrevocably designate, nominate, constitute, appoint and authorise M/s. having its registered office at, being one of the Members of the Joint Venture, as the Lead Member and true and lawful attorney of the Joint Venture (hereinafter referred to as the “Attorney”). We hereby irrevocably authorize the Attorney (with power to sub-delegate) to conduct all business for and on behalf of the Joint Venture and any one of us during the bidding process and, in the event the Joint Venture is awarded the Contract, during the execution of the Project and in this regard, to do on our behalf and on behalf of the Joint Venture, all or any of such acts, deeds or things as are necessary or required or incidental to the qualification of the Joint Venture and submission of its Bid for the Project, including but not limited to signing and submission of all applications, bids and other documents and writings, participating in Pre-Bid and other conferences, respond to queries, submit information/ documents, sign and execute Contracts and undertakings consequent to acceptance of the Bid of the Joint Venture and generally to represent the Joint Venture in all its dealings with the Employer, and/ or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the Joint Venture’s Bid for the Project and/ or upon award thereof during the period of execution of the Contract.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us / the Joint Venture.

IN WITNESS WHEREOF WE THE PRINCIPALS ABOVE NAMED HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS DAY OF 2019

Tenderer

Superintending Engineer

For

(Signature, name, designation and address of the first Non-Lead Member)

Witnesses:

1.

(Notarized)

2.

Accepted

.....

(Signature)

(Name, title and address of the Attorney / Lead Member)

Notes:

- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
- The Contractor should submit along with the Power of Attorney, the extract of the charter documents and documents such as the board or shareholders' resolution / authorization in favour of the persons executing this Power of Attorney on behalf of the Non-Lead Members / Lead Member and the Memorandum and Articles of Association of the Non-Lead Members / Lead Member.
- For a Power of Attorney executed and issued overseas, the document should also be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued and should be duly stamped on receipt in India. However, the Power of Attorney provided by the Contractor from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.

Tenderer

Superintending Engineer

Joint Venture Agreement

(To be executed on Stamp paper of appropriate value)

THIS JOINT VENTURE AGREEMENT is entered into on this the day of 20...

AMONGST

1. M/s..... Limited, a company incorporated under the Companies Act, 1956 and having its registered office at (here in after referred to as the "First Party" which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

2. M/s..... Limited, a company incorporated under the Companies Act, 1956 and having its registered office at (hereinafter referred to as the "Second Party" which expression shall, unless repugnant to the context include its successors and permitted assigns)

The above mentioned First Party & Second Party are collectively referred to as the "Parties" and each is individually referred to as a "Party"

WHEREAS,

- (A) represented by its (hereinafter referred to as the "**Employer**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited Bids (the "**Bids**") by its Bid Documents for qualification and selection of Contractors for Project (the "**Project**").
- (B) The Parties are interested in jointly bidding for the Project as members of a Joint Venture (JV) and in accordance with the terms and conditions of the Bid Document in respect of the Project, and
- (C) It is a necessary condition under the Bid Document that the members of the Joint Venture shall enter into a Joint Venture Agreement and furnish a copy thereof with the Bid.

NOW IT IS HEREBY AGREED as follows:

1. Definitions and Interpretations

In this Agreement, the capitalised terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the Bid Documents

2. Joint Venture

- 2.1 The Parties do hereby irrevocably constitute a Joint Venture (the "**Joint Venture**") for the purposes of jointly participating in the Bidding Process for the Project.

Tenderer

Superintending Engineer

- 2.2 The Parties hereby undertake to participate in the Bidding Process only through this Joint Venture and not individually and/ or through any other joint venture / Joint Venture constituted for this Project, either directly or indirectly or through any of their Associates.

3. Role of the Parties

The Parties hereby undertake to perform the roles and responsibilities as described below:

- (a) The First Party shall be the Lead Member of the JV and shall have the Power of Attorney from all members for conducting all business for and on behalf of the JV during the Bidding Process and during the execution of the Contract.
- (b) The Second Party shall be the member of the JV; and

4. Joint and Several Liability

The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Project and in accordance with the terms of the Bid Documents and the Contract, under and in accordance with the Contract to be entered into with the Employer.

5. Shares in the JV

- 5.1 The Parties agree that the proportion of shares among the Parties in the JV shall be as follows:

First Party: (Lead Member: At least 51%)

Second Party:

6. Representation of the Parties

Each Party represents to the other Parties as of the date of this Agreement that:

- (a) Such Party is duly organised, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;
- (b) The execution, delivery and performance by such Party of this Agreement has been authorized by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Joint Venture Member is annexed to this Agreement, and will not, to the best of its knowledge:
 - (i) require any consent or approval not already obtained;
 - (ii) violate any Applicable Law presently in effect and having applicability to it;

- (iii) violate the Memorandum and Articles of Association, by-laws or other applicable organizational documents thereof;
 - (iv) violate any clearance, permit, concession, grant, license or other governmental authorization, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
 - (v) create or impose any liens, mortgages, pledges, claims, security interests, charges or encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;
- (c) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and
- (d) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Affiliates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfillment of its obligations under this Agreement.

7. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect during the Contract Period and in accordance with the Contract to be entered into with the Employer, in case the Project is awarded to the Joint Venture. However, in case the Joint Venture is either not qualified for the Project or does not get selected for award of the Project, the Agreement will stand terminated.

8. Miscellaneous

8.1 This Joint Venture Agreement shall be governed by laws of India.

8.2 The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Employer.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED

For and on behalf of the First Party

By

Signature

Tenderer

Superintending Engineer

Name

Designation

Address

SIGNED, SEALED AND DELIVERED

For and on behalf of the Second Party

By

Signature

Name

Designation

Address

In the presence of :

Witnesses :

1.

2.

Notes:

- The mode of execution of the Joint Venture Agreement should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
- The Contractor should submit along with the Joint Venture Agreement, the extract of the charter documents and documents such as the board or shareholders' resolution / authorization in favour of the persons executing this Agreement on behalf of the Parties and the Memorandum and Articles of Association of the Parties.
- For an Agreement executed and issued overseas, the document should also be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued and should be duly stamped on receipt in India.

Tenderer

Superintending Engineer

MILESTONE PROGRAMME

Name of the work: Construction of Joladarasi Reservoir across Kundu river of 0.8 TMC near Joladarasi village, Koilakuntla Mandal, Kurnool Dist

Sl.No	Description of Work			Total Value	1 st Milestone			2 nd Milestone		
					Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
1	Investigation									
	Physical		Programme	1 Job						
	Financial	Rs. Lakhs	Programme	17.45	5.00	3.00	3.00	6.45		
2	Earth work Excavation									
	Physical	Cum.	Programme	1430325	50000	50000	200000	200000	200000	200000
	Financial	Rs. Lakhs	Programme	2331.16	82.00	81.00	326.00	326.00	326.00	326.00
3	Concrete									
	Physical	Cum.	Programme	44331				2000	2000	2000
	Financial	Rs. Lakhs	Programme	2901.31				131.00	131.00	131.00
4	Formation of Earth bund									
	Physical	Cum.	Programme	1759218				90000	90000	90000
	Financial	Rs. Lakhs	Programme	11542.33				590.500	590.500	590.500
5	Mechanical									
	Physical	MT	Programme	1157	50	50	50	50	50	50
	Financial	Rs. Lakhs	Programme	1545.00	67.00	67.00	67.00	67.00	67.00	67.00
6	RSD									
	Physical	Sqm	Programme	374884						
	Financial	Rs. Lakhs	Programme	2196.05						
7	View tower cum guard room and DG Room with DG set									
	Physical		Programme	1 Job						
	Financial	Rs. Lakhs	Programme	30.03				3.34	3.34	3.34
8	Electrification									
	Physical	Cum.	Programme	1 Job						
	Financial	Rs. Lakhs	Programme	219.70				13.00	13.00	13.00
9	Costuction of Pylon									
	Physical	Cum.	Programme	1 Job						
	Financial	Rs. Lakhs	Programme	12.13						
			ECV	20795.16	154.00	151.00	396.00	1137.29	1130.84	1130.84

MILESTONE PROGRAMME

Name of the work: Construction of Joladarasi Reservoir across Kundu river of 0.8 TMC near Joladarasi village, Koilakuntla Mandal, Kurnool Dist

Sl.No	Description of Work			Total Value	3 rd Milestone			4 th Milestone		
					Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21
1	Investigation									
	Physical		Programme	1 Job						
	Financial	Rs. Lakhs	Programme	17.45						
2	Earth work Excavation									
	Physical	Cum.	Programme	1430325	130325					
	Financial	Rs. Lakhs	Programme	2331.16	212.16					
3	Concrete									
	Physical	Cum.	Programme	44331	3000	3000	3000	3000	3000	2000
	Financial	Rs. Lakhs	Programme	2901.31	196.00	196.00	196.00	196.00	196.00	131.00
4	Formation of Earth bund									
	Physical	Cum.	Programme	1759218	90000	90000	90000	90000	90000	90000
	Financial	Rs. Lakhs	Programme	11542.33	590.500	590.500	590.500	590.500	590.500	590.500
5	Mechanical									
	Physical	MT	Programme	1157	50	50	50	50	50	50
	Financial	Rs. Lakhs	Programme	1545.00	67.00	67.00	67.00	67.00	67.00	67.00
6	RSD									
	Physical	Sqm	Programme	374884	21000	21000	21000	21000	21000	21000
	Financial	Rs. Lakhs	Programme	2196.05	123.00	123.00	123.00	123.00	123.00	123.00
7	View tower cum guard room and DG Room with DG set									
	Physical		Programme	1 Job						
	Financial	Rs. Lakhs	Programme	30.03	3.34	3.34	3.34	3.34	3.34	0
8	Electrification									
	Physical	Cum.	Programme	1 Job						
	Financial	Rs. Lakhs	Programme	219.70	13.00	13.00	13.00	13.00	13.00	0.00
9	Costuction of Pylon									
	Physical	Cum.	Programme	1 Job						
	Financial	Rs. Lakhs	Programme	12.13						
			ECV	20795.16	1205.00	992.84	992.84	992.84	992.84	911.50

MILESTONE PROGRAMME

Name of the work: Construction of Joladarasi Reservoir across Kundu river of 0.8 TMC near Joladarasi village, Koilakuntla Mandal, Kurnool Dist

Sl.No	Description of Work		Total Value	5 th Milestone			6th Milestone		
				Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
1	Investigation								
	Physical		Programme	1 Job					
	Financial	Rs. Lakhs	Programme	17.45					
2	Earth work Excavation								
	Physical	Cum.	Programme	1430325			200000	200000	
	Financial	Rs. Lakhs	Programme	2331.16			326	326	
3	Concrete								
	Physical	Cum.	Programme	44331	1000	1000	2700	2700	2700
	Financial	Rs. Lakhs	Programme	2901.31	65.00	65.00	177.00	177.00	177.00
4	Formation of Earth bund								
	Physical	Cum.	Programme	1759218	60000	60000	90000	90000	90000
	Financial	Rs. Lakhs	Programme	11542.33	394.000	394.000	590.50	590.50	590.50
5	Mechanical								
	Physical	MT	Programme	1157	50	50	50	50	50
	Financial	Rs. Lakhs	Programme	1545.00	67.00	67.00	67.00	67.00	67.00
6	RSD								
	Physical	Sqm	Programme	374884	10000	10000	26000	26000	26000
	Financial	Rs. Lakhs	Programme	2196.05	60.00	60.00	152.00	152.00	152.00
7	View tower cum guard room and DG Room with DG set								
	Physical		Programme	1 Job					
	Financial	Rs. Lakhs	Programme	30.03	0	0	3.31		
8	Electrification								
	Physical	Cum.	Programme	1 Job					
	Financial	Rs. Lakhs	Programme	219.70	0.00	0.00	13.00	13.00	13.00
9	Costuction of Pylon								
	Physical	Cum.	Programme	1 Job					
	Financial	Rs. Lakhs	Programme	12.13					
			ECV	20795.16	586.00	586.00	1002.81	1325.50	999.50

MILESTONE PROGRAMME											
Name of the work: Construction of Joladarasi Reservoir across Kundu river of 0.8 TMC near Joladarasi village, Koilakuntla Mandal,Kurnool Dist											
Sl.No	Description of Work			Total Value	7 th Milestone			8 th Milestone			Total Value
					Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	
1	Investigation										
	Phisical		Programme	1 Job							
	Financial	Rs. Lakhs	Programme	17.45							17.45
2	Earth work Excavation										
	Phisical	Cum.	Programme	1430325							
	Financial	Rs. Lakhs	Programme	2331.16							2331.16
3	Concrete										
	Phisical	Cum.	Programme	44331	2700	2700	2700	431			
	Financial	Rs. Lakhs	Programme	2901.31	177.00	177.00	177.00	28.31			2901.31
4	Formation of Earth bund										
	Phisical	Cum.	Programme	1759218	90000	90000	90000	90000	90000	19218	
	Financial	Rs. Lakhs	Programme	11542.33	590.50	590.50	590.50	590.50	590.50	125.335	11542.33
5	Mechanical										
	Phisical	MT	Programme	1157	50	50	50	50	50	7	
	Financial	Rs. Lakhs	Programme	1545.00	67.00	67.00	67.00	67.00	67.00	4.00084	1545.00
6	RSD										
	Phisical	Sqm	Programme	374884	26000	26000	26000	26000	20884		
	Financial	Rs. Lakhs	Programme	2196.05	152.00	152.00	152.00	152.00	122.05		2196.05
7	View tower cum guard room and DG Room with DG set										
	Phisical		Programme	1 Job							
	Financial	Rs. Lakhs	Programme	30.03							30.03
8	Electrification										
	Phisical	Cum.	Programme	1 Job							
	Financial	Rs. Lakhs	Programme	219.70	13.00	13.00	13.00	13.00	11.7045	0	219.70
9	Costuction of Pylon										
	Phisical	Cum.	Programme	1 Job							
	Financial	Rs. Lakhs	Programme	12.13						12.13	12.13
			ECV	20795.16	999.50	999.50	999.50	850.81	791.25	141.46	20795.16

Abbreviations:

The following are the commonly used abbreviations in this document

1. BG- Bank Guarantee
2. CC- Cement Concrete
3. CFMS – Comprehensive Financial Management System
4. Cum- Cubic Metre
5. DD- Demand Draft
6. ECV-Estimated Contract Value
7. EMD- Earnest Money Deposit
8. GST- goods and services tax
9. JV – Joint Venture
- 10.L-1: Lowest Bidder-1
- 11.NIT- Notice Inviting Tender
- 12.PAN - Permanent Account Number
- 13.RCC- Reinforced Cement Concrete
- 14.RM/RMT- Running Meters
- 15.TCV – Tender Contract Value
- 16.LS- Lumpsum
- 17.RTGS-Real Time Gross Settlement
- 18.NEFT - National Electronic Funds Transfer
- 19.APTS – Andhra Pradesh Technological Services
- 20.J.V – Joint Venture
- 21.PWD- Public Works Department
- 22.CPWD – Central Public Works Department
- 23.PCC – Plain Cement Concrete
- 24.HP – Horse Power
- 25.KVA-KiloVolt Ampere

- 26.APSS – Andhra Pradesh Standard Specifications
- 27.IS – Indian Standard
- 28.MORT&H – Ministry of Road Transport and Highways
- 29.NAC – National Academy of Construction
- 30.CA- Course Aggregate
- 31.FA – Fine Aggregate
- 32.PVC - polyvinyl chloride
- 33.MOU – Memorandum of Understanding
- 34.TMT- Thermo Mechanically Treated steel
- 35.POL – Petroleum Oil & Lubricants
- 36.MT-Metric Tonne
- 37.IOC – Indian Oil Corporation
- 38.HSD – High Speed Diesel
- 39.CRMB - Crumb Rubber Modified Bitumen
- 40.BIS – Bureau of Indian Standard

FORMS OF TENDER QUALIFICATION INFORMATION
QUALIFICATION INFORMATION ANNEXURE-I
CHECKLIST TO ACOMPANY THE TENDER

Sl. No	Description	Submitted in Cover 'A'	Page No. (see Note below)
1	2	3	4
1	Copy of Contractors valid Registration under appropriate Class as per Tender Notice	Yes / No	
2	Furnishing of Income tax clearance certificate is dispensed with. However the contractors shall furnish their copy of permanent Account Number (PAN) Card and copy of Latest Income tax reruns submitted along with proof of receipt.	Yes / No	
3	Copies of GST Registration	Yes / No	
4	Details of value of Civil Engineering works executed in the last TEN financial years in the Tenderers name in Statement-I with supporting certificates.	Yes / No	
5	Details of similar works completed as Prime Contractor during the last TEN financial Years in Statement-II with supporting certificates.	Yes / No	
6	Quantities of work executed as Prime Contractor in the last TEN financial years - in Statement – III with supporting certificates.	Yes / No	
7	A detail of existing commitments i.e., works on hand in Statement-IV with Supporting Certificates.	Yes / No	
8	Availability of critical equipment in Statement –V.	Yes / No	
9	Availability of Key personnel in Statement.VI.	Yes / No	
10	Litigation history in Statement –VII.	Yes / No	
11	Proof of liquid assets in the shape of Solvency certificates etc., for the required amount.	Yes / No	
12	List of certificates enclosed	Yes / No	

Notes:-

1. All the statements copies of the certificates, documents etc., enclosed to the Technical bid shall be given page numbers on the right corner of each certificate, which will be indicated in column (4) against each item. The statements furnished shall be in the formats appended to the tender document. The information shall be filled-in by the Tenderer in the checklist and statements I to VII, and shall be enclosed to the Technical bid for the purposes of verification as well as evaluation of the Tenderers Compliance to the qualification criteria as provided in the Tender document. All the Certificates, documents, statements as per check-list shall be submitted by the Tenderer in sealed Cover "A".

DECLARATION

I / We _____ have gone through carefully all the Tender conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or determination of contract or any other action deemed fit, taken by, the Department against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

I / WE hereby declare that, I / WE have not been blacklisted / debarred / Suspended / demoted in any department in Andhra Pradesh or in any State due to any reasons.

Signature of the Tenderer

STATEMENT – I

Details of value of Civil Engineering works executed in each year during the last TEN financial years by the Tenderer.

Sl. No.	Financial Year	Value in Rupees
1	2010-11	
2	2011-12	
3	2012-13	
4	2013-14	
5	2014-15	
6	2015-16	
7	2016-17	
8	2017-18	
9	2018-19	
10	2019-20	

- a) Attach certificate(s) issued by the Executive Engineer concerned and counter signed by Superintending Engineer showing work wise / year wise value of work done in respect of all the works executed by the Tenderer during last ten years **OR**
- b) Certificate from Chartered Accountant supported with Annual Balance Sheet tallying with I.T. Clearance certificate.

Signature of the Tenderer

STATEMENT – II

Details of similar works completed in the Name of the Tenderer during the last TEN financial years.

Sl. No	Name of the work	Address of Agt. Concluding Authority	Agreement No. & dated.	Value of Contract	Stipulated period of completion
1	2	3	4	5	6

Actual date of completion	Value of work done year wise during the last 'TEN' years.										Total value of work done
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	6 th Year	7 th Year	8 th Year	9 th Year	10 th Year	
7	8	9	10	11	12	13	14	15	16	17	18

Attach certificates issued by the Executive Engineer concerned and countersigned by the Superintending Engineer showing work wise / year wise value of work done and date of completion.

Signature of the Tenderer

STATEMENT – III

Physical quantities executed by the Tenderer in the last TEN financial years. [work wise / year wise].

Sl. No	Financial Year	Name of work	Agt.No	Quantities executed		
				Earthwork Excavation	Embankment	Concrete
1	2	3	4	5	6	7
1	2010-11					
2	2011-12					
3	2012-13					
4	2013-14					
5	2014-15					
6	2015-16					
7	2016-17					
8	2017-18					
9	2018-19					
10	2019-20					

Attach certificates in support of the above quantities issued by the Executive Engineer concerned and countersigned by the Superintending Engineer duly showing the quantities executed year wise.

Signature of the Tenderer

STATEMENT – IV

Details of Existing Commitments

Details of works on hand and, yet to be completed as on the date of submission of the Tender and works for which Tender s have been submitted are to be furnished.

A) Existing Commitments on ongoing works:

SI.No	Name of work	Address of Agt. Concluding authority	Agt. No. & Date	Value of contract	Stipulated period of completion	Value of work done so far.	Balance Value of works to be completed	Anticipated date of completion	Updated value of balance work
1	2	3	4	5	6	7	8	9	10

Attach certificates issued by the Executive Engineer concerned and countersigned by Superintending Engineer, indicating the balance work to be done, and likely period of completion.

Signature of the Tenderer

B) Details of works for which Tenders are submitted [awarded / likely to be awarded]

Sl. No.	Name of work	Address of Agt. Concluding authority	Estimated value of work	Stipulated period of completion	Date on which tender was submitted	Present stage of Tender
1	2	3	4	5	6	7

Signature of the Tenderer

STATEMENT – V

Availability of Critical Equipment

The Tenderer should furnish the information required below, regarding the availability of the equipment, required for construction / quality control.

Sl. No.	Details of Equipment	Number required	Number	
			Owned	Leased
1	2	3	4	5

Signature of the Tenderer

The Tenderer has to submit with a certificate issued by the Executive Engineer (or) a Declaration on non judicial stamp paper worth Rs 100/- as prescribed in Statement-V given below along with sufficient proof of document in support of owning such as Invoice / Certificate of Registration by competent authority in support of the critical equipment..

DECLARATION

I / We _____, do hereby solemnly affirm and declare that I /we own the following equipment for using on the subject work and also declare that I / We will abide by any action such as disqualification or determination of Contract or blacklisting or any action deemed fit, if the department detects at any stage that I/we do not possess the equipment listed below.

Sl. No.	Details of each Equipment	Year of purchase	Regn. Number	Capacity	Any other data.	Is it in working condition
1	2	3	4	5	6	7

Signature of the Tenderer

STATEMENT – VI**Availability of Key Personnel**

Qualification and experience of Key Personnel proposed to be deployed for execution of the Contract.

Sl. No	Name	Designation	Qualification	Total Experience	Working with the Tenderer since.
1	2	3	4	5	6

Signature of the Tenderer

STATEMENT – VII

Information on litigation history in which Tenderer is the Petitioner.

Sl. No	Case No. / Year	Court where filed	Subject Matter / Prayer in the case	Respondent s i.e., SE / CE	Present Stage
1	2	3	4	5	6

Signature of the Tenderer

FORM – XX – CHECKLIST AND SELF DECLARATION FOR SELECTED PRE-QUALIFICATION CRITERIA (TECHNICAL AND COMMERCIAL)

Note: This document does **NOT** provide an exhaustive list of all the eligibility, technical and commercial requirements for this tender and is to be read in conjunction with the eligibility, technical and commercial requirements as specified in the RFP. Providing proof for the parameters specified only in this Form shall **NOT** guarantee qualification of the bidder. Supporting documents shall be provided for **ALL** the eligibility, technical and commercial requirements specified in this Form as well as the RFP.

Instructions to the Bidder:

- (i) This Form provides selected minimum technical and commercial requirements for each bidder to be awarded the tendered works.
- (ii) The bidder is expected to declare values against each of the identified criteria and to sign the declaration provided at the end of this Form.
- (iii) The declared values (by bidders) should meet the minimum requirements mentioned.
- (iv) The signature shall be of the person authorized with the Power of Attorney to sign on behalf of the firm/ lead JV partner.
- (v) In case of a JV, the combined resources will be considered unless otherwise specified. This is subject to meeting the requisite terms and conditions specified in the RFP
- (vi) All self-declarations are to be supported with relevant validating documents, some of which may have been identified in the RFP.
- (vii) The bidder is advised to provide clear proof for all eligibility, technical and commercial requirements and to provide Letters of Explanation where he deems that further justification is required.

The Technical and Commercial Criteria defined below are subject to additional terms and conditions specified in the RFP and should not be construed to be standalone representatives of determination of qualification.

Technical Pre-Qualification Criteria

1. The bidder should have satisfactorily completed similar nature of works of value not less than **Rs. 51,98,78,873/-** as a prime contractor in any one year during last ten Financial years **(2010-11 to 2019-20)**. This value will be updated by giving 10% simple weight age per year to bring them to **2019-20** price level.

Activity	Minimum Requirement in a year during last Ten Financial Years (2010-11 to 2019-20)	Declared Value
Earth Work Excavation	3,57,581 Cum	
Embankment	4,39,805 Cum	
Concrete	11,083 Cum	

2. Commercial Pre-Qualification Criteria

Criterion	Minimum Requirement	Declared Value
Satisfactory completion of similar works ¹ of minimum value ²	INR Rs.51,98,78,873	
Liquid assets or credit facilities or Solvency Certificate from Indian Nationalized or Scheduled Banks of value not less than	INR Rs.36,51,00,000	
Assured available Bid capacity as per formula (3AN-B)	Greater than INR Rs.207,95,15,493/-	

Declaration and Undertaking:

I hereby declare that all the above furnished information is true to the best of my knowledge and is validated by relevant supporting documents provided with this Form. I am also aware that in case of any variations between the supporting documents or field visits and the above furnished information, the firm I represent is liable to be disqualified from the current tender.

Signed:

Name and Designation:

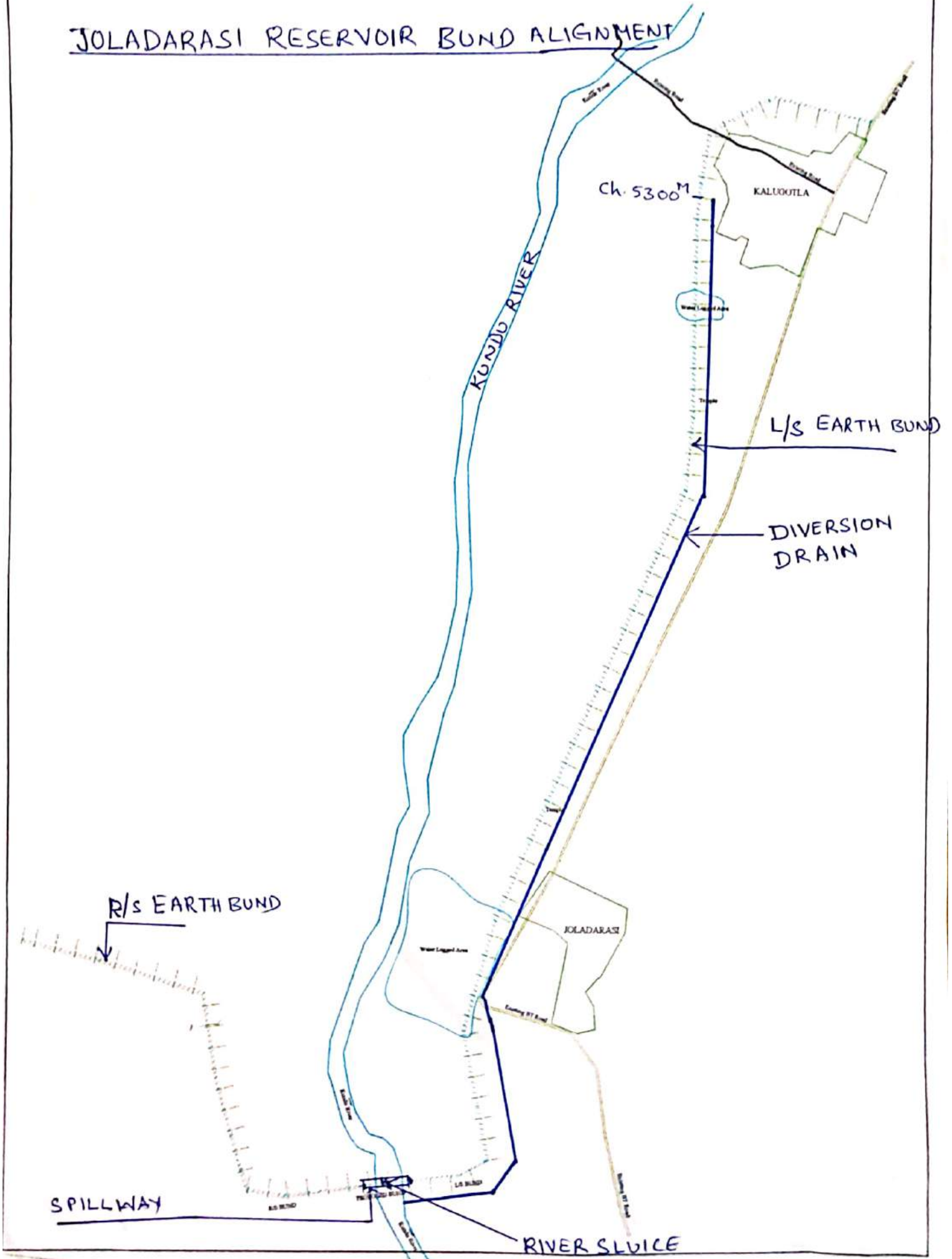
Date:

Place:

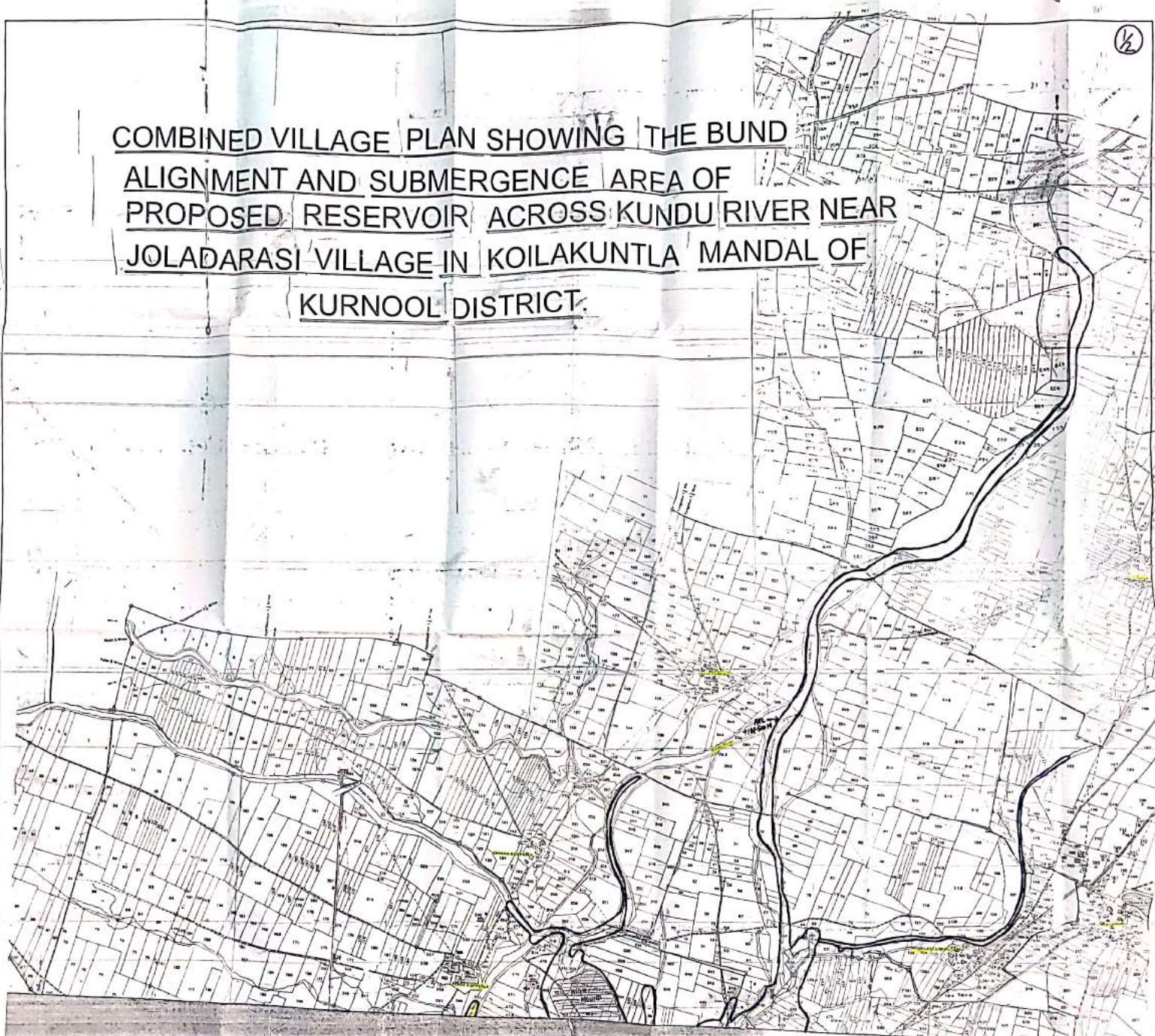
¹ Similar works means, construction of Irrigation projects / Irrigation projects with water conveyance system.

² In any one year as a prime contractor during last 10 (ten) years (2010-11 to 2019-20) up dated by giving 10% simple weightage per year to bring them to 2019-20 price level.

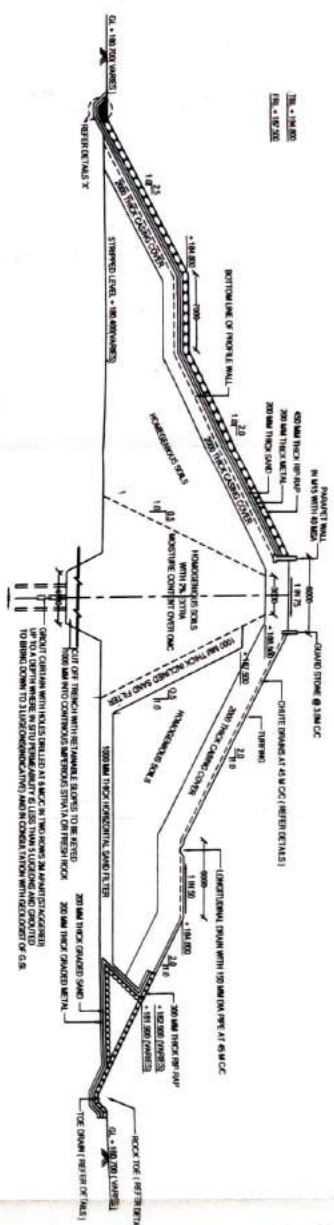
JOLADARASI RESERVOIR BUND ALIGNMENT



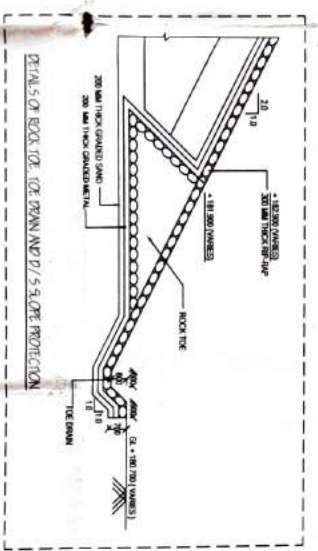
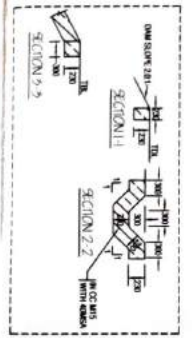
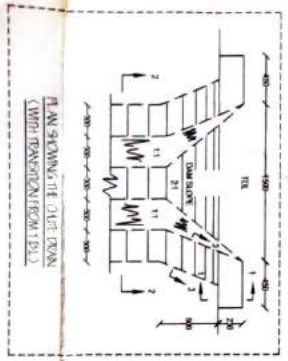
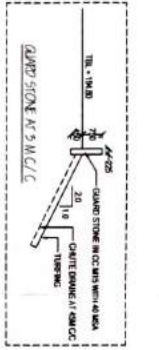
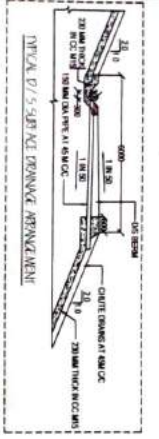
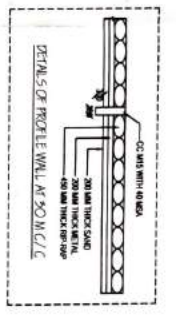
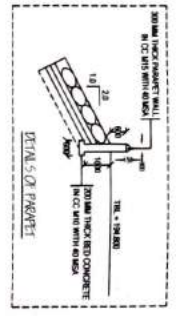
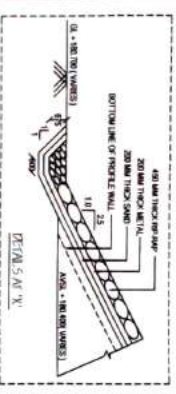
COMBINED VILLAGE PLAN SHOWING THE BUND
ALIGNMENT AND SUBMERGENCE AREA OF
PROPOSED RESERVOIR ACROSS KUNDU RIVER NEAR
JOLADARASI VILLAGE IN KOILAKUNTLA MANDAL OF
KURNOOL DISTRICT.



THE L. 1000
THE L. 1000



TYPE A: EARTH RETAINING WALL OF HEIGHT 4.00 M (CONNECTING SETBACK ROAD)



SPECIFICATION DRAWING ONLY
NOT FOR EXECUTION

TABLE 1: SUMMARY OF MATERIALS

ITEM	DESCRIPTION	UNIT	QUANTITY	REMARKS
1	Concrete	m³	100.00	
2	Reinforcement Steel	kg	1000.00	
3	Gravel	m³	50.00	
4	Drainage Pipe	m	10.00	

TABLE 2: SUMMARY OF DIMENSIONS

ITEM	DESCRIPTION	UNIT	VALUE	REMARKS
1	Height	m	4.00	
2	Length	m	10.00	
3	Width	m	0.50	
4	Base Width	m	1.00	

1. ALL DIMENSIONS ARE IN METERS AND DECIMALS THEREOF. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHALL BE TO FACE.

2. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

3. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

4. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

5. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

6. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

7. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

8. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

9. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.

10. THE EARTH RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) AND THE SPECIFICATIONS OF THE INDIAN STANDARD CODES (IS) FOR CONCRETE AND REINFORCEMENT STEEL.



Project: Road Transport and Highways
Location: New Delhi
Date: 10/10/2024

TABLE 3: SUMMARY OF PROJECT INFORMATION

ITEM	DESCRIPTION	UNIT	VALUE	REMARKS
1	Project Name		Earth Retaining Wall	
2	Location		New Delhi	
3	Client		Government of India	
4	Design		10/10/2024	
5	Drawn		10/10/2024	
6	Checked		10/10/2024	
7	Approved		10/10/2024	

4. SPECIFICATIONS FOR ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT B.I.S. SPECIFICATIONS OR EQUIVALENT SPECIFICATIONS WHERE EVER B.I.S. SPECIFICATIONS ARE NOT AVAILABLE.
5. THE FOUNDATION TREATMENT NAMELY CURTAIN AND CONSOLIDATION GROUTING INDICATED IS ONLY TENTATIVE. THE DEPTHS, SPACING ARE SUBJECT TO CORROBORATION BY GEOLOGIST OR G.S.I
6. THE ENERGY DISSIPATION ARRANGEMENT & C.V. VALUE SHOWN IN THIS DRAWING IS TENTATIVE WHICH IS SUBJECT TO CORROBORATION BY MODEL STUDIES.
7. FOR DESIGNS OF GATE GROOVES, EN PARTS GATE AND HOIST ETC. SEPARATE MECHANICAL DRAWINGS SHALL BE REFERRED.

8. THE FOLLOWING SPECIFICATIONS SHALL BE ADOPTED FOR VARIOUS COMPONENTS OF SPILLWAY

- a) 2000 THICK U/S FACE C.C. M 20 WITH 80 M.S.A
- b) HEARTING OF BODY WALL IN C.C. M 15 WITH 80 M.S.A
- c) PERS. C.C. M 20 WITH 80 M.S.A
- d) SPILLWAY CREST AND D/S GRADICES IN C.C. M 20 WITH 80 M.S.A

9. THE MAX. COMPRESSIVE STRESS AT FOUNDATION GRADE IS WORKED OUT TO BE ABOUT 7500 KN/M² AND IT SHALL BE ENSURED BEFORE EXECUTION THAT THE FOUNDATION CAN TAKE THE ABOVE STRESS BY ADEQUATE LAB AND INSITU TESTS.

10. NECESSARY PRE COOLING AND POST COOLING METHODS FOR TEMPERATURE CONTROL AND PRE DESIGN MEASURES FOR ACHIEVING TEMP. CONTROL MAY BE DONE AS PER IS: 145-91-97.

11. FOR THE STABILITY OF DAM AGAINST SLIDING THE SHEAR PARAMETERS 'C' AND 'Φ' OF FOUNDATION ROCK ARE ASSUMED AS 60 KN/M² AND 35° RESPECTIVELY. THESE SHALL BE GOT CONFIRMED BY THE IN SITU SHEAR TESTS ON EXPOSURE OF FOUNDATION ROCK.

12. DRAINAGE HOLES SHALL BE DRILLED ONLY AFTER ALL THE FOUNDATION GROUTING HAS BEEN COMPLETED.

13. ANY CHANGE IN FOUNDATION BELOW EL. +177.00 THE SAME SHALL BE REFERRED TO C.D.O FOR CHECKING THE STABILITY OF SPILLWAY.

14. REFERENCE TO I.S. CODES

- a) IS 456 - 2000
- b) IS 1195 - 1984
- c) IS 6512 - 1984
- d) IS 1893 - 1984
- e) IS 6934 - 1998

NOTES

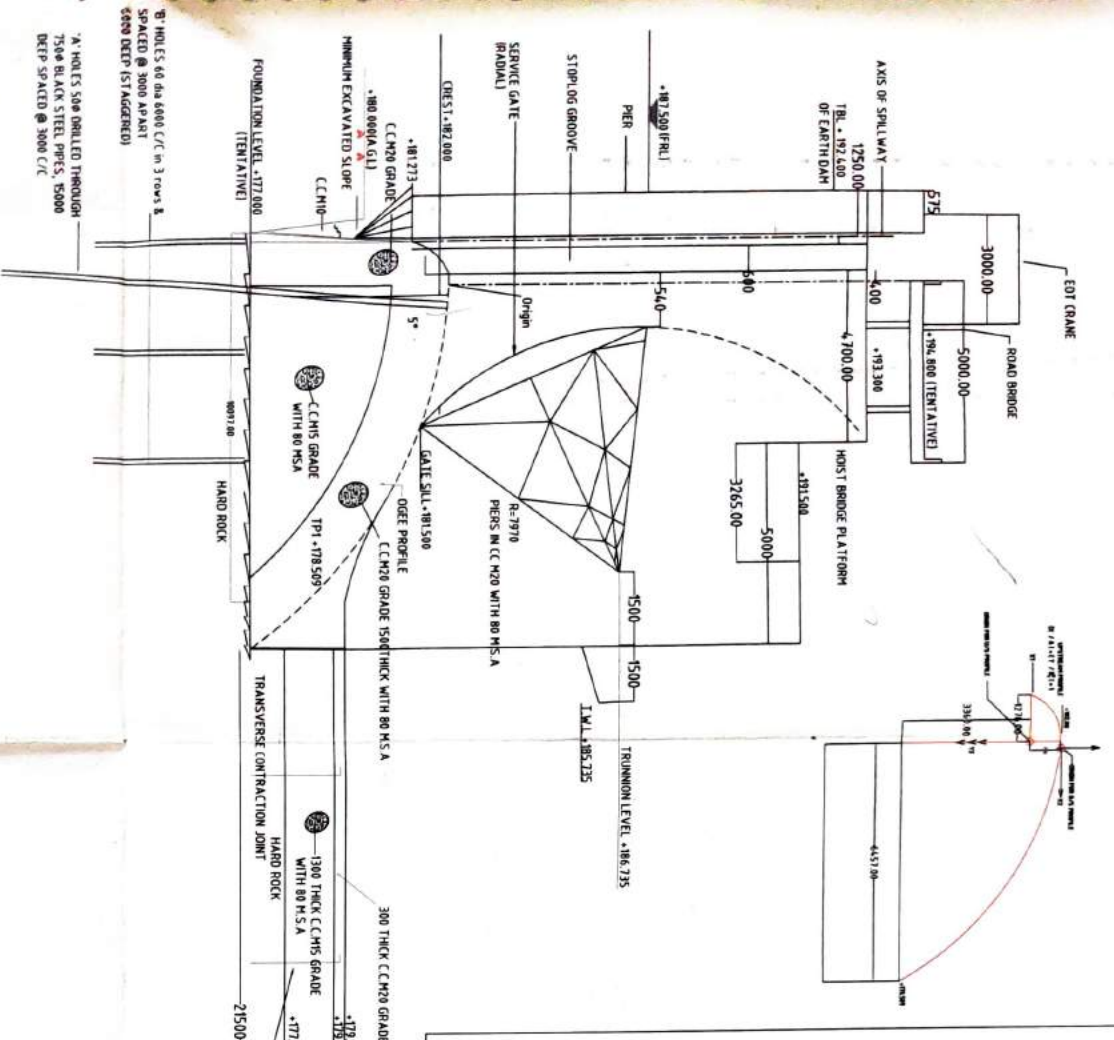
1. ALL DIMENSIONS ARE IN METRE/FEET AND LEVELS ARE IN METRE/FEET
2. THE SPILLWAY IS DESIGNED FOR A MAXIMUM FLOOD DISCHARGE OF 466270 CUMecs.

3. THE FOLLOWING CONCRETE MIXES ARE PROPOSED FOR THE SPILLWAY

S.NO	ITEM	MAX	MAX SIZE OF AGGREGATE
1	U/S FACE CREST GRADES	M20	80
2	HEARTING	M20	80
3	PERS.	M20	80
4	SILLING BASIN	M20	80
5	BRIDGE	M20	20

HYDRAULIC PARTICULARS

1. MAX FLOOD DISCHARGE : 466270 CUMecs
2. TOP OF ROAD LEVEL : 176.800 (TENTATIVE)
3. DESIGN HEAD (HD) : 5.50 M
4. MW/FRL : 187.500 M
5. CREST LEVEL : 187.800 M
6. MAX T.W.L : 185.735
7. DEEPEST FOUNDATION LEVEL : 177.000 M
8. NO. & SIZE OF VENTS : 15 - M20 - 10M X 5.50M (INCLUSIVE OF 2 VENTS FOR INTERMEDIATE CONDITION)
9. THICKNESS OF INTERMEDIATE PIER : 2.5M
10. THICKNESS OF END PIER : 2.00 (TENTATIVE)
11. TYPE OF ENERGY DISSIPATION : SILLING BASIN
12. TYPE OF GATE : RADIAL
13. C.D. VALUE : 1.984



CROSS SECTION OF SPILLWAY

1. HOLES 60 dia 6000 C/C in 3 rows & SPACED @ 3000 APART

2. HOLES 500 DRILLED THROUGH 7500 BLACK STEEL PILES, 5000 DEEP SPACED @ 3000 C/C

U/S CO-ORDINATES		D/S CO-ORDINATES	
X IN MTRS.	Y IN MTRS.	X IN MTRS.	Y IN MTRS.
0.000	0.727	0.000	0.000
0.300	0.707	0.500	0.031
0.600	0.682	1.000	0.111
1.000	0.642	1.500	0.234
		2.000	0.389
		2.500	0.603
		3.000	0.845
		3.500	1.124
		4.000	1.439
		4.500	1.790
		5.000	2.175
		5.500	2.594
		6.000	3.047
		6.200	3.238
		6.400	3.434
		6.457	3.491

CLIENT	GOVERNMENT OF ANDHRA PRADESH
PROJECT	IRRIGATION & CAD DEPARTMENT
TITLE	FORMATION OF RESERVOIR ACROSS KUNDU RIVER NEAR JOLDARSI KURNOOL DISTRICT
PREPARED & SUBMITTED	CROSS SECTION OF SPILLWAY
DATE	SCALE - 1:100
	DWG. NO.

③
Inspection Report of the Technical Expert Committee of Projects Works in Kurnool
District.

Office of
 R.NO. 1865-6-37
 Date 11/12/2016
 S.R.B.C.

	11/1
S.E.	21 31
P.A.	12/8/11

Date of inspection: 16th December 2015.

Expert Committee Members Present:

1. Sri K.V. Subba Rao Chief Engineer, (Retd) and Member
2. Sri Routhu Satyanarayana, Chief Engineer, (Retd) and member
3. Sri M.K.Rahaman, Engineer-in-Chief, (Retd) and Member

Officers present:

1. Sri M. Giridhara Reddy, Chief Engineer, Central Designs Organisation
2. Sri G. Chittibabu, Chief Engineer, Projects, Kurnool.
3. Sri V.Ramachandraiah, Superintending Engineer, TGP Circle, Nandyal.

1.00: introduction:

The Engineer - in - chief, Irrigation has requested the Technical Expert Committee to inspect Pothireddypadu head regulator, Kundu river protection works in Nandyal town and also the GNSS canal package works in Package 28 reach and offer technical advice on some of the problems being encountered. Accordingly the above members of the Technical Expert Committee inspected the works on 16-12-2015 and furnish the following report.

2.00 Approach channel of the Pothireddypadu head regulator:

1-502
 13/11/16
 The Pothireddypadu head regulator is constructed in the foreshore of the Srisaillam reservoir to draw waters through the Srisaillam Right main canal which feeds drinking water to Chennai city, the ayacut under the Srisaillam Right Branch canal, the Telugu Ganga Project, the Galeru Nagari Sujala Sravanli and also the supplemental needs of the K.C.canal ayacut. The draws through the regulator for these projects also facilitate to serve the drinking water needs of the areas being served by them. Initially the regulator was designed to draw a discharge of 425 cumecs (15,000 cusecs). As this capacity was found inadequate to draw flood flows in a reduced length of time another regulator is now constructed. The drawing capacity of this regulator is 1246 cumecs (44,000 cusecs). Both these regulators have approach channels of about 4 kms in length extending into the foreshore of the reservoir upstream of the regulators. The approach channels have been so designed and executed that the regulators will be able draw the design discharges at the MDDL of +266.300 m (854.00 ft). When the reservoir levels fall below +266.300 m (845.00 ft) the waters recede much beyond the reach of the approach channels now existing due to higher ground levels in the foreshore. For emergent drinking water needs of the areas being served by the regulators; it has become incumbent to draw waters from the reservoir up to the sill levels of the regulators namely +256.338 m (841.00 ft). As the present approach channels are not in a position to draw waters below the level of + 266.300 m (845.00 ft), these are proposed to be remodelled by extending the approach channels further into the foreshore.

36

2

The proposals put forth by the field officers are examined with reference to the site conditions and the following recommendations are made.

2.01: Recommendations:

- i. The approach channels may be extended further into the foreshore. It is informed that the extension will be in the order of 6 kms making the total length of the approach channels as 10 kms.
- ii. The drawls from the reservoir above +257.556 m (845.00 ft) will be drawn from a reservoir lake, but when the reservoir level falls below the berm levels of the approach channels there will be a surface slope within the approach channel water prism to generate flows. Therefore provision must be made to account for this fall in energy levels in the design considerations.
- iii. In order to minimise the silting in the approach channel a reverse bed slope of 1 in 15000 may be adopted in the bed levels. This is to be provided in the extended length only.
- iv. The section of the extended approach channel may be such that it will draw 70.7 cumecs (2500 cusecs) when the reservoir level is +257.556 m (845.00 ft) with the sill level of the regulator being +256.337 m (841.00 ft).
- v. The proposals with site survey particulars may be sent to the Central Designs Organization and the Chief Engineer. CDO may discuss the proposals with the Expert Committee if considered necessary.

3.00 Kundu River Protection works in Nandyal town;

Nandyal town is crisscrossed by rivulets and streams called Maddileru, Paleru, Chamaka va which all join Kundu river flowing through the town limits. The Nandyal town was affected by floods in these streams in the years 2007 and 2009. The areas abutting the banks of these streams were inundated due to high flood levels recorded. Loss of property and human lives was recorded. Therefore the Government of Andhra Pradesh sanctioned estimates for flood protection works to the town in the year 2008 for an amount of Rs.97.51 Crores. The protection works to be carried out included works on Galeru, Chamalkalva and Kundu rivers in addition to improvements to Nandyal chinnacheruvu.

Tenders were called for three reaches relating to Kundu River in Nandyal town. Only works in one reach from km. 5.00 to km. 6.850 were grounded. Even these works could not proceed ahead due to delays in land acquisition and the agreement was closed. At present no works are in progress. The sanction by the government was only up to the km. 6.850. But subsequently sanction was sought for the reach from the km.6.850 to km. 8.800. This reach from Km. 6.850 to km. 8.800 has an existing railway bridge and proposed high way Road bridge. The hydraulic particulars approved by the Central Designs Organization include widening of the river bed as well as lowering of the bed levels at the railway line crossing. In view of the widening and lowering of the existing bed levels under the railway bridge the Railways suggested that a new bridge will have to be constructed to replace the old one. The government wanted a review be made as to the necessity of the protection works under execution and further works proposed.

including the railway and the road bridges. The Technical Expert Committee was requested by the Chief Engineer, Projects Kurnool to inspect the area and make recommendations.

3.01: Observations:

The Expert Committee visited on 16.12.2015 six locations of the flood affected areas of the town. These are

- a. At 2.00 kms downstream of the confluence of the Galeru stream with the Kundu River. This is the start point for the protection works on the Kundu River.
- b. At the village locations of Nandamuru Nagar and YSR Nagar- right bank of Maddileru stream, behind the Nandyal bus station. The ground levels here are reported as +207.00 m and the villages were reportedly inundated with water up to one meter depth..
- c. Right bank of Maddileru stream where a wall was partly constructed (200 m in length) on the left bank and an earthen bund of 1200 meters on the right bank. This location is 600 m upstream of the confluence of Maddileru with Kundu River. The chainage here will be km.3.00 of the Kundu River. Here the ground levels are reported as +204.00 m and flood level of the year 2007 was marked on one residential building. The building must have been under at least 2.0 meters of water.
- d. The confluence point of Chamakalva with Kundu River in the town of Nandyal. The chainage is km. 6.850.
- e. At the km. 6.995 where a high way bridge was recently constructed- that is after the floods in the year 2009.
- f. At the railway bridge at km. 7.905. Upstream of the railway bridge, extensive ramps, roads at high levels, were laid blocking the course of the river

The following are the observations of the Committee during the inspections.

- i. There are encroachments all along the lengths of the streams on either side and there are many permanent constructions.
- ii. The two villages Nandamuru Nagar and YSR Nagar also lie within the high flood levels.
- iii. Between the highway bridge and the railway bridge are encroachments blocking the river course.
- iv. An agency prepared the DPRs for the proposed protection works but there is no contour plan available marking the villages' levels, ground levels and the features obstructing the flow. It is not clear on what basis the DPR was prepared.
- v. The flood levels obtaining in the town are influenced by the downstream flow conditions. Therefore it would be proper to assess the flood levels taking into account the downstream river cross sections. Fixing hydraulic particulars with reference to a short stretch of the river in the town would serve no purpose. Mere widening and lowering the bed of the river will offer only temporary relief that too to a diminutive extent as these works will not alter the status of the water levels downstream of the town. In no time the bed levels will again revert back to the pre rehabilitation stage.
- vi. It is necessary to plan protection works taking into account the ground situation- such as the impracticability of removing the encroachments, entry of effluents, debris into the stream course etc.,
- vii. It is not necessary to plan the protection works for a 100 year return flood. It is enough if they are planned for a 50 year return flood.

- viii. The protection works could be limited to the areas populated by the residents and at other places as the inundation is for a few hours precautionary measures would have to be followed to prevent human loss.
- ix. The floods in the year 2009 are due to the Srisailem reservoir water entering the Kundu basin at Pothireddipadu than due to rains in the catchment upstream of Nandyal town. As the occurrence of 2009 is not possible to be repeated it is enough if the protection works are planned with reference to the flood levels of 2007. It is observed that the flood levels recorded in 2007 were higher than those in the year 2009.
- x. It is possible to obtain some relief by way of lower flood levels upstream of the road bridge at km.6.995, if the obstructions and encroachments in the bed of the Kundu River upstream of the railway bridge are removed.

The Committee makes the following recommendations.

3.02: Recommendations:

- i. It is necessary that a contour plan covering the portions coming within the flooded zone of the town and its surrounding areas be prepared duly marking the areas of habitations, farming fields and other important landmarks. On the plan the area of inundation as per field verification has to be marked so that protection works could be planned appropriately and at places where damages to residential areas could be avoided.
- ii. The Central Design Organization has to be furnished existing cross sections of the streams right up to a distance of 2 kilometers downstream of the railway bridge duly marking the 2007 flood levels observed. With the help of the cross sections the CDO should be able to arrive at the flood levels downstream of the bridge for different discharges. The 2007 flood levels have to be correlated and the flood levels for a return period of 50 years extrapolated.
- iii. The protection works then have to be planned and executed based on the study of the plans prepared and the field data of flood levels recorded in the year 2007. The Committee is of the opinion that the protection works are to be planned with reference to the existing ground realities rather than trying to plan widening the river bed at the railway bridge and lowering the bed levels. The status of the bed will be a quick changing scenario and any modification will yield only a passing relief.
- iv. As the above is likely to take time, meanwhile the bed of the Kundu River from the confluence of the Maddaleru at km. 6.850 to the railway bridge at km. 7.900 may be cleared of all obstructions within the flow area so that increased areas will be available for flood flows. This measure is likely to provide relief on the upstream areas with lower flood levels because of the downstream free flow conditions.
- v. There is no need at present to either widen the bed width or lower the bed levels at the railway bridge or in other areas. All obstructions within the existing river margins on either side should be removed. A final decision on the need to either widen or lower the bed and the bed levels will be possible after the field surveys are made available and a study made.

4.00: GNSS Canal package 28 works:

At the request of the Chief engineer, Projects, Kurnool the following locations along the canal have been visited by the Committee and the observations of the Committee are as follows;

i) Reach from km.21.100 to km. 21.400;

This canal reach, it is seen, negotiates a lime Quarry area. Mining in this area has been going on in spite of cancellation of lease by obtaining a legal stay. The ground levels have gone below the designed canal bed levels. The lime deposit may in course of time be a source of leakage through solution channels that may be formed. Formation of solution channels in Kurnool district is very common and has been observed in the HNSS canal and the GNSS canal on the upstream near the village Ramathirtham. The issue before the Committee is whether any special treatment is necessary in this reach.

The canal runs in banking reach here and the banks are as high as 12 meters and the bank sections have been designed after a regular testing of soils and stability analysis. The side slopes of the designed banks are very flat with 2.5 h to 1 v and 3.5 h to 1 v. A central impervious core has also been provided. A berm of 1500 mm was provided on the upstream slope. The Committee suggests that the width of the berm be modified to 3000 mm as minimum roller width is necessary. Similarly it would be necessary to provide a central cut off extending into the impermeable strata.

There is also no need to resort to bed filling by borrowing the soils. The mined areas may be filled only with any excavated spoil obtained from the canal works. With regard to the possible solution channels the Committee is of the opinion that the GNSS canal is a flood flow canal and is operated for a short period. Therefore the behaviour could be observed over the years and only when it is found that there is substantial water loss then only lining could be considered. As per the approved hydraulic particulars the canal section is unlined and may remain so as of now.

ii) Proposed inlet at km. 26.619 in place of Super Passage

As per the approved hydraulic particulars at this chainage a super passage is proposed to negotiate a stream crossing. The field staff suggested that the Super Passage could be replaced with an inlet. The maximum flood discharge of the stream is reported as 38.77 cumecs. The Chief Engineer, Central Designs Organization informed that an inlet could be provided if its discharge is less than 5% of the canal discharge. The design discharge of the GNSS canal is 566.337 cumecs (20000 cusecs). Therefore the discharge at 5% will be 28.3 cumecs and the stream's discharge is more than 5% of the canal discharge. It is also seen that there are three more inlets on the upstream of this location, at km.24.900 (16 cumecs), km. 27.640 (17 cumecs) and at km.28.250 (29 cumecs). Thus the contribution from the four streams including the one at km. 26.619 now being proposed will add up to 100.77 cumecs which will be nearly 18% of the canal discharge. Therefore it is necessary that the issue is examined in detail.

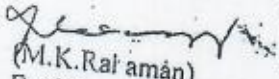
The GNSS canal is a flood flow canal and most of its alignment is in cutting. It is unlikely that the maximum discharge in the flood flow canal will coincide with the maximum outflow from all the four streams. An outlet for these discharges is being provided in the shape of an escape at km.35.315 where a stream by name Jurreru is being negotiated. It is necessary that the carrying

capacity of the surplus course of this Jurreru is evaluated to find out whether it could accommodate all the inflows from the four streams. Alternatively another outlet could be provided downstream of proposed inlet at km.26.619. Detailed field particulars of all the two alternatives may be sent to the Central Designs Organization for a detailed study. It could also be examined whether the additional 100.77 cumecs could be accommodated in the free board zone of the canal. The Central Designs Organization may discuss with the Expert Committee, if considered necessary after the receipt of filed particulars and study.

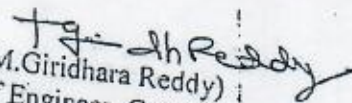
iii) Canal reach from km.33.300 to km. 33.600:

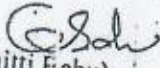
This canal reach runs in partial cut and partial embankment. The Central Designs Organization has suggested that the bank above the ground level has to be with a side wall in concrete construction citing agreement conditions. The field staff suggested that instead of the concrete wall an earth bund could be formed. Technically there need not be any objection to the forming of an earthen bank. The bank however should be formed with suitable soils and to the design requirements such as a berm at the ground level. The Chief Engineer, Kurnool and the Chief Engineer, CDO may decide the issue with reference to the contractual obligations and take decision. They are free to consult the Expert Committee further on the issue if they deem it necessary.


(K.V. Subba Rao)
Chief Engineer (Retired) and Member


(M.K. Ramam)
Engineer-in-Chief (Retired) and Member


(Routhu Salyanarayana)
Chief Engineer (Retired) and Member


(M. Giridhara Reddy)
Chief Engineer, Central Designs Organization


(G. Chitti Babu)
Chief Engineer (Projects), Kurnool

Enst. No.: CE(P)/Kul/DEE2/AEE/^{Inspection notes} 4A/1 dt 06/01/2016
Copy of inspection report of the Technical Expert Committee for Kurnool District is forwarded to all the concerned Superintending Engineers for information and n/a.

// T.C.F. //

To,
The SE/TGP/Nich S. Chinniah
The SE/SRBC/Chinniah
The SE/SRBC/Chinniah
6.1.16
Chief Engineer (P) - Irrigation: Kurnool

Copy to the files of P-20, Kurnool P-20, Chinniah