Government of Jammu and Kashmir

JKSPDC

J&K State Power Development Corporation Limited

TENDER

Government of Jammu and Kashmir

J&K State Power Development Corporation Limited

TENDER DOCUMENT

FOR

Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan.

Civil Maintenance Division Upper Sindh Hydel Project Stage II Kangan.

NOVEMBER 2011

OFFICE OF THE EXECUTIVE ENGINEER, CIVIL MAINTAINENCE DIVISION, USHP-II, KANGAN.

E-mail :- xenckangan@gmail.com

NOTICE INVITNG TENDER

Gist of Tender Notice No: 04 /CMD-Works of 2011 Dated: 09-11-2011

For and on behalf of the Managing Director, JKPDC, Srinagar/Jammu, sealed Tenders are invited, "Under Two Cover System" (Cover-I: Pre-qualification Documents & Cover-II: Price Bid) for below mentioned work from Contractors/ Reputed firms /Corporations having necessary experience in execution of similar nature of work and possessing requisite, infrastructure, manpower, machinery *and* equipment so as to reach the office of the Chief Engineer, Civil Investigation and Design Wing, PDC, CID Block, PDD Complex, Bemina, Srinagar-190018 by registered post, Speed post or Courier services, on or before 30th November, 2011 upto 1500 hours:-

SNo.	Name of Work	Estimated Advertised Cost of Work	Earnest Money (EM)	Class of Contractor	Cost of Tender document	Time of Completion
1	Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan.	Rs.361.49 Lacs	Rs 7.23 Lacs	"A" / "Special" Class contractors/ Reputed firms/ Corporations	Rs.6000/-	Six Months
2	Modernization of Spill channel from RD 861.7M to RD1100M USHP-II, Kangan.	Rs.452.43 Lacs	Rs 9.05 Lacs	"A" / "Special" Class contractors/ Reputed firms/ Corporations	Rs.8000/-	Six Months
3	Modernization of Spill channel from RD 1100M to RD 1280M USHP-II,	Rs.361.75 Lacs	Rs 7.24 Lacs	"A" / "Special" Class contractors/ Reputed	Rs.6000/-	Six Months

	Kangan.			firms/ Corporations		
4	Modernization of Spill channel from RD 1280M to RD 1338.55 M USHP-II, Kangan.	Rs. 290.81 Lacs	Rs 5.82 Lacs	"A" / "Special" Class contractors/ Reputed firms/ Corporations	Rs.6000/-	Six Months

Terms and conditions:-

1. The tenderer should use prescribed Tender Form along with Tender document duly issued by the undersigned or from the office of Chief Engineer, Civil Investigation and Design Wing, PDC,Bemina, Srinagar Which will be issued from 21-11-2011 to 26-11-2011 against payment of the amount reflected above per set (Non-Refund able and non-transferable) in the shape of Indian Postal order/Demand draft drawn in favour of Chief Pay and Accounts Officer, USHP-II PDC Kangan The. tender document can also be downloaded from JKSPDC website enclosed with the bid at the time of its submission . However, firms downloading the document from the website must intimate (by or before the last date fixed for sale of tender document) through e-***jkspdc.nic.in*** and in case the same is done, a demand draft in the above manner must be mail or fax (to the address of CE CI&D cecidkmr@gmail.com) their intention of submitting their tender.

2. Time is the essence of the contract. The work is to be completed in the stipulated time period in all respects, by working in multiple shifts. The tenderer shall furnish their construction schedule of work in the form of bar chart and its narrative plan in order to complete the work within the stipulated time period of 6 calendar months (as shown against each work). Only such tenderers may tender for the work, who have requisite resources, infrastructural back up, technical know how and experience to complete the work by or before completion period.

3. To be eligible for Pre-qualification, tenderers shall provide adequate documentary evidence *to* the satisfaction of the

Employer of their capability and adequacy of resources to carry out the contract effectively. To this end, all tenderers shall include the following information to be furnished in 'Cover-I' of the Tender:-

i) Documentary proof i.e. Original/ attested copies of allotment /agreements/completion certificates from the concerned departments of having successfully completed works during last seven years ,the magnitude whereof should not be less than either of the following:-

A) Three similar completed works (RCC Hydraulic Structures) each costing not less than the amount equal to 40% of the estimated advertised cost.

OR

B)Two similar completed works (RCC Hydraulic Structures) each costing not less than the amount equal to 50% of the estimated advertised cost.

OR

B) One similar completed work (RCC Hydraulic Structures) costing not less than the amount equal to 80% of the estimated advertised cost.

ii) The tenderer should have average financial turnover during the last 3 years ending 31st March of the previous financial year, at least 30% of the estimated advertised cost, for which the original Bank statement duly authenticated by the concerned Bank /Chartered Accountant shall be entertained.

iii) Earnest money (EM) of the amount reflected above against each work, in the shape of FDR/Bank Guarantee/DD pledged to the Accounts Officer with Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar *(*payable at Srinagar) should be attached with the Pre-qualification Documents in Cover-I. EM in the shape of cheque /cash shall not be entertained. Any tender without EM shall be rejected out rightly.

All terms/conditions /eligibility can be seen in the office of the Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, or on the official web site of JKPDC address: www.jkspdc.nic.in

Executive Engineer
Civil Maintenance Division,
USHP-II, Kangan.

Office of the Executive Engineer, Civil Maintenance Division Upper Sindh Hydel Project Stage IInd, Kangan.

Notice Inviting Tender.
Tender Notice No 04 /CMD-Works of 2011
Dated: 09-11-2011

Name of the work: Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan.

Approximate cost of the work: Rs.361.49Lacs.

Letter inviting Tenders and instructions for tenderers.

1. Tender form comprising of following Documents:-

Part-I

a. N.I.T.
b. Agreement.
c. Information and instructions for tenderers.
d. Tender forms and Schedules.
e. General Conditions of the contract.
f. Forms of different deeds.

Part II

1. Technical Specifications.
2. Specification Drawings.
3. Annexure if any.

Tender form along with Tender Documents issued by the Executive Engineer, Civil Maintenance Division, Upper Sindh Hydel Project Stage-II, Kangan or the office of the Chief Engineer, Civil Investigation & Design Wing J&K SPDC Srinagar sold to M/S_____-
_____-
_____-
_____.

Registration No:_____
Communication addresses:
Contact details :
Tel:
Fax:
Mobile no:
E-mail:

Against payment of Rs. 6000/- (Rupees six Thousand Only)
Per set (Non refundable / non transferable) in the shape of Indian Postal order / Demand Draft No:_____
In favour of the Chief Pay & Accounts Officer, Upper Sindh Hydel Project Stage-II, Kangan, District Ganderbal.

Executive Engineer,
Civil Maintenance Division,
USHP-II, Kangan.

TENDER DOCUMENT

FOR

Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan.

TENDER FORMS, GENERAL AND SPECIAL CONDITIONS OF THE CONTRACT.

PART – I

1. N.I.T.
2. Agreement.
3. Information and instructions for tenderers.
4. Tender Forms and Schedules.
5. General Conditions of the Contract.
6. Forms of different deeds.

PART – II

1. Technical Specifications.
2. Specification Drawings.
3. Annexure, if any.

Document No: I

Notice Inviting Tenders

OFFICE OF THE EXECUTIVE ENGINEER, CIVIL MAINTAINENCE DIVISION, USHP-II, KANGAN.

E-mail :- xenckangan@gmail.com

NOTICE INVITNG TENDER

Tender Notice No: 04 /CMD-Works of 2011 Dated: 09 -11-2011

For and on behalf of the Managing Director, JKPDC, Srinagar/Jammu, sealed Tenders are invited, "Under Two Cover System" (Cover-I: Pre-qualification Documents & Cover-II: Price Bid) for below mentioned work from Contractors/ Reputed firms /Corporations having necessary experience in execution of similar nature of work and possessing requisite, infrastructure, manpower, machinery and equipment so as to reach the office of the Chief Engineer, Civil Investigation and Design Wing, PDC, CID Block, PDD Complex, Bemina, Srinagar-190018 by registered post, Speed post or Courier services, on or before 30th November, 2011 upto 1500 hours:-

SNo.	Name of Work	Estimated Advertised Cost of Work	Earnest Money (EM)	Class of Contractor	Cost of Tender document	Time of Completion
1	Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan.	Rs.361.49 Lacs	Rs 7.23 Lacs	"A" / "Special" Class contractors/ Reputed firms/ Corporations	Rs.6000/-	Six Months
2	Modernization of Spill channel from RD 861.7M to RD1100M USHP-II, Kangan.	Rs.452.43 Lacs	Rs 9.05 Lacs	"A" / "Special" Class contractors/ Reputed firms/ Corporations	Rs.8000/-	Six Months
3	Modernization of Spill channel from RD 1100M to RD 1280M USHP-II, Kangan.	Rs.361.75 Lacs	Rs 7.24 Lacs	"A" / "Special" Class contractors/ Reputed firms/ Corporations	Rs.6000/-	Six Months
4	Modernization of	Rs. 290.81	Rs 5.82	"A"Class contractors/	Rs.6000/-	Six

	Spill channel from RD 1280M to RD 1338.55 M USHP-II, Kangan.	Lacs	Lacs	Reputed firms/ Corporations		Months

Terms and conditions:-

1. The tenderer should use prescribed Tender Form along with Tender document duly issued by the undersigned or from the office of Chief Engineer, Civil Investigation and Design Wing, PDC,Bemina, Srinagar Which will be issued from 21-11-2011 to 26-11-2011 against payment of the amount reflected above per set (Non-Refund able and non-transferable) in the shape of Indian Postal order/Demand draft drawn in favour of Chief Pay and Accounts Officer, USHP-II PDC Kangan (payable at Kangan). The tender document can also be downloaded from JKSPDC website **jkspdc.nic.in** and in case the same is done, a demand draft in the above manner must be enclosed with the bid at the time of its submission . However, firms downloading the document from the website must intimate (by or before the last date fixed for sale of tender document) through e-mail or fax (to the address of CE CI&D cecidkmr@gmail.com *)* their intention of submitting their tender.

2. The Tenders shall be opened on the same day or any other subsequent date convenient to the tender opening authority in presence of tenderers or their authorized representatives who choose to be present. In case date of receipt of tenders is declared a holiday or if the office circumstances etc. remains closed due to any unavoidable the tenders will be opened on the next working day.

3. Any tender reaching after expiry of the prescribed date and time shall not be received. Tender submitting tender on the basis of document downloaded from website has not been given before cut off date for sale of documents will not be entertained**.**where intimation about intention of

4. Conditional tenders will not be accepted at all and same shall be out rightly rejected.

5. All the Taxes/ duties levied by State/Central Government /local authorities, at the time of ten days before submission of price bid of contract, shall be applicable to this contract as per relevant provisions, and same shall be deducted at source at the time of

payment or as applicable under rules for such works & for procurement/ supply/ transfer/shifting/carriage of T&P, equipment, machinery, materials etc. whatsoever involved within or outside the State.

6. Time is the essence of the contract. The work is to be completed in the stipulated time period in all respects, by working in multiple shifts. The tenderer shall furnish their construction schedule of work in the form of bar chart and its narrative plan in order to complete the work within the stipulated time period of 6 calendar months (as shown against each work). Only such tenderers may tender for the work, who have the requisite resources, infrastructural back up, technical know how and experience to complete the work by or before completion period

7. The name of the work, reference to NIT, advertised amount, details of EM, particulars of tenderer with communication addresses and Tender Cover-I and Cover-II should be written legibly on the envelopes.

8. Earnest money (EM) and cost of tender document (in case of down loaded tender documents) of the amount reflected above in the tabular form against each work, in the shape of FDR/Bank Guarantee/DD pledged to the Accounts Officer with Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar **(**payable at Srinagar) should be attached with the Pre-qualification Documents in Cover-I. EM in the shape of cheque/cash shall not be entertained. Any tender without EM and cost of tender document shall be rejected out rightly. Sealed Cover-II will contain “Price Bid” only. The tenderer should also certify on their envelopes that they have enclosed the EM and are tendering within the capacity of their Registration /Enlistment Card.

9. The Tenderers shall have to furnish with their tender a clearance certificate from the Income Tax Department.

10. The intending tenderers are advised to visit the site of work as mentioned above, in their own interests, at their own cost/responsibility to acquaint themselves with the actua/ site conditions for quoting genuine and workable rates keeping in view the working conditions, access to site, dumping sites, source and availability of constructional material**,** labour and equipment, weather/climate conditions etc.

11. The tenderer should quote their rates item wise as per rate list enclosed with the tender document. The rates shall be inclusive of all charges i.e. cost of material including cement, Structural and steel of all sorts, dewatering **,** diversions, supply and carriage of raw materials and water, electricity charges etc.

12. The tender document shall be issued only on the written requests from tenderers, on the specified dates as above on the production of registered enlistment certificate duly renewed for the current financial year, income tax clearance certificate, sales tax clearance certificate/Tin registration from Sales tax department, PAN card and experience certificate for having executed/completed such works as mentioned above.

13. The validity of the tender shall be 180 calend*a*r days from the opening of the tenders.

14. All other terms and conditions shall remain same as laid down in the standardized detailed tender document in vogue in the Project and to be issued to tenderer in addition to those indicated in the PWD form No.25 (double) & in this NIT.

15. The Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar, shall have the right to reject all or any of the tenders and will not be bound to accept the lowest or any other tender or to give any reasons for such decision and / or rejection of any tender.

16. The N.I.T. shall be available on the official web site of JKSPDC address: www.jkspdc.nic.in

Cover-I:

Pre-qualification Documents:

To be eligible for Pre-qualification, tenderers shall provide adequate documentary evidence to the satisfaction of the Employer of their capability and adequacy of resources to carry out the contract effectively. To this end, all tenderers shall include the following information to be furnished in 'Cover-I' of the Tender:-

1) Documentary proof i.e. Original/attested copies of allotments / agreements /completion certificates from the concerned departments of having successfully completed works during last seven years**,** the magnitude whereof should not be less than either of the following:-

C) Three similar completed works (RCC Hydraulic Structures) each costing not less than the amount equal to 40% of the estimated advertised cost.

OR

B)Two similar completed works (RCC Hydraulic Structures) each costing not less than the amount equal to 50% of the estimated advertised cost.

OR

D) One similar completed work (RCC Hydraulic Structures) costing not less than the amount equal to 80% of the estimated advertised cost.

2) The tenderer should have average financial turnover during the last 3 years ending 31st March of the previous financial year, at least 30% of the estimated advertised cost, for which the original Bank statement duly authenticated by the concerned Bank /Chartered Accountant shall be entertained.
3) Earnest money (EM) of the amount reflected above against each work, in the shape of FDR/Bank Guarantee/DD pledged to the Acccounts Officer with Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar *(*payable at Srinagar) should be attached with *the* Pre-qualification Documents in Cover-I. EM in the shape of cheque/cash shall not be entertained. Any tender without EM shall be rejected out rightly.

4) The tenderer should have adequate T&P, machinery and equipment owned by him for the execution of work along with owner ship details as well. The tenderer should possess the following Minimum required Plant and Machinery and submit documentary evidence of their ownership in the cover-I of their tender:-

(At each section of work)

a) Concrete Mixers = 2No's.

b) Vibrators (60mm needle) = 2No's.

(40mm needle) =2No's.

c) Dewatering pumps = 2 No.

d) Welding sets = 1No

e) Tippers = 3No's

` f) Steel shuttering with scaffolding and struts = sufficient quantities (not less than 600 Sqm)

In addition to above the bidder should own or undertake to deploy on hire charges the following machinery / equipment at the start of execution of work:-

1	Excavator	= 1 No.
2	Trench compactor	= 1 No.
3	Diesel Generator (50 KVA capacity*)*	= 1 No.

5) Organization set up:

The tenderer should have the following minimal technical staff on their regular establishment or should undertake to deploy them at the time of execution for which they shall submit documentary evidence in their cover-I of the tender:

Technical Staff:-

(At each section of work)

a. Civil Engineer (degree)	1 (one) No.
b. Civil Engineer (diploma)	2 (Two) No's
c. Surveyor	1 (one) No
d. Supervisors	3 (three*) No's*

Cover-II:

Price Bid:

1. Price Bid "Cover-II" of the Tenders shall be opened only for the Prequalified Tenderers after ascertaining the competency/eligibility of the individual tenderers to undertake the job as per the qualification criteria indicated above.

2. Before opening of Price bids, scrutiny/clarification of contractor's conditions (if any) shall be made/obtained to evaluate the financial effects etc. Authenticity of Earnest Money deposit will also be ascertained beforehand.

3. Price bid, if included in cover-I instead of cover -II, shall render such tender as invalid and such tender shall be rejected.

Executive Engineer,
Civil Maintenance Division,
USHP-II, Kangan.

CMD, USHP-II, Kangan.

No. USHP-II/CMD/ Dated:

Copy for information to the:-

1 Managing Director, J&K State Power Development Corporation, Jammu.
2 Executive Director, J&K State Power Development Corporation, Jammu.
3 Director Finance, J&K State Power Development Corporation, Jammu.
4 Chief Engineer, Generation Wing, PDC, Bemina, Srinagar.
5 Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar.
6-11 Chief Engineer, R&B, Irrigation, PHE, UEED, PMGSY and ERA Srinagar/Jammu.
12 Chief Geologist, J&K State Power Development Corporation, Jammu/ Srinagar.
13 Company Secretary JKSPDC, Jammu with the request to up load the NIT on the official web site of JKSPDC.
14-15 Superintending Engineer, Generation Circle1st/2nd, PDC, Baramulla/ Bemina, Srinagar/Bar.
16-22 Executive Engineer,Mechnical Division, USHP-II/Generation Division Ganderbal/Kangan/Sumbal / Civil Maintenance Division LJHP/USHP- II / Sindh Project Division, Kangan.
23 Chief Pay and Accounts Officer USHP-II, Kangan.
24-25 Assistant Executive Engineer, Wangth Link Sub Division/Power House sub Division/ Sumbal Link Sub Division 1st & 2nd.
26-30 Contractor's Association Kangan/Ganderbal/Sheikhbagh Srinagar/ Court road Srinagar.
31 Notice Board.

Executive Engineer,
CivilMaintenance Division,
USHP-II, Kangan.

FOR SPECIAL ATTENTION TO THE TENDERER:

1. All tenderers are cautioned that tenders containing any deviation whatsoever from terms and conditions, specifications, drawings designs etc. as contained in tender document are liable to be rejected as non-responsive.

2. The tenderer shall submit all the relevant documents / information's / Schedules stipulated in the tender document. Incomplete tenders are likely to be rejected.

3. The tenderers are requested to submit the details of construction plant, equipment and machinery to be deployed for the work as stipulated in the tender documents.

4. Unless exempted (in which case the requisite certification be attached with document) the tenders without earnest money deposit shall be rejected as non-responsive.
5. Sealed tenders on prescribed forms should be affixed with revenue stamp worth Rs. 10/- (Rupees Ten only).
6. The Chief Engineer, Civil Investigation & Design Wing Bemina, Srinagar (J&K) shall have the right to reject or accept any or all tenders besides will not be bound to accept the lowest or any other tender or to give any reasons for such decision.

7. The tenderer if found successful for more than one work shall have to full fill proportionality combined pre qualification criteria for the work in question or he may choose to select any one of his works in which he works out successful.

8. For working out the pre qualification requirements of previous experience in similar works during last seven years and financial turn over for last three years annual escalation of 6%(on compound basis)shall be accounted for to work out their magnitude as on 31-03-2011.

Executive Engineer,
Civil Maintenance Division,
USHP-II, Kangan.

To

The Chief Engineer,
Civil Investigation & Design Wing,
J&K State Power Development Department,
Bemina, Srinagar (J&K)

No:
Dated:

Subject:- Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan.

Reference: - N.I.T. No: 04CMD- Works of 2011 Dated:- 09-11-2011 issued by the Executive Engineer CMD USHP-II.

Sir,

1. With reference to the above NIT and having examined the Tender Documents for the above named work besides satisfying myself / ourselves of the terms & conditions , duties required and the conditions prevailing at site of work,as per the tender documents, I / We offer to execute the said work in conformity with the said "Terms and conditions" "General Conditions of the Contract" "Technical specifications and Drawings" my / our tendered rates are detailed in the Schedule of prices.

2. If, my / our tender is accepted, I / we undertake to construct and complete the work within the stipulated period.

3. And I/We further undertake that if my / our tender is accepted, I /we will enter into and execute, an agreement in the form specified , within the scheduled time, when called upon by the Chief Engineer, Civil Investigation and Design Wing PDC, Bemina, Srinagar (J&K) to do so.

4. I/We agree to abide by the offer submitted by us and by the terms / conditions of this tender for a period of 180 calendar days from the date fixed for opening the same and it shall remain binding upon me / us and may be accepted at any time before expiry of that period. I / We agree that until a formal agreement is prepared and executed, this tender together with your written acceptance thereof shall constitute a binding contract between us.

5. a. I / We have enclosed an Earnest money for Rs. (Rupees_____) in the shape of _____ bearing No:_____ with the tender vide enclosed receipt No:_____ dated:_____-

b. I/We further agree that if I/We withdraw the offer in full or part on the tendered rates before the expiry of the validity period as per clause (4) above, the earnest money deposited shall be liable to forfeiture in addition to other penalities ,under rules, at the discretion of the Executive Engineer/ Chief Engineer, Civil Investigation & Design Wing PDC Bemina, Srinagar.

6. I / We agree to the deduction of the Security Deposit from all progressive bills as per clauses of the General Conditions of the contract.

7. I/We understand that you are not bound to accept the lowest or any tender you may receive.

8. i. I/We understand that the decision of the Corporation in determining my / Our eligibility to undertake the work shall be binding on me / us and that no claim on this account shall be entertained by the Corporation.

ii. No allowances for dewatering, diversions, construction of haul / approach roads, head load, carriages, water charges etc. shall be claimed as all rates are inclusive of all these charges, if any involved.

9. The rates quoted are for finished items and no wastage whatever shall be claimed, unless otherwise provided in the terms of contract.

10. Should this tender be accepted, I/We undertake to mobilize for the work at site in full, with stand- by arrangements as per site requirements, within 15 day from the issue of the allotment / letter of intent in my / our favour.

11. Rates quoted for earth work items shall apply to all sorts of classification of Earth work for the work including blasting , disposal, and the rates thus quoted are not subject to any revision whatever the type of soil is encountered during the execution.

12. I/We further agree that the Earth work excavation if any done on trial pits in this reach falling within the alignment is not payable to us and excavation quantity on this activity shall be deducted from our overall excavation quantity of the work.

13. I/We further agree that all cement works shall be laboratory tested for aggregates (coarse/fine) , cement ratio, Cube strength etc. and the testing charges shall be borne by me/us.

Date this_____day of_____

For and on behalf of_____

Signature._____

In the capacity of_____

Duly authorized to sign tenders for and on behalf of._____

Witness:

Address:

Occupation:

Witness:

Address:

Occupation:

Cover-I

Terms and Conditions

1. **ELIGIBILITY AND MINIMUM CRITERIA FOR QUALIFICATION.**

(A) To be eligible for pre-qualification, tenderers shall provide evidence satisfactory to the Employer of their capability and adequacy of resources to carry out the Contract effectively. To this end, all tenders submitted shall include the following information to be furnished in "Cover-I" of PART –I of the Tender:-

i. Details of similar type of work completed by the Tenderer in Form I as on date of tender.
ii. Details of works tendered for the works to be completed as on the date of submission of tender in Form II.
iii. Details of Plant and equipment immediately available with the Contractor / Firm for use on this work in Form III.
iv. Declaration by the applicant / tenderer in Form IV.
v. Any other relevant additional information in form V or on the letter Head of the Contractor / Company /Corporation.

(B) For the Purpose of this particular contract, tenderers should meet the following qualifying criteria as a minimum:-

i. The tenderer has to produce documentary proof i.e. Original/attested copies of allotments/agreements/completion certificates from the concerned departments of having successfully completed works during last seven years, the magnitude whereof should nort be less than either of the following:-

a. Three similar completed works (RCC Hydraulic Structures) each costing not less than the amount equal to 40% of the estimated advertised cost.

OR

b. Two similar completed works (RCC Hydraulic Structures) each costing not less than the amount equal to 50% of the estimated advertised cost.

OR

c. One similar completed work (RCC Hydraulic Structures) costing not less than the amount equal to 80% of the estimated advertised cost.

ii. The tenderer should have average financial turnover during the last 3 years ending 31st March of the previous financial year, at least 30% of the estimated advertised cost for which the original Bank statement duly authenticated by the concerned Bank /Charted Accountant shall be entertained.

iii. Earnest money (EM) of Rs. 7.23 lacs in the shape of FDR/Bank Guarantee/DD pledged to the Account Officer with Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar, (payable at Srinagar) should be attached with the Pre-qualification Documents in Cover-I. EM in the shape of cheque/cash shall not be entertained. Any tender without EM shall be rejected out rightly.
iv. The tenderer should furnish latest clearance from Income tax Department.

(C) **Price Bids.**

i. Price bid in "Cover-II" of the tender shall be opened only after ascertaining the competency / eligibility of the individual tenderers to undertake the job as per the qualifying criteria indicated above.

ii. Before opening of price bids, scrutiny / clarification of Contractors observation (if any) shall be made / obtained. Authenticity of Earnest money deposit will also be ascertained beforehand.

2. As the time of completion is of paramount importance only such tenderers may tender for the work who have the resources and experience to complete the work by or before completion period.

4. The tenderers shall have to furnish with their tender a clearance certificate from the Income Tax Department.

5. The Tenderers should attach with their tender a list of Construction equipment (with value of each item in present conditions) which they have in their possession and can be employed by them on this job. They should also submit list of other equipments (with value) which they intent to procure for deployment on this job so as to ensure its timely completion.

6. The tenders in two covers should be addressed to the "Chief Engineer, Civil Investigation & Design Wing, PDC, Bemina, Srinagar (J&K)" so as to reach his office before due date and time. The name of the work, name of tenderer and the tender "Cover-I" and "Cover –II" should be written legibly on the Envelopes.

7. Tenders are to be submitted by Registered post / Speed Post / Courier Service. The Tenderers should make sure that the tender reaches the office of the Chief Engineer, Civil Investigation & Design Wing PDC, Bemina, Srinagar, well before the prescribed date and time.

8. In case of any dispute between the tenderer and the Corporation, the Arbitrator who-so-ever, shall not enjoy the Power of awarding the interest on principal amount of dispute in a Contract both for pre-award as well as post award.

9. Any tender received on expiry of prescribed date and time will not be entertained.

10. Any tender by telegram shall be rejected.

11. The Chief Engineer (tender opening authority) reserves himself the right to accept / reject any tender without assigning any reasons thereof.

FORM-I

WORK OF SIMILAR TYPE AND MAGINITUDE OF THE WORK UNDER CONSIDERATION

COMPLETED BY THE TENDERER

SNo.	Name of the Work	Place and country	allotted cost	Time of completion as per contract and actual Time in which completed	Date of completion	Principal features

Signature of Contractor No. of Correction Executive Engineer

FORM-II

WORKS TENDERED FOR AND WORKS TO BE COMPLETED AS ON THE DATE OF

SUBMISSIOM OF THE TENDER

S NO.	Name of work	Place and country	Works in hand			Works tendered for			REMARKS
			Allotted cost of Work	Remaining to be executed	Anticipated date of completion	Estimated cost	Date When Decision Is expected	Stipulated Date And period of completion	

Signature of Tenderer No. of Correction Executive Engineer

FORM-III

DETAILS OF PLANT AND EQUIPMENTS IMMEDIATELY AVAILABLE WITH THE

TENDERER FOR USE OF THIS WORK

S No.	Type of equipment	No. of Units	Kind and Make	Capacity	Age and Condition	Remarks

Signature of the Tenderer

FORM – IV

DECLERATION

Name of the work _____.

_____.

_____

I / We declare that I/We have made myself / ourselves thoroughly conversant with the local conditions, site conditions and availability of labour, material, equipment and other such inputs on which I/We shall base my / Our rates for this work. I/We have carefully gone through and hence understood all the general specifications and design/drawings pertaining to all items of the work.

Signature of the Tenderer

FORM – V

ADDITIONAL INFORMATION

Signature of the Tenderer

2.

AGREEMENT

This agreement made on this_____day of _____ between the Managing Director of the Jammu and Kashmir Power Development Corporation (hereinafter referred to as the Government of J&K) which expression shall include its successors, assignees, represented by Power Development Corporation and M/S_____
(hereinafter called the "Contractor" which expression shall include their successors and assignees of the other part.

Whereas, the Jammu and Kashmir State Power Development Corporation, invited tenders for the work of "Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan"
(herein called the "Work") and the Contractor has furnished his tender and other conditions in response to the invitation of tenders.

Whereas, the J&K State Power Development Corporation have accepted the tender submitted by the Contractor for the execution of this work covered under and required to be done under this agreement upon the terms and subject to the conditions as mentioned herein below and in this agreement.

The contract comprises the following component parts, all of which shall form an integral part of this contract as if herein set out verbatim or if not, attached as if hereto attached.

1.	Document No: I	Notice Inviting Tender.
2.	Document No: II	Letter of Award and letter of Acceptance.
3.	Document No: III	Tender as finally accepted comprising of:- I. Information and instructions for tenderers. II. Tender forms and Schedules. i. Tender Forms ii. Contractor's warranty. iii. Schedule "A" Schedule of Quantity and prices. iv. Schedule "B" Schedule of material to be issued to the Contractor. v. Schedule "C" Completion Schedule of Works and compensation for delay. vi. Schedule" D" Reference to General conditions of the contract. vii. Schedule "E" Special features / conditions of the contract. viii. Schedule "F" Construction Plant,

		equipment and Machinery and its planning schedule.
		ix. Schedule "G" List of plant, machinery and equipment immediately available with the Contractor for deployment on the works.
		III. General Conditions of contact.
		IV: Deeds of guarantee and hypothecation etc. referred to therein.
		V. Special condition s of the contract.
		VI Annexure
4.	Document No: IV (Part –II-of tender document)	Technical specifications, along with Scope of of works and general information about Various works of project.
5.	Document No: V (Part - III of Tender document)	Specification Drawings and Tender Drawings.

The expression "Government of Jammu and Kashmir" and "The Managing Director, J&K State Power Development Department" unless the context otherwise requires shall deem to mean and include "Power Development Corporation (JKSPDC)" and vice versa.

Now these present witness and parties hereto hereby agree and declare as follows, that is to say in consideration of the payments to be made by the "Managing Director, the Jammu and Kashmir State Power Development Corporation," the contractor shall execute the said works in the manner as prescribed in the agreement of which are implied or may be reasonably necessary for the completion of the said work on the terms and conditions mentioned in the contract.

In witness whereof the parties hereto have signed this agreement hereunder on the date respectively mentioned against the signatures of each
at _____

For and on behalf of
Contractor.

Place:_____

Witnessed by: -

For and on behalf of
MD J&K SPDC

Signature:_____
Designation:_____

Place:_____

Witnessed by:-

3.

Information & Instructions for Tenderers.

3.

INFORMATION AND INSTRUCTIONS FOR TENDERERS.

1. The details of work to be carried out and its scope are given in the "Technical Specifications" of these documents which also indicates a brief description of the project where work is to be executed. The tenderers are advised to study the same carefully before tendering and they shall be deemed to have fully acquainted themselves with the same.

2.1. The tenderers, in their own interest, are also advised to inspect and examine the site and its surroundings and satisfy themselves, before submitting their tenders, in respect of the site conditions including but not restricting to the following which may influence or effect the work or cost thereof under the contract:-

a. Site conditions including access to the site, existing and required roads and other means of transport / communication (other than that of the Corporation) for use by him in connection with the work.

b. Requirement and availability of land and other facilities for his enabling works, colonies, stores and workshops etc.

c. Ground condition including those bearing upon transportation, disposal, handling and storage of materials required for the work or obtained there from.

d. Source and extent of availability of suitable materials including water etc and labour(skilled and unskilled), required for work and Laws and Regulations governing their use and employment.

e. Geological, meteorological, climatological ,topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work.

f. The limit and extent of surface and sub-surface water to be encountered during the performance of the work and the requirement of drainage and pumping.

g. The type of equipment and facilities needed, preliminary to, for and in the performance of the work, and

h. All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or effect the work or the cost thereof under this contract.

2.2 The tenderers should note that information, if any, in regard to the site, local conditions, as contained in these tender documents, except for the material agreed to be supplied by the Corporation has been given merely to assist the tenderer and is not warranted to be complete.

2.3 The tenderers should note and bear in mind that the Corporation shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge, as aforesaid, on the part of the tenderers shall be at their risk and

cost and no charges or claims whatsoever consequent upon the lack of any information, knowledge of understanding shall be entertained or payable by the corporation.

3. The tender should be submitted in the prescribed form and the same should be signed properly as laid down hereunder:-

a. If the tender is submitted by an individual, it should be signed by the proprietor above his full name and full name of his firm with its current business address.

b. If the tender is submitted by a proprietary firm it should be signed by the proprietor above his full name and full name of his firm with its current business address.

c. If the tender is submitted by a firm in partnership, it should be signed by all the partners of the firm above their full names and current business addresses or by the partner holding the Power of attorney for the firm by signing the tender in which case a certified copy of the Power of Attorney shall accompany the tender. A certified copy of the partnership deed and current business address of all the partners of the firm shall also accompany the tender.

d. If the tender is submitted by a limited Company or a limited Corporation, it shall be signed by a duly authorized person holding the powers of attorney for signing the tender in which case a certified copy of the power of attorney shall accompany the tender. Such limited companies or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.

e. If the tender is submitted by a group of firms, the sponsoring firm shall submit complete information pertaining to each firm in the group and State along with the bid as to which of the firm shall have the responsibility for tendering and for completion of the contract document and furnish evidence admissible in law in respect of the authority assigned to such firm on behalf of the group of firms for tendering and for completion of the contract document. The full information and satisfactory evidence pertaining to the participations of each member of the group of firm in the tender shall be furnished along with the tender.

f. All witnesses and sureties shall be persons of status and their full names, occupations and addresses shall be stated below their signatures. All signatures to be affixed on each page in the tender shall have to be dated.

g. The tender for the works shall not be witnessed by a tenderer or tenderers who himself / themselves has / have tendered or who may and has / have tendered for the same works. Failure to observe this condition shall render the tender of the tenderer tendering as well as of those witnessing the tender liable to rejection.

4. The tenderer shall furnish with his tender:-

a. The details of construction plant, equipment and machinery and its planning Schedule as required vide Schedule “F” of the tender document.

b. The details of plant, equipment and machinery immediately available with the tenderer for deployment on the work as required vide Schedule ”G” of tender document.

c. The details of plant, equipment and machinery and its planning proposed to be used for the work for which Import licenses and release of foreign exchange, if any may be required by the tenderer.

d. Details of technical and supervisory personnel already employed by tenderer which he proposes to utilize for this work and such other personnel which he proposes to employ further for this work.

e. Relevant information on the capacity, financial resources and experience about himself.

5. A: Earnest money (EM) of Rs. 7.23 lacs in the shape of FDR/BankGuarantee/DD pledged to the Accounts Officer with Chief Engineer, Civil Investigation and Design Wing, PDC, Bemina, Srinagar, (payable at Srinagar) should be attached with the Pre-qualification Documents in Cover-I. EM in the shape of cheque/cash shall not be entertained. Any tender without EM shall be rejected out rightly.

B: Tenders not accompanied by Earnest money deposits shall be rejected. If during the tender validity period, the tenderer withdraws his tender, the earnest money deposit shall be forfeited.

C: The Earnest money Deposit will be returned to the unsuccessful tenderers.

6. The rates shall be written both in words and in figures. A tenderer shall also show the total of each item, the total of each Schedule and the grand Total of the whole contract. Corrections, if any, shall be made by crossing out initialing, dating and rewriting. In case of conflict between the figures and words in the rates, the later shall prevail.

7. The Corporation shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest or any tender or to give any reasons for their decision.

8. The Chief Engineer, Civil Investigation & Design Wing PDC, Bemina, Srinagar, or his duly authorized representative will open the tenders in the presence of tenderers who may be present at the time. If any of the tenderers or his agent is not present at the time of opening of tenders, the Chief Engineer, Civil Investigation and Design Wing PDC Bemina, Srinagar or his duly authorized representative will, on opening of tenders of the absentee tenderer, prepare a statement of the attested and unattested corrections in the tender over his signatures. Such a list shall then be binding on the absentee tenderer.

9. The tenderers shall not be entitled during the period of validity of their offers, without the consent in writing of the Corporation to revoke or withdraw their tenders or vary in any respect the tender given or any term thereof. In case of a tenderer revoking or withdrawing, his tender or varying any terms in regard thereof without the consent of the Corporation in writing, the tenderer shall forfeit his earnest money paid along with the tender and is also liable to other penalties as applicable under rules.

10. The “Notice inviting Tender” and this “Information and instructions for tenderers” shall form a part of the tender document.

To

The Chief Engineer,
Civil Investigation & Design Wing,
J&K State Power Development Department,
Bemina, Srinagar (J&K)

Sir,

I/We have Read and examine the following tender documents relating to the work of "Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan"

1. i. a. Notice Inviting Tender
b. Information and instructions for tenderers.
c. Warranty
d. Schedule A,B,C,D,E,F and G.
f. Special conditions along with Annexures.
ii. Technical Specifications.
iii. Drawings.

2. I/We hereby tender for execution of the works referred to in the documents mentioned in paragraph-1. above upon the terms and conditions contained or referred to in the aforesaid documents and in accordance to all respects with the Specifications, designs, drawings, and other details given therein and at the rates contained in Schedule "A" and within the period of completion as given in Schedule "D" and subject to such terms and conditions as stipulated in relevant clause.

3. I/We agree to keep this tender open for acceptance for 180 days from the date of opening of price bid thereof and also agree not to make any modifications in its terms and conditions of our own accord.

4. A Sum of Rs._____ (Rupees_____) Only is hereby forwarded in the form of Bank Guarantee/CDR/FDR/Demand Draft as Earnest Money.

5. I/We agree that if I/We fail to keep the validity of tender open, as aforesaid. ,or make any modification in the terms and conditions of my/our own accord and/or after the acceptance of our tender if I/We fail to commence the execution of the works as provided in the tender document referred to paragraph-1 above, I/We shall become liable for forfeiture of my/our Earnest Money, as aforesaid and the Corporation shall without prejudice to any other right or remedy, be at liberty to forfeit the said Earnest Money and initiate other penalties against us for our such default.

6. Should this tender be accepted, I/We agree to abide by and fulfill all the terms and conditions and provisions of the above mentioned tender documents.

7. I/We certify that the Tender submitted by me/us is strictly in accordance with the terms and conditions, Technical Specifications etc. as contained in your Tender

documents, referred to in paragraph-1 above and it is further certified that it does not contain any deviations to the aforesaid documents.

Witness_____

Date _____

Signature in the capacity of

_____

Duly authorized to sign the tender on behalf of

(IN BLOCK LETTERS)

_____

_____

Address_____

_____

Date_____

Address_____

_____

WARRANTY FORM

M/S_____having its registered office at (give complete address for communication) _____
(hereinafter referred to as the contractor) have carefully studied all the documents Technical Specifications, Drawings etc. pertaining to the contract for work -
"Modernization of Spill channel from RD 801.7M to RD 861.7M including super passage and diversion of Bamlina nallah , USHP-II, Kangan" ,local site conditions and having undertaken to execute the said work do hereby Warranty that:-

1. The Contractor is familiar with all the requirements of the contract.
2. The contractor has visited the site and assessed the local site conditions and satisfied himself regarding the character of the work and local conditions that may affect the work or its performance.
3. The contractor is satisfied that the work can be performed and completed as required in the contract.
4. The contractor has no collusion with other contractors, with any of the men of Engineer Incharge or with any person in Corporation to execute the said works according to the terms and conditions of the said contract.
5. The contractor has not been influenced by any statement or promise of the Corporation or Engineer Incharge but only the contract documents.
6. The contractor accepts all risks directly or indirectly connected with the performance of the contract.
7. The contractor is financially solvent.
8. The contractor is experienced and competent to perform the contract to the satisfaction of Engineer Incharge.
9. The statement submitted by the contractor is true.
10. The contractor is familiar with all general and special Laws, Acts, Ordinances, Rules and Regulations of the Municipalities, District, State and Centeral Government that may affect the execution of work, its cost /performance or personnel employment therein.

Date:_____

For and on behalf of the
Contractor

Tender forms and Schedule:

Schedule "A"

(BOQ)

SCHEDULE OF ITEMS AND QUANTITIES

FOR

Modernization of Spill channel from RD 801.70 M to RD 861.70 M

OF

UPPER SINDH HYDEL PROJECT STAGE – II

KANGAN KASHMIR.

2

TOP SHEET

(1) Modernization of spill channel from RD 801.70 M to RD 861.70 including super passage and diversion of Bamlina nallah, Upper Sindh Hydel Project Stage-II, Kangan.

(2) Tender notice No: 04/CMD-Works of 2011 dated:- 09. 11. 2011, Circulated by the Executive Engineer, Civil Maintenance Division, USHP-II, Kangan vide his endorsement No: USHP-II /CMD/ 2263 – 94 dated:- 09. 11. 2011,

(3) Estimated cost = Rs. 361.49 lacs.

(4) Time of completion:- Six calendar months.

(5) Date of receipt / opening: 30 . 11 . 2011

Tender document issued to M/S_____

Prop:_____

Son of _____

R/O:_____

Class of Contractor:_____

Registration No:_____

(6) Reference to BD No:_____ dated:_____. 11. 2011

Executive Engineer,
Civil Maintenance Division,
USHP-II, Kangan.

Schedule "A"

Rate list for Modernization of Spill channel from RD 801.70 M to RD 861.70 M USHP-II Kangan.

S.No	Item of work	Quantity	Unit	Rate to be quoted by the contractor all inclusive.
01.	Dismantling of Reinforced cement concrete manually by way of compressor, concrete breaker, jack hammer, drilling chisels and other connected accessories, including charges of gas cutter of embedded reinforcement bars with all other connected charges including disposal of dismantled muck to the dumping site with all leads and lifts up to 6 Km. including head load carriage of cut lengths of embedded steels reinforcement of various dia to the project store Margund including all other connected charges for the complete job.	318.00 Cu.M.	Cu.M.	
02.	Dismantling of plain cement concrete manually by way of breaking with pneumatic concrete breakers including charges of compressor, concrete breaker, jack hammer, drilling chisels and other connected charges for the complete job.	67.00 Cu.M.	Cu.M.	
03.	Earth work excavation in all sorts of soil under all conditions of saturation, including breaking of boulders including disposal of excavated earth up to dumping site 6 Kms. including all other connected charges for the complete job.	9093 Cu.M.	Cu.M.	
04.	Providing and laying sand filter media including cost and carriage of sand from Ganderbal (selected sand as per specification) including all other connected charges for the complete job.	82.00 Cu.M.	Cu.M.	

Head Draftsman Executive Engineer Signature of Tenderer

Rate list for Modernization of Spill channel from RD 801.70 M to RD 861.70 M USHP-II, Kangan.

S.No	Item of work	Quantity	Unit	Rate to be quoted by the contractor all inclusive.
05.	Providing and laying plain cement concrete, M-10 1:3:6, 1 cement 3 coarse sand : 6 crushed aggregate 20 mm nominal size or as per the designed mix including cost and carriage of all the materials from the approved source, including cost and carriage of Jhelum brand 43 grade JK cement from the open market, including charges for mixing with mechanical mixers, laying of concrete in proper position, compacting with vibrators including water charges and curing including head load of all the materials, including all other connected charges for the complete job (cost of form work shall be paid separately	123.00 Cu.M.	Cu.M.	
06.	Providing and laying reinforced cement concrete M-20 (1:11/2:3) 1 cement : 1.5 coarse sand : 3 crushed aggregate 20 mm nominal size or as per the designed mix conforming to IS 456 (latest) including cost and carriage of all the materials from the approved source, including cost and carriage of Jhelum brand 43 Grade JK Cement from the open market including cost for supply and application of synthetic fiber (polyester 12 mm Recron 3S @ 12.5 gms per 50 Kgs. of cement) including charges for mixing with mechanical mixers, laying of concrete in proper position compacting with vibrators including water charges and curing including head load of all the materials, including all other connected charges for the complete job (cost of form work / reinforcement shall be paid separately)	1894.00 Cu.M.	Cu.M.	

Head Draftsman Executive Engineer Signature of Tenderer

Rate list for Modernization of Spill channel from RD 801.70 M to RD 861.70 M USHP-II, Kangan.

S.No	Item of work	Quantity	Unit	Rate to be quoted by the contractor all inclusive.
07.	Form work to sides of raft, wall etc. and attached features for in situ concrete work by using steel sheeting including tack welding wherever required including centering scaffolding, including all other connected charges for the complete job (The surface area in contact with concrete shall be paid only	5064.00 S.M.	S. M.	
08.	Providing and fixing of 150 mm SWG Galvanized iron sheets 24 gauge for concrete joints in structures wherever required including cost and carriage of G.I. sheets of standard quality from open market, including all other connected charges for the complete job.	1390.00 R.M.	R. M.	
09.	Earth work available excavated earth, all sorts of soil and filling compacted previous materials excluding stones and shingles over 75 mm size on sides of wall or wherever required with all leads and lifts, watering dressing, ramming in 150 mm layers by hand rammers including all other connected charges for the complete job.	1388.00 Cu.M.	Cu.M.	
10.	Supply and fixing of 225 mm wide PVC water seal dumbbell type with central bulb for expansion joints conforming to ISI 2220 specifications for watertight joints in bed and sides of the channel, including vulcanizing of joints filling of water face sides of grooves with 12 mm wide and 40 mm deep sealing compound including painting of grooves with primer @ 1ltr. Per 4 Sq.M. including providing of 12 mm thick bituminous joint filler in joints on either sides of PVC seal and applying of 10 mm minimum asbestos fiber bituminous mastic between the faces at joint, including cost and carriage of PVC seal, sealing compound, primer, bituminous fiber, including all other connected charges for the complete job.	337.00 R.M.	R. M.	

Head Draftsman Executive Engineer Signature of Tenderer/s

Rate list for Modernization of Spill channel from RD 801.70 M to RD 861.70 M USHP-II, Kangan.

S.No	Item of work	Quantity	Unit	Rate to be quoted by the contractor all inclusive.
11.	Supply, straightening, cutting, bending, binding and placing of tar steel reinforcement bars conforming to IS 1786 (latest) for R.C.C. works of required shape land size in proper position as will be specified including tack welding wherever required including cost and carriage of tar steel from authorized dealer of SAIL, including cost and carriage of binding wire, with all leads and lifts including all other connected charges for the complete job.	265.50 M.T.	M. T.	
12.	Providing and laying plain cement concrete M-15 (1:2:4) 1 cement:2 coarse sand: 4 graded stone aggregate 20 mm nominal size or as per design mix, including cost and carriage of all the materials from approved source, including cost and carriage of Jhelum brand 43 grade JK cement from the open market, including charges of mixing by mechanical mixers, laying of concrete to proper position compacting with vibrators, including water charges and curing, including head load of all the materials, including all other connected charges for the complete job.	32.00 Cu.M.	Cu.M.	
13.	Providing and mixing admixture repidite in concrete (30% of total quantity only) including cost and carriage of the material, including all other connected charges for the complete job (Concrete work needed to be executed during lean/winter period.	15000.00 Liters.	Liter.	

Head Draftsman Executive Engineer Signature of Tenderer/s

Schedule "B"

The rates quoted should include the cost for procurement of all required materials like Cement, Steel of Sorts, Structural steel, Spun Pipes and Explosive etc. including its carriage to site of work for complete job.

Executive Engineer,
Civil Maintenance Division
Upper Sindh Hydel Project Stage II
Kangan.

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Schedule "C"

COMPLETION SCHEDULE OF WORK AND COMPENSATION OF DELAY

S No.	Description of works Groups/Sub Groups	Completion time/ Date	Compensation of Delay
1	Excavation including bed treatment by way of filter bed, mud mat etc.	Within five months from date of issue of allotment / letter of intent	0.5 % (half %) of contract sum per week of delay subject to maximum delay of eight weeks , where after, in addition to this penalty, the engineer –in-charge shall have the powers to augment men, material, machinery and equipment (or to get the work executed, in part /in full), through other means at the risk and cost of the contractor. In addition to this, beyond a delay of eight weeks, the contractor shall be liable for additional penalty @ Rs 10000 (Rupees Ten Thousand) per each day of delay.
2	Work of concreting finishing works complete in all respects including repairs and testing, site clearance, commissioning and handing over of work to Engineer-in-charge.	Within six months excluding mobilization period of 15 days from date of issue of allotment/letter of intent.	Same as above

Note:

The contractor shall have to complete the work as a whole covered under this contract before or up to six months from the date of issue of allotment or letter of intent , failing which he shall be liable to penalty @ ½ % (half %) of contract sum per week of delay subject to a maximum of 5 % of contract sum for a total cumulative delay of ten weeks. Beyond this delay, in addition to this penalty, action as enumerated above in schedule – C, shall be initiated against the defaulting contractor.

Schedule "D"

REFERENCE TO GENERAL CONDITIONS OF THE CONTRACT.

S.No.	Clause No.	Description.	Stipulations.
1.	13	Advances	No advances for mobilization, machinery, equipment, material, labour and the like shall be paid.
	13.1(A)	Simple interest per annum on lump sum advance.	Not applicable in view of above
	13.1(B)	Simple interest per annum of sum advanced on purchase of plant and equipment	Same as above
2.	18.2(iii)	Market rate-percentage addition to cover contractor's overheads, profits, supervisions and other charges.	25% (excluding the taxes payable by the contractor)
3.	23	Power Supply Tariff Rate.	Rs.2.65 Per Unit + 22% electricity duty for metered OR Rs.900/- Per KW + 22% electricity duty for non metered
4.	39.1	Time allowed for execution of work	The work as a whole to be completed in all respects within six calendar months.
5.	42	Defect liability period.	12 calendar months from certified date of final completion of entire work covered under the contract.
6.	45	Price Variation:	
		i. Percentage of labour component in the value of work	20% ([percent)
		ii. Percentage of material component in the value of work (excluding departmental material issued)	15% (percent)
		iii. Percentage of component of respective item of P.O.L. a. Petrol b. H.S.D. c. Lubricants.	 1% (percent) 5% (percent) 4% (percent)

SCHEDULE 'E'

Special features of the contract and requirement of equipment for the work

Location:

`Approximately 45 Kms. From Srinagar city at Kangan in district Ganderbal, on Srinagar-Leh National Highway.

Road Link:

The site is approachable from nearest Jammu Rail Head / Udhampur Railway Station. From Udhampur, Kangan Town is approachable by Road approximately 300Km on Srinagar-Leh National Highway. From Kangan to site of work is about 4 Kms toward North East on Kangan- Wangth road. The access to site is by fair weather approach road via Forwbay and BR at village Burnbugh.

Climate:

The summer climate in the area is cooler than Jammu with Maximum Temperature upto 36 degrees Celsius. The rainy season commences from July and lasts upto ending August. The winter rains and snowfall generally starts from late November with mercury dipping up to 12 degrees Celsius below freezing point of zero degree Celsius during severe part of winter from 21ST December to 28th February.
The average annual precipitation in the area goes up to 750 mm.

Bench Mark and setting of Work:

The contractor shall be given permanent Bench Mark and also the upstream and downstream levels of the tunnel and cut and cover conduits at the time of work is started. The inlet location and exit location at site will be identified by the Engineer In charge.

Setting out of work both on surface and inside the tunnel including the alignment, curves and connection with the exiting upstream and downstream water conductor will be the responsibility of the contractor during the mobilization period and the charges on that account shall be borne by the contractor and it is deemed that the same has been considered by the contractor while bidding for the relevant unit rates.

Power Supply:

Supply of Power for construction purposes, the connection will be provided by the Corporation near the site but proper electric distribution line inside and outside the working area, shall however be laid and maintained by the contractor at his own cost.

The contractor shall be required to pay electric charges @Rs.5/- per Unit (Kw-hr) on meter basis to the electric department/Corporation.

The contractor shall however make his own stand by arrangements in the form of D G Sets of adequate capacity to keep the work going on uninterrupted during power failure and shut down if any. The Corporation shall not take any responsibility for power failure and consequent interruption which will take place on the work.

Scope of work:

1. Earthwork in excavation consolidation of sub-base**.**
2. Filter media.
3. RCC works.
4. Back filling/bolder filling.
5. Other item of work as may be required to be carried out for completing this work for commercial use.

SCHEDULE 'F'

CONSTRUCTION PLANT, EQUIPMENT AND MACHINERY AND ITS PLANNING SCHEDULE

SNo	Name of plant/ Equipment and machinery and its use for construction	Year of make and capacity	Source / Sources of Mobilization	No. to be deployed for this work Month wise phasing in accordance with construction schedule									
				1	2	3	4	5	6	7	8	9	

Note:

1. The above Schedule will be supplemented from time to time, to the tune to achieve the required targets and as per the directions of Engineer In charge.

2. Under the Head Source/s of Mobilization, the contractor should indicate whether equipments are free to use for this work or equipments are to be mobilized from his existing contracts or fresh purchases etc.

SCHEDULE 'G'

LIST OF PLANT, MACHINERY AND EQUIPMENT IMMEDIATELY AVAILABLE WITH COMTRACTOR FOR DEPLOYMENT ON THE WORKS

(TO BE FURNISHED BY THE TENDERER)

SNo	Name of Machinery	Quantity	Description size, Capacity model etc.	Condition	Year of service	Present Location

5.

General Conditions of the Contract.

5.

GENERAL CONDITIONS OF THE CONTRACT

CLAUSE No.1 DEFINITIONS:

In the Contract, the following expression shall, unless the contract otherwise requires, have the meanings thereby respectively assigned to the:-

i. **Contract:**
means the document forming the tender, acceptance thereof and the formal agreement executed between the corporation and the contractor, together with documents referred to therein. Otherwise it shall mean the Notice Inviting tender, Information and Instructions for tenderers, Conditions laid down in the Tender document (including warranty, "Schedules attached thereto, General conditions of the contract, Special conditions if any, specifications, Designs, Drawings, offer submitted by tenderer with its acceptance from the corporation after clarifications / final negotiations with the tenderer, and letter of Award / letter of intent thereof.

ii. **Contract sum:**
means the amount arrived at by multiplying the quantities shown in the Schedule of Quantities and prices by the respective item rates as allotted by the allotting authority, with acceptance of the tenderer, after clarifications and negotiations , with him, if any.

iii. **Contractor:**
means the successful tenderer who is awarded contact to perform the work covered under these tender documents and shall be deemed to include the Contractor's executors, representatives or assignees approved by the Engineer in charge.

Iv: **Government:**
means Government and Kashmir State.

V: **Day :** means the calendar day beginning and ending at midnight.

Vi: **Drawings:**
Means the drawings referred to in the specifications and / or appended with the tender document, any modification of such drawings approved in writing by the Engineer in charge and shall also include drawings issued for actual construction of the works from time to time by the Engineer in charge.

VII: **Engineer in charge**:
Means the Engineering Officer appointed by the Corporation to sign or cause to sign the contract agreement on behalf of the Corporation and / or the Engineer Officer appointed by the Corporation or its duly authorized representative to direct, supervise and be in charge of the works for the purpose of this contract.

viii. **Engineer**:
Means the Chief Engineer, Civil Investigation and Design Wing PDC Srinagar or such other officer to act as the Engineer. It shall also mean and

include Superintending Engineer, Executive Engineer, Assistant Executive Engineer, Assistant Engineer directly in charge of the work or any part thereof under the administrative control of Chief Engineer, as long as he is not final authority, in which case this term shall mean the Chief Engineer, Civil Investigation and Design Wing PDC Srinagar.

Ix: **Site**:

Means the land and / or other places, on under in or through which the works are to be executed including any other land or places which may be allotted for the purpose of the contract.

X: **Month**:

shall mean the Calendar month.

XI: **Plant**:

shall mean and include any or all plant construction machinery equipment, tools, and other implements of all descriptions necessary for speedy execution of the work in safe and workman manner.

XII: **Tests**:

means such tests as will be required to be carried out during execution and after completion of the work either by the Contractor or by the Engineer at site of work or at requisite testing laboratories, to ascertain the quality of the work done. Tests on completion will mean the final test inclusive of water test and the above tests without which the work cannot be certified as satisfactory and taken over by the Engineer.

CLAUSE No.2 INTERPRETATIONS:

2.1 Works impetrating the singular only shall also include the plural, he includes she and vice versa unless this is repugnant to the context.

2.2. Heading, and marginal notes in these General conditions shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof of the contract.

CLAUSE No.3. SECURITY DEPOSIT FOR PERFORMANCE:

3.1. The contractor for due performance of the contract, within thirty days from the date of issue of Letter of Award, shall furnish an initial security deposit of two percent of the contract sum in any one of the following forms:-

a. Demand Draft on any Bank and in the name of Chief Pay and Accounts Officer, Upper Sindh Hydel Project stage IInd, Kangan.

b. Fixed Deposit Receipts with any schedule or Nationalized Bank in J&K Pledged to the Chief Pay & Accounts Officer, USHP II Kangan.

c. Bank Guarantee Bonds of the Indian Nationalized Bank or State Bank of India or any Scheduled Bank of India (Provided such scheduled Bank certifies that the Guarantees given are within the limits prescribed by Reserve Bank of India) and in the form as acceptable to the Corporation

The earnest money deposited by the Contractor along with the tender shall be adjusted towards the initial security deposit.

3.2 Including the initial security deposit under sub clause 3.1 above, the contractor shall have to furnish to the Engineer in charge security deposit for due performance of the contract a sum equal to 5% of the contract sum. Such sums of balance 3% shall be deducted by the Engineer in charge from the running account bills of the contractor @5% of the total value of each bill towards security deposit, subject to the condition that the total amount of such deductions together with the amount of initial security deposit as laid down in sub clause 3.1 above; shall not exceed 5% of the contract sum.

3.3: If the contractor expressly requests in writing he will be permitted to convert the amount of security deposit deducted from his running account bills into one of the Government security of Fixed deposit receipt of Bank Guarantee as in aforesaid sub-clause 3.1.

3.4: In case a fixed deposit receipt of any Bank is furnished by the Contractor to department as part of the security deposit the Bank goes into liquidation, or for other reasons is unable to make payment against the said fixed deposit receipt the loss caused thereby shall be borne by the contractor and the contractor shall forthwith or on demand furnish additional security to the department to make good the deficit.

3.5: All compensation or other sums of money payable by the contractor under the terms of the contract or any other contract or on any other account whatsoever, may be deducted from or paid by the sale of the sufficient part of his security deposit or from the interest arising there from or from any sum which may be due or may become due to the contractor by the department on any account whatsoever. Also in the event of the contractors security deposit being reduced by reasons of such deductions or sale, as aforesaid, the contractor shall, within fourteen days of receipt of notice of demand from the Engineer in charge make good the deficit in his security deposit.

3.6: Government papers tendered as security shall be taken at 5% (five percent) below the market price or at their face value, whichever is less.

3.7.a. Should there arise any occasion under the contract due to which the periods of validities of Bank Guarantees or the Government security as may have been furnished by the contractor from time to time, are required to be extended / renewed, the contractor at his own cost shall get the validity periods of such guarantees, deposits securities, to the Engineer in charge one month before the expiry date of the aforesaid guarantees. Deposit receipts / securities originally furnished. Also in case of any deficit in Securities on any account as might occur or is noticed the contractor shall forthwith or on demand furnish additional securities.

3.7. b. In case of failure of the contractor to strictly comply with the aforesaid provisions on any account for whatsoever reasons, the Engineer in charge shall be at liberty, notwithstanding anything contained contrary to this in the contract, to take such measures and actions, including but not restricting to the following as may be considered necessary by him under the circumstances to satisfy the provisions of contract for having the required amount of securities at the relevant time.

i. to invoke the existing Bank Guarantee, Fixed Deposit Government Securities, and or

ii. to with hold the payment of the bills or other dues of the contractor arising out of the contract till such time the aggregate of the amount of such bills reaches the level of the amount of the expired Bank Guarantee and / or the deficit in security deposit is made good or the contractor furnishes ka fresh Bank Guarantee / Fixed Deposit Receipt / Government security.

3.8. Bank Guarantees, Bank Drafts, Government Securities fixed deposit receipts as aforesaid shall be valid till the date of expiry of defect liability period under the contract (clause 43).

CLAUSE No.4 REFUND OF SECURITY DEPOSIT:

The security deposit less any amount due shall on demand be returned to the contractor on the expiry of defect liability period (referred to in clause 43 hereof) provided the Engineer in charge is satisfied that there is no demand against the contactor.

CLAUSE No.5 SUFFICIENCY OF TENDER:

The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates quoted in the Schedule of Quantities and Prices which shall (except as otherwise provided in the contract) cover all his obligations under the contract and all matters and things necessary for the proper execution and completion of the works in accordance with the provisions of the contract and its maintenance during construction.

CLAUSE No.6. CONTRACT DOCUMENTS:

6.1 The language or languages in which the contract documents shall be drawn up shall be in English and if the said documents are written in more than one, the language according to which the contract is to be construed and interpreted shall be English and designated as the “Ruling language”.

6.2 The contactor shall be furnished free of charges, four certified true copies of the contract documents.

6.3 One copy of contract document, furnished to the contractor, as aforesaid , shall be kept by the contractor on the site in good order and the same shall at all reasonable time be available for inspection and use by the Engineer in charge, his representatives or by other inspecting officers.

6.4. None of these documents shall be used by the contactor for any purpose other than that of this contract.

CLAUSE No.7. DISCREPANCIES AND ADJUSTMENT OF ERRORS:

7.1 Detailed drawings shall be followed in preference to small scale drawings and flagged dimensions in preference to scaled dimensions. In the case of discrepancy between the schedule of quantities and prices, the specifications & / or the drawings, the following order of precedence shall be observed:-

a. Description in the schedule of quantities and prices.
b. Relevant specifications &special conditions if any.
c. Drawings.
d. General specifications.

7.2. The contactor shall study and compare the drawings / specifications and the relevant information given to him by the Engineer in charge and shall report in writing to the Engineer in charge, any discrepancy and inconsistency which he

notes. The decision of the Engineer in charge regarding the true intent and meaning of the drawings and specifications shall be final and binding. Immediately on noticing any such discrepancy, error, omission or ambiguity he shall bring same to the notice of the Engineer before start of any work or such items and obtain the instructions from him. Any work done by the contractor after discovery by him of such discrepancy, error, omission or ambiguity without authorization by the Engineer will be entirely at the contractor's risk.

7.3. Any error in description, quantity or price in schedule of quantities and prices or any omission there from shall not violate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.

7.4. If on check there are found to be difference between the rates given by the contractor in words and figures the amount worked out by him in the schedule of quantities and prices and General Summary, the same will be adjusted in accordance with the following rules:-

a. in the event of discrepancy between description in words and figures quoted by a tenderer, the description in words shall prevail.

b. in the event of an error occurring in the amount / column of schedule of quantities and prices as a result of wrong multiplication of unit price and quantity, the unit price shall be regarded as firm and multiplication shall be amended on the basis of the price.

c. All errors in totaling the amount column and in carrying forward totals shall be corrected.

d. The totals of various sections of schedule of quantities and prices amended shall be carried over the General Summary and the tendered sum amended accordingly. The tendered sum so altered shall, for the purpose of tender, be substituted for such originally tendered and considered for acceptance instead of the original sum quoted by the tenderer. Any rounding off of quantities or in sections of schedule of quantities and prices or in General Summary by the tenderer shall be ignored.

CLAUSE No:8: DUTIES AND POWERS OF REPRESENTATIVE OF THE ENGINEER IN CHARGE

8.1 The duties of the representative of the Engineer in charge are to watch and supervise the works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to order any work involving any extra payment by the Department nor to make any variation in the works.

8.2 The Engineer in charge may, from time to time in writing delegate to his representative any of the powers and authorities vested in the Engineer in charge and shall furnish to the contractor a copy of all such written delegation of Powers and authorities. Any written instructions or written approval given by the representative of the Engineer in charge to the contractor within the terms of such delegation shall bind the contractor and the Department as though it has been given by the Engineer in charge.

8.3. Failure of the representative of the Engineer in charge to disapprove any work or materials shall be without prejudice to the power of the Engineer in charge thereafter to disapprove such work / materials and to order the pulling down

removal or braking up thereof. The contractor shall at his own expenses again carry out such works as directed by the Engineer in charge.

8.4. If the contractor is dissatisfied with any decision of the representative of the Engineer in charge, he will be entitled to refer the matter to the Engineer in charge who shall thereupon confirm, reverse or vary such decision and the decision of Engineer in charge in this regard shall be final and binding on the contractor.

CLAUSE No.9. ASSIGNMENT AND SUB-LETTING:

The contractor shall not sublet, transfer or assign the whole or any part of the work under the contract. Provided that the Engineer in charge may, at his discretion, approve and authorize the contactor to sublet any part of the work, which in his opinion is not substantial, after the contractor submits to him in writing the details of the part of the work(s) or trades proposed to be sublet, the name of the sub contractor thereof together with his past experience in the said work / trade and the form of the proposed sub contract. Nevertheless any such approval or authorization by the Engineer in charge shall not relieve /absolve the contractor from his any or all liabilities, contractual obligations, duties and responsibilities under the contract. The contractor shall also be fully responsible to the Department for all the acts and omissions of the sub contractor, his employees and agents or persons directly employed by the contractor. However, the employment of piece rate workers shall not be construed as sub letting.

CLAUSE No.10. FACILITIES TO OTHER CONTRACTORS:

The contractor shall, in accordance with the requirements of the work, as decided by the Engineer in charge, afford all reasonable facilities to other contractors engaged simultaneously on separate contracts and for departmental labour and labour of any other properly authorized authority or statutory body which may be employed at the site for execution of any work not included in the contract or of any contract which the Department may enter into in connection with or ancillary to the work. In all matters of conflict of interest, the Engineer in charge shall direct what compromise should be made and his decision shall be final and binding on the parties.

CLAUSE No:11. CHANGES IN CONSTITUTION:

Where the contractor is a partnership firm, prior approval in writing of the Engineer in charge shall be obtained before any change is made in the constitution of the firm.

Where the contractor is an individual or a Hindu undivided family business concern such approval, as aforesaid shall likewise be obtained before the contractor enters into any partnership firm which would have the right to carry out the work undertaken by the contractor, if prior approval as aforesaid, is not obtained, the contract shall be deemed to have been assigned in contravention of clause 37 hereof and the same action will be taken and the same consequences shall ensure as provided for in the said clause 37.

If the Contractor constitutes (under applicable laws) a joint venture, consortium or other unincorporated grouping of two or more person:

a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the contract;
b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and

c) the contractor shall not alter its composition or legal status without the prior consent of the Employer"

CLAUSE No: 12. USE AND CARE OF SITE:

12.1. The contractor will be permitted to use the site and lands under the control of the Department and required for execution of work, subject to such conditions as detailed in sub clause 12.4 ibid. The contractor shall not commence any operation on such lands except with the prior approval of the Engineer in charge.

All areas of operation including those for his staff and labour colonies, handed over to the contractor, shall be cleared and handed over back by the contractor at his own cost and expenses whatsoever to the Engineer in charge. The contractor shall make good, at his own cost , to the satisfaction of the Engineer in charge, any damage, alterations, made to areas of other property and handed over to him for purpose of these works.With the permission of the Engineer in charge, the contractor, may at his own expenses, erect temporary structures for storage sheds, office, residence etc. for non commercial use on the land handed over to him and at the completion of the work, these structures should be dismantled forthwith and the site cleared and handed over to the Engineer in charge. The lands required for providing facilities to the labour employed on the work will be allotted free of cost as per approved plan. The contractor shall also provide and maintain at his own expenses such temporary fences, guards, bridges and roads as may be necessary for the execution of his preliminary, enabling and ancillary works or for safeguarding the public, if the Engineer in charge shall order any departure from any arrangement made by the contractor, the contractor shall comply with such orders as the Engineer in charge may issue from time to time. The contractor shall not use, or allow to be used, the site / land for any purpose other than the one specified herein.

12.2 The Engineer in charge shall at his discretion and for the duration of the contract, make available land for the construction of the contractors field office (s) Colony, workshop (s) Stores, magazine for explosives in isolated locations assembly yard, land for borrow pits and quarries and access thereto over routes indicated by the Engineer in charge as may be required for execution of the work. Development including leveling and dressing of the land and construction of temporary roads (other than those to be provided by the Department under the contract) office, colonies, workshops, stores magazine etc. as per the plans approved by the Engineer in charge shall be done by the contractor at his own cost. The contractor shall get his layout plan for the enabling works approved by the Engineer in charge, before start of work. The area of land required for the enabling works shall be determined by the Engineer in charge after the plans are received and the decision of the Engineer in charge of the work shall be final and binding on the contractor. Land shall be generally made available at or near the site of work, if possible and available, other wise , at any other places earmarked for the purpose by the Engineer in charge.

12.3. The contractor shall provide at his own cost all temporary path ways / roads required at site or in quarries or barrow areas and shall alter, adopt and maintain the same as required from time to time and shall bear all expenses and charges for special or temporary way levies required by him in connection with access to the site and shall take up and clear them away and make good all

damages done to the site as and when no longer required and as and when ordered by the Engineer in charge.

12.4 The use of land as provided in sub clause 12.1 to 12.3 ibid shall be regulated and be subject to the following and such other terms and conditions as may be imposed by the department.

i. That he shall pay a nominal license fee of Rs.1000/- (Rupees one thousand) per year or part of a year for use and occupation in respect of each and every separate areas of land allotted to him.

ii. That such use or occupation shall not confer any right of tenancy of the land on the contractor.

iii. That the contractor shall be bound to vacate the land on demand by the Engineer in charge.

iv. That the contractor shall have no right to any construction over this land without the written permission of the Engineer in charge. In case he is allowed to construct any structure he shall have to demolish and clear the same at his cost before handing over the land back to the department unless agreed to the contrary.

v. That possession of site or other lands by the contactor in connection with the contract shall not be deemed to confer on him any right or interest in or over the land or possession thereof.

12.5. On completion of the work and before payment of the final bill, the contractor shall handover the vacant possession of the land licensed to him in connection with the work duly cleaned to the Engineer in charge duly made good the damages, if any done to the site.

CLAUSE No:13. ADVANCES AND RECOVERY THEREOF:

13.1 Financial assistance in the shape of recoverable advances, as considered necessary by the Engineer in charge and on written request in this regard from the contractor, may be provided to contactor for augmenting / supplementing his resources in the manner indicated hereunder. Such assistance shall not be made a pre-condition by the contractor for execution of the works.

A- ADVANCES FOR INITIAL MOBILISATION, PRELIMINARY, ENABLING AND ANCILLARY WORKS for labour mobilization, construction of offices, stores, labour huts, staff quarters, workshops, providing of services lines of power, water supply, air lines, sanitation, approaches, haul roads etc.

No such advances, what so ever , shall be released to the contractor and he is supposed to take care of all these activities, out of his own resources and at his own risk / cost. However, the plans and drawings showing the location of the preliminary, enabling and ancillary works proposed to be deployed by the contractor should be submitted, got finalized and approved from the Engineer in charge before proceeding with such works.

B- ADVANCE FOR PLANT, EQUIPMENT, Materials AND SHUTTERING:

i. No advances for procurement, carriage, shifting, installation etc of machinery, plant, equipment, materials, shuttering and the like shall be made to

the contractor and he shall have to arrange all these, out of his own resources and at his own risk and cost.

ii. The construction plant and equipment as are required for the actual execution of the work, depending upon the techniques and sequences of construction as proposed by the contractor, shall be mutually discussed and finally approved by the Engineer in charge. Such approved plant and equipment must reach the site of work in good condition duly certified both by the contractor and Engineer in charge in respect of their utility, performance and dependability.

iii. The contractor shall be responsible for maintaining the plant and equipment in good working condition during the period of execution. The contractor shall also not demobilize / remove from the site of work the plant and equipment without written permission of the Engineer in charge. In case the contractor desires to shift any such plant and equipment from the site of work, he shall do so with the written permission of the Engineer in charge.

iv. The Engineer in charge, if he so desires, but after proper consent from the contractor, shall be entitled to retain/ take over, on depreciated cost basis, any item or plant and equipment which was deployed at site, by the contractor, with or without the assistance provided by the Corporation, in any respect for such deployment . The depreciation cost of such items of plant and transfer price as laid down by the central water commission for transfer of surplus plant and equipment from one project to another and the price thus worked out by the Engineer in charge shall be final and binding upon the contractor.

v. In respect of new plant and machinery, the cost of the equipment for the purpose of this clause shall mean the cost as involved by the suppliers of the equipment, inclusive of taxes and duties. In respect of old plant and equipment the cost as evaluated by the approved value shall be taken into account. In respect of both old and new equipment, the transportation cost shall not be taken into account for this purpose. In respect of imported equipment C.I.C. cost plus custom duty shall be deemed to be the cost of equipment for the purpose of this clause.

13.2. In case suspension of work by the Department (for reasons other than default by the contractor) for more than 30 days at a time, the contractor shall be at liberty to remove the plant and equipment or any part thereof , to any other work site of the contractor within the project, for executing his other works. Provided, however, the prior to such removal the contractor shall submit to the Engineer in charge an undertaking to bring back to the site before expiry of period of suspension, the plant and equipment as may be necessary for the completion of the work.

CLAUSE No:14 COMMENCEMENT OF WORK:

14.1. The contractor shall commence the work(s) within 15 days after the issue of letter of Award / letter of intent, and shall proceed with the same with expedition and without delay as may be expressly sanctioned or ordered by the Engineer in charge. If the contractor commits default in the commencement of

the work as aforesaid, the Engineer in charge shall without prejudice to any other right or remedy, be at liberty to cancel the contract and forfeit the earnest money.

14.2 The contractor shall have to strictly adhere to such an agreed completion/construction schedule i.e. Schedule "C" However, it shall not relieve the contractor of any of his duties, obligations or responsibilities under the contact.

14.3 The contractor shall submit along with his tender, the construction planning, phasing and sequence of construction, time and Bar / progress chart, within the frame work of construction schedule i.e. Schedule "E" for achieving the completion targets of work(s) as a whole and also of each group / sub group of work(s) (stipulated in Schedule "C") showing the order or procedure and a statement showing the method and techniques of construction by which the contractor purposes to carry out the works. Such charts or programme shall be prepared in direct relation to the construction schedule i.e. Schedule "E" as well as the time stated in the contract document for completion of items of works stipulated in Schedule "C". It shall indicate the commencement and completion of various trades or sections of the work, distribution and balancing of work load pertaining to construction activities in various structures / component parts of work into calendar months, duly taking into account working days available in each working season and number of working days available for working months, to arrive at seasonal monthly average and seasonal monthly peak progress with corresponding time periods. Such construction planning will be discussed and finally agreed with successful tenderer before award of work and same shall form an integral part of agreement.

Contractor shall have to strictly adhere to such an agreed planning and scheduling. However, it shall not relieve the contractor of any of his duties, obligations or pre-responsibilities under the contract.

CLAUSE No: 15 WORKS TO BE CARRIED OUT IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS AND ORDERS ETC.

15.1 The contractor shall execute the whole and every part of the work in the most substantial and workmanship manner and both as regards material and otherwise in every respect in strict conformity with the specification laid down or as may be laid down by the Engineer in charge under the terms of the contract. The contractor shall also conform exactly, fully and faithfully to the designs, drawings, specifications and instructions in writing in respect of the work, duly signed by the Engineer in charge as may be issued from time to time.

15.2 The contractor shall be entitled to receive, on demand, in addition to the contract documents, in accordance with the provisions of clause 6.2, the documents, set forth herein in respect of the work on commencement or during the performance of the contract.

a. Contract drawings and revisions there to 3 sets.
b. Specifications or revisions thereof other than standard Printed specifications. 2 sets.
c. Explanations, instructions etc. 1 copy.

Such further drawings, explanations, modifications and instructions, as the Engineer in charge may issue to the contactor from time to time in respect of

the work, shall be deemed to form integral part of the contract and the contractor shall be bound to carry out the work accordingly.

15.3. All instructions and orders in respect of the work shall be given by the Engineer in charge in writing. However any verbal instructions or orders shall be confirmed by the Engineer in charge as soon as practicable without loss of time. Only such written instructions shall be deemed to be valid.

15.4. Construction drawings will be supplied according to the requirement of the construction schedule and progress of work.

CLAUSE No: 16. SETTING OUT THE WORKS:

16.1 The Engineer in charge shall establish / indicate bench marks / survey reference points and their elevations.

16.2 The contractor shall be responsible for the true and proper setting out of all the work (in relation to the aforementioned bench marks / survey reference points) for the correctness of the location, grades, dimensions and alignment of all components of the work and for the provision of all instruments, appliances, materials and labor required in connection therewith. If at any time during the progress of the work any error shall appear or arise in the location, grades, dimensions, or alignment of any part of the work, the contactor on being required to do so by the Engineer in charge shall at his own expenses, rectify such error to the satisfaction of the Engineer in charge.

16.3 The contractor shall afford all reasonable facilities and assistance to the Engineer in charge for checking the setting out and lines and grades established by the contactor. The checking of any setting out or of any line and grade by the Engineer in charge shall not in any way relieve the contractor of his responsibility for the correctness thereof.

CLAUSE No: 17 URGENT WORKS:

If any urgent work (in respect whereof the decision of the Engineer in charge shall be final and binding) becomes necessary, the contactor shall execute the same as may be directed.

CLAUSE No: 18 DEVIATIONS:

18.1 The Engineer in charge shall have powers to make any deviations in the original specifications or drawings or designs of the works or any part thereof that are, in his opinion, necessary at the time of or during the course of execution of the work, for the aforesaid purpose or for any other reason, if it shall, in the opinion of the Engineer in charge, be desirable, he shall also have the powers to make deviations, such as (i) Variations (ii) Extra (iii) Additions / omissions and (iv) Alterations or substitutions of any kind. No such Deviations in the specifications or drawings or designs or schedule of quantities, as aforesaid, shall in any way vitiate or invalidate the contract and any such deviations, which the contractor may be directed to do, shall form integral part of the contract as if originally provided therein and the contactor shall carry out the same on the same terms and conditions in all respects, on which he agreed to do the work under the contract.

18.2 The rates for such items of work as are required to be executed due to deviations, as stated in Sub clause 18.1 above shall be payable in the manner as stated hereunder, subject to the conditions that the variations so ordered do not

exceed plus or minus 30% (thirty percent) in respect of individual item except items of dewatering and pressure relief valves, contact / consolidation grouting, drilling, shot creating for which allotted rates shall hold good for all deviations / variations and provided further that the cost of work executed / to be executed by the contractor including the cost of deviations is not more or less than 25% (Twenty five percent) of the contract sum.

i. The rates already provided in the schedule of quantities shall apply in respect of the same item (s) of work to be executed due to variation.

ii. In case same items are not available in the schedule of quantities, the rates of such items, as far as practicable shall be derived from the quoted rates of analogues item(s) in the schedule of quantities after actual observance at site. The decision to select analogues item(s) shall be taken by the Engineer in charge which shall be conclusive and binding on the contractor.

iii. Provided where some extra items and / or analogues items are not available in the schedule of quantities and for the variation in respect of individual items exceeding the prescribed limit of 30% as aforesaid, the rates for such item(s) to be executed shall be determined by the Engineer in charge on the basis of actual analyzed cost comprising of the cost of material to be supplied by the Contractor/ corporation (including transportation and taxes, levies, if paid), labor actually engaged for the particular work, cost of operation of plant and machinery used for the work plus such percentage (as indicated in schedule "D") to cover the overheads, profits, contractors supervision and other charges if any. The decision of the Engineer in charge in deriving rates, as aforesaid, shall be conclusive and binding on the contactor.

Iv: The amount due to price variation as stipulated in the clause No: 46 applicable to work done during pendency of the contract shall not be included in the payments of work done covered under schedule of quantities and prices, for the purpose of working out the prescribed limit of $\pm$ 30% on individual items of work and / or the overall deviation limit of $\pm$ 25% on the contract sum. Thus payments on account of price variation shall be over and above the prescribed limit of $\pm$ 30% in the individual item of work and / or overall limit of $\pm$ 25% on the contract sum.

18.3 If requested by the contractor the time for completion of the work shall in the event of any deviation resulting in additional cost over the contract sum, be extended in the proportion which the altered, additional or substituted work bears to the original contract sum plus such further additional time as may be considered reasonable by the Engineer in charge whose decision shall be conclusive as to such provision.

18.4. Under no circumstances, the contractor shall at any stage suspend the work on account of non-settlement of rates of such deviated items.

CLAUSE No: 19 CONTRACTORS SUPERVISION:

19.1 The contractor shall either himself supervise the execution of the works or shall appoint at his own expenses an Engineer as his accredited agent approved by the Engineer in charge, if contractor has himself not sufficient knowledge or experience to be capable of receiving instructions or cannot give his full attention to the works. The contractor or his agent shall be present at site(s) and shall superintendent the execution of the works with such additional assistance

in each trade, as the work involved shall require and considered reasonable by the Engineer in charge. Directions / instructions given by the Engineer in charge to the contractor's agent shall be considered to have the same force as if these had been given to contractor himself.

19.2 If the contractor fails to appoint a suitable agent as directed by the Engineer in charge, the Engineer in charge shall have full powers to suspend the execution of the works until such date as a suitable agent is appointed by the contractor and takes over the suspension of the work. For any such suspension, the contractor shall be held responsible for delay so caused to the works.

CLAUSE 20: INSTRUCTIONS AND NOTICES:

20.1 Except as otherwise provided in this contract, all notices to be given on behalf of the department and all other actions to be taken on its behalf may be given or taken by the Engineer in charge or any of his authorized officer for the time being entrusted with the functions, duties and powers of the Engineer in charge.

20.2 All instructions, notices and communications etc. under the contract shall be given in writing and any such oral orders / instructions given shall be confirmed in writing and such communication which is not given or confirmed in writing shall not be valid.

20.3. All instructions, notices and communications shall be deemed to have been duly given or sent to the contractor, if delivered to the contractor, his authorized agent, or left at, or posted to the address given by the contractor or his authorized agent or to the last known place of abode or business of the contractor or his agent in case of services by post shall be deemed to have been served on the date when in the ordinary course of post the3se would shave been delivered to him and in other case on the day on which the same were so delivered or left.

20.4. The Engineer-in-charge shall communicate or confirm the instructions to the contractor in respect of the execution of work in a "work site order book" maintained in the office of the Engineer-in-charge and the contractor or his authorized representative shall confirm receipt of such instructions by signing the relevant entries in this book. If required by the contractor, he shall be furnished a certified true copy of such instruction/s.

CLAUSE No: 21 PATENTS RIGHTS:

The contractor shall indemnify the department, its representatives or its employees against any action, claim or proceedings relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties or other charges which may be payable in respect of any article or material or part thereof included in the Contract. In the event of any claim being made or action being brought against the Corporation or any agent, servant or employee of the Corporation in respect of any such matters as aforesaid the contractor shall immediately be notified thereof. Provided that such indemnity shall not apply when such infringement has taken place in complying with the specific directions issued by the corporation but the contractor shall pay any

royalties or other charges payable in respect of any such use, the amount so paid being reimbursed to the contractor only if the use was the result of any drawings and / or specifications issued after submission of the tender.

CLAUSE NO: 22. MATERIALS:

22.1 The contractor shall at his own expenses provide / arrange all materials required for the bonafide use on work under the contract and also for initial Mobilization Preliminary, Enabling and Ancillary works.

22.2 All materials to be provided by the Contractor shall be in conformity with the specifications laid down in the contract and the contractor shall furnish from time to time proof and samples, at his cost, of the materials as may be specified by the Engineer in charge for his approval before use in the works. The Engineer in charge shall also have powers to have such tests, in addition to those specified in the contract, as may be required and the contractor shall provide all facilities to carry out the same. The cost of materials consumed in such tests and also expenses incurred thereon shall be borne by the Contractor in all cases except when the material is agreed to be supplied by the Department under the contract, and also that the materials are in conformity with the provisions of the contract.

22.3 The Engineer in charge or his representative shall be entitled at any time to inspect and examine any materials intended to be used in or on the works, either on the site or at factory or workshop or other place(s) where such materials are assembled, fabricated, manufactured or at any place where these are lying or from where these are being obtained. For this purpose, the contractor shall afford such facilities as may be required for such inspection and examination.

22.4 The Engineer in charge shall have full powers to require removal of any or all materials brought to site by the contractor which are not in accordance with the contract specifications, or samples approved by him. Should the contractor fail to remove the rejected materials, the Engineer in charge shall be at liberty to have them removed by other means at the contractors risk and cost. The Engineer in charge shall have full powers to procure other proper materials to be substituted at Contractors risk / costs.

22.5 **a.** If construction materials, like cement, steel, explosives etc. are required by the contractor for the bonafide use of his preliminary, enabling and ancillary works (relating to the works under the contract) and if such materials are available and can be spared by the Corporation, the Engineer in charge may issue the same to the contractor on the issue rate of the Corporation prevalent at that time and on such terms and conditions as may be stipulated by the Engineer in charge. Provided further that the quantity of such materials are justified and has been assessed by the Engineer in charge according to the plans and the phasing as approved by the Engineer in charge.

b. The contractor shall have no claim whatsoever against the Corporation / Department for non issue of the construction materials for preliminary, enabling and ancillary works as mentioned in 22.5(a) above. The decision of the Engineer in charge in respect of 22.5(a) and (b) shall be final, conclusive and binding on the contractor.

c. The supply of the materials as per the approved / finalized plans, programme / requirement shall be regulated with reference to the availability and depending

on the priorities with respect to various other works of the project, as may be fixed by the Chief Engineer of the project and the contractor shall have no right or claim in this regard.

22.6 It is a prime responsibility of the contractor to arrange for all the materials. The Engineer in charge may, however, assist the contractor on request in regard to procurement of HSD, Petrol, Lubricants for bonafide use on works from recognized suppliers.

CLAUSE No: 23 : POWER SUPPLY:

23.1 Power (415 Volts, 3 phase, 50 cycles) as received by the Corporation from the Transmission system and as required at site for use at the works by the contractor shall be supplied in bulk to him and charged @ Rs.2.65 Per Unit + 22% electricity duty for metered OR RS.900/- Per KW plus 22% electricity duty for non metered (as mentioned in Schedule "D") on meter reading basis. The contractor shall indicate his requirement of power and the actual requirement of Power will be determined by the Engineer in charge whose decision in this regard shall be final and binding. The Corporation cannot ensure the continuous and un interrupted supply of Power as the possibility of interruptions / failures / shutdowns in the supply of power cannot be ruled out. Failure of normal supply of Power by shutdowns or other unforeseen circumstances will not entitle the contractor to claim any damage or compensation or extension in the construction period whatsoever. In the event of non supply of power by the Corporation due to Power failure or to meet any exigency, the contractor at his own cost shall make his own alternative arrangements to meet the requirements of Power so that the execution of the work remains un-interrupted.

23.2 Bills for the charges of electrical energy supplied by the Corporation to the contractor each month will be recovered from him in the next bill in respect of the work done by him. The contractor, at his own cost, shall provide and install all necessary electrical installation, like switchgear, wiring, fixtures, bulbs and other temporary equipments for further distribution and utilization of energy for power and lighting and shall remove the same on completion of the work. All jobs shall be suitably lighted by the contractor at his own expense for their proper execution and inspection and to the satisfaction of the Engineer in charge in accordance with the provisions of the Indian Electricity Act / Rules or any other laws in force. All electrical works of the contractor shall conform to the rules and regulations relating to such works in force from time to time as specified in the Indian Electricity Act / rules and to the satisfaction of the Engineer in charge.

CLAUSE NO; 24 : SUPPLY OF UNFILTERED WATER FOR CONSTRUCTION PURPOSES.

The contractor shall make his own arrangements for water required for and in connection with the work at his cost. It shall be the responsibility of the contractor to satisfy himself that the water arranged by him is fit for construction and consumption and he shall adequately treat such water whenever it is not found fit for the said purposes.

CLAUSE NO: 25: WATCHING AND LIGHTING:

The contractor shall provide and maintain at his expenses all lights, guards, fencing and watching when and where necessary or as required by the Engineer in charge for the protection of the works or for the safety and convenience of those employed on the works or the Public.

CLAUSE NO: 26: WORK DURING NIGHT OR ON SUNDAYS AND HOLIDAYS:

26.1 Subject to any provisions to the contrary contained in the contract, none of the works shall be carried out during Sundays or holidays without the permission in writing of the Engineer in charge. However, when work is unavoidable or necessary for safety of life, property of works, the contractor shall take necessary action immediately and advise the Engineer in charge accordingly.

26.2 The Engineer in charge may, however, direct the contractor that the work may be carried out on holidays, Sundays and / or extra shifts to ensure completion of works under the contract as scheduled.

CLAUSE NO: 27:SITE DRAINAGE, PROTCTION OF TREES AND PREVENTION OF NUISANCE:

27.1. Unless otherwise provided in the contract, water which may accumulate on the site during the progress of work or in trenches and excavations from any cause or public source whatsoever shall be removed from the site by the contractor to the satisfaction of the Engineer in charge and at the contractor expenses.

27.2 The contractor shall Endeavour to protect from damage trees marked by the Engineer in charge at the site of work or in the lands licensed to him for use under the contract. Where necessary the contractor shall provide at his expenses temporary fencing to protect such trees.

27.3. The contractor shall at no time, cause or permit any nuisance on the site or cause anything which shall cause un-necessary disturbance or inconvenience to the public in general and owners / tenants / occupants of adjacent properties.

CLAUSE NO: 28 L A B O U R

28.1 The Contractor shall make his own arrangement for the engagement of all Labor, local or otherwise, and for their payment, housing feeding and transport. The Contractor shall comply with all the relevant labor Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety welfare, and shall allow them all their legal rights. The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work. Further the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel and shall not allow any of the Contractor's personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

The contractor shall employ labor in sufficient numbers to maintain the required rates of progress and of quality to ensure workmanship of the degree specified in the contract and to the satisfaction of the Engineer in charge. The contractor shall not employ in connection with the works any person who has not completed fifteen years of age.

28.2 The contractor shall furnish and deliver fortnightly to the Engineer in charge, a distribution return of the number and description by trades of the work of people employed on the works. The Contractor shall also submit on 4th and 9th of every month to the Engineer in-charge a true statement showing there-in the

below mentioned complete details, in respect of the second half of the preceding month and the first half of the current month :

i. The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and

ii. the number of female workers who have been allowed maternity benefit as provided in the Maternity benefit Act 1961 or Rules made there under and the amount paid to them.

28.3 The Contractor shall pay to labor employed by him either directly or through sub contractors wages not less than wages as defined in the contract labor (Regulation and Abolition) Act 1970 with General Rules framed there under and amendments made from time to time.

28.4 The contractor shall in respect of labor employed by him either directly or through sub contractors comply with or cause to be complied with the contract Labor (Regulation and Abolition) Act 1970 and Rules framed there under in regard to all matters provided therein.

28.5 The Contactor shall comply with the provisions of all the Acts, Laws, any Regulation or Bye Laws of any Local or their Statutory Authority applicable in relation to the execution of the works, such as:-

i. Payment of Wages Act 1956 (Amended).
ii. Minimum Wages Act 1948 (Amended).
iii. The Contract Labor (Regulation and Abolition) Act, 1970 with Rules framed there under as amended.
iv. Workmen compensation Act 1923, as amended by Amendment Act No: 65 of 1976.
v. Employer's Liability Act, 1938 (amended).
vi. Maternity Benefit Act 1961 (Amended)
vii. The Industrial Employment (Standing orders) Act, 1946 (Amended)
viii. The Industrial Disputes Act 1947 (Amended)
ix. Payment of Bonus Act 1965 and Amendment Act No: 43 of 1977 and No: 48 of 1978 and any amendments thereof.
x. The personal Injuries (Compensation Insurance) Act, 1963 and any modifications thereof, and rules made there under from time to time.

The contractor shall take into account all the above said financial liabilities in his quoted rates and nothing extra, whatsoever, shall be payable to him on this account.

28.6 The Contractor shall be liable to pay his contribution and the employees contribution to the State Insurance Scheme in respect of all labor employed by him for the execution of the contract, in accordance with the provisions of " the Employees State Insurance Act, 1948" as amended from time to time. In case the Contactor fails to submit full details of his account of labor employed and the contribution payable, the Engineer in charge shall recover from the running bills of the contractor an amount of contribution as assessed by him. The amount so recovered shall be adjusted against the actual contribution payable for Employees State Insurance.

28.7 The Engineer in charge shall on a report having been made by an inspecting officer as defined in the contract labor (Regulation and Abolition) Act and Rules or on his own in his capacity as Principal Employer, have the power to deduct from the amount due to the contractor any sum required or estimated to be

required for making good the loss suffered by worker(s) by reason of non fulfillment of the conditions of the Contract for the benefit of workers, nonpayment of wages or of deductions made from him for wages which are not justified by the terms of the contract or non observance of the said Act and Rules framed there under with amendments made from time to time.

28.8 The contractor shall indemnify the department against any payments to be made under and for observance of the Regulations, Laws, Rules as stipulated in clause 28.5 above without prejudice to his right to claim indemnity from his sub contractors, In the event of the contractors failure to comply with the provisions of all the Acts / Laws stipulated in the Clause 28.5 or in the event of decree or award of order against the contractor having been received from the competent authority on account of any default or breach or in connection with any of the provision of the Act/Law/Rules mentioned in Sub Clause 28.5 above, the Engineer in charge without prejudice to any other right or remedy under the contract shall be empowered to deduct such sum or sums from the bills of the contractor or from his security deposit or from other payments due under this contract or any other contract to satisfy within a reasonable time the provisions of the various Acts / Laws / Rules / codes as mentioned under Sub clause 28.5 above, on the part of the contractor under the contract on behalf of and at the expenses of the contractor and make payment and / or provide amenities facilities / services accordingly. In this regard, the decision of the Engineer in charge shall be conclusive and binding on the contractors.

28.9 In the event of the Contractor committing a default or breach of any of the provisions of the aforesaid Contractors Labor (Regulations and Abolition) Act and Rules as amended from time to time or furnishing any information or submitting of filling any Form / Register /Slip under the provisions of these Regulations which is materially incorrect, then on the report of the Inspecting Officers as defined in the relevant Acts and Rules as referred to in clause 28.1 above, the Contractor shall ;without prejudice to any other liability pay to the Corporation a Sum not exceeding Rs. 5000/- (Five thousands only) as liquidated damages for every default, breach of furnishing, making, submitting, filling materially incorrect statement as may be fixed by the Engineer in charge and in the event of the Contractors default in continuing in this respect the liquidation damages may be enhanced to Rs. 5000/- per day for each day of default subject to a maximum of five percent of the estimated cost of the works put to tender. The Engineer in charge shall deduct such amount from bills or security deposit of the Contractor and credit the same to the Welfare Fund constituted under the Regulations. The decision of the Engineer in charge in this respect shall be final and binding.

28.10 The contractor shall at his own expenses comply with or cause to be complied with the provisions / Rules provided for welfare and health of contract labor in the contract Labor (Regulation and Abolition) Act and other relevant Acts and Rules framed there under or any other instructions issued by Corporation in this regard for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the works. In case, the contractor fails to make arrangements as aforesaid, the Engineer in charge shall be entitled to do so and recover the cost thereof from the Contractor.

28.11. The contractor shall at his own expenses arrange for the safety provisions as required by the Engineer in charge, in respect of all labor directly or indirectly

employed for performance of the works and shall provide all facilities in connection therewith. In case the contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer in charge shall be entitled to do so and recover the cost thereof from the Contractor. But this will not absolve the contractor of his responsibility or otherwise thereof.

28.12. Failure to comply with" Provisions / Rules made for Welfare and Health of Contract Labour" of the provisions relating to report on accidents and grant of maternity benefits to female workers and all the relevant acts / Rules referred in Clause No: 28.5 above shall make the contractor liable to pay to the Corporation as liquidated damages an amount not exceeding to Rs. 5000/- for each default or materially incorrect statement.; The decision of the Engineer in charge in such matters based on reports from the Inspecting Officer as defined in the relevant Acts and Rules as referred in clause 28.5 above shall be final and binding and deductions for recovery of such liquidated damages shall be made from any amount payable to the contractor. In the event of any injury, disability or death of any workmen in or about the work employed by the contractor either directly or through his sub contractors, contractor shall at all times indemnify and save harmless the corporation against all claims, damages and compensation under the workmen compensation Act, 1923 as amended from time to time or in other Law for the time being in force and Rules there under from time to time and also against all costs, charges and expenses of any smooth action by proceedings arising out of such accidents or injury, disability or death of workman and against all sum or sums which may with the consent of the contractor be paid to compromise or compound any claim in this regard. If any award, decree or order is passed against the Contractor for recovery of any compensation under the Workman compensation Act, 1923, for any injury, disability or death of a workman by any competent court, the said sum or sums shall be deducted by the Engineer in charge from any sum then due or that may become due to the contractor or from the security deposit or sale thereof in full or part under the contract any other contract with the Corporation towards fulfillment of the said decree, award or orders.

28.13. Provided always that the contractor shall have no right to demand payments / claims whatsoever on account of his compliance with his obligations under this clause and Labour Regulation except those specifically mentioned in the clause 45 pertaining to price adjustment / variation.

CLAUSE No: 29 REMOVAL OF CONTRACTOR'S MEN.

The contractor shall employ on the execution of the works only such persons as are skilled and experienced in their respective trades and the Engineer in charge shall be at liberty to object to and require the contractor to remove from the works any persons employed by the Contractor on the execution of the works who, in the opinion of the Engineer in charge, mis-conducts himself or is incompetent, or negligent in the proper performance of his duties. The contractor shall forthwith comply with such requisition and such person shall not be again employed upon the works without permission of the Engineer in charge.

CLAUSE NO: 30 MATERIALS OBTAINED FROM EXCAVATION AND TREASURE TROVE FOSSILS ETC.

30.1 Materials of any kind obtained from excavation on the site shall remain the property of the Corporation and shall be disposed off as directed by the Engineer in charge.

30.2 However, if any of the materials thus obtained from excavation on the site is such as can be used on the execution of the work under the contract, the contractor will be allowed to use the same free of cost (except that any amount of royalty paid for in this regard by the Corporation shall be recoverable from the contractor) for the aforesaid purpose provided the same is found suitable and is approved by the Engineer in charge.

30.3 Fossils, coins articles of value, structures and other remains or things of geological or archeological interests discovered on the site shall be the absolute property of the Corporation. The contractor shall take reasonable precautions to prevent his labour or any other person from removing or damaging any such article or thing and shall immediately upon the discovery thereof any before removal acquaint the Engineer in charge with such discovery and carry out the Engineer in Charge's directions as to the disposal of the same at the expenses of the contractor.

CLAUSE NO: 31. FORCE MAJEURE:

31.1 The term " Force Majeure" shall herein mean riots (other than among the contractor's employees), Civil Commendation (to the extent not insurable) war (whether declared or not), invasion, act of foreign enemies, hostilities, Civil War, rebellion, revolution, insurrection, military or usurped power, damage from aircraft, nuclear fission, acts of God, such as earthquake (above 7 magnitude on Richter scale), lightning, unprecedented floods / wind storms, fires not caused by the contractor's negligence and other such causes over which the contractor has no control and are accepted as such by the Engineer in charge, whose decision shall be final and binding. In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed of the part effected by such Force Majeure shall be treated as suspended for the period during which such force Majeure cause lasts, provided the party alleging that it has been rendered unable as aforesaid, thereby shall notify within 10 days of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of such cause.

31.2. On occurrence of Force Majeure , the liability of either party shall be dealt with in accordance with the provisions of sub clause 33.2

31.3. Should there be a request for extension of time arising out of "Force Majeure" the same shall be considered in accordance with clause 38.

CLAUSE NO: 32 LIABILITY FOR DAMAGE ,DEFECTS OR IMPERFECTIONS AND RECTIFICATION THEREOF.

32.1 If the contractor or his labour or sub contractor injure, destroy or damage road, fence , enclosures, water pipe, cables, buildings, drains, electricity or telephone posts, wires, trees, grass line, cultivated land in the area in which they may be working or in the areas contiguous to the premises on which the work or any part of it is being executed or if any damage is caused during the progress of

work, the contractor shall upon receipt of a notice in writing in that behalf from the Engineer in charge, make the same good at his cost.

32.2 If it appears to Engineer in charge or his representative at any time during construction or reconstruction or prior to the expiration of the Defects liability period as specified in Schedule "D" that any work has been executed with unsound, imperfect or unskilled workmanship or that any materials or articles provided by the contractor for execution of the work are unsound or of a quality inferior to that contracted for, or otherwise, not in accordance with the contract, or that any defect, shrinkage or other faults found in the work arising out of defective or improper materials or workmanship, the contractor shall upon receipt of a notice in writing in that behalf from the Engineer in charge, forthwith rectify or remove and reconstruct the work so specified in whole or in part, as the case may be and / or remove the materials / articles so specified and provide other proper and suitable materials at his expenses.

CLAUSE NO: 33 CONTRACTOR'S LIABILITY AND INSURANCE:

33.1 From commencement to completion of the work(s) as a whole, the contractor shall take full responsibility for the care thereof and for taking precautions to prevent loss or damage. He shall be liable for any damage or loss that may happen to the works or any part thereof, and to the Corporation's Plant, equipment and material (hired or issued the contractor) shall be in good order and condition and in conformity in every respect with the requirements of the contract and instructions of the Engineer in charge.

33.2 i. Neither party to the contract shall be liable to the other in respect of any loss or damage which may occur or arise out of "Force Majeure" to the works or any part thereof or to any material or article at site but not incorporated in the works or to any person or anything or material whatsoever of either party provided such a loss or damage could not have been foreseen or avoided by a prudent person and the either party shall bear losses and damages in respect of their respective men and materials. As such liability of either parties shall include claims / compensations of the third party also.

ii. Provided, however, in an eventuality as mentioned in sub-clause 33.2 (i) above, the following provisions shall also have effect:-

a. The contractor shall, as may be directed in writing by the Engineer in charge proceed with the erection and completion of the works under and in accordance with the provisions and conditions of the contract; and

b. The contractor shall, as may be directed in writing by the Engineer in charge, re-execute the works lost or damaged, remove from the site any debris and so much of the works as well have been damaged and carry the Corporations T&P Plant and equipment, material etc. to the Corporation's stores. The cost of such re-execution of the works, removal of damaged works and carrying of corporation's store shall; be ascertained in the same manner as for deviations and this shall be added to the contract sum.

Provided always that the contractor shall, at his own cost, repair and make good so much of the loss or damage as has been occasioned by any

failure on his part to perform his obligations under the contract or not taking precautions to prevent loss or damage or minimize the amount of such loss or damages. Final assessment of loss / damage shall be decided by the Engineer in charge and his decision shall be final and binding.

33.3 The contractor shall indemnify and keep indemnified the Corporation against all losses and claims for death, injuries, or damage to any person or any property whatsoever which may arise out of or in consequence of the construction and maintenance of works during the contract period and also against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto, and such liabilities shall include claims / compensations of the third party.

33.4 a. Before commencing execution of the work, the contractor shall without in any way limiting his obligations and responsibilities under this condition, Insure against any damage, loss or injury which may occur to any property (excluding that of the Corporation but including the Corporations buildings rented by the Contactor wholly or on part and any part of which is used by him for storing combustible material, public liability by arising out of carrying out of the contract. For this purpose the contractor shall take out, pay all costs and maintain through the period of his contract, public liability by or arising out of carrying out the contract. For this purpose, the contractor shall take out, pay all costs and maintain throughout the period of his contract, public liability with the following coverage:-

i. Public Liability limits for bodily injury or death not less than Rs. 2.00 lacs for one person and Rs. 4.00 lacs for each accident.

ii. Property liability limits for each accident not less than 2.00 lacs.

b. The contractor shall prove to the Engineer in charge from time to time that he has taken out all the insurance policies referred to above and has paid the necessary premiums for keeping the policies alive till expiry of the defects liability period.

c. The contractor shall ensure that similar insurance policies are taken out by his sub contractor (if any) and shall be responsible for any claims or losses to the corporation resulting from their failure to obtain adequate insurance protection in connection thereof. The contractor shall produce or cause to be produced by his sub-contractors (if any) as the case may be and the relevant policy or policies and premium receipt as and when required by the Engineer-in-charge.

33.5 If the contractor and / or his sub contractors (if any) shall fail to effect and keep in force the insurance which he / they may be required to effect under the terms of the contract then and in any such case the Corporation may, without being bound to, effect and keep in force any such insurance and pay such premium or premiums as may be necessary for the purpose and from time to time deduct the amount so paid by the Corporation from any money due or which may become due to the contractor or recover the same as a debit due from the contractor.

33.6 The contractor shall at his own expenses arrange for the safety provisions in respect of the works covered under this contract. In case, the contractor fails to comply with the safety requirement the Engineer in charge shall be entitled to and make the necessary arrangements at the risk and cost of the contractor. This

will, however, not absolve the contractor of his overall responsibility to execute the works under the contract.

CLAUSE NO: 34: SUSPENSION OF WORKS:

34.1 The contractor shall on the order of the Engineer in charge suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer in charge may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Engineer in charge. If such suspension is:-

a. Provided for in the contract, or

b. Necessary for the proper execution of the works or by reason of weather conditions or by some default on the part of the contractor, or

c. Necessary for the safety of the works or any part thereof.

The contractor shall not be entitled to extra costs (if any) incurred by him during the period of suspension of the work; but in the event of any suspension ordered by the Engineer in charge for reasons other than aforementioned and when each such period of suspension exceeds 14 days, the contractor shall be entitled to such extension of time for completion of the works as the Engineer in charge may consider proper having regard to the period or periods of such suspensions and to such compensation as the Engineer in charge may consider reasonable in respect of salaries or wages paid by the contactor to his employees during the periods of such suspension.

34.2 If the progress of the work or any part thereof is suspended on the order of the Engineer in charge for more than three months at a time the contractor may serve a written notice on the Engineer in charge requiring permission within 15 days from the receipt of thereof to proceed with the works or that part thereof in regard to which progress is suspended and if such permission is not granted within the time the contractor by a further written notice so served may (but is not bound to) elect to treat the suspension where it affects part only of the works as an omission of such part or where it affects the whole of the works as an abandonment of the contract by the department.

CLAUSE 35 FORECLOSURE OF CONTRACT IN FULL OR IN PART DUE TO ABANDONMENT OR REDUCTION IN SCOPE OF WORK.

If at any time after acceptance of the tender the Corporation decides to abandon or reduce the scope of the works for reason whatsoever and hence does not require whole or any part of the work to be carried out, the Engineer in charge shall give notice in writing to that effect to the contractor and the contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he could not derive in consequence of the foreclosure of the whole or part of the works.

35.1 The contactor shall be paid at contract rates for full amount of the works executed at site and, in addition, a reasonable amount as certified by the

Engineer in charge for the items hereunder motioned which could not utilized on the work to the full extent because of the foreclosures:-

a. Any expenditure incurred on preliminary works, e.g. temporary access roads, temporary labour huts, staff quarters and site office, storage accommodation and water storage tanks.

b. i. The corporation shall have the option to take over contractors materials or any part thereof, either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental of the work), provided, however, the Corporation shall be bound to take over the material or such portions thereof as the contractor does not desire to retain. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.

ii. For contractors materials not retained by the Corporation reasonable cost of transporting such materials from site to Contractors permanent stores or to his other works, whichever is less. If materials are not transported to either of the said places, no cost of transportation shall be payable.

c. If any materials supplied by the Corporation are rendered surplus, the same except normal wastage shall be returned by the contractor to the Corporation at the rates not exceeding those at which these were originally issued less allowance for any deterioration or damage which may have been caused whilst the materials were in the custody of the Contractor.

d. Reasonable compensation for transfer of T&P from site to Contractors permanent Stores, or to his other works whichever is less. If T&P are not transported to either of the said places, no cost of transportation shall be payable.

35.2 The contractor shall if required by the Engineer in charge, furnish to him books of account, wage books, time sheets and other relevant documents as may be necessary to enable him to certify that reasonable amount payable under this conditions.

CLAUSE 36 TERMINATION OF CONTRACT ON DEATH:

If the contractor is an individual or a proprietary concern and the individual or the proprietor dies, or if the contractor is a partnership concern and one of the partners dies, then, unless the Engineer in charge is satisfied that the legal representatives of the individual contractor or the legal representatives of the proprietor of the proprietary concern and in the case of partnership, the surviving partners are capable of carrying out and completing the contract, the Engineer in charge shall be entitled to terminate the contract as to its incomplete part without the Corporation being in any way liable to payment of any compensation whatsoever or any account to the estate of the deceased contractor and / or to the surviving partners of the contractors firm on account of termination of the contract. The decision of the Engineer in charge that the legal representatives of the deceased contractor or the surviving partners of the Contractors firm cannot carry out and complete the work under the contract shall be final and binding on the parties. In the event of such termination the Corporation shall not hold the estate of the deceased contractor and / or the surviving partners of the contactors firm liable for damages for not completing

the contract. Provided that the Power of the Engineer in charge of such termination of contract shall be without prejudice to any other right or remedy which shall have accrued or shall accrue to him under the contact.

CLAUSE 37. DEFAULT BY THE CONTACTOR AND TERMINATION OF CONTRACT IN FULL OR IN PART.

37.1 If the contractor:-

i. commits default in complying with or commits breach of any of the terms and conditions of the contact and does not remedy it or take effective steps to remedy it immediately and not later than 10 days in any case after a notice in writing is given to him in that behalf by the Engineer in charge or

ii. fails to complete the work(s) or any item of work(s) within the time specified in schedule "C" or any extended time under the contract and does not complete the work(s) or any item of work(s) within the period specified in a notice given in writing in that behalf by the Engineer in charge; or

iii shall offer or give or agree to give to any person in Corporation service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or for bearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for the corporation or

iv. shall enter into contract with the corporation in connection with which commission has been paid or agreed to be paid by him or to his knowledge unless the particulars of any such commission and the terms of payment thereof have previously been disclosed in writing to the Engineer in charge ; or

v. shall obtain a contract with the Corporation as a result of ring tendering or other non bonafide methods of competitive tendering; or

vi. being an individual, or if a firm, any partner thereof, shall at any time be adjusted insolvent or have a receiving order for administration of his estate made against him or shall take any proceedings for liquidation for the purpose of amalgamation or reconstruction under any Insolvency Act for the time being in force or make any conveyance or assignment of his effective or composition or arrangement for the benefit of his creditors or purport as to do or if any application be made under any insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors; or

vii. being a company shall pass a resolution or the Court shall make an order for liquidation of its affairs or a receiver or manager on behalf of the debenture holders shall be appointed or circumstances shall arise which entitle the Court or debenture holders to appoint a receiver or manager; or

viii. Shall suffer an execution in an execution being levied on his goods,

ix. assigns, transfers, sublets (engagement of labour on a piece work basis or of labour with materials not being incorporated in the work shall not be deemed to be sub-letting) on attempts to assign, transfer or sublet the entire works or any portion thereof without the prior written approval of the Engineer in Charge.

The Engineer in charge shall have powers to terminate the contact in full or in part as aforesaid without prejudice to any other right or remedy which shall have accrued or shall accrue of which cancellation notice in writing

to the contactor under the hand of the Engineer in charge shall be conclusive evidence.

37.2 The Engineer in charge shall, on such termination of the contact, have powers (i) to take possession of the site of work under the contact as well as the land / premises allotted to the contractor for his preliminary, enabling and ancillary works and (ii) also any materials, constructional plant, equipment, implements, stores, structures etc. thereon. The Engineer in charge shall also have powers to carry out the incomplete work by any means or through any other agency or by himself at the risk and cost of the Contactor. In such a case, the value of the work done through such agencies shall be credited to the contractor at his contract prices and the contractor shall pay the excess amount, if any, incurred in completing the work as aforesaid, as stipulated under sub clause 37.4 hereunder.

37.3 On termination of the contract in full or in part, the Engineer in charge may direct that a part or whole of such plant, equipment and materials, structures be removed from the site of the work as well as from the land / premises allotted to the contractor for his preliminary, enabling and ancillary works within a stipulated period. If the contactor shall fail to do so within the period specified in a notice in writing by the Engineer in charge, the Engineer in charge may cause them to be sold, holding the net proceeds of such sale to the credit of the contractor, which shall be released after completion of works and settlement of amounts under the contract.

37.4. If the expenses incurred or to be incurred by the Corporation for carrying out and completing the incomplete work or part of the same, as certified by the Engineer in charge are in excess of the value of work credited / to be credited to the contractor, the difference shall be paid by the contractor to the Corporation. If the contractor fails to pay such an amount, as aforesaid, within thirty days of receipt of notice in writing from the Engineer in charge, the Engineer in charge shall be empowered to recover such amount from any sums due to the contractor on any account under this or any other contract or from his security deposit or otherwise.

37.5 Also, the Engineer in charge shall have the right to sell any or all of the contractors unused materials, constructional plant, equipment, implements, temporary buildings / structures etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the contractor under the contract and if thereafter there may be any balance outstanding from the contractor, the Engineer in charge shall have powers to recover the same in accordance with the provisions of the contact.

37.6. All decisions / actions of the Engineer in charge under this clause, as aforesaid, shall be conclusive and binding on the contactor.

CLAUSE 38: COMPLETION TIME AND EXTENSIONS:

38.1 Time allowed for execution of the work as specified in schedule “C” or the extended time, if any, in accordance with these conditions shall be essence of the contract.

38.2 However, if the work is delayed on account of:-

i. Increase in the quantity of work to be done under the contract as per clause 18; or
ii. Suspension of work as per clause 34 or
iii. Rebuilding of work as per clause 33 or
iv. "Force Majeure"; or
v. any other cause which, in absolute discretion of the Engineer in Charge is beyond the contractors control.

Then immediately upon the happening of any such event as aforesaid, the contractor shall inform the Engineer in charge accordingly, but the contractor shall nevertheless use constantly his best endeavors to prevent and / or make good the delay and shall do all that may be required in this regard. The contractor shall also request, in writing, for extension of time, to which he may consider himself eligible under the contract, within ten days of the date of happening of any such events as indicated above.

38.3 In any such case as may have arisen due to any of the events, as aforesaid, and which may have been brought out by the contactor in writing, the Engineer in charge may give a fair and reasonable extension of time after taking into consideration the nature of the work delayed and practicability of its execution during the period of extension. Provided in the event of non receipt of a request for such extensions from the contractor for reasons whatsoever, the Engineer in charge may at his sole discretion and with due regard to the event grant, fair and reasonable extension of time suamotto.

Such extensions, if admissible, shall be communicated to the contractor by the Engineer in charge in writing within one month of the date of receipt of such request or within one month of the occurrence of the event, but in any case before expiry of the contract period.

CLAUSE 39. COMPENSATION FOR DELAY:

39.1 If the contractor fails to complete all items of work(s) in respect of any of the sub-group / group and or work as a whole, as the case may be and as specified in Schedule "C" before the expiry of the period(s) of completion as stipulated in the aforesaid schedule, or any extended period (not due to the fault of the contractor) as may be allowed, he shall without prejudice to any other right or remedy of the corporation on account of such default, pay as an ascertained / agreed compensation not by way of penalty, such amount as stipulated on the aforesaid schedule "C"

39.2. Should, however, the contractor achieve the completion of the entire works as a whole under the contract within the time as stipulated in Schedule "D" or in the extended time (not due to reasons of default on the part of the contractor) as may be accorded, the corporation will refund to him the amount of compensation recovered from him, if any, in respect of delay in the non-completion of work(s) under the individual group / sub group, as aforesaid in full. In this regard, the decision of the Engineer in charge shall be final and binding.

39.3 The amount of compensation may be adjusted / with held, deducted or set off against any sum due or payable to the contractor under this or any other contract with the Department.

CLAUSE 40: INSPECTION AND APPROVAL:

40.1 All works embracing more than one process shall be subject to examination and approval at each stage thereof and the contractor shall give due notice to the Engineer in charge or his authorized representative when each stage is ready. In default of such notice, the Engineer in charge shall be entitled to appraise the quality and extent thereof and the decision of the Engineer in charge in this regard shall be final and binding.

40.2 No work shall be covered or put out of view without the approval of the Engineer in charge or his authorized representative and the contractor shall afford full opportunity for examination of foundations before permanent work is placed thereon. The contractor shall give due notice to the Engineer in charge or his authorized representative whenever any such work or foundation is ready for examination and the Engineer in charge or his representative shall, without unreasonable delay, unless he considers it un-necessary and advised the contractor accordingly, examine and measure such work or such foundations. In the event of the failure of the contractor to give such notice, he shall, if required by the Engineer in charge uncover such work at the contractors expense.

40.3 The Engineer in charge or his representative shall have powers at any time to inspect and examine any part of the works and the contractor shall give such facilities as may be required for such inspection and examination.

40.4 The contractor shall uncover any part of the works and / or make opening in or through the same as the Engineer in charge may from time to time direct for his verification and shall reinstate and make good such part to the satisfaction of the Engineer in charge. If any such part has been covered up or put out of view after being approved by the Engineer in charge and is subsequently found, on uncovering, to be executed in accordance with the contract, the expenses of uncovering and / or making openings in or through, reinstating and making good the same shall be borne by the corporation. If any other causes, all such expenses shall be borne by the contractor.

CLAUSE 41 COMPLETION CERTIFICATE:

41.1 The work shall be completed to the entire satisfaction of the Engineer in charge and in accordance with the time mentioned in Schedule ”D” and terms and conditions mentioned in clause 38. As soon as the work under the contract is completed as a whole, the contractor shall give notice of such completion to the Engineer in charge. The Engineer in charge, within thirty days of receipt of such notice, shall inspect the work and shall satisfy himself that the work(s) has been completed in accordance with the provisions of the contract and then issue to the contractor a certificate of completion indicating the date of completion. Should the Engineer in charge notice that there are defects in the works or the works are not considered to be complete, he shall issue a notice in writing to the contractor to rectify / replace the defective work or any part thereof or complete the work, as the case may be, within such time as may be notified and after the contractor has complied with as aforesaid and given notices of completion the Engineer in charge shall inspect the work and issue the completion certificate in the same manner as aforesaid.

41.2. No certificate of completion shall be issued as stipulated under 41.1 above nor work be considered to be completed unless the contractor shall have removed from the work site and / or premises all his belongings / temporary arrangements brought / made by them for the purpose of execution of the work and clean the site and / or premises in all respects, including proper disposal of all surplus materials and made the whole of the site and / or premises fit for immediate occupation / use to the satisfaction of the Engineer in charge. If the contractor fails to comply with the above mentioned requirements on or before the date of completion of the work, the Engineer in charge may as he thinks fit and at the risk and cost of the contractor, fulfill such requirements and remove / dispose off the surplus materials, contractors belongings / temporary arrangements, as aforesaid, and the contractor shall have no claim in this respect except for any sum released by the sale of the surplus materials / contractors belongings / temporary arrangements less the cost of fulfilling the said requirements and any other amount that may be due from the contractor. Should the expenditure on the aforesaid account exceed the amount released by sale of such surplus materials / contractors belongings / temporary arrangements then the contractor shall on demand, pay the amount of such excess expenditure.

CLAUSE 42 DEFECTS LIABILITY PERIOD.

The contractor shall be responsible to make good and remedy, at his cost, within such period as may be stipulated by the Engineer in charge, any defects which may develop or may be noticed before the expiry of the period mentioned in Schedule ”D” from the certified date of completion of the entire work (including and comprising of all the group / sub groups of works, if any) covered under the contract.

CLAUSE 43 MEASUREMENT:

43.1 The Engineer in charge shall except as otherwise stated ascertain and determine by measurement, the value of the work done in accordance with the contract.

43.2 Notwithstanding any provision in the relevant standard method of measurement or any general or local custom, measurement of work done under the contract shall be taken in accordance with the procedure set forth in the Technical specifications or Schedule of quantities under the contract. In the case of items of work which are not covered by the Technical specifications or schedules of quantities, measurement shall be taken in accordance with the relevant standard methods of measurements laid down by the Indian Standard Institution.

43.3 All items having a financial value shall be entered in measurement book, level book, etc. prescribed by the Department so that a complete record is maintained of all work performed under the contract.

43.4. Measurement shall be taken jointly by the Engineer in charge or his authorized representative and by the contractor or his authorized representative.

43.5 Before taking measurements of any works, the Engineer in charge or representative deputed by him for the purpose, shall give a reasonable notice to the contractor. If the contractor fails to attend or send an authorized representative for measurement after such a notice or fails to countersign or to record the objection within a week from the date of taking the measurement then in that event the measurements taken by the Engineer in charge shall be taken to be correct and final measurements of such work.

43.6 The contractor shall, without extra charges, provide assistance with every appliances, labour and other things necessary for measurement.

43.7 Measurements shall be signed and dated by both parties each day on the site on completion of measurement. If the contractor objects to any of the measurements recorded by the representative of the Engineer in charge a note to that effect shall be made in the measurement book against the item objected to and such note shall be signed and dated by both parties engaged in taking the measurement. The decision of the Engineer in charge of any such dispute or difference or interpretation shall be final and binding on the contractor in respect of all contract items, substituted items, extra items and deviations.

CLAUSE 44 PAYMENT ON ACCOUNT:

44.1 Interim bills shall be submitted by the contractor monthly or before the date fixed by the Engineer in charge for the work executed. The Engineer in charge shall then arrange to have the bills verified with reference to the measurements recorded in the measurement book(s).

44.2 Payment on account for amount admissible shall be made on the Engineer in charge certifying the sum to which the contractor is considered entitled by way of interim payment for the work executed after deducting there from the amounts already paid, the security deposit and such other amounts as may be with held / deductable or recoverable in terms of the contract.

44.3 Payment of the contractor's bills shall be made by the Corporation within 21 days from the date of submission of the bills subject to the acceptance of the Engineer in charge.

44.4 Payments due to the contractor shall be made by crossed cheque by the Engineer in charge or his authorized representative. Such cheques shall be issued direct to the contractor on furnishing a stamped receipt for the amount of the cheque or to his constituted attorney duly authorized to receive such payments from the Engineer in charge.

44.5 Any interim certificate given relating to work done or materials delivered may be modified or corrected by any subsequent interim certificate or by the final certificate. No certificate(s) of the Engineer in charge supporting an interim payment shall itself be conclusive evidence that any work or materials to which it relates is / are in accordance with the contract.

44.6 Should there be a request for extension of date of completion, pending its consideration interim payments shall continue to be made as provided herein.

CLAUSE 45 PRICE ADJUSTMENT / VARIATIONS:

Payment to contractor for work done shall be adjusted for increase or decrease in the cost of Labour, Materials (except for those materials supplied

by the department) and Petrol, Diesel, Oil and Lubricants (POL) according to the procedure mentioned hereunder:-

A: LABOUR:

If after the date of opening of price bid of tender and during the currency of the contract, there is any increase or decreases in the cost of Labour as reflected in the "All India Consumer Price Index". The corresponding increase or decrease in the payments to the contractor on this account shall be calculated by the formulas':-

$$VI = \frac{L}{100} \times \frac{R \times (I - Io)}{Io}$$

Where

VI = Amount to be adjusted in Contractors payment for the work done during the quarter under consideration.

L = Percentage of Labour component in the value of work as mentioned in Schedule "D"

R = value of work done and payable during the quarter under review (excluding those extra / additional, substituted and altered items of work, whose rates have been worked out and paid on the basis of actual analysis of costs or are based on the current market rates)

Io = All India Consumer Price Index for Industrial Workers General Index (Base 1960 = 100) for the month in which price bid of Tenders were opened, as published in the Indian Labour "Journal of Labour Bureau" Ministry of Labour, Government of India.

I = All India Average Consumer Price Index for Industrial workers (General Index) with respect to the same base, as above, average for the three months of the quarter under consideration.

B M A T E R I A L S

If after the date of opening of the price bid of tender and during the currency of the contract, there is any increase or decrease in the prices of materials (to be arranged by the Contractor) as reflected in the revised Index Numbers of wholesale prices in India (Base 1970-71 = 100), under sub group " Miscellaneous Products" the corresponding increase or decrease in the payments to the contractor shall be made according to the following formula:-

$$V2 = \frac{K}{100} \times R \times \frac{(M - Mo)}{Mo}$$

Where:-

V2 = Amount of variation payable to or recoverable from the contractor during the quarter under review, based on monthly average and adjusted along with the bill.

K = Percentage of material component (other than those materials supplied by the Department) in the value of work as mentioned in Schedule "D"

R = Value of work done and payable during the quarter under review (excluding those extra, additional, substituted and altered items of work, whose rates have been worked out and paid, on the basis of actual analysis of costs or are based on the current market rates).

Mo = Revised Index Number of the wholesale prices in India for "Miscellaneous products" Base 1970-81 = 100) for the month in which price bid of tenders were opened, as published in the monthly Bulletin issued by the Economic Adviser, Ministry of Energy, Government of India, New Delhi.

M = The revised Index number of the wholesale prices in India for Miscellaneous products with respect to the same base, monthly average over the quarter under review.

C. PETROL, DIESEL, OIL AND LUBRICANTS:

If after the date of opening of the price bid of tender and during the currency of the contract, there is any price variation (increase or decrease) in the cost of Petrol, Diesel, Oil and Lubricants, the same shall be paid to or recovered from the Contractor in accordance with the following formula:-

$$V3 = \frac{P}{100} \times R \times \frac{(X-Xo)}{Xo}$$

Where:-

V3 = the increase or decrease in the total payment to be made to the contractor during the quarter under review, based on monthly average and adjusted along with the bills.

P = Component of respective item as component as percentage in the value of work as indicated in Schedule "D"

R = Value of work done and payable during the quarter under review (excluding those extra substituted and altered items of works, whose rates are based on actual analysis or the current market rates).

Xo = Actual all inclusive price of respective item of POL on the date of opening of the price bid of tender at the nearest oil, Petrol pump.

X = Actual all inclusive price of item, calculated as the average price for the item for the quarter under review at the same oil petrol pump as above.

(Lube HD 30 shall be taken as an Index for calculation of price variation for all lubricants)

45.2 Provided further that adjustments on account of above as provided in sub clause 45.1 shall be subject to the following:-

a. The period for review i.e. the "Quarter" for calculating the price variation shall be "Calendar Quarter" defined hereunder:-

January to March	Ist quarter (both months inclusive)
April to June	2nd quarter (both months inclusive)

July to September	3rd quarter (both months inclusive)
October to December	4th quarter (both months inclusive)

In case, however, the contract is allotted during a particular quarter, calculation for price adjustment / variation for remaining part of this quarter, shall be made separately in accordance with the above procedure.

b. This clause shall be applicable only for the work that is carried out within the completion period as in schedule "D" of extended time if any under clause 38.

c. Variations arising on account of payment related to rates for extra, altered and substituted items whose cost has been worked out on actual analyzed cost or on market price basis as envisaged in clause 17 shall be regulated with reference to such variations in cost as are subsequent to the date of settlement of the rates, instead of the date of opening of the price bid of tenders.

d. No separate escalation whatsoever shall be payable for any statutory or otherwise, increase in customs duty, excise duty, sale tax, octroi, Dharat etc, on materials and on labour required for the execution of the work over and above the provisions made in this clause.

e. No claims whatsoever for the price adjustment / variations other than those stipulated above shall be entertained.

CLAUSE 46 TAXES, DUTIES AND LEVIES ETC.

46.1 All existing sales tax or any other tax or duty or levy such as Octroi, Dharat, Entry Tax, Royalty, Terminal Tax on all materials, including petrol, oil and lubricants (and increase, if any on these during the currency of the contract) that the contractor has to purchase for the performance of the contract, shall be payable by the contractor and the corporation will not entertain any claim for compensation whatsoever, in this regard. The rates quoted by the contractor shall be deemed to be inclusive of all such taxes, duties, levies etc. and any increase thereon.

46.2 However, if a New Tax or duty or levy (other than that existing on the date of opening of the price bid of tender) is imposed under a statute or law during the currency of the contract and the contractor become liable to and actually pays the same for obtaining materials required for bonafide use on the works contracted, then the contactor shall immediately inform the Engineer in charge in this regard. The Corporation will reimburse the same to the contractor on production of satisfactory proof of payment, provided that the amount thus claimed is not paid under price variation clause in the contract.

46.3 ***Deleted***

CLAUSE 47 PAYMENT OF FINAL BILL:

The final bill shall be submitted by the contactor within one month of the date fixed for completion of the work or of the date the certificate of completion furnished by the Engineer in charge. No further claim in this regard unless as specified herein under shall be entertained. Payment shall be made within three months if the amount of the contract plus that of the additional

items is upto Rs. 2 lacs and in 6 months, if the same exceeds Rs. 2.00 lacs and after the submission of such bill. If there shall be any dispute about any item or items of the work, then the undisputed item or items only shall be paid within the said period of three months or six months, as the case may be. The contractor shall submit a list of the disputed items within thirty days from the dis-allowance thereof and if he fails to do so, his claim shall be deemed to have been fully waived and absolutely extinguished.

CLAUSE 48 OVER PAYMENTS AND UNDER PAYMENTS

48.1 Whenever any claim whatsoever for the payment of a sum of money to the corporation arises out of or under this contract against the contractor, the same may be deducted by the corporation from any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that, under any other contract with the corporation or from any other sum whatsoever due to the contractor from the Corporation or from his security deposit, or he shall pay the claim on demand.

48.2 The Corporation reserves the right to carry out post payment audit and technical examination of the final bill including all supporting vouchers, abstracts, etc. The corporation further reserves the right to enforce recovery of any overpayment when detected, notwithstanding the fact that the amount of final bill may be included, by one of the parties , as an item of dispute before an arbitrator appointed under clause 53 of this contract and notwithstanding the fact that the amount of the final bill figures in the arbitration award.

48.3 If as a result of such audit and technical examination , any overpayment is discovered in respect of any work done by the contractor or alleged to have been done by him under the contract, it shall be recovered by the corporation from the contractor by any or all of the methods prescribed above, and if any under payment is discovered, the amount shall be duly paid to the contractor by the corporation.

48.5 Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be with held or retained by way of lien by the Engineer in charge or corporation against any claim of the corporation or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Engineer in charge or department or with such other person or persons.

The sum of money so with held or retained under this clause by the Engineer in charge or corporation will be kept with held or retained as such by the Engineer in charge or corporation or till his claim arising out of in the same contract or any other contract is either mutually settled or determined by the arbitrator, if the contract is governed by the arbitration clause under the clause 53 or by the competent court hereinafter provided, as the case may be, and the contractor shall have no claim for interest or damages whatsoever on this account or any other ground in respect of any sum of money with held or retained under this clause.

CLAUSE 49 TRAINING OF APPRENTICES:

The contractor shall, during the currency of the contract, engage and also ensure engagement by his sub contractor and other employed by the contractor in connection with the works, such number of apprentices and in such categories for such periods as may be required under the apprenticeship Act 1961 and he shall be responsible for all obligations of the employer under the aforesaid Act, including the liability to make payment to Apprentices as required under the Act.

CLAUSE 50 CONTRACT MATTERS TO BE TREATED AS CONFIDENTIAL:

50.1 All documents, correspondence, decisions and orders concerning the contract shall be considered as confidential and or / restricted in nature by the contractor and he shall not divulge or allow access to them by any unauthorized person.

50.2 The contractor shall take necessary steps to ensure that all persons employed on any work in connection with this contract have noted that the Indian official secrets Act 1923 (XIX of 1923) applied to them and shall continue so to apply even after the execution of such works under the contract.

CLAUSE 51 LAWS GOVERNING THE CONTRACT:

Unless otherwise hereinafter provided, this contract shall be governed by the Laws in force in the Jammu and Kashmir State.

CLAUSE 52. PENALTY CLAUSE:

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 specifications, mode of procedure and the carrying out of the work as stipulated in the clause Nos:7,8,10,13,17,18,20, 23, 28, 31,33,36,39,40, 42 and Schedule "C" the decision of the Engineer in charge, which shall be given in writing, shall be final and binding on the contractor.

Time allowed for execution of work as specified in schedule "D" is the essence of contract. In case the contractor fails to comply with time of completion of work, penalty shall be payable by the contractor to the employer at the rate of 5% of the total contract value for delay in achieving the work as per schedule "C". The employer may without prejudice to any other method of recovery, deduct the amount of penalty from the payment due or to become due to the contractor. The payment for penalty shall not relieve the contractor from his obligations to complete the work or from any other of his obligations and liabilities under the contract.

CLAUSE 53. ARBITRATION:

53.1 Except as otherwise provided, in clause 52 hereinbefore, all questions, disputes or differences in respect of which the decision has not been final and conclusive, arising between the contractor and the corporation, in relation to or in connection with the contract shall be referred for arbitration in the manner provided as under and to the sole arbitrator appointed as follows:-

i. Either of the parties may give to the other notice in writing of the existence of such questions, dispute or differences;

ii. within thirty (30 days) of receipt of such notice from either party the Chief Engineer Civil Investigation & Design Wing PDC Srinagar , Engineer in charge of the work at the time of such dispute shall send to the contractor a

panel of three persons and thereafter the contractor within fifteen (15) days of receipt of such panel communicate to the Chief Engineer / Executive Engineer the name of one of the persons from such panel and such a person shall then be appointed sole arbitrator by the Chief Engineer / Executive Engineer.

iii. Provided that if the contractor fails to communicate the selection of a name out of the panel so forwarded to him by the Chief Engineer / Executive Engineer then after the expiry of the aforesaid stipulated period the Chief Engineer, Civil Investigation & Design Wing PDC Srinagar shall without delay select one person from the aforesaid panel and appoint him as the sole arbitrator.

53.2 If any dispute arises out of or in connection with the terms and conditions of this contract or as to be interpretation thereof or as to conformity of the works with the plan, specification and measurement etc., the same shall be settled by the Arbitration." The Arbitrators nominated by the parties or appointed by the intervention of courts shall be bound by following terms while arbitrating the dispute:-

a) The Arbitrator shall pass a speaking award with reference to each item of claim/dispute.

b) The Arbitrator shall pass an award strictly as per the terms and conditions of the contract. Any award contrary to the terms and conditions of NIT Agreement shall be void and not enforceable.

c) The Arbitrator shall not award pre-reference, penditlite or future interest on any claim awarded in favour of any party.

The venue of Arbitration shall be in the State of Jammu and Kashmir"

The Arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, then the Chief Engineer/Executive Engineer shall appoint another person to act as sole Arbitrator. Such person shall be entitled to proceed with the reference from the stage at which it was left by the predecessor.

53.3 The award of the arbitrator shall be final and binding. The Arbitrator shall decide in what proportion the Arbitrators fees, as well as the cost of Arbitration proceedings shall be borne by either party.

53.4 The Arbitrator with the consent of the parties can enlarge the time, from time to time, to make and publish his award.

53.5 A notice of the existence in question, dispute or differences in connection with the contract, unless served by either party within 30 days of the expiry of the defects liability period, failing which all rights and claims under this contract shall be deemed to have been waived and thus forfeited and absolutely barred.

53.6 Where the amount of claim is Rs. Ten lacs (10.00 lacs) only and above, the arbitrator shall give reasons for the award.

53.7 The work under this contract shall continue during Arbitration proceedings and no payments due from or payment by the Corporation shall be with held on account of such proceedings except to the extent which may be in dispute.

53.8 Subject to aforesaid modifications Arbitration Act Samvat 2002, or any statutory modifications or re-enactment thereof and the rules made there under

and for time being in force shall apply to the Arbitration proceedings under this clause.

CLAUSE NO: 54. CONSTRUCTION PLANT AND EQUIPMENT:

54.1. The contractor shall provide and install all necessary construction plant, equipment and machinery required for the execution of the work under the contract at his cost and shall use such methods and appliances for the purpose of all the operations connected with the work covered by the contractor which shall ensure the completion of work(s) within the specified time.

54.2. The contractor shall submit as per schedule "F" , full details of construction plant, equipment and machinery proposed to be deployed for works along with its planning schedule showing month wise phasing shall be in accordance with the construction schedule , plant, equipment and machinery schedule i.e. Schedule "G" and "F" attached hereto, so as to achieve the targets laid down in Schedule "C" and annexure there to. All these schedules are an integral part of the agreement.

The contractor shall have to adhere to the deployment schedule of construction plant equipment and machinery as provided by the Engineer-in-charge . However, Engineer-in-charge, whose decision shall be final and binding on the contractor, may permit deviation in the following cases:-

(i) In view of geological or design considerations any change in the equipment to be used becomes justified.

(ii) Any other reason for which the scope of the work either in terms of quantities or item rates undergo a change and

(iii) If the construction schedule itself is for any reason up dated and changed and is binding on the contractor in terms of the contract.

54.3. The contractor shall have to certify the requirement utility, performance and dependability of the proposed construction plant, equipment and machinery for bonfire execution of work. He shall give an under taking accepting full responsibility for proper installation, testing, commissioning land maintaining the same in good working condition throughout the contract period. The proper supply of spare parts, accessories and maintenance arrangements shall be entirely the responsibility of the contractor.

54.4. The Contractor shall submit the following information in triplicate to the Engineer-in-charge for approval within the time stipulated against each item:

a. The general layout plan of construction plant and equipment for the execution of the work within 30 days after the issue of letter of award.

b: Detailed drawings showing the location of major plant and other facilities which he proposes to put up at the site including any change in the general layout, at least thirty days prior to the commencement of the respective work.

54.5. Provided always that any such approval mentioned in 54.4(a) and (b) shall not absolve the contractor of his obligations for due execution and timely completion of the contract.

54.6. Subject to the availability of any item of Corporation's plant, equipment and machinery and at the written request of the contractor, such plant equipment and machinery may be issued to the contractor on hire for being deployed on the work contracted, for at pre-determined rates, terms and conditions at the sole discretion of the Engineer-in-charge

NOTE:

In case of contract with another public Sector Undertaking, the Clause No: 53.1 to 53.8 shall stand deleted and the following arbitration clauses shall apply.

Except as otherwise provided, in case of a contract with a Public Sector Undertaking if at any time any question, dispute or difference whatsoever arises between the parties upon or in relation to, or in connection with this agreement, the same shall be settled by arbitration in terms of the Ministry of Finance (Bureau of Public Enterprises) O.M. No: BPE/GL-901/76MAN/2/110/75-BPE/CM-I, dated: 01.01.19976, 29.10.1976 and 04.10.1977 or any modifications / amendments thereof.

The arbitrator shall have the power to enlarge the terms to make the award with the consent of the parties, provided always that the commencement or continuation of the arbitration proceedings shall not result in cessation or suspension of any of the rights and obligation of the parties or any payment due to them hereunder.

FORMS OF DIFFERENT DEEDS

(on non-judicial stamp paper of appropriate value)
PROFORMA OF BANK GUARANTEE IN LIEU OF EARNEST MONEY DEPOSIT.

Ref:
To

Dear Sirs,

In accordance with your Notice inviting tender for _____ .
_____.
Under your specification No:_____ dated:-_____
(hereinafter called the Tenderer) with following Directors on their Board of Directors/Partners of firm.

1.	2.
3.	4.
5.	6.
7.	9.
9.	10

Whereas to participate in the said tender for the following:-
1._____
2._____
3._____

Whereas it is condition in the tender documents that the tenderer has to deposit Earnest Money with respect to the tender, with _____(hereinafter referred to as Corporation) amounting to equire to submit Bank Guarantee from a Nationalized Bank irrevocable and operative till____ days after the validity of the offer(i.e. 210 days from the date of opening of tender) for the like amount which amount is likely to be forfeited on the happenings of contingencies mentioned in the tender documents.

And whereas the tenderer desires to secure exemption from deposit of Earnest money has offered to furnish Bank Guarantee for a sum of Rs. ____ to the corporation for Earnest money.

Now therefore we the _____Bank, a body corporate constituted under th Banking companies (Acquisition of Transfer of Undertaking) Act 1969 and branch office at _____(hereinafter referred to as the Bank) do hereby undertake to agree to pay on demand in writing by the _____with any demur, reservation or recourse.

We, the aforesaid bank, further agree that the Corporation shall be the sole judge of and as to whether the tenderer has committed any breaches of any of the terms costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the corporation on account thereof the extent of the Earnest money required to be deposited by the tenderer in respect of the said tender document and the decision of the Corporation that the tenderer has committed such breach or breaches and as to the amount or amounts of loss damage costs charges and expenses caused to suffered by or that may be caused to or suffered by the Corporation shall be final and binding on us.

We, the said Bank further agree that the Guarantee herein contained shall remain in full force and effect until it is released by the corporation and change in the constitution, liquidation or dissolution of the Tenderer, shall not be _____. Our liability guaranteed herein. It is further declared that _____is shall not be necessary for the corporation to proceed against the contractor before proceeding against the Bank and the Guarantee herein contained shall be ___against the Bank No:_____ with standing any security which_____Corporation may have obtained or shall _____from the contractor at the item when proceedings are taken against the Bank for whatever amount of may be outstanding unrealized under the Guarantee.

The right of the corporation to recover the said amount of Rs. _____ from us in manner aforesaid will not be disputes have been raised by the said M/S _____(tenderer and / or dispute or disputes are pending before any authority, Officer, tribunal ____ Arbitrator etc.

Notwithstanding anything stated above, our liability under this guarantee shall be restricted to Rs._____ and our guarantee shall remain in force up to____ and unless a demand or claim under the guarantee is made on us in writing within three months after the aforesaid date i.e. on or before the ____ all your rights under the guarantee shall be forfeited and we shall be relieved and discharged from all liability there under.

Date:
Place

Signature
Printed Name
Designation
Banks common seal.

In presence of
Witness (with full name and address) Authorization No.
1.

2

Please indicate the name and address of the projects / stations / officers where the B.G. is to be executed.

PROFORMA OF IDEMNITY BOND TO B EXECUTED BY THE CONTRCTOR FOR INITIAL ADVANCE PAYMENT FOR PERFORMANCE OF ITS CONTRACT.

IDEMNITY BOND.

This Indemnity Bond is made this_____ day of _____ 20
By _____ _____ a company registered under the Companies Act, 1956/ Partnership firm/Proprietary concern having its Registered office at _____(hereinafter called as Contractor or "obligator" which expression shall include its successors and permitted assignees in favour of _____ having its registered office at _____ (Name and address of the Corporation) and its Station at _____(hereinafter called owner which expression shall include its successors and assignees)
Whereas Power Development Corporation has awarded to the contractor a contract for _____ vide award No:_____dted:_____
And its amendment No:_____ (applicable when amendments hve been issued) (hereinafter called the contract) in terms of which Corporation is required to release initial advance to the contractor for execution of the contract (hereinafter called the Advance)

NOW, THEREFORE, this indemnity Bond witnessed as follows:-
1. That in consideration of advance of Rs. _____(Rupees_____) released to the contractor for the purpose of performance of the contract the contractor hereby undertakes to indemnity and shall keep Corporation indemnified for the advance. The contractor hereby acknowledges receipt of the advance.
2. That the contractor is obliged and shall remain absolutely responsible and take all risks whatsoever till the supply is effected in accordance with the terms and conditions of the contract and its receipt and acceptance by the Corporation at its station. The contractor undertakes to keep Corporation harmless against any loss or damage that may be caused to the equipment / materials under the contract which the advance has been released by the Corporation.
3. The contractor undertakes that the advance shall be used exclusively to the performance / execution of the contract strictly in accordance with its terms and conditions and no part of the above advance shall be utilized for any other work or purpose whatsoever. It is clearly understood by the contractor that non observance of the obligations under this indemnity Bond by the contractor shall inter-alia constitute a criminal breach of trust on the part of the contractor for all intents and purposes including legal / penal consequences.
4. This indemnity bond is irrevocable. The contractor undertakes the advance has been released for successful execution of the contact and any failure on the part of the contractor to execute the contract in part / full as per the terms and conditions of the contract, shall be deemed to be a breach of contract and the contractor shall forthwith return the advance with interest @ 18% upon demand form Corporation without any

demur, reservation or protect and without reference to any Arbitrator / Tribunal or any other authority whatsoever.

IN WITNESS WHEREOF, the contractor has hereunto set its hand through its authorized representative under the common seal of the company, the day, month and year first above mentioned.

Witness	For and on behalf of M/S
1. Signature	1. Signature
2. Name	2. Name
3. Address	3. Address.
	Authorized representative.
1. Signature	1. Signature
2. Name	2. Name
3. Address	3. Address.

Indemnity Bonds are to be executed by the authorized persons and (i) in case of constructing company under common seal of the company of (ii) having the power of attorney issued under common seal of the company with authority to execute indemnity bonds (ii) in case of (ii) the original Power of Attorney if it is specifically for our contract or a Photostat copy of the Power of Attorney it is a general Power of Attorney and such documents should be attached to indemnity bond.

Bond should be duly notarized.

(On Non-Judicial stamp paper of appropriate value and purchased in the name of executing Bank)

FORM OF BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT IN INDIVIDUAL CONTRACT.

The _____

1. In consideration of the _____(Company name / contractor) having its registered office at _____(full address) (hereinafter called the said Corporation which expression shall unless repugnant to the subject or context include its administrators, successors and assignees) having agreed under the terms and conditions of the award letter bearing No:_____ dated:_____ issued by Corporation which has been unequivocally accepted by the contactor M/S_____ work of _____ (hereinafter called the said contract) to accept a deed of Guarantee as herein provided for Rs. _____ (Rs._____) from Nationalized Bank in lieu of the security deposit to be made by the contractor or in lieu of the deduction to be made from the contractors bills, for the due fulfillment by the said contractor of the terms and conditions contained in the said contract. We, the _____ Bank (hereinafter referred to as the said Bank) and having our registered office at _____ do hereby undertake and agree to indemnify and keep indemnified the corporation from time to the extent of Rs. _____ (Rs._____) against any loss or damage cost, charges and expenses caused to or suffered by or that may caused to or suffered by the corporation by reasons of any breach or breaches by the said contractor of any of the terms and conditions contained in the said contract and to unconditionally pay the amount claimed by the corporation on demand and ;without demur to the extent aforesaid.

2. We_____Bank further agree that the corporation shall be the sole judge of and to whether the said contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation on account thereof and the decision of the Co portion that the said contractor has committed such breach or breaches and as to the amount of loss, damage, costs charges and expenses caused to or suffered by or that may be caused to or suffered by the corporation from time to time shall be final and binding on us.

3. We, the said Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken or the performance of the said contact and till all the dues of the corporation under the said contract or by virtue of any of the terms and conditions governing the said contract have been fully paid and its claim satisfied or discharged and till the owner certified that the terms and conditions of the same contract have been fully and properly carried out by the said contractor and accordingly discharges this Guarantee subject however, that the corporation shall no claim under the Guarantee after 90(ninety) days from the date of expiry of the defects liability period as provided in the said contract i.e. ___ date or from

the date of cancellation of said contact, as the case may be, unless a notice of the claim under this Guarantee has been served on the Bank before the expiry of the said in which case the same shall be enforceable against the Bank notwithstanding the fact that the same is enforced after the expiry of the said contract.

4. The Corporation shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or indemnity, from time to time to vary any of the terms and conditions of the said contact or to extend time of performance by the said contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor and either to enforce or forebear from enforcing any of the terms and conditions governing the said contract or securities available to corporation and the said Bank shall not b released from its liability under these presents by any exercise by the corporation of the liberty with reference to the matters aforesaid or by reasons of time being given to the said contractor or ay other forbearance, act or omission on the part of the corporation or any indulgence by the or portion to the said contractor or any other matter or thing whatsoever which under the law relating to securities would be for this provision have effect of so releasing the Bank from its such liability.

5. It shall not be necessary for corporation to proceed against the contractor before proceeding against the Bank and Guarantee herein contained shall be enforceable against the Bank, not withstanding any security which the Corporation may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

6. We, the said Bank lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the corporation in writing and agre that any change in the constitution of the said contract or the said Bank shall not discharge of liability hereunder. If any further extension to this Guarantee is required kthe same shall be exstenderd to such required periods on receiving instruction from M/S_____ on whose behalf this guarantee is issued.

For and on behalf of Bank.

In presence of
Witness
1.

2

Sign.
Name & Desig.
Authorization No:
Date and place
Banks seal.

Note:-

1. The address will be that of the project / office where the Bank Guarantee is to be submitted.
2. Validity of the Bank Guarantee should be 90 days in excess from the date of dispatch of material.

(On Non-Judicial stamp paper of appropriate value and purchased in the name of executing Bank)

PROFORMA OF BANK GUARANFTEE FOR CONTRACT PERFORMANCE

Bank Guaranteed No: _____

Ref:_____
Date_____

To,
_____ SEB/Power Utilities (name & address)
Dear Sirs,
In consideration of the ---SEB (hereinafter referred to as the "Owner" which expression shall unless repugnant to the context or meaning thereof include it's successors, administrators, and assigns) having awarded to M/S _____ with it's Registered / Head Office at _____ (hereinafter referred to as the "Contractor" which expression shall unless repugnant to the context or meaning thereof, include it's successors, administrators and assigns) a contract by issue of Owner's Letter of Intent No:_____ dated _____ and the same having been unequivocally accepted by the Contractor resulting in a "Contract" bearing No:_____ dated_____ Valued at _____ for _____ and the contractor (scope of Contract) having agreed to provide a Contract Performance Guarantee or the faithful performance of the entire Contract equivalent to _____ % (percent) of the said value of the Contract to the owner
We _____ (Name & Address) having it's Head Office at _____ (hereinafter referred to as the "Bank" which expression shall, unless do hereby guarantee and undertake to pay the owner, on demand any and all money payable by the Contractor to the extent of _____ as aforesaid at any time up to _____ (days/months/year) without any demur, reservation, contest, recourse or protest and/or without any reference to the Contractor Any such demand made by the owner on the Bank shall be conclusive and binding not withstanding any difference between the Owner and Contractor or any dispute pending before any court, tribunal or any other authority. The Bank undertakes not to revoke this guarantee during it's currency without previous consent of other Owner and further agrees that the guarantee herein contained shall continue to be enforceable till the Owner discharge this guarantee.
The owner shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee from time to time to extend the time for performance of the Contract by the Contractor. The owner shall have the fullest liberty, without affecting this guarantee to postpone from time to time the exercise of any powers vested in them or of any right which may to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the owner and Contractor or any other course of or remedy or security available to the owner. The Bank shall not be released of it's obligations under these presents by any exercise by the owner of it's liberty with reference to the matters aforesaid on any of other indulgence shown by the owner or by any other matter or thing whatsoever which under law would but

for this provision, have the effect of relieving the Bank.

The Bank also agree that the owner at it's option shall be entitled to enforce this Guarantee against the Bank as a Principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the owner may have in relation to the Contractor's liabilities.

Notwithstanding anything contained hereinabove our liability under this guarantee is restricted to _____ and it shall remain in force up to and including _____ and shall be extended from time to time for such period (not exceeding lone year) as may be desired by M/S _____ on whose behalf this guarantee has been given

Witness

Dated this _____ day of _____20_____ at _____

Witness

_____ _____

Signature Signature

_____ _____

Name Bank's Rubber Stamp

_____ _____

Official address Name

_____ _____

Designation with Bank Stamp.

.

Attorney as per power of Attorney No:___

Dated:_____

Note:-

--- This sum shall be ten percent (10%) of the Contract price.

__ Validity of the Bank Guarantee should be 90 days in excess of the period for which it is required.

----- The address will be that of the project / office where the B. G. is to be executed.

PART II

TECHNICAL SPECIFICTIONS

SECTION- I
GENERAL SPECIFICATIONS.

1-1 GENERAL:

All specifications shall conform to the relevant Indian Standard specification unless otherwise specified hereinafter. For points not covered by the IS specifications and or the portions thereof and if no mention be made therein, the written instructions of the Engineer In charge shall be binding on the contractor. The work shall be carried out strictly in accordance with the approved plans and designs and specifications and as per the instructions of the Engineer in charge and no deviations or changes are permissible without the written order of the Engineer in charge.

1-2 RIGHT TO CHANGE LOCATION AND PLANS:

When additional information regarding foundation or other condition become available as a result of Excavation work and Geological studies, the minor adjustments, if any, in the layout shall have to be carried out by the contractor in conformity with the construction drawings that shall be supplied to contractor by the project authorities at no extra cost to the project.

Such changes shall be intimated to contractor well in advance. The contractor shall have to submit complete proposal of their "Construction Plan layout" before actual start of work, discuss the same with project authorities and set it approved before the commencement of work. Since no major change in the location of component is expected, the plan layout set at site by contractor shall not be liable for change. If any minor changes occur, they shall have to be carried out at no extra cost to the project.

1-3 Before starting the excavation, the contractor or his authorized agent shall be provided with levels of the ground at the site. He will further be required to sign the field book, L-Section and Cross sections based on the ground levels taken in token of acceptance of the ground levels before the commencement of the work. In case he commences the work without verifying and accepting the cross sections and L sections of the ground it will be assumed that he has accepted the same as taken by the project and no complaint or claim whatsoever in this behalf will be entertained.

1-4 The contractor shall notify, the Engineer in charge in writing, his authorized agent.

1-5 BENCH MARKS AND SURVEY STAKES:

Bench marks and survey stakes shall be preserved by the contractor and in case of their destruction or removal by him or his employees, they will be replaced by the project at the contractor's expenses and his sureties shall be liable there for.

1-6 CLEARANCE OF SITE:

The contractor shall have to clear the site of work before the work is commenced and after its completion. The prices quoted shall be inclusive of all charges likely to be incurred in carrying out the work of site clearance initial and final and shall also hold good under all conditions of weather.

After completion of the work entrusted to the contractor, the Engineer in charge shall issue the "Completion Certificate" only when completion in all respects and handing over of works covered in the contract is made so that these can be put to commercial use.

1-7 LAND FOR THE USE OF CONTACTORS WORK:

The contractor shall make his own arrangements for constructing Quarters and other structures required for his work on the land earmarked for such purpose by the project. Ground rent as decided by the Engineer in charge shall be recovered from the contactor.

1-8 COMMUNICATION LINES AND NATURAL WATER COURSES:

The contractor shall not close any communication lines without the permission of the Engineer in charge. The contractor shall also not obstruct any natural lines of drainages without the approval of the Engineer in charge.

1-9 FIELD TESTING OF STRUCTURE AFTER COMPLETION (WATER TEST)

Water test / Fill test / Test of impermeability of joints / core test / load test or any other field test required to be done after completion of the work to determine whether the structure fulfills all its structural and functional requirements shall be specified by the Engineer and shall have to be done by the contractor immediately after the completion of the work or when desired by the Engineer in charge on notification there for by him. Release of security deposit and issue of final completion certificate shall be subject to successful completion of test / tests.

1-10 D E L E T E D

SECTION – 3

EXCAVATION

3-1 GENERAL:

i. Setting out:

The contractor shall establish at suitable points to the satisfaction of the Engineer in charge, permanent reference marks on the centre line as may be necessary and directed. The permanent marks shall be inscribed on bronzed pegs, set in substantial concrete blocks where they will be free from the likely hood of disturbances. Suitable permanent bench marks shall be established. As the work progresses, centre line marks shall be made on pegs inserted at convenient intervals to the satisfaction of the Engineer in charge for checking alignment, grades, levels etc. and also the dimensions of the " minimum excavation lines" the contractor shall at all times, remain responsible for the sufficiency and accuracy of all such bench marks and reference points. The cost of these shall be deemed to have been included in the rates for excavation provided in the schedule of quantities and prices biz, Schedule "A": of part Ist.

ii. ACCURACY OF ALIGNMENTS, GRADES, LEVELS ETC.

Bench marks and fixed reference points, with the value of levels and the coordinates are fixed by the project in the works area. Plans showing the position, coordinates and levels of the salient points will be supplied to the contractor. The contractor will fix permanent points and bench marks in the working area. He shall take all precautions to see that the points fixed by the project are not disturbed by his workmen and shall make good the damage if any at his own cost.

The contractor shall excavate true to alignment grade and levels and shall check these at frequent intervals as the work progresses. The contractor shall provide free of cost all facilities like labour, instruments, etc. and all co-operation to the Engineer in charge to check the alignment, grade, levels etc. whenever and every time they are asked for. Such checking by the Engineer in charge shall not absolve the contractor from his responsibility of maintaining the accuracy of the work. Any discrepancies or error detected during the course of excavation and or at the time of end of the work shall be set right by the contractor at his own cost in a manner satisfactory to the Engineer in charge.

3-2 OPEN EXCAVATION:

Scope:

The works of excavation to be done under these specifications shall consist of furnishing all machinery, tools, labours and materials required and performing all works required to carry out excavation of different materials,

conveyances and disposal of the above maintaining the excavation slopes and trenches preparing the foundations as shown on the drawings and as directed by the Engineer in charge, drainage and all operations covered within the intent and purpose of this item of work.

Also the area of open excavation, shall wherein the opinion of Engineer in charge, clearing it necessary be cleared of all trees, bushes, rubbish and other objectionable matter and the materials removed shall be burnt off. The cost of all these items shall be deemed to have been included in the unit price provided for items under excavation.

This excavation is to be conducted in all sorts of soil, soft and hard murum all overburdens, debris, silt deposits, river borne materials, slush mud, all sorts of clay, soft rock, disintegrated and decomposed rock, boulders of whatever size encountered and all other type of rock which can be executed manually, loosened by barring, wedging and / or blasting. Blasting shall however be done as per the instructions of the Engineer in charge depending upon the site and strata conditions met with during excavation. When blasting is prohibited for any reasons, as directed by Engineer in charge, the excavation in rock shall be carried out by chiseling, wedging, barring, broaching, line drilling or any other suitable method agreed to by the Engineer in charge.

3-3 **METHOD OF EXCAVATION:**

Excavation shall be carried out using such method and techniques as are required to reduce over break to a minimum beyond the line of excavation shown on the contract drawings and will neither damages nor crack the rock or foundation of other structure or as required by the Engineer in charge. Particular care shall be exercised to ensure the stability of remaining rock after excavation. At all stages of excavation of work, all necessary precautions shall be taken to preserve the rock below and beyond the line of excavation in the soundest possible conditions.

a. **Pre-shearing:**

The side walls of all open cut excavation in rock under these specifications shall be drilled and blasted according to the techniques of pre shearing.

Pre shearing is the technique of carefully drilling holes within a maximum diameter of 45 mm on the plane of the final rock surface and loading each hole with a continuous explosive charge and firing them simultaneously with instantaneous ignition to create a crack along the plane of the final rock surface. The maximum permissible centre to centre spacing of the holes for pre shearing shall be 500 mm and such holes shall be drilled at closer spacing if required by the Engineer in charge, to prevent damage to the surface produced, by the pre-shearing. Not more than 4 holes shall be blasted with one delay. Charge in each drill hole shall not exceed 2.02 per meter depth distributed uniformly in depth. The pre shearing may be carried out either in advance of drilling the primary blasted holes or the pre shearing holes may be fired along with main blast but timed to fix Ist. The first of row of production holes adjacent to the pre sheared

face shall be lightly charge to ensure that no damage will result to the pre sheared face when the main charge is fired.

The drilling and blasting pattern may be modified to suit the rock condition as advised by the Geologist and the Engineer in charge.

b. **Line drilling.**

This procedure will be adopted in case of excavation of the shear zones, if any, to the prescribed lines which will be impracticable by ordinary drilling and blasting method. Line drilling shall consist of forming excavated rock faces by drilling a single line of closely spaced holes not less than 60 mm in diameter in the plane of the required rock surface to provide a plane of weakness along which the rock will break. The distance between centres of the holes for drilling shall not be greater than 300 mm and such holes shall be drilled at closer spacing if required by Engineer in charge so as to ensure that the rock will break to the desired lines. Holes for line drilling shall not exceed 6 meters in length except as otherwise approved by the Engineer in charge.

Blasting in line drill holes will not normally be permitted in the first row of production holes adjacent to the line drill holes. Final trimming of line drilled faces shall be completed by wedging and barring or other approved methods.

3-4 **LIMITS OF EXCAVATION:**

a. **Excavation of minimum lines and grades:**

Excavation for foundation shall be made up to firm rock free from weathered materials, open seams, and shall be so shaped, cleaned and roughly stepped as to produce the desired surface of contact between the concrete and rock as shown on the Drawings or as directed by the Engineer in charge. Where not to be covered with concrete, excavation shall be made to the full dimensions required and shall be finished to the full prescribed lines and grades in workman like manner, except that sharp points of undisturbed ledge rock will be permitted to extend within the prescribed lines not more than 15 cm. Where concrete is to be placed upon or against rock and average and minimum thickness are shown the excavation shall be sufficient to provide for the minimum thickness of concrete at all points and prescribed average thickness shall be exceeded as little as possible. Measurement for payment of such excavation will be limited to the excavation required for the prescribed average thickness of the concrete. Where concrete is to be placed upon or against rock and the thickness of concrete is not indicated on the Drawings the excavation shall be made to the line and grades prescribed by the Engineer in charge. Measurement for payment of such excavation will be made of the material actually removed within the lines established by the Engineer In charge.

b. **Over excavation.**

Any damage done to the work due to the contractor's operation including shattering the materials beyond the excavation lines shall be repaired by the contactor at his cost. Over excavation if any, performed for the purpose or reason except as may be order in writing by the Engineer in charge, and whether or not due to the fault of the contractor shall be at the expenses of contractor where required to complete the work all such over excavation shall be refilled with masonry or concrete as approved by the Engineer in charge at the expenses of the contractor.

Any over excavation resulting from Geological consideration and not due to the fault of contractor and certified by Engineer in charge shall be paid at 2/3rd of the rate accepted in the schedule of bids. In such case the over excavation shall be backfilled by the contractor as directed by the Engineer in charge and the concreting thus done shall be measured and paid at the unit price allotted in the Schedule of Quantities and prices viz. Schedule "A" of Part Ist.

No blasting that might injure the work, will be permitted, and any damage done to the work by blasting incld. The shattering of the materials beyond the required excavation lines, shall be repaired by the contractor at his own expenses in a manner satisfactory to the Engineer in charge. Slopes shattered or loosened by blasting shall be taken down by the contractor at his own expenses. All cavities in rock excavation upon or against which concrete is to be placed caused by careless excavation, and determined by the Engineer in charge or by the removal, as directed by the Engineer in charge, rock or other foundation materials needlessly damaged by blasting or other operations of the contractor, shall be filled solidly with concrete of the same mix as the foundation concrete entirely at the expenses of the contactor incld. cost of all materials required there for. Additional excavation outside the specified minimum lines of excavation for temporary excess or haul roads for any other temporary construction facility or for the convenience of the contractor shall not be permitted without the prior approval in writing of the Engineer in charge. All the cost in such additional excavation and backfill shall be borne by the contractor.

c. **Revision of lines and grades:**

During the progress of work it may be found necessary or desirable to vary the slopes or the dimensions of the excavation from those shown on the Drawings or established by the Engineer in charge. The contractor shall be entitled to no additional compensation above the unit rate in the schedule of bids for excavation by reason of such changes provided that if such changes are made after the excavation has been done to the slopes or dimensions established by the Engineer in charge that unit costs will be increased or decreased as a result of such changes and an equitable adjustment of unit price will be made in accordance with the applicable provisions of the conditions of the contract.

3-5 **Stripping Bluffs or loose Rocks:**

Early in the construction programme, before any work of excavation is taken up, all loose rocks, semi detached rock in or close to the area to be excavated that is liable to fall or endanger shall be stripped. The method used shall be such as not to shelter or render unstable or unsafe any rock that was originally sound and safe. Any material not requiring removal as contemplated herein, but which may later become loosened or unstable shall be promptly and satisfactorily removed.

3-6 **Excavation surcharge slopes:**

The side slopes in excavation shall be as steep as will stand with safety in overburden, but shall not exceed those shown on Drawings without specific permission of the Engineer in charge.

3-7 **Excavation in open cuts:**

All the excavation in the open cuts shall be made true to lines, slopes and grades shown in the drawings. No material shall project within the dimensions of the minimum excavation marked. Boulders projecting out from the excavated faces shall be removed, if in the opinion of the Engineer in charge, they are likely to be a hindrance to other works, flow of water etc. The hollows left out in the side shall be paid for as excavation for the particular class of material surrounding the boulder.

Suitable berms shall be left at appropriate places with necessary approach maps and sump pits for installation of dewatering purpose or other purposes, as required or directed by the Engineer in charge. These shall be excavated and the excavation finished to lines and grades shown on the Drawings and to the satisfaction of Engineer in charge. No payments shall be made for formation of such berms or Ramps, sumps, etc. except for excavation when the same falls and is completed within the minimum of modified excavation lines.

In the case of excavation of over burdens, where the surface is left as excavated, or is to be covered by pitching, formation of rain cuts and gullies shall be avoided by provision of proper drainage. Any gullies formed shall be made good by properly packing excavated rock spoil in them, at the contractors cost. All holes left by removing boulders will also be filled in with rock spoil, at no extra cost.

In special locations (only in rock) where specially indicated or ordered in writing by the Engineer in charge, the use of explosives shall be discontinued and excavation completed by line drilling, broaching, wedging or barring or other suitable methods, approved or directed by Engineer in charge.

All loose or loosened rock in the sides shall be removed by barring and wedging etc. the unit price for excavation rock shall include the cost of all those operations.

3-8 **Protection of Excavated surface**:

The contractor shall be responsible for the stability of all temporary slopes and shall support to the satisfaction of the Engineer in charge, all surface exposed by the excavation until completion of the work. Temporary supports if required, for protecting excavated slopes shall be provided and erected by the contactor at his own cost.

3-9 **Excavation for foundation:**

After removal of overburden, excavation shall be continued in rock for foundation of the structures to the depth shown on the drawings and as directed by the Engineer in charge. At all stages of excavation, precautions shall be taken to preserve the rock below and beyond the lines of required excavation in the soundest possible condition. The quantity and strength of the explosive used in the foundation excavation in rock in various locations shall be such as will neither damage nor crack the rock or adjacent structures outside the limits of excavation.

As the excavation approaches its final lines, the depth of the holes and the strength and amount of explosives should be progressively and suitably reduced up to 500 mm from the specified foundation level, Further excavation, of so directed, by the Engineer in charge shall be carried out by the line drilling and broaching. All excavation beyond the minimum excavation line in the surface which have to be covered shall be filled back by concrete of same quality as may be directed. No payment will be made for such concrete, unit price tendered for excavation in rock shall inclusive the cost of all excavations as specified herein up to final lines and levels.

3-10 **Under ground excavation:**

Scope: The work of excavation of tunnel and Adits or shafts if any, under these specifications shall consist of furnishing of all labour, tools and plants, materials, consumable, blasting materials etc. required for carrying out tunnel excavation in shear zone / Rock by controlled blasting or any other means including removal, conveyance and disposal of the excavated material as specified. The scope shall also include supporting excavated sections by temporary and permanent supports, all as required and specified. The scope shall also include adequate ventilation, lighting and drainage of all the work underground excavation, the enclosed tender Drawings are merely indicative of the nature and scope of work to be done under contract. The work shall actually be carried out in accordance with construction drawings, issued by the Engineer in charge from time to time or as ordered by him in writing and such drawings and orders shall be deemed to be the contract drawings indicating the nature and scope of work under the contract. The contractor shall assume full and sole

responsibility for the safety and stability of entire excavation performed under the contract until the final completion of the work.

If fulfillment of this responsibility, the contractor shall adopt such and all measures as he may consider necessary and all such measures shall be deemed to fall within the scope of tunnel excavation. Depending upon the site conditions an adit may have to be constructed which will be decided by the Engineer in charges.

3-11 **General:**

All underground excavation shall be made to the lines, grades and dimensions shown in the contract Drawing or as establishment by the Engineer in charge. The general dimensions, arrangements and broad details of the typical sections are shown in the tender drawings enclosed. Underground excavation in tunnel shall be done in accordance with the specifications laid down hereunder Permanent supports as shown in the drawings or as directed by Engineer in charge shall be fabricated and erected by the contractor in accordance with the provisions of these technical specifications. Temporary timbering in tunnel if required shall be provided by the contractor at his own cost.

The contractor shall provide suitable equipment and make all necessary arrangements to the satisfaction of Engineer in charge for moving the machinery along the alignment and grade of tunnel to check the dimensions of the excavation and lining etc. as and when required by the Engineer in charge. The cost of all this shall be deemed to be included in the unit price of item of excavation by tunneling provided in schedule of quantities and prices schedule "A" of part I. The arrangements of checking the alignment by laser control shall be available at site.

3-12 to 3-15 **Deleted**

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3-16 **Instruments for in-situ measurements:**

The contactor shall keep available at the site tape, extensometer, bore hole extensometer, pressure cells, load cells, inclinometer and piezaometers for in-situ measurements in wake of safe construction and safety measure.

3-17 **Lighting, Ventilation, Drainage and Pumping:**

The cost of all the lighting, furnishing, installing, maintaining and operative ventilation system shall be deemed to be included in the unit price provided for excavation in the schedule of quantities and prices viz Schedule "A" of part Is. All water from the underground excavation, shall be satisfactorily drained away and pumped out, if necessary.; In case the underground springs

are met with, any water from them shall be sealed away as not to damage or endanger any work. The pumps to be used shall be operated either by compressed air or electric motors and not by any type of internal combustion engine unless specifically permitted . Drainage of all Tunnels excavated upgrade will be by gravity. If a channel has to be excavated outside the lines of excavation, the contractor may excavate such channels with the approval of Engineer in charge. This channel shall be filled back by the contractor with concrete as specified for the lining of tunnels. The excavation and back filling of such channel carried out by the contactor shall be at his cost.

When, however, the water has to be pumped out, the contactor shall install the necessary pumps and pipes as may be approved by the Engineer in charge in writing. The channels or the pumping units shall be maintained satisfactorily till 21 days after the concrete lining is laid.

The underground and the construction water to be pumped out may be contaminated with dust, cement, slurry, dirt sand etc. The pumping arrangements to be provided shall be suitable for such drainage works. It shall be seen that at no location there is pooling of water. The contractor must take all precautions essential to prevent water from flowing into the tunnel from open area. All the drilling for the underground excavation shall be done with an adequate supply of water to each drill.

3-18 **Communication facilities**.

The contractor shall install and maintain proper communication facilities (e.g. telephone etc) in good working order at all times during the period of the work concerned at or near the working face of the tunnel and other places so as to afford prompt communications over each such telephone, throughout the full working hours every day, with some responsible employee of the contractor outside the tunnel etc. The contractor shall also install, maintain and operate such other communication and signal facilities as may be necessary for the safe and efficient protection of the work. All such facilities shall be subject to the approval of the Engineer in charge. Authorized employees of project shall have free use of such communications and signal facilities.

The entire cost of providing and maintaining such a communication and signal system shall be deemed to have been included in the unit rates provided for the item of excavation in the schedule of quantities and prices, viz. Schedule “A” of Part I.

3-19 **General specifications:**

Apart from what has been stipulated above, the excavation shall be carried out in accordance with the relevant provisions of following Indian Standard specifications and to the dimensions lines and grades shown in the contract drawings.

i. Code of Practice for construction of Tunnels (Part I) precision survey and setting out IS 5878 (Part I) 1971

ii. Code of practice for construction of Tunnels (Part II) underground excavation in rock section I drilling and blasting- IS 5878 (Part II / Section I) 1970.

iii. Code of practice for construction of tunnels (Part II) underground excavation in rock section 2 : Ventilation, lighting, mucking and dewatering – IS 5878 (Part II, Section -2) 1971

iv. Code of practice for construction of tunnels Part II underground excavation in rock Section 3. Tunneling methods of steadily inclined tunnels, shafts and underground Power House IS-5878 (Part II /Section 3) 1971.

v. Code of practice for construction of tunnels (part IV) Tunnel supports IS 5878 (Part 4th) 1971.

Reference shall also be made to the recommendations of CWPRS Pune in respect of underground excavation.

3-20 to 3-24 **Deleted**

3-25 Explosive and Blasting:

The contractor shall acquaint himself with all the applicable laws and regulations concerning storing handling and the use of explosives. All such laws, regulations and rules etc. as are current from time to time shall be binding upon the contractor.

The provisions detailed in this are supplementary to the above laws, rules and regulations etc. and are applicable except where they conflict with the aforementioned laws etc. from time to time. Further the Engineer in charge may issue modifications, alterations and new instructions from time to time. The contractor shall comply with the same without these being made a cause for any claim.

3-26 Materials:

All the materials, such as explosives, detonators, fuse tamping materials etc. that are proposed to be used in blasting operations, shall have the prior approval of the Engineer in charge. The use of a fuse with only one protective coat is prohibited. The fuse shall be sufficiently water resistant as to be unaffected when immersed in water for 30 minutes. The rate of burning of the fuse shall be uniform and not less than 4 seconds per 25 mm of length with 10% tolerance on either side.

Before use, the fuse shall be inspected and most, damaged or broken ones discarded. The rate of burning of all new types of fuses, or when they have been in stock for long shall be tested before use. The detonators used shall be capable of giving an effective blasting of the explosives. Moist or damaged detonators shall be discarded.

3-27 Personnel:

Excavation by blasting will be permitted only under personal supervision of competent and licensed persons and trained workmen. All supervisors and

workmen in charge of makeup, handling, storage and blasting work shall be adequately insured by the contractor. The storage shall be in charge of a very reliable person, approved by the Engineer in charge who may if necessary cause police enquires being made as to his reliability, antecedents etc. The contractor shall have to produce security for the person in charge of explosives, if and as required by the Engineer in charge or the Civil authorities of the District. The contractor shall make sure that his supervisors and workmen are fully conversant with all the rules to be observed in storing, handling and use of explosives. It shall be assured that the supervisor in charge is thoroughly acquainted with all the details of the handling and the blasting operations.

3-28 **Storage of explosives:**

The contractor shall build a magazine for storing the explosives. The site of the magazine, its capacity and design shall subject to approval by the Engineer in charge and the Inspector of explosives, before the construction is taken up. As s rule, the explosives should be stored in clean, dry, well ventilated, bullet proof and fire proof building on an isolated site. Alternatively the contractor may arrange portable magazine of adequate capacity to cope up with the requirements of the work.

The explosives, detonators and fuses shall each be separately stored. A careful a day to day account of the use of explosives shall be kept y the contractor in the approved register and in a approved manner. The Engineer in charge may also pay surprise visits to the storage magazine. In case of any unaccountable shortage of the explosive or if the account is not found to have been maintained in a manner prescribed by the Engineer the contractor shall be liable to be penalized with forfeiture of security deposits, pledged by him with the project or his tender shall be liable to be cancelled 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 in the Court of Law.

i. The magazine shall at all times be kept scrupulously clean.
ii. No un-authorized person should at any time be admitted inside the magazine.
iii. The magazine shall, when not in use by authorized person be kept well and securely locked.
iv. The magazine on no account be opened during or on the approach of a thunderstorm and no person shall remain in the vicinity of magazine during such period.
v. Magazine shoes without nails shall at all time be kept in the magazine and a water tub or cement trough about 300 mm high and 460 mm in diameter, filled with water shall be fixed near the door of the magazines.
vi. Persons entering the magazine must put on magazine shoes which shall be provided by the contractor for the purpose and be careful.

a.` Not to put their feet on the clean floor unless they have the magazine shoes on
b. Not to allow the magazine shoes to touch the ground outside the plain floor.
c. Not to allow any direct or grit to fall on the clean floor.

vii. Persons with bare feet shall before entering the magazine dip their feet in water and then step direct from the tub over the barrier(if there be one) on the clean floor.

viii. A brush or broom shall be kept in the lobby of the magazine for cleaning out the magazine on each occasion it is opened for the receipt, delivery or inspection of explosives.

ix. No matches / inflammable material shall be allowed in the magazine or not shall be obtained from an electric storage battery lantern.

x. No person having articles of steel or iron on him shall be allowed to enter the magazine.

xi. Oils, cottoned waste and critical liable to spontaneous ignition shall not be allowed inside the magazine.

xii. Workman shall be examined before they enter the magazine to see that they have none of prohibited articles on their person.

xiii. No tools or implements other than those of copper, brass, gunmetal or wood shall be allowed inside the magazine. All tools shall be used with extreme gentleness and care.

xiv. Boxes of explosives shall not be thrown down or dragged or along the floor and shall be stacked on trestles. Where there are white Ants, the legs of the trestles, should rest in shallow copper, lead or brass, bowls containing water. Open boxes of dynamite shall not be exposed to the direct rays of the sun.

xv. Empty boxes or loose packing materials shall not be kept inside the magazine.

xvi. The magazine shall have lighting conductor, which should be got tested at least once a year, by an officer authorized by the Engineer in charge. The contractor shall within 15 days comply with all the recommendations made by the officer testing the lighting conductor, failing which the Engineer in charge shall be entitled to comply with the same at the contractors expenses, which shall not be open to question and the Engineer in charge may take any action that he may consider fit.

xvii. A notice shall be hung near the storage prohibiting entrance of unauthorized people.

xviii. The following shall be hang in the lobby of the magazine.

a. A copy of rules both in English and in the language which the workers concerned are familiar with.
b. A statement showing the stock in the magazine at the particular time.
c. The certificate showing the last date of testing of the lightening conductor.
d. A notice that smoking is strictly prohibited.

xix. The magazine shall be inspected almost twice a year by an officer representing the Engineer in charge who shall see that all rules are strictly complied with. He shall notify all omissions etc. to the contractor who shall rectify the defects within a period of 15 days from the date of receipt of the notice failing which the Engineer in charge may take whatever action be considered suitable.

3-29 **Disposal of deteriorated explosives:**

All deteriorated explosive shall be disposed off in an approved manner. The quantity of the deteriorated explosives to be disposed off shall be intimated to the Engineer in charge prior to its disposal.

3-30 **Preparation of primes and charging of holes:**

The primes shall not be prepared near open flames or fires. The work of preparation of primes shall always be entrusted to same personal. Primes shall be used as soon as possible after they are ready. The work of charging shall not commence before all the drilling work at the site is completed and the supervisor has satisfied himself to that effect by actual inspection. While charging open lamps shall be kept away. For charging with powered explosive a naked flames shall not be allowed. Only wooden tamping rods, without any kind of metal on the rod shall be allowed to be used. The tamping rod shall be of cylindrical ends.

Before holes must be of such a size that the cartridges can easily pass down and they shall not, however, but too big. One cartridge shall be inserted at a time and gently pressed down with the temping rods. The sand, clay or other taping materials used for filling the holes completely shall not be temped too hard.

3.31 **Blasting:**

Blasting pattern shall be got approved by Engineer in charge and its effects on surrounding area to be monitored by geophones. Necessary precaution shall be taken while blasting and in case of damages to any structures done due to blasting operation of the contractor, the cost of making it good shall be borne by the contractor. Blasting shall be carried out during fixed hours of the day which shall be got approved by the Engineer in charge. The hours fixed shall not be altered without prior written approval of the Engineer in charge. The site of blasting operation shall be prominently demarcated by the red danger flags. The order to fire shall be given only by the supervisor in charge of the work and this order shall be given only after giving the siren warning signal three times so as to enable all the labour watchmen etc to reach safe shelters. A siren with distinctive notes shall be used to give the warning signals. The siren shall not be used for any other purpose. All the labour shall be made acquainted with the sound of the siren and shall be strictly warned to leave their work immediately at the first warning signal and to make for safe shelters, and not to leave the shelters until the clear signal has been given. All the roads and footpaths leading to the blasting areas shall be watched. In special cases, suitable extra precautions shall be taken The Engineer in charge may, however, permit blasting for underground excavation, without restriction on fixed times, provided that he is satisfied that proper precaution are taken to give sufficient warning to all concerned and that the work of the agencies on the site is not unduly hampered for lighting fuses, a lamp with strong flame such as carbide lamp shall be used. The supervisor shall watch the time required for firing of the fuses and shall see that all the workmen are under safe shelters in good time.

3-32 **Electrical firing.**

i. Only the supervisor in charge shall possess key of the firming apparatus and he should keep it always with him.
ii. Special apparatus shall be used as a source of current for the blasting operation. Power lines shall not be taped for the purpose.
iii. The detonators shall be checked before use.
iv. Such of electrical lines as could constitute danger for work of charging shall be removed from the site.
v. The firing cables shall be with proper insulating cover, so as to avoid short circuiting due to contact with water, metallic parts or rock.
vi. For blast in series only detonators of the same manufacture and of the same group of electrical resistance shall be used.
vii. The use of the earth as a return line shall not be permitted.
viii. The firing cable shall be connected to source of current only when there is nobody in the area of blasting.
ix. Before firing, the circuit shall be checked by a suitable apparatus.
x. After firing whether with or without an actual blast, the contact between the firing cable and the source of current, shall be cut off before any people are allowed to leave the shelters.
xi. During storm, charging with electrical detonators shall be suspended. The charges already placed in holes shall be blasted as quickly as possible, but taking all the safety precautions and giving necessary warning signals. If this is not possible then the site shall be abandoned till the storm is passed.

3-33 **Precautions after blasting:**

After the blast, the supervisor must carefully inspect the work and satisfy himself that all the charges have exploded. After the blast takes place in underground works, the workman shall not be allowed to go to the face / area till all the toxic gases are evacuated.

3-34 **Misfires:**

If it is suspected that part of the blast has failed to fire or is delayed, sufficient time shall be allowed to elapse before entering the dangerous zone. When fuse and blasting caps are used, a safe time shall be allowed and then the supervisor alone shall leave the shelter to see the misfire. None of the driller on the work near this hole until one of the two following operations have been carried out by the Supervisor, either (i) the supervisor should very carefully (where the tamping is of damp clay) extract the tamping with a wooden scrapper or got of water or compressed air (using pipe of soft material) and withdraw the fuse with the primer and detonator attached after which a fresh primer and detonator with fuse should be placed in this hole and fired out, or (II) the hole may be cleared up 300 mm of tamping and the direction then be ascertained by placing a stick in the hole. Another hole may then be drilled at least 225 mm away and parallel to it, this hole should then be charged and fired. The balance of the cartridge and detonators found in the muck shall be removed before leaving the work, the supervisor should inform; the supervisor of the relieving shift in any case of misfires and should point out the precaution with red cross denoting the same, also stating that action, if any he has taken in the matter. The

supervisor should also at once report at the office, all cases of misfire, the cause of the same and what steps were taken in connection therewith. The name of the day and night shift supervisors must be noted in the contractor's office. If a misfire has been found to be due to a defective detonator or dynamite, the whole quantity or box from which the defective articles were taken must be returned to the office for inspection. Drilling in holes not completely exploded by blasting shall not be permitted.

3-35 **Disposal of materials**:

Before excavation is started, the disposal of spoils shall be carefully planned. The excavated material shall be dumped sufficiently clear of the edges of excavations permitting ample space for trolley track parts, installation of lifting and dewatering machines, stacking construction materials etc, and transported to stock or waste piles. The useful material shall be stocked in separate areas with reference to the nature of the material. All the materials shall, as far as possible be removed in dry conditions.

Materials from rock excavation, which are fit for use in masonry, for plums, for aggregate breaking etc. will required special attention and shall be preserved in areas close to the site of use to be specified by the Engineer in charge. Steps should be taken to keep the materials clean a subsequent cleaning will be difficult and imperfect. All other excavated materials excluding those which can be utilized elsewhere shall be carried from excavation site and dumped at a dumping place selected by the Engineer in charge up to a distance as specified in the schedule of quantities so as to form a spoil bank. Spoil bank shall be located where they will not interfere with the natural flow of water. Excavated materials shall not be carelessly thrown over the premises and should be deposited directly in permanent position. The Engineer in charge may ask the contractor to dump the excavated materials in regular heaps, bunds, blanket rip rap with regular slopes as directed by the Engineer in charge and level also so as to provide natural drainage.

3-36 **Geological Mapping:**

Detailed Geological mapping is required to be done during excavation and before excavation is declared as completed. The contractor as and when directed by the Engineer in charge shall clean the excavated portion for Geological mapping. All loose fragments or excavated rock shall be removed and the area air, air water jetted as required. No extra allowances shall be payable to the contractor on this account, all this deem to have been included in the Unit price of excavation.

3-37 **Measurements and payments:**

Cross sections of the site of excavation shall be taken just prior to the commencement of work under the contract and grades and lines picked for excavation. Intermediate cross sections will be taken at such points as required. The final excavated section shall be taken on completion of excavation and plotted on the initial and intermediate cross sections previously taken. All

measurements for excavation will be based on the survey subject to condition that un necessary excavation shall not be measured. Where excavation is done to steeper slopes than the grade specified, the grades fixed for excavation shall be taken on the basis of measurement. The cost of material and other connected charges for operation like timbering, shoring and strutting etc. shall deem to be included in the unit rates provided for the item of excavation. The quantities are approximate and shall be paid according to actual measurement on site. The rates for excavation shall include the removal, handling and disposal of all materials wet or dry, encountered within the limits of these specifications and shall further include drilling holes for blasting, lighting and other operations necessary for excavation and protection of works. The rates for excavation for all classes shall include all lifts as well as indicated in the schedule of quantities and prices and shall also include all other temporary works necessary to maintain the excavation in good order during construction. The rate of excavation shall also include besides drilling of hole for blasting, cost of blasting materials such as explosives, fuse coils, detonators etc.

Payment for excavation of tunnel except for over break beyond payment line will be made at unit price per Cu.m. provided in schedule of quantities and prices. Over excavation except otherwise specified herein before beyond payment line shall not be measured for payment. The unit price for tunnel excavation shall be deemed to include cost of furnishing and carriage of all labour, materials, tools, plants and equipment, blasting materials such as explosive, fuse coils, detonators etc. temporary works including staging, scaffolding gangways etc. required for excavation, removal, disposal of excavated materials for all lifts and up to specified leads. The unit price of excavation shall also include provision of adequate ventilation and lighting, the cost of furnishing and erecting temporary supports, for maintaining the excavated sections till these are permanently supported and their subsequent removal.

SECTION 4 - CEMENT CONCRETE :

4-1 **Scope:**

The work covered by this section consists of furnishing all materials, equipments and labour for the manufacture, transport, placing, finishing and curing of concrete in the structures include in these specifications and performing all the functions necessary and ancillary thereto. Cement (subject to it's availability) shall be supplied on cost recoverable basis from project stores at **Margund Kangan**.

4-2 **Composition:**

Concrete shall be composed of ordinary Portland cement / Portland pozzolana cement, water, fine and coarse aggregate, if considered necessary the Engineer in charge, an air entertaining a mixture, dispersion agent and a pozzolanic admixture. The design of each concrete mix will be based on the water cement ratio necessary to secure a plastic workable mix suitable for the specific conditions of placement and will properly cured, a product having durability, impermeability and strength in accordance with all the requirements, of the structure required be the Engineer in charge and the test samples of each specified mix shall be prepared and tested in the project laboratory. The contractor may be present at the time of such tests if he so desires. If in the opinion of Engineer in charge the utilization of above mentioned admixture is found necessary, same shall have to be arranged by the contractor and shall be paid for on production of sufficient proof to support the reasonability of rates.

4-3 **Design of concrete mix.**

a. The exact proportions in which the different aggregates ingredients are to be used for different parts of the work shall be determined by the Engineer in charge from time to time during the progress of the work and as analysis and tests are made of the samples of the aggregates and the resulting concrete. No extra payment or deductions shall be made in the unit price for variations in various ingredients.

b. The determination of the proportions by the Engineer in charge shall not relieve the contractor of his responsibility for producing and placing concrete conforming to the specified requirements. Before mixing concrete for any part of structures, the contractor shall satisfy himself that concrete mixed in proportions determined by Engineer in charge will permit the contractor to produce the concrete complying with the specified strength requirements. The contractor shall notify the Engineer in charge of any objection he has concerning the mix proportions and shall submit to the Engineer in charge for approval of his proposed alternative proportions which if approved by the Engineer in charge shall be used for the manufacture of concrete.

c. The specifications of concrete are subject to changes as per construction drawings and site conditions during construction. Laboratory tests as per standard practice would be carried out with the use of specified approved

aggregate to find out the ingredients required to give the desired strength in any structure. The contractor will be associated with these experiments, and he would be fully responsible to give the concrete of the specified strength.

d. The requirements for water cement ration and consistency conform to relevant IS specifications and as approved and directed by Engineer in charge. The mixes shall be designed to meet all the requirements as specified for different classifications of concrete. If required for workability or otherwise an approved powdered admixture may be used. The water cement ration will be regulated by the requirement of workability durability impermeability and design. The amount of water shall be adjusted for any variation in the moisture content or grading of aggregates as they enter the mixer and in any batch shall not be more than the amount just sufficient to produce concrete of the required consistency after a normal mixing period. Uniformity in concrete consistency from batch will be maintained.

4-4 **Testing:**

All tests shall be in accordance with the recommended procedure given in various ISI codes in these specifications, the following tests will be made on concrete at mixer site.

i. Slump
ii. Unit weight.
iii. Air content
iv. Strength test.

The frequency of these tests will depend on the nature of job and will be decided by the Engineer in charge. The contractor shall provide all necessary facilities, materials and labour for these tests as the Engineer in charge may consider necessary for which no separate payment shall be made. The contractor shall make arrangements for taking of standard cubes from the cement concrete mix from such places and portions as the Engineer in charge may deem fit and may determine and assess the quality of work. Such cubes may be tested at site or sent to a recognized laboratory or institution. The result of the test as received from the Laboratory shall be binding on the parties. The standard moulds for the cement concrete cube (15 cm cube) shall be provided by the contractor in sufficient numbers not less than six numbers. The cost of testing the cubes and arrangements for transportation to a specified laboratory or a test house shall be made by the contractor. The selection of the test house shall be made by Corporation. The charges for the tests falling below prescribed norms to be got done additionally shall conform to relevant IS code for test of concrete 7/28 days after laying of cement concrete lining, samples might be drilled out and subject to standard ISI tests for which the firm shall have to make necessary arrangements and to bear the cost. Should any portion of the lining not conform to the required compressive strength on the basis such tests / results, the lining done in such reaches shall have to be dismantled. Tests for consistency of concrete (slump test) and compressive strength of concrete shall be made in accordance with the recommended procedure laid down in Indian Standard specifications.

4-5 **Strength requirements of concrete (All values in Kg/cm^2)**

The requirements of strength of concrete of various mixes shall conform to the following tables:-

Grade of concrete	Compressive strength on 15 cm cube, minimum at 7 days.	Compressive strength of 15 cum cube at 28 days after mixing	
		Preliminary test (Minimum)	Works test (Minimum)
M 100 (M 10)	70	135	100
M 150 (M 15)	100	200	150
M 200 (M 20)	135	250	200
M 250 (M 25)	170	320	250
M 300 (M 30)	200	380	300
M 350 (M 35)	235	440	380
M 400 (M 40)	270	500	400

Defined according to minimum 28 days strength maximum aggregate size and minimum or maximum slumps and other approximated details shall be in accordance with IS 456 of 1978. The classification as designed and different mixes of concrete shall be in accordance with the design requirement for concrete structures. The above stated mix proportions may have to be modified after detailed laboratory tests and field experience. These mixes may further be modified to suit the work or the nature of materials used. As far as possible concreting under extreme conditions of temperature etc. shall have to be avoided. In case the concreting work is done under extreme conditions of temperature and wind special precautions with the prior approval of the Engineer in charge shall have to be taken.

4-6 **Cement:**

Ordinary Portland cement / Portland pozzdolana cement will conform to IS 269-1976 or 1489-1976 and its subsequent amendments. The cement shall be used by the contractor until notice has been given by the Engineer in charge about its suitability for use in works. The cement shall be transported from stores to work site in trucks, provided with adequate arrangements for prevention of deterioration due to weather conditions and loss or damage during transit beyond permissible limits. Immediately upon receipt at the site of work, cement shall be stored in a dry weather tight and properly ventilated structure with adequate provisions for the prevention of absorption of moisture. All storage facilities shall be subject to the approval of the Engineer in charge and shall be such as to permit easy access for inspection and identification. Adequate capacity of storage shall be provided at each work site to ensure uninterrupted working, in order that cement may not become unduly aged. After delivery the contractor shall use any cement which has been stored at work site for 60 days or more before using cement of lesser age. Any cement stored at work site for over four months shall not be used unless test proves it to be satisfactory.

Sampling and testing of cement shall be done in accordance with Indian Standard Specifications IS 269-1976 /1489-1976.

4-7 **Coarse aggregates:**

a. **General**

Aggregate, both coarse and fine can be available from the main source at local / Crushers at locals approximately 10 Km from site. Production of aggregates from the above source will involve quarrying of the raw material, transporting, processing i.e. screening, crushing, washing etc. The contractor may use excavated material as aggregate for concrete on prior approval of the Engineer in charge. Such materials shall be stacked separately, processed, washed and stock piled according to sizes of aggregate sizes within such limits Coarse aggregate for concrete shall be furnished by the contractor and shall consist of crushed rock or natural gravel or a mixture of crushed rock and natural gravel blended uniformly and to the satisfaction of the Engineer in charge to achieve the desired quality of concrete. Coarse aggregate shall consist of uncoated, hard, strong, dense and durable pieces and shall be free from injurious amounts of disintegrated stones, soft flunky or elongated particles, salt, alkali, vegetable and other deleterious substances. The percentage of deleterious substance of any size in coarse aggregate as delivered to the mixer shall not exceed the following values.

Material	Percentage by weight.
Materials passing IS Sieve No. 8	3
Soft fragments.	1
Clay lumps	1
Other deleterious substance	1

The sum of percentages by weight of all deleterious substances in any size as delivered to mixer shall not exceed by 5% by weight. Coarse aggregates may be rejected if it does not comply with the following test requirement, carried out as specified in IS No: 383-1970 and any subsequent amendment issued thereafter.

i. **Abrasion test:** The percentage of wear on uncrushed particles should not exceed 15%, and on crushed particles should not exceed 20%.
ii. **Soundness test**: The average loss of weight after 10 cycles should not be more than 12% with sodium suplhate solution and / or 18% with magnesium sulphate solution.
ii. **Specific gravity test**: The specific gravity computed on dry basis should not be less than 2.6.
iv. **Absorption test**: The amount of water absorbed should not exceed 5%/
v. **Aggregate crushing value and aggregate impact value**: Limits as per IS 383-1970.

The Engineer in charge may examine the aggregate in other respects as well such as the quick chemical resistivity test assessment of clay, soft and elongated particles etc and the contractor shall supply free of cost necessary

quantities of aggregates to carry out all the tests as desired by the Engineer in charge. The sources from which concrete aggregates are to be obtained shall be selected by the contractor well in advance of the time when they are required in the work, and shall supply samples to the Engineer in charge at least 60 days before the contemplated use of aggregate in concrete. The aggregate shall be resistant softening, leaching or chemical alternation after its incorporation in concrete. In case the stone is not considered to be free from dust, dirt etc. by the Engineer in charge, the contractor shall get the stone screened, washed and / or treated as directed.

b. **Grading:** The coarse aggregates as delivered to the mixer shall be of uniform grading within the limits as may be specified by the Engineer in charge. The aggregate shall be classified into four grades, passing through square mesh, screens of the corresponding sizes so as to produce the following sizes :-

Nominal size	Range	IS sieve designations.	%age passing Through screens.
Very large	150mm – 75 mm	0”	90- 100
		3”	0- 15
Large	75 mm – 38 mm	3”	90-100
		1½”	0-15
Medium	38 mm – 20 mm	1½”	90-100
		3/4”	0-10
Small	20 mm – 5 mm	3/4”	90-100
		No. 440	0-10
		No. 240	0-2

There being no IS sieve above 4 inches, six inches square mesh sieve shall be used. Percentage limits for undersize and oversize of aggregates in various proportions shall be governed by the provision of USBR concrete manual.

c. **Sampling**: All sampling of coarse aggregates shall be in accordance with the applicable provision of IS 383-1970 and subsequent amendments. All tests will be made by and under the supervision of the project. Routine control test with aggregate at various stages in aggregate processing storage piles, batching and mixing plant will be made by the project. The contractor shall provide such facilities as the Engineer in charge may consider necessary for the ready procurement of respective test samples.

d. **Storing and handling of coarse aggregates**:

The coarse aggregate shall be distributed in for storage piles designated 150mm-75mm, 75mm to 38 mm 38mm to 20 mm and 20 mm to 4.75 mm as per contractors layout approved by the Engineer in charge. The piles shall be so located as to avoid any undesirable material getting mixed up with the aggregate. If the piles get mixed up with undesirable materials, the contractor shall remove such undesirable material by washing and other measures directed by the Engineer in charge. The aggregate shall be so deposited in and removed from the storage piles, as not to cause any excessive breakage or change in the uniformity of the grading. The contractor shall keep at all times live storage of coarse

aggregates so as to last for the work without replenishment, for at least one week.

4-8 **Fine aggregates:**

a. **General:** The term fine aggregate or sand is used to designate the aggregates in which the maximum size of particles is 4.75 mm. The contractor shall be responsible for the investigation and procurement of sand of the quality specified herein. Depending upon availability and suitability it may be necessary to supplement the Nallah sand with manufactured sand from quarried rock. Manufactured sand may have to be used entirely or blended with Nallah sand to obtain a satisfactory grading of the fine aggregate. In the case of Nallah sand, the source from which it is obtained shall be subject to approval of Engineer in charge. Presently the source where from sand is to be obtained is Local crushers at Wussan 10 Kms away from work site. The fine aggregate whether it be Nallah sand, crushed sand and / or mixture of both in proportion as required by the Engineer in charge shall comprise as aggregate particles having a maximum size up to 4.75 mm. The manufactured sand, if used, shall be crushed out of approved stone and the contractor shall take suitable measures to reduce the blowing of dust at each point of handling of this sand. All fine aggregates obtained from the Nallah bed shall be washed to remove impurities. Aggregate as manufactured from natural rocks shall be freed from dust by either blowing or any other approved process to the satisfaction of the Engineer in charge. The fine aggregates shall be clean, free from excess mica, silt particles, organic and chemical impurities. The sand shall consist of hard dense, durable uncoated rock fragments. The maximum %age of deleterious substances in the sand as delivered to the mixer shall not exceed the following values:-

Materials	percentage by weight.
Materials finer than IS sieve No. 8.	3
Shale	1
Coal and lignite	1
Clay lumps	1

The sum of the percentage by weight of deleterious substances in sand as delivered to the mixer shall not exceed 5%. Sand may be rejected if it does not comply with the following test requirements carried out as specified in IS 383-1970, and any subsequent amendments issued thereafter.

i. **Test of organic impurities:-**

The sand should not produce a color darker than the standard in the colorimeter test for organic impurities.

ii. **Soundness test:**

After 10 cycles, the average loss of weight should not be more than 10% with sodium sulphate solution and / or 15 percent with magnesium sulphate solution.

iii. **The specific gravity:**

The specific gravity computed on the dry basis should not be less than 2.6.

b. **Grading:**

The fine aggregates as delivered to the mixer or as incorporated in the mixed concrete shall be of uniform grading and when tested by means of standard screens shall conform to the following limits.

ASTM Screen No.	IS Sieve designation (IS 460-1962)	Individual percent by weight retained on screen.
4	4.75 mm	0 – 5
8	2.36 mm	5-15
16	1.18 mm	10-25
30	600 microns	10-30
50	300 microns	15-35
100	150 microns	12-20
Pan	Pan	3 – 7

If the individual percent retained on the I.S. Sieve1.18 mm is 20 percent or less, the maximum limit for the individual percent retained on 2.36 mm screen may be increased to 20%. During normal operations, the grading of the fine aggregate shall be controlled so that the fines modulus of nine samples out of the five aggregate as delivered to the mixer shall be within the range of 2.30 to 3.10. Any classifying batching or other operations on the fine aggregate required to meet the gradations shall be included in the unit price provided for the item of work in which the fine aggregate is used.

c. **Sampling:** All sampling of fine aggregate shall be in accordance with th applicable provisions of IS 383-1970 and any subsequent amendments. All tests will be made by and under the supervision of project authorities. Routine control test of the fine aggregate at various stages in aggregate processing, storage piles, batching and mixing plant will be made by the project authorities. The contractor shall provide such facilities as the Engineer in charge may consider necessary for the ready procurement of representative test samples.

d. **Storage:**- The fine aggregates will be stored in separate stock piles within the limits of the areas as approved by the Engineer in charge. The removal of the materials from storage area shall be done in a manner that will result in increase in the uniformity of the grading in so far as possible. All aggregates shall remain in free draining storage for at last 72 hours prior to use. Sufficient live storage so as to last for the work without replenishment for at least one week shall be maintained.

4-9 **Admixture:-** All admixtures shall conform to requirements specified in IS 9103 of 1979. If approved by the Engineer in charge admixture may be used to secure increase to workability or otherwise to improve other qualities. When the air entraining admixture be used the amount for air entraining agent used shall be such as will effect the entraining of 3-5% of air by volume of the concrete. This can be changed whenever found necessary to meet the varying conditions and encountered during construction. The agent shall be able to the bath in solution in a portion of mixing water by means of a mechanical batch or capable of accurate measurements and in such a manner as will ensure uniform

distribution of the agency throughout the bath during the specified mixing period. When accelerator is being used in the concrete, the portion of the mixing water containing the air entraining agent shall be introduced separately into mixer. Accelerators, the admixtures for increasing the strength of concrete at early stages may be used upon written approval of the Engineer in charge, covering the type, amount and location of use. The amount of accelerator used shall be not more than that necessary to produce the desired result. Admixture shall be measured accurately and shall be introduced into the mixer in solution in the mixing water. Admixtures shall not be used in excess of 2% by weight of cement, Use of accelerator in the concrete shall in no way effect the compliance with the requirement so these specifications governing protection and curing of concrete. The term pozzolana, permissible only in case of ordinary Portland cement, is used to designate finely polverised silicum materials which though not cementitious inmselvescombine with lineat ordinary temperature in the pressure of water to form cementitious compounds. In case pozzolanna is used it will replace some of the cement in the concrete. Cement and pozzolana cement shall be issued by the project at the project stores on cost recoverable basis (subject to availability). Accelerators and air entraining agents, approved by the Engineer in charge shall be arranged by the contractor at his own cost. Cost shall be paid to the contractor on production of satisfactory proof of payment. All admixtures shall conform to requirements specified in IS 9103-1979.

4-10 **Water:**

Water for mixing concrete, shotcrete, mortar and grout shall be clear and free from injurious oils, acids, alkalis, organic matter, salt, objectionable qualities of silt and other impurities and shall conform to requirements stipulated in IS 456 of 1978.The suspended matter in water shall not exceed 2000 parts per million by weight. The contractor shall make his own arrangements for pumping water required for washing aggregates, mixing in concrete, curing etc. and shall provide pumps, pipe lines etc. at his own cost. Water shall be periodically checked for silt or other impurities at the discretion of the Engineer in charge.

4-11 **Batching:**

All aggregate shall be batched by weight. The batching equipment shall be of the requisite capacity to maintain the required progress of work. This shall be capable of determining accurately, by direct weighing the prescribed amounts of the various ingredients including water, cement admixture, if any, and each individual size of aggregate entering the concrete. The equipment and its operation shall at all times be subject to the approval of the Engineer in charge. The contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale and other measuring devices involved in the batching operation.

The tests shall be made in the presence of project representative, nominated by the Engineer incharge and shall be adequate to prove the accuracy of the measuring device. The frequency of such tests shall be determined by the Engineer incharge and shall be adequate to prove the accuracy of the measuring devices. The frequency of such tests shall be determined by the Engineer incharge. Unless otherwise directed, tests shall be made once a week at random without any notice. The contractor shall make such adjustments, repairs or

replacements as may be necessary to meet the specified requirements for accuracy of measurements, Volumetric batching shall not be reported to without prior consent of the Engineer in charge, who may allow this, in his sole discretion when the quantity of concrete work and the rate of its placement are so small as not to warrant the use of complete batching. The quantities of fine and coarse aggregates shall be specified in volumetric units based on bulk density of fine and coarse aggregate determined from time to time when the concreting is in progress. The contractor shall provide such means and equipments are required to accurately determine and control the relative elements of various materials including size, water, cement, admixture if used and each individual size of aggregates entering the concrete as such means equipment and their operation shall be subject at all times to the approval of the Engineer in charge.

4-12 **Mixing of concrete:**

All concrete shall be thoroughly mixed in a tilt batch mixer of an approved type, size and design so as to positively ensure uniform distribution of the components throughout the mass during the mixing operations. Each mixer and its operation shall be subject to the approval of the Engineer in charge and any mixer that in the opinion of the Engineer in charge at any time, produce unsatisfactory result shall be promptly repaired or replaced to the satisfaction of the Engineer in charge. Each mixer shall be equipped by the contractor with a mechanically operated timing and signaling or locking device satisfactory to the Engineer in charge for indicating and assuring the completion of the required mixing period. Arrangements shall also be made to check revolutions of the mixer. But dirt and other undesirable substances shall be completely excluded. The mixer shall not ordinarily be loaded beyond their rated capacity or operated in excess of the speed recommended by the manufacturer. Unless otherwise determined, the mixing of each batch shall continue for not less than the number of minutes stated below after all materials, except the full amount of water are in mixer.

Capacity of mixer	Mixing time
Half Cubic yard or smaller	1¼ minutes.
3/4 to one and half cubic yard.	1½ minutes.
Two to three cubic yards.	2 minutes.
Four cubic yards.	2½minutes.

The minimum period specified are predicted on proper control of the speed of rotation of the mixer and of the introduction of the materials, including water into the mixer, but may be increased when the charging and mixing operations fail to produce a concrete batch that conforms to the fore going requirements with respect to adequacy of mixing. The concrete as discharged from the mixer, shall be uniform in composition and consistency from batch to batch except where changes in composition or consistency are required. It is particularly important in-charging the mixer that the ingredients(cement, sand and aggregates) shall be arranged in the charging hopper in such a manner that proportion amount of each will be in all parts of the stream as it flows into the mixer and that the period of flow of each is about the same.The general requirement of I.S-457-1957 shall be followed for various operations. The first, concrete batch at the

start of the days work shall be made richer by the addition of extra cement as directed. Mixer shall be capable of ready discharge of concrete of the lowest slump which can be consolidated by vibration, separation of coarse aggregates from mortar (which commonly results when the concrete is discharged from mixers) should be avoided by proper arrangements of the discharge so that the concrete will fall vertically and not directly into the container to receive it. Blade arrangements and discharge mechanism of all types of mixers should be such that throughout the discharging operations the aggregate is well distributed from coarse to fine, should the last fraction of the batch contain an excessive amount of coarse aggregate, this portion should be retained and mixed with the succeeding batch. Care should be taken to see that the water is released first and continuous to flow while solid ingredients are entering the mixer. Discharge pipes of all water batches must be of a such size and so arranged that the flow into mixer will be completed within the first 25% of the mixing time and will be delivered well inside the mixer where it will be mixed quickly with the entire batch. In generally, only sufficient water should be used in mixing to produce a workable mix of the required consistency, as determined by the Engineer in charge. Over mixing, requiring addition of water to preserve the required consistency shall not be permitted. Hand mixing of cement concrete will not be allowed unless the total quantity to be mixed is small i.e. less than 3 cubic meters. Coarse materials shall be measured in gauge box on sheets or smaller surface. After the removal of the box, the coarse aggregate shall be spread to an even layer. Sand shall similarly be measured in a gauge box and spread evenly over coarse aggregate. The requisite quantity of cement shall be spread over the material. All the ingredients shall then be turned over in the dry state three times or more, until they are thoroughly mixed. A measured quantity of water shall then be added. The mix shall be carefully and sufficiently turned over until a uniformly mixed concrete is obtained.

4-13 **Forms for concrete:**

Forms shall be used, wherever necessary to confine the concrete and shape it to the required lines, or to ensure against contamination of the concrete by materials caving or sloughing from adjacent surfaces left by excavation or other features of work. Forms shall be true to lines and grades within the allowable tolerance. 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 sufficiently tight to prevent loss of mortor from the concrete. Camber strips shall be placed in the covers of forms so as to produce leveled edges on permanently exposed concrete surface. Interior angles on such surfaces and edges will not require leveling unless requirement for leveling is indicated on the drawings. Formed joints in exposed concrete surface shall be leveled, except where such leveling is specially eliminated by the direction of Engineer in charge. Forms for concrete surface against which backfill or concrete is not to be placed shall be reset and tightened at construction joint so that they fit snugly and firmly against the hardened forms, tie shall be used as necessary to ensure against spreading of the reset forms under pressure of the subsequently placed concrete and consequent off set from the previously formed face. Embedded metal rods used for holding forms shall remain embedded and shall terminate not less than 30 mm in the concrete clear of the formed surfaces

where the maximum size of aggregate in the concrete is 38 mm or less and not less than 50 mm in the concrete clear of the formed faces of the concrete. Where the maximum size of the aggregate is 75 mm or more, embedded fastness on the ends of rods shall be such that their removal will leave holes of regular shape. Embedded wire ties for holding forms will not be permitted in concrete walls to be subjected to water pressure, or where the concrete surfaces through which the ties would extend will be permanently exposed. Wire ties shall be cut off flush with the surfaces of the concrete after the forms are removed, wood sheathing or lining shall be of such kind and quality or shall be so treated or coated that there will be no chemical deterioration or discoloration of the formed concrete surfaces. The type and condition of form shearing and lining, the ability forms to withstand distortion caused by placement and vibration of the concrete and the workmanship used in form construction shall be such that the form surfaces, after being finished will conform to the applicable requirements pertaining to finish of formal surfaces, as directed by the Engineer in charge. Forms for warped surfaces shall be constructed so as to conform accurately to the required curvatures of the sections. Dimensions from the centre lines of the structure to the concrete surfaces will be given at several sections throughout the length of the structure where necessary to meet requirement for curvature, the form sheathing shall be built up and fitted as to make tight and smooth forms surfaces. The form shall be so constructed that the joint marks in the concrete surfaces inside water conduits shall follow the line of water flow. After the forms have been constructed, 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 of form materials shall be dressed to the required curvature. When the concrete is placed in the form, the surface of the form shall be free from incrustations of mortar, rout, or other foreign materials that could contaminate the concrete or interfere with the fulfillment of the specified requirements relating to the finish of framed surfaces. Before concrete is placed, the surfaces of the form shall be oiled with commercial forms oil or other form coating materials as approved by Engineer in charge that will effectively prevent striking and will not stain the concrete surfaces. After oiling, surplus oil on the form surfaces and any oil on reinforced steel or other surface 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 mineral oil suitably compounded with on or more ingredients which are appropriate for the purpose of other form containing material to the satisfaction of the Engineer in charge. After the forms are erected and before any concrete is placed the form shall be inspected for line, level and concrete with respect to the structure, adequacy of dressing, freedom from dirt, fixture, opening etc. No concrete shall be placed against the forms unless the forms have been checked and the placement of concrete is permitted by the Engineer in charge. Such inspection and approval shall, however, not absolve the contractor of his responsibility for the sufficiency and stability of the forms. The contractor shall at all times be solely responsible for its sufficiency, adequacy, stability. To facilitate satisfactory progress with the specified and curing and enable earliest practicable repair of surface imperfections, forms shall be removed as soon as the concrete has hardened sufficiently to prevent damage by careful form removal. Forms on upper stopping faces of concrete such as forms and the water

sides of warped tensions, shall be removed as soon as concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surface shall be performed at once and be followed immediately by the specified curing. To avoid excessive stresses in the concrete that might result from swelling of the form, wood forms for wall and openning shall be loosened as soon as this can be accomplished without damage to the concrete. Form for the opening shall be constructed so as to facilitate such oprnings. Forms shall be removed with care so as to avoid injury to the concrete and any concrete so damages shall be repaired in accordance with the provisions for "repair of concrete". The form work viz centering, shuttering, strutting and propping etc. shall be deemed to be included in the unit rate of concreting provided in schedule of bids. This shall also include removal of form work for various types of structures complete in all respects as directed by Engineer in charge. In curved lengths of tunnels and where the tunnel sections are to be molded to special sections such as bell mouth etc. timber forms conforming to the provisions of these specifications may be allowed to be used by the Engineer in charge. The form work shall be capable of being removed and re-erected without disturbing the concrete lining and other forms in places. The operations shall be carried out without hindrances to the places at concrete. The contractor shall arrange to manufacture sufficient length of forms to maintain the placement schedule of the concrete lining. The form work shall be such that the internal dimensions of the lining conform to these specified for the various elements of work. The shuttering shall be arranged with joints close together so that the finished surface of the concrete may be free from excrescences and afford smooth surface to the passage of water. The form work for tunnel lining shall be provided with sufficient opening along each side of wall and in the arch to permit access to and inspection of concrete being placed behind the forms.

4-14 **Concrete:**

The composition of concrete for tunnel lining shall conform to the specifications detailed in these specifications and shall be of the specified strength except as modified specifically in any case or directed by Engineer in charge. The finesse percentage in the mix shall be regulated so as to feed to concrete pumps with good workable concrete. The invert side and arching of the tunnels shall be cleared of all loose excavation materials, cracked or scattered rock and then thoroughly cleaned. Before placing of concrete is undertaken

The rock surface shall be thoroughly wetted. Placing of concrete in any section shall not be commenced until ordered by the Engineer in charge. The item of concrete lining (covering all the operations concerned within the intent of work)until include plain or reinforced concrete placed between prescribed interior surface of the concrete to lining, and the surface of the excavated rock, except as provided hereinafter. The lining may be along with the steel permanent supports and steel reinforcement as directed by the Engineer in charge. It may also be possible that in the tunnels only some portions of the tunnel are required to be lined with either cement concrete or reinforced cement concrete as may, in the opinion of the Engineer in charge be necessitated during construction, after the actual strata is fully known. The quantities for the concrete lining includes in the schedule of bids are therefore approximate and likely to undergo changes once the nature of the substrata is known after excavation. Similarly, only typical sections are shown on the drawings which are merely indicative. It should

however, be clearly understood that the assumption may or may not be realized in actual construction and the lengths of reinforced lining in the case of tunnel and of cement concrete, shotcrete and reinforced cement concrete lining might be different from those that are indicated in the drawings. The methods of treatment shown in typical sections are only to be taken as indicative and their actual dimensions or the methods of treatment shall be fixed by the Engineer in charge at the time of actual construction. The contractor shall have no claim or compensation for variations, if any in the shape, length, dimensions and the methods of treatment of different sections but he will be paid on the basis of the actual quantities of work necessitated and turned out by them according to the unit rates for different items in the schedule of bids. No concrete shall be placed until all form work, installation of parts to be embedded on preparation of surfaces involved in the placing above been approved by the Engineer incharge. No concrete shall be placed in water except with the written permission of the Engineer in charge and the method of depositing the concrete shall be subject to his approval. Concrete shall not be placed in running water and shall not be subjected to the action of running water until after the concrete has hardened. The cost of all operations of placing concrete on its preparation shall be deemed as included in the unit rate for the item of concreting /shotcreting. Concrete which is not placed and compacted in accordance with the specifications, and is, in the opinion of the Engineer in charge of inferior quality shall be removed and replaced by the contractor. The entire cost of removing and replacing such rejected concrete shall be borne by the contractor, including the cost of all materials required in replacement. All concrete structures shall be constructed to the exact lines, grade and dimensions as be specified on the drawings, However, inadvertent deviations from the established lines, grades and dimensions will be permitted to the extent specified in drawings or as may be decided by the Engineer in charge. Concrete work that exceeds the specified tolerance limits shall be remedied or removed and replaced. Concrete forms shall be got and maintained sufficiently within allowable tolerance limits. Allowable deviation from plumb level and from the alignment profile grades and dimensions shown on drawings are defied as tolerance and are to be distinguished from irregularities in finish. The degree of finish and the requirements for finishing of concrete surface shall be as indicated on the drawing. In case of absence of these from drawings, these shall be adhered to relevant IS specifications or as determined by Engineer in charge. Furnishing of concrete surface shall be performed only by skilled workmen and in the presence of a representative of Engineer in charge. The case of any dispute regarding tolerance limits, degree of finish and requirement of finish the decision of engineer in charge shall be conclusive and binding on the contractor.

4-15 **Transporting and compaction:**

The methods and equipment used for transporting concrete and the time that elapses during transportation shall be such as will not cause appreciable segregation of coarse aggregates, are slump loss in excess of 25 mm in the concrete as it is delivered into the work. The concrete shall be placed before it has attained its initial setting. Re-tempering of concrete shall not be permitted. Any concrete, which has become so stiff that proper placing without tempering cannot be assumed, shall be wasted at the cost of the contractor. Concrete shall

be deposited in all cases as nearly as practicable directly in its final position and shall not be cased to flow in manner that the later movement will permit or cause segregation of the coarse aggregate, mortar, or water from the concrete segregation if used by allowing the concrete to fall freely from too great a height or at too great angle from the vertical or to strike the forms or reinforcement steel not be permitted and, where such segregation would otherwise occur, suitable drop chutes and baffles shall be provided to confine and control the falling concrete. Methods and equipments employed in depositing concrete in forms shall be such as will not result in clusters or groups of coarse aggregates particles being separated from the concrete mass, but if clusters do occur, they shall be scattered before the concrete is vibrated. A few scattered individual places of coarse aggregate that can be restored into the mass by vibration will not be objectionable.

Concrete shall be compacted to the maximum practicable density, in such a manner that it is free from pockets of coarse aggregate and is in intimate contacts with surface of forms and embedded material. Unless otherwise permitted, all concrete shall be compacted by mechanical vibrators. Compaction of concrete shall, wherever practicable, be carried out by the use of immersion type vibrators concrete vibrators having vibrating hands of 100 millimeters. or more in diameter shall be operated at a speed of at least 6000 revolutions per minute when impressed in the concrete vibrators having vibrating head less than 100 mm in diameter shall be operated at speeds of at least 7000 revolutions per minute in the concrete. Normally form work shall be designed to provide for the insertion and operation of mechanical vibrators in the placed concrete. Form vibrators shall be used where ever internal vibration is not possible or would be inadequate.

In compacting each layer of concrete, the vibrator shall be operated in as near vertical position and the vibrating head shall be allowed to penetrate and revibrate the concrete in the upper portion of the underlying layer. In the area where newly placed concrete in each layer joints previously placed concrete, more vibration than usual shall be performed, the vibrator penetrating deeply at close inter also along these contracts. Layers of concrete shall be placed until layers previously placed have been vibrated thoroughly as specified. Contract of the vibrating head with surfaces of the forms shall be avoided.

In order to obtain even and dense surfaces which are free from aggregate pockets, honey combining or air holes it may be necessary to supplement internal vibration with form vibration or hand spading along the boundaries of the concrete and around embedded parts while the concrete is plastic under the vibratory action. The contractor shall use any on or all of the above methods of consolidation as required by the Engineer-in-charge.

In compacting the surface of a concrete lift, the coarser particles of aggregate at the surface shall be embedded completely while the concrete is being vibrated. Surface vibrators shall be avoided. For formed concrete surfaces for which on finish is specified special attention shall be given to vibration in order to prevent surface pitting.

Care shall be taken to avoid contact of the vibrating heads of internal vibrators with the surface of the forms and embedded metal work to avoid damaging or disturbing them.

Where a slip screed is used, concrete shall be placed ahead of the screed and consolidated with internal vibrators so as to ensure complete filling under the screed. The rate of advance of the screed shall be adjusted as required by the Engineer-in-charge to suit such filling.

4-16 **Curing of concrete:**

Concrete shall be cured by water shall be kept wet for at least 14 days. Curing shall start as soon as the concrete has hardened sufficiently to prevent damage by moisturing the surfaces and shall continue until completion of specified curing period or until covered with fresh concrete. The concrete shall be kept wet by covering the uniformed surface with water saturated materials (such as damp sand or by use of wet sacks) or by a system of perforated pipes mechanical sprinklers or porous hose, or by any other method which shall keep all surface of concrete being cured continuously wet. Appropriate measures shall be adopted to protect exposed surfaces of fresh concrete from water spray. All equipments needed for adequate protection and curing of the concrete shall be on hand and ready to install before actual concrete placement begins. Detailed plan, provisions and procedures by which the various protection and curing phases will be firmly established, shall settled prior to the initial stages of concreting operations. Water for curing shall be clean and free from any element which will cause staining or discoloration of concrete, besides meeting the specifications for water used for mixing concrete. Where forms of wood laggings are used and left in place during curing, the laggings shall be kept wet at all times to prevent the lagging from opening at the joints. Forms in touch contact with new concrete shall also be kept wet so as to keep the surface of the new concrete as soon as possible, construction joints shall be cured in the same manner and shall be kept moist for at least 72 hours prior to the placing of additional concrete upon the joints. Especially if the humidity inside the tunnel provides enough moisture for this purpose in further curing may be needed. Otherwise perforated pipes will have to be fixed to the tunnel roof through which water under pressure will be sprayed on concrete. If water is not easily available in the vicinity owing to avoid conditions, the best method is to spray paint the concrete surface with bituminous paints or other readymade asphaltic compounds, immediately on stripping. The curing period for such will not be less than 7-10 days and easing will not be allowed before this period. The cost of furnishing and applying all material used for curing concrete shall be included in the unit price in the schedule of bids for the concrete on which the curing materials are used. In case the curing operations are inadequate or unsatisfactory, the Engineer in charge shall be entitled to take such steps he may deem necessary to make good the deficiencies and defects at the contractors risk and cost.

4-17 **Repairs of concrete**:

Repairs of concrete shall be performed by skilled workmen and in the presence of a representative of the Engineer in charge. All imperfections on the concrete surface shall be corrected as necessary to produce surfaces that conform to the requirements. Repair of imperfections in formed concrete shall be completed within 24 hours after removal of forms. Concrete that is damaged from any cause and concrete that is honey combed, fractured, or otherwise defective, and concrete which because of excessive surface depressions, must be

excavated and built up to bring the surface to prescribed lines, and shall be removed and replaced with dry pack, mortar or concrete as per directions of the Engineer in charge.

4-18 to 4-21 **Deleted**

4-22 **Chipping and roughing of concrete Surfaces:**

Concrete surfaces upon or against which additional concrete is to be placed shall be chipped and roughened to a depth of not be more than 25 mm of the surfaces. The roughening shall be performed by chipping or other satisfactory methods in such a manner so as not to loosen, cause crack or shatter any part of the concrete beyond the roughened surface. After being roughened the surface of the concrete shall thoroughly of all loose fragments, direct, lime and other objectionable materials and shall be sound and hard and in such conditions as to ensure adequate bond between old and new concrete. All concrete which is not hard, dense and durable shall be removed to the depth required to secure the requisite satisfactory surface.

4-23 **Measurement and payment:**

Measurement for payment of concrete (Plain or reinforced) will be made for the volume in cubic meter of the concrete placed within the finished lines as shown in the drawings or as directed by the Engineer in charge. Measurement of concrete placed for lining Tunnel shall be measured between the precast RCC laggings and the finished surface of tunnel without making any deductions for embedded permanent supports and steel reinforcement. Payment of concrete filled between the outer side (towards rock) of the RCC laggings upto the pay line fixed for purpose of competition of earth work excavation, viz for the space at a parallel distance of 100 mm only from the laggings towards rock will also be admissible provided that the excavation is admissible in terms of clause 3-20 B. No measurement or payment will be made for defective or damaged concrete, concrete wasted or concrete required by the contractor for his temporary or enabling works or otherwise required to fill enlargement to excavations required by the contractor for his convenience in performing the work but which is not required for the permanent structure notwithstanding the fact that the Engineer in charge may have approved the excavation of such enlargement. No separate measurement or payment will be made for form work, preparation of surface before placing concrete, curing concrete, preparation of construction joints and surface, striking or forming of the surface joints or for leaving recess and block outs and formed holes. Payment for placing reinforcement will be made at the unit price provided there for in the schedule of quantities and price which unit price shall include cost of furnishing and transporting all labor, materials(except otherwise specified herein) tools and plants and other consumables required for providing, manufacturing and placing of concrete as specified. The unit price shall include cost of all operations for manufacturing / processing of aggregates, compacting and curing of concrete including provisions of form work and scaffolding required for placement of concrete specified. The unit price shall also include cost of providing and fixing temporary supports and other measures

enabling works and ventilation, lighting as required. The unit price quoted shall include the cost of cement and steel. For any change in the mix proportions of shotcrete, mortar, cement concrete than might have been specified earlier if any variation in the cement content becomes necessary on finalization of the actual design mix in the field, corresponding variations in the unit price shall be made on a pro-rata basis considering the cost of cement alone. No allowances of whatsoever shall be made for variation in the other ingredients of the mix.

Note:
The contractor will be deemed to have given satisfactory concrete if at least 90% of the samples tested show a strength equal to or greater than the specified strength, and the coefficient of variation does not exceed 15%.

DESIGN MIX:

The specified strength will be taken in accordance with IS 456-1964 and IS 576-1959 and their subsequent reviews. In case the coefficient of variation and strength of concrete as obtained in field are not found to be satisfactory, the Engineer in charge may stop the contractors work altogether till the contractor makes suitable improvement to the satisfaction of the Engineer in charge or may permit him to complete the work by adding extra quantity of cement to get the desired strength, fee of cost to the Government. The Engineer in charge will also be empowered to get the work done after a mix design is provided by him for which the criteria is laid down as under:-

Class of concrete	Cement in Kgs. Per C.M	28 days design strength in Kgs. Per Cm^2using 15x15x15 cubes	Maximum aggregate size.	Slump range in MM	Indicative location for use.
M-10	205 Kgs.	100 Kgs.	80 MM	25-50	Mass concrete
	220 Kgs.	100 Kgs.	40 MM	25-75	Thin sections.
M-15	265 Kgs.	150 Kgs.	80 MM	25-50	Mass concrete.
	300 Kgs.	150 Kgs.	40 MM	25-75	Lightly reinforced thin section.
	320 Kgs.	150 Kgs.	20 MM	25-75	Heavily reinforced thin sections.
M-20	310 Kgs.	200 Kgs.	20 MM	25-50	Mass concrete
	330 Kgs.	200 Kgs.	40 MM	25-75	Lightly reinforced thin sections.
	355 Kgs.	200 Kgs.	20 MM	25-75	Heavily reinforced

					thin sections.
M-26.2	390 Kgs.	262 Kgs.	80 MM	25-50	Mass concrete.
	405 Kgs.	262 Kgs.	40 MM	25-75	Lightly reinforced thin section.
	435 Kgs.	262 Kgs.	20 MM	25-75	Heavily reinforced thin section.

The strength indicated above are minimum 28 days strength based on 15 x 15 x 15 cm cubes in accordance with IS 456-1978. These classifications as desired for different mixes of concrete shall be in accordance with the design

requirements for concrete structures. Mix be designed by trail mixes and adjustments done to meet the design requirements.

The contractor shall base his tender on the mix design indicated as above on previous page and if any variation in the cement content becomes necessary on finalization of actual Design mix in the field corresponding variation shall be made on pro rata basis considering the case of cement alone. No allowance whatsoever shall be made for variation in other ingredients of the mix.

SECTION-5 **Deleted**

SECTION -6

ANCHOR BARS IN ROCK, REINFORCEMENT AND STRUCTURAL STEEL WORKS:

6-1 **Anchor Bars in rock / rock bolts.:**

a. **Drilling holes for rock bolts**.

Wherever shown on Drawings or directed by the Engineer in charge holes shall be drilled into the rock to receive bars for anchoring.

The dimension of anchor bars and location, diameter and depths of the anchor bar holes shall be as shown in drawings or as directed by the Engineer Incharge. The diameter of holes shall not be less than 1½ times the diameter or the greatest transverse dimension of the anchor bars specified. Anchor bars shall be cleaned thoroughly before being placed. The holes shall be cleaned thoroughly, kept plugged until placing the bars and shall be filled completely and compactly with cement grout or mortar mixed in proportions and to the consistency as may be specified by the Engineer in charge. All the water shall be removed from the holes before placing the anchor grout. The anchor bars shall be forced into place before the grouting or mortar has taken its initial set and where practicable, shall be vibrated or rammed until the entire surface of the embedded portion of the bars is intimated contact with the grout. Special care shall be taken to ensure against movement of the bars which have been placed and grouted. Anchor bars shall be placed sufficiently in advance of concrete operations to allow the grout to set. Anchor bars found loose after setting shall be replaced by others at the expenses of the contractor. Cost of cement so wasted shall be to the account of contractor. Either cement mortar shall be used for grouting of anchors. The cement mortar shall be 1:1 proportion by volume of cement and sand with the minimum quantity of water required for proper workability. The cement slurry or mortar shall first be filled in anchor hole and the anchor fixed in position properly to the specified length as may be directed by the Engineer in charge.

b. **Measurement and payment**

Measurement for drilling holes for anchor bars and grouting bars in place will be based upon the length of holes required to be drilled and grouted beyond the surface of the rock excavation. Payment for fixing of anchor bars, grouting, bars in place shall be deemed to be included in the unit rate provided for the item in the schedule of bids which unit rate shall also include the cost of cutting and being of anchor bars, furnishing grout, drilling holes and grouting the bars in place, including of cleaning of steel bars compacting grout and all T & P and labour for all operation etc. as specified and cost and carriage of cement and steel to site of work. The cost of ventilation and lighting of work areas shall also be deemed to be included in the said unit price.

6-2 **Reinforcement:**

a. Scope:

The contractor shall make arrangements for handling, transporting steel to site of works and for cutting, bending and placing reinforcement as indicated on construction Drawings or as directed by the Engineer in charge and include all the charges in his unit rates.

b. **Quality of reinforcement**:

Steel reinforcement shall be tor steel or as specified or as directed by the Engineer in charge and shall conform to relevant IS specification

cold twisted steel bars shall comply with the requirements of I. S. 1786 of 1961 as revised from time to time. Wire for tying reinforcement shall be of soft annealed steel of 14-16 BWG and shall have an ultimate strength not less than 6500 Kg/Cm² and yield point not less than 3850 Kg / cm². Reinforcement bars shall be properly stores and stacked on wooden skids to prevent the steel from coming into contact with soil. Bars of the same size, length shape and grade shall be assembled in racks / stacks and marked distinctly.

c. **Drawings.**

Detailed drawings showing the exact position, sizes and shapes of reinforcement bars would be supplied by the project. Detailed bar lists and bending diagrams showing the number, size, length and bending of all bars required in various parts of the work shall, however, be prepared by the contractor. Such bar schedule shall be submitted to the Engineer in charge for checking well before their requirement for placement.

d. **Cutting, bending, binding and placing reinforcement:**

Reinforcement bars shall be of sizes prescribed and shall be cut to the requirements up to shapes and fixed in position as shown on Drawings or as directed by the Engineer in charge. Cutting, bending, binding and placing reinforcement shall conform to IS specifications IS 2502 of 1963 as revised from time to time. Reinforcement shall not be straightened or bent in a manner that will inure or weaken the material. Bars shall be bent cold to the shape and dimensions required. Heating of bars for bending shall not be allowed except where specifically permitted by the Engineer in charge.

Deformed bars shall not be re-bent after being bent and straightened unless initial bending and subsequent straightening and bending and all carried out with the bar heated to cherry red heat and all operations are carried out under proper supervision. Bars bent hot shall not be cooled by quenching. Before placing the reinforcement bars in position all bars shall be thoroughly cleaned of all loose rust, oil, scale, grease and other foreign substance and care shall be taken to keep them in this condition until concrete is placed. All bars shall be of size and length directed and no substitution shall be made unless approved in writing by the Engineer in charge. Splices of reinforcement shall not be made at points of high bending moment except as specifically approved. Spliced bars shall provide sufficient lap to transfer stresses by bond only. Reinforcement shall be placed accurately in position shown on Drawings and shall be held firmly in position during placing and setting of the concrete. The reinforcement shall be maintained in position by use of built in concrete blocks, steel chairs, steel spacers, steel hangers, and other steel supports as approved by Engineer in charge at sufficiently close intervals, so that they will not sag between supports or be displaced during the placing of concrete. Where reinforcement bars intersect they shall be securely connected with tying black annealed wire (gauge 14/16) tiled in a figure 8 K-not or tack welded, except that where the bars spacing is less than 300 mm in each direction only alternate intersections need to be connected. Tying wise and steel supports shall not be carried to

permanently exposed surfaces and shall be subject to the same requirements as reinforced steel with regard to concrete over. Whenever possible the contractor shall remove the spacer blocks, provided their removal does not disturb the concrete. Exposed reinforcement intended for binding or dowelling between two placement of concrete shall be protected from being disturbed and shall be thoroughly cleaned prior to subsequent concreting. Reinforcement shall be so placed that there will be a clear distance of at least 25 mm between the reinforcement and any anchor bolts or embedded metal work, except as otherwise directed by the Engineer in-charge. Reinforcement shall be converted with the concrete to the minimum depths shown on Drawings. The similar portals shall not be placed intimate proximity with each other nor be joined by conductor especially in the continued presence of moisture, unless it is known that no galvanic action will result. (The relative galvanic action in the electrometers series). Tack welding of bars may also be permitted to keep the bars in position. Such stacking should not cause cutting of the bars.

e. **Jointing and splicing:**

Joint or splices in reinforcement bars shall be made at locations shown on the Drawings or as directed by the Engineer in charge and shall not ordinarily be closer than 6 meters. Additional joints or splices may be permitted at positions other than those on the Drawings provided the position of joints in adjacent bars is staggered as approved. The reinforcement shall be so placed that the joints in reinforcement bars are staggered by at least 50%. Splicing shall be done either by providing overlap to transfer stresses by bond or by welding as per standard practices or as approved by the Engineer in charge. No lapping or splicing shall be made at the points of high bending movements. Reinforcement bars of 25 mm diameter and less shall normally be provided with standard overlap. Reinforcement bars of 28 mm diameter and above shall be butt welded with overlap angle in accordance with provisions of I.S. 2751 of l1966 or latest revision thereof. Weld splicing may also be permitted with overlap. The butt welding / lap / splice welding shall be in accordance with Indian Standard specifications. Welding of reinforcement bars shall be performed under cover from the weather and shall be performed by the electric method, using suitable electrodes which shall be got approved by the Engineer in-charge. In case of welding done to join bars of different sizes, the length of lap shall be governed by the smaller size bars and payments made for the same. All welding shall be one in accordance with provisions of IS 816 of 1956 as revised from time to time. Welding materials, welding procedures and workmanship of welders etc. will be subject to inspection and approval at all times during the progress of the work. The specimens for different types of welded splices and for different sizes of bars shall be required to be prepared by the contractor free of cost for ascertaining the quality of welders and welding. Samples shall be got tested by the project at contractors cost.

f. **Measurement and payment:**

Measurement of steel reinforcement shall be made to arrive at the Weight of steel reinforcement by linear measurements (Exclusive of the weight of weld splices and binding wire) actually placed in position and embedded in concrete in accordance with the approved drawings. Steel used for lappages as per instructions of Engineer in charge and as authorized by him will be considered as bonafide use and included in measurement. However binding wire pints, chairs, tie rods, spacers, supports used for keeping reinforcement in position, line and grade shall not be included in measurement for payment. Payment shall be made at the unit rate provided there for in the "Schedule of quantities and prices" reinforcement shall include the cost of transportation of steel from project stores to site of work, its storage at site, the cost of supplying, fabricating, binding wire, chairs, pins, spacers, ties and metal supports, if any, hauling, sorting, straightening, cutting bending, cleaning, placing, securing and maintaining in position all reinforcement bars as shown on Drawings or as directed by the Engineer in charge and plant and materials required for carrying out all operations under the specification excluding cost of reinforcement steel. The cost for splicing and welding shall be deemed to be included in the unit price provided for reinforcement. The unit price shall also include all temporary works including staging scaffolding, gang ways, pathways, guarded fences, gilders, ventilation and lighting of work area required for completion of work. The wastage of steel bars shall not be included for payment. The weights as specified by the manufacturers list or catalogues or as fixed by project, shall be taken as standard for purpose of computing the total weight of steel placed in reinforcement, while M.S. Rounds below 12 mm diameter will be supplied on actual basis and accounted for in the similar manner while working out consumption at site. Before starting any concreting the contractor should make certain that measurement of the reinforcement placed has been recorded and the Engineer in charge certified to the correctness of the reinforcement used. Failure to do so may mean no payment or payment at the unquestioned discretion of Engineer in charge for the reinforcement concerned. The reinforcement steel shall be cut most economically and strictly according to Bar Bending Schedule.

6-3 **Structural Steel Work:**

General:

All structural steel work for various structures will be furnished, completely fabricated in section with a supply of revets and permanent bolts for field erection. Erection in the field of all these structures shall be by bolting revetting, and/ or by welding or by any combination of these and the contractor shall be prepared to perform all classes of work. Only expert revetters and qualified welders shall be employed to perform the revetting and welding, if required by the Engineer-in-charge each such revetters or welding operator shall submit satisfactory evidence of his ability before being allowed to perform the work.

All parts shall be accurately assembled and erected as shown on the drawings, fabricators approved erection drawings, or as directed by the Engineer-in-charge. All match marks of the manufacturer or fabricator

shall be followed carefully. Members shall not be overstressed during the process of erection and hammering that will injure or distort the members will not be permitted. Bearing surfaces and surfaces to be in permanent contact shall be carefully cleaned before the members are assembled or erected. In bolted connections the bolts shall be dawn tight and where fitted, bolted connections are shown on the drawings or required by the Engineer-in-charge, the bolt holes shall be reamed in the field to provide a light drive fit. Where revetiting is required the field connections and splices of all members carrying erection stresses shall have not less than ½ of all the holes filled with bolts and cylindrical erections pins(half bolts and half pins) before being revetted. The diameter of the fitting up bolts shall be the same as the nominal diameter of the revets or field bolts and cylindrical erection pins shall be 0.8 mm larger in diameter than the normal diameter of the revets provided. The cylindrical erection pins used in erecting all structural steel gates and fames shall be of the same diameter as the revet or bolt holes. Erection bolts and pins shall be furnished by the contractor. Corrections of minor misfits and a reasonable amount of remaining and cutting of excess stock from revets shall be considered legitimate part of erection. For the purpose of determining what constitutes a reasonable amount of remaining it shall be considered that where any revolt or bolt hole is not more than 3 mm of an concentricity in the 2 or more members after the connection as temporarily assembled, the same is as minor error in shop work. Any hole more than 3 mm off in concentricity after the connection is temporarily assembled shall be reported immediately to the Engineer-in-charge and his approval of the method of correction shall be obtained, the contractor will be a paid for such required correction of structural steel as extra work under the provisions of the relevant clause. Cutting of members with a cutting torch will not be permitted unless approved by the Engineer-in-charge.

Rivetting shall be done with pneumatic revetters. All connections shall be accurately and securely fitted during assembling and shall be only such as to bring the parts into position and not sufficient to enlarge the holes or distort the metal. All unfair holes shall be reamed or drilled. An unfair hole is considered as one in which a cold revet of the size specified will not enter with light tapping after light drifting has been resorted to.

Revet shall be heated to a light cherry red colour, and shall be driven shile not. They shall not be overheated or burned. When driven, the revets shall completely fill the holes and shall firmly grip the connected parts together. The revet head shall be of the same shape and size as the heads of shop revets, full and symmetrical, concentric with the shank and shall have full bearing on the member. Recouping or caulking of revets will not be permitted. In removing revets, the surrounding metal shall not be injured, and if necessary revets shall be drilled out. Field rivets shall not be painted until they have been inspected and accepted by the Engineer-in-charge.

All welding shall be done by the shielded are method. All welding rds required shall be furnished by the contractor. Welding rods shall be subject to the approval of the Engineer-in-charge. Wields shall be made as

specified on the drawings and in accordance with the conventional welding symbols of the American welding society. Welding except for outlet pieces and where otherwise specifically state shall be done in accordance with the section 4 of the latest revision of the American welding Society's Code for Arc and Gas welding in building construction. All welds shall have complete penetrations and freedom from imperfections. Stud anchors and stud bolts shall be end welded with automatic welding guns.

Test specimens for different types of welded splices joints and for different sizes of bars and members shall be required to be prepared by the contractor free of cost for ascertaining the quality of welders and welding. Samples shall be got tested at contractor's cost.

6-4 **Measurements and payments:**

Measurement for payment of permanent steel supports will be made to arrive at the weight of steel ribs, wall plates, foot beams, foot plates, linear plates tie rods and other structural steel members as are approved by the Engineer in charge for placing and which, in judgment of Engineer in charge are necessary for adequate construction. No deduction shall be made for holes cut for rivets etc. used for fabrication of steel supports will not be included in calculating the weight of net lengths and size of all structural members' plates etc. as authorized, fabricated and erected shall be calculated for the payment from the unit weighs given in the book of standard sections. The unit price quoted for item shall include cost and carriage charges of steel and plates involved in work up to the site of work. The payment for fabrication and erection of permanent steel supports will be made for the quantity of permanent steel supports at unit price per tones provided there for in schedule of quantities and prices. The unit price shall be deemed to be included cost of furnishing and carriage of all labour, tools, plants and equipment, materials consumables, and all that is necessary for fabricating, handling into position and erection of permanent steel supports. Including ventilation and lighting of work area in accordance with the specifications laid down herein. The unit price shall also be deemed to include cost of cutting holes for bolts and rivets and cost of furnishing and fixing such bolts, rivets, nuts and washers complete cost of all welding required including all materials required there for shall also be deemed to be included in the unit price. The unit price shall also include furnishing, placing and removing all temporary supports including timber supports or spreaders when required and no payment shall be made in the contractor on this account. The actual consumption on the work shall be as specified in the final detailed drawings issued by the Engineer in charge or authorized by him from time to time.

SECTION 7

SPECIAL CONDITIONS AND SAFETY MEASURES:

7-1 The principal of semi empirical design during construction demands a great deal of flexibility from the side of contractor. Therefore provision is laid down explicitly in the specification to allow for adjustments which might within reason become necessary during the execution of the contract. At this stage only a preliminary analysis, design and specifications form s the basis of this contract document but as soon as the construction is under way a continuous process of measuring and checking deformations and stresses in situ will provide a guide line for the strengthen and supporting measures required actually and the contractor shall be bound to that change and adjustment of that construction procedure.

7-2 The work shall have to be done in multiple shifts etc. Duration of work in compressed air for labourers shall be as follows:

a. For pressure from 1.4 Kg / cm^2 the work period could be about 8 hours with at least half hour in free air.

b. For pressure from 1.4 Kg / cm^2 to about 2.10 Kg/Cm^2 the working period will have to be reduced to 4 hours with at least 2 hours in free air.

7-3 Feeler holes shall be provided in advance to extra length for observing the presence of water in the tunnel for safety measures.

7-4 Seepage water shall have to be drained out with the help of dewatering pumps driven electrically or by any other expedient means.

7-5 Electric power for running machinery, Cretans' fans, adequate lighting of tunnel etc. shall be arranged by the contractor through O & M department besides the contractor shall make his own standby arrangements in the form of D.G. sets of suitable capacity to keep the work going on uninterrupted during unavoidable power failures and local shedding if any.

7-6 The contractor shall have to arrange labour experienced in this type of work and to provide standard safety devices such as gumboots, steel helmets, torches of different made and to make timely shuttering, timbering, rock bolting and use blowers etc.

7-7 The contractor shall provide timely supports shuttering, timbering, rock bolting and use exhaust cum blower fans for defuming the tunnel above. Air cooling / water cooling system be provided for maintaining the temperature within the tunnel.

7-8 Proper attention should be taken to see that no cavity is left behind the lining to avoid dangerous bending cracks.

7-9 Good workmanship is an important factor for tunneling. The contractor shall keep experienced staff for executing the job.

7-10 The contractor shall have to indicate the average daily progress of the tunnel which can be executed by him and submit a firm schedule on a fortnightly basis on which they shall work. The progress of work shall be reviewed after every fortnight. In case of failure on the part of contractor to the mutually accepted time schedule of the progress, the contract may be terminated and balance work got done through other agencies at the risk and cost of original contractor. The time schedule shall be submitted to the Engineer in charge within 15 days of the issue of allotment order / letter. The entire work shall have to be completed in stipulated time period. The timer period of completion shall be essence of contract. The work throughout the period of completion will have to proceed with diligence.

7-11 Advance payments for mobilization or for procurement and purchase of equipment shall be payable or admissible under the contract in terms of the individual merits etc. of the lowest successful contractor and in line with the contract award terms.

7-12 Subject to force majeure clause as defined elsewhere in these documents, if the contractor fails to complete the entire work within the stipulated period or any extension that may be granted subsequently by the Engineer in charge, the contractor shall be liable to pay as penalty / liquidated sum equivalent to one quarter of one percent of the estimated cost of the entire work for each work of such delay provided in the amount of penalty so imposed shall not exceed 10% of the advertised estimated cost of the work. The estimated cost of this work in this case shall be taken to mean as tendered cost.

7-13 The contractor shall be responsible for the protection of measuring points and instruments and sufficient precautions against damage or destruction due to blasting or site traffic.

7-14 The classification of the encountered rock shall be agreed upon after every round by the Engineer in charge. Resident Geologist and contractor according to the description of rock types.

7-15 Deleted

7-16 Deleted

7-17 The contractor shall provide and place the temporary or permanent supports promptly after blasting and mucking operation.

7-18 Deleted

7-19 Adequate pumping arrangements shall be provided so that if any contingencies arise at the contract of shale and sand stone all the water is quickly pumped out.

7-20 Drill holes shall not cut through faults or seams in the rock as this will cause the gases of explosion to escape along the least line of resistance viz. through these joints and cause no breakage of the rock.

7-21 Due to heaviness and fastness of Drills the same shall be mounted and directed on Jumbos (fixed horizontally or vertically as required). These jumbos shall be fabricated out of telescopic steel to bring 75 mm to 110 mm in diameter. Compressors used shall be capable of maintaining an air pressure of 7 Kgs /cm² constantly.

7-22 Great care should be taken in transporting, loading and storing of the explosives. The explosives shall not be stored for longer time to avoid their chemical change. The store house for explosives shall be properly selected and strict rules shall be framed for its functioning, so as to avoid serious accidents. The storing place for explosives should be during well ventilated and fire proof. The explosives should be handled with extreme care and all measures shall be taken to avoid misfire, premature explosion and suffocation from gases due to explosion.

7-23 The contractor has to adhere to the principle measures to increase safety as below. Sincere efforts should be made for adopting all the possible safety measures by always remembering that the lives of workers are more important than the tunnel work.

i. Removal of rock protrusions by hammer (Scaling) shall be done immediately and properly in the wake of blasting. The hammer stroke should sound hard and not hollow, hollow sound indicates loose rock.
Ii Isolated big blocks, loosened but temporarily perched shall be promptly propped up and afterwards safely cleared.
iii. If soft strata are traversed the roof should be supported in the wake of excavation.
iv. Open flames, electrical short circuiting etc. shall be scrupulously avoided inside the tunnel.
v. Good first aid equipment shall be near at hand and excellent firefighting equipment with adequate water supply, if possible shall also be made readily available.
vi. Light and power lines shall be properly insulated and a field telephone installed.
vii. The floor of the tunnel shall be kept clear and water should not ;be allowed to stand in pools.
viii. The derailments of loaded cars shall be avoided by the installation of proper lights at different places in the tunnel.
ix. Adequate equipment shall be provided for hoisting of muck, efficient and quick removal of muck is necessary.
x. For tunnels with wet flooring, boots and stickers of correct size shall be used so as to prevent slipping and to result in minimum injury of the foot and toe of the workers.
xi. The tunnel shall be well illuminated by the provision of more lights

at all important places along the tunnel. All the lights and light conduits shall be so protected that they are not damaged during accidents.

xii. The concentration of dust shall be brought down to the safe hygienic limits by taking suitable measures.

xiii. The safety measures taken should be conveyed to the workers by announcements / posters in individual contracts.

xiv: The regulation working period based on the compressed air pressure shall never be exceeded.

xv. Decompression back to normal air pressure shall be gradual.

xvi: Suitable refreshment and sufficient rests are essential to recoup the worker after work.

xvii. Sufficient steps shall be taken to see that the air pressure is maintained at the desired valve.

8. DEWATERING

8-01 **Preamble**

The success of the excavation and subsequent operations in construction depend entirely upon the fool-proof, satisfactory and adequate arrangements of dewatering. A battery of adequate number of very efficient and reliable pumps will have to be arranged and kept ready for operation with an adequate number of standby to meet any emergent demand e.g. on account of failure of electricity or sudden inflow or increase in seepage. The contractor shall not be entitled to any claim or compensation due to failure of continuous Electric supply on the part of the department / corporation, such eventualities will have to be taken care of by the contractor himself.

The dewatering pumps will be of such capacity and heads, that disposal of water is made to the final sport without repeated dewatering or engaging booster pumps. If stage pumping is restored to by the contractor, pumping for only one sage will be paid for. Some slush pumps and few sump may be required to tackle slushy and silty water in the pit and for local dewatering.

8.02. **Measurements and payments:**

For dewatering to take out seepage water no extra charges shall be payable to the contractor, the charges therefore shall be included in the rate for various items of work. Seepage water shall have to be drained with the help of dewatering pumps driven electrically. The contractors are advised not to quote dewatering as an additional item and to incorporate the dewatering charges in the various items involved in the execution of Tunnel as per their judgment and experience. Besides the rates of various items quoted by contractor shall be presumed to have been incorporated with all dewatering charges required up to the completion and handing over of the work.

9 **Pitching:**

The thickness of the pitching shall be 300 mm or as directed by the Engineer-in-charge and shall be measured normal to the slope of the embankment.

The pitching material shall consist of most durable rock fragment of approved quality, got from excavation/Nallah. The rock fragments for pitching shall be dense, sound, resistant to abrasion and free from cracks, seams, shale partings, conglomerate bands and other defects that would tend to increase unduly their susceptibility to destruction by water and weathering action. The stones shall be hand placed on the slope of the embankment. The stones shall be placed on edge after laying the spawls. Rock fragments and small stones shall be driven into interstices to wedge the pitching in place.

10 **Masonry:**

The masonry shall consist of good stone available from excavated materials / Nallah or as approved by the Engineer-in-charge, thoroughly embedded in mortor. The mortor shall be cement motor each in accordance with respective specifications or otherwise as directed by the Engineer-in-charge and the relevant I.S.I code will apply.

11 **Back fill:**

Backfill is defined as excavation refill of embankment material which is required to be placed under these specifications and which can not be deposited around structure of in adjacent embankment until after structures are completed. Back fill consisting of suitable earth or rock bits of small boulders shall be placed in such locations as shown in the drawings or as directed by the Engineer – in – Charge. Backfill which on account of its nature of location will be required no compaction will be classified as back fill. Back fill which will be compacted about the structures by means of rollers.

12 **Construction Joints:**

Construction joints shall be provided for the work as directed by the Engineer – in – Charge. The joints shall be made by the forming the concrete one side of the joint and all owing lit to set before concrete is placed on the other side of the joint. The surface of the concrete first placed at the contraction joints in the work shall be coated with an approved sealing compound.

13 **P.V.C. Sealing , Sealing compound:**

PVC Seals will be placed in joints as directed and as shown in drawings . the PVC seals shall be 225mm wide with central hollow bulb type and shall be conform to relevant I.S Standards.

The contractors shall furnish the materials for the complete job which will include filling of sealing compound on water side face of seal for a minimum depth of 30mm as well as charges for priming coat of the space of the joint where sealing compound is to be poured. Hot applied sealing compound for joints in concrete shall conform to I. S- 1834-1961. They shall form a resilient and achieve barrier in concrete joints and shall be capable of resisting the infiltration of water. They shall not unduly be effected by temperature variation and shall resist any tendency to flow out of joint. They shall not become brittle or suffer loss of resiliency during cold weather conditions. The sealing compound shall be tested according to the appendices of I.S – 1834 – 1961.

14 **Aeration Pipes:**

The contractor shall furnish ISI Mark PVC pipes as specified in the drawings and embed in RCC as shown in drawing or as per the approval /directions of the Engineer-in-Charge.

Specification Drawings

Annexure –I

Notes:

01. All dimensions are in millimeters.
02. This is only specification drawing and not to be used for construction.
03. The location of rock bolts may be decided as per site conditions in consultation with the senior geologist of J&K State Power Development Corporation.
04. Over lapping feeler holes may be drilled well in advance in the Major shear zones to ascertain the sub-surface flow of water in the tunneling medium.
05. Whenever water is detected in feeler holes suitable remedial measures to be taken in advance before continuing with tunneling in such zones.
06. Drainage holes are indicative only to be provided at suitable intervals depending upon site conditions.
07. Bottom struts may be bent to suitable shape.
08. Cold twisted bars shall confirm to relevant IS-Specification.
09. Shotcrete may be approved with mesh reinforcement wherever considered necessary based on Geological appraisal during excavation.
10. Mild steel bars, if to be used shall conform to IS-432 and shall have to be of tested quality.